

Appendix 17 : 2020 Aquatic Ecosystem Monitoring Program (AEMP) Report

Aquatic Effects Monitoring Program 2020 Annual Report

Meliadine Gold Project

Prepared for:



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PLAIN LANGUAGE SUMMARY

Introduction

This document summarizes the current state of knowledge about water quality in Meliadine Lake and small waterbodies surrounding the Meliadine Gold mine north of Rankin Inlet. Information presented in this report was collected as part of the Annual Aquatic Effects Monitoring Program (AEMP) and the Water Quality Management and Optimization Program (WQ-MOP). Below is an overview of each program.

AEMP. The AEMP is the monitoring program used to evaluate short-term and long-term effects of the mine on the aquatic environment. Other objectives of the AEMP include evaluating the accuracy of predictions in the Final Environmental Impact Statement (FEIS) and providing information to inform management decisions. The scope of the 2020 AEMP focused on water quality monitoring in Meliadine Lake and three smaller waterbodies in close proximity to the mine. In addition to the routine water quality monitoring in Meliadine Lake, a targeted phytoplankton study was completed in Meliadine Lake in August as an indicator of the overall health of the aquatic ecosystem in Meliadine Lake.

WQ-MOP. A separate water quality monitoring program was completed in Meliadine Lake in 2020 as a condition of the 2020 Emergency Amendment to discharge excess water that had accumulated in Collection Pond 1 (CP1) to critically high levels in 2019. The 2020 Emergency Amendment allowed Agnico Eagle to discharge water with higher concentrations of total dissolved solids (TDS). The WQ-MOP was implemented to verify that an increase in the TDS discharge limit from 1,400 mg/L to 3,500 mg/L in surface contact water discharged to Meliadine Lake is protective of aquatic life in the lake. Monitoring for the WQ-MOP happened concurrent to water quality monitoring for the AEMP, and, where appropriate, the results and conclusions presented in the WQ-MOP report (Golder 2020) were incorporated into the overall assessment of water quality in Meliadine Lake.

The water quality data collected under the AEMP and WQ-MOP in 2020 was evaluated to answer this question:

Has water quality changed as the result of activities at the mine, and if so, do those changes align with what was predicted and approved in the Project Certificate?

The Nunavut Impact Review Board (NIRB) approved the project and the Nunavut Water Board (NWB) issued the Type A Water Licence with the understanding that some changes in water quality were likely, but that changes would be minor based on the proposed mine design, and that they would not impact the health of aquatic life, drinking water quality and human health, or the continued traditional and non-traditional use of fish (Agnico Eagle 2015).

What does a “change in water quality” mean?

Water quality is not a “fixed” concept. The characteristics and properties that define water quality fluctuate naturally between seasons and between years in response to a number of factors, and changes in water quality do not mean the water is unsafe for human consumption or unsafe for fish and other aquatic life. For example, spring runoff from snow melt can carry fine sediment with higher concentrations of dissolved solids into nearby lakes and rivers and result in “changes” in water quality compared to other times of the year. Similar changes can also happen after rain events. Over the longer-term, changes in regional climate patterns may lead to more subtle shifts in water quality. A change in water quality, in this context, refers to a noticeable difference relative to some other point of comparison in time (e.g., the baseline [pre-development] period) or space (e.g., reference areas).

Summary of Activities on Site in 2020

Underground mining at Tiriganiaq continued in 2020. In late 2019/early 2020, mining in Tiriganiaq Pit 2 started and as of the end of 2020 was still on going. Waste rock from development of Tiriganiaq Pit 2 was transport to waste rock storage facility 3 (WRSF 3). Other major developments on site in 2020 included construction of Collection pond (CP6) which acts as the collection point for runoff from WRSF 3 and construction of Saline Pond 4 within the footprint of Tiriganiaq Pit 1.

Discharge of treated surface contact water from CP1 (the main Collection pond on site) to Meliadine Lake occurred continuously between June 5th and October 4th. The 2020 discharge period occurred earlier than in 2018 and 2019 to draw down the level of water in CP1 to make room for runoff from spring freshet. In total, over 1 million cubic meters (mM) of water was discharged from CP1 to Meliadine Lake in 2020.

Effluent Quality Discharged to Meliadine Lake

Effluent Chemistry and Acute Toxicity Test Results

Regular chemistry and toxicity testing of surface contact water was completed on treated surface contact water from CP1 while the mine was discharging effluent in 2020. Discharge of surface contact water to Meliadine Lake is allowed as long as 1) concentrations of certain parameters are below limits specified in the Water Licence and Metal and Diamond Mining Effluent Regulations (MDMER), and 2) effluent is not toxic to fish. Key findings from the 2020 effluent chemistry and acute toxicity tests were:

- Effluent discharged to Meliadine Lake was below the limits specified in the Water Licence and MDMER.
- Full strength (undiluted) effluent was non-toxic to fish as well as the aquatic invertebrate *Daphnia magna* in the 18 acute toxicity tests conducted on a weekly basis in 2020. The highest measured TDS concentration in effluent tested in 2020 was 3,090 mg/L TDS.

Chronic Toxicity Test Results

Chronic toxicity testing is conducted monthly when the mine is discharging water to Meliadine Lake as per requirements for monitoring effluent quality under MDMER. The updated regulations require monthly testing on the most sensitive species based on previous test results. In 2018, the aquatic plant *Lemna minor* was more sensitive to surface contact water than fish (Fathead Minnow), aquatic invertebrates (*Ceriodaphnia dubia* [water flea]), or algae. In 2019 and 2020, *L. minor* was selected as the surrogate species for chronic toxicity testing. Four tests were completed in 2020, and in all but one, there were no effects to *L. minor* growth or biomass. A slight reduction in *L. minor* growth (i.e., the number of fronds that grow in 7-days) occurred in the test where the concentration of TDS was 3,100 mg/L.

A comprehensive chronic toxicity testing program was conducted as part of the WQ-MOP in 2020 to validate that the in-lake benchmark of 1,000 mg/L TDS protects against chronic effects to fish (Fathead Minnow), invertebrates (*D. magna* and *Hyaella azteca*), or aquatic plants (*L. minor*). In multiple rounds of tests, the results verified that the proposed increase of the effluent discharge limit from 1,400 mg/L to 3,500 mg/L TDS in the Water Licence, and corresponding in-lake TDS benchmark of 1,000 mg/L, conservatively protects the health of fish, invertebrates, and primary producers in Meliadine Lake.

Summary of Effluent Quality in 2020

Effluent quality and toxicity testing in 2020 validated that a TDS discharge limit of 3,500 mg/L in treated effluent discharged to Meliadine Lake is safe for aquatic life. Considering the treated effluent is (a) non-toxic at full strength, and (b) rapidly diluted within a short-distance from the point of release in Meliadine Lake, the risk of mine-related effects to aquatic life (algae, invertebrates, and fish) in Meliadine Lake are low.

No follow-up actions or mitigation are recommended for 2021 other than routine effluent chemistry and toxicity testing in accordance with regulatory requirements for the project.

Water Quality in Meliadine Lake

The objective of the Meliadine Lake water quality monitoring program is to assess whether there are mine-related changes in water quality, and if the answer is yes, provide recommendations to ensure long-term protection of the aquatic environment.

The scope and frequency of monitoring for the 2020 AEMP was similar to previous years, and included water quality monitoring at a near-field area around where effluent is released from the diffuser in the east basin, at a mid-field area to track spatial changes in water quality downstream from the mine, and at three reference areas far away in other sheltered basins of Meliadine Lake. The study areas within Meliadine Lake were selected specifically to distinguish between changes in water that are related to

activities at the mine versus changes that are natural. The overall assessment of water quality in Meliadine Lake in 2020 was informed by answering the following questions:

- Were there any exceedances of water quality guidelines for the protection of human health and aquatic life?
- Is water in the east basin of Meliadine Lake different compared to baseline/reference conditions, and if so, are the changes more extreme than what was predicted in the approved Project?
- Are there any actions that need to be taken as part of the adaptive management plan?

The answer to these questions is provided below.

Water is safe to drink

Water collected in close proximity to where effluent was released in Meliadine Lake was safe for human consumption, with no exceedances of *Guidelines for Canadian Drinking Water Quality* published by Health Canada. The concentrations of some parameters have increased in the east basin, but the magnitude of the change is well below levels of concern for people's health. In 2020, the maximum TDS concentration in the east basin near the mine was 90 mg/L, which is over 5-times lower than the Health Canada drinking water guideline of 500 mg/L meant to protect "good tasting" water.

Water is safe for fish and other aquatic life

Water samples collected throughout 2020 were measured at concentrations below what are conservatively associated with effects to fish, invertebrates, and algae. Federal water quality guidelines and site-specific water quality objectives (in the case of fluoride, arsenic, and iron at Meliadine) are conservative, meaning the guidelines are set at concentrations meant to protect the most sensitive aquatic species. If, as was observed in 2020, concentrations are well below aquatic life guidelines, there is a high degree of confidence that water in Meliadine Lake is safe for fish and other aquatic organisms living in the lake.

Has water quality changed over time?

As part of the original assessment for the Mine, it was expected that water quality in the lake would change as a result of discharge; however, the context of that change in terms of the magnitude of change (i.e., above a normal range) and the spatial extent of that change (i.e., limited to the mixing zone, east basin, or to the lake outlet) is examined.

The normal range describes water quality before construction, and also includes recent information on water quality in reference areas sampled further away in Meliadine Lake each year. In 2020, some water quality parameters like total dissolved solids and chloride were above their normal range, indicating concentrations have increased slightly over time, but changes are small, consistent with FEIS predictions, and well below guidelines.

Plume delineation studies were conducted to evaluate the spatial extent of change. The discharge was dispersed within a short distance of the diffuser, and beyond 100 m, the plume was largely not detectable compared to background conditions. Furthermore, when discharge ceased, or flows were reduced (as was the case during most of August), the concentration of effluent was less than 1% within 100 m of the diffuser.

Are management actions required beyond routine monitoring under AEMP?

Decisions pertaining to water quality are made within the Response Framework that links monitoring results with appropriate management actions to implement changes before effects to aquatic life or drinking water quality occur. The Response Framework uses action levels to define the level of response associated with each action level (negligible, low, medium, or high).

The Low Action Level was not exceeded at Meliadine Lake in 2020 based on the following information from the effluent quality monitoring program and the surface water monitoring program:

- 1) The Low Action Level for chronic toxicity is defined as a persistent effect measured in three consecutive monthly tests. Monthly chronic toxicity tests from June through September showed effluent was not causing effects to growth or development for aquatic species.
- 2) Some minor changes in water quality in the near-field area (MEL-01; more than 100 m from the diffuser) of Meliadine Lake have occurred due to mining-related activities, but current concentrations are well below the lowest water quality guidelines for the protection of aquatic life or human health.

In conclusion, while some parameters have increased over time in the east basin of Meliadine Lake relative to baseline / reference conditions, the difference between areas constitutes a *minor change* as described in the FEIS, as concentrations remain well below guidelines meant to protect aquatic life and drinking water quality.

Recommendations for 2021

Spatial and temporal changes in water quality will continue to be monitored as part of the AEMP in 2021. Other monitoring scheduled for 2021 in Meliadine includes biological monitoring for fish and benthic invertebrate community health on the 3-year cycle under the Environmental Effects Monitoring (EEM) program. This will be the second EEM study conducted at Meliadine. Additional fish and benthic invertebrate monitoring is planned for the same time under the AEMP, and as was the case in 2018, the intention is to coordinate sampling between the AEMP and EEM program as outlined in the AEMP Design Plan.

Water Quality in the Peninsula Lakes

Water quality monitoring at the Peninsula Lakes (Lake A8, Lake B7, and Lake D7) was completed twice in July and August to evaluate whether non-point source discharges (i.e., dust, or alteration of watersheds) is affecting water quality beyond the minor changes that were predicted in the approved project. Based on their location relative to mine infrastructure, *minor* changes in water quality were predicted as part of the FEIS, meaning some parameters would increase relative to baseline levels, but that water quality guidelines for aquatic life and drinking water quality would be met. Lake B7, which is close to the tailings storage facility (TSF), and Lake A8, which is adjacent to the Tiriganiaq open pits, are more susceptible to mine-related changes in water quality than Lake D7, which is located east of Lake B7.

Conclusions

Results from 2020 demonstrate that changes in water quality at the Peninsula Lakes align with predictions in the FEIS: some parameters have increased relative to the baseline period, but current conditions support freshwater aquatic life and human uses, although current human use of both Lake B7 and Lake A8 are limited due to their location relative to mine infrastructure. Importantly, the spatial extent of potential non-point source mine-related changes to water quality in lakes on the peninsula appears to be localized to the lakes in close proximity to mine, and do not extend farther out to Lake D7.

Overall, the year-over-year changes in water quality that were detected in Lake B7 and Lake A8 for some parameters do not warrant management actions or mitigation based on the adaptive management strategy in the Response Framework. Continuation of the waste management and water management strategy, coupled with on-going efforts to control off-site dust migration, will help keep water quality within the range of minor changes predicted in the FEIS. Key findings from this year's assessment are presented below.

Water is safe for aquatic life and human health

There were no exceedances of water quality guidelines for the protection of aquatic life, human health drinking water quality, or site-specific water quality objectives (in the case of fluoride, arsenic and iron) for water samples collected from Lake A8, Lake B7, and Lake D7 in 2020. People are not permitted to source drinking water from Lake A8 or Lake B7 during operations given safety concerns with accessing these lakes, nonetheless, the fact water quality met guidelines for safe consumption in 2020 provides an additional level of assurance with which to assess water quality in the other lakes further away from the site, on the peninsula.

Has water quality changed over time?

In alignment with the original assessment (Agnico Eagle 2014), some parameters have increased relative to the baseline period, most notably arsenic in Lake A8 and Lake B7 and lithium in Lake B7. For the majority of other parameters, concentrations have either plateaued or decreased as the mine has

transitioned from peak construction to operations. Although water quality has changed, the absolute concentrations remain below guidelines or SSWQO for the protection of aquatic life.

Recommendations for 2021

On-going monitoring of temporal trends in water quality at the Peninsula Lakes will continue in 2021 as outlined in the AEMP Design Plan.

Phytoplankton Health in Meliadine Lake

Phytoplankton (algae) monitoring has been conducted annually as a targeted study in Meliadine Lake since 2015, rather than a core component of the AEMP. To date, monitoring data from the phytoplankton study has been used as a line of evidence, along with chlorophyll-a and nutrient concentration data, to determine if activities at the mine have contributed to increased primary productivity in Meliadine Lake.

Of the biological studies included in the AEMP, phytoplankton monitoring is the only program conducted annually (fish and benthic invertebrate studies are conducted every 3-years coinciding with the EEM cycle). In this respect, the information on the health of the phytoplankton community is valuable for linking annual changes in water quality to an indicator of the ecological health of Meliadine Lake.

The first step in the assessment of the health of the phytoplankton community involves looking for differences among stations (near-field, mid-field and reference) and across years (before mine discharges began vs after). If changes are noticed, the next step is to determine if the changes are part of the natural variability in phytoplankton or if activities at the mine are contributing to the change. Patterns in nutrient levels at each station are used to help determine whether differences in the phytoplankton community are related to the mine. Even if the change is attributed to the mine, other biological communities may not be impacted if the magnitude of the change is not too severe.

The following conclusions are based on findings of the 2020 phytoplankton study, taking into consideration the full range of available nutrient data and phytoplankton community results collected under the AEMP.

The phytoplankton community is healthy

The phytoplankton community had noticeably lower biomass and richness (number of taxa) across all 5 study areas in 2020, which was attributed to natural variability. Prior to 2020, there was some plausible evidence supporting the notion that nutrient loading (phosphorus in particular) during the pre-construction period had contributed to an increase in biomass in 2015 relative to the results from 2013. Results from 2020 show nutrients released to Meliadine Lake are not contributing to year-over-year increases in primary productivity as evidenced by higher total biomass in the near-field area of Meliadine Lake.

Quantitative analysis of the structure of the community using multivariate analysis provided an additional line of evidence to support the conclusion that lake-wide reductions in biomass and richness in 2020 were natural. The phytoplankton community has been different than the mid-field exposure area and reference areas dating back to the baseline period, but in 2020, the phytoplankton communities in the near-field and mid-field areas became more similar to one another compared to previous years. Results to date indicate that the phytoplankton community in the near-field area is diverse and healthy.

No evidence of wide-spread nutrient enrichment in Meliadine Lake

During the pre-construction and early construction phase of the project, loading of phosphorus to Meliadine Lake from the sewage treatment plant (STP) at the exploration camp was suspected of contributing to the increase in phytoplankton biomass observed in 2015. Concerns regarding potential for nutrient enrichment led to changes in how sewage is managed on site in late 2017, with all sewage treated at the main camp STP. The effect of this change was a reduction in phosphorus loading to the lake in recent years, even with the substantial increase in the volume of water discharged each year from CP1. Recent water quality data from 2018 through 2020 shows water and waste management has been effective at reducing total phosphorus loading to Meliadine Lake.

Nitrogen loading has increased since 2018, coinciding with discharge of surface contact water that when in contact with waste rock, picks up residual blasting material containing nitrogen parameters. In 2020, approximately 5-times as much nitrogen was discharged to Meliadine Lake compared to 2019. The substantial increase in the volume of water discharged from CP1 was the main reason for the increased loading. Despite the increased loadings, the magnitude of changing nitrogen concentrations in the east basin of Meliadine Lake were relatively low compared to baseline and more recent monitoring results from 2018 and 2019. Furthermore, some nitrogen parameters that appear to be increasing in the east basin also trended higher at the reference areas in 2020 due to natural variability regional patterns of change. Overall, any minor change in nutrient concentrations in the near-field area aligns with predicted changes in the Water Licence Application that stated nutrient concentrations would increase relative to baseline, but there would be no effect on aquatic life. Six years of phytoplankton monitoring support this conclusion.

Recommendations for 2021

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 will be continued in 2021 to supplement water quality monitoring and to monitor for mine-related effects.

TABLE OF CONTENTS

PLAIN LANGUAGE SUMMARY	III
TABLE OF CONTENTS.....	XI
LIST OF FIGURES.....	XIV
LIST OF TABLES.....	XVII
LIST OF APPENDICES	XIX
USE & LIMITATIONS OF THIS REPORT	XX
ACRONYMS & GLOSSARY OF TERMS	XXI
REPORT ORGANIZATION	XXVI
1 INTRODUCTION.....	1
1.1 Mine Site and Environmental Setting	1
1.2 Overview of the Aquatic Effects Monitoring Program.....	7
1.3 Scope and Objectives of the 2020 AEMP	8
1.4 Activities on Site in 2020	9
2 AEMP STUDY DESIGN.....	14
2.1 Study Areas.....	14
2.1.1 Meliadine Lake	14
2.1.2 Peninsula Lakes	15
2.2 Field and Laboratory Methods.....	16
2.2.1 Data Management	19
2.3 Approach to Evaluating Water Quality Results.....	19
2.3.1 Key Questions for Evaluating Changes in Water Quality	19
2.3.2 Comparison to Baseline / Reference Conditions	20
2.3.3 Comparison to FEIS Predictions	21
2.3.4 AEMP Benchmarks	22
2.4 Response Framework and Action Levels.....	26
2.4.1 Assessment of Toxicological Impairment.....	26
2.4.2 Assessment of Nutrient Enrichment	27
3 QUALITY ASSURANCE / QUALITY CONTROL	29
3.1 Limnology and Water Chemistry QA/QC	29
3.1.1 Field Data and Sample Collection	29
3.1.2 Field Duplicates	30

3.1.1	Blank Samples	30
3.1.2	Laboratory QC	31
3.1.3	QA/QC Summary – Water Quality	31
3.2	Phytoplankton QA/QC.....	31
3.3	Data Entry & Sample Shipping	32
4	MELIADINE LAKE – EFFLUENT CHARACTERIZATION	33
4.1	Overview	33
4.2	Effluent Chemistry.....	33
4.3	Effluent Toxicity.....	34
4.3.1	Acute Toxicity Testing	34
4.3.2	Sublethal Toxicity Testing (Action Level Assessment – End of Pipe Toxicity)	35
4.4	Discharge from CP1 to Meliadine Lake	38
4.5	Loadings to Meliadine Lake.....	39
4.6	Effluent Mixing	40
4.7	Figures and Tables – Effluent Characterization.....	42
5	MELIADINE LAKE – WATER QUALITY	51
5.1	Overview of the 2020 Water Quality Monitoring Program	51
5.1.1	AEMP.....	51
5.1.2	WQ-MOP	51
5.2	Objectives and Approach to Assessing Water Quality	52
5.3	2020 Water Quality Results.....	57
5.3.1	<i>In-situ</i> Water Quality	57
5.3.2	Snow Pack Chemistry Results (February and April 2020)	60
5.3.3	Current Water Quality Compared to Guidelines	61
5.3.4	Normal Range Assessment.....	61
5.3.5	Comparison to FEIS Predictions	63
5.3.6	Spatial and Temporal Trends	64
5.4	Low Action Level Assessment – Meliadine Lake	66
5.4.1	End-of-Pipe Effluent Toxicity.....	67
5.4.2	Water Quality for the Protection of Aquatic Life and Human Health.....	67
5.5	Conclusions and Recommendations for 2020.....	68
5.6	Figures – Meliadine Lake Water Quality	70
5.7	Tables – Meliadine Lake Water Quality	92
6	MELIADINE LAKE – PHYTOPLANKTON	121
6.1	Background.....	121
6.2	Objectives.....	122

6.3	2020 Field Program	123
6.3.1	Data Analysis	123
6.4	Results and Discussion	127
6.4.1	Context for Assessing Nutrient Enrichment in Meliadine Lake	127
6.4.2	Nutrients and Chlorophyll-a Concentrations	129
6.4.3	Phytoplankton Community	131
6.4.4	Nutrient-Productivity Relationships.....	135
6.4.5	Trophic Status Index.....	136
6.5	Low Action Level Assessment	136
6.6	Summary and Recommendations for 2021	138
6.7	Figures – Meliadine Lake Phytoplankton	140
6.8	Tables – Meliadine Lake Phytoplankton	157
7	PENINSULA LAKES – WATER QUALITY	161
7.1	2020 Field Program	161
7.1.1	Field Data and Sample Collection	161
7.2	Approach and Objectives	161
7.3	Results and Discussion	163
7.3.1	Field-Measured Water Quality Parameters	163
7.3.2	Water Quality Screening	164
7.3.3	Temporal Trend Assessment.....	168
7.4	Low Action Level Assessment – Peninsula Lakes	169
7.5	Recommendations for 2021.....	169
7.6	Figures – Peninsula Lakes.....	170
7.7	Tables – Peninsula Lakes	178
8	REFERENCES.....	192

LIST OF FIGURES

Figure 1-1. Overview of the Study Area for the Meliadine AEMP	4
Figure 1-2. Surface Features at the Meliadine Gold Mine (as of 2020)	5
Figure 1-3. Water Quality Monitoring Stations for the Peninsula Lakes Study	6
Figure 1-4. Surface Contact Water Management in 2020	12
Figure 4-1. Daily Discharge from CP1 to Meliadine Lake in 2018 through 2020	39
Figure 4-2. Percent Effluent Concentration Relative to the Distance from the Diffuser, July 21, 2020 ..	43
Figure 4-3. Percent Effluent Concentration Relative to the Distance from the Diffuser, August 13, 2020	44
Figure 5-1 Water quality monitoring stations in Meliadine Lake.....	71
Figure 5-2 Dissolved Oxygen (DO, mg/L), pH, and Temperature from Limnology Profiles in Meliadine Lake in 2020	72
Figure 5-3 Specific Conductivity ($\mu\text{S}/\text{cm}$) Throughout Meliadine Lake By Area and Date in 2020.....	73
Figure 5-4 Specific Conductivity ($\mu\text{S}/\text{cm}$) in the Near-Field Area (MEL-01) By Station and Date in 2020	74
Figure 5-5. Meliadine Lake water quality (open water) – concentrations of TDS, hardness, and major ions (Ca, Mg, K, and Na) since 2013.	75
Figure 5-6. Meliadine Lake water quality (open-water) – pH, conductivity, and concentrations of selected nutrients since 2013.	76
Figure 5-7. Meliadine Lake water quality (open-water) –concentrations of selected metals (total) since 2013.	77
Figure 5-8. Meliadine Lake water quality (open-water) –concentrations of selected metals (total) since 2013.	78
Figure 5-9. Meliadine Lake water quality (open-water) – concentrations of selected metals (dissolved) since 2013.	79
Figure 5-10. Meliadine Lake water quality (open-water) – concentrations of selected metals (dissolved) since 2013.	80
Figure 5-11. Predicted Changes in Total Dissolved Solids (calculated; mg/L) in the East Basin of Meliadine Lake Compared to Observed Results	81
Figure 5-12. Predicted Changes in Chloride (mg/L) in the East Basin of Meliadine Lake Compared to Observed Results.....	82
Figure 5-13. Cumulative Measured and Modeled Loadings of TDS in the Current Life of Mine.	83

Figure 5-14. Spatial and Temporal Changes in TDS and Constituent Major Ions In Meliadine Lake Since 2018	84
Figure 5-15. Spatial and Temporal Changes in Arsenic, Barium, Copper, and Manganese in Meliadine Lake Since 2018.....	85
Figure 5-16. Concentrations of Total Dissolved Solids (measured and calculated) and Chloride at MEL-01 Stations Relative to the Distance from the Diffuser Since 2018.....	86
Figure 5-17. Ionic Composition of Baseline Surface Water in Meliadine Lake	87
Figure 5-18. Ionic Composition of Surface Contact Water (MEL-14).....	88
Figure 5-19. Ionic Composition of Recent Reference Area Surface Water from Meliadine Lake.....	89
Figure 5-20. Ionic Composition of Recent Surface Water from MEL-01, MEL-02 and the Edge of the Mixing Zone.....	90
Figure 5-21. Water Quality in Meliadine Lake in 2020 Relative to the Normal Ranges, AEMP Action Levels and AEMP Benchmarks	91
Figure 6-1. Annual loadings (kg/year) of nitrogen and total phosphorus to Meliadine Lake	128
Figure 6-2 Concentration of Nitrogen Species Measured in Effluent Samples from MEL-14 from 2018 – 2020	141
Figure 6-3. Spatial and Temporal Changes in Nitrogen and Phosphorus, 2018-2020	142
Figure 6-4. Spatial and Temporal Changes in Nitrogen and Phosphorus Relative to the Distance from the Diffuser, 2018-2020	143
Figure 6-5 Concentrations of Key Nutrients Collected in Meliadine Lake from the August Phytoplankton Studies, 2015 – 2020	144
Figure 6-6 Concentrations of nitrogen and phosphorus in Meliadine Lake, 1997 through 2013.....	145
Figure 6-7 Chlorophyll-a Concentrations (µg/L) in Meliadine Lake from the August Phytoplankton Studies, 2015 – 2020.....	146
Figure 6-8 Total phytoplankton biomass, density and taxa richness for Meliadine Lake sampling areas.	147
Figure 6-9. Major taxa group biomass, density and taxa richness for phytoplankton in Meliadine Lake sampling areas (2013 – 2020).	148
Figure 6-10. Ordination plot of phytoplankton community non-metric multidimensional scaling (nMDS) for Meliadine Lake (2015 through 2020).	149
Figure 6-11. Non-metric multidimensional scaling (nMDS) results showing ordination of the reference and exposure area phytoplankton results by year for Meliadine Lake.	150

Figure 6-12. Relationship between chlorophyll-a and phytoplankton biomass for Meliadine Lake across years, 2016 through 2020.	151
Figure 6-13. Relationship between chlorophyll-a and phytoplankton biomass for Meliadine Lake by year, 2016 through 2020.....	152
Figure 6-14. Relationship between key nutrient concentrations and phytoplankton biomass indicators by sampling area for Meliadine Lake, 2016 through 2020	153
Figure 6-15. Relationship between key nutrient concentrations and phytoplankton biomass indicators by year for Meliadine Lake, 2015 through 2020.....	154
Figure 6-16. Relationship between key nutrient concentrations and phytoplankton biomass indicators by year for the near-field area (MEL-01) of Meliadine Lake, 2015 through 2020.	155
Figure 6-17. Trophic Status Index values (+/- standard error) for Meliadine Lake, 2015 through 2020	156
Figure 7-1. <i>In-situ</i> Limnology Profiles at the Peninsula Lakes, 2018 – 2020	171
Figure 7-2. Concentrations of TDS, Hardness, and Major Ions (Ca, Mg, K, and Na) Since 2015	172
Figure 7-3. pH, conductivity, and Concentrations of Selected Nutrients Since 2015	173
Figure 7-4. Total (Unfiltered) Concentrations of Selected Metals Since 2015 (Aluminum to Lead).....	174
Figure 7-5. Total (Unfiltered) Concentrations of Selected Metals Since 2015 (Lithium to Zinc)	175
Figure 7-6. Concentration of Selected Dissolved Metals Since 2015 (Aluminum to Lead).....	176
Figure 7-7. Concentration of Selected Dissolved Metals Since 2015 (Lithium to Zinc)	177

LIST OF TABLES

Table 1-1.	Surface Contact Water Management Plan	10
Table 1-2.	Summary of Major Development Activities Since the Start of Construction in 2015.....	13
Table 2-1.	Water quality parameters collected for the AEMP.....	17
Table 2-2.	AEMP Benchmarks (current to 2020)	24
Table 2-3.	Low Action Level Assessment Criteria for Water Quality – Toxicological Impairment.....	28
Table 2-4.	Low Action Level Assessment Criteria for Water Quality – Nutrient Enrichment	28
Table 4-1.	Sublethal Toxicity Testing on MEL-14 Effluent Samples in 2020	36
Table 4-2.	Effluent quality limits for the effluent discharge from MEL-14	45
Table 4-3.	Monthly Discharge Volumes from CP1 to Meliadine Lake since 2018	46
Table 4-4.	Acute Toxicity Test Results on Effluent Samples from MEL-14 in 2020.....	47
Table 4-5.	Sublethal Toxicity Test Results for <i>Lemna minor</i> (Duckweed) Since 2018	48
Table 4-6.	Sublethal Toxicity Test Results on Effluent Discharged to Meliadine Lake Since 2018	49
Table 4-7.	Loadings estimate to Meliadine Lake from CP1 in 2020.....	50
Table 5-1.	Percent Increase in Chloride Concentrations (mg/L) Between Areas and Years Since 2015	65
Table 5-2.	Summary of the Meliadine Lake sampling events in 2020.	93
Table 5-3.	Overview of Monitoring Completed for the WQ-MOP and Cross-Over with the AEMP in 2020	94
Table 5-4.	MEL-01 Water Quality Summary Statistics – March 2020 Sampling Event	95
Table 5-5.	MEL-02 Water Quality Summary Statistics – March 2020 Sampling Event	98
Table 5-6.	Near-Field Area (MEL-01) Water Quality Summary Statistics – 2020 Open Water Sampling Events (July, August, September).....	101
Table 5-7.	Mid-Field Area (MEL-02) Water Quality Summary Statistics – 2020 Open Water Sampling Events (July, August, September).....	104
Table 5-8.	Reference Area 1 (MEL-03) Water Quality Summary Statistics – 2020 Open Water Sampling Events (July, August, September).....	107
Table 5-9.	Reference Area 2 (MEL-04) Water Quality Summary Statistics – 2020 Open Water Sampling Events (August)	110
Table 5-10.	MEL-05 Water Quality Summary Statistics – 2020 Open Water Sampling Events (August)	113
Table 5-11.	Water Quality Summary Statistics for the Pooled Reference Areas (MEL-03, MEL-04 and MEL-05) – 2020 Open Water Sampling Events (July, August, September).....	116

Table 5-12.	Normal Range Screening Summary for the Near-field and Mid-field areas in 2020	119
Table 6-1.	Phytoplankton Community Data from Locations Sampled in Meliadine Lake in 1997 and 1998	121
Table 6-2.	Trophic classification of lakes based on ranges of total phosphorus, chlorophyll-a and Secchi depth.....	125
Table 6-3.	Trophic classification of lakes based on total phosphorus trigger ranges.....	126
Table 6-4.	Comparison of trophic status index and general trophic classifications in lakes.	126
Table 6-5	Chlorophyll-a (µg/L) Summary Statistics for August Sampling Events, 2015-2020.	158
Table 6-6	Major Taxa Biomass and Density from the Phytoplankton Study in Meliadine Lake in 2020	159
Table 6-7	Secchi Depth and Total Water Depth from the August 2020 Sampling Event	160
Table 7-1.	Parameters that exceeded the normal range in concentration for the Peninsula Lakes in 2020 and comparison of mean/median concentrations from 2018-2020	165
Table 7-2.	Parameters that exceeded Baseline Concentrations by More than 10% in 2020	166
Table 7-3.	Peninsula Lake area monitoring stations sampled in 2020	179
Table 7-4.	Lake A8 – Water Quality Screening Assessment, 2020.....	180
Table 7-5.	Lake B7 – Water Quality Screening Assessment, 2020.....	183
Table 7-6.	Lake D7 – Water Quality Screening Assessment, 2020.....	186
Table 7-7.	Lake A8 – Normal Range Screening Assessment, 2020	189
Table 7-8.	Lake B7 – Normal Range Screening Assessment, 2020.....	190
Table 7-9.	Lake D7 – Normal Range Screening Assessment, 2020	191

LIST OF APPENDICES

APPENDIX A	QUALITY ASSURANCE / QUALITY CONTROL
APPENDIX B	EFFLUENT CHARACTERIZATION, 2020
Appendix B1	MEL-14 Effluent Chemistry, 2020
Appendix B2	Daily Discharge Volumes from CP1 to Meliadine Lake in 2020
APPENDIX C	MELIADINE LAKE – SUPPORTING FIGURES AND TABLES
Appendix C1	Meliadine Lake Water Chemistry – Boxplots
Appendix C2	Meliadine Lake Water Chemistry – Scatter Plots
Appendix C3	Meliadine Lake Water Chemistry Results, 2020
APPENDIX D	PENINSULA LAKES – SUPPORTING TABLES
APPENDIX E	PHYTOPLANKTON DATA
Appendix E1	2020 Phytoplankton Taxonomy (Plankton R Us)
Appendix E2	Phytoplankton Major Taxa Biomass and Density (2013-2019)
APPENDIX F	CHLOROPHYLL-A DATA
Appendix F1	2020 Chlorophyll-a (University of Alberta)
Appendix F2	Meliadine Lake Chlorophyll-a Database (2013, 2015-2020)
APPENDIX G	2020 SNOW PACK SURVEY AND CHEMISTRY DATA

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.

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The findings contained in this report are based, in part, upon information provided by others. In preparing this report, Azimuth has assumed that the data or other information provided by others is factual and accurate. If any of the information is inaccurate, site conditions change, new information is discovered, and/or unexpected conditions are encountered in future work, then modifications by Azimuth to the findings, conclusions and recommendations of this report may be necessary.

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 a given amount of lake water.
Blanks (for quality control)	<p>TB = these samples 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.</p> <p>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.</p> <p>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.</p>
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.
DF	Dilution Factor: the amount by which the effluent is diluted at a given sample location within Meliadine Lake (e.g., a dilution factor of 50:1 corresponds to 2% effluent).

Acronym / Term	Definition
DIN	Depth-integrated nutrients (DIN) refers to the composite water sample collected for nutrient analyses for the phytoplankton study. The “depth-integrated” sample is a composite water sample taken from various depths in the water column. Chlorophyll-a and phytoplankton taxonomy samples are collected using the depth-integrated sampling method.
DO	Dissolved oxygen
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.

Acronym / Term	Definition
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.
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 used 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.

Acronym / Term	Definition
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.
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.
SWTP	Saline Water Treatment Plant: treatment of saline groundwater to remove excess TSS, salts (CaCl_2 , NaCl), metals, phosphorus, and nitrogenous compounds.
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

Acronym / Term	Definition
WQG	Water quality guideline; generic term referring to guidelines developed by various agencies for protection of aquatic life
WL	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
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

REPORT ORGANIZATION

The 2020 Aquatic Effects Monitoring Program (AEMP) report is organized into a main document and 9 appendices. While last year was the first year Azimuth reported on the AEMP water quality results, the report structure remains largely the same as in previous years (Golder 2018, 2019).

The document is organized into the following sections. Figures and tables are included at the end of each chapter.

Plain Language Summary – a high-level summary of the 2020 monitoring results for each component of the AEMP (effluent characterization, Meliadine Lake water quality, Peninsula Lakes water quality, and the phytoplankton study in Meliadine Lake).

Section 1 (Introduction) provides an overview of the AEMP and outlines the scope and objectives of the 2020 program according to the *AEMP Design Document* (Golder 2016).

Section 2 (AEMP Study Design) summarizes the core elements of the water quality component of the AEMP study design including sampling areas, sampling methods, and data analysis. This section also provides an overview of the decision-making framework for evaluating whether changes in water quality have occurred, and whether those changes are plausibly related to activities at the mine.

Section 3 (Quality Assurance / Quality Control): a high-level summary of the quality assurance and quality control assessment (QA/QC) presented in **Appendix A**.

Section 4 (Effluent Characterization): This section summarizes results from the effluent monitoring program (i.e., effluent chemistry, toxicity test results, and loadings assessment).

Section 5 (Meliadine Water Quality): Summary of the 2020 water quality results from the Meliadine Lake component of the AEMP.

Section 6 (Meliadine Phytoplankton): Summary of the 2020 phytoplankton study in Meliadine Lake. Figures and Tables specific to each component of the program are included at the end of each section.

Section 7 (Peninsula Lake Water Quality): Summary of the 2020 water quality results from the Peninsula Lakes component of the AEMP.

1 INTRODUCTION

This document presents findings of the 2020 Aquatic Effects Monitoring Program (AEMP) at Agnico Eagle Mines Ltd (Agnico Eagle) Meliadine Gold Project (the mine). The mine is located approximately 25 km north of Rankin Inlet, Nunavut on the southeast shore of Meliadine Lake (**Figure 1-1**). The property is approximately 111,000 ha, and there are currently five deposits in the mine plan: Tiriganiaq, Discovery, Pump, Fzone, and Wesmeg (Agnico Eagle 2015). 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 2019) and the Type A Water Licence (2AM-MEL-1631) granted by the Nunavut Water Board (NWB) on April 1, 2016.

In April 2020, the NWB granted an emergency amendment to the Type A Water Licence to allow discharge of effluent to Meliadine Lake with higher concentrations of total dissolved solids (TDS). The emergency amendment was in effect for the 2020 discharge season. Details regarding the emergency amendment are discussed in **Section 1.4**.

1.1 Mine Site and Environmental Setting

Mine Site

The Meliadine mine consists of the following infrastructure: 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 collection ponds (CPs¹), 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 mine entered commercial production in 2019 with ore coming from underground mining of the Tiriganiaq deposit. Two open pits (Tiriganiaq Pit 1 & 2) are also part of the approved project. The current extent of the mine development, as of late 2020, is shown in **Figure 1-2**.

Meliadine Lake Watershed

The mine is located within the Meliadine Lake watershed, on the southwest shore of Meliadine Lake. In total, the Meliadine Lake watershed encompasses an area of approximately 560 km². Meliadine Lake is somewhat unique in that it has two outlets, both of which ultimately drain into Hudson Bay. The largest

¹ The terms Containment pond, Collection pond, and Control pond are synonymous.

outflow is the Meliadine River, located in the south basin of the lake, which flows through a series of small water bodies and Little Meliadine Lake before draining into Hudson Bay, just north of Rankin Inlet (**Figure 1-1**). The second outflow is a smaller tributary in the northwest basin of the lake that flows into Peter Lake, which ultimately drains into Melvin Bay via the Diana River system.

Meliadine Lake is one of the larger lakes in the region with a surface area of approximately 107 km² and a maximum length of 31 km (southeast to northwest). The morphology of the lake is characterized by a highly convoluted shoreline, numerous islands, and shallow reefs. More than one third of Meliadine Lake volume is contributed by lake areas that are less than 2 m in depth, which indicates a considerable reduction in lake volume and overwintering potential during winter (Golder 2019). Maximum ice thickness is about 2 m and occurs in March/April, increasing the concentration of some ions, such as chloride, in the water near the ice-water interface. This occurs due to cryo-concentration, where ice formation excludes certain ions and increases their concentration in the water column (Wetzel 1983). This phenomenon is well documented at reference lakes and exposure areas sampled as part of the water quality monitoring program for the Meadowbank Mine, situated north of Baker Lake, Nunavut.

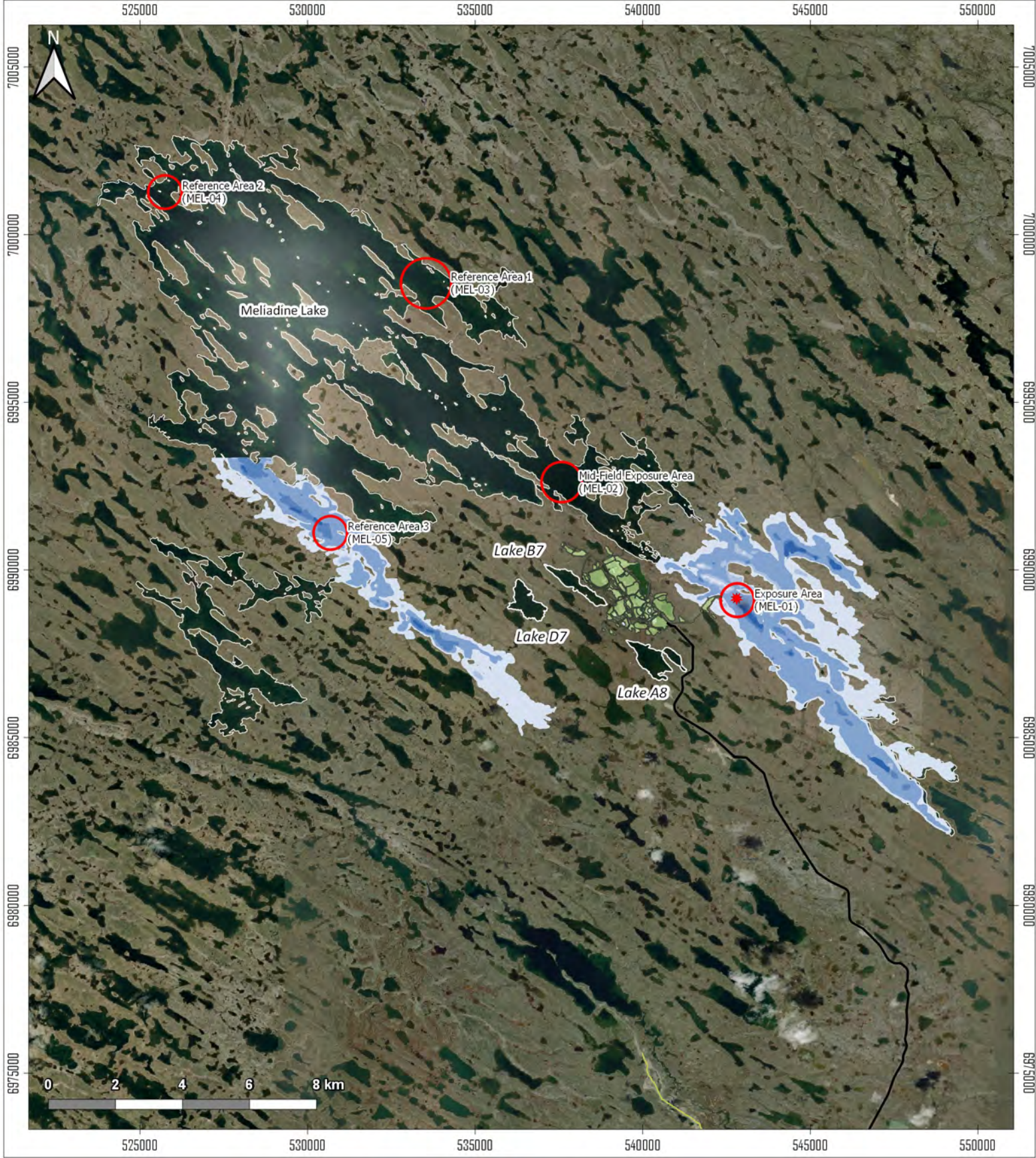
Meliadine Lake is broadly split into three basins based on its morphology. Descriptions of each basin (summarized below) are taken from the 2019 interpretive report (Golder 2019) based on information collected during the baseline period (Agnico Eagle 2014).

- The **east basin** is 2,212 ha and contributes approximately 21% to the entire area of Meliadine Lake. It is separated from the rest of the lake by a shallow and narrow area (up to 2.3 m deep, 100 to 300 m wide, and 800 m long) that features numerous rocky islands and reefs. Golder noted in the FEIS (Agnico Eagle 2014) that the east basin may be isolated from the west basin during the winter months, preventing fish passage.
- The **west basin** is the largest basin in Meliadine Lake. At approximately 7,100 ha, the west basin makes up approximately 68% of the surface area of the entire Lake. The outlet to Peter Lake is located at the northwest end of the west basin. Water depth throughout the west basin tends to be deeper than other areas of Meliadine Lake, with water depths greater than 8 m more common than the east and south basins.
- The **south basin** is 1,135 ha and contributes approximately 11% to the entire lake area. The outlet to the Meliadine River located at the southeast end of the basin is generally shallow (less than 4 m deep).

Peninsula Lakes Watersheds

Several small watersheds are located on the Meliadine peninsula between the south and east basins of the lake. These peninsula watersheds comprise an extensive network of lakes, ponds, and interconnecting streams that ultimately drain into Meliadine Lake (**Figure 1-3**). The lakes within the

Peninsula are generally small (<90 ha in area) and shallow (<5 m in maximum depth). They are connected to each other (and to Meliadine Lake) through short stream sections; however, they can often be isolated by limited flow during summer/fall and frozen stream conditions during winter (Golder 2012).



<p>Legend</p> <ul style="list-style-type: none">Meliadine Mine SiteAll-weather access roadDiffuserMeliadine Lake sampling areas <p>Water Depth Intervals (m)</p> <ul style="list-style-type: none">0 - 22 - 44 - 88 - 1212 - 22		<p>AZIMUTH</p>	<p>Figure 1-1 Overview of the Study Area for the Meliadine AEMP</p> <p>2020 Aquatic Effects Monitoring Program Annual Report</p> <p>REFERENCES: 1. Waterbody and watercourse data from Natural Resources Canada (NRC) 2. Mine Plan provided by Agnico Eagle 3. Bathymetry data provide by Golder</p> <p>Date: March 25, 2021 Datum: NAD 83 UTM Zone 15N Scale: 1:150,000; overview (1:650,000) Software: QGIS version 3.16.0-Hannover Produced by: E. Franz; J. Ellenor</p>
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Figure 1-2.
Surface Features at the Meliadine
Gold Mine (as of 2020)

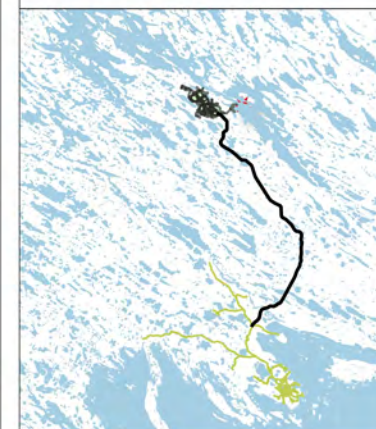
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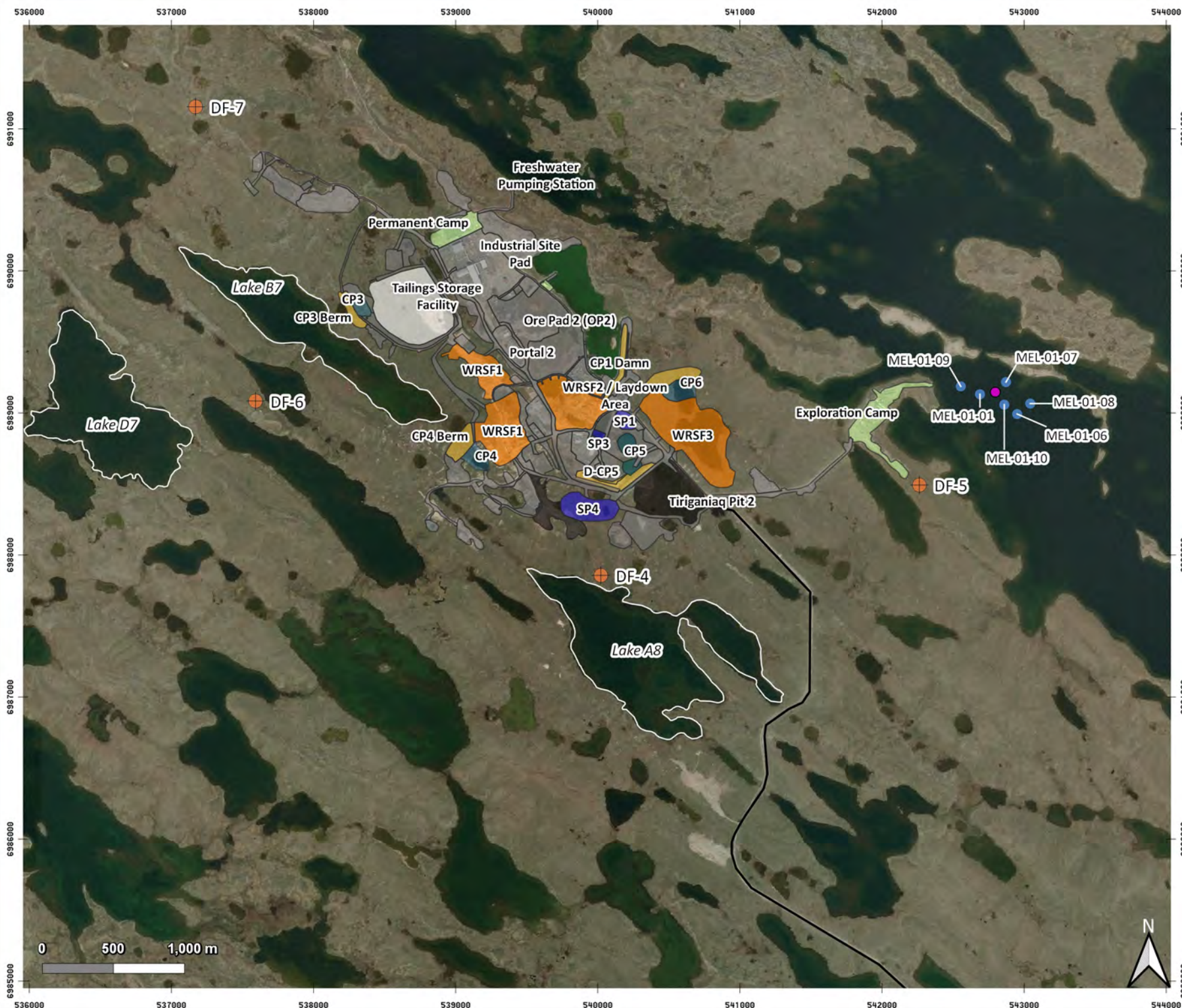


Date: February 14, 2021
Datum: NAD 83 UTM Zone 15N
Scale: 1:35,000
Software: QGIS version 3.16.0-Hannover
Produced by: E. Franz; J. Ellenor

REFERENCES
1. Basemap imagery from Google
2. Mine Plan provided by Agnico Eagle



- Legend**
- Berm
 - Open Pit
 - Containment Pond
 - Saline Pond
 - Tailings Storage Facility
 - Waste Rock Storage Facility
 - Diffuser
 - MEL-01 Monitoring Stations
 - Dustfall Stations



535000

540000

545000

The blue dashed lines illustrate the flow of water from Lake A8, Lake B7, and Lake D7 towards Meliadine Lake.



Figure 1-3
Water Quality Monitoring Stations for the
Peninsula Lakes Study

2020 Aquatic Effects Monitoring Program
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Date: March 25, 2021
Datum: NAD 83 UTM Zone 15N
Scale: 1:65,000
Software: QGIS version 3.16.0-Hannover
Produced by: E. Franz; J. Ellenor

REFERENCES
1. Basemap imagery from Google
2. Mine Plan provided by Agnico Eagle
3. Roads and waterbodies from IARC
4. Bathymetry data provided by Golder



Legend

Peninsula Lakes watersheds

Water Sampling Stations

Meliadine Mine Site

All-Weather Access Road

Dustfall Stations

Diffuser

Water Depth Intervals (m)

0 - 2

2 - 4

4 - 8

8 - 12

12 - 22

535000

540000

545000

0 1 2 3 km



6990000

6995000

6995000

1.2 Overview of the Aquatic Effects Monitoring Program

Under the Terms and Conditions of the Project Certificate and the Type A Water Licence² (2AM-MEL-1631; Part I), Agnico Eagle must undertake routine monitoring in lakes that may be impacted by activities at the mine. The Aquatic Effects Monitoring Program, or AEMP for short, is the integrated monitoring program used to determine whether discharge of treated effluent, changes in water flow near the site, and aerial emissions are causing changes in water quality and impacts to aquatic life beyond what was predicted in the Final Environmental Impact Statement (FEIS; Agnico Eagle 2014). All project phases, from construction to operations to closure were considered when the AEMP was developed in consultation with communities, stakeholders, and regulators. Inuit Qaujimajatuqangit (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 assessing potential changes related to on-going construction and early operations, but the design also considers later phases of the Project (i.e., late operations to closure), and potential development of other deposits. The *AEMP Design Plan* (Golder 2016) outlines how the monitoring program is conducted, and applies to aquatic monitoring in Meliadine Lake and three lakes located close to the mine (referred to collectively as the Peninsula Lakes). The Meliadine Lake study and the Peninsula Lakes study are similar in their mandate, but differ with respect to the frequency and scope monitoring. An overview of each study is provided below.

Meliadine Lake Study

The Meliadine Lake study is the more expansive of the two studies because Meliadine Lake is the receiving environment for discharge of treated surface contact water collected on site³. Surface contact water refers to precipitation and runoff that occurs within the footprint of the mine. The general strategy for managing surface contact water is to intercept water that comes in contact with mine infrastructure and direct it towards Collection Ponds (CPs) through a network of dikes, channels, and culverts, thereby mitigating the uncontrolled release of contact water to the aquatic environment⁴. In accordance with the *Metal and Diamond Mining Effluent Regulations* (MDMER), biological monitoring studies are completed on a 3-year cycle in Meliadine Lake to assess whether discharge of effluent is causing an effect to fish and benthic invertebrate communities. To improve efficiency and reduce

² The Water Licence broadly outlines the terms of water use and disposal of waste, including the conditions for discharging water into Meliadine Lake. The Nunavut Water Board approved on May 19th, 2016 (NWB 2016).

³ None of the water used in the milling circuit is discharge to aquatic receiving environments.

⁴ The updated Water Management Plan was submitted as Appendix C in the Type A Water Licence Amendment (Agnico Eagle 2020).

redundancy, the scope of biological monitoring under the AEMP was harmonized with the Environmental Effects Monitoring (EEM) program required under MDMER. There are however, certain aspects of the AEMP that go beyond what is required under EEM (e.g., fish tissue chemistry monitoring and additional study areas). The expanded monitoring under the AEMP compared to the EEM program reflects commitments made during the regulatory approval process. Biological studies on the health of fish and benthic invertebrate communities and fish tissue chemistry are aligned with the 3-year cycle for EEM under MDMER. The next biological monitoring studies are planned for 2021.

Peninsula Lakes Study

Three lakes located near the mine, Lake A8, Lake B7, and Lake D7 are included in the AEMP to monitor changes caused by non-point source discharges such as aerial emissions and dust deposition and erosion caused by alteration of the natural drainages as part of construction of the mine (Golder 2016). The letters A, B, and D correspond to subdrainages (watersheds) on the peninsula, and the lake numbers within each drainage basin indicate where the lake is located along the flow path. For example, Lake D7 flows into Lake D6 and so on, eventually draining into the last lake in the D watershed (Lake D1), which flows into Meliadine Lake near outlet to the Meliadine River. **Figure 1-3** shows the location of the Peninsula Lakes and the subdrainages on the peninsula.

None of the small lakes in the vicinity of the mine receive treated effluent, which means there is no requirement for biological monitoring under MDMER. Water quality monitoring in the Peninsula Lakes is conducted annually as an early indicator of potential mine-related changes. This approach received support from intervenors during the consultation phase, with understanding that biological monitoring may be required in the future, if project-related changes to water quality exceed changes predicted in the FEIS.

1.3 Scope and Objectives of the 2020 AEMP

In “off-years”, years when EEM sampling is not completed, the AEMP focuses specifically on assessing changes in water quality in Meliadine Lake and the Peninsula Lakes. The scope of the 2020 monitoring program focused on assessing potential changes in water quality and primary productivity in Meliadine Lake and changes in water quality in the Peninsula Lakes (Lake A8, Lake B7, and Lake D7). A supplemental “targeted” phytoplankton study has also been conducted annually as a part of the Meliadine Lake study since 2015 to help determine if the mine is causing changes in primary productivity. The study was considered “targeted” rather part of the core monitoring program because in the early years of monitoring there was uncertainty about whether the data generated from the phytoplankton study would provide insights to help distinguish between natural vs mine-related changes the phytoplankton community assemblage and biomass. Based on 5+ years of data, the phytoplankton monitoring program has shown promise as a monitoring tool for directly evaluating

whether nutrients (e.g., nitrogen and phosphorus) discharged to Meliadine Lake are causing increases in primary productivity. Phytoplankton community results (i.e., biomass), along with the chlorophyll-a and nutrient data, will still be evaluated in a weight-of-evidence assessment to help determine whether nutrient enrichment is occurring in Meliadine Lake due to mine-related activities.

The 2020 AEMP was conducted to fulfill the objectives as stated in the *AEMP Design Plan* (Golder 2016):

- Determine the short-term and long-term effects of the Project on the aquatic receiving environment,
- Evaluate the accuracy of the predictions in the Final Environmental Impact Statement,
- Assess whether mitigation measures are effective at reducing impacts to the aquatic environment, and
- Provide recommendations (as required) for follow-up monitoring or mitigation as part of the Response Framework which links monitoring results to management actions.

An overview of the AEMP study design as it pertains to Meliadine Lake and the Peninsula Lakes is presented in [Section 2](#).

1.4 Activities on Site in 2020

Mining operations have the potential to affect water quality in the aquatic receiving environment through discharge of treated effluent (surface contact water to Meliadine Lake), accidental spills, altered hydrology due to construction activities, and aerial emissions and dust deposition. A summary of major construction activities, spills, and effluent discharge is provided below as context for assessing potential mining-related changes in water quality in Meliadine Lake and the Peninsula Lakes.

Construction and Operations

The following major site related activities that occurred in 2020.

- Collection Pond 6 (CP6) was constructed over the winter of 2019/2020 and was completed prior to freshet. The thermal berm on the north of the pond divides the H watershed in two, with the north portion flowing out to Meliadine Lake and the south flowing to CP6. The material used for the berm construction was clean waste rock (non-potentially acid generating [NPAG] and no saline groundwater contamination) from the surface blasts.
- Mining of Tiriganiaq Pit 2 began winter 2019/2020 and is still on-going. Construction also includes the placement of waste rock in WRSF3, which is within the CP6 catchment.
- Saline Pond 4 (SP4) was constructed over the winter of 2019/2020 within the footprint of Tiriganiaq Pit 1. Overburden was placed in WRSF1, while waste rock material was placed in a temporary storage area between the Tiriganiaq 1 and Tiriganiaq 2 footprints.

Details regarding construction activities and normal operations are provided in the Annual Report prepared by Agnico Eagle.

Effluent Discharge to Meliadine Lake

Precipitation and runoff are intercepted and diverted to CPs to prevent uncontrolled off-site migration of surface contact water. Five CPs are currently in operation (**Table 1-1**); CP3 through CP6 are located adjacent to major infrastructure (**Figure 1-2** [map] and **Figure 1-4** [schematic]). Water from these peripheral CPs is ultimately pumped to CP1 (formerly Lake H17⁵). Other sources of water to CP1 include direct runoff from the CP1 catchment and treated wastewater from the Sewage Treatment Plant (STP). Water collected in CP5 is either pumped directly to CP1 or diverted to the reverse osmosis treatment plant if the total dissolved solids (TDS) concentration exceeds the Water Licence limit for TDS (3,500 mg/L in 2020). Most of the surface contact water in CP1 is discharged to Meliadine Lake after treatment at the Effluent Water Treatment Plant (EWTP). The purpose of the EWTP is to reduce total suspended solids (TSS) to below 15 mg/L (Actiflo® model ACP-700R). The EWTP also removes some phosphorus⁶.

Table 1-1. Surface Contact Water Management Plan

Source	Collection Pond
Industrial Site Pad, Ore Stockpile (OP2), Landfill	CP1
WRSF1	CP1, CP4, CP5
WRSF3	CP2* and CP6
Tiriganiaq Pits 1* and 2	CP5 (2020), CP4 (2021)
TSF	CP1 and CP3

Adapted from Table 9 in Appendix C of the Type A Water Licence Amendment (Agnico Eagle 2020a)

* Construction planned for 2021.

In April 2020, Agnico Eagle was granted an emergency amendment of the Type A water licence to temporarily discharge surface contact water from CP1 with a maximum average concentration of TDS of 3,500 mg/L. The increase in the limit for TDS from 1,400 mg/L to 3,500 mg/L was granted for the 2020 discharge season to address critically high-water levels in CP1 caused by the combination of an unusually wet year in 2019 and an overly conservative limit for TDS (Agnico Eagle 2020). The emergency amendment was granted by the NWB subject to the following terms and conditions:

⁵ This lake was dewatered between August 21 and October 1, 2016 and converted into CP1 for managing surface contact water on site. Water was discharged via a temporary diffuser located north of CP1, in the narrows connecting the east basin of Meliadine Lake with the west basin. The volume of water released was greater than 50 m³, which triggered the mine falling under MDMER.

⁶ Personal communication from the Meliadine Environment Department (March 15, 2021).

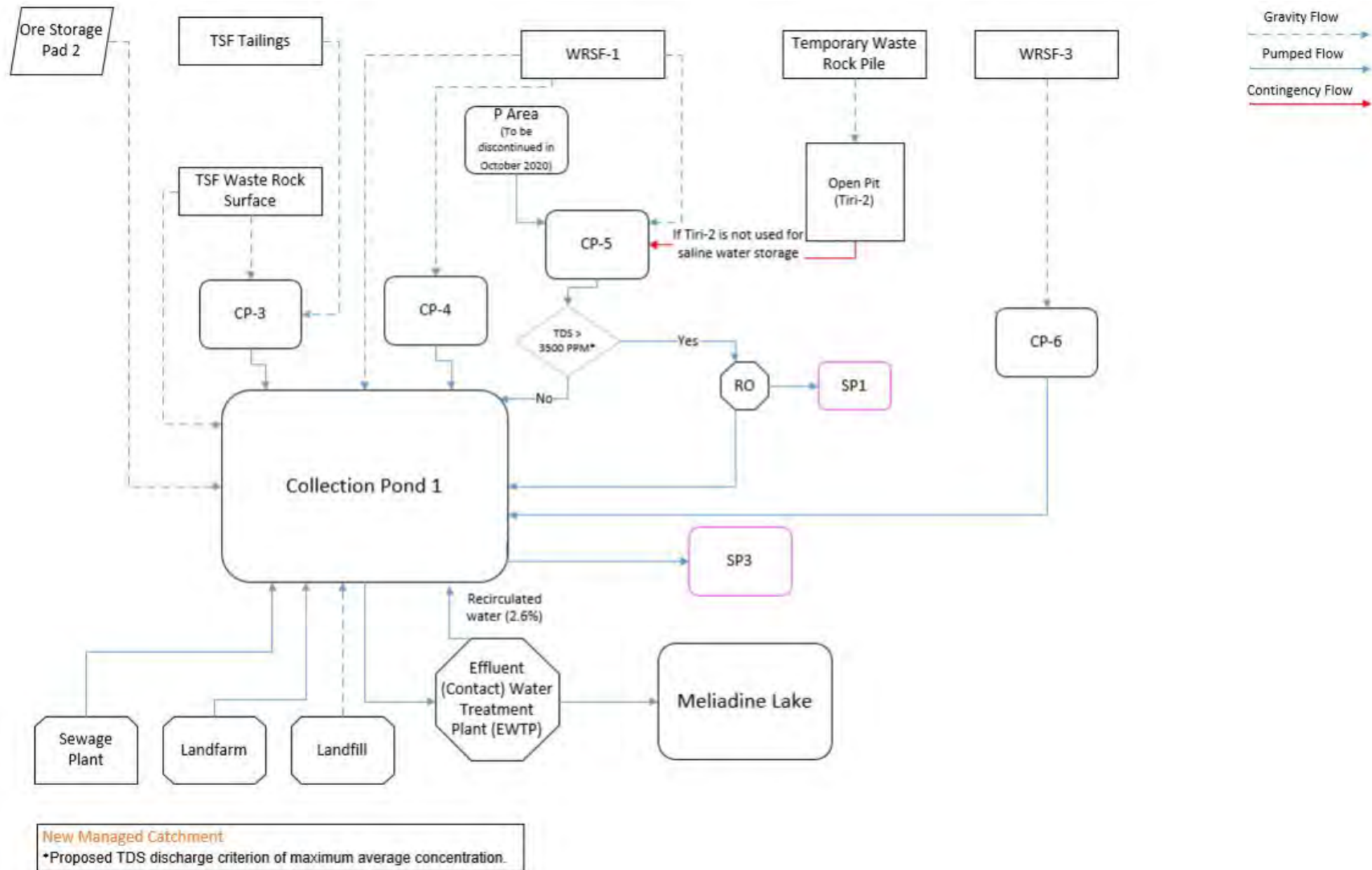
- Effluent quality will meet existing limits in the water licence and MDMER,
- Agnico Eagle will establish a scientifically-defensible in-lake benchmark for TDS that is protective of the environment (1,000 mg/L),
- Conduct water quality monitoring and toxicity testing to validate the interim TDS targets and a plume delineation study to provide information about the assimilation capacity of the lake, and
- Develop an adaptive management strategy for discharge of water from CP1 to Meliadine Lake.

The conditions of the Emergency Amendment were implemented through the *Water Quality Monitoring and Optimization Plan* (WQ-MOP). The WQ-MOP was split into 3 phases:

1. Development of interim TDS targets for the effluent and surface water at the edge of the mixing zone in Meliadine Lake (100 m). Interim effluent (3,500 mg/L) and edge of mixing zone (1,000 mg/L) targets were developed. Golder concluded that the interim guidelines would be protective of aquatic life in Meliadine Lake.
2. Validation studies on effluent and receiving environment water quality were carried out throughout the discharge period (June 5th to October 4th). Water quality was monitored by collecting samples for chemistry and toxicity testing. In addition, two plume delineation surveys were conducted to track the vertical and horizontal dispersion of the effluent during the discharge period.
3. Finalization of the TDS Benchmarks for end of pipe effluent quality and surface water quality at the edge of the mixing zone.

A Water Management Working Group (WMWG) was formed with representatives from the Nunavut Water Board (NWB), Environment and Climate Change Canada (ECCC), Crown Indigenous Relations and Northern Affairs Canada (CIRNAC), Kivalliq Inuit Association (KivIA), Agnico Eagle, and their technical lead on the project (Golder). The WMWG met regularly through the summer and fall to receive updates on the WQ-MOP results.

Monitoring for the WQ-MOP happened concurrent to water quality monitoring for the AEMP, and the conclusions stemming from the WQ-MOP (Golder 2020) were incorporated into the overall assessment of effluent quality and water quality in Meliadine Lake for the 2020 AEMP. Details pertaining to the toxicity testing and water quality monitoring for the WQ-MOP are discussed in [Section 4](#) (Effluent Characterization) and [Section 5](#) (Meliadine Lake Water Quality).

Figure 1-4. Surface Contact Water Management in 2020

Note: This figure was taken from *Meliadine Site Water Balance and Water Quality Model* (Golder 2020b) prepared in support of the Water Licence Amendment.

Table 1-2. Summary of Major Development Activities Since the Start of Construction in 2015

Mine Year	Mine Development Activities and Sequence ^[a]
Q4 of Yr -5 (2015)	<ul style="list-style-type: none"> 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
Yr -4 (2016)	<ul style="list-style-type: none"> 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)
Yr -3 (2017)	<ul style="list-style-type: none"> 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)
Yr -2 (2018)	<ul style="list-style-type: none"> 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
Yr -1 (2019)	<ul style="list-style-type: none"> 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
Yr 1 (2020)	<ul style="list-style-type: none"> 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

Notes:

Key water management activities are **bolded**.

[a] This table was adapted from the Mine Waste Management Plan (Agnico Eagle 2020).

2 AEMP STUDY DESIGN

This chapter provides an overview of the AEMP study design with respect to the water quality component of the program. Information on study design considerations for fish (health and chemistry), benthic invertebrate community health, and sediment quality are discussed in detail in the *AEMP Design Plan* (Golder 2016).

2.1 Study Areas

As mentioned previously, the AEMP is comprised of two related, yet distinct monitoring programs: the Meliadine Lake study and the Peninsula Lakes study. The two programs share common field methods, analytical methods, quality assurance and quality control protocols, and similar strategies for evaluating the water quality data, but there are some notable differences. An overview of study design for Meliadine Lake and the Peninsula Lakes is provided below.

2.1.1 Meliadine Lake

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. Conceptually, NF areas provide an early-warning for introductions of stressors into the receiving environment and are situated in close proximity to the primary sources of exposure at a site (i.e., the edge of the mixing zone for effluent). MF areas are located farther downstream from the NF monitoring areas and help define the spatial extent of potential changes observed at NF area(s). Finally, reference areas provide insights into regional trends (e.g., climatic events) that would be expected to influence all sampling areas (i.e., natural temporal changes).

There are five water quality sampling *areas* in Meliadine Lake, and each area has five spatially-distinct replicate *stations* located at least 100 m apart to characterize variability within each area. The targeted lake depth at each station is 8 to 10 m, with water samples collected at a depth of 4 m from the surface. These stations are also where benthic invertebrates and sediment are collected for the EEM program every 3 years.

- **Near-field (MEL-01)** – The entire NF area is approximately 500 m in diameter (**Figure 1-2**). Two of the fixed sampling stations are located 100 m from the diffuser to provide greater likelihood of detecting changes in water quality during the open-water discharge period. The other three stations are located at between 200 and 250 m from the diffuser. An additional monitoring

station was established at 100 m from the diffuser in 2020 as part of the study design for the WQ-MOP undertaken specifically for the emergency amendment. Details of the WQ-MOP are discussed in [Section 5.1.2](#) of the Meliadine Lake water quality study.

- **Mid-field (MEL-02)** – the *mid-field* monitoring area (MEL-02) is located approximately 3 km northwest from MEL-01, northwest of the constriction separating the east and west basins. The general flow direction at MEL-01 is from southeast to northwest; water quality data from MEL-02 provide a spatial context for any changes observed at MEL-01 that may be mine-related as opposed to natural.
- **Reference Areas 1, 2, and 3 (MEL-03, MEL-04 and MEL-05)** – Three *reference areas* in Meliadine Lake are sampled annually to assess whether there are spatial differences in water quality at the NF and MF stations relative to far-field locations in Meliadine Lake. Reference Area 1 (MEL-03) is located in the northeast area of the west basin⁷ of Meliadine Lake and is sampled concurrently with the NF and MF areas in July, August, and September. Reference Area 2 (MEL-04; northwest part of the west basin) and Reference Area 3 (MEL-05; south basin near the outlet to Meliadine River) are sampled in August as part of the expanded monitoring program that includes phytoplankton monitoring.

The Meliadine Lake water sampling program is designed primarily to detect changes in water quality during the open-water season, coinciding when effluent is discharged to Meliadine Lake. The open-water season in the region is short, typically from early to mid-June until the end of October. Sampling in June and October is not recommended due to safety concerns related to ice stability in the spring and inclement weather in October.

Given the short-window to complete open-water sampling, one winter (through-ice) sampling event is completed at the NF and MF areas to provide a *snap-shot* of conditions in Meliadine Lake and assess the spatial extent of water quality changes in areas closest to the mine. Water samples are not collected from reference areas in the winter due to the distance from site and ensuing health and safety considerations for safe sampling, which precludes a more formal assessment of mine-related vs natural changes in water quality during the prolonged ice-covered season.

2.1.2 Peninsula Lakes

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

⁷ Use of east, west and south basins for Meliadine Lake as per Golder (2019).

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.

- **Watershed A** – Lakes in watershed A are located mainly to the south and east of the mine. Lake A8 is the largest of the lakes in the subdrainage. The outlet to Lake A8 is located at the southeast end of the lake. Water from Lake A8 ultimately flows into Meliadine Lake, approximately 2 km south of sampling area MEL-01.
- **Watershed B** – Lakes in watershed B are located west and south of the mine site. Lake B7, located adjacent to the TSF, is the largest lake in the subdrainage and represents the lake that is most suitable for monitoring changes in water quality related to dust from the TSF. Surface water flows from north to south, eventually emptying into Meliadine Lake south east of MEL-05.
- **Watershed D** – Lakes in watershed D are located west of watershed B. The direction of flow is from east to west, with Lake D1 emptying into Meliadine Lake across from where Meliadine Lake drains into the Meliadine River.

Water quality monitoring at three headwater lakes (Lake A8, Lake B7 and Lake D7; **Figure 1-2**) is conducted twice during the open water season in July and August to assess whether the mine is indirectly causing changes in water quality. As outlined in the *AEMP Study Design* (Golder 2016), the scope of the Peninsula Lakes AEMP focuses solely on assessing changes in water quality. If changes in water quality are detected, follow-up investigations may be implemented as part of the AEMP Response Framework (Figure 8.1 in Golder 2016).

2.2 Field and Laboratory Methods

Field methods for the Meliadine Lake and the Peninsula Lakes program follow the same standard operating procedure (SOP), with a few slight modifications when sampling at the shallower Peninsula Lakes.

In-situ Field Measurements

Field sampling is completed by boat without anchoring if wind and wave conditions are light to moderate. In inclement weather, the boat is anchored to stay within close proximity to the fixed sampling location. At each sampling station, field measurements (water depth and physicochemical measurements) are collected prior to surface water quality samples for chemistry analysis. Total depth of the water column is measured either by using a sounding line or a boat-mounted sonar unit; during the ice-cover program a sounding line is used to measure total depth. *In-situ* physicochemical measurements are taken just below the surface (or below the ice during ice-covered conditions), at 0.5 m below the surface, at 1.0 m below the surface and every 1 m thereafter throughout the water column ending at approximately 0.5 m above the sediment. Multiprobes (e.g., YSI, or Eureka Manta) with

sensors for measuring dissolved oxygen (DO) as mg/L and %, temperature as °C, pH, and specific conductivity as $\mu\text{S}/\text{cm}$ are used for limnology measurements. During ice-covered conditions at Meliadine Lake, ice thickness is also measured.

Surface Water Sampling – AEMP

Surface water samples are collected using a Kemmerer grab sampler from mid-depth in the water column during the open-water sampling events. Meliadine Lake stations are sampled at 4 m. The shallower Peninsula Lakes are sampled at 1 m below the surface. The Kemmerer is triple rinsed prior to sampling at each area. For the winter sampling event at Meliadine Lake, water samples are collected mid-depth using an electric submersible pump connected to a length of C-Flex (Cole Parmer) silicon tubing. Prior to filling the bottles, water is pumped through the tubing for at least two minutes to flush the entire system.

Bottles for chemistry analysis are pre-labelled before going into the field and handled (i.e., preserved and filtered) according to specifications provided by ALS Environmental. Filtered samples for dissolved organic carbon, dissolved nutrients, and dissolved metals are collected using a syringe and 0.45 μm disc filter provided by ALS (see [Table 2-1](#)). A checklist is included with the field data sheet to verify the samples requiring filtration and to ensure preservation is handled correctly.

Water quality samples for the AEMP are sent to ALS Environmental in Winnipeg, MB. The lab in Winnipeg arranges sample shipping to Edmonton, Vancouver, and Fort Collins, Colorado based on the analytical capabilities at these locations and the detection limits for the project. ALS is an analytical laboratory accredited by the Canadian Association for Laboratory Accreditation Inc. (CALA).

Table 2-1. Water quality parameters collected for the AEMP.

List of 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 radium-226

Water Sampling – Phytoplankton Study

The phytoplankton study in Meliadine Lake is undertaken in the August AEMP event and includes the following monitoring components:

1. Phytoplankton taxonomy (biomass [mg/m³], density [cells/L], and richness [number of taxa])
2. Chlorophyll-a
3. Nutrients

Water samples are collected as composite samples collected from discrete depth intervals through the water column (aka depth-integrated samples). Depth-integrated, rather than discrete sampling, considers potential heterogeneity in the vertical distribution of the phytoplankton community top to bottom in the water column. Sampling followed the same methods as in previous years (e.g., Golder 2019). First, Secchi depth (20-cm disk) was measured at each location to determine the depth of the euphotic zone⁸, defined as 2-times the Secchi depth. After defining the depth of the euphotic zone, water samples were collected (using the Kemmerer) from just below the surface and every two meters through the euphotic zone (or to 2 m off the lake bed if the estimated euphotic zone extended right to the bottom⁹). An equal volume of water from each discrete sample was combined in a clean bucket to create the composite depth-integrated sample. Subsamples of the composite depth integrated water sample were collected for 1) nutrients, 2) chlorophyll-a, and 3) phytoplankton taxonomy. One sample at each station was collected for nutrients and phytoplankton; triplicate samples were collected for chlorophyll-a.

- Each sample for nutrient analysis was collected from the depth-integrated composite and processed according to instructions from ALS. Samples were processed (i.e., filtered and/or preserved as required by analyte or analyte group) and refrigerated. Samples were shipped cold to ALS (Edmonton) for analysis of total nitrogen (TN), dissolved nitrogen, total Kjeldahl nitrogen (TKN), dissolved Kjeldahl nitrogen, total ammonia, nitrate, nitrite, total phosphorus (TP), dissolved phosphorus, dissolved orthophosphate, and soluble reactive silica (SRSi).
- Triplicate subsamples of the depth-integrated composite were collected for chlorophyll-a. Each triplicate sample was collected by filtering 500 mL of water through a Whatman glass fiber type C filter with a nominal pore size of 1.2 µm using a vacuum pump. Individual filters were folded in half, placed in pre-labelled containers, and shipped frozen to the Biogeochemical Analytical

⁸ The euphotic zone is the vertical extent of water column where sufficient light is present for photosynthesis; typically, depth where 1% of surface irradiance is measured (see Koenings and Edmundson 1991, Alberta Environment 2006; both as cited in Golder 2019).

⁹ The total water depth at all of the stations in Meliadine is less than 2-times the Secchi depth.

Service Laboratory at the University of Alberta (Edmonton), for spectrophotometric analysis of chlorophyll-a.

- Each sample for phytoplankton analysis was collected from the depth-integrated composite in a 250-ml amber Nalgene bottle. Samples 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).

2.2.1 Data Management

Water quality data for the Meliadine project are managed within an EQUIS database. Water quality data are uploaded directly to EQUIS by the different laboratories. Data analysis, including summary statistics, plotting, and statistical analyses were completed using open-source software (R; version 3.6.1).

Descriptive summary statistics were calculated for the list of AEMP water chemistry parameters listed in **Table 2-1**. Summary statistics (mean, standard deviation (SD), median, minimum and maximum values) are calculated on the pooled annual results for each area (in the case of Meliadine Lake) or individual lakes (for the Peninsula Lakes). Summary statistics were calculated separately for the winter and open-water sampling events in Meliadine Lake. In cases when the reported concentration from the lab was less than the detection limit (DL), half the value of the DL was used to calculate the mean and SD. If more than 50% of the values were <DL, the mean and SD were not calculated and other statistics (e.g., median or maximum) were used to interpret the results. Parameters with more than 50% of the samples below the DL were not carried forward for further analysis. This approach to handling non-detect (or censored data) was adopted from previous reports (e.g., Golder 2019).

2.3 Approach to Evaluating Water Quality Results

2.3.1 Key Questions for Evaluating Changes in Water Quality

To help focus the decision-making process, a series of *key questions* were proposed for each component of the AEMP as a way of evaluating mine-related changes to water quality, fish health, the health of benthic invertebrate communities, and the opportunity for traditional and non-traditional use of the fishery. The key questions for each component of the AEMP are outlined in the AEMP Design Plan (2016), but for the purpose of the 2020 AEMP Report, only questions pertaining to water quality assessment are discussed herein.

Each year, three key questions are evaluated for the water quality component of the AEMP:

1. *Are concentrations of parameters in the effluent less than limits specified in the Water Licence?*
2. *Has water quality in the exposure areas changed over time, relative to reference/baseline areas (in the case of Meliadine Lake) or baseline conditions (in the case of the Peninsula Lakes)?*

- If the answer is “no”, then water quality in Meliadine Lake or the Peninsula Lakes is similar to conditions measured in the baseline period, and the conclusion is that activities at the mine are not causing changes in water quality.
- If the answer is “yes”, then a more thorough examination of the data is required to verify that the changes in water quality are consistent with the FEIS predictions and that water quality is safe for aquatic life and human consumption.

3. *Is water quality consistent with predictions outlined in the Final Environmental Impact Statement (FEIS) and less than AEMP Action Levels¹⁰?*

The first question applies specifically to the Meliadine Lake study. Simply put, under terms of the Water Licence (and MDMER), certain parameters (e.g., TDS, some metals) in treated contact water cannot exceed authorized limits. Questions 2 and 3 broadly apply to both the Meliadine Lake and the Peninsula Lakes studies, with some differences specific to each study design. For example, as of August 2020, there are updated predictions for how water quality in the east basin of Meliadine will change between 2020 and 2028 (based on total dissolved solids). These model results provide a point of comparison to accurately assess whether changes observed in Meliadine Lake match the magnitude and extent of changes based on the current mine plan (Tetra Tech 2020). In the case of the Peninsula Lakes, the predictions from the 2014 FEIS remain the point of comparison (discussed further below).

The following sections discuss how water quality data is evaluated relative to the key questions above and how the data are ultimately interpreted within the Aquatic Monitoring Response Framework in the AEMP Design Plan (Golder 2016).

2.3.2 Comparison to Baseline / Reference Conditions

Spatial and temporal comparisons are an important aspect of the water quality monitoring program for both Meliadine Lake and the Peninsula Lakes. In previous AEMP reporting cycles, the *normal range* has been the default method for evaluating current water quality at the exposure areas relative to baseline and reference conditions. The normal range represents the range of natural variability in data based on data collected during the baseline period and supplemented with additional reference area chemistry data that may be collected each year. Use of the normal range concept can be effective in situations where water quality is expected to remain relatively consistent compared to reference areas or baseline conditions. However, in situations where water quality is predicted to change, as is the case with the east basin of Meliadine Lake and various waterbodies on the peninsula, these comparisons become less

¹⁰ 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 are discussed in detail in [Section 2.3.4](#).

insightful after analytes have moved beyond the upper limit of the normal range. In the case of Meliadine Lake for example, both the FEIS (Agnico Eagle 2014) and recently updated water quality modeling completed by Tetra Tech (2020) predict TDS concentrations in the east basin to increase beyond the normal range to approximately 170 mg/L by 2028. TDS concentrations in the NF area exceeded the normal range in 2019 and are expected to do so for another decade or more (see [Section 5.3.4](#) for more details). Thus, when clear mining-related changes have been identified, tracking trends should also focus on both quantitative and qualitative comparisons to the FEIS (or more recent) predictions and on comparisons to project-specific action levels and benchmarks.

Notwithstanding, each year, water quality results for each lake (Meliadine, Lake A8, Lake B7, and Lake D7) are screened against their respective normal ranges of baseline / reference conditions¹¹. 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. In the case of Meliadine Lake, normal ranges are updated each year with the addition of new reference data from MEL-03, MEL-04, and MEL-05. The nuances of the normal range assessment for the Meliadine Lake and Peninsula Lakes studies are discussed in more detail within their respective chapters.

2.3.3 Comparison to FEIS Predictions

In the context of the AEMP, the term “FEIS predictions” refers to the *expected* change in surface water quality in response to development of the mine (Agnico Eagle 2014). FEIS predictions were based on the results of water quality modelling that was done for Meliadine Lake and some of the waterbodies on the peninsula that may be affected by mining development. The extent, timing, and certain aspects of the mine development in the Project Certificate No.006 are no longer relevant to the current life of mine. Consequently, the *specific* numerical water quality predictions for Meliadine Lake and the waterbodies on the peninsula are also outdated for most parameters except for TDS, chloride, and sodium (discussed in [Section 5.3.5](#)). However, the broad *narrative* statements about changes in water quality related to mining activities are still a relevant point of comparison for evaluating whether the mine is operating within the approved scope of the Project. Changes in water quality in the FEIS were defined as either *negligible* or *minor* based on the predicted increase relative to baseline data for a given parameter and lake and water quality guidelines (e.g., aquatic life or human drinking water guidelines) or site-specific water quality objectives (SSWQO):

- A *negligible* change was defined as an increase of 10% or less relative to baseline conditions. As stated in Volume 10 of the FEIS (Agnico Eagle 2014), a 10% increase relative to baseline

¹¹ Normal ranges were not derived for the ice-covered sampling events due to insufficient reference and baseline data for the winter months.

concentrations accounts for variability in spatial and temporal concentrations, variability in field and laboratory methods, and conservatism incorporated into predictive models.

- A *minor* change in water quality is defined as an increase in concentration relative to baseline or reference conditions, but less than water quality guidelines or SSWQOs.

2.3.4 AEMP Benchmarks

The term *AEMP Benchmark* refers to the various water quality guidelines for protection of aquatic life, guidelines for the protection of human drinking water quality, or site-specific water quality objectives (SSWQO) developed for the Project (**Table 2-2**). The AEMP Benchmarks are the effects thresholds protective of aquatic life and human drinking water quality for the project. To provide an added level of protection, the *AEMP Action Level* is set at 75% of the AEMP Benchmark (i.e., the lowest water quality guideline or SSWQO) for each parameter. The AEMP Action Levels are early warning ‘triggers’ meant to signal changes in water quality that may be of concern prior to exceedances of effect-based thresholds for the protection of aquatic life and human health.

AEMP Benchmarks for Toxicological Impairment (Harmonized List)

In previous AEMP reporting cycles, separate screening assessments for aquatic life and human health were undertaken using separate sets of AEMP Benchmarks. To simplify the screening assessment, the lowest of the freshwater aquatic life and drinking water guidelines for each parameter were adopted as the AEMP Benchmark (and corresponding AEMP Action Level) in 2020. With the exception of fluoride, arsenic, and iron, which have SSWQO, and antimony which has a lower health-based drinking water quality guideline, the water quality guidelines for protection of aquatic life are more conservative (i.e., lower). Therefore, if the concentration of a given parameter is below the AEMP Benchmark for aquatic life, the benchmark for drinking water quality is also met. An exception was made in the case of arsenic, and the drinking water quality guideline of 10 µg/L was adopted as the AEMP Benchmark rather than the SSWQO of 25 µg/L. To date, arsenic concentrations remain well below the drinking water quality guideline.

AEMP Benchmarks for toxicological effects to aquatic life were adopted from the most recent guidelines published by the following sources:

- Canadian Council of Ministers of the Environment (CCME) – The freshwater aquatic life guidelines published by CCME were adopted as the AEMP Benchmarks for protection of aquatic life unless other jurisdictions published more recent guidelines.
- Federal Environmental Quality Guidelines (FEQG) – As stated on the ECCC website, the FEQGs are being developed where there is a federal need for a guideline but where the CCME guidelines for the substance have not yet been developed or are not reasonably expected to be updated in the

near future. FEQGs are similar to CCME WQGs in that they are based solely on toxicological effects data using the same methods of derivation, where adequate data exists. Parameters with more recent FEQG include vanadium (2016), cobalt (2017), copper (2019 [under revision])¹², lead (2020), and strontium (2020).

- Guidelines published by the British Columbia Ministry of Environment and Climate Change Strategy (BC ENV) for parameters not covered under either CCME or FEQGs (e.g., sulphate).
- Guidelines from other jurisdictions (e.g., TDS guideline for Alaska of 500 mg/L [ADEC 2012]).
- Canadian drinking water quality guidelines (Health Canada 2020).

Some parameters, such as aluminum, lead, cadmium, and zinc have calculated guidelines that are dependent on other parameters known to affect their toxicity (e.g., hardness, pH, DOC). For simplicity, the AEMP Benchmarks for these parameters were conservatively defined as the lowest sample-specific aquatic life guideline calculated for the NF samples in 2020. In the case of sulphate, which has a hardness-dependent aquatic life guideline in BC, the AEMP benchmark was set to 128 mg/L for Meliadine Lake (hardness < 30 mg CaCO₃/L) compared to 218 for the Peninsula Lakes (hardness between 31 to 75 mg CaCO₃/L) to account for natural differences in hardness among the lakes.

AEMP Benchmarks for Nutrient Enrichment

Total phosphorus (i.e., the limiting nutrient in Meliadine Lake) and chlorophyll-a (i.e., a direct indicator of primary productivity used in trophic status assessment) are the parameters included in the nutrient enrichment action level assessment. The AEMP benchmarks for nutrient enrichment were selected to protect the oligotrophic status of Meliadine Lake and represent the commonly accepted upper limits of the oligotrophic ranges for total phosphorus and chlorophyll-a (Golder 2019).

- Total phosphorus: 0.01 mg/L based on CCME (2004) trigger ranges for evaluating trophic status in lakes.
- Chlorophyll-a: 4.5 µg/L, based on an evaluation by DDMI (2013) of chlorophyll-a concentrations compared to trophic status. Their assessment concluded that 4.5 µg/L represents a reasonable and conservative upper boundary for classifying northern lakes as oligotrophic (Golder 2019).

¹² The FEQG for copper is based on the biotic ligand model.

Table 2-2. AEMP Benchmarks (current to 2020)

Parameter	Units	Aquatic Life Water Quality Guidelines				AEMP Benchmarks			AEMP Action Level (75% of Lowest Benchmark)	Notes on the AEMP Benchmark
		SSWQO	CCME	FEQG	Other Sources	Aquatic Life	Drinking Water Quality	Nutrient Enrichment		
Conventional Parameters										
pH	-	-	6.5 -9.0	-	-	6.5 to 9.0	-	-	6.5 to 9.0	CCME (1987).
Dissolved oxygen	mg/L	-	6.5	-	-	6.5	-	-	6.5	CCME (1987). Lower limit for protecting cold water species.
TDS and Major Ions										
Total Dissolved Solids	mg/L	1,000	-	-	500	500	500	-	375	Alaska DEC 2012. Guideline is protective of salmon spawning habitat downstream of Red Dog Mine in Alaska. The ionic composition of TDS is primarily calcium sulphate. At Meliadine, Cl, Na, and Ca are the dominant ions in surface contact water discharged to Meliadine Lake (Golder 2020a). TDS guidelines are dependent on relative proportion of the constituent ions. The ADEC guideline for TDS is carried forward as the AEMP Benchmark rather than the proposed in-lake edge benchmark of 1,000 mg/L at the edge of the mixing zone (Golder 2020a).
Chloride	mg/L	-	120	-	-	120	-	-	90	CCME (2011). Derived with mostly no- and some low-effect data and are intended to protect against negative effects to aquatic ecosystem structure and function during indefinite exposures (e.g. abide by the guiding principle as per CCME 2007).
Sulphate	mg/L	-	-	-	128-218	128-218	-	-	Meliadine Lake = 96 Peninsula Lakes = 163	BC ENV (2018). The sulphate guideline is hardness dependent. 128 mg/L applies to Meliadine Lake (hardness < 30 mg CaCO3/L); 218 mg/L applies to the Peninsula Lakes (hardness = 31 to 75 mg CaCO3/L)
Fluoride	mg/L	2.8	0.12	-	-	2.8	1.5	-	2.1	Golder (2014). The Health Canada guideline for fluoride is not health based. SSWQO adopted as the AEMP Benchmark
Nutrients										
Nitrate	mg-N/L	-	2.93	-	-	2.93	10	-	2.18	CCME (2012). Protection against direct toxic effects. 2.93 mg/L based on the conversion factor in the factsheet.
Nitrite	mg-N/L	-	0.06	-	-	0.06	1.0	-	0.045	CCME (1987)
Total ammonia	mg-N/L	-	0.58	-	-	0.58	-	-	0.44	CCME (2001). The guideline for total ammonia is temperature and pH dependent. For the purpose of this assessment, the guideline was conservatively set for water with pH = 7.5 and a temperature of 15 °C. This guideline for NH3 is converted to total ammonia as N by multiplying 0.715 mg/L x 0.8224.
Total phosphorus	mg/L	-	0.01	-	-	-	-	0.01	0.0075	CCME (2004). The total phosphorus guideline applies to Meliadine Lake only. The CCME guideline of 0.01 mg/L is defined as the transition between oligotrophic and mesotrophic status.
Chlorophyll-a	µg/L	-	-	-	4.5	-	-	4.5	3.38	Diavik Diamond Mines Inc (DDMI 2013). “Reasonable” upper limit for classifying northern lakes as oligotrophic
Metals (Total Fraction)										
Aluminum	µg/L	-	Variable	-	-	100	-	-	75	CCME (1987). pH dependent; 100 µg/L when pH > 6.5
Antimony	µg/L	-	-	9.0	-	9.0	6.0	-	4.5	Health Canada (1997)
Arsenic	µg/L	25	5	-	-	25	10	-	7.5	Health Canada (2006). Health Canada drinking water quality guideline is lower than the SSWQO and was adopted as the Benchmark for preliminary screening purposes.
Barium	µg/L	-	-	-	1,000	1,000	2,000	-	750	BC ENV (2018)
Boron	µg/L	-	1,500	-	-	1,500	5,000	-	1,125	CCME (2009)
Cadmium	µg/L	-	Variable	-	-	MEL= 0.043 A8= 0.14 B7=0.13 D7=0.076	7	-	MEL= 0.032 A8=0.1 B7=0.096 D7=0.057	CCME (2014). The guideline applies to total Cd and is hardness dependent: <i>WQG (µg/L) = 10{0.83(log[hardness]) – 2.46 }</i>
Chromium (VI)	µg/L	-	1	5	-	5	50	-	3.75	FEQG 2018. The guideline applies to hexavalent chromium (CrVI) which is more toxic than Cr(III). The FEQG replaces the CCME guideline from 1997.
Cobalt	µg/L	-	-	Variable	-	MEL=0.78 A8=0.95 B7=0.92 D7=0.78	-	-	MEL=0.78 A8=0.71 B7=0.69 D7=	FEQG 2017. Hardness-dependent guideline: <i>WQG = exp{[(0.414[ln(hardness)] - 1.887)}</i>
Copper	µg/L	-	Variable	-	-	MEL=2.0 A8=2.1 B7=2.0 D7=2.0	-	-	MEL=1.75 A8=1.5 B7=1.5 D7=1.5	CCME 1987. The existing AEMP Benchmark from CCME only considers hardness as a modifying factor on the bioavailability and toxicity of Cu for aquatic organisms. A new FEQG for dissolved Cu is under review based on the biotic ligand model (BLM) which considers a broad suite of water quality parameters that influence Cu bioavailability. This new FEQG will likely replace the existing CCME guideline once approved by

Parameter	Units	Aquatic Life Water Quality Guidelines				AEMP Benchmarks			AEMP Action Level (75% of Lowest Benchmark)	Notes on the AEMP Benchmark
		SSWQO	CCME	FEQG	Other Sources	Aquatic Life	Drinking Water Quality	Nutrient Enrichment		
Iron	µg/L	1,060	300	variable	-	1,060	300	-	225	The Health Canada guideline for iron is an aesthetic objective based on taste and other considerations. The concentrations of iron are well below the 300 µg/L aesthetic guideline, so for screening purposes, this value was adopted rather than the SSWQO as an early indicator of increasing iron concentrations. The draft FEQG (2019) is hardness and pH dependent: $WQG = \exp(0.671[\ln(DOC)] + 0.171[pH] + 5.586)$
Lead	µg/L	-	1	Variable dissolved	-	MEL= 3.31 A8=7.9 B7=8.6 D7=7.4	5	-	MEL= 2.48 PEN = 3.75	FEQG 2019. The FEQG for lead is based on the dissolved fraction and is hardness and DOC dependent: $WQG = \exp(0.514[\ln(DOC)] + 0.214[\ln(Hardness)] + 0.4152)$ The lowest FEQG for Meliadine Lake is below the Health Canada drinking water guideline. Therefore, the AEMP Benchmark for protection of aquatic life is also protective of drinking water quality in Meliadine Lake. For the Peninsula Lakes, the Health Canada drinking water guideline of 5 µg/L is lower than the FEQG for Lake A8, B7, and D7.
Manganese	µg/L	-	Variable dissolved	-	-	MEL= 210 A8=350 B7=440 D7=320	120	-	90	Health Canada (2020). The health-based drinking water quality guideline is lower than the CCME guideline and is used as the AEMP Benchmark. CCME (2019). The aquatic life water quality guideline for Mn applies to the dissolved fraction and is hardness and pH dependent (refer to calculator in the factsheet).
Mercury	µg/L	-	0.026	-	-	0.026	1	-	0.0195	CCME (2003)
Molybdenum	µg/L	-	73	-	-	73	-	-	54.8	CCME (1999)
Nickel	µg/L	-	variable	-	-	25	-	-	18.8	CCME 1987. Hardness-dependent guideline. At hardness less than 60 mg/L, the guideline is 25 µg/L. At other hardness levels, the guideline is: $WQG (\mu\text{g/L}) = e\{0.76[\ln(Hardness)]+1.06\}$
Selenium	µg/L	-	1	-	-	1	50	-	0.75	CCME (1987).
Silver	µg/L	-	0.25	-	-	0.25	-	-	0.188	CCME (2015).
Strontium	µg/L	-	-	2,500 dissolved	-	2,500	7,000	-	1,875	FEQG (2020). The guideline for dissolved Sr was conservatively set as the AEMP Benchmark for total Sr.
Thallium	µg/L	-	0.8	-	-	0.8	-	-	0.6	CCME (1999).
Uranium	µg/L	-	15	-	-	15	20	-	11.25	CCME (2011).
Vanadium	µg/L	-	-	120	-	120	-	-	90	FEQG (2016).
Zinc	µg/L		Variable dissolved			MEL=3.91 A8=21.9 B7=23.0 D7=11.6	-	-	MEL=2.93 A8=16.4 B7=17.3 D7=8.7	CCME (2018). The chronic WQG for Zn applies to the dissolved fraction and is hardness, DOC, and pH dependent: $WQG = \exp(0.947[\ln(Hardness \text{ mg/L})] - 0.815[pH] + 0.398[\ln(DOC \text{ mg/L})] + 4.625)$ The guideline for dissolved Zn was conservatively set as the AEMP Benchmark for total Zn.

Notes:

MEL = Meliadine Lake; PEN = Peninsula Lakes (A8, B7, and D7)

The AEMP Benchmarks for metals apply to the total fraction. In the case of Lead, Strontium, and Zinc, the freshwater aquatic life guidelines derived for the dissolved fraction have been adopted as the AEMP Benchmarks. For parameters that vary with hardness, pH, DOC, etc, the lowest guideline calculated at MEL-01 in 2020 was adopted as the AEMP Benchmark for Aquatic Life.

Sources:

- CCME = Canadian Environmental Guidelines for the Protection of Aquatic Life (current to February, 2020). Benchmarks for parameters that are pH or hardness-dependent were conservatively set at the lowest guidelines calculated for the 2020 samples in the NF area in Meliadine Lake.
- FEQG = Federal Environmental Quality Guidelines, Environment and Climate Change Canada. Note: benchmarks for parameters that are pH or hardness-dependent were conservatively set at the lowest guidelines calculated for the 2020 samples in Meliadine Lake.
- ADEC (Alaska Department of Environmental Conservation). 2012. Water Quality Standards. 18 AAC 70. Amended as of April 8, 2012. Juneau, AK, USA. Available at: Link. Accessed March 2014.
- British Columbia Ministry of Environment (BC ENV). 2020. British Columbia Approved Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture - Summary Report. Water Protection & Sustainability Branch, BC Ministry of Environment & Climate Change Strategy. August 2019.
- Site Specific Water Quality Objectives (Golder 2014)
- Health Canada. 2020. Guidelines for Canadian Drinking Water Quality—Summary Table. Water and Air Quality Bureau, Health Environments and Consumer Safety Branch, Health Canada, Ottawa, Ontario.

2.4 Response Framework and Action Levels

The Response Framework links monitoring results with appropriate management actions to implement changes before effects occur¹³. The Response Framework for Meliadine was developed based on *Draft Guidelines for Adaptive Management – a Response Framework for Aquatic Effects Monitoring* (WLWB 2010) and experience gained at Meadowbank (Azimuth 2012).

The Response Framework uses action levels to define the level of response associated with each action level (negligible, low, medium, or high). Action levels were developed for each monitoring component (e.g., water, benthic invertebrate community endpoints, etc.) based on comparison to the baseline data (e.g., normal range assessment), by adopting water quality guidelines as *AEMP Benchmarks*, or statistical tests. The managed response is dependent on what changed in the environment (e.g., higher concentration of X parameter) and the action level that is exceeded (low, moderate, or high).

Furthermore, the specific management action that would be appropriate in a given case depends on the underlying cause. For example, if a metal becomes elevated in the aquatic receiving environment, the identification of options for further assessment and/or mitigation would be different if the source of the metal is groundwater versus effluent versus dust (Azimuth 2012).

Low Action Levels, which were updated in 2018, provide an early warning indicator (aka ‘trigger’) that changes in water quality have occurred before concentrations increase to levels associated with effects to aquatic life or drinking water quality. An overview of the Low Action Levels for toxicological impairment and nutrient enrichment and their corresponding evaluation criteria are provided below.

2.4.1 Assessment of 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 from changes in water quality are evaluated using information from sublethal toxicity testing on effluent from MEL-14 and comparing water quality to the AEMP Benchmarks described above in **Section 2.3.4**. Parameters carried forward in this assessment have toxicologically-based thresholds for the protection of aquatic life, such as pH, dissolved oxygen, certain major ions and nutrients (e.g., chloride and nitrate), and metals. Parameters of concern published by Health Canada for the protection of drinking water quality are also included in the assessment.

¹³ Terminology for *effect* and *change* is taken from the AEMP Design Document (Golder 2016). *Effects* are defined as *changes* that are linked to activities at the mine. For example, a particular water quality parameter may increase from one year to the next due to inherent natural temporal variability or a regional trend that caused changes in water quality over a wide area. In this respect, the increase constitutes a *change*, but not an *effect* that is plausibly linked to activities at the mine.

A summary of the questions and approach to assessing toxicological impairment for effluent quality and water quality are summarized below in **Table 2-3**.

2.4.2 Assessment of Nutrient Enrichment

Discharge of treated effluent containing nutrients to Meliadine Lake has the potential to cause an increase in primary productivity, which under certain conditions, can lead to changes in the overall health of freshwater aquatic communities. Two metrics are used to evaluate nutrient enrichment: chlorophyll-a and total phosphorus concentrations. The Low Action Level assessment for nutrient enrichment follows the same approach described above for aquatic life: (1) an increase or change relative to baseline, (2) exceedance of the Low Action Levels, and (3) divergent trends between the NF and reference areas (**Table 2-4**). All three conditions must be met for an exceedance of the low action level for nutrient enrichment.

As part of the nutrient enrichment assessment, phytoplankton community data are also assessed to validate or refute the determination of nutrient enrichment based on total phosphorus and chlorophyll-a data. Phytoplankton indices such as community structure and biomass provide a direct estimate of whether activities at the mine are contributing resulting in changes in the primary productivity of the lake. To date, measurement endpoints for the phytoplankton community have not been formally incorporated in the Low Action Level assessment. Which metrics are best suited to include in the Low Action Level assessment are discussed in **Section 6.6**.

Table 2-3. Low Action Level Assessment Criteria for Water Quality – Toxicological Impairment

Conditions	Criteria
End-of-Pipe Toxicity	
Is effluent from MEL-14 causing a persistent toxic effect to aquatic species other than fish?	The low action level is exceeded if exposure to full-strength effluent causes an IC25 or EC50 response in three consecutive tests for test species other than fish.
Aquatic Life	
Has water quality at the near-field area changed relative to baseline/reference conditions?	Compare current water quality against the normal range of baseline/reference conditions.
Does current water quality exceed the AEMP Action Level of 75% of the AEMP benchmark?	AEMP benchmarks are based on water quality guidelines published by CCME, FEQG, or site-specific water quality objectives (SSWQO) in the case of fluoride, arsenic, and iron. As an “early warning trigger” the AEMP benchmark is set equal to 75% of the respective guideline.
Is there a divergent trend in water quality at the NF area in Meliadine Lake compared to the reference areas? ¹⁴	Water quality plots are used to visually assess whether the pattern of change in water quality over time at the NF area is divergent from the pattern at the reference areas. The normal range assessment is used to short-list parameters that warrant more scrutiny in the temporal assessment.
Drinking Water Quality	
Are parameters in drinking water below guidelines protective of human health?	The low action level assessment for safe drinking water follows the same approach described above for aquatic life. 75% of the GCDWQ are the AEMP benchmarks for evaluating whether drinking water quality is being impacted by mining activities.

Table 2-4. Low Action Level Assessment Criteria for Water Quality – Nutrient Enrichment

Questions for Nutrient Enrichment	Evaluation
Are concentrations of chlorophyll-a and total phosphorous (TP) elevated relative to baseline / reference?	Compare current water quality against the normal range of baseline/reference conditions.
Does current water quality exceed 75% of the AEMP benchmark?	Compare current water quality results against AEMP benchmarks.
Is there a divergent temporal trend between NF and reference areas?	Rely primarily on water quality plots to determine the different between areas and over time.

¹⁴ There are no reference areas used in the assessment of the Peninsula Lakes. Temporal trends are evaluated as part of normal range assessment (i.e., comparison of current water quality to baseline conditions).

3 QUALITY ASSURANCE / QUALITY CONTROL

The framework of the 2020 quality assurance quality control QA/QC program is outlined in the *AEMP Design Document* (Golder, 2016). The Design Document is the foundation for assessing data quality for each component of the AEMP (e.g., water, phytoplankton). Detailed analysis of the data quality for each component is provided in **Appendix A**. A summary of the key messages from the 2020 QA/QC program is provided in the subsections below.

3.1 Limnology and Water Chemistry QA/QC

Field QC procedures included the collection and/or analysis of field duplicates and blanks (travel, equipment, and deionized water blanks). The laboratory QC program included duplicate analysis, blanks, and analysis of spike samples and reference material to verify the accuracy and precision of the analytical method. The QA/QC objectives and methods for water chemistry are provided in **Appendix A**.

3.1.1 Field Data and Sample Collection

For specific field QA procedures, see **Appendix A**. Briefly, field QA methods were applied to prevent cross-contamination between locations and from the equipment itself. These methods included wearing nitrile gloves and rinsing the sample equipment with surface water prior to collecting samples.

QA Summary: AEMP Field Data and Sample Collection

- The 2020 AEMP water quality sampling plan for Meliadine Lake and the Peninsula Lakes was completed in full, as per the recommended schedule and timing of sampling in the *AEMP Design Document* (Golder 2016) and recommendations in the 2019 interpretive report (Azimuth 2020).
- Sample integrity related to shipping and hold times is briefly discussed in **Section 3.3** and in further detail in **Appendix A**. Analytical results from the travel blanks (TB), deionized water blanks (DB) and equipment blanks (EB) indicated reliable sample handling and that the potential for cross-contamination to bias interpretation of the 2020 water quality data is unlikely..
- The laboratory QC assessment completed by ALS indicated the 2020 water quality data were typically within the established DQOs. In the few instances where a DQO was exceeded, the lab concluded the results were reliable and fit for use in the water quality assessment.

3.1.2 Field Duplicates

QC Summary: Field Duplicate Results

There were only a few sample/parameter combinations where the field duplicate RPDs did not meet lab-specified DQOs in 2020. Furthermore, most of the deviations noted in 2020 occurred for parameters that were within 10-times the analytical detection limit (DL). The high degree of precision between field duplicate samples indicate consistency in sample collection and sample handling in 2020. For more information about field duplicate results refer to [Appendix A](#).

3.1.1 Blank Samples

Three different types of *blank* samples are included in the AEMP, travel blanks (TB), deionized water blanks (DB) and equipment blanks (EB). For detailed information about each type of blank sample collected refer to [Appendix A](#).

QA Summary: Blank Results

Results from the DB blanks and travel blanks did not warrant flagging any parameters as cautionary or unreliable in the 2020 analyses.

Travel Blanks – Travel blanks were submitted for the March, August and September sampling events. In March and August, ammonia was detected in the travel blanks, and for the August sample, the concentration in the blank was more than 10-fold higher than the detection limit. Ammonia was also detected in the deionized water blank and equipment blank from the same sampling events. Discussions are ongoing with ALS to determine what caused the ammonia exceedances in the travel blanks, as well as the overall quality of the deionized water provided by the laboratory for QC purposes.

De-ionized Blanks (DB) and Equipment Blanks (EB) – There were a few parameters detected in the DB and EB for all four sampling events in 2020. March and August were the months with the greatest number of parameters that were detected in the DB and EB. In most cases, the measured concentration in the blank was only marginally above the DL (< 5-times). There were, however, 6 parameters in the March DB blank and 8 parameters in the March EB where concentrations exceeded 10-times the DL. In August, only 2 parameters were measured in the EB (total antimony and dissolved strontium). The fact that parameters were measured in both the DB and EB suggests there may have been issues with the deionized water provided by the laboratory for use in collecting blanks. The quality of deionized water and steps taken to collect the blanks are being evaluated with the goal of reducing the number of detected parameters in the blanks for the 2021 AEMP.

The lake water samples were evaluated for potential cross-contamination, and the detected concentrations in the blanks were considered to have negligible impact on the results. No

measurements were flagged as unreliable in 2020 based on the DB and EB results. The water quality data passed the QA/QC assessment and are reliable for data analysis and interpretation of spatial trends.

3.1.2 Laboratory QC

The following laboratory QC measures were implemented for the water chemistry analyses; laboratory duplicates, method blanks, matrix spikes and laboratory reference materials. For detailed information about the laboratory QC measures refer to [Appendix A](#).

QA Summary: Laboratory QC Program

Laboratory QA/QC for water chemistry was very good in 2020 with very few laboratory data quality qualifiers and none that were likely to impact data interpretation.

Laboratory Duplicates – All the laboratory duplicates met the DQOs for water chemistry in 2020. The laboratory duplicate results indicate good analytical precision.

Matrix Spike – There were a few major cations and metals detected at concentrations above the DL in March. These analytes are typically flagged in the matrix spiked recovery and do not affect the interpretation of the 2020 water quality data.

Laboratory Control Samples – Reference material analysis met the ALS DQOs for all samples analyzed as part of the 2020 except for; boron in March and bismuth in July. The results do not affect the interpretation of the 2020 water quality data.

3.1.3 QA/QC Summary – Water Quality

The 2020 AEMP water quality data collected from Meliadine Lake and the Peninsula Lakes was considered reliable and fit for interpretation in the AEMP based on the QA/QC assessment.

3.2 Phytoplankton QA/QC

The approaches to field QA described above for the water chemistry QA/QC program apply equally to the phytoplankton, chlorophyll-a, and depth-integrated nutrient (DIN) samples. The phytoplankton sampling plan for Meliadine Lake was completed in full, as per recommendations in the 2019 interpretive report (Azimuth 2020). Sampling was completed by the Agnico Eagle Environment Department concurrent with the August AEMP sampling event. Detailed analysis of the phytoplankton data quality is included in [Appendix A](#).

The phytoplankton, chlorophyll-a and DIN QA/QC assessment results are summarized as follows:

Sample Integrity – Samples were reported at ambient temperatures upon receipt at the laboratory and reflect the challenges with shipping from a remote mine site. Likewise, hold time exceedances for

parameters and analytes with short hold times are unavoidable but are not considered likely to impact data analysis and interpretation.

Blanks – The chlorophyll-a laboratory blanks results were equal to or slightly higher (0.06 µg/L) than the reported detection limit (0.04 µg/L). Blank results for 2020 indicated reliable sample handling and that cross-contamination related to sampling equipment is unlikely.

Field Duplicates – The 2020 field duplicate results for phytoplankton and chlorophyll-a were very good. All of the field duplicate RPDs for chlorophyll-a and phytoplankton total biomass and density were within the established DQOs indicating very good replicability in sample collection. For DIN samples, there were a few cases where RPDs did not meet DQOs. On one occasion, the RPD for total phosphorus did not meet the DQO and the reported concentration was higher than 10-times the DL. While all the cases where RPDs did not meet DQOs were flagged for assessment, total phosphorus was weighted more heavily when reviewing the implications on sampling protocol and data interpretation since the reported concentrations were higher than 10-times the DL. The duplicate QAQC results were considered to have negligible impact on the results. No measurements were flagged as unreliable in 2020 based on the duplicate results.

Laboratory QC Assessment – The laboratory QC assessment passed (i.e., data were within the established DQOs) for samples submitted to Plankton R Us Inc. (taxonomy laboratory duplicates) and the University of Alberta (chlorophyll-a blanks) in 2020. The laboratory QC assessment completed by ALS indicated the 2020 data were typically within the established DQOs. In the one instance where a DQO was exceeded, the lab concluded the results were reliable and fit for use.

Data collected as part of the phytoplankton program were deemed reliable for analysis and interpretation.

3.3 Data Entry & Sample Shipping

Careful documentation and handling of all samples and data is a key component of QA/QC in a field program. Field QA/QC procedures pertaining to data collection and entry were adhered to in 2020 and are described in [Appendix A](#). Sample shipments to the analytical laboratories were accompanied by chain-of-custody (CoC) forms detailing sample identification, reporting requirements, and sample handling information.

Overall, sample temperatures received at the laboratory were variable depending on season and reflect the challenges with shipping from a remote mine site. Likewise, hold-time exceedances for parameters and analytes with short hold-times are unavoidable but are not considered likely to impact data analysis and interpretation.

4 MELIADINE LAKE – EFFLUENT CHARACTERIZATION

4.1 Overview

Agnico Eagle is permitted to discharge treated contact water to Meliadine Lake as long as concentrations are below effluent quality limits specified in the Water Licence (**Table 4-2**) and effluent is not acutely toxic to aquatic life. Discharge volumes, effluent chemistry data, toxicity test results, and loadings are reported quarterly by the Agnico Eagle Environment Department to the Minister of the Environment as per MDMER (Section 21 and Section 22; Government of Canada 2020).

The purpose of effluent characterization program is to ensure that surface contact water discharged to Meliadine Lake is not harmful to aquatic life. The following topics are discussed in this section of the report:

- Effluent Chemistry at the final discharge point (MEL-14),
- Acute toxicity testing with rainbow trout (*Oncorhynchus mykiss*) and zooplankton (*Daphnia magna*), and
- Chronic toxicity testing using representative freshwater species
- Discharge volume and loading estimates
- Effluent mixing in the near-field (NF) area

Together, the results of the effluent characterization program provide foundational information for interpreting water quality in Meliadine Lake. Some of the results of the effluent chemistry and effluent toxicity testing, as well as the most recent plume delineation surveys, were reported in detail as part of the WQ-MOP (Golder 2020a); key findings from that report are summarized herein.

4.2 Effluent Chemistry

Effluent was sampled at MEL-14 approximately weekly from June 5th to October 2nd. In total, 22 samples were submitted for chemistry and screened against effluent limits the Water Licence and MDMER. Tabulated screening results, raw data, and plots showing the concentrations of key parameters in the effluent are presented in **Appendix B1**.

Key findings from the 2020 effluent chemistry data are:

- No exceedances of effluent limits in Schedule 4 of the MDMER and the Type A Water Licence were reported in the 2020.
- Total dissolved solids concentrations were below the authorized limit of 3,500 mg/L in 2020. The highest measured TDS concentrations coincided with peak discharge periods in June (2,500 to

3,090 mg/L) and mid-to-late September (2,300 to 2,600 mg/L) (**Table 4-4**). The temporal pattern of concentrations changes for constituent analytes such as chloride, sulphate, and hardness followed a predictably similar pattern as TDS.

- Concentrations of key parameters of concern (i.e., some metals and nutrients) were typically higher at the onset of discharge in June compared to late-season sampling. For some parameters, there was a noticeable increase in 2020 relative to 2018 and 2019, but the pattern wasn't consistent throughout the year. By August, concentrations in MEL-14 samples were more in line with results from 2018 and 2019.

4.3 Effluent Toxicity

4.3.1 Acute Toxicity Testing

Background

Monthly acute toxicity testing is a requirement for mines authorized to discharge effluent to the aquatic receiving environment (Subsection 36[3] of the *Fisheries Act*). When the mine is discharging to Meliadine Lake, monthly toxicity testing is conducted on rainbow trout to verify that treated effluent released to Meliadine Lake is not acutely lethal¹⁵. Acute toxicity testing is also conducted using the aquatic invertebrate *D. magna* at the same time as the rainbow trout toxicity tests as per Subsection 17(2) of the MDMER.

Acute Toxicity Test Results from 2020

More frequent acute toxicity tests were conducted in 2020 as a requirement of the emergency amendment to dewater CP1. In total, 18 rounds of acute toxicity tests were conducted. Golder summarized the results of the 2020 acute toxicity tests in the final report for the WQ-MOP (Golder 2020a). The results of the toxicity tests are provided in **Table 4-4** and summarized below.

- Full strength, undiluted effluent was not acutely toxic to rainbow trout or *D. magna* in any of the tests conducted in 2020.
- Survival was 100% in 17 of the 18 tests. One test for each species had survival of 90%. There was no evidence of poor effluent quality in either of the tests as indicated by TDS concentrations in the mid-range of values reported in 2020 (1,340 mg/L to 3,090 mg/L).

Summary Statement: The results from 2020 are consistent with results from 2018 and 2019 that showed effluent discharge to Meliadine Lake is not acutely toxic to aquatic life. These data validate that

¹⁵ Acute lethality means full-strength undiluted effluent kills more than 50% of the rainbow trout during the 96-hr test period.

the proposed increase in the maximum allowable concentration of TDS from 1,400 mg/L to 3,500 mg/L will comply with discharge criteria that states effluent released to Meliadine Lake must be non-toxic to fish.

4.3.2 Sublethal Toxicity Testing (Action Level Assessment – End of Pipe Toxicity)

Background

Sublethal (chronic) toxicity testing is a requirement under MDMER (Schedule 5 subsections 5&6; Government of Canada, 2020). 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 (EC 2012). Details of sublethal toxicity testing are outlined in Schedule 5, subsection 6 of the MDMER. Meliadine became subject to the MDMER *prior* to June 1, 2018, and under transitional provision 39(b), quarterly testing is required on one species as per subsection 6(3)¹⁶:

- Subsection 5(1): Conduct testing according to standard methods listed in the MDMER, which includes sublethal testing on a fish species (either Fathead Minnow [*Pimephales promelas*] or Rainbow Trout), *Ceriodaphnia dubia*, an algal species (e.g., *Pseudokirchneriella subcapitata*), and Duckweed (*Lemna minor*).
- Subsection 6(1): Conduct two rounds of testing each year, with at least one month between the two tests for three years.
- Subsection 6(3): After three years, the frequency of sublethal testing can be reduced to once per calendar quarter using the most sensitive species listed in subsection 5(1). The most sensitive species is the species that shows an effect (e.g., growth, survival) at the lowest effluent concentration.

Prior to the 2019 AEMP, representatives with Environment Canada were consulted on their interpretation of the most sensitive species for sublethal testing for effluent discharged to Meliadine Lake. Sublethal toxicity tests performed in 2018 indicated the freshwater macrophyte *L. minor* was more sensitive to effluent from MEL-14 than fish (Fathead Minnow), invertebrates (*C. dubia*) or algae (*P. subcapitata*). Environment Canada agreed to this interpretation of the data, and since 2019 *L. minor* was selected as the species for sublethal toxicity testing. Additional sublethal testing with other species was undertaken in 2020 as a requirement under the WQ-MOP (discussed below).

¹⁶ Email from Erik Allen with Environment Canada on June 19, 2019 confirmed this interpretation of sublethal toxicity testing requirements under MDMER.

Expanded Sublethal Toxicity Testing Program in 2020

An expanded sublethal (chronic) toxicity testing program was completed in 2020 to verify that the interim benchmark of 1,000 mg/L TDS at the edge of the mixing zone is protective of aquatic life in Meliadine Lake beyond the mixing zone, 100 m from the diffuser. Four species were chosen for sublethal toxicity testing: Fathead Minnow (7-d survival and growth) and *L. minor* (7-d growth inhibition) as per the 2018 AEMP/EEM program and *Hyalella azteca* (amphipod invertebrate; 14-d survival and growth) and *D. magna* (21-d survival and reproduction). For each species, a series of tests were conducted to examine the chronic response of the test species when exposed to water from Meliadine Lake (edge of the mixing zone) compared to different types of controls (i.e., laboratory control water, soft water control, and reference area controls). Different control treatments were tested to account for possible effects to the test organisms from exposure to low hardness water in Meliadine Lake. The rationale for designing the sublethal toxicity tests with multiple control treatments is provided in the WQ-MOP report (Golder 2020a). Suffice to say, the scope of the program was rigorous to provide a high level of confidence when interpreting whether water quality at the edge of the mixing zone is protective of aquatic life.

Although the purpose of the sublethal toxicity testing program for the WQ-MOP was to validate the interim benchmark of 1,000 mg/L TDS, ECCC and the KIA requested that sublethal toxicity testing also be completed using full strength effluent from MEL-14 on all four test species. Full strength tests on effluent samples from MEL-14 were added to the sublethal toxicity testing program starting with the July sampling event. In total, three rounds of sublethal toxicity tests were conducted under the WQ-MOP in addition to the one early-June sampling event conducted for compliance purposes under MDMER (Table 4-1). The tests completed under the WQ-MOP were included the overall assessment of effluent toxicity under the AEMP in 2020.

Table 4-1. Sublethal Toxicity Testing on MEL-14 Effluent Samples in 2020

Test Species	Type	June 7	July 19	August 23	Sept 13
<i>Lemna minor</i>	Aquatic plant	●	●	●	●
Fathead Minnow	Fish		●	●	●
<i>Daphnia magna</i>	Zooplankton		●	●	●
<i>Hyalella azteca</i>	Benthic Invertebrate		●	●	●

Sublethal Toxicity Test Results from 2020

The results of the sublethal toxicity tests on *L. minor* for all years (2018 to 2020) are provided in **Table 4-5**. The complete sublethal toxicity dataset for all species tested since the onset of discharge from CP1 in 2018 is provided in **Table 4-6**. A summary of the results from 2020 based on information summarized in Golder (2020a) are provided below for each test species.

L. minor – The June 15th test resulted in a reduction in the yield (number of fronds) relative to the control treatment. Effluent from MEL-14 at a concentration of approximately 67% resulted in a 25% reduction in the number of fronds. Biomass, or the weight of *L. minor*, was not affected. The concentration of TDS in effluent taken on June 15th was 3,100 mg/L, the highest concentration measured among the sample collected to date (**Table 4-5**)

Fathead Minnow – There were no impacts to survival or growth endpoints in the first 7-d test on July 7th, 2020. In August and September, reduction in survival and growth were observed in full-strength effluent tests as well as some of the replicate treatments from the receiving environment samples. The cause of lower survival was attributed to a bacterial or fungal infection as evidenced by a “fuzzy” appearance on the specimens that deceased. The August and September test results were not considered representative of chronic effects to fish from exposure to the effluent or receiving environment water in Meliadine Lake.

H. azteca – There were no effects to survival or growth in any of the three tests on full-strength effluent in 2020.

D. magna – The July 19th test showed no effect to survival, growth, or reproduction when *D. magna* were exposed to effluent with a TDS concentration of 1,430 mg/L. In August, a reduction in reproduction (# of neonates) was observed relative to the laboratory control treatment. The IC25 for this test was 37% effluent (v/v). The concentration of TDS was 1,850 mg/L. The 95% confidence interval for effects to reproduction was highly variable, ranging from 4% effluent to full-strength. Similarly, variable responses were observed in the receiving environment samples from Meliadine Lake, implying that effluent was not the primary cause of lower reproduction (Golder 2020a). In the subsequent round of testing on September 13th, the IC25 for both reproduction and survival endpoints was approximately 90% effluent (v/v). The concentration of TDS in this batch of effluent was 1,780 mg/L. While some minor impairment to reproduction was event across two rounds of testing on full-strength effluent, three rounds of 21-d test indicate high survival and minimal impacts to growth when pelagic aquatic invertebrates are exposed to nearly full-strength effluent.

Assessment of End-of-Pipe Toxicity

The low Action Level for end-of-pipe toxicity is classified as a persistent sublethal toxic effect observed in the same test organism in three consecutive monthly samples collected from MEL-14 for compliance

purposes. Sublethal effects are defined as an effluent concentration less than the highest test concentration that causes a 25% effect to growth or reproduction relative to the control treatment (also known as the IC25). If the low Action Level for end-of-pipe toxicity is reached, additional investigations may be undertaken, such as increased frequency of testing to confirm the effect, assessing the spatial extent of the effect within the mixing zone in MEL-01, or other targeted investigations to identify the underlying cause of the effect (e.g., toxicity identification evaluation testing).

Low Action Level Assessment of End-of-Pipe Toxicity

In the context of the low Action Level Assessment for end-of-pipe toxicity, the sublethal toxicity test results from 2020 indicate that fish, invertebrates, and aquatic plants are not at risk of acute or chronic effects from exposure to effluent discharged to Meliadine Lake. This conclusion is supported by three rounds of sublethal toxicity testing of water from the edge of the mixing zone in Meliadine Lake. No follow-up actions or mitigation are recommended for 2021 other than routine acute and sublethal testing as per requirements of the Water Licence (WL) and MDMER.

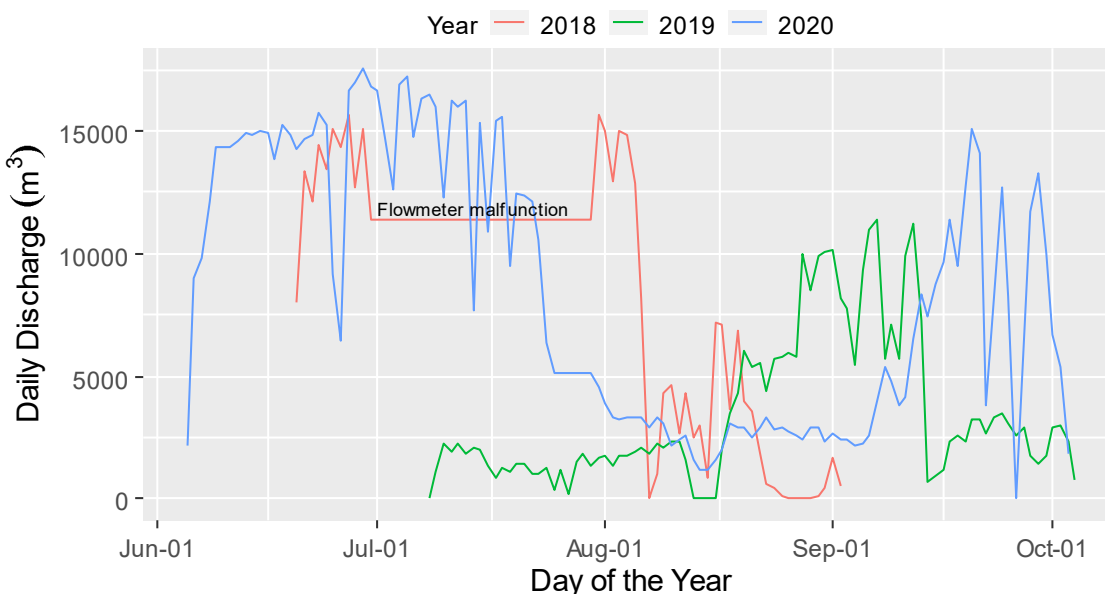
4.4 Discharge from CP1 to Meliadine Lake

The volume of water (m³) discharged from CP1 to Meliadine Lake is recorded daily. Daily discharge volume from CP1 to Meliadine Lake since 2018 is shown in **Figure 4-1**. Monthly discharge volumes to Meliadine through the permanent diffuser from 2018 through 2020 are presented in **Table 4-3**. The EWTP is capable processing 22,000 m³/day.

In 2020, a significant draw down of CP1¹⁷ occurred in June and July to create extra storage capacity in CP1 prior to freshet. The largest daily discharge in 2020 was 17,520 m³ on June 29th, and between the June 5th and the end of July, more than 700,000 m³ of water from CP1 was discharged to Meliadine Lake. By the end of the season, over 1 million m³ of effluent water was discharged over a 121-day period between June 5th and October 4th. By comparison, the total volume of water discharged to Meliadine Lake in 2019 was only 306,773 m³ (less than half of what was discharged in 2018) due to post-treatment effluent quality exceeding the limit for TDS of 1,400 mg/L.

Through the entire month of August, the volume of water discharged daily to Meliadine Lake was significantly reduced, at approximately 2,700 m³/day due to less precipitation falling on site and repurposing of water from CP1 for use at the process plant. The rate of discharge increased in September to draw down the water level in CP1 before freeze-up and create storage capacity for runoff from snowmelt for spring 2021 freshet.

¹⁷ According to the Water Management Plan (Agnico Eagle 2020), the maximum operating level for CP1 under normal conditions is approximately 742,000 m³ (mean precipitation years).

Figure 4-1. Daily Discharge from CP1 to Meliadine Lake in 2018 through 2020

4.5 Loadings to Meliadine Lake

The loadings of deleterious substances in the effluent deposited to Meliadine Lake are recorded monthly (during discharge months) from the final discharge point (i.e., MEL-14) as per Part 2, Division 2, Section 20 of the MDMER (Government of Canada, 2020). Monthly loadings are calculated using Equation 1:

$$ML = C \times V / 1,000 \quad (\text{Equation 1})$$

Where ML is the monthly loading in kg, C is the monthly mean concentration of the deleterious substances in mg/L, and V is the total monthly volume of effluent deposited from the final discharge point (i.e., MEL-14) in m^3 . Daily discharge volumes were provided to Azimuth by Agnico Eagle and are presented in a table in [Appendix B2](#).

Monthly loadings for parameters included in effluent characterization are presented in [Table 4-7](#). The comparatively large volume of water discharged in 2020 (1 million m^3) compared to 2018 and 2019 resulted in predictably higher mass loading to Meliadine Lake for some parameters, notably, the constituent ions that make up TDS (e.g., sodium, chloride, calcium, and sulphate) and some nitrogen species¹⁸. Loadings were highest in the month of June when the rate of dewatering at CP1 was at its peak and parameter concentrations in CP1 were at their highest. Ice was on CP1 throughout the month of June, and the effect of cryo-concentration likely contributed, at least in part, to higher concentrations

¹⁸ Ionic composition of TDS in effluent (MEL-14) presented in the WQ-MOP (Golder 2020).

of TDS and other parameters. Cryo-concentration refers to the process whereby major ions (e.g., sodium, magnesium, chloride) and other parameters such as metal and nutrients become concentrated as ice forms. The average TDS in June when ice was on CP1 was 2,840 mg/L (**Table 4-7**). Winter sampling in CP1 conducted for the WQ-MOP between November and March showed even higher concentrations of TDS (~4,400 mg/L) confirming the effect that ice cover has on the concentration of parameters in CP1.

Cryo-concentration likely played a role in the early-season peak concentrations in MEL-14 samples, but the updated water balance and water quality model (Golder 2020b) showed that contact water on site from 2019 had higher TDS concentrations to begin with. However, the updated model predicts future TDS concentrations in the CPs, which ultimately report to CP1, will decline gradually in response to changes in waste rock management on site (Golder 2020b).

The loadings estimate for selected nutrient parameters (i.e., total phosphorus and TKN) are discussed in **Section 6** to inform the nutrient enrichment discussion.

4.6 Effluent Mixing

Two plume delineation surveys were completed as part of the WQ-MOP in 2020 using specific conductivity and calculated TDS data to provide an estimate of effluent mixing at the edge of the dilution zone (Golder 2020a)¹⁹. The study design followed the same methods as the survey that was completed during the Cycle 1 biological monitoring study in 2018 (Golder 2019):

- Twenty-two (22) stations were established in a radial pattern at 50 m, 100 m, 175 m and 250 m from the diffuser.
- Dilution factors (DFs) were calculated using specific conductivity and calculated TDS. DFs were conservatively calculated according to Equation 2:

$$DF = \frac{C_{eff} - C_{amb}}{MC_{dif} - C_{amb}} \quad (\text{Equation 2})$$

C_{eff} = average conductivity in effluent from MEL-14 on the same day as the plume delineation survey

C_{amb} = maximum conductivity (or calculated TDS) at a given sampling station

MC_{dif} = average conductivity (or calculated TDS) in the mid-field area MEL-02 (used to characterize ambient open water conditions in Meliadine Lake in 2020)

Golder concluded that field measured specific conductivity was an accurate method for tracing TDS concentrations; therefore, for the purpose of the study design, the results for specific conductivity were

¹⁹ Golder investigated the relationship between field measured conductivity and calculated TDS to verify that conductivity is a suitable tracer for TDS.

used to describe effluent mixing behavior. For ease of interpretation, DFs were converted to percent effluent by taking the reciprocal of the DF (i.e., % effluent = $1/DF$). Results from the two surveys are summarized below.

July Plume Delineation Survey

The first survey in 2020 was conducted on July 21st at the tail-end of the highest discharge period in 2020. Approximately 12,400 m³ were discharged to Meliadine Lake on July 21st, which ranked as the 41st highest volume out of the 121 days. **Figure 4-2** shows the effluent concentration at the various monitoring locations. The percent effluent measured at the edge of the mixing zone (100 m) ranged from 0.68 to 1.75 %.

Depth profiling at the stations indicated the plume was more evident at depth than closer to the surface. At surface, the plume traveled more to the north, whereas closer to the bottom, the plume showed an east to west direction of travel, which is consistent with the general direction of flow from southeast to northwest.

August Plume Delineation Survey

The second survey was conducted on August 13th during a period of low discharge (i.e., 1,600 m³ was discharged on August 13th, corresponding to the 5th lowest volume discharged in 2020 [rank 117 out of 121 days]). *In-situ* specific conductivity was between 102 to 106 µS/cm among the various plume delineation monitoring stations in August. Based on these results, it's evident that during periods of lower daily discharge, the plume is well dispersed a short distance from the diffuser. **Figure 4-3** shows the concentration of effluent is less than 1% within 50 m of the diffuser.

Summary of Effluent Mixing in the Near-Field Area

Based on the data collected in 2020, taking into consideration effluent quality and daily discharge volumes, the concentration of effluent may periodically exceed 1% at 250 m from the diffuser during the open water period, but the extent of the detectable plume is highly dependent on the volume of the water discharged. The design of the diffuser, and mixing characteristics within the NF area of the east basin, result in effective mixing of the effluent (Golder 2020a).

4.7 Figures and Tables – Effluent Characterization

Figure 4-2.
Percent Effluent Concentration Relative
to the Distance from the Diffuser,
July 21, 2020

2020 Aquatic Effects Monitoring Program
Annual Report

AZIMUTH



Date: February 14, 2021
Datum: NAD 83 UTM Zone 15N
Scale: 1:8,000 (inset 1:120,000)
Software: QGIS version 3.16.0-Hannover
Produced by: E. Franz; J. Ellenor

REFERENCES
1. Basemap imagery from Google
2. Mine Plan provided by Agnico Eagle
3. Plume delineation data from Golder (2020)



Legend

★ Diffuser

Effluent Concentration

● < 1%

● 1 - 1.5

● 1.5 - 2

● >2%

Distance from the diffuser

○ 100 m

○ 250 m

○ 400 m

Effluent concentration shown at each location is based on
the maximum specific conductivity measured in the water
column.

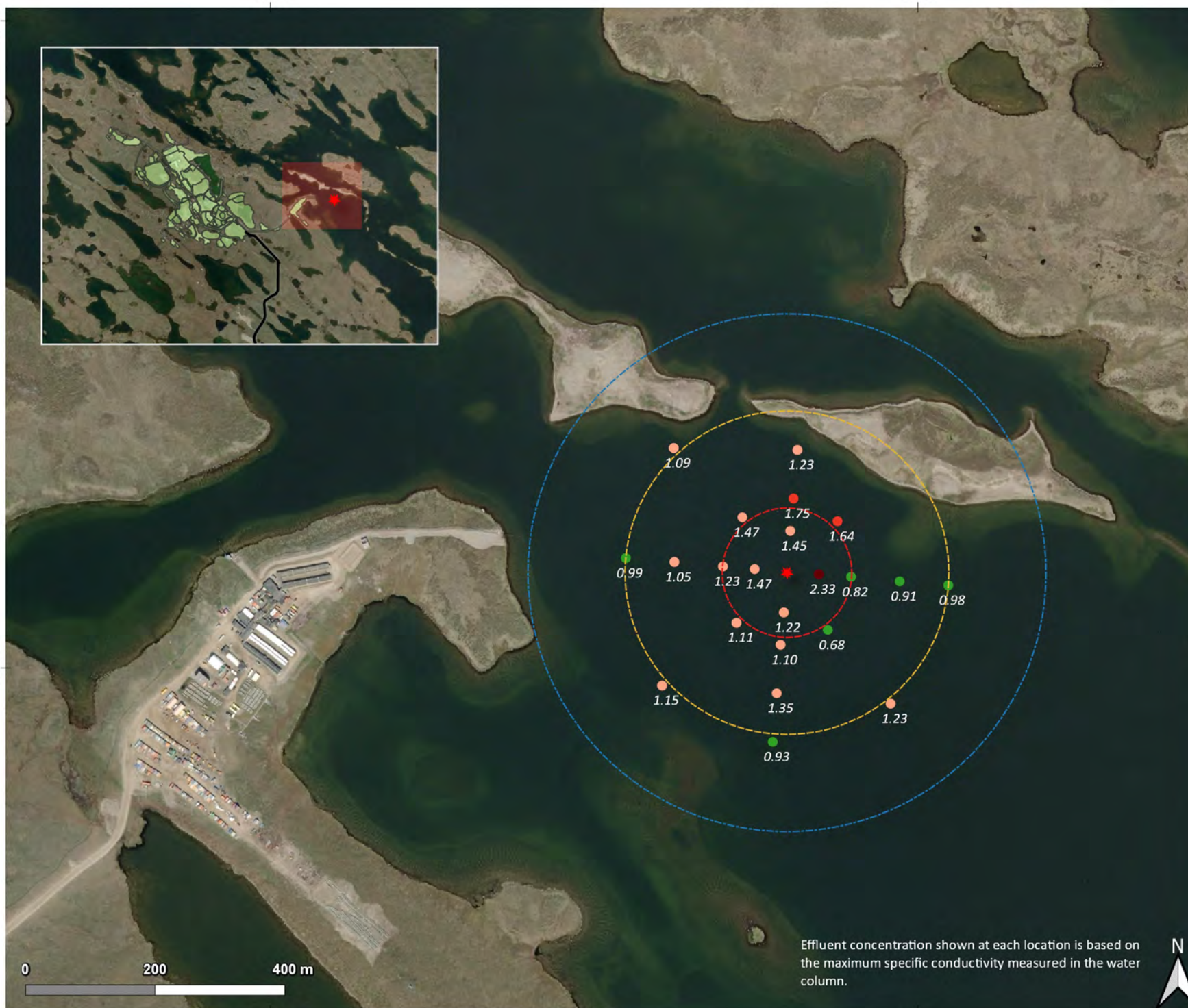
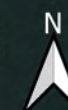


Table 4-2 Effluent quality limits for the effluent discharge from MEL-14

Parameter	Units	Maximum Average Concentration	Maximum Concentration in a Grab Sample
Conventional Parameters			
pH ^[a]	-	6.0 9.5	6.0 9.5
Total Dissolved Solids (measured) ^[b]	mg/L	3,500	-
Total Suspended Solids ^[a]	mg/L	15	30
Nutrients			
Total Phosphorus ^[c]	mg/L	2	4
Total Ammonia ^[c]	mg/L	14	18
Metals			
Total Aluminum ^[c]	mg/L	2	3
Total Arsenic ^[d]	mg/L	0.3	0.6
Total Copper ^[d]	mg/L	0.2	0.4
Total Nickel ^[a]	mg/L	0.5	1
Total Lead ^[a]	mg/L	0.2	0.4
Total Zinc ^[d]	mg/L	0.4	0.8
Other Parameters			
Total Cyanide ^[d]	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 2018).^[b] Increased limits for TDS in 2020 as per the Emergency Amendment (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

Table 4-3 Monthly Discharge Volumes from CP1 to Meliadine Lake since 2018

Year	Month	Days	Discharge (m ³)
2018	June	10	134,272
	July	na*	352,551
	August	26	153,066
	September	3	2,632
	October	0	0
	<i>Totals for 2018</i>	<i>70</i>	<i>642,521</i>
2019	June	0	0
	July	24	30,614
	August	31	107,540
	September	30	157,912
	October	5	10,707
	<i>Totals for 2019</i>	<i>89</i>	<i>306,773</i>
2020	June	26	352,954
	July	31	366,094
	August	31	83,454
	September	30	214,845
	October	3	13,836
	<i>Totals for 2020</i>	<i>121</i>	<i>1,031,177</i>

Notes:

* The flowmeter malfunctioned in July 2018. Daily discharge volumes and the number of days were unavailable for July 2018. Assumed discharge occurred each day in July. Daily discharge data for July 2018 was taken from Appendix 2A in Golder (2019). Agnico Eagle provided the raw discharge data in 2019 and 2020.

Table 4-4 Acute Toxicity Test Results on Effluent Samples from MEL-14 in 2020

Date	Measured TDS (mg/L)	Rainbow Trout		<i>Daphnia Magna</i>	
		LC50	Survival in Full Strength Effluent	LC50	Survival in Full Strength Effluent
7-Jun-20	2,570	>100	100	>100	100
14-Jun-20	3,090	>100	100	>100	100
21-Jun-20	2,790	>100	100	>100	100
28-Jun-20	2,910	>100	100	>100	100
5-Jul-20	1,510	>100	100	>100	100
12-Jul-20	1,370	>100	100	>100	100
19-Jul-20	1,430	>100	100	>100	100
26-Jul-20	1,340	>100	100	>100	100
2-Aug-20	1,550	>100	100	>100	100
9-Aug-20	1,650	>100	100	>100	100
16-Aug-20	1,660	>100	100	>100	100
23-Aug-20	1,850	>100	100	>100	90
30-Aug-20	1,620	>100	90	>100	100
6-Sep-20	1,910	>100	100	>100	100
13-Sep-20	1,780	>100	100	>100	100
20-Sep-20	2,410	>100	100	>100	100
27-Sep-20	2,300	>100	100	>100	100
2-Oct-20	2,630	>100	100	>100	100

Notes:

This table was adapted from Table B-4 in Golder (2020a)

LC50 = concentration that causes a 50% reduction in survival

Table 4-5 Sublethal Toxicity Test Results for *Lemna minor* (Duckweed) Since 2018

Year	Date	Measured TDS (mg/L)	Effluent Concentration (%) Causing Inhibition (IC25) to <i>Lemna minor</i> Frond Number or Biomass	
			Test Endpoint = Frond Number	Test Endpoint = Frond Weight (Biomass)
2018	7-Aug-18	1,140*	72.3 (36.4 to 86.5)	>97
	13-Aug-18	1,260	42.0 (26.5 to 63.2)	38.2 (26.6 to 52.1)
	3-Sep-18	1,360	>97	>97
2019	9-Jul-19	1,190	>97	>97
	13-Aug-19	1,130	>97	>97
	1-Oct-19	860	>97	>97
2020	15-Jun-20	3,100	67.2 (58.9 to 76.4)	>97
	19-Jul-20	1,430	>97	>97
	23-Aug-20	1,850	>97	>97
	13-Sep-20	1,780	>97	>97

Notes:

* Total dissolved solids were measured in effluent on August 5th for the August 7th, 2018 chronic toxicity test.

IC25 = concentration that causes a 25% effect to frond number or frond yield. 95% confidence intervals shown in parentheses

Table 4-6. Sublethal Toxicity Test Results on Effluent Discharged to Meliadine Lake Since 2018

Species					Fathead Minnow		Ceriodaphnia dubia		P. subcapitata	Lemna minor			Hyaella azteca		Daphnia magna		
Test Type					Sublethal		Sublethal		Sublethal	Sublethal			Sublethal		Sublethal		
Test Duration					7-d		14-d		72 h	7-d			14-d		21-d		
Endpoint					IC-25 (growth)	LC-50 (survival)	IC-25 (reproduction)	LC-50 (survival)	IC-25 (growth)	IC-25 (biomass)	IC-25 (frond #)	IC-50 (frond #)	IC-25 (growth)	LC-50 (survival)	LC-50 (survival)	IC-25 (reproduction)	IC-25 (growth)
Sample date	Sample date	Sample name	Chloride (mg/L)	Measured TDS (mg/L)	%	%	%	%	%	%	%	%	%	%	%	%	%
2018	7-Aug-18	MEL-14	530 [e]	1140 [e]	> 100	> 100	> 100	> 100	>90.9	> 97.0	72.3 (36.4-86.5)	-	-	-	-	-	-
	13-Aug-18	MEL-14	590	1,260	> 100	> 100	see note [a]	see note [a]	>90.9	42.0 (26.5-63.2)	38.2 (26.6-52.1)	-	-	-	-	-	-
	3-Sep-18	MEL-14	660	1,360	> 100	> 100	90.1 (23.3-96.3)	> 100	>90.9	> 97.0	> 97.0	-	-	-	-	-	-
2019	9-Jul-19	MEL-14	500	1,190	-	-	-	-	-	> 97.0	> 97.0	-	-	-	-	-	-
	13-Aug-19	MEL-14	410	1,130	-	-	-	-	-	> 97.0	> 97.0	-	-	-	-	-	-
	24-Sep-19	MEL-12[b]	1,100	2,490	> 100	> 100	24.3	> 100	60.8	> 97.0	26.3	-	-	-	-	-	-
	1-Oct-19	MEL-14 & -12[b]	530	860	> 100	> 100	58.8	> 100	88.2	> 97.0	> 97.0	-	-	-	-	-	-
2020	15-Jun-20	MEL-14	1,300	3,100	-	-	-	-	-	> 97.0	67.2 (58.9 to 76.4)	-	-	-	-	-	-
	19-Jul-20	MEL-14	530	1,430	> 100	> 100	-	-	-	> 97	-	> 97	> 100	> 100	> 100	> 100	> 100
	23-Aug-20	MEL-14 [d]	700	1,850	8.7 (2.2-21.9)	13.5 (8.9-20.5)	-	-	-	> 97	-	> 97	> 100	> 100	> 100	37.6 (4.9-N/A)	> 100
	13-Sep-20	MEL-14 [d]	900	1,780	24.2 (13.7-36.4)	43.2 (30.1-62)	-	-	-	> 97	-	> 97	> 100	> 100	90.3 (30.0->100)	93.8 (4.6-N/A)	> 100

Notes:

Green = no effect in 100% (full strength) effluent; **Yellow** = effect measured in effluent at concentrations >50% effluent concentration; **Orange** = effect measured in effluent at concentrations <50% effluent concentration.

IC/ECxx concentrations in parentheses are the 95% confidence intervals.

[a] The *C. dubia* test on Aug 13, 2018 failed laboratory control criteria. Results from this test were invalid.

[b] The toxicity tests on September 24, 2019 were conducted on water taken with water from MEL-12 prior to treatment at EWTP.

[c] Sublethal tests on *C. dubia*, *P. subcapitata*, and Fathead Minnow on October 1, 2019 were conducted on water taken with water from MEL-12 prior to treatment at EWTP.

[d] Reduced growth and survival in the August and September Fathead Minnow tests was attributed to pathogens caused by the test conditions, not the chemistry of the effluent. These data are not considered representative of effects to fish.

Table 4-7. Loadings estimate to Meliadine Lake from CP1 in 2020

Month	June			July			August			September			October			Yearly
Total volume (m³)	352,954			366,094			83,454			214,845			13,829			1,031,176
Parameter	N<DL	Mean Conc. (n=6)	Loadings (kg)	N<DL	Mean Conc. (n=5-6)	Loadings (kg)	N<DL	Mean Conc. (n=5-6)	Loadings (kg)	n<DL	Mean Conc. (n=5)	Loadings (kg)	n<DL	Conc. (n=1)	Loadings (kg)	Annual Loadings to Meliadine Lake
Conventional Parameters																
Total Dissolved Solids	0	2840	1003566	0	1470	538158	0	1680	140322	0	2070	444299	0	2630	36370	2162716
Total Suspended Solids	0	6.33	2235	0	4.8	1757	0	3.86	322	0	5.4	1160	0	5	69	5544
Total Dissolved Solids (Calculated)	0	2600	917680	0	1150	421008	0	1440	120412	0	1860	399612	0	2300	31807	1890519
Nutrients and Organic Carbon																
Ammonia (as N)	0	10.6	3730	0	1.47	537	0	0.385	32	0	1.34	288	0	2.3	32	4619
Total Phosphorus	0	0.0475	17	0	0.034	12	3	0.0218	2	3	0.0208	4	0	0.029	0	36
Nitrate (as N)	0	27.5	9700	0	11.9	4349	0	11	922	0	13.9	2982	0	16.1	223	18176
Nitrate + Nitrite (as N)	0	27.6	9730	0	12.2	4459	0	11.3	945	0	14.3	3064	0	16.4	227	18425
Nitrite (as N)	0	0.09	32	0	0.319	117	0	0.297	25	0	0.392	84	0	0.35	5	263
Total Kjeldahl Nitrogen	0	11.7	4141	0	2.48	906	1	0.953	80	0	1.9	408	0	3.4	47	5582
Total Metals																
Aluminum (T)	0	0.622	220	0	0.594	218	0	0.476	40	0	0.643	138	0	0.585	8	623
Arsenic (T)	0	0.0473	17	0	0.00444	2	0	0.00442	0	0	0.00352	1	0	0.00243	0	19
Copper (T)	1	0.00338	1	0	0.00128	0	0	0.00157	0	0	0.00153	0	0	0.0019	0	2.15
Lead (T)	4	0.00105	0	3	0.000302	0	6	0.000267	0	5	0.0002	0	1	0.0004	0	0.55
Nickel (T)	1	0.00947	3	0	0.00378	1	0	0.00447	0	0	0.0061	1	0	0.0102	0	6.55
Zinc (T)	4	0.0282	10	4	0.00625	2	6	0.00667	1	5	0.005	1	1	0.01	0	14
Other Parameters																
Cyanide (Total)	0	0.00863	3	3	0.0065	2	6	0.005	0	5	0.005	1	1	0.005	0	7

Notes:
Effluent was discharged from June 5th to October 4, 2020.
Concentrations <DL were conservatively set = DL when calculating the monthly loadings to Meliadine Lake.
Monthly loadings = average concentration (mg/L) x total volume/1,000.

5 MELIADINE LAKE – WATER QUALITY

5.1 Overview of the 2020 Water Quality Monitoring Program

As discussed earlier in this report, an expanded water quality monitoring program was completed in 2020 as a condition of the emergency amendment to discharge water with higher TDS concentrations from CP1. An overview of water quality monitoring under the AEMP and monitoring completed under the *Water Quality Monitoring and Optimization Plan* (WQ-MOP) is provided below. Although the two programs were conducted as separate scopes of work, results and conclusions from the WQ-MOP factor heavily in the overall assessment of water quality in Meliadine Lake in 2020.

5.1.1 AEMP

Sampling areas and stations within each area are shown in **Figure 5-1**. Station-specific information (coordinates and depths) are provided in **Table 5-2**. Field sample collections and analyses followed methods outlined in the AEMP Design Document (Golder, 2016) and in recent AEMP interpretive reports (Golder 2019). Water samples were collected from approximately mid-depth at each station (~4 to 5 m below the surface). Limnology measurements (temperature, dissolved oxygen, pH, and specific conductivity) were taken at 1 m depth intervals from the surface to within approximately 1 m of the sediment.

Details of the water quality study design, including field and lab methods are provided in **Section 2.2**. QA/QC methods and results are summarized in **Section 3** and fully detailed in **Appendix A**.

5.1.2 WQ-MOP

The purpose of the water quality monitoring program for the WQ-MOP was to validate the interim science-based benchmark for TDS of 1,000 mg/L at the edge of the mixing zone and provide information on the assimilation of effluent in the mixing zone of Meliadine Lake. To meet these objectives, a water quality monitoring program was designed to characterize water chemistry and chronic toxicity at NF, with supplemental sampling at the MF, and reference areas to help inform spatial patterns in the lake and provide control data for the analyses. The monitoring program ran from the onset of discharge in early June until late September. At the NF area (MEL-01), water samples were collected on a weekly basis from three stations located at the edge of the mixing zone and submitted for chemistry analysis (Maxxam Analytics). Samples were taken from the depths in the water column where specific conductivity readings were the highest, in an attempt to characterize the highest concentrations of parameters associated with the effluent. This study design consideration is important to keep in mind when comparing water quality data from the WQ-MOP and the AEMP. The standardized approach to sampling at mid-depth for the AEMP, may in some cases, under-estimate the concentrations of certain

parameters if the negatively buoyant plume remains stratified below 4-5 m at the NF AEMP stations, as was evident in some of the limnology profiles taken at the edge of the mixing zone during the WQ-MOP.

Two of the three NF monitoring stations sampled under the WQ-MOP were located at existing AEMP stations (MEL-01-01 and MEL-01-07) given their proximity to the diffuser (~100 m). A third location (MEL-01-10) was sampled for the WQ-MOP because the other three established AEMP stations are located beyond the 100 m mixing zone boundary. Water samples were collected monthly for chronic toxicity testing, the results of which are summarized in [Section 4.3](#). Mid-field (MF) and reference areas were sampled on a monthly basis. In addition to water sampling for chemistry and toxicity testing, two plume delineation studies were conducted in July and August to determine the spatial extent of effluent mixing in the NF area. A summary of the plume delineation surveys was provided in [Section 4.6](#).

There was considerable overlap in water quality done under the AEMP and the WQ-MOP in 2020, and results and conclusions presented in the WQ-MOP report (Golder 2020a) are referred to extensively in this section of the AEMP. [Table 5-3](#) summarizes the scope of the WQ-MOP and linkages with the AEMP.

5.2 Objectives and Approach to Assessing Water Quality

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

- Determine whether 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 reduce impacts to 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 centered around answering these two key questions:

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

Approach – This question was 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.

2. *Is water quality consistent with predictions outlined in the Final Environmental Impact Statement (FEIS) and less than AEMP Action Levels²⁰?*

²⁰ 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 are discussed in detail in [Section 2.3.4](#).

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 water quality screening against the AEMP Action Levels (aka trigger values).

A brief overview of each element of the data analysis framework is discussed below.

Normal Range Assessment

Normal range, as defined in the AEMP, refers to the range of baseline/reference conditions for the various components of the AEMP. In simple terms, the normal range is the instrument used to assess whether current conditions (e.g., the measured concentration of a particular metal) 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.

A slight modification of the approach to calculating the normal ranges for water quality was put forward as part of the 2019 AEMP (Azimuth 2020). Previously, estimates of the normal range in concentrations was calculated using prediction intervals for data that were normally distributed, or the 90th percentile for parameters with highly skewed distributions (i.e., non-normal). In 2018, the majority of the parameters failed assumptions of normality, and the estimate of the normal range of concentrations in Meliadine Lake was based on the percentile method. In the few instances where results followed a normal distribution, and the prediction interval method (PI) and percentile method produced similar results. Given the two methods produced similar results, the percentile method was adopted as the default for calculating the upper limit (and lower in the case of pH) range of baseline/reference concentrations in Meliadine Lake. Key assumptions were as follows:

- The normal range applies to samples collected in the open water period.
- Pooled reference area (MEL-03, MEL-04, and MEL-05) data collected during the AEMP Monitoring Program between 2016 and 2020 and baseline data collected in Meliadine Lake between 1995 and 2013 (Agnico Eagle 2014) were included in the calculations. Results for metals and nitrogen parameters collected prior to 2016 were not retained in the normal range calculations because detection limits were typically 10-fold higher than current DLs²¹.

²¹ Refer to Golder 2019; Appendix 6B for information pertaining to data that were deemed “unreliable” for estimating baseline/reference conditions.

- The upper limit of the normal range was set equal to the 90th percentile of the baseline/reference area data (*Method A*) or equal to the current detection limit (*Method B*) for parameters with greater than 85% of the values less than the DL.

For parameters that exceeded the normal range, the relative percent increase in the median concentration compared to the upper limit of the baseline/reference conditions was calculated. For ease of interpretation, parameters with a median concentration less than 10% of the normal range were shaded yellow in **Table 5-12**. In cases where the median concentration in 2020 was greater than 10% of the normal range, orange shading was used. Lastly, **Figure 5-5** to **Figure 5-10** are point plots showing the concentration of selected major ions, nutrients, and metals in samples collected during the open water period since 2013. The green line on each plot represents the normal range of concentrations in Meliadine Lake including data collected from the reference areas in 2020.

Water Quality Guideline Screening

Individual samples were screened against the various WQGs presented in **Table 2-2** to determine if there were any individual samples that exceed aquatic life, human drinking water guidelines, or the SSWQO for fluoride, arsenic and iron in 2020. For most parameters, the lowest value of the aforementioned guidelines was adopted as the AEMP Benchmark as the point of comparison for informing management actions within the Low Action Level assessment and Response Framework.

Comparison to FEIS Predictions and Updated Water Quality Model Results

An important aspect of the water quality assessment for Meliadine Lake is determining if the pattern, timing, and magnitude of changes in water quality match the predicted changes based on the approved design plan for the mine. Predicted future changes in water quality 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 were 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” 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 MAC 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. The prediction for TDS and chloride in the 2014 FEIS and the updated Tetra Tech model are shown in **Figure 5-11** and **Figure 5-12**, respectively. Current TDS and chloride concentrations in the NF area were compared against both sets of predictions as another point of comparison for how well surface contact water is managed on site.

Temporal and Spatial Trends

Temporal and spatial trends in water quality in Meliadine Lake were evaluated primarily using plots showing the difference in concentration for indicator parameters among the monitoring areas in Meliadine Lake and over time. Last year, parameters exceeding their respective normal ranges were carried forward for statistical comparisons of the differences *among* exposure and pooled reference areas using the non-parametric Kruskal-Wallis (K-W) test²². This step provided little insight into changes in water quality between areas that weren’t already evident in the normal range assessment or through visual examination of scatterplots and boxplots. The NF vs reference area comparisons were statistically significantly different for all the parameters that exceeded the normal range in 2019, and in the case of NF vs MF comparisons, only three parameters exceeded the normal range but were not statistically significantly different. Given the rather limited value that K-W and post-hoc statistical comparisons added to the decision-making process in 2019, this procedure was not completed in 2020. Rather, the 2020 results were taken at face value and median concentrations for the open water period that exceeded the normal range were carried forward in the process (described below).

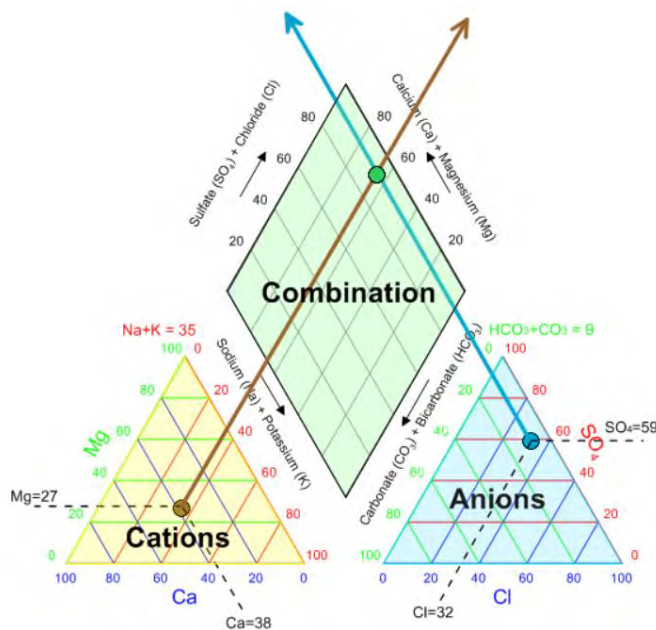
A generalized workflow was developed to short-list the number of parameters that get carried forward in the discussion:

²² Parameters carried forward in the spatial assessment were first evaluated for normality and homoscedasticity (i.e., equal variance). All of the parameters carried forward in the spatial assessment failed the assumption of normality; analyses were conducted using non-parametric methods.

- Parameters with fewer than 50% detected concentrations in 2020 were excluded from the spatial and temporal trend assessment. The monthly water quality results were examined to verify that the frequency of non-detects was generally consistent in each month ([Appendix C2](#)).
- Parameters exceeding the normal range at the NF or MF areas were retained for further analysis. Where a number of parameters were identified for a given parameter class (e.g., major ions, nutrients, metals), a short list of “surrogate” parameters were identified to carry forward for more detailed analysis using various plots. For example, with the exception of chloride, temporal and spatial changes in the constituent ions that make up TDS are not discussed in detail given the similar pattern of change observed among areas and between years. The intent of this step was to streamline the analyses by minimizing repetition.

In addition to the more traditional scatterplots and boxplots used in previous reporting cycles, Piper plots were incorporated into the spatial and temporal analysis in 2020 as a tool to investigate potential changes in ion composition in Meliadine Lake before and after effluent discharge from CP1 began in 2018. Piper plots are trilinear plots that depict the relative percentage (in milliequivalents) of major cations (Na, Mg, Ca) and anions (Cl, SO_4 , HCO_3) present in a water sample (Piper 1944). They are used primarily to visualize similarities or differences among water samples based on their ionic composition and are particularly useful for distinguishing among water sources. While the specifics can be modified, the general approach involves looking at the percent composition of 3 cation and 3 anion groups. The cation groups used for Meliadine Lake were calcium, magnesium and sodium + potassium; the anion groups are sulfate, chloride and carbonate (CO_3) + bicarbonate (HCO_3). The relative percentages of each cation and anion group are shown on separate trilinear plots, and then projected onto a combination plot.

The figure to the right shows how the proportions of the cations and anions in the trilinear plots on the bottom left and right, respectively, are used to characterize the ionic composition of the water sample. In the Piper plot example below, calcium (38%) and magnesium (27%) are the dominant cations in the water sample, while sulphate SO_4 (59%), is the dominant anion. Samples with similar ionic signatures will cluster more closely together on the plots.



5.3 2020 Water Quality Results

The 2020 water quality data are discussed in the following sections:

- *In-situ* Water Quality – Limnology plots
- Water chemistry compared to normal ranges, guidelines (i.e., AEMP benchmarks)
- Spatial and temporal assessments

Conclusions derived from each of these sets of analyses were factored into the Low Action Level assessment ([Section 5.4](#)).

Figures and tables specific to the data evaluation are included in [Section 5.6](#) and [Section 5.7](#), respectively.

Supplemental boxplots and point plots showing the concentration of key water quality parameters are provided in [Appendix C](#).

5.3.1 *In-situ* Water Quality

Field measured water quality parameters provide important “real-time” information on potential changes water quality and are an important tool for assessing water quality in Meliadine Lake.

Limnology profiles were taken concurrently with water sampling at the NF, MF, and reference areas in 2020.

Expanded *in-situ* monitoring in the NF area was conducted as part of the WQ-MOP from June through September. Through-ice sampling was completed once in June, coinciding with the start of discharge from CP1 to Meliadine Lake. When the ice came off the lake in July, profiles were taken at the NF mixing zone stations on an approximately weekly basis. The MF and reference area stations were sampled on a monthly basis. Lastly, remote continuous monitoring of temperature and specific conductivity was conducted from early June to early October at the NF stations located at the edge of the mixing zone. At each station, the probe was positioned 2 m above the sediment and set to record values every hour. The continuous remote monitoring data are discussed in detail in Appendix B of the WQ-MOP (Golder 2020a).

Figure 5-2 shows the average dissolved oxygen (DO), temperature, and pH readings for each area in the ice-covered (March and June) and open water (July, August, and September) sampling events. **Figure 5-3** shows the average specific conductivity for the replicate profiles taken in each area, for each sampling even. A more detailed look at the spatial and temporal patterns in specific conductivity profiles are shown for the NF area MEL-01 in **Figure 5-4**.

Temperature

Water temperatures in March and June were near 0°C below the ice, increasing to approximately 2.5°C near the bottom of the lake. Variability in water temperature among NF and MF areas was low during the ice-covered season. Water temperatures increase rapidly in Meliadine Lake during the month of July when the ice comes off the lake. By the 3rd week of July when sampling was completed in 2020, water temperatures were between 11°C and 14°C. By mid-August, the water temperature at the NF had peaked at 16°C at the NF area and between 12°C and 14°C at the reference areas. The maximum temperature recorded at the remote continuous monitoring stations at the edge of the mixing zone was 16.5°C (Golder 2020a). In early September, water temperatures had decreased to between 8°C and 10°C.

Dissolved Oxygen

Dissolved oxygen (DO) exceeded 16 mg/L at most stations and depth intervals in March. Reliable dissolved oxygen measurements are often difficult to obtain during winter sampling events as multi-probe meters are not designed to function in sub-zero temperatures. Winter dissolved oxygen readings have periodically been flagged for reliability (Golder 2018), and the 2020 results were similarly flagged. At standard temperature and atmospheric pressure (0°C and 1 Atm or 760 mmHg), the theoretical limit of DO in freshwater is approximately 14 mg/L.

During the open water period, the lake was well-oxygenated (~10 to 12 mg/L) with DO concentrations relatively uniform both vertically in the water column and horizontally among the five monitoring areas (**Figure 5-2**).

pH

pH, much like DO, can be difficult to measure accurately in the winter. For the winter sampling events in 2020, pH was generally more variable and lower than compared to the open water sampling events. Most of the pH readings from March and June fell between 6.75 and 7.5, which is consistent with recent monitoring and in the range of values recorded in Meliadine Lake prior to the onset of effluent discharge. In 2017, for example, pH measured under-ice in January and February was between 7 and 8 for most profiles taken at MEL-01 and MEL-02, with the occasional depth reading measuring in the range of 6.5 and 7 (Golder 2018). Throughout the open water period, pH was consistently on the slightly basic side of circumneutral at approximately 7.5 with no evidence of vertical stratification within areas or spatial differences among the NF, MF, and reference areas.

Specific Conductivity

Conductivity is a measure of the electrical conductivity in water, and as the amount of salt (ionic parameters) increases, conductivity also rises. As a monitoring tool, *in-situ* conductivity readings are an

effective way of assessing changes in water quality related to mining effluent. Throughout this section, NF monitoring stations MEL-01-01, MEL-01-07, and MEL-01-10 are referred to as the “mixing zone stations” based on their location at the edge of the 100 m mixing zone. These three stations were also monitored under the WQ-MOP, and together with monitoring done at the AEMP stations MEL-01-06, MEL-01-08, and MEL-01-09, provide a spatial context to evaluate changes in conductivity stepping out from the diffuser.

The following conclusions regarding water quality in Meliadine Lake in 2020 integrate findings presented in the WQ-MOP report (Golder 2020a), supplemented with additional monitoring conducted specifically under the AEMP.

Pre-Discharge Period (March) – In March when no discharge occurred, specific conductivity at the NF and MF areas measured between 100 $\mu\text{S}/\text{cm}$ and 130 $\mu\text{S}/\text{cm}$ (black line on [Figure 5-3](#)). The effect of cryo-concentration was evident in the March and June profile results at the MF and reference areas ([Figure 5-3](#)).

Early Spring Monitoring – Conductivity increased in the NF coinciding with the start of discharge to Meliadine Lake on June 5th. Soon after discharge started, the plume was detected on June 7th during the first sampling event for the WQ-MOP. At the mixing zone stations MEL-01-01 and MEL-01-07, conductivity increased from less than 120 $\mu\text{S}/\text{cm}$ at the surface to approximately 200 $\mu\text{S}/\text{cm}$ near the bottom of the lake ([Figure 5-4](#)). The June event was conducted through the ice when conditions are less conducive to effluent mixing, and the noticeable increase and vertical stratification of specific conductivity at MEL-01-01 and MEL-01-07 is consistent with more stagnant conditions under ice. Evidence of stratification persisted at the mixing zone stations into early July when ice was receding.

Transition to Open Water (end of July) – Ice came off the NF area around July 22nd. In July and August, conductivity in the NF areas was largely well mixed, with no obvious pattern of vertically stratification or horizontally among the stations. For the majority of the samples collected during July and August, specific conductivity measurements fell within a relatively narrow range between 100 $\mu\text{S}/\text{cm}$ to 125 $\mu\text{S}/\text{cm}$. Generally lower conductivity in August is directly related to less water discharged from CP1. For most of August, daily discharge was below 3,000 m^3 , as less precipitation fell during the peak of summer and some of the surface contact water in CP1 was pumped to the process plant.

Late Season Monitoring (Sept 1 – Oct 4) – Limnology profiles taken in September (pink and purple shaded lines in [Figure 5-4](#)) showed more evidence of vertical stratification, coinciding with the increase in effluent discharge from CP1 beginning on September 12th. The spatial extent of vertical stratification evident in the profiles taken on September 13th extends from the diffuser to the three stations at the edge of the mixing zone. The MEL-01 stations located approximately 250 m from the diffuser were not sampled on the same day, but two days prior, on September 11th, the conductivity measurements were uniform top to bottom in the water column at just under 110 $\mu\text{S}/\text{cm}$. Approximately $\frac{1}{2}$ the volume of

water was discharged on September 11th (4,000 m³) compared to two days later on September 13th (8,300 m³). These findings broadly agree with the results of the plume delineation surveys in July and August that showed the plume was detectable at concentrations greater than 1% at 100 m from the diffuser during periods of high discharge (July plume survey [Figure 4-2]), but during periods of reduced flow from CP1 to Meliadine Lake, the effluent is thoroughly mixed within 100 m of the diffuser (August plume delineation survey [Figure 4-3]).

Lake-Wide Conductivity – Seasonal variability was evident in conductivity readings at the MF and reference areas. Based on the data from the NF areas, combined with the plume delineation surveys conducted in July and August, the spatial extent of changes in conductivity attributed to effluent discharge are confined to a relatively small area within 250 m of the point of discharge.

5.3.2 Snow Pack Chemistry Results (February and April 2020)

Snow pack monitoring was completed at five areas around the site on February 24th and April 20th, 2020. Results of the survey are presented in Appendix G. Two of the locations, DF-5, located south of the exploration camp, and DF-7, northwest of the site, are upgradient from Meliadine Lake and represent the most suitable monitoring areas for assessing off-site migration of dust (Figure 1-2). The snow pack monitoring program provides high-level information about off-site dust migration during the winter months, but drawing any conclusions between detectable concentrations in snow and potential changes in water quality would require a more detailed estimate of loadings that is beyond the intent of this monitoring program.

Around half of the parameters measured in the snow samples from DF-5 and DF-7 were less than the analytical DLs. The reported DLs in 2020 were considerably lower than in 2019, which limited the comparison of snow chemistry data between the two years. Of the parameters that were detected in February 2020, most were less than 5-times the analytical DL except for, aluminum, arsenic, barium, cadmium, copper, iron, lead and manganese. At concentrations close to the DL, the analytical precision is reduced. In April, around half the parameters detected were greater than 5-times the DL including molybdenum, nickel, silver, thallium, uranium and zinc in addition to the parameters detected at concentrations higher than 5 times the DL in February. There were no far-field or reference areas sampled. The farthest location, DF-6, is located west of the site between Lake B7 and Lake D7; chemistry data from this station was consistent with stations DF-5 and DF-7 monitoring locations, both in terms of the parameters detected and the magnitude of concentrations compared to DLs. The prevalence of parameters that were detected at concentrations greater than 5 times the DLs in snow samples at the four monitoring stations suggests off-site dust migration to the tundra may be occurring during the winter months. However, the relative contribution from dust in snow melt during freshet is likely negligible compared to water quality changes associated with the discharge of treated effluent in early spring/summer.

5.3.3 Current Water Quality Compared to Guidelines

Water quality results from the winter and open water sampling events were screened against water quality guidelines and site-specific water quality objectives (SSWQOs). The screening summary for the March sampling event are provided in **Table 5-4** (MEL-01) and **Table 5-5** (MEL-02). The screening summary for the open water samples collected from MEL-01, MEL-02, and Reference Areas are provided in **Table 5-6** to **Table 5-11**.

One water quality exceedance was recorded at the NF area for total copper in March. The single copper exceedance (2.21 µg/L) marginally exceeded the CCME water quality guideline of 2 µg/L. On average, copper concentrations were 1.34 µg/L at the NF area for that event; total copper concentrations averaged 0.85 mg/L across the open water season and no other exceedances of aquatic life or health-based drinking water guidelines were documented in the NF and MF areas during that period (**Table 5-6**).

Drinking water for the camp is sourced from Meliadine Lake in the narrows between MEL-01 and MEL-02. The intake (station MEL-11) lies in the direct path of flow for water exiting the east basin (**Figure 5-1**). Routine testing is done on camp water sourced from Meliadine Lake to ensure a safe drinking water supply for people on site. Since construction of the main camp, there have been no instances of water exceeding health-based standards for safe consumption. Data from this station are reported in the Annual Report.

5.3.4 Normal Range Assessment

Results of the normal range screening assessment comparing the median water chemistry concentrations for the open-water sampling events²³ at the NF and MF are presented in **Table 5-12**. In total, there were twenty-two (22) parameters that exceeded the upper limit of baseline/reference conditions at MEL-01 based on the median concentration from the AEMP water sampling events in July, August, and September. As expected, the list of parameters that exceeded the normal range of baseline/reference concentrations in 2020 included TDS (calculated)²⁴ and constituent major ions (e.g., chloride, sodium, calcium, and sulphate). Total phosphorus and total organic carbon (TOC) also

²³ Normal range concentrations are not calculated for samples collected in the winter because adequate reference and baseline data were not available for the calculation.

²⁴ TDS results are provided as *measured* and *calculated* concentrations for the AEMP water quality samples. Calculated TDS, rather than measured TDS, was selected for the normal range assessment to remain consistent with existing methods. Golder provided a detailed review of calculated vs measured TDS results in a Technical Memorandum for the Snap Lake Project (Golder 2013b). From their review, they noted that “measured TDS is subject to laboratory interferences that can reduce the accuracy of the measurement. Calculated TDS assumes the analytes exist in the sample in the forms analyzed, so are not influenced by any changes that may occur when taken out of solution. Using this method is likely more accurate given the practical limitations in handling and measuring TDS.”

exceeded the normal range in 2020, as did the following metals: arsenic, barium, boron, cobalt, iron, lithium, manganese, nickel, strontium, and uranium. Reactive silica, which wasn't measured in 2019, exceeded the normal range in 2020 and in 2018.

Most of the parameters that were above their respective normal ranges in the NF area exceeded by at least 10%. In 2020, the median concentrations of chloride and sodium were 60% and 47% above baseline/reference concentrations, respectively. The median concentration of chloride in the NF area in 2020 was 17.8 mg/L, compared to the normal range of 9.6 mg/L. Given the predominance of chloride and sodium in the effluent, this observation is not surprising. Other parameters that have increased relative to baseline conditions included arsenic, cobalt, lithium, manganese, nickel, and strontium. Relative to baseline/reference conditions in the lake, the median annual concentration of these metals has at least doubled (>50% increase).

Farther downstream, at the MF area, there were fewer parameters that exceeded their respective normal ranges in 2020, and those that did exceed were more often within 10% of the upper limit of baseline/reference conditions (**Table 5-12**). Chloride and sodium, as well as magnesium and sulphate and selected metals (e.g., arsenic) increased at the MF area relative to baseline/reference conditions in Meliadine Lake, but the magnitude of increase was consistently lower than that observed at the NF area.

Some metals such as arsenic, cobalt, iron, and strontium have exceeded the normal range of baseline/reference concentrations since the normal range concept was first introduced in the AEMP. Exceedance are expected to continue based on observations collected since 2015. In the case of metals and nitrogen parameters, the normal range calculation is heavily weighted towards samples collected in the west and south basins between 2016 and 2020²⁵, and because there are no baseline data from the east basin in the normal range assessment, natural variability between basins is not accounted for in the estimate of the normal range for metals and nitrogen parameters. **Figure C2-28** shows the concentration of arsenic in the NF area has increased very gradually dating back to the baseline phase in 2013, a pattern that is also evident at the reference areas. Spatial and temporal patterns will be discussed in more detail below, but the example of arsenic demonstrates that an exceedance of the normal range does not necessarily imply the observed changes are related to the mine. For this reason, it's important to scrutinize normal range exceedances to determine if the exceedance represents an actual year-over-year increase or simply a continuation of a long-term lake-wide trend.

²⁵ Refer to **Section Error! Reference source not found.** for a discussion on reference data included in the normal range calculations. A screening assessment completed as part of the 2018 AEMP concluded the 2013 baseline metals data from the east basin of Meliadine Lake were not suitable for use in the normal range calculations (see Appendix 6B in Golder 2019 for the underlying rationale).

5.3.5 Comparison to FEIS Predictions

Figure 5-11 illustrates the predicted concentration of TDS in the model domain for the 2014 FEIS and the updated 2020 mixing model compared to observed TDS (calculated) concentrations in the east basin (MEL-01) up to and including results from 2020. The following points stand out when looking at the observed increase in calculated TDS compared to predicted changes in the FEIS and more recent 2020 model update:

- The updated water quality model predicts TDS concentrations will increase more rapidly compared to the original far-field mixing model for the east basin presented in the 2014 FEIS. By 2021, the Tetra Tech base case model predicts maximum TDS concentrations at the edge of the mixing zone will increase from 89 mg/L in 2020 to 150 mg/L in 2021. Between 2021 and 2028 (the last year in the model), a more gradual further increase of 20 mg/L is predicted, for a maximum concentration of 170 mg/L.
- The 2014 FEIS predicted a more gradual increase in TDS from early through late operations, with peak TDS of 176 mg/L occurring around 2030-31, 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 mine that is based solely on development of the Tiriganiaq deposit.
- During the early operations period (2018-2020), TDS concentrations at the MEL-01 stations have tracked similar to the predicted increase in the 2014 FEIS when looking specifically at calculated TDS (**Figure 5-11**). Measured TDS is slightly higher, but follows a similar overall pattern. The Tetra Tech model predicted TDS concentrations of 83 mg/L at the edge of the mixing zone in 2020. The observed results from 2020 are in broad agreement with this prediction. At 100 m from the diffuser, measured TDS concentrations in the 2020 collected under the WQ-MOP were between 30 mg/L and 115 mg/L. These samples were taken from the water depth with the highest specific conductivity, and are an accurate estimate of the worst-case TDS concentrations at 100 m from the diffuser. The average measured TDS concentration at the edge of the mixing zone in 2020 was approximately 70 mg/L.

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)²⁶. *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 within water quality guidelines for the protection of aquatic life and drinking water quality. Information presented in the water quality screening assessment and the

²⁶ See Section 7.4.7 (Residual Impact Summary) in the FEIS for more information (Volume 7; Agnico Eagle 2014)

normal range assessment confirm that although water quality in the east basin has changed compared to baseline conditions (> normal range), these changes are in line with the FEIS predictions and the current concentrations of all parameters are well below water guidelines meant to protect aquatic life and drinking water quality for human consumption.

5.3.6 Spatial and Temporal Trends

The following section provides an overview of spatial and temporal patterns of changes in water quality for TDS (and constituent ions) as well as selected metals. Water quality data for key parameters within Meliadine Lake were qualitatively examined for temporal patterns on condensed time series plots of open-water conditions between 2015 and 2019 presented in **Figure 5-5** through **Figure 5-10**. Plots for all parameters in the winter and open-water sampling events are presented in **Appendix C1** (boxplots) and **Appendix C2** (scatter plots) to illustrate general trends in parameter concentrations during open water and ice cover conditions in Meliadine Lake. The detailed assessment of changes in nutrients are discussed in the phytoplankton study (**Section 6.4.2**) as part of the broader discussion regarding nutrient enrichment.

TDS and Major Ions

Based on the characteristics of the effluent discharged to Meliadine Lake, total dissolved solids (either calculated or measured), and chloride in particular, are among the parameters best suited to assess changes in water quality between areas and across years. As shown in the table below, chloride concentrations have increased over time (yearly % increase) at NF, MF, and reference areas, but the rate of change has been higher in the NF area compared to the MF area and Reference Area 1, where open water sampling has been conducted at the same frequency since 2016. The two years that saw the largest yearly % increase, as well the biggest relative percent difference between areas, were 2018 and 2020, which match the expected pattern of change associated with discharge of water from CP1 to Meliadine Lake. Of note, is that in 2019, when discharge from CP1 was curtailed, chloride concentrations decreased in the NF area relative to 2018, suggesting the east basin is not only effective at assimilating effluent, as suggested by Golder (2020a) and Tetra Tech (2020), but that changes in water quality are reversible when less water is discharged from CP1. This is an important consideration as Agnico Eagle looks to implement an adaptive management strategy involving the option of transporting water from CP1 to Melvin Bay via the proposed waterline.

Table 5-1. Percent Increase in Chloride Concentrations (mg/L) Between Areas and Years Since 2015

Year	NF MEL-01		MF MEL-02		REF1 MEL-03		Relative Percent Difference in Chloride Between Areas		
	Mean	Yearly % Increase	Mean	Yearly % Increase	Mean	Yearly % Increase	NF vs MF	NF vs FF	MF vs FF
2015	8.6	-	8.8	-	-	-	-2%	-	-
2016	9.4	8%	8.4	-5%	7.8	-	11%	19%	8%
2017	10.6	13%	9.4	11%	8.2	6%	13%	25%	13%
2018	12.7	18%	9.4	0%	8.3	1%	30%	41%	12%
2019	11.9	-7%	10.9	15%	9.4	12%	9%	23%	14%
2020	17.8	40%	11.9	9%	9.4	-1%	40%	62%	24%

As shown in **Figure 5-5**, TDS concentrations have been trending higher in the east basin of Meliadine Lake dating back to 2013 before the start of construction. The reference area data is sparse, but there is some evidence of a subtle lake-wide changes in water quality going back to the baseline period in the late 1990's (**Figures C2-6** [measured TDS]; **Figure C2-16** [chloride]). The calculated TDS data set goes as far back as 2008; (**Figure C2-7**), and in general there is compelling evidence when looking at calculated TDS. Adding to the uncertainty regarding long-term temporal trends is the conclusion Golder arrived at as part of the normal range screening assessment for the 2018 AEMP. In their analysis of the 2015 to 2017 water quality data, Golder concluded based on box and whisker plots that the 2015 to 2017 NF water quality data differed from the pre-2015 dataset for several major ions, and suggested that some aspects of water quality in the NF area were affected by pre-construction exploration activities²⁷. Prior to dewatering of Lake H17 in late 2016, the only documented discharge to Meliadine Lake was gray water and sewage from the exploration camp STP, neither of which seem like plausible sources to influence TDS in the NF area over time (**Figure 5-13**). No other exploration activities that could have contributed to changes in water quality at this spatial and temporal scale were identified.

To support the discussion regarding the spatial and temporal extent of mine-related vs natural changes in TDS, Piper plots were constructed to illustrate the ionic composition of water samples from recent monitoring in 2018 through 2020 compared to the baseline period. Piper plots provide a visual way of assessing the ionic signature or “fingerprint” surface water in Meliadine Lake. During the baseline period, water samples collected throughout Meliadine Lake were predominantly comprised of calcium or sodium + potassium as the cations and bicarbonate and chloride as the anions (**Figure 5-17**). In contrast, surface contact water has a distinct signature of high chloride and a mix of calcium and sodium (**Figure 5-18**), owing to the fact that some of the waste on site is from underground where TDS concentration in groundwater is naturally elevated. Therefore, a shift in the ionic composition of water

²⁷ Refer to Appendix 6B in Golder (2019)

from Meliadine Lake towards higher proportion of chloride, in particular, would suggest effluent is the cause of the change (Golder 2020a).

Recent results for the reference areas from 2018 to 2020 (**Figure 5-19**) are consistent with the baseline results (**Figure 5-17**), with bicarbonate/carbonate the dominant anions, suggesting that the subtle trends in TDS observed at the reference areas are unrelated to effluent inputs to the lake. Results for the NF area, MF area and edge of the mixing zone since 2018 (**Figure 5-20**) show higher chloride at the NF area relative to the MF area. The important take home message here is that the increase in chloride is subtle, meaning effluent is rapidly mixed with surface water a short distance from the diffuser.

Metals

Increases in TDS and constituent ions is consistent with the expected change in water quality caused by effluent. However, the large volume of water discharged in June and July also had higher concentrations of some metals. The combination of high discharge volumes and higher concentrations of certain parameters in CP1, contributed to observed increases for several metals in the NF area in the July sampling event, notably arsenic, cobalt, and manganese (among others). Of all the parameters that showed increases in 2020, arsenic stands out, because of the large magnitude of the increase at the MF area relative to concentrations observed in 2019. For context, prior to 2020, variable, yet increasing concentrations of arsenic were evident at the NF area, while the MF and reference areas remained relatively consistent in the range of 0.2 to 0.3 µg/L (**Figure 5-7**). In 2020, an increase was observed for both total and dissolved arsenic at MEL-02, with concentrations in the July sampling event approaching 0.6 µg/L. What makes this result surprising is that concentrations at MEL-02 were of similar magnitude to both MEL-01 and MEL-13 (above diffuser) (**Figure 5-15** and **Figure 5-16**). This observation seems inconsistent with effluent as the source, particularly given the measured plume dilution in the receiving environment (Golder 2020a) and the effluent mixing model update by Tetra Tech (2020), which both demonstrate rapid dilution of effluent within a relatively short distance of the diffuser. Finally, the absolute concentrations are well below the AEMP Action Level of 7.5 µg/L.

5.4 Low Action Level Assessment – Meliadine Lake

Water quality data from the AEMP are assessed within a response framework that compares results from the current monitoring year against Low Action Level criteria to determine if additional studies, monitoring, or mitigation are required. Low Action levels, which were updated in 2018, provide an early warning indicator (aka ‘trigger’) that changes in water quality have occurred before concentrations increase to levels associated with effects to aquatic life or impaired drinking water quality for human consumption. The conclusions of the Low Action Level assessment for effluent toxicity and water quality are presented in the following sections. The Low Action Level assessment for nutrient enrichment in Meliadine Lake is presented **Section 6.5** of the phytoplankton study.

5.4.1 End-of-Pipe Effluent Toxicity

The Low Action Level for end-of-pipe toxicity is classified as a persistent sublethal toxic effect observed in the same test organism in three consecutive monthly samples collected from MEL-14 for compliance purposes. Persistent sublethal effects due to effluent exposure were not observed in the toxicity tests conducted on *L. minor*, *H. azteca*, *D. magna*, or Fathead Minnow in 2020. The frequency with which toxicity testing was conducted in 2020 provides a high level of confidence in the conclusion that effluent discharged to Meliadine Lake is non-toxic to aquatic plants, invertebrates, and fish. Furthermore, the absence of persistent effects attributable to effluent demonstrates that the increase in the TDS limit from 1,400 mg/L to 3,500 in 2020 is protective of aquatic life.

5.4.2 Water Quality for the Protection of Aquatic Life and Human Health

The Low Action Level for water quality and toxicological effects to aquatic life and impacts to human health have 3 conditions (**Table 2-3**), all three of which must be exceeded to trigger a Low Action Level exceedance:

- Water quality in the NF area is different from baseline (normal range assessment),
- At least one parameter exceeds 75% of the AEMP Benchmark, and
- Divergent trends between the NF and reference areas.

The harmonized list of AEMP Benchmarks for aquatic life and human health to a single AEMP Benchmark for a water quality parameter reduced redundancy in reporting as compared to previous years. Of the parameters with both aquatic life and drinking water quality guidelines, the aquatic life guidelines were typically lower. This meant water quality deemed safe for aquatic life from a toxicological perspective can also be considered safe for human drinking water use. The drinking water guideline was adopted as the AEMP Benchmark for arsenic, antimony, iron, and manganese. In the case of iron, the drinking water guideline is based on preserving taste (aesthetic objective) rather than protecting against toxicological effects. Normally the aesthetic objective would not be factored into decision-making, but given that members of the community have recently expressed concern about activities at the mine changing the taste of the water, use of the aesthetic objective as the AEMP Benchmark seems appropriate.

Figure 5-21 presents the median concentration in the NF, MF and pooled reference areas relative to the normal range, AEMP Action Level, and AEMP Benchmark in a “dashboard”. The results of the normal range and water quality screening assessment (as shown in **Figure 5-21**), as well as the temporal and spatial trend assessment (**Section 5.3.6**), provide the supporting evidence used to answer the following three questions.

Question 1: *Has water quality in the NF area changed relative to baseline/reference conditions?*

- **Response:** Yes
- The normal range assessment flagged several major ions, TOC, and several metals as exceeding the upper limit of the normal range in 2020.

Question 2: *Is the concentration for a given parameter at Near-field area MEL-01 greater than 75% of the AEMP benchmark?*

- **Response:** No.
- No parameters exceeded the AEMP Action Level in 2020. For parameters without an AEMP Benchmark, the second criterion is not applicable; for these parameters, the low action level trigger is evaluated based on criteria in questions 1 (above) and 3 (below).

Question 3: *Is there evidence of a divergent trend over time in the concentrations of a given parameter at the Near-field compared to the reference area?*

- **Response:** Several parameters have increased in the NF area relative to baseline and reference conditions. The pattern of the change in the NF area is consistent with changes related to effluent discharge, as reflected by higher concentrations of TDS and constituent ions, nitrogen parameters, and some metals linked to mining activities. Importantly, the pattern of the change in concentration is consistent with what was predicted in the FEIS, namely that water quality in the east basin would change relative to baseline conditions, but that water quality at the edge of the mixing zone (100 m) would meet aquatic life guidelines, human health guidelines, or SSWQOs.

5.5 Conclusions and Recommendations for 2021

The various approaches to evaluating water quality (e.g., normal range assessment, spatial/temporal scatterplots) all point to changes in water quality in the east basin associated with effluent. The magnitude of the change is broadly consistent with predictions in the FEIS, namely, that water quality would change relative to baseline/reference conditions, but that water quality would continue to meet guidelines for the protection of aquatic life and human drinking water quality at 100 m from the diffuser. Based on the extensive monitoring program in 2020, the proposed increase in the MAC of TDS in effluent from 1,400 mg/L to 3,500 mg/L appears protective of aquatic life and human drinking water quality.

At this stage of the AEMP, there is no evidence of year-over-year changes in water quality that warrant management actions or mitigation strategies beyond on-going monitoring as per the Water Licence and MDMER requirements.

The scope of the 2021 monitoring program includes biological monitoring for the health of the fish and benthic invertebrate communities in Meliadine as per the 3-year monitoring cycle under the harmonized EEM/AEMP.

5.6 Figures – Meliadine Lake Water Quality

Figures specific to Meliadine Lake are presented below. Additional supporting water chemistry plots are provided in **Appendix C1** (boxplots) and **Appendix C2** (scatterplots).

Figure 5-1
Water quality monitoring stations in
Meliadine Lake.

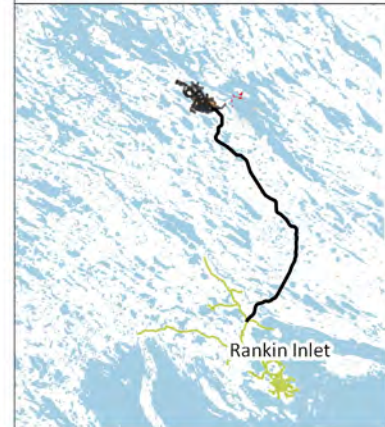
2020 Aquatic Effects Monitoring Program
Annual Report

AZIMUTH



Date: March 25, 2021
Datum: NAD 83 UTM Zone 15N
Scale: 1:110,000 (inset: 1:45,000)
Software: QGIS version 3.8.2
Produced by: E. Franz

REFERENCES
1. Basemap imagery from Sentinel 2 on September 13, 2019
2. Mine Plan provided by Agnico Eagle
3. Mining zone extent based on Golder (2019) and the FEIS (Agnico Eagle 2014)



Legend

Monitoring Stations

- Diffuser
- Meliadine Lake Water Stations
- Dustfall/Snowpack Monitoring Station
- Water intake from Meliadine Lake
- for drinking water at the camp

MEL-02-01 and MEL-02-04 were inadvertently sampled in July, August, and September instead of the permanent stations MEL-02-06 and MEL-02-08.

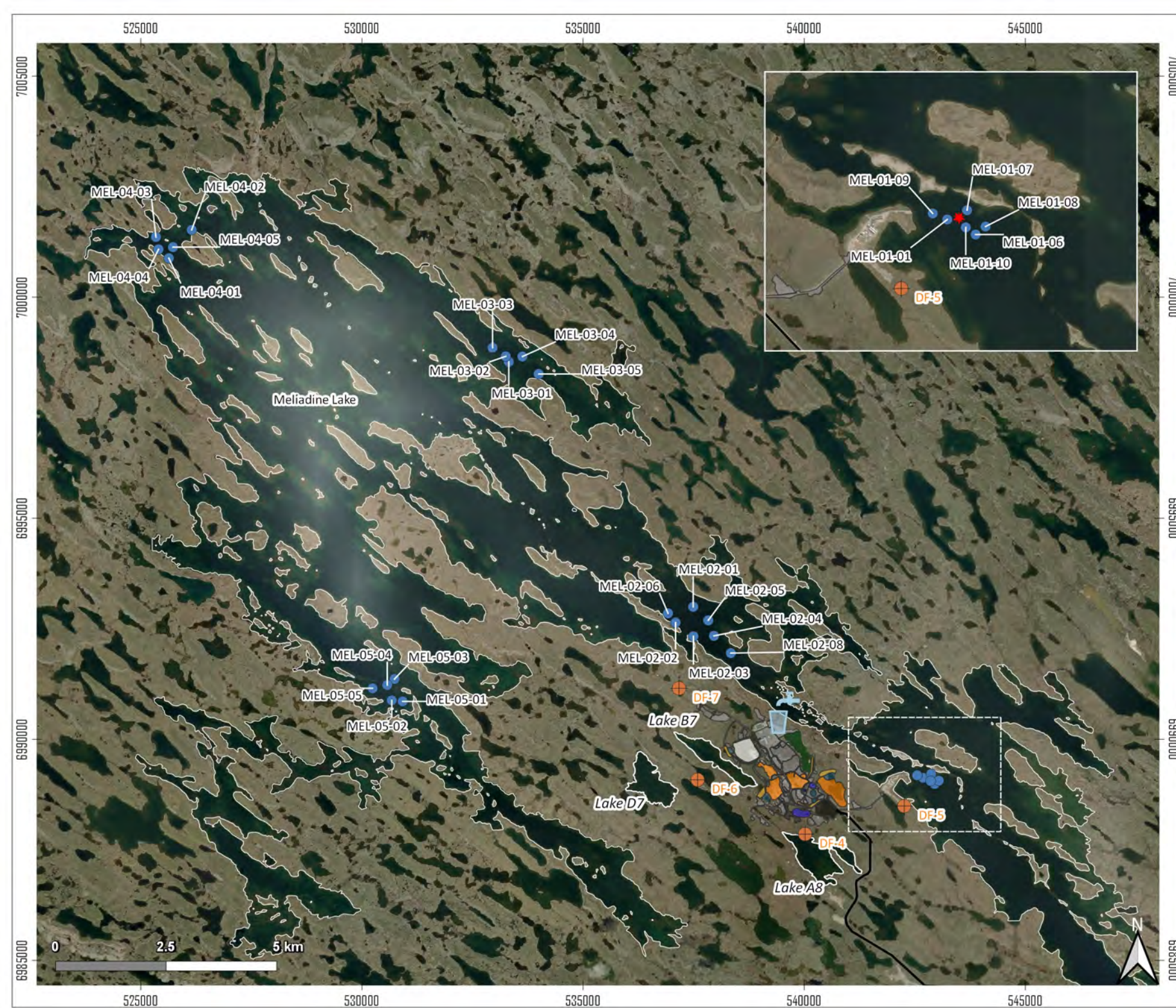


Figure 5-2 Dissolved Oxygen (DO, mg/L), pH, and Temperature from Limnology Profiles in Meliadine Lake in 2020

Notes: Each line represents the average of the five water quality profiles taken at each area per month under the AEMP. The June (2020-6) sampling was done as part of the WQ-MOP. Results are shown here to provide an additional under-ice monitoring event to assess spatial and season changes.

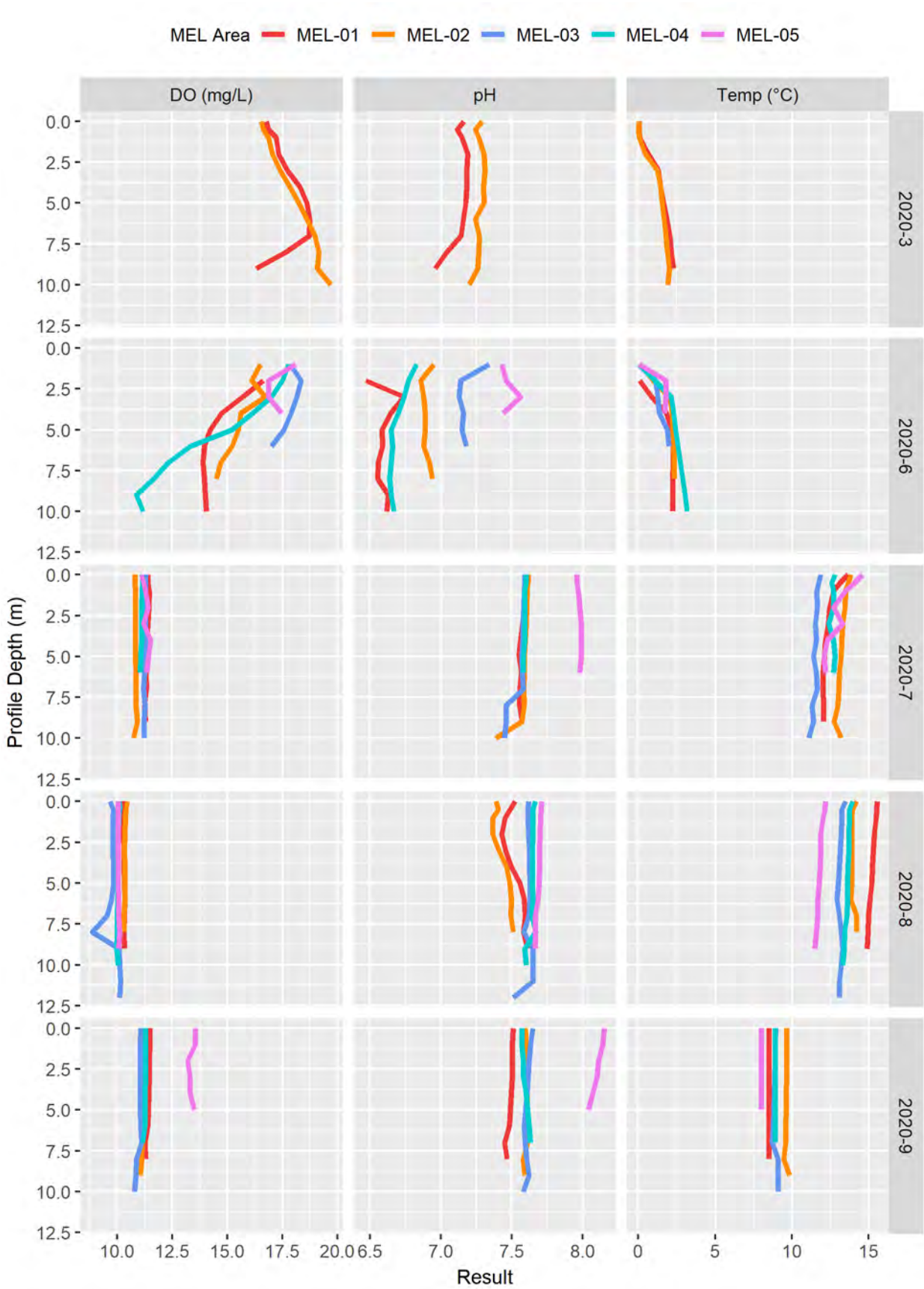


Figure 5-3 Specific Conductivity (µS/cm) Throughout Meliadine Lake By Area and Date in 2020

Notes: Each line represents the average of Sp. Cond readings taken in each area on a particular day. The Diffuser station refers to MEL-13, located on top of the diffuser. Approximately weekly profiles were taken as per the WQ-MOP at the edge of the mixing zone in MEL-01. Monthly profiling was done at the mid-field (MEL-02) and reference areas (MEL-03, MEL-04, and MEL-05) under the AEMP.

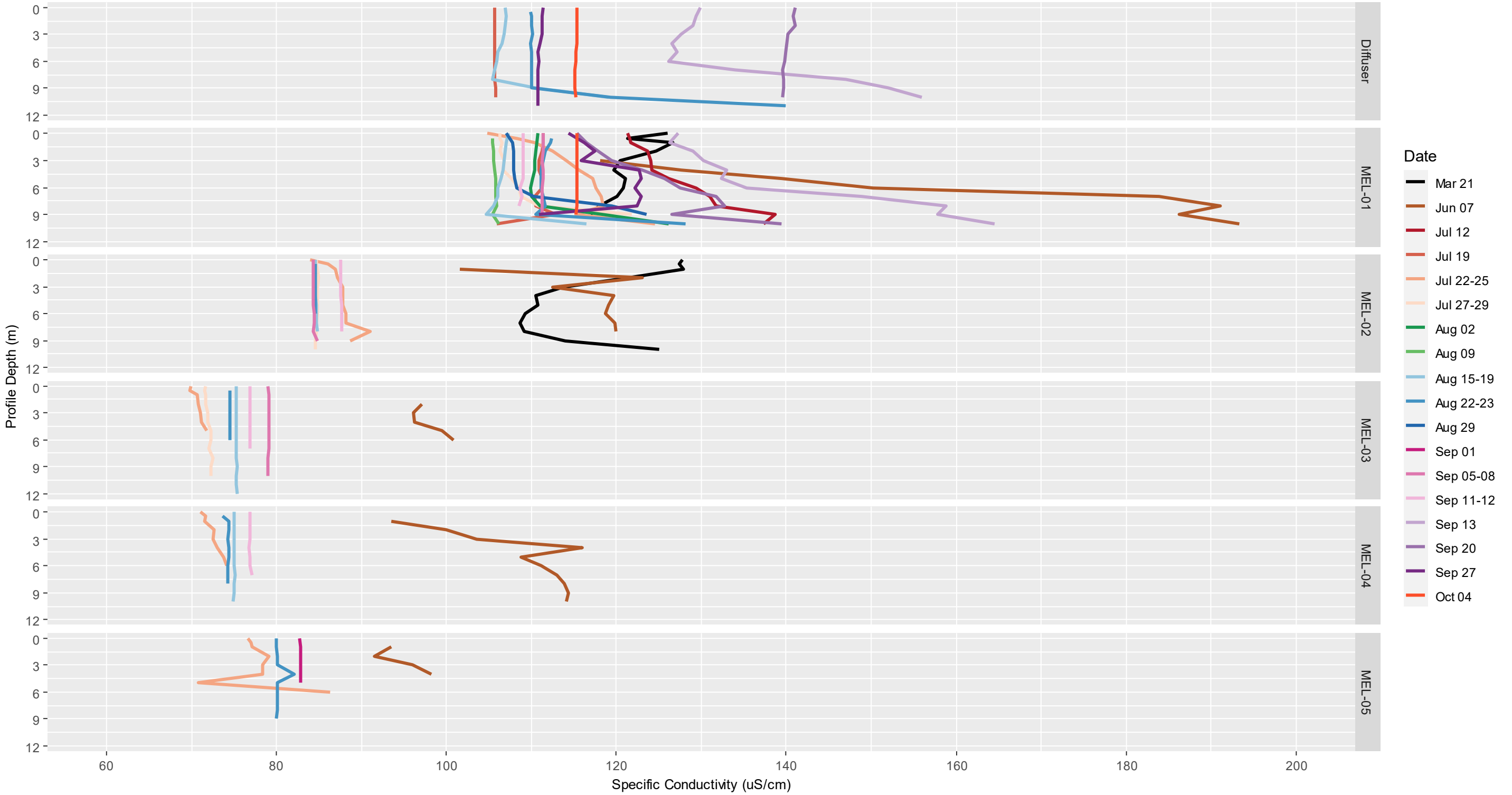


Figure 5-4 Specific Conductivity (µS/cm) in the Near-Field Area (MEL-01) By Station and Date in 2020

Notes: Each line represents discrete sampling taken on each day at each station (1 complete profile). The Diffuser station refers to MEL-13, located on top of the diffuser. Approximately weekly profiles were taken as per the WQ-MOP at the edge of the mixing zone in MEL-01. Stations MEL-01-01, MEL-01-07 and MEL-01-10 correspond to stations MEL-13-01, MEL-13-07, and MEL-13-10 in the WQ-MOP.

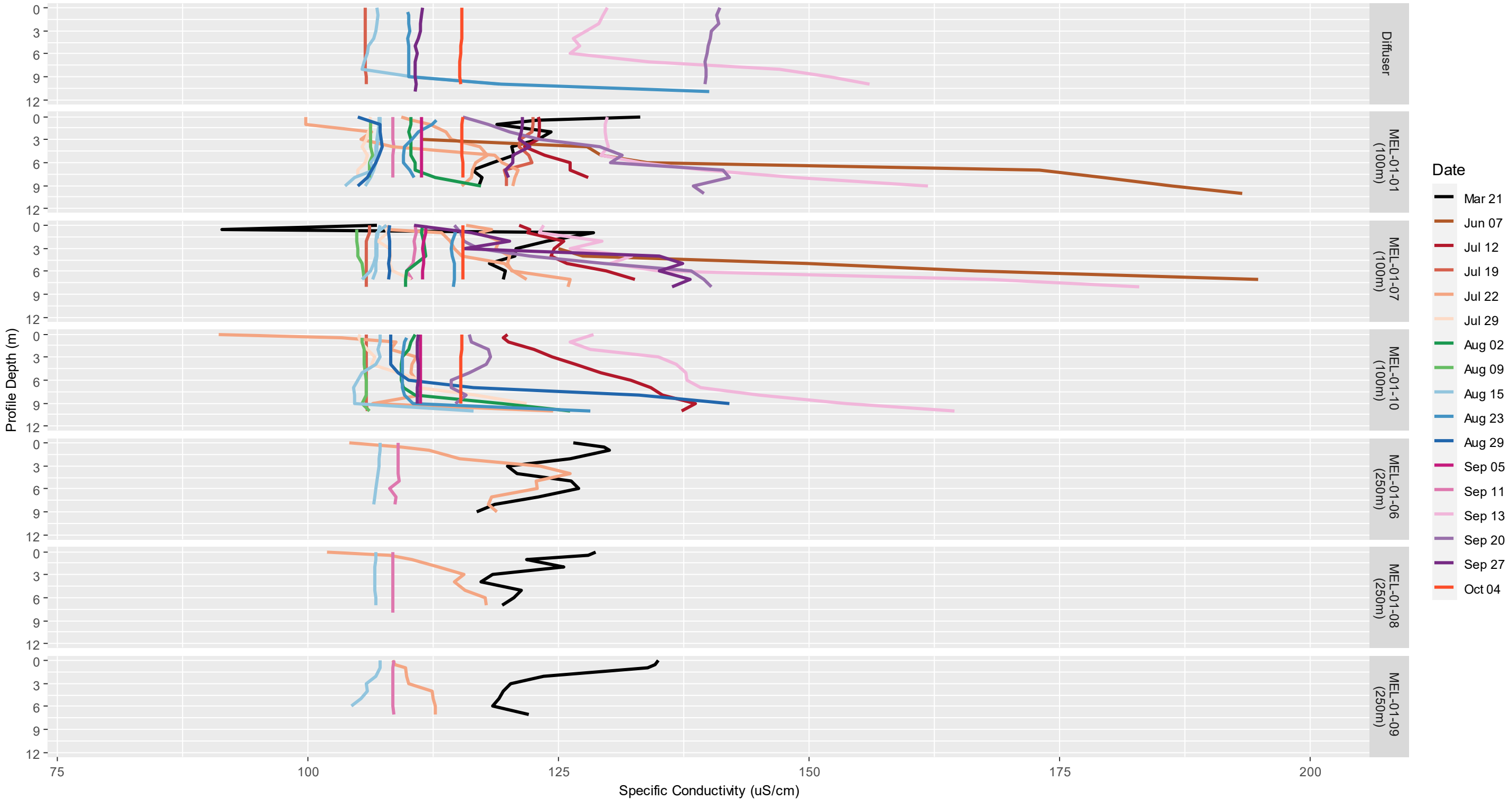


Figure 5-5. Meliadine Lake water quality (open water) – concentrations of TDS, hardness, and major ions (Ca, Mg, K, and Na) since 2013.

Notes: 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 corresponds to the upper 90th percentile concentration for samples collected during baseline and from the reference areas.
TDS = total dissolved solids; Hard = hardness; Ca, Mg, K, and Na = calcium, magnesium, potassium, sodium; Cl = chloride; SO4 = sulphate.

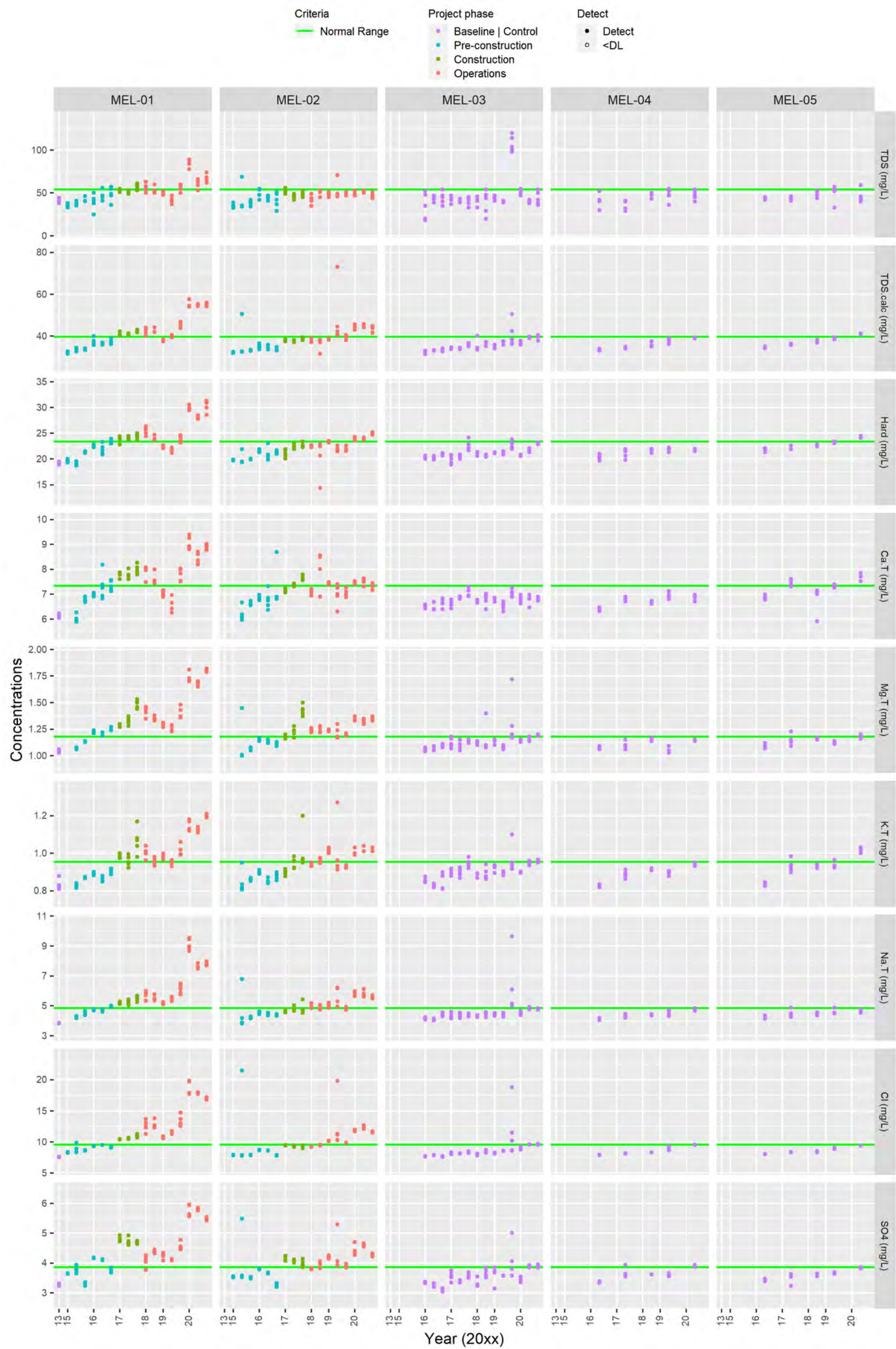


Figure 5-6. Meliadine Lake water quality (open-water) – pH, conductivity, and concentrations of selected nutrients since 2013.

Notes: 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 corresponds to the upper 90th percentile concentration for samples collected during baseline and from the reference areas. field and lab conductivity (F and L); Alk.T = total alkalinity; NH3-N = ammonia (as N); NO3-N = nitrate (as N); TKN = total Kjeldahl nitrogen; T-P = total phosphorus.

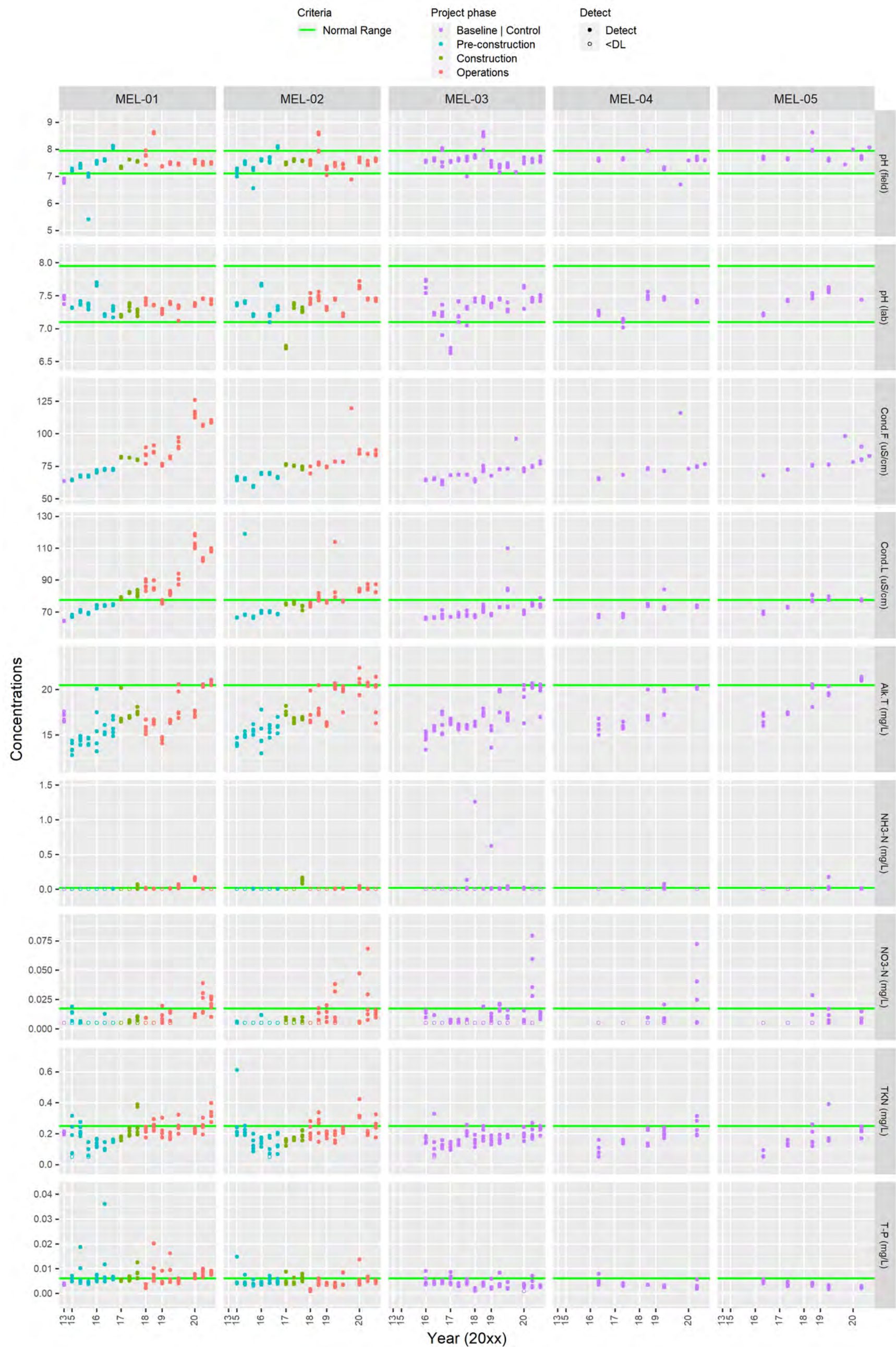


Figure 5-7. Meliadine Lake water quality (open-water) –concentrations of selected metals (total) since 2013.

Notes: 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 corresponds to the upper 90th percentile concentration for samples collected during baseline and from the reference areas.



Figure 5-8. Meliadine Lake water quality (open-water) –concentrations of selected metals (total) since 2013.

Notes: 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 corresponds to the upper 90th percentile concentration for samples collected during baseline and from the reference areas.



Figure 5-9. Meliadine Lake water quality (open-water) – concentrations of selected metals (dissolved) since 2013.

Notes: Concentrations for the dissolved (0.45 µm filtered) fraction.
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.
Normal ranges are not calculated for the dissolved fraction of these metals (water quality guidelines specific to these parameters apply to the unfiltered fraction).

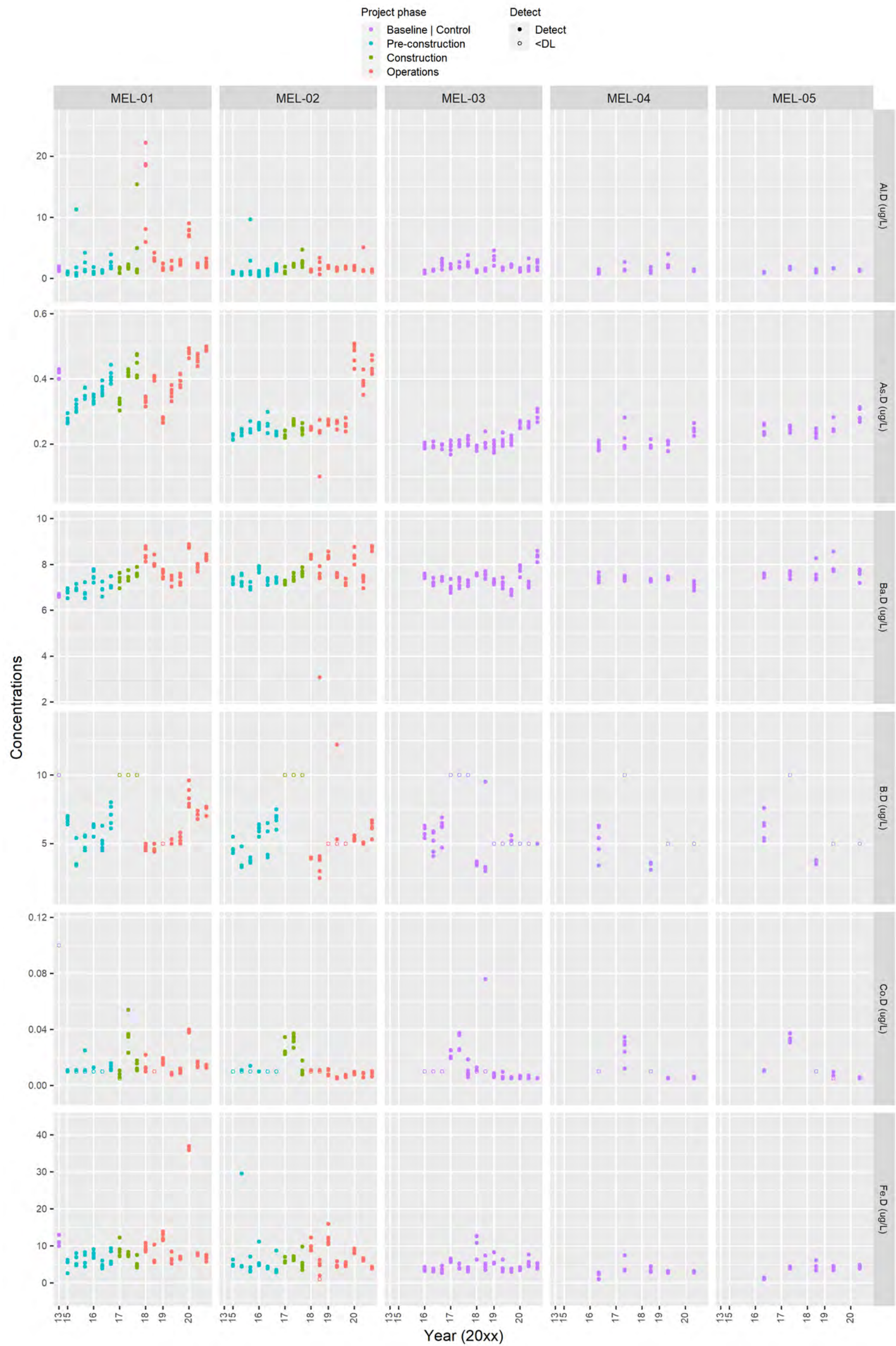


Figure 5-10. Meliadine Lake water quality (open-water) – concentrations of selected metals (dissolved) since 2013.

Notes: Concentrations for the dissolved (0.45 µm filtered) fraction.
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.
Normal ranges were calculated for dissolved lead, manganese, and zinc because the aquatic life guidelines were derived for the dissolved fraction.

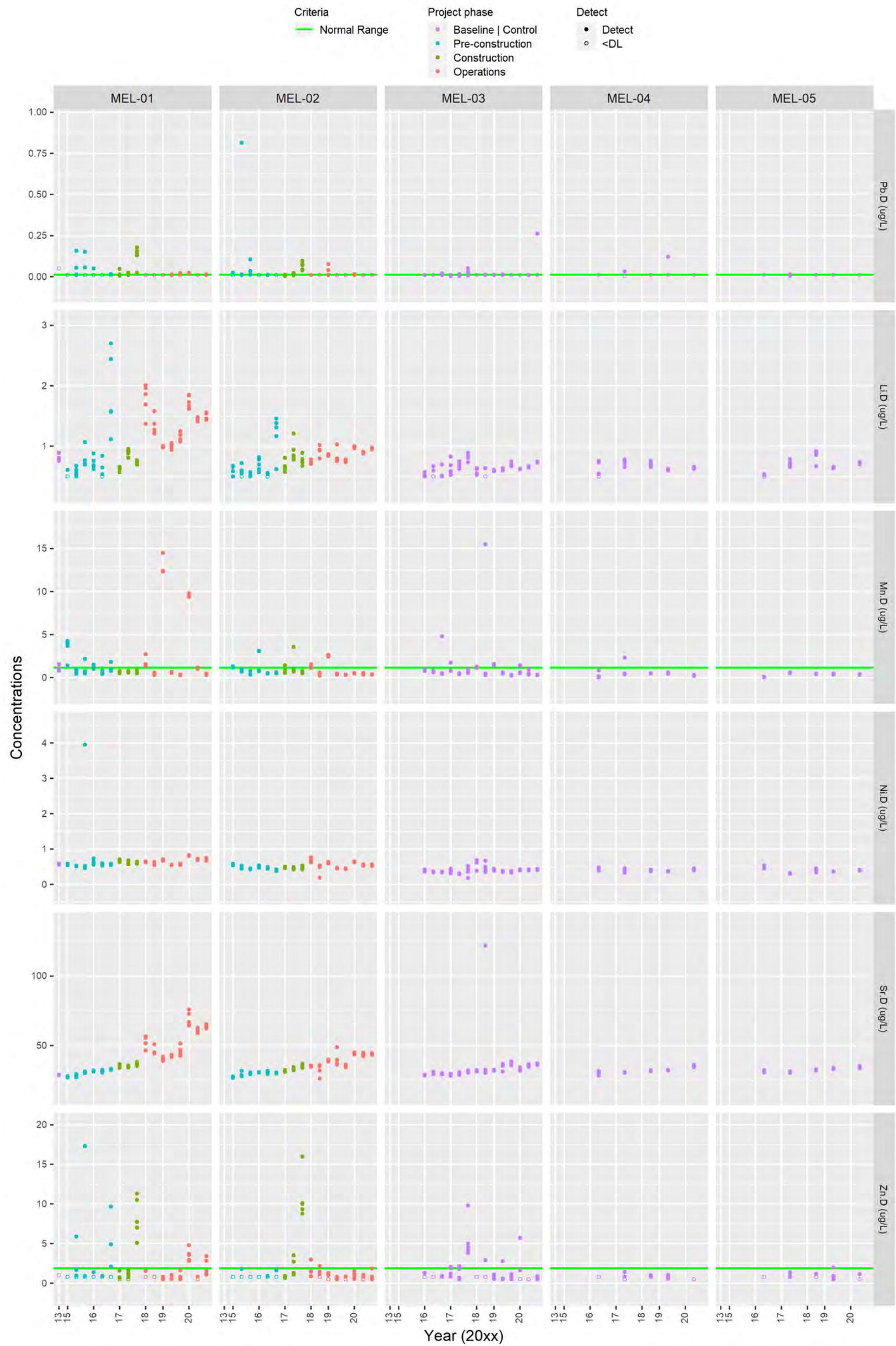


Figure 5-11. Predicted Changes in Total Dissolved Solids (calculated; mg/L) in the East Basin of Meliadine Lake Compared to Observed Results

Notes: The FEIS (2014) predictions (green 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 2020 (Tetra Tech 2020). The pink dots represent the observed TDS calculated data collected to date from the NF area as part of the AEMP.

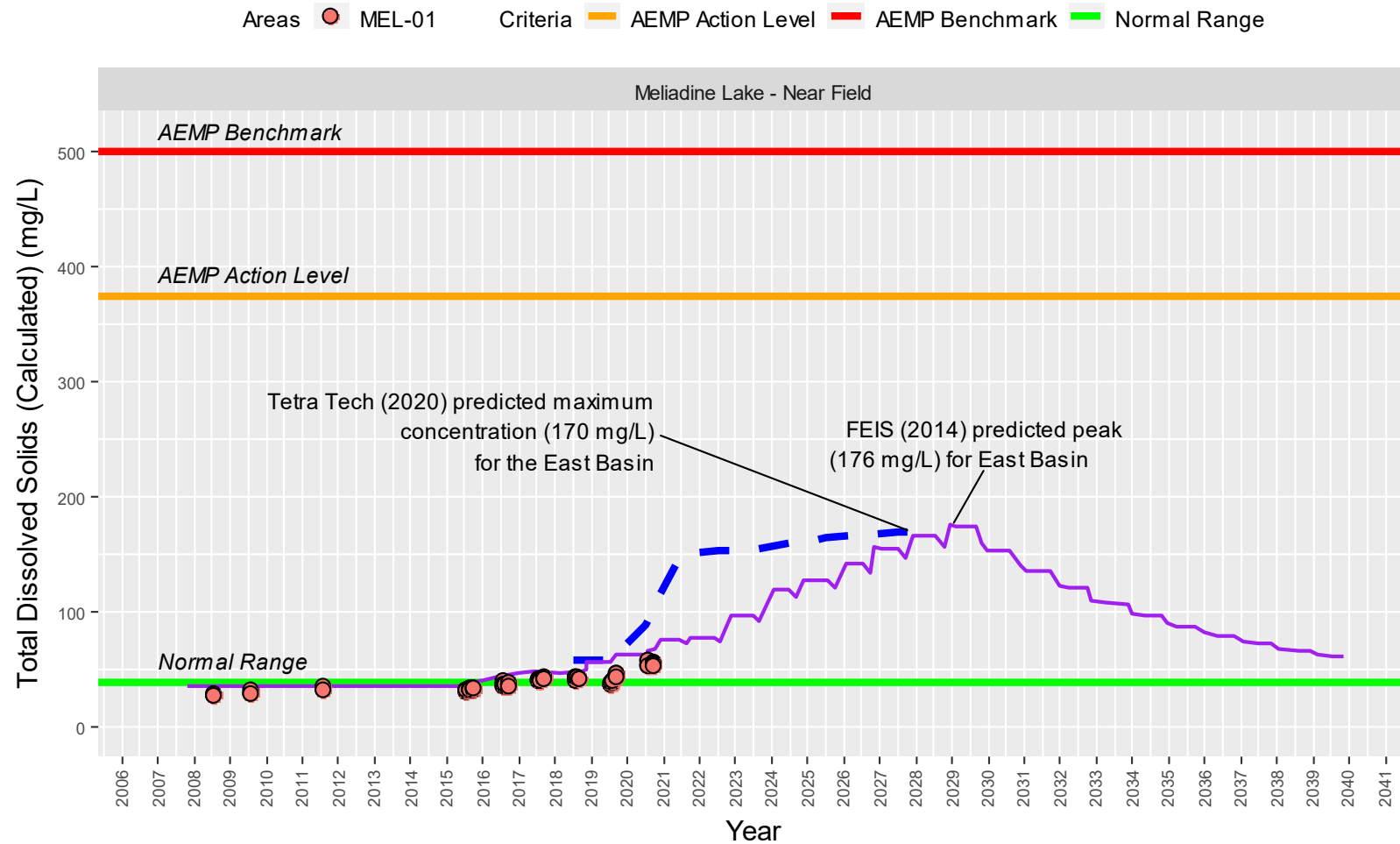


Figure 5-12. Predicted Changes in Chloride (mg/L) in the East Basin of Meliadine Lake Compared to Observed Results

Notes: The FEIS (2014) predictions (green 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 2020 (Tetra Tech 2020). The pink dots represent the observed chloride data collected to date from the NF area as part of the AEMP.

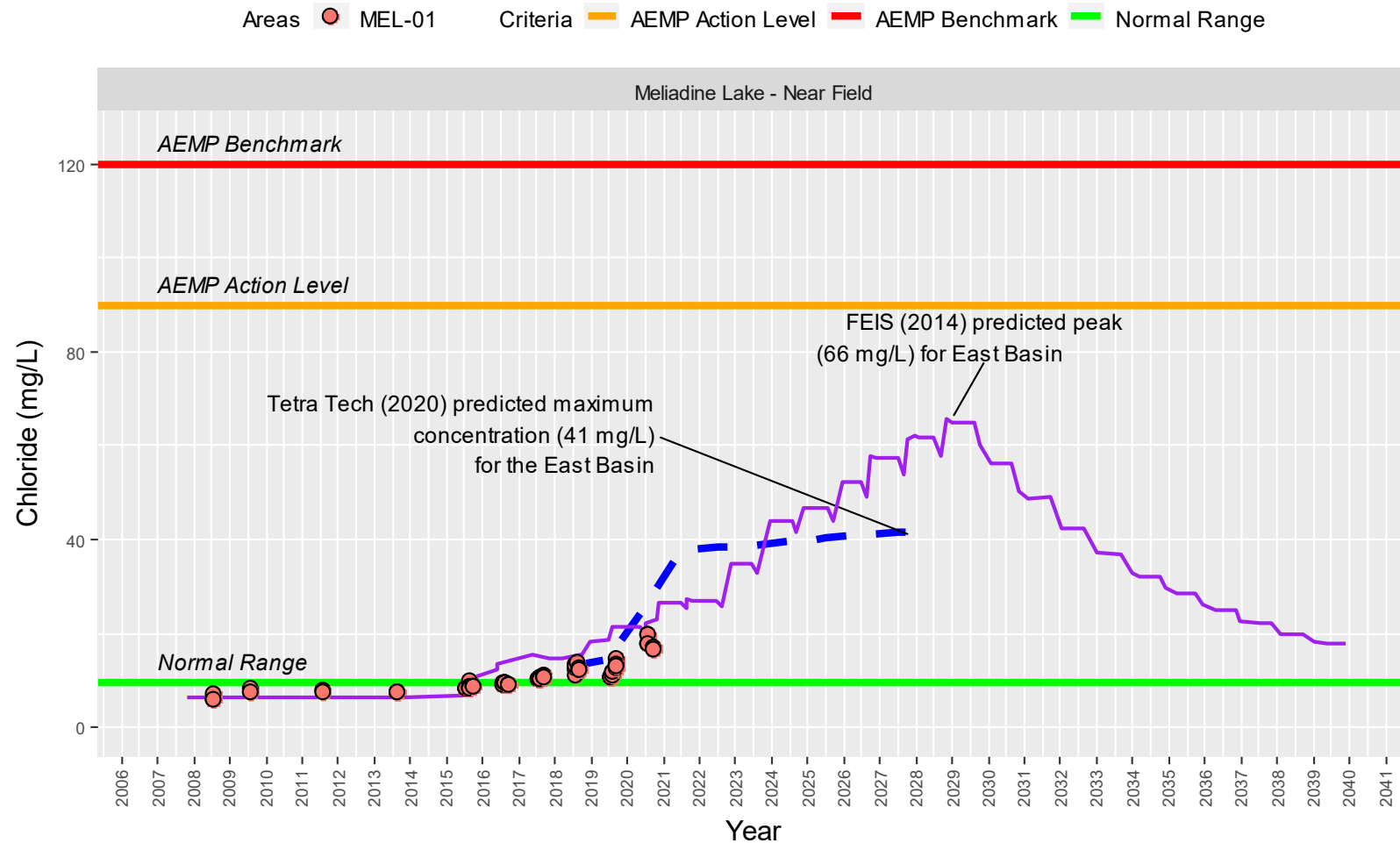


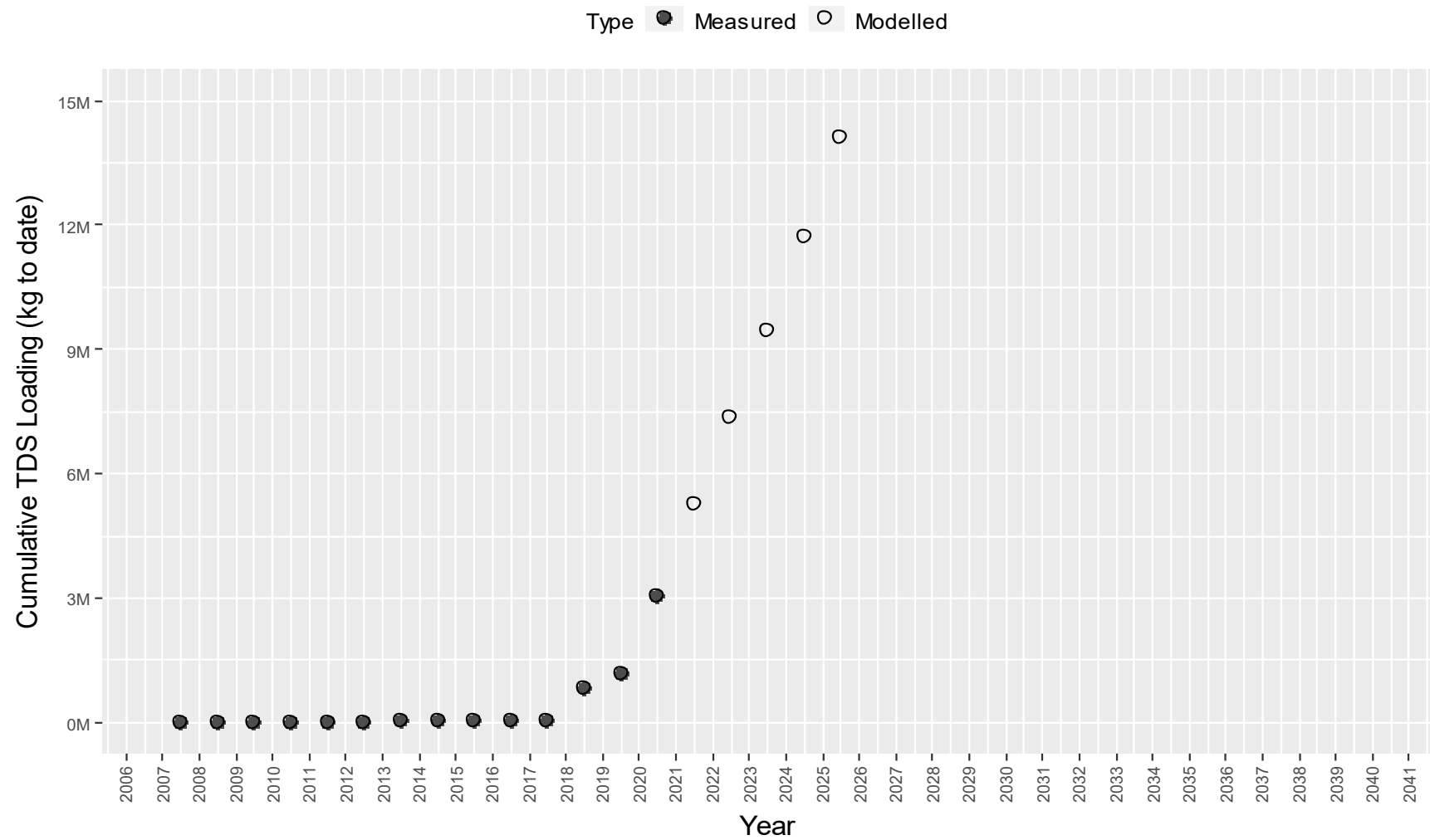
Figure 5-13. Cumulative Measured and Modeled Loadings of TDS in the Current Life of Mine.

Figure 5-14. Spatial and Temporal Changes in TDS and Constituent Major Ions In Meliadine Lake Since 2018

Notes: Data are for the open water sampling events only, corresponding to when treated effluent was released to the lake. Points are jittered slightly to avoid overplotting. The full suite of water quality analyses were not completed at the MEL-13 diffuser station and the edge of the mixing zone samples each year.

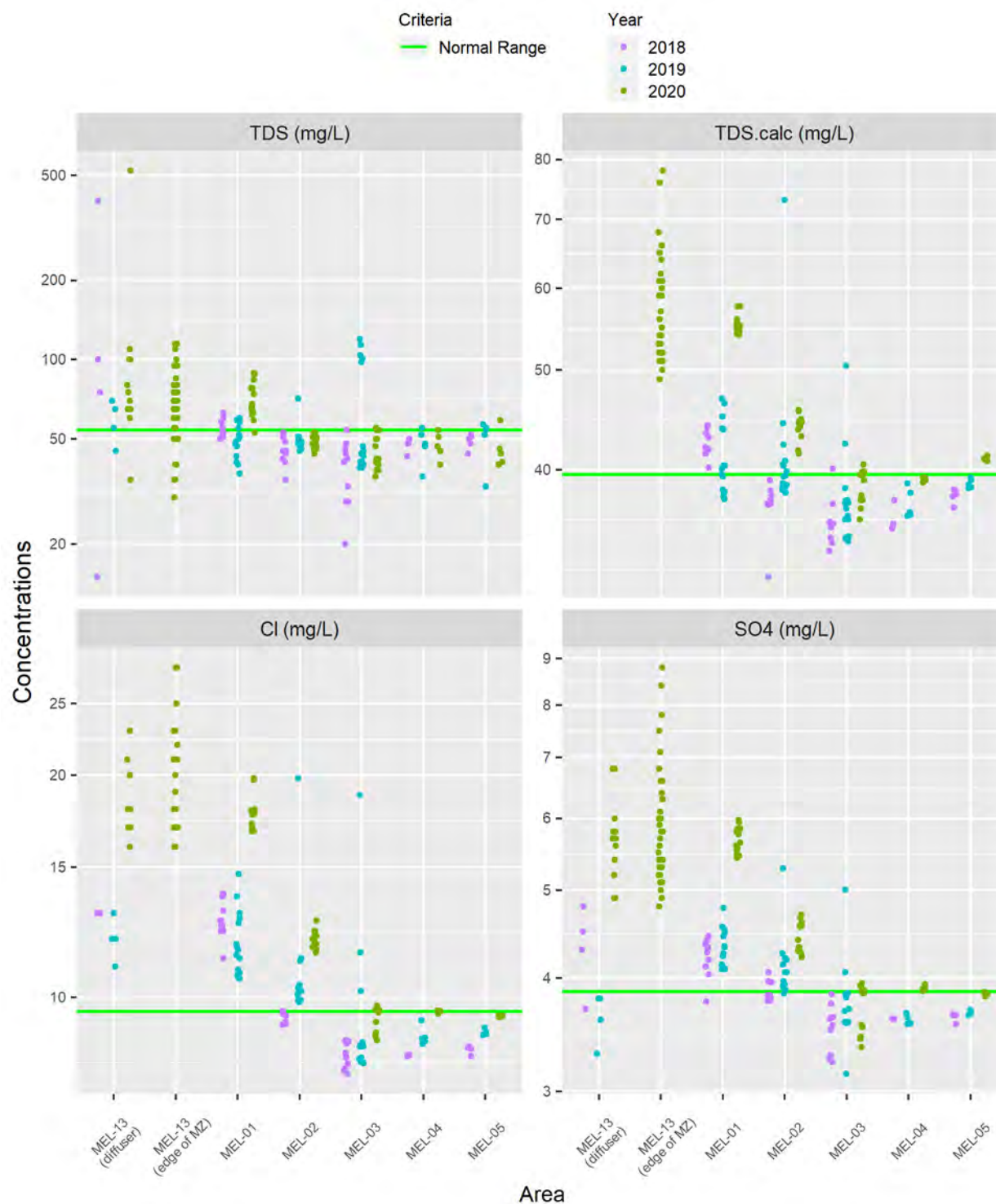


Figure 5-15. Spatial and Temporal Changes in Arsenic, Barium, Copper, and Manganese in Meliadine Lake Since 2018

Notes: Data are for the open water sampling events only, corresponding to when treated effluent was released to the lake. Points are jittered slightly to avoid overplotting. The full suite of water quality analyses were not completed at the MEL-13 diffuser station and the edge of the mixing zone samples each year.

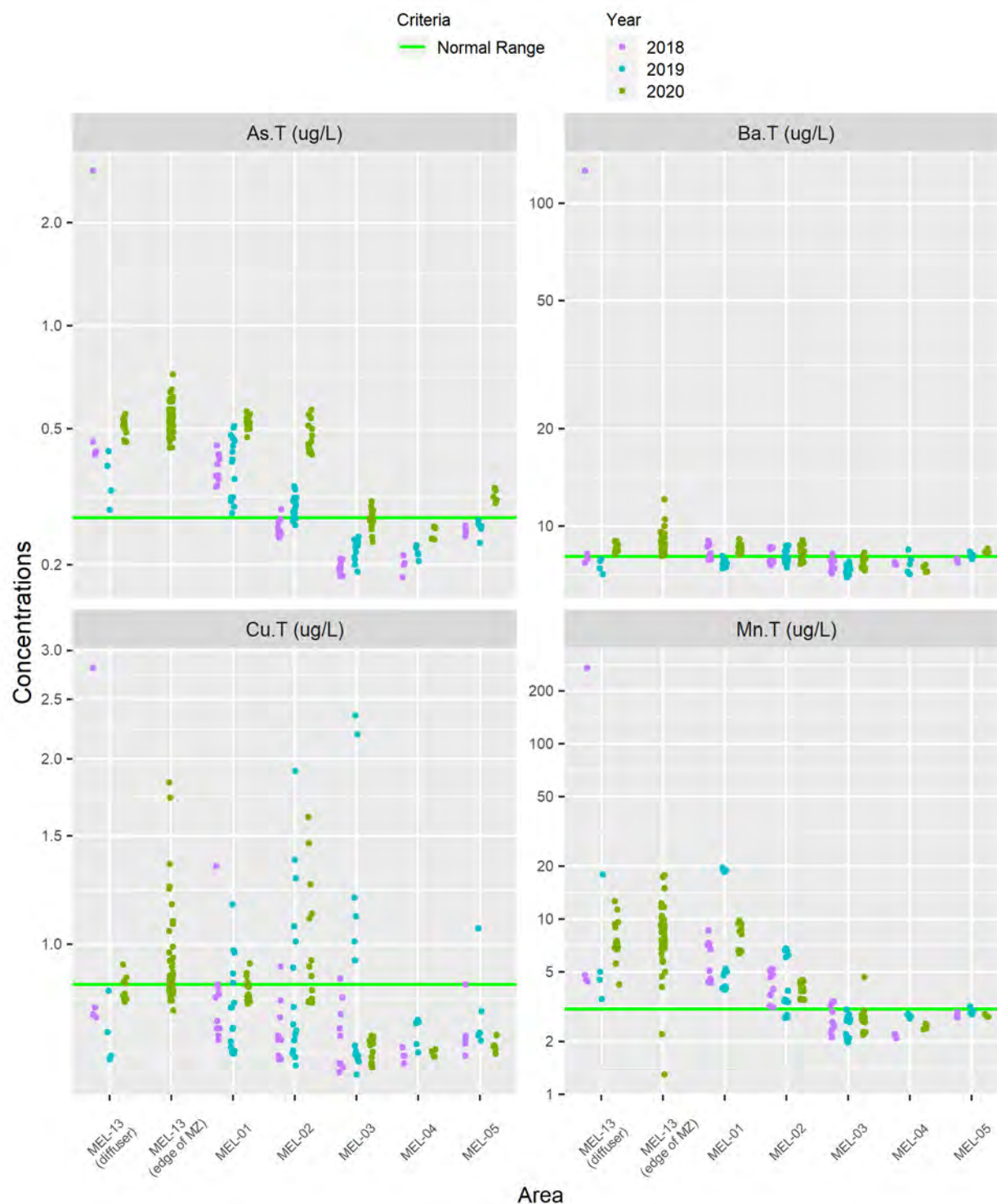


Figure 5-16. Concentrations of Total Dissolved Solids (measured and calculated) and Chloride at MEL-01 Stations Relative to the Distance from the Diffuser Since 2018

Notes: Open water sampling events only, corresponding to when treated effluent was released to the lake. Results for the diffuser sampling station “MEL-13” are shown at 0 m on the x-axis. Stations MEL-01-01, MEL-01-07, and MEL-01-10 are located at ~ 100 m from the diffuser.

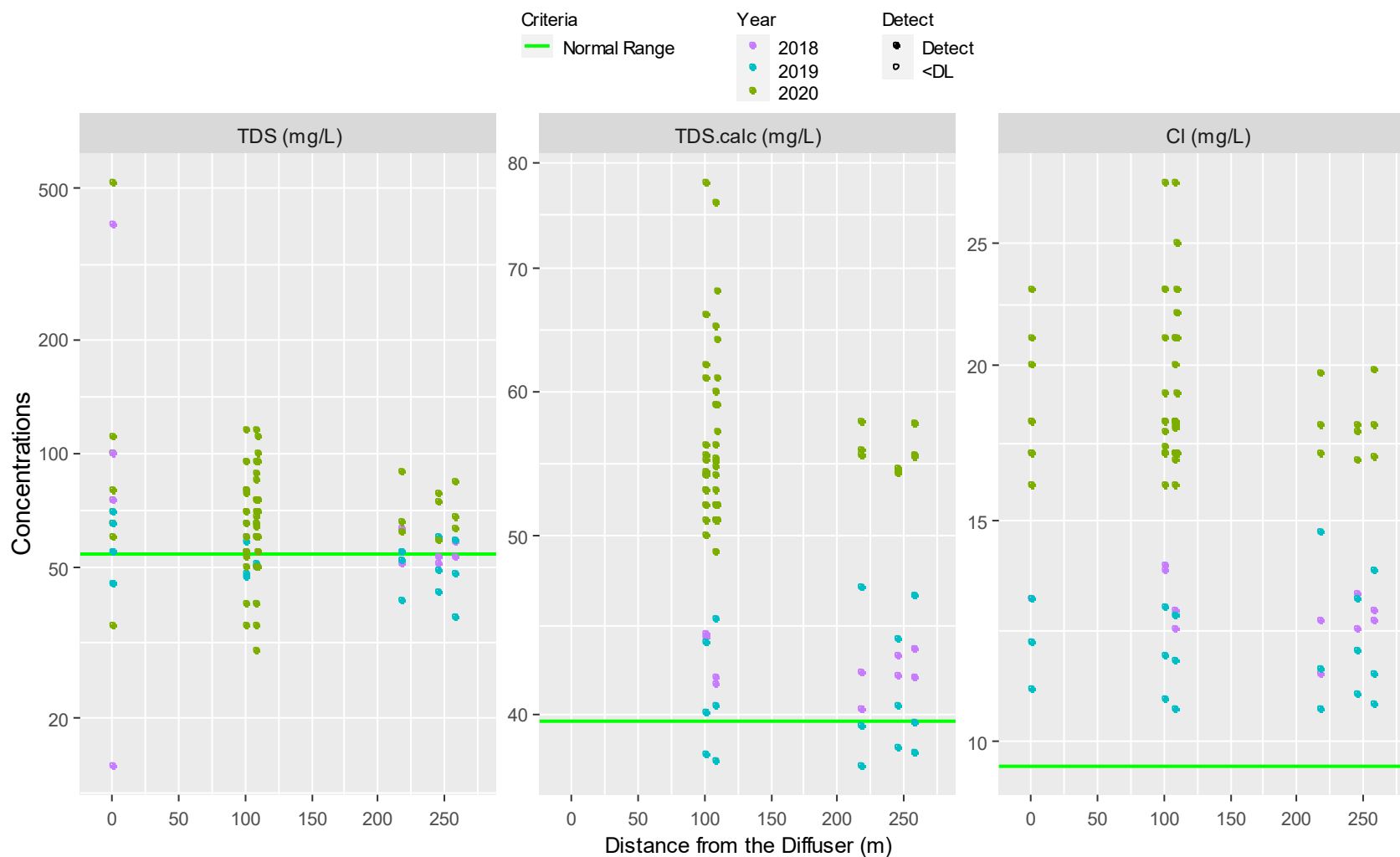


Figure 5-17. Ionic Composition of Baseline Surface Water in Meliadine Lake

Notes: The trilinear plot on the bottom left shows the relative proportion (%) of major cations in each sample. The plot on the bottom right shows the relative proportion (%) of the major anions. The rhomb integrates the relative contribution of the cations and anions for each sample in one panel. Baseline water is characterized as calcium carbonate or sodium carbonate.

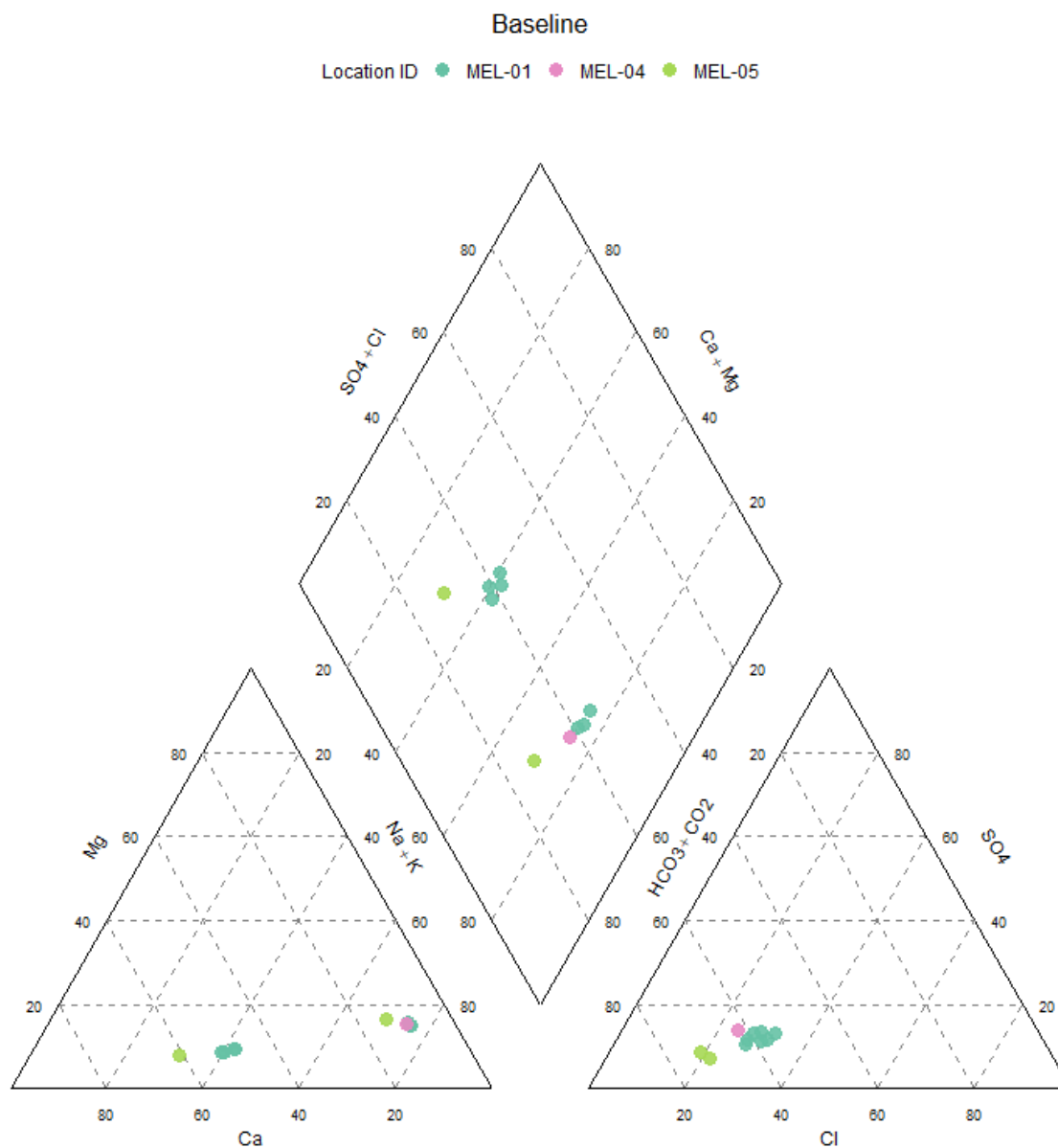


Figure 5-18. Ionic Composition of Surface Contact Water (MEL-14)

Notes: The trilinear plot on the bottom left shows the relative proportion (%) of major cations in each sample. The plot on the bottom right shows the relative proportion (%) of the major anions. The rhomb integrates the relative contribution of the cations and anions for each sample in one panel. Effluent discharged to Meliadine Lake is predominantly sodium chloride.

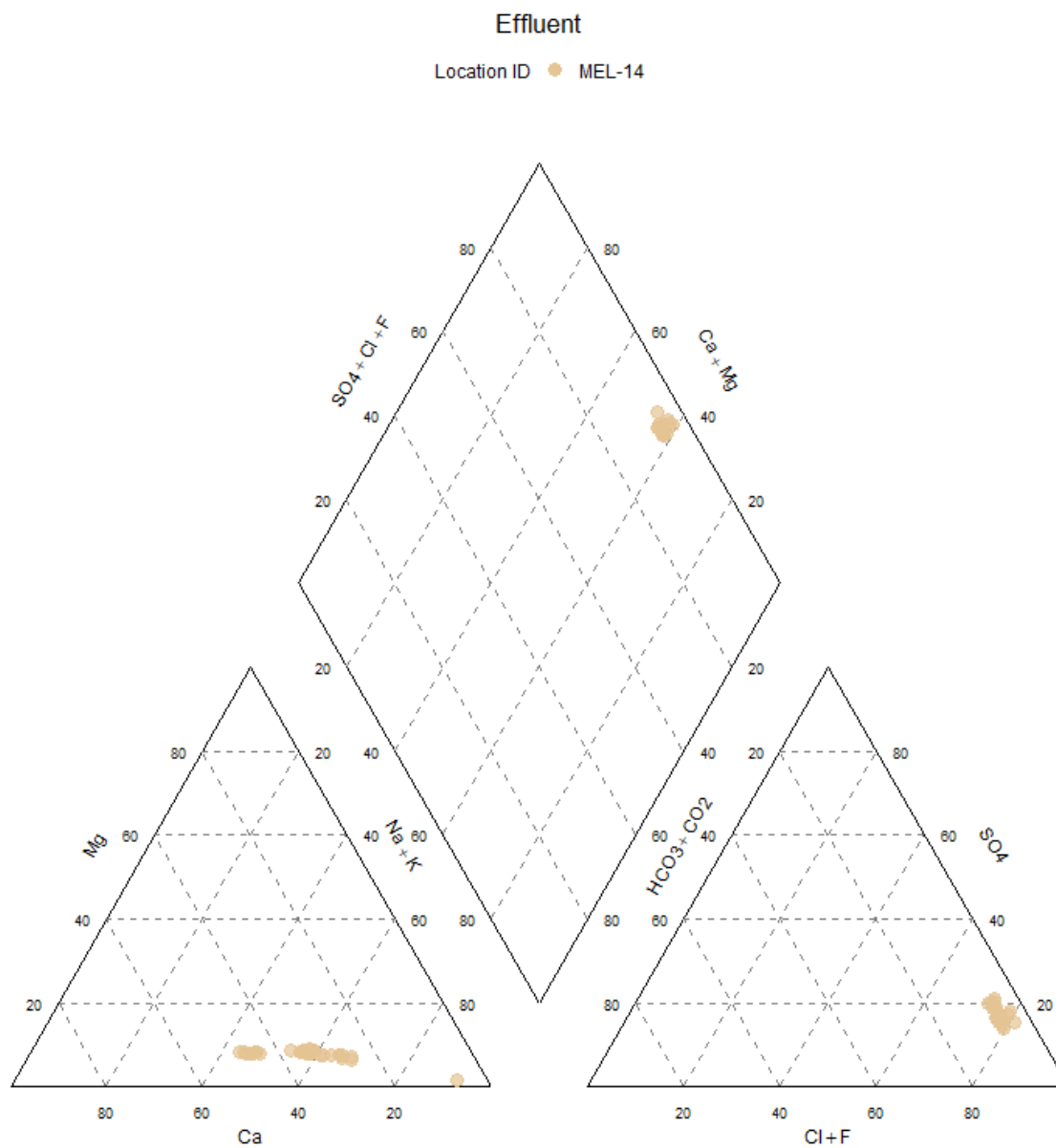


Figure 5-19. Ionic Composition of Recent Reference Area Surface Water from Meliadine Lake

Notes: The trilinear plot on the bottom left shows the relative proportion (%) of major cations in each sample. The plot on the bottom right shows the relative proportion (%) of the major anions. The rhomb integrates the relative contribution of the cations and anions for each sample in one panel. Recent reference area water samples are characterized as predominantly calcium bicarbonate.

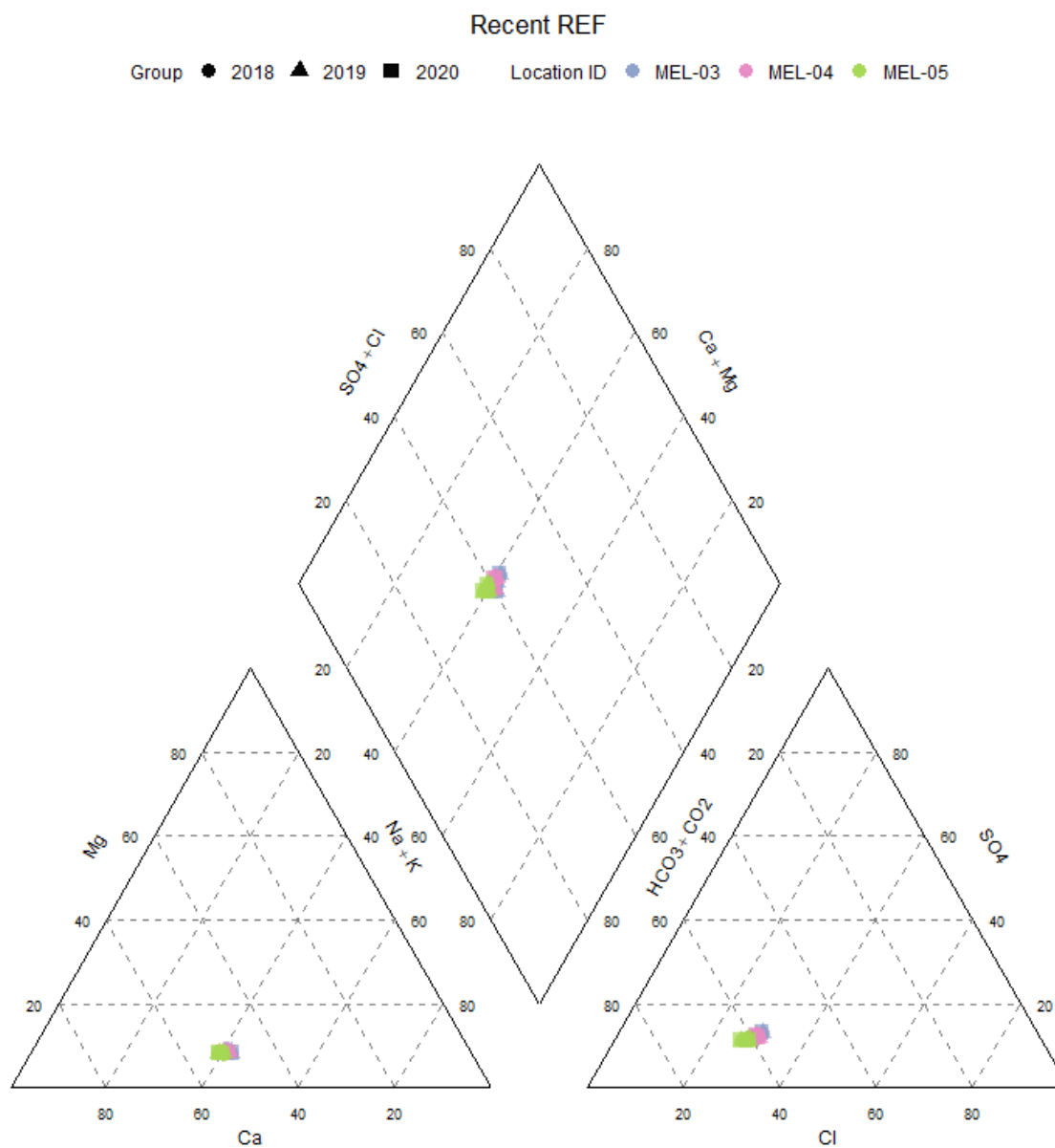


Figure 5-20. Ionic Composition of Recent Surface Water from MEL-01, MEL-02 and the Edge of the Mixing Zone

Notes: The trilinear plot on the bottom left shows the relative proportion (%) of major cations in each sample. The plot on the bottom right shows the relative proportion (%) of the major anions. The rhomb integrates the relative contribution of the cations and anions for each sample in one panel. Recent NF (MEL-01) and edge of mixing zone water samples are characterized as calcium chloride and calcium bicarbonate.

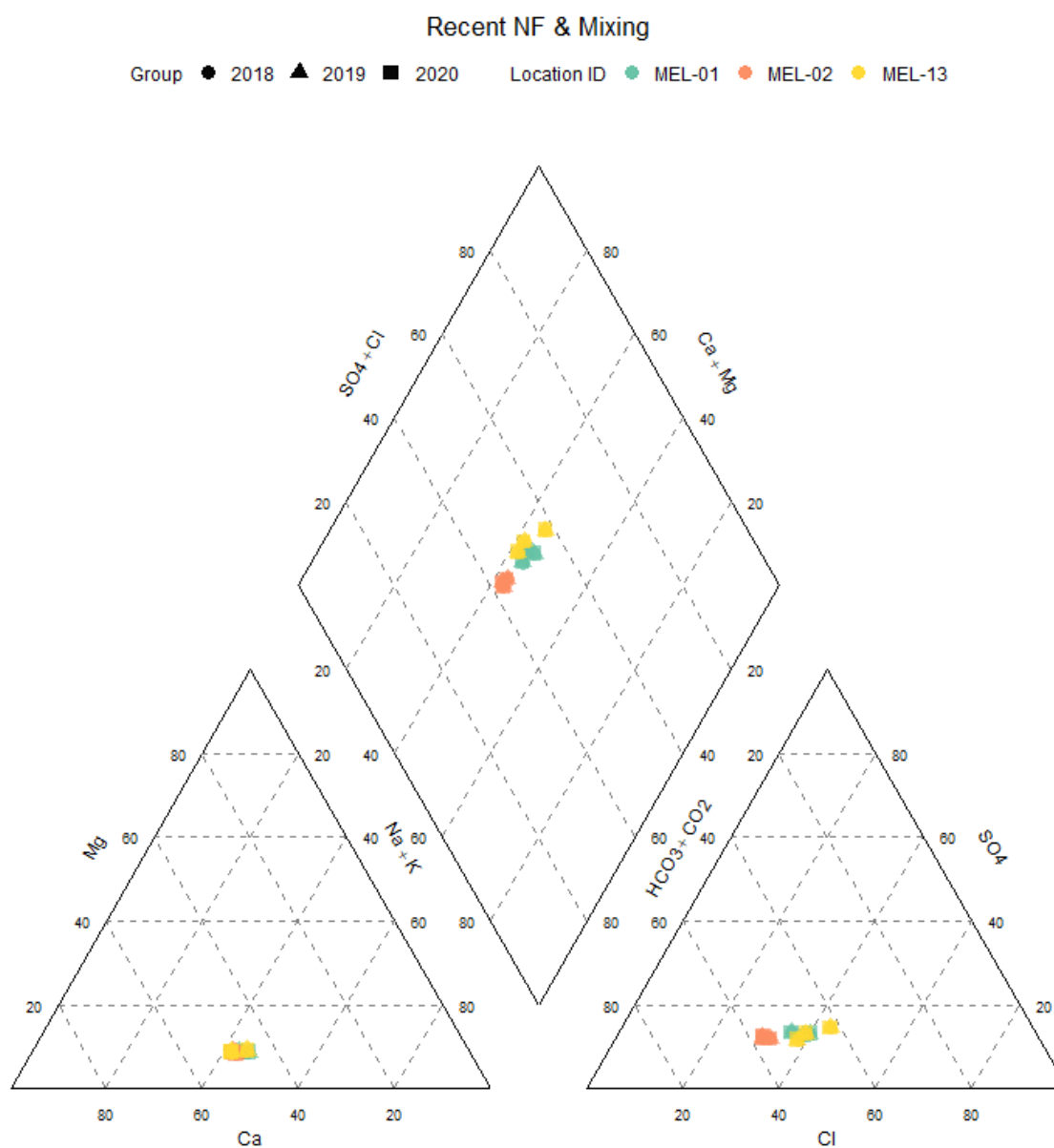
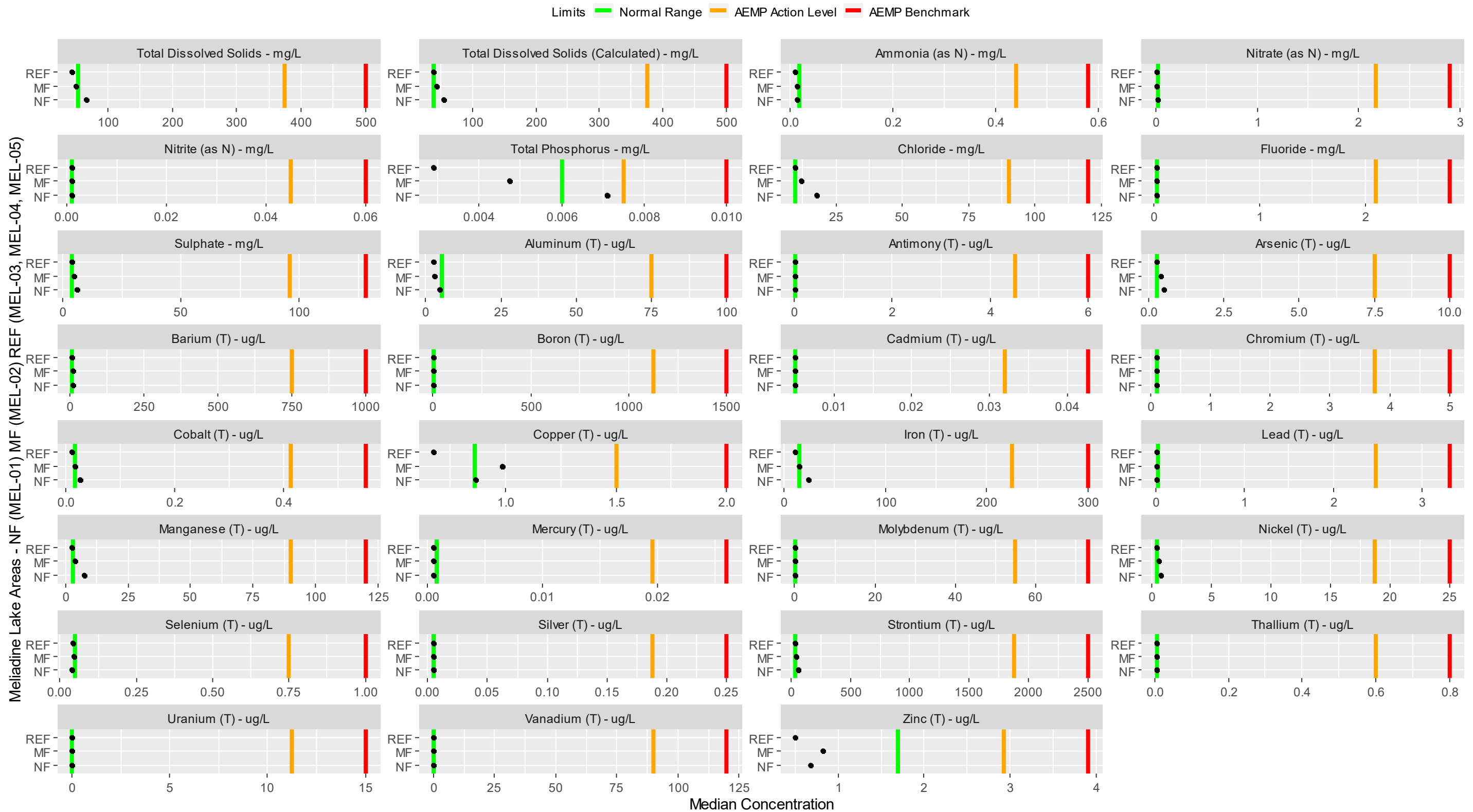


Figure 5-21. Water Quality in Meliadine Lake in 2020 Relative to the Normal Ranges, AEMP Action Levels and AEMP Benchmarks

Notes: AEMP Action Level = 75% of the AEMP Benchmark. Refer to Table 2-2 for the AEMP Benchmarks for each parameter. The black dot represents the median concentration of the open water samples in 2020.



5.7 Tables – Meliadine Lake Water Quality

Tables specific to Meliadine Lake are presented below. The 2019 water quality dataset for the Meliadine Lake stations is provided in **Appendix C3**.

Table 5-2. Summary of the Meliadine Lake sampling events in 2020.

Area	Station ID	UTM (zone 15V)		March event	July event		August event				September event		
				21-Mar	22-Jul	27-Jul	15-Aug	18-Aug	19-Aug	23-Aug	7-Sep	8-Sep	11-Sep
Near-field	MEL-01-01	542690	6989132	LP, WQ	LP, WQ		LP, WQ, Phyto						LP, WQ
	MEL-01-06	542952	6988993	LP, WQ	LP, WQ		LP, WQ, Phyto						LP, WQ
	MEL-01-07	542873	6989218	LP, WQ	LP, WQ		LP, WQ, Phyto						LP, WQ
	MEL-01-08	543044	6989067	LP, WQ	LP, WQ		LP, WQ, Phyto						LP, WQ
	MEL-01-09	542555	6989188	LP, WQ	LP, WQ		LP, WQ, Phyto						LP, WQ
Mid-field	MEL-02-01*	537491	6992999			LP, WQ		LP, WQ, Phyto			LP, WQ		
	MEL-02-02	537093	6992642	LP, WQ		LP, WQ		LP, WQ, Phyto			LP, WQ		
	MEL-02-03	537497	6992332	LP, WQ		LP, WQ		LP, WQ, Phyto			LP, WQ		
	MEL-02-04*	537961	6992341			LP, WQ		LP, WQ, Phyto			LP, WQ		
	MEL-02-05	537831	6992692	LP, WQ		LP, WQ		LP, WQ, Phyto			LP, WQ		
	MEL-02-06	536922	6992853	LP, WQ									
	MEL-02-08	538342	6991952	LP, WQ									
Reference Area 1	MEL-03-01	533321	6998540	LP, WQ		LP, WQ			LP, WQ, Phyto			LP, WQ	
	MEL-03-02	533253	6998664	LP, WQ		LP, WQ			LP, WQ, Phyto			LP, WQ	
	MEL-03-03	532954	6998860	LP, WQ		LP, WQ			LP, WQ, Phyto			LP, WQ	
	MEL-03-04	533629	6998660	LP, WQ		LP, WQ			LP, WQ, Phyto			LP, WQ	
	MEL-03-05	533997	6998265	LP, WQ		LP, WQ			LP, WQ, Phyto			LP, WQ	
Reference Area 2	MEL-04-01	525634	7000884	LP, WQ					LP, WQ, Phyto				
	MEL-04-02	526151	7001525	LP, WQ					LP, WQ, Phyto				
	MEL-04-03	525343	7001363	LP, WQ					LP, WQ, Phyto				
	MEL-04-04	525401	7001085	LP, WQ					LP, WQ, Phyto				
	MEL-04-05	525727	7001134	LP, WQ					LP, WQ, Phyto				
Reference Area 3	MEL-05-01	530922	6990859	LP, WQ						LP, WQ, Phyto			
	MEL-05-02	530675	6990883	LP, WQ						LP, WQ, Phyto			
	MEL-05-03	530737	6991365	LP, WQ						LP, WQ, Phyto			
	MEL-05-04	530573	6991231	LP, WQ						LP, WQ, Phyto			
	MEL-05-05	530241	6991156	LP, WQ						LP, WQ, Phyto			

Notes:

* Historical monitoring stations MEL-02-01 and MEL-02-04 in the mid-field area were inadvertently sampled in July, August, and September instead of MEL-02-06 and MEL-02-08.

Phyto = depth-integrated samples taken for phytoplankton taxonomy, nutrients, and chlorophyll-a

WQ = water samples for chemistry (conventional parameters, major ions and nutrients, organic carbon, metals)

Profile = limno profile for DO, temp, pH, and specific conductivity

Table 5-3. Overview of Monitoring Completed for the WQ-MOP and Cross-Over with the AEMP in 2020

Area	AEMP Water Quality Monitoring	Station ID	UTM (zone 15V)		Monitoring for the Emergency Amendment (WQ-MOP)	
			Easting	Northing	Water Quality	Chronic Toxicity
MEL-01 Near-field	<ul style="list-style-type: none"> - Near-field sampling areas - Sampled once during the winter, and monthly during the open water period when water is discharge (July, August and September) 	MEL-01-01 = MEL-13-01	542690	6989132	~ weekly	Jun, Jul, Aug, Sep
		MEL-01-06	542952	6988993		
		MEL-01-07 = MEL-13-07	542873	6989218	~ weekly	Jun, Jul, Aug, Sep
		MEL-01-08	543044	6989067		
		MEL-01-09	542555	6989188		
	Edge of mixing zone station for WQ-MOP	MEL-01-10 = MEL-13-10 †	542861	6989059	~ weekly	Jun, Jul, Aug, Sep
MEL-02 Mid-field	<ul style="list-style-type: none"> - Mid-field sampling stations - Sampled on the same frequency as the NF area stations to determine the spatial extent of water quality changes related to effluent discharge into Meliadine Lake 	MEL-02-01 *	537491	6992999		
		MEL-02-02	537093	6992642		
		MEL-02-03	537497	6992332		
		MEL-02-04 *	537961	6992341		
		MEL-02-05	537831	6992692	Jun, Jul, Aug, Sep	
		MEL-02-06 *	536922	6992853		
		MEL-02-08 *	538342	6991952		
MEL-03 Reference Area 1	<ul style="list-style-type: none"> - Reference area located in the west basin of Meliadine Lake - Sampled monthly in July, August, and September to track natural fluctuations in water quality 	MEL-03-01	533321	6998540		
		MEL-03-02	533253	6998664	Jun, Jul, Aug, Sep	
		MEL-03-03	532954	6998860		
		MEL-03-04	533629	6998660		
		MEL-03-05	533997	6998265		
MEL-04 Reference Area 2	<ul style="list-style-type: none"> - Reference area located in the northwest basin of Meliadine Lake near the outlet to Peter lake - Sampled only in August 	MEL-04-01	525634	7000884		
		MEL-04-02	526151	7001525		
		MEL-04-03	525343	7001363		
		MEL-04-04	525401	7001085		
		MEL-04-05	525727	7001134	Jun, Jul, Aug, Sep	
MEL-05 Reference Area 3	<ul style="list-style-type: none"> - Reference area located in the southeast basin of Meliadine Lake near the outlet to the Meliadine River - Sampled only in August 	MEL-05-01	530922	6990859		
		MEL-05-02	530675	6990883		
		MEL-05-03	530737	6991365		
		MEL-05-04	530573	6991231	Jun, Jul, Aug, Sep	
		MEL-05-05	530241	6991156		

Notes:

[a] Station IDs for the NF area differed slightly for the AEMP (MEL-01) compared to the WQ-MOP (MEL-13).

Water quality under the WQ-MOP was conducted approximately weekly at the AEMP monitoring stations at the edge of the mixing zone.

Table 5-4. MEL-01 Water Quality Summary Statistics – March 2020 Sampling Event

Parameter	Units	Lowest Detection Limit	Screening Criteria ^[a]				Near-Field Area (MEL-01)													
			Aquatic Life ^[b]	Health Canada		SSWQO	Summary Statistics ^[c] Winter Sampling										Screening Summary			
				Chronic	GCDWQ		Aesthetic Objective	N	N<MDL	% <MDL	Mean	SD	Median	Min	Max	Chronic	HH	AO	SSWQO	
Field Measurements																				
Temperature	C	-	-	-	15	-	5	0	0	1.46	0.0536	1.43	1.41	1.53	-	-	-	-		
Sp. Conductivity (field)	uS/cm	-	-	-	-	-	5	0	0	120	1.47	120	117	121	-	-	-	-		
pH (field)	pH units	-	6.5 9.0	-	7.0 10.5	-	5	0	0	7.18	0.154	7.22	6.93	7.35	0	-	1	-		
DO (mg/L)	mg/L	-	6.5	-	-	-	5	0	0	18.3	0.422	18.2	17.8	18.8	0	-	-	-		
DO (%)	%	-	-	-	-	-	5	0	0	132	2.9	131	128	135	-	-	-	-		
Conventional Parameters																				
Conductivity (lab)	uS/cm	1	-	-	-	-	5	0	0	118	1.92	118	116	121	-	-	-	-		
Hardness	mg/L	0.2	-	-	-	-	5	0	0	37.3	3.43	35.2	34.6	42.7	-	-	-	-		
pH (lab)	pH units	0.1	6.5 9.0	-	7.0 10.5	-	5	0	0	7.3	0.0344	7.29	7.27	7.35	0	-	0	-		
Total Dissolved Solids	mg/L	13	-	-	500	-	5	0	0	64.6	6.19	67	54	70	-	-	0	-		
Total Dissolved Solids (Calc)	mg/L	1	-	-	500	-	5	0	0	62	2.31	61.3	59.1	64.5	-	-	0	-		
Total Suspended Solids	mg/L	1	-	-	-	-	5	5	100	-	-	-	-	1	-	-	-	-		
Turbidity (lab)	NTU	0.1	-	-	-	-	5	0	0	0.216	0.0581	0.19	0.16	0.31	-	-	-	-		
Major Ions																				
Alkalinity, Bicarbonate	mg/L	1.2	-	-	-	-	5	0	0	32.8	0.439	32.8	32.1	33.2	-	-	-	-		
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	26.8	0.358	26.9	26.3	27.2	-	-	-	-		
Bromide	mg/L	0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Calcium (D)	mg/L	0.01	-	-	-	-	5	0	0	11.8	1.3	11	10.7	13.8	-	-	-	-		
Calcium (T)	mg/L	0.01	-	-	-	-	5	0	0	11.2	0.259	11.2	10.9	11.6	-	-	-	-		
Chloride	mg/L	0.1	120	-	250	-	5	0	0	16.4	0.867	16.3	15.1	17.5	0	-	0	-		
Fluoride	mg/L	0.02	0.12	1.5	-	2.8	5	0	0	0.0322	0.00192	0.033	0.029	0.034	0	0	-	0		
Magnesium (D)	mg/L	0.004	-	-	-	-	5	0	0	1.92	0.0487	1.91	1.87	1.99	-	-	-	-		
Magnesium (T)	mg/L	0.004	-	-	-	-	5	0	0	1.95	0.0205	1.95	1.92	1.97	-	-	-	-		
Potassium (D)	mg/L	0.02	-	-	-	-	5	0	0	1.35	0.0148	1.35	1.33	1.37	-	-	-	-		
Potassium (T)	mg/L	0.02	-	-	-	-	5	0	0	1.39	0.0261	1.38	1.36	1.43	-	-	-	-		
Reactive Silica (SiO2)	mg/L	0.01	-	-	-	-	5	0	0	0.611	0.0141	0.616	0.595	0.624	-	-	-	-		
Sodium (D)	mg/L	0.02	-	-	-	-	5	0	0	7.82	0.184	7.86	7.56	8.06	-	-	-	-		
Sodium (T)	mg/L	0.02	-	-	200	-	5	0	0	7.96	0.147	7.99	7.71	8.07	-	-	0	-		
Sulphate	mg/L	0.3	-	-	500	-	5	0	0	6.3	0.283	6.34	5.87	6.63	-	-	0	-		
Nutrients																				
Ammonia (as N)	mg/L	0.005	0.141	-	-	-	5	0	0	0.015	0.00246	0.0148	0.0123	0.019	0	-	-	-		
Nitrate (as N)	mg/L	0.005	2.9	10	-	-	5	0	0	0.0563	0.0309	0.0455	0.0355	0.111	0	0	-	-		
Nitrate + Nitrite (as N)	mg/L	0.0051	-	-	-	-	5	0	0	0.0642	0.0277	0.0548	0.0386	0.111	-	-	-	-		
Nitrite (as N)	mg/L	0.001	0.06	1	-	-	5	1	20	0.00806	0.0068	0.007	0.001	0.0171	0	0	-	-		
Nitrogen	mg/L	0.05	-	-	-	-	5	0	0	0.318	0.0612	0.295	0.266	0.416	-	-	-	-		

Parameter	Units	Lowest Detection Limit	Screening Criteria ^[a]				Near-Field Area (MEL-01)											
			Aquatic Life ^[b]	Health Canada		SSWQO	Summary Statistics ^[c] Winter Sampling								Screening Summary			
				GCDWQ	Aesthetic Objective		N	N<MDL	% <MDL	Mean	SD	Median	Min	Max	Chronic	HH	AO	SSWQO
Orthophosphate (PO4-P)	mg/L	0.001	-	-	-	-	5	5	100	-	-	-	-	0.001	-	-	-	-
Total Diss Phosphorus	mg/L	0.001	-	-	-	-	5	0	0	0.00196	0.000391	0.002	0.0013	0.0023	-	-	-	-
Total Dissolved Nitrogen	mg/L	0.05	-	-	-	-	5	0	0	0.296	0.0257	0.283	0.275	0.338	-	-	-	-
Total Kjeldahl Nitrogen	mg/L	0.05	-	-	-	-	5	0	0	0.254	0.0377	0.257	0.214	0.305	-	-	-	-
Total Kjeldahl Nitrogen (diss)	mg/L	0.05	-	-	-	-	5	0	0	0.232	0.00973	0.227	0.222	0.245	-	-	-	-
Total Phosphorus	mg/L	0.001	-	-	-	-	5	0	0	0.00506	0.000385	0.0051	0.0045	0.0055	-	-	-	-
Organic/Inorganic Carbon																		
Dissolved Organic Carbon	mg/L	0.5	-	-	-	-	5	0	0	4.53	0.176	4.43	4.4	4.81	-	-	-	-
Total Organic Carbon	mg/L	0.5	-	-	-	-	5	0	0	4.49	0.0847	4.51	4.38	4.57	-	-	-	-
Total Metals																		
Aluminum (T)	ug/L	1	100	-	-	-	5	0	0	4.00	3.18	2.40	1.60	9.30	0	-	-	-
Antimony (T)	ug/L	0.02	-	6	-	-	5	4	80	-	-	0.02	0.02	0.157	-	0	-	-
Arsenic (T)	ug/L	0.02	5	10	-	25	5	0	0	0.496	0.0294	0.486	0.473	0.547	0	0	-	0
Barium (T)	ug/L	0.02	-	1000	-	-	5	0	0	11.4	0.356	11.3	11.1	12	-	0	-	-
Beryllium (T)	ug/L	0.005	-	-	-	-	5	5	100	-	-	-	-	0.005	-	-	-	-
Bismuth (T)	ug/L	0.005	-	-	-	-	5	5	100	-	-	-	-	0.005	-	-	-	-
Boron (T)	ug/L	5	1500	5000	-	-	5	0	0	6.92	0.13	6.9	6.8	7.1	0	0	-	-
Cadmium (T)	ug/L	0.005	0.0427 0.0604	5	-	-	5	4	80	-	-	0.005	0.005	0.009	0	0	-	-
Chromium (T)	ug/L	0.1	5	50	-	-	5	4	80	-	-	0.1	0.1	0.1	0	0	-	-
Cobalt (T)	ug/L	0.005	0.78	-	-	-	5	0	0	0.0172	0.000856	0.0175	0.0161	0.018	0	-	-	-
Copper (T)	ug/L	0.05	2	2000	1000	-	5	0	0	1.34	0.493	1.1	1.04	2.21	1	0	0	-
Iron (T)	ug/L	1	300	-	300	1060	5	0	0	14	12.7	8.6	7.5	36.7	0	-	0	0
Lead (T)	ug/L	0.01	-	5	-	-	5	3	60	-	-	0.01	0.01	1.04	-	0	-	-
Lithium (T)	ug/L	0.5	-	-	-	-	5	0	0	1.38	0.0245	1.38	1.34	1.4	-	-	-	-
Manganese (T)	ug/L	0.05	-	120	20	-	5	0	0	1.71	0.357	1.58	1.44	2.32	-	0	0	-
Mercury (T)	ug/L	0.5	0.026	1	-	-	5	2	40	0.000414	0.000151	5.00E-04	5.00E-04	0.00056	0	0	-	-
Molybdenum (T)	ug/L	0.05	73	-	-	-	5	0	0	3.7	5.22	0.791	0.116	12.2	0	-	-	-
Nickel (T)	ug/L	0.05	25	-	-	-	5	0	0	0.913	0.0321	0.901	0.893	0.97	0	-	-	-
Selenium (T)	ug/L	0.04	1	50	-	-	5	1	20	0.0512	0.0192	0.057	0.04	0.068	0	0	-	-
Silicon (T)	ug/L	50	-	-	-	-	5	0	0	269	12.5	268	258	289	-	-	-	-
Silver (T)	ug/L	0.005	0.25	-	-	-	5	5	100	-	-	-	-	0.005	0	-	-	-
Strontium (T)	ug/L	0.02	2500	7000	-	-	5	0	0	66.9	0.672	67	66	67.8	0	0	-	-
Sulfur (T)	ug/L	500	-	-	-	-	5	0	0	2090	55.9	2090	2040	2180	-	-	-	-
Thallium (T)	ug/L	0.005	0.8	-	-	-	5	5	100	-	-	-	-	0.005	0	-	-	-
Tin (T)	ug/L	0.02	-	-	-	-	5	5	100	-	-	-	-	0.02	-	-	-	-
Titanium (T)	ug/L	0.05	-	-	-	-	5	3	60	-	-	0.05	0.05	0.183	-	-	-	-
Uranium (T)	ug/L	0.001	15	20	-	-	5	0	0	0.019	0.00132	0.0185	0.0178	0.0211	0	0	-	-
Vanadium (T)	ug/L	0.05	-	-	-	-	5	5	100	-	-	-	-	0.05	-	-	-	-
Zinc (T)	ug/L	0.5	-	-	5000	-	5	1	20	3.54	4.96	1.98	0.5	12.3	-	-	0	-
Zirconium (T)	ug/L	0.01	-	-	-	-	5	0	0	0.0574	0.0916	0.021	0.012	0.221	-	-	-	-

Parameter	Units	Lowest Detection Limit	Screening Criteria ^[a]				Near-Field Area (MEL-01)													
			Aquatic Life ^[b]	Health Canada		SSWQO	Summary Statistics ^[c] Winter Sampling										Screening Summary			
				Chronic	GCDWQ		Aesthetic Objective	N	N<MDL	% <MDL	Mean	SD	Median	Min	Max	Chronic	HH	AO	SSWQO	
Dissolved Metals																				
Aluminum (D)	ug/L	1	-	-	-	-	5	0	0	2.94	1.65	2.8	1.3	5	-	-	-	-		
Antimony (D)	ug/L	0.02	-	-	-	-	5	5	100	-	-	-	-	0.02	-	-	-	-		
Arsenic (D)	ug/L	0.02	-	-	-	-	5	0	0	0.456	0.0113	0.457	0.44	0.471	-	-	-	-		
Barium (D)	ug/L	0.02	-	-	-	-	5	0	0	11	0.152	11	10.8	11.1	-	-	-	-		
Beryllium (D)	ug/L	0.005	-	-	-	-	5	5	100	-	-	-	-	0.005	-	-	-	-		
Bismuth (D)	ug/L	0.005	-	-	-	-	5	5	100	-	-	-	-	0.005	-	-	-	-		
Boron (D)	ug/L	5	-	-	-	-	5	0	0	6.98	0.0837	7	6.9	7.1	-	-	-	-		
Cadmium (D)	ug/L	0.005	-	-	-	-	5	5	100	-	-	-	-	0.005	-	-	-	-		
Chromium (D)	ug/L	0.1	-	-	-	-	5	5	100	-	-	-	-	0.1	-	-	-	-		
Cobalt (D)	ug/L	0.005	-	-	-	-	5	0	0	0.0128	0.00231	0.0117	0.0111	0.0166	-	-	-	-		
Copper (D)	ug/L	0.05	-	-	-	-	5	0	0	1.11	0.0709	1.07	1.05	1.22	-	-	-	-		
Iron (D)	ug/L	1	-	-	-	-	5	0	0	6.08	1.59	5.6	4.8	8.6	-	-	-	-		
Lead (D)	ug/L	0.01	3.31 6.32	-	-	-	5	3	60	-	-	0.01	0.01	0.022	0	-	-	-		
Lithium (D)	ug/L	0.5	-	-	-	-	5	0	0	1.35	0.0195	1.34	1.32	1.37	-	-	-	-		
Manganese (D)	ug/L	0.05	210 330	-	-	-	5	0	0	0.598	0.212	0.461	0.422	0.88	0	-	-	-		
Mercury (D)	ug/L	0.5	-	-	-	-	5	4	80	-	-	5.00E-04	5.00E-04	0.00076	-	-	-	-		
Molybdenum (D)	ug/L	0.05	-	-	-	-	5	0	0	0.106	0.00518	0.103	0.102	0.113	-	-	-	-		
Nickel (D)	ug/L	0.05	-	-	-	-	5	0	0	0.876	0.0367	0.867	0.835	0.935	-	-	-	-		
Selenium (D)	ug/L	0.04	-	-	-	-	5	1	20	0.0448	0.0153	0.051	0.04	0.06	-	-	-	-		
Silicon (D)	ug/L	50	-	-	-	-	5	0	0	258	8.44	258	245	268	-	-	-	-		
Silver (D)	ug/L	0.005	-	-	-	-	5	5	100	-	-	-	-	0.01	-	-	-	-		
Strontium (D)	ug/L	0.02	2500	-	-	-	5	0	0	66.3	1.38	66.3	64.3	68.2	0	-	-	-		
Sulfur (D)	ug/L	500	-	-	-	-	5	0	0	2150	82	2130	2060	2280	-	-	-	-		
Thallium (D)	ug/L	0.005	-	-	-	-	5	5	100	-	-	-	-	0.005	-	-	-	-		
Tin (D)	ug/L	0.02	-	-	-	-	5	5	100	-	-	-	-	0.02	-	-	-	-		
Titanium (D)	ug/L	0.05	-	-	-	-	5	5	100	-	-	-	-	0.05	-	-	-	-		
Uranium (D)	ug/L	0.001	-	-	-	-	5	0	0	0.0191	0.00103	0.0193	0.018	0.0206	-	-	-	-		
Vanadium (D)	ug/L	0.05	-	-	-	-	5	5	100	-	-	-	-	0.05	-	-	-	-		
Zinc (D)	ug/L	0.5	3.91 10.6	-	5000	-	5	1	20	7.76	10.4	1.66	0.5	†24.1	0	-	0	-		
Zirconium (D)	ug/L	0.01	-	-	-	-	5	0	0	0.023	0.0224	0.013	0.012	0.063	-	-	-	-		
Other																				
Cyanide (free)	mg/L	0.001	-	-	-	-	5	5	100	-	-	-	-	0.001	-	-	-	-		
Cyanide (Total)	mg/L	0.001	0.005	0.2	-	-	5	5	100	-	-	-	-	0.001	0	0	-	-		
Cyanide (WAD)	mg/L	0.001	-	-	-	-	5	5	100	-	-	-	-	0.001	-	-	-	-		
Radium-226	Bq/l	0.005	-	-	-	-	5	5	100	-	-	-	-	0.0085	-	-	-	-		

Notes

[a] Refer to the main document for references to the various screening criteria.

[b] The range of acute and chronic guidelines are shown for parameters with site-specific water quality guidelines (e.g., cadmium, dissolved zinc, and dissolved manganese).

[c] Mean and SD were not calculated if >50% of the values were <MDL. 1/2 the MDL was used to calculate the mean and SD if >50% of the measurements were > MDL.

Maximum total and dissolved zinc results were considered outliers (†)

Table 5-5. MEL-02 Water Quality Summary Statistics – March 2020 Sampling Event

Parameter	Units	Lowest Detection Limit	Screening Criteria ^[a]				Mid-Field Area (MEL-02)													
			Aquatic Life ^[b]	Health Canada		SSWQO	Summary Statistics ^[c] Open Water Sampling										Screening Summary			
				Chronic	GCDWQ		Aesthetic Objective	N	N<MDL	% <MDL	Mean	SD	Median	Min	Max	Chronic	HH	AO	SSWQO	
Field Measurements																				
Temperature	C	-	-	-	15	-	5	0	0	1.45	0.0559	1.46	1.39	1.51	-	-	0	-		
Sp. Conductivity (field)	uS/cm	-	-	-	-	-	5	0	0	110	2.89	112	106	113	-	-	-	-		
pH (field)	pH units	-	6.5 9.0	-	7.0 10.5	-	5	0	0	7.3	0.0728	7.27	7.22	7.41	0	-	0	-		
DO (mg/L)	mg/L	-	6.5	-	-	-	5	0	0	17.8	1.18	17.5	16.3	19.3	0	-	-	-		
DO (%)	%	-	-	-	-	-	5	0	0	129	7.82	127	120	138	-	-	-	-		
Conventional Parameters																				
Conductivity (lab)	uS/cm	1	-	-	-	-	5	0	0	109	2.51	109	105	112	-	-	-	-		
Hardness	mg/L	0.2	-	-	-	-	5	0	0	32.8	0.606	33.1	31.8	33.3	-	-	-	-		
pH (lab)	pH units	0.1	6.5 9.0	-	7.0 10.5	-	5	0	0	7.32	0.0344	7.33	7.29	7.37	0	-	0	-		
Total Dissolved Solids	mg/L	13	-	-	500	-	5	0	0	60.4	4.93	59	55	68	-	-	0	-		
Total Dissolved Solids (Calc)	mg/L	1	-	-	500	-	5	0	0	56.9	1.86	56.9	53.9	59	-	-	0	-		
Total Suspended Solids	mg/L	1	-	-	-	-	5	4	80	-	-	1	1	1.3	-	-	-	-		
Turbidity (lab)	NTU	0.1	-	-	-	-	5	1	20	0.156	0.068	0.18	0.1	0.22	-	-	-	-		
Major Ions																				
Alkalinity, Bicarbonate	mg/L	1.2	-	-	-	-	5	0	0	31.6	0.585	31.8	30.6	32.1	-	-	-	-		
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	25.9	0.477	26.1	25.1	26.3	-	-	-	-		
Bromide	mg/L	0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Calcium (D)	mg/L	0.01	-	-	-	-	5	0	0	10.3	0.183	10.3	9.96	10.4	-	-	-	-		
Calcium (T)	mg/L	0.01	-	-	-	-	5	0	0	10.4	0.398	10.4	9.88	11	-	-	-	-		
Chloride	mg/L	0.1	120	-	250	-	5	0	0	14.8	0.85	14.8	13.5	15.8	0	-	0	-		
Fluoride	mg/L	0.02	0.12	1.5	-	2.8	5	0	0	0.0324	0.00167	0.032	0.031	0.035	0	0	-	0		
Magnesium (D)	mg/L	0.004	-	-	-	-	5	0	0	1.76	0.0531	1.76	1.68	1.82	-	-	-	-		
Magnesium (T)	mg/L	0.004	-	-	-	-	5	0	0	1.78	0.051	1.79	1.71	1.84	-	-	-	-		
Potassium (D)	mg/L	0.02	-	-	-	-	5	0	0	1.33	0.0297	1.33	1.29	1.37	-	-	-	-		
Potassium (T)	mg/L	0.02	-	-	-	-	5	0	0	1.33	0.0288	1.33	1.28	1.35	-	-	-	-		
Reactive Silica (SiO2)	mg/L	0.01	-	-	-	-	5	0	0	0.446	0.035	0.441	0.409	0.501	-	-	-	-		
Sodium (D)	mg/L	0.02	-	-	-	-	5	0	0	7.27	0.276	7.31	6.82	7.57	-	-	-	-		
Sodium (T)	mg/L	0.02	-	-	200	-	5	0	0	7.28	0.236	7.27	7.04	7.57	-	-	0	-		
Sulphate	mg/L	0.3	-	-	500	-	5	0	0	5.73	0.273	5.7	5.34	6.1	-	-	0	-		
Nutrients																				
Ammonia (as N)	mg/L	0.005	0.141	-	-	-	5	0	0	0.0183	0.0032	0.0168	0.0153	0.0234	0	-	-	-		
Nitrate (as N)	mg/L	0.005	2.9	10	-	-	5	0	0	0.0255	0.00321	0.0259	0.0213	0.0296	0	0	-	-		
Nitrate + Nitrite (as N)	mg/L	0.0051	-	-	-	-	5	0	0	0.0319	0.00486	0.0318	0.0269	0.039	-	-	-	-		
Nitrite (as N)	mg/L	0.001	0.06	1	-	-	5	0	0	0.00636	0.00371	0.0055	0.0021	0.0117	0	0	-	-		
Nitrogen	mg/L	0.05	-	-	-	-	5	0	0	0.324	0.0815	0.307	0.25	0.457	-	-	-	-		

Parameter	Units	Lowest Detection Limit	Screening Criteria ^[a]				Mid-Field Area (MEL-02)											
			Aquatic Life ^[b]	Health Canada		SSWQO	Summary Statistics ^[c] Open Water Sampling								Screening Summary			
				GCDWQ	Aesthetic Objective		N	N<MDL	% <MDL	Mean	SD	Median	Min	Max	Chronic	HH	AO	SSWQO
Orthophosphate (PO4-P)	mg/L	0.001	-	-	-	-	5	5	100	-	-	-	-	0.001	-	-	-	-
Total Diss Phosphorus	mg/L	0.001	-	-	-	-	5	0	0	0.00206	0.000428	0.0018	0.0017	0.0027	-	-	-	-
Total Dissolved Nitrogen	mg/L	0.05	-	-	-	-	5	0	0	0.293	0.0258	0.287	0.272	0.335	-	-	-	-
Total Kjeldahl Nitrogen	mg/L	0.05	-	-	-	-	5	0	0	0.292	0.0812	0.268	0.224	0.425	-	-	-	-
Total Kjeldahl Nitrogen (diss)	mg/L	0.05	-	-	-	-	5	0	0	0.261	0.0223	0.259	0.239	0.296	-	-	-	-
Total Phosphorus	mg/L	0.001	-	-	-	-	5	0	0	0.00402	0.000444	0.0039	0.0034	0.0045	-	-	-	-
Organic/Inorganic Carbon																		
Dissolved Organic Carbon	mg/L	0.5	-	-	-	-	5	0	0	4.05	0.103	4.07	3.88	4.13	-	-	-	-
Total Organic Carbon	mg/L	0.5	-	-	-	-	5	0	0	4.01	0.0731	4.03	3.89	4.08	-	-	-	-
Total Metals																		
Aluminum (T)	ug/L	1	100	-	-	-	5	0	0	1.6	0.235	1.5	1.4	2	0	-	-	-
Antimony (T)	ug/L	0.02	-	6	-	-	5	5	100	-	-	-	-	0.02	-	0	-	-
Arsenic (T)	ug/L	0.02	5	10	-	25	5	0	0	0.39	0.015	0.382	0.38	0.416	0	0	-	0
Barium (T)	ug/L	0.02	-	1000	-	-	5	0	0	10.9	0.313	11	10.4	11.2	-	0	-	-
Beryllium (T)	ug/L	0.005	-	-	-	-	5	5	100	-	-	-	-	0.005	-	-	-	-
Bismuth (T)	ug/L	0.005	-	-	-	-	5	5	100	-	-	-	-	0.005	-	-	-	-
Boron (T)	ug/L	5	1500	5000	-	-	5	0	0	6.32	0.249	6.5	6	6.5	0	0	-	-
Cadmium (T)	ug/L	0.005	0.0427 0.0604	5	-	-	5	5	100	-	-	-	-	0.005	0	0	-	-
Chromium (T)	ug/L	0.1	5	50	-	-	5	5	100	-	-	-	-	0.1	0	0	-	-
Cobalt (T)	ug/L	0.005	0.78	-	-	-	5	0	0	0.0133	0.00237	0.0127	0.0103	0.0164	0	-	-	-
Copper (T)	ug/L	0.05	2	2000	1000	-	5	0	0	1.06	0.0217	1.07	1.03	1.08	0	0	0	-
Iron (T)	ug/L	1	300	-	300	1060	5	0	0	5.68	0.795	5.9	4.5	6.5	0	-	0	0
Lead (T)	ug/L	0.01	-	5	-	-	5	4	80	-	-	0.01	0.01	0.011	-	0	-	-
Lithium (T)	ug/L	0.5	-	-	-	-	5	0	0	1.22	0.0438	1.23	1.15	1.27	-	-	-	-
Manganese (T)	ug/L	0.05	-	120	20	-	5	0	0	1.35	0.214	1.24	1.17	1.7	-	0	0	-
Mercury (T)	ug/L	0.5	0.026	1	-	-	5	5	100	-	-	-	-	5.00E-04	0	0	-	-
Molybdenum (T)	ug/L	0.05	73	-	-	-	5	0	0	2.55	3.38	0.132	0.114	7.09	0	-	-	-
Nickel (T)	ug/L	0.05	25	-	-	-	5	0	0	0.756	0.0332	0.762	0.7	0.788	0	-	-	-
Selenium (T)	ug/L	0.04	1	50	-	-	5	0	0	0.0584	0.00799	0.063	0.047	0.065	0	0	-	-
Silicon (T)	ug/L	50	-	-	-	-	5	0	0	195	21.1	202	169	215	-	-	-	-
Silver (T)	ug/L	0.005	0.25	-	-	-	5	5	100	-	-	-	-	0.005	0	-	-	-
Strontium (T)	ug/L	0.02	2500	7000	-	-	5	0	0	60	2.67	59.6	56.7	63.4	0	0	-	-
Sulfur (T)	ug/L	500	-	-	-	-	5	0	0	1910	99.3	1940	1760	2000	-	-	-	-
Thallium (T)	ug/L	0.005	0.8	-	-	-	5	5	100	-	-	-	-	0.005	0	-	-	-
Tin (T)	ug/L	0.02	-	-	-	-	5	4	80	-	-	0.02	0.02	0.135	-	-	-	-
Titanium (T)	ug/L	0.05	-	-	-	-	5	5	100	-	-	-	-	0.05	-	-	-	-
Uranium (T)	ug/L	0.001	15	20	-	-	5	0	0	0.0166	0.00213	0.016	0.0142	0.0193	0	0	-	-
Vanadium (T)	ug/L	0.05	-	-	-	-	5	5	100	-	-	-	-	0.05	-	-	-	-
Zinc (T)	ug/L	0.5	-	-	5000	-	5	0	0	1.34	1.06	0.99	0.63	3.22	-	-	0	-
Zirconium (T)	ug/L	0.01	-	-	-	-	5	2	40	0.044	0.08	0.011	0.01	0.187	-	-	-	-

Parameter	Units	Lowest Detection Limit	Screening Criteria ^[a]				Mid-Field Area (MEL-02)													
			Aquatic Life ^[b]	Health Canada		SSWQO	Summary Statistics ^[c] Open Water Sampling										Screening Summary			
				Chronic	GCDWQ		Aesthetic Objective	N	N<MDL	% <MDL	Mean	SD	Median	Min	Max	Chronic	HH	AO	SSWQO	
Dissolved Metals																				
Aluminum (D)	ug/L	1	-	-	-	-	5	0	0	1.22	0.0837	1.2	1.1	1.3	-	-	-	-		
Antimony (D)	ug/L	0.02	-	-	-	-	5	5	100	-	-	-	-	0.02	-	-	-	-		
Arsenic (D)	ug/L	0.02	-	-	-	-	5	0	0	0.363	0.0154	0.367	0.341	0.378	-	-	-	-		
Barium (D)	ug/L	0.02	-	-	-	-	5	0	0	10.8	0.444	10.8	10.1	11.3	-	-	-	-		
Beryllium (D)	ug/L	0.005	-	-	-	-	5	5	100	-	-	-	-	0.005	-	-	-	-		
Bismuth (D)	ug/L	0.005	-	-	-	-	5	5	100	-	-	-	-	0.005	-	-	-	-		
Boron (D)	ug/L	5	-	-	-	-	5	0	0	6.38	0.164	6.4	6.1	6.5	-	-	-	-		
Cadmium (D)	ug/L	0.005	-	-	-	-	5	5	100	-	-	-	-	0.005	-	-	-	-		
Chromium (D)	ug/L	0.1	-	-	-	-	5	5	100	-	-	-	-	0.1	-	-	-	-		
Cobalt (D)	ug/L	0.005	-	-	-	-	5	0	0	0.0102	0.00179	0.0099	0.008	0.0127	-	-	-	-		
Copper (D)	ug/L	0.05	-	-	-	-	5	0	0	0.98	0.0298	0.975	0.956	1.03	-	-	-	-		
Iron (D)	ug/L	1	-	-	-	-	5	0	0	3.32	0.482	3.2	2.7	3.9	-	-	-	-		
Lead (D)	ug/L	0.01	3.31 6.32	-	-	-	5	5	100	-	-	-	-	0.01	0	-	-	-		
Lithium (D)	ug/L	0.5	-	-	-	-	5	0	0	1.18	0.0308	1.18	1.13	1.21	-	-	-	-		
Manganese (D)	ug/L	0.05	210 330	-	-	-	5	0	0	0.391	0.0194	0.39	0.367	0.412	0	-	-	-		
Mercury (D)	ug/L	0.5	-	-	-	-	5	4	80	-	-	5.00E-04	5.00E-04	0.00055	-	-	-	-		
Molybdenum (D)	ug/L	0.05	-	-	-	-	5	0	0	0.108	0.0177	0.103	0.093	0.139	-	-	-	-		
Nickel (D)	ug/L	0.05	-	-	-	-	5	0	0	0.744	0.0328	0.765	0.7	0.769	-	-	-	-		
Selenium (D)	ug/L	0.04	-	-	-	-	5	3	60	-	-	0.04	0.04	0.05	-	-	-	-		
Silicon (D)	ug/L	50	-	-	-	-	5	0	0	193	15.5	193	170	212	-	-	-	-		
Silver (D)	ug/L	0.005	-	-	-	-	5	5	100	-	-	-	-	0.005	-	-	-	-		
Strontium (D)	ug/L	0.02	2500	-	-	-	5	0	0	61.7	2.73	62.2	58.2	64.8	0	-	-	-		
Sulfur (D)	ug/L	500	-	-	-	-	5	0	0	2000	85	1980	1920	2130	-	-	-	-		
Thallium (D)	ug/L	0.005	-	-	-	-	5	5	100	-	-	-	-	0.005	-	-	-	-		
Tin (D)	ug/L	0.02	-	-	-	-	5	5	100	-	-	-	-	0.02	-	-	-	-		
Titanium (D)	ug/L	0.05	-	-	-	-	5	5	100	-	-	-	-	0.05	-	-	-	-		
Uranium (D)	ug/L	0.001	-	-	-	-	5	0	0	0.0163	0.000596	0.0164	0.0155	0.0169	-	-	-	-		
Vanadium (D)	ug/L	0.05	-	-	-	-	5	5	100	-	-	-	-	0.05	-	-	-	-		
Zinc (D)	ug/L	0.5	3.91 10.6	-	5000	-	5	0	0	3.14	2.89	2.17	1.07	8.13	0	-	0	-		
Zirconium (D)	ug/L	0.01	-	-	-	-	5	3	60	-	-	0.01	0.01	0.01	-	-	-	-		
Other																				
Cyanide (free)	mg/L	0.001	-	-	-	-	5	4	80	-	-	0.001	0.001	0.0022	-	-	-	-		
Cyanide (Total)	mg/L	0.001	0.005	0.2	-	-	5	4	80	-	-	0.001	0.001	0.0024	0	0	-	-		
Cyanide (WAD)	mg/L	0.001	-	-	-	-	5	4	80	-	-	0.001	0.001	0.0021	-	-	-	-		
Radium-226	Bq/l	0.005	-	-	-	-	5	4	80	-	-	0.0077	0.0031	0.0092	-	-	-	-		

Notes

[a] Refer to the main document for references to the various screening criteria.

[b] The range of acute and chronic guidelines are shown for parameters with site-specific water quality guidelines (e.g., cadmium, dissolved zinc, and dissolved manganese).

[c] Mean and SD were not calculated if >50% of the values were <MDL. 1/2 the MDL was used to calculate the mean and SD if >50% of the measurements were > MDL.

Table 5-6. Near-Field Area (MEL-01) Water Quality Summary Statistics – 2020 Open Water Sampling Events (July, August, September)

Parameter	Units	Lowest Detection Limit	Screening Criteria ^[a]				AEMP Benchmark	AEMP Action Level ^[c]	Near-Field Area (MEL-01)												
			Aquatic Life ^[b]	Health Canada		SSWQO			Summary Statistics – Open Water Sampling ^[d]								Screening Summary				
				Chronic	GCDWQ				Aesthetic Objective	N	N<MDL	% <MDL	Mean	SD	Median	Min	Max	Chronic	HH	AO	SSWQO
Field Measurements																					
Temperature	C	-	-	-	15	-	-	-	15	0	0	12	2.86	12.2	8.5	15.4	-	-	-	-	
Sp. Conductivity (field)	uS/cm	-	-	-	-	-	-	-	15	0	0	111	5.46	109	106	126	-	-	-	-	
pH (field)	pH units	-	6.5 9.0	-	7.0 10.5	-	6.5 9.0	6.5 9.0	15	0	0	7.52	0.0515	7.52	7.43	7.61	0	-	0	-	
DO (mg/L)	mg/L	-	6.5	-	-	-	6.5	-	15	0	0	11	0.534	11.3	10.2	11.5	0	-	-	-	
DO (%)	%	-	-	-	-	-	-	-	15	0	0	96.7	24.9	104	7.5	107	-	-	-	-	
Conventional Parameters																					
Conductivity (lab)	uS/cm	1	-	-	-	-	-	-	15	0	0	109	5.18	108	102	119	-	-	-	-	
Hardness	mg/L	0.2	-	-	-	-	-	-	15	0	0	29.5	1.24	29.7	27.8	31.3	-	-	-	-	
pH (lab)	pH units	0.1	6.5 9.0	-	7.0 10.5	-	6.5 9.0	6.5 9.0	15	0	0	7.42	0.0419	7.43	7.34	7.46	0	-	0	-	
Total Dissolved Solids	mg/L	13	-	-	500	-	500	375	15	0	0	70.6	10.8	68	53	89	-	-	0	-	
Total Dissolved Solids (Calc)	mg/L	1	-	-	500	-	500	375	15	0	0	55.3	1.11	55.2	54.1	57.7	-	-	0	-	
Total Suspended Solids	mg/L	1	-	-	-	-	-	-	15	12	80	-	-	1	1	1.3	-	-	-	-	
Turbidity (lab)	NTU	0.1	-	-	-	-	-	-	15	0	0	0.486	0.107	0.46	0.29	0.67	-	-	-	-	
Major Ions																					
Alkalinity, Bicarbonate	mg/L	1.2	-	-	-	-	-	-	15	0	0	23.8	2.02	25	20.7	25.7	-	-	-	-	
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	-	-	-	-	-	-	15	0	0	19.5	1.66	20.5	17	21.1	-	-	-	-	
Bromide	mg/L	0.1	-	-	-	-	-	-	15	15	100	-	-	-	-	0.1	-	-	-	-	
Calcium (D)	mg/L	0.01	-	-	-	-	-	-	15	0	0	8.98	0.388	9.04	8.46	9.56	-	-	-	-	
Calcium (T)	mg/L	0.01	-	-	-	-	-	-	15	0	0	8.79	0.338	8.82	8.2	9.39	-	-	-	-	
Chloride	mg/L	0.1	120	-	250	-	120	90	15	0	0	17.8	0.907	17.8	16.8	19.8	0	-	0	-	
Fluoride	mg/L	0.02	0.12	1.5	-	2.8	2.8	2.1	15	0	0	0.0255	0.00188	0.024	0.024	0.028	0	0	-	0	
Magnesium (D)	mg/L	0.004	-	-	-	-	-	-	15	0	0	1.72	0.0764	1.72	1.61	1.82	-	-	-	-	
Magnesium (T)	mg/L	0.004	-	-	-	-	-	-	15	0	0	1.74	0.0653	1.73	1.65	1.82	-	-	-	-	
Potassium (D)	mg/L	0.02	-	-	-	-	-	-	15	0	0	1.14	0.0515	1.12	1.08	1.23	-	-	-	-	
Potassium (T)	mg/L	0.02	-	-	-	-	-	-	15	0	0	1.16	0.0368	1.14	1.11	1.21	-	-	-	-	
Reactive Silica (SiO2)	mg/L	0.01	-	-	-	-	-	-	15	0	0	0.333	0.0798	0.327	0.237	0.447	-	-	-	-	
Sodium (D)	mg/L	0.02	-	-	-	-	-	-	15	0	0	8	0.319	7.95	7.54	8.69	-	-	-	-	
Sodium (T)	mg/L	0.02	-	-	200	-	-	-	15	0	0	8.17	0.724	7.82	7.48	9.55	-	-	0	-	
Sulphate	mg/L	0.3	-	-	500	-	-	-	15	0	0	5.68	0.185	5.64	5.43	5.97	-	-	0	-	
Nutrients																					
Ammonia (as N)	mg/L	0.005	0.141	-	-	-	0.58	0.44	15	0	0	0.0187	0.00913	0.0145	0.0098	0.0389	0	-	-	-	
Nitrate (as N)	mg/L	0.005	2.9	10	-	-	2.9	2.18	15	5	33	0.055	0.0716	0.0109	0.005	0.173	0	0	-	-	
Nitrate + Nitrite (as N)	mg/L	0.0051	-	-	-	-	-	-	15	5	33	0.0556	0.0723	0.0109	0.0051	0.175	-	-	-	-	
Nitrite (as N)	mg/L	0.001	0.06	1	-	-	0.06	0.045	15	10	67	-	-	0.001	0.001	0.0019	0	0	-	-	
Orthophosphate (PO4-P)	mg/L	0.001	-	-	-	-	-	-	15	15	100	-	-	-	-	0.001	-	-	-	-	

Parameter	Units	Lowest Detection Limit	Screening Criteria ^[a]				AEMP Benchmark	AEMP Action Level ^[c]	Near-Field Area (MEL-01)											
			Aquatic Life ^[b]	Health Canada		SSWQO			Summary Statistics – Open Water Sampling ^[d]								Screening Summary			
				Chronic	GCDWQ				Aesthetic Objective	N	N<MDL	% <MDL	Mean	SD	Median	Min	Max	Chronic	HH	AO
Total Diss Phosphorus	mg/L	0.001	-	-	-	-	-	-	15	1	7	0.00289	0.000931	0.0029	0.001	0.0046	-	-	-	-
Total Dissolved Nitrogen	mg/L	0.05	-	-	-	-	-	-	15	0	0	0.281	0.0698	0.281	0.12	0.366	-	-	-	-
Total Kjeldahl Nitrogen	mg/L	0.05	-	-	-	-	-	-	15	0	0	0.267	0.059	0.246	0.196	0.398	-	-	-	-
Total Kjeldahl Nitrogen (diss)	mg/L	0.05	-	-	-	-	-	-	15	0	0	0.226	0.0675	0.219	0.105	0.359	-	-	-	-
Total Phosphorus	mg/L	0.001	-	-	-	-	-	-	15	0	0	0.00785	0.00125	0.0077	0.006	0.01	-	-	-	-
Organic/Inorganic Carbon																				
Dissolved Organic Carbon	mg/L	0.5	-	-	-	-	-	-	15	0	0	3.44	0.202	3.4	3.13	3.8	-	-	-	-
Total Organic Carbon	mg/L	0.5	-	-	-	-	-	-	15	0	0	3.44	0.228	3.4	3.04	3.8	-	-	-	-
Total Metals																				
Aluminum (T)	ug/L	1	100	-	-	-	100	75	15	0	0	5.3	1.62	4.7	3.3	8.4	0	-	-	-
Antimony (T)	ug/L	0.02	9	6	-	-	-	4.5	15	15	100	-	-	-	-	0.02	-	0	-	-
Arsenic (T)	ug/L	0.02	5	10	-	25	10	7.5	15	0	0	0.523	0.0244	0.522	0.472	0.561	0	0	-	0
Barium (T)	ug/L	0.02	-	1000	-	-	-	750	15	0	0	8.49	0.273	8.37	8.14	9.11	-	0	-	-
Beryllium (T)	ug/L	0.005	-	-	-	-	-	-	15	14	93	-	-	0.005	0.005	0.0061	-	-	-	-
Bismuth (T)	ug/L	0.005	-	-	-	-	-	-	15	15	100	-	-	-	-	0.005	-	-	-	-
Boron (T)	ug/L	5	1500	5000	-	-	1500	1125	15	0	0	7.6	0.657	7.5	6.7	9	0	0	-	-
Cadmium (T)	ug/L	0.005	0.043 0.060	5	-	-	0.043	0.032	15	15	100	-	-	-	-	0.005	0	0	-	-
Chromium (T)	ug/L	0.1	5	50	-	-	5	3.75	15	15	100	-	-	-	-	0.1	0	0	-	-
Cobalt (T)	ug/L	0.005	0.78	-	-	-	0.78	0.585	15	0	0	0.0302	0.00503	0.0315	0.0224	0.0402	0	-	-	-
Copper (T)	ug/L	0.05	2	2000	1000	-	2	1.5	15	0	0	0.848	0.0383	0.852	0.8	0.93	0	0	0	-
Iron (T)	ug/L	1	300	-	300	1060	300	225	15	0	0	25.9	2.69	24.6	22.9	29.9	0	-	0	0
Lead (T)	ug/L	0.01	-	5	-	-	3.31	2.48	15	9	60	-	-	0.01	0.01	0.022	-	0	-	-
Lithium (T)	ug/L	0.5	-	-	-	-	-	-	15	0	0	1.53	0.123	1.49	1.4	1.81	-	-	-	-
Manganese (T)	ug/L	0.05	-	120	-	-	120	90	15	0	0	8.32	1.38	8.67	6.34	9.82	-	0	0	-
Mercury (T)	ug/L	0.5	0.026	1	-	-	0.026	0.020	15	8	53	-	-	0.0005	0.0005	0.00076	0	0	-	-
Molybdenum (T)	ug/L	0.05	73	-	-	-	73	54.8	15	0	0	0.155	0.154	0.103	0.091	0.68	0	-	-	-
Nickel (T)	ug/L	0.05	25	-	-	-	25	18.8	15	0	0	0.781	0.0578	0.776	0.701	0.888	0	-	-	-
Selenium (T)	ug/L	0.04	1	50	-	-	1	0.75	15	14	93	-	-	0.04	0.04	0.055	0	0	-	-
Silicon (T)	ug/L	50	-	-	-	-	-	-	15	0	0	194	66.5	165	137	351	-	-	-	-
Silver (T)	ug/L	0.005	0.25	-	-	-	0.25	0.188	15	15	100	-	-	-	-	0.025	0	-	-	-
Strontium (T)	ug/L	0.02	2500	7000	-	-	2500	1875	15	0	0	67.1	7.97	65	58.5	82.1	0	0	-	-
Sulfur (T)	ug/L	500	-	-	-	-	-	-	15	0	0	1900	111	1930	1670	2080	-	-	-	-
Thallium (T)	ug/L	0.005	0.8	-	-	-	0.8	0.6	15	15	100	-	-	-	-	0.005	0	-	-	-
Tin (T)	ug/L	0.02	-	-	-	-	-	-	15	15	100	-	-	-	-	0.02	-	-	-	-
Titanium (T)	ug/L	0.05	-	-	-	-	-	-	15	0	0	0.114	0.0384	0.098	0.058	0.189	-	-	-	-
Uranium (T)	ug/L	0.001	15	20	-	-	15	11.25	15	0	0	0.0189	0.00135	0.0187	0.0175	0.0227	0	0	-	-
Vanadium (T)	ug/L	0.05	120	-	-	-	120	90	15	14	93	-	-	0.05	0.05	0.061	-	-	-	-
Zinc (T)	ug/L	0.5	-	-	5000	-	3.91	2.93	15	5	33	0.755	0.597	0.64	0.5	2.47	-	-	0	-
Zirconium (T)	ug/L	0.01	-	-	-	-	-	-	15	11	73	-	-	0.01	0.01	0.013	-	-	-	-

Parameter	Units	Lowest Detection Limit	Screening Criteria ^[a]				AEMP Benchmark	AEMP Action Level ^[c]	Near-Field Area (MEL-01)													
			Aquatic Life ^[b]	Health Canada		SSWQO			Summary Statistics – Open Water Sampling ^[d]								Screening Summary					
				Chronic	GCDWQ				Aesthetic Objective	N	N<MDL	% <MDL	Mean	SD	Median	Min	Max	Chronic	HH	AO	SSWQO	
Dissolved Metals																						
Aluminum (D)	ug/L	1	-	-	-	-	-	-	15	0	0	4.12	2.74	2.5	1.8	9	-	-	-	-		
Antimony (D)	ug/L	0.02	-	-	-	-	-	-	15	11	73	-	-	0.02	0.02	0.023	-	-	-	-		
Arsenic (D)	ug/L	0.02	-	-	-	-	-	-	15	0	0	0.478	0.0169	0.483	0.439	0.5	-	-	-	-		
Barium (D)	ug/L	0.02	-	-	-	-	-	-	15	0	0	8.31	0.419	8.26	7.69	8.89	-	-	-	-		
Beryllium (D)	ug/L	0.005	-	-	-	-	-	-	15	15	100	-	-	-	-	0.005	-	-	-	-		
Bismuth (D)	ug/L	0.005	-	-	-	-	-	-	15	15	100	-	-	-	-	0.005	-	-	-	-		
Boron (D)	ug/L	5	-	-	-	-	-	-	15	0	0	7.67	0.793	7.7	6.8	9.6	-	-	-	-		
Cadmium (D)	ug/L	0.005	-	-	-	-	-	-	15	15	100	-	-	-	-	0.005	-	-	-	-		
Chromium (D)	ug/L	0.1	-	-	-	-	-	-	15	15	100	-	-	-	-	0.1	-	-	-	-		
Cobalt (D)	ug/L	0.005	-	-	-	-	-	-	15	0	0	0.0224	0.0121	0.0148	0.0127	0.04	-	-	-	-		
Copper (D)	ug/L	0.05	-	-	-	-	-	-	15	0	0	0.827	0.0304	0.83	0.763	0.897	-	-	-	-		
Iron (D)	ug/L	1	-	-	-	-	-	-	15	0	0	17	14.2	7.9	5.8	37	-	-	-	-		
Lead (D)	ug/L	0.01	3.31 6.32	-	-	-	3.31	2.48	15	8	53	-	-	0.01	0.01	0.025	0	-	-	-		
Lithium (D)	ug/L	0.5	-	-	-	-	-	-	15	0	0	1.56	0.149	1.54	1.41	1.85	-	-	-	-		
Manganese (D)	ug/L	0.05	210 330	-	-	-	210	158	15	0	0	3.69	4.32	1.07	0.309	9.82	0	-	-	-		
Mercury (D)	ug/L	0.5	-	-	-	-	-	-	15	11	73	-	-	0.0005	0.0005	0.00078	-	-	-	-		
Molybdenum (D)	ug/L	0.05	-	-	-	-	-	-	15	0	0	0.114	0.0112	0.112	0.095	0.135	-	-	-	-		
Nickel (D)	ug/L	0.05	-	-	-	-	-	-	15	0	0	0.747	0.0576	0.726	0.668	0.837	-	-	-	-		
Selenium (D)	ug/L	0.04	-	-	-	-	-	-	15	8	53	-	-	0.04	0.04	0.056	-	-	-	-		
Silicon (D)	ug/L	50	-	-	-	-	-	-	15	0	0	204	118	156	125	533	-	-	-	-		
Silver (D)	ug/L	0.005	-	-	-	-	-	-	15	15	100	-	-	-	-	0.005	-	-	-	-		
Strontium (D)	ug/L	0.02	2500	-	-	-	2500	1875	15	0	0	64.6	4.6	64.4	58.9	75.9	0	-	-	-		
Sulfur (D)	ug/L	500	-	-	-	-	-	-	15	0	0	1920	187	1870	1670	2310	-	-	-	-		
Thallium (D)	ug/L	0.005	-	-	-	-	-	-	15	15	100	-	-	-	-	0.005	-	-	-	-		
Tin (D)	ug/L	0.02	-	-	-	-	-	-	15	15	100	-	-	-	-	0.02	-	-	-	-		
Titanium (D)	ug/L	0.05	-	-	-	-	-	-	15	9	60	-	-	0.05	0.05	0.151	-	-	-	-		
Uranium (D)	ug/L	0.001	-	-	-	-	-	-	15	0	0	0.0204	0.0025	0.0202	0.0172	0.025	-	-	-	-		
Vanadium (D)	ug/L	0.05	-	-	-	-	-	-	15	15	100	-	-	-	-	0.05	-	-	-	-		
Zinc (D)	ug/L	0.5	3.91 10.6	-	5000	-	3.91	2.93	15	4	27	1.98	1.52	1.53	0.5	4.8	0	-	0	-		
Zirconium (D)	ug/L	0.01	-	-	-	-	-	-	15	11	73	-	-	0.01	0.01	0.014	-	-	-	-		
Other																						
Cyanide (free)	mg/L	0.001	-	-	-	-	-	-	15	15	100	-	-	-	-	0.001	-	-	-	-		
Cyanide (Total)	mg/L	0.001	0.005	0.2	-	-	0.005	0.004	15	15	100	-	-	-	-	0.001	0	0	-	-		
Cyanide (WAD)	mg/L	0.001	-	-	-	-	-	-	15	15	100	-	-	-	-	0.001	-	-	-	-		
Radium-226	Bq/l	0.005	-	-	-	-	-	-	15	13	87	-	-	0.0089	0.005	0.03	-	-	-	-		

Notes

[a] Refer to the main document for references to the various screening criteria.

[b] The range of chronic guidelines are shown for parameters with site-specific water quality guidelines (e.g., cadmium, dissolved zinc, and dissolved manganese).

[c] AEMP Action Level = 75% of the AEMP Benchmark (lowest of the water quality guidelines for aquatic life and human health).

[d] Mean and SD were not calculated if >50% of the values were <MDL. 1/2 the MDL was used to calculate the mean and SD if >50% of the measurements were > MDL.

** There were not water quality exceedances of aquatic life, drinking water, or site-specific water quality objectives in the 2020 open water sampling events.

Table 5-7. Mid-Field Area (MEL-02) Water Quality Summary Statistics – 2020 Open Water Sampling Events (July, August, September)

Parameter	Units	Lowest Detection Limit	Screening Criteria ^[a]				AEMP Benchmark	AEMP Action Level ^[c]	Mid-Field Area (MEL-02)											
			Aquatic Life ^[b]	Health Canada		SSWQO			Summary Statistics - Open Water Sampling ^[d]							Screening Summary				
				Chronic	GCDWQ				Aesthetic Objective	N	N<MDL	% <MDL	Mean	SD	Median	Min	Max	Chronic	HH	AO
Field Measurements																				
Temperature	C	-	-	-	15	-	-	-	19	0	0	11.7	3.03	13.3	2.21	14.2	-	-	0	-
Sp. Conductivity (field)	uS/cm	-	-	-	-	-	-	-	19	0	0	86.7	8.05	84.7	83.5	120	-	-	-	-
pH (field)	pH units	-	6.5 9.0	-	7.0 10.5	-	6.5 9.0	6.5 9.0	19	0	0	7.52	0.174	7.57	6.89	7.7	0	-	1	-
DO (mg/L)	mg/L	-	6.5	-	-	-	6.5	-	19	0	0	11	1.17	10.8	10.3	15.6	0	-	-	-
DO (%)	%	-	-	-	-	-	-	-	19	0	0	102	4.12	102	97.5	115	-	-	-	-
Conventional Parameters																				
Conductivity (lab)	uS/cm	1	-	-	-	-	-	-	15	0	0	84.1	1.65	84.1	82.3	87.5	-	-	-	-
Hardness	mg/L	0.2	-	-	-	-	-	-	15	0	0	24.3	0.511	24.2	23.6	25.2	-	-	-	-
pH (lab)	pH units	0.1	6.5 9.0	-	7.0 10.5	-	6.5 9.0	6.5 9.0	15	0	0	7.51	0.104	7.45	7.42	7.72	0	-	0	-
Total Dissolved Solids	mg/L	13	-	-	500	-	500	375	15	0	0	49.1	2.77	49	44	53	-	-	0	-
Total Dissolved Solids (Calc)	mg/L	1	-	-	500	-	500	375	15	0	0	44.1	1.18	44.4	41.5	45.7	-	-	0	-
Total Suspended Solids	mg/L	1	-	-	-	-	-	-	15	14	93	-	-	1	1	2.2	-	-	-	-
Turbidity (lab)	NTU	0.1	-	-	-	-	-	-	15	1	7	0.256	0.0799	0.26	0.1	0.37	-	-	-	-
Major Ions																				
Alkalinity, Bicarbonate	mg/L	1.2	-	-	-	-	-	-	15	0	0	24.7	1.86	25.3	19.9	27.3	-	-	-	-
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	-	-	-	-	-	-	15	0	0	20.3	1.53	20.7	16.3	22.4	-	-	-	-
Bromide	mg/L	0.1	-	-	-	-	-	-	15	15	100	-	-	-	-	0.1	-	-	-	-
Calcium (D)	mg/L	0.01	-	-	-	-	-	-	15	0	0	7.55	0.16	7.52	7.31	7.8	-	-	-	-
Calcium (T)	mg/L	0.01	-	-	-	-	-	-	15	0	0	7.44	0.124	7.44	7.17	7.63	-	-	-	-
Chloride	mg/L	0.1	120	-	250	-	120	90	15	0	0	11.9	0.324	11.8	11.5	12.7	0	-	0	-
Fluoride	mg/L	0.02	0.12	1.5	-	2.8	2.8	2.1	15	0	0	0.0263	0.0011	0.026	0.025	0.028	0	0	-	0
Magnesium (D)	mg/L	0.004	-	-	-	-	-	-	15	0	0	1.32	0.0421	1.33	1.21	1.38	-	-	-	-
Magnesium (T)	mg/L	0.004	-	-	-	-	-	-	15	0	0	1.34	0.0193	1.34	1.3	1.37	-	-	-	-
Potassium (D)	mg/L	0.02	-	-	-	-	-	-	15	0	0	0.986	0.0255	0.987	0.903	1.02	-	-	-	-
Potassium (T)	mg/L	0.02	-	-	-	-	-	-	15	0	0	1.01	0.0147	1.01	0.991	1.04	-	-	-	-
Reactive Silica (SiO2)	mg/L	0.01	-	-	-	-	-	-	15	0	0	0.293	0.0163	0.286	0.273	0.319	-	-	-	-
Sodium (D)	mg/L	0.02	-	-	-	-	-	-	15	0	0	5.66	0.192	5.63	5.3	6.03	-	-	-	-
Sodium (T)	mg/L	0.02	-	-	200	-	-	-	15	0	0	5.74	0.15	5.7	5.5	6.12	-	-	0	-
Sulphate	mg/L	0.3	-	-	500	-	-	-	15	0	0	4.42	0.167	4.33	4.22	4.7	-	-	0	-
Nutrients																				
Ammonia (as N)	mg/L	0.005	0.141	-	-	-	0.58	0.44	15	2	13	0.0173	0.0181	0.0124	0.005	0.0682	0	-	-	-
Nitrate (as N)	mg/L	0.005	2.9	10	-	-	2.9	2.18	15	9	60	-	-	0.005	0.005	0.0504	0	0	-	-
Nitrate + Nitrite (as N)	mg/L	0.0051	-	-	-	-	-	-	15	9	60	-	-	0.0051	0.0051	0.0504	-	-	-	-
Nitrite (as N)	mg/L	0.001	0.06	1	-	-	0.06	0.045	15	15	100	-	-	-	-	0.001	0	0	-	-
Orthophosphate (PO4-P)	mg/L	0.001	-	-	-	-	-	-	15	15	100	-	-	-	-	0.001	-	-	-	-

Parameter	Units	Lowest Detection Limit	Screening Criteria ^[a]				AEMP Benchmark	AEMP Action Level ^[c]	Mid-Field Area (MEL-02)											
			Aquatic Life ^[b]	Health Canada		SSWQO			Summary Statistics - Open Water Sampling ^[d]								Screening Summary			
				Chronic	GCDWQ				Aesthetic Objective	N	N<MDL	% <MDL	Mean	SD	Median	Min	Max	Chronic	HH	AO
Total Diss Phosphorus	mg/L	0.001	-	-	-	-	-	-	15	0	0	0.00183	0.000337	0.0018	0.0013	0.0024	-	-	-	-
Total Dissolved Nitrogen	mg/L	0.05	-	-	-	-	-	-	15	0	0	0.248	0.0751	0.215	0.172	0.375	-	-	-	-
Total Kjeldahl Nitrogen	mg/L	0.05	-	-	-	-	-	-	15	0	0	0.264	0.0673	0.244	0.176	0.424	-	-	-	-
Total Kjeldahl Nitrogen (diss)	mg/L	0.05	-	-	-	-	-	-	15	0	0	0.241	0.0677	0.215	0.171	0.361	-	-	-	-
Total Phosphorus	mg/L	0.001	-	-	-	-	-	-	15	0	0	0.00569	0.00241	0.005	0.0035	0.0137	-	-	-	-
Organic/Inorganic Carbon																				
Dissolved Organic Carbon	mg/L	0.5	-	-	-	-	-	-	15	0	0	2.98	0.402	2.83	2.7	4.3	-	-	-	-
Total Organic Carbon	mg/L	0.5	-	-	-	-	-	-	15	0	0	3.06	0.465	2.9	2.62	4.1	-	-	-	-
Total Metals																				
Aluminum (T)	ug/L	1	100	-	-	-	100	75	15	0	0	3.53	1.09	3.3	2.2	6.3	0	-	-	-
Antimony (T)	ug/L	0.02	9	6	-	-	-	4.5	15	15	100	-	-	-	-	0.02	-	0	-	-
Arsenic (T)	ug/L	0.02	5	10	-	25	10	7.5	15	0	0	0.471	0.0492	0.449	0.421	0.567	0	0	-	0
Barium (T)	ug/L	0.02	-	1000	-	-	-	750	15	0	0	8.32	0.455	8.35	7.64	9.05	-	0	-	-
Beryllium (T)	ug/L	0.005	-	-	-	-	-	-	15	15	100	-	-	-	-	0.005	-	-	-	-
Bismuth (T)	ug/L	0.005	-	-	-	-	-	-	15	15	100	-	-	-	-	0.005	-	-	-	-
Boron (T)	ug/L	5	1500	5000	-	-	1500	1125	15	1	7	5.4	0.973	5.4	5	7	0	0	-	-
Cadmium (T)	ug/L	0.005	0.043 0.060	5	-	-	0.043	0.032	15	14	93	-	-	0.005	0.005	0.0071	0	0	-	-
Chromium (T)	ug/L	0.1	5	50	-	-	5	3.75	15	13	87	-	-	0.1	0.1	0.19	0	0	-	-
Cobalt (T)	ug/L	0.005	0.78	-	-	-	0.78	0.585	15	0	0	0.0177	0.00308	0.0167	0.0136	0.0233	0	-	-	-
Copper (T)	ug/L	0.05	2	2000	1000	-	2	1.5	15	0	0	0.999	0.259	0.888	0.804	1.61	0	0	0	-
Iron (T)	ug/L	1	300	-	300	1060	300	225	15	0	0	17.6	4.24	15.8	13.4	24.4	0	-	0	0
Lead (T)	ug/L	0.01	-	5	-	-	3.31	2.48	15	7	47	0.0241	0.0334	0.011	0.01	0.123	-	0	-	-
Lithium (T)	ug/L	0.5	-	-	-	-	-	-	15	0	0	0.942	0.0455	0.93	0.88	1.01	-	-	-	-
Manganese (T)	ug/L	0.05	-	120	-	-	120	90	15	0	0	3.94	0.391	4.02	3.44	4.5	-	0	0	-
Mercury (T)	ug/L	0.5	0.026	1	-	-	0.026	0.020	15	7	47	0.000489	0.000344	0.00051	0.0005	0.00158	0	0	-	-
Molybdenum (T)	ug/L	0.05	73	-	-	-	73	54.8	15	0	0	0.47	1.31	0.094	0.072	5.19	0	-	-	-
Nickel (T)	ug/L	0.05	25	-	-	-	25	18.8	15	0	0	0.618	0.0662	0.595	0.544	0.748	0	-	-	-
Selenium (T)	ug/L	0.04	1	50	-	-	1	0.75	15	7	47	0.0373	0.018	0.042	0.04	0.066	0	0	-	-
Silicon (T)	ug/L	50	-	-	-	-	-	-	15	0	0	146	12.2	146	122	166	-	-	-	-
Silver (T)	ug/L	0.005	0.25	-	-	-	0.25	0.188	15	15	100	-	-	-	-	0.005	0	-	-	-
Strontium (T)	ug/L	0.02	2500	7000	-	-	2500	1875	15	0	0	43.5	1.66	43.5	41.1	46.6	0	0	-	-
Sulfur (T)	ug/L	500	-	-	-	-	-	-	15	0	0	1480	108	1440	1380	1730	-	-	-	-
Thallium (T)	ug/L	0.005	0.8	-	-	-	0.8	0.6	15	15	100	-	-	-	-	0.005	0	-	-	-
Tin (T)	ug/L	0.02	-	-	-	-	-	-	15	13	87	-	-	0.02	0.02	0.045	-	-	-	-
Titanium (T)	ug/L	0.05	-	-	-	-	-	-	15	2	13	0.0744	0.0273	0.075	0.05	0.125	-	-	-	-
Uranium (T)	ug/L	0.001	15	20	-	-	15	11.25	15	0	0	0.0157	0.000981	0.0155	0.0141	0.0174	0	0	-	-
Vanadium (T)	ug/L	0.05	120	-	-	-	120	90	15	15	100	-	-	-	-	0.05	-	-	-	-
Zinc (T)	ug/L	0.5	-	-	5000	-	3.91	2.93	15	5	33	2.69	5.99	0.77	0.5	23.6†	-	-	0	-
Zirconium (T)	ug/L	0.01	-	-	-	-	-	-	15	15	100	-	-	-	-	0.01	-	-	-	-

Parameter	Units	Lowest Detection Limit	Screening Criteria ^[a]				AEMP Benchmark	AEMP Action Level ^[c]	Mid-Field Area (MEL-02)											
			Aquatic Life ^[b]	Health Canada		SSWQO			Summary Statistics - Open Water Sampling ^[d]								Screening Summary			
				Chronic	GCDWQ				Aesthetic Objective	N	N<MDL	% <MDL	Mean	SD	Median	Min	Max	Chronic	HH	AO
Dissolved Metals																				
Aluminum (D)	ug/L	1	-	-	-	-	-	-	15	2	13	1.59	1.06	1.4	1	5.1	-	-	-	-
Antimony (D)	ug/L	0.02	-	-	-	-	-	-	15	15	100	-	-	-	-	0.02	-	-	-	-
Arsenic (D)	ug/L	0.02	-	-	-	-	-	-	15	0	0	0.435	0.0458	0.431	0.351	0.509	-	-	-	-
Barium (D)	ug/L	0.02	-	-	-	-	-	-	15	0	0	8.13	0.644	8.31	6.96	8.81	-	-	-	-
Beryllium (D)	ug/L	0.005	-	-	-	-	-	-	15	15	100	-	-	-	-	0.005	-	-	-	-
Bismuth (D)	ug/L	0.005	-	-	-	-	-	-	15	15	100	-	-	-	-	0.005	-	-	-	-
Boron (D)	ug/L	5	-	-	-	-	-	-	15	0	0	5.54	0.558	5.3	5	6.7	-	-	-	-
Cadmium (D)	ug/L	0.005	-	-	-	-	-	-	15	15	100	-	-	-	-	0.005	-	-	-	-
Chromium (D)	ug/L	0.1	-	-	-	-	-	-	15	13	87	-	-	0.1	0.1	0.16	-	-	-	-
Cobalt (D)	ug/L	0.005	-	-	-	-	-	-	15	0	0	0.00831	0.00132	0.0087	0.0058	0.0102	-	-	-	-
Copper (D)	ug/L	0.05	-	-	-	-	-	-	15	0	0	0.789	0.0592	0.776	0.731	0.965	-	-	-	-
Iron (D)	ug/L	1	-	-	-	-	-	-	15	0	0	6.32	1.94	6.3	3.9	9.3	-	-	-	-
Lead (D)	ug/L	0.01	3.31 6.32	-	-	-	3.31	2.48	15	10	67	-	-	0.01	0.01	0.016	0	-	-	-
Lithium (D)	ug/L	0.5	-	-	-	-	-	-	15	0	0	0.951	0.0433	0.97	0.88	1	-	-	-	-
Manganese (D)	ug/L	0.05	210 330	-	-	-	210	158	15	0	0	0.458	0.0806	0.465	0.348	0.559	0	-	-	-
Mercury (D)	ug/L	0.5	-	-	-	-	-	-	15	12	80	-	-	0.0005	0.0005	0.00084	-	-	-	-
Molybdenum (D)	ug/L	0.05	-	-	-	-	-	-	15	0	0	0.0875	0.0104	0.089	0.072	0.102	-	-	-	-
Nickel (D)	ug/L	0.05	-	-	-	-	-	-	15	0	0	0.582	0.051	0.563	0.525	0.658	-	-	-	-
Selenium (D)	ug/L	0.04	-	-	-	-	-	-	15	8	53	-	-	0.04	0.04	0.055	-	-	-	-
Silicon (D)	ug/L	50	-	-	-	-	-	-	15	0	0	144	7.77	144	126	154	-	-	-	-
Silver (D)	ug/L	0.005	-	-	-	-	-	-	15	15	100	-	-	-	-	0.005	-	-	-	-
Strontium (D)	ug/L	0.02	2500	-	-	-	2500	1875	15	0	0	43.9	0.675	43.9	42.3	44.9	0	-	-	-
Sulfur (D)	ug/L	500	-	-	-	-	-	-	15	0	0	1510	142	1510	1290	1720	-	-	-	-
Thallium (D)	ug/L	0.005	-	-	-	-	-	-	15	15	100	-	-	-	-	0.005	-	-	-	-
Tin (D)	ug/L	0.02	-	-	-	-	-	-	15	15	100	-	-	-	-	0.02	-	-	-	-
Titanium (D)	ug/L	0.05	-	-	-	-	-	-	15	15	100	-	-	-	-	0.05	-	-	-	-
Uranium (D)	ug/L	0.001	-	-	-	-	-	-	15	0	0	0.0162	0.00127	0.016	0.0142	0.0185	-	-	-	-
Vanadium (D)	ug/L	0.05	-	-	-	-	-	-	15	15	100	-	-	-	-	0.05	-	-	-	-
Zinc (D)	ug/L	0.5	3.91 10.6	-	5000	-	3.91	2.93	15	4	27	0.778	0.485	0.76	0.5	1.86	0	-	0	-
Zirconium (D)	ug/L	0.01	-	-	-	-	-	-	15	14	93	-	-	0.01	0.01	0.01	-	-	-	-
Other																				
Cyanide (free)	mg/L	0.001	-	-	-	-	-	-	15	15	100	-	-	-	-	0.001	-	-	-	-
Cyanide (Total)	mg/L	0.001	0.005	0.2	-	-	0.005	0.004	15	15	100	-	-	-	-	0.001	0	0	-	-
Cyanide (WAD)	mg/L	0.001	-	-	-	-	-	-	15	15	100	-	-	-	-	0.001	-	-	-	-
Radium-226	Bq/l	0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes

[a] Refer to the main document for references to the various screening criteria.

[b] The range of chronic guidelines are shown for parameters with site-specific water quality guidelines (e.g., cadmium, dissolved zinc, and dissolved manganese).

[c] AEMP Action Level = 75% of the AEMP Benchmark (lowest of the water quality guidelines for aquatic life and human health).

[d] Mean and SD were not calculated if >50% of the values were <MDL. 1/2 the MDL was used to calculate the mean and SD if >50% of the measurements were > MDL.

** There were not water quality exceedances of aquatic life, drinking water, or site-specific water quality objectives in the 2020 open water sampling events.

Table 5-8. Reference Area 1 (MEL-03) Water Quality Summary Statistics – 2020 Open Water Sampling Events (July, August, September)

Parameter	Units	Lowest Detection Limit	Screening Criteria ^[a]				AEMP Benchmark	AEMP Action Level ^[c]	Reference Area 1 (MEL-03)											
			Aquatic Life ^[b]	Health Canada		SSWQO			Summary Statistics - Open Water Sampling ^[d]							Screening Summary				
				Chronic	GCDWQ				Aesthetic Objective	N	N<MDL	% <MDL	Mean	SD	Median	Min	Max	Chronic	HH	AO
Field Measurements																				
Temperature	C	-	-	-	15	-	-	-	19	0	0	10.7	2.9	11.5	1.36	13.5	-	-	0	-
Sp. Conductivity (field)	uS/cm	-	-	-	-	-	-	-	18	0	0	76.4	5.78	75.2	71.1	96.2	-	-	-	-
pH (field)	pH units	-	6.5 9.0	-	7.0 10.5	-	6.5 9.0	6.5 9.0	19	0	0	7.58	0.118	7.59	7.16	7.73	0	-	0	-
DO (mg/L)	mg/L	-	6.5	-	-	-	6.5	-	19	0	0	11.1	1.87	10.9	7.64	17.9	0	-	-	-
DO (%)	%	-	-	-	-	-	-	-	19	0	0	100	8.28	97.3	94.1	131	-	-	-	-
Conventional Parameters																				
Conductivity (lab)	uS/cm	1	-	-	-	-	-	-	15	0	0	73.2	2.64	73.5	68.7	78.7	-	-	-	-
Hardness	mg/L	0.2	-	-	-	-	-	-	15	0	0	21.8	0.991	21.8	20.6	23.2	-	-	-	-
pH (lab)	pH units	0.1	6.5 9.0	-	7.0 10.5	-	6.5 9.0	6.5 9.0	15	0	0	7.49	0.098	7.47	7.3	7.65	0	-	0	-
Total Dissolved Solids	mg/L	13	-	-	500	-	500	375	15	0	0	45.1	6.57	42	36	55	-	-	0	-
Total Dissolved Solids (Calc)	mg/L	1	-	-	500	-	500	375	15	0	0	38.7	1.4	39.5	35.8	40.5	-	-	0	-
Total Suspended Solids	mg/L	1	-	-	-	-	-	-	15	15	100	-	-	-	-	1	-	-	-	-
Turbidity (lab)	NTU	0.1	-	-	-	-	-	-	15	0	0	0.204	0.0478	0.2	0.14	0.33	-	-	-	-
Major Ions																				
Alkalinity, Bicarbonate	mg/L	1.2	-	-	-	-	-	-	15	0	0	24.1	1.62	24.6	19.9	25.3	-	-	-	-
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	-	-	-	-	-	-	15	0	0	19.8	1.32	20.2	16.3	20.7	-	-	-	-
Bromide	mg/L	0.1	-	-	-	-	-	-	15	15	100	-	-	-	-	0.1	-	-	-	-
Calcium (D)	mg/L	0.01	-	-	-	-	-	-	15	0	0	6.82	0.34	6.84	6.34	7.28	-	-	-	-
Calcium (T)	mg/L	0.01	-	-	-	-	-	-	15	0	0	6.8	0.137	6.8	6.46	6.98	-	-	-	-
Chloride	mg/L	0.1	120	-	250	-	120	90	15	0	0	9.39	0.357	9.61	8.75	9.74	0	-	0	-
Fluoride	mg/L	0.02	0.12	1.5	-	2.8	2.8	2.1	15	0	0	0.0275	0.00239	0.027	0.025	0.032	0	0	-	0
Magnesium (D)	mg/L	0.004	-	-	-	-	-	-	15	0	0	1.17	0.0383	1.15	1.12	1.23	-	-	-	-
Magnesium (T)	mg/L	0.004	-	-	-	-	-	-	15	0	0	1.16	0.0262	1.15	1.13	1.2	-	-	-	-
Potassium (D)	mg/L	0.02	-	-	-	-	-	-	15	0	0	0.924	0.0258	0.927	0.885	0.971	-	-	-	-
Potassium (T)	mg/L	0.02	-	-	-	-	-	-	15	0	0	0.936	0.0272	0.947	0.895	0.967	-	-	-	-
Reactive Silica (SiO2)	mg/L	0.01	-	-	-	-	-	-	15	0	0	0.23	0.0186	0.234	0.202	0.254	-	-	-	-
Sodium (D)	mg/L	0.02	-	-	-	-	-	-	15	0	0	4.72	0.165	4.78	4.47	4.95	-	-	-	-
Sodium (T)	mg/L	0.02	-	-	200	-	-	-	15	0	0	4.74	0.175	4.84	4.39	4.94	-	-	0	-
Sulphate	mg/L	0.3	-	-	500	-	-	-	15	0	0	3.75	0.213	3.86	3.36	3.95	-	-	0	-
Nutrients																				
Ammonia (as N)	mg/L	0.005	0.141	-	-	-	0.58	0.44	15	2	13	0.02	0.0222	0.0122	0.005	0.0793	0	-	-	-
Nitrate (as N)	mg/L	0.005	2.9	10	-	-	2.9	2.18	15	11	73	-	-	0.005	0.005	0.0271	0	0	-	-
Nitrate + Nitrite (as N)	mg/L	0.0051	-	-	-	-	-	-	15	11	73	-	-	0.0051	0.0051	0.0271	-	-	-	-
Nitrite (as N)	mg/L	0.001	0.06	1	-	-	0.06	0.045	15	15	100	-	-	-	-	0.001	0	0	-	-
Orthophosphate (PO4-P)	mg/L	0.001	-	-	-	-	-	-	15	15	100	-	-	-	-	0.001	-	-	-	-

Parameter	Units	Lowest Detection Limit	Screening Criteria ^[a]				AEMP Benchmark	AEMP Action Level ^[c]	Reference Area 1 (MEL-03)											
			Aquatic Life ^[b]	Health Canada		SSWQO			Summary Statistics - Open Water Sampling ^[d]								Screening Summary			
				Chronic	GCDWQ				Aesthetic Objective	N	N<MDL	% <MDL	Mean	SD	Median	Min	Max	Chronic	HH	AO
Total Diss Phosphorus	mg/L	0.001	-	-	-	-	-	-	15	5	33	0.00193	0.00247	0.0012	0.001	0.0104	-	-	-	-
Total Dissolved Nitrogen	mg/L	0.05	-	-	-	-	-	-	15	0	0	0.19	0.0255	0.19	0.153	0.235	-	-	-	-
Total Kjeldahl Nitrogen	mg/L	0.05	-	-	-	-	-	-	15	0	0	0.209	0.0346	0.201	0.152	0.268	-	-	-	-
Total Kjeldahl Nitrogen (diss)	mg/L	0.05	-	-	-	-	-	-	15	0	0	0.186	0.0242	0.19	0.148	0.231	-	-	-	-
Total Phosphorus	mg/L	0.001	-	-	-	-	-	-	15	1	7	0.00324	0.00142	0.0031	0.001	0.0071	-	-	-	-
Organic/Inorganic Carbon																				
Dissolved Organic Carbon	mg/L	0.5	-	-	-	-	-	-	15	0	0	2.21	0.633	2.57	1.3	2.91	-	-	-	-
Total Organic Carbon	mg/L	0.5	-	-	-	-	-	-	15	0	0	2.15	0.498	2.45	1.4	2.63	-	-	-	-
Total Metals																				
Aluminum (T)	ug/L	1	100	-	-	-	100	75	15	0	0	3.27	1.27	2.8	2.3	7.4	0	-	-	-
Antimony (T)	ug/L	0.02	9	6	-	-	-	4.5	15	14	93	-	-	0.02	0.02	0.021	-	0	-	-
Arsenic (T)	ug/L	0.02	5	10	-	25	10	7.5	15	0	0	0.271	0.0203	0.274	0.234	0.307	0	0	-	0
Barium (T)	ug/L	0.02	-	1000	-	-	-	750	15	0	0	7.77	0.294	7.87	7.29	8.26	-	0	-	-
Beryllium (T)	ug/L	0.005	-	-	-	-	-	-	15	15	100	-	-	-	-	0.005	-	-	-	-
Bismuth (T)	ug/L	0.005	-	-	-	-	-	-	15	15	100	-	-	-	-	0.005	-	-	-	-
Boron (T)	ug/L	5	1500	5000	-	-	1500	1125	15	15	100	-	-	-	-	5	0	0	-	-
Cadmium (T)	ug/L	0.005	0.043 0.060	5	-	-	0.043	0.032	15	15	100	-	-	-	-	0.005	0	0	-	-
Chromium (T)	ug/L	0.1	5	50	-	-	5	3.75	15	15	100	-	-	-	-	0.1	0	0	-	-
Cobalt (T)	ug/L	0.005	0.78	-	-	-	0.78	0.585	15	0	0	0.0124	0.00271	0.0121	0.0084	0.0197	0	-	-	-
Copper (T)	ug/L	0.05	2	2000	1000	-	2	1.5	15	0	0	0.676	0.0287	0.69	0.631	0.711	0	0	0	-
Iron (T)	ug/L	1	300	-	300	1060	300	225	15	0	0	12.9	4.03	11.7	10.7	27	0	-	0	0
Lead (T)	ug/L	0.01	-	5	-	-	3.31	2.48	15	10	67	-	-	0.01	0.01	0.062	-	0	-	-
Lithium (T)	ug/L	0.5	-	-	-	-	-	-	15	0	0	0.679	0.0289	0.69	0.64	0.72	-	-	-	-
Manganese (T)	ug/L	0.05	-	120	-	-	120	90	15	0	0	2.72	0.601	2.69	2.19	4.67	-	0	0	-
Mercury (T)	ug/L	0.5	0.026	1	-	-	0.026	0.020	15	14	93	-	-	0.0005	0.0005	0.00072	0	0	-	-
Molybdenum (T)	ug/L	0.05	73	-	-	-	73	54.8	15	0	0	0.987	3.52	0.072	0.06	13.7	0	-	-	-
Nickel (T)	ug/L	0.05	25	-	-	-	25	18.8	15	0	0	0.422	0.0169	0.418	0.402	0.448	0	-	-	-
Selenium (T)	ug/L	0.04	1	50	-	-	1	0.75	15	5	33	0.0399	0.0164	0.043	0.04	0.068	0	0	-	-
Silicon (T)	ug/L	50	-	-	-	-	-	-	15	0	0	112	10.3	113	97	128	-	-	-	-
Silver (T)	ug/L	0.005	0.25	-	-	-	0.25	0.188	15	15	100	-	-	-	-	0.005	0	-	-	-
Strontium (T)	ug/L	0.02	2500	7000	-	-	2500	1875	15	0	0	35.6	0.792	35.5	34	36.9	0	0	-	-
Sulfur (T)	ug/L	500	-	-	-	-	-	-	15	0	0	1350	115	1360	1080	1560	-	-	-	-
Thallium (T)	ug/L	0.005	0.8	-	-	-	0.8	0.6	15	15	100	-	-	-	-	0.005	0	-	-	-
Tin (T)	ug/L	0.02	-	-	-	-	-	-	15	14	93	-	-	0.02	0.02	0.025	-	-	-	-
Titanium (T)	ug/L	0.05	-	-	-	-	-	-	15	4	27	0.0993	0.118	0.069	0.05	0.501	-	-	-	-
Uranium (T)	ug/L	0.001	15	20	-	-	15	11.25	15	0	0	0.0142	0.000964	0.0138	0.0128	0.0158	0	0	-	-
Vanadium (T)	ug/L	0.05	120	-	-	-	120	90	15	14	93	-	-	0.05	0.05	0.055	-	-	-	-
Zinc (T)	ug/L	0.5	-	-	5000	-	3.91	2.93	15	5	33	0.631	0.343	0.67	0.5	1.46	-	-	0	-
Zirconium (T)	ug/L	0.01	-	-	-	-	-	-	15	15	100	-	-	-	-	0.01	-	-	-	-

Parameter	Units	Lowest Detection Limit	Screening Criteria ^[a]				AEMP Benchmark	AEMP Action Level ^[c]	Reference Area 1 (MEL-03)											
			Aquatic Life ^[b]	Health Canada		SSWQO			Summary Statistics - Open Water Sampling ^[d]								Screening Summary			
				Chronic	GCDWQ				Aesthetic Objective	N	N<MDL	% <MDL	Mean	SD	Median	Min	Max	Chronic	HH	AO
Dissolved Metals																				
Aluminum (D)	ug/L	1	-	-	-	-	-	-	15	0	0	1.87	0.716	1.6	1.1	3.3	-	-	-	-
Antimony (D)	ug/L	0.02	-	-	-	-	-	-	15	15	100	-	-	-	-	0.02	-	-	-	-
Arsenic (D)	ug/L	0.02	-	-	-	-	-	-	15	0	0	0.268	0.0177	0.266	0.249	0.308	-	-	-	-
Barium (D)	ug/L	0.02	-	-	-	-	-	-	15	0	0	7.74	0.562	7.85	7	8.59	-	-	-	-
Beryllium (D)	ug/L	0.005	-	-	-	-	-	-	15	15	100	-	-	-	-	0.005	-	-	-	-
Bismuth (D)	ug/L	0.005	-	-	-	-	-	-	15	15	100	-	-	-	-	0.005	-	-	-	-
Boron (D)	ug/L	5	-	-	-	-	-	-	15	13	87	-	-	5	5	5	-	-	-	-
Cadmium (D)	ug/L	0.005	-	-	-	-	-	-	15	14	93	-	-	0.005	0.005	0.0054	-	-	-	-
Chromium (D)	ug/L	0.1	-	-	-	-	-	-	15	15	100	-	-	-	-	0.1	-	-	-	-
Cobalt (D)	ug/L	0.005	-	-	-	-	-	-	15	6	40	0.0045	0.00178	0.0051	0.005	0.0072	-	-	-	-
Copper (D)	ug/L	0.05	-	-	-	-	-	-	15	0	0	0.645	0.0348	0.654	0.596	0.705	-	-	-	-
Iron (D)	ug/L	1	-	-	-	-	-	-	15	0	0	4.71	1.05	4.2	3.4	7.7	-	-	-	-
Lead (D)	ug/L	0.01	3.31 6.32	-	-	-	3.31	2.48	15	13	87	-	-	0.01	0.01	0.262	0	-	-	-
Lithium (D)	ug/L	0.5	-	-	-	-	-	-	15	0	0	0.678	0.0509	0.66	0.62	0.75	-	-	-	-
Manganese (D)	ug/L	0.05	210 330	-	-	-	210	158	15	0	0	0.521	0.296	0.42	0.301	1.43	0	-	-	-
Mercury (D)	ug/L	0.5	-	-	-	-	-	-	15	15	100	-	-	-	-	0.0005	-	-	-	-
Molybdenum (D)	ug/L	0.05	-	-	-	-	-	-	15	0	0	0.0713	0.0122	0.073	0.051	0.096	-	-	-	-
Nickel (D)	ug/L	0.05	-	-	-	-	-	-	15	0	0	0.42	0.0141	0.421	0.397	0.448	-	-	-	-
Selenium (D)	ug/L	0.04	-	-	-	-	-	-	15	10	67	-	-	0.04	0.04	0.062	-	-	-	-
Silicon (D)	ug/L	50	-	-	-	-	-	-	15	0	0	111	10.8	110	94	132	-	-	-	-
Silver (D)	ug/L	0.005	-	-	-	-	-	-	15	15	100	-	-	-	-	0.005	-	-	-	-
Strontium (D)	ug/L	0.02	2500	-	-	-	2500	1875	15	0	0	34.9	1.91	36	31.8	37.1	0	-	-	-
Sulfur (D)	ug/L	500	-	-	-	-	-	-	15	0	0	1360	127	1360	1160	1610	-	-	-	-
Thallium (D)	ug/L	0.005	-	-	-	-	-	-	15	15	100	-	-	-	-	0.005	-	-	-	-
Tin (D)	ug/L	0.02	-	-	-	-	-	-	15	15	100	-	-	-	-	0.02	-	-	-	-
Titanium (D)	ug/L	0.05	-	-	-	-	-	-	15	13	87	-	-	0.05	0.05	0.136	-	-	-	-
Uranium (D)	ug/L	0.001	-	-	-	-	-	-	15	0	0	0.0131	0.00172	0.0132	0.0102	0.0167	-	-	-	-
Vanadium (D)	ug/L	0.05	-	-	-	-	-	-	15	15	100	-	-	-	-	0.05	-	-	-	-
Zinc (D)	ug/L	0.5	3.91 10.6	-	5000	-	3.91	2.93	15	10	67	-	-	0.5	0.5	5.7	0	-	0	-
Zirconium (D)	ug/L	0.01	-	-	-	-	-	-	15	15	100	-	-	-	-	0.01	-	-	-	-
Other																				
Cyanide (free)	mg/L	0.001	-	-	-	-	-	-	15	15	100	-	-	-	-	0.001	-	-	-	-
Cyanide (Total)	mg/L	0.001	0.005	0.2	-	-	0.005	0.004	15	15	100	-	-	-	-	0.001	0	0	-	-
Cyanide (WAD)	mg/L	0.001	-	-	-	-	-	-	15	15	100	-	-	-	-	0.001	-	-	-	-
Radium-226	Bq/l	0.005	-	-	-	-	-	-	15	14	93	-	-	0.008	0.0063	0.031	-	-	-	-

Notes

[a] Refer to the main document for references to the various screening criteria.

[b] The range of chronic guidelines are shown for parameters with site-specific water quality guidelines (e.g., cadmium, dissolved zinc, and dissolved manganese).

[c] AEMP Action Level = 75% of the AEMP Benchmark (lowest of the water quality guidelines for aquatic life and human health).

[d] Mean and SD were not calculated if >50% of the values were <MDL. 1/2 the MDL was used to calculate the mean and SD if >50% of the measurements were > MDL.

** There were not water quality exceedances of aquatic life, drinking water, or site-specific water quality objectives in the 2020 open water sampling events.

Table 5-9. Reference Area 2 (MEL-04) Water Quality Summary Statistics – 2020 Open Water Sampling Events (August)

Parameter	Units	Lowest Detection Limit	Screening Criteria ^[a]				AEMP Benchmark	AEMP Action Level ^[c]	Reference Area 2 (MEL-04)											
			Aquatic Life ^[b]	Health Canada		SSWQO			Summary Statistics Open Water Sampling [d]							Screening Summary				
				Chronic	GCDWQ				Aesthetic Objective	N	N<MDL	% <MDL	Mean	SD	Median	Min	Max	Chronic	HH	AO
Field Measurements																				
Temperature	C	-	-	-	15	-	-	-	9	0	0	11.8	3.9	13.8	2.29	13.9	-	-	0	-
Sp. Conductivity (field)	uS/cm	-	-	-	-	-	-	-	9	0	0	79.5	13.7	75	73	116	-	-	-	-
pH (field)	pH units	-	6.5 9.0	-	7.0 10.5	-	6.5 9.0	6.5 9.0	9	0	0	7.53	0.314	7.6	6.7	7.74	0	-	1	-
DO (mg/L)	mg/L	-	6.5	-	-	-	6.5	-	9	0	0	11	2.02	10.1	9.92	16.2	0	-	-	-
DO (%)	%	-	-	-	-	-	-	-	9	0	0	100	8.14	96.8	96	121	-	-	-	-
Conventional Parameters																				
Conductivity (lab)	uS/cm	1	-	-	-	-	-	-	5	0	0	73.8	0.55	73.9	72.8	74.2	-	-	-	-
Hardness	mg/L	0.2	-	-	-	-	-	-	5	0	0	21.7	0.259	21.6	21.5	22	-	-	-	-
pH (lab)	pH units	0.1	6.5 9.0	-	7.0 10.5	-	6.5 9.0	6.5 9.0	5	0	0	7.42	0.0122	7.42	7.4	7.43	0	-	0	-
Total Dissolved Solids	mg/L	13	-	-	500	-	500	375	5	0	0	47.4	5.41	47	40	54	-	-	0	-
Total Dissolved Solids (Calc)	mg/L	1	-	-	500	-	500	375	5	0	0	39.1	0.167	39.1	38.9	39.3	-	-	0	-
Total Suspended Solids	mg/L	1	-	-	-	-	-	-	5	5	100	-	-	-	-	1	-	-	-	-
Turbidity (lab)	NTU	0.1	-	-	-	-	-	-	5	0	0	0.172	0.0661	0.14	0.14	0.29	-	-	-	-
Major Ions																				
Alkalinity, Bicarbonate	mg/L	1.2	-	-	-	-	-	-	5	0	0	24.7	0.134	24.6	24.5	24.8	-	-	-	-
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	20.2	0.0837	20.2	20.1	20.3	-	-	-	-
Bromide	mg/L	0.1	-	-	-	-	-	-	5	5	100	-	-	-	-	0.1	-	-	-	-
Calcium (D)	mg/L	0.01	-	-	-	-	-	-	5	0	0	6.81	0.094	6.78	6.71	6.91	-	-	-	-
Calcium (T)	mg/L	0.01	-	-	-	-	-	-	5	0	0	6.88	0.104	6.91	6.71	6.97	-	-	-	-
Chloride	mg/L	0.1	120	-	250	-	120	90	5	0	0	9.56	0.0316	9.57	9.51	9.59	0	-	0	-
Fluoride	mg/L	0.02	0.12	1.5	-	2.8	2.8	2.1	5	0	0	0.0272	0.000447	0.027	0.027	0.028	0	0	-	0
Magnesium (D)	mg/L	0.004	-	-	-	-	-	-	5	0	0	1.15	0.00837	1.15	1.14	1.16	-	-	-	-
Magnesium (T)	mg/L	0.004	-	-	-	-	-	-	5	0	0	1.15	0.00548	1.15	1.14	1.15	-	-	-	-
Potassium (D)	mg/L	0.02	-	-	-	-	-	-	5	0	0	0.918	0.00557	0.919	0.909	0.923	-	-	-	-
Potassium (T)	mg/L	0.02	-	-	-	-	-	-	5	0	0	0.94	0.00718	0.939	0.932	0.951	-	-	-	-
Reactive Silica (SiO2)	mg/L	0.01	-	-	-	-	-	-	5	0	0	0.245	0.00385	0.244	0.24	0.249	-	-	-	-
Sodium (D)	mg/L	0.02	-	-	-	-	-	-	5	0	0	4.64	0.0327	4.64	4.6	4.67	-	-	-	-
Sodium (T)	mg/L	0.02	-	-	200	-	-	-	5	0	0	4.77	0.0672	4.76	4.68	4.86	-	-	0	-
Sulphate	mg/L	0.3	-	-	500	-	-	-	5	0	0	3.89	0.027	3.89	3.87	3.94	-	-	0	-
Nutrients																				
Ammonia (as N)	mg/L	0.005	0.141	-	-	-	0.58	0.44	5	1	20	0.0291	0.0286	0.0246	0.005	0.0723	0	-	-	-
Nitrate (as N)	mg/L	0.005	2.9	10	-	-	2.9	2.18	5	5	100	-	-	-	-	0.005	0	0	-	-
Nitrate + Nitrite (as N)	mg/L	0.0051	-	-	-	-	-	-	5	5	100	-	-	-	-	0.0051	-	-	-	-
Nitrite (as N)	mg/L	0.001	0.06	1	-	-	0.06	0.045	5	5	100	-	-	-	-	0.001	0	0	-	-
Orthophosphate (PO4-P)	mg/L	0.001	-	-	-	-	-	-	5	5	100	-	-	-	-	0.001	-	-	-	-

Parameter	Units	Lowest Detection Limit	Screening Criteria ^[a]				AEMP Benchmark	AEMP Action Level ^[c]	Reference Area 2 (MEL-04)											
			Aquatic Life ^[b]	Health Canada		SSWQO			Summary Statistics Open Water Sampling [d]							Screening Summary				
				Chronic	GCDWQ				Aesthetic Objective	N	N<MDL	% <MDL	Mean	SD	Median	Min	Max	Chronic	HH	AO
Total Diss Phosphorus	mg/L	0.001	-	-	-	-	-	-	5	0	0	0.00138	0.000249	0.0013	0.0012	0.0018	-	-	-	-
Total Dissolved Nitrogen	mg/L	0.05	-	-	-	-	-	-	5	0	0	0.2	0.023	0.215	0.171	0.218	-	-	-	-
Total Kjeldahl Nitrogen	mg/L	0.05	-	-	-	-	-	-	5	0	0	0.241	0.0553	0.223	0.188	0.314	-	-	-	-
Total Kjeldahl Nitrogen (diss)	mg/L	0.05	-	-	-	-	-	-	5	0	0	0.2	0.023	0.215	0.171	0.218	-	-	-	-
Total Phosphorus	mg/L	0.001	-	-	-	-	-	-	5	0	0	0.00302	0.0015	0.0026	0.0019	0.0056	-	-	-	-
Organic/Inorganic Carbon																				
Dissolved Organic Carbon	mg/L	0.5	-	-	-	-	-	-	5	0	0	2.44	0.15	2.35	2.34	2.68	-	-	-	-
Total Organic Carbon	mg/L	0.5	-	-	-	-	-	-	5	0	0	2.41	0.141	2.49	2.18	2.51	-	-	-	-
Total Metals																				
Aluminum (T)	ug/L	1	100	-	-	-	100	75	5	0	0	2.18	0.563	2.3	1.4	2.9	0	-	-	-
Antimony (T)	ug/L	0.02	9	6	-	-	-	4.5	5	5	100	-	-	-	-	0.02	-	0	-	-
Arsenic (T)	ug/L	0.02	5	10	-	25	10	7.5	5	0	0	0.25	0.0108	0.256	0.237	0.259	0	0	-	0
Barium (T)	ug/L	0.02	-	1000	-	-	-	750	5	0	0	7.35	0.169	7.25	7.21	7.58	-	0	-	-
Beryllium (T)	ug/L	0.005	-	-	-	-	-	-	5	5	100	-	-	-	-	0.005	-	-	-	-
Bismuth (T)	ug/L	0.005	-	-	-	-	-	-	5	5	100	-	-	-	-	0.005	-	-	-	-
Boron (T)	ug/L	5	1500	5000	-	-	1500	1125	5	5	100	-	-	-	-	5	0	0	-	-
Cadmium (T)	ug/L	0.005	0.043 0.060	5	-	-	0.043	0.032	5	5	100	-	-	-	-	0.02	0	0	-	-
Chromium (T)	ug/L	0.1	5	50	-	-	5	3.75	5	5	100	-	-	-	-	0.1	0	0	-	-
Cobalt (T)	ug/L	0.005	0.78	-	-	-	0.78	0.585	5	0	0	0.0101	0.00188	0.0108	0.0072	0.0119	0	-	-	-
Copper (T)	ug/L	0.05	2	2000	1000	-	2	1.5	5	0	0	0.664	0.00832	0.658	0.657	0.675	0	0	0	-
Iron (T)	ug/L	1	300	-	300	1060	300	225	5	0	0	8.06	0.351	8	7.6	8.5	0	-	0	0
Lead (T)	ug/L	0.01	-	5	-	-	3.31	2.48	5	4	80	-	-	0.01	0.01	0.011	-	0	-	-
Lithium (T)	ug/L	0.5	-	-	-	-	-	-	5	0	0	0.686	0.0114	0.69	0.67	0.7	-	-	-	-
Manganese (T)	ug/L	0.05	-	120	-	-	120	90	5	0	0	2.43	0.0733	2.44	2.34	2.52	-	0	0	-
Mercury (T)	ug/L	0.5	0.026	1	-	-	0.026	0.020	5	5	100	-	-	-	-	0.0005	0	0	-	-
Molybdenum (T)	ug/L	0.05	73	-	-	-	73	54.8	5	0	0	6.21	5.94	7.76	0.1	13.5	0	-	-	-
Nickel (T)	ug/L	0.05	25	-	-	-	25	18.8	5	0	0	0.431	0.00952	0.426	0.421	0.442	0	-	-	-
Selenium (T)	ug/L	0.04	1	50	-	-	1	0.75	5	4	80	-	-	0.04	0.04	0.048	0	0	-	-
Silicon (T)	ug/L	50	-	-	-	-	-	-	5	0	0	122	7.66	119	112	131	-	-	-	-
Silver (T)	ug/L	0.005	0.25	-	-	-	0.25	0.188	5	5	100	-	-	-	-	0.005	0	-	-	-
Strontium (T)	ug/L	0.02	2500	7000	-	-	2500	1875	5	0	0	36.5	0.602	36.3	36	37.5	0	0	-	-
Sulfur (T)	ug/L	500	-	-	-	-	-	-	5	0	0	1240	126	1280	1040	1360	-	-	-	-
Thallium (T)	ug/L	0.005	0.8	-	-	-	0.8	0.6	5	5	100	-	-	-	-	0.005	0	-	-	-
Tin (T)	ug/L	0.02	-	-	-	-	-	-	5	5	100	-	-	-	-	0.02	-	-	-	-
Titanium (T)	ug/L	0.05	-	-	-	-	-	-	5	4	80	-	-	0.05	0.05	0.07	-	-	-	-
Uranium (T)	ug/L	0.001	15	20	-	-	15	11.25	5	0	0	0.0128	0.000941	0.0127	0.0116	0.0142	0	0	-	-
Vanadium (T)	ug/L	0.05	120	-	-	-	120	90	5	5	100	-	-	-	-	0.05	-	-	-	-
Zinc (T)	ug/L	0.5	-	-	5000	-	3.91	2.93	5	4	80	-	-	0.5	0.5	0.91	-	-	0	-
Zirconium (T)	ug/L	0.01	-	-	-	-	-	-	5	5	100	-	-	-	-	0.01	-	-	-	-

Parameter	Units	Lowest Detection Limit	Screening Criteria ^[a]				AEMP Benchmark	AEMP Action Level ^[c]	Reference Area 2 (MEL-04)											
			Aquatic Life ^[b]	Health Canada		SSWQO			Summary Statistics Open Water Sampling [d]								Screening Summary			
				Chronic	GCDWQ				Aesthetic Objective	N	N<MDL	% <MDL	Mean	SD	Median	Min	Max	Chronic	HH	AO
Dissolved Metals																				
Aluminum (D)	ug/L	1	-	-	-	-	-	-	5	0	0	1.3	0.141	1.2	1.2	1.5	-	-	-	-
Antimony (D)	ug/L	0.02	-	-	-	-	-	-	5	5	100	-	-	-	-	0.02	-	-	-	-
Arsenic (D)	ug/L	0.02	-	-	-	-	-	-	5	0	0	0.245	0.0144	0.248	0.225	0.264	-	-	-	-
Barium (D)	ug/L	0.02	-	-	-	-	-	-	5	0	0	7.11	0.179	7.14	6.86	7.28	-	-	-	-
Beryllium (D)	ug/L	0.005	-	-	-	-	-	-	5	5	100	-	-	-	-	0.005	-	-	-	-
Bismuth (D)	ug/L	0.005	-	-	-	-	-	-	5	5	100	-	-	-	-	0.005	-	-	-	-
Boron (D)	ug/L	5	-	-	-	-	-	-	5	5	100	-	-	-	-	5	-	-	-	-
Cadmium (D)	ug/L	0.005	-	-	-	-	-	-	5	5	100	-	-	-	-	0.005	-	-	-	-
Chromium (D)	ug/L	0.1	-	-	-	-	-	-	5	5	100	-	-	-	-	0.1	-	-	-	-
Cobalt (D)	ug/L	0.005	-	-	-	-	-	-	5	3	60	-	-	0.005	0.005	0.0062	-	-	-	-
Copper (D)	ug/L	0.05	-	-	-	-	-	-	5	0	0	0.647	0.0143	0.647	0.627	0.667	-	-	-	-
Iron (D)	ug/L	1	-	-	-	-	-	-	5	0	0	2.94	0.167	2.9	2.8	3.2	-	-	-	-
Lead (D)	ug/L	0.01	3.31 6.32	-	-	-	3.31	2.48	5	5	100	-	-	-	-	0.01	0	-	-	-
Lithium (D)	ug/L	0.5	-	-	-	-	-	-	5	0	0	0.646	0.0152	0.65	0.63	0.66	-	-	-	-
Manganese (D)	ug/L	0.05	210 330	-	-	-	210	158	5	0	0	0.266	0.0334	0.26	0.226	0.308	0	-	-	-
Mercury (D)	ug/L	0.5	-	-	-	-	-	-	5	5	100	-	-	-	-	0.0005	-	-	-	-
Molybdenum (D)	ug/L	0.05	-	-	-	-	-	-	5	0	0	0.911	1.28	0.083	0.073	2.97	-	-	-	-
Nickel (D)	ug/L	0.05	-	-	-	-	-	-	5	0	0	0.417	0.0223	0.413	0.398	0.455	-	-	-	-
Selenium (D)	ug/L	0.04	-	-	-	-	-	-	5	3	60	-	-	0.04	0.04	0.068	-	-	-	-
Silicon (D)	ug/L	50	-	-	-	-	-	-	5	0	0	114	5.07	115	108	119	-	-	-	-
Silver (D)	ug/L	0.005	-	-	-	-	-	-	5	5	100	-	-	-	-	0.005	-	-	-	-
Strontium (D)	ug/L	0.02	2500	-	-	-	2500	1875	5	0	0	35	0.719	34.9	34.4	36.2	0	-	-	-
Sulfur (D)	ug/L	500	-	-	-	-	-	-	5	0	0	1230	93.1	1230	1100	1350	-	-	-	-
Thallium (D)	ug/L	0.005	-	-	-	-	-	-	5	5	100	-	-	-	-	0.005	-	-	-	-
Tin (D)	ug/L	0.02	-	-	-	-	-	-	5	5	100	-	-	-	-	0.02	-	-	-	-
Titanium (D)	ug/L	0.05	-	-	-	-	-	-	5	5	100	-	-	-	-	0.05	-	-	-	-
Uranium (D)	ug/L	0.001	-	-	-	-	-	-	5	0	0	0.0125	0.000385	0.0126	0.0121	0.013	-	-	-	-
Vanadium (D)	ug/L	0.05	-	-	-	-	-	-	5	5	100	-	-	-	-	0.05	-	-	-	-
Zinc (D)	ug/L	0.5	3.91 10.6	-	5000	-	3.91	2.93	5	5	100	-	-	-	-	0.5	0	-	0	-
Zirconium (D)	ug/L	0.01	-	-	-	-	-	-	5	5	100	-	-	-	-	0.01	-	-	-	-
Other																				
Cyanide (free)	mg/L	0.001	-	-	-	-	-	-	5	5	100	-	-	-	-	0.001	-	-	-	-
Cyanide (Total)	mg/L	0.001	0.005	0.2	-	-	0.005	0.004	5	5	100	-	-	-	-	0.001	0	0	-	-
Cyanide (WAD)	mg/L	0.001	-	-	-	-	-	-	5	5	100	-	-	-	-	0.001	-	-	-	-
Radium-226	Bq/l	0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes

[a] Refer to the main document for references to the various screening criteria.

[b] The range of chronic guidelines are shown for parameters with site-specific water quality guidelines (e.g., cadmium, dissolved zinc, and dissolved manganese).

[c] AEMP Action Level = 75% of the AEMP Benchmark (lowest of the water quality guidelines for aquatic life and human health).

[d] Mean and SD were not calculated if >50% of the values were <MDL. 1/2 the MDL was used to calculate the mean and SD if >50% of the measurements were > MDL.

** There were not water quality exceedances of aquatic life, drinking water, or site-specific water quality objectives in the 2020 open water sampling events.

Table 5-10. MEL-05 Water Quality Summary Statistics – 2020 Open Water Sampling Events (August)

Parameter	Units	Lowest Detection Limit	Screening Criteria ^[a]				AEMP Benchmark	AEMP Action Level ^[c]	Reference Area 3 (MEL-05)											
			Aquatic Life ^[b]	Health Canada		SSWQO			Summary Statistics - Open Water Sampling ^[d]								Screening Summary			
				Chronic	GCDWQ				Aesthetic Objective	N	N<MDL	% <MDL	Mean	SD	Median	Min	Max	Chronic	HH	AO
Field Measurements																				
Temperature	C	-	-	-	15	-	-	-	8	0	0	10.2	3.68	11.8	1.7	12.3	-	-	0	-
Sp. Conductivity (field)	uS/cm	-	-	-	-	-	-	-	8	0	0	83.7	6.9	80.2	78.3	98.2	-	-	-	-
pH (field)	pH units	-	6.5 9.0	-	7.0 10.5	-	6.5 9.0	6.5 9.0	8	0	0	7.75	0.2	7.7	7.44	8.07	0	-	0	-
DO (mg/L)	mg/L	-	6.5	-	-	-	6.5	-	8	0	0	11.6	2.66	10.1	9.99	17.5	0	-	-	-
DO (%)	%	-	-	-	-	-	-	-	8	0	0	101	11.9	93.2	92.2	123	-	-	-	-
Conventional Parameters																				
Conductivity (lab)	uS/cm	1	-	-	-	-	-	-	5	0	0	77.6	0.342	77.5	77.1	78	-	-	-	-
Hardness	mg/L	0.2	-	-	-	-	-	-	5	0	0	24.3	0.148	24.3	24.1	24.5	-	-	-	-
pH (lab)	pH units	0.1	6.5 9.0	-	7.0 10.5	-	6.5 9.0	6.5 9.0	5	0	0	7.44	0	7.44	7.44	7.44	0	-	0	-
Total Dissolved Solids	mg/L	13	-	-	500	-	500	375	5	0	0	46	7.65	44	40	59	-	-	0	-
Total Dissolved Solids (Calc)	mg/L	1	-	-	500	-	500	375	5	0	0	41	0.192	41	40.8	41.3	-	-	0	-
Total Suspended Solids	mg/L	1	-	-	-	-	-	-	5	5	100	-	-	-	-	1	-	-	-	-
Turbidity (lab)	NTU	0.1	-	-	-	-	-	-	5	0	0	0.362	0.303	0.25	0.17	0.9	-	-	-	-
Major Ions																				
Alkalinity, Bicarbonate	mg/L	1.2	-	-	-	-	-	-	5	0	0	25.9	0.187	25.9	25.6	26.1	-	-	-	-
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	21.2	0.148	21.2	21	21.4	-	-	-	-
Bromide	mg/L	0.1	-	-	-	-	-	-	5	5	100	-	-	-	-	0.1	-	-	-	-
Calcium (D)	mg/L	0.01	-	-	-	-	-	-	5	0	0	7.74	0.0476	7.75	7.66	7.78	-	-	-	-
Calcium (T)	mg/L	0.01	-	-	-	-	-	-	5	0	0	7.67	0.14	7.72	7.53	7.85	-	-	-	-
Chloride	mg/L	0.1	120	-	250	-	120	90	5	0	0	9.42	0.0179	9.42	9.4	9.44	0	-	0	-
Fluoride	mg/L	0.02	0.12	1.5	-	2.8	2.8	2.1	5	0	0	0.0262	0.000447	0.026	0.026	0.027	0	0	-	0
Magnesium (D)	mg/L	0.004	-	-	-	-	-	-	5	0	0	1.21	0.0148	1.21	1.19	1.23	-	-	-	-
Magnesium (T)	mg/L	0.004	-	-	-	-	-	-	5	0	0	1.18	0.0152	1.19	1.16	1.2	-	-	-	-
Potassium (D)	mg/L	0.02	-	-	-	-	-	-	5	0	0	0.948	0.0107	0.949	0.937	0.962	-	-	-	-
Potassium (T)	mg/L	0.02	-	-	-	-	-	-	5	0	0	1.02	0.0114	1.02	1	1.03	-	-	-	-
Reactive Silica (SiO2)	mg/L	0.01	-	-	-	-	-	-	5	0	0	0.281	0.00517	0.28	0.276	0.289	-	-	-	-
Sodium (D)	mg/L	0.02	-	-	-	-	-	-	5	0	0	5.06	0.215	5.08	4.73	5.27	-	-	-	-
Sodium (T)	mg/L	0.02	-	-	200	-	-	-	5	0	0	4.67	0.1	4.7	4.54	4.76	-	-	-	-
Sulphate	mg/L	0.3	-	-	500	-	-	-	5	0	0	3.84	0.0167	3.84	3.82	3.86	-	-	0	-
Nutrients																				
Ammonia (as N)	mg/L	0.005	0.141	-	-	-	0.58	0.44	5	1	20	0.00812	0.00447	0.0086	0.005	0.0147	0	-	-	-
Nitrate (as N)	mg/L	0.005	2.9	10	-	-	2.9	2.18	5	3	60	-	-	0.005	0.005	0.0134	0	0	-	-
Nitrate + Nitrite (as N)	mg/L	0.0051	-	-	-	-	-	-	5	3	60	-	-	0.0051	0.0051	0.0134	-	-	-	-
Nitrite (as N)	mg/L	0.001	0.06	1	-	-	0.06	0.045	5	5	100	-	-	-	-	0.001	0	0	-	-
Orthophosphate (PO4-P)	mg/L	0.001	-	-	-	-	-	-	5	5	100	-	-	-	-	0.001	-	-	-	-

Parameter	Units	Lowest Detection Limit	Screening Criteria ^[a]				AEMP Benchmark	AEMP Action Level ^[c]	Reference Area 3 (MEL-05)											
			Aquatic Life ^[b]	Health Canada		SSWQO			Summary Statistics - Open Water Sampling ^[d]							Screening Summary				
				Chronic	GCDWQ				Aesthetic Objective	N	N<MDL	% <MDL	Mean	SD	Median	Min	Max	Chronic	HH	AO
Total Diss Phosphorus	mg/L	0.001	-	-	-	-	-	-	5	0	0	0.0014	0.000122	0.0014	0.0012	0.0015	-	-	-	-
Total Dissolved Nitrogen	mg/L	0.05	-	-	-	-	-	-	5	0	0	0.194	0.0224	0.191	0.177	0.232	-	-	-	-
Total Kjeldahl Nitrogen	mg/L	0.05	-	-	-	-	-	-	5	0	0	0.221	0.0315	0.228	0.17	0.248	-	-	-	-
Total Kjeldahl Nitrogen (diss)	mg/L	0.05	-	-	-	-	-	-	5	0	0	0.19	0.0254	0.185	0.165	0.232	-	-	-	-
Total Phosphorus	mg/L	0.001	-	-	-	-	-	-	5	0	0	0.00252	0.000259	0.0025	0.0022	0.0029	-	-	-	-
Organic/Inorganic Carbon																				
Dissolved Organic Carbon	mg/L	0.5	-	-	-	-	-	-	5	0	0	2.59	0.135	2.55	2.46	2.77	-	-	-	-
Total Organic Carbon	mg/L	0.5	-	-	-	-	-	-	5	0	0	2.63	0.201	2.63	2.42	2.95	-	-	-	-
Total Metals																				
Aluminum (T)	ug/L	1	100	-	-	-	100	75	5	0	0	2.28	0.217	2.2	2.1	2.6	0	-	-	-
Antimony (T)	ug/L	0.02	9	6	-	-	-	4.5	5	5	100	-	-	-	-	0.02	-	0	-	-
Arsenic (T)	ug/L	0.02	5	10	-	25	10	7.5	5	0	0	0.319	0.0137	0.316	0.303	0.336	0	0	-	0
Barium (T)	ug/L	0.02	-	1000	-	-	-	750	5	0	0	8.33	0.117	8.29	8.23	8.53	-	0	-	-
Beryllium (T)	ug/L	0.005	-	-	-	-	-	-	5	5	100	-	-	-	-	0.005	-	-	-	-
Bismuth (T)	ug/L	0.005	-	-	-	-	-	-	5	5	100	-	-	-	-	0.005	-	-	-	-
Boron (T)	ug/L	5	1500	5000	-	-	1500	1125	5	4	80	-	-	5	5	5.1	0	0	-	-
Cadmium (T)	ug/L	0.005	0.043 0.060	5	-	-	0.043	0.032	5	5	100	-	-	-	-	0.005	0	0	-	-
Chromium (T)	ug/L	0.1	5	50	-	-	5	3.75	5	5	100	-	-	-	-	0.1	0	0	-	-
Cobalt (T)	ug/L	0.005	0.78	-	-	-	0.78	0.585	5	0	0	0.0109	0.00115	0.0108	0.0098	0.0124	0	-	-	-
Copper (T)	ug/L	0.05	2	2000	1000	-	2	1.5	5	0	0	0.684	0.0173	0.683	0.665	0.712	0	0	0	-
Iron (T)	ug/L	1	300	-	300	1060	300	225	5	0	0	9.9	0.367	9.7	9.6	10.5	0	-	0	0
Lead (T)	ug/L	0.01	-	5	-	-	3.31	2.48	5	5	100	-	-	-	-	0.01	-	0	-	-
Lithium (T)	ug/L	0.5	-	-	-	-	-	-	5	0	0	0.738	0.0148	0.74	0.72	0.76	-	-	-	-
Manganese (T)	ug/L	0.05	-	120	-	-	120	90	5	0	0	2.79	0.0472	2.77	2.76	2.87	-	0	0	-
Mercury (T)	ug/L	0.5	0.026	1	-	-	0.026	0.020	5	5	100	-	-	-	-	0.0005	0	0	-	-
Molybdenum (T)	ug/L	0.05	73	-	-	-	73	54.8	5	0	0	0.149	0.0669	0.128	0.099	0.266	0	-	-	-
Nickel (T)	ug/L	0.05	25	-	-	-	25	18.8	5	0	0	0.355	0.0135	0.355	0.342	0.372	0	-	-	-
Selenium (T)	ug/L	0.04	1	50	-	-	1	0.75	5	0	0	0.0516	0.00709	0.049	0.046	0.064	0	0	-	-
Silicon (T)	ug/L	50	-	-	-	-	-	-	5	0	0	147	9.58	148	134	161	-	-	-	-
Silver (T)	ug/L	0.005	0.25	-	-	-	0.25	0.188	5	5	100	-	-	-	-	0.005	0	-	-	-
Strontium (T)	ug/L	0.02	2500	7000	-	-	2500	1875	5	0	0	36.5	0.404	36.6	35.9	37	0	0	-	-
Sulfur (T)	ug/L	500	-	-	-	-	-	-	5	0	0	1350	86.4	1330	1240	1450	-	-	-	-
Thallium (T)	ug/L	0.005	0.8	-	-	-	0.8	0.6	5	5	100	-	-	-	-	0.005	0	-	-	-
Tin (T)	ug/L	0.02	-	-	-	-	-	-	5	5	100	-	-	-	-	0.02	-	-	-	-
Titanium (T)	ug/L	0.05	-	-	-	-	-	-	5	5	100	-	-	-	-	0.05	-	-	-	-
Uranium (T)	ug/L	0.001	15	20	-	-	15	11.25	5	0	0	0.0133	0.00135	0.0132	0.0115	0.0148	0	0	-	-
Vanadium (T)	ug/L	0.05	120	-	-	-	120	90	5	5	100	-	-	-	-	0.05	-	-	-	-
Zinc (T)	ug/L	0.5	-	-	5000	-	3.91	2.93	5	4	80	-	-	0.5	0.5	0.9	-	-	0	-
Zirconium (T)	ug/L	0.01	-	-	-	-	-	-	5	5	100	-	-	-	-	0.01	-	-	-	-

Parameter	Units	Lowest Detection Limit	Screening Criteria ^[a]				AEMP Benchmark	AEMP Action Level ^[c]	Reference Area 3 (MEL-05)											
			Aquatic Life ^[b]	Health Canada		SSWQO			Summary Statistics - Open Water Sampling ^[d]								Screening Summary			
				Chronic	GCDWQ				Aesthetic Objective	N	N<MDL	% <MDL	Mean	SD	Median	Min	Max	Chronic	HH	AO
Dissolved Metals																				
Aluminum (D)	ug/L	1	-	-	-	-	-	-	5	0	0	1.36	0.114	1.4	1.2	1.5	-	-	-	-
Antimony (D)	ug/L	0.02	-	-	-	-	-	-	5	5	100	-	-	-	-	0.02	-	-	-	-
Arsenic (D)	ug/L	0.02	-	-	-	-	-	-	5	0	0	0.289	0.0201	0.281	0.268	0.313	-	-	-	-
Barium (D)	ug/L	0.02	-	-	-	-	-	-	5	0	0	7.62	0.251	7.74	7.19	7.78	-	-	-	-
Beryllium (D)	ug/L	0.005	-	-	-	-	-	-	5	5	100	-	-	-	-	0.005	-	-	-	-
Bismuth (D)	ug/L	0.005	-	-	-	-	-	-	5	5	100	-	-	-	-	0.005	-	-	-	-
Boron (D)	ug/L	5	-	-	-	-	-	-	5	5	100	-	-	-	-	5	-	-	-	-
Cadmium (D)	ug/L	0.005	-	-	-	-	-	-	5	5	100	-	-	-	-	0.005	-	-	-	-
Chromium (D)	ug/L	0.1	-	-	-	-	-	-	5	5	100	-	-	-	-	0.1	-	-	-	-
Cobalt (D)	ug/L	0.005	-	-	-	-	-	-	5	3	60	-	-	0.005	0.005	0.006	-	-	-	-
Copper (D)	ug/L	0.05	-	-	-	-	-	-	5	0	0	0.681	0.0279	0.684	0.634	0.706	-	-	-	-
Iron (D)	ug/L	1	-	-	-	-	-	-	5	0	0	4.38	0.363	4.3	3.9	4.9	-	-	-	-
Lead (D)	ug/L	0.01	3.31 6.32	-	-	-	3.31	2.48	5	5	100	-	-	-	-	0.01	0	-	-	-
Lithium (D)	ug/L	0.5	-	-	-	-	-	-	5	0	0	0.726	0.0152	0.73	0.7	0.74	-	-	-	-
Manganese (D)	ug/L	0.05	210 330	-	-	-	210	158	5	0	0	0.377	0.0528	0.413	0.316	0.421	0	-	-	-
Mercury (D)	ug/L	0.5	-	-	-	-	-	-	5	5	100	-	-	-	-	0.0005	-	-	-	-
Molybdenum (D)	ug/L	0.05	-	-	-	-	-	-	5	0	0	0.089	0.0308	0.07	0.062	0.125	-	-	-	-
Nickel (D)	ug/L	0.05	-	-	-	-	-	-	5	0	0	0.406	0.0124	0.405	0.388	0.418	-	-	-	-
Selenium (D)	ug/L	0.04	-	-	-	-	-	-	5	4	80	-	-	0.04	0.04	0.042	-	-	-	-
Silicon (D)	ug/L	50	-	-	-	-	-	-	5	0	0	135	4.55	134	130	142	-	-	-	-
Silver (D)	ug/L	0.005	-	-	-	-	-	-	5	5	100	-	-	-	-	0.005	-	-	-	-
Strontium (D)	ug/L	0.02	2500	-	-	-	2500	1875	5	0	0	34.5	0.594	34.6	33.7	35.1	0	-	-	-
Sulfur (D)	ug/L	500	-	-	-	-	-	-	5	0	0	1380	70.5	1400	1260	1430	-	-	-	-
Thallium (D)	ug/L	0.005	-	-	-	-	-	-	5	5	100	-	-	-	-	0.005	-	-	-	-
Tin (D)	ug/L	0.02	-	-	-	-	-	-	5	5	100	-	-	-	-	0.02	-	-	-	-
Titanium (D)	ug/L	0.05	-	-	-	-	-	-	5	5	100	-	-	-	-	0.05	-	-	-	-
Uranium (D)	ug/L	0.001	-	-	-	-	-	-	5	0	0	0.0143	0.00141	0.0137	0.013	0.0158	-	-	-	-
Vanadium (D)	ug/L	0.05	-	-	-	-	-	-	5	5	100	-	-	-	-	0.05	-	-	-	-
Zinc (D)	ug/L	0.5	3.91 10.6	-	5000	-	3.91	2.93	5	4	80	-	-	0.5	0.5	1.12	0	-	0	-
Zirconium (D)	ug/L	0.01	-	-	-	-	-	-	5	5	100	-	-	-	-	0.01	-	-	-	-
Other																				
Cyanide (free)	mg/L	0.001	-	-	-	-	-	-	5	5	100	-	-	-	-	0.001	-	-	-	-
Cyanide (Total)	mg/L	0.001	0.005	0.2	-	-	0.005	0.004	5	5	100	-	-	-	-	0.001	0	0	-	-
Cyanide (WAD)	mg/L	0.001	-	-	-	-	-	-	5	5	100	-	-	-	-	0.001	-	-	-	-
Radium-226	Bq/l	0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes

[a] Refer to the main document for references to the various screening criteria.

[b] The range of chronic guidelines are shown for parameters with site-specific water quality guidelines (e.g., cadmium, dissolved zinc, and dissolved manganese).

[c] AEMP Action Level = 75% of the AEMP Benchmark (lowest of the water quality guidelines for aquatic life and human health).

[d] Mean and SD were not calculated if >50% of the values were <MDL. 1/2 the MDL was used to calculate the mean and SD if >50% of the measurements were > MDL.

** There were not water quality exceedances of aquatic life, drinking water, or site-specific water quality objectives in the 2020 open water sampling events.

Table 5-11. Water Quality Summary Statistics for the Pooled Reference Areas (MEL-03, MEL-04 and MEL-05) – 2020 Open Water Sampling Events (July, August, September)

Parameter	Units	Lowest Detection Limit	Screening Criteria ^[a]				AEMP Benchmark	AEMP Action Level ^[c]	Pooled Reference Areas											
			Aquatic Life ^[b]	Health Canada		SSWQO			Summary Statistics - Open Water Sampling ^[d]							Screening Summary				
				Chronic	GCDWQ				Aesthetic Objective	N	N<MDL	% <MDL	Mean	SD	Median	Min	Max	Chronic	HH	AO
Field Measurements																				
Temperature	C	-	-	-	15	-	-	-	36	0	0	10.8	3.29	11.8	1.36	13.9	-	-	0	-
Sp. Conductivity (field)	uS/cm	-	-	-	-	-	-	-	35	0	0	78.8	8.93	75.3	71.1	116	-	-	-	-
pH (field)	pH units	-	6.5 9.0	-	7.0 10.5	-	6.5 9.0	6.5 9.0	36	0	0	7.6	0.21	7.61	6.7	8.07	0	-	1	-
DO (mg/L)	mg/L	-	6.5	-	-	-	6.5	-	36	0	0	11.2	2.05	10.9	7.64	17.9	0	-	-	-
DO (%)	%	-	-	-	-	-	-	-	36	0	0	100	8.88	97	92.2	131	-	-	-	-
Conventional Parameters																				
Conductivity (lab)	uS/cm	1	-	-	-	-	-	-	25	0	0	74.2	2.67	74	68.7	78.7	-	-	-	-
Hardness	mg/L	0.2	-	-	-	-	-	-	25	0	0	22.3	1.28	22	20.6	24.5	-	-	-	-
pH (lab)	pH units	0.1	6.5 9.0	-	7.0 10.5	-	6.5 9.0	6.5 9.0	25	0	0	7.47	0.0816	7.44	7.3	7.65	0	-	0	-
Total Dissolved Solids	mg/L	13	-	-	500	-	500	375	25	0	0	45.8	6.37	45	36	59	-	-	0	-
Total Dissolved Solids (Calc)	mg/L	1	-	-	500	-	500	375	25	0	0	39.2	1.42	39.5	35.8	41.3	-	-	0	-
Total Suspended Solids	mg/L	1	-	-	-	-	-	-	25	25	100	-	-	-	-	1	-	-	-	-
Turbidity (lab)	NTU	0.1	-	-	-	-	-	-	25	0	0	0.229	0.149	0.2	0.14	0.9	-	-	-	-
Major Ions																				
Alkalinity, Bicarbonate	mg/L	1.2	-	-	-	-	-	-	25	0	0	24.6	1.43	24.8	19.9	26.1	-	-	-	-
Alkalinity, Carbonate	mg/L	0.6	-	-	-	-	-	-	25	25	100	-	-	-	-	0.6	-	-	-	-
Alkalinity, Hydroxide	mg/L	0.34	-	-	-	-	-	-	25	25	100	-	-	-	-	0.34	-	-	-	-
Alkalinity, Total	mg/L	1	-	-	-	-	-	-	25	0	0	20.1	1.16	20.3	16.3	21.4	-	-	-	-
Bromide	mg/L	0.1	-	-	-	-	-	-	25	25	100	-	-	-	-	0.1	-	-	-	-
Calcium (D)	mg/L	0.01	-	-	-	-	-	-	25	0	0	7	0.461	6.9	6.34	7.78	-	-	-	-
Calcium (T)	mg/L	0.01	-	-	-	-	-	-	25	0	0	6.99	0.373	6.87	6.46	7.85	-	-	-	-
Chloride	mg/L	0.1	120	-	250	-	120	90	25	0	0	9.43	0.282	9.55	8.75	9.74	0	-	0	-
Fluoride	mg/L	0.02	0.12	1.5	-	2.8	2.8	2.1	25	0	0	0.0272	0.00191	0.027	0.025	0.032	0	0	-	0
Magnesium (D)	mg/L	0.004	-	-	-	-	-	-	25	0	0	1.17	0.0356	1.16	1.12	1.23	-	-	-	-
Magnesium (T)	mg/L	0.004	-	-	-	-	-	-	25	0	0	1.16	0.0245	1.15	1.13	1.2	-	-	-	-
Potassium (D)	mg/L	0.02	-	-	-	-	-	-	25	0	0	0.927	0.023	0.927	0.885	0.971	-	-	-	-
Potassium (T)	mg/L	0.02	-	-	-	-	-	-	25	0	0	0.953	0.0388	0.95	0.895	1.03	-	-	-	-
Reactive Silica (SiO2)	mg/L	0.01	-	-	-	-	-	-	25	0	0	0.243	0.0249	0.243	0.202	0.289	-	-	-	-
Sodium (D)	mg/L	0.02	-	-	-	-	-	-	25	0	0	4.77	0.214	4.77	4.47	5.27	-	-	-	-
Sodium (T)	mg/L	0.02	-	-	200	-	-	-	25	0	0	4.73	0.147	4.76	4.39	4.94	-	-	0	-
Sulphate	mg/L	0.3	-	-	500	-	-	-	25	0	0	3.8	0.175	3.86	3.36	3.95	-	-	0	-
Nutrients																				
Ammonia (as N)	mg/L	0.005	0.141	-	-	-	0.58	0.44	25	4	16	0.0195	0.0218	0.0099	0.005	0.0793	0	-	-	-
Nitrate (as N)	mg/L	0.005	2.9	10	-	-	2.9	2.18	25	19	76	-	-	0.005	0.005	0.0271	0	0	-	-
Nitrate + Nitrite (as N)	mg/L	0.0051	-	-	-	-	-	-	25	19	76	-	-	0.0051	0.0051	0.0271	-	-	-	-
Nitrite (as N)	mg/L	0.001	0.06	1	-	-	0.06	0.045	25	25	100	-	-	-	-	0.001	0	0	-	-
Orthophosphate (PO4-P)	mg/L	0.001	-	-	-	-	-	-	25	25	100	-	-	-	-	0.001	-	-	-	-

Parameter	Units	Lowest Detection Limit	Screening Criteria ^[a]				AEMP Benchmark	AEMP Action Level ^[c]	Pooled Reference Areas											
			Aquatic Life ^[b]	Health Canada		SSWQO			Summary Statistics - Open Water Sampling ^[d]								Screening Summary			
				Chronic	GCDWQ				Aesthetic Objective	N	N<MDL	% <MDL	Mean	SD	Median	Min	Max	Chronic	HH	AO
Total Diss Phosphorus	mg/L	0.001	-	-	-	-	-	-	25	5	20	0.00172	0.00191	0.0014	0.001	0.0104	-	-	-	-
Total Dissolved Nitrogen	mg/L	0.05	-	-	-	-	-	-	25	0	0	0.193	0.0238	0.19	0.153	0.235	-	-	-	-
Total Kjeldahl Nitrogen	mg/L	0.05	-	-	-	-	-	-	25	0	0	0.218	0.0391	0.223	0.152	0.314	-	-	-	-
Total Kjeldahl Nitrogen (diss)	mg/L	0.05	-	-	-	-	-	-	25	0	0	0.19	0.0239	0.19	0.148	0.232	-	-	-	-
Total Phosphorus	mg/L	0.001	-	-	-	-	-	-	25	1	4	0.00305	0.00128	0.0029	0.001	0.0071	-	-	-	-
Organic/Inorganic Carbon																				
Dissolved Organic Carbon	mg/L	0.5	-	-	-	-	-	-	25	0	0	2.33	0.516	2.51	1.3	2.91	-	-	-	-
Total Organic Carbon	mg/L	0.5	-	-	-	-	-	-	25	0	0	2.3	0.44	2.47	1.4	2.95	-	-	-	-
Total Metals																				
Aluminum (T)	ug/L	1	100	-	-	-	100	75	25	0	0	2.85	1.13	2.6	1.4	7.4	0	-	-	-
Antimony (T)	ug/L	0.02	9	6	-	-	-	4.5	25	24	96	-	-	0.02	0.02	0.021	-	0	-	-
Arsenic (T)	ug/L	0.02	5	10	-	25	10	7.5	25	0	0	0.277	0.0288	0.274	0.234	0.336	0	0	-	0
Barium (T)	ug/L	0.02	-	1000	-	-	-	750	25	0	0	7.8	0.397	7.87	7.21	8.53	-	0	-	-
Beryllium (T)	ug/L	0.005	-	-	-	-	-	-	25	25	100	-	-	-	-	0.005	-	-	-	-
Bismuth (T)	ug/L	0.005	-	-	-	-	-	-	25	25	100	-	-	-	-	0.005	-	-	-	-
Boron (T)	ug/L	5	1500	5000	-	-	1500	1125	25	24	96	-	-	5	5	5.1	0	0	-	-
Cadmium (T)	ug/L	0.005	0.043 0.060	5	-	-	0.043	0.032	25	25	100	-	-	-	-	0.02	0	0	-	-
Chromium (T)	ug/L	0.1	5	50	-	-	5	3.75	25	25	100	-	-	-	-	0.1	0	0	-	-
Cobalt (T)	ug/L	0.005	0.78	-	-	-	0.78	0.585	25	0	0	0.0117	0.00246	0.0114	0.0072	0.0197	0	-	-	-
Copper (T)	ug/L	0.05	2	2000	1000	-	2	1.5	25	0	0	0.675	0.0243	0.677	0.631	0.712	0	0	0	-
Iron (T)	ug/L	1	300	-	300	1060	300	225	25	0	0	11.3	3.7	10.8	7.6	27	0	-	0	0
Lead (T)	ug/L	0.01	-	5	-	-	3.31	2.48	25	19	76	-	-	0.01	0.01	0.062	-	0	-	-
Lithium (T)	ug/L	0.5	-	-	-	-	-	-	25	0	0	0.692	0.0331	0.69	0.64	0.76	-	-	-	-
Manganese (T)	ug/L	0.05	-	120	-	-	120	90	25	0	0	2.68	0.479	2.69	2.19	4.67	-	0	0	-
Mercury (T)	ug/L	0.5	0.026	1	-	-	0.026	0.020	25	24	96	-	-	0.0005	0.0005	0.00072	0	0	-	-
Molybdenum (T)	ug/L	0.05	73	-	-	-	73	54.8	25	0	0	1.86	4.26	0.099	0.06	13.7	0	-	-	-
Nickel (T)	ug/L	0.05	25	-	-	-	25	18.8	25	0	0	0.41	0.0319	0.418	0.342	0.448	0	-	-	-
Selenium (T)	ug/L	0.04	1	50	-	-	1	0.75	25	9	36	0.0394	0.0162	0.044	0.04	0.068	0	0	-	-
Silicon (T)	ug/L	50	-	-	-	-	-	-	25	0	0	121	16.9	117	97	161	-	-	-	-
Silver (T)	ug/L	0.005	0.25	-	-	-	0.25	0.188	25	25	100	-	-	-	-	0.005	0	-	-	-
Strontium (T)	ug/L	0.02	2500	7000	-	-	2500	1875	25	0	0	35.9	0.826	36	34	37.5	0	0	-	-
Sulfur (T)	ug/L	500	-	-	-	-	-	-	25	0	0	1330	117	1330	1040	1560	-	-	-	-
Thallium (T)	ug/L	0.005	0.8	-	-	-	0.8	0.6	25	25	100	-	-	-	-	0.005	0	-	-	-
Tin (T)	ug/L	0.02	-	-	-	-	-	-	25	24	96	-	-	0.02	0.02	0.025	-	-	-	-
Titanium (T)	ug/L	0.05	-	-	-	-	-	-	25	13	52	-	-	0.05	0.05	0.501	-	-	-	-
Uranium (T)	ug/L	0.001	15	20	-	-	15	11.25	25	0	0	0.0137	0.00115	0.0136	0.0115	0.0158	0	0	-	-
Vanadium (T)	ug/L	0.05	120	-	-	-	120	90	25	24	96	-	-	0.05	0.05	0.055	-	-	-	-
Zinc (T)	ug/L	0.5	-	-	5000	-	3.91	2.93	25	13	52	-	-	0.5	0.5	1.46	-	-	0	-
Zirconium (T)	ug/L	0.01	-	-	-	-	-	-	25	25	100	-	-	-	-	0.01	-	-	-	-

Parameter	Units	Lowest Detection Limit	Screening Criteria ^[a]				AEMP Benchmark	AEMP Action Level ^[c]	Pooled Reference Areas											
			Aquatic Life ^[b]	Health Canada		SSWQO			Summary Statistics - Open Water Sampling ^[d]								Screening Summary			
				Chronic	GCDWQ				Aesthetic Objective	N	N<MDL	% <MDL	Mean	SD	Median	Min	Max	Chronic	HH	AO
Dissolved Metals																				
Aluminum (D)	ug/L	1	-	-	-	-	-	-	25	0	0	1.66	0.615	1.4	1.1	3.3	-	-	-	-
Antimony (D)	ug/L	0.02	-	-	-	-	-	-	25	25	100	-	-	-	-	0.02	-	-	-	-
Arsenic (D)	ug/L	0.02	-	-	-	-	-	-	25	0	0	0.268	0.0222	0.266	0.225	0.313	-	-	-	-
Barium (D)	ug/L	0.02	-	-	-	-	-	-	25	0	0	7.59	0.513	7.59	6.86	8.59	-	-	-	-
Beryllium (D)	ug/L	0.005	-	-	-	-	-	-	25	25	100	-	-	-	-	0.005	-	-	-	-
Bismuth (D)	ug/L	0.005	-	-	-	-	-	-	25	25	100	-	-	-	-	0.005	-	-	-	-
Boron (D)	ug/L	5	-	-	-	-	-	-	25	23	92	-	-	5	5	5	-	-	-	-
Cadmium (D)	ug/L	0.005	-	-	-	-	-	-	25	24	96	-	-	0.005	0.005	0.0054	-	-	-	-
Chromium (D)	ug/L	0.1	-	-	-	-	-	-	25	25	100	-	-	-	-	0.1	-	-	-	-
Cobalt (D)	ug/L	0.005	-	-	-	-	-	-	25	12	48	0.00423	0.00175	0.0051	0.005	0.0072	-	-	-	-
Copper (D)	ug/L	0.05	-	-	-	-	-	-	25	0	0	0.653	0.0328	0.654	0.596	0.706	-	-	-	-
Iron (D)	ug/L	1	-	-	-	-	-	-	25	0	0	4.29	1.08	4.2	2.8	7.7	-	-	-	-
Lead (D)	ug/L	0.01	3.31 6.32	-	-	-	3.31	2.48	25	23	92	-	-	0.01	0.01	0.262	0	-	-	-
Lithium (D)	ug/L	0.5	-	-	-	-	-	-	25	0	0	0.681	0.0476	0.66	0.62	0.75	-	-	-	-
Manganese (D)	ug/L	0.05	210 330	-	-	-	210	158	25	0	0	0.441	0.251	0.374	0.226	1.43	0	-	-	-
Mercury (D)	ug/L	0.5	-	-	-	-	-	-	25	25	100	-	-	-	-	0.0005	-	-	-	-
Molybdenum (D)	ug/L	0.05	-	-	-	-	-	-	25	0	0	0.243	0.623	0.074	0.051	2.97	-	-	-	-
Nickel (D)	ug/L	0.05	-	-	-	-	-	-	25	0	0	0.417	0.016	0.415	0.388	0.455	-	-	-	-
Selenium (D)	ug/L	0.04	-	-	-	-	-	-	25	17	68	-	-	0.04	0.04	0.068	-	-	-	-
Silicon (D)	ug/L	50	-	-	-	-	-	-	25	0	0	117	12.9	116	94	142	-	-	-	-
Silver (D)	ug/L	0.005	-	-	-	-	-	-	25	25	100	-	-	-	-	0.005	-	-	-	-
Strontium (D)	ug/L	0.02	2500	-	-	-	2500	1875	25	0	0	34.8	1.52	34.9	31.8	37.1	0	-	-	-
Sulfur (D)	ug/L	500	-	-	-	-	-	-	25	0	0	1340	120	1350	1100	1610	-	-	-	-
Thallium (D)	ug/L	0.005	-	-	-	-	-	-	25	25	100	-	-	-	-	0.005	-	-	-	-
Tin (D)	ug/L	0.02	-	-	-	-	-	-	25	25	100	-	-	-	-	0.02	-	-	-	-
Titanium (D)	ug/L	0.05	-	-	-	-	-	-	25	23	92	-	-	0.05	0.05	0.136	-	-	-	-
Uranium (D)	ug/L	0.001	-	-	-	-	-	-	25	0	0	0.0132	0.00156	0.013	0.0102	0.0167	-	-	-	-
Vanadium (D)	ug/L	0.05	-	-	-	-	-	-	25	25	100	-	-	-	-	0.05	-	-	-	-
Zinc (D)	ug/L	0.5	3.91 10.6	-	5000	-	3.91	2.93	25	19	76	-	-	0.5	0.5	†5.7	0	-	0	-
Zirconium (D)	ug/L	0.01	-	-	-	-	-	-	25	25	100	-	-	-	-	0.01	-	-	-	-
Other																				
Cyanide (free)	mg/L	0.001	-	-	-	-	-	-	25	25	100	-	-	-	-	0.001	-	-	-	-
Cyanide (Total)	mg/L	0.001	0.005	0.2	-	-	0.005	0.004	25	25	100	-	-	-	-	0.001	0	0	-	-
Cyanide (WAD)	mg/L	0.001	-	-	-	-	-	-	25	25	100	-	-	-	-	0.001	-	-	-	-
Radium-226	Bq/l	0.005	-	-	-	-	-	-	15	14	93	-	-	0.008	0.0063	0.031	-	-	-	-

Notes

[a] Refer to the main document for references to the various screening criteria.

[b] The range of chronic guidelines are shown for parameters with site-specific water quality guidelines (e.g., cadmium, dissolved zinc, and dissolved manganese).

[c] AEMP Action Level = 75% of the AEMP Benchmark (lowest of the water quality guidelines for aquatic life and human health).

[d] Mean and SD were not calculated if >50% of the values were <MDL. 1/2 the MDL was used to calculate the mean and SD if >50% of the measurements were > MDL.

** There were not water quality exceedances of aquatic life, drinking water, or site-specific water quality objectives in the 2020 open water sampling events.

Table 5-12. Normal Range Screening Summary for the Near-field and Mid-field areas in 2020

Parameter	Units	Lowest Detection Limit	Normal Range (upper 90th percentile)	Median Reference Concentration in 2020	Near-Field Area (MEL-01)					Mid-Field Area (MEL-02)				
					N	N<MDL	Median	% Increase	# > NR in 2020	N	N<MDL	Median	% Increase	# > NR in 2020
Conventional Parameters														
Conductivity (lab)	uS/cm	1	77.5	74	15	0	108	33%	15	15	0	84.1	8%	15
Hardness	mg/L	0.2	23.4	22	15	0	29.7	24%	15	15	0	24.2	3%	15
TDS (Calculated)	mg/L	1	39.6	39.5	15	0	55.2	33%	15	15	0	44.4	11%	15
Major Ions														
Alkalinity, Total	mg/L	1	20.5	20.3	15	0	20.5	0%	6	15	0	20.7	1%	8
Calcium (T)	mg/L	0.01	7.33	6.87	15	0	8.82	18%	15	15	0	7.44	1%	12
Chloride	mg/L	0.1	9.56	9.55	15	0	17.8	60%	15	15	0	11.8	21%	15
Fluoride	mg/L	0.02	0.028	0.027	15	0	0.024	-15%	0	15	0	0.026	-7%	0
Magnesium (T)	mg/L	0.004	1.18	1.15	15	0	1.73	38%	15	15	0	1.34	13%	15
Potassium (T)	mg/L	0.02	0.95	0.95	15	0	1.14	18%	15	15	0	1.01	6%	15
Reactive Silica (SiO2)	mg/L	0.01	0.27	0.24	15	0	0.327	20%	10	15	0	0.286	6%	15
Sodium (T)	mg/L	0.02	4.85	4.76	15	0	7.82	47%	15	15	0	5.7	16%	15
Sulphate	mg/L	0.3	3.87	3.86	15	0	5.64	37%	15	15	0	4.33	11%	15
Nutrients														
Ammonia (as N)	mg/L	0.005	0.017	0.010	15	0	0.0145	-18%	7	15	2	0.0124	-34%	3
Nitrate (as N)	mg/L	0.005	0.018	0.005	15	5	0.0109	-49%	5	15	9	0.005	-113%	1
Total Diss Phosphorus	mg/L	0.001	0.0031	0.0014	15	1	0.0029	-8%	4	15	0	0.0018	-54%	0
Total Kjeldahl Nitrogen	mg/L	0.05	0.25	0.22	15	0	0.246	-2%	7	15	0	0.244	-2%	7
Total Phosphorus	mg/L	0.001	0.006	0.0029	15	0	0.0077	25%	14	15	0	0.005	-18%	4
Organic/Inorganic Carbon														
Total Organic Carbon	mg/L	0.5	3.00	2.47	15	0	3.4	13%	15	15	0	2.9	-3%	4
Total Metals														
Aluminum (T)	µg/L	1	5.32	2.6	15	0	4.7	-12%	6	15	0	3.3	-47%	1
Arsenic (T)	µg/L	0.02	0.275	0.274	15	0	0.522	62%	15	15	0	0.449	48%	15
Barium (T)	µg/L	0.02	8.05	7.87	15	0	8.37	4%	15	15	0	8.35	4%	10
Boron (T)	µg/L	5	6.52	5	15	0	7.5	14%	15	15	1	5.4	-19%	1
Cobalt (T)	µg/L	0.005	0.016	0.0114	15	0	0.0315	65%	15	15	0	0.0167	4%	11
Copper (T)	µg/L	0.05	0.86	0.677	15	0	0.852	-1%	6	15	0	0.89	3%	8
Iron (T)	µg/L	1	15	10.8	15	0	24.6	48%	15	15	0	15.8	5%	9
Lead (T)	µg/L	0.01	0.0222	0.01	15	9	0.01	-76%	0	15	7	0.011	-67%	5

Parameter	Units	Lowest Detection Limit	Normal Range (upper 90th percentile)	Median Reference Concentration in 2020	Near-Field Area (MEL-01)					Mid-Field Area (MEL-02)				
					N	N<MDL	Median	% Increase	# > NR in 2020	N	N<MDL	Median	% Increase	# > NR in 2020
Lithium (T)	µg/L	0.5	0.72	0.69	15	0	1.49	70%	15	15	0	0.93	25%	15
Manganese (T)	µg/L	0.05	3.06	2.69	15	0	8.67	96%	15	15	0	4.02	27%	15
Mercury (T)	µg/L	0.5	0.0008	0.0005	15	8	0.0005	-46%	0	15	7	0.00051	-44%	1
Molybdenum (T)	µg/L	0.05	0.107	0.099	15	0	0.103	-4%	6	15	0	0.094	-13%	4
Nickel (T)	µg/L	0.05	0.441	0.418	15	0	0.776	55%	15	15	0	0.595	30%	15
Selenium (T)	µg/L	0.04	0.049	0.044	15	14	0.04	-20%	1	15	7	0.042	-15%	4
Strontium (T)	µg/L	0.02	36.1	0.02	15	0	65	57%	15	15	0	43.5	19%	15
Titanium (T)	µg/L	0.05	0.17	0.05	15	0	0.098	-54%	1	15	2	0.075	-78%	0
Uranium (T)	µg/L	0.001	0.0164	0.0136	15	0	0.0187	13%	15	15	0	0.0155	-6%	4
Zinc (T)	µg/L	0.5	1.7	0.5	15	5	0.64	-91%	1	15	5	0.77	-75%	3
Dissolved Metals														
Lead (D)	µg/L	0.00001	0.0125	0.01	15	8	0.010	-22%	7	15	10	0.010	-22%	4
Manganese (D)	µg/L	0.05	1.2	0.374	15	0	1.07	-11%	5	15	0	0.465	-88%	0
Zinc (D)	µg/L	0.5	1.9	0.5	15	4	1.53	-22%	7	15	4	0.76	-86%	0

Notes.
The normal range assessment applies to open water sampling events (July, August, and September) collected under the AEMP.
Median concentration in 2020 compared against the normal range. Values <MDL were conservatively set equal to MDL when calculating the median concentration.
The % increase in the median concentration relative to the normal range was calculated as: (Median-NR)/((Median+NR)/2*100)
Yellow highlighted cells indicate the median concentration is greater than the normal range.
Orange highlighted cells indicate parameters where the median concentration was > 10% above the normal range.

6 MELIADINE LAKE – PHYTOPLANKTON

6.1 Background

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. Several species of algae occur in freshwater subarctic lakes, and each species is uniquely adapted to exist under the extreme climate conditions. Zooplankton are tiny, free-swimming animals that live in the water column and feed on phytoplankton. Collectively, phytoplankton and zooplankton form the base of the pelagic food web, providing energy and nutrients to higher trophic level consumers such as fish.

The first phytoplankton monitoring studies in Meliadine Lake and other lakes in the region were completed in the late 1990's 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 broadly similar among the four basins, and followed the same pattern of temporal change during the open water season each year (Golder 2012). Biomass was lower in 1997 in comparison to 1998, with values in the 300 to 600 µg/L range 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 6-1. Phytoplankton Community Data from Locations Sampled in Meliadine Lake in 1997 and 1998

Site	AEMP Area	Date	Density (No. cells/L)	Biomass (µg/L)	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	1887	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

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 strictly for qualitative, high-level comparisons 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 dataset as a "recent" baseline data given the same lab was used for the analysis. 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.

Plankton monitoring for the AEMP started in 2015. Assessment of the first three years of data (2015-2017) resulted in the recommendation to exclude zooplankton as a tool for long-term monitoring under the AEMP due to high spatial and temporal variability in abundance and biomass (Golder 2018). Meanwhile, phytoplankton was carried forward for monitoring under what were termed "targeted studies" in the AEMP Design Plan (Golder 2016). Phytoplankton monitoring was classified as a targeted study rather than a core component of the AEMP because there was some uncertainty about utility of the 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. In an effort to streamline the assessment, Golder recommended one sampling 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).

Notwithstanding a limited baseline dataset to compare against, the 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 a "snap-shot" of the health of the aquatic environment in Meliadine Lake in years when fish and benthic invertebrate studies aren't completed as per the 3-year AEMP and EEM cycle.

6.2 Objectives

This section presents the results of the August 2020 phytoplankton sampling program in Meliadine Lake and explores spatial and temporal trends across the entire dataset (summer events only). The following analyses presented herein are to:

1. Assess spatial and temporal patterns in nutrients. Increased nutrient loads to Meliadine Lake could result in the stimulation of phytoplankton productivity.
2. Assess 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. Assess 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. Track spatial and temporal patterns in Trophic Status Index (TSI). TSI has been used to classify estimated productivity of lakes based on TP, chlorophyll-a, and/or Secchi depth.

Collectively, these analyses provide insights into whether development-related changes in nutrient concentrations in Meliadine Lake has resulted in corresponding changes to the phytoplankton community.

6.3 2020 Field Program

Field collections and sample analyses were conducted according to methods outlined in the *AEMP Design Document* (Golder, 2016).

Phytoplankton sampling was conducted in August 2020 in conjunction with AEMP water quality sampling. Five replicate stations were sampled at the “fixed” monitoring stations in each area with the exception of the MF area where 2 of the original stations were sampled (MEL-02-01 and MEL-02-04) rather than MEL-02-06 and MEL-02-08. New monitoring locations were established in the MF prior to the August 2018 field program in areas that were more suitable for benthic invertebrate sampling. With respect to water quality monitoring, the stations are broadly within the same area, and not materially important to characterizing water quality and the phytoplankton community at MEL-02. Sampling areas and stations are shown in **Figure 5-1**. Coordinates are listed in **Table 5-2**.

6.3.1 Data Analysis

Spatial and Temporal Trends

Time series plots organized by sampling area were used to highlight spatial and temporal patterns in nutrients, chlorophyll-a, and phytoplankton metrics.

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, and chlorophytes).

Community Structure

Multivariate ordination analyses were undertaken to investigate differences in biological community structure over space and time using non-metric multidimensional scaling (nMDS). nMDS takes multidimensional taxonomic data (e.g., biomass by station-year) and then reduces it to 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 Technical Guidance Document for EEM studies (EC 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 (EC 2012). Thus, patterns in community structure are first examined for the Meliadine Lake reference areas. Secondly, 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.

All statistical analyses were conducted using R 3.5.1 (R Core Team 2018) and the analysis was conducted as follows:

- Data were compiled for 12 metrics (i.e., biomass and taxa richness results for each major taxa [2 endpoints x 6 major taxa]).
- The statistical package 'vegan' (version 2.5-6) was used to conduct the nMDS. First, the entire 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. Clarke (1993) suggests the following guidelines for acceptable stress values: <0.05 = excellent, <0.10 = good, <0.20 = usable, >0.20 = not acceptable.
- 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 support 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)
- 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 were used (each cited in Golder 2019):

- Vollenweider (1968) - A general classification scheme based on ranges of TP, chlorophyll-a and Secchi depth (**Table 6-2**).
- CCME (2004) - A total phosphorus-specific scheme using trigger ranges (**Table 6-3**).
- Carlson (1977) - Independent index scores for TP, chlorophyll-a and Secchi depth (**Table 6-4**), calculated as follows:

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

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

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

Table 6-2. Trophic classification of lakes based on ranges of total phosphorus, chlorophyll-a and Secchi depth.

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

Note:

Reference = Vollenweider 1968

Table 6-3. Trophic classification of lakes based on total phosphorus trigger ranges.

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

Note:

Reference = CCME 2004

Table 6-4. Comparison of trophic status index and general trophic classifications in lakes.

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

Note:

Reference = Carlson 1977

Action Level Assessment – Nutrient Enrichment

Total phosphorus and chlorophyll-a are the two supporting measures/indicators used to evaluate nutrient enrichment. Other nutrients and water quality parameters can affect phytoplankton community structure, but phosphorous appears to be the limiting nutrient for Meliadine Lake (Golder 2019). The AEMP benchmarks are:

- Total phosphorus = 0.01 mg/L, corresponding to the upper limit of oligotrophic status in the CCME guidance document for managing freshwater systems (CCME 2004), and
- Chlorophyll-a = 4.5 µg/L, based on the relationship between chlorophyll-a and trophic status.

Concentrations greater than 75% of the AEMP benchmark are the early warning trigger values used in the low Action Level assessment.

6.4 Results and Discussion

6.4.1 Context for Assessing Nutrient Enrichment in Meliadine Lake

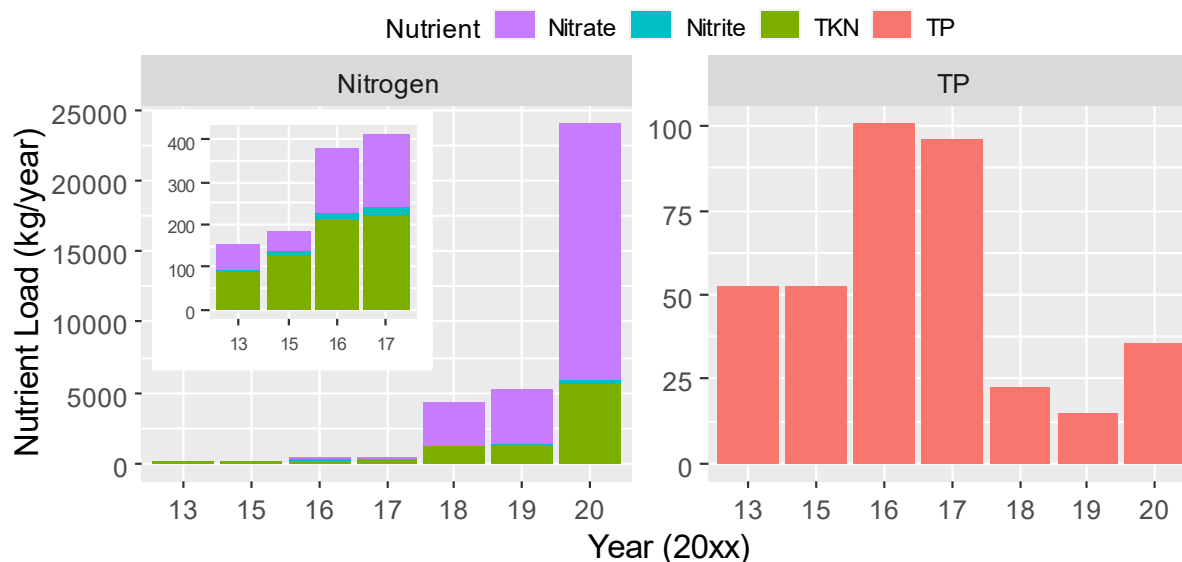
Nutrient Loading to the NF Area

As discussed earlier in **Section 4.4**, loadings are calculated each month based on the average monthly concentration measured in samples from MEL-14 and the total volume of effluent released to the lake. The monthly loadings for key nutrients (e.g., nitrate [NO₃], nitrite [NO₂], total Kjeldahl nitrogen [TKN]²⁸, and total phosphorous) are discussed here to provide context for the water quality data and phytoplankton community results. **Figure 6-1** shows the estimated nutrient loading (kg/year) to Meliadine Lake since 2013 for total phosphorus and total nitrogen, which is the sum of nitrate, nitrite, and TKN.

Inputs of nitrogen to Meliadine Lake increased in 2020 relative to 2018 and 2019 as a direct result of the draw-down of the water level in CP1. **Figure 6-1**. Nitrate was the dominant nitrogen species in the water. Residual nitrogen from explosives residue is mobilized in surface water (i.e., rain and snow melt) that comes in contact with waste rock on site. Absolute concentrations of various nitrogen species were higher in MEL-14 samples collected in June and early July 2020 during the peak discharge period, but by the middle of July, total nitrogen and total phosphorus concentrations were at or below concentrations reported in 2018 and 2019 (**Figure 6-2**).

Phosphorus loadings to Meliadine Lake increased slightly in 2020 relative to 2018/2019, but loadings are still well below the peak observed in 2016/2017. Commissioning and operation of the main camp sewage treatment plant in 2017 to treat gray water and sewage has effectively lowered the amount of phosphorus discharged to Meliadine Lake compared to the pre-construction and construction phase (2015-2017).

²⁸ Total Kjeldahl nitrogen is the sum of organic nitrogen and ammonia.

Figure 6-1. Annual loadings (kg/year) of nitrogen and total phosphorus to Meliadine Lake

Phytoplankton Responses to Changes in Nutrients

The effects of nutrients on phytoplankton production have been studied extensively (e.g., Schindler 1971, 1974, Kelly et al. 2018). While much of this research has focused on the adverse effects of nutrient enrichment (eutrophication) in low latitude, temperate lakes, some studies explored productivity dynamics in oligotrophic systems, including high-latitude lakes in northern Canada (e.g., Lim et al. 2001, Michelutti et al. 2002, Ogbebo et al. 2009).

Total phosphorous (TP) and/or total nitrogen (TN) are generally considered the most important nutrients affecting phytoplankton productivity in freshwater systems (e.g., Schindler 1971). While TN:TP ratios have long been used as a tool to categorize lakes based on the nutrient most likely limiting primary production (see Lewis & Wurtsbaugh 2008 for review), they have been shown to be inaccurate for both high-latitude (Ogbebo et al. 2009) and temperate lakes (Dolman and Wiedner 2015). One of the possible reasons for this is that there is substantial uncertainty in which nutrient forms are assimilable. Both nitrogen and phosphorus are present in molecules that range from highly bioavailable to essentially unavailable for uptake by algae. The challenge in assessing nutrient limitation is that the bioavailable forms are notoriously variable due to extremely high turnover rates. Lewis and Wurtsbaugh (2008) suggest that the stronger correlation between chlorophyll-a and TP relative to TN is simply due to TP having proportionately more bioavailable forms than TN. Broad experimental evidence from nitrogen and phosphorus enrichment studies suggests that phosphorus is far less limiting than was previously thought and that primary productivity is often co-limited by both nitrogen and phosphorus (Esler et al. 2007, Lewis and Wurtsbaugh 2008, Sterner 2008).

6.4.2 Nutrients and Chlorophyll-a Concentrations

Concentrations of key nutrients from the August AEMP and depth-integrate-nutrient (DIN) sampling events since 2015 are plotted in **Figure 6-5** (key nutrients). Nutrient data from the routine AEMP samples in **Section 5** are presented to provide a supporting information and context for some of the more variable estimates of nutrient concentrations obtained from the DIN sampling events.

Total Phosphorus

Phosphorus in the NF area (MEL-01) shows a high degree of within-station variability for a given year. Five-fold differences in total phosphorus among stations within an area are not out of the ordinary, and have been observed nearly every year since monitoring under the AEMP started in 2015. The DIN samples have shown considerably less within-station variability for total phosphorus relative to the AEMP samples, with the exception of 2019 when the DIN samples showed considerable within-station variability in most of the study areas.

Total phosphorus concentrations in the 2020 DIN samples (blue dots in **Figure 6-5**) were lower than in 2019, but relative to previous years, total phosphorus was at the upper range of concentrations measured since 2015. Concentrations in the DIN ranged from 0.007 to 0.013 mg/L, with an average of 0.011 mg/L. Looking specifically at the AEMP samples, the evidence of increasing concentrations of total phosphorus in the NF area is less conclusive. In 2020, the August total phosphorus concentrations were well within the range observed in August since 2015 (less than 0.01 µg/L). Furthermore, the 2020 samples show considerably less variability compared to previous years. Nonetheless, both the AEMP and DIN samples demonstrate that current concentrations of phosphorus are at the upper boundary of the oligotrophic status for freshwater lakes (0.01 µg/L). The comparatively large volume of water discharged to Meliadine Lake in 2020 likely contributed to higher concentrations in the NF area in 2020, particularly in comparison to 2019 when less than 1/3 of the total volume in 2020 was discharged.

At the MF area, total phosphorus concentrations in 2020 were comparable to previous years for the AEMP samples collected in August. The DIN data from the MF area were more variable compared to the AEMP samples, but looking across years, there is no indication that phosphorus concentrations are trending higher in the west basin of Meliadine Lake. This conclusion is supported by the total dissolved phosphorus data (D.TP) and orthophosphate data (PO₄-P) that have remained consistent over time, dating back to 2015 (**Figure 6-5**).

Total phosphorus concentrations at the far-field reference areas were typically at or below the ultra-oligotrophic status of 0.004 mg/L in samples collected in 2020. The available monitoring data indicate that the increase in phosphorus is confined the east basin of Meliadine Lake.

Dissolved phosphorus concentrations are considerably less variable compared to unfiltered total phosphorus. **Figure 6-5** clearly shows that dissolved phosphorus concentrations have remained stable

within and between exposure and reference areas dating back to 2016. Dissolved phosphorus, rather than total, appears to provide a more resolved (i.e., less variable) representation of spatial and temporal changes in phosphorus within Meliadine Lake.

Nitrogen

Concentrations of nitrogen (dissolved and total N, TKN) in the DIN samples were higher in 2020 relative to previous years. The temporal change was particularly evident for total nitrogen and TKN, despite both parameters showing considerable with-area variability, particularly for the unfiltered samples (**Figure 6-5**). Notwithstanding the considerable within-station variability, it's clear that total nitrogen and TKN are increasing in each area relative to the early years of monitoring in 2015 and 2016. While there is likely a site-related component to the observed increase, other factors are likely contributing to the increases observed in some areas. For example, among the highest reported concentrations of nitrate in 2020 were measured in samples from MEL-05 (**Figure 6-5**). The spatial pattern of higher concentrations at the reference area compared to MF and NF samples does not point to activities at the mine as the principal cause of the observed change. If a "lake-wide" change was occurring in response to activities at the mine, higher concentrations of nitrate would be expected at MF area MEL-02 as the first downstream monitoring area along the southeast to northwest flow path for effluent discharged to the east basin (MEL-01). The nitrate results for MEL-05, while seemingly anomalous, were not flagged as invalid during the QC screening assessment; therefore, the data were retained for comparing spatial and temporal trends.

Reactive Silica

In 2020, SiO₂ concentrations at the NF area decreased substantially from 0.4 mg/L to just over 0.3 mg/L (**Figure 6-5**). The concentrations measured at the NF area in 2020 are now within the range observed at the MF area between 2017 and 2020. The reduction in 2020 continues the recent trend of lower SiO₂ concentrations since 2017 when concentrations spiked at 0.55 mg/L in response to dewatering of Lake H17 to create CP1 (**Figure 6-5**). While there are slight differences in SiO₂ among exposure and reference areas that are consistent with a development-related source, the pattern of the change at the NF area indicates SiO₂ is trending towards a return to baseline/reference conditions.

Organic Carbon

Long-term monitoring as part of the AEMP shows concentrations have remained fairly consistent dating back to 2013 (NF) and 2015 (MF) (**Figure C2-24** [DOC] and **Figure C2-25** [TOC]). There was a noticeable increase during the pre-construction/construction phase from 2017 through early 2018, but since then DOC and TOC have returned to 2013 baseline levels.

Nutrient Summary

The spatial and temporal pattern of the increase in nitrogen shows some evidence of a mining-related change, although considering baseline data dating back to 1997, it's clear that nitrogen concentrations have, historically, been at levels similar to current concentrations (see TKN; [Figure C2-21](#)). Spatial and temporal changes in TP related to mining activity are less evident. Dissolved and total phosphorus are trending higher at the NF area, but the spatial extent appears largely confined to the east basin, with concentrations in the MF remaining relatively consistent dating back to 2015. At the far-field areas, total phosphorus concentrations have shown an overall decrease since 2016, coinciding with upgrades to the sewage treatment plant that came online in 2017.

Chlorophyll-a

Summary statistics for chlorophyll-a data collected between 2015 and 2020 are shown in [Table 6-5](#). Plots of the chlorophyll-a concentrations by year and area are shown in [Figure 6-7](#). In 2020, chlorophyll-a concentrations were highest at the NF area, ranging between 1.6 and 2.4 µg/L in the 15 samples collected. Farther away at MEL-02, chlorophyll-a concentrations were approximately 2-fold lower (average of 0.9 µg/L) and broadly within the range of concentrations reported at the three reference areas (0.5 to 1.1 µg/L). The spatial pattern observed in 2020 (i.e., NF>MF>=REF) is consistent with monitoring conducted since 2016, the first year that reference area sampling was completed under the AEMP. Over-time, chlorophyll-a concentrations have been relatively stable among the various study areas. The only notable exception is data collected in 2019 when an issue with the filter material used for sampling chlorophyll-a resulted in uniformly lower concentrations at all five study areas compared to previous years. The absolute concentrations in each area are not considered representative of the conditions the lake, but the pattern of the difference among the NF, MF, and reference areas is informative, and for this reason, the data were retained in the analysis.

In summary, there is no evidence of year-over-year increases in chlorophyll-a concentrations at the NF area in response to activities at the mine. There are spatial differences with Meliadine Lake, with higher concentrations of chlorophyll-a in the east basin compared to the far-field areas in the lake, but the relative magnitude of the difference between the exposure and reference areas hasn't changed.

6.4.3 Phytoplankton Community

Raw species data for the 2020 phytoplankton study is provided in [Appendix E1](#) along with estimates of the biovolume for each species. Summary data for major taxa group biomass and density for 2020 are presented in [Table 6-6](#) and for previous years in [Appendix E2](#). The primary metrics used to evaluate the health of the phytoplankton community and potential nutrient enrichment in Meliadine Lake are total biomass and total richness. Phytoplankton density results are tabulated and plotted to support the discussion as needed.

Biomass

Total phytoplankton biomass for Meliadine Lake is shown in **Figure 6-8**. Average biomass for the major taxa groups is presented in **Figure 6-9**.

Phytoplankton biomass trended lower in 2020 compared to previous years at the exposure and reference areas. The most pronounced decline occurred in the NF area where biomass declined from around 430 mg/m³ in 2019 to less than 250 mg/m³ at all five NF sampling stations in 2020 (**Figure 6-8**). Within Meliadine Lake, the relative difference in biomass between the NF, MF and reference areas narrowed in 2020. Average biomass at NF exposure area was 210 mg/m³ compared to 170 mg/m³ at the MF area, and 200 mg/m³ at MEL-03 (reference area 1). Average biomass was lowest (140 mg/m³) at reference areas 2 and 3.

Among the major taxa, the decline was primarily reflected in reduced biomass for chrysophytes species, which are commonly referred to as golden-brown algae (**Figure 6-9**). Lower chrysophytes biomass in 2020 was accompanied by a corresponding increase in the proportional biomass of cryptophytes (**Figure 6-9**). Phytoplankton communities fluctuate seasonally in response to yearly climate and seasonal patterns in water temperature, as well as the nutrient status of the lake.

With the step-decrease in biomass observed at the NF area in 2020, primary productivity in the NF, as measured by total biomass, is in the range of values from the August 2013 baseline monitoring program. 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), which means the absolute differences or similarities between years should be interpreted cautiously. Overall, nutrient loading and corresponding increases in some parameters (i.e., nitrogen species) does not appear to be resulting in a corresponding increase in primary productivity as indicated by phytoplankton biomass (discussed in greater detail below).

Richness

There was a wide-spread reduction in the number of taxa in 2020 compared to 2019, a pattern that matches what was observed for biomass. Taxa richness, at the lowest practical level of identification, was generally between 30 and 35 among the five study areas in 2020. By comparison, richness measured in 2015 to 2019 has fairly consistently been between 40 and 50 taxa per sample (**Figure 6-8**). Lower total richness at the NF was primarily reflected in fewer species of the chrysophyte major taxa group (between 10 and 14 taxa per sample) compared to previous years where the number of taxa was typically closer to 20 (**Figure 6-9**). To date, monitoring under the AEMP has consistently shown that chrysophytes are the dominant taxa group in Meliadine Lake, in terms of the number of species, as well as biomass and density during the late summer period (**Figure 6-9**). 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).

Community Structure

Finer patterns in community structure across sampling areas and years were explored with multivariate non-metric multidimensional scaling (nMDS) analysis²⁹. The ordination plot showing results for *reference* area-year combinations and their associated 90th, 95th and 99th percentile probability ellipses is presented in the left panel of **Figure 6-10**³⁰. These probability ellipses reflect the overall phytoplankton community at the reference areas across all sampling events; they are included on all plots to provide context. Note that this approach assumes that there were no among-basin differences in the phytoplankton community prior to mine development. Unfortunately, the baseline dataset is limited (the two earliest events only targeted NF [2013] or NF/MF [2015]; these earlier results are presented for general context, but should be interpreted cautiously given the lack of corresponding reference area data) and this assumption cannot be verified. Thus, the reference-based probability ellipses may not fully represent the phytoplankton community on a lake-wide basis.

Results for *exposure* area-year combinations relative to the reference area probability ellipses are presented in the right panel of **Figure 6-10**. Note that the 2013 and 2015 data for the NF area are shown for general context, but should be interpreted with caution given the reference areas were not sampled in either of those years. Results are presented by year in **Figure 6-11** to highlight the relative locations of each area both within and across years. The correlation matrix at the bottom of **Figure 6-11** is provided to aid in the interpretation of results by showing how major taxa group biomass and richness relate to each of the nMDS axes. Key results are as follows:

- Axis 1 – this axis is dominated by chrysophyte biomass and richness and to a slightly lesser extent by dinoflagellate biomass and richness. The negative correlations for all these metrics indicates that higher scores on Axis 1 equate to lower biomass and richness for these two taxa groups.
- Axis 2 – this axis is dominated by diatom, chlorophyte and cryptophyte biomass. Again, the negative correlations mean that higher scores on Axis 2 have lower biomass of these groups.

Interpretation of the overall (**Figure 6-10**) and by-year (**Figure 6-11**) plots needs to consider both the absolute (i.e., results in relation to the probability ellipses) and relative (i.e., positions of areas relative to

²⁹ A description of the nMDS analysis using the 'Vegan' software package is presented here: [\(Link\)](#)

³⁰ The stress value for the best fit of the data in 2-dimensions was 0.088. As discussed in the data analysis section, stress is the measure of the goodness of fit of the transformed multi-dimensional data, and according to Clarke (1993), a stress value <0.1 is considered "good" for visualizing multi-dimensional data in a reduced number of dimensions.

one another) patterns. For example, the relative position of the NF and MF areas relative to one another and to the reference areas varies among years. While the MF area has generally tracked in line with the reference areas, both the MF and NF consistently had higher scores on Axis 2, indicating relatively higher biomass for diatoms, chlorophytes and cryptophytes relative to the reference areas. In years where community biomass has been higher (2015 through 2019), the NF area has had consistently lower scores on Axis 1, indicating higher biomass and richness of chrysophytes and dinoflagellates relative to the other areas. In contrast, the only two years where NF had a positive score on Axis 1 were the two years with the lowest community biomass (2013 and 2020). Despite these general differences, there have been years (e.g., 2018) where all the stations grouped fairly close to one another.

The 2020 results show the largest year-over-year changes seen to date, with major shifts occurring at all areas, and predominantly on Axis 1 (**Figure 6-11**). The reference areas all had higher scores on Axis 1, relative to 2019, reflecting the lake-wide decrease in biomass and richness of chrysophytes and dinoflagellates (as seen in **Figure 6-8**). The MF area saw a shift of similar magnitude as the reference areas on Axis 1 and the NF shift was even higher. Overall, the 2020 scores on Axis 1 were actually very close across NF, MF and MEL-04/MEL-05. In contrast, the spread on Axis 2 shows similar results across the reference areas (both in 2020 and in relation to 2019), whereas the NF and MF areas both show lower scores in 2020 (**Figure 6-11**). Again, as noted previously, negative scores on Axis 2 translate to higher biomass of chlorophytes, diatoms and cryptophytes relative to the reference areas (as seen in **Figure 6-9**). Interesting, the NF and MF areas are relatively closer together in 2020 than in other years, likely reflecting the more similar biomass between these two areas than has been observed in other years (as seen in **Figure 6-9**). Overall, the 2020 results reflect the largest differences observed to date in the phytoplankton community between the NF/MF areas and the reference areas. However, given that they are predominantly on Axis 2, these differences reflect relatively higher biomass of chlorophytes, diatoms and cryptophytes compared to the reference areas despite the lake-wide drop in overall biomass.

The underlying drivers of the above patterns are unclear. While the FEIS concluded that increased nitrogen concentrations beyond the mixing zone could result in a shift in community structure favoring species that are capable of assimilating nitrogen more efficiently (Agnico Eagle 2014), it seems unlikely that these patterns are mine-related for the following reasons:

- Lake-wide drop in biomass and richness – despite a substantial increase in nitrogen loading to the east basin (**Figure 6-1**) and increased total phosphorus concentrations both NF and MF (**Figure 6-5**), the prevailing trend in the phytoplankton community was the drop in biomass and richness seen across all areas in 2020. This pattern suggests a regional change due to natural variability.

- Lack of appreciable differences between NF, MF and REFs – if the observed differences in the community were due to mine-related changes in water quality, then the response pattern should roughly match the gradient in concentrations observed (i.e., NF>>MF>>REFs). However, the main changes to the community in 2020 occurred across all stations. Further, the relatively consistent differences between NF and MF observed since 2015 actually decreased in 2020, despite the changes in water quality discussed previously.

In conclusion, the 2020 results show a clear, lake-wide pattern of decreased biomass and richness of chrysophytes and dinoflagellates that is best explained by natural variability. In addition, despite the largest year-over-year changes in water quality observed to date, there were no obvious patterns discernable between the NF and MF areas that could be attributed to the mine as these two areas had more similar communities in spite of a steeper exposure gradient to effluent in 2020.

6.4.4 Nutrient-Productivity Relationships

Two phytoplankton productivity metrics were used in this study: chlorophyll-a and phytoplankton volumetric-based biomass. The relationship between biomass and chlorophyll-a was explored across years (**Figure 6-12**) and across sampling areas within years (**Figure 6-13**). Both plots show a positive relationship between these productivity metrics, although it appears to be stronger in early years of monitoring (e.g., 2016 – 2019). Variability in the relationship, particularly among years, is likely due to differing chlorophyll-a content among phytoplankton groups. For example, smaller algal cells have proportionately more chlorophyll-a than do larger cells, and there is a general shift towards larger size cells during seasonal succession (Felip and Catalan 2000, Kasprzak et al. 2008).

Relationships between nutrient concentrations (TN and TP) and the two phytoplankton biomass estimators are shown across all areas and years (**Figure 6-14** highlighting areas and **Figure 6-15** highlighting years) and for the NF area only across years (**Figure 6-16**). The relationships were all highly variable and did not show consistent changes in phytoplankton biomass with increasing nutrient concentrations. This is most easily visualized in the plot singling out MEL-01 (**Figure 6-16**), particularly looking at the 2019 results for TP, which clearly show little change in either phytoplankton biomass or chlorophyll-a across a broad range of TP concentrations.

While no apparent nutrient-productivity relationships were identified, the high uncertainty regarding the representativeness of TP and TN of their bioavailable forms precludes concluding that these results are evidence of a lack of effect on productivity. Consequently, a higher weighting should be placed on the actual phytoplankton community results.

6.4.5 Trophic Status Index

Trophic status index (TSI) values were calculated for 2020 based on mean (+/- se) of TP, chlorophyll-a and Secchi depth at each sampling area and compared to previous years in [Figure 6-17](#). TP results are presented in [Table 5-6](#). Chlorophyll-a summary statistics and Secchi depth results from the August sampling events are provided in [Table 6-5](#) and [Table 6-7](#), respectively.

TSI values based on TP, chlorophyll-a and Secchi depth were all highest at the NF (MEL-01) area but remained within the oligotrophic classification category. Results are described in more detail below in the context of the underlying metrics:

- Total Phosphorus – the TSI value at the NF area in 2020 was the highest recorded to date, continuing an upward trend since 2015 (see [Figure 6-5](#)). By comparison, the TSI values for other areas in Meliadine Lake have remained consistent.
- Chlorophyll-a – the TSI value at the NF area in 2020 was in the range of values observed since 2016. Mean chlorophyll-a in 2020 was 1.97 µg/L ([Table 6-5](#)).
- Secchi Depth – the TSI at the NF area was in the range of values dating back to 2015. There is no indication of trophic changes in the NF area based on water quality data collected to date.

It is important to note that TSI is simply an index used to predict the trophic status of a lake. The existing TSI, developed by Carlson (1977), has been around for decades and is based, at least in part, on the premise that TP limits primary production in freshwater systems. As discussed previously, the current state of knowledge is such that N-P co-limitation is more prevalent (Lewis and Wurtsbaugh 2008). Nojavan et al. (2019a, 2019b) published a modified TSI that incorporates TN, TP, Secchi depth, and elevation into a single model that classifies lakes in probabilistic terms. In the absence of direct quantification of phytoplankton communities, as is often the case in water quality studies, the TSI (or new and improved version) can provide useful information on potential spatial or temporal differences in trophic status across locations and/or years. However, when actual phytoplankton data are available, less emphasis should be placed on the TSI values.

6.5 Low Action Level Assessment

The low action level assessment for nutrient enrichment relies on TP and chlorophyll-a results as indicators of nutrient enrichment in the NF area. The following two questions were assessed to determine if the low action level was exceeded.

Question 1: Are concentrations of total phosphorous (TP) and chlorophyll-a elevated relative to baseline / reference?

- **Response:** The average total phosphorus concentration in samples collected between July and September at the NF area in the 2020 AEMP was 0.0079 mg/L, which exceeded the 90th

percentile normal range of 0.006 mg/L, indicating that TP in the NF area has increased relative to baseline / reference conditions in Meliadine Lake. Chlorophyll-a was higher in the NF area relative to the other areas of Meliadine Lake, but the relative difference between the NF and MF and NF and FF areas was similar in 2020 compared with previous monitoring dating back to 2015.

- Based on 5 years of data, excluding anomalous results from 2019, there is fairly conclusive evidence to suggest that chlorophyll-a is naturally variable among the east, west, and south basins. A more relevant point of comparison is whether the temporal pattern of chlorophyll-a concentrations more or less mirrors the pattern observed in other areas of the lake (Question 3).

Question 2: Do concentrations exceed the AEMP Action Level for Total Phosphorus and Chlorophyll-a?

- **Response:** The AEMP Benchmarks are based on the objective of keeping Meliadine Lake within the oligotrophic classification. The AEMP Benchmark for total phosphorus comes from CCME (2004); 0.01 µg/L is the upper bound of the oligotrophic status, and not a guideline associated with adverse effects to aquatic life (CCME, 2004). Furthermore, there are a multitude of factors that contribute to changes in the trophic status of a lake, of which TP is one. In 2020, TP marginally exceeded the AEMP Action Level based on the mean (0.00785 mg/L) and median (0.0077 mg/L) in samples collected under the AEMP³¹. Exceedances of the AEMP Benchmark (0.01 mg/L) have periodically occurred at the exposure and reference areas in Meliadine Lake (**Figure C2-23**). To provide additional context on potential changes in the trophic status of the lake, a second assessment criteria using the chlorophyll-a data is included in the AEMP Action Level assessment.
- The AEMP Benchmark for chlorophyll-a is 4.5 µg/L. The value was adopted from Diavik Diamond Mines Inc (DDMI 2013) as a “reasonable” upper limit for classifying northern lakes as oligotrophic. The AEMP Action Level of 3.36 µg/L was not exceeded in the samples from the NF area in 2020.

Question 3: Is there a divergent temporal trend between NF and reference areas?

- **Response:** TP has shown considerable within-area and within-year variability throughout the AEMP monitoring period (2015 to 2020). As shown in **Figure 6-5**, TP is typically more variable within a given year (i.e., seasonally between month) than between years (i.e., from 2015 to 2016, etc.). This applies to both exposure and reference areas in Meliadine Lake.

³¹ The detection limit for TP for samples collected under the WQ-MOP was 0.02 mg/L, which is 2-times the limit of 0.01 mg/L for classifying lakes as oligotrophic (CCME 2004). The TP data, as well as nitrogen data from the WQ-MOP were not included in the nutrient assessment given the comparatively high detection limits for these parameters.

- The results from MEL-01 beyond the mixing zone in 2020 were well within the range reported in 2018 and 2019 from the NF area. Furthermore, the maximum reported TP concentration in 2020 was lower (~ 0.01 mg/L) compared to 2018 (~ 0.02 mg/L) and 2019 (0.017 mg/L).
- In short, TP concentrations vary month-by-month in a similar pattern at the NF and MEL-03 reference area and year-over-year increases in TP at the NF area are not evident based on the available data dating back to 2013.

6.6 Summary and Recommendations for 2021

The following conclusions are based on findings of the 2020 phytoplankton study, taking into consideration the full range of available nutrient data and phytoplankton community results collected under the AEMP.

Nutrients – Results to date indicate that changes in nutrient concentrations, particularly nitrogen, have occurred at the NF area since 2015 (i.e., the pattern is consistent with mining activities). There is some uncertainty about the magnitude of the change depending on whether the AEMP dataset or DIN data are relied on for interpreting the change. Further, confounding the interpretation of spatial and temporal trends is the fact that some nitrogen parameters, namely TKN and ammonia, trended higher at the reference areas in 2020; in some samples collected under the AEMP, concentrations exceeded the maximum observed in the NF area, despite nitrogen loading from CP1 increasing nearly 5-fold in 2020 compared to 2019. It's evident that the nitrogen parameters in CP1 are not contributing to a substantial increase relative to the reference areas or previous monitoring data from the NF area.

Water sampling for depth-integrate nutrients is no longer recommended as part of the August phytoplankton program. Water is collected for nutrients more frequently as part of the routine AEMP water quality program (discrete sampling at mid-depth), providing a more robust dataset for assessing changes in nutrient concentrations within and between years. Water for phytoplankton taxonomy and chlorophyll-a analyses will still be collected using the depth-integrated collection method for comparability between years.

Phytoplankton – The phytoplankton community had noticeably lower biomass and richness across all 5 study areas in 2020 that was attributed to natural variability. Prior to 2020, there was some plausible evidence supporting the notion that nutrient loading (TP in particular) during the pre-construction period had contributed to an increase in biomass in 2015 relative to the results from 2013. Results from 2020 further 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 biomass.

The multivariate community analysis clearly showed the lake-wide changes described above. Despite this predominant lake-wide pattern, the NF and MF areas became more similar to one another than in

previous years. This latter pattern does not appear to support a mine-related effect as water quality was generally quite different between these areas in 2020, which would have led to bigger differences rather than to lower. Continued annual monitoring of phytoplankton is recommended to assess differences in the structure of the community between the NF, MF, and reference areas. The phytoplankton community in Meliadine Lake appears healthy.

Nutrient-Productivity Relationships – Phytoplankton biomass was tracked by two metrics: volumetric-based biomass (direct measure of the community) and chlorophyll-a (surrogate measure). The metrics were weakly, but positively, correlated across years, with differential photosynthetic pigment content among phytoplankton taxa a likely important source of the variability. Ultimately, direct measurement of the community is a better indicator of biomass, but chlorophyll-a provides complementary, yet independent, information that is easy to collect. As in previous years, neither measure of biomass was correlated to either TN or TP, suggesting that mining-related nutrient inputs do not appear to be responsible for the observed differences in phytoplankton biomass or chlorophyll-a.

Trophic Status Index – TSI values remain in the oligotrophic classification. While TSI values based on TP and Secchi depth at the NF area were higher than in previous years, the TSI value for the NF area based on chlorophyll-a was within the range of values reported since 2016. These TSI values provide a rough guide only and should be given less emphasis than direct measures of the phytoplankton community.

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. Continued phytoplankton monitoring in 2021 is recommended.

6.7 Figures – Meliadine Lake Phytoplankton

Figure 6-2 Concentration of Nitrogen Species Measured in Effluent Samples from MEL-14 from 2018 – 2020

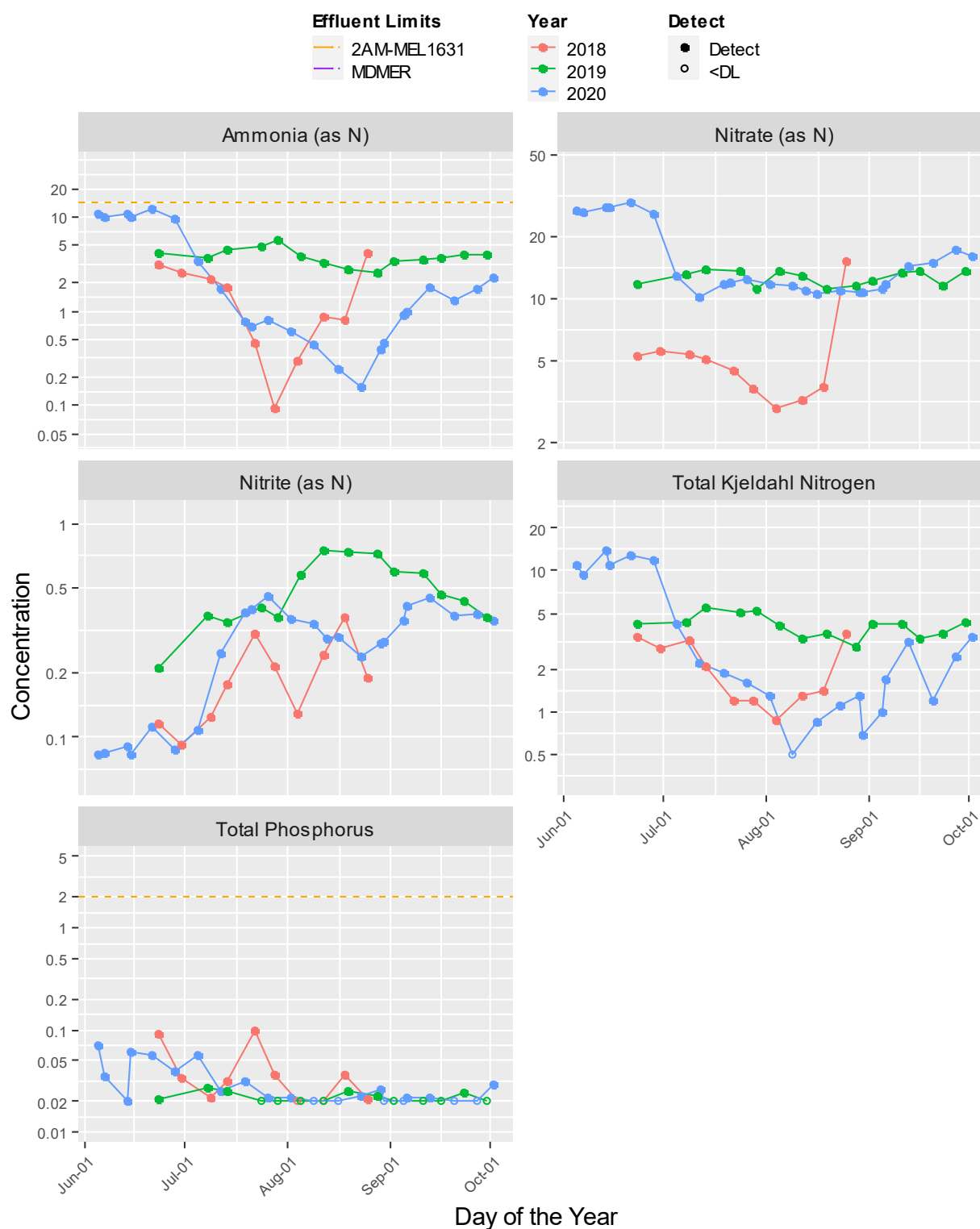


Figure 6-3. Spatial and Temporal Changes in Nitrogen and Phosphorus, 2018-2020

Notes: Data are for the open water sampling events only, corresponding to when treated effluent was released to the lake. Points are jittered slightly to avoid overplotting. The full suite of water quality analyses were not completed at the MEL-13 edge of the mixing zone stations each year.

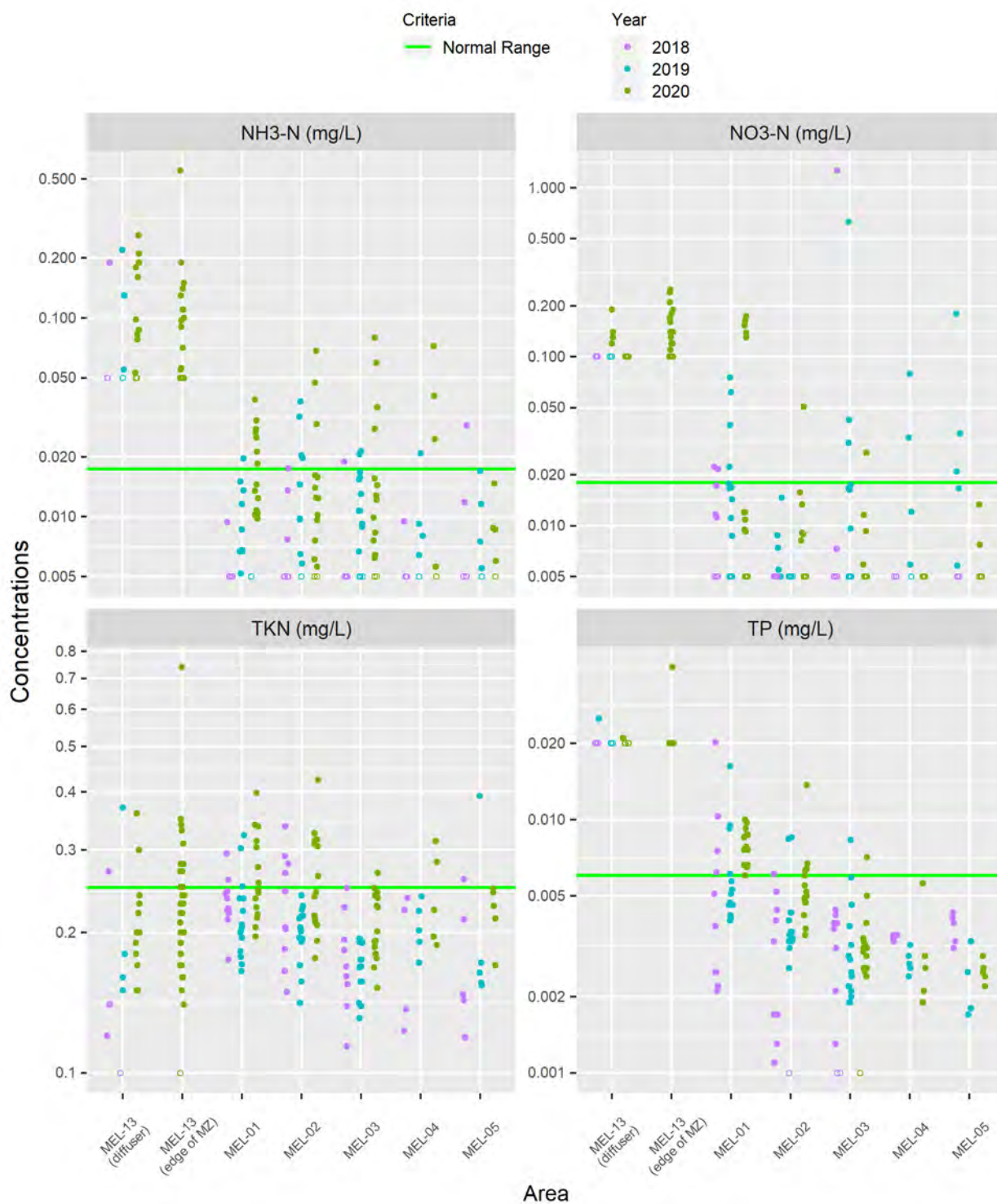


Figure 6-4. Spatial and Temporal Changes in Nitrogen and Phosphorus Relative to the Distance from the Diffuser, 2018-2020

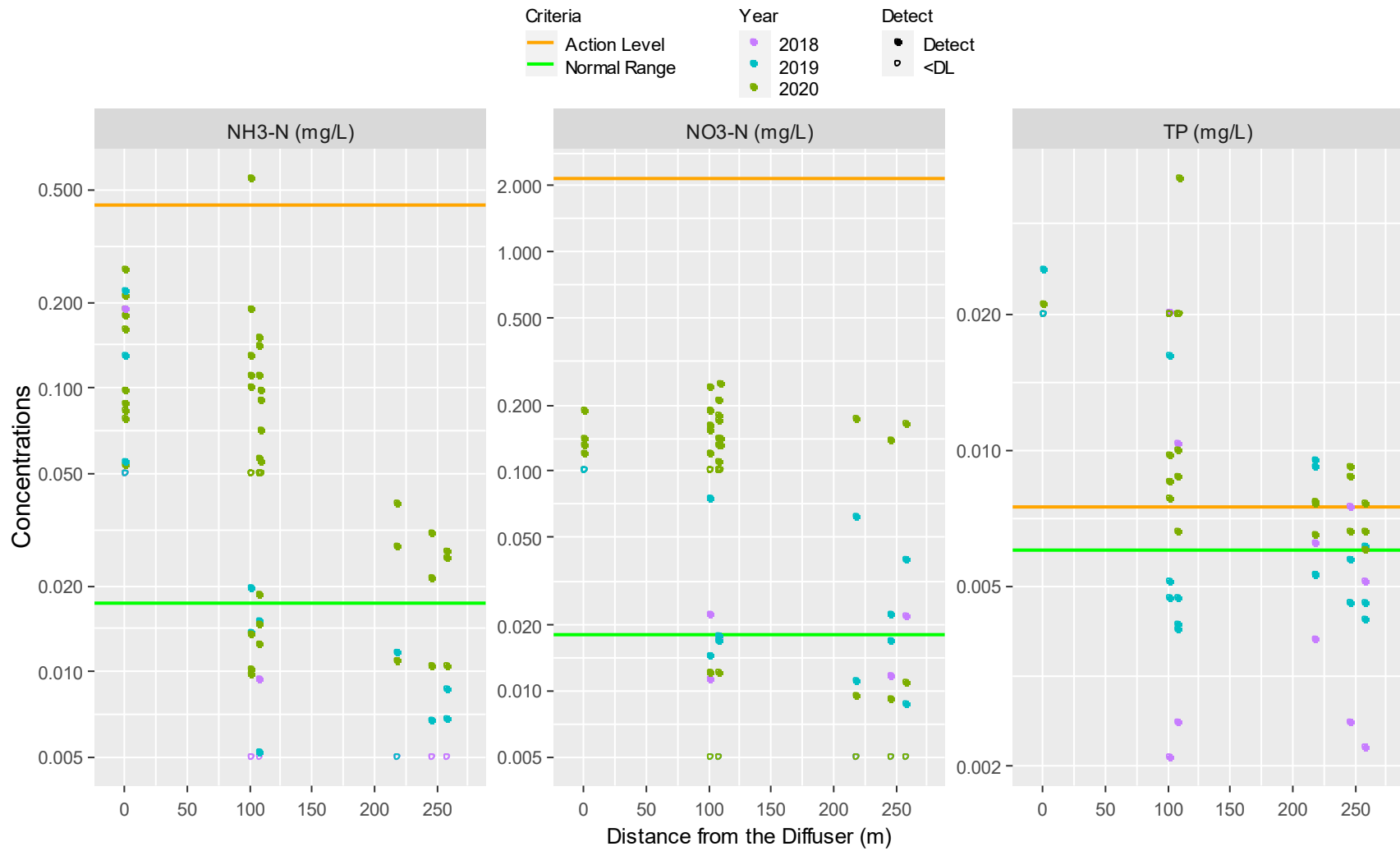


Figure 6-5 Concentrations of Key Nutrients Collected in Meliadine Lake from the August Phytoplankton Studies, 2015 – 2020

Notes: Nutrient concentrations are presented for both the AEMP and depth integrate nutrient (DIN) samples for August sampling events to compare differences between the two sampling methods.



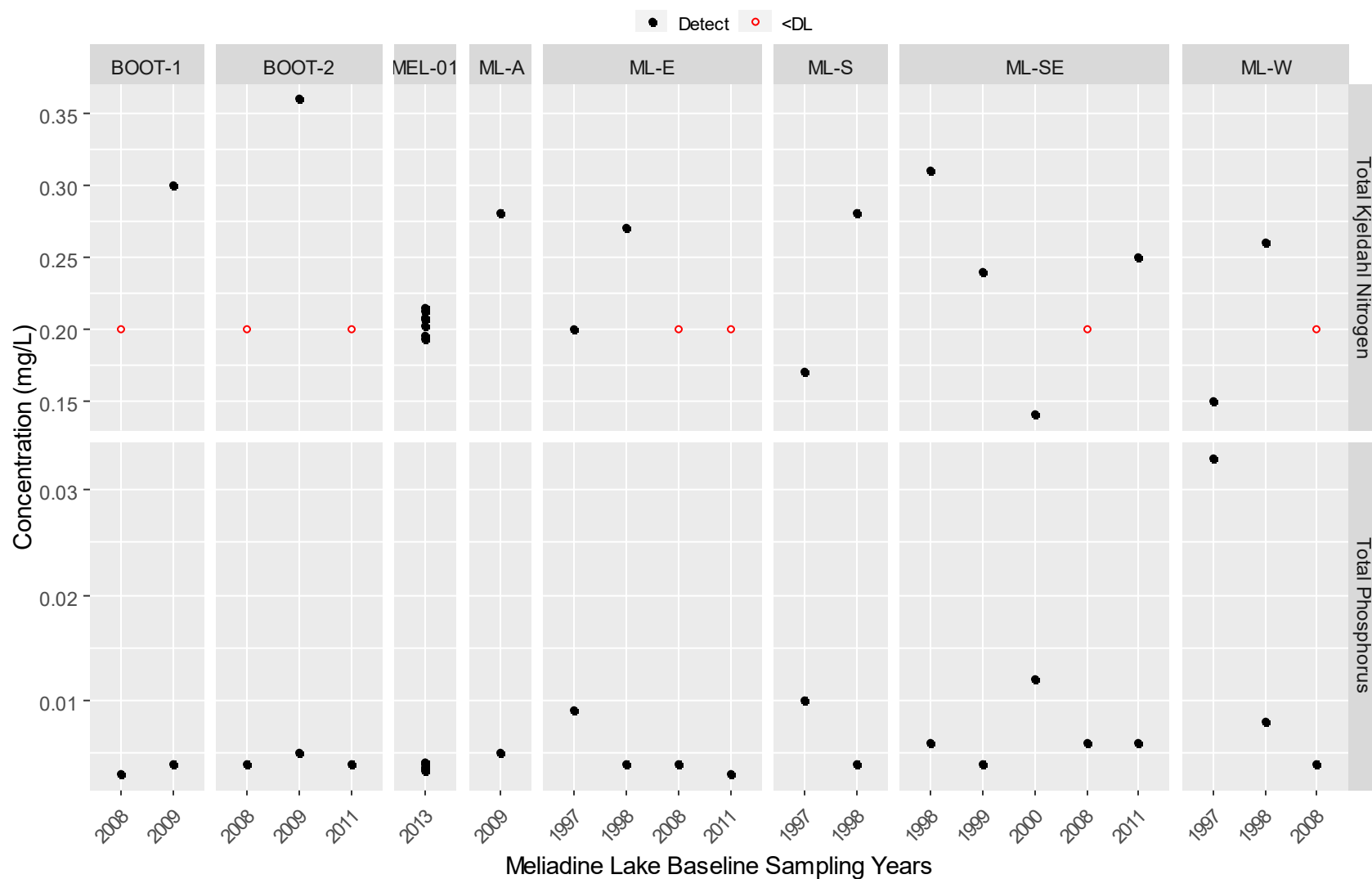
Figure 6-6 Concentrations of nitrogen and phosphorus in Meliadine Lake, 1997 through 2013.

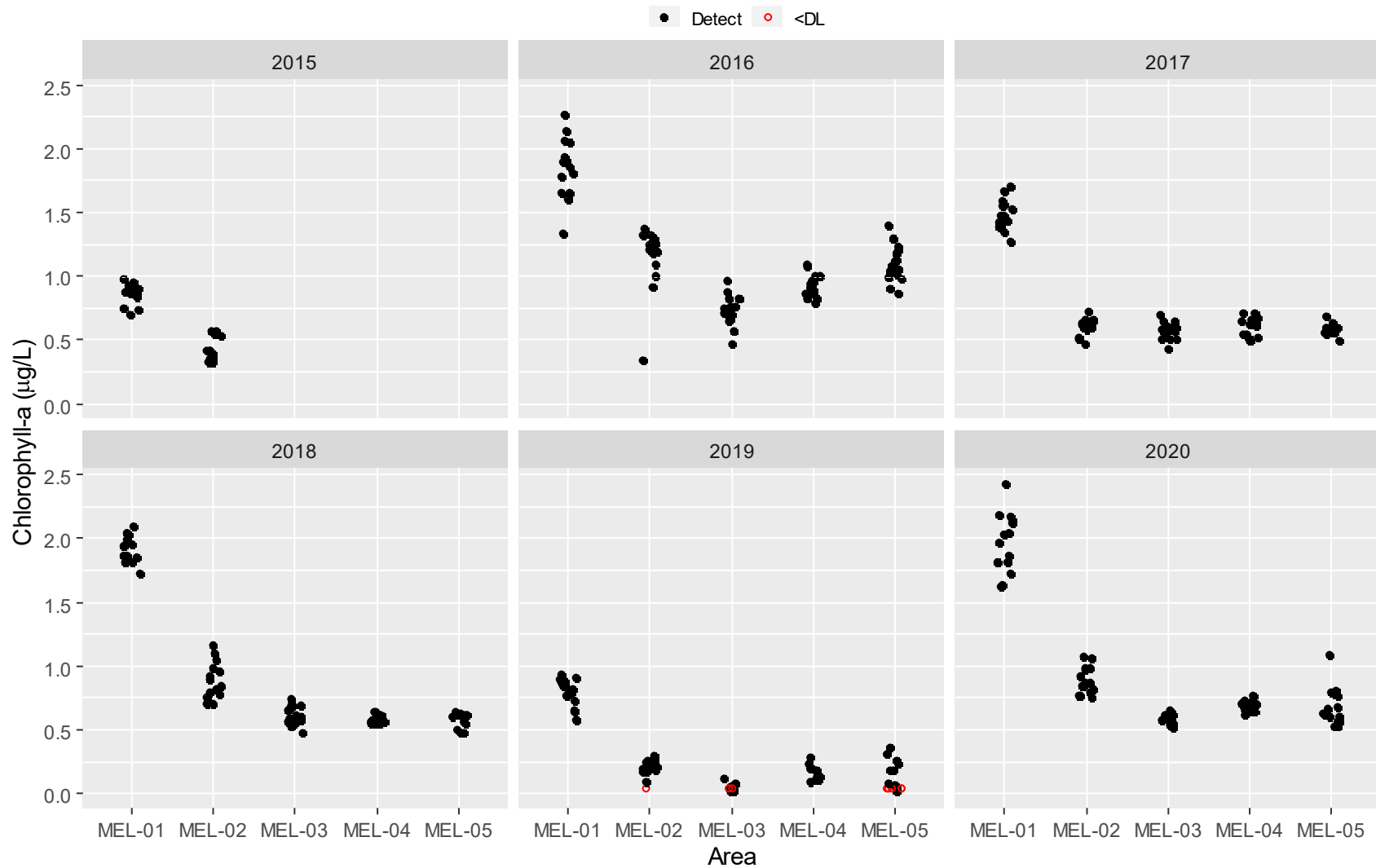
Figure 6-7 Chlorophyll-a Concentrations ($\mu\text{g/L}$) in Meliadine Lake from the August Phytoplankton Studies, 2015 – 2020

Figure 6-8 Total phytoplankton biomass, density and taxa richness for Meliadine Lake sampling areas.

Figure 6-9. Major taxa group biomass, density and taxa richness for phytoplankton in Meliadine Lake sampling areas (2013 – 2020).

Notes: Major taxa group endpoints (richness, biomass, and density) for each area-year are based on the average (arithmetic mean) of 5 samples.

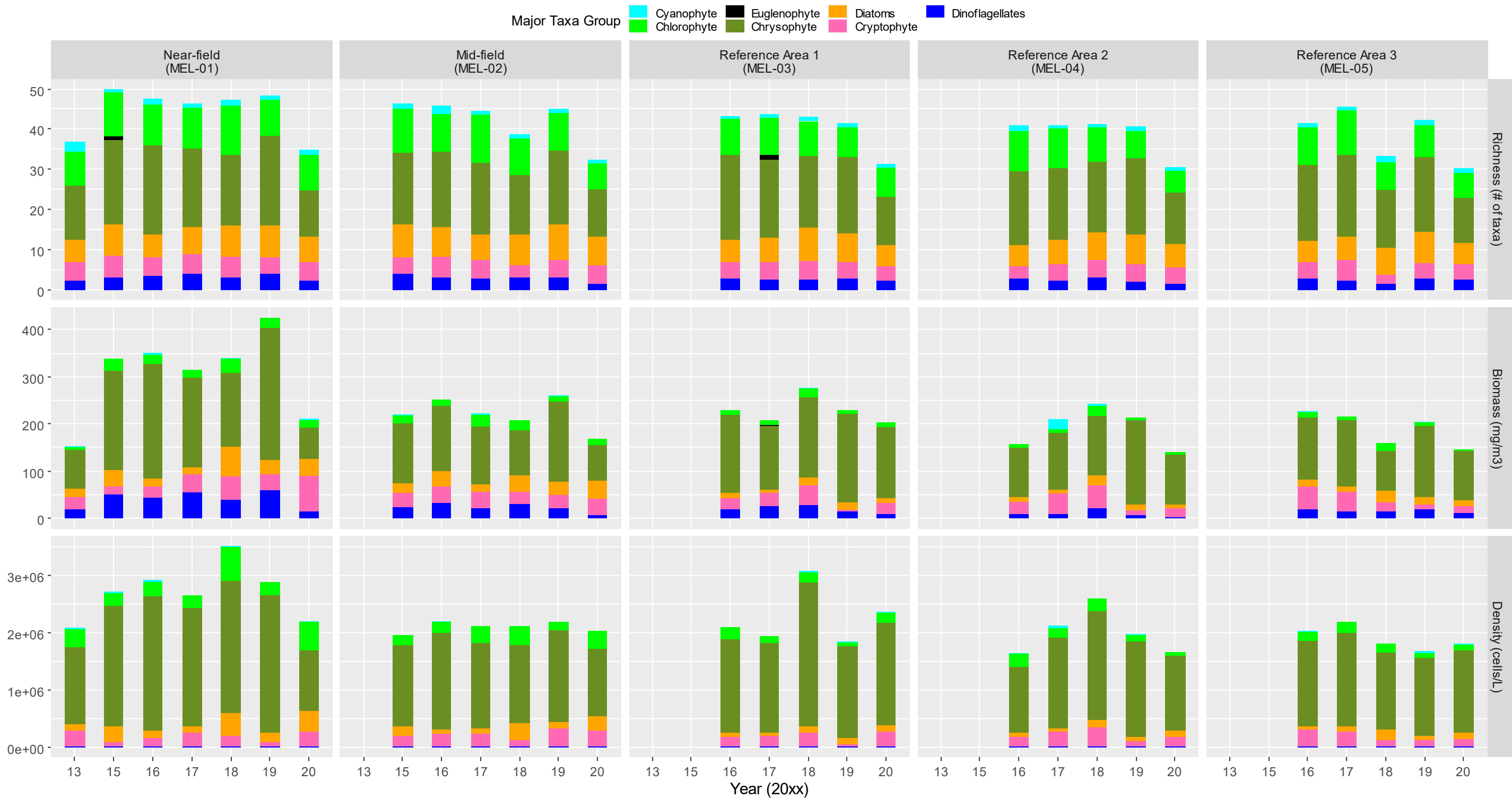


Figure 6-10. Ordination plot of phytoplankton community non-metric multidimensional scaling (nMDS) for Meliadine Lake (2015 through 2020).

Notes: area-year nomenclature: MEL04-18 = Meliadine Lake area MEL-04 sample collected in 2018.

Left panel (REF) = results for reference area-year combinations and their associated probability ellipses

Right panel (EXP) = exposure area-year combinations shown relative to reference area probability ellipses

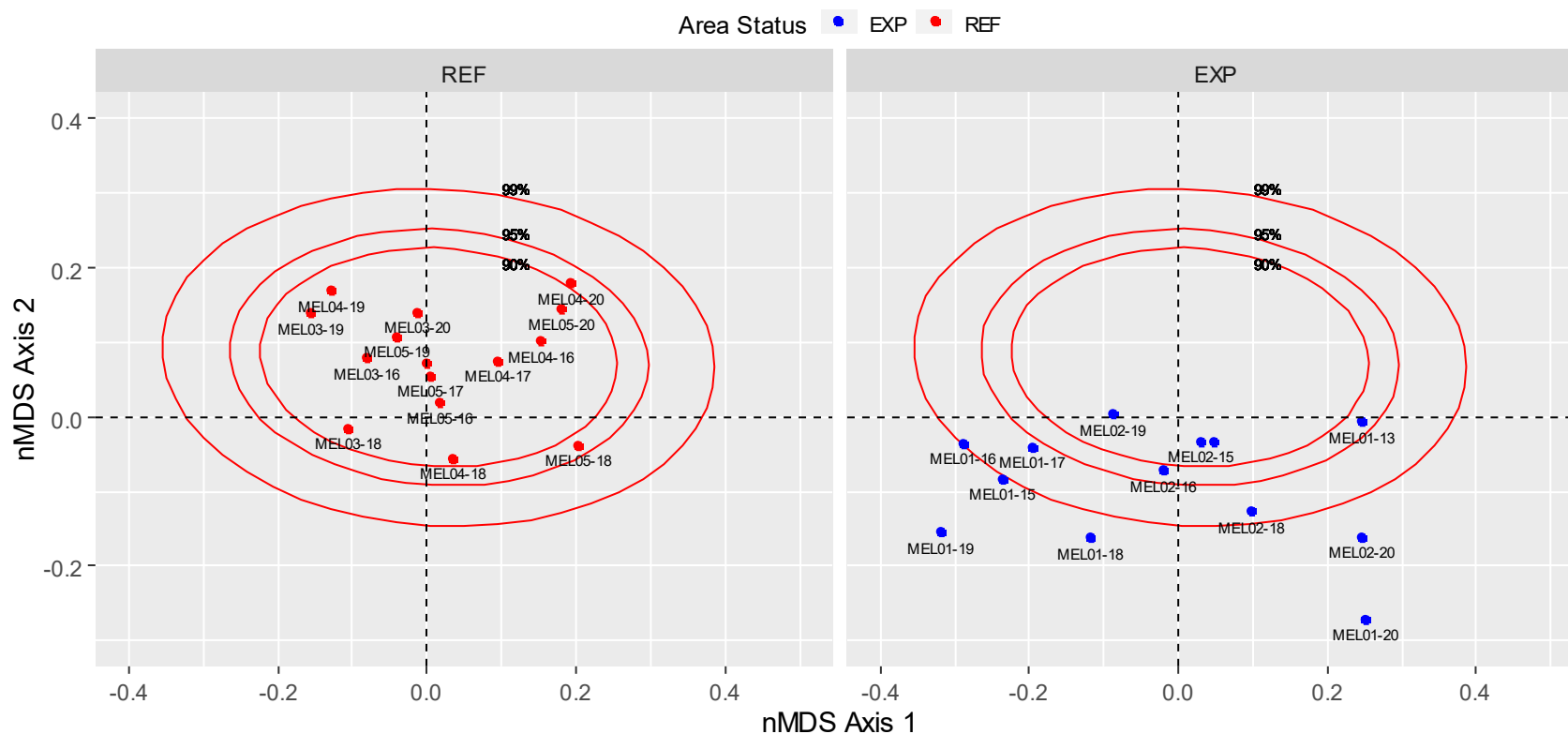


Figure 6-11. Non-metric multidimensional scaling (nMDS) results showing ordination of the reference and exposure area phytoplankton results by year for Meliadine Lake.

Notes: The correlation plot at the bottom is based on the 2020 data; blue cells are negatively correlated, red cells are positively correlated. “X” indicates the correlation value is not statistically significant (p<0.05).

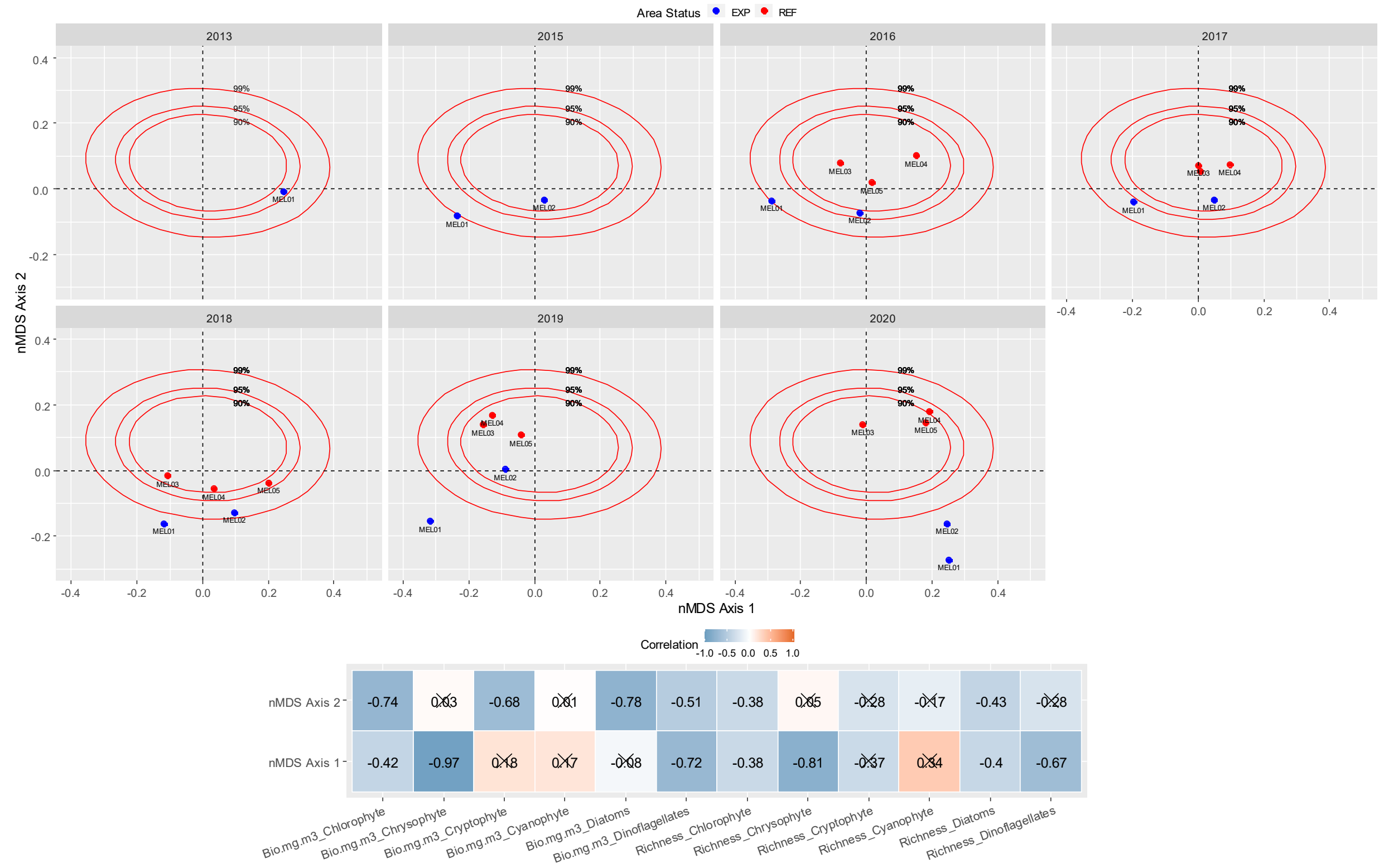


Figure 6-12. Relationship between chlorophyll-a and phytoplankton biomass for Meliadine Lake across years, 2016 through 2020.

Notes: The chlorophyll-a data from 2019 were given a cautionary flag during the QC review of the data due to concerns over the filter material. Data are shown for transparency, but the results are not considered representative of the chlorophyll-a concentrations in the lake during 2019.

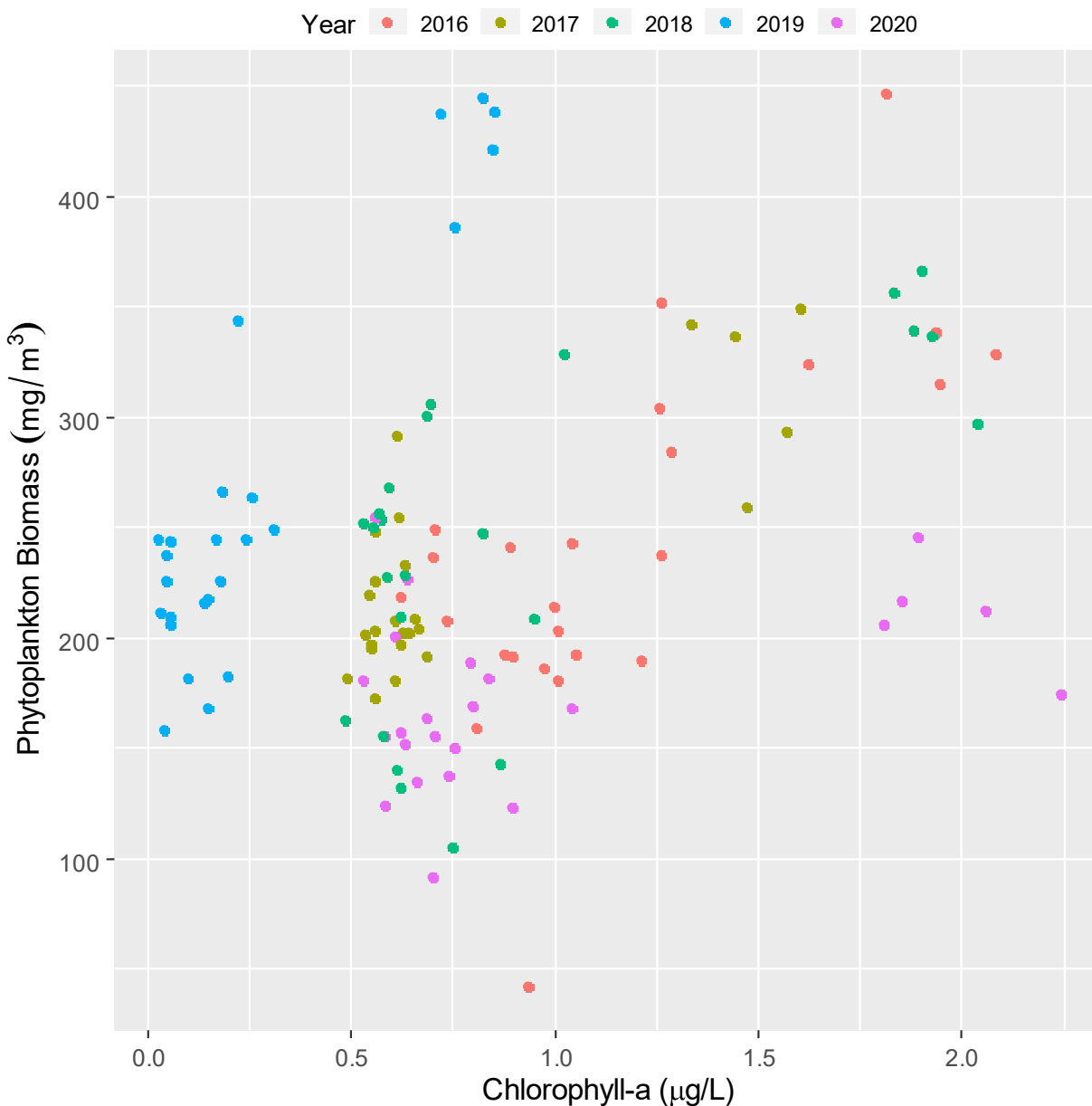


Figure 6-13. Relationship between chlorophyll-a and phytoplankton biomass for Meliadine Lake by year, 2016 through 2020.

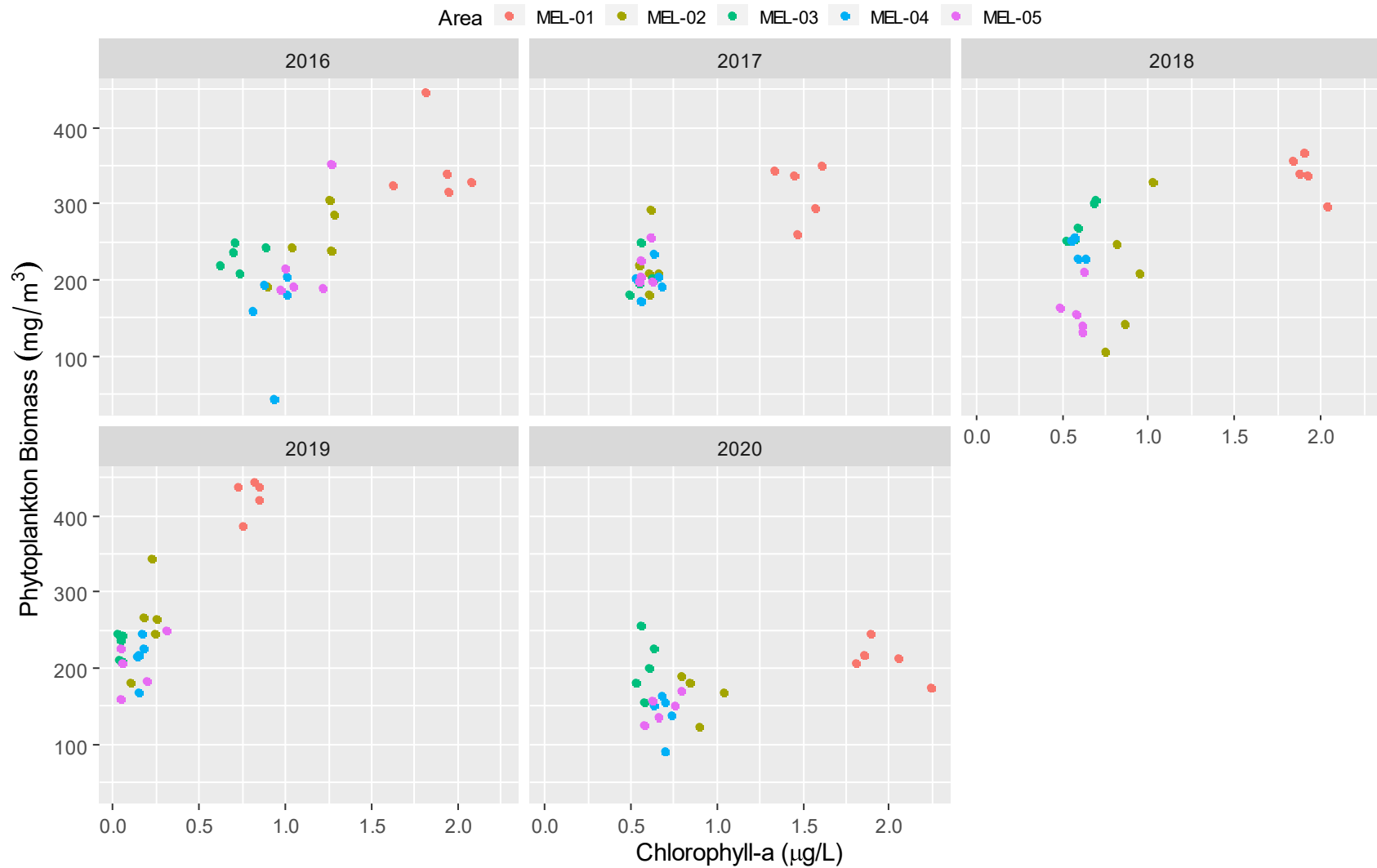


Figure 6-14. Relationship between key nutrient concentrations and phytoplankton biomass indicators by sampling area for Meliadine Lake, 2016 through 2020

Notes: The black dots represent total nitrogen concentrations that were measured below the limit of detection in samples from 2015.

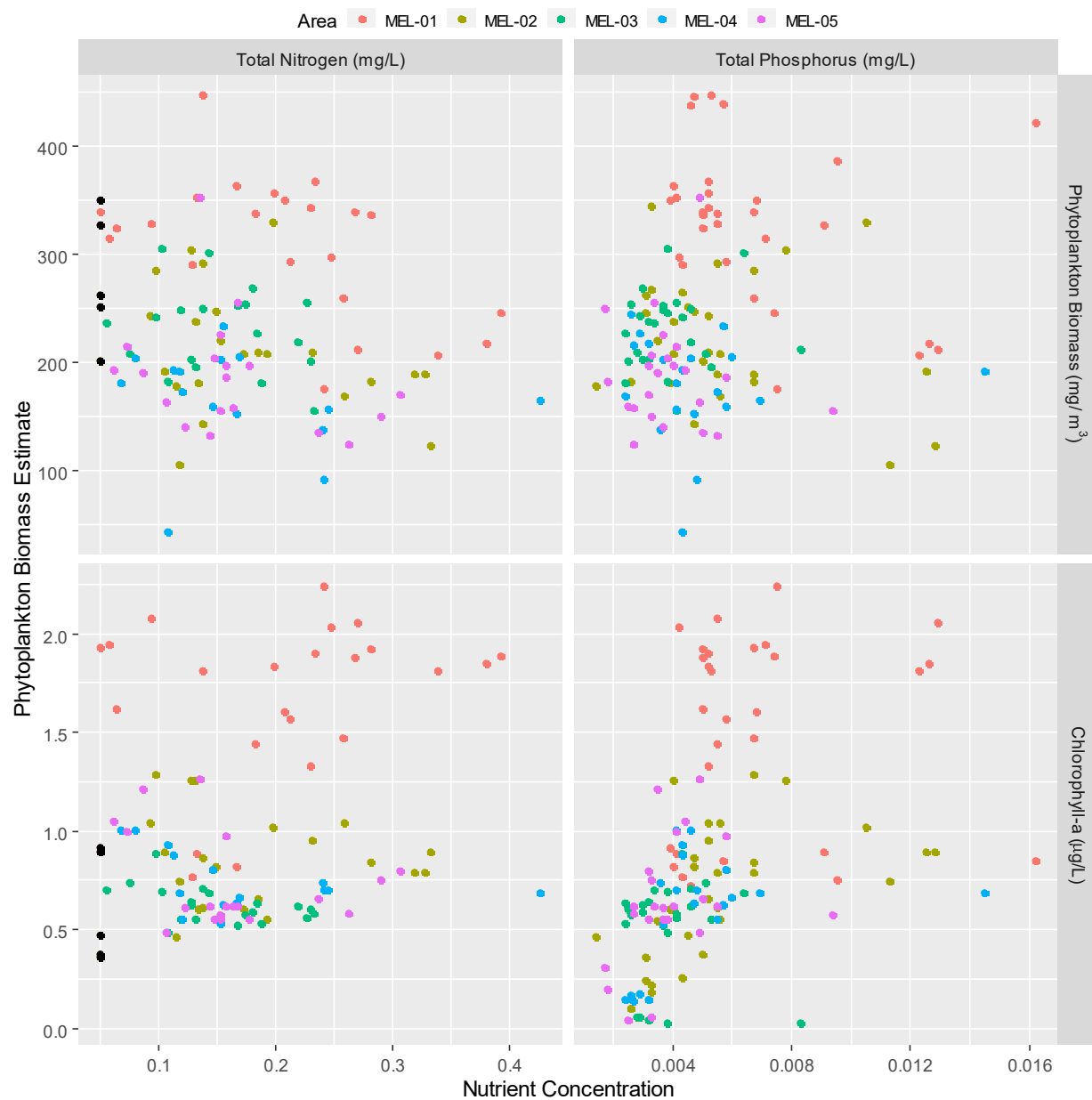


Figure 6-15. Relationship between key nutrient concentrations and phytoplankton biomass indicators by year for Meliadine Lake, 2015 through 2020

Notes: The black dots represent total nitrogen concentrations that were measured below the limit of detection in samples from 2015.

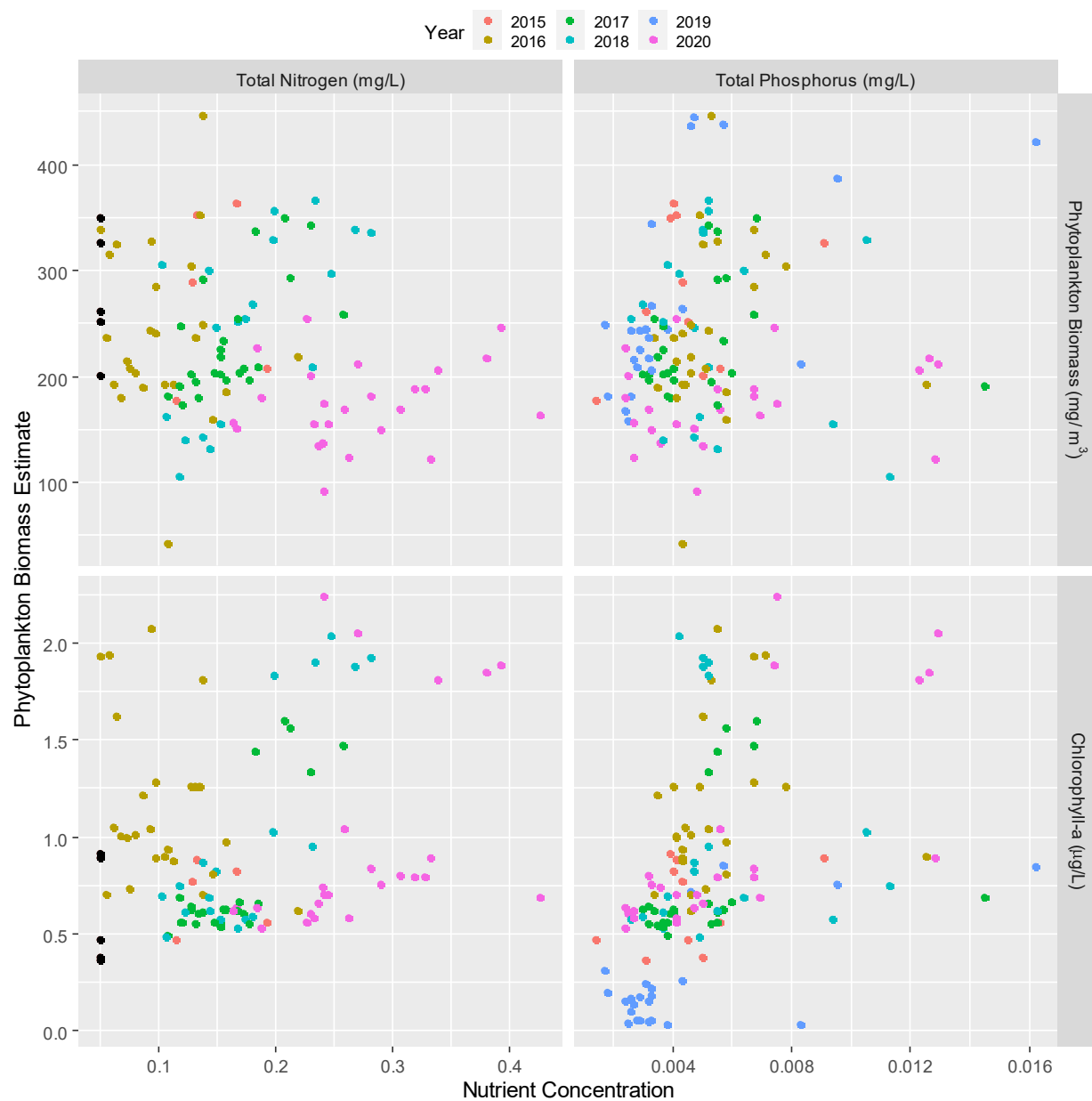


Figure 6-16. Relationship between key nutrient concentrations and phytoplankton biomass indicators by year for the near-field area (MEL-01) of Meliadine Lake, 2015 through 2020.

Notes: The black dots represent total nitrogen concentrations that were measured below the limit of detection in samples from 2015.

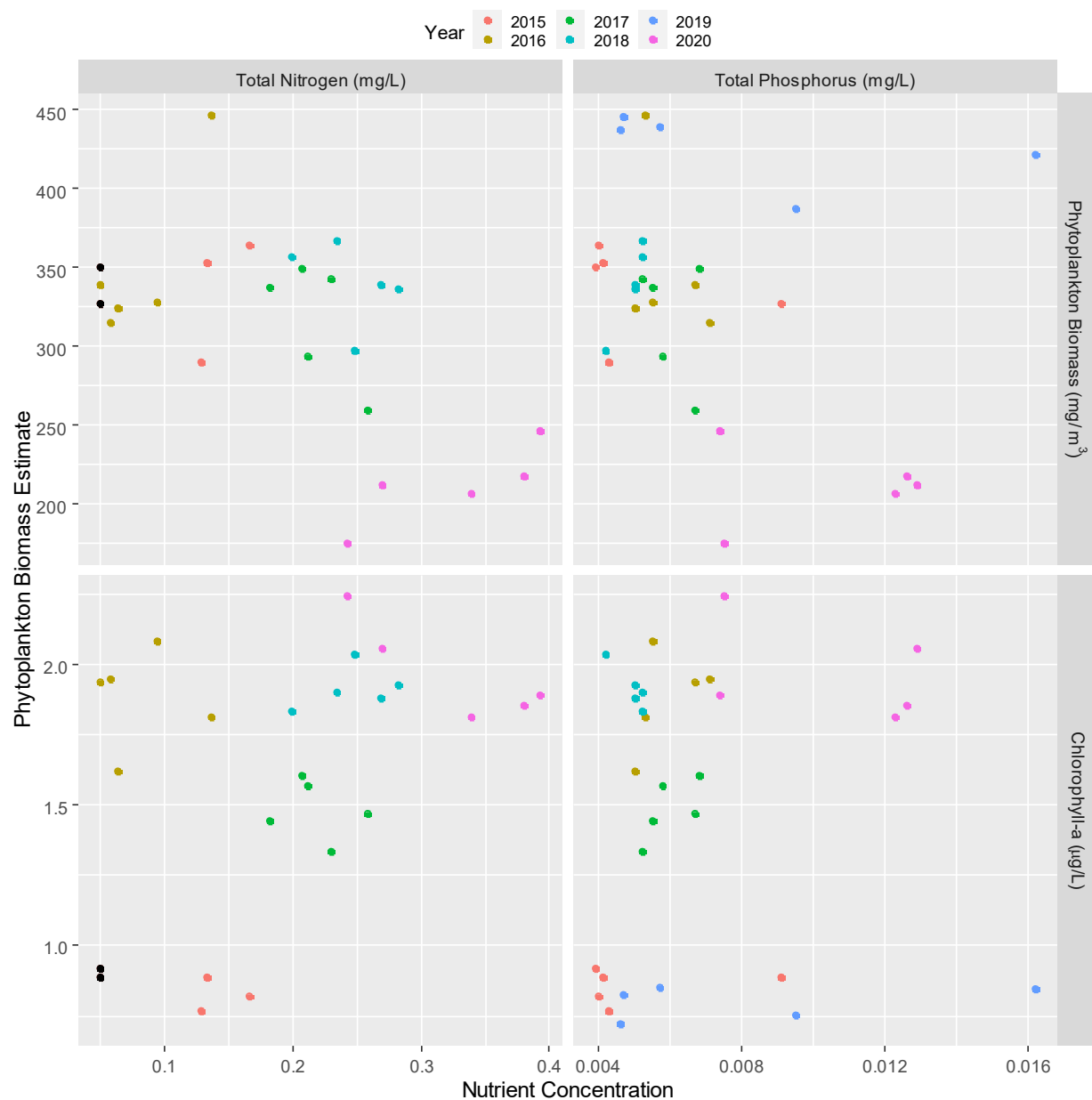
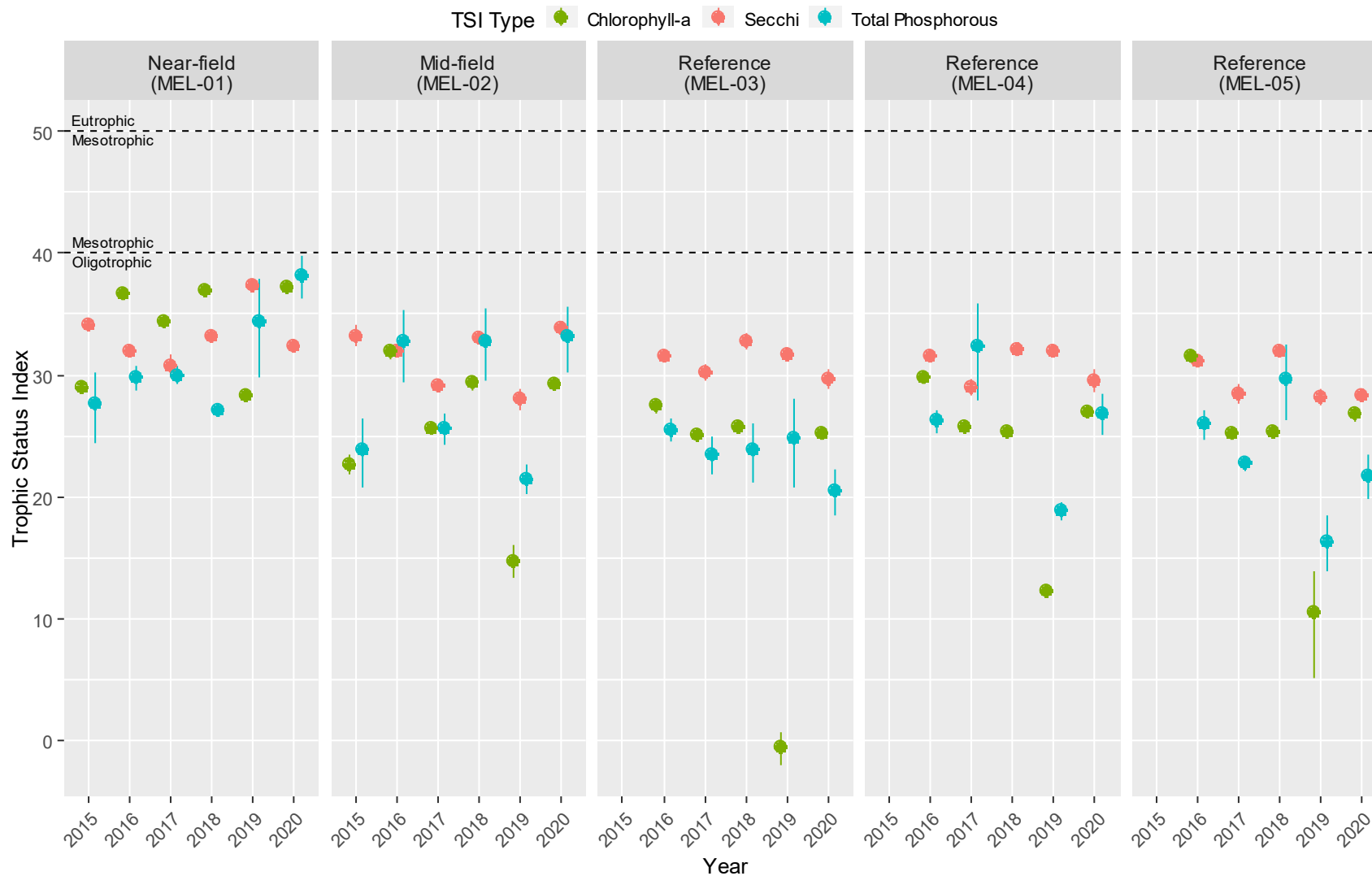


Figure 6-17. Trophic Status Index values (+/- standard error) for Meliadine Lake, 2015 through 2020

6.8 Tables – Meliadine Lake Phytoplankton

Tables for the Meliadine Phytoplankton Study are listed below. Supporting tables for phytoplankton and chlorophyll-a data are provided in [Appendix E](#) and [Appendix F](#).

Table 6-5 Chlorophyll-a ($\mu\text{g/L}$) Summary Statistics for August Sampling Events, 2015-2020.

Area	Year	Count	Mean	SD	SE	Median	Min	Max
MEL-01	2015	14	0.859	0.0793	0.0212	0.871	0.702	0.973
	2016	15	1.88	0.257	0.0663	1.9	1.33	2.27
	2017	15	1.48	0.118	0.0304	1.47	1.27	1.7
	2018	15	1.91	0.103	0.0266	1.94	1.73	2.09
	2019†	15	0.799	0.106	0.0273	0.82	0.58	0.93
	2020	15	1.97	0.226	0.0584	2.03	1.62	2.43
MEL-02	2015	15	0.445	0.0959	0.0248	0.412	0.32	0.573
	2016	15	1.15	0.256	0.0662	1.21	0.337	1.37
	2017	15	0.605	0.0675	0.0174	0.62	0.46	0.72
	2018	15	0.881	0.148	0.0381	0.84	0.7	1.17
	2019†	15	0.199	0.0667	0.0172	0.2	0.04	0.3
	2020	15	0.889	0.106	0.0274	0.87	0.75	1.08
MEL-03	2016	15	0.73	0.122	0.0315	0.744	0.46	0.965
	2017	15	0.573	0.0662	0.0171	0.58	0.43	0.69
	2018	15	0.613	0.0725	0.0187	0.6	0.48	0.74
	2019†	15	0.042	0.0286	0.00738	0.03	0.01	0.12
	2020	15	0.584	0.0442	0.0114	0.59	0.51	0.65
MEL-04	2016	15	0.926	0.0922	0.0238	0.915	0.78	1.09
	2017	15	0.613	0.0733	0.0189	0.63	0.49	0.71
	2018	11	0.585	0.0375	0.0113	0.56	0.55	0.64
	2019†	15	0.161	0.0548	0.0142	0.15	0.09	0.28
	2020	15	0.691	0.0394	0.0102	0.7	0.62	0.77
MEL-05	2016	15	1.1	0.147	0.0379	1.08	0.868	1.4
	2017	15	0.581	0.0448	0.0116	0.58	0.49	0.68
	2018	15	0.583	0.0569	0.0147	0.61	0.47	0.64
	2019†	15	0.129	0.115	0.0296	0.07	0.02	0.36
	2020	15	0.682	0.149	0.0384	0.63	0.53	1.09

Notes

Three replicate samples are collected at each of the 5 stations per area, per event.

† The 2019 chlorophyll-a concentration data were considered “unreliable” for comparing between years because of an issue with the filter type used in 2019. Data are retained for spatial comparisons between areas in 2019, but should not be used for temporal analysis.

Table 6-6 Major Taxa Biomass and Density from the Phytoplankton Study in Meliadine Lake in 2020

Area-Replicate	Date	Phytoplankton Biomass (mg/m3)							Phytoplankton Density (cells/L)						
		Cyanophyte	Chlorophyte	Chrysophyte	Diatom	Cryptophyte	Dinoflagellate	TOTAL	Cyanophyte	Chlorophyte	Chrysophyte	Diatom	Cryptophyte	Dinoflagellate	TOTAL
2020															
MEL-01															
MEL -0101 - PC	15-Aug-20	1	7.12	51	51.13	84.33	11.75	206.17	2,600	100,192	714,416	328,904	187,296	2,400	1,335,808
MEL -0106 - PC	15-Aug-20	2	23.29	69	26.96	79.03	17.70	217.16	3,000	970,840	1,066,432	341,160	206,848	23,952	2,612,232
MEL -0107 - PC	15-Aug-20	8.62	14.25	102	35.55	66.91	18.43	246.07	75,440	444,624	1,970,616	425,816	301,808	3,200	3,221,504
MEL -0108 - PC	15-Aug-20	1.50	15.52	35	34.12	72.07	16.65	174.81	3,000	460,976	441,224	330,024	229,784	10,384	1,475,392
MEL -0109 - PC	15-Aug-20	1.50	18.84	79	24.77	80.04	8.13	212.26	3,000	540,000	1,094,168	252,952	413,568	2,000	2,305,688
Percent Density or Biomass		1.37	7.48	31.75	16.33	36.19	6.88		0.79	22.98	48.28	15.33	12.23	0.38	
MEL-02															
MEL -0201 - PC	18-Aug-20	0	27.48	78	35.03	37.30	3.25	181.52	800	500,296	1,078,400	258,088	368,600	800	2,206,984
MEL -0202 - PC	18-Aug-20	0	4.59	61	79.15	36.21	7.75	188.65	800	348,232	1,200,128	275,000	278,008	1,400	2,103,568
MEL -0203 - PC	18-Aug-20	1	3.62	66	22.11	25.47	4.88	122.89	1,000	65,456	977,824	230,920	147,696	1,200	1,424,096
MEL -0204 - PC	18-Aug-20	0.50	5.72	101	31.97	43.39	6.53	188.69	1,000	130,712	1,487,088	158,512	352,048	600	2,129,960
MEL -0205 - PC	18-Aug-20	0.10	27.47	78	20.84	34.78	7.53	168.55	200	567,736	1,221,880	261,856	265,240	1,600	2,318,512
Percent Density or Biomass		0.22	8.10	45.08	22.24	20.83	3.52		<0.1	15.83	58.58	11.63	13.86	<0.1	
MEL-03															
MEL -0301	19-Aug-20	0	6	152	9.62	19.71	14.02	200.81	200	135,512	2,040,656	51,888	233,488	2,400	2,464,144
MEL -0302	19-Aug-20	0	8	176	10.16	24.58	7.33	226.69	0	97,392	1,559,128	145,680	305,528	1,400	2,109,128
MEL -0303	19-Aug-20	0	22.75	196	5.79	26.53	4.03	254.94	0	604,656	1,883,608	108,760	348,032	800	2,945,856
MEL -0304	19-Aug-20	0	6.16	126	11.30	18.05	18	180.41	0	131,712	1,817,752	132,312	224,704	2,400	2,308,880
MEL -0305	19-Aug-20	0	1.70	103	23.46	18.68	8.03	155.18	200	14,968	1,587,664	95,592	232,088	2,200	1,932,712
Percent Density or Biomass		<0.1	4.38	74.02	5.93	10.56	5.10		<0.1	8.37	75.58	4.54	11.43	<0.1	
MEL-04															
MEL -0401	19-Aug-20	0.2	2.073	103	8.57	21.4	1.84	137.54	400	8,784	1,107,336	88,208	192,784	200	1,397,712
MEL -0402	19-Aug-20	0	0.77	141	6.68	14.25	0.81	163.81	0	29,136	1,731,744	182,600	98,392	200	2,042,072
MEL -0403	19-Aug-20	0.4	11.08	102	11.9	18.08	8.35	151.72	800	132,712	1,351,192	80,040	184,000	600	1,749,344
MEL -0404	19-Aug-20	0	7.17	115	10.73	19.8	2.44	155.67	0	59,272	1,228,864	158,648	178,016	600	1,625,400
MEL -0405	19-Aug-20	0.1	3.39	62	6.94	17.6	1.63	91.65	200	152,464	1,106,736	66,056	183,400	400	1,509,256
Percent Density or Biomass		<0.1	3.50	74.83	6.40	13.02	2.15		<0.1	4.59	78.40	6.91	10.05	<0.1	
MEL-05															
MEL -0501 - PC	23-Aug-20	3	3.65	129	14.17	15.47	4	169.41	29,336	31,536	1,501,856	69,656	140,896	600	1,773,880
MEL -0502 - PC	23-Aug-20	0	4.71	93	8.64	15.96	12.04	134.89	600	123,528	1,221,880	103,376	189,184	1,600	1,640,168
MEL -0503 - PC	23-Aug-20	4	2.56	104	11.60	13.48	15.19	149.93	28,736	252,440	1,243,432	175,216	146,480	1,000	1,847,304
MEL -0504 - PC	23-Aug-20	0	5.41	102	16.98	16.76	16.15	157.15	0	138,296	1,544,560	103,776	175,616	2,600	1,964,848
MEL -0505 - PC	23-Aug-20	1	1.92	91	10.38	9.07	11.71	124.10	1,000	29,936	1,623,584	68,856	75,440	2,600	1,801,416
Percent Density or Biomass		0.98	2.48	70.44	8.40	9.62	8.09		0.66	6.38	79.04	5.77	8.06	<0.1	

Table 6-7 Secchi Depth and Total Water Depth from the August 2020 Sampling Event

Area	Station	Secchi (m)	Water (m)
MEL-01	MEL-01-01	7.1	9.4
	MEL-01-06	na	8.8
	MEL-01-07	7	7.7
	MEL-01-08	7.2	7.5
	MEL-01-09	6	7.1
MEL-02	MEL-02-01	6	6
	MEL-02-02	6.1	7.8
	MEL-02-03	6.3	7
	MEL-02-04	6.1	9
	MEL-02-05	6.1	8
MEL-03	MEL-03-01	7.1	7.1
	MEL-03-02	8	8.5
	MEL-03-03	10	12.2
	MEL-03-04	8	8
	MEL-03-05	7.8	7.8
MEL-04	MEL-04-01	7.4	7.4
	MEL-04-02	10.1	10.1
	MEL-04-03	8.6	8.6
	MEL-04-04	8.1	8.1
	MEL-04-05	7.1	7.1
MEL-05	MEL-05-01	9.1	9.1
	MEL-05-02	9.2	9.2
	MEL-05-03	8.38	8.38
	MEL-05-04	10	10
	MEL-05-05	8.3	8.3

Notes

na = Secchi depth was not recorded at MEL-01-06

7 PENINSULA LAKES – WATER QUALITY

7.1 2020 Field Program

Field collections and sample analyses were conducted according to methods outlined in the *AEMP Design Document* (Golder 2016) and in recent AEMP interpretive reports.

7.1.1 Field Data and Sample Collection

Water sampling was completed in July and August 2020 at Lake A8, Lake B7, and Lake D7 as per the study design (**Figure 1-2**). The three Peninsula Lakes are relatively shallow (1.5 to 2.5 m). Total water depth was measured using a sounding line or portable depth sounder. Secchi depth was not recorded at any of the Peninsula Lakes due the shallow depth of the lakes (i.e., the Secchi disc is visible at the bottom of the lake).

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 (**Figure 1-2; Table 7-3**). 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 at 1 m using a Kemmerer grab sampler according to the water sampling SOP for the AEMP (Golder 2016). Water samples for dissolved analyses (e.g., metals) were filtered in the field using a syringe and disposable 0.45 µm disc filter according to standard methods recommended by ALS Environmental³². Samples were refrigerated and shipped to ALS (Winnipeg, MB) for analysis.

7.2 Approach and Objectives

Lakes A8, B7, and D7 are located on the peninsula between the south and east basins of Meliadine Lake near the mine and are monitored annually as part of the AEMP. These small lakes are included in the AEMP because of the potential for mine-related changes to water quality caused by deposition of air emissions and alteration of the sub-watersheds on the peninsula (Golder 2016). The methods and data analyses described in this report are consistent with previous AEMP reporting cycles and followed the objectives outlined in the *AEMP Study Design Document* (Golder 2016) to answer the following two key questions:

³² ALS EnviroMail™ Issue #121 ([Link to ALS website](#)) for information on best practices for filtering water samples.

1. *Is water quality in the Peninsula Lakes consistent with water quality predictions in the FEIS and less than AEMP Action Levels³³?*
2. *Are concentrations of key parameters increasing over time relative to baseline conditions?*

To answer these questions, water quality data from the Peninsula Lakes study in 2020 were evaluated by:

- Comparison against the normal range of baseline conditions,
- Screening against aquatic life and drinking water quality guidelines (AEMP Benchmarks),
- Comparison to water quality predictions in the FEIS, and
- Temporal comparisons of changing concentrations over time.

Normal Range Comparison

Normal ranges calculated for the Lake A8, Lake B7, and Lake D7 in 2018 AEMP have been carried forward for use in this report. Data included in the normal range calculation for each parameter were collected between 1995 and 2011 (baseline) and 2015 to 2017 (pre-construction). Golder conducted a review of the historical data as part of the 2018 normal range assessment and concluded that conventional parameters, major ions, and selected nutrients from the historical data were fit for use in the normal range estimation. Nitrogen parameters and metals were not retained because DLs in the historical data are not comparable with current DLs. Statistical methods used to estimate the normal range of concentrations for the Peninsula Lakes are described in Golder (2018).

Comparison to FEIS Predictions

Golder conducted water quality modeling 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 peninsula³⁴. As mentioned previously, the original Project Certificate No.006 included development of deposits other than Tiriganiaq, two of which would have required 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

³³ AEMP Action Levels and Benchmarks are listed in [Table 2-2](#).

³⁴ 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.

Lake D7 were removed from the final design because the lakes are underlain by a zone of 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 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). Similar to Meliadine Lake, water quality in the waterbodies closest to the mine (e.g., Lake B7) was predicted to change, but most water quality parameters, changes in water quality were predicted to be *minor*, defined as an increase from baseline, but less than guidelines for protection of aquatic life, drinking water quality, and SSWQO. The only notable statement in the Type A Water Licence Application with direct relevance for the Peninsula Lakes study applies to arsenic. During operations, water quality was predicted to meet MMER (now MDMER) discharge limits at all CPs on site, with the exception of 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).

Temporal Trend Assessment

Temporal trends in concentrations were examined qualitatively using plots showing concentrations of selected water quality parameters over time. Parameters were carried forward for temporal trend assessment if the parameter *exceeded* the normal range screening assessment, similar to the approach outlined for the Meliadine Lake study.

7.3 Results and Discussion

This section summarizes results of the 2020 water quality assessment for the Peninsula Lakes. Figures and tables to support the results and discussion are presented at the end of this chapter in **Section 7.6** (Figures) and **Section 7.7** (Tables), respectively.

7.3.1 Field-Measured Water Quality Parameters

Limnology profiles for the Peninsula Lakes in July and August 2020 are presented in **Figure 7-1**. The small size and shallow depth of the Peninsula Lakes means oxygen, pH, temperature, and specific conductivity are well mixed vertically (top to bottom in the water column) and horizontally (between stations).

Dissolved oxygen – Wave and wind action kept the lakes well oxygenated in July and August (> 8 mg/L).

pH – The pH of the lakes was slightly alkaline, typically measuring between 7.5 and 8.5 compared to Meliadine Lake which is typically circum-neutral (7 to 7.5). There is no evidence of changes in pH in the Peninsula Lakes since the transition from baseline to constructions and operations.

Specific conductivity – Specific conductivity was lowest at Lake D7 and highest at Lake B7 and Lake A8 in 2020. Specific conductivity increased slightly between the July and August event at Lake D7 and Lake A8, consistent with the pattern of change that was observed in 2019. At Lake B7, the magnitude of the increase between July and August 2020 was more pronounced, as indicated by Lake B7 conductivity measuring the range observed in Lake A8 (244 $\mu\text{S}/\text{cm}$ in July and 281 $\mu\text{S}/\text{cm}$; **Figure 7-1**).

Compared to limnology profiles taken in 2018, conductivity in both Lake A8 and Lake B7 has increased, with a particularly noticeable step-increase between 2019 and 2020 at Lake B7 (**Figure 7-1**). In 2018, lake-wide conductivity was in the range of 130 to 140 $\mu\text{S}/\text{cm}$ and in the range of conductivity reported for Lake D7. From July 2019 to August 2020, lake-wide conductivity has increased from 150 $\mu\text{S}/\text{cm}$ to 275 $\mu\text{S}/\text{cm}$. conductivity in Lake D7 has remained consistent, while both Lake B7 and Lake A8 have trended higher based on their locations relative to the TSF (Lake B7) and Tiriganiaq Pit development (Lake A8).

7.3.2 Water Quality Screening

Summary statistics and water quality screening results for the Peninsula Lakes are provided in **Table 7-4** (Lake A8), **Table 7-5** (Lake B7), and **Table 7-6** (Lake D7).

Comparison to Guidelines

Water quality for the Peninsula Lakes was predicted to meet aquatic life, human health guideline, or in the case of fluoride, arsenic, and iron SSWQO throughout construction, operations, and closure (Agnico Eagle 2015). Arsenic concentrations were below the SSWQO of 25 $\mu\text{g}/\text{L}$ in Lake A8 (mean sample concentration of 5.4 $\mu\text{g}/\text{L}$) and Lake B7 (mean sample concentration of 5.5 $\mu\text{g}/\text{L}$). The SSWQO is the AEMP Benchmark for the protection of aquatic life and is conservatively protective of the aquatic receiving environment (Golder 2013). There were no other exceedances of CCME WQGs or drinking water quality guidelines in the Peninsula Lakes samples from 2020 based on the mean concentration from the July and August sampling events.

Normal Range Assessment

Results of the normal range screening assessment for the Peninsula Lakes are summarized in **Table 7-1**. Detailed tables showing results of the normal range screening assessment are provided in **Table 7-7** (Lake A8), **Table 7-8** (Lake B7) and, **Table 7-9** (Lake D7) at the end of this chapter. The upper limit of the normal range is also shown in the temporal chemistry plots in **Figure 7-2** to **Figure 7-6** to help visualize changes in water quality over time relative to the normal range.

Table 7-1. Parameters that exceeded the normal range in concentration for the Peninsula Lakes in 2020 and comparison of mean/median concentrations from 2018-2020

Lake	Parameter > NR in 2020	Normal Range ^[a]	AEMP Benchmark	Baseline ^[b]		Concentration ^[c]		
				Median	Max	2020	2019	2018
A8	Ammonia as N	0.011	0.58	<0.05	1.3	0.043	0.016*	0.003
	Aluminum (T) (µg/L)	3.0	100	2	40	4.5*	5.2	4.3
	Arsenic (T) (µg/L)	2.4	25	1.8	4.2	5.4	2.3	2.5
	Boron (T) (µg/L)	5.0	1,500	<50	<100	5.6 *	5.0	2.9
	Copper (T) (µg/L)	0.89	2.1	1.2	27	1.3	0.73	0.7
	Iron (T) (µg/L)	67	300	72	695	73	89	79
	Lead (T) (µg/L)	0.030	5.0	<0.05	63	0.069	0.060	0.020
	Molybdenum (T)	0.22	73	<0.02	<5	0.27	0.19	0.25*
	Vanadium (T) (µg/L)	0.05	120	0.25	1	0.051*	0.067*	0.053*
B7	Chloride (mg/L)	25.0	120			38.9	26.6	24
	Sulphate (mg/L)	6.00	218			8.15	5.90	4.92
	Antimony (T) (µg/L)	0.020	6.0			0.069*	0.020	0.020
	Arsenic (T) (µg/L)	1.80	25			5.45	1.79	1.59
	Barium (T) (µg/L)	20.0	1,000			24.6	19.4	20.0
	Boron (T) (µg/L)	8.00	1,500			14.9*	9.6 *	10.5*
	Cobalt (T) (µg/L)	0.05	0.92			0.07	0.052	0.04
	Lithium (T) (µg/L)	7.50	na			19.6	12.6	14.4
	Molybdenum (T)	0.24	73			1.42	0.18	0.19
	Strontium (T) (µg/L)	155	1,700			276	205	226
	Uranium (T) (µg/L)	0.030	15			0.044	0.025	0.026
	Vanadium (T) (µg/L)	0.050	120			0.051*	0.072*	0.074*
D7	Ammonia (as N)	0.009	0.14	<0.05	1.4	0.031	0.019*	0.020*
	Nitrate (as N) (mg/L)	0.005	2.9	0.04	0.8	0.012*	0.009*	0.005
	Aluminum (T) (µg/L)	6.7	100	5.3	21	7.3	6.3	5.28
	Arsenic (T) (µg/L)	1.2	25	1.1	3.8	1.3	1.1	1.0
	Cobalt (T) (µg/L)	0.050	0.78	<0.1	<15	0.064	0.050	0.064
	Lead (T) (µg/L)	0.020	5.0	<0.2	1.4	0.024*	0.034	0.019
	Titanium (T) (µg/L)	0.34	na	0.7	<10	0.40	0.31	0.23
	Vanadium (T) (µg/L)	0.070	120	0.1	30	0.092*	0.11*	0.07

Notes

na = no AEMP Benchmark for lithium or titanium (i.e., no aquatic life or human health drinking water guidelines).

[a] Normal ranges were calculated in Golder (2019) using baseline data from 1995 to 2011 and 2015 to 2017. Some baseline data used in the FEIS for metals and nitrogen parameters were not included in derivation of the normal range estimates due to high detection limits in samples analyzed from the 1990s and 2000s baseline surveys.

[b] Baseline median and maximum concentrations for Lake A8 and Lake D7 are reported in Appendix 7.4-A (Agnico Eagle 2014).

[c] **Bolded** concentrations exceeded the upper limit of the normal range by more than 10% and were > 5* the analytical detection limit.

"*" indicates the mean/median concentration exceed the normal range in 2020 but was <5-times the analytical detection limit.

Table 7-2. Parameters that exceeded Baseline Concentrations by More than 10% in 2020

Lake	Concentrations Exceed 10% Baseline
A8	Ammonia, arsenic, copper, lead, molybdenum
B7	Chloride, sulphate, arsenic, barium, cobalt, lithium, molybdenum, strontium, uranium
D7	Ammonia, cobalt, titanium

Notes

“*” indicates the mean/median concentration exceed the FEIS prediction but was <5 x the analytical detection limit.

Comparison to Water Quality Predictions in the FEIS

Table 7-1 presents those parameters (in bold) where the mean or median concentration in 2020 exceeded the upper limit of baseline concentrations by 10%. For the purpose of this assessment, the upper 90th percentile of the normal range is used to characterize baseline concentrations. Parameters that exceeded 10% of baseline but where concentrations were measured at less than 5-times the analytical detection limit are shown, but not considered “elevated” because of higher uncertainty with results close to the analytical detection limit. Results for each lake are discussed below.

Lake A8 Water Quality Summary

Lake A8 water quality in 2020 was within the normal range of concentrations for the majority of the parameters. Mean and/or median concentrations of ammonia, copper, lead, and molybdenum exceeded the upper limit of the normal range by more than 10% and were greater than 5x the detection limit, but were below the water quality guidelines for protection of aquatic life and drinking water quality. The mean arsenic concentration in Lake A8 in 2020 (5.6 µg/L) was elevated relative to the normal range for the baseline period (2.4 µg/L) and but was below the AEMP Benchmark (SSWQO) for the project of 25 µg/L.

Dustfall monitoring location DF-4 located on the north shore of Lake A8 was sampled during the snow pack survey in February and April 2020. The station is located directly south of Tirianiaq pit development. Most of the parameters were detected above DL in 2020 (**Appendix G**). Parameters detected in 2019 were also reported at detectable concentrations in the 2020 snow samples including; aluminum, arsenic, iron, strontium, as well as major cations (e.g., calcium and magnesium). Several parameters were detected at concentrations at least 5 times above the detection limit at DF-4 in at least one sampling event in 2020 including; aluminum, antimony, arsenic, barium, cadmium, cobalt, chromium, copper, iron, lead, manganese, molybdenum, nickel, strontium, thallium, uranium and zinc. Of these, aluminum, arsenic, copper, lead, and molybdenum also exceeded their respective water quality normal ranges by over 10% during summer sampling, suggesting that dust may be influencing water quality in Lake A8; however, concentrations are not trending upward, and concentrations remain below the AEMP benchmarks which are protective of aquatic life.

Lake B7 Water Quality Summary

The extent of the TSF, as of the end of 2020, is within approximately 150 m of the northeast shore of Lake B7. Water quality results from 2020 were compared against the upper limit of the normal range of baseline data to evaluate the effectiveness of control measures to limit off-site migration of contaminants from non-point sources (e.g., dust and aerial emissions). Concentrations of chloride, sulphate, arsenic, barium, cobalt, lithium boron, lithium, strontium, and uranium exceeded normal ranges by over 10% and were also at least 5 times the analytical detection limit. Of the parameters with AEMP Benchmarks, none exceeded their respective Action Levels (75% of the AEMP Benchmark).

Snow samples were collected at the dustfall station DF-6 (**Figure 1-2**), the station closest to B7, in February and April, 2020. Unlike in 2019, TSS was detected in samples collected in 2020. Other parameters that were detected at concentrations greater than 5 times the DL in at least one sampling event include aluminum, antimony, arsenic, barium, cadmium, chromium, cobalt, copper, iron, lead, manganese, molybdenum, nickel, selenium, silver, strontium, uranium, and zinc. Whether detectable concentrations of TSS or other parameters is linked to off-site dust migration is unclear. However, the effect of dust on water quality in Lake B7 is likely negligible considering the volume of water entering these lakes during spring freshet.

Lake D7 Water Quality Summary

Cobalt and titanium were the only two parameters, other than ammonia, that were elevated in 2020 relative to baseline concentrations and greater than 5 times the analytical detection limit. In the case of cobalt, the mean concentration (0.064 µg/L) was also observed in 2018, and was marginally above the normal range of 0.05 µg/L. Similarly, the mean concentration of titanium (0.40 µg/L), is only slightly above the normal range of 0.34 µg/L. However, mean concentration has increased relative to 2019 (0.31 µg/L) and 2018 (0.23 µg/L). These results conform to water quality model results that predicted titanium concentrations would increase by 10% from baseline levels for the D watershed lakes during construction and operations. By post-closure, titanium concentrations are predicted to decrease to baseline concentrations (FEIS Volume 7; Agnico Eagle 2014). Other parameters, including nitrate, lead, and vanadium are elevated relative to baseline concentrations but are within 5 times the analytical detection limit. Measurement uncertainty is higher for readings close to the detection limit, and these results should be interpreted with caution due to greater uncertainty associated with low-level analyses³⁵.

³⁵ The BC Environmental Laboratory Technical Advisor recommends 5-times the analytical detection limit as a guide for assessing analytical accuracy for laboratory duplicates based on measurement uncertainty estimates from various laboratories ([Link to document](#)).

Lake D7 is, as expected, the lake that more closely resembles baseline conditions given its location relative to the mine. In this context, Lake D7 provides a good point of comparison with which to monitor the spatial extent of changes in water quality attributable to non-point source discharges from the mine. It's evident that for most parameters, and particularly those that were elevated at Lake B7 and Lake A8, the spatial extent of mine-related changes to water quality for lakes on the peninsula is confined to lakes closest to the site.

7.3.3 Temporal Trend Assessment

The normal range assessment is one way of evaluating whether current water quality is within the range of conditions measured prior to development. To further support the normal range assessment, temporal changes in water quality were qualitatively examined using temporal plots to visually examine changes in concentration for key parameters since the onset of formal baseline monitoring for the AEMP in 2015. Condensed-temporal plots of changes in concentration over time are presented in [Figure 7-2](#) to [Figure 7-7](#) and provide a visual means of assessing changes over time.

Observations from the temporal assessment of changes in water quality are:

- Relative to the construction phase (2017 and 2018) major ionic compounds ([Figure 7-2](#)) and conductivity ([Figure 7-3](#)) have remained stable through 2020 at Lake A8 and Lake D7. However, these parameters have shown an increasing trend during 2020 at Lake B7 relative to the construction phase. Sodium, chloride, and sulphate were slightly higher at B7 in 2020 compared to previous years, with chloride and sulphate exceeding 10% of the normal range for the baseline dataset ([Table 7-8](#)).
- Nutrient parameters were within the range of baseline concentrations (see TKN, total phosphorus, and DOC in [Figure 7-3](#)), with the exception of nitrate at D7. Nitrate concentrations have typically been less than the analytical detection limit of 0.005 µg/L at D7. However, in 2020, the mean concentration was 0.012 µg/L.
- Metal concentrations (total and dissolved fractions) in Lake D7 were similar in 2020 to the two previous years ([Figure 7-4](#) to [Figure 7-7](#)). However, increases in metals concentrations were observed in both Lake A8 (arsenic, copper, and lead) and Lake B7 (arsenic, barium, boron, cobalt, lithium, molybdenum, strontium, and uranium).

Concentrations of aluminum and iron (total fraction) appear to have stabilized at Lake A8 after increasing during the construction phase ([Figure 7-4](#)).

Lead concentrations at Lake A8 and Lake D7 also appear to have stabilized after increasing during the construction phase. It is clear from [Figure 7-7](#) that the frequency of detection for total lead has increased at all three Peninsula Lakes since 2017. Current concentrations are consistent with predictions in the FEIS and below concentrations that would trigger a Low Action Level exceedance.

7.4 Low Action Level Assessment – Peninsula Lakes

Results presented in [Section 7.3](#) provides the evidence used to answer the following two questions about whether the mine is causing changes to water quality in the Peninsula Lakes:

Question 1: is water quality in the Peninsula Lakes consistent with the FEIS predictions (negligible to minor increase from baseline) and less than the AEMP benchmarks (Table 2-2)?

- **Response:** Water quality in the Peninsula Lakes has changed relative to baseline conditions, particularly in the case of Lake A8 and Lake B7. Among the parameters with noticeable increases in 2020 are arsenic (Lake A8 and Lake B7), barium (Lake B7), cobalt (Lake B7), and lithium (Lake B7). Arsenic is the only parameter with effects-based guidelines. The AEMP Benchmark for arsenic is 10 µg/L for protection of human drinking water quality, which may not be an appropriate benchmark to compare against given the proximity of Lake A8 and Lake B7 to mine infrastructure and the expectation that people are not using either lake for drinking water. All four samples in Lake B7 and Lake A8 were above 3 µg/L, but the average concentration at Lake A8 (5.8 µg/L) and Lake B7 (5.5 µg/L) remains below the Low Action Level of 7.5 µg/L.
- There were a few samples in Lake A8 with copper concentrations that exceeded the AEMP Action Level, but the average concentration from the July and August sampling events was 1.3 µg/L, marginally below the 1.5 µg/L Low Action Level concentration for copper.
- No other parameters were close to the AEMP Low Action Levels.

Question 2: are concentrations increasing over time relative to baseline conditions in each lake?

- **Response:** There is clear evidence that some parameters have increased relative to the baseline period, most notably arsenic in Lake A8 and Lake B7 and lithium in Lake B7. For the majority of other parameters, concentrations have either plateaued or decreased as the mine has transitioned from peak construction to operations. The small number of parameters that have increased at Lake A8 and Lake B7 (e.g., arsenic, boron, lithium) are clearly attributable to mining activities; however, it's important to reiterate that minor changes in water quality were predicted in the FEIS (Agnico Eagle 2014) for these, and other lakes on the peninsula, due to non-point source discharges such as dust and altered hydrology to accommodate mine development.

7.5 Recommendations for 2021

Water quality in Lake A8 and Lake B7 in 2020 conform to the FEIS prediction of a *minor* change (i.e., > baseline but < WQG) and concentrations are less than the AEMP Action Levels (75% of the AEMP Benchmark). According to the Response Framework criteria, routine monitoring is planned for 2021 to continue track mine-related changes in water quality in the Peninsula Lakes.

7.6 Figures – Peninsula Lakes

Figure 7-1. *In-situ* Limnology Profiles at the Peninsula Lakes, 2018 – 2020

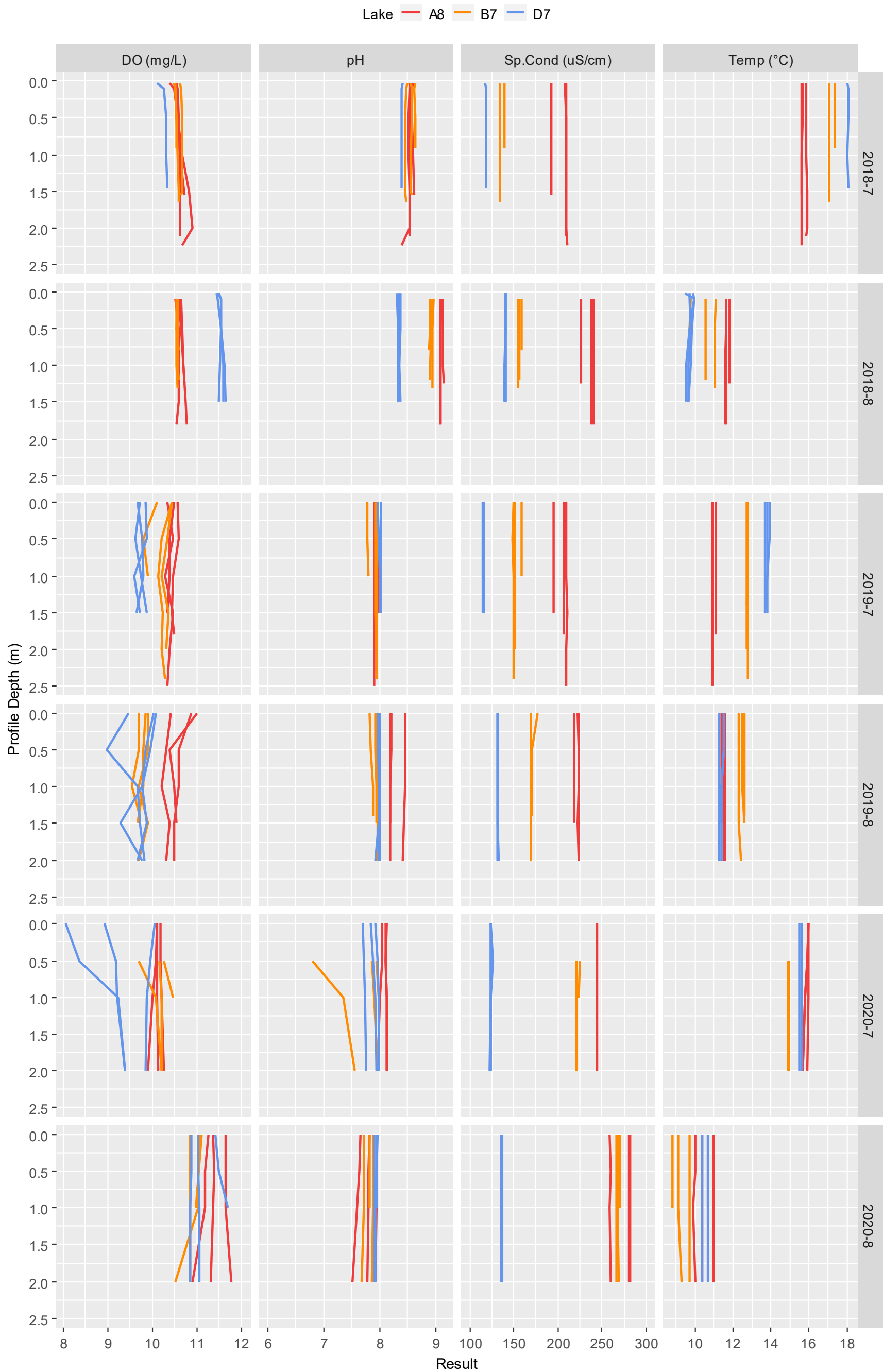


Figure 7-2. Concentrations of TDS, Hardness, and Major Ions (Ca, Mg, K, and Na) Since 2015

Notes: TDS = total dissolved solids; Hard = hardness; Ca, Mg, K, and Na = calcium, magnesium, potassium, sodium; Cl = chloride; SO4 = sulphate.
Normal range = the upper 90th prediction interval or percentile of baseline concentrations (pre-2018). Action Level = 75% of the AEMP Benchmark (Table 2-2).

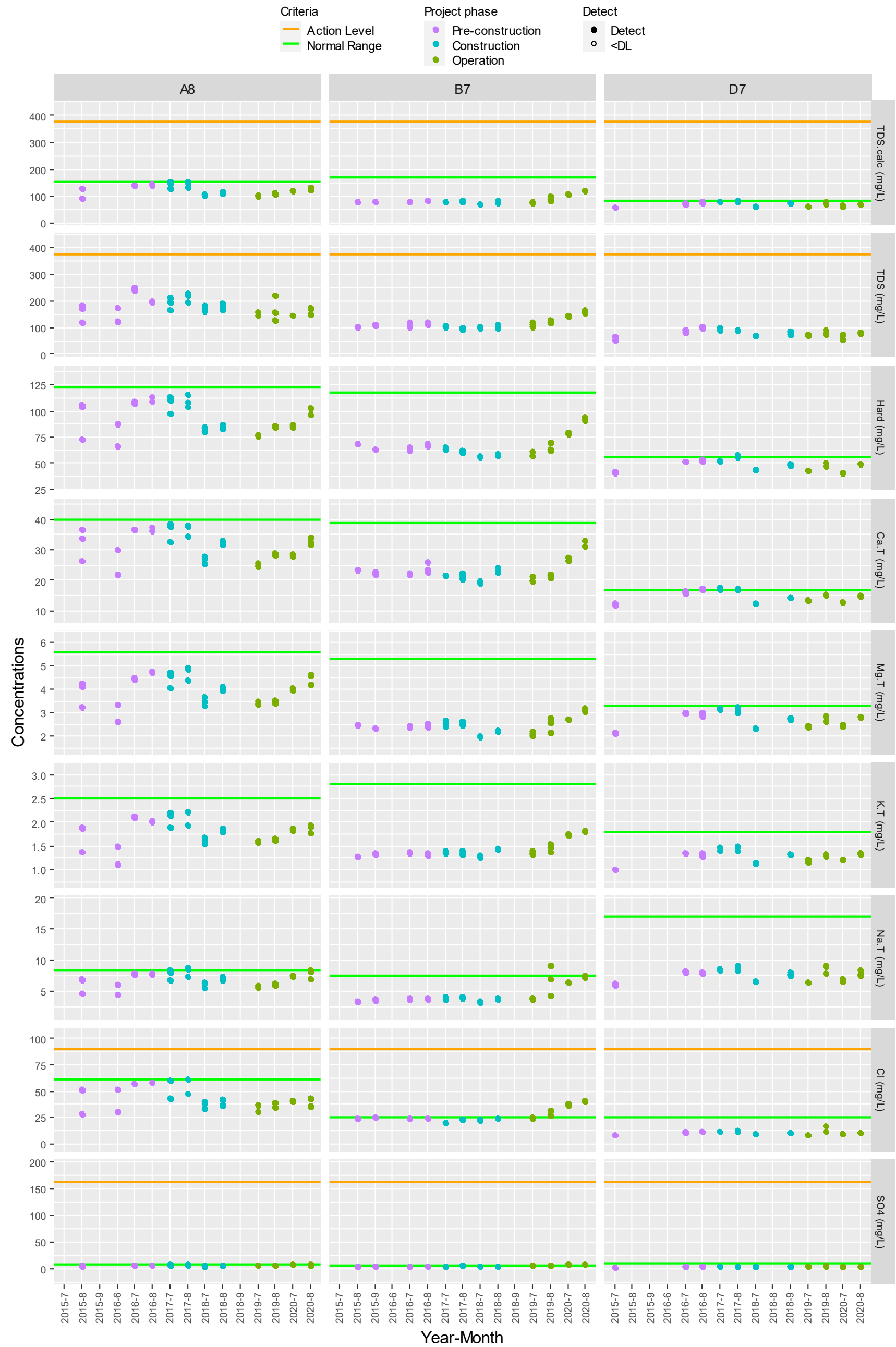


Figure 7-3. pH, conductivity, and Concentrations of Selected Nutrients Since 2015

Notes: TDS = total dissolved solids; Hard = hardness; Ca, Mg, K, and Na = calcium, magnesium, potassium, sodium; Cl = chloride; SO4 = sulphate.
Normal range = the upper 90th prediction interval or percentile of baseline concentrations (pre-2018). Action Level = 75% of the AEMP Benchmark (Table 2-2).

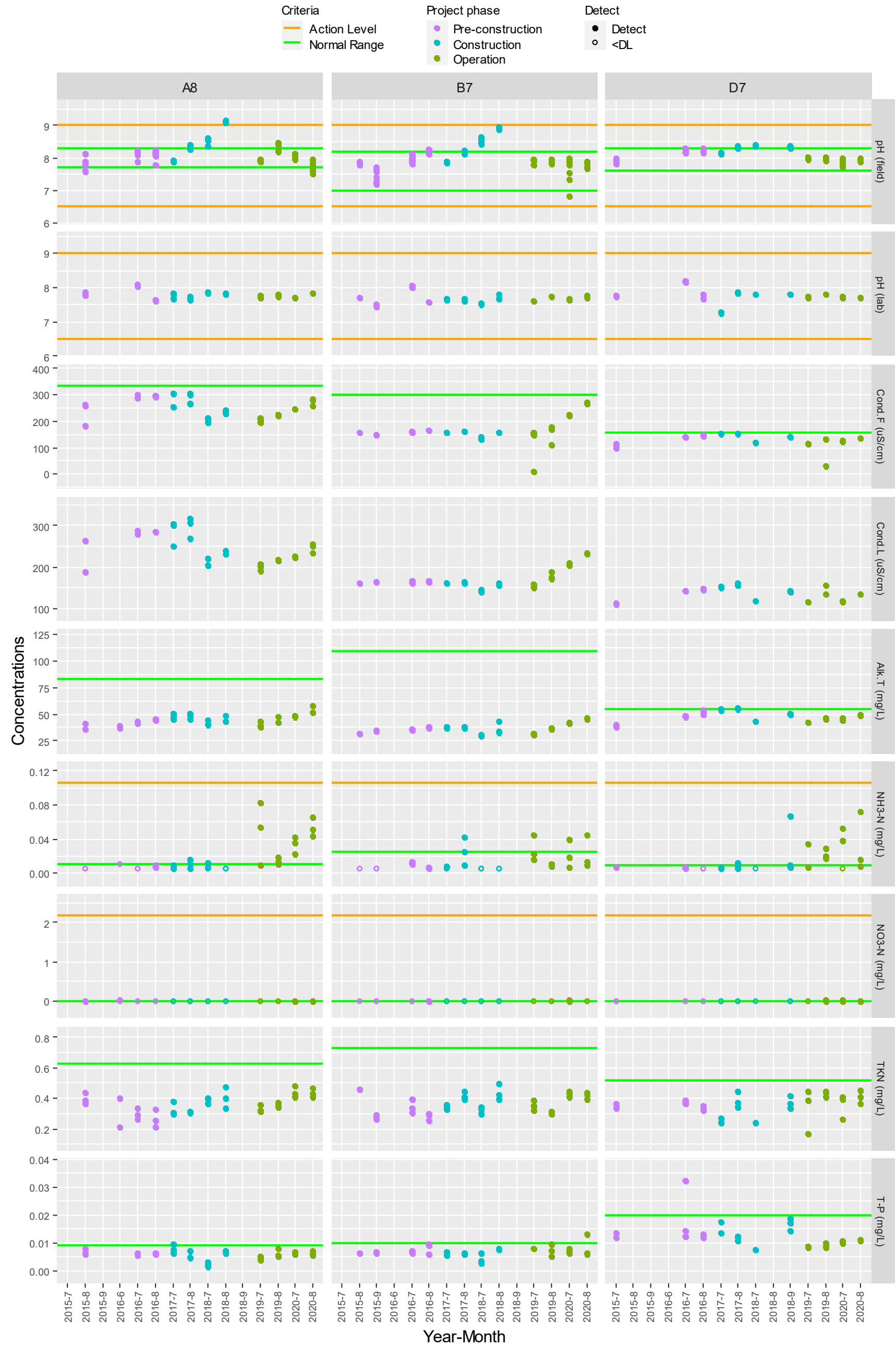


Figure 7-4. Total (Unfiltered) Concentrations of Selected Metals Since 2015 (Aluminum to Lead)

Notes: Normal range = the upper 90th prediction interval or percentile of baseline concentrations (pre-2018). Action Level = 75% of the AEMP Benchmark (Table 2-2).

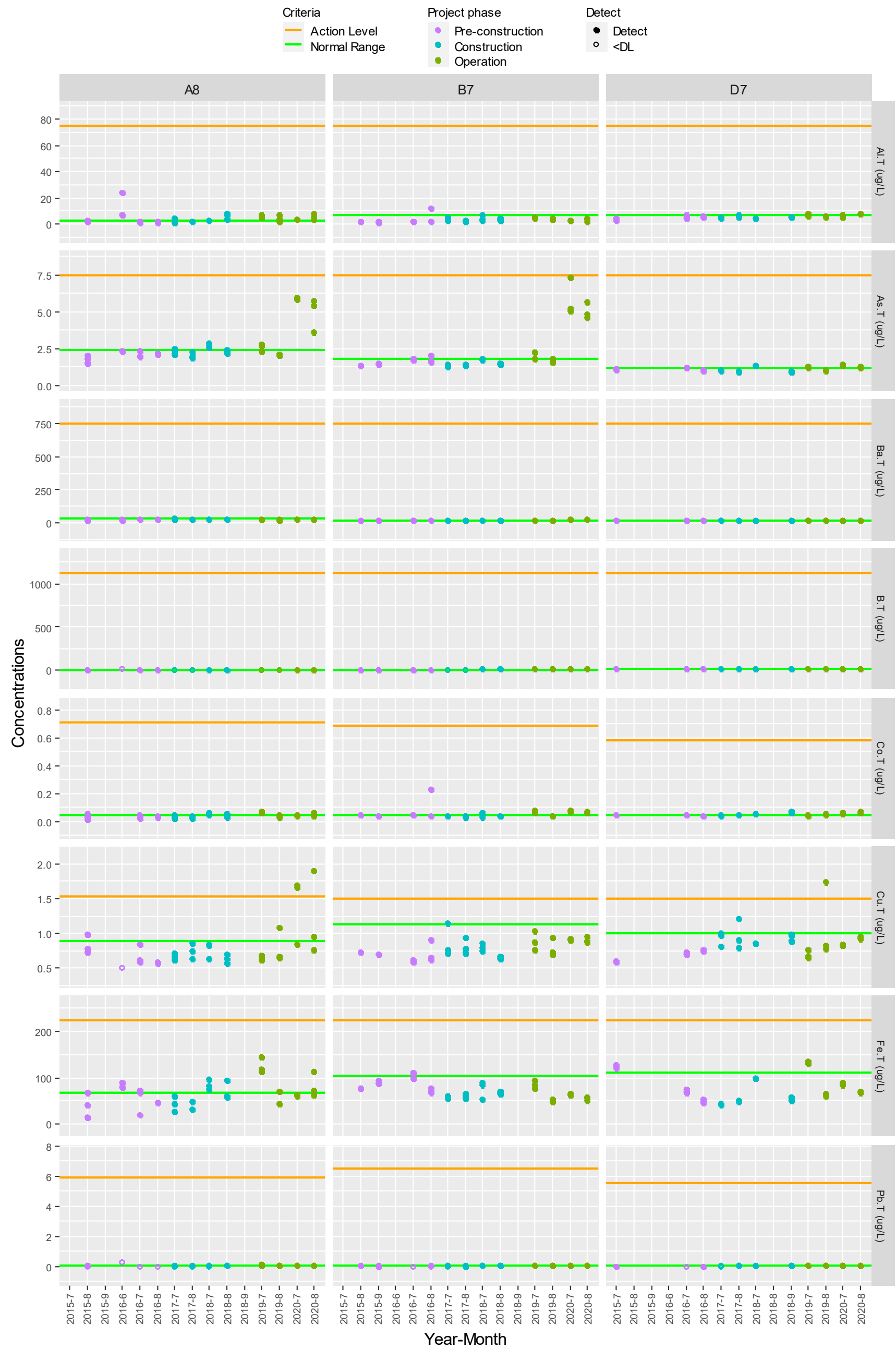


Figure 7-5. Total (Unfiltered) Concentrations of Selected Metals Since 2015 (Lithium to Zinc)

Notes: Normal range = the upper 90th prediction interval or percentile of baseline concentrations (pre-2018). Action Level = 75% of the AEMP Benchmark (Table 2-2).

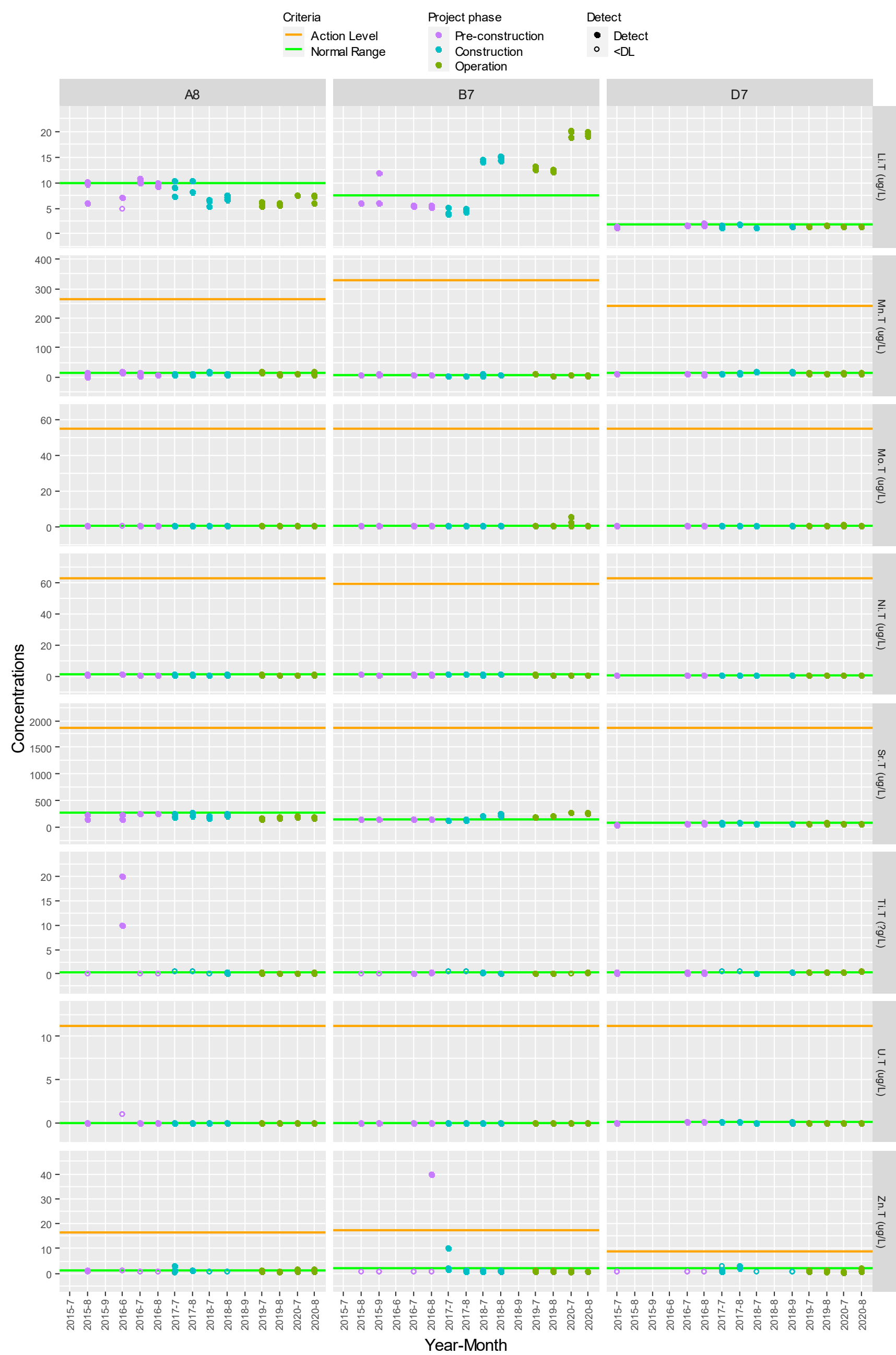


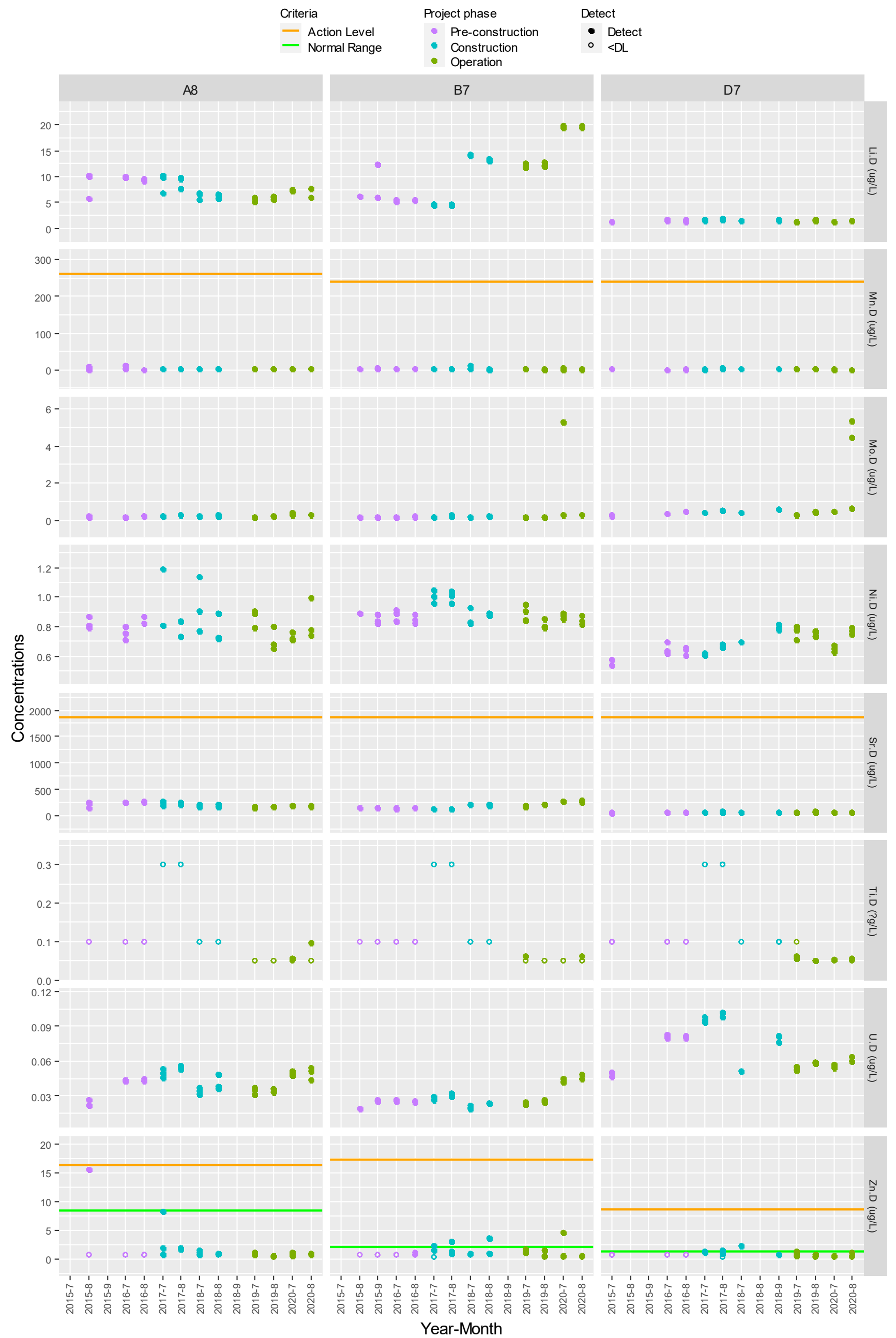
Figure 7-6. Concentration of Selected Dissolved Metals Since 2015 (Aluminum to Lead)

Notes: Concentrations shown in log10 scale for the dissolved (0.45 µm filtered) fraction.
Normal ranges were not computed for these dissolved parameters.



Figure 7-7. Concentration of Selected Dissolved Metals Since 2015 (Lithium to Zinc)

Notes: Concentrations shown in log10 scale for the dissolved (0.45 µm filtered) fraction. Normal ranges were not originally developed for dissolved manganese and strontium.



7.7 Tables – Peninsula Lakes

Tables specific to the Peninsula Lakes study areas are presented below. The 2020 water quality dataset for the Peninsula Lake stations is provided in [Appendix D](#).

Table 7-3. Peninsula Lake area monitoring stations sampled in 2020

Area	Station ID	UTM (zone 15V)				Depths ^[b]
		Easting	Northing	Jul	Aug	
				11, 13 & 15	9, 12 & 14	Total
Lake A8	A8-01	540007	6987659	✓	✓ (FD)	2.3
	A8-02	540211	6987204	✓	✓	2.2
	A8-03	540925	6987421	✓	✓	1.7
Lake B7	B7-01	538631	6989096	✓	✓	1.0
	B7-02	538195	6989436	✓	✓	1.7
	B7-03	537713	6989798	✓	✓	1.7
Lake D7	D7-01	536390	6989340	✓ (FD)	✓ (FD)	1.7
	D7-02	536567	6988868	✓	✓	1.7
	D7-03	536852	6988689	✓	✓	1.8

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).

Table 7-4. Lake A8 – Water Quality Screening Assessment, 2020.

Parameter	Units	Screening Criteria ^[a]					AEMP Benchmark ^[c]	AEMP Action Level	Lake A8												
		Normal Range (Upper Limit of Baseline)	Aquatic Life	Health Canada		SSWQO			Summary Statistics ^[d]								% of samples > screening criteria				
			CCME or FEQG Aquatic Life [b]	GCDWQ	Aesthetic Objective				N	N<MDL	% <MDL	Mean	SD	Median	Min	Max	Chronic	GCDWQ	AO	SSWQG	
Field Measurements																					
Temperature (°C)	°C	-	-	-	15	-	-	-	6	0	0	13.2	3	13.4	9.9	16	-	-	-	-	
Sp. Conductivity (field) (µS/cm)	uS/cm	334	-	-	-	-	-	-	6	0	0	259	18.2	252	244	281	-	-	-	-	
pH (field)	pH units	7.7 8.3	6.5 9.0	-	7.0 10.5	-	6.5 9.0	-	6	0	0	7.93	0.206	7.98	7.59	8.12	0	-	0	-	
DO (mg/L)	mg/L	-	6.5	-	-	-	6.5	-	5	0	0	10.6	0.737	10.2	10	11.6	0	-	-	-	
DO (%)	%	-	-	-	-	-	-	-	6	0	0	102	2.17	102	99.9	106	-	-	-	-	
Conventional Parameters																					
Conductivity (lab, µS/cm)	uS/cm	-	-	-	-	-	-	-	6	0	0	236	14.3	230	222	256	-	-	-	-	
Hardness	mg/L	123	-	-	-	-	-	-	6	0	0	93.2	8.79	91.6	84.5	103	-	-	-	-	
pH (lab)	pH units	-	6.5 9.0	-	7.0 10.5	-	6.5 9.0	-	6	0	0	7.76	0.0602	7.76	7.71	7.82	0	-	0	-	
Total Dissolved Solids	mg/L	-	-	-	500	-	500	375	6	0	0	155	14.3	147	144	174	-	-	0	-	
TDS (Calculated)	mg/L	152	-	-	500	-	500	375	6	0	0	123	6.5	120	118	132	-	-	0	-	
Total Suspended Solids	mg/L	4	-	-	-	-	-	-	6	5	83	-	-	1	1	1.2	-	-	-	-	
Turbidity (lab, NTU)	NTU	0.87	-	-	-	-	-	-	6	0	0	0.47	0.132	0.465	0.35	0.71	-	-	-	-	
Major Ions																					
Alkalinity, Bicarbonate	mg/L	91	-	-	-	-	-	-	6	0	0	62.4	4.44	61.4	58.3	70.2	-	-	-	-	
Alkalinity, Carbonate	mg/L	-	-	-	-	-	-	-	6	6	100	-	-	0.6	0.6	0.6	-	-	-	-	
Alkalinity, Hydroxide	mg/L	-	-	-	-	-	-	-	6	6	100	-	-	0.34	0.34	0.34	-	-	-	-	
Alkalinity, Total	mg/L	83.6	-	-	-	-	-	-	6	0	0	51.1	3.62	50.3	47.8	57.5	-	-	-	-	
Bromide		-	-	-	-	-	-	-	6	0	0	0.237	0.0163	0.24	0.21	0.26	-	-	-	-	
Calcium (D)	mg/L	-	-	-	-	-	-	-	6	0	0	30.5	2.97	30	27.5	33.9	-	-	-	-	
Calcium (T)	mg/L	40	-	-	-	-	-	-	6	0	0	30.6	2.61	30.2	27.8	34.1	-	-	-	-	
Chloride	mg/L	61.000	120	-	250	-	120	90	6	0	0	41.1	2.87	41.2	36	43.8	0	-	0	-	
Fluoride	mg/L	0.04	0.12	1.5	-	2.8	1.5	1.125	6	0	0	0.0338	0.00248	0.0335	0.031	0.038	na	0	-	0	
Magnesium (D)	mg/L	-	-	-	-	-	-	-	6	0	0	4.18	0.386	4.03	3.85	4.78	-	-	-	-	
Magnesium (T)	mg/L	5.6	-	-	-	-	-	-	6	0	0	4.24	0.289	4.12	3.98	4.63	-	-	-	-	
Potassium (D)	mg/L	-	-	-	-	-	-	-	6	0	0	1.84	0.0611	1.82	1.78	1.94	-	-	-	-	
Potassium (T)	mg/L	2.5	-	-	-	-	-	-	6	0	0	1.87	0.0615	1.86	1.78	1.95	-	-	-	-	
Reactive Silica (SiO2)		1.3	-	-	-	-	-	-	6	0	0	0.795	0.299	0.722	0.554	1.3	-	-	-	-	
Sodium (D)	mg/L	-	-	-	-	-	-	-	6	0	0	7.54	0.436	7.34	7.18	8.16	-	-	-	-	
Sodium (T)	mg/L	8.4	-	-	200	-	-	-	6	0	0	7.68	0.569	7.49	6.96	8.41	-	-	0	-	
Sulphate	mg/L	9.3	-	-	500	-	218	164	6	0	0	7.49	0.612	7.63	6.39	8.02	-	-	0	-	
Nutrients																					
Ammonia (as N)	mg/L	0.011	0.141	-	-	-	0.141	0.106	6	0	0	0.0433	0.0144	0.043	0.0227	0.0656	0	-	-	-	
Nitrate (as N)	mg/L	0.015	2.9	10	-	-	2.9	2.175	6	3	50	-	-	0.0057	0.005	0.0139	0	0	-	-	
Nitrate + Nitrite (as N)	mg/L	-	-	-	-	-	-	-	6	3	50	-	-	0.00575	0.0051	0.0139	-	-	-	-	
Nitrite (as N)	mg/L	0.0005	0.06	1	-	-	0.06	0.045	6	6	100	-	-	0.001	0.001	0.001	0	0	-	-	
Nitrogen		-	-	-	-	-	-	-	6	0	0	0.442	0.0295	0.44	0.406	0.481	-	-	-	-	
Orthophosphate (PO4-P)		0.0023	-	-	-	-	-	-	6	6	100	-	-	0.001	0.001	0.001	-	-	-	-	
Total Diss Phosphorus		0.006	-	-	-	-	-	-	6	0	0	0.0028	0.000346	0.0028	0.0023	0.0033	-	-	-	-	
Total Dissolved Nitrogen		-	-	-	-	-	-	-	6	0	0	0.362	0.0361	0.37	0.318	0.403	-	-	-	-	
Total Kjeldahl Nitrogen	mg/L	0.63	-	-	-	-	-	-	6	0	0	0.438	0.0311	0.43	0.406	0.481	-	-	-	-	
Total Kjeldahl Nitrogen (diss)		-	-	-	-	-	-	-	6	0	0	0.357	0.0355	0.366	0.312	0.403	-	-	-	-	
Total Phosphorus	mg/L	0.009	-	-	-	-	0.01	0.0075	6	0	0	0.00627	0.000592	0.00615	0.0056	0.007	-	-	-	-	
Organic/Inorganic Carbon																					
Dissolved Organic Carbon	mg/L	4.9	-	-	-	-	-	-	6	0	0	4.23	0.455	4.16	3.86	5.11	-	-	-	-	
Total Organic Carbon	mg/L	4.7	-	-	-	-	-	-	6	0	0	4.18	0.43	4.02	3.9	5.05	-	-	-	-	

Parameter	Units	Screening Criteria ^[a]					AEMP Benchmark ^[c]	AEMP Action Level	Lake A8											
		Normal Range (Upper Limit of Baseline)	Aquatic Life	Health Canada		SSWQO			Summary Statistics ^[d]								% of samples > screening criteria			
			CCME or FEQG Aquatic Life [b]	GCDWQ	Aesthetic Objective				N	N<MDL	% <MDL	Mean	SD	Median	Min	Max	Chronic	GCDWQ	AO	SSWQG
Total Metals																				
Aluminum (T)	µg/L	3	100	-	-	-	100	75	6	0	0	4.47	1.79	3.75	3.2	7.9	0	-	-	-
Antimony (T)	µg/L	0.4	9	6	-	-	6	4.5	6	0	0	0.0895	0.109	0.05	0.034	0.312	-	0	-	-
Arsenic (T)	µg/L	2.4	5	10	-	25	10	7.5	6	0	0	5.39	0.908	5.78	3.58	5.92	na	0	-	0
Barium (T)	µg/L	32	-	1000	-	-	1000	750	6	0	0	25	0.85	24.8	23.9	26	-	0	-	-
Beryllium (T)	µg/L	0.01	-	-	-	-	-	-	6	6	100	-	-	0.005	0.005	0.005	-	-	-	-
Bismuth (T)	µg/L	0.01	-	-	-	-	-	-	6	6	100	-	-	0.005	0.005	0.005	-	-	-	-
Boron (T)	µg/L	5	1500	5000	-	-	1500	1125	6	2	33	4.6	1.63	5.6	5	5.7	0	0	-	-
Cadmium (T)	µg/L	0.005	0.138 0.162	5	-	-	0.138	0.104	6	5	83	-	-	0.005	0.005	0.0076	0	0	-	-
Chromium (T)	µg/L	0.06	1	50	-	-	1	0.75	6	6	100	-	-	0.1	0.1	0.1	0	0	-	-
Cobalt (T)	µg/L	0.05	0.951 1.03	-	-	-	0.951	0.713	6	0	0	0.0477	0.00837	0.046	0.0401	0.0633	0	-	-	-
Copper (T)	µg/L	0.89	2.05 2.43	2000	1000	-	2.05	1.54	6	0	0	1.3	0.505	1.31	0.758	1.9	0	0	0	-
Iron (T)	µg/L	67	300	-	300	1060	300	225	6	0	0	72.7	20.1	63.5	61.6	113	na	-	0	0
Lead (T)	µg/L	0.03	-	5	-	-	5	3.8	6	0	0	0.0663	0.0111	0.0685	0.049	0.081	-	0	-	-
Lithium (T)	µg/L	10	-	-	-	-	-	-	6	0	0	7.26	0.603	7.51	6.03	7.55	-	-	-	-
Manganese (T)	µg/L	13	-	120	20	-	350	263	6	0	0	10.8	3.74	9.53	8.39	18.4	-	0	0	-
Mercury (T)	µg/L	0.0012	0.026	1	-	-	0.026	0.020	6	3	50	-	-	0.00051	0.0005	0.00078	0	0	-	-
Molybdenum (T)	µg/L	0.22	73	-	-	-	73	54.8	6	0	0	0.274	0.013	0.272	0.261	0.297	0	-	-	-
Nickel (T)	µg/L	0.92	84.1 97.7	-	-	-	84.1	63.1	6	0	0	0.827	0.095	0.79	0.744	1	0	-	-	-
Selenium (T)	µg/L	0.02	1	50	-	-	1	0.75	6	4	67	-	-	0.04	0.04	0.043	0	0	-	-
Silicon (T)	µg/L	-	-	-	-	-	-	-	6	0	0	395	164	360	258	677	-	-	-	-
Silver (T)	µg/L	0.005	0.25	-	-	-	0.25	0.188	6	6	100	-	-	0.005	0.005	0.005	0	-	-	-
Strontium (T)	µg/L	273	2500	7000	-	-	1700	1275	6	0	0	192	12	194	173	204	0	0	-	-
Sulfur (T)	µg/L	-	-	-	-	-	-	-	6	0	0	2660	217	2670	2290	2880	-	-	-	-
Thallium (T)	µg/L	0.005	0.8	-	-	-	0.8	0.6	6	6	100	-	-	0.005	0.005	0.005	0	-	-	-
Tin (T)	µg/L	0.05	-	-	-	-	-	-	6	5	83	-	-	0.02	0.02	0.022	-	-	-	-
Titanium (T)	µg/L	0.25	-	-	-	-	-	-	6	0	0	0.144	0.107	0.112	0.057	0.346	-	-	-	-
Uranium (T)	µg/L	0.054	15	20	-	-	15	11.3	6	0	0	0.0484	0.00414	0.0465	0.045	0.0557	0	0	-	-
Vanadium (T)	µg/L	0.01	-	-	-	-	120	90	6	3	50	-	-	0.0505	0.05	0.064	-	-	-	-
Zinc (T)	µg/L	1.2	-	-	5000	-	21.9	16.4	6	0	0	1.15	0.448	1.01	0.62	1.8	-	-	0	-
Zirconium (T)	µg/L	-	-	-	-	-	-	-	6	5	83	-	-	0.01	0.01	0.132	-	-	-	-
Dissolved Metals																				
Aluminum (D)	µg/L	-	-	-	-	-	-	-	6	0	0	2.15	0.616	2.15	1.1	2.9	-	-	-	-
Antimony (D)	µg/L	-	-	-	-	-	-	-	6	0	0	0.058	0.0318	0.049	0.03	0.106	-	-	-	-
Arsenic (D)	µg/L	-	-	-	-	-	-	-	6	0	0	4.44	0.836	4.72	2.8	5.02	-	-	-	-
Barium (D)	µg/L	-	-	-	-	-	-	-	6	0	0	23.8	0.776	23.6	22.9	25.1	-	-	-	-
Beryllium (D)	µg/L	-	-	-	-	-	-	-	6	6	100	-	-	0.005	0.005	0.005	-	-	-	-
Bismuth (D)	µg/L	-	-	-	-	-	-	-	6	6	100	-	-	0.005	0.005	0.005	-	-	-	-
Boron (D)	µg/L	-	-	-	-	-	-	-	6	1	17	4.82	1.14	5.25	5	5.4	-	-	-	-
Cadmium (D)	µg/L	-	-	-	-	-	-	-	6	5	83	-	-	0.005	0.005	0.0062	-	-	-	-
Chromium (D)	µg/L	-	-	-	-	-	-	-	6	6	100	-	-	0.1	0.1	0.1	-	-	-	-
Cobalt (D)	µg/L	-	-	-	-	-	-	-	6	0	0	0.0228	0.00423	0.0214	0.0196	0.0305	-	-	-	-
Copper (D)	µg/L	-	-	-	-	-	-	-	6	0	0	1.02	0.432	0.78	0.702	1.61	-	-	-	-
Iron (D)	µg/L	-	-	-	-	-	-	-	6	0	0	33.6	9.03	31.6	25.6	51.2	-	-	-	-
Lead (D)	µg/L	-	7.88 9.32	-	-	-	7.88	5.91	6	0	0	0.0307	0.00864	0.033	0.02	0.039	0	-	-	-
Lithium (D)	µg/L	-	-	-	-	-	-	-	6	0	0	7.22	0.617	7.37	6.01	7.69	-	-	-	-
Manganese (D)	µg/L	-	350 440	-	-	-	350	263	6	0	0	1.42	0.92	1.08	0.879	3.29	0	-	-	-
Mercury (D)	µg/L	-	-	-	-	-	-	-	6	4	67	-	-	0.0005	0.0005	0.00216	-	-	-	-
Molybdenum (D)	µg/L	-	-	-	-	-	-	-	6	0	0	0.302	0.048	0.298	0.259	0.392	-	-	-	-
Nickel (D)	µg/L	-	-	-	-	-	-	-	6	0	0	0.784	0.106	0.753	0.711	0.993	-	-	-	-

Parameter	Units	Screening Criteria ^[a]					AEMP Benchmark ^[c]	AEMP Action Level	Lake A8											
		Normal Range (Upper Limit of Baseline)	Aquatic Life	Health Canada		SSWQO			Summary Statistics ^[d]								% of samples > screening criteria			
			CCME or FEQG Aquatic Life [b]	GCDWQ	Aesthetic Objective				N	N<MDL	% <MDL	Mean	SD	Median	Min	Max	Chronic	GCDWQ	AO	SSWQG
Selenium (D)	µg/L	-	-	-	-	-	-	-	6	4	67	-	-	0.04	0.04	0.044	-	-	-	-
Silicon (D)	µg/L	-	-	-	-	-	-	-	6	0	0	390	149	352	270	652	-	-	-	-
Silver (D)	µg/L	-	-	-	-	-	-	-	6	6	100	-	-	0.005	0.005	0.005	-	-	-	-
Strontium (D)	µg/L	-	2500	-	-	-	-	-	6	0	0	192	8.93	193	177	201	0	-	-	-
Sulfur (D)	µg/L	-	-	-	-	-	-	-	6	0	0	2690	212	2760	2270	2840	-	-	-	-
Thallium (D)	µg/L	-	-	-	-	-	-	-	6	6	100	-	-	0.005	0.005	0.005	-	-	-	-
Tin (D)	µg/L	-	-	-	-	-	-	-	6	6	100	-	-	0.02	0.02	0.02	-	-	-	-
Titanium (D)	µg/L	-	-	-	-	-	-	-	6	4	67	-	-	0.05	0.05	0.097	-	-	-	-
Uranium (D)	µg/L	-	-	-	-	-	-	-	6	0	0	0.0496	0.00347	0.0502	0.0439	0.0539	-	-	-	-
Vanadium (D)	µg/L	-	-	-	-	-	-	-	6	6	100	-	-	0.05	0.05	0.05	-	-	-	-
Zinc (D)	µg/L	8.5	21.9 25.3	-	-	-	21.9	16.4	6	0	0	0.922	0.221	1.02	0.52	1.1	0	-	-	-
Zirconium (D)	µg/L	-	-	-	-	-	-	-	6	6	100	-	-	0.01	0.01	0.01	-	-	-	-
Other																				
Cyanide (Free)	mg/L	-	-	-	-	-	-	-	6	6	100	-	-	0.001	0.001	0.001	-	-	-	-
Cyanide (Total)	mg/L	0.001	0.005	0.2	-	-	0.005	0.0038	6	6	100	-	-	0.001	0.001	0.001	0	0	-	-
Cyanide (WAD)	mg/L	-	-	-	-	-	-	-	6	6	100	-	-	0.001	0.001	0.001	-	-	-	-

Notes

[a] Refer to the main document for references to the various screening criteria.

[b] The range of acute and chronic guidelines calculated for the 2020 water quality data is shown for parameters with site-specific water quality guidelines (e.g., cadmium, dissolved zinc, and dissolved manganese).

[c] Refer to **Table 2-2** for the list of the AEMP Benchmarks. Benchmarks and corresponding Action Levels for dissolved Pb, Mn, Sr, and Zn were applied to the total (unfiltered fraction).

[d] Mean and SD were not calculated if >50% of the values were <MDL. 1/2 the MDL was used to calculate the mean and SD if >50% of the measurements were > MDL.

"na" refers to the chronic WQG screening results that don't apply to parameters with SSWQO (fluoride, arsenic, iron).

Table 7-5. Lake B7 – Water Quality Screening Assessment, 2020.

Parameter	Units	Screening Criteria ^[a]					AEMP Benchmark ^[c]	AEMP Action Level	Lake B7												
		Normal Range (Upper Limit of Baseline)	Aquatic Life		Health Canada				SSWQO	Summary Statistics ^[d]								% of samples > screening criteria			
			CCME or FEQG Aquatic Life [b]	GCDWQ	Aesthetic Objective	N				N<MDL	% <MDL	Mean	SD	Median	Min	Max	Chronic	GCDWQ	AO	SSWQO	
Field Measurements																					
Temperature (°C)	°C	-	-	-	15	-	-	-	6	0	0	12.1	3.15	12.3	8.8	15	-	-	-	-	
Sp. Conductivity (field) (µS/cm)	uS/cm	302	-	-	-	-	-	-	6	0	0	245	25.3	246	222	270	-	-	-	-	
pH (field)	pH units	7 8.2	6.5 9.0	-	7.0 10.5	-	6.5 9.0	-	6	0	0	7.77	0.228	7.84	7.35	7.99	0	-	0	-	
DO (mg/L)	mg/L	-	6.5	-	-	-	6.5	-	6	0	0	10.6	0.408	10.7	10.1	11	0	-	-	-	
DO (%)	%	-	-	-	-	-	-	-	6	0	0	99.2	4.5	98.4	94.8	105	-	-	-	-	
Conventional Parameters																					
Conductivity (lab, µS/cm)	uS/cm	-	-	-	-	-	-	-	6	0	0	220	14.3	220	205	235	-	-	-	-	
Hardness	mg/L	118	-	-	-	-	-	-	6	0	0	85.4	7.86	85	77.6	94.6	-	-	-	-	
pH (lab)	pH units	-	6.5 9.0	-	7.0 10.5	-	6.5 9.0	-	6	0	0	7.7	0.0559	7.68	7.65	7.78	0	-	0	-	
Total Dissolved Solids	mg/L	-	-	-	500	-	500	375	6	0	0	150	10.6	148	140	164	-	-	0	-	
TDS (Calculated)	mg/L	171	-	-	500	-	500	375	6	0	0	114	6.41	114	108	121	-	-	0	-	
Total Suspended Solids	mg/L	3	-	-	-	-	-	-	6	3	50	-	-	1.15	1	2.8	-	-	-	-	
Turbidity (lab, NTU)	NTU	0.69	-	-	-	-	-	-	6	0	0	0.387	0.0612	0.41	0.3	0.44	-	-	-	-	
Major Ions																					
Alkalinity, Bicarbonate	mg/L	135	-	-	-	-	-	-	6	0	0	53.4	3.33	53.2	50	56.9	-	-	-	-	
Alkalinity, Carbonate	mg/L	-	-	-	-	-	-	-	6	6	100	-	-	0.6	0.6	0.6	-	-	-	-	
Alkalinity, Hydroxide	mg/L	-	-	-	-	-	-	-	6	6	100	-	-	0.34	0.34	0.34	-	-	-	-	
Alkalinity, Total	mg/L	110	-	-	-	-	-	-	6	0	0	43.7	2.72	43.6	41	46.6	-	-	-	-	
Bromide		-	-	-	-	-	-	-	6	0	0	0.152	0.00983	0.155	0.14	0.16	-	-	-	-	
Calcium (D)	mg/L	-	-	-	-	-	-	-	6	0	0	29.4	2.77	29.2	26.6	32.6	-	-	-	-	
Calcium (T)	mg/L	39	-	-	-	-	-	-	6	0	0	29.7	2.97	29.3	26.5	33.1	-	-	-	-	
Chloride	mg/L	25.000	120	-	250	-	120	90	6	0	0	38.9	1.75	38.8	37.1	41	0	-	0	-	
Fluoride	mg/L	0.04	0.12	1.5	-	2.8	2.8	2.1	6	0	0	0.0317	0.00225	0.0315	0.029	0.034	na	0	-	0	
Magnesium (D)	mg/L	-	-	-	-	-	-	-	6	0	0	2.92	0.228	2.88	2.7	3.19	-	-	-	-	
Magnesium (T)	mg/L	5.3	-	-	-	-	-	-	6	0	0	2.92	0.23	2.9	2.7	3.2	-	-	-	-	
Potassium (D)	mg/L	-	-	-	-	-	-	-	6	0	0	1.77	0.035	1.77	1.73	1.82	-	-	-	-	
Potassium (T)	mg/L	2.8	-	-	-	-	-	-	6	0	0	1.78	0.0414	1.78	1.72	1.83	-	-	-	-	
Reactive Silica (SiO2)		2.3	-	-	-	-	-	-	6	0	0	0.856	0.158	0.85	0.69	1.03	-	-	-	-	
Sodium (D)	mg/L	-	-	-	-	-	-	-	6	0	0	6.85	0.41	6.77	6.36	7.35	-	-	-	-	
Sodium (T)	mg/L	7.5	-	-	200	-	-	-	6	0	0	6.86	0.453	6.8	6.41	7.45	-	-	0	-	
Sulphate	mg/L	6	-	-	500	-	218	164	6	0	0	8.22	0.168	8.14	8.13	8.56	-	-	0	-	
Nutrients																					
Ammonia (as N)	mg/L	0.025	0.141	-	-	-	0.141	0.106	6	0	0	0.022	0.0162	0.0158	0.0062	0.0444	0	-	-	-	
Nitrate (as N)	mg/L	0.005	2.9	10	-	-	2.9	2.18	6	4	67	-	-	0.005	0.005	0.0206	0	0	-	-	
Nitrate + Nitrite (as N)	mg/L	-	-	-	-	-	-	-	6	4	67	-	-	0.0051	0.0051	0.0206	-	-	-	-	
Nitrite (as N)	mg/L	0.005	0.06	1	-	-	0.06	0.045	6	6	100	-	-	0.001	0.001	0.001	0	0	-	-	
Nitrogen		-	-	-	-	-	-	-	6	0	0	0.428	0.0265	0.43	0.394	0.469	-	-	-	-	
Orthophosphate (PO4-P)		0.001	-	-	-	-	-	-	6	6	100	-	-	0.001	0.001	0.001	-	-	-	-	
Total Diss Phosphorus		0.008	-	-	-	-	-	-	6	0	0	0.00295	0.000321	0.0029	0.0026	0.0033	-	-	-	-	
Total Dissolved Nitrogen		-	-	-	-	-	-	-	6	0	0	0.375	0.0951	0.374	0.212	0.497	-	-	-	-	
Total Kjeldahl Nitrogen	mg/L	0.73	-	-	-	-	-	-	6	0	0	0.424	0.0201	0.428	0.394	0.448	-	-	-	-	
Total Kjeldahl Nitrogen (diss)		-	-	-	-	-	-	-	6	0	0	0.371	0.093	0.374	0.204	0.477	-	-	-	-	
Total Phosphorus	mg/L	0.01	-	-	-	-	-	-	6	0	0	0.0079	0.00273	0.00675	0.0061	0.0133	-	-	-	-	
Organic/Inorganic Carbon																					
Dissolved Organic Carbon	mg/L	5.5	-	-	-	-	-	-	6	0	0	4.92	0.118	4.9	4.8	5.1	-	-	-	-	
Total Organic Carbon	mg/L	7.6	-	-	-	-	-	-	6	0	0	4.83	0.0876	4.86	4.7	4.9	-	-	-	-	

Parameter	Units	Screening Criteria ^[a]					AEMP Benchmark ^[c]	AEMP Action Level	Lake B7											
		Normal Range (Upper Limit of Baseline)	Aquatic Life	Health Canada		SSWQO			Summary Statistics ^[d]								% of samples > screening criteria			
			CCME or FEQG Aquatic Life [b]	GCDWQ	Aesthetic Objective				N	N<MDL	% <MDL	Mean	SD	Median	Min	Max	Chronic	GCDWQ	AO	SSWQO
Total Metals																				
Aluminum (T)	µg/L	6.6	100	-	-	-	100	75	6	0	0	3.02	1.03	3.1	1.6	4.7	0	-	-	-
Antimony (T)	µg/L	0.02	9	6	-	-	6	4.5	6	0	0	0.0693	0.0483	0.0425	0.035	0.144	-	0	-	-
Arsenic (T)	µg/L	1.8	5	10	-	25	10	7.5	6	0	0	5.45	0.989	5.13	4.62	7.33	na	0	-	0
Barium (T)	µg/L	20	-	1000	-	-	1000	750	6	0	0	24.7	1	24.6	23.4	25.8	-	0	-	-
Beryllium (T)	µg/L	0.01	-	-	-	-	-	-	6	6	100	-	-	0.005	0.005	0.005	-	-	-	-
Bismuth (T)	µg/L	0.01	-	-	-	-	-	-	6	6	100	-	-	0.005	0.005	0.005	-	-	-	-
Boron (T)	µg/L	8	1500	5000	-	-	1500	1125	6	0	0	15	0.462	14.8	14.5	15.6	0	0	-	-
Cadmium (T)	µg/L	0.007	0.128 0.151	5	-	-	0.128	0.096	6	6	100	-	-	0.005	0.005	0.02	0	0	-	-
Chromium (T)	µg/L	0.06	1	50	-	-	1	0.75	6	6	100	-	-	0.1	0.1	0.1	0	0	-	-
Cobalt (T)	µg/L	0.05	0.918 0.997	-	-	-	0.918	0.689	6	0	0	0.0697	0.00831	0.0718	0.0585	0.0784	0	-	-	-
Copper (T)	µg/L	1.13	2 2.26	2000	1000	-	2	1.5	6	0	0	0.91	0.0279	0.908	0.878	0.957	0	0	0	-
Iron (T)	µg/L	103	300	-	300	1060	300	225	6	0	0	59.6	6.2	60.8	50.7	66	na	-	0	0
Lead (T)	µg/L	0.08	-	5	-	-	5	3.75	6	0	0	0.0557	0.0201	0.057	0.025	0.077	-	0	-	-
Lithium (T)	µg/L	7.5	-	-	-	-	-	-	6	0	0	19.6	0.555	19.8	18.9	20.2	-	-	-	-
Manganese (T)	µg/L	8.6	-	120	20	-	440	330	6	0	0	6.13	0.808	6.16	5.22	7.06	-	0	0	-
Mercury (T)	µg/L	0.004	0.026	1	-	-	0.026	0.020	6	4	67	-	-	0.0005	0.0005	0.00056	0	0	-	-
Molybdenum (T)	µg/L	0.24	73	-	-	-	73	54.75	6	0	0	1.42	2.04	0.271	0.241	5.27	0	-	-	-
Nickel (T)	µg/L	1.4	78.8 91.6	-	-	-	25	18.75	6	0	0	0.829	0.028	0.841	0.781	0.851	0	-	-	-
Selenium (T)	µg/L	0.04	1	50	-	-	1	0.75	6	3	50	-	-	0.043	0.04	0.054	0	0	-	-
Silicon (T)	µg/L	-	-	-	-	-	-	-	6	0	0	424	102	409	323	541	-	-	-	-
Silver (T)	µg/L	0.005	0.25	-	-	-	0.25	0.188	6	6	100	-	-	0.005	0.005	0.005	0	-	-	-
Strontium (T)	µg/L	155	2500	7000	-	-	1700	1275	6	0	0	273	12.5	276	254	285	0	0	-	-
Sulfur (T)	µg/L	-	-	-	-	-	-	-	6	0	0	2880	135	2860	2750	3100	-	-	-	-
Thallium (T)	µg/L	0.005	0.8	-	-	-	0.8	0.6	6	3	50	-	-	0.00535	0.005	0.0058	0	-	-	-
Tin (T)	µg/L	0.05	-	-	-	-	-	-	6	3	50	-	-	0.0205	0.02	0.035	-	-	-	-
Titanium (T)	µg/L	0.25	-	-	-	-	-	-	6	5	83	-	-	0.05	0.05	0.303	-	-	-	-
Uranium (T)	µg/L	0.03	15	20	-	-	15	11.3	6	0	0	0.0436	0.00401	0.0428	0.0389	0.0488	0	0	-	-
Vanadium (T)	µg/L	0.01	-	-	-	-	120	90	6	2	33	0.0455	0.0166	0.0505	0.05	0.063	-	-	-	-
Zinc (T)	µg/L	1.9	-	-	5000	-	23	17.3	6	1	17	0.722	0.378	0.695	0.5	1.39	-	-	0	-
Zirconium (T)	µg/L	-	-	-	-	-	-	-	6	6	100	-	-	0.01	0.01	0.01	-	-	-	-
Dissolved Metals																				
Aluminum (D)	µg/L	-	-	-	-	-	-	-	6	0	0	2.32	0.608	2.4	1.3	2.9	-	-	-	-
Antimony (D)	µg/L	-	-	-	-	-	-	-	6	0	0	0.077	0.0702	0.0395	0.034	0.208	-	-	-	-
Arsenic (D)	µg/L	-	-	-	-	-	-	-	6	0	0	4.78	0.798	4.63	4.07	6.24	-	-	-	-
Barium (D)	µg/L	-	-	-	-	-	-	-	6	0	0	23.6	1.01	23.6	22.5	24.8	-	-	-	-
Beryllium (D)	µg/L	-	-	-	-	-	-	-	6	6	100	-	-	0.005	0.005	0.005	-	-	-	-
Bismuth (D)	µg/L	-	-	-	-	-	-	-	6	6	100	-	-	0.005	0.005	0.005	-	-	-	-
Boron (D)	µg/L	-	-	-	-	-	-	-	6	0	0	14.6	0.333	14.6	14.3	15.1	-	-	-	-
Cadmium (D)	µg/L	-	-	-	-	-	-	-	6	6	100	-	-	0.005	0.005	0.005	-	-	-	-
Chromium (D)	µg/L	-	-	-	-	-	-	-	6	5	83	-	-	0.1	0.1	0.23	-	-	-	-
Cobalt (D)	µg/L	-	-	-	-	-	-	-	6	0	0	0.052	0.00888	0.0492	0.0451	0.0691	-	-	-	-
Copper (D)	µg/L	-	-	-	-	-	-	-	6	0	0	0.89	0.0462	0.903	0.832	0.94	-	-	-	-
Iron (D)	µg/L	-	-	-	-	-	-	-	6	0	0	37.4	14.2	33.6	28.2	65.8	-	-	-	-
Lead (D)	µg/L	-	8.61 9.21	-	-	-	8.61	6.46	6	0	0	0.0385	0.018	0.0385	0.018	0.068	0	-	-	-
Lithium (D)	µg/L	-	-	-	-	-	-	-	6	0	0	19.6	0.217	19.5	19.3	19.8	-	-	-	-
Manganese (D)	µg/L	-	440	-	-	-	440	330	6	0	0	1.7	2.42	0.722	0.407	6.61	0	-	-	-
Mercury (D)	µg/L	-	-	-	-	-	-	-	6	5	83	-	-	0.0005	0.0005	0.00075	-	-	-	-
Molybdenum (D)	µg/L	-	-	-	-	-	-	-	6	0	0	1.11	2.03	0.285	0.259	5.26	-	-	-	-
Nickel (D)	µg/L	-	-	-	-	-	-	-	6	0	0	0.857	0.0265	0.862	0.815	0.886	-	-	-	-
Selenium (D)	µg/L	-	-	-	-	-	-	-	6	5	83	-	-	0.04	0.04	0.042	-	-	-	-

Parameter	Units	Screening Criteria ^[a]					AEMP Benchmark ^[c]	AEMP Action Level	Lake B7											
		Normal Range (Upper Limit of Baseline)	Aquatic Life			SSWQO			Summary Statistics ^[d]										% of samples > screening criteria	
			Health Canada																	
			CCME or FEQG Aquatic Life ^[b]	GCDWQ	Aesthetic Objective				N	N<MDL	% <MDL	Mean	SD	Median	Min	Max	Chronic	GCDWQ	AO	SSWQO
Silicon (D)	µg/L	-	-	-	-	-	-	-	6	0	0	421	76.1	421	338	503	-	-	-	-
Silver (D)	µg/L	-	-	-	-	-	-	-	6	6	100	-	-	0.005	0.005	0.005	-	-	-	-
Strontium (D)	µg/L	-	2500	-	-	-	2500	1875	6	0	0	273	11.7	271	258	293	0	-	-	-
Sulfur (D)	µg/L	-	-	-	-	-	-	-	6	0	0	2900	138	2940	2710	3040	-	-	-	-
Thallium (D)	µg/L	-	-	-	-	-	-	-	6	3	50	-	-	0.00565	0.005	0.0067	-	-	-	-
Tin (D)	µg/L	-	-	-	-	-	-	-	6	4	67	-	-	0.02	0.02	0.065	-	-	-	-
Titanium (D)	µg/L	-	-	-	-	-	-	-	6	5	83	-	-	0.05	0.05	0.063	-	-	-	-
Uranium (D)	µg/L	-	-	-	-	-	-	-	6	0	0	0.0449	0.00212	0.0448	0.042	0.0486	-	-	-	-
Vanadium (D)	µg/L	-	-	-	-	-	-	-	6	5	83	-	-	0.05	0.05	0.051	-	-	-	-
Zinc (D)	µg/L	2.2	23 26.7	-	-	-	23	17.3	6	2	33	1.13	1.7	0.54	0.5	4.59	0	-	-	-
Zirconium (D)	µg/L	-	-	-	-	-	-	-	6	6	100	-	-	0.01	0.01	0.01	-	-	-	-
Other																				
Cyanide (Free)	mg/L	-	-	-	-	-	-	-	6	6	100	-	-	0.001	0.001	0.001	-	-	-	-
Cyanide (Total)	mg/L	0.001	0.005	0.2	-	-	0.005	0.00375	6	6	100	-	-	0.001	0.001	0.001	0	0	-	-
Cyanide (WAD)	mg/L	-	-	-	-	-	-	-	6	6	100	-	-	0.001	0.001	0.001	-	-	-	-

Notes

[a] Refer to the main document for references to the various screening criteria.

[b] The range of acute and chronic guidelines calculated for the 2020 water quality data is shown for parameters with site-specific water quality guidelines (e.g., cadmium, dissolved zinc, and dissolved manganese).

[c] Refer to **Table 2-2** for the list of the AEMP Benchmarks. Benchmarks and corresponding Action Levels for dissolved Pb, Mn, Sr, and Zn were applied to the total (unfiltered fraction).

[d] Mean and SD were not calculated if >50% of the values were <MDL. 1/2 the MDL was used to calculate the mean and SD if >50% of the measurements were > MDL.

"na" refers to the chronic WQG screening results that don't apply to parameters with SSWQO (fluoride, arsenic, iron).

Table 7-6. Lake D7 – Water Quality Screening Assessment, 2020.

Parameter	Units	Screening Criteria ^[a]					AEMP Benchmark ^[c]	AEMP Action Level	Lake D7											
		Normal Range (Upper Limit of Baseline)	Aquatic Life	Health Canada		SSWQO			Summary Statistics ^[d]								% of samples > screening criteria			
			CCME or FEQG Aquatic Life [b]	GCDWQ	Aesthetic Objective				N	N<MDL	% <MDL	Mean	SD	Median	Min	Max	Chronic	HH	AO	SSWQG
Field Measurements																				
Temperature (°C)	°C	-	-	-	15	-	-	-	6	0	0	13.1	2.72	13.1	10.4	15.6	-	-	-	-
Sp. Conductivity (field) (µS/cm)	µS/cm	159	-	-	-	-	-	-	6	0	0	130	6.54	130	124	136	-	-	-	-
pH (field)	pH units	7 8.2	6.5 9.0	-	7.0 10.5	-	6.5 9.0	-	6	0	0	7.9	0.085	7.93	7.74	7.98	0	-	0	-
DO (mg/L)	mg/L	-	6.5	-	-	-	6.5	-	6	0	0	10.3	1.03	10.4	9.21	11.7	0	-	-	-
DO (%)	%	-	-	-	-	-	-	-	6	0	0	96.8	3.3	98.4	92.6	99.7	-	-	-	-
Conventional Parameters (mg/L unless otherwise specified)																				
Conductivity (lab, µS/cm)	uS/cm	-	-	-	-	-	-	-	6	0	0	125	8.79	126	116	133	-	-	-	-
Hardness	mg/L	56	-	-	-	-	-	-	6	0	0	45.1	4.49	45	40.9	49.4	-	-	-	-
pH (lab)	pH units	-	6.5 9.0	-	7.0 10.5	-	6.5 9.0	-	6	0	0	7.71	0.0163	7.72	7.69	7.73	0	-	0	-
Total Dissolved Solids	mg/L	-	-	-	500	-	500	375	6	0	0	73.3	8.76	75	57	82	-	-	0	-
TDS (Calculated)	mg/L	81	-	-	500	-	500	375	6	0	0	67.1	4.53	67.4	62.4	71.5	-	-	0	-
Total Suspended Solids	mg/L	2	-	-	-	-	-	-	6	1	17	1.53	0.592	1.75	1	2	-	-	-	-
Turbidity (lab, NTU)	NTU	1.1	-	-	-	-	-	-	6	0	0	0.833	0.0924	0.85	0.71	0.95	-	-	-	-
Major Ions (mg/L)																				
Alkalinity, Bicarbonate	mg/L	68	-	-	-	-	-	-	6	0	0	57.7	2.56	58.4	54.4	60.1	-	-	-	-
Alkalinity, Carbonate	mg/L	-	-	-	-	-	-	-	6	6	100	-	-	0.6	0.6	0.6	-	-	-	-
Alkalinity, Hydroxide	mg/L	-	-	-	-	-	-	-	6	6	100	-	-	0.34	0.34	0.34	-	-	-	-
Alkalinity, Total	mg/L	55	-	-	-	-	-	-	6	0	0	47.3	2.09	47.8	44.6	49.3	-	-	-	-
Bromide		-	-	-	-	-	-	-	6	6	100	-	-	0.1	0.1	0.1	-	-	-	-
Calcium (D)	mg/L	-	-	-	-	-	-	-	6	0	0	13.7	1.35	13.6	12.4	15	-	-	-	-
Calcium (T)	mg/L	17	-	-	-	-	-	-	6	0	0	13.8	1.09	13.8	12.7	14.9	-	-	-	-
Chloride	mg/L	25.000	120	-	250	-	120	90	6	0	0	9.6	0.628	9.58	8.96	10.2	0	-	0	-
Fluoride	mg/L	0.05	0.12	1.5	-	2.8	2.8	2.1	6	0	0	0.0415	0.00274	0.0415	0.039	0.044	na	0	-	0
Magnesium (D)	mg/L	-	-	-	-	-	-	-	6	0	0	2.66	0.28	2.64	2.39	2.97	-	-	-	-
Magnesium (T)	mg/L	3.3	-	-	-	-	-	-	6	0	0	2.64	0.192	2.64	2.46	2.84	-	-	-	-
Potassium (D)	mg/L	-	-	-	-	-	-	-	6	0	0	1.25	0.0763	1.25	1.16	1.33	-	-	-	-
Potassium (T)	mg/L	1.8	-	-	-	-	-	-	6	0	0	1.27	0.0682	1.27	1.2	1.34	-	-	-	-
Reactive Silica (SiO2)		0.28	-	-	-	-	-	-	6	0	0	0.385	0.119	0.385	0.269	0.499	-	-	-	-
Sodium (D)	mg/L	-	-	-	-	-	-	-	6	0	0	7.19	0.638	7.18	6.53	7.96	-	-	-	-
Sodium (T)	mg/L	17	-	-	200	-	-	-	6	0	0	7.29	0.672	7.2	6.65	8.37	-	-	0	-
Sulphate	mg/L	10	-	-	500	-	218	163.5	6	0	0	4.28	0.389	4.21	3.9	4.82	-	-	0	-
Nutrients (mg/L)																				
Ammonia (as N)	mg/L	0.009	0.141	-	-	-	0.141	0.106	6	1	17	0.0312	0.0274	0.0265	0.005	0.0719	0	-	-	-
Nitrate (as N)	mg/L	0.005	2.9	10	-	-	2.9	2.18	6	1	17	0.0118	0.0106	0.00745	0.005	0.0311	0	0	-	-
Nitrate + Nitrite (as N)	mg/L	-	-	-	-	-	-	-	6	1	17	0.012	0.0107	0.00745	0.0051	0.0311	-	-	-	-
Nitrite (as N)	mg/L	0.0005	0.06	1	-	-	0.06	0.045	6	5	83	-	-	0.001	0.001	0.0011	0	0	-	-
Nitrogen		-	-	-	-	-	-	-	6	0	0	0.392	0.0548	0.41	0.294	0.453	-	-	-	-
Orthophosphate (PO4-P)		0.003	-	-	-	-	-	-	6	6	100	-	-	0.001	0.001	0.001	-	-	-	-
Total Diss Phosphorus		0.008	-	-	-	-	-	-	6	0	0	0.00352	0.000232	0.00345	0.0033	0.0038	-	-	-	-
Total Dissolved Nitrogen		-	-	-	-	-	-	-	6	0	0	0.296	0.0558	0.311	0.207	0.349	-	-	-	-
Total Kjeldahl Nitrogen	mg/L	0.52	-	-	-	-	-	-	6	0	0	0.381	0.0644	0.398	0.263	0.453	-	-	-	-
Total Kjeldahl Nitrogen (diss)		-	-	-	-	-	-	-	6	0	0	0.284	0.0612	0.298	0.2	0.343	-	-	-	-
Total Phosphorus	mg/L	0.02	-	-	-	-	-	-	6	0	0	0.0107	0.000549	0.0107	0.0099	0.0113	-	-	-	-
Organic/Inorganic Carbon (mg/L)																				
Dissolved Organic Carbon	mg/L	5.1	-	-	-	-	-	-	6	0	0	4.76	0.188	4.7	4.6	5.1	-	-	-	-
Total Organic Carbon	mg/L	14	-	-	-	-	-	-	6	0	0	4.64	0.105	4.62	4.5	4.8	-	-	-	-

Parameter	Units	Screening Criteria ^[a]					AEMP Benchmark ^[c]	AEMP Action Level	Lake D7											
		Normal Range (Upper Limit of Baseline)	Aquatic Life	Health Canada		SSWQO			Summary Statistics ^[d]								% of samples > screening criteria			
			CCME or FEQG Aquatic Life [b]	GCDWQ	Aesthetic Objective				N	N<MDL	% <MDL	Mean	SD	Median	Min	Max	Chronic	HH	AO	SSWQG
Total Metals (µg/L)																				
Aluminum (T)	µg/L	6.7	100	-	-	-	100	75	6	0	0	7.15	1.04	7.25	5.7	8.2	0	-	-	-
Antimony (T)	µg/L	0.03	9	6	-	-	6	4.5	6	6	100	-	-	0.02	0.02	0.02	-	0	-	-
Arsenic (T)	µg/L	1.2	5	10	-	25	10	7.5	6	0	0	1.29	0.097	1.27	1.18	1.44	na	0	-	0
Barium (T)	µg/L	17	-	1000	-	-	1000	750	6	0	0	16.3	0.809	16.4	14.8	17.1	-	0	-	-
Beryllium (T)	µg/L	0.01	-	-	-	-	-	-	6	6	100	-	-	0.005	0.005	0.005	-	-	-	-
Bismuth (T)	µg/L	0.01	-	-	-	-	-	-	6	6	100	-	-	0.005	0.005	0.005	-	-	-	-
Boron (T)	µg/L	17	1500	5000	-	-	1500	1125	6	0	0	15.5	0.885	15.4	14.6	16.6	0	0	-	-
Cadmium (T)	µg/L	0.005	0.075 0.088	5	-	-	0.0755	0.057	6	6	100	-	-	0.005	0.005	0.005	0	0	-	-
Chromium (T)	µg/L	0.06	1	50	-	-	1	0.75	6	6	100	-	-	0.1	0.1	0.1	0	0	-	-
Cobalt (T)	µg/L	0.05	0.78	-	-	-	0.78	0.585	6	0	0	0.0624	0.00436	0.0642	0.0542	0.0663	0	-	-	-
Copper (T)	µg/L	1	2	2000	1000	-	2	1.5	6	0	0	0.882	0.0595	0.878	0.818	0.955	0	0	0	-
Iron (T)	µg/L	112	300	-	300	1060	300	225	6	0	0	78.3	9.94	77.4	68.7	89.5	na	-	0	0
Lead (T)	µg/L	0.02	-	5	-	-	5	3.75	6	0	0	0.0238	0.00325	0.024	0.02	0.029	-	0	-	-
Lithium (T)	µg/L	1.9	-	-	-	-	-	-	6	0	0	1.42	0.0497	1.42	1.36	1.48	-	-	-	-
Manganese (T)	µg/L	13	-	120	20	-	320	240	6	0	0	12.9	0.638	12.8	12.2	13.6	-	0	0	-
Mercury (T)	µg/L	0.001	0.026	1	-	-	0.026	0.020	6	0	0	0.000587	5.89E-05	0.000575	0.00053	0.00069	0	0	-	-
Molybdenum (T)	µg/L	0.48	73	-	-	-	73	54.8	6	0	0	0.506	0.129	0.46	0.427	0.767	0	-	-	-
Nickel (T)	µg/L	0.75	25	-	-	-	25	18.75	6	0	0	0.77	0.0711	0.77	0.678	0.862	0	-	-	-
Selenium (T)	µg/L	0.06	1	50	-	-	1	0.75	6	0	0	0.0605	0.00782	0.0595	0.052	0.07	0	0	-	-
Silicon (T)	µg/L	-	-	-	-	-	-	-	6	0	0	198	59.8	194	142	258	-	-	-	-
Silver (T)	µg/L	0.005	0.25	-	-	-	0.25	0.188	6	5	83	-	-	0.005	0.005	0.0095	0	-	-	-
Strontium (T)	µg/L	83	2500	7000	-	-	1700	1275	6	0	0	68	0.726	67.9	66.9	69.1	0	0	-	-
Sulfur (T)	µg/L	-	-	-	-	-	-	-	6	0	0	1510	203	1500	1310	1700	-	-	-	-
Thallium (T)	µg/L	0.005	0.8	-	-	-	0.8	0.6	6	6	100	-	-	0.005	0.005	0.005	0	-	-	-
Tin (T)	µg/L	0.05	-	-	-	-	-	-	6	5	83	-	-	0.02	0.02	0.022	-	-	-	-
Titanium (T)	µg/L	0.34	-	-	-	-	-	-	6	2	33	0.344	0.153	0.403	0.3	0.536	-	-	-	-
Uranium (T)	µg/L	0.1	15	20	-	-	15	11.25	6	0	0	0.0556	0.00692	0.0556	0.0488	0.0635	0	0	-	-
Vanadium (T)	µg/L	0.07	120	-	-	-	120	90	6	0	0	0.0922	0.0103	0.0925	0.08	0.105	-	-	-	-
Zinc (T)	µg/L	2	-	-	5000	-	11.6	8.7	6	1	17	0.878	0.663	0.565	0.5	1.95	-	-	0	-
Zirconium (T)	µg/L	-	-	-	-	-	-	-	6	5	83	-	-	0.01	0.01	0.025	-	-	-	-
Dissolved Metals (µg/L)																				
Aluminum (D)	µg/L	-	-	-	-	-	-	-	6	0	0	2.45	0.517	2.35	1.9	3.4	-	-	-	-
Antimony (D)	µg/L	-	-	-	-	-	-	-	6	6	100	-	-	0.02	0.02	0.02	-	-	-	-
Arsenic (D)	µg/L	-	-	-	-	-	-	-	6	0	0	1.01	0.0688	1.01	0.918	1.11	-	-	-	-
Barium (D)	µg/L	-	-	-	-	-	-	-	6	0	0	15.8	0.464	15.6	15.2	16.4	-	-	-	-
Beryllium (D)	µg/L	-	-	-	-	-	-	-	6	6	100	-	-	0.005	0.005	0.005	-	-	-	-
Bismuth (D)	µg/L	-	-	-	-	-	-	-	6	6	100	-	-	0.005	0.005	0.005	-	-	-	-
Boron (D)	µg/L	-	-	-	-	-	-	-	6	0	0	15.1	0.601	15.2	14.2	15.8	-	-	-	-
Cadmium (D)	µg/L	-	-	-	-	-	-	-	6	6	100	-	-	0.005	0.005	0.005	-	-	-	-
Chromium (D)	µg/L	-	-	-	-	-	-	-	6	6	100	-	-	0.1	0.1	0.1	-	-	-	-
Cobalt (D)	µg/L	-	-	-	-	-	-	-	6	0	0	0.0184	0.00134	0.0183	0.0168	0.0202	-	-	-	-
Copper (D)	µg/L	-	-	-	-	-	-	-	6	0	0	0.807	0.0454	0.814	0.747	0.852	-	-	-	-
Iron (D)	µg/L	-	-	-	-	-	-	-	6	0	0	26.3	5.42	26.4	20.2	32.1	-	-	-	-
Lead (D)	µg/L	-	7.35 7.79	-	-	-	7.35	5.51	6	2	33	0.00917	0.00337	0.0105	0.01	0.013	0	-	-	-
Lithium (D)	µg/L	-	-	-	-	-	-	-	6	0	0	1.4	0.0753	1.4	1.33	1.48	-	-	-	-
Manganese (D)	µg/L	-	320	-	-	-	320	240	6	0	0	0.549	0.124	0.536	0.418	0.76	0	-	-	-
Mercury (D)	µg/L	-	-	-	-	-	-	-	6	3	50	-	-	0.0005	0.0005	0.00063	-	-	-	-
Molybdenum (D)	µg/L	-	-	-	-	-	-	-	6	0	0	1.96	2.29	0.536	0.443	5.33	-	-	-	-
Nickel (D)	µg/L	-	-	-	-	-	-	-	6	0	0	0.711	0.0685	0.711	0.627	0.796	-	-	-	-
Selenium (D)	µg/L	-	-	-	-	-	-	-	6	1	17	0.0443	0.0145	0.0435	0.04	0.06	-	-	-	-

Parameter	Units	Screening Criteria ^[a]					AEMP Benchmark ^[c]	AEMP Action Level	Lake D7											
		Normal Range (Upper Limit of Baseline)	Aquatic Life	Health Canada		SSWQO			Summary Statistics ^[d]										% of samples > screening criteria	
			CCME or FEQG Aquatic Life [b]	GCDWQ	Aesthetic Objective				N	N<MDL	% <MDL	Mean	SD	Median	Min	Max				
Silicon (D)	µg/L	-	-	-	-	-	-	-	6	0	0	192	47.7	192	145	242	-	-	-	-
Silver (D)	µg/L	-	-	-	-	-	-	-	6	6	100	-	-	0.005	0.005	0.005	-	-	-	-
Strontium (D)	µg/L	-	2500	-	-	-	2500	1875	6	0	0	68.6	2.29	68.6	66.1	72.5	0	-	-	-
Sulfur (D)	µg/L	-	-	-	-	-	-	-	6	0	0	1510	198	1520	1270	1750	-	-	-	-
Thallium (D)	µg/L	-	-	-	-	-	-	-	6	6	100	-	-	0.005	0.005	0.005	-	-	-	-
Tin (D)	µg/L	-	-	-	-	-	-	-	6	6	100	-	-	0.02	0.02	0.02	-	-	-	-
Titanium (D)	µg/L	-	-	-	-	-	-	-	6	4	67	-	-	0.05	0.05	0.056	-	-	-	-
Uranium (D)	µg/L	-	-	-	-	-	-	-	6	0	0	0.059	0.00421	0.0586	0.0537	0.064	-	-	-	-
Vanadium (D)	µg/L	-	-	-	-	-	-	-	6	4	67	-	-	0.05	0.05	0.053	-	-	-	-
Zinc (D)	µg/L	1.4	11.6 14.3	-	-	-	11.6	8.7	6	3	50	-	-	0.53	0.5	1.16	0	-	-	-
Zirconium (D)	µg/L	-	-	-	-	-	-	-	6	5	83	-	-	0.01	0.01	0.016	-	-	-	-
Other (mg/L)																				
Cyanide (Free)	mg/L	-	-	-	-	-	-	-	6	100	-	-	0.001	0.001	0.001	-	-	-	-	-
Cyanide (Total)	mg/L	0.001	0.005	0.2	-	-	0.005	0.00375	6	100	-	-	0.001	0.001	0.001	0	0	-	-	0
Cyanide (WAD)	mg/L	-	-	-	-	-	-	-	6	100	-	-	0.001	0.001	0.001	-	-	-	-	-

Notes

[a] Refer to **Table 2-2** for references to the various screening criteria.

[b] The range of acute and chronic guidelines calculated for the 2020 water quality data is shown for parameters with site-specific water quality guidelines (e.g., cadmium, dissolved zinc, and dissolved manganese).

[c] Refer to **Table 2-2** for the list of the AEMP Benchmarks. Benchmarks and corresponding Action Levels for dissolved Pb, Mn, Sr, and Zn were applied to the total (unfiltered fraction).

[d] Mean and SD were not calculated if >50% of the values were <MDL. 1/2 the MDL was used to calculate the mean and SD if >50% of the measurements were > MDL.

"na" refers to the chronic WQG screening results that don't apply to parameters with SSWQO (fluoride, arsenic, iron).

Table 7-7. Lake A8 – Normal Range Screening Assessment, 2020

Parameter	Current DL	Normal Range ^[a]		Lake A8			
		Calculation Method ^[b]	Value	Summary Statistics ^[c]			
				N	N<DL	Mean	Median
Field Measurements							
Sp. Conductivity (field) (µS/cm)	0.1	Percentile	334	6	0	259	251
pH (field)	0.1	PI	7.7 8.3	6	0	7.93	7.98
Conventional Parameters (mg/L unless otherwise specified)							
Hardness	0.2	Percentile	123	6	0	93.2	91.6
TDS (Calculated)	-	Percentile	152	6	0	123	121
Total Suspended Solids	1	Percentile	4	6	5	-	1
Turbidity (lab, NTU)	0.1	PI (λ)	0.87	6	0	0.47	0.47
Major Ions (mg/L)							
Alkalinity, Bicarbonate	1	PI (λ)	91	6	0	62.4	61.4
Alkalinity, Total	1	PI (λ)	83.6	6	0	51.1	50.3
Calcium (T)	0.01	Percentile	40	6	0	30.6	30.25
Chloride	0.1	Percentile	61	6	0	41.1	41.3
Fluoride	0.02	PI	0.04	6	0	0.034	0.034
Magnesium (T)	0.004	Percentile	5.6	6	0	4.24	4.12
Potassium (T)	0.02	Percentile	2.5	6	0	1.867	1.86
Sodium (T)	0.02	Percentile	8.4	6	0	7.68	7.49
Sulphate	0.3	PI	9.3	6	0	7.49	7.63
Nutrients (mg/L)							
Ammonia (as N)	0.005	Percentile	0.011	6	0	0.043	0.043
Nitrate (as N)	0.005	Percentile	0.015	6	3	-	0.0057
Nitrite (as N)	0.001	DL	0.001	6	6	-	0.001
Total Kjeldahl Nitrogen	0.05	PI (λ)	0.63	6	0	0.44	0.4305
Total Phosphorus	0.001	PI	0.009	6	0	0.0063	0.0062
Organic/Inorganic Carbon (mg/L)							
Dissolved Organic Carbon	0.5	PI	4.9	6	0	4.23	4.16
Total Organic Carbon	0.5	PI	4.7	6	0	4.19	4.02
Total Metals (µg/L)							
Aluminum (T)	1	PI (λ)	3	6	0	4.47	3.75
Antimony (T)	0.02	Percentile	0.4	6	0	0.090	0.05
Arsenic (T)	0.02	PI	2.4	6	0	5.39	5.78
Barium (T)	0.02	PI	32	6	0	25.0	24.9
Beryllium (T)	0.005	DL	0.005	6	6	-	0.005
Bismuth (T)	0.005	DL	0.005	6	6	-	0.005
Boron (T)	5	Percentile	5	6	2	4.6	5.6
Cadmium (T)	0.005	DL	0.005	6	5	-	0.005
Chromium (T)	0.1	DL	0.1	6	6	-	0.1
Cobalt (T)	0.005	PI	0.05	6	0	0.047683	0.046
Copper (T)	0.05	PI	0.89	6	0	1.30	1.3075
Iron (T)	1	PI	67	6	0	72.7	63.5
Lead (T)	0.01	Percentile	0.03	6	0	0.066	0.069
Lithium (T)	0.5	Percentile	10	6	0	7.26	7.51
Manganese (T)	0.05	PI	13	6	0	10.8	9.53
Mercury (T)	0.0005	PI	0.0012	6	3	-	0.00051
Molybdenum (T)	0.05	Percentile	0.22	6	0	0.27	0.27
Nickel (T)	0.05	PI	0.92	6	0	0.83	0.79
Selenium (T)	0.04	DL	0.04	6	4	-	0.04
Silver (T)	0.005	DL	0.005	6	6	-	0.005
Strontium (T)	0.02	PI (λ)	273	6	0	192	195
Thallium (T)	0.005	Percentile	0.005	6	6	-	0.005
Tin (T)	0.02	Percentile	0.05	6	5	-	0.02
Titanium (T)	0.05	Percentile	0.25	6	0	0.14	0.11
Uranium (T)	0.001	PI (λ)	0.054	6	0	0.048	0.047
Vanadium (T)	0.05	DL	0.05	6	3	-	0.051
Zinc (T)	0.5	Percentile	1.2	6	0	1.18	1.005

Notes:

[a] Refer to Golder (2019) for information on statistical methods used to calculate the normal ranges for the Peninsula Lakes.

[b] Upper limit (90th percentile or 90th prediction interval [PI]) of the normal range used for screening purposes, with the exception of pH which has a relevant lower limit.

[c] If the normal range was calculated using the PI or PI (λ) method, mean concentrations were screened against upper limit. If the percentile method was used to calculate the normal range, the median concentration was compared to the upper limit.

Orange highlighted cells indicate the mean/median concentration exceeds the upper limit of the normal range (baseline) by > 10%.

Bold values indicate the mean/median concentration is greater than the upper limit of the normal range.

Table 7-8. Lake B7 – Normal Range Screening Assessment, 2020

Parameter	Current DL	Normal Range ^[a]		Lake B7			
		Calculation Method ^[b]	Value	Summary Statistics ^[c]			
				N	N<MDL	Mean	Median
Field Measurements							
Sp. Conductivity (field) (µS/cm)	0.1	Percentile	302	6	0	245	246
pH (field)	0.1	PI (λ)	7.0 8.2	6	0	7.77	7.84
Conventional Parameters (mg/L unless otherwise specified)							
Hardness	0.2	Percentile	118	6	0	85.5	85
TDS (Calculated)	-	Percentile	171	6	0	115	115
Total Suspended Solids	1	PI (λ)	3	6	3	-	1.15
Turbidity (lab, NTU)	0.1	PI (λ)	0.69	6	0	0.39	0.41
Major Ions (mg/L)							
Alkalinity, Bicarbonate	1	Percentile	135	6	0	53.4	53.3
Alkalinity, Total	1	Percentile	110	6	0	43.7	43.65
Calcium (T)	0.01	Percentile	39	6	0	29.7	29.3
Chloride	0.1	Percentile	25	6	0	38.9	38.9
Fluoride	0.02	PI (λ)	0.04	6	0	0.032	0.032
Magnesium (T)	0.004	Percentile	5.3	6	0	2.92	2.9
Potassium (T)	0.02	Percentile	2.8	6	0	1.78	1.78
Sodium (T)	0.02	Percentile	7.5	6	0	6.86	6.8
Sulphate	0.3	Percentile	6	6	0	8.225	8.15
Nutrients (mg/L)							
Ammonia (as N)	0.005	Percentile	0.025	6	0	0.022	0.016
Nitrate (as N)	0.005	Percentile	0.005	6	4	-	0.005
Nitrite (as N)	0.001	DL	0.005	6	6	-	0.001
Total Kjeldahl Nitrogen	0.05	PI (λ)	0.73	6	0	0.424	0.428
Total Phosphorus	0.001		0.01	6	0	0.0079	0.0068
Organic/Inorganic Carbon (mg/L)							
Dissolved Organic Carbon	0.5	PI	5.5	6	0	4.92	4.905
Total Organic Carbon	0.5	PI (λ)	7.6	6	0	4.83	4.86
Total Metals (µg/L)							
Aluminum (T)	1	PI (λ)	6.6	6	0	3.02	3.1
Antimony (T)	0.02	DL	0.02	6	0	0.069	0.043
Arsenic (T)	0.02	PI (λ)	1.8	6	0	5.45	5.13
Barium (T)	0.02	Percentile	20	6	0	24.7	24.6
Beryllium (T)	0.005	DL	0.01	6	6	-	0.005
Bismuth (T)	0.005	DL	0.01	6	6	-	0.005
Boron (T)	5	Percentile	8	6	0	15.0	14.9
Cadmium (T)	0.005	Percentile	0.007	6	6	-	0.005
Chromium (T)	0.1	DL	0.1	6	6	-	0.1
Cobalt (T)	0.005	PI	0.05	6	0	0.070	0.072
Copper (T)	0.05	Percentile	1.13	6	0	0.9095	0.91
Iron (T)	1	PI	103	6	0	59.65	60.9
Lead (T)	0.01	Percentile	0.08	6	0	0.056	0.057
Lithium (T)	0.5	PI (λ)	7.5	6	0	19.6	19.8
Manganese (T)	0.05	Percentile	8.6	6	0	6.13	6.17
Mercury (T)	0.0005	PI (λ)	0.004	6	4	-	0.0005
Molybdenum (T)	0.05	PI (λ)	0.24	6	0	1.42	0.27
Nickel (T)	0.05	PI (λ)	1.4	6	0	0.83	0.84
Selenium (T)	0.04	Percentile	0.04	6	3	-	0.043
Silver (T)	0.005	DL	0.005	6	6	-	0.005
Strontium (T)	0.02	PI	155	6	0	273	275.5
Thallium (T)	0.005	DL	0.005	6	3	-	0.0054
Tin (T)	0.02	DL	0.05	6	3	-	0.0205
Titanium (T)	0.05	Percentile	0.25	6	5	-	0.05
Uranium (T)	0.001	PI	0.03	6	0	0.044	0.043
Vanadium (T)	0.05	DL	0.05	6	2	0.046	0.051
Zinc (T)	0.5	Percentile	1.9	6	1	0.72	0.70

Notes:

[a] Refer to Golder (2019) for information on statistical methods used to calculate the normal ranges for the Peninsula Lakes.

[b] Upper limit (90th percentile or 90th prediction interval [PI]) of the normal range used for screening purposes, with the exception of pH which has a relevant lower limit.

[c] If the normal range was calculated using the PI or PI (λ) method, mean concentrations were screened against upper limit. If the percentile method was used to calculate the normal range, the median concentration was compared to the upper limit.

Orange highlighted cells indicate the mean/median concentration exceeds the upper limit of the normal range (baseline) by > 10%.

Bold values indicate the mean/median concentration is greater than the upper limit of the normal range.

Table 7-9. Lake D7 – Normal Range Screening Assessment, 2020

Parameter	Current DL	Normal Range		Lake D7			
		Calculation Method ^[a]	Value	Summary Statistics ^[c]			
				N	N<MDL	Mean	Median
Field Measurements							
Sp. Conductivity (µS/cm)	0.1	Percentile	159	6	0	130	130
pH (field)	0.1	PI (λ)	7.0 8.2	6	0	7.91	7.93
Conventional Parameters (mg/L unless otherwise specified)							
Hardness	0.2	Percentile	56	6	0	45.1	45
TDS (Calculated)	-	Percentile	81	6	0	67.1	67.5
Total Suspended Solids	1	Percentile	2	6	1	1.53	1.75
Turbidity (lab, NTU)	0.1	PI	1.1	6	0	0.83	0.85
Major Ions (mg/L)							
Alkalinity, Bicarbonate	1	Percentile	68	6	0	57.7	58.4
Alkalinity, Total	1	Percentile	55	6	0	47.3	47.8
Calcium (T)	0.01	Percentile	17	6	0	13.8	13.8
Chloride	0.1	Percentile	25	6	0	9.6	9.58
Fluoride	0.02	Percentile	0.05	6	0	0.042	0.042
Magnesium (T)	0.004	Percentile	3.3	6	0	2.65	2.64
Potassium (T)	0.02	PI (λ)	1.8	6	0	1.27	1.27
Sodium (T)	0.02	Percentile	17	6	0	7.29	7.21
Sulphate	0.3	Percentile	10	6	0	4.28	4.21
Nutrients (mg/L)							
Ammonia (as N)	0.005	PI	0.009	6	1	0.031	0.0265
Nitrate (as N)	0.005	DL	0.005	6	1	0.012	0.0075
Nitrite (as N)	0.001	DL	0.0005	6	5	-	0.001
Total Kjeldahl Nitrogen	0.05	PI (λ)	0.52	6	0	0.38	0.40
Total Phosphorus	0.001	Percentile	0.02	6	0	0.011	0.011
Organic/Inorganic Carbon (mg/L)							
Dissolved Organic Carbon	0.5	PI (λ)	5.1	6	0	4.76	4.71
Total Organic Carbon	0.5	Percentile	14	6	0	4.64	4.62
Total Metals (µg/L)							
Aluminum (T)	1	PI	6.7	6	0	7.15	7.25
Antimony (T)	0.02	Percentile	0.03	6	6	-	0.02
Arsenic (T)	0.02	PI	1.2	6	0	1.29	1.27
Barium (T)	0.02	PI	17	6	0	16.3	16.4
Beryllium (T)	0.005	DL	0.01	6	6	-	0.005
Bismuth (T)	0.005	DL	0.01	6	6	-	0.005
Boron (T)	5	PI	17	6	0	15.5	15.35
Cadmium (T)	0.005	DL	0.005	6	6	-	0.005
Chromium (T)	0.1	DL	0.1	6	6	-	0.1
Cobalt (T)	0.005	Percentile	0.05	6	0	0.062	0.064
Copper (T)	0.05	PI	1	6	0	0.88	0.88
Iron (T)	1	PI (λ)	112	6	0	78.2	77.4
Lead (T)	0.01	Percentile	0.02	6	0	0.024	0.024
Lithium (T)	0.5	PI	1.9	6	0	1.43	1.42
Manganese (T)	0.05	PI	13	6	0	12.9	12.8
Mercury (T)	0.0005	PI	0.001	6	0	0.00059	0.00058
Molybdenum (T)	0.05	PI (λ)	0.48	6	0	0.51	0.46
Nickel (T)	0.05	PI	0.75	6	0	0.77	0.77
Selenium (T)	0.04	Percentile	0.06	6	0	0.061	0.060
Silver (T)	0.005	DL	0.005	6	5	-	0.005
Strontium (T)	0.02	PI (λ)	83	6	0	68.0	67.9
Thallium (T)	0.005	DL	0.005	6	6	-	0.005
Tin (T)	0.02	DL	0.05	6	5	-	0.02
Titanium (T)	0.05	PI (λ)	0.34	6	2	0.34	0.40
Uranium (T)	0.001	PI	0.1	6	0	0.056	0.056
Vanadium (T)	0.05	PI (λ)	0.07	6	0	0.092	0.093
Zinc (T)	0.5	Percentile	2	6	1	0.88	0.57

Notes:

[a] Refer to Golder (2019) for information on statistical methods used to calculate the normal ranges for the Peninsula Lakes.

[b] Upper limit (90th percentile or 90th prediction interval [PI]) of the normal range used for screening purposes, with the exception of pH which has a relevant lower limit.

[c] If the normal range was calculated using the PI or PI (λ) method, mean concentrations were screened against upper limit. If the percentile method was used to calculate the normal range, the median concentration was compared to the upper limit.

Orange highlighted cells indicate the mean/median concentration exceeds the upper limit of the normal range (baseline) by > 10%.

Bold values indicate the mean/median concentration is greater than the upper limit of the normal range.

8 REFERENCES

- ADEC (Alaska Department of Environmental Conservation). 2012. Water Quality Standards. 18 AAC 70. Amended as of April 8, 2012. Juneau, AK, USA. Available at: Link. Accessed March 2014.
- Agnico Eagle (Agnico Eagle Mines Ltd.) 2015. Meliadine Gold Project – Type A Water Licence Main Application Document. April 2015. Version 1.
- Agnico Eagle (Agnico Eagle Mines Ltd.). 2014. Meliadine Gold Project, Nunavut. Final Environmental Impact Statement. Submitted to the Nunavut Impact Review Board. April 2014.
- Azimuth Consulting Group Inc. (Azimuth). 2020. Aquatic Effects Monitoring Program – 2019 Report. March 2020.
- Azimuth. 2019. Core Receiving Environment Monitoring Program 2018. Report prepared by Azimuth Consulting Group, Vancouver, BC for Agnico Eagle Mines Ltd., Baker Lake, NU. March 2018.
- Azimuth. 2013. Technical Memorandum: Meliadine – AEMP Development, Phase 1. Prepared by Azimuth for internal use by Agnico Eagle. December 13, 2013.
- Azimuth. 2012. Core Receiving Environment Monitoring Program (CREMP): Design Document 2012, Meadowbank Mine. Report prepared by Azimuth Consulting Group, Vancouver, BC for Agnico-Eagle Mines Ltd., Baker Lake, NU. December, 2012.
- Carlson RE. 1977. A trophic state index for lakes. *Limnol. Oceanogr.* 22: 361-369.
- Diavik Diamond Mines Inc. (DDMI). 2013. Aquatic Effects Monitoring Program Study Design Version 3.5. Diavik Diamond Mines Inc., Yellowknife, Northwest Territories. May 2014.
- Dolman AM and C Wiedner. 2015. Predicting phytoplankton biomass and estimating critical N:P ratios with piecewise models that conform to Liebig's law of the minimum. *Freshwater Biol.* 60: 686-697.
- Environment Canada 2012. Metal Mining Technical Guidance Document for Environmental Effects Monitoring.
- Elser JJ, MES Bracken, EE Cleland, DS Gruner, WS Harpole, H. Hillebrand, JT Ngai, EW Seabloom, JB Shurin and JR Smith. 2007: Global analysis of nitrogen and phosphorus limitation of primary producers in freshwater, marine and terrestrial ecosystems. *Ecol. Lett.* 10: 1135–1142.
- Golder 2020a. Water Quality Management and Optimization Plan. Progress Update Rev4. Phase 3: Meliadine Mine Effluent Discharge Benchmarks for Total Dissolved Solids. Submitted to Agnico Eagle Mines Ltd – Meliadine Mine Operations. November 13, 2020.
- Golder 2020b. Meliadine Site Water Balance and Water Quality Model. Type A 2AM-MEL-1631 Water Licence Amendment. Submitted to Agnico Eagle Mines Ltd. August 21, 2020.
- Golder. 2019. Cycle 1 Environmental Effects Monitoring Report and 2018 Aquatic Effects Monitoring Program Annual Report. Submitted to Agnico Eagle Mines Ltd – Meliadine Gold Mine. March 27, 2019.
- Golder. 2018. Aquatic Effects Monitoring Program – 2017 Annual Report. Prepared for Agnico Eagle Mines Limited, Meliadine Division, Rouyn-Noranda, QC. March 2018.

- Golder. 2016. Aquatic Effects Monitoring Program (AEMP) Design Plan. Doc 485-1405283 Ver. 1. Submitted to Agnico Eagle Mines Limited. June 2016.
- Golder. 2013a. Reinstated Draft Site-Specific Water Quality Objective (SSWQO) Assessment, Meliadine Gold Project, Nunavut. Technical Memorandum. Submitted to Agnico Eagle Mines Ltd.
- Golder. 2013b. Technical Memorandum. 2012 Total Dissolved Solids Results – Laboratory Calculation Discrepancy. Project No 1212490001-5000-5020. Prepared by Golder Associates for De Beers Canada. Inc. April 26, 2013.
- Golder. 2012. Aquatics Baseline Synthesis Report, 1994 to 2009 – Meliadine Gold Project, Nunavut. Report Number: Doc 327-1013730076 Ver. 0, Submitted to Agnico Eagle Mines Ltd. October 16, 2012.
- Government of Canada. 2020. Metal and Diamond Mining Effluent Regulations. SOR/2002-222; current to 27 January, 2020.
- Health Canada. 2020. Guidelines for Canadian Drinking Water Quality—Summary Table. Water and Air Quality Bureau, Health Environments and Consumer Safety Branch, Health Canada, Ottawa, Ontario.
- Kelly PT, CT Solomon, JA Zwart, and SE Jones. 2018. A framework for understanding variation in pelagic gross primary production of lake ecosystems. *Ecosystems*, <https://doi.org/10.1007/s10021-018-0226-4>
- Lewis Jr, W.M. and Wurtsbaugh, W.A., 2008. Control of lacustrine phytoplankton by nutrients: erosion of the phosphorus paradigm. *International Review of Hydrobiology*, 93(4-5), pp.446-465.
- Lim DSS, MSV Douglas, JP Smol, and DR Lean. 2001. Physical and chemical limnological characteristics of 38 lakes and ponds on Bathurst Island, Nunavut, Canadian High Arctic. *Internat. Rev. Hydrobiol.* 86: 1-22.
- Michellutti, N, MSV Douglas, DCG Muir, X Wang, and JP Smol. 2002. Limnological Characteristics of 38 Lakes and Ponds on Axel Heiberg Island, High Arctic Canada. *Internat. Rev. Hydrobiol.* 87: 385-399.
- NIRB (Nunavut Impact Review Board). Project Certificate [No.: 006]. February 26, 2019.
- NWB (Nunavut Water Board). 2020. NWB Water Licence Type A No. 2AM-MEL-1631 – Request for the Ministers Consent to Process Amendment No.1 on an Emergency Basis and Attached Reasons for Decision and Amendment No.1 for the Ministers Consideration. File No. 2AM1631/Emergency Amendment No.1.
- NWB (Nunavut Water Board). 2016. Type A Water Licence No: 2AM-MEL1631. April 2016.
- Nojavan AF, Kreakie BJ, Hollister JW, Qian S. 2019b. Example application of a continuous lake trophic state index on lakes with limited data. *PeerJ Preprints* 7:e27913v1 <https://doi.org/10.7287/peerj.preprints.27913v1>
- Ogbebo, FE, MS Evans, MJ Waiser, VP Tumber, and JJ Keating. 2009. Nutrient limitation of phytoplankton growth in Arctic lakes of the lower Mackenzie River Basin, northern Canada. *CJFAS* 66: 247-260.
- Pienitz R., M.S.V. Douglas and J.P. Smol (eds), 2004. Long-Term Environmental Change in Arctic and Antarctic Lakes. Kluwer Academic Publishers, Dordrecht, The Netherlands.
- R Core Team (2018). R: A language and environment for statistical computing. R Foundation for Statistical Computing, Vienna, Austria. URL <https://www.R-project.org/>.

- Schindler DW. 1971. Carbon, nitrogen, and phosphorus and the eutrophication of freshwater lakes. *J. Phycol.* 7: 321-329.
- Schindler DW. 1974. Eutrophication and recovery in experimental lakes: Implications for lake management. *Science* 184 (No.4135): 897-899.
- Smith VH (1982) The nitrogen and phosphorus dependence of algal biomass in lakes: an empirical and theoretical analysis. *Limnol Oceanogr* 27: 1101–1112.
- Sterner, RW. 2008 On the phosphorus limitation paradigm for lakes. *Internat. Rev. Hydrobiol.* 93: 433-455.

APPENDICES

APPENDIX A
QUALITY ASSURANCE / QUALITY CONTROL

TABLE OF CONTENTS – APPENDIX A

A.1	INTRODUCTION	1
A.2	WATER CHEMISTRY	1
A.2.1	QA/QC Methods.....	1
A.2.1.1	Field	1
A.2.1.2	Laboratory	5
A.2.2	Results and Discussion	7
A.2.2.1	Field Results	7
A.2.2.2	Laboratory Results	10
A.2.3	QA/QC Summary	11
A.3	PHYTOPLANKTON STUDY	13
A.3.1	QA/QC Methods.....	13
A.3.1.1	Field	13
A.3.1.2	Laboratory	14
A.4	RESULTS AND DISCUSSION	14
A.4.1	Field Results	14
A.4.1.1	Sample Shipping and Handling.....	14
A.4.1.2	Field Duplicates	15
A.4.2	Laboratory Results.....	15
A.4.3	QA/QC Summary	16

LIST OF TABLES – APPENDIX A

Table A-1.	Sample Submission Records for Water Samples Submitted to ALS Analytical for the 2020 AEMP	18
Table A-2.	Field QC Summary for the 2020 AEMP Water Samples	19
Table A-3.	Parameters Detected in Deionized Water Blanks (DB) and Equipment Blanks (EB) in 2020	20
Table A-4.	Laboratory QC Summary for Water Samples Analyzed by ALS Environmental in 2020	23
Table A-5.	Field Duplicate Results for Phytoplankton Biomass and Density, August 2020	24
Table A-6.	Laboratory Duplicate Results for Phytoplankton Biomass and Density, August 2020	25
Table A-7.	Field duplicate results for chlorophyll-a samples collected in August 2020.....	26

LIST OF SUB-APPENDICES

March 2020 Sampling Event: Preliminary Screening and QC Assessment

July 2020 Sampling Event: Preliminary Screening and QC Assessment

August 2020 Sampling Event: Preliminary Screening and QC Assessment

September 2020 Sampling Event: Preliminary Screening and QC Assessment

A.1 INTRODUCTION

The objective of quality assurance and quality control (QA/QC) was to assure that the chemical and biological data collected were representative of the material or populations being sampled, were of known quality, have sufficient laboratory precision to be highly repeatable, were properly documented, and were scientifically defensible. Data quality was assured throughout the collection and analysis of samples using specified standardized procedures, by the employment of laboratories that have been certified for all applicable methods, and by staffing the program with experienced technicians.

A brief description of quality assurance and quality control practices are provided here.

- *Quality Assurance* (QA) 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) are measures taken to verify that the specific DQOs are met.

There were two major components to the 2020 Meliadine AEMP program: water quality and phytoplankton. The field and laboratory QA/QC methods ([Section A.2](#)) and results and discussion ([Section A.4](#)) for each of these media are reported herein.

A.2 WATER CHEMISTRY

A.2.1 QA/QC Methods

An overview of the QA/QC methods in 2020 for the water chemistry component of the AEMP is provided below; refer to the *AEMP Design Plan* (Golder, 2016) for a complete description.

Field duplicates, laboratory duplicates, and blank samples were analyzed as part of the QA/QC program in each of the four AEMP sampling events in 2020 which occurred in March, July, August and September. Peninsula lakes A8, B7 and D7 were only sampled in July and August 2020.

A.2.1.1 Field

Field Data and Sample Collection

Briefly, the standard QA procedures for the water chemistry program included thoroughly flushing the flexible tubing and pump to prevent cross-contamination between areas and thoroughly rinsing the sample containers with site water prior to sample collection. Field limnology data were collected using a multiprobe meter. The meter was calibrated before field measurements 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 contamination 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 any 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 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) was transcribed into an EQUIS database jointly administered by Agnico Eagle and Golder.

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 provide the laboratory with sample details, ensure that sample handling instructions are followed and that all samples are accounted for.

The Meliadine Environment Department plans water sampling events to minimize the amount of time that samples are in transit between the Site, Val d'Or, and the various laboratories in Vancouver, Alberta, Winnipeg and Colorado. The remote location of the mine will always present challenges with some analytes exceeding recommended hold-times, but the effect of slightly exceeding hold-times on the quality of the results is considered negligible. 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.

Recommended hold-times are provided by the laboratory for analytes and water quality parameters. The times vary from a low of 0.25 days for pH to six months for metals. Hold-times for water samples are regularly exceeded for turbidity, pH, nitrate, nitrite, total dissolved solids, total suspended solids and dissolved orthophosphate (as P). Occasionally, hold-times are exceeded for cyanides (free and total). Samples are generally shipped very soon after collection and the distances and logistics make it impossible to meet short hold-times. However, it is highly unlikely that results are affected for those parameters or analytes where hold-times were not met in 2020.

Sample Blanks

Field QC procedures as part of the AEMP included collecting and analyzing three different types of *blank* samples; travel blanks, de-ionized water blanks (DB) and equipment blanks (EB). Blank sample collection, particularly equipment blanks, required careful planning, attention to detail, focuses on the

importance of cleanliness and generally provided a good opportunity to refine sample collection skills. Furthermore, blank results provided context to help explain anomalous water chemistry results in the AEMP samples.

Blank samples were collected once per sample event, and were submitted *blind* to the laboratory, to ensure they were treated the same as field collected samples during analysis. Results from the field, equipment and travel blanks were examined for detectable concentrations of any of the parameters measured; no parameter in blanks should exceed laboratory method detection limits (DLs). If an analyte was detected in a blank, the results for the batch of samples submitted with the blank were compared with the measured concentration in the blank; results that were less than 10-times the detected analyte concentration in the equipment blank were flagged to examine the potential for cross-contamination to affect the results¹. This threshold does not apply to pH measurements, as DLs are not available for the pH scale.

Travel blanks (TB) – Travel blanks provided by ALS consisted of deionized water in sampling bottles and received the same treatment as field samples during shipment, handling, storage, and laboratory analysis. Three travel blanks were provided by the analytical laboratory for the purpose of testing for contamination associated with travel (e.g., hold time, temperature, moisture, desiccation, leaching). The travel blanks were opened in the field only to collect a sample then sealed immediately afterwards. Travel blank results were treated the same as equipment blank results by the analytical laboratory. Travel blanks should (1) be included in sample container shipments, (2) come directly from the analytical laboratory and (3) be stored in a cool place (e.g., refrigerator).

De-ionized water blanks (DB; aka field blanks) – To obtain a DB blank, deionized water provided by the analytical laboratory was transferred to a sample bottle in the field. Field blanks were handled and analyzed using the same techniques as water samples collected in the field. Field blanks were used to detect potential contamination during sample collection, handling, shipping and laboratory analysis. Field blank results were treated the same as equipment blank results by the analytical laboratory.

Equipment blanks (EB) – To obtain an EB, deionized water provided by the analytical laboratory was transferred to the same equipment used to collect field samples. The deionized water was first run through the equipment and then transferred to a sample bottle. Equipment blanks were handled in the same way as field samples and used to detect potential contamination from sampling equipment. Results from equipment blanks were examined for detectable concentrations of any of the parameters measured; no parameter should exceed DLs. If an analyte was detected in a blank, the results for the

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

batch of samples submitted with the blank were compared with the measured concentration in the blank; results that were less than 10-times the detected analyte concentration in the equipment blank were flagged to examine the potential for cross-contamination to affect the results.

Collecting both field blanks and equipment blanks provided an opportunity to assess the potential for the sampling equipment to introduce contamination. If analytes were detected in both the field and equipment blanks the sample collection methods and equipment used to collect water was not likely to bias the water quality data.

Field Duplicates

Additional samples (i.e., field duplicates) were collected as a subset of the field sampling locations for water. Field duplicates were collected at the same time and using the same methodology as field samples and with the intent of collecting the same media. Field duplicates were used to identify the precision of field sampling methods and laboratory analysis and within-station variability. Field duplicates were submitted *blind* to the laboratory and analysed using the same methods and equipment as original samples.

Results of the field duplicates were assessed by measuring the relative percent difference (RPD) as a percentage between original and duplicate measurements. The RPD was used as measure of precision by the laboratory and the magnitude of variability between original and field duplicate samples. The variability in field duplicates may be attributed to sampling procedures and/or natural conditions (i.e., spatial heterogeneity in the sampling media). The equation used to calculate the RPD is the following:

$$RPD = \frac{(A - B)}{\left(\frac{A + B}{2}\right)} \times 100$$

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

The DQOs for field duplicates were 1.5X the laboratory RPDs (RPDs can be negative or positive). If no RPD was provided by the laboratory, the field duplicate DQO was set to a default of 40%. The adjustment above laboratory RPDs is to reflect that field duplicates are inherently more variable compared to laboratory duplicates partly because field duplicate samples are collected from a large sample volume (i.e., the lake or stream) versus a small well-mixed sample volume (i.e., the single sample container in the laboratory). The Canadian Council of Ministers for the Environment (CCME) states that acceptance limits for field-based QC are broader than laboratory QC and are typically 1.5 to 2 times the laboratory QC limits (CCME 2016).

As stated, RPD values may be either positive or negative, and ideally should provide a mix of the two, clustered around zero. RPDs 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 value was outside the field duplicate DQO it was flagged

for review. When analyte concentrations were less than 10-times the DL we expected a greater likelihood of not meeting the DQOs because laboratory precision was slightly further from the DLs and because smaller concentrations of analytes per volume tends to magnify variability between the original sample and the duplicate. These occurrences were still flagged for assessment in order to assess the implications for sampling protocol and data interpretation. However, given the higher potential to not meet DQOs for those reasons outlined above, they were not weighted as highly unless there was a relatively high percentage of RPD values that did not meet DQOs or if the RPD values themselves were very high. Analyte concentrations that were greater than 10-times DL and did not meet the DQOs were given more weight in the QA/QC assessment.

A.2.1.2 Laboratory

Water samples collected during the 2020 Meliadine AEMP, with the exception of the radium-226, were analyzed by ALS Environmental Laboratory (ALS; Vancouver, Edmonton and Winnipeg locations). Analysis of radium-226 was subcontracted by ALS Edmonton to ALS in Fort Collins, Colorado, US. ALS is an analytical laboratory 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.

The first step in the QC program involves documenting any issues with the sample submission. This step applies to all sampling components (i.e., water chemistry and phytoplankton). 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 recommended 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 use the results.

There are five main components of the water chemistry laboratory QC program to assess analytical precision, bias, and completeness:

Laboratory Duplicate – These samples provide insights into the precision of laboratory analyses. The laboratory randomly chooses samples to re-run as duplicates. Duplicate aliquots are taken from the samples and run through parts (aliquots taken post digestion) or all (aliquots taken from the sample bottle) of the laboratory analytical process. 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 were assessed by measuring the RPD as a percentage between original and duplicate measurements which is referred to as the measure of precision by the laboratory.

For full discussion of the RPD calculation, see [Section A.2.1.1](#). 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) – These samples are analyzed to assess background interference or contamination that exists in the analytical system that could lead to elevated concentrations or false positive data. An analyte-free matrix (e.g., DEIONIZED 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 DLs. 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. These samples provide insights into the degree that the sample matrix could interfere with analyses.

Laboratory Control Sample (LCS) – An LCS is a well-characterized sample of known analytes and concentration in water. 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 within control limits and whether the laboratory can make 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 $\pm 10\%$ of the CRM.

The lowest available DLs corresponding to each parameter were specified for all the chemical analyses conducted for the Meliadine AEMP water quality program. Changes in DLs for any given water quality parameter were reviewed, and confirmed with the laboratory. 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.

In 2020, two preliminary analyses were conducted to assess the reliability of sample results from each sampling event. Samples failing either one of these tests have been flagged as uncertain, and require further assessment.

The first analysis compares dissolved and total concentrations for a given parameter at each location. If the dissolved concentration exceeded the corresponding total concentration, the parameter was re-

analyzed by ALS. After re-analysis, samples in which dissolved concentrations are greater than total with a relative percent difference (RPD) of more than 30% are considered as requiring further scrutiny.

The second analysis compares parameter concentrations within each sampling area. In most cases, samples at stations in the same sampling area are expected to have similar concentrations, and outlying data points may be anomalous. Sampling areas where the maximum concentration was more than a factor of 5 greater than the median of all samples within the sampling area are highlighted here as requiring further scrutiny.

All samples failing to meet these reliability checks are summarized in the preliminary screening memos for each sampling event (See **Appendix Appendix A**).

A.2.2 Results and Discussion

Results of the QA/QC analysis are discussed below, along with a discussion on the implications of the QA/QC assessment of the sample results from 2020.

A.2.2.1 Field Results

Table A-1 provides a field QC summary and summarizes the sample integrity observations (e.g., broken sample containers, mislabeled containers), the temperature in the shipping coolers upon arrival to the laboratory, and the parameters that exceeded their recommended hold times for analysis.

Sample Shipping and Handling

The target temperature for samples arriving at ALS was between 5°C and 10°C. The range of temperatures reported in 2020 was between 4.2°C in September to a high of 23°C in July. These temperature ranges reflect the seasonal ambient temperatures. The effect on preserved samples is considered negligible. Except for a re-analysis of metals in samples from the March sampling event, no sample integrity observations were identified.

The sample shipping and handling QA/QC for water samples in 2020 was considered acceptable, and better than in 2019. The logistics, distances, and general challenges of collecting and shipping samples from a remote mine in Nunavut meant that hold times were exceeded for several parameters/analytes but the impact on results is considered negligible.

Field Duplicates

The target frequency of field duplicate sample collection was approximately 10% of the total number of samples collected. For this program, 83 original samples were collected over four events (i.e., one event in March, July, August and September) and ten duplicate samples were collected (12.1% of samples). In 2020, one field duplicate was collected in March, three in July, four in August and two were collected in

September. The field duplicate results are summarized in **Table A-2** and presented in more detail in **Appendix A** for each sampling event.

As mentioned in **Section A.2.1.1**, the DQOs for field duplicates were 1.5X the laboratory RPD for each analyte unless no RPD was available, in which case, a default 40% was used. The laboratory RPDs for water chemistry for most analytes were 20% and, as such, in 2020 the DQOs for field duplicate water samples were less than $\pm 30\%$.

Appendix A summarizes the number of analytes from each sampling event for which the field duplicate RPDs did not meet the DQOs. In March, the RPDs for total molybdenum and nitrite (as N) did not meet the DQOs. In July, the RPDs were not met in at least one sample for total ammonia, Nitrite-N, Nitrate-N, aluminum, iron, dissolved and total manganese, molybdenum, dissolved silicon, dissolved tin, titanium and dissolved and total zinc. In August, RPDs did not meet DQOs for total ammonia (as N), total kjeldahl nitrogen (TKN), total nitrogen, total and dissolved antimony, dissolved manganese, and dissolved zirconium. All RPDs met the DQOs in September. Similar to 2019, total ammonia, measured as nitrogen, exceeded the DQOs in multiple samples collected in July and August. Some of the variability, as observed with nitrogen, may be attributed to increased plant (algae) growth in these months.

Only a few field duplicate RPDs did not meet DQOs in 2020, suggesting that sample collection and sample handling occurred at a high standard.

QC Blanks

Travel Blanks

Travel blanks were submitted for the March, August and September sampling events and none were submitted for the July sampling event.

Detectable concentrations of total ammonia (as N) were detected in the March, August, and September TB. Total zinc was detected in the August and September TB, and a turbidity was detected in the September TB (**Table A-2**). Total ammonia (as N) detected in the March travel blank was not detected in the EB, but was detected in both the TB and EB in August and September. Total zinc was detected in the August travel blank but not the equipment blank. All parameters detected in the travel blank were detected in the equipment blank in the September sampling event. In the travel blanks, all parameters were detected less than 10-times the DL, except for total ammonia (as N) in August which was detected at a concentration slightly higher than 10-times the DL.

The TB results for total ammonia suggest factors other than cross-contamination from sampling equipment as the underlying cause of detected concentrations in the blanks in 2020.

De-ionized Water Blanks

The goal of these deionized water blanks (DB) is to test the quality of the de-ionized water batch and variability in laboratory analytical methods. DB with the full suite of analyses were submitted for all sampling events. DB were submitted for dissolved metals but not filtered in the field. Results of the blanks collected for the AEMP are summarized in **Table A-3** and details provided in **Appendix A**.

In March, the detected concentrations were close to respective DLs for conductivity, hardness, total and bicarbonate alkalinity, total and dissolved barium, total and dissolved copper, total and dissolved nickel, strontium, total and dissolved zinc, dissolved magnesium and dissolved manganese. The detected concentrations were higher than 10-times the DL for total and dissolved calcium, molybdenum, total and dissolved sodium, and dissolved strontium.

In July, the detected concentrations were close to respective DLs for total dissolved solids (TDS), TKN, total nitrogen, total phosphorus, reactive silica, zinc, dissolved aluminum and dissolved strontium. None of the parameters were detected at concentrations higher than 10-times the DL in the DB.

In August, the detected concentrations were close to respective DLs for total ammonia (as N), arsenic, barium, iron, strontium, and dissolved barium, calcium and zinc. None of the concentrations in the DB blank were higher than 10-times the DL.

In September, the detected concentrations were close to respective DLs for conductivity, total ammonia (as N), reactive silica, aluminum, arsenic, barium, calcium, iron, lead, manganese, potassium, rubidium, sodium, strontium, titanium, zinc and dissolved arsenic, barium, calcium, iron, lead, manganese, rubidium, sodium, strontium, zinc and Ra-226. Dissolved tin was the only parameter in the DB detected at concentrations higher than 10-times the DL.

Equipment Blanks

Equipment blanks (DB) represent one of the best opportunities to assess not only the water sampling equipment but the skills of the sampling teams. Collecting these samples requires careful planning and closely following the sample collection methods as outlined in the *AEMP Design Plan* (Golder 2016; Golder 2018).

Several analytes were detected in each of the equipment blanks submitted in 2020. Equipment blank results are summarized in **Table A-3** and details provided in **Appendix A**. In general, results were acceptable for the 2020 sampling events.

In March, several analytes were detected at concentrations higher than 10-times their respective DLs including barium, calcium, copper, lead, molybdenum, strontium, dissolved lead and dissolved strontium. Several other analytes were detected at concentrations close to the DL.

In July, August and September, several analytes were detected at concentrations close to the DL. Only two analytes in August, antimony and dissolved strontium, were detected at concentrations higher than 10-times their respective DL.

There were several analytes detected in both the DB and equipment blanks. Other analytes were detected in the equipment blanks but not the DB at concentrations close to the detection limits. While there is less confidence in the results when concentrations of analytes are detected in the blanks, the 2020 results are not likely to impact the interpretation of water quality.

The implications of possible cross-contamination on interpreting the water quality data from the same event is considered inconsequential for each sampling event.

A.2.2.2 Laboratory Results

Laboratory detection limits were adjusted for a few analytes. While the changes aren't likely to affect the interpretation of certain analytes (e.g., TDS), the DLs for the following parameters were adjusted due to sample matrix effects: dissolved and total silver in March, silver, Ra-226 and cadmium in July, cadmium in August, and Ra-226 in September. Since results were close to the detection limit the precision of the results was reduced for these parameters.

ALS provides a thorough account of their QC assessment in each Certificate of Analysis (COA) that is issued². These results are summarized in [Table A-4](#). 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 as outlined in [Section A.2.1.2](#):

- **Laboratory Duplicates** – The laboratory DQO for most parameters is an RPD of less than 20%. All the laboratory duplicates met the DQOs for water chemistry in 2020.
- **Method blanks (MB)** – The MB is a blank matrix sample that is taken through the entire analytical procedure to test variability in the analytical method and report any bias in the analysis. MB results are equal to the limit of reporting (or DL as termed here). MB qualifiers are either:

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.

- “B” – Method Blank exceeds ALS DQO. Associated sample results which are < DL or > 5 times blank level are considered reliable.
- “MB-LOR” – Method Blank exceeds ALS DQO. DLs have been adjusted for samples with positive hits below 5x blank levels.

The MB flag “B” was assigned for thorium (total or dissolved) in a few samples in July and August. The results indicate that the laboratory may have increased DLs in these cases. The DQO flags for MB samples were reviewed; the results do not affect the interpretation of the 2020 water quality data.

- **Matrix Spike (MS)** – MS recovery is on occasion flagged in the QC assessment due to high concentrations of the analyte in the sample. These instances are rare, and are typically associated with parameters such as major cations (e.g., magnesium) or certain metals with detected results above the DL (i.e., strontium). In 2020, MS recovery was flagged for a few analytes in March. The limited number of cases with DQO flags for MS samples were reviewed; the results do not affect the interpretation of the 2020 water quality data.
- **Laboratory Control Samples (LCS) / Certified Reference Material (CRM) / Internal Reference Material (IRM)** – Reference material analysis met the ALS DQOs for all samples analyzed as part of the 2020 except for; boron in March and bismuth in July. The results do not affect the interpretation of the 2020 water quality data.

A.2.3 QA/QC Summary

The field and laboratory QA/QC assessment indicated the data collected in 2020 were reliable. Some issues with the blanks were identified, particularly related to the quality of deionized water used for DB and EB.

Sample Integrity — Sample temperatures received at the laboratory were variable depending on season and reflect the challenges with shipping from a remote mine site. Likewise hold time exceedances for parameters and analytes with short hold times are unavoidable but are not considered likely to impact data analysis and interpretation.

Blanks — There were several analytes detected in the DB and EB submitted in 2020. Apart from a few results, the magnitude of the detected concentrations in the various blanks was typically less than 10-times the DL. Detected concentrations of various parameters in the blanks indicates the potential for cross-contamination. Close examination of the water quality data from 2020 indicated concentrations were consistent with previously-reported results, and potential for cross-contamination to bias the interpretation of the 2020 water quality data is considered unlikely.

Field Duplicates — The 2020 field duplicate results were good with only a few of the calculated RPDs exceeding the DQOs. Periodic exceedances of DQOs for field duplicates is not uncommon for water quality programs.

Laboratory QC Assessment — The laboratory QC assessment completed by ALS indicated the 2020 water quality data were typically within the established DQOs. In the few instances where a DQO was exceeded, the lab concluded the results were reliable and fit for use in the water quality assessment.

A.3 PHYTOPLANKTON STUDY

A.3.1 QA/QC Methods

An overview of the QA/QC methods in 2020 for the phytoplankton component of the AEMP is provided below; refer to the *AEMP Design Plan* (Golder 2016) for a complete description.

A.3.1.1 Field

In 2020, water samples for phytoplankton, chlorophyll-a and depth-integrated nutrients (DIN) were collected during the August sampling event. Standard procedures were used to collect the depth-integrate sample as a composite of water taken from surface to near-bottom in the water column (Golder, 2018). 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.

Field Duplicates

Quality control procedures implemented during field operations during the August 2020 sampling event in Meliadine Lake included the collection of duplicate phytoplankton samples, triplicate chlorophyll-a samples and duplicate DIN water samples, all 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 at randomly selected stations. The duplicates were submitted *blind* to ALS for analysis in order to assess sampling variability and sample homogeneity. Duplicates represented 12% of the total number of phytoplankton samples collected for analysis. RPDs were calculated for field and laboratory duplicates 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, however, 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 RPDs. Thus, we evaluate the quality of these data based on total density and total biomass both for field and laboratory duplicates. For field duplicates, an RPD of 50% for total density and biomass concentrations is considered acceptable.

Chlorophyll-a — Triplicate samples of chlorophyll-a were collected in 2020 and RPDs were calculated for each triplicate sample. An RPD of 50% is considered acceptable.

Depth-integrated nutrients (DIN) — Duplicate DIN samples were collected in 2020. Duplicates represented 11.5% of the total number of DIN samples collected for analysis. All duplicates were submitted blind to ALS for analysis. Field QA/QC methods for DIN samples were the same as the methods used for surface water ([Section A.2.1.1](#)).

For more information regarding the handling of field duplicates refer to [Section A.2.1.1](#).

A.3.1.2 Laboratory

In 2020, water samples collected for DIN analyses were submitted to the University of Alberta Biogeochemical Analytical Service Laboratory (BASL). Water samples collected for chlorophyll-a analyses were submitted to ALS. Both BASL and ALS laboratories have CALA accreditation. Finally, 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.2.1.1](#), the first step in the QC program involves documenting any issues with the sample submission. This step applies to all sampling components (e.g., chlorophyll-a, DIN samples and phytoplankton). Plankton-R-Us Inc. reports sample integrity concerns via email.

Phytoplankton — As a measure of laboratory QA/QC on the enumeration method replicate counts were performed on 12% of the samples. Replicate samples were randomly chosen and processed at different times from the original analysis to reduce bias (Golder, 2018). The laboratory replicate is an additional aliquot (10 mL) that is taken from the same sample jar as the original sample and analyzed in the same manner as the original. Laboratory QC results were reviewed to determine whether there were any laboratory DQOs that were not met in 2020. An RPD of 25% for total density and biomass concentrations is considered acceptable for laboratory replicates.

Chlorophyll-a — There were no errors, omissions or inconsistencies with the chlorophyll-a data in 2020.

Depth-integrated Nutrients — Laboratory QA/QC methods and RPD calculations for DIN samples were the same as the methods used for surface water ([Section A.2.1.1](#) and [A.2.1.2](#)). Nutrient parameters were analyzed at both Winnipeg and Edmonton ALS locations.

A.4 RESULTS AND DISCUSSION

As described in [Section A.2](#), QA measures were implemented to keep data quality within the program's DQOs. This section presents the QA/QC results for the phytoplankton portion of the AEMP program to verify data quality relative to the DQOs. The QA/QC results presented below for the 2020 AEMP program are summarized in [Section 3](#) of the main report.

A.4.1 Field Results

A.4.1.1 Sample Shipping and Handling

The sample shipping and handling QA/QC for samples in 2020 was acceptable, with no minor sample integrity issues identified by ALS. The logistics, distances, and general challenges of collecting and

shipping samples from a remote mine in Nunavut meant that recommended hold times were exceeded for several parameters/analytes (e.g., nitrate, nitrite) but the impact on results is considered negligible (see [Section A.2.1.1](#)).

A.4.1.2 Field Duplicates

Results of the RPD analysis for phytoplankton and chlorophyll-a are presented in [Table A-5](#) and [Table A-7](#):

Phytoplankton — All the field duplicate RPD's for total biomass and density met the DQOs indicating very good replicability in sample collection. See [Table A-5](#) for the complete phytoplankton and biomass field duplicate results, including RPDs calculated for major taxa groups.

Chlorophyll-a — No sample integrity issues were identified by the laboratory. None of the replicates collected at each station exceeded the DQO outlined in [Section A.3.1.2 \(Table A-7\)](#). Pre-rinsed GF/C filters (pore size of 1.2 µm) were used in 2020 to be consistent with years prior to 2019. In 2019, MF Millipore filters with pore size of 0.45 µm were used resulting in uniformly lower than usual concentrations across samples relative to previous years.

DIN — For several parameters, the concentrations fell below the DL and therefore RPDs were not calculated. For the RPDs that were calculated, there were several RPDs that did not meet the DQOs. On one occasion, the RPD for total phosphorus exceeded the DQO with concentrations higher than 10-times the DL. In the same field duplicate, the RPDs exceeded the DQOs for several other parameters ([Table A-2](#) and [Appendix A \[August 2020 Sampling Event\]](#)). While all the cases where RPDs did not meet DQOs were flagged for assessment to review the implications on sampling protocol and data interpretation, total phosphorus was weighted more heavily since the reported concentrations were higher than 10-times the DL.

To improve sample shipping and handling for chlorophyll-a and DIN samples, ALS provided an updated CoC for the AEMP that explicitly states what samples bottles (and corresponding analyses) are sent to the different ALS locations. The updated CoC has a unique location code that identifies which analyses are done at Winnipeg, Edmonton, Vancouver, and Fort Collins.

A.4.2 Laboratory Results

Phytoplankton — The DQOs for laboratory duplicates for phytoplankton is an RPD less than 25% for total biomass and total density ([Table A-6](#)). In 2020, no laboratory duplicates were above $\pm 25\%$ for total biomass or density. Therefore, data in 2020 was considered very high quality. At the major taxa group level, it's common for biomass and density to differ by more than 25% between the laboratory duplicate samples, particularly when biomass and density estimates are low.

Chlorophyll-a — There were no issues reported by BASL. For field blanks, the laboratory reported concentrations of chlorophyll-a ranging from the DL (i.e., 0.04 µg/L) to slightly above the DL (i.e., 0.05-0.06 µg/L).

Depth Integrated Nutrients— Silica (SiO₂) was assigned a laboratory qualifier in one sample since the matrix spike could not be calculated due to high analyte background in the sample. All other laboratory QC measures met the DQO's including the method blanks, the matrix spikes and laboratory control samples. Overall, the results do not affect the interpretation of the 2020 water quality data. Except for one RPD for total dissolved phosphorus, all RPDs were below the laboratory DQOs.

A.4.3 QA/QC Summary

The field and laboratory QA/QC phytoplankton, chlorophyll-a and DIN results in 2020 were acceptable. This indicates good replicability and sample handling in the field and in the laboratory.

Sample Integrity — Samples reported at ambient temperatures received at the laboratory and reflect the challenges with shipping from a remote mine site. Likewise hold time exceedances for parameters and analytes with short hold times are unavoidable but are not considered likely to impact data analysis and interpretation.

Blanks — All chlorophyll-a laboratory blanks results were equal to or slightly higher than the reported detection limit. Blanks were not included for phytoplankton or DIN samples. Blank results for 2020 indicated reliable sample handling and that cross-contamination related to sampling equipment is unlikely.

Field Duplicates — The 2020 field duplicate results for phytoplankton and chlorophyll-a were very good with all calculated RPDs meeting DQOs. All the field duplicate RPDs for phytoplankton total biomass and density met the DQOs indicating very good replicability in sample collection. For several analytes in the field duplicate DIN sample results the RPDs did not meet the DQOs, however, it is uncertain whether the exceedances were attributed to sampling procedures and/or natural conditions (i.e., spatial heterogeneity in the sampling media). Future use of the depth-integrated sampling method to collect nutrient data for the phytoplankton study is not recommended (refer to discussion in the main document for more information).

Laboratory QC Assessment — The laboratory QC assessment completed by ALS indicated the 2020 data were typically within the established DQOs. In the one instance where a DQO was exceeded, the lab concluded the results were reliable and fit for use.

QA/QC TABLES

Table A-1. Sample Submission Records for Water Samples Submitted to ALS Analytical for the 2020 AEMP

Event	Lab ID(s)	Parameters Measured	Date Sampled	Date Received	Sample Integrity Observations	Temperature (°C)	Hold-time Exceedances	Data Qualifiers ¹
March	L2432715	All parameters	21-Mar-20	31-Mar-20	Metals revised on sample fraction 8	8.9	7 hold-time exceedances	L2432715: DLM, DTC, HTA, RRV
July	L2482210 L2482216 L2484438 L2485199	All parameters	Jul 22, 27, 28, 31	Jul 31, Aug 6 & 7	None	20.9, 20.9, 17.1, 23	12 hold-time exceedances. See lab reports.	L2482210: DLM, DLRC, DTC, OPF L2482216: DLRC, OPF L2484438: DLM, DTC, HTD, OPF, RRR, RRV L2485199: DLM, HTD, OPF, RRR
August	L2492144 L2492826 L2492831 L2496250 L2496253 L2496258	All parameters	Aug 15, 18, 19, 21, 23, 24	Aug 21, 24, 31	None	22.8, 21.4, 21.4, 16.6, 16.6, 16.8	7 hold-time exceedances. See lab reports.	L2492144: OPF L2492826: OPF L2492831: DLM, DTC, OPF, RRV L2496250: RRV L2496253: DTC, RRV L2496258: DTMF
	L2492185 L2492819 L2492840 L2496242	Depth Integrated Nutrients	Aug 15, 18, 19, 23	August 21, 24, 31	None	23.1, 21.4, 21.4, 17.1	3 hold-time exceedances. See lab reports.	L2492185: OPF, RRV
September	L2501979 L2502391 L2504254	All parameters	Sep 7, 8, 11	Sep 11, 14, 17	None	17.6, 15.9, 4.2	6 hold-time exceedances. See lab reports.	L2501979: HTD L2502391: DLRC, DTC, RRV L2504254: DLRC, DTC, DTMF, OPF, RRV

Data and Laboratory QC qualifiers:

DLHM = Detection Limit Adjusted: Sample has high moisture content.

DLM = Detection Limit Adjusted due to sample matrix effects (e.g. chemical interference, colour, turbidity).

DLRC = Detection Limit Raised for Radio Chemistry test due to sample matrix (e.g. high TDS) or instrument detector conditions.

DTMF = Dissolved concentration exceeds total for field-filtered samples. Metallic contaminants may have been introduced to dissolved sample during field filtration.

DTC = Dissolved concentration exceeds total. Results were confirmed by re-analysis.

DQO = Data quality objective.

HTA = Analytical holding time was exceeded.

HTD = Hold time exceeded for re-analysis or dilution, but initial testing was conducted within hold time.

OPF = Orthophosphate test was conducted on frozen (preserved) sample. CCME hold time (72 hrs) was exceeded, but freezing can extend hold time to 30 days according to ISO 5667-3 (2012).

RRV = Reported Result Verified By Repeat Analysis.

RRR = Refer to Report Remarks for issues regarding this analysis.

Table A-2. Field QC Summary for the 2020 AEMP Water Samples

Event	Parameters Measured	Field QC summary (number of parameters that exceeded data quality objectives [DQO]) ¹			
		Travel Blank	DI Blank	Equipment Blank	Duplicates
March	All parameters	Total Ammonia 1.6x DL	21 results	33 result	2 results
July	All parameters	No travel blank collected	8 results	12 results	12 results
August	All parameters	Total Ammonia 13x DL Total Zinc 1.1x DL	8 results	22 results	15 results
	Depth Integrated Nutrients	N/A	N/A	N/A	12 results
September	All parameters	Turbidity 1.4x DL Total Ammonia 2.5x DL Total Zinc 2.2x DL	28 results	23 results	None

Notes:

N/A = not collected

1. Refer to [Appendix A1](#) for information on which parameters exceed the data quality objectives (DQO).

Table A-3. Parameters Detected in Deionized Water Blanks (DB) and Equipment Blanks (EB) in 2020

Sampling Event	Blank	Analyte	Results	DL	Result ÷ DL	> 10 X DL?
March	DI	Conductivity	2	1	2.0	FALSE
		Hardness (as CaCO3)	0.72	0.2	3.6	FALSE
		Alkalinity, Total (as CaCO3)	2.1	1	2.1	FALSE
		Bicarbonate (HCO3)	2.6	1.2	2.2	FALSE
		Barium (Ba)-Total	0.000021	0.00002	1.1	FALSE
		Calcium (Ca)-Total	0.168	0.01	16.8	TRUE
		Copper (Cu)-Total	0.000077	0.00005	1.5	FALSE
		Molybdenum (Mo)-Total	0.00262	0.00005	52.4	TRUE
		Nickel (Ni)-Total	0.000133	0.00005	2.7	FALSE
		Sodium (Na)-Total	0.45	0.02	22.5	TRUE
		Strontium (Sr)-Total	0.000126	0.00002	6.3	FALSE
		Zinc (Zn)-Total	0.00166	0.0005	3.3	FALSE
		Barium (Ba)-Dissolved	0.000051	0.00002	2.6	FALSE
		Calcium (Ca)-Dissolved	0.278	0.01	27.8	TRUE
		Copper (Cu)-Dissolved	0.000088	0.00005	1.8	FALSE
		Magnesium (Mg)-Dissolved	0.0075	0.004	1.9	FALSE
		Manganese (Mn)-Dissolved	0.000055	0.00005	1.1	FALSE
		Nickel (Ni)-Dissolved	0.000107	0.00005	2.1	FALSE
		Sodium (Na)-Dissolved	0.442	0.02	22.1	TRUE
		Strontium (Sr)-Dissolved	0.000205	0.00002	10.3	TRUE
		Zinc (Zn)-Dissolved	0.00341	0.0005	6.8	FALSE
	EB	Conductivity	1.6	1	1.6	FALSE
		Hardness (as CaCO3)	0.27	0.2	1.4	FALSE
		Alkalinity, Total (as CaCO3)	1.1	1	1.1	FALSE
		Bicarbonate (HCO3)	1.3	1.2	1.1	FALSE
		Chloride (Cl)	0.17	0.1	1.7	FALSE
		Aluminum (Al)-Total	0.0016	0.001	1.6	FALSE
		Arsenic (As)-Total	0.000105	0.00002	5.3	FALSE
		Barium (Ba)-Total	0.000247	0.00002	12.4	TRUE
		Calcium (Ca)-Total	0.12	0.01	12.0	TRUE
		Copper (Cu)-Total	0.000519	0.00005	10.4	TRUE
		Iron (Fe)-Total	0.0052	0.001	5.2	FALSE
		Lead (Pb)-Total	0.000776	0.00001	77.6	TRUE
		Magnesium (Mg)-Total	0.0168	0.004	4.2	FALSE
		Manganese (Mn)-Total	0.000413	0.00005	8.3	FALSE
		Molybdenum (Mo)-Total	0.00237	0.00005	47.4	TRUE
		Nickel (Ni)-Total	0.000167	0.00005	3.3	FALSE
		Rubidium (Rb)-Total	1.59E-05	5E-06	3.2	FALSE
		Sodium (Na)-Total	0.092	0.02	4.6	FALSE
		Strontium (Sr)-Total	0.000905	0.00002	45.3	TRUE
		Titanium (Ti)-Total	0.000057	0.00005	1.1	FALSE
		Zinc (Zn)-Total	0.00119	0.0005	2.4	FALSE
		Arsenic (As)-Dissolved	0.000043	0.00002	2.2	FALSE
		Barium (Ba)-Dissolved	0.00018	0.00002	9.0	FALSE
		Calcium (Ca)-Dissolved	0.092	0.01	9.2	FALSE
		Copper (Cu)-Dissolved	0.00026	0.00005	5.2	FALSE
		Lead (Pb)-Dissolved	0.000285	0.00001	28.5	TRUE
		Magnesium (Mg)-Dissolved	0.0096	0.004	2.4	FALSE
		Manganese (Mn)-Dissolved	0.000273	0.00005	5.5	FALSE
		Nickel (Ni)-Dissolved	0.000054	0.00005	1.1	FALSE
		Rubidium (Rb)-Dissolved	1.09E-05	5E-06	2.2	FALSE
		Sodium (Na)-Dissolved	0.051	0.02	2.6	FALSE
		Strontium (Sr)-Dissolved	0.000662	0.00002	33.1	TRUE
		Zinc (Zn)-Dissolved	0.00117	0.0005	2.3	FALSE

Sampling Event	Blank	Analyte	Results	DL	Result ÷ DL	> 10 X DL?
July	DI	Total Dissolved Solids	4.6	4	1.2	FALSE
		Total Kjeldahl Nitrogen	0.072	0.05	1.4	FALSE
		Total Nitrogen	0.072	0.05	1.4	FALSE
		Phosphorus (P)-Total	0.0026	0.001	2.6	FALSE
		Silica, Reactive (as SiO2)	0.037	0.01	3.7	FALSE
		Zinc (Zn)-Total	0.00066	0.0005	1.3	FALSE
		Aluminum (Al)-Dissolved	0.0047	0.001	4.7	FALSE
		Strontium (Sr)-Dissolved	0.000029	0.00002	1.5	FALSE
	EB	Turbidity	0.15	0.1	1.5	FALSE
		Molybdenum (Mo)-Total	0.000063	0.00005	1.3	FALSE
		Barium (Ba)-Dissolved	0.000027	0.00002	1.4	FALSE
		Calcium (Ca)-Dissolved	0.013	0.01	1.3	FALSE
		Iron (Fe)-Dissolved	0.0013	0.001	1.3	FALSE
		Strontium (Sr)-Dissolved	0.000041	0.00002	2.1	FALSE
		Zinc (Zn)-Dissolved	0.00083	0.0005	1.7	FALSE
August	DB	Ammonia, Total (as N)	0.009	0.005	1.8	FALSE
		Arsenic (As)-Total	0.00003	0.00002	1.5	FALSE
		Barium (Ba)-Total	0.000025	0.00002	1.3	FALSE
		Iron (Fe)-Total	0.0012	0.001	1.2	FALSE
		Strontium (Sr)-Total	0.000024	0.00002	1.2	FALSE
		Barium (Ba)-Dissolved	0.000035	0.00002	1.8	FALSE
		Calcium (Ca)-Dissolved	0.017	0.01	1.7	FALSE
		Zinc (Zn)-Dissolved	0.0013	0.0005	2.6	FALSE
	EB	Alkalinity, Total (as CaCO3)	1.3	1	1.3	FALSE
		Ammonia, Total (as N)	0.0072	0.005	1.4	FALSE
		Bicarbonate (HCO3)	1.6	1.2	1.3	FALSE
		Nitrate and Nitrite as N	0.0075	0.0051	1.5	FALSE
		Nitrate (as N)	0.0075	0.005	1.5	FALSE
		Antimony (Sb)-Total	0.000421	0.00002	21.1	TRUE
		Barium (Ba)-Total	0.000047	0.00002	2.4	FALSE
		Calcium (Ca)-Total	0.031	0.01	3.1	FALSE
		Copper (Cu)-Total	0.000083	0.00005	1.7	FALSE
		Magnesium (Mg)-Total	0.0057	0.004	1.4	FALSE
		Rubidium (Rb)-Total	0.0000065	0.000005	1.3	FALSE
		Sodium (Na)-Total	0.035	0.02	1.8	FALSE
		Strontium (Sr)-Total	0.000181	0.00002	9.1	FALSE
		Tin (Sn)-Total	0.000034	0.00002	1.7	FALSE
		Antimony (Sb)-Dissolved	0.000053	0.00002	2.7	FALSE
		Barium (Ba)-Dissolved	0.000044	0.00002	2.2	FALSE
		Calcium (Ca)-Dissolved	0.045	0.01	4.5	FALSE
		Copper (Cu)-Dissolved	0.000085	0.00005	1.7	FALSE
		Magnesium (Mg)-Dissolved	0.0088	0.004	2.2	FALSE
		Rubidium (Rb)-Dissolved	0.0000063	0.000005	1.3	FALSE
		Sodium (Na)-Dissolved	0.043	0.02	2.2	FALSE
		Strontium (Sr)-Dissolved	0.000234	0.00002	11.7	TRUE
September	DI	Conductivity	1.5	1	1.5	FALSE
		Ammonia, Total (as N)	0.0243	0.005	4.9	FALSE
		Silica, Reactive (as SiO2)	0.039	0.01	3.9	FALSE
		Aluminum (Al)-Total	0.0019	0.001	1.9	FALSE
		Arsenic (As)-Total	0.000049	0.00002	2.5	FALSE
		Barium (Ba)-Total	0.000036	0.00002	1.8	FALSE
		Calcium (Ca)-Total	0.03	0.01	3.0	FALSE
		Iron (Fe)-Total	0.0033	0.001	3.3	FALSE
		Lead (Pb)-Total	0.000013	0.00001	1.3	FALSE
		Manganese (Mn)-Total	0.000104	0.00005	2.1	FALSE
		Potassium (K)-Total	0.048	0.02	2.4	FALSE
		Rubidium (Rb)-Total	0.0000086	0.000005	1.7	FALSE

Sampling Event	Blank	Analyte	Results	DL	Result ÷ DL	> 10 X DL?
September	DB	Sodium (Na)-Total	0.044	0.02	2.2	FALSE
		Strontium (Sr)-Total	0.000075	0.00002	3.8	FALSE
		Titanium (Ti)-Total	0.000083	0.00005	1.7	FALSE
		Zinc (Zn)-Total	0.00078	0.0005	1.6	FALSE
		Arsenic (As)-Dissolved	0.000032	0.00002	1.6	FALSE
		Barium (Ba)-Dissolved	0.000038	0.00002	1.9	FALSE
		Calcium (Ca)-Dissolved	0.039	0.01	3.9	FALSE
		Iron (Fe)-Dissolved	0.0012	0.001	1.2	FALSE
		Lead (Pb)-Dissolved	0.000014	0.00001	1.4	FALSE
		Manganese (Mn)-Dissolved	0.000091	0.00005	1.8	FALSE
		Rubidium (Rb)-Dissolved	0.0000075	0.000005	1.5	FALSE
		Sodium (Na)-Dissolved	0.041	0.02	2.1	FALSE
		Strontium (Sr)-Dissolved	0.000096	0.00002	4.8	FALSE
		Tin (Sn)-Dissolved	0.000228	0.00002	11.4	TRUE
		Zinc (Zn)-Dissolved	0.00177	0.0005	3.5	FALSE
		Ra-226	0.011	0.0079	1.4	FALSE
	EB	Turbidity	0.11	0.1	1.1	FALSE
		Ammonia, Total (as N)	0.0445	0.005	8.9	FALSE
		Aluminum (Al)-Total	0.0024	0.001	2.4	FALSE
		Arsenic (As)-Total	0.000043	0.00002	2.2	FALSE
		Barium (Ba)-Total	0.000083	0.00002	4.2	FALSE
		Calcium (Ca)-Total	0.048	0.01	4.8	FALSE
		Copper (Cu)-Total	0.000056	0.00005	1.1	FALSE
		Iron (Fe)-Total	0.0035	0.001	3.5	FALSE
		Lead (Pb)-Total	0.000012	0.00001	1.2	FALSE
		Magnesium (Mg)-Total	0.0075	0.004	1.9	FALSE
		Manganese (Mn)-Total	0.000403	0.00005	8.1	FALSE
		Nickel (Ni)-Total	0.000097	0.00005	1.9	FALSE
		Rubidium (Rb)-Total	0.0000099	0.000005	2.0	FALSE
		Sodium (Na)-Total	0.075	0.02	3.8	FALSE
		Strontium (Sr)-Total	0.000198	0.00002	9.9	FALSE
		Titanium (Ti)-Total	0.000094	0.00005	1.9	FALSE
		Zinc (Zn)-Total	0.00084	0.0005	1.7	FALSE
		Barium (Ba)-Dissolved	0.000032	0.00002	1.6	FALSE
		Calcium (Ca)-Dissolved	0.027	0.01	2.7	FALSE
		Manganese (Mn)-Dissolved	0.000194	0.00005	3.9	FALSE
		Rubidium (Rb)-Dissolved	0.0000083	0.000005	1.7	FALSE
		Strontium (Sr)-Dissolved	0.000124	0.00002	6.2	FALSE
		Zinc (Zn)-Dissolved	0.00086	0.0005	1.7	FALSE

Notes

DI = deionized water blank; EB = equipment blank

Result ÷ DL indicated the magnitude of the difference in concentration in the blank compared to the detection limit

> 10x DL flags those parameters where the concentration in the DB or EB was greater than 10-times the detection limit

Table A-4. Laboratory QC Summary for Water Samples Analyzed by ALS Environmental in 2020

Event	Lab ID(s)	Parameters Measured	Laboratory QC Summary				
			Detection Limits	Duplicates	Method Blanks	Matrix Spike	LCS / CRM
March	L2432715	All parameters	None	None	None	L2432715: MS-B	L2432715: MES
July	L2482210 L2482216 L2484438 L2485199	All parameters	None	None	L2482210 & L2482216: B	None	L2482210: MES
August	L2492144 L2492826 L2492831 L2496250 L2496253 L2496258	All parameters	None	None	L2492144: B	None	None
	L2492185 L2492819 L2492840 L2496242	Depth Integrated Nutrients	None	None	None	L2492185, L2492840 & L2496242: MS-B	None
September	L2501979 L2502391 L2504254	All parameters	None	None	None	None	None

Notes:

"None" = there were not data quality objective exceedances

Data and Laboratory QC qualifiers

B = Method Blank exceeds ALS DQO. All associated sample results are at least 5 times greater than blank levels and are considered reliable.

MES = Data Quality Objective was marginally exceeded (by < 10% absolute) for < 10% of analytes in a Multi-Element Scan / Multi-Parameter Scan (considered acceptable as per OMOE & CCME).

MS-B = Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

Table A-5. Field Duplicate Results for Phytoplankton Biomass and Density, August 2020

Field QA	Date	Sample	Phytoplankton Biomass (mg/m ³)						
			Cyanophyte	Chlorophyte	Chrysophyte	Diatom	Cryptophyte	Dinoflagellate	TOTAL
MEL-01-09-PC	15-Aug-20	Sample	1.5	19	79	25	80	8	212
		Field dup	1.8	23	65	26	80	14	210
		RPD (%)	-18	-20	19	-3	0	-53	1
MEL-02-01-PC	18-Aug-20	Sample	0.4	27	78	35	37	3	182
		Field dup	1	10	86	28	34	9	167
		RPD (%)	-40	95	-10	24	10	-93	8
MEL-03-01-PC	19-Aug-20	Sample	0.1	6	152	10	20	14	201
		Field dup	0.1	2	129	11	20	11	173
		RPD (%)	0	87	16	-11	1	20	15

Field QA	Date	Sample	Phytoplankton Density (cells/L)						
			Cyanophyte	Chlorophyte	Chrysophyte	Diatom	Cryptophyte	Dinoflagellate	TOTAL
MEL-01-09-PC	15-Aug-20	Sample	3,000	540,000	1,094,168	252,952	413,568	2,000	2,305,688
		Field dup	3,600	1,065,232	1,081,600	329,792	241,568	9,984	2,731,776
		RPD (%)	-18	-65	1.2	-26	53	-133	-17
MEL-02-01-PC	18-Aug-20	Sample	800	500,296	1,078,400	258,088	368,600	800	2,206,984
		Field dup	1,200	195,568	1,567,312	251,736	277,408	2,200	2,295,424
		RPD (%)	-40	88	-37	2	28.2	-93.3	-3.9
MEL-03-01-PC	19-Aug-20	Sample	200	135,512	2,040,656	51,888	233,488	2,400	2,464,144
		Field dup	200	100,976	2,019,304	143,680	233,688	2,200	2,500,048
		RPD (%)	0.0	29	1	-94	0	9	-1.4

Notes:

RPD = Relative Percent Difference (%) = ((original - duplicate) / (original + duplicate)/2) x 100.

Bolded RPD values exceed 50%.

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

Table A-6. Laboratory Duplicate Results for Phytoplankton Biomass and Density, August 2020

Area-Replicate	Date	Sample	Phytoplankton Biomass (mg/m ³)						
			Cyanophyte	Chlorophyte	Chrysophyte	Diatom	Cryptophyte	Dinoflagellate	TOTAL
MEL -01-08	15-Aug-20	Sample	1.5	16	35	34	72	17	175
		Lab dup	1.3	14	65	35	72	18	205
		RPD (%)	14	10	-60	-3	0	-6	-16
MEL-02-04	18-Aug-20	Sample	0.50	5.7	101	32	43	6.5	189
		Lab dup	0.20	5.2	111	31	50	2.4	200
		RPD (%)	86	10	-10	3	-14	91	-6
MEL-05-03	23-Aug-20	Sample	3.6	2.6	104	12	13	15	150
		Lab dup	3.8	4.2	86	16	17	3.3	129
		RPD (%)	-5	-48	19	-30	-22	129	15

Area-Replicate	Date	Date	Phytoplankton Density (cells/L)						
			Cyanophyte	Chlorophyte	Chrysophyte	Diatom	Cryptophyte	Dinoflagellate	TOTAL
MEL -01-08	15-Aug-20	Sample	3,000	460,976	441,224	330,024	229,784	10,384	1,475,392
		Lab dup	2,600	453,992	793,640	292,720	200,648	10,384	1,753,984
		RPD (%)	14	2	-57	12	14	0	-17
MEL-02-04	18-Aug-20	Sample	1,000	130,712	1,487,088	158,512	352,048	600	2,129,960
		Lab dup	400	173,216	1,580,680	122,592	396,352	600	2,273,840
		RPD (%)	86	-28	-6.1	26	-12	0	-6.5
MEL-05-03	23-Aug-20	Sample	28,736	252,440	1,243,432	175,216	146,480	1,000	1,847,304
		Lab dup	29,136	231,888	1,330,040	190,584	168,832	600	1,951,080
		RPD (%)		8	-6.7	-8	-14	50	-5.5

Notes:

RPD = Relative Percent Difference (%) = ((original - duplicate) / (original + duplicate)/2) x 100.

Bolded RPD values exceed 25%.

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

Table A-7. Field duplicate results for chlorophyll-a samples collected in August 2020

Chlorophyll-a (µg/L)									
Replicate	Sample = MEL-01-09-PC Duplicate = AUG-DUP-01-PC			Sample = MEL-02-01-PC Duplicate = AUG-DUP-02-PC			Sample = MEL-03-01-PC Duplicate = AUG-DUP-03-PC		
	Sample	Duplicate	RPD	Sample	Duplicate	RPD	Sample	Duplicate	RPD
1	2.14	2.02	5.8	0.87	0.89	-2.3	0.62	0.55	12.0
2	2.03	2.01	1.0	0.98	0.61	46.5	0.61	0.62	-1.6
3	2.03	2.11	-3.9	0.92	0.76	19.0	0.61	0.62	-1.6

Notes

RPD = Relative Percent Difference (%) = $((\text{original} - \text{duplicate}) / (\text{original} + \text{duplicate}) / 2) \times 100$.

RPDs are calculated when both samples are above detection.

The data quality objective (DQO) for field duplicates is an RPD of 50%.

Bolded RPD values exceed 50%.

APPENDIX A1

MONTHLY WATER QUALITY ASSESSMENT REPORTS

MARCH 2020 SAMPLING EVENT:
PRELIMINARY SCREENING AND QC ASSESSMENT

Meliadine Mine - Water Quality Monitoring 2020

Preliminary Screening of March, 2020 Water Quality Monitoring

Azimuth Consulting Group Inc.
on behalf of Agnico Eagle Mines Ltd.

Report Date: 2020-11-23

Table of Contents

1	INTRODUCTION & SAMPLING OVERVIEW	2
2	TRIGGER SCREENING	3
2.1	Result Reliability Checks.....	6
3	LABORATORY & FIELD QUALITY CONTROL RESULTS	8
3.1	Overall QC Results	9
3.2	Laboratory Duplicates	9
3.3	Laboratory Control Samples.....	9
3.4	Matrix Spike.....	9
3.5	Matrix Blank	10
3.6	Field Duplicates	10
3.7	DI Blank	11
3.8	Equipment Blank	11
3.9	Travel Blank	13
3.10	Holding Time Exceedances.....	13

1 INTRODUCTION & SAMPLING OVERVIEW

This document was prepared by Azimuth Consulting Group Inc (Azimuth) to provide the Meliadine Environment Department with a brief overview of the water chemistry results collected in March, 2020 as part of the Aquatic Effects Monitoring Program (AEMP). AEMP water quality monitoring occurs in March (MEL-01 and -02), July (MEL-01, -02, and -03), August (MEL-01, -02, -03, -04, and -05), and September (MEL-01, -02, and -03). In addition, peninsula lakes A8, B7, and D7 are sampled in July and August. The purpose of this memo is to:

1. Screen the water chemistry results from ALS against normal ranges and thresholds to keep the Environment Department informed about potential changes in water quality, including the early identification of potentially anomalous data (Section 2).
2. Review laboratory (blanks, duplicates, matrix spikes, etc.) and field quality control (QC) results, and identify potential issues in lab or field methods (Section 3).

Samples included in this report are shown in Table 1, while field blanks are shown in Table 2.

Table 1: Summary of March, 2020 samples.

Sample ID	Area ID	Duplicate	Date_Sampled	ALS Sample ID
MEL-01-01	MEL-01	-	2020-03-21	L2432715-1
MEL-01-06	MEL-01	-	2020-03-21	L2432715-2
MEL-01-07	MEL-01	-	2020-03-21	L2432715-3
MEL-01-08	MEL-01	-	2020-03-21	L2432715-4
MEL-01-09	MEL-01	-	2020-03-21	L2432715-5
MEL-02-02	MEL-02	-	2020-03-21	L2432715-6
MEL-02-03	MEL-02	-	2020-03-21	L2432715-7
MEL-02-05	MEL-02	-	2020-03-21	L2432715-8
MEL-02-06	MEL-02	-	2020-03-21	L2432715-9
MEL-02-08	MEL-02	DUP-MEL-MAR-01	2020-03-21	L2432715-10

Table 2: Summary of field blanks collected in March, 2020.

Client_Sample_ID	ID_Name	ALS Sample ID
DI-MAR-01	DI Blank	L2432715-12
EB-MAR-01	Equipment Blank	L2432715-13
TB-MAR-01	Travel Blank	L2432715-14

2 TRIGGER SCREENING

Sampling results were screened relative to relevant normal ranges and thresholds. Normal range, as defined in the AEMP, numerically describes the natural range of baseline/reference conditions for the various components of the AEMP. In simple terms, the normal range is the instrument used to assess whether current conditions (e.g., the measured concentration of a particular metal) has changed relative to baseline/reference conditions. In the case of the March sampling event, results are screened relative to the thresholds only, as normal ranges are not applicable to winter lake conditions. A summary of trigger and threshold exceedances is provided in Table 3 (Refer to Azimuth 2020 for details on the normal range and threshold values used here). The subsequent table (Table 4) provides all sample results above trigger and threshold values in March, 2020.

Figures displaying all parameters with at least one sample above the relevant normal range or threshold are also provided.

Table 3: Summary of trigger and threshold exceedances in March, 2020.

Area	Parameter	Samples Exceeding Threshold	Stations
Meliadine Lake	Copper (T)	1	MEL-01-06
	Lead (T)	1	MEL-01-06*
	Zinc (D)	3	MEL-01-01*, MEL-01-07*, MEL-02-02*

* Indicates samples which failed reliability checks and are consequently uncertain.

Table 4: Meliadine trigger and threshold exceedances in March, 2020.

Area ID	Sample ID	Parameter	Results	DL	Units	MDL	Threshold	Reliability
MEL-01	MEL-01-01	Zinc (D)	0.012	5e-04	mg/L	-	0.0056	Uncertain
	MEL-01-06	Copper (T)	0.0022	5e-05	mg/L	-	0.002	-
	MEL-01-06	Lead (T)	0.001	1e-05	mg/L	-	0.001	Uncertain
	MEL-01-07	Zinc (D)	0.024	5e-04	mg/L	-	0.0056	Uncertain
MEL-02	MEL-02-02	Zinc (D)	0.0081	5e-04	mg/L	-	0.0056	Uncertain

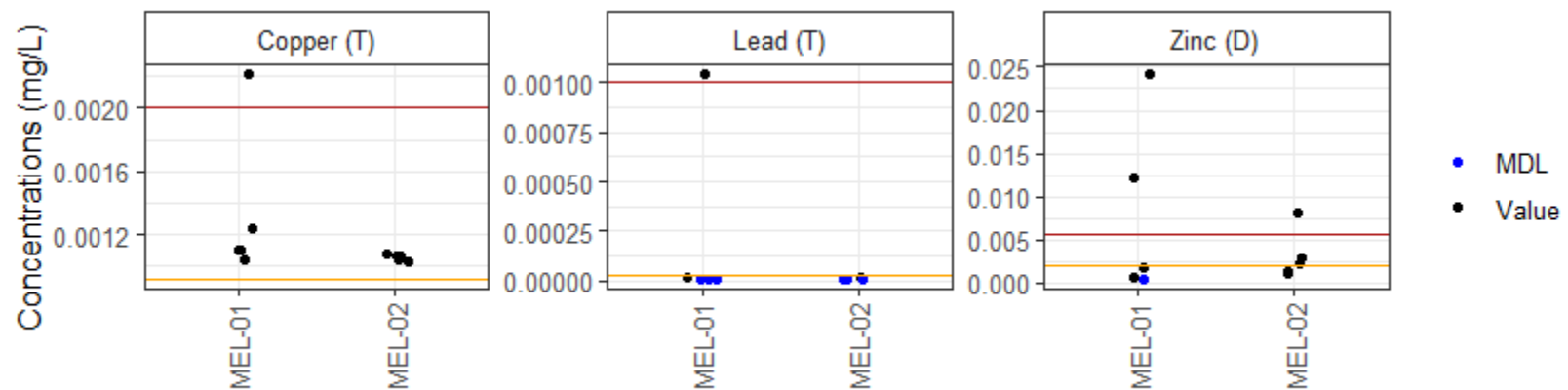


Figure 1: Sampling event results for metals in Meliadine Lake with at least one sample above the upper limit of the normal range. The red line indicates the relevant threshold (if applicable) while the orange line indicates the upper limit of the normal range (if applicable). Samples below method detection limits (MDL) are set to the detection limit and shown in blue.

2.1 Result Reliability Checks

Two preliminary analyses were conducted to assess the reliability of sample results. Samples failing either one of these tests have been flagged as uncertain, and warrant further evaluation.

The first analysis compares dissolved and total concentrations for a given parameters at each location. Samples in which dissolved concentrations are greater than total with a relative percent difference (RPD) of more than 30% are considered potentially unreliable. All samples failing to meet this reliability check are summarized in Table 5.

The second analysis compares parameter concentrations within each sampling area. In most cases, samples at stations in the same sampling area are expected to have similar concentrations, and outlying data points may be anomalous. Sampling areas where the maximum concentration was more than a factor of 5 greater than the median of all samples within the sampling area are highlighted here as potentially unreliable. All samples failing to meet this reliability check are summarized in Table 6.

Table 5: Samples with uncertain reliability due to differences in dissolved and total parameter results.

Sample ID	Area ID	Parameter	Result (T)	Result (D)	MDL (T)	MDL (D)	RPD
MEL-01-07	MEL-01	Zinc	0.00098	0.0241	-	-	184.4
MEL-01-01	MEL-01	Zinc	0.00198	0.0122	-	-	144.1
MEL-02-06	MEL-02	Zinc	0.00105	0.00296	-	-	95.3
MEL-02-02	MEL-02	Zinc	0.00322	0.00813	-	-	86.5
MEL-01-01	MEL-01	Aluminum	0.0021	0.005	-	-	81.7
MEL-01-07	MEL-01	Lead	1e-05	2.2e-05	MDL	-	75
MEL-02-05	MEL-02	Zinc	0.00099	0.00217	-	-	74.7
MEL-02-08	MEL-02	Zinc	0.00063	0.00135	-	-	72.7
MEL-01-06	MEL-01	Silver	5e-06	1e-05	MDL	MDL	66.7
MEL-01-07	MEL-01	Aluminum	0.0016	0.0028	-	-	54.5
MEL-01-08	MEL-01	Mercury	5e-07	7.6e-07	-	-	41.3

Table 6: Samples with uncertain reliability due to differences between results from the same sampling area.

Area ID	Parameter	DL	Median	Max	Difference	Station_with_Max
MEL-01	Lead (T)	1e-05	0.000010	0.001040	104.0	MEL-01-06
MEL-02	Molybdenum (T)	5e-05	0.000132	0.007090	53.7	MEL-02-06
MEL-01	Molybdenum (T)	5e-05	0.000791	0.012200	15.4	MEL-01-07
MEL-01	Zinc (D)	5e-04	0.001660	0.024100	14.5	MEL-01-07
MEL-01	Antimony (T)	2e-05	0.000020	0.000157	7.8	MEL-01-06
MEL-02	Tin (T)	2e-05	0.000020	0.000135	6.7	MEL-02-02
MEL-01	Zinc (T)	5e-04	0.001980	0.012300	6.2	MEL-01-06

3 LABORATORY & FIELD QUALITY CONTROL RESULTS

ALS' laboratory QC samples for water are:

- *Laboratory duplicates* (LD) - these samples provide insights into the precision of laboratory analyses. Duplicate aliquots are taken from the samples and run through part (aliquots taken post digestion) or all (aliquots taken from the sample bottle) the laboratory analytical process.
- *Laboratory control samples* (LCS) - these samples provide insights into whether the laboratory systems are working as intended. They are comprised of a mixture of analyte-free water to which known amounts of the method analytes are added. They are essentially an internal version of a certified reference material.
- *Matrix spikes* (MS) - these samples involve the analysis of actual samples, to which a known amount of method analytes are added in amounts high enough that the spikes are clearly discernable relative to existing concentrations. These samples provide insights into the degree that the sample matrix could interfere with analyses.
- *Matrix blanks* (MB) - these samples are analyzed to assess background interference or contamination that exists in the analytical system that could lead to elevated concentrations or false positive data. These samples are comprised of analyte-free water.

The following field QC samples were collected and submitted blind to ALS:

- *Field duplicates* (FD) - these samples provide insights into (a) variability in field conditions and (b) the precision of laboratory analyses. Duplicate samples are collected from the same location and treated independently through the sampling and analysis process.
- *Deionized blanks* (DB) - these samples 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.
- *Equipment blanks* (EB) - these samples 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.
- *Travel blanks* (TB) - these samples 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.

3.1 Overall QC Results

Overall laboratory and field QC results are summarized in Table 7.

Table 7: Summary of laboratory and field QC results by sample type.

QC_Element		Pass	Fail	ND
Laboratory	Lab Duplicate	205	0	0
	Lab Control Sample	214	1	0
	Matrix Spike	102	0	8
	Matrix Blank	214	0	0
Field	Field Duplicate	121	2	1
	Deionized Water Blank	100	21	0
	Equipment Blank	88	33	0
	Travel Blank	101	1	0

3.2 Laboratory Duplicates

All laboratory duplicate results met laboratory QC objectives.

3.3 Laboratory Control Samples

In this sampling event, 1 laboratory control sample failed to meet the QC objectives. Laboratory control sample results not meeting QC objectives are summarized in Table 8.

Table 8: Details for laboratory control sample results not meeting QC objectives.

QC_Lot	Analyte	Percent	Limit	LCS.QC
1302039	Boron (B)-Total	68.2	80-120	Fail

3.4 Matrix Spike

All matrix spike results met laboratory QC objectives.

In addition, some parameters had spike levels too low to confidently quantify them relative to existing concentrations in the sample. Consequently, QC results for these results could not be calculated (see Table 9).

Table 9: Analytes not determined for matrix spikes.

QC_Lot	Analyte	ALS_QC_ID ¹
1288086	Calcium (Ca)-Total	DUP-MEL-MAR-01
1288086	Magnesium (Mg)-Total	DUP-MEL-MAR-01
1288086	Sodium (Na)-Total	DUP-MEL-MAR-01
1288086	Strontium (Sr)-Total	DUP-MEL-MAR-01
1288087	Calcium (Ca)-Dissolved	MEL-01-06
1288087	Magnesium (Mg)-Dissolved	MEL-01-06
1288087	Sodium (Na)-Dissolved	MEL-01-06
1288087	Strontium (Sr)-Dissolved	MEL-01-06

¹ALS_QC_ID listing of 'Anonymous' indicates QC sample from another client used.

3.5 Matrix Blank

All matrix blank results met laboratory QC objectives.

3.6 Field Duplicates

In this sampling event, 2 field duplicate samples failed to meet the QC objectives. Field duplicate sample results not meeting QC objectives are summarized in Table 10.

In addition, some field duplicate samples could not be appropriately compared to other samples due to differences in detection limits. Consequently, QC results for these results could not be calculated (see Table 11).

Table 10: Details for field duplicate results not meeting QC objectives.

QC_Lot.x	Analyte	RPD	DIFFx	FD.QC
1288086	Molybdenum (Mo)-Total	191.7	104.7	Fail
1287910	Nitrite (as N)	156.5	7.2	Fail

Table 11: Details for field duplicate results which could not be determined.

QC_Lot.x	Analyte	RPD	DIFFx	FD.QC
1288086	Silver (Ag)-Total	66.7	NA	ND

3.7 DI Blank

In this sampling event, 21 deionized water blank samples failed to meet the QC objectives. Deionized water blank results not meeting QC objectives are summarized in Table 13.

Table 13: Details for deionized water blank results not meeting QC objectives.

QC_Lot	ID	Analyte	Results	DL	FB.QC
1287743	DI	Conductivity	2.000000	1.00000	Fail
	DI	Hardness (as CaCO3)	0.720000	0.20000	Fail
1287743	DI	Alkalinity, Total (as CaCO3)	2.100000	1.00000	Fail
	DI	Bicarbonate (HCO3)	2.600000	1.20000	Fail
1288575	DI	Barium (Ba)-Total	0.000021	0.00002	Fail
1288575	DI	Calcium (Ca)-Total	0.168000	0.01000	Fail
1288575	DI	Copper (Cu)-Total	0.000077	0.00005	Fail
1288575	DI	Molybdenum (Mo)-Total	0.002620	0.00005	Fail
1288575	DI	Nickel (Ni)-Total	0.000133	0.00005	Fail
1288575	DI	Sodium (Na)-Total	0.450000	0.02000	Fail
1288575	DI	Strontium (Sr)-Total	0.000126	0.00002	Fail
1288575	DI	Zinc (Zn)-Total	0.001660	0.00050	Fail
1288576	DI	Barium (Ba)-Dissolved	0.000051	0.00002	Fail
1288576	DI	Calcium (Ca)-Dissolved	0.278000	0.01000	Fail
1288576	DI	Copper (Cu)-Dissolved	0.000088	0.00005	Fail
1288576	DI	Magnesium (Mg)-Dissolved	0.007500	0.00400	Fail
1288576	DI	Manganese (Mn)-Dissolved	0.000055	0.00005	Fail
1288576	DI	Nickel (Ni)-Dissolved	0.000107	0.00005	Fail
1288576	DI	Sodium (Na)-Dissolved	0.442000	0.02000	Fail
1288576	DI	Strontium (Sr)-Dissolved	0.000205	0.00002	Fail
1288576	DI	Zinc (Zn)-Dissolved	0.003410	0.00050	Fail

3.8 Equipment Blank

In this sampling event, 33 equipment blank samples failed to meet the QC objectives. Equipment blank results not meeting QC objectives are summarized in Table 12.

Table 12: Details for equipment blank results not meeting QC objectives.

QC_Lot	ID	Analyte	Results	DL	FB.QC
1287743	EB	Conductivity	1.60e+00	1.0e+00	Fail
	EB	Hardness (as CaCO3)	2.70e-01	2.0e-01	Fail
1287743	EB	Alkalinity, Total (as CaCO3)	1.10e+00	1.0e+00	Fail
	EB	Bicarbonate (HCO3)	1.30e+00	1.2e+00	Fail
1287910	EB	Chloride (Cl)	1.70e-01	1.0e-01	Fail
1288575	EB	Aluminum (Al)-Total	1.60e-03	1.0e-03	Fail
1288575	EB	Arsenic (As)-Total	1.05e-04	2.0e-05	Fail
1288575	EB	Barium (Ba)-Total	2.47e-04	2.0e-05	Fail
1288575	EB	Calcium (Ca)-Total	1.20e-01	1.0e-02	Fail
1288575	EB	Copper (Cu)-Total	5.19e-04	5.0e-05	Fail
1288575	EB	Iron (Fe)-Total	5.20e-03	1.0e-03	Fail
1288575	EB	Lead (Pb)-Total	7.76e-04	1.0e-05	Fail
1288575	EB	Magnesium (Mg)-Total	1.68e-02	4.0e-03	Fail
1288575	EB	Manganese (Mn)-Total	4.13e-04	5.0e-05	Fail
1288575	EB	Molybdenum (Mo)-Total	2.37e-03	5.0e-05	Fail
1288575	EB	Nickel (Ni)-Total	1.67e-04	5.0e-05	Fail
1288575	EB	Rubidium (Rb)-Total	1.59e-05	5.0e-06	Fail
1288575	EB	Sodium (Na)-Total	9.20e-02	2.0e-02	Fail
1288575	EB	Strontium (Sr)-Total	9.05e-04	2.0e-05	Fail
1288575	EB	Titanium (Ti)-Total	5.70e-05	5.0e-05	Fail
1288575	EB	Zinc (Zn)-Total	1.19e-03	5.0e-04	Fail
1288576	EB	Arsenic (As)-Dissolved	4.30e-05	2.0e-05	Fail
1288576	EB	Barium (Ba)-Dissolved	1.80e-04	2.0e-05	Fail
1288576	EB	Calcium (Ca)-Dissolved	9.20e-02	1.0e-02	Fail
1288576	EB	Copper (Cu)-Dissolved	2.60e-04	5.0e-05	Fail
1288576	EB	Lead (Pb)-Dissolved	2.85e-04	1.0e-05	Fail
1288576	EB	Magnesium (Mg)-Dissolved	9.60e-03	4.0e-03	Fail
1288576	EB	Manganese (Mn)-Dissolved	2.73e-04	5.0e-05	Fail
1288576	EB	Nickel (Ni)-Dissolved	5.40e-05	5.0e-05	Fail
1288576	EB	Rubidium (Rb)-Dissolved	1.09e-05	5.0e-06	Fail
1288576	EB	Sodium (Na)-Dissolved	5.10e-02	2.0e-02	Fail
1288576	EB	Strontium (Sr)-Dissolved	6.62e-04	2.0e-05	Fail
1288576	EB	Zinc (Zn)-Dissolved	1.17e-03	5.0e-04	Fail

3.9 Travel Blank

In this sampling event, 1 travel blank sample failed to meet the QC objectives. Travel blank results not meeting QC objectives are summarized in Table 14.

Table 14: Details for travel blank results not meeting QC objectives.

QC_Lot	ID	Analyte	Results	DL	FB.QC
1289586	TB	Ammonia, Total (as N)	0.008	0.005	Fail

3.10 Holding Time Exceedances

In addition to those ALS laboratory QC samples described above, during QC screening samples were also assessed against recommended hold times. Parameters and associated sample numbers exceeding recommended hold times in this sampling event are shown in Table 15. Note that pH is included in the suite of field measurements and has a very short recommended hold time, so exceeding the hold time for laboratory analysis is expected and of little importance.

Table 15: Analytes and associated number of samples exceeding holding times.

Analyte	n
Phosphate Ortho Dissolved in Water	26
Nitrate in Water by IC (Low Level)	13
Nitrite in Water by IC (Low Level)	13
pH	13
Total Dissolved Solids (TDS)	13
Total Suspended Solids by Grav. (1 mg/L)	13
Turbidity	13

JULY 2020 SAMPLING EVENT:
PRELIMINARY SCREENING AND QC ASSESSMENT

Meliadine Mine - Water Quality Monitoring 2020

Preliminary Screening of July, 2020 Water Quality Monitoring

Azimuth Consulting Group Inc.
on behalf of Agnico Eagle Mines Ltd.

Report Date: 2020-11-23

Table of Contents

1	INTRODUCTION & SAMPLING OVERVIEW	2
2	TRIGGER SCREENING	5
2.1	Result Reliability Checks.....	38
3	LABORATORY & FIELD QUALITY CONTROL RESULTS	40
3.1	Overall QC Results	41
3.2	Laboratory Duplicates	41
3.3	Laboratory Control Samples.....	41
3.4	Matrix Spike.....	41
3.5	Matrix Blank	42
3.6	Field Duplicates	43
3.7	DI Blank	43
3.8	Equipment Blank	44
3.9	Travel Blank.....	44
3.10	Holding Time Exceedances.....	44

1 INTRODUCTION & SAMPLING OVERVIEW

This document was prepared by Azimuth Consulting Group Inc (Azimuth) to provide the Meliadine Environment Department with a brief overview of the water chemistry results collected in July, 2020 as part of the Aquatic Effects Monitoring Program (AEMP). AEMP water quality monitoring occurs in March (MEL-01 and -02), July (MEL-01, -02, and -03), August (MEL-01, -02, -03, -04, and -05), and September (MEL-01, -02, and -03). In addition, peninsula lakes A8, B7, and D7 are sampled in July and August. The purpose of this memo is to:

1. Screen the water chemistry results from ALS against normal ranges and thresholds to keep the Environment Department informed about potential changes in water quality, including the early identification of potentially anomalous data (Section 2).
2. Review laboratory (blanks, duplicates, matrix spikes, etc.) and field quality control (QC) results, and identify potential issues in lab or field methods (Section 3).

Samples included in this report are shown in Table 1, while field blanks are shown in Table 2.

Table 1: Summary of July, 2020 samples.

Sample ID	Area ID	Duplicate	Date_Sampled	ALS Sample ID
A8-01	A8	JUL-DUP-03	2020-07-28	L2484438-11
A8-02	A8	-	2020-07-28	L2484438-12
A8-03	A8	-	2020-07-28	L2484438-13
B7-01	B7	-	2020-07-27	L2484438-14
B7-02	B7	-	2020-07-27	L2484438-15
B7-03	B7	-	2020-07-27	L2484438-16
D7-01	D7	-	2020-07-31	L2485199-1
D7-02	D7	-	2020-07-31	L2485199-2
D7-03	D7	-	2020-07-31	L2485199-3
MEL-01-01	MEL-01	-	2020-07-22	L2482210-1
MEL-01-06	MEL-01	-	2020-07-22	L2482210-2
MEL-01-07	MEL-01	JUL-DUP-01	2020-07-22	L2482210-3
MEL-01-08	MEL-01	-	2020-07-22	L2482210-4
MEL-01-09	MEL-01	-	2020-07-22	L2482210-5
MEL-02-01	MEL-02	-	2020-07-27	L2484438-1
MEL-02-02	MEL-02	-	2020-07-27	L2484438-2
MEL-02-03	MEL-02	-	2020-07-27	L2484438-3
MEL-02-04	MEL-02	-	2020-07-27	L2484438-4
MEL-02-05	MEL-02	-	2020-07-27	L2484438-5
MEL-03-01	MEL-03	-	2020-07-27	L2484438-6
MEL-03-02	MEL-03	-	2020-07-27	L2484438-7
MEL-03-03	MEL-03	-	2020-07-27	L2484438-8
MEL-03-04	MEL-03	-	2020-07-27	L2484438-9
MEL-03-05	MEL-03	JUL-DUP-02	2020-07-27	L2484438-10

Table 2: Summary of field blanks collected in July, 2020.

Client_Sample_ID	ID_Name	ALS Sample ID
JUL-DI-01	DI Blank	L2484438-19
JUL-EB-01	Equipment Blank	L2484438-20

2 TRIGGER SCREENING

Sampling results were screened relative to relevant normal ranges and thresholds. Normal range, as defined in the AEMP, numerically describes the natural range of baseline/reference conditions for the various components of the AEMP. In simple terms, the normal range is the instrument used to assess whether current conditions (e.g., the measured concentration of a particular metal) has changed relative to baseline/reference conditions. In the case of the March sampling event, results are screened relative to the thresholds only, as normal ranges are not applicable to winter lake conditions. A summary of trigger and threshold exceedances is provided in Table 3 (Refer to Azimuth 2020 for details on the normal range and threshold values used here). The subsequent table (Table 4) provides all sample results above trigger and threshold values in July, 2020.

Figures displaying all parameters with at least one sample above the relevant normal range or threshold are also provided.

Table 3: Summary of trigger and threshold exceedances in July, 2020.

Area	Parameter	Samples Exceeding Normal Range	Samples Exceeding Threshold	Stations
Meliadine Lake				
	Aluminum (T)	7	0	MEL-01-01, MEL-01-06, MEL-01-07, MEL-01-08, MEL-01-09, MEL-02-01, MEL-03-05
	Ammonia-N	2	0	MEL-02-05*, MEL-03-05
	Arsenic (T)	14	0	MEL-01-01, MEL-01-06, MEL-01-07, MEL-01-08, MEL-01-09, MEL-02-01, MEL-02-02, MEL-02-03, MEL-02-04, MEL-02-05, MEL-03-01, MEL-03-02, MEL-03-04, MEL-03-05
	Barium (T)	11	0	MEL-01-01, MEL-01-06, MEL-01-07, MEL-01-08, MEL-01-09, MEL-02-01, MEL-02-02, MEL-02-03, MEL-02-04, MEL-02-05, MEL-03-05
	Bicarbonate alkalinity	6	0	MEL-02-01, MEL-02-02, MEL-02-04, MEL-02-05, MEL-03-03, MEL-03-04
	Boron (T)	6	0	MEL-01-01, MEL-01-06, MEL-01-07, MEL-01-08, MEL-01-09, MEL-02-01
	Cadmium (T)	1	0	MEL-02-01
	Calcium (T)	10	0	MEL-01-01, MEL-01-06, MEL-01-07, MEL-01-08, MEL-01-09, MEL-02-01, MEL-02-02, MEL-02-03, MEL-02-04, MEL-02-05
	Chloride	14	0	MEL-01-01, MEL-01-06, MEL-01-07, MEL-01-08, MEL-01-09, MEL-02-01, MEL-02-02, MEL-02-03, MEL-02-04, MEL-02-05, MEL-03-01, MEL-03-03, MEL-03-04, MEL-03-05
	Chromium (T)	1	0	MEL-02-03
	Cobalt (T)	11	0	MEL-01-01, MEL-01-06, MEL-01-07, MEL-01-08, MEL-01-09, MEL-02-01, MEL-02-02, MEL-02-03, MEL-02-04, MEL-02-05, MEL-03-05
	Copper (T)	1	0	MEL-02-03
	DOC	9	0	MEL-01-01, MEL-01-06, MEL-01-07, MEL-01-08, MEL-01-09, MEL-02-01, MEL-02-03, MEL-02-04, MEL-02-05
	Hardness	10	0	MEL-01-01, MEL-01-06, MEL-01-07, MEL-01-08, MEL-01-09, MEL-02-01, MEL-02-02, MEL-02-03, MEL-02-04, MEL-02-05

Area	Parameter	Samples Exceeding Normal Range	Samples Exceeding Threshold	Stations
	Iron (T)	11	0	MEL-01-01, MEL-01-06, MEL-01-07, MEL-01-08, MEL-01-09, MEL-02-01, MEL-02-02, MEL-02-03, MEL-02-04, MEL-02-05, MEL-03-05
	Lead (T)	5	0	MEL-02-01, MEL-02-02, MEL-02-03, MEL-02-04, MEL-02-05
	Lithium (T)	10	0	MEL-01-01, MEL-01-06, MEL-01-07, MEL-01-08, MEL-01-09, MEL-02-01, MEL-02-02, MEL-02-03, MEL-02-04, MEL-02-05
	Magnesium (T)	10	0	MEL-01-01, MEL-01-06, MEL-01-07, MEL-01-08, MEL-01-09, MEL-02-01, MEL-02-02, MEL-02-03, MEL-02-04, MEL-02-05
	Manganese (T)	11	0	MEL-01-01, MEL-01-06, MEL-01-07, MEL-01-08, MEL-01-09, MEL-02-01, MEL-02-02, MEL-02-03, MEL-02-04, MEL-02-05, MEL-03-05
	Molybdenum (T)	9	0	MEL-01-01, MEL-01-06, MEL-01-07, MEL-01-08, MEL-01-09, MEL-02-01, MEL-02-02, MEL-02-04, MEL-02-05*
	Nickel (T)	14	0	MEL-01-01, MEL-01-06, MEL-01-07, MEL-01-08, MEL-01-09, MEL-02-01, MEL-02-02, MEL-02-03, MEL-02-04, MEL-02-05, MEL-03-01, MEL-03-03, MEL-03-04, MEL-03-05
	Nitrate-N	7	0	MEL-01-01, MEL-01-06, MEL-01-07, MEL-01-08, MEL-01-09, MEL-02-01, MEL-03-05
	Nitrite-N	5	0	MEL-01-01, MEL-01-06, MEL-01-07, MEL-01-08, MEL-01-09
	Potassium (T)	10	0	MEL-01-01, MEL-01-06, MEL-01-07, MEL-01-08, MEL-01-09, MEL-02-01, MEL-02-02, MEL-02-03, MEL-02-04, MEL-02-05
	Reactive silica	10	0	MEL-01-01, MEL-01-06, MEL-01-07, MEL-01-08, MEL-01-09, MEL-02-01, MEL-02-02, MEL-02-03, MEL-02-04, MEL-02-05
	Selenium (T)	3	0	MEL-02-02, MEL-02-03, MEL-03-01
	Silver (T)	1	0	MEL-01-09
	Sodium (T)	12	0	MEL-01-01, MEL-01-06, MEL-01-07, MEL-01-08, MEL-01-09, MEL-02-01, MEL-02-02, MEL-02-03, MEL-02-04, MEL-02-05, MEL-03-04, MEL-03-05
	Strontium (T)	15	0	MEL-01-01, MEL-01-06, MEL-01-07, MEL-01-08, MEL-01-09, MEL-02-01, MEL-02-02, MEL-02-03, MEL-02-04, MEL-02-05, MEL-03-01, MEL-03-02, MEL-03-03, MEL-03-04, MEL-03-05

Area	Parameter	Samples Exceeding Normal Range	Samples Exceeding Threshold	Stations
Peninsula Lakes	Sulphate	10	0	MEL-01-01, MEL-01-06, MEL-01-07, MEL-01-08, MEL-01-09, MEL-02-01, MEL-02-02, MEL-02-03, MEL-02-04, MEL-02-05
	TDS	8	0	MEL-01-01, MEL-01-06, MEL-01-07, MEL-01-08, MEL-01-09, MEL-02-04, MEL-03-01, MEL-03-02
	TDS (calculated)	10	0	MEL-01-01, MEL-01-06, MEL-01-07, MEL-01-08, MEL-01-09, MEL-02-01, MEL-02-02, MEL-02-03, MEL-02-04, MEL-02-05
	Tin (T)	1	0	MEL-02-05
	Titanium (T)	1	0	MEL-03-05*
	TKN	5	0	MEL-02-01, MEL-02-02, MEL-02-03, MEL-02-04, MEL-02-05
	TOC	9	0	MEL-01-01, MEL-01-06, MEL-01-07, MEL-01-08, MEL-01-09, MEL-02-01, MEL-02-02, MEL-02-03, MEL-02-05
	Total Alkalinity	6	0	MEL-02-01, MEL-02-02, MEL-02-04, MEL-02-05, MEL-03-03, MEL-03-04
	Total phosphorous	5	0	MEL-01-01, MEL-01-06, MEL-01-07, MEL-01-09, MEL-02-05
	Uranium (T)	7	0	MEL-01-01, MEL-01-06, MEL-01-07, MEL-01-08, MEL-01-09, MEL-02-03, MEL-02-04
	Vanadium (T)	1	0	MEL-03-05
	Zinc (D)	6	1	MEL-01-01*, MEL-01-06*, MEL-01-07*, MEL-01-08*, MEL-01-09*, MEL-03-02*
	Zinc (T)	3	0	MEL-01-07, MEL-02-01*, MEL-02-03
	Aluminum (T)	4	0	A8-01, A8-02, A8-03, D7-01
	Ammonia-N	6	0	A8-01, A8-02, A8-03, B7-01, D7-02, D7-03
	Antimony (T)	3	0	B7-01, B7-02, B7-03
	Arsenic (T)	9	0	A8-01, A8-02, A8-03, B7-01, B7-02, B7-03, D7-01, D7-02, D7-03
	Barium (T)	4	0	B7-01, B7-02, B7-03, D7-01

Area	Parameter	Samples Exceeding Normal Range	Samples Exceeding Threshold	Stations
	Boron (T)	6	0	A8-01, A8-02, A8-03, B7-01, B7-02, B7-03
	Cadmium (T)	1	0	B7-03
	Chloride	3	0	B7-01, B7-02, B7-03
	Chromium (T)	9	0	A8-01, A8-02, A8-03, B7-01, B7-02, B7-03, D7-01, D7-02, D7-03
	Cobalt (T)	6	0	B7-01, B7-02, B7-03, D7-01, D7-02, D7-03
	Copper (T)	2	0	A8-02, A8-03
	Lead (T)	5	0	A8-01, A8-02, A8-03, D7-01, D7-03
	Lithium (T)	3	0	B7-01, B7-02, B7-03
	Manganese (T)	1	0	D7-01
	Molybdenum (T)	7	0	A8-01, A8-02, A8-03, B7-01, B7-02, B7-03, D7-01
	Nitrate-N	5	0	B7-01, B7-02, D7-01, D7-02, D7-03
	Nitrite-N	6	0	A8-01, A8-02, A8-03, D7-01, D7-02, D7-03
	Reactive silica	1	0	D7-01
	Selenium (T)	6	0	A8-01, A8-02, A8-03, B7-03, D7-02, D7-03
	Silver (T)	1	0	D7-01
	Strontium (T)	3	0	B7-01, B7-02, B7-03
	Sulphate	3	0	B7-01, B7-02, B7-03
	Thallium (T)	3	0	B7-01, B7-02, B7-03
	Total nitrogen	5	0	A8-01, A8-02, A8-03, B7-01, B7-02
	Uranium (T)	3	0	B7-01, B7-02, B7-03
	Vanadium (T)	9	0	A8-01, A8-02, A8-03, B7-01, B7-02, B7-03, D7-01, D7-02, D7-03
	Zinc (D)	1	0	B7-02*
	Zinc (T)	1	0	A8-02

* Indicates samples which failed reliability checks and are consequently uncertain.

Table 4: Meliadine trigger and threshold exceedances in July, 2020.

Area ID	Sample ID	Parameter	Results ¹	DL	Units	MDL	Threshold	Normal Range Limit	% Above NR ²	Reliability
A8										
	A8-01	Aluminum (T)	0.0033	0.001	mg/L	-	0.1	0.003	10	-
	A8-02	Aluminum (T)	0.0032	0.001	mg/L	-	0.1	0.003	6.7	-
	A8-03	Aluminum (T)	0.0035	0.001	mg/L	-	0.1	0.003	16.7	-
	A8-01	Ammonia-N	0.042	0.005	mg/L	-	1.8	0.011	282.7	-
	A8-02	Ammonia-N	0.035	0.005	mg/L	-	1.8	0.011	220	-
	A8-03	Ammonia-N	0.023	0.005	mg/L	-	1.8	0.011	106.4	-
	A8-01	Arsenic (T)	0.0058	2e-05	mg/L	-	0.025	0.0024	141.7	-
	A8-02	Arsenic (T)	0.0059	2e-05	mg/L	-	0.025	0.0024	146.3	-
	A8-03	Arsenic (T)	0.0059	2e-05	mg/L	-	0.025	0.0024	146.7	-
	A8-01	Boron (T)	0.0056	0.005	mg/L	-	1.5	0.005	12	-
	A8-02	Boron (T)	0.0057	0.005	mg/L	-	1.5	0.005	14	-
	A8-03	Boron (T)	0.0056	0.005	mg/L	-	1.5	0.005	12	-
	A8-01	Chromium (T)	1e-04	1e-04	mg/L	MDL	0.001	6e-05	66.7	-
	A8-02	Chromium (T)	1e-04	1e-04	mg/L	MDL	0.001	6e-05	66.7	-
	A8-03	Chromium (T)	1e-04	1e-04	mg/L	MDL	0.001	6e-05	66.7	-
	A8-02	Copper (T)	0.0017	5e-05	mg/L	-	0.002	0.00089	86.5	-
	A8-03	Copper (T)	0.0017	5e-05	mg/L	-	0.002	0.00089	91	-
	A8-01	Lead (T)	6.7e-05	1e-05	mg/L	-	0.001	3e-05	123.3	-
	A8-02	Lead (T)	8.1e-05	1e-05	mg/L	-	0.001	3e-05	170	-
	A8-03	Lead (T)	7e-05	1e-05	mg/L	-	0.001	3e-05	133.3	-
	A8-01	Molybdenum (T)	0.00028	5e-05	mg/L	-	0.073	0.00022	25.5	-
	A8-02	Molybdenum (T)	3e-04	5e-05	mg/L	-	0.073	0.00022	35	-
	A8-03	Molybdenum (T)	0.00027	5e-05	mg/L	-	0.073	0.00022	22.3	-

Area ID	Sample ID	Parameter	Results ¹	DL	Units	MDL	Threshold	Normal Range Limit	% Above NR ²	Reliability
B7	A8-01	Nitrite-N	0.001	0.001	mg/L	MDL	0.06	5e-04	100	-
	A8-02	Nitrite-N	0.001	0.001	mg/L	MDL	0.06	5e-04	100	-
	A8-03	Nitrite-N	0.001	0.001	mg/L	MDL	0.06	5e-04	100	-
	A8-01	Selenium (T)	4e-05	4e-05	mg/L	MDL	0.001	2e-05	100	-
	A8-02	Selenium (T)	4e-05	4e-05	mg/L	MDL	0.001	2e-05	100	-
	A8-03	Selenium (T)	4.2e-05	4e-05	mg/L	-	0.001	2e-05	110	-
	A8-01	Total nitrogen	0.48	0.05	mg/L	-	-	0.37	30	-
	A8-02	Total nitrogen	0.41	0.05	mg/L	-	-	0.37	11.9	-
	A8-03	Total nitrogen	0.44	0.05	mg/L	-	-	0.37	19.7	-
	A8-01	Vanadium (T)	5e-05	5e-05	mg/L	MDL	0.12	1e-05	400	-
	A8-02	Vanadium (T)	5e-05	5e-05	mg/L	MDL	0.12	1e-05	400	-
	A8-03	Vanadium (T)	5e-05	5e-05	mg/L	MDL	0.12	1e-05	400	-
	A8-02	Zinc (T)	0.0018	5e-04	mg/L	-	-	0.0012	50	-
	B7-01	Ammonia-N	0.04	0.005	mg/L	-	1.8	0.025	59.6	-
B7	B7-01	Antimony (T)	3.5e-05	2e-05	mg/L	-	0.009	2e-05	75	-
	B7-02	Antimony (T)	3.5e-05	2e-05	mg/L	-	0.009	2e-05	75	-
	B7-03	Antimony (T)	3.8e-05	2e-05	mg/L	-	0.009	2e-05	90	-
	B7-01	Arsenic (T)	0.0073	2e-05	mg/L	-	0.025	0.0018	307.2	-
	B7-02	Arsenic (T)	0.0052	2e-05	mg/L	-	0.025	0.0018	189.4	-
	B7-03	Arsenic (T)	0.005	2e-05	mg/L	-	0.025	0.0018	180.6	-
	B7-01	Barium (T)	0.026	2e-05	mg/L	-	1	0.02	28.5	-
	B7-02	Barium (T)	0.026	2e-05	mg/L	-	1	0.02	29	-
	B7-03	Barium (T)	0.025	2e-05	mg/L	-	1	0.02	25.5	-
	B7-01	Boron (T)	0.015	0.005	mg/L	-	1.5	0.008	86.2	-

Area ID	Sample ID	Parameter	Results ¹	DL	Units	MDL	Threshold	Normal Range Limit	% Above NR ²	Reliability
	B7-02	Boron (T)	0.016	0.005	mg/L	-	1.5	0.008	93.8	-
	B7-03	Boron (T)	0.016	0.005	mg/L	-	1.5	0.008	95	-
	B7-03	Cadmium (T)	2e-05	2e-05	mg/L	MDL	4e-05	7e-06	185.7	-
	B7-01	Chloride	37	0.1	mg/L	-	120	25	49.2	-
	B7-02	Chloride	37	0.1	mg/L	-	120	25	48.4	-
	B7-03	Chloride	38	0.1	mg/L	-	120	25	50.4	-
	B7-01	Chromium (T)	1e-04	1e-04	mg/L	MDL	0.001	6e-05	66.7	-
	B7-02	Chromium (T)	1e-04	1e-04	mg/L	MDL	0.001	6e-05	66.7	-
	B7-03	Chromium (T)	1e-04	1e-04	mg/L	MDL	0.001	6e-05	66.7	-
	B7-01	Cobalt (T)	7.3e-05	5e-06	mg/L	-	0.00078	5e-05	46.2	-
	B7-02	Cobalt (T)	7.7e-05	5e-06	mg/L	-	0.00078	5e-05	53.6	-
	B7-03	Cobalt (T)	7.8e-05	5e-06	mg/L	-	0.00078	5e-05	56.8	-
	B7-01	Lithium (T)	0.019	5e-04	mg/L	-	-	0.0075	152	-
	B7-02	Lithium (T)	0.02	5e-04	mg/L	-	-	0.0075	166.7	-
	B7-03	Lithium (T)	0.02	5e-04	mg/L	-	-	0.0075	169.3	-
	B7-01	Molybdenum (T)	0.00027	5e-05	mg/L	-	0.073	0.00024	11.3	-
	B7-02	Molybdenum (T)	0.0022	5e-05	mg/L	-	0.073	0.00024	812.5	-
	B7-03	Molybdenum (T)	0.0053	5e-05	mg/L	-	0.073	0.00024	2095.8	-
	B7-01	Nitrate-N	0.0075	0.005	mg/L	-	2.9	0.005	50	-
	B7-02	Nitrate-N	0.021	0.005	mg/L	-	2.9	0.005	312	-
	B7-03	Selenium (T)	4.6e-05	4e-05	mg/L	-	0.001	4e-05	15	-
	B7-01	Strontium (T)	0.28	2e-05	mg/L	-	1.7	0.16	82.6	-
	B7-02	Strontium (T)	0.28	2e-05	mg/L	-	1.7	0.16	81.3	-
	B7-03	Strontium (T)	0.28	2e-05	mg/L	-	1.7	0.16	83.9	-
	B7-01	Sulphate	8.1	0.3	mg/L	-	130	6	35.7	-

Area ID	Sample ID	Parameter	Results ¹	DL	Units	MDL	Threshold	Normal Range Limit	% Above NR ²	Reliability
D7	B7-02	Sulphate	8.1	0.3	mg/L	-	130	6	35.5	-
	B7-03	Sulphate	8.6	0.3	mg/L	-	130	6	42.7	-
	B7-01	Thallium (T)	5.8e-06	5e-06	mg/L	-	8e-04	5e-06	16	-
	B7-02	Thallium (T)	5.7e-06	5e-06	mg/L	-	8e-04	5e-06	14	-
	B7-03	Thallium (T)	5.8e-06	5e-06	mg/L	-	8e-04	5e-06	16	-
	B7-01	Total nitrogen	0.44	0.05	mg/L	-	-	0.42	4.5	-
	B7-02	Total nitrogen	0.47	0.05	mg/L	-	-	0.42	11.7	-
	B7-01	Uranium (T)	3.9e-05	1e-06	mg/L	-	0.015	3e-05	29.7	-
	B7-02	Uranium (T)	4.2e-05	1e-06	mg/L	-	0.015	3e-05	39	-
	B7-03	Uranium (T)	4e-05	1e-06	mg/L	-	0.015	3e-05	34.3	-
	B7-01	Vanadium (T)	5e-05	5e-05	mg/L	-	0.12	1e-05	400	-
	B7-02	Vanadium (T)	5e-05	5e-05	mg/L	MDL	0.12	1e-05	400	-
	B7-03	Vanadium (T)	5e-05	5e-05	mg/L	MDL	0.12	1e-05	400	-
	B7-02	Zinc (D)	0.0046	5e-04	mg/L	-	0.0056	0.0022	108.6	Uncertain
	D7-01	Aluminum (T)	0.0068	0.001	mg/L	-	0.1	0.0067	1.5	-
D7	D7-02	Ammonia-N	0.038	0.005	mg/L	-	1.8	0.009	318.9	-
	D7-03	Ammonia-N	0.052	0.005	mg/L	-	1.8	0.009	476.7	-
	D7-01	Arsenic (T)	0.0014	2e-05	mg/L	-	0.025	0.0012	20	-
	D7-02	Arsenic (T)	0.0014	2e-05	mg/L	-	0.025	0.0012	12.5	-
	D7-03	Arsenic (T)	0.0013	2e-05	mg/L	-	0.025	0.0012	9.2	-
	D7-01	Barium (T)	0.017	2e-05	mg/L	-	1	0.017	0.6	-
	D7-01	Chromium (T)	1e-04	1e-04	mg/L	MDL	0.001	6e-05	66.7	-
	D7-02	Chromium (T)	1e-04	1e-04	mg/L	MDL	0.001	6e-05	66.7	-
	D7-03	Chromium (T)	1e-04	1e-04	mg/L	MDL	0.001	6e-05	66.7	-

Area ID	Sample ID	Parameter	Results ¹	DL	Units	MDL	Threshold	Normal Range Limit	% Above NR ²	Reliability
D7	D7-01	Cobalt (T)	6.4e-05	5e-06	mg/L	-	0.00078	5e-05	28.8	-
	D7-02	Cobalt (T)	6.1e-05	5e-06	mg/L	-	0.00078	5e-05	21.8	-
	D7-03	Cobalt (T)	5.4e-05	5e-06	mg/L	-	0.00078	5e-05	8.4	-
	D7-01	Lead (T)	2.5e-05	1e-05	mg/L	-	0.001	2e-05	25	-
	D7-03	Lead (T)	2.1e-05	1e-05	mg/L	-	0.001	2e-05	5	-
	D7-01	Manganese (T)	0.013	5e-05	mg/L	-	-	0.013	1.5	-
	D7-01	Molybdenum (T)	0.00077	5e-05	mg/L	-	0.073	0.00048	59.8	-
	D7-01	Nitrate-N	0.031	0.005	mg/L	-	2.9	0.005	522	-
	D7-02	Nitrate-N	0.017	0.005	mg/L	-	2.9	0.005	234	-
	D7-03	Nitrate-N	0.0078	0.005	mg/L	-	2.9	0.005	56	-
	D7-01	Nitrite-N	0.001	0.001	mg/L	MDL	0.06	5e-04	100	-
	D7-02	Nitrite-N	0.0011	0.001	mg/L	-	0.06	5e-04	120	-
	D7-03	Nitrite-N	0.001	0.001	mg/L	MDL	0.06	5e-04	100	-
	D7-01	Reactive silica	0.28	0.01	mg/L	-	-	0.28	0.7	-
	D7-02	Selenium (T)	6.2e-05	4e-05	mg/L	-	0.001	6e-05	3.3	-
	D7-03	Selenium (T)	6.9e-05	4e-05	mg/L	-	0.001	6e-05	15	-
	D7-01	Silver (T)	9.5e-06	5e-06	mg/L	-	0.00025	5e-06	90	-
	D7-01	Vanadium (T)	8.8e-05	5e-05	mg/L	-	0.12	7e-05	25.7	-
	D7-02	Vanadium (T)	8.2e-05	5e-05	mg/L	-	0.12	7e-05	17.1	-
	D7-03	Vanadium (T)	8e-05	5e-05	mg/L	-	0.12	7e-05	14.3	-
MEL-01										
MEL-01	MEL-01-01	Aluminum (T)	0.0084	0.001	mg/L	-	0.1	0.0054	55.8	-
	MEL-01-06	Aluminum (T)	0.0069	0.001	mg/L	-	0.1	0.0054	28	-
	MEL-01-07	Aluminum (T)	0.0061	0.001	mg/L	-	0.1	0.0054	13.2	-
	MEL-01-08	Aluminum (T)	0.0076	0.001	mg/L	-	0.1	0.0054	41	-

Area ID	Sample ID	Parameter	Results ¹	DL	Units	MDL	Threshold	Normal Range Limit	% Above NR ²	Reliability
	MEL-01-09	Aluminum (T)	0.0073	0.001	mg/L	-	0.1	0.0054	35.4	-
	MEL-01-01	Arsenic (T)	0.00052	2e-05	mg/L	-	0.025	0.00025	107.6	-
	MEL-01-06	Arsenic (T)	0.00052	2e-05	mg/L	-	0.025	0.00025	108.8	-
	MEL-01-07	Arsenic (T)	0.00054	2e-05	mg/L	-	0.025	0.00025	115.9	-
	MEL-01-08	Arsenic (T)	5e-04	2e-05	mg/L	-	0.025	0.00025	100.8	-
	MEL-01-09	Arsenic (T)	0.00047	2e-05	mg/L	-	0.025	0.00025	88	-
	MEL-01-01	Barium (T)	0.0086	2e-05	mg/L	-	1	0.0079	9.2	-
	MEL-01-06	Barium (T)	0.0091	2e-05	mg/L	-	1	0.0079	15.2	-
	MEL-01-07	Barium (T)	0.0088	2e-05	mg/L	-	1	0.0079	10.9	-
	MEL-01-08	Barium (T)	0.0088	2e-05	mg/L	-	1	0.0079	11.8	-
	MEL-01-09	Barium (T)	0.0084	2e-05	mg/L	-	1	0.0079	5.7	-
	MEL-01-01	Boron (T)	0.0075	0.005	mg/L	-	1.5	0.0067	12.4	-
	MEL-01-06	Boron (T)	0.008	0.005	mg/L	-	1.5	0.0067	19.9	-
	MEL-01-07	Boron (T)	0.0074	0.005	mg/L	-	1.5	0.0067	10.9	-
	MEL-01-08	Boron (T)	0.0081	0.005	mg/L	-	1.5	0.0067	21.4	-
	MEL-01-09	Boron (T)	0.0075	0.005	mg/L	-	1.5	0.0067	12.4	-
	MEL-01-01	Calcium (T)	8.9	0.01	mg/L	-	-	7.3	21.8	-
	MEL-01-06	Calcium (T)	9.3	0.01	mg/L	-	-	7.3	26.7	-
	MEL-01-07	Calcium (T)	8.9	0.01	mg/L	-	-	7.3	22.3	-
	MEL-01-08	Calcium (T)	9.4	0.01	mg/L	-	-	7.3	28.5	-
	MEL-01-09	Calcium (T)	8.8	0.01	mg/L	-	-	7.3	20.7	-
	MEL-01-01	Chloride	18	0.1	mg/L	-	120	8.8	103.4	-
	MEL-01-06	Chloride	20	0.1	mg/L	-	120	8.8	125.1	-
	MEL-01-07	Chloride	18	0.1	mg/L	-	120	8.8	102.3	-
	MEL-01-08	Chloride	20	0.1	mg/L	-	120	8.8	126.3	-

Area ID	Sample ID	Parameter	Results ¹	DL	Units	MDL	Threshold	Normal Range Limit	% Above NR ²	Reliability
	MEL-01-09	Chloride	18	0.1	mg/L	-	120	8.8	104.6	-
	MEL-01-01	Cobalt (T)	3.6e-05	5e-06	mg/L	-	0.00078	1.6e-05	123.8	-
	MEL-01-06	Cobalt (T)	4e-05	5e-06	mg/L	-	0.00078	1.6e-05	151.3	-
	MEL-01-07	Cobalt (T)	3.2e-05	5e-06	mg/L	-	0.00078	1.6e-05	101.2	-
	MEL-01-08	Cobalt (T)	3.2e-05	5e-06	mg/L	-	0.00078	1.6e-05	96.9	-
	MEL-01-09	Cobalt (T)	3.8e-05	5e-06	mg/L	-	0.00078	1.6e-05	135.6	-
	MEL-01-01	DOC	3.4	1	mg/L	-	-	2.7	25.9	-
	MEL-01-06	DOC	3.4	1	mg/L	-	-	2.7	25.9	-
	MEL-01-07	DOC	3.4	1	mg/L	-	-	2.7	25.9	-
	MEL-01-08	DOC	3.5	1	mg/L	-	-	2.7	29.6	-
	MEL-01-09	DOC	3.8	1	mg/L	-	-	2.7	40.7	-
	MEL-01-01	Hardness	30	0.2	-	-	-	23	28.6	-
	MEL-01-06	Hardness	30	0.2	-	-	-	23	32	-
	MEL-01-07	Hardness	30	0.2	-	-	-	23	29.4	-
	MEL-01-08	Hardness	31	0.2	-	-	-	23	32.5	-
	MEL-01-09	Hardness	30	0.2	-	-	-	23	27.7	-
	MEL-01-01	Iron (T)	0.03	0.001	mg/L	-	1.1	0.015	98	-
	MEL-01-06	Iron (T)	0.029	0.001	mg/L	-	1.1	0.015	91.4	-
	MEL-01-07	Iron (T)	0.029	0.001	mg/L	-	1.1	0.015	94	-
	MEL-01-08	Iron (T)	0.029	0.001	mg/L	-	1.1	0.015	93.4	-
	MEL-01-09	Iron (T)	0.03	0.001	mg/L	-	1.1	0.015	96.7	-
	MEL-01-01	Lithium (T)	0.0016	5e-04	mg/L	-	-	7e-04	130	-
	MEL-01-06	Lithium (T)	0.0018	5e-04	mg/L	-	-	7e-04	154.3	-
	MEL-01-07	Lithium (T)	0.0016	5e-04	mg/L	-	-	7e-04	122.9	-
	MEL-01-08	Lithium (T)	0.0018	5e-04	mg/L	-	-	7e-04	158.6	-

Area ID	Sample ID	Parameter	Results ¹	DL	Units	MDL	Threshold	Normal Range Limit	% Above NR ²	Reliability
	MEL-01-09	Lithium (T)	0.0016	5e-04	mg/L	-	-	7e-04	127.1	-
	MEL-01-01	Magnesium (T)	1.7	0.004	mg/L	-	-	1.2	47.9	-
	MEL-01-06	Magnesium (T)	1.8	0.004	mg/L	-	-	1.2	54.7	-
	MEL-01-07	Magnesium (T)	1.7	0.004	mg/L	-	-	1.2	45.3	-
	MEL-01-08	Magnesium (T)	1.8	0.004	mg/L	-	-	1.2	54.7	-
	MEL-01-09	Magnesium (T)	1.7	0.004	mg/L	-	-	1.2	46.2	-
	MEL-01-01	Manganese (T)	0.0095	5e-05	mg/L	-	-	0.0032	200.6	-
	MEL-01-06	Manganese (T)	0.0098	5e-05	mg/L	-	-	0.0032	211.7	-
	MEL-01-07	Manganese (T)	0.0092	5e-05	mg/L	-	-	0.0032	193.3	-
	MEL-01-08	Manganese (T)	0.0097	5e-05	mg/L	-	-	0.0032	208.6	-
	MEL-01-09	Manganese (T)	0.0096	5e-05	mg/L	-	-	0.0032	203.8	-
	MEL-01-01	Molybdenum (T)	1e-04	5e-05	mg/L	-	0.073	8.3e-05	23.3	-
	MEL-01-06	Molybdenum (T)	9.1e-05	5e-05	mg/L	-	0.073	8.3e-05	10	-
	MEL-01-07	Molybdenum (T)	9.6e-05	5e-05	mg/L	-	0.073	8.3e-05	16.1	-
	MEL-01-08	Molybdenum (T)	9.4e-05	5e-05	mg/L	-	0.073	8.3e-05	13.7	-
	MEL-01-09	Molybdenum (T)	9.1e-05	5e-05	mg/L	-	0.073	8.3e-05	10	-
	MEL-01-01	Nickel (T)	0.00082	5e-05	mg/L	-	0.025	0.00042	97.4	-
	MEL-01-06	Nickel (T)	0.00085	5e-05	mg/L	-	0.025	0.00042	104.8	-
	MEL-01-07	Nickel (T)	0.00089	5e-05	mg/L	-	0.025	0.00042	112.9	-
	MEL-01-08	Nickel (T)	0.00083	5e-05	mg/L	-	0.025	0.00042	99.8	-
	MEL-01-09	Nickel (T)	0.00085	5e-05	mg/L	-	0.025	0.00042	103.6	-
	MEL-01-01	Nitrate-N	0.13	0.005	mg/L	-	2.9	0.021	528	-
	MEL-01-06	Nitrate-N	0.17	0.005	mg/L	-	2.9	0.021	735.7	-
	MEL-01-07	Nitrate-N	0.15	0.005	mg/L	-	2.9	0.021	639.1	-
	MEL-01-08	Nitrate-N	0.16	0.005	mg/L	-	2.9	0.021	692.3	-

Area ID	Sample ID	Parameter	Results ¹	DL	Units	MDL	Threshold	Normal Range Limit	% Above NR ²	Reliability
	MEL-01-09	Nitrate-N	0.14	0.005	mg/L	-	2.9	0.021	571.5	-
	MEL-01-01	Nitrite-N	0.0011	0.001	mg/L	-	0.06	0.001	10	-
	MEL-01-06	Nitrite-N	0.0013	0.001	mg/L	-	0.06	0.001	30	-
	MEL-01-07	Nitrite-N	0.0011	0.001	mg/L	-	0.06	0.001	10	-
	MEL-01-08	Nitrite-N	0.0019	0.001	mg/L	-	0.06	0.001	90	-
	MEL-01-09	Nitrite-N	0.0012	0.001	mg/L	-	0.06	0.001	20	-
	MEL-01-01	Potassium (T)	1.1	0.02	mg/L	-	-	0.94	20.6	-
	MEL-01-06	Potassium (T)	1.2	0.02	mg/L	-	-	0.94	25.9	-
	MEL-01-07	Potassium (T)	1.1	0.02	mg/L	-	-	0.94	19.5	-
	MEL-01-08	Potassium (T)	1.2	0.02	mg/L	-	-	0.94	24.9	-
	MEL-01-09	Potassium (T)	1.1	0.02	mg/L	-	-	0.94	20.6	-
	MEL-01-01	Reactive silica	0.44	0.01	mg/L	-	-	0.26	65.3	-
	MEL-01-06	Reactive silica	0.45	0.01	mg/L	-	-	0.26	68.7	-
	MEL-01-07	Reactive silica	0.42	0.01	mg/L	-	-	0.26	60.4	-
	MEL-01-08	Reactive silica	0.44	0.01	mg/L	-	-	0.26	66.4	-
	MEL-01-09	Reactive silica	0.39	0.01	mg/L	-	-	0.26	48.7	-
	MEL-01-09	Silver (T)	2.5e-05	2.5e-05	mg/L	MDL	0.00025	5e-06	400	-
	MEL-01-01	Sodium (T)	9	0.02	mg/L	-	-	4.6	97.4	-
	MEL-01-06	Sodium (T)	9.6	0.02	mg/L	-	-	4.6	109.9	-
	MEL-01-07	Sodium (T)	8.7	0.02	mg/L	-	-	4.6	90.5	-
	MEL-01-08	Sodium (T)	9.4	0.02	mg/L	-	-	4.6	107.3	-
	MEL-01-09	Sodium (T)	8.9	0.02	mg/L	-	-	4.6	94.9	-
	MEL-01-01	Strontium (T)	0.074	2e-05	mg/L	-	1.7	0.034	115.2	-
	MEL-01-06	Strontium (T)	0.082	2e-05	mg/L	-	1.7	0.034	139.4	-

Area ID	Sample ID	Parameter	Results ¹	DL	Units	MDL	Threshold	Normal Range Limit	% Above NR ²	Reliability
	MEL-01-07	Strontium (T)	0.072	2e-05	mg/L	-	1.7	0.034	110.5	-
	MEL-01-08	Strontium (T)	0.082	2e-05	mg/L	-	1.7	0.034	138.8	-
	MEL-01-09	Strontium (T)	0.074	2e-05	mg/L	-	1.7	0.034	114.6	-
	MEL-01-01	Sulphate	5.6	0.3	mg/L	-	130	3.7	53.2	-
	MEL-01-06	Sulphate	6	0.3	mg/L	-	130	3.7	62.1	-
	MEL-01-07	Sulphate	5.6	0.3	mg/L	-	130	3.7	51	-
	MEL-01-08	Sulphate	5.9	0.3	mg/L	-	130	3.7	61.3	-
	MEL-01-09	Sulphate	5.6	0.3	mg/L	-	130	3.7	52.1	-
	MEL-01-01	TDS	88	13	mg/L	-	500	51	71.9	-
	MEL-01-06	TDS	89	13	mg/L	-	500	51	73.8	-
	MEL-01-07	TDS	78	13	mg/L	-	500	51	52.3	-
	MEL-01-08	TDS	84	13	mg/L	-	500	51	64.1	-
	MEL-01-09	TDS	78	13	mg/L	-	500	51	52.3	-
	MEL-01-01	TDS (calculated)	54	-	mg/L	-	500	38	42.1	-
	MEL-01-06	TDS (calculated)	58	-	mg/L	-	500	38	50.4	-
	MEL-01-07	TDS (calculated)	54	-	mg/L	-	500	38	41.3	-
	MEL-01-08	TDS (calculated)	58	-	mg/L	-	500	38	50.2	-
	MEL-01-09	TDS (calculated)	54	-	mg/L	-	500	38	41	-
	MEL-01-01	TOC	3.4	1	mg/L	-	-	3	13.3	-
	MEL-01-06	TOC	3.6	1	mg/L	-	-	3	20	-
	MEL-01-07	TOC	3.8	1	mg/L	-	-	3	26.7	-
	MEL-01-08	TOC	3.6	1	mg/L	-	-	3	20	-
	MEL-01-09	TOC	3.6	1	mg/L	-	-	3	20	-
	MEL-01-01	Total phosphorous	0.0066	0.001	mg/L	-	-	0.006	10	-
	MEL-01-06	Total phosphorous	0.0065	0.001	mg/L	-	-	0.006	8.3	-

Area ID	Sample ID	Parameter	Results ¹	DL	Units	MDL	Threshold	Normal Range Limit	% Above NR ²	Reliability
MEL-01	MEL-01-07	Total phosphorous	0.0078	0.001	mg/L	-	-	0.006	30	-
	MEL-01-09	Total phosphorous	0.0066	0.001	mg/L	-	-	0.006	10	-
	MEL-01-01	Uranium (T)	1.9e-05	1e-06	mg/L	-	0.015	1.7e-05	15	-
	MEL-01-06	Uranium (T)	2.3e-05	1e-06	mg/L	-	0.015	1.7e-05	35.9	-
	MEL-01-07	Uranium (T)	1.9e-05	1e-06	mg/L	-	0.015	1.7e-05	16.2	-
	MEL-01-08	Uranium (T)	1.9e-05	1e-06	mg/L	-	0.015	1.7e-05	11.4	-
	MEL-01-09	Uranium (T)	1.9e-05	1e-06	mg/L	-	0.015	1.7e-05	16.2	-
	MEL-01-01	Zinc (D)	0.0037	5e-04	mg/L	-	0.0056	0.002	88.3	Uncertain
	MEL-01-06	Zinc (D)	0.0048	5e-04	mg/L	-	0.0056	0.002	144.9	Uncertain
	MEL-01-07	Zinc (D)	0.0036	5e-04	mg/L	-	0.0056	0.002	82.1	Uncertain
	MEL-01-08	Zinc (D)	0.0028	5e-04	mg/L	-	0.0056	0.002	42.3	Uncertain
	MEL-01-09	Zinc (D)	0.0029	5e-04	mg/L	-	0.0056	0.002	49	Uncertain
	MEL-01-07	Zinc (T)	0.0025	5e-04	mg/L	-	-	0.0022	13.8	-
MEL-02	MEL-02-01	Aluminum (T)	0.0063	0.001	mg/L	-	0.1	0.0054	16.9	-
	MEL-02-05	Ammonia-N	0.047	0.005	mg/L	-	1.8	0.015	217.4	Uncertain
	MEL-02-01	Arsenic (T)	0.00057	2e-05	mg/L	-	0.025	0.00025	125.9	-
	MEL-02-02	Arsenic (T)	0.00055	2e-05	mg/L	-	0.025	0.00025	118.7	-
	MEL-02-03	Arsenic (T)	0.00051	2e-05	mg/L	-	0.025	0.00025	103.2	-
	MEL-02-04	Arsenic (T)	0.00054	2e-05	mg/L	-	0.025	0.00025	113.5	-
	MEL-02-05	Arsenic (T)	5e-04	2e-05	mg/L	-	0.025	0.00025	99.2	-
	MEL-02-01	Barium (T)	0.0088	2e-05	mg/L	-	1	0.0079	11.6	-
	MEL-02-02	Barium (T)	0.0088	2e-05	mg/L	-	1	0.0079	10.9	-
	MEL-02-03	Barium (T)	0.0087	2e-05	mg/L	-	1	0.0079	10.2	-
	MEL-02-04	Barium (T)	0.0091	2e-05	mg/L	-	1	0.0079	14.4	-

Area ID	Sample ID	Parameter	Results ¹	DL	Units	MDL	Threshold	Normal Range Limit	% Above NR ²	Reliability
	MEL-02-05	Barium (T)	0.0088	2e-05	mg/L	-	1	0.0079	10.9	-
	MEL-02-01	Bicarbonate alkalinity	27	1.2	mg/L	-	-	24	11.9	-
	MEL-02-02	Bicarbonate alkalinity	25	1.2	mg/L	-	-	24	3.7	-
	MEL-02-04	Bicarbonate alkalinity	26	1.2	mg/L	-	-	24	6.1	-
	MEL-02-05	Bicarbonate alkalinity	26	1.2	mg/L	-	-	24	6.1	-
	MEL-02-01	Boron (T)	0.007	0.005	mg/L	-	1.5	0.0067	4.9	-
	MEL-02-01	Cadmium (T)	7.1e-06	5e-06	mg/L	-	4e-05	5e-06	42	-
	MEL-02-01	Calcium (T)	7.5	0.01	mg/L	-	-	7.3	2.3	-
	MEL-02-02	Calcium (T)	7.5	0.01	mg/L	-	-	7.3	2.1	-
	MEL-02-03	Calcium (T)	7.5	0.01	mg/L	-	-	7.3	3	-
	MEL-02-04	Calcium (T)	7.4	0.01	mg/L	-	-	7.3	1.6	-
	MEL-02-05	Calcium (T)	7.4	0.01	mg/L	-	-	7.3	1.4	-
	MEL-02-01	Chloride	12	0.1	mg/L	-	120	8.8	37.1	-
	MEL-02-02	Chloride	12	0.1	mg/L	-	120	8.8	34.9	-
	MEL-02-03	Chloride	12	0.1	mg/L	-	120	8.8	34.9	-
	MEL-02-04	Chloride	12	0.1	mg/L	-	120	8.8	33.7	-
	MEL-02-05	Chloride	12	0.1	mg/L	-	120	8.8	36	-
	MEL-02-03	Chromium (T)	0.00019	1e-04	mg/L	-	0.001	0.00013	45	-
	MEL-02-01	Cobalt (T)	2.1e-05	5e-06	mg/L	-	0.00078	1.6e-05	33.1	-
	MEL-02-02	Cobalt (T)	1.8e-05	5e-06	mg/L	-	0.00078	1.6e-05	11.9	-
	MEL-02-03	Cobalt (T)	2.3e-05	5e-06	mg/L	-	0.00078	1.6e-05	45.6	-
	MEL-02-04	Cobalt (T)	2.2e-05	5e-06	mg/L	-	0.00078	1.6e-05	37.5	-
	MEL-02-05	Cobalt (T)	2.2e-05	5e-06	mg/L	-	0.00078	1.6e-05	37.5	-

Area ID	Sample ID	Parameter	Results ¹	DL	Units	MDL	Threshold	Normal Range Limit	% Above NR ²	Reliability
	MEL-02-03	Copper (T)	0.0016	5e-05	mg/L	-	0.002	0.00092	74.4	-
	MEL-02-01	DOC	4.3	1	mg/L	-	-	2.7	59.3	-
	MEL-02-03	DOC	3.3	1	mg/L	-	-	2.7	22.2	-
	MEL-02-04	DOC	3.1	1	mg/L	-	-	2.7	14.8	-
	MEL-02-05	DOC	3.1	1	mg/L	-	-	2.7	14.8	-
	MEL-02-01	Hardness	24	0.2	mg/L	-	-	23	3	-
	MEL-02-02	Hardness	24	0.2	-	-	-	23	2.6	-
	MEL-02-03	Hardness	24	0.2	-	-	-	23	2.2	-
	MEL-02-04	Hardness	24	0.2	-	-	-	23	5.2	-
	MEL-02-05	Hardness	24	0.2	-	-	-	23	4.8	-
	MEL-02-01	Iron (T)	0.023	0.001	mg/L	-	1.1	0.015	51.7	-
	MEL-02-02	Iron (T)	0.021	0.001	mg/L	-	1.1	0.015	39.1	-
	MEL-02-03	Iron (T)	0.023	0.001	mg/L	-	1.1	0.015	54.3	-
	MEL-02-04	Iron (T)	0.024	0.001	mg/L	-	1.1	0.015	59.6	-
	MEL-02-05	Iron (T)	0.024	0.001	mg/L	-	1.1	0.015	61.6	-
	MEL-02-01	Lead (T)	0.00012	1e-05	mg/L	-	0.001	2.6e-05	376.7	-
	MEL-02-02	Lead (T)	7.6e-05	1e-05	mg/L	-	0.001	2.6e-05	194.6	-
	MEL-02-03	Lead (T)	2.7e-05	1e-05	mg/L	-	0.001	2.6e-05	4.7	-
	MEL-02-04	Lead (T)	3.2e-05	1e-05	mg/L	-	0.001	2.6e-05	24	-
	MEL-02-05	Lead (T)	3.2e-05	1e-05	mg/L	-	0.001	2.6e-05	24	-
	MEL-02-01	Lithium (T)	0.001	5e-04	mg/L	-	-	7e-04	44.3	-
	MEL-02-02	Lithium (T)	0.001	5e-04	mg/L	-	-	7e-04	44.3	-
	MEL-02-03	Lithium (T)	0.001	5e-04	mg/L	-	-	7e-04	42.9	-
	MEL-02-04	Lithium (T)	0.00098	5e-04	mg/L	-	-	7e-04	40	-
	MEL-02-05	Lithium (T)	0.001	5e-04	mg/L	-	-	7e-04	42.9	-

Area ID	Sample ID	Parameter	Results ¹	DL	Units	MDL	Threshold	Normal Range Limit	% Above NR ²	Reliability
	MEL-02-01	Magnesium (T)	1.4	0.004	mg/L	-	-	1.2	17.1	-
	MEL-02-02	Magnesium (T)	1.3	0.004	mg/L	-	-	1.2	13.7	-
	MEL-02-03	Magnesium (T)	1.3	0.004	mg/L	-	-	1.2	14.5	-
	MEL-02-04	Magnesium (T)	1.3	0.004	mg/L	-	-	1.2	14.5	-
	MEL-02-05	Magnesium (T)	1.3	0.004	mg/L	-	-	1.2	14.5	-
	MEL-02-01	Manganese (T)	0.004	5e-05	mg/L	-	-	0.0032	27.6	-
	MEL-02-02	Manganese (T)	0.0039	5e-05	mg/L	-	-	0.0032	22.5	-
	MEL-02-03	Manganese (T)	0.0044	5e-05	mg/L	-	-	0.0032	39.4	-
	MEL-02-04	Manganese (T)	0.0043	5e-05	mg/L	-	-	0.0032	37.8	-
	MEL-02-05	Manganese (T)	0.0044	5e-05	mg/L	-	-	0.0032	40.3	-
	MEL-02-01	Molybdenum (T)	1e-04	5e-05	mg/L	-	0.073	8.3e-05	27	-
	MEL-02-02	Molybdenum (T)	0.00014	5e-05	mg/L	-	0.073	8.3e-05	72.9	-
	MEL-02-04	Molybdenum (T)	9.4e-05	5e-05	mg/L	-	0.073	8.3e-05	13.7	-
	MEL-02-05	Molybdenum (T)	0.0052	5e-05	mg/L	-	0.073	8.3e-05	6175.7	Uncertain
	MEL-02-01	Nickel (T)	0.00073	5e-05	mg/L	-	0.025	0.00042	74.1	-
	MEL-02-02	Nickel (T)	0.00068	5e-05	mg/L	-	0.025	0.00042	62.6	-
	MEL-02-03	Nickel (T)	0.00069	5e-05	mg/L	-	0.025	0.00042	64.7	-
	MEL-02-04	Nickel (T)	0.00067	5e-05	mg/L	-	0.025	0.00042	59.7	-
	MEL-02-05	Nickel (T)	0.00075	5e-05	mg/L	-	0.025	0.00042	79.4	-
	MEL-02-01	Nitrate-N	0.05	0.005	mg/L	-	2.9	0.021	143.5	-
	MEL-02-01	Potassium (T)	1	0.02	mg/L	-	-	0.94	9.9	-
	MEL-02-02	Potassium (T)	1	0.02	mg/L	-	-	0.94	6.3	-
	MEL-02-03	Potassium (T)	1	0.02	mg/L	-	-	0.94	6.7	-
	MEL-02-04	Potassium (T)	0.99	0.02	mg/L	-	-	0.94	5.9	-
	MEL-02-05	Potassium (T)	0.99	0.02	mg/L	-	-	0.94	5.8	-

Area ID	Sample ID	Parameter	Results ¹	DL	Units	MDL	Threshold	Normal Range Limit	% Above NR ²	Reliability
	MEL-02-01	Reactive silica	0.28	0.01	mg/L	-	-	0.26	4.9	-
	MEL-02-02	Reactive silica	0.29	0.01	mg/L	-	-	0.26	7.9	-
	MEL-02-03	Reactive silica	0.28	0.01	mg/L	-	-	0.26	6.8	-
	MEL-02-04	Reactive silica	0.31	0.01	mg/L	-	-	0.26	16.6	-
	MEL-02-05	Reactive silica	0.29	0.01	mg/L	-	-	0.26	8.7	-
	MEL-02-02	Selenium (T)	6.5e-05	4e-05	mg/L	-	0.001	4.6e-05	40.1	-
	MEL-02-03	Selenium (T)	4.8e-05	4e-05	mg/L	-	0.001	4.6e-05	3.4	-
	MEL-02-01	Sodium (T)	6	0.02	mg/L	-	-	4.6	31.4	-
	MEL-02-02	Sodium (T)	5.7	0.02	mg/L	-	-	4.6	25.9	-
	MEL-02-03	Sodium (T)	5.7	0.02	mg/L	-	-	4.6	25.7	-
	MEL-02-04	Sodium (T)	5.8	0.02	mg/L	-	-	4.6	26.8	-
	MEL-02-05	Sodium (T)	5.7	0.02	mg/L	-	-	4.6	24.4	-
	MEL-02-01	Strontium (T)	0.046	2e-05	mg/L	-	1.7	0.034	32.7	-
	MEL-02-02	Strontium (T)	0.045	2e-05	mg/L	-	1.7	0.034	32.1	-
	MEL-02-03	Strontium (T)	0.044	2e-05	mg/L	-	1.7	0.034	29.2	-
	MEL-02-04	Strontium (T)	0.047	2e-05	mg/L	-	1.7	0.034	35.9	-
	MEL-02-05	Strontium (T)	0.046	2e-05	mg/L	-	1.7	0.034	33.2	-
	MEL-02-01	Sulphate	4.4	0.3	mg/L	-	130	3.7	19.8	-
	MEL-02-02	Sulphate	4.7	0.3	mg/L	-	130	3.7	27.6	-
	MEL-02-03	Sulphate	4.3	0.3	mg/L	-	130	3.7	17.6	-
	MEL-02-04	Sulphate	4.3	0.3	mg/L	-	130	3.7	17.1	-
	MEL-02-05	Sulphate	4.3	0.3	mg/L	-	130	3.7	16.2	-
	MEL-02-04	TDS	53	13	mg/L	-	500	51	3.5	-
	MEL-02-01	TDS (calculated)	46	-	mg/L	-	500	38	18.9	-
	MEL-02-02	TDS (calculated)	44	-	mg/L	-	500	38	15.7	-

Area ID	Sample ID	Parameter	Results ¹	DL	Units	MDL	Threshold	Normal Range Limit	% Above NR ²	Reliability
MEL-02	MEL-02-03	TDS (calculated)	43	-	mg/L	-	500	38	12.4	-
	MEL-02-04	TDS (calculated)	45	-	mg/L	-	500	38	16.3	-
	MEL-02-05	TDS (calculated)	44	-	mg/L	-	500	38	15.7	-
	MEL-02-05	Tin (T)	4.5e-05	2e-05	mg/L	-	-	4.4e-05	1.1	-
	MEL-02-01	TKN	0.32	0.05	mg/L	-	-	0.25	26.5	-
	MEL-02-02	TKN	0.32	0.05	mg/L	-	-	0.25	26.9	-
	MEL-02-03	TKN	0.31	0.05	mg/L	-	-	0.25	24.1	-
	MEL-02-04	TKN	0.42	0.05	mg/L	-	-	0.25	70.3	-
	MEL-02-05	TKN	0.31	0.05	mg/L	-	-	0.25	22.9	-
	MEL-02-01	TOC	4.1	1	mg/L	-	-	3	36.7	-
	MEL-02-02	TOC	4	1	mg/L	-	-	3	33.3	-
	MEL-02-03	TOC	3.5	1	mg/L	-	-	3	16.7	-
	MEL-02-05	TOC	3.3	1	mg/L	-	-	3	10	-
	MEL-02-01	Total Alkalinity	22	1	mg/L	-	-	20	12	-
	MEL-02-02	Total Alkalinity	21	1	mg/L	-	-	20	3.5	-
	MEL-02-04	Total Alkalinity	21	1	mg/L	-	-	20	6	-
	MEL-02-05	Total Alkalinity	21	1	mg/L	-	-	20	6	-
	MEL-02-05	Total phosphorous	0.014	0.001	mg/L	-	-	0.006	128.3	-
	MEL-02-03	Uranium (T)	1.7e-05	1e-06	mg/L	-	0.015	1.7e-05	3	-
	MEL-02-04	Uranium (T)	1.7e-05	1e-06	mg/L	-	0.015	1.7e-05	4.2	-
	MEL-02-01	Zinc (T)	0.024	5e-04	mg/L	-	-	0.0022	987.6	Uncertain
	MEL-02-03	Zinc (T)	0.0064	5e-04	mg/L	-	-	0.0022	197.2	-
MEL-03										
	MEL-03-05	Aluminum (T)	0.0074	0.001	mg/L	-	0.1	0.0054	37.3	-
	MEL-03-05	Ammonia-N	0.016	0.005	mg/L	-	1.8	0.015	4.7	-

Area ID	Sample ID	Parameter	Results ¹	DL	Units	MDL	Threshold	Normal Range Limit	% Above NR ²	Reliability
	MEL-03-01	Arsenic (T)	0.00029	2e-05	mg/L	-	0.025	0.00025	14.7	-
	MEL-03-02	Arsenic (T)	0.00025	2e-05	mg/L	-	0.025	0.00025	1.2	-
	MEL-03-04	Arsenic (T)	3e-04	2e-05	mg/L	-	0.025	0.00025	17.9	-
	MEL-03-05	Arsenic (T)	0.00027	2e-05	mg/L	-	0.025	0.00025	9.2	-
	MEL-03-05	Barium (T)	0.0083	2e-05	mg/L	-	1	0.0079	4.4	-
	MEL-03-03	Bicarbonate alkalinity	25	1.2	mg/L	-	-	24	2.5	-
	MEL-03-04	Bicarbonate alkalinity	25	1.2	mg/L	-	-	24	2.5	-
	MEL-03-01	Chloride	9	0.1	mg/L	-	120	8.8	2.4	-
	MEL-03-03	Chloride	8.8	0.1	mg/L	-	120	8.8	0.5	-
	MEL-03-04	Chloride	8.9	0.1	mg/L	-	120	8.8	1.4	-
	MEL-03-05	Chloride	9.3	0.1	mg/L	-	120	8.8	5.8	-
	MEL-03-05	Cobalt (T)	2e-05	5e-06	mg/L	-	0.00078	1.6e-05	23.1	-
	MEL-03-05	Iron (T)	0.027	0.001	mg/L	-	1.1	0.015	78.8	-
	MEL-03-05	Manganese (T)	0.0047	5e-05	mg/L	-	-	0.0032	48.3	-
	MEL-03-01	Nickel (T)	0.00043	5e-05	mg/L	-	0.025	0.00042	3.6	-
	MEL-03-03	Nickel (T)	0.00042	5e-05	mg/L	-	0.025	0.00042	1.7	-
	MEL-03-04	Nickel (T)	0.00045	5e-05	mg/L	-	0.025	0.00042	7	-
	MEL-03-05	Nickel (T)	0.00044	5e-05	mg/L	-	0.025	0.00042	5.8	-
	MEL-03-05	Nitrate-N	0.027	0.005	mg/L	-	2.9	0.021	30.9	-
	MEL-03-01	Selenium (T)	4.7e-05	4e-05	mg/L	-	0.001	4.6e-05	1.3	-
	MEL-03-04	Sodium (T)	4.6	0.02	mg/L	-	-	4.6	0.7	-
	MEL-03-05	Sodium (T)	4.7	0.02	mg/L	-	-	4.6	2.4	-
	MEL-03-01	Strontium (T)	0.037	2e-05	mg/L	-	1.7	0.034	6.7	-
	MEL-03-02	Strontium (T)	0.036	2e-05	mg/L	-	1.7	0.034	5.2	-

Area ID	Sample ID	Parameter	Results ¹	DL	Units	MDL	Threshold	Normal Range Limit	% Above NR ²	Reliability
	MEL-03-03	Strontium (T)	0.036	2e-05	mg/L	-	1.7	0.034	4.4	-
	MEL-03-04	Strontium (T)	0.035	2e-05	mg/L	-	1.7	0.034	2.9	-
	MEL-03-05	Strontium (T)	0.036	2e-05	mg/L	-	1.7	0.034	4.1	-
	MEL-03-01	TDS	55	13	mg/L	-	500	51	7.4	-
	MEL-03-02	TDS	54	13	mg/L	-	500	51	5.5	-
	MEL-03-05	Titanium (T)	5e-04	5e-05	mg/L	-	-	0.00019	162.3	Uncertain
	MEL-03-03	Total Alkalinity	20	1	mg/L	-	-	20	2.5	-
	MEL-03-04	Total Alkalinity	20	1	mg/L	-	-	20	2.5	-
	MEL-03-05	Vanadium (T)	5.5e-05	5e-05	mg/L	-	0.12	5e-05	10	-
	MEL-03-02	Zinc (D)	0.0057	5e-04	mg/L	-	0.0056	0.002	190.8	Uncertain

¹Bold values are above the threshold as well as above the trigger value.

²Calculated as Result - Normal Range Limit / Normal Range Limit * 100. Darker red colours indicate a greater difference between results and normal range.

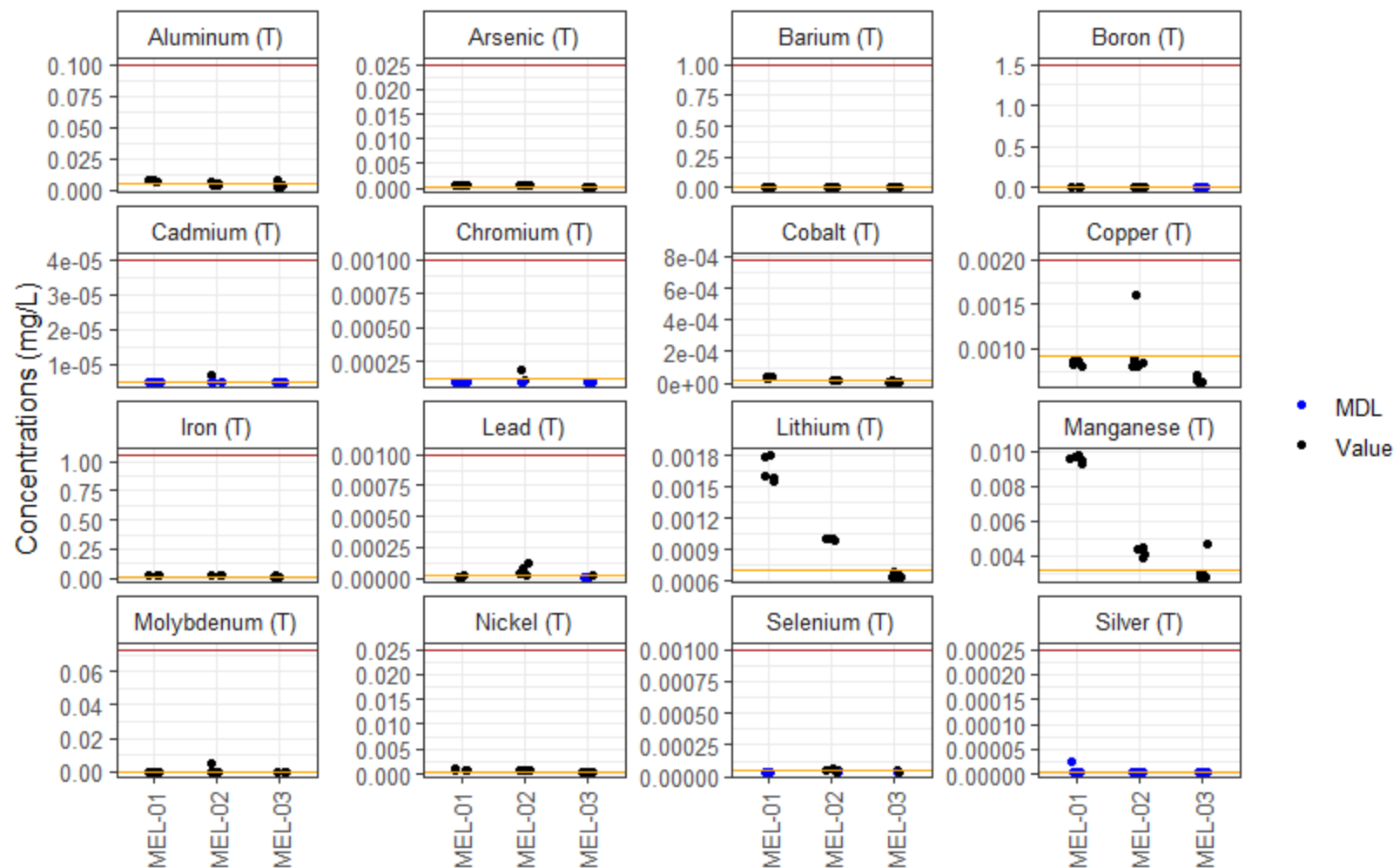


Figure 1: Sampling event results for metals in Meliadine Lake with at least one sample above the upper limit of the normal range. The red line indicates the relevant threshold (if applicable) while the orange line indicates the upper limit of the normal range (if applicable). Samples below method detection limits (MDL) are set to the detection limit and shown in blue.

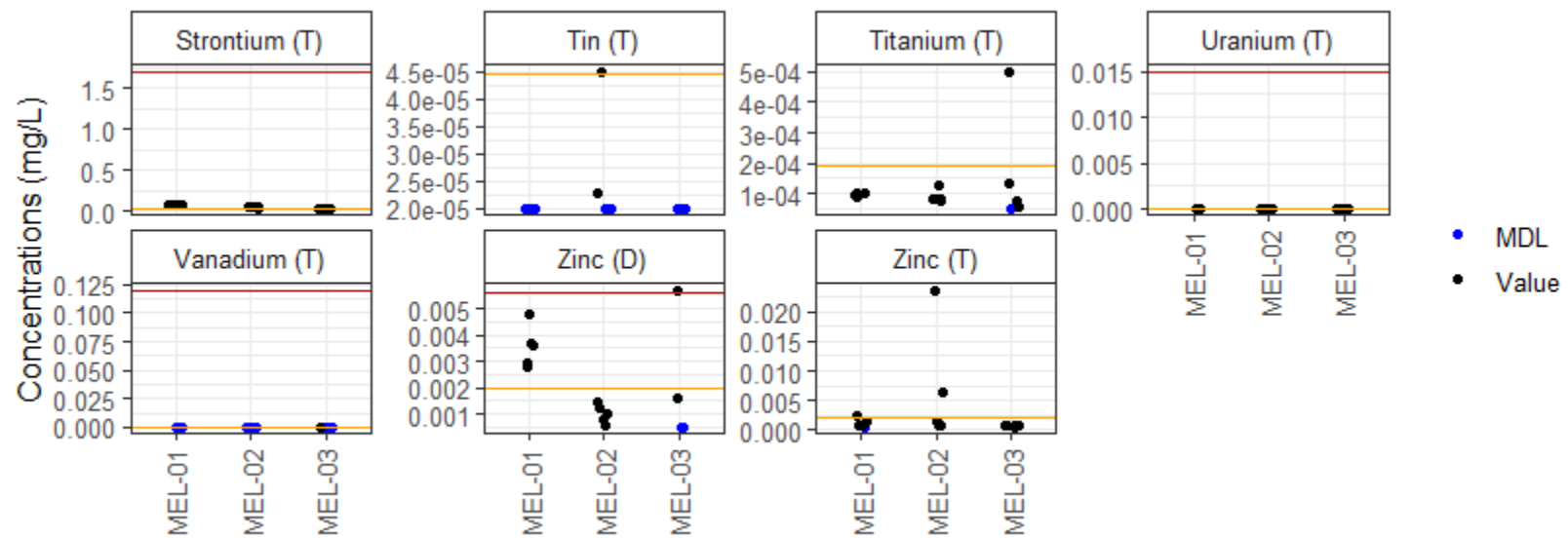


Figure 2: Sampling event results for metals in Meliadine Lake with at least one sample above the upper limit of the normal range (Part 2). The red line indicates the relevant threshold (if applicable) while the orange line indicates the upper limit of the normal range (if applicable). Samples below method detection limits (MDL) are set to the detection limit and shown in blue.

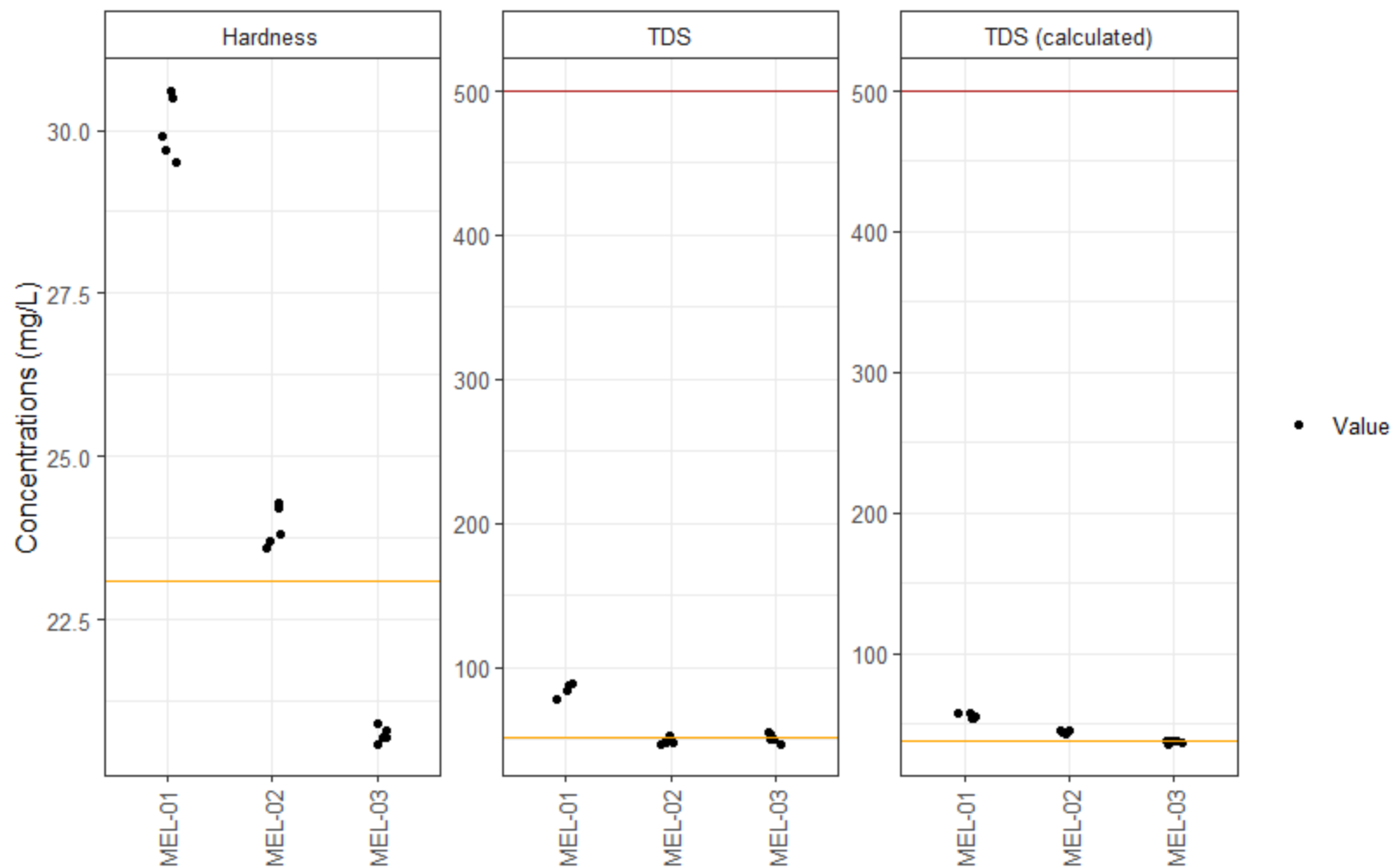


Figure 3: Sampling event results for conventional parameters in Meliadine Lake with at least one sample above the upper limit of the normal range. The red line indicates the relevant threshold (if applicable) while the orange line indicates the upper limit of the normal range (if applicable). Samples below method detection limits (MDL) are set to the detection limit and shown in blue.

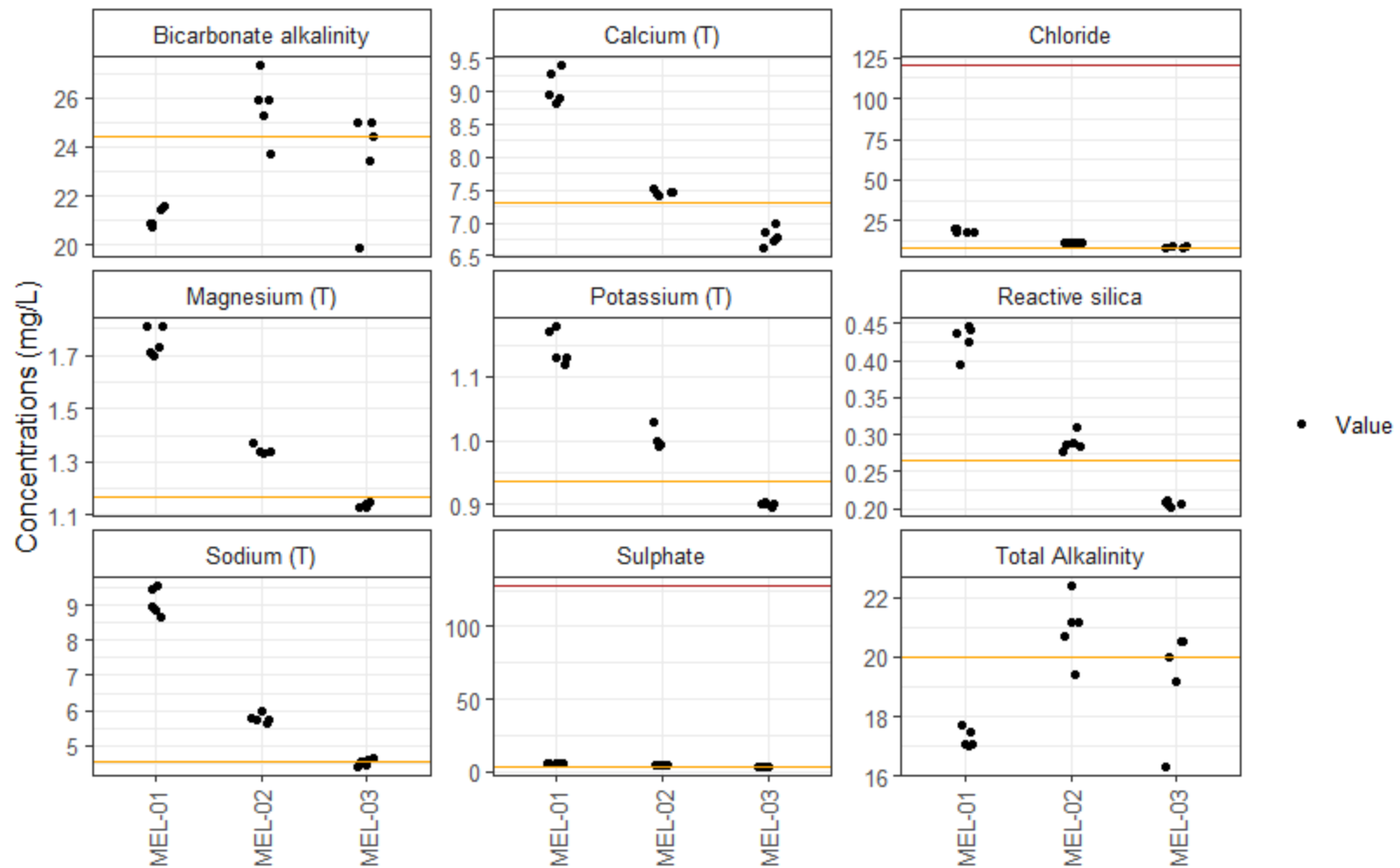


Figure 4: Sampling event results for major ions in Meliadine Lake with at least one sample above the upper limit of the normal range. The red line indicates the relevant threshold (if applicable) while the orange line indicates the upper limit of the normal range (if applicable). Samples below method detection limits (MDL) are set to the detection limit and shown in blue.

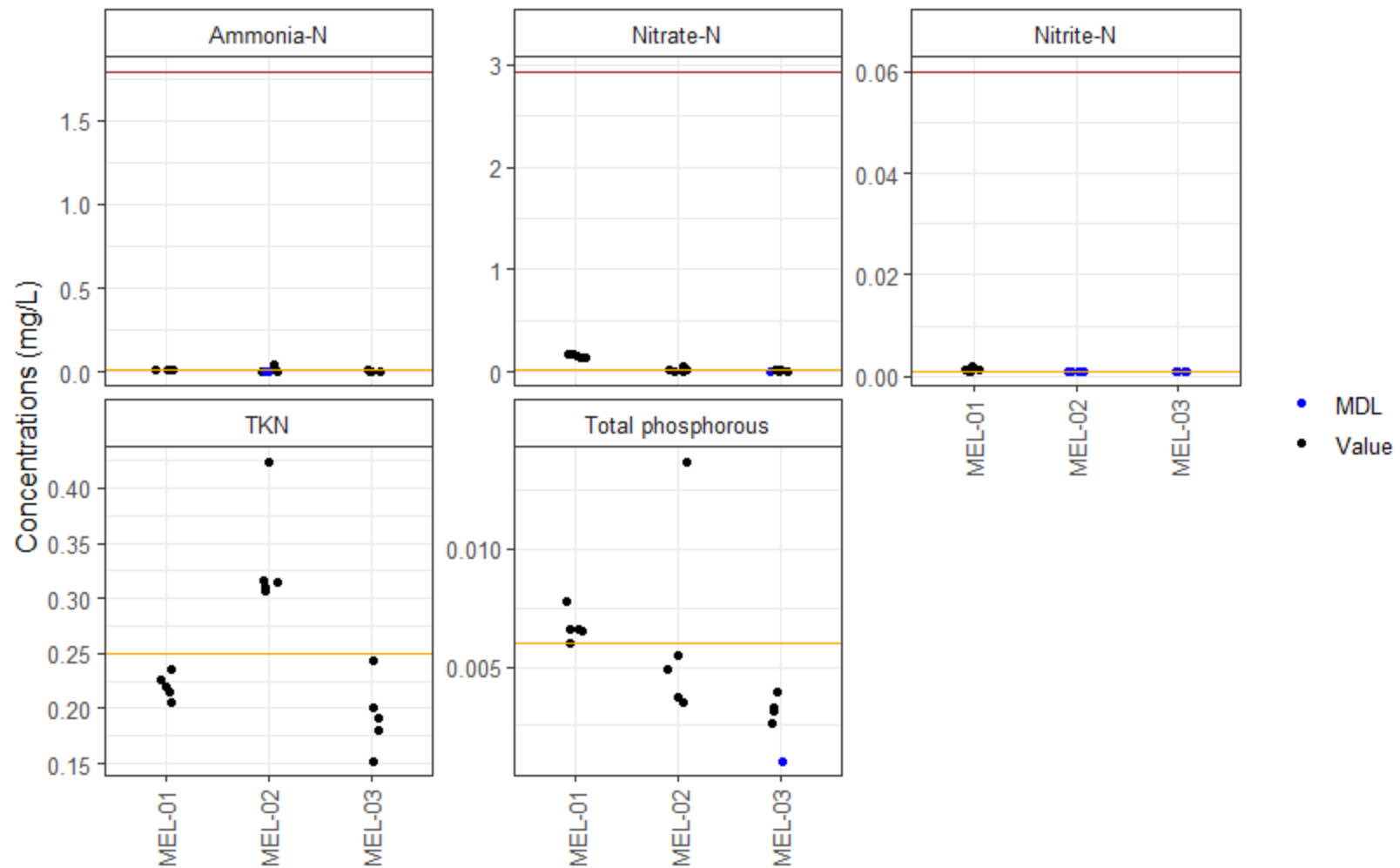


Figure 5: Sampling event results for nutrients in Meliadine Lake with at least one sample above the upper limit of the normal range. The red line indicates the relevant threshold (if applicable) while the orange line indicates the upper limit of the normal range (if applicable). Samples below method detection limits (MDL) are set to the detection limit and shown in blue.

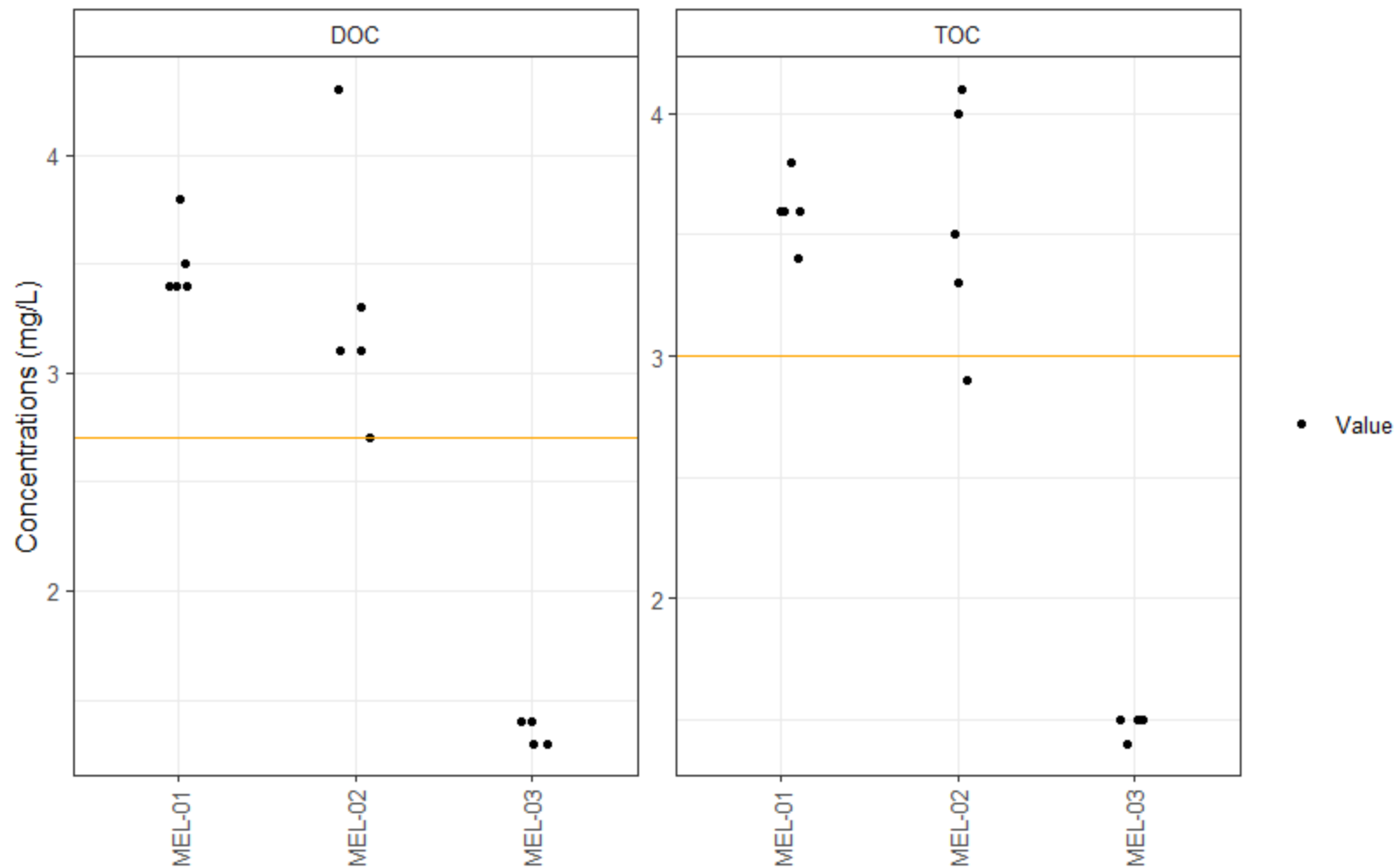


Figure 6: Sampling event results for other parameters in Meliadine Lake with at least one sample above the upper limit of the normal range. The red line indicates the relevant threshold (if applicable) while the orange line indicates the upper limit of the normal range (if applicable). Samples below method detection limits (MDL) are set to the detection limit and shown in blue.

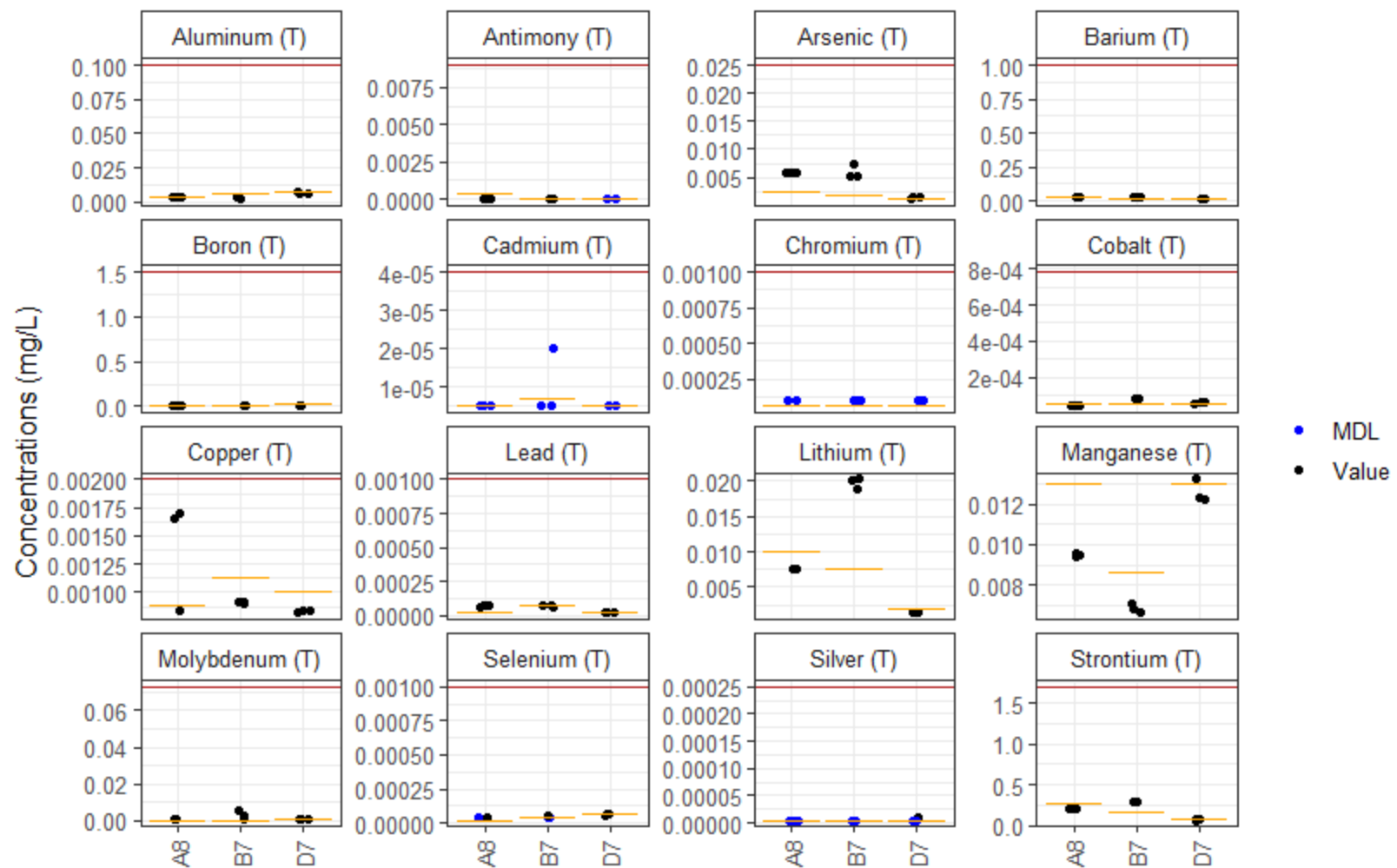


Figure 7: Sampling event results for metals in the Peninsula Lakes with at least one sample above the upper limit of the normal range. The red line indicates the relevant threshold (if applicable) while the orange line indicates the upper limit of the normal range (if applicable). Samples below method detection limits (MDL) are set to the detection limit and shown in blue.

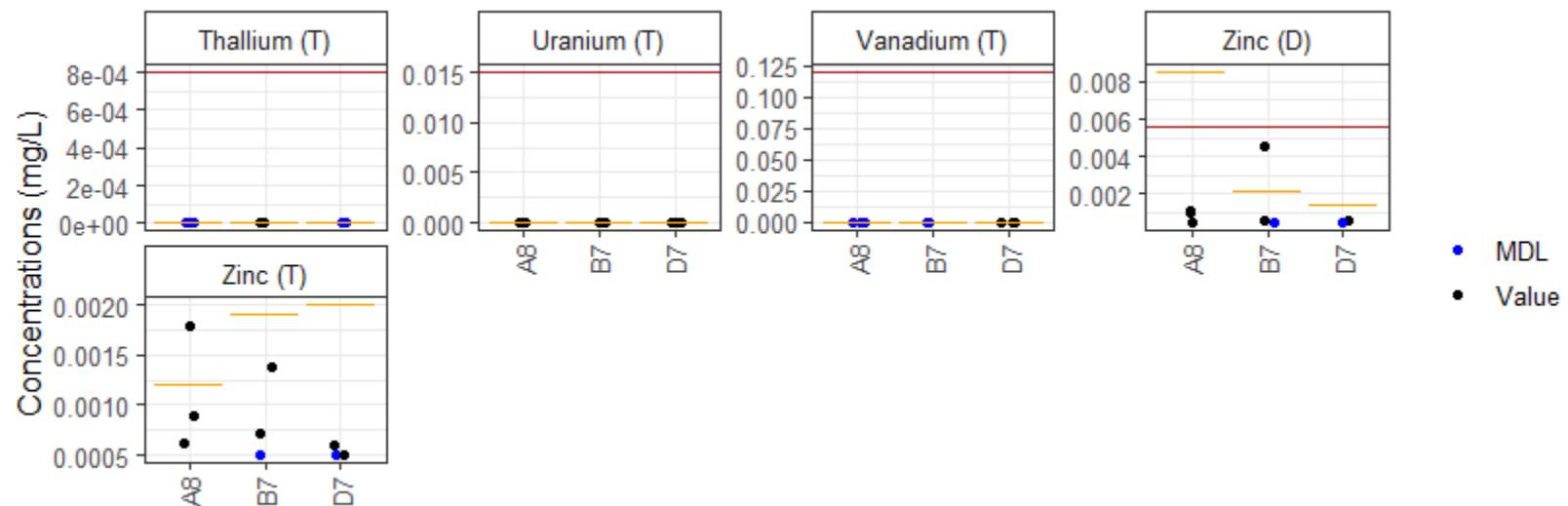


Figure 8: Sampling event results for metals in the Peninsula Lakes with at least one sample above the upper limit of the normal range (Part 2). The red line indicates the relevant threshold (if applicable) while the orange line indicates the upper limit of the normal range (if applicable). Samples below method detection limits (MDL) are set to the detection limit and shown in blue.

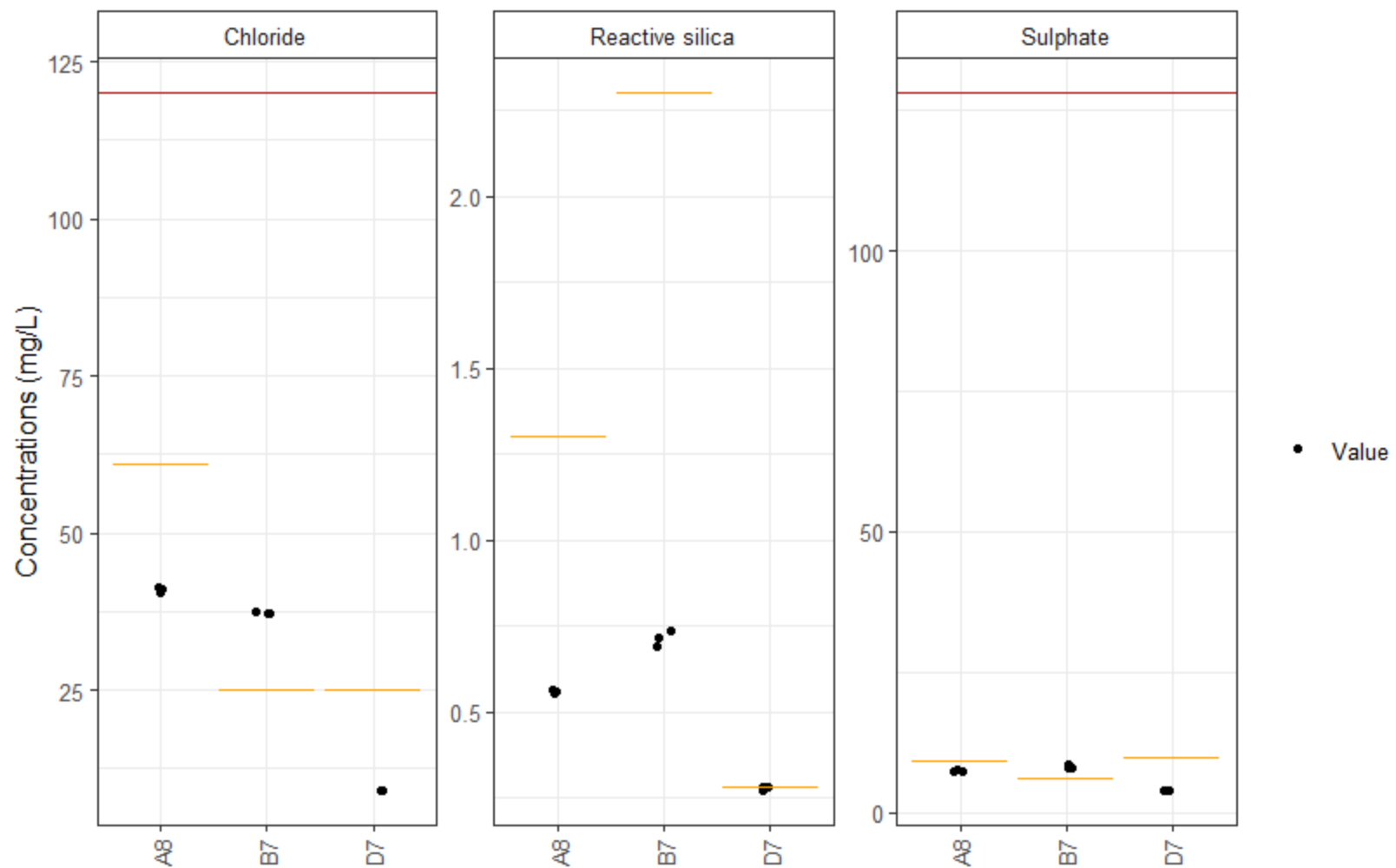


Figure 9: Sampling event results for major ions in the Peninsula Lakes with at least one sample above the upper limit of the normal range. The red line indicates the relevant threshold (if applicable) while the orange line indicates the upper limit of the normal range (if applicable). Samples below method detection limits (MDL) are set to the detection limit and shown in blue.

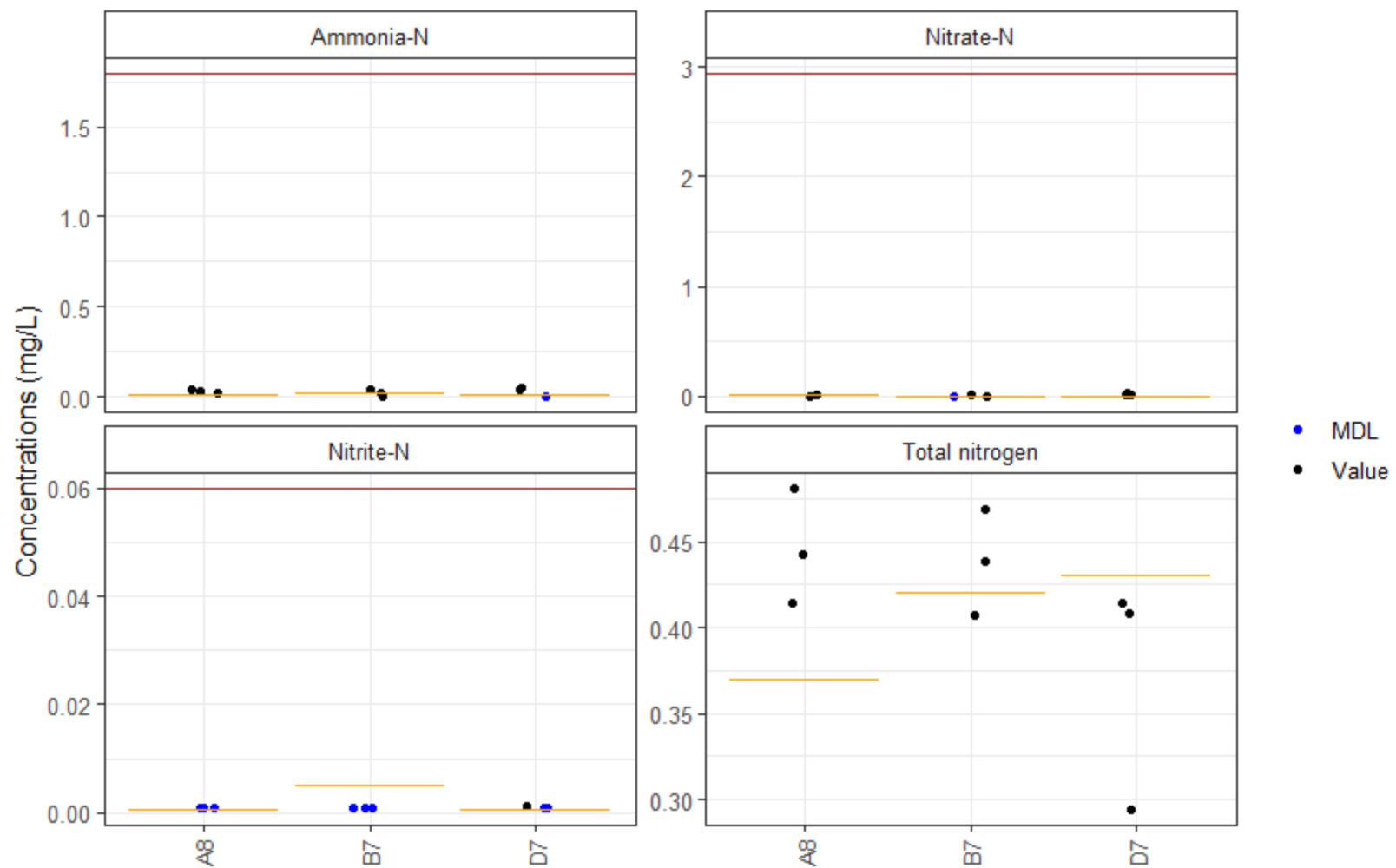


Figure 10: Sampling event results for nutrients in the Peninsula Lakes with at least one sample above the upper limit of the normal range. The red line indicates the relevant threshold (if applicable) while the orange line indicates the upper limit of the normal range (if applicable). Samples below method detection limits (MDL) are set to the detection limit and shown in blue.

2.1 Result Reliability Checks

Two preliminary analyses were conducted to assess the reliability of sample results. Samples failing either one of these tests have been flagged as uncertain, and warrant further evaluation.

The first analysis compares dissolved and total concentrations for a given parameters at each location. Samples in which dissolved concentrations are greater than total with a relative percent difference (RPD) of more than 30% are considered potentially unreliable. All samples failing to meet this reliability check are summarized in Table 5.

The second analysis compares parameter concentrations within each sampling area. In most cases, samples at stations in the same sampling area are expected to have similar concentrations, and outlying data points may be anomalous. Sampling areas where the maximum concentration was more than a factor of 5 greater than the median of all samples within the sampling area are highlighted here as potentially unreliable. All samples failing to meet this reliability check are summarized in Table 6.

Table 5: Samples with uncertain reliability due to differences in dissolved and total parameter results.

Sample ID	Area ID	Parameter	Result (T)	Result (D)	MDL (T)	MDL (D)	RPD
MEL-01-06	MEL-01	Zinc	5e-04	0.0048	MDL	-	162.3
MEL-03-02	MEL-03	Zinc	0.00084	0.0057	-	-	148.6
MEL-01-01	MEL-01	Zinc	7e-04	0.00369	-	-	136.2
MEL-01-08	MEL-01	Zinc	0.00067	0.00279	-	-	122.5
B7-02	B7	Zinc	0.00139	0.00459	-	-	107
B7-02	B7	Chromium	1e-04	0.00023	MDL	-	78.8
MEL-03-05	MEL-03	Zinc	0.00074	0.00163	-	-	75.1
MEL-01-09	MEL-01	Zinc	0.00135	0.00292	-	-	73.5
MEL-01-09	MEL-01	Titanium	9.3e-05	0.000151	-	-	47.5
MEL-02-04	MEL-02	Chromium	1e-04	0.00016	MDL	-	46.2
MEL-03-03	MEL-03	Selenium	4e-05	6.2e-05	-	-	43.1
MEL-02-05	MEL-02	Zinc	0.00083	0.00127	-	-	41.9
MEL-01-07	MEL-01	Zinc	0.00247	0.00357	-	-	36.4
MEL-01-09	MEL-01	Lead	1.4e-05	2e-05	-	-	35.3
MEL-01-08	MEL-01	Lead	1.2e-05	1.7e-05	-	-	34.5
MEL-01-08	MEL-01	Selenium	4e-05	5.6e-05	MDL	-	33.3

Table 6: Samples with uncertain reliability due to differences between results from the same sampling area.

Area ID	Parameter	DL	Median	Max	Difference	Station_with_Max
MEL-02	Molybdenum (T)	5e-05	0.000105	0.005190	49.4	MEL-02-05
B7	Molybdenum (D)	5e-05	0.000290	0.005260	18.1	B7-03
MEL-02	Zinc (T)	5e-04	0.001570	0.023600	15.0	MEL-02-01
B7	Manganese (D)	5e-05	0.000512	0.006610	12.9	B7-03
MEL-03	Zinc (D)	5e-04	0.000500	0.005700	11.4	MEL-03-02
MEL-02	Ammonia-N	5e-03	0.005600	0.047300	8.4	MEL-02-05
B7	Zinc (D)	5e-04	0.000620	0.004590	7.4	B7-02
MEL-03	Titanium (T)	5e-05	0.000074	0.000501	6.8	MEL-03-05

3 LABORATORY & FIELD QUALITY CONTROL RESULTS

ALS' laboratory QC samples for water are:

- *Laboratory duplicates* (LD) - these samples provide insights into the precision of laboratory analyses. Duplicate aliquots are taken from the samples and run through part (aliquots taken post digestion) or all (aliquots taken from the sample bottle) the laboratory analytical process.
- *Laboratory control samples* (LCS) - these samples provide insights into whether the laboratory systems are working as intended. They are comprised of a mixture of analyte-free water to which known amounts of the method analytes are added. They are essentially an internal version of a certified reference material.
- *Matrix spikes* (MS) - these samples involve the analysis of actual samples, to which a known amount of method analytes are added in amounts high enough that the spikes are clearly discernable relative to existing concentrations. These samples provide insights into the degree that the sample matrix could interfere with analyses.
- *Matrix blanks* (MB) - these samples are analyzed to assess background interference or contamination that exists in the analytical system that could lead to elevated concentrations or false positive data. These samples are comprised of analyte-free water.

The following field QC samples were collected and submitted blind to ALS:

- *Field duplicates* (FD) - these samples provide insights into (a) variability in field conditions and (b) the precision of laboratory analyses. Duplicate samples are collected from the same location and treated independently through the sampling and analysis process.
- *Deionized blanks* (DB) - these samples 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.
- *Equipment blanks* (EB) - these samples 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.
- *Travel blanks* (TB) - these samples 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.

3.1 Overall QC Results

Overall laboratory and field QC results are summarized in Table 7.

Table 7: Summary of laboratory and field QC results by sample type.

	QC_Element	Pass	Fail	ND
Laboratory	Lab Duplicate	318	0	0
	Lab Control Sample	544	1	0
	Matrix Spike	297	0	18
	Matrix Blank	539	2	0
Field	Field Duplicate	360	12	0
	Deionized Water Blank	114	8	0
	Equipment Blank	115	7	0

3.2 Laboratory Duplicates

All laboratory duplicate results met laboratory QC objectives.

3.3 Laboratory Control Samples

In this sampling event, 1 laboratory control sample failed to meet the QC objectives. Laboratory control sample results not meeting QC objectives are summarized in Table 8.

Table 8: Details for laboratory control sample results not meeting QC objectives.

QC_Lot	Analyte	Percent	Limit	LCS.QC
1347675	Bismuth (Bi)-Total	122.7	80-120	Fail

3.4 Matrix Spike

All matrix spike results met laboratory QC objectives.

In addition, some parameters had spike levels too low to confidently quantify them relative to existing concentrations in the sample. Consequently, QC results for these results could not be calculated (see Table 9).

Table 9: Analytes not determined for matrix spikes.

QC_Lot	Analyte	ALS_QC_ID ¹
1347675	Calcium (Ca)-Total	MEL-01-09
1347675	Magnesium (Mg)-Total	MEL-01-09
1347675	Sodium (Na)-Total	MEL-01-09
1347675	Strontium (Sr)-Total	MEL-01-09
1355571	Calcium (Ca)-Dissolved	JUL-DUP-01
1355571	Magnesium (Mg)-Dissolved	JUL-DUP-01
1355571	Sodium (Na)-Dissolved	JUL-DUP-01
1355571	Strontium (Sr)-Dissolved	JUL-DUP-01
1356270	Barium (Ba)-Total	JUL-DUP-03
1356270	Calcium (Ca)-Total	JUL-DUP-03
1356270	Magnesium (Mg)-Total	JUL-DUP-03
1356270	Sodium (Na)-Total	JUL-DUP-03
1356270	Strontium (Sr)-Total	JUL-DUP-03
1351348	Silica, Reactive (as SiO ₂)	D7-03
1356273	Calcium (Ca)-Dissolved	D7-03
1356273	Magnesium (Mg)-Dissolved	D7-03
1356273	Sodium (Na)-Dissolved	D7-03
1356273	Strontium (Sr)-Dissolved	D7-03

¹ALS_QC_ID listing of 'Anonymous' indicates QC sample from another client used.

3.5 Matrix Blank

In this sampling event, 2 matrix blanks results failed to meet the QC objectives. Matrix blank results not meeting QC objectives are summarized in Table 10.

Table 10: Details for matrix blank results not meeting QC objectives.

QC_Lot	Analyte	Result	Limit	MDL	MB.QC
1347675	Thorium (Th)-Total	5.6e-06	5e-06	-	Fail
1356273	Iron (Fe)-Dissolved	1.3e-03	1e-03	-	Fail

3.6 Field Duplicates

In this sampling event, 12 field duplicate samples failed to meet the QC objectives. Field duplicate sample results not meeting QC objectives are summarized in Table 11.

Table 11: Details for field duplicate results not meeting QC objectives.

QC_Lot.x	Analyte	RPD	DIFFx	FD.QC
1358655	Aluminum (Al)-Total	87.4	4.5	Fail
1352975	Ammonia, Total (as N)	75.6	4.6	Fail
1358655	Iron (Fe)-Total	81.2	15.6	Fail
1358592	Manganese (Mn)-Dissolved	92.6	18.1	Fail
1358655	Manganese (Mn)-Total	52.8	39.0	Fail
1351344	Nitrate (as N)	126.5	4.2	Fail
	Nitrate and Nitrite as N	126.5	4.1	Fail
1355571	Silicon (Si)-Dissolved	80.2	6.1	Fail
1358592	Tin (Sn)-Dissolved	166.7	10.0	Fail
1358655	Titanium (Ti)-Total	154.7	8.7	Fail
1355571	Zinc (Zn)-Dissolved	150.9	6.1	Fail
1347675	Zinc (Zn)-Total	132.7	3.9	Fail

3.7 DI Blank

In this sampling event, 8 deionized water blank samples failed to meet the QC objectives. Deionized water blank results not meeting QC objectives are summarized in Table 13.

Table 13: Details for deionized water blank results not meeting QC objectives.

QC_Lot	ID	Analyte	Results	DL	FB.QC
1355829	DI	Total Dissolved Solids	4.6e+00	4e+00	Fail
1360330	DI	Total Kjeldahl Nitrogen	7.2e-02	5e-02	Fail
	DI	Total Nitrogen	7.2e-02	5e-02	Fail
1360147	DI	Phosphorus (P)-Total	2.6e-03	1e-03	Fail
1349679	DI	Silica, Reactive (as SiO ₂)	3.7e-02	1e-02	Fail
1359486	DI	Zinc (Zn)-Total	6.6e-04	5e-04	Fail
1359372	DI	Aluminum (Al)-Dissolved	4.7e-03	1e-03	Fail
1359372	DI	Strontium (Sr)-Dissolved	2.9e-05	2e-05	Fail

3.8 Equipment Blank

In this sampling event, 7 equipment blank samples failed to meet the QC objectives. Equipment blank results not meeting QC objectives are summarized in Table 12.

Table 12: Details for equipment blank results not meeting QC objectives.

QC_Lot	ID	Analyte	Results	DL	FB.QC
1351079	EB	Turbidity	1.5e-01	1e-01	Fail
1359486	EB	Molybdenum (Mo)-Total	6.3e-05	5e-05	Fail
1359372	EB	Barium (Ba)-Dissolved	2.7e-05	2e-05	Fail
1359372	EB	Calcium (Ca)-Dissolved	1.3e-02	1e-02	Fail
1359372	EB	Iron (Fe)-Dissolved	1.3e-03	1e-03	Fail
1359372	EB	Strontium (Sr)-Dissolved	4.1e-05	2e-05	Fail
1359372	EB	Zinc (Zn)-Dissolved	8.3e-04	5e-04	Fail

3.9 Travel Blank

Travel blank results were not analyzed in this sampling event.

3.10 Holding Time Exceedances

In addition to those ALS laboratory QC samples described above, during QC screening samples were also assessed against recommended hold times. Parameters and associated sample numbers exceeding recommended hold times in this sampling event are shown in Table 14. Note that pH is included in the suite of field measurements and has a very short recommended hold time, so exceeding the hold time for laboratory analysis is expected and of little importance.

Table 14: Analytes and associated number of samples exceeding holding times.

Analyte	n
Phosphate Ortho Dissolved in Water	58
Nitrate in Water by IC (Low Level)	29
Nitrite in Water by IC (Low Level)	29
pH	29
Turbidity	29
Total Dissolved Solids (TDS)	27
Total Suspended Solids	26
DKN (as N) by Fluorescence	14
TKN (as N) by Fluorescence	14
Total Dissolved P in Water by Colour	9
Total P in Water by Colour	9
Alkalinity, Total (as CaCO ₃)	5

AUGUST 2020 SAMPLING EVENT:
PRELIMINARY SCREENING AND QC ASSESSMENT

Meliadine Mine - Water Quality Monitoring 2020

Preliminary Screening of August, 2020 Water Quality Monitoring

Azimuth Consulting Group Inc.
on behalf of Agnico Eagle Mines Ltd.

Report Date: 2020-11-20

Table of Contents

1	INTRODUCTION & SAMPLING OVERVIEW	2
2	TRIGGER SCREENING	4
2.1	Result Reliability Checks.....	44
3	LABORATORY & FIELD QUALITY CONTROL RESULTS	46
3.1	Overall QC Results	47
3.2	Laboratory Duplicates	47
3.3	Laboratory Control Samples.....	47
3.4	Matrix Spike.....	47
3.5	Matrix Blank	49
3.6	Field Duplicates	49
3.7	DI Blank	50
3.8	Equipment Blank	50
3.9	Travel Blank	51
3.10	Holding Time Exceedances.....	52

1 INTRODUCTION & SAMPLING OVERVIEW

This document was prepared by Azimuth Consulting Group Inc (Azimuth) to provide the Meliadine Environment Department with a brief overview of the water chemistry results collected in August, 2020 as part of the Aquatic Effects Monitoring Program (AEMP). AEMP water quality monitoring occurs in March (MEL-01 and -02), July (MEL-01, -02, and -03), August (MEL-01, -02, -03, -04, and -05), and September (MEL-01, -02, and -03). In addition, peninsula lakes A8, B7, and D7 are sampled in July and August. The purpose of this memo is to:

1. Screen the water chemistry results from ALS against normal ranges and thresholds to keep the Environment Department informed about potential changes in water quality, including the early identification of potentially anomalous data (Section 2).
2. Review laboratory (blanks, duplicates, matrix spikes, etc.) and field quality control (QC) results, and identify potential issues in lab or field methods (Section 3).

Samples included in this report are shown in Table 1, while field blanks are shown in Table 2.

Table 1: Summary of August, 2020 samples.

Sample ID	Area ID	Duplicate	Date_Sampled	ALS Sample ID
A8-01	A8	-	2020-08-21	L2496246-1
A8-02	A8	-	2020-08-21	L2496246-2
A8-03	A8	-	2020-08-21	L2496246-3
B7-01	B7	-	2020-08-22	L2496246-4
B7-02	B7	-	2020-08-22	L2496246-5
B7-03	B7	-	2020-08-22	L2496246-6
D7-01	D7	-	2020-08-24	L2496238-1
D7-02	D7	DUP-MEL-AUG-04	2020-08-24	L2496238-2
D7-03	D7	-	2020-08-24	L2496238-3
MEL-01-01	MEL-01	-	2020-08-15	L2492144-1
MEL-01-06	MEL-01	-	2020-08-15	L2492144-2
MEL-01-07	MEL-01	-	2020-08-15	L2492144-3
MEL-01-08	MEL-01	-	2020-08-15	L2492144-4
MEL-01-09	MEL-01	DUP-MEL-AUG-01	2020-08-15	L2492144-5
MEL-02-01	MEL-02	DUP-MEL-AUG-02	2020-08-18	L2492826-1
MEL-02-02	MEL-02	-	2020-08-18	L2492826-2
MEL-02-03	MEL-02	-	2020-08-18	L2492826-3
MEL-02-04	MEL-02	-	2020-08-18	L2492826-4
MEL-02-05	MEL-02	-	2020-08-18	L2492826-5
MEL-03-01	MEL-03	DUP-MEL-AUG-03	2020-08-19	L2492831-1
MEL-03-02	MEL-03	-	2020-08-19	L2492831-2
MEL-03-03	MEL-03	-	2020-08-19	L2492831-3
MEL-03-04	MEL-03	-	2020-08-19	L2492831-4
MEL-03-05	MEL-03	-	2020-08-19	L2492831-5
MEL-04-01	MEL-04	-	2020-08-19	L2492831-7
MEL-04-02	MEL-04	-	2020-08-19	L2492831-8
MEL-04-03	MEL-04	-	2020-08-19	L2492831-9
MEL-04-04	MEL-04	-	2020-08-19	L2492831-10
MEL-04-05	MEL-04	-	2020-08-19	L2492831-11
MEL-05-01	MEL-05	-	2020-08-23	L2496258-1
MEL-05-02	MEL-05	-	2020-08-23	L2496258-2
MEL-05-03	MEL-05	-	2020-08-23	L2496258-3
MEL-05-04	MEL-05	-	2020-08-23	L2496258-4
MEL-05-05	MEL-05	-	2020-08-23	L2496258-5

Table 2: Summary of field blanks collected in August, 2020.

Client_Sample_ID	ID_Name	ALS Sample ID
DI-AUG-01	DI Blank	L2496253-1
EB-AUG-01	Equipment Blank	L2496253-2
TB-AUG-01	Travel Blank	L2496250-1

2 TRIGGER SCREENING

Sampling results were screened relative to relevant normal ranges and thresholds. Normal range, as defined in the AEMP, numerically describes the natural range of baseline/reference conditions for the various components of the AEMP. In simple terms, the normal range is the instrument used to assess whether current conditions (e.g., the measured concentration of a particular metal) has changed relative to baseline/reference conditions. In the case of the March sampling event, results are screened relative to the thresholds only, as normal ranges are not applicable to winter lake conditions. A summary of trigger and threshold exceedances is provided in Table 3 (Refer to Azimuth 2020 for details on the normal range and threshold values used here). The subsequent table (Table 4) provides all sample results above trigger and threshold values in August, 2020.

Figures displaying all parameters with at least one sample above the relevant normal range or threshold are also provided.

Table 3: Summary of trigger and threshold exceedances in August, 2020.

Area	Parameter	Samples Exceeding Normal Range	Samples Exceeding Threshold	Stations
Meliadine Lake	Ammonia-N	13	0	MEL-01-06, MEL-01-08, MEL-01-09, MEL-02-02, MEL-02-03, MEL-02-04, MEL-03-01, MEL-03-02, MEL-03-04, MEL-03-05, MEL-04-01, MEL-04-03, MEL-04-05
	Antimony (T)	1	0	MEL-03-05
	Arsenic (T)	22	0	MEL-01-01, MEL-01-06, MEL-01-07, MEL-01-08, MEL-01-09, MEL-02-01, MEL-02-02, MEL-02-03, MEL-02-04, MEL-02-05, MEL-03-01, MEL-03-02, MEL-03-03, MEL-03-04, MEL-04-01, MEL-04-03, MEL-04-05, MEL-05-01, MEL-05-02, MEL-05-03, MEL-05-04, MEL-05-05
	Barium (T)	12	0	MEL-01-01, MEL-01-06, MEL-01-07, MEL-01-08, MEL-01-09, MEL-02-04, MEL-02-05, MEL-05-01, MEL-05-02, MEL-05-03, MEL-05-04, MEL-05-05
	Bicarbonate alkalinity	25	0	MEL-01-01, MEL-01-06, MEL-01-07, MEL-01-08, MEL-01-09, MEL-02-01, MEL-02-02, MEL-02-03, MEL-02-04, MEL-02-05, MEL-03-01, MEL-03-02, MEL-03-03, MEL-03-04, MEL-03-05, MEL-04-01, MEL-04-02, MEL-04-03, MEL-04-04, MEL-04-05, MEL-05-01, MEL-05-02, MEL-05-03, MEL-05-04, MEL-05-05
	Boron (T)	5	0	MEL-01-01, MEL-01-06, MEL-01-07, MEL-01-08, MEL-01-09
	Cadmium (T)	1	0	MEL-04-01
	Calcium (T)	14	0	MEL-01-01, MEL-01-06, MEL-01-07, MEL-01-08, MEL-01-09, MEL-02-02, MEL-02-03, MEL-02-04, MEL-02-05, MEL-05-01, MEL-05-02, MEL-05-03, MEL-05-04, MEL-05-05
	Chloride	25	0	MEL-01-01, MEL-01-06, MEL-01-07, MEL-01-08, MEL-01-09, MEL-02-01, MEL-02-02, MEL-02-03, MEL-02-04, MEL-02-05, MEL-03-01, MEL-03-02, MEL-03-03, MEL-03-04, MEL-03-05, MEL-04-01, MEL-04-02, MEL-04-03, MEL-04-04, MEL-04-05, MEL-05-01, MEL-05-02, MEL-05-03, MEL-05-04, MEL-05-05
	Cobalt (T)	8	0	MEL-01-01, MEL-01-06, MEL-01-07, MEL-01-08, MEL-01-09, MEL-02-03, MEL-02-04, MEL-02-05

Area	Parameter	Samples Exceeding Normal Range	Samples Exceeding Threshold	Stations
	Copper (T)	4	0	MEL-02-01, MEL-02-02, MEL-02-03, MEL-02-04
	DOC	12	0	MEL-01-01, MEL-01-06, MEL-01-07, MEL-01-08, MEL-01-09, MEL-02-01, MEL-02-03, MEL-02-04, MEL-02-05, MEL-03-01, MEL-03-02, MEL-05-04
	Hardness	15	0	MEL-01-01, MEL-01-06, MEL-01-07, MEL-01-08, MEL-01-09, MEL-02-01, MEL-02-02, MEL-02-03, MEL-02-04, MEL-02-05, MEL-05-01, MEL-05-02, MEL-05-03, MEL-05-04, MEL-05-05
	Iron (T)	7	0	MEL-01-01, MEL-01-06, MEL-01-07, MEL-01-08, MEL-01-09, MEL-02-03, MEL-02-04
	Lead (T)	1	0	MEL-03-02*
	Lithium (T)	15	0	MEL-01-01, MEL-01-06, MEL-01-07, MEL-01-08, MEL-01-09, MEL-02-01, MEL-02-02, MEL-02-03, MEL-02-04, MEL-02-05, MEL-05-01, MEL-05-02, MEL-05-03, MEL-05-04, MEL-05-05
	Magnesium (T)	15	0	MEL-01-01, MEL-01-06, MEL-01-07, MEL-01-08, MEL-01-09, MEL-02-01, MEL-02-02, MEL-02-03, MEL-02-04, MEL-02-05, MEL-03-03, MEL-05-01, MEL-05-02, MEL-05-03, MEL-05-05
	Manganese (T)	10	0	MEL-01-01, MEL-01-06, MEL-01-07, MEL-01-08, MEL-01-09, MEL-02-01, MEL-02-02, MEL-02-03, MEL-02-04, MEL-02-05
	Molybdenum (T)	25	0	MEL-01-01, MEL-01-06, MEL-01-07*, MEL-01-08, MEL-01-09, MEL-02-01, MEL-02-02, MEL-02-03, MEL-02-04, MEL-02-05*, MEL-03-01, MEL-03-02, MEL-03-03*, MEL-03-04, MEL-03-05, MEL-04-01, MEL-04-02, MEL-04-03, MEL-04-04, MEL-04-05, MEL-05-01, MEL-05-02, MEL-05-03, MEL-05-04, MEL-05-05
	Nickel (T)	17	0	MEL-01-01, MEL-01-06, MEL-01-07, MEL-01-08, MEL-01-09, MEL-02-01, MEL-02-02, MEL-02-03, MEL-02-04, MEL-02-05, MEL-03-01, MEL-03-02, MEL-04-01, MEL-04-02, MEL-04-03, MEL-04-04, MEL-04-05
	Potassium (T)	22	0	MEL-01-01, MEL-01-06, MEL-01-07, MEL-01-08, MEL-01-09, MEL-02-01, MEL-02-02, MEL-02-03, MEL-02-04, MEL-02-05, MEL-03-01, MEL-03-02, MEL-03-03, MEL-03-05, MEL-04-01, MEL-04-02, MEL-04-05, MEL-05-01, MEL-05-02, MEL-05-03, MEL-05-04, MEL-05-05
	Reactive silica	15	0	MEL-01-01, MEL-01-06, MEL-01-07, MEL-01-08, MEL-01-09, MEL-02-01, MEL-02-02, MEL-02-03, MEL-02-04, MEL-02-05, MEL-05-01, MEL-05-02, MEL-05-03, MEL-05-04, MEL-05-05

Area	Parameter	Samples Exceeding Normal Range	Samples Exceeding Threshold	Stations
	Selenium (T)	6	0	MEL-02-01, MEL-04-05, MEL-05-02, MEL-05-03, MEL-05-04, MEL-05-05
	Sodium (T)	24	0	MEL-01-01, MEL-01-06, MEL-01-07, MEL-01-08, MEL-01-09, MEL-02-01, MEL-02-02, MEL-02-03, MEL-02-04, MEL-02-05, MEL-03-01, MEL-03-02, MEL-03-03, MEL-03-04, MEL-03-05, MEL-04-01, MEL-04-02, MEL-04-03, MEL-04-04, MEL-04-05, MEL-05-01, MEL-05-02, MEL-05-03, MEL-05-05
	Strontium (T)	25	0	MEL-01-01, MEL-01-06, MEL-01-07, MEL-01-08, MEL-01-09, MEL-02-01, MEL-02-02, MEL-02-03, MEL-02-04, MEL-02-05, MEL-03-01, MEL-03-02, MEL-03-03, MEL-03-04, MEL-03-05, MEL-04-01, MEL-04-02, MEL-04-03, MEL-04-04, MEL-04-05, MEL-05-01, MEL-05-02, MEL-05-03, MEL-05-04, MEL-05-05
	Sulphate	25	0	MEL-01-01, MEL-01-06, MEL-01-07, MEL-01-08, MEL-01-09, MEL-02-01, MEL-02-02, MEL-02-03, MEL-02-04, MEL-02-05, MEL-03-01, MEL-03-02, MEL-03-03, MEL-03-04, MEL-03-05, MEL-04-01, MEL-04-02, MEL-04-03, MEL-04-04, MEL-04-05, MEL-05-01, MEL-05-02, MEL-05-03, MEL-05-04, MEL-05-05
	TDS	9	0	MEL-01-01, MEL-01-06, MEL-01-07, MEL-01-08, MEL-01-09, MEL-02-02, MEL-02-04, MEL-04-01, MEL-05-05
	TDS (calculated)	25	0	MEL-01-01, MEL-01-06, MEL-01-07, MEL-01-08, MEL-01-09, MEL-02-01, MEL-02-02, MEL-02-03, MEL-02-04, MEL-02-05, MEL-03-01, MEL-03-02, MEL-03-03, MEL-03-04, MEL-03-05, MEL-04-01, MEL-04-02, MEL-04-03, MEL-04-04, MEL-04-05, MEL-05-01, MEL-05-02, MEL-05-03, MEL-05-04, MEL-05-05
	TKN	5	0	MEL-01-06, MEL-01-08, MEL-03-04, MEL-04-01, MEL-04-03
	TOC	5	0	MEL-01-01, MEL-01-06, MEL-01-07, MEL-01-08, MEL-01-09
	Total Alkalinity	25	0	MEL-01-01, MEL-01-06, MEL-01-07, MEL-01-08, MEL-01-09, MEL-02-01, MEL-02-02, MEL-02-03, MEL-02-04, MEL-02-05, MEL-03-01, MEL-03-02, MEL-03-03, MEL-03-04, MEL-03-05, MEL-04-01, MEL-04-02, MEL-04-03, MEL-04-04, MEL-04-05, MEL-05-01, MEL-05-02, MEL-05-03, MEL-05-04, MEL-05-05
	Total diss phosphorous	4	0	MEL-01-01, MEL-01-06, MEL-01-07, MEL-03-01*

Area	Parameter	Samples Exceeding Normal Range	Samples Exceeding Threshold	Stations
Peninsula Lakes	Total phosphorous	9	0	MEL-01-01, MEL-01-06, MEL-01-07, MEL-01-08, MEL-01-09, MEL-02-01, MEL-02-02, MEL-02-05, MEL-03-03
	TSS	1	0	MEL-01-06
	Uranium (T)	5	0	MEL-01-01, MEL-01-06, MEL-01-07, MEL-01-08, MEL-01-09
	Aluminum (T)	6	0	A8-01, A8-02, A8-03, D7-01, D7-02, D7-03
	Ammonia-N	6	0	A8-01, A8-02, A8-03, B7-03, D7-01, D7-02
	Antimony (T)	3	0	B7-01, B7-02, B7-03
	Arsenic (T)	8	0	A8-01, A8-02, A8-03, B7-01, B7-02, B7-03, D7-01, D7-02
	Barium (T)	3	0	B7-01, B7-02, B7-03
	Boron (T)	4	0	A8-01, B7-01, B7-02, B7-03
	Cadmium (T)	1	0	A8-03
	Chloride	3	0	B7-01, B7-02, B7-03
	Chromium (T)	9	0	A8-01, A8-02, A8-03, B7-01, B7-02, B7-03, D7-01, D7-02, D7-03
	Cobalt (T)	7	0	A8-03, B7-01, B7-02, B7-03, D7-01, D7-02, D7-03
	Copper (T)	2	0	A8-01, A8-03
	DOC	1	0	A8-03
	Iron (T)	2	0	A8-01, A8-03
	Lead (T)	6	0	A8-01, A8-02, A8-03, D7-01, D7-02, D7-03
	Lithium (T)	3	0	B7-01, B7-02, B7-03
	Manganese (T)	3	0	A8-03, D7-01, D7-02
	Molybdenum (T)	6	0	A8-01, A8-02, A8-03, B7-01, B7-02, B7-03
	Nickel (T)	4	0	A8-03, D7-01, D7-02, D7-03

Area	Parameter	Samples Exceeding Normal Range	Samples Exceeding Threshold	Stations
	Nitrate-N	2	0	D7-01, D7-03
	Nitrite-N	6	0	A8-01, A8-02, A8-03, D7-01, D7-02, D7-03
	Reactive silica	3	0	D7-01, D7-02, D7-03
	Selenium (T)	6	0	A8-01, A8-02, A8-03, B7-01, B7-03, D7-01
	Sodium (T)	1	0	A8-01
	Strontium (T)	3	0	B7-01, B7-02, B7-03
	Sulphate	3	0	B7-01, B7-02, B7-03
	Titanium (T)	5	0	A8-03, B7-02, D7-01, D7-02, D7-03
	TOC	1	0	A8-03
	Total nitrogen	6	0	A8-01, A8-02, A8-03, B7-01, B7-03, D7-02
	Total phosphorous	1	0	B7-01
	Uranium (T)	4	0	A8-01, B7-01, B7-02, B7-03
	Vanadium (T)	9	0	A8-01, A8-02, A8-03, B7-01, B7-02, B7-03, D7-01, D7-02, D7-03
	Zinc (T)	1	0	A8-03

* Indicates samples which failed reliability checks and are consequently uncertain.

Table 4: Meliadine trigger and threshold exceedances in August, 2020.

Area ID	Sample ID	Parameter	Results ¹	DL	Units	MDL	Threshold	Normal Range Limit	% Above NR ²	Reliability
A8										
	A8-01	Aluminum (T)	0.004	0.001	mg/L	-	0.1	0.003	33.3	-
	A8-02	Aluminum (T)	0.0049	0.001	mg/L	-	0.1	0.003	63.3	-
	A8-03	Aluminum (T)	0.0079	0.001	mg/L	-	0.1	0.003	163.3	-
	A8-01	Ammonia-N	0.051	0.005	mg/L	-	1.8	0.011	360	-
	A8-02	Ammonia-N	0.044	0.005	mg/L	-	1.8	0.011	298.2	-
	A8-03	Ammonia-N	0.066	0.005	mg/L	-	1.8	0.011	496.4	-
	A8-01	Arsenic (T)	0.0058	2e-05	mg/L	-	0.025	0.0024	139.6	-
	A8-02	Arsenic (T)	0.0054	2e-05	mg/L	-	0.025	0.0024	125	-
	A8-03	Arsenic (T)	0.0036	2e-05	mg/L	-	0.025	0.0024	49.2	-
	A8-01	Boron (T)	0.0057	0.005	mg/L	-	1.5	0.005	14	-
	A8-03	Cadmium (T)	7.6e-06	5e-06	mg/L	-	4e-05	5e-06	52	-
	A8-01	Chromium (T)	1e-04	1e-04	mg/L	MDL	0.001	6e-05	66.7	-
	A8-02	Chromium (T)	1e-04	1e-04	mg/L	MDL	0.001	6e-05	66.7	-
	A8-03	Chromium (T)	1e-04	1e-04	mg/L	MDL	0.001	6e-05	66.7	-
	A8-03	Cobalt (T)	6.3e-05	5e-06	mg/L	-	0.00078	5e-05	26.6	-
	A8-01	Copper (T)	0.00096	5e-05	mg/L	-	0.002	0.00089	7.3	-
	A8-03	Copper (T)	0.0019	5e-05	mg/L	-	0.002	0.00089	113.5	-
	A8-03	DOC	5.1	0.5	mg/L	-	-	4.9	4.3	-
	A8-01	Iron (T)	0.072	0.001	mg/L	-	1.1	0.067	7.9	-
	A8-03	Iron (T)	0.11	0.001	mg/L	-	1.1	0.067	68.7	-
	A8-01	Lead (T)	7.2e-05	1e-05	mg/L	-	0.001	3e-05	140	-
	A8-02	Lead (T)	5.9e-05	1e-05	mg/L	-	0.001	3e-05	96.7	-
	A8-03	Lead (T)	4.9e-05	1e-05	mg/L	-	0.001	3e-05	63.3	-

Area ID	Sample ID	Parameter	Results ¹	DL	Units	MDL	Threshold	Normal Range Limit	% Above NR ²	Reliability
B7	A8-03	Manganese (T)	0.018	5e-05	mg/L	-	-	0.013	41.5	-
	A8-01	Molybdenum (T)	0.00028	5e-05	mg/L	-	0.073	0.00022	25	-
	A8-02	Molybdenum (T)	0.00026	5e-05	mg/L	-	0.073	0.00022	18.6	-
	A8-03	Molybdenum (T)	0.00026	5e-05	mg/L	-	0.073	0.00022	19.5	-
	A8-03	Nickel (T)	0.001	5e-05	mg/L	-	0.025	0.00092	8.7	-
	A8-01	Nitrite-N	0.001	0.001	mg/L	MDL	0.06	5e-04	100	-
	A8-02	Nitrite-N	0.001	0.001	mg/L	MDL	0.06	5e-04	100	-
	A8-03	Nitrite-N	0.001	0.001	mg/L	MDL	0.06	5e-04	100	-
	A8-01	Selenium (T)	4e-05	4e-05	mg/L	MDL	0.001	2e-05	100	-
	A8-02	Selenium (T)	4e-05	4e-05	mg/L	MDL	0.001	2e-05	100	-
	A8-03	Selenium (T)	4.3e-05	4e-05	mg/L	-	0.001	2e-05	115	-
	A8-01	Sodium (T)	8.4	0.02	mg/L	-	-	8.4	0.1	-
	A8-03	Titanium (T)	0.00035	5e-05	mg/L	-	-	0.00025	38.4	-
	A8-03	TOC	5	0.5	mg/L	-	-	4.7	7.4	-
	A8-01	Total nitrogen	0.41	0.05	mg/L	-	-	0.37	9.7	-
	A8-02	Total nitrogen	0.44	0.05	mg/L	-	-	0.37	18.1	-
	A8-03	Total nitrogen	0.47	0.05	mg/L	-	-	0.37	26.8	-
	A8-01	Uranium (T)	5.6e-05	1e-06	mg/L	-	0.015	5.4e-05	3.1	-
	A8-01	Vanadium (T)	5.3e-05	5e-05	mg/L	-	0.12	1e-05	430	-
	A8-02	Vanadium (T)	5.1e-05	5e-05	mg/L	-	0.12	1e-05	410	-
	A8-03	Vanadium (T)	6.4e-05	5e-05	mg/L	-	0.12	1e-05	540	-
	A8-03	Zinc (T)	0.0016	5e-04	mg/L	-	-	0.0012	30.8	-
	B7-03	Ammonia-N	0.044	0.005	mg/L	-	1.8	0.025	77.6	-
	B7-01	Antimony (T)	0.00012	2e-05	mg/L	-	0.009	2e-05	485	-

Area ID	Sample ID	Parameter	Results ¹	DL	Units	MDL	Threshold	Normal Range Limit	% Above NR ²	Reliability
	B7-02	Antimony (T)	0.00014	2e-05	mg/L	-	0.009	2e-05	620	-
	B7-03	Antimony (T)	4.7e-05	2e-05	mg/L	-	0.009	2e-05	135	-
	B7-01	Arsenic (T)	0.0057	2e-05	mg/L	-	0.025	0.0018	215.6	-
	B7-02	Arsenic (T)	0.0048	2e-05	mg/L	-	0.025	0.0018	167.8	-
	B7-03	Arsenic (T)	0.0046	2e-05	mg/L	-	0.025	0.0018	156.7	-
	B7-01	Barium (T)	0.023	2e-05	mg/L	-	1	0.02	17	-
	B7-02	Barium (T)	0.024	2e-05	mg/L	-	1	0.02	20	-
	B7-03	Barium (T)	0.024	2e-05	mg/L	-	1	0.02	20	-
	B7-01	Boron (T)	0.014	0.005	mg/L	-	1.5	0.008	81.2	-
	B7-02	Boron (T)	0.015	0.005	mg/L	-	1.5	0.008	85	-
	B7-03	Boron (T)	0.015	0.005	mg/L	-	1.5	0.008	82.5	-
	B7-01	Chloride	41	0.1	mg/L	-	120	25	64	-
	B7-02	Chloride	40	0.1	mg/L	-	120	25	61.2	-
	B7-03	Chloride	40	0.1	mg/L	-	120	25	60.4	-
	B7-01	Chromium (T)	1e-04	1e-04	mg/L	MDL	0.001	6e-05	66.7	-
	B7-02	Chromium (T)	1e-04	1e-04	mg/L	MDL	0.001	6e-05	66.7	-
	B7-03	Chromium (T)	1e-04	1e-04	mg/L	MDL	0.001	6e-05	66.7	-
	B7-01	Cobalt (T)	7.1e-05	5e-06	mg/L	-	0.00078	5e-05	41.2	-
	B7-02	Cobalt (T)	6.1e-05	5e-06	mg/L	-	0.00078	5e-05	21.4	-
	B7-03	Cobalt (T)	5.8e-05	5e-06	mg/L	-	0.00078	5e-05	17	-
	B7-01	Lithium (T)	0.02	5e-04	mg/L	-	-	0.0075	166.7	-
	B7-02	Lithium (T)	0.02	5e-04	mg/L	-	-	0.0075	160	-
	B7-03	Lithium (T)	0.019	5e-04	mg/L	-	-	0.0075	153.3	-
	B7-01	Molybdenum (T)	0.00026	5e-05	mg/L	-	0.073	0.00024	9.6	-
	B7-02	Molybdenum (T)	0.00028	5e-05	mg/L	-	0.073	0.00024	14.6	-

Area ID	Sample ID	Parameter	Results ¹	DL	Units	MDL	Threshold	Normal Range Limit	% Above NR ²	Reliability
D7	B7-03	Molybdenum (T)	0.00024	5e-05	mg/L	-	0.073	0.00024	0.4	-
	B7-01	Selenium (T)	5.4e-05	4e-05	mg/L	-	0.001	4e-05	35	-
	B7-03	Selenium (T)	5.2e-05	4e-05	mg/L	-	0.001	4e-05	30	-
	B7-01	Strontium (T)	0.25	2e-05	mg/L	-	1.7	0.16	63.9	-
	B7-02	Strontium (T)	0.27	2e-05	mg/L	-	1.7	0.16	74.2	-
	B7-03	Strontium (T)	0.26	2e-05	mg/L	-	1.7	0.16	69.7	-
	B7-01	Sulphate	8.2	0.3	mg/L	-	130	6	37.2	-
	B7-02	Sulphate	8.2	0.3	mg/L	-	130	6	35.8	-
	B7-03	Sulphate	8.1	0.3	mg/L	-	130	6	35.7	-
	B7-02	Titanium (T)	3e-04	5e-05	mg/L	-	-	0.00025	21.2	-
	B7-01	Total nitrogen	0.44	0.05	mg/L	-	-	0.42	4.3	-
	B7-03	Total nitrogen	0.42	0.05	mg/L	-	-	0.42	0.7	-
	B7-01	Total phosphorous	0.013	0.003	mg/L	-	-	0.01	33	-
	B7-01	Uranium (T)	4.8e-05	1e-06	mg/L	-	0.015	3e-05	59	-
	B7-02	Uranium (T)	4.9e-05	1e-06	mg/L	-	0.015	3e-05	62.7	-
	B7-03	Uranium (T)	4.4e-05	1e-06	mg/L	-	0.015	3e-05	46.3	-
	B7-01	Vanadium (T)	5.9e-05	5e-05	mg/L	-	0.12	1e-05	490	-
	B7-02	Vanadium (T)	6.3e-05	5e-05	mg/L	-	0.12	1e-05	530	-
	B7-03	Vanadium (T)	5.1e-05	5e-05	mg/L	-	0.12	1e-05	410	-
	D7-01	Aluminum (T)	0.0077	0.001	mg/L	-	0.1	0.0067	14.9	-
	D7-02	Aluminum (T)	0.0082	0.001	mg/L	-	0.1	0.0067	22.4	-
	D7-03	Aluminum (T)	0.0082	0.001	mg/L	-	0.1	0.0067	22.4	-
	D7-01	Ammonia-N	0.015	0.005	mg/L	-	1.8	0.009	70	-
	D7-02	Ammonia-N	0.072	0.005	mg/L	-	1.8	0.009	698.9	-

Area ID	Sample ID	Parameter	Results ¹	DL	Units	MDL	Threshold	Normal Range Limit	% Above NR ²	Reliability
	D7-01	Arsenic (T)	0.0012	2e-05	mg/L	-	0.025	0.0012	1.7	-
	D7-02	Arsenic (T)	0.0012	2e-05	mg/L	-	0.025	0.0012	2.5	-
	D7-01	Chromium (T)	1e-04	1e-04	mg/L	MDL	0.001	6e-05	66.7	-
	D7-02	Chromium (T)	1e-04	1e-04	mg/L	MDL	0.001	6e-05	66.7	-
	D7-03	Chromium (T)	1e-04	1e-04	mg/L	MDL	0.001	6e-05	66.7	-
	D7-01	Cobalt (T)	6.4e-05	5e-06	mg/L	-	0.00078	5e-05	27.8	-
	D7-02	Cobalt (T)	6.4e-05	5e-06	mg/L	-	0.00078	5e-05	28.8	-
	D7-03	Cobalt (T)	6.6e-05	5e-06	mg/L	-	0.00078	5e-05	32.6	-
	D7-01	Lead (T)	2.5e-05	1e-05	mg/L	-	0.001	2e-05	25	-
	D7-02	Lead (T)	2.9e-05	1e-05	mg/L	-	0.001	2e-05	45	-
	D7-03	Lead (T)	2.3e-05	1e-05	mg/L	-	0.001	2e-05	15	-
	D7-01	Manganese (T)	0.014	5e-05	mg/L	-	-	0.013	3.8	-
	D7-02	Manganese (T)	0.014	5e-05	mg/L	-	-	0.013	4.6	-
	D7-01	Nickel (T)	0.00082	5e-05	mg/L	-	0.025	0.00075	9.3	-
	D7-02	Nickel (T)	0.00086	5e-05	mg/L	-	0.025	0.00075	14.9	-
	D7-03	Nickel (T)	0.00081	5e-05	mg/L	-	0.025	0.00075	7.9	-
	D7-01	Nitrate-N	0.0071	0.005	mg/L	-	2.9	0.005	42	-
	D7-03	Nitrate-N	0.0058	0.005	mg/L	-	2.9	0.005	16	-
	D7-01	Nitrite-N	0.001	0.001	mg/L	MDL	0.06	5e-04	100	-
	D7-02	Nitrite-N	0.001	0.001	mg/L	MDL	0.06	5e-04	100	-
	D7-03	Nitrite-N	0.001	0.001	mg/L	MDL	0.06	5e-04	100	-
	D7-01	Reactive silica	0.49	0.05	mg/L	-	-	0.28	74.3	-
	D7-02	Reactive silica	0.5	0.01	mg/L	-	-	0.28	76.8	-
	D7-03	Reactive silica	0.5	0.01	mg/L	-	-	0.28	78.2	-
	D7-01	Selenium (T)	7e-05	4e-05	mg/L	-	0.001	6e-05	16.7	-

Area ID	Sample ID	Parameter	Results ¹	DL	Units	MDL	Threshold	Normal Range Limit	% Above NR ²	Reliability
	D7-01	Titanium (T)	0.00052	5e-05	mg/L	-	-	0.00034	52.4	-
	D7-02	Titanium (T)	5e-04	5e-04	mg/L	MDL	-	0.00034	47.1	-
	D7-03	Titanium (T)	0.00054	5e-05	mg/L	-	-	0.00034	57.6	-
	D7-02	Total nitrogen	0.45	0.05	mg/L	-	-	0.43	5.3	-
	D7-01	Vanadium (T)	9.7e-05	5e-05	mg/L	-	0.12	7e-05	38.6	-
	D7-02	Vanadium (T)	1e-04	5e-05	mg/L	-	0.12	7e-05	50	-
	D7-03	Vanadium (T)	1e-04	5e-05	mg/L	-	0.12	7e-05	44.3	-
MEL-01										
	MEL-01-06	Ammonia-N	0.039	0.005	mg/L	-	1.8	0.015	161.1	-
	MEL-01-08	Ammonia-N	0.026	0.005	mg/L	-	1.8	0.015	77.9	-
	MEL-01-09	Ammonia-N	0.03	0.005	mg/L	-	1.8	0.015	104.7	-
	MEL-01-01	Arsenic (T)	0.00051	2e-05	mg/L	-	0.025	0.00025	104	-
	MEL-01-06	Arsenic (T)	0.00051	2e-05	mg/L	-	0.025	0.00025	103.2	-
	MEL-01-07	Arsenic (T)	0.00052	2e-05	mg/L	-	0.025	0.00025	108	-
	MEL-01-08	Arsenic (T)	5e-04	2e-05	mg/L	-	0.025	0.00025	99.2	-
	MEL-01-09	Arsenic (T)	5e-04	2e-05	mg/L	-	0.025	0.00025	98.4	-
	MEL-01-01	Barium (T)	0.0087	2e-05	mg/L	-	1	0.0079	9.5	-
	MEL-01-06	Barium (T)	0.0083	2e-05	mg/L	-	1	0.0079	4.6	-
	MEL-01-07	Barium (T)	0.0084	2e-05	mg/L	-	1	0.0079	6.7	-
	MEL-01-08	Barium (T)	0.0084	2e-05	mg/L	-	1	0.0079	5.6	-
	MEL-01-09	Barium (T)	0.0081	2e-05	mg/L	-	1	0.0079	2.9	-
	MEL-01-01	Bicarbonate alkalinity	25	1.2	mg/L	-	-	24	2.5	-
	MEL-01-06	Bicarbonate alkalinity	25	1.2	mg/L	-	-	24	2.9	-
	MEL-01-07	Bicarbonate alkalinity	25	1.2	mg/L	-	-	24	2.9	-
	MEL-01-08	Bicarbonate alkalinity	25	1.2	mg/L	-	-	24	1.6	-

Area ID	Sample ID	Parameter	Results ¹	DL	Units	MDL	Threshold	Normal Range Limit	% Above NR ²	Reliability
	MEL-01-09	Bicarbonate alkalinity	25	1.2	mg/L	-	-	24	1.6	-
	MEL-01-01	Boron (T)	0.0067	0.005	mg/L	-	1.5	0.0067	0.4	-
	MEL-01-06	Boron (T)	0.0068	0.005	mg/L	-	1.5	0.0067	1.9	-
	MEL-01-07	Boron (T)	0.0071	0.005	mg/L	-	1.5	0.0067	6.4	-
	MEL-01-08	Boron (T)	0.0071	0.005	mg/L	-	1.5	0.0067	6.4	-
	MEL-01-09	Boron (T)	0.0069	0.005	mg/L	-	1.5	0.0067	3.4	-
	MEL-01-01	Calcium (T)	8.2	0.01	mg/L	-	-	7.3	12.6	-
	MEL-01-06	Calcium (T)	8.4	0.01	mg/L	-	-	7.3	14.4	-
	MEL-01-07	Calcium (T)	8.6	0.01	mg/L	-	-	7.3	17.8	-
	MEL-01-08	Calcium (T)	8.7	0.01	mg/L	-	-	7.3	19.2	-
	MEL-01-09	Calcium (T)	8.2	0.01	mg/L	-	-	7.3	12.2	-
	MEL-01-01	Chloride	18	0.1	mg/L	-	120	8.8	104.6	-
	MEL-01-06	Chloride	18	0.1	mg/L	-	120	8.8	104.6	-
	MEL-01-07	Chloride	18	0.1	mg/L	-	120	8.8	105.7	-
	MEL-01-08	Chloride	18	0.1	mg/L	-	120	8.8	104.6	-
	MEL-01-09	Chloride	18	0.1	mg/L	-	120	8.8	102.3	-
	MEL-01-01	Cobalt (T)	2.6e-05	5e-06	mg/L	-	0.00078	1.6e-05	65	-
	MEL-01-06	Cobalt (T)	2.6e-05	5e-06	mg/L	-	0.00078	1.6e-05	60	-
	MEL-01-07	Cobalt (T)	2.8e-05	5e-06	mg/L	-	0.00078	1.6e-05	77.5	-
	MEL-01-08	Cobalt (T)	2.6e-05	5e-06	mg/L	-	0.00078	1.6e-05	65.6	-
	MEL-01-09	Cobalt (T)	3.2e-05	5e-06	mg/L	-	0.00078	1.6e-05	98.1	-
	MEL-01-01	DOC	3.8	0.5	mg/L	-	-	2.7	40	-
	MEL-01-06	DOC	3.6	0.5	mg/L	-	-	2.7	31.9	-
	MEL-01-07	DOC	3.4	0.5	mg/L	-	-	2.7	26.7	-
	MEL-01-08	DOC	3.7	0.5	mg/L	-	-	2.7	38.1	-

Area ID	Sample ID	Parameter	Results ¹	DL	Units	MDL	Threshold	Normal Range Limit	% Above NR ²	Reliability
	MEL-01-09	DOC	3.4	0.5	mg/L	-	-	2.7	25.6	-
	MEL-01-01	Hardness	28	0.2	-	-	-	23	22.1	-
	MEL-01-06	Hardness	28	0.2	-	-	-	23	21.2	-
	MEL-01-07	Hardness	28	0.2	-	-	-	23	20.8	-
	MEL-01-08	Hardness	28	0.2	-	-	-	23	23.4	-
	MEL-01-09	Hardness	28	0.2	-	-	-	23	20.3	-
	MEL-01-01	Iron (T)	0.026	0.001	mg/L	-	1.1	0.015	75.5	-
	MEL-01-06	Iron (T)	0.025	0.001	mg/L	-	1.1	0.015	62.9	-
	MEL-01-07	Iron (T)	0.026	0.001	mg/L	-	1.1	0.015	68.9	-
	MEL-01-08	Iron (T)	0.023	0.001	mg/L	-	1.1	0.015	53	-
	MEL-01-09	Iron (T)	0.024	0.001	mg/L	-	1.1	0.015	55.6	-
	MEL-01-01	Lithium (T)	0.0014	5e-04	mg/L	-	-	7e-04	102.9	-
	MEL-01-06	Lithium (T)	0.0014	5e-04	mg/L	-	-	7e-04	101.4	-
	MEL-01-07	Lithium (T)	0.0015	5e-04	mg/L	-	-	7e-04	111.4	-
	MEL-01-08	Lithium (T)	0.0015	5e-04	mg/L	-	-	7e-04	112.9	-
	MEL-01-09	Lithium (T)	0.0014	5e-04	mg/L	-	-	7e-04	100	-
	MEL-01-01	Magnesium (T)	1.7	0.004	mg/L	-	-	1.2	45.3	-
	MEL-01-06	Magnesium (T)	1.7	0.004	mg/L	-	-	1.2	42.7	-
	MEL-01-07	Magnesium (T)	1.6	0.004	mg/L	-	-	1.2	41	-
	MEL-01-08	Magnesium (T)	1.6	0.004	mg/L	-	-	1.2	41	-
	MEL-01-09	Magnesium (T)	1.7	0.004	mg/L	-	-	1.2	44.4	-
	MEL-01-01	Manganese (T)	0.0094	5e-05	mg/L	-	-	0.0032	199.7	-
	MEL-01-06	Manganese (T)	0.0087	5e-05	mg/L	-	-	0.0032	175.2	-
	MEL-01-07	Manganese (T)	0.0094	5e-05	mg/L	-	-	0.0032	198.7	-
	MEL-01-08	Manganese (T)	0.0082	5e-05	mg/L	-	-	0.0032	160.6	-

Area ID	Sample ID	Parameter	Results ¹	DL	Units	MDL	Threshold	Normal Range Limit	% Above NR ²	Reliability
	MEL-01-09	Manganese (T)	0.0085	5e-05	mg/L	-	-	0.0032	170.2	-
	MEL-01-01	Molybdenum (T)	9.5e-05	5e-05	mg/L	-	0.073	8.3e-05	14.9	-
	MEL-01-06	Molybdenum (T)	1e-04	5e-05	mg/L	-	0.073	8.3e-05	23.3	-
	MEL-01-07	Molybdenum (T)	0.00068	5e-05	mg/L	-	0.073	8.3e-05	722.2	Uncertain
	MEL-01-08	Molybdenum (T)	3e-04	5e-05	mg/L	-	0.073	8.3e-05	264	-
	MEL-01-09	Molybdenum (T)	1e-04	5e-05	mg/L	-	0.073	8.3e-05	24.5	-
	MEL-01-01	Nickel (T)	0.00078	5e-05	mg/L	-	0.025	0.00042	87.5	-
	MEL-01-06	Nickel (T)	0.00077	5e-05	mg/L	-	0.025	0.00042	84.4	-
	MEL-01-07	Nickel (T)	0.00074	5e-05	mg/L	-	0.025	0.00042	77.7	-
	MEL-01-08	Nickel (T)	0.00078	5e-05	mg/L	-	0.025	0.00042	86.1	-
	MEL-01-09	Nickel (T)	0.00078	5e-05	mg/L	-	0.025	0.00042	87.3	-
	MEL-01-01	Potassium (T)	1.1	0.02	mg/L	-	-	0.94	21.7	-
	MEL-01-06	Potassium (T)	1.1	0.02	mg/L	-	-	0.94	19.5	-
	MEL-01-07	Potassium (T)	1.1	0.02	mg/L	-	-	0.94	18.5	-
	MEL-01-08	Potassium (T)	1.1	0.02	mg/L	-	-	0.94	19.5	-
	MEL-01-09	Potassium (T)	1.1	0.02	mg/L	-	-	0.94	20.6	-
	MEL-01-01	Reactive silica	0.33	0.01	mg/L	-	-	0.26	23.4	-
	MEL-01-06	Reactive silica	0.32	0.01	mg/L	-	-	0.26	20.4	-
	MEL-01-07	Reactive silica	0.33	0.01	mg/L	-	-	0.26	24.2	-
	MEL-01-08	Reactive silica	0.33	0.01	mg/L	-	-	0.26	24.9	-
	MEL-01-09	Reactive silica	0.33	0.01	mg/L	-	-	0.26	23.4	-
	MEL-01-01	Sodium (T)	7.9	0.02	mg/L	-	-	4.6	72.7	-
	MEL-01-06	Sodium (T)	7.6	0.02	mg/L	-	-	4.6	66.8	-
	MEL-01-07	Sodium (T)	7.5	0.02	mg/L	-	-	4.6	64.6	-
	MEL-01-08	Sodium (T)	7.5	0.02	mg/L	-	-	4.6	64.4	-

Area ID	Sample ID	Parameter	Results ¹	DL	Units	MDL	Threshold	Normal Range Limit	% Above NR ²	Reliability
	MEL-01-09	Sodium (T)	7.5	0.02	mg/L	-	-	4.6	65.7	-
	MEL-01-01	Strontium (T)	0.059	2e-05	mg/L	-	1.7	0.034	72.6	-
	MEL-01-06	Strontium (T)	0.06	2e-05	mg/L	-	1.7	0.034	74.3	-
	MEL-01-07	Strontium (T)	0.06	2e-05	mg/L	-	1.7	0.034	76.1	-
	MEL-01-08	Strontium (T)	0.059	2e-05	mg/L	-	1.7	0.034	72.3	-
	MEL-01-09	Strontium (T)	0.058	2e-05	mg/L	-	1.7	0.034	70.6	-
	MEL-01-01	Sulphate	5.8	0.3	mg/L	-	130	3.7	58.6	-
	MEL-01-06	Sulphate	5.8	0.3	mg/L	-	130	3.7	57.5	-
	MEL-01-07	Sulphate	5.8	0.3	mg/L	-	130	3.7	58.9	-
	MEL-01-08	Sulphate	5.8	0.3	mg/L	-	130	3.7	57.8	-
	MEL-01-09	Sulphate	5.8	0.3	mg/L	-	130	3.7	56.4	-
	MEL-01-01	TDS	64	13	mg/L	-	500	51	25	-
	MEL-01-06	TDS	66	13	mg/L	-	500	51	28.9	-
	MEL-01-07	TDS	53	13	mg/L	-	500	51	3.5	-
	MEL-01-08	TDS	63	13	mg/L	-	500	51	23	-
	MEL-01-09	TDS	59	13	mg/L	-	500	51	15.2	-
	MEL-01-01	TDS (calculated)	55	-	mg/L	-	500	38	43.6	-
	MEL-01-06	TDS (calculated)	55	-	mg/L	-	500	38	44.2	-
	MEL-01-07	TDS (calculated)	55	-	mg/L	-	500	38	44.2	-
	MEL-01-08	TDS (calculated)	55	-	mg/L	-	500	38	43.9	-
	MEL-01-09	TDS (calculated)	54	-	mg/L	-	500	38	41.8	-
	MEL-01-06	TKN	0.3	0.05	mg/L	-	-	0.25	22.1	-
	MEL-01-08	TKN	0.26	0.05	mg/L	-	-	0.25	2.4	-
	MEL-01-01	TOC	3.4	0.5	mg/L	-	-	3	13.3	-
	MEL-01-06	TOC	3.4	0.5	mg/L	-	-	3	13	-

Area ID	Sample ID	Parameter	Results ¹	DL	Units	MDL	Threshold	Normal Range Limit	% Above NR ²	Reliability
	MEL-01-07	TOC	3.4	0.5	mg/L	-	-	3	14	-
	MEL-01-08	TOC	3.6	0.5	mg/L	-	-	3	20.7	-
	MEL-01-09	TOC	3.3	0.5	mg/L	-	-	3	10.3	-
	MEL-01-01	Total Alkalinity	20	1	mg/L	-	-	20	2.5	-
	MEL-01-06	Total Alkalinity	21	1	mg/L	-	-	20	3	-
	MEL-01-07	Total Alkalinity	21	1	mg/L	-	-	20	3	-
	MEL-01-08	Total Alkalinity	20	1	mg/L	-	-	20	1.5	-
	MEL-01-09	Total Alkalinity	20	1	mg/L	-	-	20	1.5	-
	MEL-01-01	Total diss phosphorous	0.0046	0.001	mg/L	-	-	0.0034	36.5	-
	MEL-01-06	Total diss phosphorous	0.0041	0.001	mg/L	-	-	0.0034	21.7	-
	MEL-01-07	Total diss phosphorous	0.0036	0.001	mg/L	-	-	0.0034	6.8	-
	MEL-01-01	Total phosphorous	0.01	0.001	mg/L	-	-	0.006	66.7	-
	MEL-01-06	Total phosphorous	0.0076	0.001	mg/L	-	-	0.006	26.7	-
	MEL-01-07	Total phosphorous	0.0097	0.001	mg/L	-	-	0.006	61.7	-
	MEL-01-08	Total phosphorous	0.0066	0.001	mg/L	-	-	0.006	10	-
	MEL-01-09	Total phosphorous	0.0087	0.001	mg/L	-	-	0.006	45	-
	MEL-01-06	TSS	1.3	1	mg/L	-	-	1.1	18.2	-
	MEL-01-01	Uranium (T)	1.8e-05	1e-06	mg/L	-	0.015	1.7e-05	4.8	-
	MEL-01-06	Uranium (T)	2e-05	1e-06	mg/L	-	0.015	1.7e-05	19.2	-
	MEL-01-07	Uranium (T)	1.9e-05	1e-06	mg/L	-	0.015	1.7e-05	15	-
	MEL-01-08	Uranium (T)	1.9e-05	1e-06	mg/L	-	0.015	1.7e-05	12	-
	MEL-01-09	Uranium (T)	1.8e-05	1e-06	mg/L	-	0.015	1.7e-05	9.6	-

Area ID	Sample ID	Parameter	Results ¹	DL	Units	MDL	Threshold	Normal Range Limit	% Above NR ²	Reliability
MEL-02										
	MEL-02-02	Ammonia-N	0.016	0.005	mg/L	-	1.8	0.015	8.7	-
	MEL-02-03	Ammonia-N	0.068	0.005	mg/L	-	1.8	0.015	357.7	-
	MEL-02-04	Ammonia-N	0.029	0.005	mg/L	-	1.8	0.015	96	-
	MEL-02-01	Arsenic (T)	0.00042	2e-05	mg/L	-	0.025	0.00025	67.7	-
	MEL-02-02	Arsenic (T)	0.00044	2e-05	mg/L	-	0.025	0.00025	74.9	-
	MEL-02-03	Arsenic (T)	0.00044	2e-05	mg/L	-	0.025	0.00025	74.5	-
	MEL-02-04	Arsenic (T)	0.00043	2e-05	mg/L	-	0.025	0.00025	71.7	-
	MEL-02-05	Arsenic (T)	0.00042	2e-05	mg/L	-	0.025	0.00025	69.3	-
	MEL-02-04	Barium (T)	0.008	2e-05	mg/L	-	1	0.0079	1.4	-
	MEL-02-05	Barium (T)	0.0079	2e-05	mg/L	-	1	0.0079	0.4	-
	MEL-02-01	Bicarbonate alkalinity	25	1.2	mg/L	-	-	24	4.1	-
	MEL-02-02	Bicarbonate alkalinity	25	1.2	mg/L	-	-	24	2	-
	MEL-02-03	Bicarbonate alkalinity	25	1.2	mg/L	-	-	24	2	-
	MEL-02-04	Bicarbonate alkalinity	25	1.2	mg/L	-	-	24	3.7	-
	MEL-02-05	Bicarbonate alkalinity	25	1.2	mg/L	-	-	24	4.1	-
	MEL-02-02	Calcium (T)	7.5	0.01	mg/L	-	-	7.3	2.6	-
	MEL-02-03	Calcium (T)	7.6	0.01	mg/L	-	-	7.3	4.1	-
	MEL-02-04	Calcium (T)	7.6	0.01	mg/L	-	-	7.3	4.4	-
	MEL-02-05	Calcium (T)	7.6	0.01	mg/L	-	-	7.3	3.7	-
	MEL-02-01	Chloride	13	0.1	mg/L	-	120	8.8	45.1	-
	MEL-02-02	Chloride	12	0.1	mg/L	-	120	8.8	40.6	-
	MEL-02-03	Chloride	12	0.1	mg/L	-	120	8.8	40.6	-
	MEL-02-04	Chloride	12	0.1	mg/L	-	120	8.8	38.3	-
	MEL-02-05	Chloride	12	0.1	mg/L	-	120	8.8	38.3	-

Area ID	Sample ID	Parameter	Results ¹	DL	Units	MDL	Threshold	Normal Range Limit	% Above NR ²	Reliability
	MEL-02-03	Cobalt (T)	1.7e-05	5e-06	mg/L	-	0.00078	1.6e-05	3.8	-
	MEL-02-04	Cobalt (T)	1.7e-05	5e-06	mg/L	-	0.00078	1.6e-05	3.8	-
	MEL-02-05	Cobalt (T)	1.8e-05	5e-06	mg/L	-	0.00078	1.6e-05	10	-
	MEL-02-01	Copper (T)	0.0011	5e-05	mg/L	-	0.002	0.00092	21.3	-
	MEL-02-02	Copper (T)	0.0011	5e-05	mg/L	-	0.002	0.00092	19.2	-
	MEL-02-03	Copper (T)	0.0015	5e-05	mg/L	-	0.002	0.00092	58.2	-
	MEL-02-04	Copper (T)	0.0012	5e-05	mg/L	-	0.002	0.00092	35.4	-
	MEL-02-01	DOC	2.8	0.5	mg/L	-	-	2.7	4.8	-
	MEL-02-03	DOC	3	0.5	mg/L	-	-	2.7	9.6	-
	MEL-02-04	DOC	2.8	0.5	mg/L	-	-	2.7	5.2	-
	MEL-02-05	DOC	2.8	0.5	mg/L	-	-	2.7	2.6	-
	MEL-02-01	Hardness	24	0.2	-	-	-	23	4.8	-
	MEL-02-02	Hardness	24	0.2	-	-	-	23	4.3	-
	MEL-02-03	Hardness	24	0.2	-	-	-	23	4.3	-
	MEL-02-04	Hardness	24	0.2	-	-	-	23	4.8	-
	MEL-02-05	Hardness	24	0.2	-	-	-	23	3	-
	MEL-02-03	Iron (T)	0.016	0.001	mg/L	-	1.1	0.015	4.6	-
	MEL-02-04	Iron (T)	0.018	0.001	mg/L	-	1.1	0.015	17.9	-
	MEL-02-01	Lithium (T)	0.00088	5e-04	mg/L	-	-	7e-04	25.7	-
	MEL-02-02	Lithium (T)	0.00091	5e-04	mg/L	-	-	7e-04	30	-
	MEL-02-03	Lithium (T)	0.00094	5e-04	mg/L	-	-	7e-04	34.3	-
	MEL-02-04	Lithium (T)	0.00093	5e-04	mg/L	-	-	7e-04	32.9	-
	MEL-02-05	Lithium (T)	0.00094	5e-04	mg/L	-	-	7e-04	34.3	-
	MEL-02-01	Magnesium (T)	1.4	0.004	mg/L	-	-	1.2	15.4	-
	MEL-02-02	Magnesium (T)	1.3	0.004	mg/L	-	-	1.2	11.1	-

Area ID	Sample ID	Parameter	Results ¹	DL	Units	MDL	Threshold	Normal Range Limit	% Above NR ²	Reliability
	MEL-02-03	Magnesium (T)	1.3	0.004	mg/L	-	-	1.2	12	-
	MEL-02-04	Magnesium (T)	1.3	0.004	mg/L	-	-	1.2	14.5	-
	MEL-02-05	Magnesium (T)	1.3	0.004	mg/L	-	-	1.2	13.7	-
	MEL-02-01	Manganese (T)	0.0039	5e-05	mg/L	-	-	0.0032	22.9	-
	MEL-02-02	Manganese (T)	0.004	5e-05	mg/L	-	-	0.0032	28.6	-
	MEL-02-03	Manganese (T)	0.0042	5e-05	mg/L	-	-	0.0032	33.7	-
	MEL-02-04	Manganese (T)	0.0045	5e-05	mg/L	-	-	0.0032	42.9	-
	MEL-02-05	Manganese (T)	0.0041	5e-05	mg/L	-	-	0.0032	30.2	-
	MEL-02-01	Molybdenum (T)	8.8e-05	5e-05	mg/L	-	0.073	8.3e-05	6.4	-
	MEL-02-02	Molybdenum (T)	1e-04	5e-05	mg/L	-	0.073	8.3e-05	23.3	-
	MEL-02-03	Molybdenum (T)	9.6e-05	5e-05	mg/L	-	0.073	8.3e-05	16.1	-
	MEL-02-04	Molybdenum (T)	0.00011	5e-05	mg/L	-	0.073	8.3e-05	36.6	-
	MEL-02-05	Molybdenum (T)	0.00065	5e-05	mg/L	-	0.073	8.3e-05	686	Uncertain
	MEL-02-01	Nickel (T)	0.00059	5e-05	mg/L	-	0.025	0.00042	41.7	-
	MEL-02-02	Nickel (T)	0.00059	5e-05	mg/L	-	0.025	0.00042	40.5	-
	MEL-02-03	Nickel (T)	0.00061	5e-05	mg/L	-	0.025	0.00042	45.6	-
	MEL-02-04	Nickel (T)	0.00061	5e-05	mg/L	-	0.025	0.00042	45.8	-
	MEL-02-05	Nickel (T)	6e-04	5e-05	mg/L	-	0.025	0.00042	42.7	-
	MEL-02-01	Potassium (T)	1	0.02	mg/L	-	-	0.94	7.8	-
	MEL-02-02	Potassium (T)	1	0.02	mg/L	-	-	0.94	7.8	-
	MEL-02-03	Potassium (T)	1	0.02	mg/L	-	-	0.94	7.8	-
	MEL-02-04	Potassium (T)	1	0.02	mg/L	-	-	0.94	7.8	-
	MEL-02-05	Potassium (T)	1	0.02	mg/L	-	-	0.94	11	-
	MEL-02-01	Reactive silica	0.31	0.01	mg/L	-	-	0.26	17.4	-
	MEL-02-02	Reactive silica	0.31	0.01	mg/L	-	-	0.26	15.5	-

Area ID	Sample ID	Parameter	Results ¹	DL	Units	MDL	Threshold	Normal Range Limit	% Above NR ²	Reliability
	MEL-02-03	Reactive silica	0.32	0.01	mg/L	-	-	0.26	20.4	-
	MEL-02-04	Reactive silica	0.32	0.01	mg/L	-	-	0.26	18.9	-
	MEL-02-05	Reactive silica	0.31	0.01	mg/L	-	-	0.26	17.4	-
	MEL-02-01	Selenium (T)	5.1e-05	4e-05	mg/L	-	0.001	4.6e-05	9.9	-
	MEL-02-01	Sodium (T)	6.1	0.02	mg/L	-	-	4.6	34.5	-
	MEL-02-02	Sodium (T)	5.7	0.02	mg/L	-	-	4.6	25.1	-
	MEL-02-03	Sodium (T)	5.8	0.02	mg/L	-	-	4.6	27.7	-
	MEL-02-04	Sodium (T)	5.6	0.02	mg/L	-	-	4.6	23.1	-
	MEL-02-05	Sodium (T)	5.8	0.02	mg/L	-	-	4.6	27.9	-
	MEL-02-01	Strontium (T)	0.042	2e-05	mg/L	-	1.7	0.034	23	-
	MEL-02-02	Strontium (T)	0.044	2e-05	mg/L	-	1.7	0.034	28.3	-
	MEL-02-03	Strontium (T)	0.044	2e-05	mg/L	-	1.7	0.034	26.8	-
	MEL-02-04	Strontium (T)	0.043	2e-05	mg/L	-	1.7	0.034	25.1	-
	MEL-02-05	Strontium (T)	0.044	2e-05	mg/L	-	1.7	0.034	27.1	-
	MEL-02-01	Sulphate	4.6	0.3	mg/L	-	130	3.7	25.2	-
	MEL-02-02	Sulphate	4.7	0.3	mg/L	-	130	3.7	26.6	-
	MEL-02-03	Sulphate	4.6	0.3	mg/L	-	130	3.7	24.1	-
	MEL-02-04	Sulphate	4.6	0.3	mg/L	-	130	3.7	23.8	-
	MEL-02-05	Sulphate	4.6	0.3	mg/L	-	130	3.7	24.1	-
	MEL-02-02	TDS	53	13	mg/L	-	500	51	3.5	-
	MEL-02-04	TDS	53	13	mg/L	-	500	51	3.5	-
	MEL-02-01	TDS (calculated)	46	-	mg/L	-	500	38	19.1	-
	MEL-02-02	TDS (calculated)	44	-	mg/L	-	500	38	16	-
	MEL-02-03	TDS (calculated)	44	-	mg/L	-	500	38	16	-
	MEL-02-04	TDS (calculated)	44	-	mg/L	-	500	38	16	-

Area ID	Sample ID	Parameter	Results ¹	DL	Units	MDL	Threshold	Normal Range Limit	% Above NR ²	Reliability
MEL-02	MEL-02-05	TDS (calculated)	44	-	mg/L	-	500	38	15	-
	MEL-02-01	Total Alkalinity	21	1	mg/L	-	-	20	4	-
	MEL-02-02	Total Alkalinity	20	1	mg/L	-	-	20	2	-
	MEL-02-03	Total Alkalinity	20	1	mg/L	-	-	20	2	-
	MEL-02-04	Total Alkalinity	21	1	mg/L	-	-	20	3.5	-
	MEL-02-05	Total Alkalinity	21	1	mg/L	-	-	20	4	-
	MEL-02-01	Total phosphorous	0.0064	0.003	mg/L	-	-	0.006	6.7	-
	MEL-02-02	Total phosphorous	0.0067	0.003	mg/L	-	-	0.006	11.7	-
	MEL-02-05	Total phosphorous	0.0063	0.003	mg/L	-	-	0.006	5	-
	MEL-03									
	MEL-03-01	Ammonia-N	0.059	0.005	mg/L	-	1.8	0.015	298.7	-
	MEL-03-02	Ammonia-N	0.028	0.005	mg/L	-	1.8	0.015	86.6	-
MEL-03	MEL-03-04	Ammonia-N	0.079	0.005	mg/L	-	1.8	0.015	432.2	-
	MEL-03-05	Ammonia-N	0.036	0.005	mg/L	-	1.8	0.015	138.9	-
	MEL-03-05	Antimony (T)	2.1e-05	2e-05	mg/L	-	0.009	2e-05	5	-
	MEL-03-01	Arsenic (T)	0.00027	2e-05	mg/L	-	0.025	0.00025	6.8	-
	MEL-03-02	Arsenic (T)	0.00027	2e-05	mg/L	-	0.025	0.00025	7.2	-
	MEL-03-03	Arsenic (T)	0.00027	2e-05	mg/L	-	0.025	0.00025	9.2	-
	MEL-03-04	Arsenic (T)	0.00026	2e-05	mg/L	-	0.025	0.00025	3.2	-
	MEL-03-01	Bicarbonate alkalinity	25	1.2	mg/L	-	-	24	0.8	-
	MEL-03-02	Bicarbonate alkalinity	25	1.2	mg/L	-	-	24	3.7	-
	MEL-03-03	Bicarbonate alkalinity	25	1.2	mg/L	-	-	24	2	-
	MEL-03-04	Bicarbonate alkalinity	25	1.2	mg/L	-	-	24	2.5	-
	MEL-03-05	Bicarbonate alkalinity	25	1.2	mg/L	-	-	24	0.8	-
	MEL-03-01	Chloride	9.6	0.1	mg/L	-	120	8.8	10.1	-

Area ID	Sample ID	Parameter	Results ¹	DL	Units	MDL	Threshold	Normal Range Limit	% Above NR ²	Reliability
	MEL-03-02	Chloride	9.6	0.1	mg/L	-	120	8.8	9.9	-
	MEL-03-03	Chloride	9.6	0.1	mg/L	-	120	8.8	9.6	-
	MEL-03-04	Chloride	9.6	0.1	mg/L	-	120	8.8	9.8	-
	MEL-03-05	Chloride	9.6	0.1	mg/L	-	120	8.8	9.9	-
	MEL-03-01	DOC	2.7	0.5	mg/L	-	-	2.7	0.7	-
	MEL-03-02	DOC	2.8	0.5	mg/L	-	-	2.7	2.2	-
	MEL-03-02	Lead (T)	6.2e-05	1e-05	mg/L	-	0.001	2.6e-05	140.3	Uncertain
	MEL-03-03	Magnesium (T)	1.2	0.004	mg/L	-	-	1.2	0.9	-
	MEL-03-01	Molybdenum (T)	9.9e-05	5e-05	mg/L	-	0.073	8.3e-05	19.7	-
	MEL-03-02	Molybdenum (T)	9.8e-05	5e-05	mg/L	-	0.073	8.3e-05	18.5	-
	MEL-03-03	Molybdenum (T)	0.014	5e-05	mg/L	-	0.073	8.3e-05	16465.9	Uncertain
	MEL-03-04	Molybdenum (T)	0.00013	5e-05	mg/L	-	0.073	8.3e-05	59.6	-
	MEL-03-05	Molybdenum (T)	0.00011	5e-05	mg/L	-	0.073	8.3e-05	28.2	-
	MEL-03-01	Nickel (T)	0.00045	5e-05	mg/L	-	0.025	0.00042	7.2	-
	MEL-03-02	Nickel (T)	0.00042	5e-05	mg/L	-	0.025	0.00042	0.2	-
	MEL-03-01	Potassium (T)	0.95	0.02	mg/L	-	-	0.94	1.8	-
	MEL-03-02	Potassium (T)	0.95	0.02	mg/L	-	-	0.94	1.1	-
	MEL-03-03	Potassium (T)	0.96	0.02	mg/L	-	-	0.94	2.5	-
	MEL-03-05	Potassium (T)	0.95	0.02	mg/L	-	-	0.94	1.1	-
	MEL-03-01	Sodium (T)	4.8	0.02	mg/L	-	-	4.6	6.6	-
	MEL-03-02	Sodium (T)	4.9	0.02	mg/L	-	-	4.6	8.6	-
	MEL-03-03	Sodium (T)	4.9	0.02	mg/L	-	-	4.6	7	-
	MEL-03-04	Sodium (T)	4.8	0.02	mg/L	-	-	4.6	4.8	-
	MEL-03-05	Sodium (T)	4.9	0.02	mg/L	-	-	4.6	8.4	-
	MEL-03-01	Strontium (T)	0.036	2e-05	mg/L	-	1.7	0.034	5	-

Area ID	Sample ID	Parameter	Results ¹	DL	Units	MDL	Threshold	Normal Range Limit	% Above NR ²	Reliability
MEL-04	MEL-03-02	Strontium (T)	0.037	2e-05	mg/L	-	1.7	0.034	7.6	-
	MEL-03-03	Strontium (T)	0.035	2e-05	mg/L	-	1.7	0.034	0.9	-
	MEL-03-04	Strontium (T)	0.036	2e-05	mg/L	-	1.7	0.034	6.4	-
	MEL-03-05	Strontium (T)	0.035	2e-05	mg/L	-	1.7	0.034	2.3	-
	MEL-03-01	Sulphate	3.9	0.3	mg/L	-	130	3.7	5.4	-
	MEL-03-02	Sulphate	3.9	0.3	mg/L	-	130	3.7	4.8	-
	MEL-03-03	Sulphate	3.8	0.3	mg/L	-	130	3.7	4.6	-
	MEL-03-04	Sulphate	3.9	0.3	mg/L	-	130	3.7	5.6	-
	MEL-03-05	Sulphate	3.9	0.3	mg/L	-	130	3.7	6.7	-
	MEL-03-01	TDS (calculated)	40	-	mg/L	-	500	38	3	-
	MEL-03-02	TDS (calculated)	40	-	mg/L	-	500	38	3.2	-
	MEL-03-03	TDS (calculated)	39	-	mg/L	-	500	38	1.9	-
	MEL-03-04	TDS (calculated)	40	-	mg/L	-	500	38	3.2	-
	MEL-03-05	TDS (calculated)	40	-	mg/L	-	500	38	3	-
	MEL-03-04	TKN	0.27	0.05	mg/L	-	-	0.25	7.6	-
	MEL-03-01	Total Alkalinity	20	1	mg/L	-	-	20	1	-
	MEL-03-02	Total Alkalinity	21	1	mg/L	-	-	20	3.5	-
	MEL-03-03	Total Alkalinity	20	1	mg/L	-	-	20	2	-
	MEL-03-04	Total Alkalinity	20	1	mg/L	-	-	20	2.5	-
	MEL-03-05	Total Alkalinity	20	1	mg/L	-	-	20	1	-
	MEL-03-01	Total diss phosphorous	0.01	0.003	mg/L	-	-	0.0034	208.6	Uncertain
	MEL-03-03	Total phosphorous	0.0071	0.003	mg/L	-	-	0.006	18.3	-
	MEL-04-01	Ammonia-N	0.04	0.005	mg/L	-	1.8	0.015	171.8	-

Area ID	Sample ID	Parameter	Results ¹	DL	Units	MDL	Threshold	Normal Range Limit	% Above NR ²	Reliability
	MEL-04-03	Ammonia-N	0.072	0.005	mg/L	-	1.8	0.015	385.2	-
	MEL-04-05	Ammonia-N	0.025	0.005	mg/L	-	1.8	0.015	65.1	-
	MEL-04-01	Arsenic (T)	0.00026	2e-05	mg/L	-	0.025	0.00025	3.2	-
	MEL-04-03	Arsenic (T)	0.00026	2e-05	mg/L	-	0.025	0.00025	2.8	-
	MEL-04-05	Arsenic (T)	0.00026	2e-05	mg/L	-	0.025	0.00025	2	-
	MEL-04-01	Bicarbonate alkalinity	24	1.2	mg/L	-	-	24	0.4	-
	MEL-04-02	Bicarbonate alkalinity	25	1.2	mg/L	-	-	24	1.6	-
	MEL-04-03	Bicarbonate alkalinity	25	1.2	mg/L	-	-	24	0.8	-
	MEL-04-04	Bicarbonate alkalinity	25	1.2	mg/L	-	-	24	0.8	-
	MEL-04-05	Bicarbonate alkalinity	25	1.2	mg/L	-	-	24	1.6	-
	MEL-04-01	Cadmium (T)	2e-05	2e-05	mg/L	MDL	4e-05	5e-06	300	-
	MEL-04-01	Chloride	9.5	0.1	mg/L	-	120	8.8	8.7	-
	MEL-04-02	Chloride	9.6	0.1	mg/L	-	120	8.8	9.1	-
	MEL-04-03	Chloride	9.6	0.1	mg/L	-	120	8.8	9.5	-
	MEL-04-04	Chloride	9.6	0.1	mg/L	-	120	8.8	9.4	-
	MEL-04-05	Chloride	9.6	0.1	mg/L	-	120	8.8	9.6	-
	MEL-04-01	Molybdenum (T)	0.014	5e-05	mg/L	-	0.073	8.3e-05	16224.1	-
	MEL-04-02	Molybdenum (T)	0.0096	5e-05	mg/L	-	0.073	8.3e-05	11471.9	-
	MEL-04-03	Molybdenum (T)	0.00012	5e-05	mg/L	-	0.073	8.3e-05	41.5	-
	MEL-04-04	Molybdenum (T)	1e-04	5e-05	mg/L	-	0.073	8.3e-05	20.9	-
	MEL-04-05	Molybdenum (T)	0.0078	5e-05	mg/L	-	0.073	8.3e-05	9283.3	-
	MEL-04-01	Nickel (T)	0.00042	5e-05	mg/L	-	0.025	0.00042	1	-
	MEL-04-02	Nickel (T)	0.00042	5e-05	mg/L	-	0.025	0.00042	1.9	-
	MEL-04-03	Nickel (T)	0.00044	5e-05	mg/L	-	0.025	0.00042	5.5	-
	MEL-04-04	Nickel (T)	0.00043	5e-05	mg/L	-	0.025	0.00042	2.2	-

Area ID	Sample ID	Parameter	Results ¹	DL	Units	MDL	Threshold	Normal Range Limit	% Above NR ²	Reliability
	MEL-04-05	Nickel (T)	0.00044	5e-05	mg/L	-	0.025	0.00042	6	-
	MEL-04-01	Potassium (T)	0.95	0.02	mg/L	-	-	0.94	1.5	-
	MEL-04-02	Potassium (T)	0.94	0.02	mg/L	-	-	0.94	0.2	-
	MEL-04-05	Potassium (T)	0.94	0.02	mg/L	-	-	0.94	0.5	-
	MEL-04-05	Selenium (T)	4.8e-05	4e-05	mg/L	-	0.001	4.6e-05	3.4	-
	MEL-04-01	Sodium (T)	4.8	0.02	mg/L	-	-	4.6	5.5	-
	MEL-04-02	Sodium (T)	4.7	0.02	mg/L	-	-	4.6	4.2	-
	MEL-04-03	Sodium (T)	4.8	0.02	mg/L	-	-	4.6	4.6	-
	MEL-04-04	Sodium (T)	4.7	0.02	mg/L	-	-	4.6	2.9	-
	MEL-04-05	Sodium (T)	4.9	0.02	mg/L	-	-	4.6	6.8	-
	MEL-04-01	Strontium (T)	0.038	2e-05	mg/L	-	1.7	0.034	9.3	-
	MEL-04-02	Strontium (T)	0.036	2e-05	mg/L	-	1.7	0.034	5	-
	MEL-04-03	Strontium (T)	0.036	2e-05	mg/L	-	1.7	0.034	5.8	-
	MEL-04-04	Strontium (T)	0.036	2e-05	mg/L	-	1.7	0.034	6.4	-
	MEL-04-05	Strontium (T)	0.036	2e-05	mg/L	-	1.7	0.034	5.2	-
	MEL-04-01	Sulphate	3.9	0.3	mg/L	-	130	3.7	5.1	-
	MEL-04-02	Sulphate	3.9	0.3	mg/L	-	130	3.7	5.4	-
	MEL-04-03	Sulphate	3.9	0.3	mg/L	-	130	3.7	7	-
	MEL-04-04	Sulphate	3.9	0.3	mg/L	-	130	3.7	5.6	-
	MEL-04-05	Sulphate	3.9	0.3	mg/L	-	130	3.7	5.6	-
	MEL-04-01	TDS	54	13	mg/L	-	500	51	5.5	-
	MEL-04-01	TDS (calculated)	39	-	mg/L	-	500	38	1.4	-
	MEL-04-02	TDS (calculated)	39	-	mg/L	-	500	38	2.5	-
	MEL-04-03	TDS (calculated)	39	-	mg/L	-	500	38	1.9	-
	MEL-04-04	TDS (calculated)	39	-	mg/L	-	500	38	1.9	-

Area ID	Sample ID	Parameter	Results ¹	DL	Units	MDL	Threshold	Normal Range Limit	% Above NR ²	Reliability
MEL-05	MEL-04-05	TDS (calculated)	39	-	mg/L	-	500	38	2.5	-
	MEL-04-01	TKN	0.31	0.05	mg/L	-	-	0.25	26.1	-
	MEL-04-03	TKN	0.28	0.05	mg/L	-	-	0.25	13.7	-
	MEL-04-01	Total Alkalinity	20	1	mg/L	-	-	20	0.5	-
	MEL-04-02	Total Alkalinity	20	1	mg/L	-	-	20	1.5	-
	MEL-04-03	Total Alkalinity	20	1	mg/L	-	-	20	1	-
	MEL-04-04	Total Alkalinity	20	1	mg/L	-	-	20	1	-
	MEL-04-05	Total Alkalinity	20	1	mg/L	-	-	20	1.5	-
MEL-05	MEL-05-01	Arsenic (T)	3e-04	2e-05	mg/L	-	0.025	0.00025	20.7	-
	MEL-05-02	Arsenic (T)	0.00034	2e-05	mg/L	-	0.025	0.00025	33.9	-
	MEL-05-03	Arsenic (T)	0.00031	2e-05	mg/L	-	0.025	0.00025	23.5	-
	MEL-05-04	Arsenic (T)	0.00033	2e-05	mg/L	-	0.025	0.00025	31.5	-
	MEL-05-05	Arsenic (T)	0.00032	2e-05	mg/L	-	0.025	0.00025	25.9	-
	MEL-05-01	Barium (T)	0.0083	2e-05	mg/L	-	1	0.0079	4.7	-
	MEL-05-02	Barium (T)	0.0082	2e-05	mg/L	-	1	0.0079	4	-
	MEL-05-03	Barium (T)	0.0083	2e-05	mg/L	-	1	0.0079	4.8	-
	MEL-05-04	Barium (T)	0.0085	2e-05	mg/L	-	1	0.0079	7.8	-
	MEL-05-05	Barium (T)	0.0083	2e-05	mg/L	-	1	0.0079	5.1	-
	MEL-05-01	Bicarbonate alkalinity	26	1.2	mg/L	-	-	24	7	-
	MEL-05-02	Bicarbonate alkalinity	26	1.2	mg/L	-	-	24	6.1	-
	MEL-05-03	Bicarbonate alkalinity	26	1.2	mg/L	-	-	24	4.9	-
	MEL-05-04	Bicarbonate alkalinity	26	1.2	mg/L	-	-	24	6.1	-
	MEL-05-05	Bicarbonate alkalinity	26	1.2	mg/L	-	-	24	6.6	-
	MEL-05-01	Calcium (T)	7.7	0.01	mg/L	-	-	7.3	5.9	-

Area ID	Sample ID	Parameter	Results ¹	DL	Units	MDL	Threshold	Normal Range Limit	% Above NR ²	Reliability
	MEL-05-02	Calcium (T)	7.5	0.01	mg/L	-	-	7.3	3	-
	MEL-05-03	Calcium (T)	7.5	0.01	mg/L	-	-	7.3	3	-
	MEL-05-04	Calcium (T)	7.8	0.01	mg/L	-	-	7.3	7.4	-
	MEL-05-05	Calcium (T)	7.7	0.01	mg/L	-	-	7.3	5.6	-
	MEL-05-01	Chloride	9.4	0.1	mg/L	-	120	8.8	7.9	-
	MEL-05-02	Chloride	9.4	0.1	mg/L	-	120	8.8	7.7	-
	MEL-05-03	Chloride	9.4	0.1	mg/L	-	120	8.8	7.9	-
	MEL-05-04	Chloride	9.4	0.1	mg/L	-	120	8.8	7.5	-
	MEL-05-05	Chloride	9.4	0.1	mg/L	-	120	8.8	7.4	-
	MEL-05-04	DOC	2.8	0.5	mg/L	-	-	2.7	2.6	-
	MEL-05-01	Hardness	24	0.2	-	-	-	23	5.2	-
	MEL-05-02	Hardness	24	0.2	-	-	-	23	6.1	-
	MEL-05-03	Hardness	24	0.2	-	-	-	23	5.6	-
	MEL-05-04	Hardness	24	0.2	-	-	-	23	5.2	-
	MEL-05-05	Hardness	24	0.2	-	-	-	23	4.3	-
	MEL-05-01	Lithium (T)	0.00074	5e-04	mg/L	-	-	7e-04	5.7	-
	MEL-05-02	Lithium (T)	0.00072	5e-04	mg/L	-	-	7e-04	2.9	-
	MEL-05-03	Lithium (T)	0.00073	5e-04	mg/L	-	-	7e-04	4.3	-
	MEL-05-04	Lithium (T)	0.00076	5e-04	mg/L	-	-	7e-04	8.6	-
	MEL-05-05	Lithium (T)	0.00074	5e-04	mg/L	-	-	7e-04	5.7	-
	MEL-05-01	Magnesium (T)	1.2	0.004	mg/L	-	-	1.2	0.9	-
	MEL-05-02	Magnesium (T)	1.2	0.004	mg/L	-	-	1.2	1.7	-
	MEL-05-03	Magnesium (T)	1.2	0.004	mg/L	-	-	1.2	2.6	-
	MEL-05-05	Magnesium (T)	1.2	0.004	mg/L	-	-	1.2	1.7	-
	MEL-05-01	Molybdenum (T)	0.00012	5e-05	mg/L	-	0.073	8.3e-05	39.1	-

Area ID	Sample ID	Parameter	Results ¹	DL	Units	MDL	Threshold	Normal Range Limit	% Above NR ²	Reliability
	MEL-05-02	Molybdenum (T)	9.9e-05	5e-05	mg/L	-	0.073	8.3e-05	19.7	-
	MEL-05-03	Molybdenum (T)	0.00014	5e-05	mg/L	-	0.073	8.3e-05	66.9	-
	MEL-05-04	Molybdenum (T)	0.00013	5e-05	mg/L	-	0.073	8.3e-05	54.8	-
	MEL-05-05	Molybdenum (T)	0.00027	5e-05	mg/L	-	0.073	8.3e-05	221.6	-
	MEL-05-01	Potassium (T)	1	0.02	mg/L	-	-	0.94	8.9	-
	MEL-05-02	Potassium (T)	1	0.02	mg/L	-	-	0.94	8.9	-
	MEL-05-03	Potassium (T)	1	0.02	mg/L	-	-	0.94	9.9	-
	MEL-05-04	Potassium (T)	1	0.02	mg/L	-	-	0.94	6.7	-
	MEL-05-05	Potassium (T)	1	0.02	mg/L	-	-	0.94	7.8	-
	MEL-05-01	Reactive silica	0.29	0.01	mg/L	-	-	0.26	9.1	-
	MEL-05-02	Reactive silica	0.28	0.01	mg/L	-	-	0.26	6.4	-
	MEL-05-03	Reactive silica	0.28	0.01	mg/L	-	-	0.26	5.7	-
	MEL-05-04	Reactive silica	0.28	0.01	mg/L	-	-	0.26	4.5	-
	MEL-05-05	Reactive silica	0.28	0.01	mg/L	-	-	0.26	4.2	-
	MEL-05-02	Selenium (T)	6.4e-05	4e-05	mg/L	-	0.001	4.6e-05	37.9	-
	MEL-05-03	Selenium (T)	5e-05	4e-05	mg/L	-	0.001	4.6e-05	7.8	-
	MEL-05-04	Selenium (T)	4.9e-05	4e-05	mg/L	-	0.001	4.6e-05	5.6	-
	MEL-05-05	Selenium (T)	4.9e-05	4e-05	mg/L	-	0.001	4.6e-05	5.6	-
	MEL-05-01	Sodium (T)	4.8	0.02	mg/L	-	-	4.6	4.6	-
	MEL-05-02	Sodium (T)	4.7	0.02	mg/L	-	-	4.6	3.3	-
	MEL-05-03	Sodium (T)	4.8	0.02	mg/L	-	-	4.6	4.4	-
	MEL-05-05	Sodium (T)	4.6	0.02	mg/L	-	-	4.6	0.7	-
	MEL-05-01	Strontium (T)	0.037	2e-05	mg/L	-	1.7	0.034	7.9	-
	MEL-05-02	Strontium (T)	0.036	2e-05	mg/L	-	1.7	0.034	6.4	-
	MEL-05-03	Strontium (T)	0.037	2e-05	mg/L	-	1.7	0.034	7	-

Area ID	Sample ID	Parameter	Results ¹	DL	Units	MDL	Threshold	Normal Range Limit	% Above NR ²	Reliability
	MEL-05-04	Strontium (T)	0.036	2e-05	mg/L	-	1.7	0.034	4.7	-
	MEL-05-05	Strontium (T)	0.037	2e-05	mg/L	-	1.7	0.034	6.7	-
	MEL-05-01	Sulphate	3.8	0.3	mg/L	-	130	3.7	4.3	-
	MEL-05-02	Sulphate	3.9	0.3	mg/L	-	130	3.7	4.8	-
	MEL-05-03	Sulphate	3.8	0.3	mg/L	-	130	3.7	4.3	-
	MEL-05-04	Sulphate	3.8	0.3	mg/L	-	130	3.7	3.7	-
	MEL-05-05	Sulphate	3.9	0.3	mg/L	-	130	3.7	4.8	-
	MEL-05-05	TDS	59	13	mg/L	-	500	51	15.2	-
	MEL-05-01	TDS (calculated)	41	-	mg/L	-	500	38	6.4	-
	MEL-05-02	TDS (calculated)	41	-	mg/L	-	500	38	7.7	-
	MEL-05-03	TDS (calculated)	41	-	mg/L	-	500	38	6.9	-
	MEL-05-04	TDS (calculated)	41	-	mg/L	-	500	38	7.1	-
	MEL-05-05	TDS (calculated)	41	-	mg/L	-	500	38	6.6	-
	MEL-05-01	Total Alkalinity	21	1	mg/L	-	-	20	7	-
	MEL-05-02	Total Alkalinity	21	1	mg/L	-	-	20	6	-
	MEL-05-03	Total Alkalinity	21	1	mg/L	-	-	20	5	-
	MEL-05-04	Total Alkalinity	21	1	mg/L	-	-	20	6	-
	MEL-05-05	Total Alkalinity	21	1	mg/L	-	-	20	6.5	-

¹Bold values are above the threshold as well as above the trigger value.

²Calculated as Result - Normal Range Limit / Normal Range Limit * 100. Darker red colours indicate a greater difference between results and normal range.

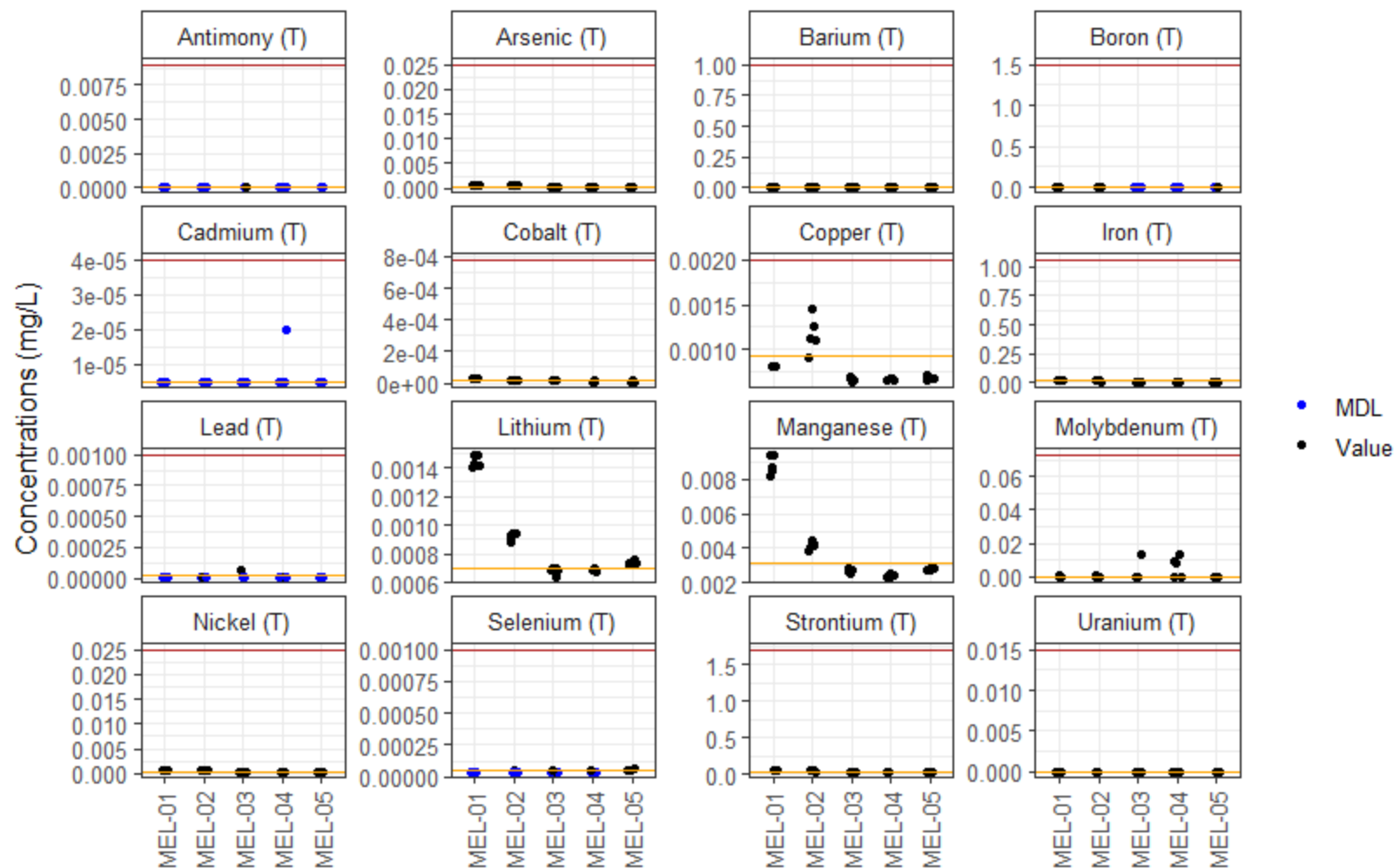


Figure 1: Sampling event results for metals in Meliadine Lake with at least one sample above the upper limit of the normal range. The red line indicates the relevant threshold (if applicable) while the orange line indicates the upper limit of the normal range (if applicable). Samples below method detection limits (MDL) are set to the detection limit and shown in blue.

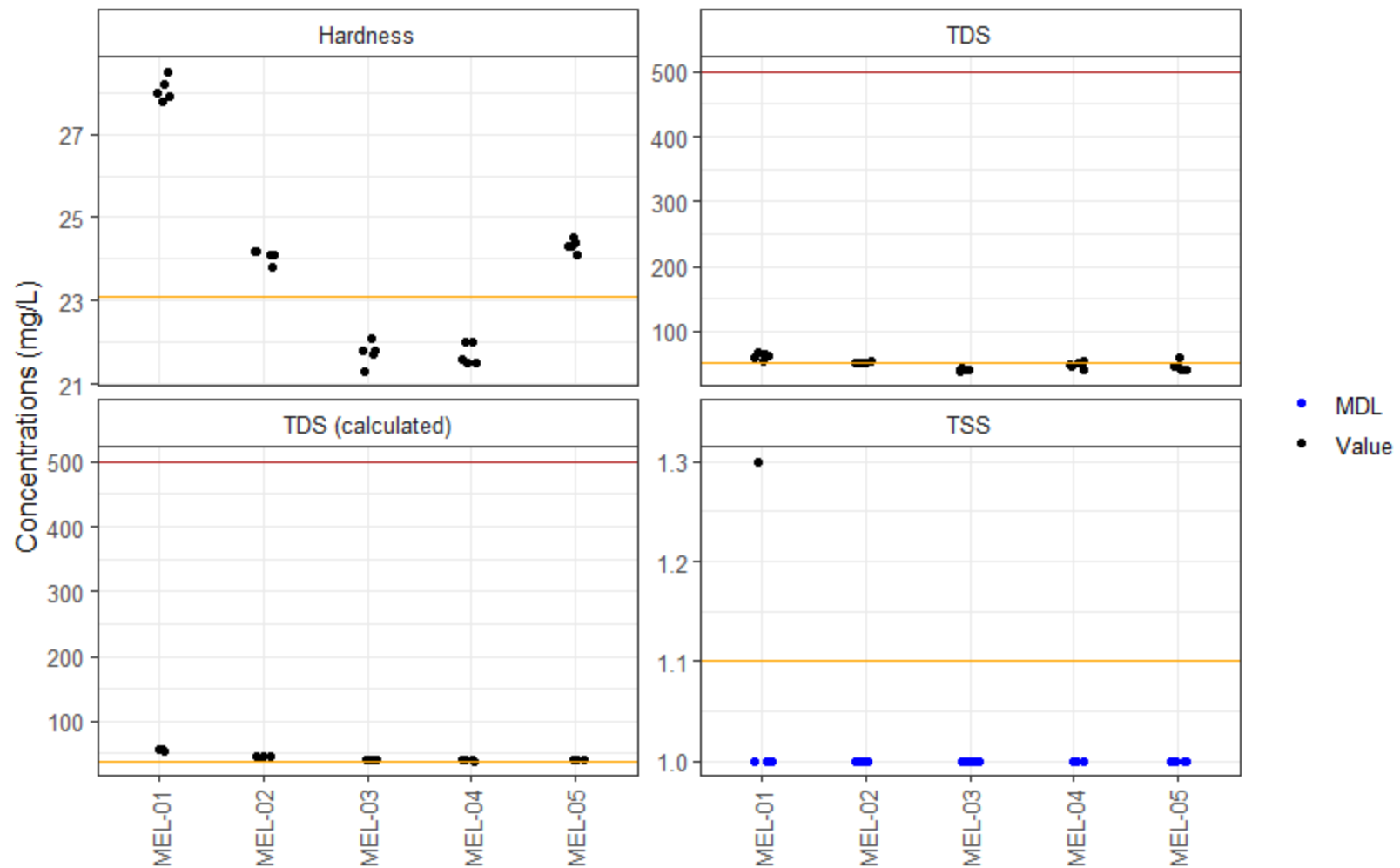


Figure 2: Sampling event results for conventional parameters in Meliadine Lake with at least one sample above the upper limit of the normal range. The red line indicates the relevant threshold (if applicable) while the orange line indicates the upper limit of the normal range (if applicable). Samples below method detection limits (MDL) are set to the detection limit and shown in blue.

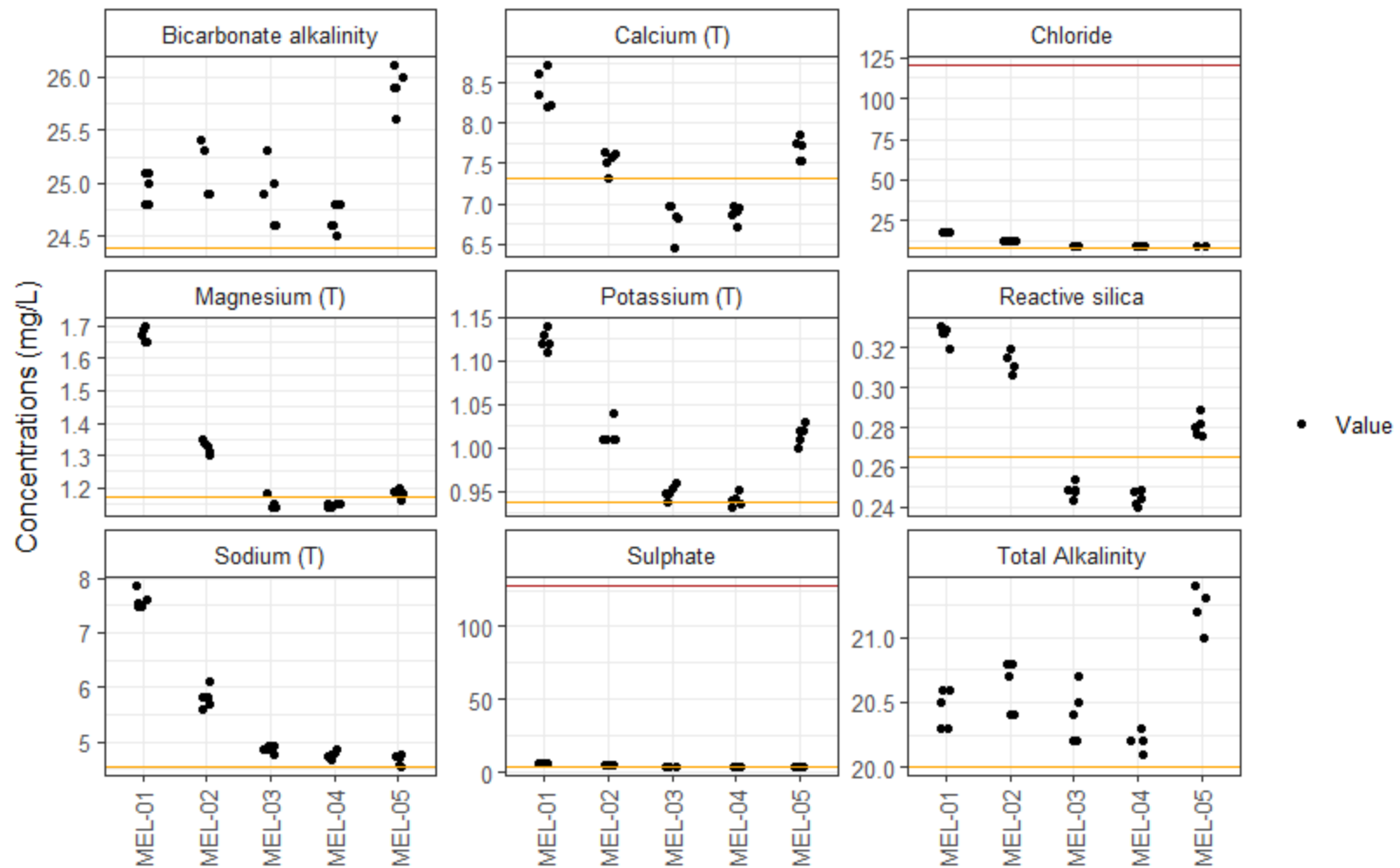


Figure 3: Sampling event results for major ions in Meliadine Lake with at least one sample above the upper limit of the normal range. The red line indicates the relevant threshold (if applicable) while the orange line indicates the upper limit of the normal range (if applicable). Samples below method detection limits (MDL) are set to the detection limit and shown in blue.

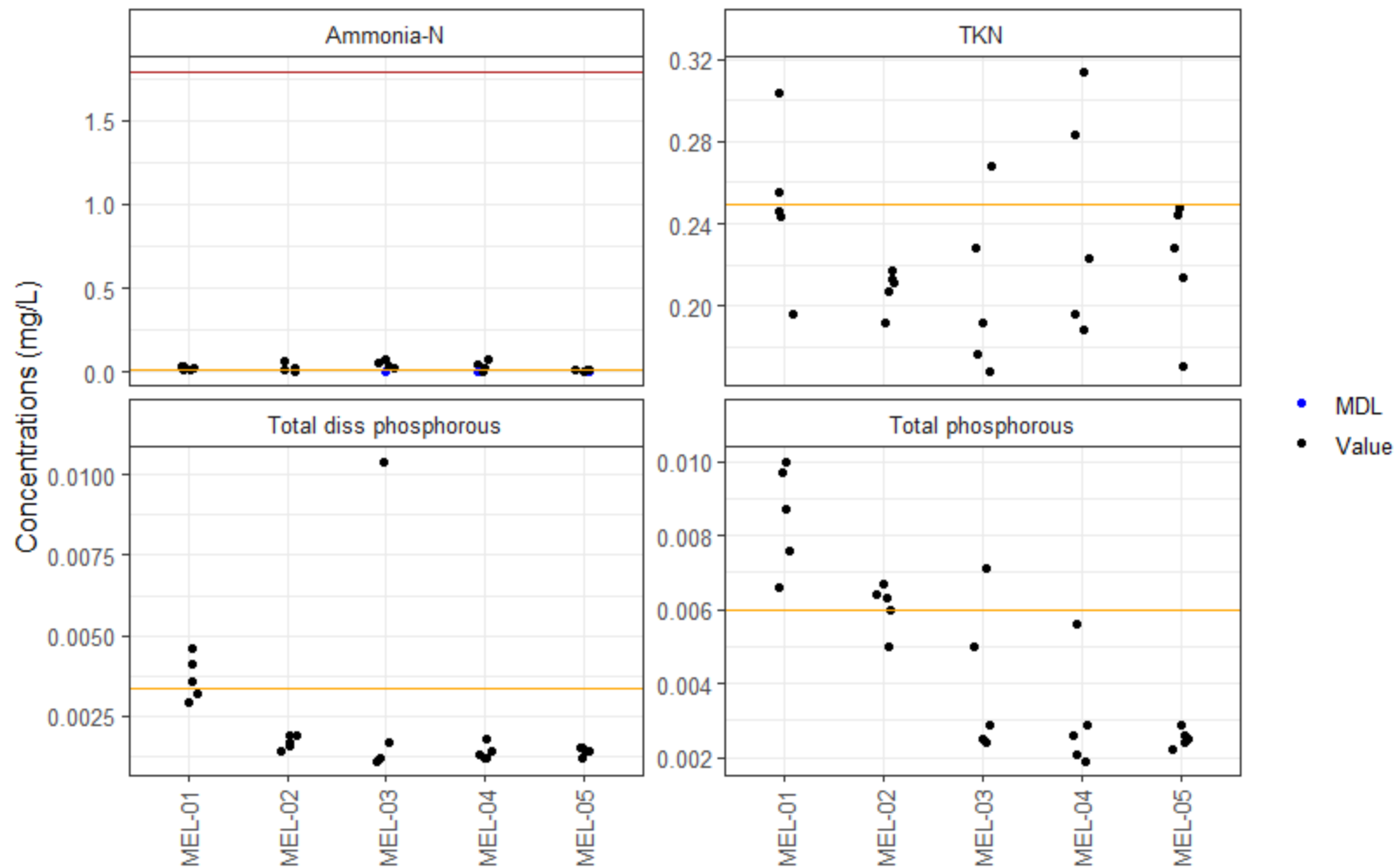


Figure 4: Sampling event results for nutrients in Meliadine Lake with at least one sample above the upper limit of the normal range. The red line indicates the relevant threshold (if applicable) while the orange line indicates the upper limit of the normal range (if applicable). Samples below method detection limits (MDL) are set to the detection limit and shown in blue.

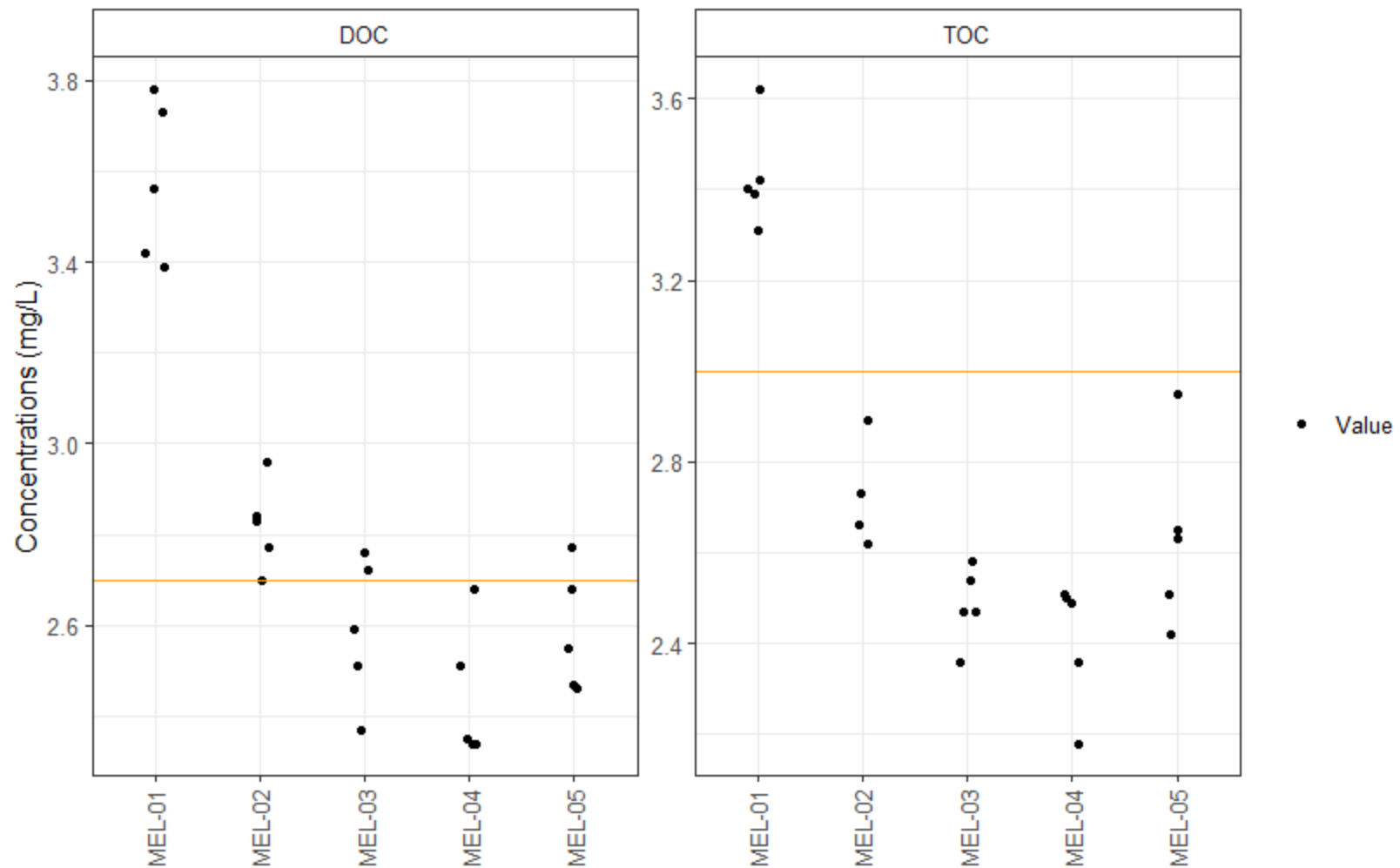


Figure 5: Sampling event results for other parameters in Meliadine Lake with at least one sample above the upper limit of the normal range. The red line indicates the relevant threshold (if applicable) while the orange line indicates the upper limit of the normal range (if applicable). Samples below method detection limits (MDL) are set to the detection limit and shown in blue.

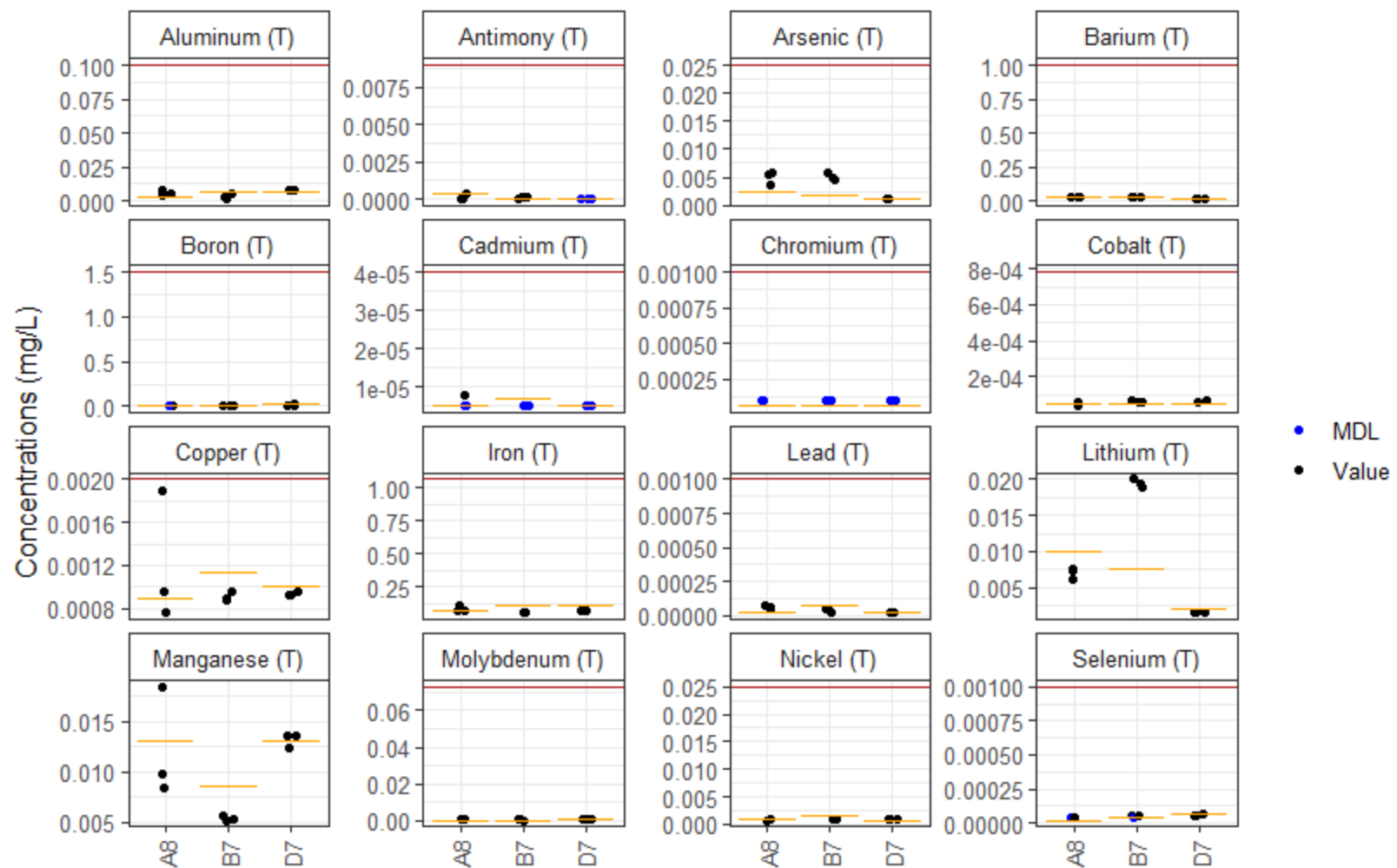


Figure 6: Sampling event results for metals in the Peninsula Lakes with at least one sample above the upper limit of the normal range. The red line indicates the relevant threshold (if applicable) while the orange line indicates the upper limit of the normal range (if applicable). Samples below method detection limits (MDL) are set to the detection limit and shown in blue.

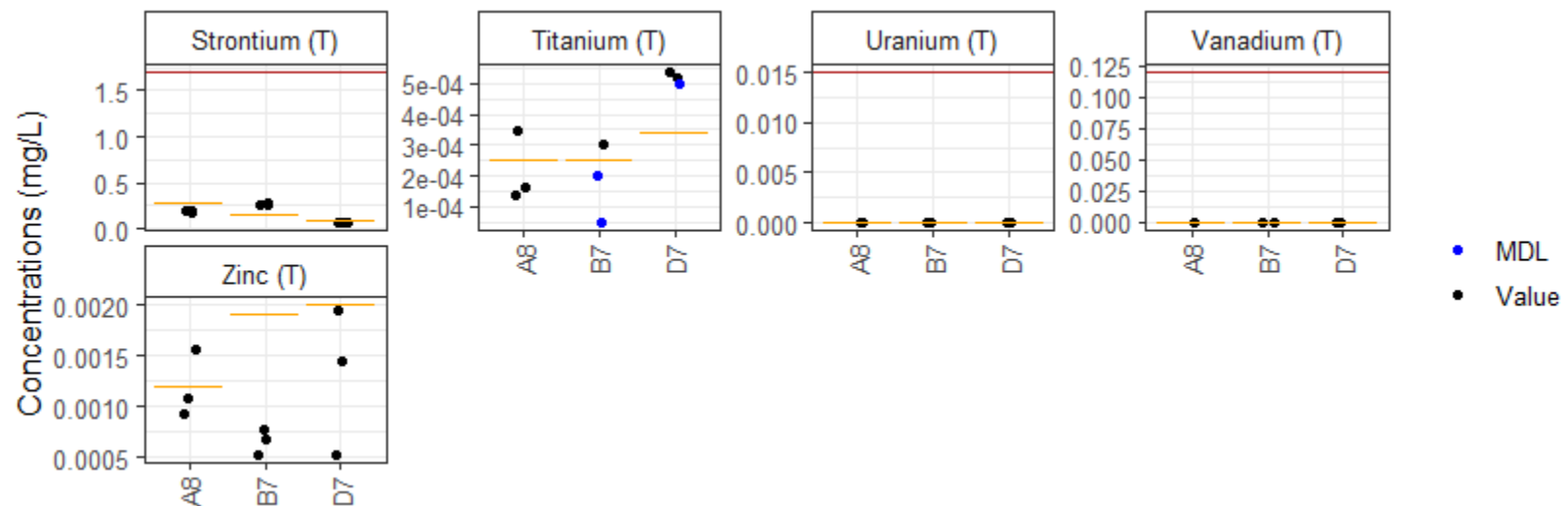


Figure 7: Sampling event results for metals in the Peninsula Lakes with at least one sample above the upper limit of the normal range (Part 2). The red line indicates the relevant threshold (if applicable) while the orange line indicates the upper limit of the normal range (if applicable). Samples below method detection limits (MDL) are set to the detection limit and shown in blue.

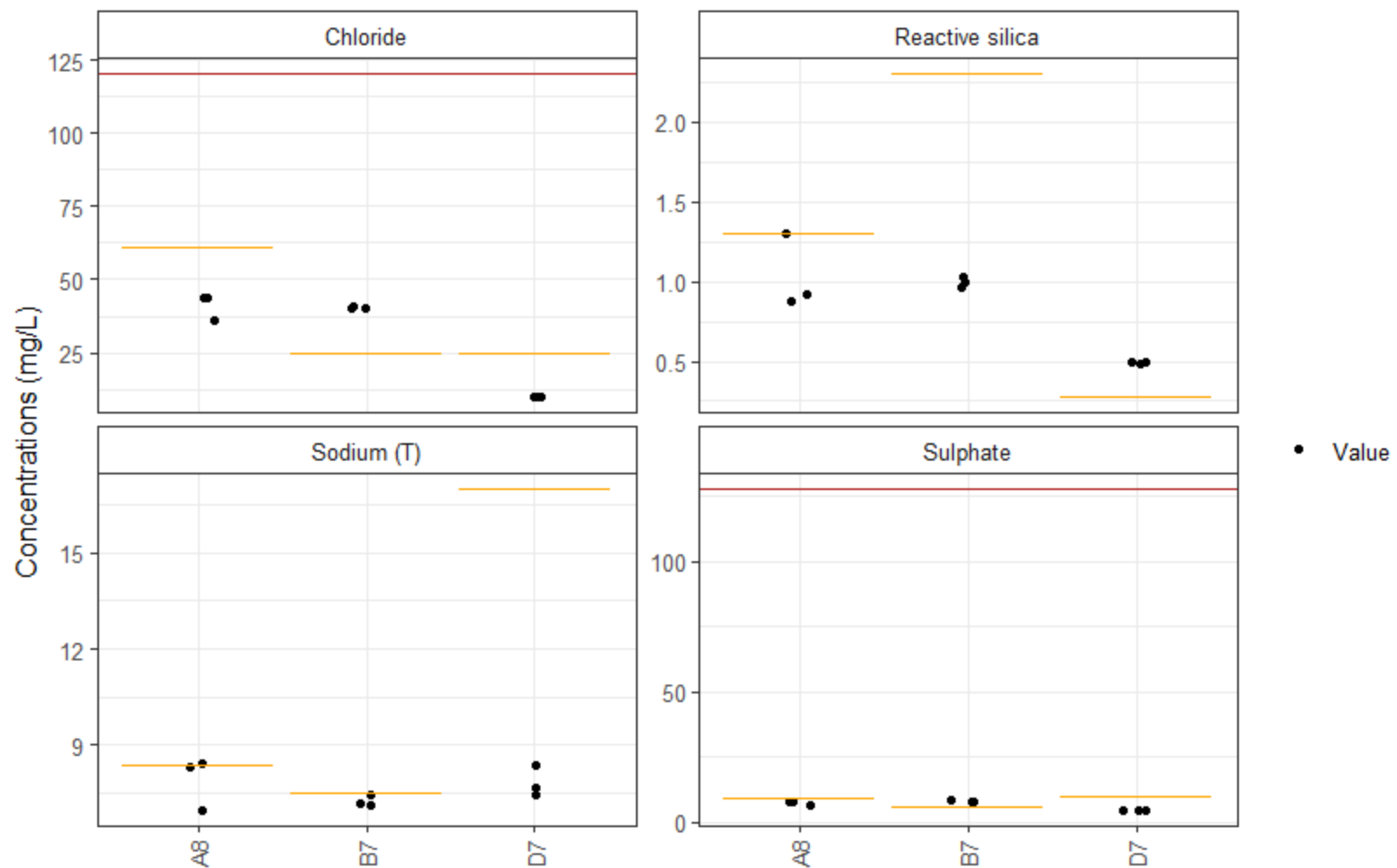


Figure 8: Sampling event results for major ions in the Peninsula Lakes with at least one sample above the upper limit of the normal range. The red line indicates the relevant threshold (if applicable) while the orange line indicates the upper limit of the normal range (if applicable). Samples below method detection limits (MDL) are set to the detection limit and shown in blue.

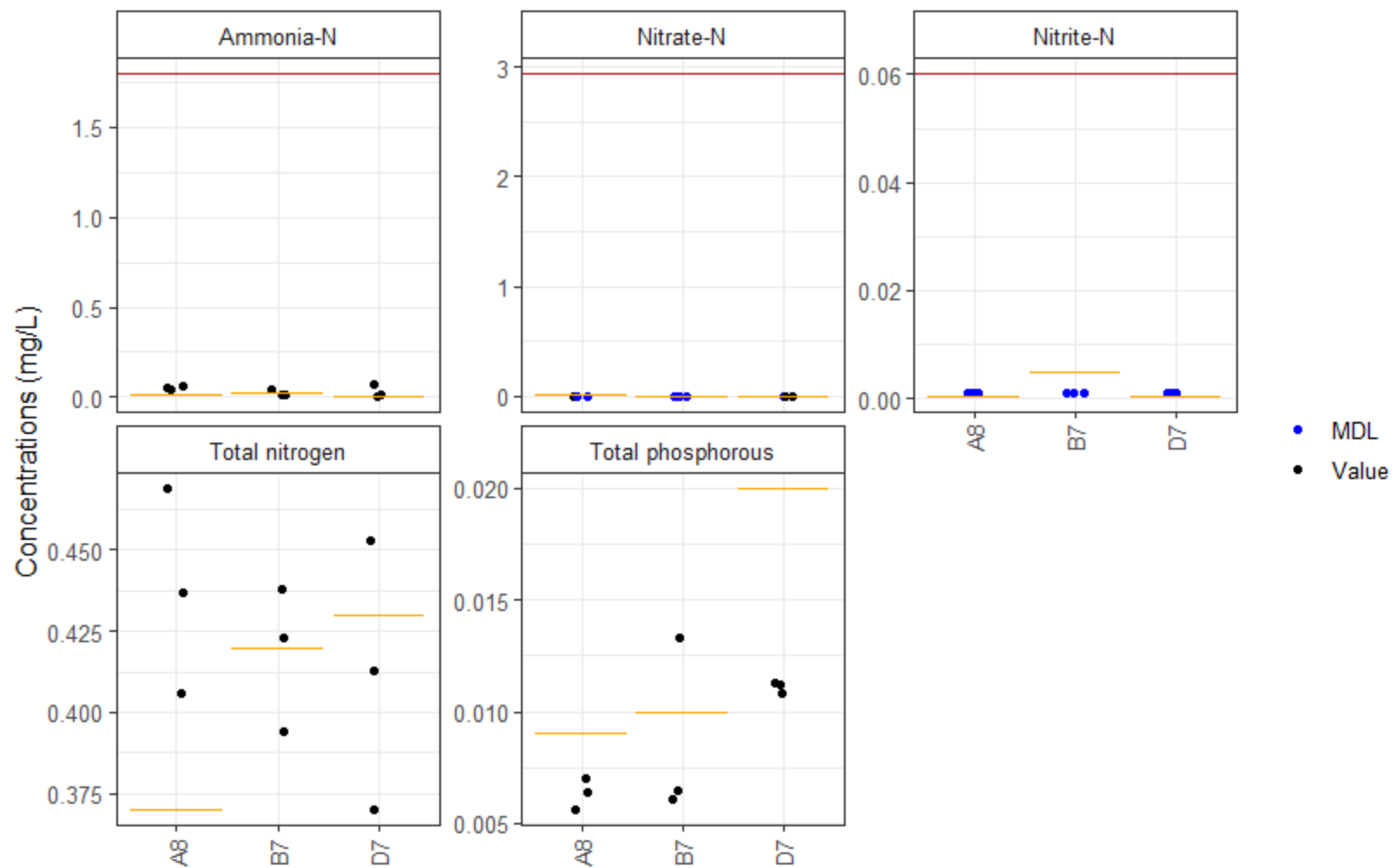


Figure 9: Sampling event results for nutrients in the Peninsula Lakes with at least one sample above the upper limit of the normal range. The red line indicates the relevant threshold (if applicable) while the orange line indicates the upper limit of the normal range (if applicable). Samples below method detection limits (MDL) are set to the detection limit and shown in blue.

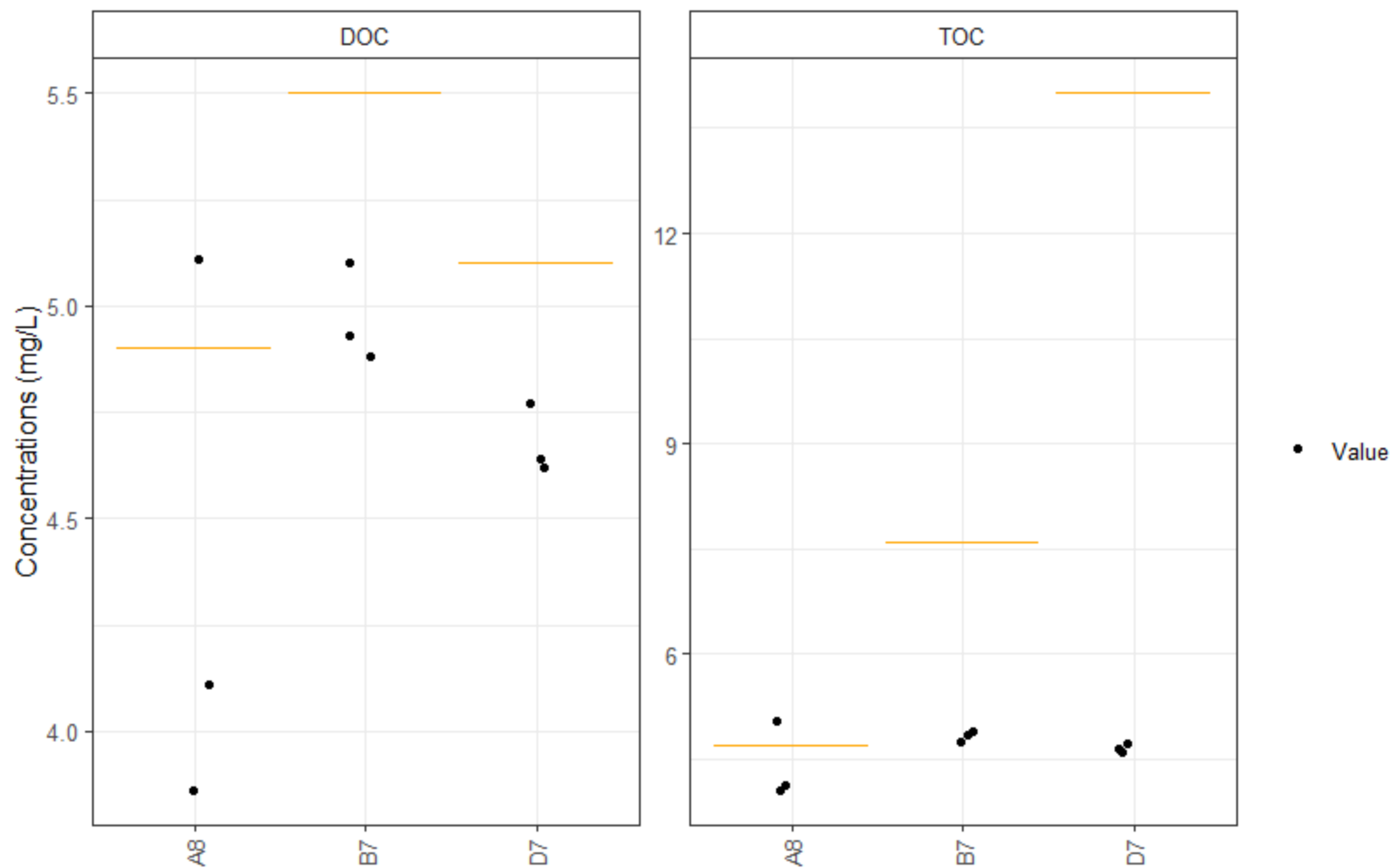


Figure 10: Sampling event results for other parameters in the Peninsula Lakes with at least one sample above the upper limit of the normal range. The red line indicates the relevant threshold (if applicable) while the orange line indicates the upper limit of the normal range (if applicable). Samples below method detection limits (MDL) are set to the detection limit and shown in blue.

2.1 Result Reliability Checks

Two preliminary analyses were conducted to assess the reliability of sample results. Samples failing either one of these tests have been flagged as uncertain, and warrant further evaluation.

The first analysis compares dissolved and total concentrations for a given parameters at each location. Samples in which dissolved concentrations are greater than total with a relative percent difference (RPD) of more than 30% are considered potentially unreliable. All samples failing to meet this reliability check are summarized in Table 5.

The second analysis compares parameter concentrations within each sampling area. In most cases, samples at stations in the same sampling area are expected to have similar concentrations, and outlying data points may be anomalous. Sampling areas where the maximum concentration was more than a factor of 5 greater than the median of all samples within the sampling area are highlighted here as potentially unreliable. All samples failing to meet this reliability check are summarized in Table 6.

Table 5: Samples with uncertain reliability due to differences in dissolved and total parameter results.

Sample ID	Area ID	Parameter	Result (T)	Result (D)	MDL (T)	MDL (D)	RPD
D7-03	D7	Molybdenum	0.000452	0.00533	-	-	168.7
D7-01	D7	Molybdenum	0.000468	0.00444	-	-	161.9
A8-03	A8	Mercury	5.9e-07	2.16e-06	-	-	114.2
A8-01	A8	Antimony	4.3e-05	0.000106	-	-	84.6
A8-02	A8	Mercury	5e-07	1.08e-06	MDL	-	73.4
B7-02	B7	Tin	3.5e-05	6.5e-05	-	-	60
MEL-04-01	MEL-04	Selenium	4e-05	6.8e-05	MDL	-	51.9
MEL-01-07	MEL-01	Zinc	5e-04	0.00083	MDL	-	49.6
MEL-02-01	MEL-02	Zinc	5e-04	0.00077	MDL	-	42.5
MEL-02-05	MEL-02	Aluminum	0.0034	0.0051	-	-	40
B7-01	B7	Mercury	5e-07	7.5e-07	MDL	-	40
B7-02	B7	Antimony	0.000144	0.000208	-	-	36.4
MEL-05-05	MEL-05	Uranium	1.15e-05	1.58e-05	-	-	31.5

Table 6: Samples with uncertain reliability due to differences between results from the same sampling area.

Area ID	Parameter	DL	Median	Max	Difference	Station_with_Max
MEL-03	Molybdenum (T)	0.00005	0.000106	0.013700	129.2	MEL-03-03
MEL-04	Molybdenum (D)	0.00005	0.000083	0.002970	35.8	MEL-04-05
MEL-03	Total diss phosphorous	0.00140	0.001200	0.010400	8.7	MEL-03-01
MEL-01	Molybdenum (T)	0.00005	0.000103	0.000680	6.6	MEL-01-07
MEL-02	Molybdenum (T)	0.00005	0.000102	0.000650	6.4	MEL-02-05
MEL-03	Lead (T)	0.00001	0.000010	0.000062	6.2	MEL-03-02
A8	Antimony (T)	0.00002	0.000057	0.000312	5.5	A8-02

3 LABORATORY & FIELD QUALITY CONTROL RESULTS

ALS' laboratory QC samples for water are:

- *Laboratory duplicates* (LD) - these samples provide insights into the precision of laboratory analyses. Duplicate aliquots are taken from the samples and run through part (aliquots taken post digestion) or all (aliquots taken from the sample bottle) the laboratory analytical process.
- *Laboratory control samples* (LCS) - these samples provide insights into whether the laboratory systems are working as intended. They are comprised of a mixture of analyte-free water to which known amounts of the method analytes are added. They are essentially an internal version of a certified reference material.
- *Matrix spikes* (MS) - these samples involve the analysis of actual samples, to which a known amount of method analytes are added in amounts high enough that the spikes are clearly discernable relative to existing concentrations. These samples provide insights into the degree that the sample matrix could interfere with analyses.
- *Matrix blanks* (MB) - these samples are analyzed to assess background interference or contamination that exists in the analytical system that could lead to elevated concentrations or false positive data. These samples are comprised of analyte-free water.

The following field QC samples were collected and submitted blind to ALS:

- *Field duplicates* (FD) - these samples provide insights into (a) variability in field conditions and (b) the precision of laboratory analyses. Duplicate samples are collected from the same location and treated independently through the sampling and analysis process.
- *Deionized blanks* (DB) - these samples 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.
- *Equipment blanks* (EB) - these samples 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.
- *Travel blanks* (TB) - these samples 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.

3.1 Overall QC Results

Overall laboratory and field QC results are summarized in Table 7.

Table 7: Summary of laboratory and field QC results by sample type.

	QC_Element	Pass	Fail	ND
Laboratory	Lab Duplicate	351	0	0
	Lab Control Sample	542	0	0
	Matrix Spike	315	0	26
	Matrix Blank	533	3	0
Field	Field Duplicate	483	15	2
	Deionized Water Blank	114	8	0
	Equipment Blank	100	22	0
	Travel Blank	75	2	0

3.2 Laboratory Duplicates

All laboratory duplicate results met laboratory QC objectives.

3.3 Laboratory Control Samples

All laboratory control sample results met laboratory QC objectives.

3.4 Matrix Spike

All matrix spike results met laboratory QC objectives.

In addition, some parameters had spike levels too low to confidently quantify them relative to existing concentrations in the sample. Consequently, QC results for these results could not be calculated (see Table 8).

Table 8: Analytes not determined for matrix spikes.

QC_Lot	Analyte	ALS_QC_ID ¹
1362325	Calcium (Ca)-Dissolved	DUP-MEL-AUG-01
1362325	Magnesium (Mg)-Dissolved	DUP-MEL-AUG-01
1362325	Sodium (Na)-Dissolved	DUP-MEL-AUG-01
1362325	Strontium (Sr)-Dissolved	DUP-MEL-AUG-01
1358518	Silica, Reactive (as SiO ₂)	DUP-MEL-AUG-02
1362333	Calcium (Ca)-Total	MEL-04-05-PC
1362333	Magnesium (Mg)-Total	MEL-04-05-PC
1362333	Sodium (Na)-Total	MEL-04-05-PC
1362333	Strontium (Sr)-Total	MEL-04-05-PC
1362324	Calcium (Ca)-Dissolved	MEL-04-05-PC
1362324	Magnesium (Mg)-Dissolved	MEL-04-05-PC
1362324	Sodium (Na)-Dissolved	MEL-04-05-PC
1362324	Strontium (Sr)-Dissolved	MEL-04-05-PC
1363494	Calcium (Ca)-Total	DUP-MEL-AUG-04
1363494	Magnesium (Mg)-Total	DUP-MEL-AUG-04
1363494	Sodium (Na)-Total	DUP-MEL-AUG-04
1363494	Strontium (Sr)-Total	DUP-MEL-AUG-04
1368820	Silica, Reactive (as SiO ₂)	MEL-05-04
1365002	Calcium (Ca)-Total	MEL-05-05
1365002	Magnesium (Mg)-Total	MEL-05-05
1365002	Sodium (Na)-Total	MEL-05-05
1365002	Strontium (Sr)-Total	MEL-05-05
1363505	Calcium (Ca)-Dissolved	MEL-05-05
1363505	Magnesium (Mg)-Dissolved	MEL-05-05
1363505	Sodium (Na)-Dissolved	MEL-05-05
1363505	Strontium (Sr)-Dissolved	MEL-05-05

¹ALS_QC_ID listing of 'Anonymous' indicates QC sample from another client used.

3.5 Matrix Blank

In this sampling event, 3 matrix blanks results failed to meet the QC objectives. Matrix blank results not meeting QC objectives are summarized in Table 9.

Table 9: Details for matrix blank results not meeting QC objectives.

QC_Lot	Analyte	Result	Limit	MDL	MB.QC
1362325	Aluminum (Al)-Dissolved	7.0e-03	1e-03	MDL	Fail
1362325	Chromium (Cr)-Dissolved	6.0e-04	1e-04	MDL	Fail
1362325	Thorium (Th)-Dissolved	8.6e-06	5e-06	-	Fail

3.6 Field Duplicates

In this sampling event, 15 field duplicate samples failed to meet the QC objectives. Field duplicate sample results not meeting QC objectives are summarized in Table 10.

In addition, some field duplicate samples could not be appropriately compared to other samples due to differences in detection limits. Consequently, QC results for these results could not be calculated (see Table 11).

Table 10: Details for field duplicate results not meeting QC objectives.

QC_Lot.x	Analyte	RPD	DIFFx	FD.QC
1365616	Ammonia, Total (as N)	185.8	39.7	Fail
1365616	Ammonia, Total (as N)	168.9	10.9	Fail
1365617	Ammonia, Total (as N)	69.0	7.4	Fail
1362325	Antimony (Sb)-Dissolved	169.0	10.9	Fail
1362324	Antimony (Sb)-Dissolved	129.8	3.7	Fail
1363505	Antimony (Sb)-Dissolved	164.1	9.1	Fail
1362331	Antimony (Sb)-Total	182.0	20.2	Fail
1362333	Antimony (Sb)-Total	160.6	8.2	Fail
1362324	Manganese (Mn)-Dissolved	68.6	9.1	Fail
1368906	Total Kjeldahl Nitrogen	58.7	3.5	Fail
	Total Nitrogen	54.9	3.4	Fail
	Total Nitrogen	54.9	3.4	Fail
	Total Nitrogen	54.9	3.4	Fail
	Total Nitrogen	54.9	3.4	Fail
1362324	Zirconium (Zr)-Dissolved	167.5	10.3	Fail

Table 11: Details for field duplicate results which could not be determined.

QC_Lot.x	Analyte	RPD	DIFFx	FD.QC
1361164	Phosphorus (P)-Total	80.4	NA	ND
1360087	Phosphorus (P)-Total Dissolved	164.9	NA	ND

3.7 DI Blank

In this sampling event, 8 deionized water blank samples failed to meet the QC objectives. Deionized water blank results not meeting QC objectives are summarized in Table 13.

Table 13: Details for deionized water blank results not meeting QC objectives.

QC_Lot	ID	Analyte	Results	DL	FB.QC
1370683	DI	Ammonia, Total (as N)	9.0e-03	5e-03	Fail
1365002	DI	Arsenic (As)-Total	3.0e-05	2e-05	Fail
1365002	DI	Barium (Ba)-Total	2.5e-05	2e-05	Fail
1365002	DI	Iron (Fe)-Total	1.2e-03	1e-03	Fail
1365002	DI	Strontium (Sr)-Total	2.4e-05	2e-05	Fail
1366838	DI	Barium (Ba)-Dissolved	3.5e-05	2e-05	Fail
1366838	DI	Calcium (Ca)-Dissolved	1.7e-02	1e-02	Fail
1366838	DI	Zinc (Zn)-Dissolved	1.3e-03	5e-04	Fail

3.8 Equipment Blank

In this sampling event, 22 equipment blank samples failed to meet the QC objectives. Equipment blank results not meeting QC objectives are summarized in Table 12.

Table 12: Details for equipment blank results not meeting QC objectives.

QC_Lot	ID	Analyte	Results	DL	FB.QC
1362852	EB	Alkalinity, Total (as CaCO ₃)	1.30e+00	1.0e+00	Fail
1370683	EB	Ammonia, Total (as N)	7.20e-03	5.0e-03	Fail
	EB	Bicarbonate (HCO ₃)	1.60e+00	1.2e+00	Fail
	EB	Nitrate and Nitrite as N	7.50e-03	5.1e-03	Fail
1365263	EB	Nitrate (as N)	7.50e-03	5.0e-03	Fail
1365002	EB	Antimony (Sb)-Total	4.21e-04	2.0e-05	Fail
1365002	EB	Barium (Ba)-Total	4.70e-05	2.0e-05	Fail
1365002	EB	Calcium (Ca)-Total	3.10e-02	1.0e-02	Fail

QC_Lot	ID	Analyte	Results	DL	FB.QC
1365002	EB	Copper (Cu)-Total	8.30e-05	5.0e-05	Fail
1365002	EB	Magnesium (Mg)-Total	5.70e-03	4.0e-03	Fail
1365002	EB	Rubidium (Rb)-Total	6.50e-06	5.0e-06	Fail
1365002	EB	Sodium (Na)-Total	3.50e-02	2.0e-02	Fail
1365002	EB	Strontium (Sr)-Total	1.81e-04	2.0e-05	Fail
1365002	EB	Tin (Sn)-Total	3.40e-05	2.0e-05	Fail
1366838	EB	Antimony (Sb)-Dissolved	5.30e-05	2.0e-05	Fail
1366838	EB	Barium (Ba)-Dissolved	4.40e-05	2.0e-05	Fail
1366838	EB	Calcium (Ca)-Dissolved	4.50e-02	1.0e-02	Fail
1366838	EB	Copper (Cu)-Dissolved	8.50e-05	5.0e-05	Fail
1366838	EB	Magnesium (Mg)-Dissolved	8.80e-03	4.0e-03	Fail
1366838	EB	Rubidium (Rb)-Dissolved	6.30e-06	5.0e-06	Fail
1366838	EB	Sodium (Na)-Dissolved	4.30e-02	2.0e-02	Fail
1366838	EB	Strontium (Sr)-Dissolved	2.34e-04	2.0e-05	Fail

3.9 Travel Blank

In this sampling event, 2 travel blank samples failed to meet the QC objectives. Travel blank results not meeting QC objectives are summarized in Table 14.

Table 14: Details for travel blank results not meeting QC objectives.

QC_Lot	ID	Analyte	Results	DL	FB.QC
1374645	TB	Ammonia, Total (as N)	0.06490	5e-03	Fail
	TB	Zinc (Zn)-Total	0.00053	5e-04	Fail

3.10 Holding Time Exceedances

In addition to those ALS laboratory QC samples described above, during QC screening samples were also assessed against recommended hold times. Parameters and associated sample numbers exceeding recommended hold times in this sampling event are shown in Table 15. Note that pH is included in the suite of field measurements and has a very short recommended hold time, so exceeding the hold time for laboratory analysis is expected and of little importance.

Table 15: Analytes and associated number of samples exceeding holding times.

Analyte	n
Phosphate Ortho Dissolved in Water	82
Nitrate in Water by IC (Low Level)	41
Nitrite in Water by IC (Low Level)	41
pH	41
Turbidity	41
Total Dissolved Solids (TDS)	14
Total Suspended Solids	14
Diss. Mercury in Water by CVAFS (Ultra)	1

SEPTEMBER 2020 SAMPLING EVENT:
PRELIMINARY SCREENING AND QC ASSESSMENT

Meliadine Mine - Water Quality Monitoring 2020

Preliminary Screening of September, 2020 Water Quality Monitoring

Azimuth Consulting Group Inc.
on behalf of Agnico Eagle Mines Ltd.

Report Date: 2020-11-20

Table of Contents

1	INTRODUCTION & SAMPLING OVERVIEW	2
2	TRIGGER SCREENING	3
2.1	Result Reliability Checks.....	26
3	LABORATORY & FIELD QUALITY CONTROL RESULTS	27
3.1	Overall QC Results	28
3.2	Laboratory Duplicates	28
3.3	Laboratory Control Samples.....	28
3.4	Matrix Spike.....	28
3.5	Matrix Blank	29
3.6	Field Duplicates	29
3.7	DI Blank	29
3.8	Equipment Blank	31
3.9	Travel Blank	32
3.10	Holding Time Exceedances.....	32

1 INTRODUCTION & SAMPLING OVERVIEW

This document was prepared by Azimuth Consulting Group Inc (Azimuth) to provide the Meliadine Environment Department with a brief overview of the water chemistry results collected in September, 2020 as part of the Aquatic Effects Monitoring Program (AEMP). AEMP water quality monitoring occurs in March (MEL-01 and -02), July (MEL-01, -02, and -03), August (MEL-01, -02, -03, -04, and -05), and September (MEL-01, -02, and -03). In addition, peninsula lakes A8, B7, and D7 are sampled in July and August. The purpose of this memo is to:

1. Screen the water chemistry results from ALS against normal ranges and thresholds to keep the Environment Department informed about potential changes in water quality, including the early identification of potentially anomalous data (Section 2).
2. Review laboratory (blanks, duplicates, matrix spikes, etc.) and field quality control (QC) results, and identify potential issues in lab or field methods (Section 3).

Samples included in this report are shown in Table 1, while field blanks are shown in Table 2.

Table 1: Summary of September, 2020 samples.

Sample ID	Area ID	Duplicate	Date_Sampled	ALS Sample ID
MEL-01-01	MEL-01	-	2020-09-11	L2504254-1
MEL-01-06	MEL-01	-	2020-09-11	L2504254-2
MEL-01-07	MEL-01	-	2020-09-11	L2504254-3
MEL-01-08	MEL-01	-	2020-09-11	L2504254-4
MEL-01-09	MEL-01	DUP-MEL-SEP-01	2020-09-11	L2504254-5
MEL-02-01	MEL-02	-	2020-09-07	L2501979-1
MEL-02-02	MEL-02	DUP-MEL-SEP-02	2020-09-07	L2501979-2
MEL-02-03	MEL-02	-	2020-09-07	L2501979-3
MEL-02-04	MEL-02	-	2020-09-07	L2501979-4
MEL-02-05	MEL-02	-	2020-09-07	L2501979-5
MEL-03-01	MEL-03	-	2020-09-08	L2502391-1
MEL-03-02	MEL-03	-	2020-09-08	L2502391-2
MEL-03-03	MEL-03	-	2020-09-08	L2502391-3
MEL-03-04	MEL-03	-	2020-09-08	L2502391-4
MEL-03-05	MEL-03	-	2020-09-08	L2502391-5

Table 2: Summary of field blanks collected in September, 2020.

Client_Sample_ID	ID_Name	ALS Sample ID
DI-SEP-01	DI Blank	L2504254-7
EB-SEP-01	Equipment Blank	L2504254-9
TB-SEP-01	Travel Blank	L2504254-8

2 TRIGGER SCREENING

Sampling results were screened relative to relevant normal ranges and thresholds. Normal range, as defined in the AEMP, numerically describes the natural range of baseline/reference conditions for the various components of the AEMP. In simple terms, the normal range is the instrument used to assess whether current conditions (e.g., the measured concentration of a particular metal) has changed relative to baseline/reference conditions. In the case of the March sampling event, results are screened relative to the thresholds only, as normal ranges are not applicable to winter lake conditions. A summary of trigger and threshold exceedances is provided in Table 3 (Refer to Azimuth 2020 for details on the normal range and threshold values used here). The subsequent table (Table 4) provides all sample results above trigger and threshold values in September, 2020.

Figures displaying all parameters with at least one sample above the relevant normal range or threshold are also provided.

Table 3: Summary of trigger and threshold exceedances in September, 2020.

Area	Parameter	Samples Exceeding Normal Range	Samples Exceeding Threshold	Stations
Meliadine Lake				
	Aluminum (T)	1	0	MEL-01-01
	Ammonia-N	5	0	MEL-01-01, MEL-01-06, MEL-01-08, MEL-01-09, MEL-02-02
	Arsenic (T)	15	0	MEL-01-01, MEL-01-06, MEL-01-07, MEL-01-08, MEL-01-09, MEL-02-01, MEL-02-02, MEL-02-03, MEL-02-04, MEL-02-05, MEL-03-01, MEL-03-02, MEL-03-03, MEL-03-04, MEL-03-05
	Barium (T)	14	0	MEL-01-01, MEL-01-06, MEL-01-07, MEL-01-08, MEL-01-09, MEL-02-01, MEL-02-02, MEL-02-03, MEL-02-04, MEL-02-05, MEL-03-01, MEL-03-03, MEL-03-04, MEL-03-05
	Beryllium (T)	1	0	MEL-01-01
	Bicarbonate alkalinity	11	0	MEL-01-01, MEL-01-06, MEL-01-07, MEL-01-08, MEL-01-09, MEL-02-01, MEL-02-03, MEL-02-05, MEL-03-01, MEL-03-02, MEL-03-03
	Boron (T)	5	0	MEL-01-01, MEL-01-06, MEL-01-07, MEL-01-08, MEL-01-09
	Calcium (T)	8	0	MEL-01-01, MEL-01-06, MEL-01-07, MEL-01-08, MEL-01-09, MEL-02-02, MEL-02-03, MEL-02-04
	Chloride	15	0	MEL-01-01, MEL-01-06, MEL-01-07, MEL-01-08, MEL-01-09, MEL-02-01, MEL-02-02, MEL-02-03, MEL-02-04, MEL-02-05, MEL-03-01, MEL-03-02, MEL-03-03, MEL-03-04, MEL-03-05
	Cobalt (T)	8	0	MEL-01-01, MEL-01-06, MEL-01-07, MEL-01-08, MEL-01-09, MEL-02-01, MEL-02-02, MEL-02-03
	Copper (T)	2	0	MEL-01-01, MEL-02-01
	DOC	12	0	MEL-01-01, MEL-01-06, MEL-01-07, MEL-01-08, MEL-01-09, MEL-02-01, MEL-02-02, MEL-02-03, MEL-02-04, MEL-02-05, MEL-03-02, MEL-03-04
	Fluoride	3	0	MEL-03-01, MEL-03-02, MEL-03-03
	Hardness	11	0	MEL-01-01, MEL-01-06, MEL-01-07, MEL-01-08, MEL-01-09, MEL-02-01, MEL-02-02, MEL-02-03, MEL-02-04, MEL-02-05, MEL-03-01

Area	Parameter	Samples Exceeding Normal Range	Samples Exceeding Threshold	Stations
	Iron (T)	7	0	MEL-01-01, MEL-01-06, MEL-01-07, MEL-01-08, MEL-01-09, MEL-02-01, MEL-02-03
	Lithium (T)	12	0	MEL-01-01, MEL-01-06, MEL-01-07, MEL-01-08, MEL-01-09, MEL-02-01, MEL-02-02, MEL-02-03, MEL-02-04, MEL-02-05, MEL-03-03, MEL-03-04
	Magnesium (T)	15	0	MEL-01-01, MEL-01-06, MEL-01-07, MEL-01-08, MEL-01-09, MEL-02-01, MEL-02-02, MEL-02-03, MEL-02-04, MEL-02-05, MEL-03-01, MEL-03-02, MEL-03-03, MEL-03-04, MEL-03-05
	Manganese (T)	10	0	MEL-01-01, MEL-01-06, MEL-01-07, MEL-01-08, MEL-01-09, MEL-02-01, MEL-02-02, MEL-02-03, MEL-02-04, MEL-02-05
	Mercury (T)	1	0	MEL-02-01
	Molybdenum (T)	5	0	MEL-01-01, MEL-01-06, MEL-01-07, MEL-01-08, MEL-01-09
	Nickel (T)	12	0	MEL-01-01, MEL-01-06, MEL-01-07, MEL-01-08, MEL-01-09, MEL-02-01, MEL-02-02, MEL-02-03, MEL-02-04, MEL-02-05, MEL-03-03, MEL-03-04
	Potassium (T)	15	0	MEL-01-01, MEL-01-06, MEL-01-07, MEL-01-08, MEL-01-09, MEL-02-01, MEL-02-02, MEL-02-03, MEL-02-04, MEL-02-05, MEL-03-01, MEL-03-02, MEL-03-03, MEL-03-04, MEL-03-05
	Reactive silica	5	0	MEL-02-01, MEL-02-02, MEL-02-03, MEL-02-04, MEL-02-05
	Selenium (T)	7	0	MEL-01-01, MEL-02-04, MEL-02-05, MEL-03-02, MEL-03-03, MEL-03-04, MEL-03-05
	Sodium (T)	15	0	MEL-01-01, MEL-01-06, MEL-01-07, MEL-01-08, MEL-01-09, MEL-02-01, MEL-02-02, MEL-02-03, MEL-02-04, MEL-02-05, MEL-03-01, MEL-03-02, MEL-03-03, MEL-03-04, MEL-03-05
	Strontium (T)	14	0	MEL-01-01, MEL-01-06, MEL-01-07, MEL-01-08, MEL-01-09, MEL-02-01, MEL-02-02, MEL-02-03, MEL-02-04, MEL-02-05, MEL-03-01, MEL-03-02, MEL-03-03, MEL-03-05
	Sulphate	15	0	MEL-01-01, MEL-01-06, MEL-01-07, MEL-01-08, MEL-01-09, MEL-02-01, MEL-02-02, MEL-02-03, MEL-02-04, MEL-02-05, MEL-03-01, MEL-03-02, MEL-03-03, MEL-03-04, MEL-03-05

Area	Parameter	Samples Exceeding Normal Range	Samples Exceeding Threshold	Stations
	TDS	6	0	MEL-01-01, MEL-01-06, MEL-01-07, MEL-01-08, MEL-01-09, MEL-03-02
	TDS (calculated)	14	0	MEL-01-01, MEL-01-06, MEL-01-07, MEL-01-08, MEL-01-09, MEL-02-01, MEL-02-02, MEL-02-03, MEL-02-04, MEL-02-05, MEL-03-01, MEL-03-02, MEL-03-03, MEL-03-05
	TKN	7	0	MEL-01-01, MEL-01-06, MEL-01-07, MEL-01-08, MEL-01-09, MEL-02-02, MEL-02-03
	TOC	5	0	MEL-01-01, MEL-01-06, MEL-01-07, MEL-01-08, MEL-01-09
	Total Alkalinity	11	0	MEL-01-01, MEL-01-06, MEL-01-07, MEL-01-08, MEL-01-09, MEL-02-01, MEL-02-03, MEL-02-05, MEL-03-01, MEL-03-02, MEL-03-03
	Total phosphorous	5	0	MEL-01-01, MEL-01-06, MEL-01-07, MEL-01-08, MEL-01-09
	TSS	2	0	MEL-01-06, MEL-02-02
	Uranium (T)	5	0	MEL-01-01, MEL-01-06, MEL-01-07, MEL-01-08, MEL-01-09
	Vanadium (T)	1	0	MEL-01-01
	Zinc (D)	2	0	MEL-01-06*, MEL-01-07*

* Indicates samples which failed reliability checks and are consequently uncertain.

Table 4: Meliadine trigger and threshold exceedances in September, 2020.

Area ID	Sample ID	Parameter	Results ¹	DL	Units	MDL	Threshold	Normal Range Limit	% Above NR ²	Reliability
MEL-01										
	MEL-01-01	Aluminum (T)	0.0056	0.001	mg/L	-	0.1	0.0054	3.9	-
	MEL-01-01	Ammonia-N	0.018	0.005	mg/L	-	1.8	0.015	24.2	-
	MEL-01-06	Ammonia-N	0.028	0.005	mg/L	-	1.8	0.015	84.6	-
	MEL-01-08	Ammonia-N	0.025	0.005	mg/L	-	1.8	0.015	67.8	-
	MEL-01-09	Ammonia-N	0.021	0.005	mg/L	-	1.8	0.015	42.3	-
	MEL-01-01	Arsenic (T)	0.00055	2e-05	mg/L	-	0.025	0.00025	119.5	-
	MEL-01-06	Arsenic (T)	0.00054	2e-05	mg/L	-	0.025	0.00025	117.1	-
	MEL-01-07	Arsenic (T)	0.00054	2e-05	mg/L	-	0.025	0.00025	113.9	-
	MEL-01-08	Arsenic (T)	0.00055	2e-05	mg/L	-	0.025	0.00025	118.7	-
	MEL-01-09	Arsenic (T)	0.00056	2e-05	mg/L	-	0.025	0.00025	123.5	-
	MEL-01-01	Barium (T)	0.0087	2e-05	mg/L	-	1	0.0079	9.5	-
	MEL-01-06	Barium (T)	0.0084	2e-05	mg/L	-	1	0.0079	5.8	-
	MEL-01-07	Barium (T)	0.0083	2e-05	mg/L	-	1	0.0079	4.8	-
	MEL-01-08	Barium (T)	0.0083	2e-05	mg/L	-	1	0.0079	4.6	-
	MEL-01-09	Barium (T)	0.0082	2e-05	mg/L	-	1	0.0079	4.2	-
	MEL-01-01	Beryllium (T)	6.1e-06	5e-06	mg/L	-	-	5e-06	22	-
	MEL-01-01	Bicarbonate alkalinity	25	1.2	mg/L	-	-	24	3.7	-
	MEL-01-06	Bicarbonate alkalinity	26	1.2	mg/L	-	-	24	5.3	-
	MEL-01-07	Bicarbonate alkalinity	25	1.2	mg/L	-	-	24	3.7	-
	MEL-01-08	Bicarbonate alkalinity	25	1.2	mg/L	-	-	24	2.5	-
	MEL-01-09	Bicarbonate alkalinity	26	1.2	mg/L	-	-	24	5.3	-
	MEL-01-01	Boron (T)	0.009	0.005	mg/L	-	1.5	0.0067	34.9	-
	MEL-01-06	Boron (T)	0.0085	0.005	mg/L	-	1.5	0.0067	27.4	-

Area ID	Sample ID	Parameter	Results ¹	DL	Units	MDL	Threshold	Normal Range Limit	% Above NR ²	Reliability
	MEL-01-07	Boron (T)	0.008	0.005	mg/L	-	1.5	0.0067	19.9	-
	MEL-01-08	Boron (T)	0.008	0.005	mg/L	-	1.5	0.0067	19.9	-
	MEL-01-09	Boron (T)	0.0074	0.005	mg/L	-	1.5	0.0067	10.9	-
	MEL-01-01	Calcium (T)	9	0.01	mg/L	-	-	7.3	22.4	-
	MEL-01-06	Calcium (T)	8.9	0.01	mg/L	-	-	7.3	22	-
	MEL-01-07	Calcium (T)	8.8	0.01	mg/L	-	-	7.3	20.5	-
	MEL-01-08	Calcium (T)	9	0.01	mg/L	-	-	7.3	23.4	-
	MEL-01-09	Calcium (T)	8.8	0.01	mg/L	-	-	7.3	20	-
	MEL-01-01	Chloride	17	0.1	mg/L	-	120	8.8	92	-
	MEL-01-06	Chloride	17	0.1	mg/L	-	120	8.8	94.3	-
	MEL-01-07	Chloride	17	0.1	mg/L	-	120	8.8	96.6	-
	MEL-01-08	Chloride	17	0.1	mg/L	-	120	8.8	93.1	-
	MEL-01-09	Chloride	17	0.1	mg/L	-	120	8.8	92	-
	MEL-01-01	Cobalt (T)	3.2e-05	5e-06	mg/L	-	0.00078	1.6e-05	97.5	-
	MEL-01-06	Cobalt (T)	3.2e-05	5e-06	mg/L	-	0.00078	1.6e-05	100.6	-
	MEL-01-07	Cobalt (T)	2.5e-05	5e-06	mg/L	-	0.00078	1.6e-05	58.1	-
	MEL-01-08	Cobalt (T)	2.2e-05	5e-06	mg/L	-	0.00078	1.6e-05	40	-
	MEL-01-09	Cobalt (T)	2.6e-05	5e-06	mg/L	-	0.00078	1.6e-05	63.8	-
	MEL-01-01	Copper (T)	0.00093	5e-05	mg/L	-	0.002	0.00092	0.8	-
	MEL-01-01	DOC	3.2	0.5	mg/L	-	-	2.7	19.3	-
	MEL-01-06	DOC	3.4	0.5	mg/L	-	-	2.7	25.2	-
	MEL-01-07	DOC	3.1	0.5	mg/L	-	-	2.7	15.9	-
	MEL-01-08	DOC	3.4	0.5	mg/L	-	-	2.7	24.8	-
	MEL-01-09	DOC	3.2	0.5	mg/L	-	-	2.7	18.1	-
	MEL-01-01	Hardness	30	0.2	mg/L	-	-	23	29.9	-

Area ID	Sample ID	Parameter	Results ¹	DL	Units	MDL	Threshold	Normal Range Limit	% Above NR ²	Reliability
	MEL-01-06	Hardness	31	0.2	mg/L	-	-	23	33.8	-
	MEL-01-07	Hardness	31	0.2	mg/L	-	-	23	35.5	-
	MEL-01-08	Hardness	31	0.2	mg/L	-	-	23	34.6	-
	MEL-01-09	Hardness	29	0.2	mg/L	-	-	23	23.8	-
	MEL-01-01	Iron (T)	0.024	0.001	mg/L	-	1.1	0.015	58.3	-
	MEL-01-06	Iron (T)	0.024	0.001	mg/L	-	1.1	0.015	58.3	-
	MEL-01-07	Iron (T)	0.023	0.001	mg/L	-	1.1	0.015	51.7	-
	MEL-01-08	Iron (T)	0.024	0.001	mg/L	-	1.1	0.015	60.9	-
	MEL-01-09	Iron (T)	0.024	0.001	mg/L	-	1.1	0.015	58.3	-
	MEL-01-01	Lithium (T)	0.0015	5e-04	mg/L	-	-	7e-04	115.7	-
	MEL-01-06	Lithium (T)	0.0015	5e-04	mg/L	-	-	7e-04	114.3	-
	MEL-01-07	Lithium (T)	0.0015	5e-04	mg/L	-	-	7e-04	111.4	-
	MEL-01-08	Lithium (T)	0.0015	5e-04	mg/L	-	-	7e-04	111.4	-
	MEL-01-09	Lithium (T)	0.0015	5e-04	mg/L	-	-	7e-04	108.6	-
	MEL-01-01	Magnesium (T)	1.8	0.004	mg/L	-	-	1.2	54.7	-
	MEL-01-06	Magnesium (T)	1.8	0.004	mg/L	-	-	1.2	54.7	-
	MEL-01-07	Magnesium (T)	1.8	0.004	mg/L	-	-	1.2	55.6	-
	MEL-01-08	Magnesium (T)	1.8	0.004	mg/L	-	-	1.2	53.8	-
	MEL-01-09	Magnesium (T)	1.8	0.004	mg/L	-	-	1.2	53	-
	MEL-01-01	Manganese (T)	0.0065	5e-05	mg/L	-	-	0.0032	107	-
	MEL-01-06	Manganese (T)	0.0066	5e-05	mg/L	-	-	0.0032	110.8	-
	MEL-01-07	Manganese (T)	0.0066	5e-05	mg/L	-	-	0.0032	108.3	-
	MEL-01-08	Manganese (T)	0.0063	5e-05	mg/L	-	-	0.0032	101.3	-
	MEL-01-09	Manganese (T)	0.0066	5e-05	mg/L	-	-	0.0032	110.2	-
	MEL-01-01	Molybdenum (T)	0.00012	5e-05	mg/L	-	0.073	8.3e-05	46.3	-

Area ID	Sample ID	Parameter	Results ¹	DL	Units	MDL	Threshold	Normal Range Limit	% Above NR ²	Reliability
	MEL-01-06	Molybdenum (T)	0.00011	5e-05	mg/L	-	0.073	8.3e-05	29.4	-
	MEL-01-07	Molybdenum (T)	0.00012	5e-05	mg/L	-	0.073	8.3e-05	42.7	-
	MEL-01-08	Molybdenum (T)	0.00012	5e-05	mg/L	-	0.073	8.3e-05	40.3	-
	MEL-01-09	Molybdenum (T)	0.00011	5e-05	mg/L	-	0.073	8.3e-05	35.4	-
	MEL-01-01	Nickel (T)	0.00072	5e-05	mg/L	-	0.025	0.00042	72.7	-
	MEL-01-06	Nickel (T)	0.00073	5e-05	mg/L	-	0.025	0.00042	74.8	-
	MEL-01-07	Nickel (T)	0.00076	5e-05	mg/L	-	0.025	0.00042	82	-
	MEL-01-08	Nickel (T)	7e-04	5e-05	mg/L	-	0.025	0.00042	69.1	-
	MEL-01-09	Nickel (T)	7e-04	5e-05	mg/L	-	0.025	0.00042	68.1	-
	MEL-01-01	Potassium (T)	1.2	0.02	mg/L	-	-	0.94	28.1	-
	MEL-01-06	Potassium (T)	1.2	0.02	mg/L	-	-	0.94	29.1	-
	MEL-01-07	Potassium (T)	1.2	0.02	mg/L	-	-	0.94	28.1	-
	MEL-01-08	Potassium (T)	1.2	0.02	mg/L	-	-	0.94	28.1	-
	MEL-01-09	Potassium (T)	1.2	0.02	mg/L	-	-	0.94	27	-
	MEL-01-01	Selenium (T)	5.5e-05	4e-05	mg/L	-	0.001	4.6e-05	18.5	-
	MEL-01-01	Sodium (T)	7.8	0.02	mg/L	-	-	4.6	71	-
	MEL-01-06	Sodium (T)	8	0.02	mg/L	-	-	4.6	74.9	-
	MEL-01-07	Sodium (T)	7.8	0.02	mg/L	-	-	4.6	71	-
	MEL-01-08	Sodium (T)	7.7	0.02	mg/L	-	-	4.6	69.5	-
	MEL-01-09	Sodium (T)	7.8	0.02	mg/L	-	-	4.6	71.9	-
	MEL-01-01	Strontium (T)	0.064	2e-05	mg/L	-	1.7	0.034	86.9	-
	MEL-01-06	Strontium (T)	0.063	2e-05	mg/L	-	1.7	0.034	84	-
	MEL-01-07	Strontium (T)	0.065	2e-05	mg/L	-	1.7	0.034	89.5	-
	MEL-01-08	Strontium (T)	0.066	2e-05	mg/L	-	1.7	0.034	91	-
	MEL-01-09	Strontium (T)	0.068	2e-05	mg/L	-	1.7	0.034	98	-

Area ID	Sample ID	Parameter	Results ¹	DL	Units	MDL	Threshold	Normal Range Limit	% Above NR ²	Reliability
	MEL-01-01	Sulphate	5.4	0.3	mg/L	-	130	3.7	47.5	-
	MEL-01-06	Sulphate	5.5	0.3	mg/L	-	130	3.7	48.8	-
	MEL-01-07	Sulphate	5.5	0.3	mg/L	-	130	3.7	50.5	-
	MEL-01-08	Sulphate	5.5	0.3	mg/L	-	130	3.7	48.8	-
	MEL-01-09	Sulphate	5.5	0.3	mg/L	-	130	3.7	48.3	-
	MEL-01-01	TDS	68	13	mg/L	-	500	51	32.8	-
	MEL-01-06	TDS	62	13	mg/L	-	500	51	21.1	-
	MEL-01-07	TDS	65	13	mg/L	-	500	51	27	-
	MEL-01-08	TDS	68	13	mg/L	-	500	51	32.8	-
	MEL-01-09	TDS	74	13	mg/L	-	500	51	44.5	-
	MEL-01-01	TDS (calculated)	55	-	mg/L	-	500	38	43.1	-
	MEL-01-06	TDS (calculated)	56	-	mg/L	-	500	38	45.2	-
	MEL-01-07	TDS (calculated)	56	-	mg/L	-	500	38	46	-
	MEL-01-08	TDS (calculated)	55	-	mg/L	-	500	38	44.2	-
	MEL-01-09	TDS (calculated)	54	-	mg/L	-	500	38	41.3	-
	MEL-01-01	TKN	0.34	0.05	mg/L	-	-	0.25	35.3	-
	MEL-01-06	TKN	0.4	0.05	mg/L	-	-	0.25	59.8	-
	MEL-01-07	TKN	0.31	0.05	mg/L	-	-	0.25	26.1	-
	MEL-01-08	TKN	0.34	0.05	mg/L	-	-	0.25	36.5	-
	MEL-01-09	TKN	0.28	0.05	mg/L	-	-	0.25	10.8	-
	MEL-01-01	TOC	3.8	0.5	mg/L	-	-	3	26	-
	MEL-01-06	TOC	3	0.5	mg/L	-	-	3	1.3	-
	MEL-01-07	TOC	3.1	0.5	mg/L	-	-	3	4.7	-
	MEL-01-08	TOC	3.2	0.5	mg/L	-	-	3	6.3	-
	MEL-01-09	TOC	3.2	0.5	mg/L	-	-	3	8.3	-

Area ID	Sample ID	Parameter	Results ¹	DL	Units	MDL	Threshold	Normal Range Limit	% Above NR ²	Reliability
MEL-01	MEL-01-01	Total Alkalinity	21	1	mg/L	-	-	20	3.5	-
	MEL-01-06	Total Alkalinity	21	1	mg/L	-	-	20	5.5	-
	MEL-01-07	Total Alkalinity	21	1	mg/L	-	-	20	3.5	-
	MEL-01-08	Total Alkalinity	20	1	mg/L	-	-	20	2.5	-
	MEL-01-09	Total Alkalinity	21	1	mg/L	-	-	20	5.5	-
	MEL-01-01	Total phosphorous	0.0087	0.003	mg/L	-	-	0.006	45	-
	MEL-01-06	Total phosphorous	0.0077	0.003	mg/L	-	-	0.006	28.3	-
	MEL-01-07	Total phosphorous	0.0085	0.003	mg/L	-	-	0.006	41.7	-
	MEL-01-08	Total phosphorous	0.0076	0.003	mg/L	-	-	0.006	26.7	-
	MEL-01-09	Total phosphorous	0.0092	0.003	mg/L	-	-	0.006	53.3	-
	MEL-01-06	TSS	1.2	1	mg/L	-	-	1.1	9.1	-
	MEL-01-01	Uranium (T)	2e-05	1e-06	mg/L	-	0.015	1.7e-05	20.4	-
	MEL-01-06	Uranium (T)	1.8e-05	1e-06	mg/L	-	0.015	1.7e-05	7.8	-
	MEL-01-07	Uranium (T)	1.8e-05	1e-06	mg/L	-	0.015	1.7e-05	5.4	-
	MEL-01-08	Uranium (T)	1.8e-05	1e-06	mg/L	-	0.015	1.7e-05	6.6	-
	MEL-01-09	Uranium (T)	1.8e-05	1e-06	mg/L	-	0.015	1.7e-05	4.8	-
	MEL-01-01	Vanadium (T)	6.1e-05	5e-05	mg/L	-	0.12	5e-05	22	-
	MEL-01-06	Zinc (D)	0.0028	5e-04	mg/L	-	0.0056	0.002	42.9	Uncertain
	MEL-01-07	Zinc (D)	0.0034	5e-04	mg/L	-	0.0056	0.002	73.5	Uncertain
	MEL-02									
	MEL-02-02	Ammonia-N	0.016	0.005	mg/L	-	1.8	0.015	6	-
	MEL-02-01	Arsenic (T)	0.00046	2e-05	mg/L	-	0.025	0.00025	82.9	-
	MEL-02-02	Arsenic (T)	0.00048	2e-05	mg/L	-	0.025	0.00025	90.4	-
	MEL-02-03	Arsenic (T)	0.00045	2e-05	mg/L	-	0.025	0.00025	78.5	-
	MEL-02-04	Arsenic (T)	0.00045	2e-05	mg/L	-	0.025	0.00025	78.9	-

Area ID	Sample ID	Parameter	Results ¹	DL	Units	MDL	Threshold	Normal Range Limit	% Above NR ²	Reliability
	MEL-02-05	Arsenic (T)	0.00042	2e-05	mg/L	-	0.025	0.00025	67.7	-
	MEL-02-01	Barium (T)	0.0082	2e-05	mg/L	-	1	0.0079	4.3	-
	MEL-02-02	Barium (T)	0.0084	2e-05	mg/L	-	1	0.0079	5.6	-
	MEL-02-03	Barium (T)	0.0084	2e-05	mg/L	-	1	0.0079	6.3	-
	MEL-02-04	Barium (T)	0.0083	2e-05	mg/L	-	1	0.0079	5.2	-
	MEL-02-05	Barium (T)	0.0084	2e-05	mg/L	-	1	0.0079	5.8	-
	MEL-02-01	Bicarbonate alkalinity	25	1.2	mg/L	-	-	24	1.6	-
	MEL-02-03	Bicarbonate alkalinity	26	1.2	mg/L	-	-	24	7	-
	MEL-02-05	Bicarbonate alkalinity	25	1.2	mg/L	-	-	24	2.5	-
	MEL-02-02	Calcium (T)	7.4	0.01	mg/L	-	-	7.3	0.7	-
	MEL-02-03	Calcium (T)	7.4	0.01	mg/L	-	-	7.3	1	-
	MEL-02-04	Calcium (T)	7.4	0.01	mg/L	-	-	7.3	1.8	-
	MEL-02-01	Chloride	12	0.1	mg/L	-	120	8.8	33.7	-
	MEL-02-02	Chloride	12	0.1	mg/L	-	120	8.8	31.4	-
	MEL-02-03	Chloride	12	0.1	mg/L	-	120	8.8	33.7	-
	MEL-02-04	Chloride	12	0.1	mg/L	-	120	8.8	33.7	-
	MEL-02-05	Chloride	12	0.1	mg/L	-	120	8.8	32.6	-
	MEL-02-01	Cobalt (T)	1.7e-05	5e-06	mg/L	-	0.00078	1.6e-05	3.8	-
	MEL-02-02	Cobalt (T)	1.7e-05	5e-06	mg/L	-	0.00078	1.6e-05	5.6	-
	MEL-02-03	Cobalt (T)	1.7e-05	5e-06	mg/L	-	0.00078	1.6e-05	4.4	-
	MEL-02-01	Copper (T)	0.00094	5e-05	mg/L	-	0.002	0.00092	2.1	-
	MEL-02-01	DOC	2.8	0.5	mg/L	-	-	2.7	4.8	-
	MEL-02-02	DOC	2.8	0.5	mg/L	-	-	2.7	1.9	-
	MEL-02-03	DOC	2.8	0.5	mg/L	-	-	2.7	2.6	-
	MEL-02-04	DOC	3	0.5	mg/L	-	-	2.7	10.7	-

Area ID	Sample ID	Parameter	Results ¹	DL	Units	MDL	Threshold	Normal Range Limit	% Above NR ²	Reliability
	MEL-02-05	DOC	2.8	0.5	mg/L	-	-	2.7	4.8	-
	MEL-02-01	Hardness	25	0.2	mg/L	-	-	23	7.4	-
	MEL-02-02	Hardness	25	0.2	mg/L	-	-	23	6.9	-
	MEL-02-03	Hardness	25	0.2	mg/L	-	-	23	8.2	-
	MEL-02-04	Hardness	25	0.2	mg/L	-	-	23	8.2	-
	MEL-02-05	Hardness	25	0.2	mg/L	-	-	23	9.1	-
	MEL-02-01	Iron (T)	0.016	0.001	mg/L	-	1.1	0.015	4.6	-
	MEL-02-03	Iron (T)	0.015	0.001	mg/L	-	1.1	0.015	1.3	-
	MEL-02-01	Lithium (T)	0.00091	5e-04	mg/L	-	-	7e-04	30	-
	MEL-02-02	Lithium (T)	9e-04	5e-04	mg/L	-	-	7e-04	28.6	-
	MEL-02-03	Lithium (T)	0.00091	5e-04	mg/L	-	-	7e-04	30	-
	MEL-02-04	Lithium (T)	0.00091	5e-04	mg/L	-	-	7e-04	30	-
	MEL-02-05	Lithium (T)	9e-04	5e-04	mg/L	-	-	7e-04	28.6	-
	MEL-02-01	Magnesium (T)	1.3	0.004	mg/L	-	-	1.2	14.5	-
	MEL-02-02	Magnesium (T)	1.3	0.004	mg/L	-	-	1.2	13.7	-
	MEL-02-03	Magnesium (T)	1.4	0.004	mg/L	-	-	1.2	16.2	-
	MEL-02-04	Magnesium (T)	1.4	0.004	mg/L	-	-	1.2	17.1	-
	MEL-02-05	Magnesium (T)	1.4	0.004	mg/L	-	-	1.2	15.4	-
	MEL-02-01	Manganese (T)	0.0035	5e-05	mg/L	-	-	0.0032	10.2	-
	MEL-02-02	Manganese (T)	0.0034	5e-05	mg/L	-	-	0.0032	9.2	-
	MEL-02-03	Manganese (T)	0.0035	5e-05	mg/L	-	-	0.0032	9.8	-
	MEL-02-04	Manganese (T)	0.0035	5e-05	mg/L	-	-	0.0032	11.4	-
	MEL-02-05	Manganese (T)	0.0035	5e-05	mg/L	-	-	0.0032	10.2	-
	MEL-02-01	Mercury (T)	1.6e-06	5e-07	mg/L	-	2.6e-05	8e-07	97.5	-
	MEL-02-01	Nickel (T)	0.00056	5e-05	mg/L	-	0.025	0.00042	35.3	-

Area ID	Sample ID	Parameter	Results ¹	DL	Units	MDL	Threshold	Normal Range Limit	% Above NR ²	Reliability
	MEL-02-02	Nickel (T)	0.00058	5e-05	mg/L	-	0.025	0.00042	38.4	-
	MEL-02-03	Nickel (T)	0.00054	5e-05	mg/L	-	0.025	0.00042	30.5	-
	MEL-02-04	Nickel (T)	0.00055	5e-05	mg/L	-	0.025	0.00042	31.2	-
	MEL-02-05	Nickel (T)	0.00055	5e-05	mg/L	-	0.025	0.00042	32.1	-
	MEL-02-01	Potassium (T)	1	0.02	mg/L	-	-	0.94	7.8	-
	MEL-02-02	Potassium (T)	1	0.02	mg/L	-	-	0.94	7.8	-
	MEL-02-03	Potassium (T)	1	0.02	mg/L	-	-	0.94	9.9	-
	MEL-02-04	Potassium (T)	1	0.02	mg/L	-	-	0.94	9.9	-
	MEL-02-05	Potassium (T)	1	0.02	mg/L	-	-	0.94	7.8	-
	MEL-02-01	Reactive silica	0.28	0.01	mg/L	-	-	0.26	6	-
	MEL-02-02	Reactive silica	0.28	0.01	mg/L	-	-	0.26	6.8	-
	MEL-02-03	Reactive silica	0.28	0.01	mg/L	-	-	0.26	4.5	-
	MEL-02-04	Reactive silica	0.28	0.01	mg/L	-	-	0.26	5.7	-
	MEL-02-05	Reactive silica	0.27	0.01	mg/L	-	-	0.26	3	-
	MEL-02-04	Selenium (T)	6.6e-05	4e-05	mg/L	-	0.001	4.6e-05	42.2	-
	MEL-02-05	Selenium (T)	5.8e-05	4e-05	mg/L	-	0.001	4.6e-05	25	-
	MEL-02-01	Sodium (T)	5.6	0.02	mg/L	-	-	4.6	24.2	-
	MEL-02-02	Sodium (T)	5.5	0.02	mg/L	-	-	4.6	20.9	-
	MEL-02-03	Sodium (T)	5.7	0.02	mg/L	-	-	4.6	25.3	-
	MEL-02-04	Sodium (T)	5.7	0.02	mg/L	-	-	4.6	25.3	-
	MEL-02-05	Sodium (T)	5.7	0.02	mg/L	-	-	4.6	24.8	-
	MEL-02-01	Strontium (T)	0.041	2e-05	mg/L	-	1.7	0.034	19.8	-
	MEL-02-02	Strontium (T)	0.042	2e-05	mg/L	-	1.7	0.034	21.3	-
	MEL-02-03	Strontium (T)	0.042	2e-05	mg/L	-	1.7	0.034	23.3	-
	MEL-02-04	Strontium (T)	0.042	2e-05	mg/L	-	1.7	0.034	23.6	-

Area ID	Sample ID	Parameter	Results ¹	DL	Units	MDL	Threshold	Normal Range Limit	% Above NR ²	Reliability
MEL-02	MEL-02-05	Strontium (T)	0.042	2e-05	mg/L	-	1.7	0.034	22.7	-
	MEL-02-01	Sulphate	4.3	0.3	mg/L	-	130	3.7	16.5	-
	MEL-02-02	Sulphate	4.3	0.3	mg/L	-	130	3.7	15.7	-
	MEL-02-03	Sulphate	4.3	0.3	mg/L	-	130	3.7	17.3	-
	MEL-02-04	Sulphate	4.3	0.3	mg/L	-	130	3.7	16.2	-
	MEL-02-05	Sulphate	4.2	0.3	mg/L	-	130	3.7	14.6	-
	MEL-02-01	TDS (calculated)	44	-	mg/L	-	500	38	14.2	-
	MEL-02-02	TDS (calculated)	42	-	mg/L	-	500	38	9	-
	MEL-02-03	TDS (calculated)	45	-	mg/L	-	500	38	16.8	-
	MEL-02-04	TDS (calculated)	42	-	mg/L	-	500	38	8.2	-
	MEL-02-05	TDS (calculated)	44	-	mg/L	-	500	38	15	-
	MEL-02-02	TKN	0.26	0.05	mg/L	-	-	0.25	6	-
	MEL-02-03	TKN	0.33	0.05	mg/L	-	-	0.25	30.9	-
	MEL-02-01	Total Alkalinity	20	1	mg/L	-	-	20	1.5	-
	MEL-02-03	Total Alkalinity	21	1	mg/L	-	-	20	7	-
	MEL-02-05	Total Alkalinity	20	1	mg/L	-	-	20	2.5	-
	MEL-02-02	TSS	2.2	1	mg/L	-	-	1.1	100	-
MEL-03										
MEL-03	MEL-03-01	Arsenic (T)	0.00028	2e-05	mg/L	-	0.025	0.00025	11.2	-
	MEL-03-02	Arsenic (T)	0.00028	2e-05	mg/L	-	0.025	0.00025	13.1	-
	MEL-03-03	Arsenic (T)	0.00031	2e-05	mg/L	-	0.025	0.00025	22.3	-
	MEL-03-04	Arsenic (T)	0.00029	2e-05	mg/L	-	0.025	0.00025	15.1	-
	MEL-03-05	Arsenic (T)	0.00026	2e-05	mg/L	-	0.025	0.00025	1.6	-
	MEL-03-01	Barium (T)	0.008	2e-05	mg/L	-	1	0.0079	1.1	-
	MEL-03-03	Barium (T)	0.008	2e-05	mg/L	-	1	0.0079	0.6	-

Area ID	Sample ID	Parameter	Results ¹	DL	Units	MDL	Threshold	Normal Range Limit	% Above NR ²	Reliability
	MEL-03-04	Barium (T)	0.0079	2e-05	mg/L	-	1	0.0079	0.4	-
	MEL-03-05	Barium (T)	0.0081	2e-05	mg/L	-	1	0.0079	2.8	-
	MEL-03-01	Bicarbonate alkalinity	25	1.2	mg/L	-	-	24	2.9	-
	MEL-03-02	Bicarbonate alkalinity	25	1.2	mg/L	-	-	24	1.6	-
	MEL-03-03	Bicarbonate alkalinity	25	1.2	mg/L	-	-	24	0.8	-
	MEL-03-01	Chloride	9.7	0.1	mg/L	-	120	8.8	11.3	-
	MEL-03-02	Chloride	9.6	0.1	mg/L	-	120	8.8	9.8	-
	MEL-03-03	Chloride	9.6	0.1	mg/L	-	120	8.8	9.9	-
	MEL-03-04	Chloride	9.5	0.1	mg/L	-	120	8.8	9	-
	MEL-03-05	Chloride	9.6	0.1	mg/L	-	120	8.8	9.8	-
	MEL-03-02	DOC	2.9	0.5	mg/L	-	-	2.7	7.8	-
	MEL-03-04	DOC	2.7	0.5	mg/L	-	-	2.7	0.7	-
	MEL-03-01	Fluoride	0.032	0.02	mg/L	-	2.8	0.028	14.3	-
	MEL-03-02	Fluoride	0.031	0.02	mg/L	-	2.8	0.028	10.7	-
	MEL-03-03	Fluoride	0.032	0.02	mg/L	-	2.8	0.028	14.3	-
	MEL-03-01	Hardness	23	0.2	mg/L	-	-	23	0.4	-
	MEL-03-03	Lithium (T)	0.00072	5e-04	mg/L	-	-	7e-04	2.9	-
	MEL-03-04	Lithium (T)	0.00071	5e-04	mg/L	-	-	7e-04	1.4	-
	MEL-03-01	Magnesium (T)	1.2	0.004	mg/L	-	-	1.2	1.7	-
	MEL-03-02	Magnesium (T)	1.2	0.004	mg/L	-	-	1.2	1.7	-
	MEL-03-03	Magnesium (T)	1.2	0.004	mg/L	-	-	1.2	1.7	-
	MEL-03-04	Magnesium (T)	1.2	0.004	mg/L	-	-	1.2	2.6	-
	MEL-03-05	Magnesium (T)	1.2	0.004	mg/L	-	-	1.2	1.7	-
	MEL-03-03	Nickel (T)	0.00042	5e-05	mg/L	-	0.025	0.00042	1.4	-
	MEL-03-04	Nickel (T)	0.00045	5e-05	mg/L	-	0.025	0.00042	7.4	-

Area ID	Sample ID	Parameter	Results ¹	DL	Units	MDL	Threshold	Normal Range Limit	% Above NR ²	Reliability
	MEL-03-01	Potassium (T)	0.97	0.02	mg/L	-	-	0.94	3.2	-
	MEL-03-02	Potassium (T)	0.95	0.02	mg/L	-	-	0.94	1.4	-
	MEL-03-03	Potassium (T)	0.95	0.02	mg/L	-	-	0.94	1.6	-
	MEL-03-04	Potassium (T)	0.97	0.02	mg/L	-	-	0.94	3.1	-
	MEL-03-05	Potassium (T)	0.96	0.02	mg/L	-	-	0.94	2.2	-
	MEL-03-02	Selenium (T)	6.8e-05	4e-05	mg/L	-	0.001	4.6e-05	46.6	-
	MEL-03-03	Selenium (T)	5.2e-05	4e-05	mg/L	-	0.001	4.6e-05	12.1	-
	MEL-03-04	Selenium (T)	6.1e-05	4e-05	mg/L	-	0.001	4.6e-05	31.5	-
	MEL-03-05	Selenium (T)	5.7e-05	4e-05	mg/L	-	0.001	4.6e-05	22.8	-
	MEL-03-01	Sodium (T)	4.8	0.02	mg/L	-	-	4.6	4.4	-
	MEL-03-02	Sodium (T)	4.8	0.02	mg/L	-	-	4.6	6.6	-
	MEL-03-03	Sodium (T)	4.9	0.02	mg/L	-	-	4.6	6.8	-
	MEL-03-04	Sodium (T)	4.8	0.02	mg/L	-	-	4.6	6.6	-
	MEL-03-05	Sodium (T)	4.8	0.02	mg/L	-	-	4.6	6.4	-
	MEL-03-01	Strontium (T)	0.036	2e-05	mg/L	-	1.7	0.034	3.5	-
	MEL-03-02	Strontium (T)	0.035	2e-05	mg/L	-	1.7	0.034	2	-
	MEL-03-03	Strontium (T)	0.035	2e-05	mg/L	-	1.7	0.034	2.9	-
	MEL-03-05	Strontium (T)	0.035	2e-05	mg/L	-	1.7	0.034	1.7	-
	MEL-03-01	Sulphate	4	0.3	mg/L	-	130	3.7	7.3	-
	MEL-03-02	Sulphate	3.9	0.3	mg/L	-	130	3.7	5.4	-
	MEL-03-03	Sulphate	3.9	0.3	mg/L	-	130	3.7	5.1	-
	MEL-03-04	Sulphate	3.8	0.3	mg/L	-	130	3.7	4.6	-
	MEL-03-05	Sulphate	3.9	0.3	mg/L	-	130	3.7	6.7	-
	MEL-03-02	TDS	54	13	mg/L	-	500	51	5.5	-
	MEL-03-01	TDS (calculated)	40	-	mg/L	-	500	38	5.6	-

Area ID	Sample ID	Parameter	Results ¹	DL	Units	MDL	Threshold	Normal Range Limit	% Above NR ²	Reliability
	MEL-03-02	TDS (calculated)	40	-	mg/L	-	500	38	3.8	-
	MEL-03-03	TDS (calculated)	40	-	mg/L	-	500	38	4	-
	MEL-03-05	TDS (calculated)	40	-	mg/L	-	500	38	3.5	-
	MEL-03-01	Total Alkalinity	21	1	mg/L	-	-	20	3	-
	MEL-03-02	Total Alkalinity	20	1	mg/L	-	-	20	1.5	-
	MEL-03-03	Total Alkalinity	20	1	mg/L	-	-	20	1	-

¹Bold values are above the threshold as well as above the trigger value.

²Calculated as $\text{Result} - \text{Normal Range Limit} / \text{Normal Range Limit} * 100$. Darker red colours indicate a greater difference between results and normal range.

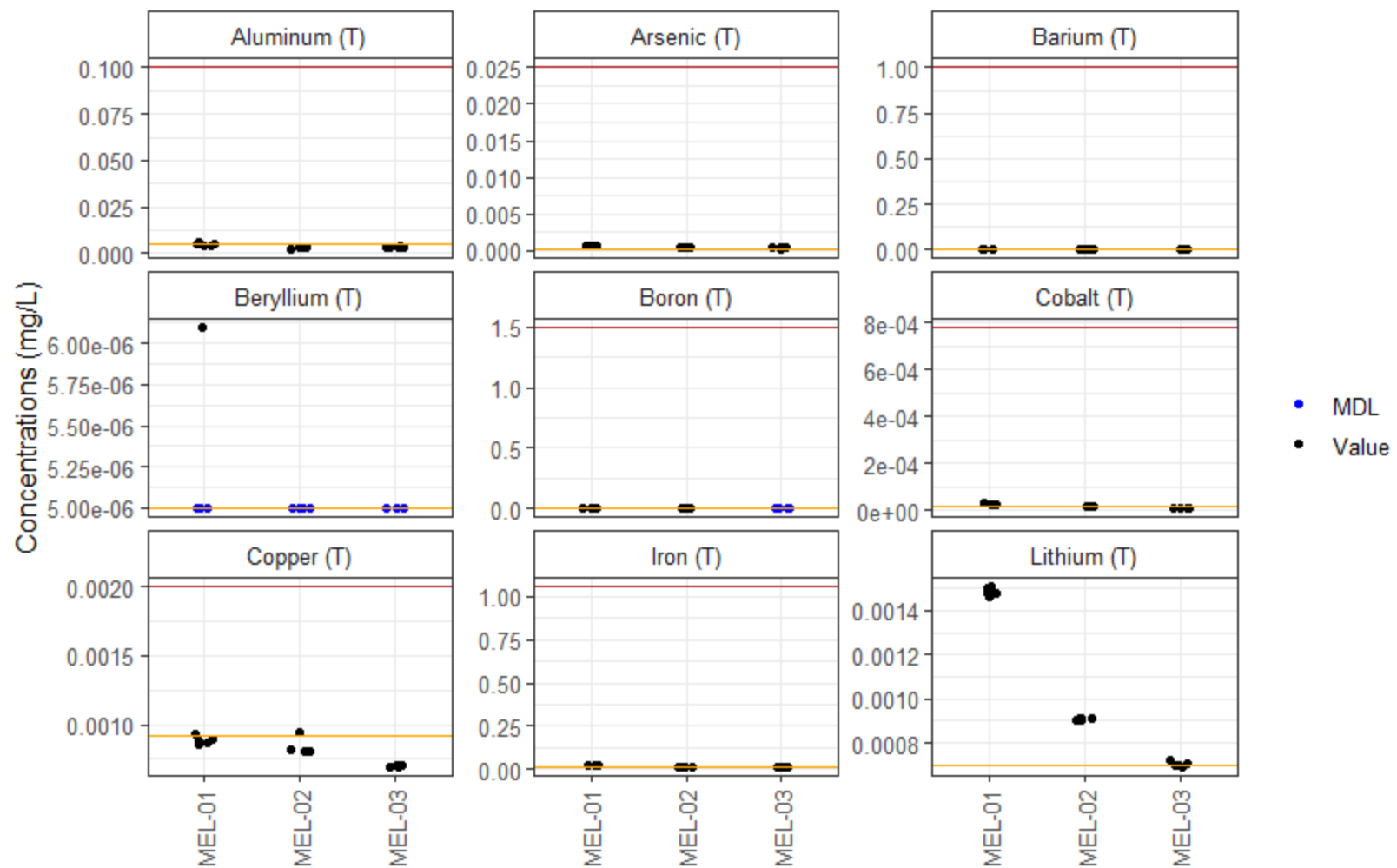


Figure 1: Sampling event results for metals in Meliadine Lake with at least one sample above the upper limit of the normal range. The red line indicates the relevant threshold (if applicable) while the orange line indicates the upper limit of the normal range (if applicable). Samples below method detection limits (MDL) are set to the detection limit and shown in blue.

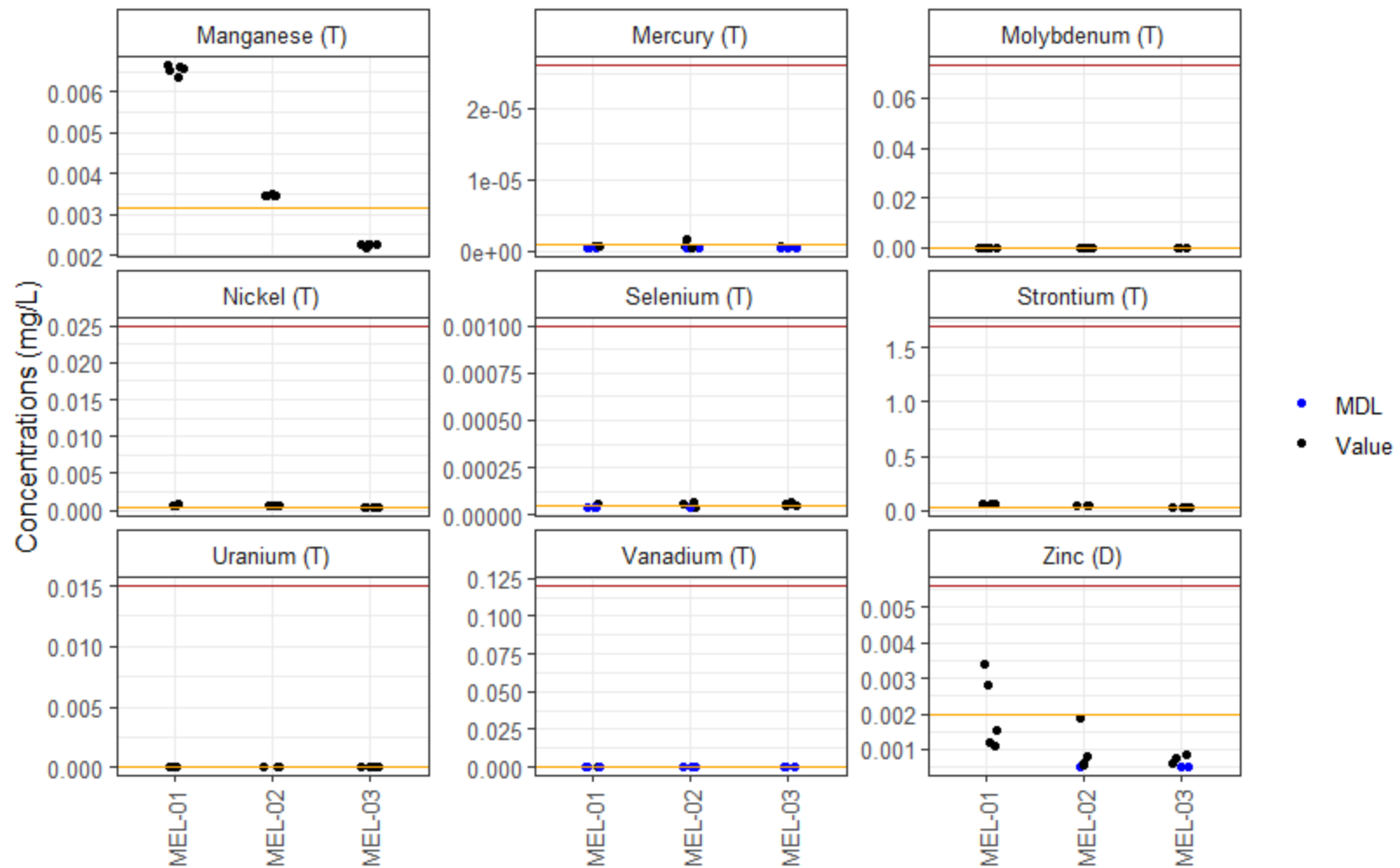


Figure 2: Sampling event results for metals in Meliadine Lake with at least one sample above the upper limit of the normal range (Part 2). The red line indicates the relevant threshold (if applicable) while the orange line indicates the upper limit of the normal range (if applicable). Samples below method detection limits (MDL) are set to the detection limit and shown in blue.

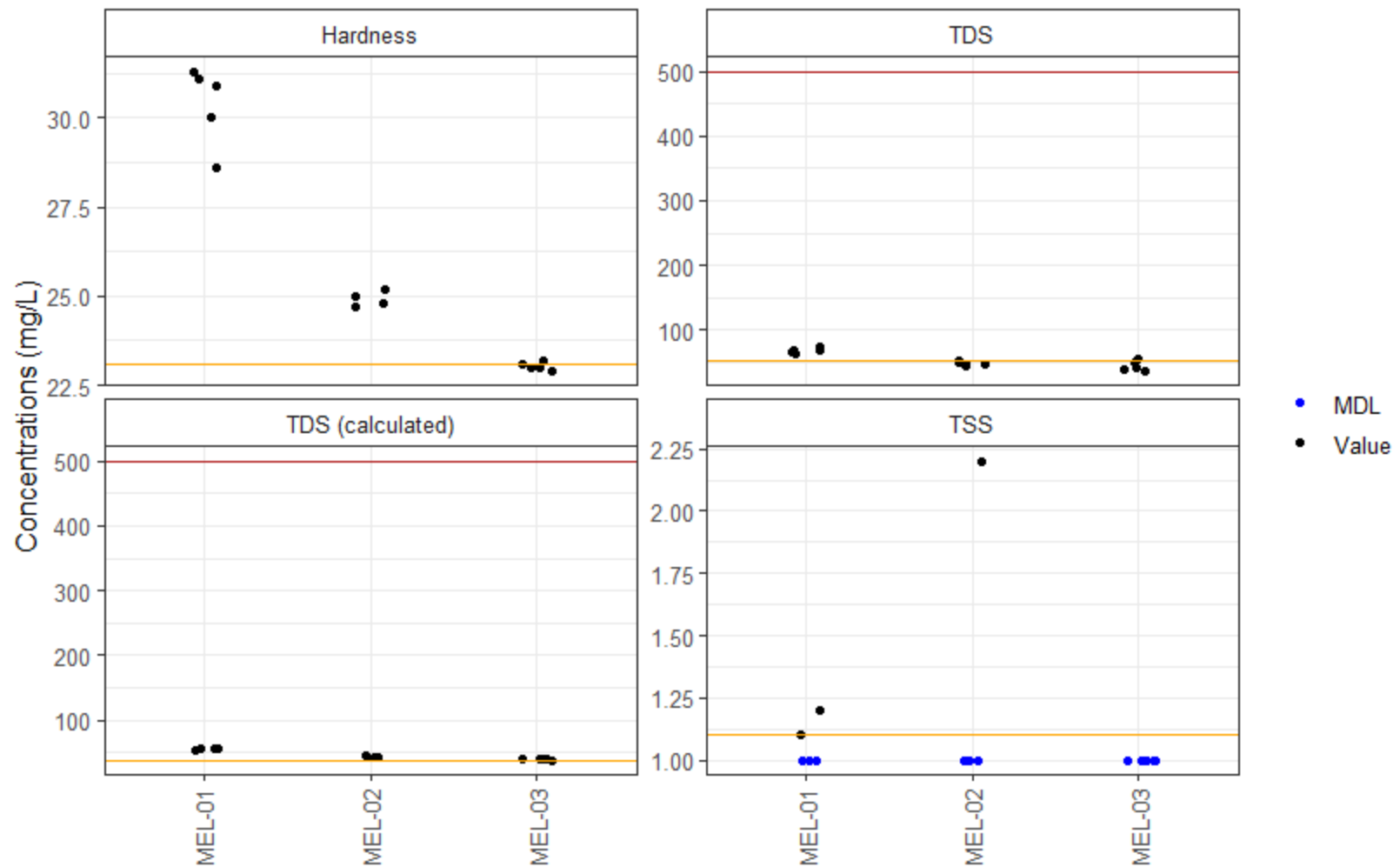


Figure 3: Sampling event results for conventional parameters in Meliadine Lake with at least one sample above the upper limit of the normal range. The red line indicates the relevant threshold (if applicable) while the orange line indicates the upper limit of the normal range (if applicable). Samples below method detection limits (MDL) are set to the detection limit and shown in blue.

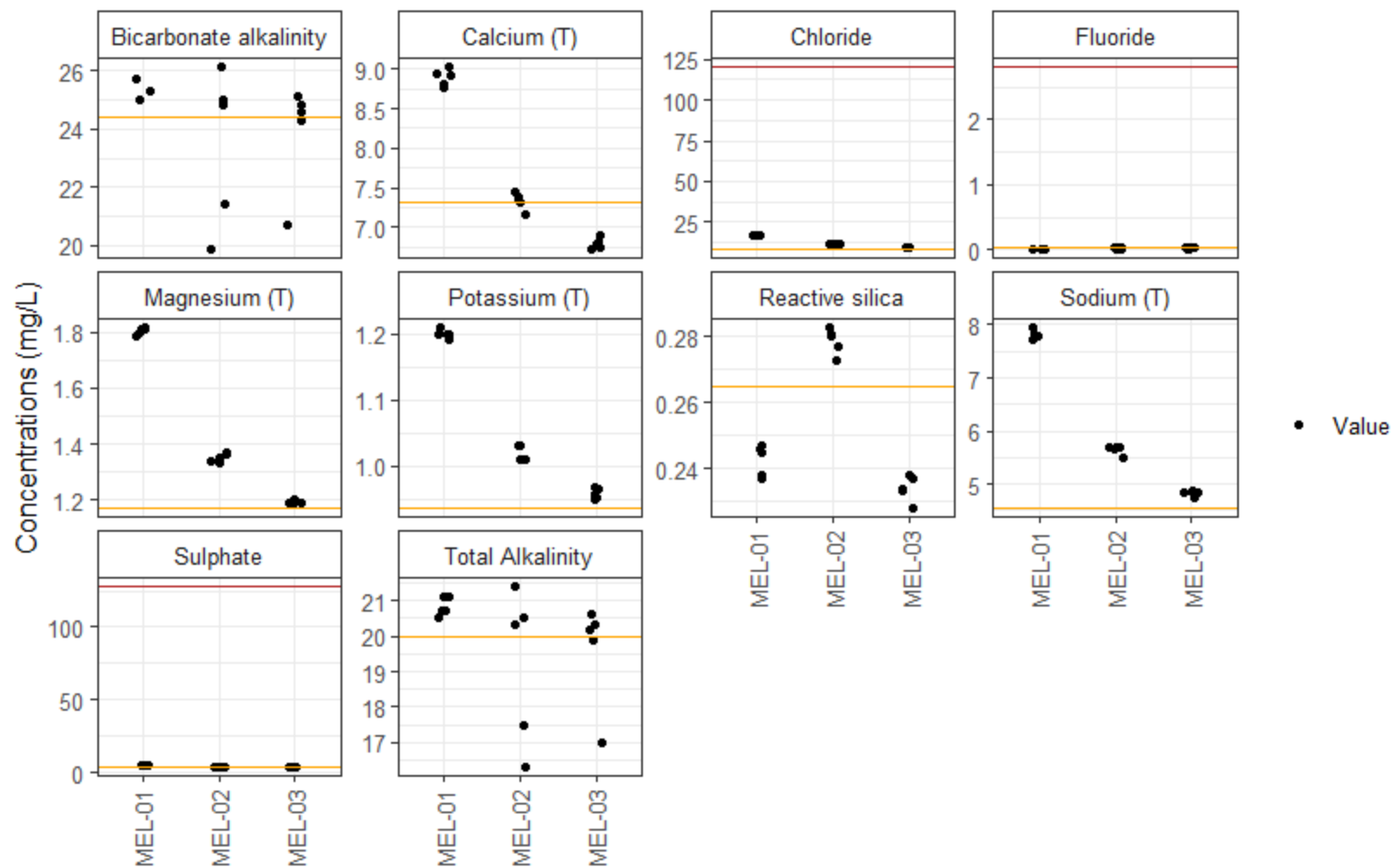


Figure 4: Sampling event results for major ions in Meliadine Lake with at least one sample above the upper limit of the normal range. The red line indicates the relevant threshold (if applicable) while the orange line indicates the upper limit of the normal range (if applicable). Samples below method detection limits (MDL) are set to the detection limit and shown in blue.

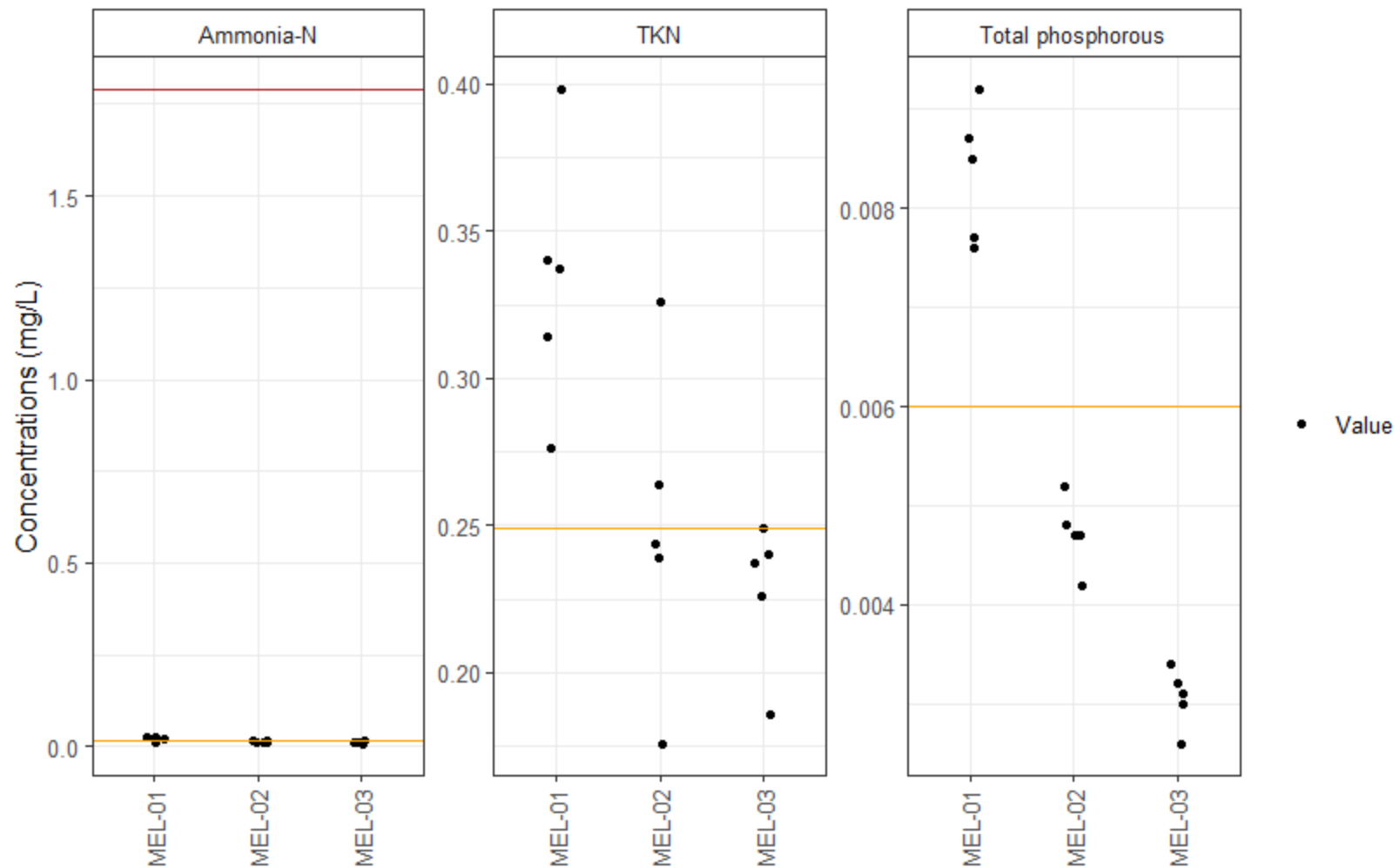


Figure 5: Sampling event results for nutrients in Meliadine Lake with at least one sample above the upper limit of the normal range. The red line indicates the relevant threshold (if applicable) while the orange line indicates the upper limit of the normal range (if applicable). Samples below method detection limits (MDL) are set to the detection limit and shown in blue.

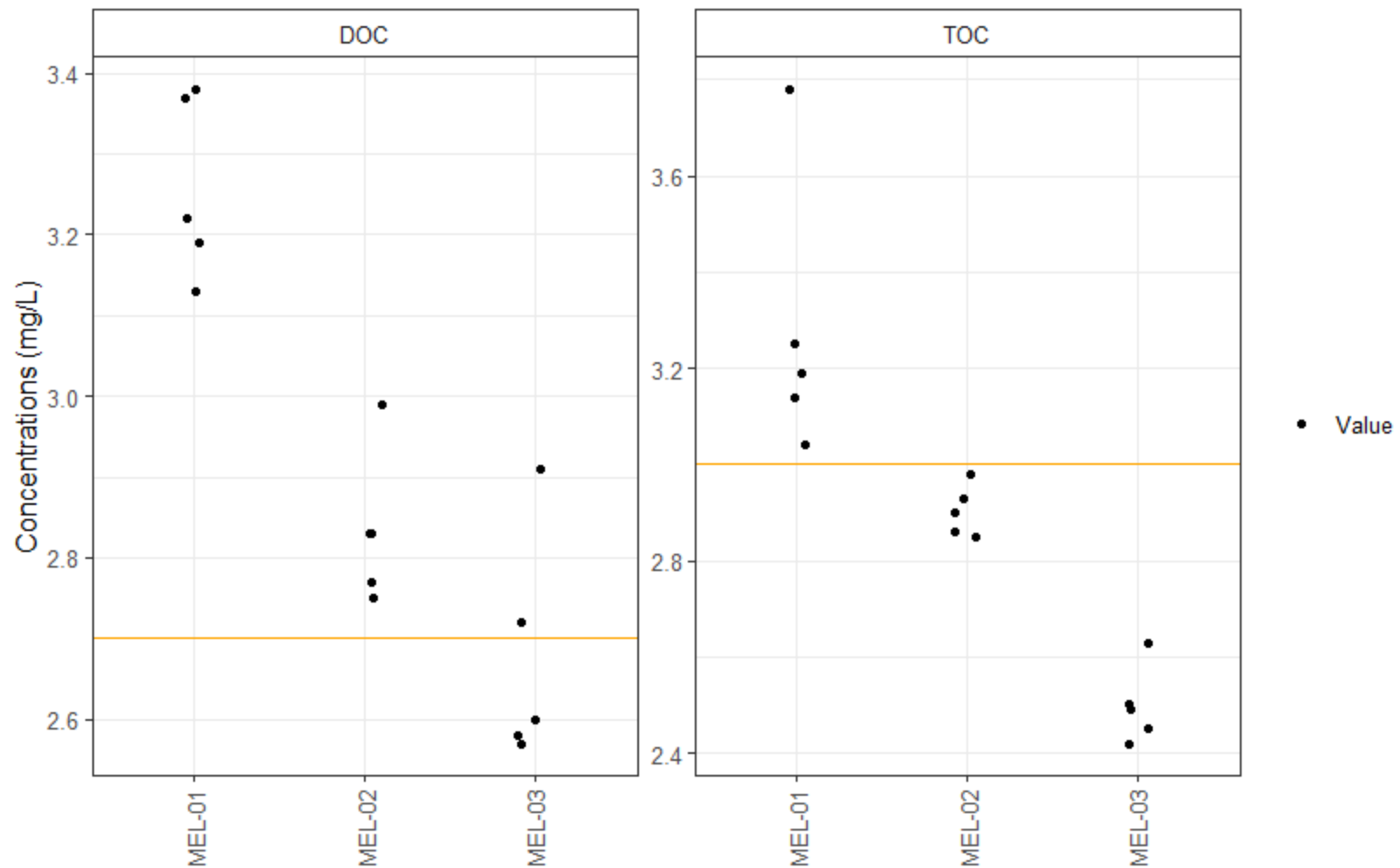


Figure 6: Sampling event results for other parameters in Meliadine Lake with at least one sample above the upper limit of the normal range. The red line indicates the relevant threshold (if applicable) while the orange line indicates the upper limit of the normal range (if applicable). Samples below method detection limits (MDL) are set to the detection limit and shown in blue.

2.1 Result Reliability Checks

Two preliminary analyses were conducted to assess the reliability of sample results. Samples failing either one of these tests have been flagged as uncertain, and warrant further evaluation.

The first analysis compares dissolved and total concentrations for a given parameters at each location. Samples in which dissolved concentrations are greater than total with a relative percent difference (RPD) of more than 30% are considered potentially unreliable. All samples failing to meet this reliability check are summarized in Table 5.

The second analysis compares parameter concentrations within each sampling area. In most cases, samples at stations in the same sampling area are expected to have similar concentrations, and outlying data points may be anomalous. Sampling areas where the maximum concentration was more than a factor of 5 greater than the median of all samples within the sampling area are highlighted here as potentially unreliable. All samples failing to meet this reliability check are summarized in Table 6.

Table 5: Samples with uncertain reliability due to differences in dissolved and total parameter results.

Sample ID	Area ID	Parameter	Result (T)	Result (D)	MDL (T)	MDL (D)	RPD
MEL-03-01	MEL-03	Lead	1e-05	0.000262	MDL	-	185.3
MEL-01-07	MEL-01	Zinc	5e-04	0.0034	MDL	-	148.7
MEL-01-06	MEL-01	Zinc	6e-04	0.0028	-	-	129.4
MEL-01-09	MEL-01	Zinc	0.00064	0.00109	-	-	52
MEL-03-01	MEL-03	Zinc	5e-04	0.00074	MDL	-	38.7
MEL-01-08	MEL-01	Lead	1e-05	1.4e-05	MDL	-	33.3
MEL-01-09	MEL-01	Lead	1e-05	1.4e-05	MDL	-	33.3
MEL-01-01	MEL-01	Zinc	0.00112	0.00153	-	-	30.9

Table 6: Samples with uncertain reliability due to differences between results from the same sampling area.

Area ID	Parameter	DL	Median	Max	Difference	Station_with_Max
MEL-03	Lead (D)	1e-05	1e-05	0.000262	26.2	MEL-03-01

3 LABORATORY & FIELD QUALITY CONTROL RESULTS

ALS' laboratory QC samples for water are:

- *Laboratory duplicates* (LD) - these samples provide insights into the precision of laboratory analyses. Duplicate aliquots are taken from the samples and run through part (aliquots taken post digestion) or all (aliquots taken from the sample bottle) the laboratory analytical process.
- *Laboratory control samples* (LCS) - these samples provide insights into whether the laboratory systems are working as intended. They are comprised of a mixture of analyte-free water to which known amounts of the method analytes are added. They are essentially an internal version of a certified reference material.
- *Matrix spikes* (MS) - these samples involve the analysis of actual samples, to which a known amount of method analytes are added in amounts high enough that the spikes are clearly discernable relative to existing concentrations. These samples provide insights into the degree that the sample matrix could interfere with analyses.
- *Matrix blanks* (MB) - these samples are analyzed to assess background interference or contamination that exists in the analytical system that could lead to elevated concentrations or false positive data. These samples are comprised of analyte-free water.

The following field QC samples were collected and submitted blind to ALS:

- *Field duplicates* (FD) - these samples provide insights into (a) variability in field conditions and (b) the precision of laboratory analyses. Duplicate samples are collected from the same location and treated independently through the sampling and analysis process.
- *Deionized blanks* (DB) - these samples 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.
- *Equipment blanks* (EB) - these samples 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.
- *Travel blanks* (TB) - these samples 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.

3.1 Overall QC Results

Overall laboratory and field QC results are summarized in Table 7.

Table 7: Summary of laboratory and field QC results by sample type.

	QC_Element	Pass	Fail	ND
Laboratory	Lab Duplicate	307	0	0
	Lab Control Sample	293	0	0
	Matrix Spike	165	0	9
	Matrix Blank	290	0	0
Field	Field Duplicate	248	0	0
	Deionized Water Blank	94	28	0
	Equipment Blank	99	23	0
	Travel Blank	69	3	0

3.2 Laboratory Duplicates

All laboratory duplicate results met laboratory QC objectives.

3.3 Laboratory Control Samples

All laboratory control sample results met laboratory QC objectives.

3.4 Matrix Spike

All matrix spike results met laboratory QC objectives.

In addition, some parameters had spike levels too low to confidently quantify them relative to existing concentrations in the sample. Consequently, QC results for these results could not be calculated (see Table 8).

Table 8: Analytes not determined for matrix spikes.

QC_Lot	Analyte	ALS_QC_ID ¹
1374502	Silica, Reactive (as SiO ₂)	DUP-MEL-SEP-03
1377938	Calcium (Ca)-Total	DUP-MEL-SEP-03
1377938	Magnesium (Mg)-Total	DUP-MEL-SEP-03
1377938	Sodium (Na)-Total	DUP-MEL-SEP-03
1377938	Strontium (Sr)-Total	DUP-MEL-SEP-03
1381730	Calcium (Ca)-Dissolved	DUP-MEL-SEP-01
1381730	Magnesium (Mg)-Dissolved	DUP-MEL-SEP-01
1381730	Sodium (Na)-Dissolved	DUP-MEL-SEP-01
1381730	Strontium (Sr)-Dissolved	DUP-MEL-SEP-01

¹ALS_QC_ID listing of 'Anonymous' indicates QC sample from another client used.

3.5 Matrix Blank

All matrix blank results met laboratory QC objectives.

3.6 Field Duplicates

All field duplicate sample results met laboratory QC objectives.

3.7 DI Blank

In this sampling event, 28 deionized water blank samples failed to meet the QC objectives. Deionized water blank results not meeting QC objectives are summarized in Table 10.

Table 10: Details for deionized water blank results not meeting QC objectives.

QC_Lot	ID	Analyte	Results	DL	FB.QC
1375124	DI	Conductivity	1.50e+00	1.0e+00	Fail
1378243	DI	Ammonia, Total (as N)	2.43e-02	5.0e-03	Fail
1374502	DI	Silica, Reactive (as SiO2)	3.90e-02	1.0e-02	Fail
1381732	DI	Aluminum (Al)-Total	1.90e-03	1.0e-03	Fail
1381732	DI	Arsenic (As)-Total	4.90e-05	2.0e-05	Fail
1381732	DI	Barium (Ba)-Total	3.60e-05	2.0e-05	Fail
1381732	DI	Calcium (Ca)-Total	3.00e-02	1.0e-02	Fail
1381732	DI	Iron (Fe)-Total	3.30e-03	1.0e-03	Fail
1381732	DI	Lead (Pb)-Total	1.30e-05	1.0e-05	Fail
1381732	DI	Manganese (Mn)-Total	1.04e-04	5.0e-05	Fail
1381732	DI	Potassium (K)-Total	4.80e-02	2.0e-02	Fail
1381732	DI	Rubidium (Rb)-Total	8.60e-06	5.0e-06	Fail
1381732	DI	Sodium (Na)-Total	4.40e-02	2.0e-02	Fail
1381732	DI	Strontium (Sr)-Total	7.50e-05	2.0e-05	Fail
1381732	DI	Titanium (Ti)-Total	8.30e-05	5.0e-05	Fail
1381732	DI	Zinc (Zn)-Total	7.80e-04	5.0e-04	Fail
1381730	DI	Arsenic (As)-Dissolved	3.20e-05	2.0e-05	Fail
1381730	DI	Barium (Ba)-Dissolved	3.80e-05	2.0e-05	Fail
1381730	DI	Calcium (Ca)-Dissolved	3.90e-02	1.0e-02	Fail
1381730	DI	Iron (Fe)-Dissolved	1.20e-03	1.0e-03	Fail
1381730	DI	Lead (Pb)-Dissolved	1.40e-05	1.0e-05	Fail
1381730	DI	Manganese (Mn)-Dissolved	9.10e-05	5.0e-05	Fail
1381730	DI	Rubidium (Rb)-Dissolved	7.50e-06	5.0e-06	Fail
1381730	DI	Sodium (Na)-Dissolved	4.10e-02	2.0e-02	Fail
1381730	DI	Strontium (Sr)-Dissolved	9.60e-05	2.0e-05	Fail
1381730	DI	Tin (Sn)-Dissolved	2.28e-04	2.0e-05	Fail
1381730	DI	Zinc (Zn)-Dissolved	1.77e-03	5.0e-04	Fail
	DI	Ra-226	1.10e-02	7.9e-03	Fail

3.8 Equipment Blank

In this sampling event, 23 equipment blank samples failed to meet the QC objectives. Equipment blank results not meeting QC objectives are summarized in Table 9.

Table 9: Details for equipment blank results not meeting QC objectives.

QC_Lot	ID	Analyte	Results	DL	FB.QC
1373525	EB	Turbidity	1.10e-01	1e-01	Fail
1378243	EB	Ammonia, Total (as N)	4.45e-02	5e-03	Fail
1381732	EB	Aluminum (Al)-Total	2.40e-03	1e-03	Fail
1381732	EB	Arsenic (As)-Total	4.30e-05	2e-05	Fail
1381732	EB	Barium (Ba)-Total	8.30e-05	2e-05	Fail
1381732	EB	Calcium (Ca)-Total	4.80e-02	1e-02	Fail
1381732	EB	Copper (Cu)-Total	5.60e-05	5e-05	Fail
1381732	EB	Iron (Fe)-Total	3.50e-03	1e-03	Fail
1381732	EB	Lead (Pb)-Total	1.20e-05	1e-05	Fail
1381732	EB	Magnesium (Mg)-Total	7.50e-03	4e-03	Fail
1381732	EB	Manganese (Mn)-Total	4.03e-04	5e-05	Fail
1381732	EB	Nickel (Ni)-Total	9.70e-05	5e-05	Fail
1381732	EB	Rubidium (Rb)-Total	9.90e-06	5e-06	Fail
1381732	EB	Sodium (Na)-Total	7.50e-02	2e-02	Fail
1381732	EB	Strontium (Sr)-Total	1.98e-04	2e-05	Fail
1381732	EB	Titanium (Ti)-Total	9.40e-05	5e-05	Fail
1381732	EB	Zinc (Zn)-Total	8.40e-04	5e-04	Fail
1381730	EB	Barium (Ba)-Dissolved	3.20e-05	2e-05	Fail
1381730	EB	Calcium (Ca)-Dissolved	2.70e-02	1e-02	Fail
1381730	EB	Manganese (Mn)-Dissolved	1.94e-04	5e-05	Fail
1381730	EB	Rubidium (Rb)-Dissolved	8.30e-06	5e-06	Fail
1381730	EB	Strontium (Sr)-Dissolved	1.24e-04	2e-05	Fail
1381730	EB	Zinc (Zn)-Dissolved	8.60e-04	5e-04	Fail

3.9 Travel Blank

In this sampling event, 3 travel blank samples failed to meet the QC objectives. Travel blank results not meeting QC objectives are summarized in Table 11.

Table 11: Details for travel blank results not meeting QC objectives.

QC_Lot	ID	Analyte	Results	DL	FB.QC
1373525	TB	Turbidity	0.14000	1e-01	Fail
1378243	TB	Ammonia, Total (as N)	0.01260	5e-03	Fail
1383175	TB	Zinc (Zn)-Total	0.00112	5e-04	Fail

3.10 Holding Time Exceedances

In addition to those ALS laboratory QC samples described above, during QC screening samples were also assessed against recommended hold times. Parameters and associated sample numbers exceeding recommended hold times in this sampling event are shown in Table 12. Note that pH is included in the suite of field measurements and has a very short recommended hold time, so exceeding the hold time for laboratory analysis is expected and of little importance.

Table 12: Analytes and associated number of samples exceeding holding times.

Analyte	n
Phosphate Ortho Dissolved in Water	42
pH	21
Nitrate in Water by IC (Low Level)	20
Nitrite in Water by IC (Low Level)	20
Turbidity	20
Total Dissolved Solids (TDS)	6

APPENDIX B
EFFLUENT CHARACTERIZATION, 2020

Appendix B1
MEL-14 Effluent Chemistry, 2020

Table B1-1. MEL-14 laboratory chemistry data, Meliadine Lake AEMP 2020.

Parameter	Units	2020	2020	2020	2020	2020	2020	2020	2020	2020	2020	2020	2020	2020	2020	2020	
		Jul	Aug	Aug	Aug	Aug	Aug	Aug	Aug	Aug	Sep	Sep	Sep	Sep	Sep	Sep	Oct
		26/07/2020	02/08/2020	09/08/2020	13/08/2020	16/08/2020	23/08/2020	28/08/2020	29/08/2020	30/08/2020	05/09/2020	06/09/2020	13/09/2020	20/09/2020	27/09/2020	02/10/2020	
Field Measurements																	
pH (field)	pH units	7.0	7.4	7.2			7.3	7.1		6.9	7.1	7.2	6.6		7.0	7.6	
DO (%)	%	75	66	98			85	103		98	98	96	97		89	105	
DO (mg/L)	mg/L	21	6.3				8.5	11		11	11	11			10	14	
Sp. Conductivity (field)	uS/cm	2,286	2,679	2,724			2,930	2,999		3,012	3,261	3,265	3,550		3,778	4,181	
Temperature	C	17	16	17			15	13		11	11	9.8	7.5		8.7	2.7	
Conventional Parameters																	
Total Dissolved Solids	mg/L	1,340	1,550	1,660	1,670	1,650	1,850		1,770	1,620	1,940	1,910	1,780	2,410	2,300	2,630	
Total Suspended Solids	mg/L	4.0	4.0	3.0	3.0	5.0	5.0		4.0	3.0	5.0	6.0	6.0	5.0	5.0	5.0	
Conductivity (lab)	uS/cm	2,500	2,500	2,700	2,800	2,800	2,900		3,000	3,000	3,100	3,200	3,500	3,500	3,900	4,000	
Hardness (D)	mg/L	531	561	583	605	600	599		659	670	685	704	777	810	871	1,010	
Hardness (T)	mg/L	561,000	562,000	614,000		612,000	632,000		616,000	633,000	683,000	708,000	756,000	781,000	948,000	971,000	
pH (lab)	pH units	7.5	7.5	7.5	7.7	7.4	7.6		7.4	7.4	7.5	7.6	7.4	7.5	7.5	7.6	
Total Dissolved Solids (Calculated)	mg/L	1,300	1,300	1,400	1,400	1,400	1,400		1,600	1,600	1,700	1,700	1,900	1,900	2,100	2,300	
Turbidity (lab)	NTU	0.70	0.70	0.60	0.50	0.70	0.50		0.60	0.60	0.60	0.60	0.70	0.70	0.60	0.60	
Major Ions																	
Alkalinity, Bicarbonate	mg/L	46	46	53	60	61	62		67	60	71	74	65	76	69	75	
Alkalinity, Carbonate	mg/L	< 1	< 1	< 1	< 1	< 1	< 1		< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	
Alkalinity, Total	mg/L	46	46	53	61	61	63		67	60	71	75	66	76	69	75	
Calcium (D)	mg/L	151	157	165	172	173	173		187	191	197	203	224	233	247	293	
Calcium (T)	mg/L	160	161	174		174	181		172	178	197	203	217	221	278	273	
Chloride	mg/L	600	630	680	700	710	700		790	780	800	780	900	920	950	1,100	
Fluoride	mg/L	< 0.1	< 0.1	0.11	< 0.1	< 0.1	< 0.1		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	
Magnesium (D)	mg/L	38	41	42	42	41	40		47	47	47	48	53	55	61	68	
Magnesium (T)	mg/L	39	39	44		43	44		45	46	47	49	52	56	62	70	
Potassium (D)	mg/L	17	18	19	19	19	19		21	21	22	22	24	25	26	29	
Potassium (T)	mg/L	17	18	20		20	21		20	21	22	23	24	24	26	29	
Reactive Silica (SiO2)	mg/L	0.90	0.80	0.78		1.2	1.2		1.1	1.2	1.8	2.0	2.0	1.9	1.5	1.8	
Sodium (D)	mg/L	243	255	273	270	278	268		299	300	292	296	343	341	382	395	
Sodium (T)	mg/L	250	246	289		272	284		290	295	303	327	335	352	377	406	
Sulphate	mg/L	130	140	150	140	140	150		170	160	200	210	230	230	260	310	
Nutrients																	
Ammonia (as N)	mg/L	0.79	0.60	0.45		0.24	0.16		0.39	0.47	0.92	0.98	1.8	1.3	1.7	2.3	
Total Phosphorus	mg/L	0.022	0.022	< 0.02		< 0.02	0.023		0.026	< 0.02	< 0.02	0.022	0.022	< 0.02	< 0.02	0.029	
Nitrate (as N)	mg/L	12	12	12	11	11	11		11	11	11	12	14	15	17	16	
Nitrate + Nitrite (as N)	mg/L	13	12	12	11	11	11		11	11	12	12	15	15	18	16	
Nitrite (as N)	mg/L	0.46	0.36	0.34	0.29	0.29	0.24		0.28	0.28	0.35	0.41	0.45	0.37	0.38	0.35	
Orthophosphate (PO4-P)	mg/L	< 0.01	< 0.01	< 0.01		< 0.01	< 0.01		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	
Total Kjeldahl Nitrogen	mg/L	1.6	1.3	< 0.5		0.84	1.1		1.3	0.68	1.0	1.7	3.1	1.2	2.5	3.4	
Organic/Inorganic Carbon																	
Dissolved Organic Carbon	mg/L	7.6	7.6	8.5		8.2	8.7		8.9	7.9	9.1	9.6	7.8	9.2	8.7	12	
Total Organic Carbon	mg/L	8.4	8.0	8.3		9.0	9.0		9.6	8.5	9.1	9.8	8.9	10	9.3	12	
Total Metals																	
Aluminum (T)	mg/L	0.73	0.41	0.46		0.47	0.53		0.49	0.50	0.44	0.50	1.00	0.62	0.67	0.59	
Arsenic (T)	mg/L	0.0042	0.0033	0.0053		0.0030	0.0036		0.0059	0.0055	0.0036	0.0044	0.0039	0.0034	0.0023	0.0024	
Copper (T)	mg/L	0.0015	0.0015	0.0012		0.0015	0.0017		0.0018	0.0017	0.0015	0.0014	0.0015	0.0018	0.0015	0.0019	
Lead (T)	mg/L	<0.0004	<0.0002	<0.0002		<0.0002	<0.0002		<0.0004	<0.0004	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	
Nickel (T)	mg/L	0.0045	0.0039	0.0044		0.0043	0.0044		0.0049	0.0049	0.0050	0.0057	0.0063	0.0066	0.0069	0.010	
Zinc (T)	mg/L	< 0.01	< 0.005	< 0.005		< 0.005	< 0.005		< 0.01	< 0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.01	
Antimony (T)	mg/L	0.0040	0.00067	0.00070		0.00063	0.00065		< 0.001	< 0.001	0.00069	0.00074	0.00071	0.00069	0.00064	< 0.001	
Barium (T)	mg/L	0.083	0.082	0.100		0.10	0.10		0.11	0.11	0.10	0.11	0.11	0.11	0.11	0.11	
Beryllium (T)	mg/L	<0.0002	<0.0001	<0.0001		<0.0001	<0.0001		<0.0002	<0.0002	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0002	
Bismuth (T)	mg/L	< 0.002	< 0.001	< 0.001		< 0.001	< 0.001		< 0.002	< 0.002	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.002	
Boron (T)	mg/L	0.32	0.27	0.32		0.31	0.35		0.37	0.37	0.34	0.38	0.42	0.39	0.40	0.46	
Cadmium (T)	mg/L	0.00002	0.00002	<0.00001		0.00001	<0.00001		<0.00002	<0.00002	<0.00001	0.00001	0.00002	0.00003	0.00002	0.00003	
Chromium (T)	mg/L	< 0.002	< 0.001	< 0.001		< 0.001	< 0.001		< 0.002	< 0.002	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.002	
Cobalt (T)	mg/L	0.0011	0.00092	0.0011		0.00098	0.00097		0.0011	0.0011	0.0012	0.0012	0.0015	0.0016	0.0016	0.0021	
Iron (T)	mg/L	0.063	0.045	0.062		0.037	0.033		0.031	0.031	0.027	0.043	0.026	0.034	0.052	0.028	
Lithium (T)	mg/L	0.076	0.063	0.070		0.077	0.077		0.082	0.083	0.066	0.058	0.074	0.070	0.080	0.084	
Manganese (T)	mg/L	0.13	0.10	0.27		0.22	0.18		0.15	0.16	0.21	0.26	0.26	0.26	0.30	0.33	
Mercury (T)	mg/L	<0.00001	<0.00001	<0.00001		<0.00001	<0.00001		<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.000			

Year	Month	Parameter	Units	Water Licence Limits		MDMER Authorized Limits of Deleterious Substances (Schedule 4)			MEL-14 Summary Statistics							Water Licence Limits			MDMER Authorized Limits of Deleterious Substances (Schedule 4)			
				Maximum Average Conc.	Maximum Grab Conc.	Maximum Monthly Mean Conc.	Maximum Composite Sample Conc.	Maximum Grab Sample Conc.	N	N-DL	N-DP	Mean	SD	Median	Min	Max	Monthly Mean	Maximum Grab	Maximum Grab (N)	Monthly Mean	Maximum Grab	Maximum Grab (N)
2018	June	Field Measurements																				
		Sp. Conductivity (Field)	uS/cm	-	-	-	-	-	1.0	0	0	1,500	-	1,500	1,500	1,500	-	-	-	-	-	-
		Conventional Parameters																				
		Hardness (D)	mg/L	-	-	-	-	-	1.0	1.0	100	-	-	-	-	0	-	-	-	-	-	-
		pH (lab)	pH units	-	-	-	-	-	1.0	0	0	7.6	-	7.6	7.6	7.6	-	-	-	-	-	-
		Total Dissolved Solids	mg/L	1,400	-	-	-	-	1.0	0	0	1,200	-	1,200	1,200	1,200	0	-	-	-	-	-
		Total Suspended Solids	mg/L	15	30	15	23	30	1.0	0	0	5.0	-	5.0	5.0	5.0	0	0	0	0	0	0
		Turbidity (lab)	NTU	-	-	-	-	-	1.0	0	0	2.5	-	2.5	2.5	2.5	-	-	-	-	-	-
		Major Ions																				
		Alkalinity, Bicarbonate	mg/L	-	-	-	-	-	1.0	0	0	51	-	51	51	51	-	-	-	-	-	-
		Alkalinity, Carbonate	mg/L	-	-	-	-	-	1.0	1.0	100	-	-	-	-	1.0	-	-	-	-	-	-
		Alkalinity, Total	mg/L	-	-	-	-	-	1.0	0	0	51	-	51	51	51	-	-	-	-	-	-
		Chloride	mg/L	-	-	-	-	-	1.0	0	0	300	-	300	300	300	-	-	-	-	-	-
		Sulphate	mg/L	-	-	-	-	-	1.0	0	0	38	-	38	38	38	-	-	-	-	-	-
		Nutrients																				
		Ammonia (as N)	mg/L	14	18	-	-	-	1.0	0	0	3.1	-	3.1	3.1	3.1	0	0	0	0	-	-
		Nitrate (as N)	mg/L	-	-	-	-	-	1.0	0	0	5.3	-	5.3	5.3	5.3	-	-	-	-	-	-
		Nitrate + Nitrite (as N)	mg/L	-	-	-	-	-	1.0	0	0	5.4	-	5.4	5.4	5.4	-	-	-	-	-	-
		Nitrite (as N)	mg/L	-	-	-	-	-	1.0	0	0	0.12	-	0.12	0.12	0.12	-	-	-	-	-	-
		Orthophosphate (PO4-P)	mg/L	-	-	-	-	-	1.0	0	0	0.068	-	0.068	0.068	0.068	-	-	-	-	-	-
		Total Kjeldahl Nitrogen	mg/L	-	-	-	-	-	1.0	0	0	3.4	-	3.4	3.4	3.4	-	-	-	-	-	-
		Total Phosphorus	mg/L	2.0	4.0	-	-	-	1.0	0	0	0.091	-	0.091	0.091	0.091	0	0	0	0	-	-
		Organic/Inorganic Carbon																				
		Dissolved Organic Carbon	mg/L	-	-	-	-	-	1.0	0	0	7.5	-	7.5	7.5	7.5	-	-	-	-	-	-
		Total Organic Carbon	mg/L	-	-	-	-	-	1.0	0	0	8.1	-	8.1	8.1	8.1	-	-	-	-	-	-
		Total Metals																				
		Mercury (T)	mg/L	-	-	-	-	-	1.0	0	0	0.0001	-	0.0001	0.0001	0.0001	-	-	-	-	-	-
		Hydrocarbons																				
		F2 (C10-C16)	mg/L	-	-	-	-	-	1.0	1.0	100	-	-	-	-	0.10	-	-	-	-	-	-
		F3 (C16-C34)	mg/L	-	-	-	-	-	1.0	1.0	100	-	-	-	-	0.20	-	-	-	-	-	-
		F4 (C34-C50)	mg/L	-	-	-	-	-	1.0	1.0	100	-	-	-	-	0.20	-	-	-	-	-	-
		Other																				
		Cyanide (Free)	mg/L	-	-	-	-	-	1.0	1.0	100	-	-	-	-	0.0010	-	-	-	-	-	-
		Cyanide (Total)	mg/L	0.50	1.0	1.0	1.5	2.0	1.0	1.0	100	-	-	-	-	0.0050	0	0	0	0	0	0
		Radium-226	Bq/l	-	-	0.37	0.74	1.1	5.0	4.0	80	-	-	-	-	0.0050	-	-	-	-	-	-
	July	Field Measurements																				
		Sp. Conductivity (Field)	uS/cm	-	-	-	-	-	5.0	0	0	1,740	114	1,700	1,600	1,900	-	-	-	-	-	-
		Conventional Parameters																				
		Hardness (D)	mg/L	-	-	-	-	-	5.0	2.0	40	257	236	398	0	470	-	-	-	-	-	-
		Hardness (T)	mg/L	-	-	-	-	-	5.0	0	0	409	49	407	344	482	-	-	-	-	-	-
		pH (lab)	pH units	-	-	-	-	-	4.0	0	0	7.2	0.23	7.2	7.0	7.5	-	-	-	-	-	-
		Total Dissolved Solids	mg/L	1,400	-	-	-	-	5.0	0	0	1,050	91	1,030	920	1,180	0	-	-	-	-	-
		Total Suspended Solids	mg/L	15	30	15	23	30	5.0	0	0	11	6.1	9.0	5.0	21	0	0	0	0	0	0
		Turbidity (lab)	NTU	-	-	-	-	-	5.0	0	0	0.84	0.48	0.70	0.30	1.6	-	-	-	-	-	-
		Major Ions																				
		Alkalinity, Bicarbonate	mg/L	-	-	-	-	-	5.0	0	0	38	7.6	38	27	47	-	-	-	-	-	-
		Alkalinity, Carbonate	mg/L	-	-	-	-	-	5.0	5.0	100	-	-	-	-	5.0	-	-	-	-	-	-
		Alkalinity, Total	mg/L	-	-	-	-	-	5.0	0	0	38	7.7	39	27	47	-	-	-	-	-	-
		Calcium (D)	mg/L	-	-	-	-	-	5.0	0	0	135	9.2	130	125	145	-	-	-	-	-	-
		Calcium (T)	mg/L	-	-	-	-	-	5.0	0	0	129	15	128	109	152	-	-	-	-	-	-
		Chloride	mg/L	-	-	-	-	-	5.0	0	0	432	42	430	400	500	-	-	-	-	-	-
		Magnesium (D)	mg/L	-	-	-	-	-	5.0	0	0	24	2.2	23	21	27	-	-	-	-	-	-
		Magnesium (T)	mg/L	-	-	-	-	-	5.0	0	0	21	2.5	21	18	25	-	-	-	-	-	-
		Potassium (D)	mg/L	-	-	-	-	-	5.0	0	0	12	1.3	12	11	14	-	-	-	-	-	-
		Potassium (T)	mg/L	-	-	-	-	-	5.0	0	0	11	1.4	12	9.6	14	-	-	-	-	-	-
		Reactive Silica (SiO2)	mg/L	-	-	-	-	-	5.0	0	0	0.24	0.14	0.21	0.071	0.45	-	-	-	-	-	-
		Sodium (D)	mg/L	-	-	-	-	-	5.0	0	0	108	13	117	101	136	-	-	-	-	-	-
		Sodium (T)	mg/L	-	-	-	-	-	5.0	0	0	105	13	107	85	120	-	-	-	-	-	-
		Sulphate	mg/L	-	-	-	-	-	5.0	0	0	48	3.3	49	43	51	-	-	-	-	-	-
		Nutrients																				
		Ammonia (as N)	mg/L	14	18	-	-	-	5.0	0	0	1.4	1.1	1.8	0.995	2.6	0	0	0	0	-	-
		Nitrate (as N)	mg/L	-	-	-	-	-	5.0	0	0	4.8	0.75	5.0	3.7	5.5	-	-	-	-	-	-
		Nitrate + Nitrite (as N)	mg/L	-	-	-	-	-	5.0	0	0	5.0	0.69	5.2	3.9	5.6	-	-	-	-	-	-
		Nitrite (as N)	mg/L	-	-	-	-	-	5.0	0	0	0.18	0.083	0.18	0.092	0.30	-	-	-	-	-	-
		Orthophosphate (PO4-P)	mg/L	-	-	-	-	-	5.0	0	0	0.10	0.050	0.10	0.050	0.10	-	-	-	-	-	-
		Total Kjeldahl Nitrogen	mg/L	-	-	-	-	-	5.0	0	0	2.1	0.91	2.1	1.2	3.2	-	-	-	-	-	-
		Total Phosphorus	mg/L	2.0	4.0	-	-	-	5.0	0	0	0.045	0.031	0.034	0.022	0.099	0	0	0	0	-	-
		Organic/Inorganic Carbon																				
		Dissolved Organic Carbon	mg/L	-	-	-	-	-	5.0	0	0	6.2	1.1	5.7	4.8	7.4	-	-	-	-	-	-
		Total Organic Carbon	mg/L	-	-	-	-	-	5.0	0	0	8.2	2.9	6.7	5.9	13	-	-	-	-	-	-
		Total Metals																				
		Aluminum (T)	mg/L	2.0	3.0	-	-	-	5.0	0	0	1.6	1.6	1.2	0.52	4.4	0	20	1.0	-	-	-
		Antimony (T)	mg/L	-	-	-	-	-	5.0	5.0	100	-	-	-	-	0.00050	-	-	-	-	-	-
		Arsenic (T)	mg/L	0.30	0.60	0.50	0.75	1.0	5.0	0	0	0.0014	0.00035	0.0013	0.0011	0.0019	0	0	0	0	0	0
		Barium (T)	mg/L	-	-	-	-	-	5.0	0	0	0.10	0.014	0.099	0.083	0.12	-	-	-	-	-	-
		Beryllium (T)	mg/L	-	-	-	-	-	5.0	5.0	100	-	-	-	-	0.00010	-	-	-	-	-	-
		Boron (T)	mg/L	-	-	-	-	-	5.0	0	0	0.12	0.026	0.12	0.094	0.16	-	-	-	-	-	-
		Cadmium (T)	mg/L	-	-	-	-	-	5.0	1.0	20	0.00002	0.00001	0.00002	0.00001	0.00002	-	-	-	-</		

Year	Month	Parameter	Units	Water Licence Limits		MDMER Authorized Limits of Deleterious Substances (Schedule 4)			MEL-14 Summary Statistics								Water Licence Limits			MDMER Authorized Limits of Deleterious Substances (Schedule 4)		
				Maximum Average Conc.	Maximum Grab Conc.	Maximum Monthly Mean Conc.	Maximum Composite Sample Conc.	Maximum Grab Sample Conc.	N	N-DL	ND-per	Mean	SD	Median	Min	Max	Monthly Mean	Maximum Grab	Maximum Grab (N)	Monthly Mean	Maximum Grab	Maximum Grab (N)
2018	August	Field Measurements																				
		Sp. Conductivity (Field)	uS/cm	-	-	-	-	-	4.0	0	0	1,950	342	2,000	1,500	2,300	-	-	-	-	-	-
		Conventional Parameters																				
		Hardness (D)	mg/L	-	-	-	-	-	4.0	1.0	25	387	260	493	0	565	-	-	-	-	-	-
		Hardness (T)	mg/L	-	-	-	-	-	4.0	0	0	406	234	505	57	557	-	-	-	-	-	-
		pH (lab)	pH units	-	-	-	-	-	4.0	0	0	7.2	0.25	7.2	6.8	7.4	-	-	-	-	-	-
		Total Dissolved Solids	mg/L	1,400	-	-	-	-	4.0	0	0	1,160	215	1,300	870	1,370	0	0	0	0	0	0
		Total Suspended Solids	mg/L	15	30	15	23	30	4.0	1.0	25	7.4	4.9	9.0	1.0	11	0	0	0	0	0	0
		Turbidity (lab)	NTU	-	-	-	-	-	4.0	1.0	25	0.46	0.40	0.40	0.10	1.0	-	-	-	-	-	-
		Major Ions																				
		Alkalinity, Bicarbonate	mg/L	-	-	-	-	-	4.0	0	0	27	14	33	6.2	37	-	-	-	-	-	-
		Alkalinity, Carbonate	mg/L	-	-	-	-	-	4.0	4.0	100	-	-	-	-	3.0	-	-	-	-	-	-
		Alkalinity, Total	mg/L	-	-	-	-	-	4.0	0	0	27	14	33	6.3	37	-	-	-	-	-	-
		Calcium (D)	mg/L	-	-	-	-	-	4.0	0	0	123	72	152	17	373	-	-	-	-	-	-
		Calcium (T)	mg/L	-	-	-	-	-	4.0	0	0	124	72	154	17	373	-	-	-	-	-	-
		Chloride	mg/L	-	-	-	-	-	4.0	0	0	545	110	560	400	660	-	-	-	-	-	-
		Magnesium (D)	mg/L	-	-	-	-	-	4.0	0	0	23	13	27	4.0	32	-	-	-	-	-	-
		Magnesium (T)	mg/L	-	-	-	-	-	4.0	0	0	24	13	30	3.9	32	-	-	-	-	-	-
		Potassium (D)	mg/L	-	-	-	-	-	4.0	0	0	15	1.2	14	14	17	-	-	-	-	-	-
		Potassium (T)	mg/L	-	-	-	-	-	4.0	0	0	15	1.5	15	13	17	-	-	-	-	-	-
		Reactive Silica (SiO2)	mg/L	-	-	-	-	-	4.0	0	0	0.73	0.53	0.77	0.078	1.3	-	-	-	-	-	-
		Sodium (D)	mg/L	-	-	-	-	-	4.0	0	0	172	44	154	144	236	-	-	-	-	-	-
		Sodium (T)	mg/L	-	-	-	-	-	4.0	0	0	172	38	158	145	229	-	-	-	-	-	-
		Sulphate	mg/L	-	-	-	-	-	4.0	0	0	44	24	54	7.2	60	-	-	-	-	-	-
		Nutrients																				
		Ammonia (as N)	mg/L	14	18	-	-	-	4.0	0	0	1.5	1.7	0.84	0.30	4.1	0	0	0	0	0	0
		Nitrate (as N)	mg/L	-	-	-	-	-	4.0	0	0	6.3	6.0	3.4	3.0	15	-	-	-	-	-	-
		Nitrate + Nitrite (as N)	mg/L	-	-	-	-	-	4.0	0	0	6.5	6.0	3.7	3.1	16	-	-	-	-	-	-
		Nitrite (as N)	mg/L	-	-	-	-	-	4.0	0	0	0.23	0.099	0.22	0.13	0.36	-	-	-	-	-	-
		Orthophosphate (PO4-P)	mg/L	-	-	-	-	-	4.0	0	0	4.0	100	-	-	0.010	-	-	-	-	-	-
		Total Kjeldahl Nitrogen	mg/L	-	-	-	-	-	4.0	0	0	1.8	1.2	1.4	0.88	3.6	-	-	-	-	-	-
		Total Phosphorus	mg/L	2.0	4.0	-	-	-	4.0	2.0	50	-	-	0.021	0.020	0.037	0	0	0	0	0	0
		Organic/Inorganic Carbon																				
		Dissolved Organic Carbon	mg/L	-	-	-	-	-	4.0	1.0	25	6.9	4.7	8.1	0.50	11	-	-	-	-	-	-
		Total Organic Carbon	mg/L	-	-	-	-	-	4.0	1.0	25	7.4	5.0	8.8	0.50	12	-	-	-	-	-	-
		Total Metals																				
		Aluminum (T)	mg/L	2.0	3.0	-	-	-	4.0	0	0	0.63	0.44	0.74	0.0050	1.0	0	0	0	0	0	0
		Antimony (T)	mg/L	-	-	-	-	-	4.0	4.0	100	-	-	-	-	0.0050	-	-	-	-	-	-
		Arsenic (T)	mg/L	0.30	0.60	0.50	0.75	1.0	4.0	0	0	0.0019	0.0011	0.0022	0.00028	0.030	0	0	0	0	0	0
		Barium (T)	mg/L	-	-	-	-	-	4.0	0	0	0.11	0.069	0.13	0.0043	0.16	-	-	-	-	-	-
		Beryllium (T)	mg/L	-	-	-	-	-	4.0	4.0	100	-	-	-	-	0.00010	-	-	-	-	-	-
		Boron (T)	mg/L	-	-	-	-	-	4.0	4.0	100	-	-	-	-	0.00010	-	-	-	-	-	-
		Cadmium (T)	mg/L	-	-	-	-	-	4.0	4.0	100	-	-	-	-	0.00001	-	-	-	-	-	-
		Chromium (T)	mg/L	-	-	-	-	-	4.0	4.0	100	-	-	-	-	0.0010	-	-	-	-	-	-
		Copper (T)	mg/L	0.20	0.40	0.30	0.45	0.60	4.0	1.0	25	0.00080	0.00038	0.00092	0.00050	0.0011	0	0	0	0	0	0
		Iron (T)	mg/L	-	-	-	-	-	4.0	1.0	25	0.12	0.11	0.11	0.0010	0.36	-	-	-	-	-	-
		Lead (T)	mg/L	0.20	0.40	0.30	0.30	0.40	4.0	3.0	75	-	-	0.00020	0.00030	0.00022	0	0	0	0	0	0
		Lithium (T)	mg/L	-	-	-	-	-	4.0	0	0	0.14	0.011	0.14	0.13	0.16	-	-	-	-	-	-
		Manganese (T)	mg/L	-	-	-	-	-	4.0	0	0	0.26	0.19	0.31	0.0024	0.41	-	-	-	-	-	-
		Mercury (T)	mg/L	-	-	-	-	-	4.0	4.0	100	-	-	-	-	0.00001	-	-	-	-	-	-
		Molybdenum (T)	mg/L	-	-	-	-	-	4.0	1.0	25	0.0016	0.00074	0.0018	0.0010	0.0022	-	-	-	-	-	-
		Nickel (T)	mg/L	0.50	1.0	0.50	0.75	1.0	4.0	1.0	25	0.0024	0.0013	0.0029	0.0010	0.0034	0	0	0	0	0	0
		Selenium (T)	mg/L	-	-	-	-	-	4.0	4.0	100	-	-	-	-	0.00010	-	-	-	-	-	-
		Silver (T)	mg/L	-	-	-	-	-	4.0	4.0	100	-	-	-	-	0.00002	-	-	-	-	-	-
		Strontium (T)	mg/L	-	-	-	-	-	4.0	0	0	2.8	1.6	3.3	0.40	4.0	-	-	-	-	-	-
		Thallium (T)	mg/L	-	-	-	-	-	4.0	3.0	75	-	-	0.00001	0.00001	0.00002	-	-	-	-	-	-
		Tin (T)	mg/L	-	-	-	-	-	4.0	4.0	100	-	-	-	-	0.00001	-	-	-	-	-	-
		Titanium (T)	mg/L	-	-	-	-	-	4.0	4.0	100	-	-	-	-	0.0050	-	-	-	-	-	-
		Uranium (T)	mg/L	-	-	-	-	-	4.0	0	0	0.00013	0.00003	0.00013	0.00010	0.00018	-	-	-	-	-	-
		Vanadium (T)	mg/L	-	-	-	-	-	4.0	4.0	100	-	-	-	-	0.0050	-	-	-	-	-	-
		Zinc (T)	mg/L	0.40	0.80	0.50	0.75	1.0	4.0	2.0	50	-	-	0.0059	0.0050	0.0085	0	0	0	0	0	0
		Dissolved Metals																				
		Aluminum (D)	mg/L	-	-	-	-	-	4.0	0	0	0.084	0.094	0.056	0.0043	0.22	-	-	-	-	-	-
		Antimony (D)	mg/L	-	-	-	-	-	4.0	4.0	100	-	-	-	-	0.025	-	-	-	-	-	-
		Arsenic (D)	mg/L	-	-	-	-	-	4.0	1.0	25	0.0019	0.0011	0.0024	0.00029	0.0050	-	-	-	-	-	-
		Barium (D)	mg/L	-	-	-	-	-	4.0	0	0	0.10	0.066	0.13	0.0044	0.15	-	-	-	-	-	-
		Beryllium (D)	mg/L	-	-	-	-	-	4.0	4.0	100	-	-	-	-	0.0050	-	-	-	-	-	-
		Boron (D)	mg/L	-	-	-	-	-	4.0	1.0	25	0.59	0.50	0.46	0.20	0.5	-	-	-	-	-	-
		Cadmium (D)	mg/L	-	-	-	-	-	4.0	4.0	100	-	-	-	-	0.00050	-	-	-	-	-	-
		Chromium (D)	mg/L	-	-	-	-	-	4.0	4.0	100	-	-	-	-	0.050	-	-	-	-	-	-
		Copper (D)	mg/L	-	-	-	-	-	4.0	1.0	25	0.0016	0.0023	0.00065	0.00022	0.010	-	-	-	-	-	-
		Iron (D)	mg/L	-	-	-	-	-	4.0	2.0	50	-	-	0.038	0.0050	0.25	-	-	-	-	-	-
		Lead (D)	mg/L	-	-	-	-	-	4.0	4.0	100	-	-	-	-	0.010	-	-	-	-	-	-
		Lithium (D)	mg/L	-	-	-	-	-	4.0	0	0	0.15	0.013	0.14	0.13	0.16	-	-	-	-	-	-
		Manganese (D)	mg/L	-	-	-	-	-	4.0	0	0	0.24	0.17	0.28	0.0025	0.38	-	-	-	-	-	-
		Molybdenum (D)	mg/L	-	-	-	-	-	4.0	2.0	50	-	-	0.0020	0.0010	0.050	-	-	-	-	-	-
		Nickel (D)	mg/L	-	-	-	-	-	4.0	2.0	50											

Year	Month	Parameter	Units	Water Licence Limits		MDMER Authorized Limits of Deleterious Substances (Schedule 4)			MEL-14 Summary Statistics							Water Licence Limits			MDMER Authorized Limits of Deleterious Substances (Schedule 4)			
				Maximum Average Conc.	Maximum Grab Conc.	Maximum Monthly Mean Conc.	Maximum Composite Sample Conc.	Maximum Grab Sample Conc.	N	N-DL	N-DP	Mean	SD	Median	Min	Max	Monthly Mean	Maximum Grab	Maximum Grab (N)	Monthly Mean	Maximum Grab	Maximum Grab (N)
2019	June	Nutrients																				
		Ammonia (as N)	mg/L	14	18	-	-	-	1.0	0	0	4.2	-	4.2	4.2	4.2	0	0	0	-	-	-
		Nitrate (as N)	mg/L	-	-	-	-	-	1.0	0	0	12	-	12	12	12	-	-	-	-	-	-
		Nitrate + Nitrite (as N)	mg/L	-	-	-	-	-	1.0	0	0	12	-	12	12	12	-	-	-	-	-	-
		Nitrite (as N)	mg/L	-	-	-	-	-	1.0	0	0	0.21	-	0.21	0.21	0.21	-	-	-	-	-	-
		Orthophosphate (PO4-P)	mg/L	-	-	-	-	-	1.0	1.0	100	-	-	-	-	0.010	-	-	-	-	-	-
		Total Kjeldahl Nitrogen	mg/L	-	-	-	-	-	1.0	0	0	4.2	-	4.2	4.2	4.2	-	-	-	-	-	-
		Total Phosphorus	mg/L	2.0	4.0	-	-	-	1.0	0	0	0.021	-	0.021	0.021	0.021	0	0	0	-	-	-
		Organic/Inorganic Carbon																				
		Dissolved Organic Carbon	mg/L	-	-	-	-	-	1.0	0	0	4.4	-	4.4	4.4	4.4	-	-	-	-	-	-
		Total Organic Carbon	mg/L	-	-	-	-	-	1.0	0	0	4.8	-	4.8	4.8	4.8	-	-	-	-	-	-
		Total Metals																				
		Aluminum (T)	mg/L	2.0	3.0	-	-	-	1.0	0	0	0.17	-	0.17	0.17	0.17	0	0	0	-	-	-
		Antimony (T)	mg/L	-	-	-	-	-	1.0	1.0	100	-	-	-	-	0.00050	-	-	-	-	-	-
		Arsenic (D)	mg/L	0.30	0.60	0.30	0.75	1.0	1.0	0	0	0.0025	-	0.0025	0.0025	0.0025	0	0	0	0	0	0
		Barium (T)	mg/L	-	-	-	-	-	1.0	0	0	0.052	-	0.052	0.052	0.052	-	-	-	-	-	-
		Beryllium (T)	mg/L	-	-	-	-	-	1.0	1.0	100	-	-	-	-	0.00010	-	-	-	-	-	-
		Bismuth (T)	mg/L	-	-	-	-	-	1.0	1.0	100	-	-	-	-	0.0010	-	-	-	-	-	-
		Boron (T)	mg/L	-	-	-	-	-	1.0	0	0	0.23	-	0.23	0.23	0.23	-	-	-	-	-	-
		Cadmium (T)	mg/L	-	-	-	-	-	1.0	0	0	0.00002	-	0.00002	0.00002	0.00002	-	-	-	-	-	-
		Chromium (T)	mg/L	-	-	-	-	-	1.0	1.0	100	-	-	-	-	0.0010	-	-	-	-	-	-
		Cobalt (T)	mg/L	-	-	-	-	-	1.0	0	0	0.00075	-	0.00075	0.00075	0.00075	-	-	-	-	-	-
		Copper (T)	mg/L	0.20	0.40	0.30	0.45	0.60	1.0	0	0	0.0013	-	0.0013	0.0013	0.0013	0	0	0	0	0	0
		Iron (T)	mg/L	-	-	-	-	-	1.0	0	0	0.12	-	0.12	0.12	0.12	-	-	-	-	-	-
		Lead (T)	mg/L	0.20	0.40	0.20	0.30	0.40	1.0	0	0	0.00026	-	0.00026	0.00026	0.00026	0	0	0	0	0	0
		Lithium (T)	mg/L	-	-	-	-	-	1.0	0	0	0.088	-	0.088	0.088	0.088	-	-	-	-	-	-
		Manganese (T)	mg/L	-	-	-	-	-	1.0	0	0	0.033	-	0.033	0.033	0.033	-	-	-	-	-	-
		Mercury (T)	mg/L	-	-	-	-	-	1.0	1.0	100	-	-	-	-	0.00001	-	-	-	-	-	-
		Molybdenum (T)	mg/L	-	-	-	-	-	1.0	0	0	0.0015	-	0.0015	0.0015	0.0015	-	-	-	-	-	-
		Nickel (T)	mg/L	0.50	1.0	0.50	0.75	1.0	1.0	0	0	0.0034	-	0.0034	0.0034	0.0034	0	0	0	0	0	0
		Selenium (T)	mg/L	-	-	-	-	-	1.0	1.0	100	-	-	-	-	0.00010	-	-	-	-	-	-
		Silver (T)	mg/L	-	-	-	-	-	1.0	0	0	0.48	-	0.48	0.48	0.48	-	-	-	-	-	-
		Strontium (T)	mg/L	-	-	-	-	-	1.0	1.0	100	-	-	-	-	0.00002	-	-	-	-	-	-
		Sulfur (T)	mg/L	-	-	-	-	-	1.0	0	0	2.0	-	2.0	2.0	2.0	-	-	-	-	-	-
		Tantalum (T)	mg/L	-	-	-	-	-	1.0	0	0	0.00002	-	0.00002	0.00002	0.00002	-	-	-	-	-	-
		Thallium (T)	mg/L	-	-	-	-	-	1.0	0	0	0.00002	-	0.00002	0.00002	0.00002	-	-	-	-	-	-
		Tin (T)	mg/L	-	-	-	-	-	1.0	1.0	100	-	-	-	-	0.0050	-	-	-	-	-	-
		Titanium (T)	mg/L	-	-	-	-	-	1.0	1.0	100	-	-	-	-	0.0050	-	-	-	-	-	-
		Uranium (T)	mg/L	-	-	-	-	-	1.0	1.0	100	-	-	-	-	0.00010	-	-	-	-	-	-
		Vanadium (T)	mg/L	-	-	-	-	-	1.0	1.0	100	-	-	-	-	0.0050	-	-	-	-	-	-
		Zinc (T)	mg/L	0.40	0.80	0.50	0.75	1.0	1.0	1.0	100	-	-	-	-	0.0050	0	0	0	0	0	0
		Zirconium (T)	mg/L	-	-	-	-	-	1.0	1.0	100	-	-	-	-	0.00010	-	-	-	-	-	-
		Dissolved Metals																				
		Aluminum (D)	mg/L	-	-	-	-	-	1.0	0	0	0.034	-	0.034	0.034	0.034	-	-	-	-	-	-
		Antimony (D)	mg/L	-	-	-	-	-	1.0	1.0	100	-	-	-	-	0.00050	-	-	-	-	-	-
		Arsenic (D)	mg/L	-	-	-	-	-	1.0	0	0	0.0023	-	0.0023	0.0023	0.0023	-	-	-	-	-	-
		Barium (D)	mg/L	-	-	-	-	-	1.0	0	0	0.052	-	0.052	0.052	0.052	-	-	-	-	-	-
		Beryllium (D)	mg/L	-	-	-	-	-	1.0	1.0	100	-	-	-	-	0.00010	-	-	-	-	-	-
		Bismuth (D)	mg/L	-	-	-	-	-	1.0	1.0	100	-	-	-	-	0.0010	-	-	-	-	-	-
		Boron (D)	mg/L	-	-	-	-	-	1.0	0	0	0.23	-	0.23	0.23	0.23	-	-	-	-	-	-
		Cadmium (D)	mg/L	-	-	-	-	-	1.0	0	0	0.00001	-	0.00001	0.00001	0.00001	-	-	-	-	-	-
		Chromium (D)	mg/L	-	-	-	-	-	1.0	1.0	100	-	-	-	-	0.0010	-	-	-	-	-	-
		Cobalt (D)	mg/L	-	-	-	-	-	1.0	0	0	0.00069	-	0.00069	0.00069	0.00069	-	-	-	-	-	-
		Copper (D)	mg/L	-	-	-	-	-	1.0	0	0	0.0012	-	0.0012	0.0012	0.0012	-	-	-	-	-	-
		Iron (D)	mg/L	-	-	-	-	-	1.0	0	0	0.090	-	0.090	0.090	0.090	-	-	-	-	-	-
		Lead (D)	mg/L	-	-	-	-	-	1.0	1.0	100	-	-	-	-	0.00020	-	-	-	-	-	-
		Lithium (D)	mg/L	-	-	-	-	-	1.0	0	0	0.067	-	0.067	0.067	0.067	-	-	-	-	-	-
		Manganese (D)	mg/L	-	-	-	-	-	1.0	0	0	0.027	-	0.027	0.027	0.027	-	-	-	-	-	-
		Molybdenum (D)	mg/L	-	-	-	-	-	1.0	0	0	0.0015	-	0.0015	0.0015	0.0015	-	-	-	-	-	-
		Nickel (D)	mg/L	-	-	-	-	-	1.0	0	0	0.0033	-	0.0033	0.0033	0.0033	-	-	-	-	-	-
		Selenium (D)	mg/L	-	-	-	-	-	1.0	0	0	0.00010	-	0.00010	0.00010	0.00010	-	-	-	-	-	-
		Silver (D)	mg/L	-	-	-	-	-	1.0	0	0	0.44	-	0.44	0.44	0.44	-	-	-	-	-	-
		Strontium (D)	mg/L	-	-	-	-	-	1.0	1.0	100	-	-	-	-	0.00002	-	-	-	-	-	-
		Sulfur (D)	mg/L	-	-	-	-	-	1.0	0	0	1.9	-	1.9	1.9	1.9	-	-	-	-	-	-
		Tantalum (D)	mg/L	-	-	-	-	-	1.0	0	0	0.00002	-	0.00002	0.00002	0.00002	-	-	-	-	-	-
		Thallium (D)	mg/L	-	-	-	-	-	1.0	0	0	0.00003	-	0.00003	0.00003	0.00003	-	-	-	-	-	-
		Tin (D)	mg/L	-	-	-	-	-	1.0	1.0	100	-	-	-	-	0.0050	-	-	-	-	-	-
		Titanium (D)	mg/L	-	-	-	-	-	1.0	1.0	100	-	-	-	-	0.0050	-	-	-	-	-	-
		Uranium (D)	mg/L	-	-	-	-	-	1.0	1.0	100	-	-	-	-	0.00010	-	-	-	-	-	-
		Vanadium (D)	mg/L	-	-	-	-	-	1.0	1.0	100	-	-	-	-	0.0050	-	-	-	-	-	-
		Zinc (D)	mg/L	-	-	-	-	-	1.0	1.0	100	-	-	-	-	0.0050	-	-	-	-	-	-
		Zirconium (D)	mg/L	-	-	-	-	-	1.0	1.0	100	-	-	-	-	0.00010	-	-	-	-	-	-
		Hydrocarbons																				
		F1 (C6-C10)	mg/L	-	-	-	-	-	1.0	1.0	100	-	-	-	-	0.025	-	-	-	-	-	-

Year	Month	Parameter	Units	Water Licence Limits		MDMER Authorized Limits of Deleterious Substances (Schedule 4)			MEL-14 Summary Statistics							Water Licence Limits		MDMER Authorized Limits of Deleterious Substances (Schedule 4)			
				Maximum Average Conc.	Maximum Grab Conc.	Maximum Monthly Mean Conc.	Maximum Composite Sample Conc.	Maximum Grab Sample Conc.	N	N-DL	NO.per	Mean	SD	Median	Min	Max	Monthly Mean	Maximum Grab (N)	Monthly Mean	Maximum Grab	Maximum Grab (N)
2019	July	Total Metals																			
		Aluminum (T)	mg/L	2.0	3.0	-	-	-	4.0	0	0	0.20	0.18	0.14	0.073	0.45	0	0	-	-	-
		Antimony (T)	mg/L	-	-	-	-	-	4.0	4.0	100	-	-	-	-	0.00050	-	-	-	-	-
		Arsenic (T)	mg/L	0.30	0.60	0.50	0.75	1.0	4.0	0	0	0.0017	0.00055	0.0016	0.0011	0.0024	0	0	0	0	0
		Barium (T)	mg/L	-	-	-	-	-	4.0	0	0	0.045	0.0058	0.045	0.038	0.052	-	-	-	-	-
		Beryllium (T)	mg/L	-	-	-	-	-	4.0	4.0	100	-	-	-	-	0.00010	-	-	-	-	-
		Bismuth (T)	mg/L	-	-	-	-	-	4.0	4.0	100	-	-	-	-	0.00010	-	-	-	-	-
		Boron (T)	mg/L	-	-	-	-	-	4.0	0	0	0.33	0.035	0.34	0.28	0.36	-	-	-	-	-
		Cadmium (T)	mg/L	-	-	-	-	-	4.0	1.0	25	0.00001	0.00001	0.00002	0.00001	0.00002	-	-	-	-	-
		Chromium (T)	mg/L	-	-	-	-	-	4.0	4.0	100	-	-	-	-	0.0010	-	-	-	-	-
2019	July	Cobalt (T)	mg/L	-	-	-	-	-	4.0	0	0	0.00059	0.00025	0.00064	0.00034	0.00083	-	-	-	-	-
		Copper (T)	mg/L	0.20	0.40	0.30	0.45	0.60	4.0	1.0	25	0.00090	0.00048	0.00099	0.00050	0.00067	0	0	0	0	0
		Iron (T)	mg/L	-	-	-	-	-	4.0	0	0	0.70	1.1	0.18	0.091	2.4	-	-	-	-	-
		Lead (T)	mg/L	0.20	0.40	0.20	0.30	0.40	4.0	4.0	100	-	-	-	-	0.00020	0	0	0	0	0
		Lithium (T)	mg/L	-	-	-	-	-	4.0	0	0	0.071	0.0069	0.071	0.062	0.077	-	-	-	-	-
		Manganese (T)	mg/L	-	-	-	-	-	4.0	0	0	0.045	0.032	0.045	0.012	0.080	-	-	-	-	-
		Mercury (T)	mg/L	-	-	-	-	-	4.0	4.0	100	-	-	-	-	0.00001	-	-	-	-	-
		Molybdenum (T)	mg/L	-	-	-	-	-	4.0	1.0	25	0.0012	0.00047	0.0013	0.0010	0.0016	-	-	-	-	-
		Nickel (T)	mg/L	0.50	1.0	0.50	0.75	1.0	4.0	0	0	0.0027	0.00064	0.0028	0.0018	0.0044	0	0	0	0	0
		Selenium (T)	mg/L	-	-	-	-	-	4.0	4.0	100	-	-	-	-	0.00010	-	-	-	-	-
2019	July	Silicon (T)	mg/L	-	-	-	-	-	4.0	0	0	0.42	0.15	0.44	0.21	0.58	-	-	-	-	-
		Silver (T)	mg/L	-	-	-	-	-	4.0	4.0	100	-	-	-	-	0.00002	-	-	-	-	-
		Strontium (T)	mg/L	-	-	-	-	-	4.0	0	0	1.9	0.21	1.9	1.6	2.2	-	-	-	-	-
		Sulfur (T)	mg/L	-	-	-	-	-	4.0	0	0	19	3.5	18	17	24	-	-	-	-	-
		Thallium (T)	mg/L	-	-	-	-	-	4.0	0	0	0.00002	0.00001	0.00003	0.00001	0.00003	-	-	-	-	-
		Tin (T)	mg/L	-	-	-	-	-	4.0	4.0	100	-	-	-	-	0.0050	-	-	-	-	-
		Titanium (T)	mg/L	-	-	-	-	-	4.0	4.0	100	-	-	-	-	0.0050	-	-	-	-	-
		Uranium (T)	mg/L	-	-	-	-	-	4.0	0	0	0.00020	0.00005	0.00022	0.00013	0.00024	-	-	-	-	-
		Vanadium (T)	mg/L	-	-	-	-	-	4.0	4.0	100	-	-	-	-	0.0050	-	-	-	-	-
		Zinc (T)	mg/L	0.40	0.80	0.50	0.75	1.0	4.0	2.0	50	-	-	0.0058	0.0050	0.0010	0	0	0	0	0
2019	July	Zirconium (T)	mg/L	-	-	-	-	-	4.0	4.0	100	-	-	-	-	0.00010	-	-	-	-	-
		Dissolved Metals																			
		Aluminum (D)	mg/L	-	-	-	-	-	4.0	0	0	0.037	0.012	0.035	0.024	0.053	-	-	-	-	-
		Antimony (D)	mg/L	-	-	-	-	-	4.0	4.0	100	-	-	-	-	0.00050	-	-	-	-	-
		Arsenic (D)	mg/L	-	-	-	-	-	4.0	0	0	0.0016	0.00049	0.0016	0.00096	0.0023	-	-	-	-	-
		Barium (D)	mg/L	-	-	-	-	-	4.0	0	0	0.046	0.0081	0.045	0.037	0.056	-	-	-	-	-
		Beryllium (D)	mg/L	-	-	-	-	-	4.0	4.0	100	-	-	-	-	0.00010	-	-	-	-	-
		Bismuth (D)	mg/L	-	-	-	-	-	4.0	4.0	100	-	-	-	-	0.00010	-	-	-	-	-
		Boron (D)	mg/L	-	-	-	-	-	4.0	0	0	0.33	0.039	0.34	0.27	0.36	-	-	-	-	-
2019	July	Cadmium (D)	mg/L	-	-	-	-	-	4.0	1.0	25	0.00001	0.00001	0.00001	0.00001	0.00002	-	-	-	-	-
		Chromium (D)	mg/L	-	-	-	-	-	4.0	4.0	100	-	-	-	-	0.0010	-	-	-	-	-
		Cobalt (D)	mg/L	-	-	-	-	-	4.0	1.0	25	0.00055	0.00032	0.00063	0.00030	0.00085	-	-	-	-	-
		Copper (D)	mg/L	-	-	-	-	-	4.0	1.0	25	0.00081	0.00050	0.00092	0.00020	0.0013	-	-	-	-	-
		Iron (D)	mg/L	-	-	-	-	-	4.0	0	0	0.078	0.060	0.065	0.0088	0.17	-	-	-	-	-
		Lead (D)	mg/L	-	-	-	-	-	4.0	4.0	100	-	-	-	-	0.00020	-	-	-	-	-
		Lithium (D)	mg/L	-	-	-	-	-	4.0	0	0	0.072	0.0072	0.070	0.067	0.082	-	-	-	-	-
		Manganese (D)	mg/L	-	-	-	-	-	4.0	0	0	0.038	0.028	0.036	0.011	0.070	-	-	-	-	-
		Molybdenum (D)	mg/L	-	-	-	-	-	4.0	1.0	25	0.0011	0.00044	0.0013	0.0010	0.0015	-	-	-	-	-
		Nickel (D)	mg/L	-	-	-	-	-	4.0	0	0	0.0026	0.00084	0.0027	0.0014	0.0034	-	-	-	-	-
2019	July	Selenium (D)	mg/L	-	-	-	-	-	4.0	4.0	100	-	-	-	-	0.00010	-	-	-	-	-
		Silicon (D)	mg/L	-	-	-	-	-	4.0	0	0	0.41	0.15	0.43	0.21	0.56	-	-	-	-	-
		Silver (D)	mg/L	-	-	-	-	-	4.0	4.0	100	-	-	-	-	0.00002	-	-	-	-	-
		Strontium (D)	mg/L	-	-	-	-	-	4.0	0	0	1.9	0.32	1.9	1.5	2.3	-	-	-	-	-
		Sulfur (D)	mg/L	-	-	-	-	-	4.0	0	0	20	2.5	19	18	24	-	-	-	-	-
		Thallium (D)	mg/L	-	-	-	-	-	4.0	0	0	0.00003	0.00001	0.00003	0.00001	0.00003	-	-	-	-	-
		Tin (D)	mg/L	-	-	-	-	-	4.0	4.0	100	-	-	-	-	0.0050	-	-	-	-	-
		Titanium (D)	mg/L	-	-	-	-	-	4.0	4.0	100	-	-	-	-	0.0050	-	-	-	-	-
		Uranium (D)	mg/L	-	-	-	-	-	4.0	1.0	25	0.00014	0.00008	0.00015	0.00010	0.00022	-	-	-	-	-
		Vanadium (D)	mg/L	-	-	-	-	-	4.0	4.0	100	-	-	-	-	0.0050	-	-	-	-	-
2019	July	Zinc (D)	mg/L	-	-	-	-	-	4.0	3.0	75	-	-	0.0050	0.0050	0.0071	-	-	-	-	-
		Zirconium (D)	mg/L	-	-	-	-	-	4.0	3.0	75	-	-	0.00010	0.00010	0.00010	-	-	-	-	-
		Hydrocarbons																			
		F1 (C6-C10)	mg/L	-	-	-	-	-	4.0	4.0	100	-	-	-	-	0.025	-	-	-	-	-
		F1 (C6-C10)-BTX	mg/L	-	-	-	-	-	4.0	4.0	100	-	-	-	-	0.025	-	-	-	-	-
		F2 (C10-C16)	mg/L	-	-	-	-	-	4.0	4.0	100	-	-	-	-	0.10	-	-	-	-	-
		F3 (C16-C34)	mg/L	-	-	-	-	-	4.0	4.0	100	-	-	-	-	0.20	-	-	-	-	-
		F4 (C34-C50)	mg/L	-	-	-	-	-	4.0	4.0	100	-	-	-	-	0.20	-	-	-	-	-
		Volatile Organics																			
		Benzene	mg/L	-	-	-	-	-	4.0	4.0	100	-	-	-	-	0.00020	-	-	-	-	-
2019	August	Ethylbenzene	mg/L	-	-	-	-	-	4.0	4.0	100	-	-	-	-	0.00020	-	-	-	-	-
		m,p-Xylenes	mg/L	-	-	-	-	-	4.0	4.0	100	-	-	-	-	0.00040	-	-	-	-	-
		o-Xylene	mg/L	-	-	-	-	-	4.0	4.0	100	-	-	-	-	0.00020	-	-	-	-	-
		Toluene	mg/L	-	-	-	-	-	4.0	4.0	100	-	-	-	-	0.00020	-	-	-	-	-
		Xylenes	mg/L	-	-	-	-	-	4.0	4.0	100	-	-	-	-	0.00040	-	-	-	-	-
		Other																			
		Biological Oxygen Demand	mg/L	-	-	-	-	-	4.0	4.0	100	-	-	-	-	2.0	-	-	-	-	-
		Cyanide (Free)	mg/L	-	-	-	-	-	4.0	2.0	50	-	-	0.0010	0.0010	0.0014	-	-	-	-	-
		Cyanide (Total)	mg/L</																		

Year	Month	Parameter	Units	Water Licence Limits		MDMER Authorized Limits of Deleterious Substances (Schedule 4)			MEL-14 Summary Statistics							Water Licence Limits		MDMER Authorized Limits of Deleterious Substances (Schedule 4)		
				Maximum Average Conc.	Maximum Grab Conc.	Maximum Monthly Mean Conc.	Maximum Composite Sample Conc.	Maximum Grab Sample Conc.	N	N-DL	NO.per	Mean	SD	Median	Min	Max	Monthly Mean	Maximum Grab (N)	Monthly Mean	Maximum Grab (N)
2019	August	Total Metals																		
		Aluminum (T)	mg/L	2.0	3.0	-	-	-	4.0	0	0	0.30	0.25	0.31	0.067	0.53	0	0	-	-
		Antimony (T)	mg/L	-	-	-	-	-	4.0	4.0	100	-	-	-	-	0.00050	-	-	-	-
		Arsenic (T)	mg/L	0.30	0.60	0.50	0.75	1.0	4.0	0	0	0.0015	0.00059	0.0016	0.00090	0.0021	0	0	0	0
		Barium (T)	mg/L	-	-	-	-	-	4.0	0	0	0.058	0.016	0.060	0.038	0.072	-	-	-	-
		Beryllium (T)	mg/L	-	-	-	-	-	4.0	4.0	100	-	-	-	-	0.00010	-	-	-	-
		Bismuth (T)	mg/L	-	-	-	-	-	4.0	4.0	100	-	-	-	-	0.00010	-	-	-	-
		Boron (T)	mg/L	-	-	-	-	-	4.0	0	0	0.27	0.11	0.25	0.18	0.39	-	-	-	-
		Cadmium (T)	mg/L	-	-	-	-	-	4.0	0	0	0.00001	0.00000	0.00001	0.00001	0.00002	-	-	-	-
		Chromium (T)	mg/L	-	-	-	-	-	4.0	4.0	100	-	-	-	-	0.0010	-	-	-	-
		Cobalt (T)	mg/L	-	-	-	-	-	4.0	0	0	0.00041	0.00007	0.00040	0.00034	0.00050	-	-	-	-
		Copper (T)	mg/L	0.20	0.40	0.30	0.45	0.60	4.0	0	0	0.00098	0.00042	0.00091	0.00062	0.00051	0	0	0	0
		Iron (T)	mg/L	-	-	-	-	-	4.0	0	0	0.091	0.035	0.090	0.049	0.13	-	-	-	-
		Lead (T)	mg/L	0.20	0.40	0.20	0.30	0.40	4.0	3.0	75	-	-	-	-	0.00020	0	0	0	0
		Lithium (T)	mg/L	-	-	-	-	-	4.0	0	0	0.053	0.026	0.054	0.050	0.050	-	-	-	-
		Manganese (T)	mg/L	-	-	-	-	-	4.0	0	0	0.014	0.0077	0.013	0.0056	0.023	-	-	-	-
		Mercury (T)	mg/L	-	-	-	-	-	4.0	4.0	100	-	-	-	-	0.00001	-	-	-	-
		Molybdenum (T)	mg/L	-	-	-	-	-	4.0	1.0	25	0.0011	0.00048	0.0013	0.0010	0.0015	-	-	-	-
		Nickel (T)	mg/L	0.50	1.0	0.50	0.75	1.0	4.0	0	0	0.0030	0.00073	0.0029	0.0023	0.0038	0	0	0	0
		Selenium (T)	mg/L	-	-	-	-	-	4.0	2.0	50	-	-	-	-	0.00011	0.00010	0.00013	-	-
		Silicon (T)	mg/L	-	-	-	-	-	4.0	0	0	0.35	0.12	0.34	0.24	0.48	-	-	-	-
		Silver (T)	mg/L	-	-	-	-	-	4.0	4.0	100	-	-	-	-	0.00002	-	-	-	-
		Strontium (T)	mg/L	-	-	-	-	-	4.0	0	0	1.9	0.38	2.0	1.4	2.3	-	-	-	-
		Sulfur (T)	mg/L	-	-	-	-	-	4.0	0	0	21	5.4	22	14	26	-	-	-	-
		Thallium (T)	mg/L	-	-	-	-	-	4.0	0	0	0.00003	0.00001	0.00003	0.00002	0.00004	-	-	-	-
		Tin (T)	mg/L	-	-	-	-	-	4.0	4.0	100	-	-	-	-	0.0050	-	-	-	-
		Titanium (T)	mg/L	-	-	-	-	-	4.0	4.0	100	-	-	-	-	0.0050	-	-	-	-
		Uranium (T)	mg/L	-	-	-	-	-	4.0	0	0	0.00029	0.00014	0.00027	0.00017	0.00046	-	-	-	-
		Vanadium (T)	mg/L	-	-	-	-	-	4.0	4.0	100	-	-	-	-	0.0050	-	-	-	-
		Zinc (T)	mg/L	0.40	0.80	0.50	0.75	1.0	4.0	3.0	75	-	-	-	-	0.0050	0	0	0	0
		Zirconium (T)	mg/L	-	-	-	-	-	4.0	4.0	100	-	-	-	-	0.00010	-	-	-	-
		Dissolved Metals																		
		Aluminum (D)	mg/L	-	-	-	-	-	4.0	0	0	0.059	0.039	0.048	0.027	0.11	-	-	-	-
		Antimony (D)	mg/L	-	-	-	-	-	4.0	4.0	100	-	-	-	-	0.00050	-	-	-	-
		Arsenic (D)	mg/L	-	-	-	-	-	4.0	0	0	0.0014	0.00049	0.0014	0.00087	0.0019	-	-	-	-
		Barium (D)	mg/L	-	-	-	-	-	4.0	0	0	0.055	0.015	0.057	0.039	0.069	-	-	-	-
		Beryllium (D)	mg/L	-	-	-	-	-	4.0	4.0	100	-	-	-	-	0.00010	-	-	-	-
		Bismuth (D)	mg/L	-	-	-	-	-	4.0	4.0	100	-	-	-	-	0.00010	-	-	-	-
		Boron (D)	mg/L	-	-	-	-	-	4.0	0	0	0.28	0.11	0.26	0.18	0.41	-	-	-	-
		Cadmium (D)	mg/L	-	-	-	-	-	4.0	1.0	25	0.00001	0.00001	0.00001	0.00001	0.00002	-	-	-	-
		Chromium (D)	mg/L	-	-	-	-	-	4.0	4.0	100	-	-	-	-	0.0010	-	-	-	-
		Cobalt (D)	mg/L	-	-	-	-	-	4.0	0	0	0.00040	0.00005	0.00039	0.00035	0.00047	-	-	-	-
		Copper (D)	mg/L	-	-	-	-	-	4.0	0	0	0.00091	0.00033	0.00087	0.00060	0.0013	-	-	-	-
		Iron (D)	mg/L	-	-	-	-	-	4.0	0	0	0.069	0.026	0.045	0.035	0.15	-	-	-	-
		Lead (D)	mg/L	-	-	-	-	-	4.0	4.0	100	-	-	-	-	0.00020	-	-	-	-
		Lithium (D)	mg/L	-	-	-	-	-	4.0	0	0	0.056	0.021	0.056	0.054	0.058	-	-	-	-
		Manganese (D)	mg/L	-	-	-	-	-	4.0	0	0	0.0083	0.0026	0.0087	0.0053	0.011	-	-	-	-
		Molybdenum (D)	mg/L	-	-	-	-	-	4.0	1.0	25	0.0045	0.0043	0.0038	0.0010	0.0098	-	-	-	-
		Nickel (D)	mg/L	-	-	-	-	-	4.0	0	0	0.0029	0.00063	0.0028	0.0023	0.0036	-	-	-	-
		Selenium (D)	mg/L	-	-	-	-	-	4.0	2.0	50	-	-	-	-	0.00010	-	-	-	-
		Silicon (D)	mg/L	-	-	-	-	-	4.0	0	0	0.33	0.096	0.34	0.25	0.42	-	-	-	-
		Silver (D)	mg/L	-	-	-	-	-	4.0	4.0	100	-	-	-	-	0.00002	-	-	-	-
		Strontium (D)	mg/L	-	-	-	-	-	4.0	0	0	1.8	0.40	1.8	1.3	2.2	-	-	-	-
		Sulfur (D)	mg/L	-	-	-	-	-	4.0	0	0	21	4.8	21	16	25	-	-	-	-
		Thallium (D)	mg/L	-	-	-	-	-	4.0	0	0	0.00003	0.00000	0.00003	0.00002	0.00003	-	-	-	-
		Tin (D)	mg/L	-	-	-	-	-	4.0	4.0	100	-	-	-	-	0.0050	-	-	-	-
		Titanium (D)	mg/L	-	-	-	-	-	4.0	4.0	100	-	-	-	-	0.0050	-	-	-	-
		Uranium (D)	mg/L	-	-	-	-	-	4.0	0	0	0.00025	0.00014	0.00022	0.00013	0.00044	-	-	-	-
		Vanadium (D)	mg/L	-	-	-	-	-	4.0	4.0	100	-	-	-	-	0.0050	-	-	-	-
		Zinc (D)	mg/L	-	-	-	-	-	4.0	3.0	75	-	-	-	-	0.0050	-	-	-	-
		Zirconium (D)	mg/L	-	-	-	-	-	4.0	4.0	100	-	-	-	-	0.00010	-	-	-	-
		Hydrocarbons																		
		F1 (C6-C10)	mg/L	-	-	-	-	-	4.0	4.0	100	-	-	-	-	0.025	-	-	-	-
		F1 (C6-C10)-BTX	mg/L	-	-	-	-	-	4.0	4.0	100	-	-	-	-	0.025	-	-	-	-
		F2 (C10-C16)	mg/L	-	-	-	-	-	4.0	4.0	100	-	-	-	-	0.10	-	-	-	-
		F3 (C16-C34)	mg/L	-	-	-	-	-	4.0	4.0	100	-	-	-	-	0.20	-	-	-	-
		F4 (C34-C50)	mg/L	-	-	-	-	-	4.0	4.0	100	-	-	-	-	0.20	-	-	-	-
		Volatiles Organics																		
		Benzene	mg/L	-	-	-	-	-	4.0	4.0	100	-	-	-	-	0.00020	-	-	-	-
		Ethylbenzene	mg/L	-	-	-	-	-	4.0	4.0	100	-	-	-	-	0.00020	-	-	-	-
		m,p-Xylenes	mg/L	-	-	-	-	-	4.0	4.0	100	-	-	-	-	0.00040	-	-	-	-
		o-Xylene	mg/L	-	-	-	-	-	4.0	4.0	100	-	-	-	-	0.00020	-	-	-	-
		Toluene	mg/L	-	-	-	-	-	4.0	4.0	100	-	-	-	-	0.00020	-	-	-	-
		Xylenes	mg/L	-	-	-	-	-	4.0	4.0	100	-	-	-	-	0.00040	-	-	-	-
		Other																		
		Biological Oxygen Demand	mg/L	-	-	-	-	-	4.0	3.0	75	-	-	-	-	2.0	-	-	-	-
		Cyanide (Free)	mg/L	-	-	-	-	-	4.0	4.0	100	-	-	-	-	0.0010	-	-	-	-
		Cyanide (Total)	mg/L	0.50	1.0	1.0	1.5	2.0	4.0	4.0	100	-	-	-	-	0.0050	0	0	0	0
		Radium-226	Bq/L	-	-	-														

Year	Month	Parameter	Units	Water Licence Limits		MDMER Authorized Limits of Deleterious Substances (Schedule 4)			MEL-14 Summary Statistics								Water Licence Limits			MDMER Authorized Limits of Deleterious Substances (Schedule 4)		
				Maximum Average Conc.	Maximum Grab Conc.	Maximum Monthly Mean Conc.	Maximum Composite Sample Conc.	Maximum Grab Sample Conc.	N	N-DL	N-D,per	Mean	SD	Median	Min	Max	Monthly Mean	Maximum Grab	Maximum Grab (N)	Monthly Mean	Maximum Grab	Maximum Grab (N)
2019	September	Total Metals																				
		Aluminum (T)	mg/L	2.0	3.0	-	-	-	4.0	0	0	0.26	0.20	0.21	0.077	0.54	0	0	0	-	-	-
		Antimony (T)	mg/L	-	-	-	-	-	4.0	4.0	100	-	-	-	-	0.0025	-	-	-	-	-	-
		Arsenic (T)	mg/L	0.30	0.60	0.50	0.75	1.0	4.0	0	0	0.0018	0.0041	0.0020	0.0012	0.0021	0	0	0	0	0	0
		Barium (T)	mg/L	-	-	-	-	-	4.0	0	0	0.068	0.0098	0.073	0.053	0.073	-	-	-	-	-	-
		Beryllium (T)	mg/L	-	-	-	-	-	4.0	4.0	100	-	-	-	-	0.00050	-	-	-	-	-	-
		Bismuth (T)	mg/L	-	-	-	-	-	4.0	4.0	100	-	-	-	-	0.0050	-	-	-	-	-	-
		Boron (T)	mg/L	-	-	-	-	-	4.0	1.0	25	0.24	0.099	0.28	0.18	0.33	-	-	-	-	-	-
		Cadmium (T)	mg/L	-	-	-	-	-	4.0	1.0	25	0.00002	0.00000	0.00002	0.00002	0.00005	-	-	-	-	-	-
		Chromium (T)	mg/L	-	-	-	-	-	4.0	4.0	100	-	-	-	-	0.0050	-	-	-	-	-	-
		Cobalt (T)	mg/L	-	-	-	-	-	4.0	1.0	25	0.00049	0.00004	0.00052	0.00043	0.0010	-	-	-	-	-	-
		Copper (T)	mg/L	0.20	0.40	0.30	0.45	0.60	4.0	1.0	25	0.00091	0.00025	0.00086	0.00065	0.0025	0	0	0	0	0	0
		Iron (T)	mg/L	-	-	-	-	-	4.0	0	0	0.14	0.096	0.11	0.052	0.28	-	-	-	-	-	-
		Lead (T)	mg/L	0.20	0.40	0.20	0.30	0.40	4.0	4.0	100	-	-	-	-	0.0010	0	0	0	0	0	0
		Lithium (T)	mg/L	-	-	-	-	-	4.0	0	0	0.062	0.0069	0.063	0.054	0.068	-	-	-	-	-	-
		Manganese (T)	mg/L	-	-	-	-	-	4.0	0	0	0.040	0.0094	0.037	0.034	0.054	-	-	-	-	-	-
		Mercury (T)	mg/L	-	-	-	-	-	4.0	4.0	100	-	-	-	-	0.00001	-	-	-	-	-	-
		Molybdenum (T)	mg/L	-	-	-	-	-	4.0	1.0	25	0.0018	0.00057	0.0019	0.0011	0.0050	-	-	-	-	-	-
		Nickel (T)	mg/L	0.50	1.0	0.50	0.75	1.0	4.0	1.0	25	0.0034	0.00070	0.0039	0.0034	0.0050	0	0	0	0	0	0
		Selenium (T)	mg/L	-	-	-	-	-	4.0	1.0	25	0.00015	0.00007	0.00013	0.00011	0.00050	-	-	-	-	-	-
		Silicon (T)	mg/L	-	-	-	-	-	4.0	0	0	0.70	0.28	0.64	0.42	1.1	-	-	-	-	-	-
		Silver (T)	mg/L	-	-	-	-	-	4.0	4.0	100	-	-	-	-	0.00010	-	-	-	-	-	-
		Sroutium (T)	mg/L	-	-	-	-	-	4.0	0	0	2.1	0.13	2.1	2.0	3.3	-	-	-	-	-	-
		Sulfur (T)	mg/L	-	-	-	-	-	4.0	0	0	30	2.7	30	26	32	-	-	-	-	-	-
		Thallium (T)	mg/L	-	-	-	-	-	4.0	2.0	50	-	-	0.00002	0.00001	0.00005	-	-	-	-	-	-
		Tin (T)	mg/L	-	-	-	-	-	4.0	4.0	100	-	-	-	-	0.025	-	-	-	-	-	-
		Titanium (T)	mg/L	-	-	-	-	-	4.0	4.0	100	-	-	-	-	0.025	-	-	-	-	-	-
		Uranium (T)	mg/L	-	-	-	-	-	4.0	1.0	25	0.00030	0.00005	0.00035	0.00026	0.00050	-	-	-	-	-	-
		Vanadium (T)	mg/L	-	-	-	-	-	4.0	4.0	100	-	-	-	-	0.025	-	-	-	-	-	-
		Zinc (T)	mg/L	0.40	0.80	0.50	0.75	1.0	4.0	3.0	75	-	-	0.0055	0.0050	0.025	0	0	0	0	0	0
		Zirconium (T)	mg/L	-	-	-	-	-	4.0	4.0	100	-	-	-	-	0.00050	-	-	-	-	-	-
		Dissolved Metals																				
		Aluminum (D)	mg/L	-	-	-	-	-	4.0	0	0	0.041	0.013	0.039	0.028	0.058	-	-	-	-	-	-
		Antimony (D)	mg/L	-	-	-	-	-	4.0	4.0	100	-	-	-	-	0.00050	-	-	-	-	-	-
		Arsenic (D)	mg/L	-	-	-	-	-	4.0	0	0	0.0017	0.00044	0.0018	0.0011	0.0022	-	-	-	-	-	-
		Barium (D)	mg/L	-	-	-	-	-	4.0	0	0	0.068	0.012	0.071	0.051	0.078	-	-	-	-	-	-
		Beryllium (D)	mg/L	-	-	-	-	-	4.0	4.0	100	-	-	-	-	0.00010	-	-	-	-	-	-
		Bismuth (D)	mg/L	-	-	-	-	-	4.0	4.0	100	-	-	-	-	0.0010	-	-	-	-	-	-
		Boron (D)	mg/L	-	-	-	-	-	4.0	0	0	0.26	0.080	0.25	0.19	0.35	-	-	-	-	-	-
		Cadmium (D)	mg/L	-	-	-	-	-	4.0	0	0	0.00002	0.00000	0.00002	0.00001	0.00002	-	-	-	-	-	-
		Chromium (D)	mg/L	-	-	-	-	-	4.0	4.0	100	-	-	-	-	0.0010	-	-	-	-	-	-
		Cobalt (D)	mg/L	-	-	-	-	-	4.0	0	0	0.00050	0.00010	0.00053	0.00037	0.00059	-	-	-	-	-	-
		Copper (D)	mg/L	-	-	-	-	-	4.0	0	0	0.00079	0.00019	0.00078	0.00059	0.0010	-	-	-	-	-	-
		Iron (D)	mg/L	-	-	-	-	-	4.0	0	0	0.062	0.030	0.057	0.034	0.10	-	-	-	-	-	-
		Lead (D)	mg/L	-	-	-	-	-	4.0	3.0	75	-	-	-	-	0.00020	0.00020	0.00036	-	-	-	-
		Lithium (D)	mg/L	-	-	-	-	-	4.0	0	0	0.059	0.0052	0.059	0.054	0.066	-	-	-	-	-	-
		Manganese (D)	mg/L	-	-	-	-	-	4.0	0	0	0.030	0.013	0.033	0.013	0.043	-	-	-	-	-	-
		Mercury (D)	mg/L	-	-	-	-	-	3.0	3.0	100	-	-	-	-	0.00001	-	-	-	-	-	-
		Molybdenum (D)	mg/L	-	-	-	-	-	4.0	0	0	0.0016	0.0019	0.0020	0.0011	0.0054	-	-	-	-	-	-
		Nickel (D)	mg/L	-	-	-	-	-	4.0	0	0	0.0017	0.00015	0.0019	0.0012	0.0019	-	-	-	-	-	-
		Selenium (D)	mg/L	-	-	-	-	-	4.0	0	0	0.00013	0.00002	0.00013	0.00010	0.00015	-	-	-	-	-	-
		Silicon (D)	mg/L	-	-	-	-	-	4.0	0	0	0.68	0.23	0.61	0.48	1.0	-	-	-	-	-	-
		Sroutium (D)	mg/L	-	-	-	-	-	4.0	4.0	100	-	-	-	-	0.00002	-	-	-	-	-	-
		Sulfur (D)	mg/L	-	-	-	-	-	4.0	0	0	2.3	0.11	2.3	2.2	2.4	-	-	-	-	-	-
		Thallium (D)	mg/L	-	-	-	-	-	4.0	0	0	31	0.80	31	30	32	-	-	-	-	-	-
		Thallium (D)	mg/L	-	-	-	-	-	4.0	0	0	0.00002	0.00001	0.00002	0.00001	0.00003	-	-	-	-	-	-
		Tin (D)	mg/L	-	-	-	-	-	4.0	4.0	100	-	-	-	-	0.0050	-	-	-	-	-	-
		Titanium (D)	mg/L	-	-	-	-	-	4.0	4.0	100	-	-	-	-	0.0050	-	-	-	-	-	-
		Uranium (D)	mg/L	-	-	-	-	-	4.0	0	0	0.00032	0.00003	0.00031	0.00029	0.00035	-	-	-	-	-	-
		Vanadium (D)	mg/L	-	-	-	-	-	4.0	4.0	100	-	-	-	-	0.0050	-	-	-	-	-	-
		Zinc (D)	mg/L	-	-	-	-	-	4.0	3.0	75	-	-	-	-	0.011	-	-	-	-	-	-
		Zirconium (D)	mg/L	-	-	-	-	-	4.0	4.0	100	-	-	-	-	0.00010	-	-	-	-	-	-
		Hydrocarbons																				
		F1 (C6-C10)	mg/L	-	-	-	-	-	4.0	4.0	100	-	-	-	-	0.025	-	-	-	-	-	-
		F1 (C6-C10)-BTEX	mg/L	-	-	-	-	-	4.0	4.0	100	-	-	-	-	0.025	-	-	-	-	-	-
		F2 (C10-C16)	mg/L	-	-	-	-	-	4.0	4.0	100	-	-	-	-	0.10	-	-	-	-	-	-
		F3 (C16-C34)	mg/L	-	-	-	-	-	4.0	4.0	100	-	-	-	-	0.20	-	-	-	-	-	-
		F4 (C34-C50)	mg/L	-	-	-	-	-	4.0	4.0	100	-	-	-	-	0.20	-	-	-	-	-	-
		Volatiles Organic																				
		Benzene	mg/L	-	-	-	-	-	4.0	4.0	100	-	-	-	-	0.00020	-	-	-	-	-	-
		Ethylbenzene	mg/L	-	-	-	-	-	4.0	4.0	100	-	-	-	-	0.00020	-	-	-	-	-	-
		m,p-Xylenes	mg/L	-	-	-	-	-	4.0	4.0	100	-	-	-	-	0.00040	-	-	-	-	-	-
		o-Xylene	mg/L	-	-	-	-	-	4.0	4.0	100	-	-	-	-	0.00020	-	-	-	-	-	-
		Toluene	mg/L	-	-	-	-	-	4.0	4.0	100	-	-	-	-	0.00020	-	-	-	-	-	-
		Xylenes	mg/L	-	-	-	-	-														

Year	Month	Parameter	Units	Water Licence Limits		MDMER Authorized Limits of Deleterious Substances (Schedule 4)			MEL-14 Summary Statistics								Water Licence Limits			MDMER Authorized Limits of Deleterious Substances (Schedule 4)		
				Maximum Average Conc.	Maximum Grab Conc.	Maximum Monthly Mean Conc.	Maximum Composite Sample Conc.	Maximum Grab Sample Conc.	N	N-DL	N-DP	Mean	SD	Median	Min	Max	Monthly Mean	Maximum Grab	Maximum Grab (N)	Monthly Mean	Maximum Grab	Maximum Grab (N)
2019	October	Field Measurements																				
		DO (mg/L)	mg/L	-	-	-	-	-	1.0	0	0	12	-	12	12	12	-	-	-	-	-	-
		pH (field)	pH units	6 9.5	-	6 9.5	-	-	1.0	0	0	7.3	-	7.3	7.3	7.3	-	0	0	-	0	0
		Sp. Conductivity (field)	uS/cm	-	-	-	-	-	1.0	0	0	2,100	-	2,100	2,100	2,100	-	-	-	-	-	-
		Temperature	C	-	-	-	-	-	1.0	0	0	3.5	-	3.5	3.5	3.5	-	-	-	-	-	-
		Conventional Parameters																				
		Conductivity (lab)	uS/cm	-	-	-	-	-	1.0	0	0	2,170	-	2,170	2,170	2,170	-	-	-	-	-	-
		Hardness (D)	mg/L	-	-	-	-	-	1.0	0	0	385	-	385	385	385	-	-	-	-	-	-
		Hardness (T)	mg/L	-	-	-	-	-	1.0	0	0	422	-	422	422	422	-	-	-	-	-	-
		pH (lab)	pH units	-	-	-	-	-	1.0	0	0	7.4	-	7.4	7.4	7.4	-	-	-	-	-	-
		Total Dissolved Solids	mg/L	1,400	-	-	-	-	1.0	0	0	860	-	860	860	860	0	-	-	-	-	-
		Total Suspended Solids	mg/L	15	30	15	23	30	1.0	0	0	2.0	-	2.0	2.0	2.0	0	0	0	0	0	0
		Turbidity (lab)	NTU	-	-	-	-	-	1.0	0	0	0.20	-	0.20	0.20	0.20	-	-	-	-	-	-
2019	October	Major Ions																				
		Alkalinity, Bicarbonate	mg/L	-	-	-	-	-	1.0	0	0	24	-	24	24	24	-	-	-	-	-	-
		Alkalinity, Carbonate	mg/L	-	-	-	-	-	1.0	1.0	100	-	-	-	-	1.0	-	-	-	-	-	-
		Alkalinity, Total	mg/L	-	-	-	-	-	1.0	0	0	24	-	24	24	24	-	-	-	-	-	-
		Calcium (D)	mg/L	-	-	-	-	-	1.0	0	0	108	-	108	108	108	-	-	-	-	-	-
		Calcium (T)	mg/L	-	-	-	-	-	1.0	0	0	124	-	124	124	124	-	-	-	-	-	-
		Chloride	mg/L	-	-	-	-	-	1.0	0	0	530	-	530	530	530	-	-	-	-	-	-
		Magnesium (D)	mg/L	-	-	-	-	-	1.0	0	0	28	-	28	28	28	-	-	-	-	-	-
		Magnesium (T)	mg/L	-	-	-	-	-	1.0	0	0	28	-	28	28	28	-	-	-	-	-	-
		Potassium (D)	mg/L	-	-	-	-	-	1.0	0	0	14	-	14	14	14	-	-	-	-	-	-
2019	October	Potassium (T)	mg/L	-	-	-	-	-	1.0	0	0	15	-	15	15	15	-	-	-	-	-	-
		Reactive Silica (SiO2)	mg/L	-	-	-	-	-	1.0	0	0	0.68	-	0.68	0.68	0.68	-	-	-	-	-	-
		Sodium (D)	mg/L	-	-	-	-	-	1.0	0	0	214	-	214	214	214	-	-	-	-	-	-
		Sodium (T)	mg/L	-	-	-	-	-	1.0	0	0	215	-	215	215	215	-	-	-	-	-	-
		Sulphate	mg/L	-	-	-	-	-	1.0	0	0	74	-	74	74	74	-	-	-	-	-	-
		Nutrients																				
		Ammonia (as N)	mg/L	14	18	-	-	-	1.0	0	0	4.0	-	4.0	4.0	4.0	0	0	0	-	-	-
		Nitrate (as N)	mg/L	-	-	-	-	-	1.0	0	0	14	-	14	14	14	-	-	-	-	-	-
		Nitrate + Nitrite (as N)	mg/L	-	-	-	-	-	1.0	0	0	14	-	14	14	14	-	-	-	-	-	-
		Nitrite (as N)	mg/L	-	-	-	-	-	1.0	0	0	0.37	-	0.37	0.37	0.37	-	-	-	-	-	-
		Orthophosphate (PO4-P)	mg/L	-	-	-	-	-	1.0	1.0	100	-	-	-	-	0.010	-	-	-	-	-	-
		Total Fixed-Nitrogen	mg/L	-	-	-	-	-	1.0	0	0	4.3	-	4.3	4.3	4.3	-	-	-	-	-	-
		Total Phosphorus	mg/L	2.0	4.0	-	-	-	1.0	1.0	100	-	-	-	-	0.020	0	0	0	-	-	-
2019	October	Organic/Inorganic Carbon																				
		Dissolved Organic Carbon	mg/L	-	-	-	-	-	1.0	0	0	3.6	-	3.6	3.6	3.6	-	-	-	-	-	-
		Total Organic Carbon	mg/L	-	-	-	-	-	1.0	0	0	3.6	-	3.6	3.6	3.6	-	-	-	-	-	-
		Total Metals																				
		Aluminum (T)	mg/L	2.0	3.0	-	-	-	1.0	0	0	0.12	-	0.12	0.12	0.12	0	0	0	-	-	-
		Antimony (D)	mg/L	-	-	-	-	-	1.0	1.0	100	-	-	-	-	0.0050	-	-	-	-	-	-
		Arsenic (T)	mg/L	0.30	0.60	0.50	0.75	1.0	1.0	0	0	0.0010	-	0.0010	0.0010	0.0010	0	0	0	0	0	0
		Barium (T)	mg/L	-	-	-	-	-	1.0	0	0	0.055	-	0.055	0.055	0.055	-	-	-	-	-	-
		Beryllium (T)	mg/L	-	-	-	-	-	1.0	1.0	100	-	-	-	-	0.0010	-	-	-	-	-	-
		Bismuth (D)	mg/L	-	-	-	-	-	1.0	1.0	100	-	-	-	-	0.0010	-	-	-	-	-	-
		Boron (T)	mg/L	-	-	-	-	-	1.0	0	0	0.35	-	0.35	0.35	0.35	-	-	-	-	-	-
		Cadmium (T)	mg/L	-	-	-	-	-	1.0	0	0	0.00003	-	0.00003	0.00003	0.00003	-	-	-	-	-	-
		Chromium (T)	mg/L	-	-	-	-	-	1.0	1.0	100	-	-	-	-	0.0010	-	-	-	-	-	-
		Cobalt (T)	mg/L	-	-	-	-	-	1.0	0	0	0.00052	-	0.00052	0.00052	0.00052	-	-	-	-	-	-
2019	October	Copper (T)	mg/L	0.20	0.40	0.30	0.45	0.60	1.0	0	0	0.00072	-	0.00072	0.00072	0.00072	0	0	0	0	0	0
		Iron (T)	mg/L	-	-	-	-	-	1.0	0	0	0.080	-	0.080	0.080	0.080	-	-	-	-	-	-
		Lead (T)	mg/L	0.20	0.40	0.30	0.30	0.40	1.0	1.0	100	-	-	-	-	0.0020	0	0	0	0	0	0
		Lithium (T)	mg/L	-	-	-	-	-	1.0	0	0	0.082	-	0.082	0.082	0.082	-	-	-	-	-	-
		Manganese (T)	mg/L	-	-	-	-	-	1.0	0	0	0.038	-	0.038	0.038	0.038	-	-	-	-	-	-
		Mercury (T)	mg/L	-	-	-	-	-	1.0	1.0	100	-	-	-	-	0.00001	-	-	-	-	-	-
		Molybdenum (T)	mg/L	-	-	-	-	-	1.0	0	0	0.0014	-	0.0014	0.0014	0.0014	-	-	-	-	-	-
		Nickel (T)	mg/L	0.50	1.0	0.50	0.75	1.0	1.0	0	0	0.0034	-	0.0034	0.0034	0.0034	0	0	0	0	0	0
		Selenium (T)	mg/L	-	-	-	-	-	1.0	0	0	0.0014	-	0.0014	0.0014	0.0014	-	-	-	-	-	-
		Silicon (T)	mg/L	-	-	-	-	-	1.0	0	0	0.66	-	0.66	0.66	0.66	-	-	-	-	-	-
2019	October	Silver (T)	mg/L	-	-	-	-	-	1.0	1.0	100	-	-	-	-	0.00002	-	-	-	-	-	-
		Strontium (T)	mg/L	-	-	-	-	-	1.0	0	0	2.2	-	2.2	2.2	2.2	-	-	-	-	-	-
		Sulfur (T)	mg/L	-	-	-	-	-	1.0	0	0	33	-	33	33	33	-	-	-	-	-	-
		Thallium (T)	mg/L	-	-	-	-	-	1.0	0	0	0.00002	-	0.00002	0.00002	0.00002	-	-	-	-	-	-
		Tin (T)	mg/L	-	-	-	-	-	1.0	1.0	100	-	-	-	-	0.0050	-	-	-	-	-	-
		Titanium (T)	mg/L	-	-	-	-	-	1.0	1.0	100	-	-	-	-	0.0050	-	-	-	-	-	-
		Uranium (T)	mg/L	-	-	-	-	-	1.0	0	0	0.00028	-	0.00028	0.00028	0.00028	-	-	-	-	-	-
		Vanadium (T)	mg/L	-	-	-	-	-	1.0	1.0	100	-	-	-	-	0.0050	-	-	-	-	-	-
		Zinc (T)	mg/L	0.40	0.80	0.50	0.75	1.0	1.0	0	0	0.015	-	0.015	0.015	0.015	0	0	0	0	0	0
		Zirconium (T)	mg/L	-	-	-	-	-	1.0	1.0	100	-	-	-	-	0.00010	-	-	-	-	-	-
2019	October	Dissolved Metals																				
		Aluminum (D)	mg/L	-	-	-	-	-	1.0	0	0	0.019	-	0.019	0.019	0.019	-	-	-	-	-	-
		Antimony (D)	mg/L	-	-	-	-	-	1.0	1.0	100	-	-	-	-	0.0050	-	-	-	-	-	-
		Arsenic (D)	mg/L	-	-	-	-	-														

Year	Month	Parameter	Units	Water Licence Limits		MDMER Authorized Limits of Deleterious Substances (Schedule 4)			MEL-14 Summary Statistics										Water Licence Limits			MDMER Authorized Limits of Deleterious Substances (Schedule 4)		
				Maximum Average Conc.	Maximum Grab Conc.	Maximum Monthly Mean Conc.	Maximum Composite Sample Conc.	Maximum Grab Sample Conc.	N	N-DL	N-DP	Mean	SD	Median	Min	Max	Monthly Mean	Maximum Grab	Maximum Grab (N)	Monthly Mean	Maximum Grab	Maximum Grab (N)		
2020	January	Field Measurements																						
		DO (%)	%	-	-	-	-	-	1.0	0	0	96	-	96	96	96	-	-	-	-	-	-	-	
		pH (field)	pH units	6 9.5	-	6 9.5	-	-	1.0	0	0	6.9	-	6.9	6.9	6.9	-	0	0	-	0	0		
		Sp. Conductivity (field)	uS/cm	-	-	-	-	-	1.0	0	0	4,590	-	4,590	4,590	4,590	-	-	-	-	-	-		
		Temperature	C	-	-	-	-	-	1.0	0	0	7.5	-	7.5	7.5	7.5	-	-	-	-	-	-		
		DO (%)	%	-	-	-	-	-	6.0	0	0	98	2.3	98	94	100	-	-	-	-	-	-		
		DO (mg/L)	mg/L	-	-	-	-	-	4.0	0	0	12	0.22	12	12	12	-	-	-	-	-	-		
		pH (field)	pH units	6 9.5	-	6 9.5	-	-	6.0	0	0	7.0	0.15	7.0	6.9	7.3	-	0	0	-	0	0		
		Sp. Conductivity (field)	uS/cm	-	-	-	-	-	6.0	0	0	4,930	157	4,940	4,720	5,180	-	-	-	-	-	-		
		Temperature	C	-	-	-	-	-	6.0	0	0	6.4	1.4	6.1	4.7	8.7	-	-	-	-	-	-		
2020	June	Conventional Parameters																						
		Conductivity (lab)	uS/cm	-	-	-	-	-	6.0	0	0	4,800	175	4,750	4,600	5,100	-	-	-	-	-	-		
		Hardness (D)	mg/L	-	-	-	-	-	6.0	0	0	1,070	47	1,060	1,020	1,140	-	-	-	-	-	-		
		Hardness (T)	mg/L	-	-	-	-	-	6.0	0	0	1,060	26	1,050	1,020	1,090	-	-	-	-	-	-		
		pH (lab)	pH units	-	-	-	-	-	6.0	0	0	7.5	-	7.5	7.5	7.5	-	-	-	-	-	-		
		Total Dissolved Solids	mg/L	3,500	-	-	-	-	6.0	0	0	2,840	231	2,850	2,570	3,100	0	-	-	-	-	-		
		Total Dissolved Solids (Calcu)	mg/L	-	-	-	-	-	2.0	0	0	2,600	0	2,600	2,600	2,600	-	-	-	-	-	-		
		Total Suspended Solids	mg/L	15	30	15	23	30	6.0	0	0	6.3	1.0	6.0	5.0	8.0	0	0	0	0	0	0		
		Turbidity (lab)	NTU	-	-	-	-	-	6.0	0	0	1.6	0.19	1.7	1.2	1.7	-	-	-	-	-	-		
2020	June	Major Ions																						
		Alkalinity, Bicarbonate	mg/L	-	-	-	-	-	6.0	0	0	109	7.7	110	96	120	-	-	-	-	-	-		
		Alkalinity, Carbonate	mg/L	-	-	-	-	-	6.0	6.0	100	-	-	-	-	1.0	-	-	-	-	-			
		Alkalinity, Total	mg/L	-	-	-	-	-	6.0	0	0	110	7.3	110	97	120	-	-	-	-	-	-		
		Calcium (D)	mg/L	-	-	-	-	-	6.0	0	0	307	14	302	293	327	-	-	-	-	-	-		
		Calcium (T)	mg/L	-	-	-	-	-	6.0	0	0	301	5.5	300	295	311	-	-	-	-	-	-		
		Chloride	mg/L	-	-	-	-	-	6.0	0	0	1,280	41	1,300	1,200	1,300	-	-	-	-	-	-		
		Fluoride	mg/L	-	-	-	-	-	2.0	2.0	100	-	-	-	-	0.10	-	-	-	-	-			
		Magnesium (D)	mg/L	-	-	-	-	-	6.0	0	0	75	3.5	75	71	79	-	-	-	-	-	-		
		Magnesium (T)	mg/L	-	-	-	-	-	6.0	0	0	74	3.1	73	70	79	-	-	-	-	-	-		
2020	June	Potassium (D)	mg/L	-	-	-	-	-	6.0	0	0	35	1.1	34	34	37	-	-	-	-	-	-		
		Potassium (T)	mg/L	-	-	-	-	-	6.0	0	0	34	0.85	34	34	36	-	-	-	-	-	-		
		Reactive Silica (SiO2)	mg/L	-	-	-	-	-	6.0	0	0	5.9	1.6	5.7	3.8	8.3	-	-	-	-	-	-		
		Sodium (D)	mg/L	-	-	-	-	-	6.0	0	0	492	19	493	470	510	-	-	-	-	-	-		
		Sodium (T)	mg/L	-	-	-	-	-	6.0	0	0	482	18	476	463	512	-	-	-	-	-	-		
		Sulfate	mg/L	-	-	-	-	-	6.0	0	0	233	10	230	220	250	-	-	-	-	-	-		
		Nutrients																						
		Ammonia (as N)	mg/L	14	18	-	-	-	6.0	0	0	11	0.94	11	9.4	12	0	0	0	-	-	-		
		Nitrate (as N)	mg/L	-	-	-	-	-	6.0	0	0	28	1.2	28	26	29	-	-	-	-	-	-		
		Nitrate + Nitrite (as N)	mg/L	-	-	-	-	-	6.0	0	0	28	1.2	28	26	29	-	-	-	-	-	-		
		Nitrite (as N)	mg/L	-	-	-	-	-	6.0	0	0	0.090	0.011	0.086	0.083	0.11	-	-	-	-	-	-		
		Orthophosphate (PO4-P)	mg/L	-	-	-	-	-	6.0	3.0	50	-	-	0.011	0.010	0.023	-	-	-	-	-	-		
		Total Kjeldahl Nitrogen	mg/L	-	-	-	-	-	6.0	0	0	12	1.6	12	9.4	14	-	-	-	-	-	-		
		Total Phosphorus	mg/L	2.0	4.0	-	-	-	6.0	0	0	0.048	0.019	0.048	0.020	0.072	0	0	0	-	-	-		
2020	June	Organic/Inorganic Carbon																						
		Dissolved Organic Carbon	mg/L	-	-	-	-	-	6.0	0	0	12	0.82	13	11	13	-	-	-	-	-	-		
		Total Organic Carbon	mg/L	-	-	-	-	-	6.0	0	0	14	0.84	14	12	14	-	-	-	-	-	-		
		Total Metals																						
		Aluminum (T)	mg/L	2.0	3.0	-	-	-	6.0	0	0	0.62	0.11	0.64	0.45	0.79	0	0	0	-	-	-		
		Antimony (T)	mg/L	-	-	-	-	-	6.0	6.0	100	-	-	-	-	0.0050	-	-	-	-	-	-		
		Arsenic (T)	mg/L	0.30	0.60	0.50	0.75	1.0	6.0	0	0	0.047	0.029	0.061	0.0047	0.072	0	0	0	0	0	0		
		Barium (T)	mg/L	-	-	-	-	-	6.0	0	0	0.15	0.0018	0.15	0.15	0.16	-	-	-	-	-	-		
		Beryllium (T)	mg/L	-	-	-	-	-	6.0	6.0	100	-	-	-	-	0.0010	-	-	-	-	-	-		
		Bismuth (T)	mg/L	-	-	-	-	-	6.0	6.0	100	-	-	-	-	0.010	-	-	-	-	-	-		
		Boron (T)	mg/L	-	-	-	-	-	6.0	1.0	17	0.44	0.098	0.48	0.45	0.52	-	-	-	-	-	-		
		Cadmium (T)	mg/L	-	-	-	-	-	6.0	1.0	17	0.00008	0.00002	0.00009	0.00008	0.00010	-	-	-	-	-	-		
		Chromium (T)	mg/L	-	-	-	-	-	6.0	6.0	100	-	-	-	-	0.010	-	-	-	-	-	-		
		Cobalt (T)	mg/L	-	-	-	-	-	6.0	0	0	0.0031	0.00034	0.0031	0.0029	0.0038	-	-	-	-	-	-		
		Copper (T)	mg/L	0.20	0.40	0.30	0.45	0.60	6.0	1.0	17	0.0020	0.00027	0.0021	0.0028	0.0050	0	0	0	0	0	0		
		Iron (T)	mg/L	-	-	-	-	-	6.0	1.0	17	0.16	0.071	0.16	0.10	0.25	-	-	-	-	-	-		
		Lead (T)	mg/L	0.20	0.40	0.30	0.30	0.40	6.0	4.0	67	-	-	0.0010	0.00061	0.0020	0	0	0	0	0	0		
		Lithium (T)	mg/L	-	-	-	-	-	6.0	0	0	0.15	0.0058	0.15	0.14	0.16	-	-	-	-	-	-		
		Manganese (T)	mg/L	-	-	-	-	-	6.0	0	0	1.3	0.032	1.3	1.3	1.4	-	-	-	-	-	-		
		Mercury (T)	mg/L	-	-	-	-	-	6.0	6.0	100	-	-	-	-	0.00010	-	-	-	-	-	-		
		Molybdenum (T)	mg/L	-	-	-	-	-	6.0	4.0	67	-	-	0.0050	0.0043	0.010	-	-	-	-	-	-		
2020	June	Nickel (T)	mg/L	0.50	1.0	0.50	0.75	1.0	6.0	1.0	17	0.0086	0.0019	0.0095	0.0087	0.010	0	0	0	0	0	0		
		Selenium (T)	mg/L	-	-	-	-	-	6.0	1.0	17	0.00064	0.00008	0.00068	0.00060	0.0010	-	-	-	-	-	-		
		Silicon (T)	mg/L	-	-	-	-	-	6.0	0	0	1.8	0.14	1.8	1.5	1.9	-	-	-	-	-	-		
		Silver (T)	mg/L	-	-	-	-	-	6.0	6.0	100	-	-	-	-	0.00020	-	-	-	-	-	-		
		Strontium (T)	mg/L	-	-	-	-	-	6.0	0	0	5.5	0.22	5.5	5.3	5.8	-	-	-	-	-	-		
		Sulfur (T)	mg/L	-	-	-	-	-	6.0	0	0	85	6.7	83	77	97	-	-	-	-	-	-		
		Thallium (T)	mg/L	-	-	-	-	-	6.0	2.0	33	0.00005	0.00001	0.00005	0.00005	0.00010	-	-	-	-	-	-		
		Tin (T)	mg/L	-	-	-	-	-	6.0	6.0	100	-	-	-	-	0.050	-	-	-					

Year	Month	Parameter	Units	Water Licence Limits		MDMER Authorized Limits of Deleterious Substances (Schedule 4)			MEL-14 Summary Statistics										Water Licence Limits			MDMER Authorized Limits of Deleterious Substances (Schedule 4)		
				Maximum Average Conc.	Maximum Grab Conc.	Maximum Monthly Mean Conc.	Maximum Composite Sample Conc.	Maximum Grab Sample Conc.	N	N-DL	N-DP	Mean	SD	Median	Min	Max	Monthly Mean	Maximum Grab	Maximum Grab (N)	Monthly Mean	Maximum Grab	Maximum Grab (N)		
2020	July	Field Measurements																						
		DO (%)	%	-	-	-	-	-	2.0	0	0	79	5.9	79	75	83	-	-	-	-	-	-	-	-
		DO (mg/L)	mg/L	-	-	-	-	-	4.0	0	0	16	5.2	17	9.1	21	-	-	-	-	-	-	-	-
		pH (field)	pH units	6 9.5	-	6 9.5	-	-	4.0	0	0	7.1	0.60	7.0	6.6	7.8	-	-	0	-	-	0	0	
		Sp. Conductivity (field)	uS/cm	-	-	-	-	-	4.0	0	0	2,210	133	2,260	2,020	2,300	-	-	0	-	-	-	-	-
		Temperature	C	-	-	-	-	-	4.0	0	0	15	2.6	16	11	17	-	-	-	-	-	-	-	-
		Conventional Parameters																						
		Conductivity (lab)	uS/cm	-	-	-	-	-	5.0	0	0	2,300	187	2,300	2,000	2,500	-	-	-	-	-	-	-	-
		Hardness (D)	mg/L	-	-	-	-	-	5.0	0	0	487	38	488	426	531	-	-	-	-	-	-	-	-
		Hardness (T)	mg/L	-	-	-	-	-	4.0	0	0	508	58	524	426	561	-	-	-	-	-	-	-	-
		pH (lab)	pH units	-	-	-	-	-	5.0	0	0	7.3	0.19	7.3	7.0	7.5	-	-	-	-	-	-	-	-
		Total Dissolved Solids	mg/L	3,500	-	-	-	-	5.0	0	0	1,470	144	1,430	1,340	1,700	0	-	-	-	-	-	-	-
		Total Dissolved Solids (Calc)	mg/L	-	-	-	-	-	4.0	0	0	1,150	129	1,150	1,000	1,300	-	-	-	-	-	-	-	-
		Total Suspended Solids	mg/L	15	30	15	23	30	5.0	0	0	4.8	0.45	5.0	4.0	5.0	0	0	0	0	0	0	0	0
		Turbidity (lab)	NTU	-	-	-	-	-	5.0	0	0	0.86	0.11	0.90	0.70	1.0	-	-	-	-	-	-	-	-
		Major Ions																						
		Alkalinity, Bicarbonate	mg/L	-	-	-	-	-	5.0	0	0	32	9.2	29	23	46	-	-	-	-	-	-	-	-
		Alkalinity, Carbonate	mg/L	-	-	-	-	-	5.0	5.0	100	-	-	-	-	1.0	-	-	-	-	-	-	-	-
		Alkalinity, Total	mg/L	-	-	-	-	-	5.0	0	0	32	9.3	29	23	46	-	-	-	-	-	-	-	-
		Calcium (D)	mg/L	-	-	-	-	-	5.0	0	0	138	11	140	121	151	-	-	-	-	-	-	-	-
		Calcium (T)	mg/L	-	-	-	-	-	4.0	0	0	145	17	150	120	160	-	-	-	-	-	-	-	-
		Chloride	mg/L	-	-	-	-	-	5.0	0	0	566	52	570	500	630	-	-	-	-	-	-	-	-
		Fluoride	mg/L	-	-	-	-	-	4.0	4.0	100	-	-	-	-	0.10	-	-	-	-	-	-	-	-
		Magnesium (D)	mg/L	-	-	-	-	-	5.0	0	0	35	2.8	35	30	38	-	-	-	-	-	-	-	-
		Magnesium (T)	mg/L	-	-	-	-	-	4.0	0	0	36	3.6	37	31	39	-	-	-	-	-	-	-	-
		Potassium (D)	mg/L	-	-	-	-	-	5.0	0	0	15	1.4	16	13	17	-	-	-	-	-	-	-	-
		Potassium (T)	mg/L	-	-	-	-	-	4.0	0	0	16	1.7	16	13	17	-	-	-	-	-	-	-	-
		Reactive Silica (SiO2)	mg/L	-	-	-	-	-	5.0	0	0	1.2	0.23	1.1	0.90	1.5	-	-	-	-	-	-	-	-
		Sodium (D)	mg/L	-	-	-	-	-	5.0	0	0	220	20	218	194	243	-	-	-	-	-	-	-	-
		Sodium (T)	mg/L	-	-	-	-	-	4.0	0	0	227	22	230	197	250	-	-	-	-	-	-	-	-
		Sulfate	mg/L	-	-	-	-	-	5.0	0	0	118	8.4	120	110	130	-	-	-	-	-	-	-	-
		Nutrients																						
		Ammonia (as N)	mg/L	14	18	-	-	-	5.0	0	0	1.5	1.2	0.79	0.69	3.4	0	0	0	-	-	-	-	-
		Nitrate (as N)	mg/L	-	-	-	-	-	5.0	0	0	12	1.1	12	10	13	-	-	-	-	-	-	-	-
		Nitrate + Nitrite (as N)	mg/L	-	-	-	-	-	5.0	0	0	12	1.0	11	11	13	-	-	0	0	0	0	0	0
		Nitrite (as N)	mg/L	-	-	-	-	-	5.0	0	0	0.32	0.14	0.39	0.11	0.46	-	-	-	-	-	-	-	-
		Orthophosphate (PO4-P)	mg/L	-	-	-	-	-	5.0	5.0	100	-	-	-	-	0.010	-	-	-	-	-	-	-	-
		Total Dissolved Nitrogen	mg/L	-	-	-	-	-	4.0	0	0	2.5	1.2	2.1	1.6	4.2	-	-	-	-	-	-	-	-
		Total Phosphorus	mg/L	2.0	4.0	-	-	-	4.0	0	0	0.034	0.016	0.029	0.022	0.057	0	0	0	-	-	-	-	-
		Organic/Inorganic Carbon																						
		Dissolved Organic Carbon	mg/L	-	-	-	-	-	4.0	0	0	5.7	1.3	5.2	4.7	7.6	-	-	-	-	-	-	-	-
		Total Organic Carbon	mg/L	-	-	-	-	-	4.0	0	0	6.2	1.5	5.6	5.2	8.4	-	-	-	-	-	-	-	-
		Total Metals																						
		Aluminum (T)	mg/L	2.0	3.0	-	-	-	4.0	0	0	0.59	0.12	0.60	0.44	0.73	0	0	0	-	-	-	-	-
		Antimony (T)	mg/L	-	-	-	-	-	4.0	2.0	50	-	-	0.00051	0.00050	0.0040	-	-	-	-	-	-	-	-
		Arsenic (D)	mg/L	0.30	0.60	0.50	0.75	1.0	4.0	0	0	0.0004	0.00077	0.0004	0.0006	0.0054	0	0	0	0	0	0	0	0
		Barium (D)	mg/L	-	-	-	-	-	4.0	0	0	0.0072	0.0091	0.072	0.061	0.083	-	-	-	-	-	-	-	-
		Beryllium (T)	mg/L	-	-	-	-	-	4.0	4.0	100	-	-	-	-	0.00020	-	-	-	-	-	-	-	-
		Bismuth (T)	mg/L	-	-	-	-	-	4.0	4.0	100	-	-	-	-	0.0020	-	-	-	-	-	-	-	-
		Boron (T)	mg/L	-	-	-	-	-	4.0	0	0	0.26	0.044	0.25	0.22	0.32	-	-	-	-	-	-	-	-
		Cadmium (T)	mg/L	-	-	-	-	-	4.0	0	0	0.00002	0.00000	0.00002	0.00002	0.00001	-	-	-	-	-	-	-	-
		Chromium (T)	mg/L	-	-	-	-	-	4.0	4.0	100	-	-	-	-	0.0020	-	-	-	-	-	-	-	-
		Cobalt (T)	mg/L	-	-	-	-	-	4.0	0	0	0.0011	0.00015	0.0011	0.00097	0.0013	-	-	-	-	-	-	-	-
		Copper (T)	mg/L	0.20	0.40	0.30	0.45	0.60	4.0	0	0	0.0013	0.00019	0.0013	0.0010	0.0015	0	0	0	0	0	0	0	0
		Iron (T)	mg/L	-	-	-	-	-	4.0	0	0	0.069	0.019	0.063	0.054	0.097	-	-	-	-	-	-	-	-
		Lead (T)	mg/L	0.20	0.40	0.20	0.30	0.40	4.0	3.0	75	-	-	0.00030	0.00020	0.00041	0	0	0	0	0	0	0	0
		Lithium (D)	mg/L	-	-	-	-	-	4.0	0	0	0.068	0.0074	0.068	0.058	0.076	-	-	-	-	-	-	-	-
		Manganese (T)	mg/L	-	-	-	-	-	4.0	0	0	0.18	0.15	0.30	0.058	0.46	-	-	-	-	-	-	-	-
		Mercury (T)	mg/L	-	-	-	-	-	4.0	4.0	100	-	-	-	-	0.00010	-	-	-	-	-	-	-	-
		Molybdenum (T)	mg/L	-	-	-	-	-	4.0	0	0	0.0026	0.00033	0.0026	0.0022	0.0030	-	-	-	-	-	-	-	-
		Nickel (T)	mg/L	0.50	1.0	0.50	0.75	1.0	4.0	0	0	0.0038	0.00073	0.0038	0.0031	0.0045	0	0	0	0	0	0	0	0
		Selenium (T)	mg/L	-	-	-	-	-	4.0	0	0	0.00025	0.00004	0.00024	0.00021	0.00030	-	-	-	-	-	-	-	-
		Silicon (T)	mg/L	-	-	-	-	-	4.0	0	0	0.58	0.12	0.53	0.49	0.75	-	-	-	-	-	-	-	-
		Silver (T)	mg/L	-	-	-	-	-	4.0	4.0	100	-	-	-	-	0.00004	-	-	-	-	-	-	-	-
		Strontium (T)	mg/L	-	-	-	-	-	4.0	0	0	2.6	0.30	2.6	2.3	2.8	-	-	-	-	-	-	-	-
		Sulfur (T)	mg/L	-	-	-	-	-	4.0	0	0	41	3.6	41	36	45	-	-	-	-	-	-	-	-
		Thallium (T)	mg/L	-	-	-	-	-	4.0	0	0	0.00003	0.00000	0.00003	0.00003	0.00003	-	-	-	-	-	-	-	-
		Tin (T)	mg/L	-	-	-	-	-	4.0	4.0	100	-	-	-	-	0.010	-	-	-	-	-	-	-	-

Year	Month	Parameter	Units	Water Licence Limits		MDMER Authorized Limits of Deleterious Substances (Schedule 4)			MEL-14 Summary Statistics							Water Licence Limits			MDMER Authorized Limits of Deleterious Substances (Schedule 4)			
				Maximum Average Conc.	Maximum Grab Conc.	Maximum Monthly Mean Conc.	Maximum Composite Sample Conc.	Maximum Grab Sample Conc.	N	N-DL	N-DP	Mean	SD	Median	Min	Max	Monthly Mean	Maximum Grab	Maximum Grab (N)	Monthly Mean	Maximum Grab	Maximum Grab (N)
2020	August	Field Measurements																				
		DO (%)	%	-	-	-	-	-	5.0	0	0	90	15	98	66	103	-	-	-	-	-	-
		DO (mg/L)	mg/L	-	-	-	-	-	4.0	0	0	9.1	2.2	9.6	6.3	11	-	-	-	-	-	-
		pH (field)	pH units	6 9.5	-	6 9.5	-	-	5.0	0	0	7.2	0.18	7.2	6.8	7.4	-	-	0	-	0	0
		Sp. Conductivity (field)	uS/cm	-	-	-	-	-	5.0	0	0	2,870	157	2,930	2,680	3,010	-	-	0	-	-	-
		Temperature	C	-	-	-	-	-	5.0	0	0	14	2.6	15	11	17	-	-	-	-	-	-
		Conventional Parameters																				
		Conductivity (lab)	uS/cm	-	-	-	-	-	7.0	0	0	2,810	177	2,800	2,500	3,000	-	-	-	-	-	-
		Hardness (D)	mg/L	-	-	-	-	-	7.0	0	0	611	40	600	561	670	-	-	-	-	-	-
		Hardness (T)	mg/L	-	-	-	-	-	6.0	0	0	612	26	615	562	633	-	-	-	-	-	-
		pH (lab)	mg/L	-	-	-	-	-	7.0	0	0	7.5	0.13	-	-	-	-	-	-	-	-	-
		Total Dissolved Solids	mg/L	3,500	-	-	-	-	7.0	0	0	1,680	99	1,690	1,550	1,850	0	-	-	-	-	-
		Total Dissolved Solids (Calc)	mg/L	-	-	-	-	-	7.0	0	0	1,440	113	1,400	1,300	1,600	-	-	-	-	-	-
		Total Suspended Solids	mg/L	15	30	15	23	30	7.0	0	0	3.9	0.90	4.0	3.0	5.0	0	0	0	0	0	0
		Turbidity (lab)	NTU	-	-	-	-	-	7.0	0	0	0.60	0.063	0.60	0.50	0.70	-	-	-	-	-	-
		Major Ions																				
		Alkalinity, Bicarbonate	mg/L	-	-	-	-	-	7.0	0	0	58	6.9	60	46	67	-	-	-	-	-	-
		Alkalinity, Carbonate	mg/L	-	-	-	-	-	7.0	7.0	100	-	-	-	-	-	-	-	-	-	-	-
		Alkalinity, Total	mg/L	-	-	-	-	-	7.0	0	0	59	7.0	61	46	67	-	-	-	-	-	-
		Calcium (D)	mg/L	-	-	-	-	-	7.0	0	0	174	12	173	157	191	-	-	-	-	-	-
		Calcium (T)	mg/L	-	-	-	-	-	6.0	0	0	173	6.9	174	161	181	-	-	-	-	-	-
		Chloride	mg/L	-	-	-	-	-	7.0	0	0	713	56	700	630	790	-	-	-	-	-	-
		Fluoride	mg/L	-	-	-	-	-	7.0	6.0	86	-	-	0.10	0.10	0.11	-	-	-	-	-	-
		Magnesium (D)	mg/L	-	-	-	-	-	7.0	0	0	43	2.6	42	40	47	-	-	-	-	-	-
		Magnesium (T)	mg/L	-	-	-	-	-	6.0	0	0	43	2.4	44	39	46	-	-	-	-	-	-
		Potassium (D)	mg/L	-	-	-	-	-	7.0	0	0	20	1.2	19	18	21	-	-	-	-	-	-
		Potassium (T)	mg/L	-	-	-	-	-	6.0	0	0	20	1.1	20	18	21	-	-	-	-	-	-
		Reactive Silica (SiO2)	mg/L	-	-	-	-	-	6.0	0	0	1.1	0.20	1.2	0.78	1.2	-	-	-	-	-	-
		Sodium (D)	mg/L	-	-	-	-	-	7.0	0	0	278	17	273	255	300	-	-	-	-	-	-
		Sodium (T)	mg/L	-	-	-	-	-	6.0	0	0	279	18	286	246	295	-	-	-	-	-	-
		Sulfate	mg/L	-	-	-	-	-	7.0	0	0	150	12	150	140	170	-	-	-	-	-	-
		Nutrients																				
		Ammonia (as N)	mg/L	14	18	-	-	-	6.0	0	0	0.39	0.16	0.42	0.16	0.60	0	0	0	-	-	-
		Nitrate (as N)	mg/L	-	-	-	-	-	7.0	0	0	11	0.44	11	12	-	-	-	-	-	-	-
		Nitrate + Nitrite (as N)	mg/L	-	-	-	-	-	7.0	0	0	11	0.44	11	12	-	-	-	-	-	-	-
		Nitrite (as N)	mg/L	-	-	-	-	-	7.0	0	0	0.30	0.040	0.29	0.24	0.36	-	-	-	-	-	-
		Orthophosphate (PO4-P)	mg/L	-	-	-	-	-	6.0	6.0	100	-	-	-	-	0.010	-	-	-	-	-	-
		Total Dissolved Nitrogen	mg/L	-	-	-	-	-	6.0	1.0	17	-	-	0.91	0.41	0.97	0.50	1.3	-	-	-	-
		Total Phosphorus	mg/L	2.0	4.0	-	-	-	6.0	3.0	50	-	-	0.021	0.020	0.026	0	0	0	-	-	-
		Organic/Inorganic Carbon																				
		Dissolved Organic Carbon	mg/L	-	-	-	-	-	6.0	0	0	8.3	0.49	8.4	7.6	8.9	-	-	-	-	-	-
		Total Organic Carbon	mg/L	-	-	-	-	-	6.0	0	0	8.7	0.58	8.8	8.0	9.6	-	-	-	-	-	-
		Total Metals																				
		Aluminum (T)	mg/L	2.0	3.0	-	-	-	6.0	0	0	0.48	0.040	0.48	0.41	0.53	0	0	0	-	-	-
		Antimony (T)	mg/L	-	-	-	-	-	6.0	2.0	33	0.00061	0.00099	0.00069	0.00063	0.0010	-	-	-	-	-	-
		Arsenic (D)	mg/L	0.30	0.60	0.50	0.75	1.0	6.0	0	0	0.0044	0.0013	0.0044	0.0009	0.0059	0	0	0	0	0	0
		Barium (T)	mg/L	-	-	-	-	-	6.0	0	0	0.10	0.0097	0.10	0.082	0.11	-	-	-	-	-	-
		Beryllium (T)	mg/L	-	-	-	-	-	6.0	6.0	100	-	-	-	-	0.00020	-	-	-	-	-	-
		Bismuth (T)	mg/L	-	-	-	-	-	6.0	6.0	100	-	-	-	-	0.0020	-	-	-	-	-	-
		Boron (T)	mg/L	-	-	-	-	-	6.0	0	0	0.33	0.041	0.33	0.27	0.37	-	-	-	-	-	-
		Cadmium (T)	mg/L	-	-	-	-	-	6.0	4.0	67	-	-	0.00002	0.00001	0.00002	-	-	-	-	-	-
		Chromium (T)	mg/L	-	-	-	-	-	6.0	6.0	100	-	-	-	-	0.0020	-	-	-	-	-	-
		Cobalt (T)	mg/L	-	-	-	-	-	6.0	0	0	0.0010	0.00098	0.0010	0.00092	0.0011	-	-	-	-	-	-
		Copper (T)	mg/L	0.20	0.40	0.30	0.45	0.60	6.0	0	0	0.0016	0.00013	0.0016	0.0012	0.0018	0	0	0	0	0	0
		Iron (T)	mg/L	-	-	-	-	-	6.0	0	0	0.040	0.012	0.035	0.031	0.062	-	-	-	-	-	-
		Lead (T)	mg/L	0.20	0.40	0.20	0.30	0.40	6.0	6.0	100	-	-	-	-	0.00040	0	0	0	0	0	0
		Lithium (T)	mg/L	-	-	-	-	-	6.0	0	0	0.075	0.0074	0.077	0.063	0.083	-	-	-	-	-	-
		Manganese (T)	mg/L	-	-	-	-	-	6.0	0	0	0.18	0.029	0.17	0.10	0.27	-	-	-	-	-	-
		Mercury (T)	mg/L	-	-	-	-	-	6.0	6.0	100	-	-	-	-	0.00001	-	-	-	-	-	-
		Molybdenum (T)	mg/L	-	-	-	-	-	6.0	0	0	0.0036	0.00029	0.0037	0.0031	0.0039	-	-	-	-	-	-
		Nickel (T)	mg/L	0.50	1.0	0.50	0.75	1.0	6.0	0	0	0.0045	0.00038	0.0044	0.0009	0.0069	0	0	0	0	0	0
		Selenium (T)	mg/L	-	-	-	-	-	6.0	0	0	0.0026	0.00033	0.0026	0.00033	0.00033	-	-	-	-	-	-
		Silicon (T)	mg/L	-	-	-	-	-	6.0	0	0	0.52	0.14	0.54	0.35	0.67	-	-	-	-	-	-
		Silver (T)	mg/L	-	-	-	-	-	6.0	6.0	100	-	-	-	-	0.00004	-	-	-	-	-	-
		Strontium (T)	mg/L	-	-	-	-	-	6.0	0	0	3.2	0.15	3.2	2.8	3.3	-	-	-	-	-	-
		Sulfur (T)	mg/L	-	-	-	-	-	6.0	0	0	51	5.1	50	44	58	-	-	-	-	-	-
		Thallium (T)	mg/L	-	-	-	-	-	6.0	1.0	17	0.00003	0.00001	0.00003	0.00001	0.00003	-	-	-	-	-	-
		Tin (T)	mg/L	-	-	-	-	-	6.0	6.0	100	-	-	-	-	0.010	-	-	-	-	-	-
		Titanium (T)	mg/L	-	-	-	-	-	6.0	6.0	100	-	-	-	-	0.010	-	-	-	-	-	-
		Uranium (T)	mg/L	-	-	-	-	-	6.0	0	0	0.00045	0.00016	0.00040	0.00031	0.00072	-	-	-	-	-	-
		Vanadium (T)	mg/L	-	-	-	-	-	6.0	6.0	100	-	-	-	-	0.010	-	-	-	-	-	-
		Zinc (T)	mg/L	0.40	0.80	0.50	0.75	1.0	6.0	6.0	100	-	-	-	-	0.010	0	0	0	0	0	0
		Zirconium (T)	mg/L	-	-	-	-	-	6.0	6.0	100	-	-	-	-	0.00020	-	-	-	-	-	-
		Dissolved Metals																				
		Aluminum (D)	mg/L	-	-	-	-	-	6.0	0	0	0.13	0.019</									

Year	Month	Parameter	Units	Water Licence Limits		MDMER Authorized Limits of Deleterious Substances (Schedule 4)			MEL-14 Summary Statistics										Water Licence Limits		MDMER Authorized Limits of Deleterious Substances (Schedule 4)		
				Maximum Average Conc.	Maximum Grab Conc.	Maximum Monthly Mean Conc.	Maximum Composite Sample Conc.	Maximum Grab Sample Conc.	N	N-DL	ND-per	Mean	SD	Median	Min	Max	Monthly Mean	Maximum Grab	Maximum Grab (N)	Monthly Mean	Maximum Grab	Maximum Grab (N)	
2020	September	Field Measurements																					
		DO (%)	%	-	-	-	-	-	4.0	0	0	95	4.0	96	89	98	-	-	-	-	-	-	-
		DO (mg/L)	mg/L	-	-	-	-	-	3.0	0	0	11	0.32	11	10	11	-	-	-	-	-	-	-
		pH (field)	pH units	6 9.5	-	6 9.5	-	-	4.0	0	0	7.0	0.26	7.1	6.6	7.2	-	-	0	-	-	0	0
		Sp. Conductivity (field)	uS/cm	-	-	-	-	-	4.0	0	0	3,460	250	3,410	3,260	3,780	-	-	0	-	-	-	-
		Temperature	C	-	-	-	-	-	4.0	0	0	9.2	1.4	9.3	7.5	11	-	-	-	-	-	-	-
		Conventional Parameters																					
		Conductivity (lab)	uS/cm	-	-	-	-	-	5.0	0	0	3,440	313	3,500	3,100	3,900	-	-	-	-	-	-	-
		Hardness (D)	mg/L	-	-	-	-	-	5.0	0	0	769	77	777	685	871	-	-	-	-	-	-	-
		Hardness (T)	mg/L	-	-	-	-	-	5.0	0	0	775	104	756	683	948	-	-	-	-	-	-	-
		pH (lab)	pH units	-	-	-	-	-	5.0	0	0	7.5	0.070	7.5	7.4	7.6	-	-	-	-	-	-	-
		Total Dissolved Solids	mg/L	3,500	-	-	-	-	5.0	0	0	2,070	272	1,540	1,780	2,410	0	-	-	-	-	-	-
		Total Dissolved Solids (Calc)	mg/L	-	-	-	-	-	5.0	0	0	1,860	167	1,900	1,700	2,100	-	-	-	-	-	-	-
		Total Suspended Solids	mg/L	15	30	15	23	30	5.0	0	0	5.4	0.55	5.0	5.0	6.0	0	0	0	0	0	0	0
		Turbidity (lab)	NTU	-	-	-	-	-	5.0	0	0	0.64	0.055	0.60	0.60	0.70	-	-	-	-	-	-	-
		Major Ions																					
		Alkalinity, Bicarbonate	mg/L	-	-	-	-	-	5.0	0	0	71	4.3	71	65	76	-	-	-	-	-	-	-
		Alkalinity, Carbonate	mg/L	-	-	-	-	-	5.0	5.0	100	-	-	-	-	-	-	-	-	-	-	-	-
		Alkalinity, Total	mg/L	-	-	-	-	-	5.0	0	0	71	4.2	71	66	76	-	-	-	-	-	-	-
		Calcium (D)	mg/L	-	-	-	-	-	5.0	0	0	221	21	224	197	247	-	-	-	-	-	-	-
		Calcium (T)	mg/L	-	-	-	-	-	5.0	0	0	223	32	217	197	278	-	-	-	-	-	-	-
		Chloride	mg/L	-	-	-	-	-	5.0	0	0	870	76	900	780	950	-	-	-	-	-	-	-
		Fluoride	mg/L	-	-	-	-	-	5.0	5.0	100	-	-	-	-	-	-	-	-	-	-	-	-
		Magnesium (D)	mg/L	-	-	-	-	-	5.0	0	0	53	5.9	53	47	61	-	-	-	-	-	-	-
		Magnesium (T)	mg/L	-	-	-	-	-	5.0	0	0	53	5.9	52	47	62	-	-	-	-	-	-	-
		Potassium (D)	mg/L	-	-	-	-	-	5.0	0	0	24	1.8	24	22	26	-	-	-	-	-	-	-
		Potassium (T)	mg/L	-	-	-	-	-	5.0	0	0	24	1.5	24	22	26	-	-	-	-	-	-	-
		Reactive Silica (SiO2)	mg/L	-	-	-	-	-	5.0	0	0	1.8	0.21	1.9	1.5	2.0	-	-	-	-	-	-	-
		Sodium (D)	mg/L	-	-	-	-	-	5.0	0	0	331	37	341	292	382	-	-	-	-	-	-	-
		Sodium (T)	mg/L	-	-	-	-	-	5.0	0	0	339	48	335	303	377	-	-	-	-	-	-	-
		Sulfate	mg/L	-	-	-	-	-	5.0	0	0	226	23	230	200	260	-	-	-	-	-	-	-
		Nutrients																					
		Ammonia (as N)	mg/L	14	18	-	-	-	5.0	0	0	1.3	0.40	1.3	0.92	1.8	0	0	0	-	-	-	-
		Nitrate (as N)	mg/L	-	-	-	-	-	5.0	0	0	14	2.5	14	11	17	-	-	-	-	-	-	-
		Nitrate + Nitrite (as N)	mg/L	-	-	-	-	-	5.0	0	0	14	2.5	14	11	17	-	-	-	-	-	-	-
		Nitrite (as N)	mg/L	-	-	-	-	-	5.0	0	0	0.39	0.038	0.38	0.35	0.45	-	-	-	-	-	-	-
		Orthophosphate (PO4-P)	mg/L	-	-	-	-	-	5.0	5.0	100	-	-	-	-	-	-	-	-	-	-	-	-
		Total Dissolved Nitrogen	mg/L	-	-	-	-	-	5.0	0	0	1.9	0.89	1.7	1.0	3.1	-	-	-	-	-	-	-
		Total Phosphorus	mg/L	2.0	4.0	-	-	-	5.0	3.0	60	-	-	-	-	-	-	-	-	-	-	-	-
		Organic/Inorganic Carbon																					
		Dissolved Organic Carbon	mg/L	-	-	-	-	-	5.0	0	0	8.9	0.68	9.1	7.8	9.6	-	-	-	-	-	-	-
		Total Organic Carbon	mg/L	-	-	-	-	-	5.0	0	0	9.4	0.47	9.3	8.5	10	-	-	-	-	-	-	-
		Total Metals																					
		Aluminum (T)	mg/L	2.0	3.0	-	-	-	5.0	0	0	0.64	0.22	0.62	0.44	1.00	0	0	0	-	-	-	-
		Antimony (T)	mg/L	-	-	-	-	-	5.0	0	0	0.00069	0.00004	0.00069	0.00004	0.00074	-	-	-	-	-	-	-
		Arsenic (D)	mg/L	0.30	0.60	0.50	0.75	1.0	5.0	0	0	0.00016	0.00018	0.00016	0.00018	0.00041	0	0	0	0	0	0	0
		Barium (D)	mg/L	-	-	-	-	-	5.0	0	0	0.11	0.0030	0.11	0.10	0.11	-	-	-	-	-	-	-
		Beryllium (T)	mg/L	-	-	-	-	-	5.0	5.0	100	-	-	-	-	-	-	-	-	-	-	-	-
		Bismuth (T)	mg/L	-	-	-	-	-	5.0	5.0	100	-	-	-	-	-	-	-	-	-	-	-	-
		Boron (T)	mg/L	-	-	-	-	-	5.0	0	0	0.39	0.029	0.39	0.34	0.42	-	-	-	-	-	-	-
		Cadmium (T)	mg/L	-	-	-	-	-	5.0	1.0	20	0.00002	0.00001	0.00002	0.00001	0.00003	-	-	-	-	-	-	-
		Chromium (T)	mg/L	-	-	-	-	-	5.0	5.0	100	-	-	-	-	-	-	-	-	-	-	-	-
		Cobalt (T)	mg/L	-	-	-	-	-	5.0	0	0	0.0014	0.00023	0.0015	0.0012	0.0016	-	-	-	-	-	-	-
		Copper (T)	mg/L	0.20	0.40	0.30	0.45	0.60	5.0	0	0	0.0015	0.00017	0.0015	0.0014	0.0018	0	0	0	0	0	0	0
		Iron (T)	mg/L	-	-	-	-	-	5.0	0	0	0.036	0.011	0.034	0.026	0.052	-	-	-	-	-	-	-
		Lead (T)	mg/L	0.20	0.40	0.20	0.30	0.40	5.0	5.0	100	-	-	-	-	-	0.00020	0	0	0	0	0	0
		Lithium (D)	mg/L	-	-	-	-	-	5.0	0	0	0.070	0.0083	0.070	0.058	0.080	-	-	-	-	-	-	-
		Manganese (T)	mg/L	-	-	-	-	-	5.0	0	0	0.26	0.032	0.26	0.21	0.30	-	-	-	-	-	-	-
		Mercury (T)	mg/L	-	-	-	-	-	5.0	5.0	100	-	-	-	-	-	-	-	-	-	-	-	-
		Molybdenum (T)	mg/L	-	-	-	-	-	5.0	0	0	0.0042	0.00028	0.0041	0.0040	0.0047	-	-	-	-	-	-	-
		Nickel (T)	mg/L	0.50	1.0	0.50	0.75	1.0	5.0	0	0	0.0061	0.00076	0.0063	0.0050	0.0069	0	0	0	0	0	0	0
		Selenium (T)	mg/L	-	-	-	-	-	5.0	0	0	0.0042	0.00007	0.0040	0.0032	0.00049	-	-	-	-	-	-	-
		Silicon (T)	mg/L	-	-	-	-	-	5.0	0	0	0.80	0.063	0.79	0.74	0.88	-	-	-	-	-	-	-
		Silver (T)	mg/L	-	-	-	-	-	5.0	5.0	100	-	-	-	-	-	-	-	-	-	-	-	-
		Strontium (D)	mg/L	-	-	-	-	-	5.0	0	0	3.6	0.28	3.5	3.2	4.0	-	-	-	-	-	-	-
		Sulfur (T)	mg/L	-	-	-	-	-	5.0	0	0	76	9.8	77	61	88	-	-	-	-	-	-	-
		Thallium (T)	mg/L	-	-	-	-	-	5.0	0	0	0.00003	0.00001	0.00003	0.00003	0.00004	-	-	-	-	-	-	-
		Tin (T)	mg/L	-	-	-	-	-	5.0	5.0	100	-	-	-	-	-	-	-	-	-	-	-	-
		Titanium (D)	mg/L	-	-	-	-	-	5.0	5.0	100	-	-	-	-	-	0.0050	-	-	-	-	-	-
		Uranium (T)	mg/L	-	-	-	-	-	5.0	0	0	0.0011	0.00041	0.0011	0.00072	0.0018	-	-	-	-	-	-	-
		Vanadium (T)	mg/L	-	-	-	-	-	5.0	5.0	100	-	-	-	-	-	0.005						

Year	Month	Parameter	Units	Water Licence Limits		MDMER Authorized Limits of Deleterious Substances (Schedule 4)			MEL-14 Summary Statistics								Water Licence Limits			MDMER Authorized Limits of Deleterious Substances (Schedule 4)		
				Maximum Average Conc.	Maximum Grab Conc.	Maximum Monthly Mean Conc.	Maximum Composite Sample Conc.	Maximum Grab Sample Conc.	N	N-DL	N-DL	Mean	SD	Median	Min	Max	Monthly Mean	Maximum Grab	Maximum Grab (N)	Monthly Mean	Maximum Grab	Maximum Grab (N)
2020	October	Field Measurements																				
		DO (%)	%	-	-	-	-	-	1.0	0	0	105	-	105	105	105	-	-	-	-	-	-
		DO (mg/L)	mg/L	-	-	-	-	-	1.0	0	0	14	-	14	14	14	-	-	-	-	-	-
		pH (field)	pH units	6 9.5	-	6 9.5	-	-	1.0	0	0	7.6	-	7.6	7.6	7.6	-	-	0	-	-	0
		Sp. Conductivity (field)	uS/cm	-	-	-	-	-	1.0	0	0	4,180	-	4,180	4,180	4,180	-	-	-	-	-	-
		Temperature	C	-	-	-	-	-	1.0	0	0	2.7	-	2.7	2.7	2.7	-	-	-	-	-	-
		Conventional Parameters																				
		Conductivity (lab)	uS/cm	-	-	-	-	-	1.0	0	0	4,000	-	4,000	4,000	4,000	-	-	-	-	-	-
		Hardness (D)	mg/L	-	-	-	-	-	1.0	0	0	1,010	-	1,010	1,010	1,010	-	-	-	-	-	-
		Hardness (T)	mg/L	-	-	-	-	-	1.0	0	0	971	-	971	971	971	-	-	-	-	-	-
		pH (lab)	pH units	-	-	-	-	-	1.0	0	0	7.6	-	7.6	7.6	7.6	-	-	-	-	-	-
		Total Dissolved Solids	mg/L	3,500	-	2,630	-	-	1.0	0	0	2,630	-	2,630	2,630	2,630	0	-	-	-	-	-
		Total Dissolved Solids (Calc)	mg/L	-	-	-	-	-	1.0	0	0	2,300	-	2,300	2,300	2,300	-	-	-	-	-	-
		Total Suspended Solids	mg/L	15	30	15	23	30	1.0	0	0	5.0	-	5.0	5.0	5.0	0	0	0	0	0	0
		Turbidity (lab)	NTU	-	-	-	-	-	1.0	0	0	0.60	-	0.60	0.60	0.60	-	-	-	-	-	-
		Major Ions																				
		Alkalinity, Bicarbonate	mg/L	-	-	-	-	-	1.0	0	0	75	-	75	75	75	-	-	-	-	-	-
		Alkalinity, Carbonate	mg/L	-	-	-	-	-	1.0	1.0	100	-	-	-	1.0	-	-	-	-	-	-	-
		Alkalinity, Total	mg/L	-	-	-	-	-	1.0	0	0	75	-	75	75	75	-	-	-	-	-	-
		Calcium (D)	mg/L	-	-	-	-	-	1.0	0	0	293	-	293	293	293	-	-	-	-	-	-
		Calcium (T)	mg/L	-	-	-	-	-	1.0	0	0	273	-	273	273	273	-	-	-	-	-	-
		Chloride	mg/L	-	-	-	-	-	1.0	0	0	1,100	-	1,100	1,100	1,100	-	-	-	-	-	-
		Fluoride	mg/L	-	-	-	-	-	1.0	1.0	100	-	-	-	0.10	-	-	-	-	-	-	-
		Magnesium (D)	mg/L	-	-	-	-	-	1.0	0	0	68	-	68	68	68	-	-	-	-	-	-
		Magnesium (T)	mg/L	-	-	-	-	-	1.0	0	0	70	-	70	70	70	-	-	-	-	-	-
		Potassium (D)	mg/L	-	-	-	-	-	1.0	0	0	29	-	29	29	29	-	-	-	-	-	-
		Potassium (T)	mg/L	-	-	-	-	-	1.0	0	0	29	-	29	29	29	-	-	-	-	-	-
		Reactive Silica (SiO ₂)	mg/L	-	-	-	-	-	1.0	0	0	1.8	-	1.8	1.8	1.8	-	-	-	-	-	-
		Sodium (D)	mg/L	-	-	-	-	-	1.0	0	0	395	-	395	395	395	-	-	-	-	-	-
		Sodium (T)	mg/L	-	-	-	-	-	1.0	0	0	406	-	406	406	406	-	-	-	-	-	-
		Sulfate	mg/L	-	-	-	-	-	1.0	0	0	310	-	310	310	310	-	-	-	-	-	-
		Nutrients																				
		Ammonia (as N)	mg/L	14	18	-	-	-	1.0	0	0	2.3	-	2.3	2.3	2.3	0	0	0	-	-	-
		Nitrate (as N)	mg/L	-	-	-	-	-	1.0	0	0	16	-	16	16	16	-	-	-	-	-	-
		Nitrate + Nitrite (as N)	mg/L	-	-	-	-	-	1.0	0	0	16	-	16	16	16	-	-	-	-	-	-
		Nitrite (as N)	mg/L	-	-	-	-	-	1.0	0	0	0.35	-	0.35	0.35	0.35	-	-	-	-	-	-
		Orthophosphate (PO ₄ -P)	mg/L	-	-	-	-	-	1.0	1.0	100	-	-	-	0.010	-	-	-	-	-	-	-
		Total Dissolved Nitrogen	mg/L	-	-	-	-	-	1.0	0	0	3.4	-	3.4	3.4	3.4	-	-	-	-	-	-
		Total Phosphorus	mg/L	2.0	4.0	-	-	-	1.0	0	0	0.029	-	0.029	0.029	0.029	0	0	0	-	-	-
		Organic/Inorganic Carbon																				
		Dissolved Organic Carbon	mg/L	-	-	-	-	-	1.0	0	0	12	-	12	12	12	-	-	-	-	-	-
		Total Organic Carbon	mg/L	-	-	-	-	-	1.0	0	0	12	-	12	12	12	-	-	-	-	-	-
		Total Metals																				
		Aluminum (T)	mg/L	2.0	3.0	-	-	-	1.0	0	0	0.59	-	0.59	0.59	0.59	0	0	0	-	-	-
		Antimony (T)	mg/L	-	-	-	-	-	1.0	1.0	100	-	-	-	0.0010	-	-	-	-	-	-	-
		Arsenic (D)	mg/L	0.30	0.60	0.50	0.75	1.0	1.0	0	0	0.0024	-	0.0024	0.0024	0.0024	0	0	0	0	0	0
		Barium (D)	mg/L	-	-	-	-	-	1.0	0	0	0.11	-	0.11	0.11	0.11	-	-	-	-	-	-
		Beryllium (T)	mg/L	-	-	-	-	-	1.0	1.0	100	-	-	-	0.00020	-	-	-	-	-	-	-
		Bismuth (T)	mg/L	-	-	-	-	-	1.0	1.0	100	-	-	-	0.0020	-	-	-	-	-	-	-
		Boron (D)	mg/L	-	-	-	-	-	1.0	0	0	0.46	-	0.46	0.46	0.46	-	-	-	-	-	-
		Cadmium (T)	mg/L	-	-	-	-	-	1.0	0	0	0.00003	-	0.00003	0.00003	0.00003	-	-	-	-	-	-
		Chromium (T)	mg/L	-	-	-	-	-	1.0	1.0	100	-	-	-	0.0020	-	-	-	-	-	-	-
		Cobalt (D)	mg/L	-	-	-	-	-	1.0	0	0	0.0021	-	0.0021	0.0021	0.0021	-	-	-	-	-	-
		Copper (T)	mg/L	0.20	0.40	0.30	0.45	0.60	1.0	0	0	0.0019	-	0.0019	0.0019	0.0019	0	0	0	0	0	0
		Iron (T)	mg/L	-	-	-	-	-	1.0	0	0	0.028	-	0.028	0.028	0.028	-	-	-	-	-	-
		Lead (T)	mg/L	0.20	0.40	0.20	0.30	0.40	1.0	1.0	100	-	-	-	0.00040	0	0	0	0	0	0	0
		Lithium (D)	mg/L	-	-	-	-	-	1.0	0	0	0.084	-	0.084	0.084	0.084	-	-	-	-	-	-
		Manganese (T)	mg/L	-	-	-	-	-	1.0	0	0	0.33	-	0.33	0.33	0.33	-	-	-	-	-	-
		Mercury (T)	mg/L	-	-	-	-	-	1.0	1.0	100	-	-	-	0.00001	-	-	-	-	-	-	-
		Molybdenum (T)	mg/L	-	-	-	-	-	1.0	0	0	0.0045	-	0.0045	0.0045	0.0045	-	-	-	-	-	-
		Nickel (T)	mg/L	0.50	1.0	0.50	0.75	1.0	1.0	0	0	0.010	-	0.010	0.010	0.010	0	0	0	0	0	0
		Selenium (T)	mg/L	-	-	-	-	-	1.0	0	0	0.00060	-	0.00060	0.00060	0.00060	-	-	-	-	-	-
		Silicon (T)	mg/L	-	-	-	-	-	1.0	0	0	0.85	-	0.85	0.85	0.85	-	-	-	-	-	-
		Silver (T)	mg/L	-	-	-	-	-	1.0	1.0	100	-	-	-	0.00004	-	-	-	-	-	-	-
		Strontium (D)	mg/L	-	-	-	-	-	1.0	0	0	4.1	-	4.1	4.1	4.1	-	-	-	-	-	-
		Sulfur (T)	mg/L	-	-	-	-	-	1.0	0	0	101	-	101	101	101	-	-	-	-	-	-
		Thallium (T)	mg/L	-	-	-	-	-	1.0	0	0	0.00004	-	0.00004	0.00004	0.00004	-	-	-	-	-	-
		Tin (T)	mg/L	-	-	-	-	-	1.0	1.0	100	-	-	-	0.010	-	-	-	-	-	-	-
		Titanium (D)	mg/L	-	-	-	-	-	1.0	1.0	100	-	-	-	0.010	-	-	-	-	-	-	-
		Uranium (T)	mg/L	-	-	-	-	-	1.0	0	0	0.0027	-	0.0027	0.0027	0.0027	-	-	-	-	-	-
		Vanadium (D)	mg/L	-	-	-	-	-	1.0	1.0	100	-	-	-	0.010	-	-	-	-	-	-	-
		Zinc (T)	mg/L	0.40	0.80	0.50	0.75	1.0	1.0	1.0	100	-	-	-	0.010	0	0	0	0	0	0	0
		Zirconium (T)	mg/L	-	-	-	-	-	1.0	1.0	100	-	-	-	0.00020	-	-	-	-	-	-	-
		Dissolved Metals																				
		Aluminum (D																				

Appendix B2

Daily Discharge Volumes from CP1 to Meliadine Lake in 2020

CP1 DAILY DISCHARGE FLOW RATES TO MELIADINE LAKE - JUNE 2020

Date	ACTUAL daily discharge to Meliadine Lake (m ³)	FORECASTED daily discharge to meet target cumulative monthly total to Meliadine Lake (m ³)	Cumulative discharge to Meliadine Lake (m ³)	Discharged daily average conductivity (uS/cm)	Discharged daily average TSS (mg/L) (internal lab)	Discharged daily average pH	Discharged daily average temperature (°C) (in EWTP)
05/06/2020	2197	2197	2197	4780	4.7	7.0	(no record)
06/06/2020	9001	9001	11198	4650	5.3	7.0	(no record)
07/06/2020	9830	9830	21028	4548	6.0	7.1	(no record)
08/06/2020	12137	12137	33165	4780	6.3	7.1	(no record)
09/06/2020	14389	14389	47554	4843	4.0	7.1	(no record)
10/06/2020	14369	14369	61924	4896	6.2	7.1	(no record)
11/06/2020	14373	14373	76297	4923	6.6	7.1	(no record)
12/06/2020	14561	14561	90858	4960	5.0	6.9	(no record)
13/06/2020	14901	14901	105759	5028	5.8	7.0	(no record)
14/06/2020	14812	14812	120571	5054	6.9	7.0	(no record)
15/06/2020	15012	15012	135582	4967	5.6	7.1	(no record)
16/06/2020	14965	14965	150547	4894	5.2	7.0	(no record)
17/06/2020	13857	13857	164404	4930	4.0	7.0	(no record)
18/06/2020	15254	15254	179658	4948	5.0	6.9	(no record)
19/06/2020	14872	14872	194530	4945	4.0	6.9	(no record)
20/06/2020	14291	14291	208821	4874	4.5	7.0	5.6
21/06/2020	14688	14688	223509	4851	4.8	7.1	5.3
22/06/2020	14843	14843	238352	4396	5.3	6.9	5.3
23/06/2020	15767	15767	254119	3906	4.0	6.9	5.7
24/06/2020	15295	15295	269414	4750	4.3	7.0	3.1
25/06/2020	9141	9141	278554	5090	2.10 (NTU)	6.9	1.9
26/06/2020	6456	6456	285010	4589	4.0	7.1	5.4
27/06/2020	16678	16678	301689	4829	4.0	7.0	4.9
28/06/2020	16961	16961	318650	4588	5.0	7.1	4.6
29/06/2020	17518	17518	336167	4534	4.3	7.0	6.0
30/06/2020	16786	16786	352954	4989	4.0	6.9	4.4

ACTUAL Average Daily Discharge = 13,575 m³/d

TARGET Daily Discharge Rate = 15,000 m³/d

ACTUAL Monthly Cumulative Discharge = 352,954 m³/month

FORECASTED Monthly Cumulative Discharge = 352,954 m³/month

TARGET Monthly Cumulative Discharge = 450,000 m³/month

CP1 DAILY DISCHARGE FLOW RATES TO MELIADINE LAKE - JULY 2020

Date	ACTUAL daily discharge to Meliadine Lake (m ³)	FORECASTED daily discharge to meet target cumulative monthly total to Meliadine Lake (m ³)	Cumulative discharge to Meliadine Lake (m ³)	Discharged daily average conductivity (uS/cm)	Discharged daily average TSS (mg/L) (internal lab)	Discharged daily average pH	Discharged daily average temperature (°C) (in EWTP)
01/07/2020	16656	16656	16656	4750	4.0	7.1	6.4
02/07/2020	14670	14670	31326	4665	5.8	7.0	7.2
03/07/2020	12646	12646	43972	4223	4.0	7.0	8.5
04/07/2020	16860	16860	60832	3285	4.3	6.9	10.4
05/07/2020	17211	17211	78043	2206	5.0	7.2	12.8
06/07/2020	14792	14792	92835	1883	<4.0	7.5	13.5
07/07/2020	16313	16313	109147	1905	<4.0	7.5	13.9
08/07/2020	16529	16529	125676	1913	<4.0	7.3	14.1
09/07/2020	15996	15996	141673	1952	<4.0	7.2	14.5
10/07/2020	12299	12299	153972	2053	<4.0	7.4	15
11/07/2020	16202	16202	170174	2038	<4.0	7.2	14.6
12/07/2020	15992	15992	186166	2027	<4.0	7.3	16.5
13/07/2020	16213	16213	202379	2075	<4.0	7.6	15.4
14/07/2020	7674	7674	210053	2146	<4.0	7.7	14.6
15/07/2020	15340	15340	225393	2180	<4.0	7.2	14.2
16/07/2020	10904	10904	236297	2188	<4.0	7.3	14.5
17/07/2020	15378	15378	251675	2191	<4.0	7.3	14.7
18/07/2020	15623	15623	267298	2212	<4.0	6.9	14.2
19/07/2020	9491	9491	276789	2255	<4.0	6.9	15.0
20/07/2020	12456	12456	289245	2277	<4.0	6.9	15.2
21/07/2020	12404	12404	301649	2326	<4.0	6.4	17.0
22/07/2020	12121	12121	313770	2343	<4.0	6.8	18.0
23/07/2020	10555	10555	324325	2359	<4.0	7.0	18.5
24/07/2020	6368	6368	330693	2435	<4.0	7.1	18.8
25/07/2020	5133	5133	335826	2429	<4.0	7.2	16.9
26/07/2020	5143	5143	340969	2441	<4.0	7.1	15.4
27/07/2020	5148	5148	346117	2452	<4.0	7.0	15.8
28/07/2020	5149	5149	351265	2471	<4.0	6.9	17.1
29/07/2020	5150	5150	356416	2514	<4.0	7.1	16.1
30/07/2020	5152	5152	361568	2530	<4.0	7.1	17.2
31/07/2020	4526	4526	366094	2545	<4.0	6.9	16.2

ACTUAL Average Daily Discharge = 11,809 m3/d

TARGET Daily Discharge Rate = 15,000 m3/d

ACTUAL Monthly Cumulative Discharge = 366,094 m3/month

FORECASTED Monthly Cumulative Discharge = 366,094 m3/month

TARGET Monthly Cumulative Discharge = 450,000 m3/month

CP1 DAILY DISCHARGE FLOW RATES TO MELIADINE LAKE - AUGUST 2020

Date	ACTUAL daily discharge to Meliadine Lake (m ³)	FORECASTED daily discharge to meet target cumulative monthly total to Meliadine Lake (m ³)	Cumulative discharge to Meliadine Lake (m ³)	Discharged daily average conductivity (uS/cm)	Discharged daily average TSS (mg/L) (internal lab)	Discharged daily average pH	Discharged daily average temperature (°C) (in EWTP)
01/08/2020	3878	3878	3878	2563	<4.0	6.9	15.9
02/08/2020	3281	3281	7159	2582	<4.0	7.0	16.7
03/08/2020	3274	3274	10432	2606	<4.0	7.2	17.5
04/08/2020	3320	3320	13752	2621	<4.0	7.2	18.9
05/08/2020	3324	3324	17076	2631	<4.0	7.1	19.9
06/08/2020	3322	3322	20398	2650	<4.0	7.0	20.1
07/08/2020	2873	2873	23271	2662	<4.0	7.0	19.3
08/08/2020	3282	3282	26553	2669	<4.0	7.0	17.8
09/08/2020	3077	3077	29630	2708	<4.0	7.0	16.9
10/08/2020	2153	2153	31783	2722	4.0	7.0	15.8
11/08/2020	2454	2454	34237	2726	<4.0	7.1	15.8
12/08/2020	2599	2599	36836	2724	<4.0	7.2	15.8
13/08/2020	1601	1601	38437	2765	<4.0	7.1	16.2
14/08/2020	1154	1154	39591	2791	5.7	7.1	14.3
15/08/2020	1163	1163	40754	2742	5.5	6.8	14.9
16/08/2020	1563	1563	42317	2757	4.0	6.9	15.2
17/08/2020	1988	1988	44305	2780	<4.0	7.0	13.7
18/08/2020	3039	3039	47344	2809	<4.0	6.7	12.5
19/08/2020	2913	2913	50257	2844	<4.0	6.7	12.5
20/08/2020	2871	2871	53128	2854	4.5	6.7	11.7
21/08/2020	2473	2473	55601	2831	<4.0	6.8	12.2
22/08/2020	2895	2895	58496	2838	<4.0	7.0	11.7
23/08/2020	3310	3310	61806	2864	<4.0	6.9	11.1
24/08/2020	2859	2859	64665	2885	<4.0	7.0	12.6
25/08/2020	2933	2933	67597	2905	<4.0	7.0	13.2
26/08/2020	2721	2721	70318	2934	<4.0	7.0	13.5
27/08/2020	2596	2596	72915	3013	<4.0	6.9	12.1
28/08/2020	2402	2402	75317	3008	<4.0	6.9	12.6
29/08/2020	2911	2911	78228	3017	<4.0	6.9	12.9
30/08/2020	2882	2882	81111	3038	<4.0	6.9	12.5
31/08/2020	2344	2344	83455	3117	<4.0	6.9	11.2

ACTUAL Average Daily Discharge = 2,692 m3/d

TARGET Daily Discharge Rate = 15,000 m3/d

ACTUAL Monthly Cumulative Discharge = 83,455 m3/month

FORECASTED Monthly Cumulative Discharge = 83,455 m3/month

TARGET Monthly Cumulative Discharge = 450,000 m3/month

CP1 DAILY DISCHARGE FLOW RATES TO MELIADINE LAKE - SEPTEMBER 2020

Date	ACTUAL daily discharge to Meliadine Lake (m ³)	FORECASTED daily discharge to meet target cumulative monthly total to Meliadine Lake (m ³)	Cumulative discharge to Meliadine Lake (m ³)	Discharged daily average conductivity (uS/cm)	Discharged daily average TSS (mg/L) (internal lab)	Discharged daily average pH	Discharged daily average temperature (°C) (in EWTP)
01/09/2020	2669	2669	2669	3084	<4.0	6.9	11.2
02/09/2020	2398	2398	5067	3059	<4.0	6.9	11.5
03/09/2020	2440	2440	7507	3051	<4.0	6.9	12.1
04/09/2020	2152	2152	9659	3065	<4.0	7.1	11.7
05/09/2020	2271	2271	11930	3100	<4.0	7.0	11.4
06/09/2020	2604	2604	14534	3196	<4.0	6.9	11
07/09/2020	3964	3964	18498	3212	<4.0	6.9	8.8
08/09/2020	5336	5336	23834	3231	<4.0	6.8	8
09/09/2020	4817	4817	28651	3335	5.5	7.1	7.2
10/09/2020	3814	3814	32465	3316	4.5	7.3	7.7
11/09/2020	4175	4175	36640	3339	5.0	7.2	8.15
12/09/2020	6564	6564	43203	3365	<4.0	7.2	7
13/09/2020	8336	8336	51540	3387	6.5	6.9	7.65
14/09/2020	7449	7449	58989	3393	5.0	7.0	6.83
15/09/2020	8767	8767	67755	3406	4.0	7.4	5.5
16/09/2020	9685	9685	77441	3443	4.0	7.3	4.1
17/09/2020	11365	11365	88806	3487	8.5	7.0	4.2
18/09/2020	9474	9474	98280	3480	4.0	6.8	5.7
19/09/2020	12764	12764	111044	3494	4.0	7.0	5.0
20/09/2020	15071	15071	126115	3538	4.0	7.1	5.7
21/09/2020	14139	14139	140254	3640	4.0	7.2	5.9
22/09/2020	3792	3792	144045	3704	4.0	7.7	6.5
23/09/2020	8151	8151	152196	3700	4.0	7.4	5.4
24/09/2020	12734	12734	164930	3683	4.0	7.3	6.0
25/09/2020	8245	8245	173174	3779	4.0	7.3	7.5
26/09/2020	15	15	173189	3873	4.0	7.3	6.2
27/09/2020	6667	6667	179856	3833	4.0	6.9	6.4
28/09/2020	11749	11749	191605	3872	4.0	7.3	5.7
29/09/2020	13290	13290	204895	4119	4.0	7.2	4.0
30/09/2020	9950	9950	214846	4005	4.0	7.2	4.4

ACTUAL Average Daily Discharge = 7,162 m3/d

TARGET Daily Discharge Rate = 15,000 m3/d

ACTUAL Monthly Cumulative Discharge = 214,846 m3/month

FORECASTED Monthly Cumulative Discharge = 214,846 m3/month

TARGET Monthly Cumulative Discharge = 450,000 m3/month

CP1 DAILY DISCHARGE FLOW RATES TO MELIADINE LAKE - OCTOBER 2020

Date	ACTUAL daily discharge to Meliadine Lake (m ³)	Cumulative discharge to Meliadine Lake (m ³)	Discharged daily average conductivity (uS/cm)	Discharged daily average TSS (mg/L) (internal lab)	Discharged daily average pH	Discharged daily average temperature (°C) (in EWTP)
01/10/2020	6675	6675	4078	4.0	7.4	3.1
02/10/2020	5338	12013	4092	4.0	7.4	3.3
03/10/2020	1816	13829	4113	4.0	7.4	3.0
04/10/2020						
05/10/2020						
06/10/2020						
07/10/2020						
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28/10/2020						
29/10/2020						
30/10/2020						
31/10/2020						

ACTUAL Average Daily Discharge = 4,610 m3/d

TARGET Daily Discharge Rate = 15,000 m3/d

ACTUAL Monthly Cumulative Discharge = - m3/month

FORECASTED Monthly Cumulative Discharge = - m3/month

TARGET Monthly Cumulative Discharge = 450,000 m3/month

APPENDIX C

MELIADINE LAKE – SUPPORTING FIGURES AND TABLES

Appendix C1

Meliadine Lake Water Chemistry – Boxplots

LIST OF FIGURES – APPENDIX C1

Figure C1-1.	Field pH.....	1
Figure C1-2.	Specific conductivity ($\mu\text{S}/\text{cm}$)	2
Figure C1-3.	Lab-measured conductivity ($\mu\text{S}/\text{cm}$)	3
Figure C1-4.	Hardness (mg/L)	4
Figure C1-5.	Lab measured pH.....	5
Figure C1-6.	Total dissolved solids (mg/L)	6
Figure C1-7.	Calculated total dissolved solids (mg/L)	7
Figure C1-8.	Total suspended solids (mg/L).....	8
Figure C1-9.	Lab measured turbidity (NTU)	9
Figure C1-10.	Bicarbonate alkalinity (mg/L)	10
Figure C1-11.	Total alkalinity (mg/L).....	11
Figure C1-12.	Total calcium ($\mu\text{g}/\text{L}$).....	12
Figure C1-13.	Total magnesium (mg/L)	13
Figure C1-14.	Total potassium (mg/L).....	14
Figure C1-15.	Total sodium (mg/L)	15
Figure C1-16.	Chloride (mg/L).....	16
Figure C1-17.	Fluoride (mg/L)	17
Figure C1-18.	Ammonia (as nitrogen) (mg/L)	18
Figure C1-19.	Nitrate (as nitrogen) (mg/L)	19
Figure C1-20.	Nitrate and nitrite (as nitrogen) (mg/L).....	20
Figure C1-21.	Total Kjeldahl nitrogen (mg/L).....	21
Figure C1-22.	Sulphate (mg/L)	22
Figure C1-23.	Total phosphorus ($\mu\text{g}/\text{L}$).....	23
Figure C1-24.	Dissolved organic carbon (mg/L)	24
Figure C1-25.	Total organic carbon (mg/L)	25
Figure C1-26.	Total aluminum ($\mu\text{g}/\text{L}$).....	26
Figure C1-27.	Total antimony ($\mu\text{g}/\text{L}$).....	27
Figure C1-28.	Total arsenic ($\mu\text{g}/\text{L}$).....	28
Figure C1-29.	Total barium ($\mu\text{g}/\text{L}$).....	29

Figure C1-30. Total beryllium ($\mu\text{g/L}$)	30
Figure C1-31. Total bismuth ($\mu\text{g/L}$)	31
Figure C1-32. Total boron ($\mu\text{g/L}$)	32
Figure C1-33. Total cadmium ($\mu\text{g/L}$)	33
Figure C1-34. Total chromium ($\mu\text{g/L}$)	34
Figure C1-35. Total cobalt ($\mu\text{g/L}$)	35
Figure C1-36. Total copper ($\mu\text{g/L}$)	36
Figure C1-37. Total iron ($\mu\text{g/L}$)	37
Figure C1-38. Total lead ($\mu\text{g/L}$)	38
Figure C1-39. Total lithium ($\mu\text{g/L}$)	39
Figure C1-40. Total manganese ($\mu\text{g/L}$)	40
Figure C1-41. Total mercury ($\mu\text{g/L}$)	41
Figure C1-42. Total molybdenum ($\mu\text{g/L}$)	42
Figure C1-43. Total nickel ($\mu\text{g/L}$)	43
Figure C1-44. Total selenium ($\mu\text{g/L}$)	44
Figure C1-45. Total silver ($\mu\text{g/L}$)	45
Figure C1-46. Total strontium ($\mu\text{g/L}$)	46
Figure C1-47. Total thallium ($\mu\text{g/L}$)	47
Figure C1-48. Total tin ($\mu\text{g/L}$)	48
Figure C1-49. Total titanium ($\mu\text{g/L}$)	49
Figure C1-50. Total uranium ($\mu\text{g/L}$)	50
Figure C1-51. Total vanadium ($\mu\text{g/L}$)	51
Figure C1-52. Total zinc ($\mu\text{g/L}$)	52
Figure C1-53. Dissolved manganese ($\mu\text{g/L}$)	53
Figure C1-54. Dissolved zinc ($\mu\text{g/L}$)	54

Figure C1-1. Field pH

Notes: FEIS predictions (where applicable) represent predicted water quality at the edge of the mixing zone in the near-field area (MEL-01).

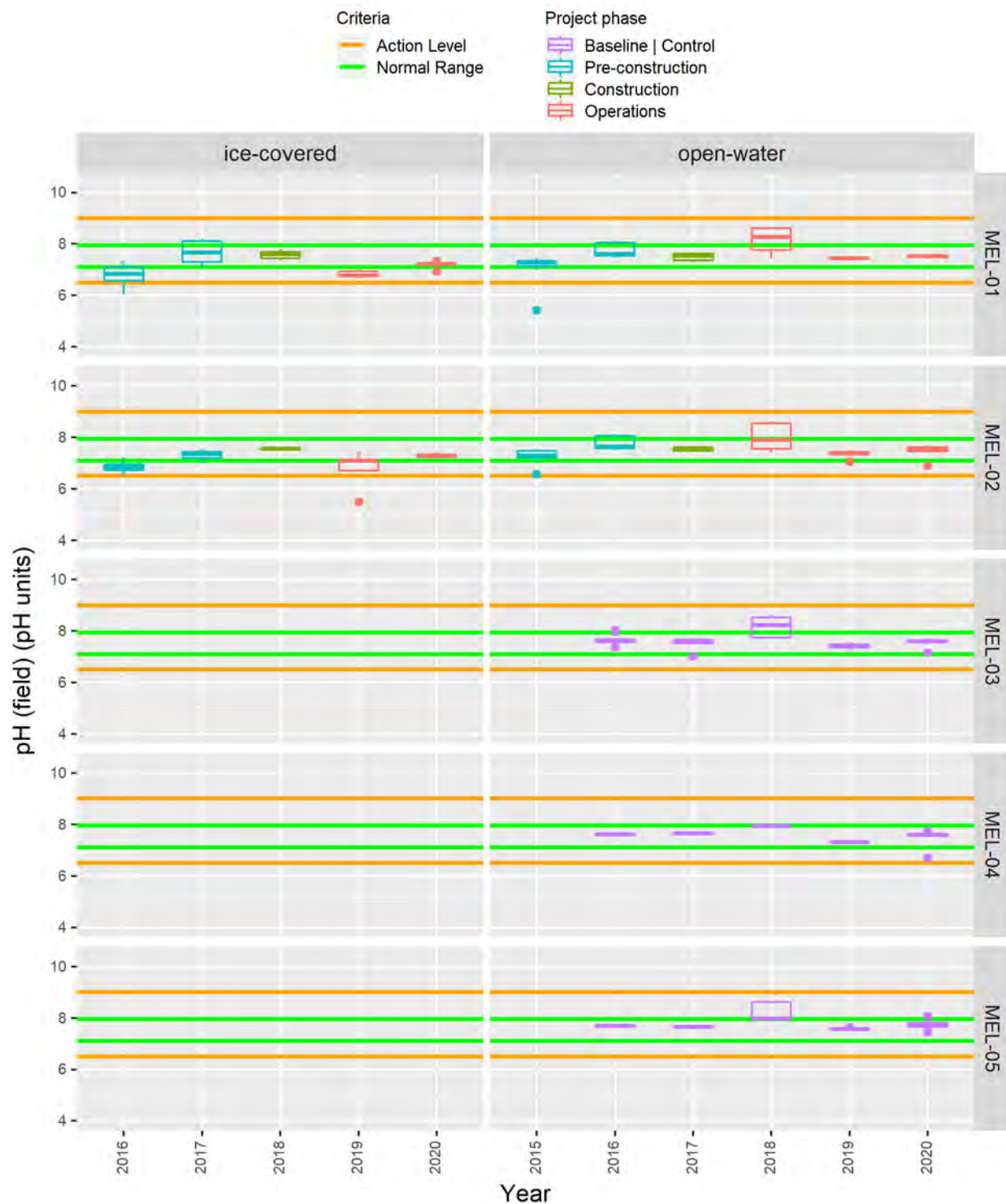


Figure C1-2. Specific conductivity ($\mu\text{S}/\text{cm}$)

Notes: FEIS predictions (where applicable) represent predicted water quality at the edge of the mixing zone in the near-field area (MEL-01).

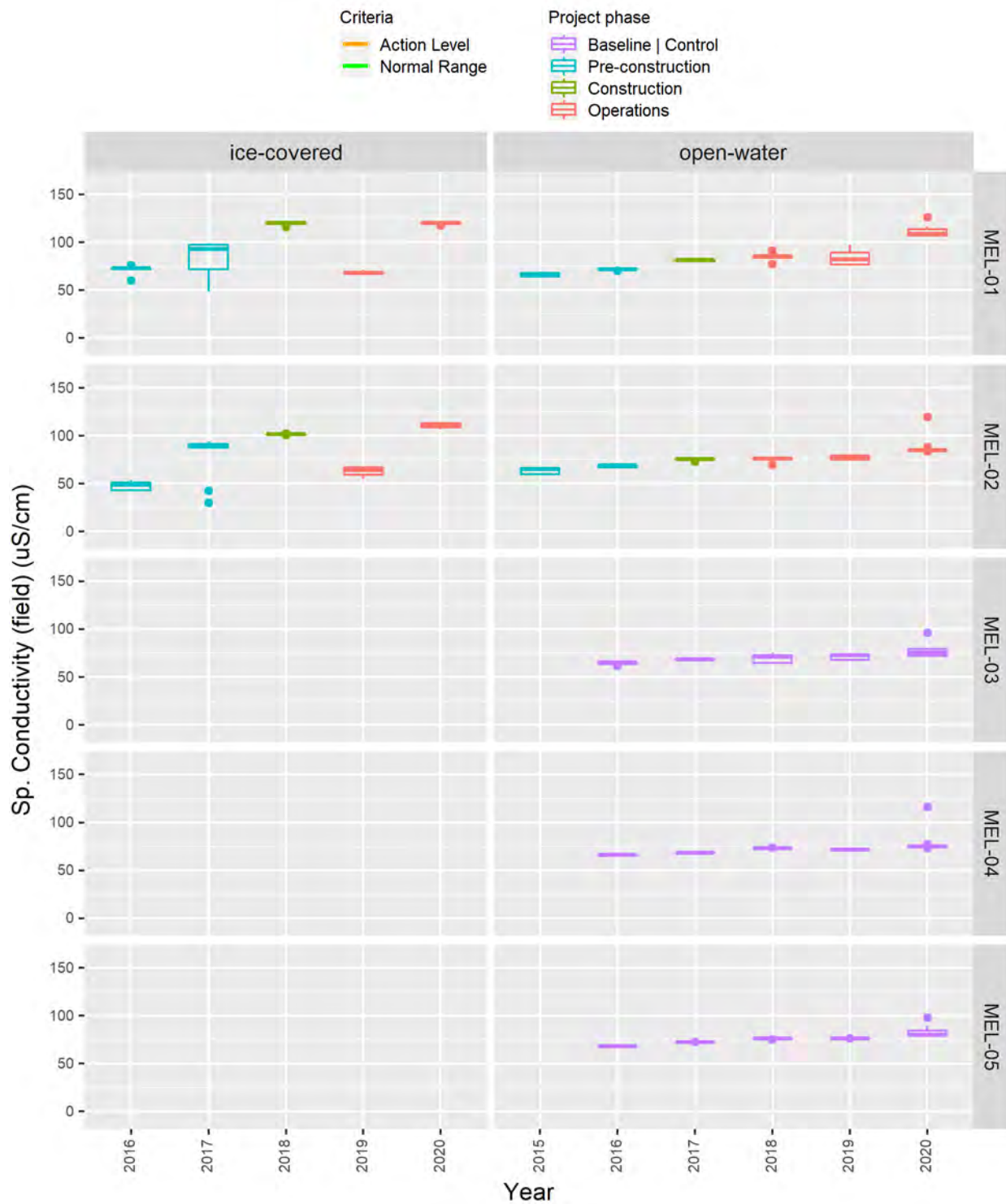


Figure C1-3. Lab-measured conductivity ($\mu\text{S}/\text{cm}$)

Notes: FEIS predictions (where applicable) represent predicted water quality at the edge of the mixing zone in the near-field area (MEL-01).

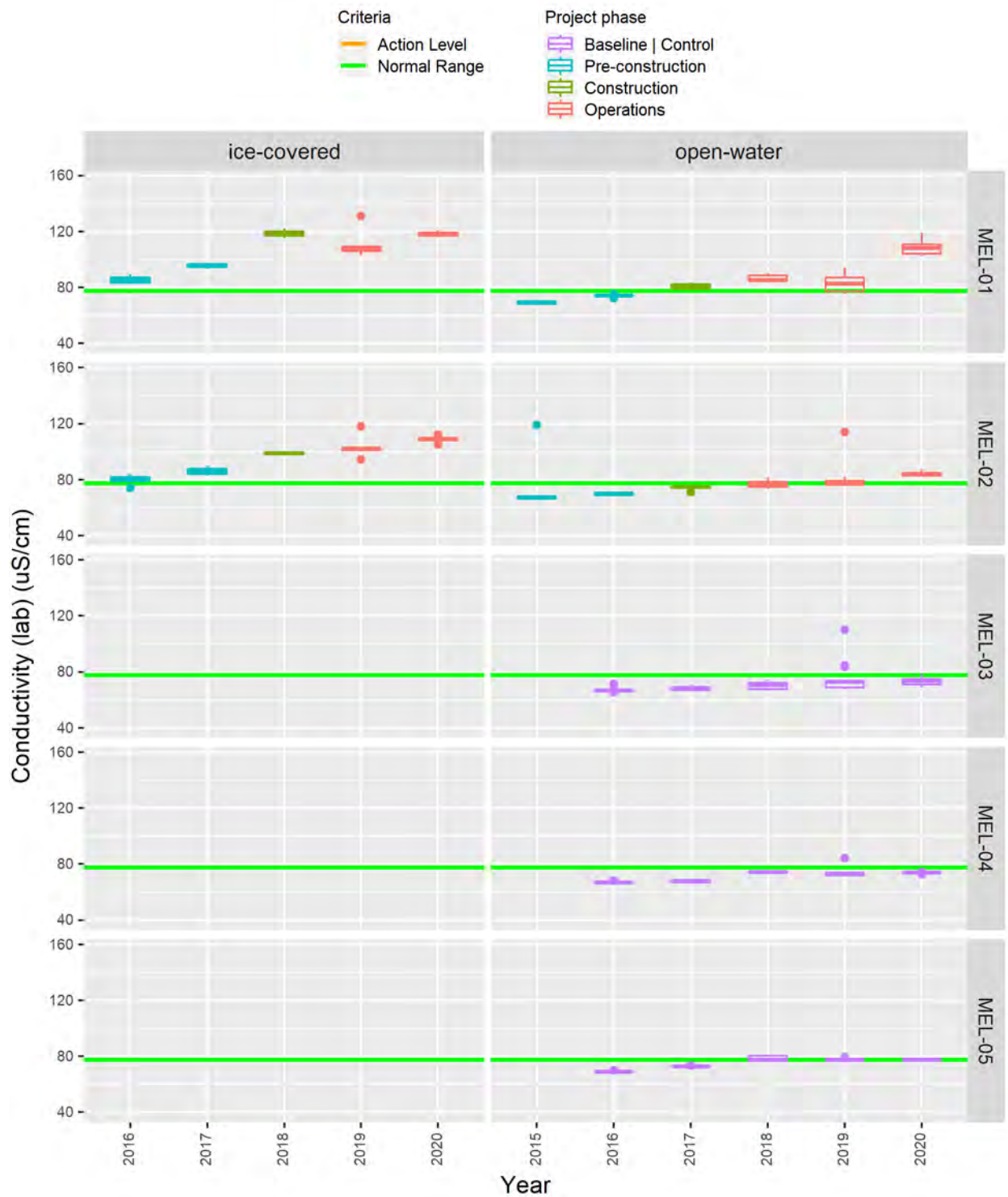


Figure C1-4. Hardness (mg/L)

Notes: FEIS predictions (where applicable) represent predicted water quality at the edge of the mixing zone in the near-field area (MEL-01).

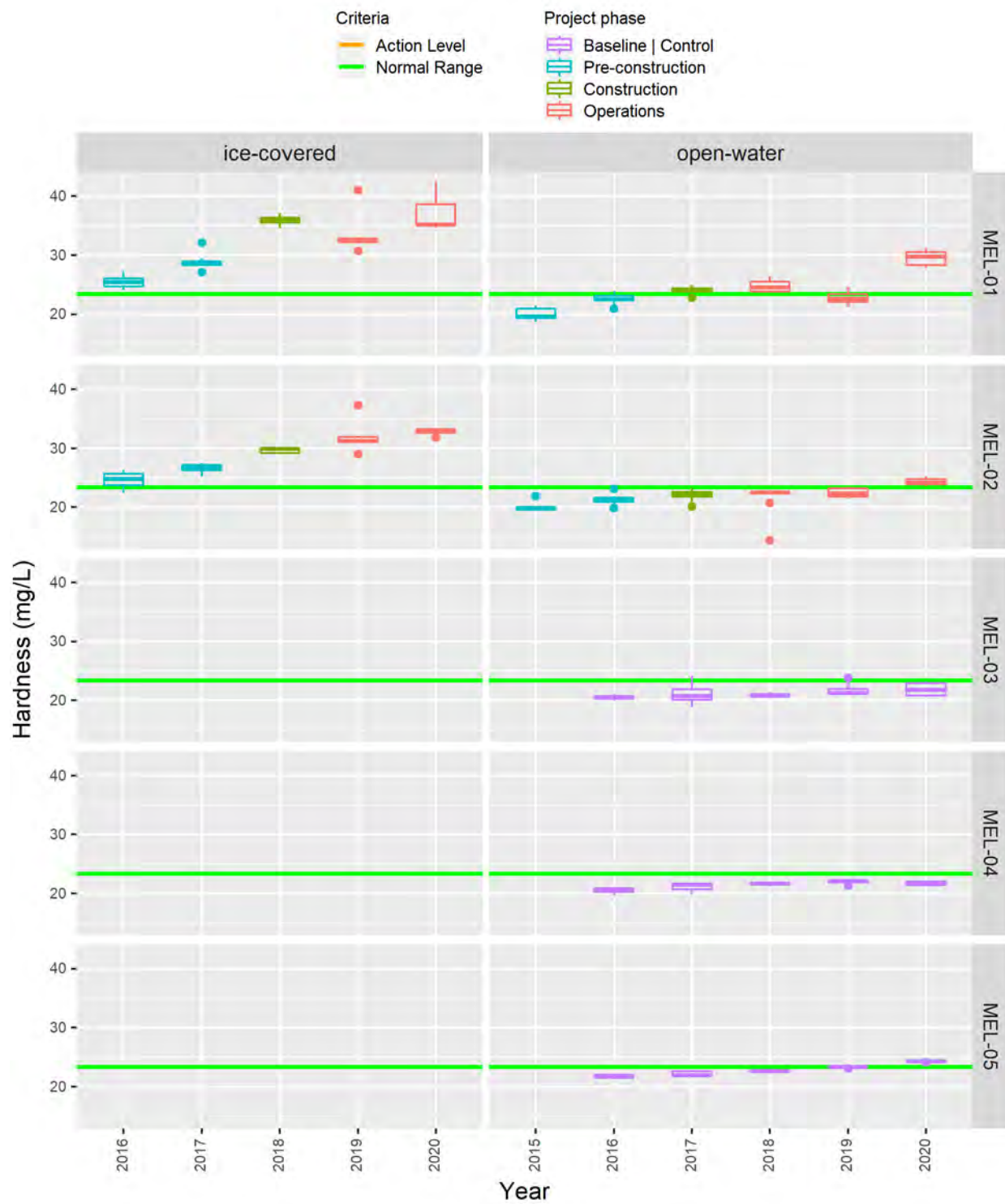


Figure C1-5. Lab measured pH

Notes: FEIS predictions (where applicable) represent predicted water quality at the edge of the mixing zone in the near-field area (MEL-01).

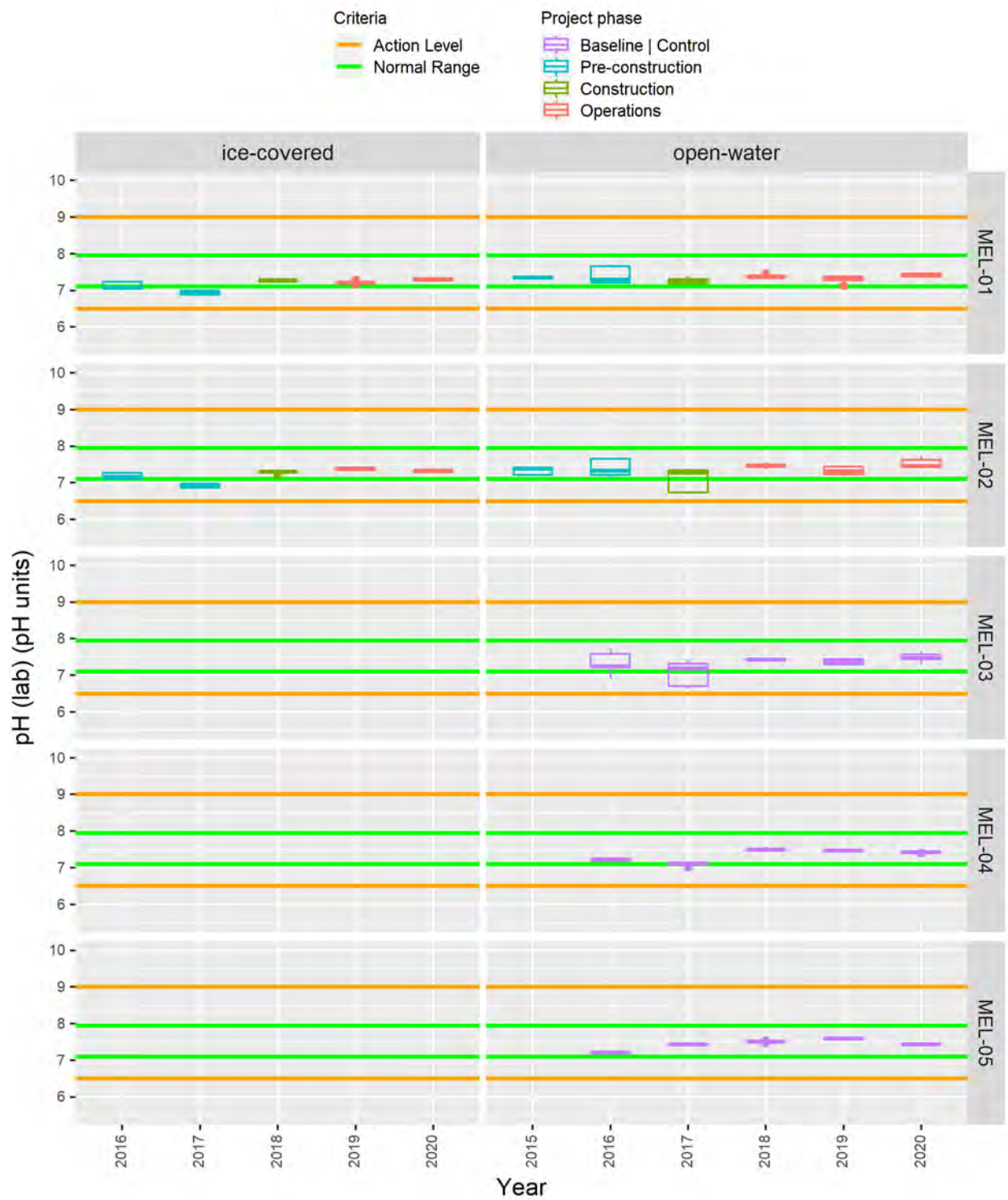


Figure C1-6. Total dissolved solids (mg/L)

Notes: FEIS predictions (where applicable) represent predicted water quality at the edge of the mixing zone in the near-field area (MEL-01).

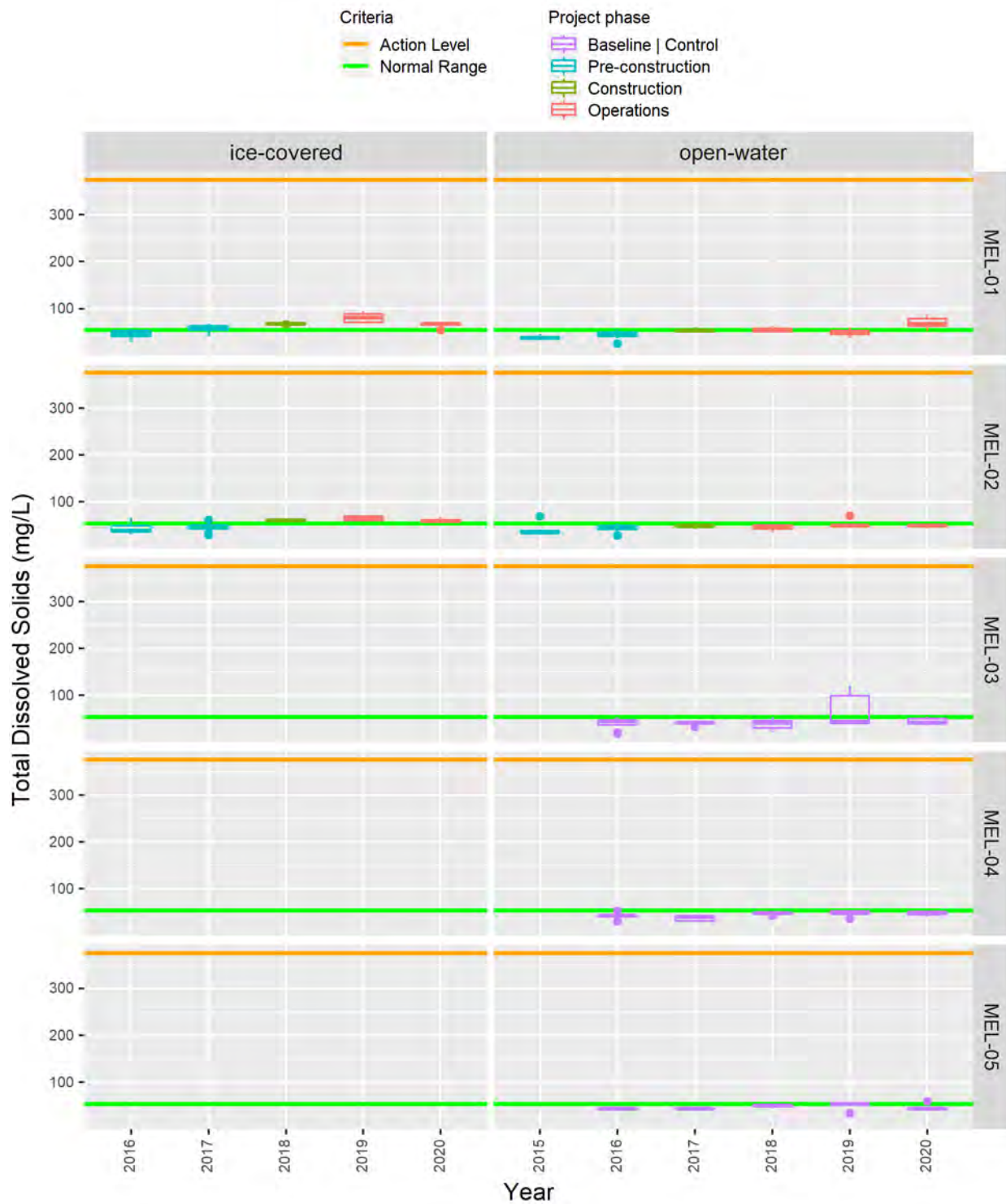


Figure C1-7. Calculated total dissolved solids (mg/L)

Notes: FEIS predictions (where applicable) represent predicted water quality at the edge of the mixing zone in the near-field area (MEL-01).

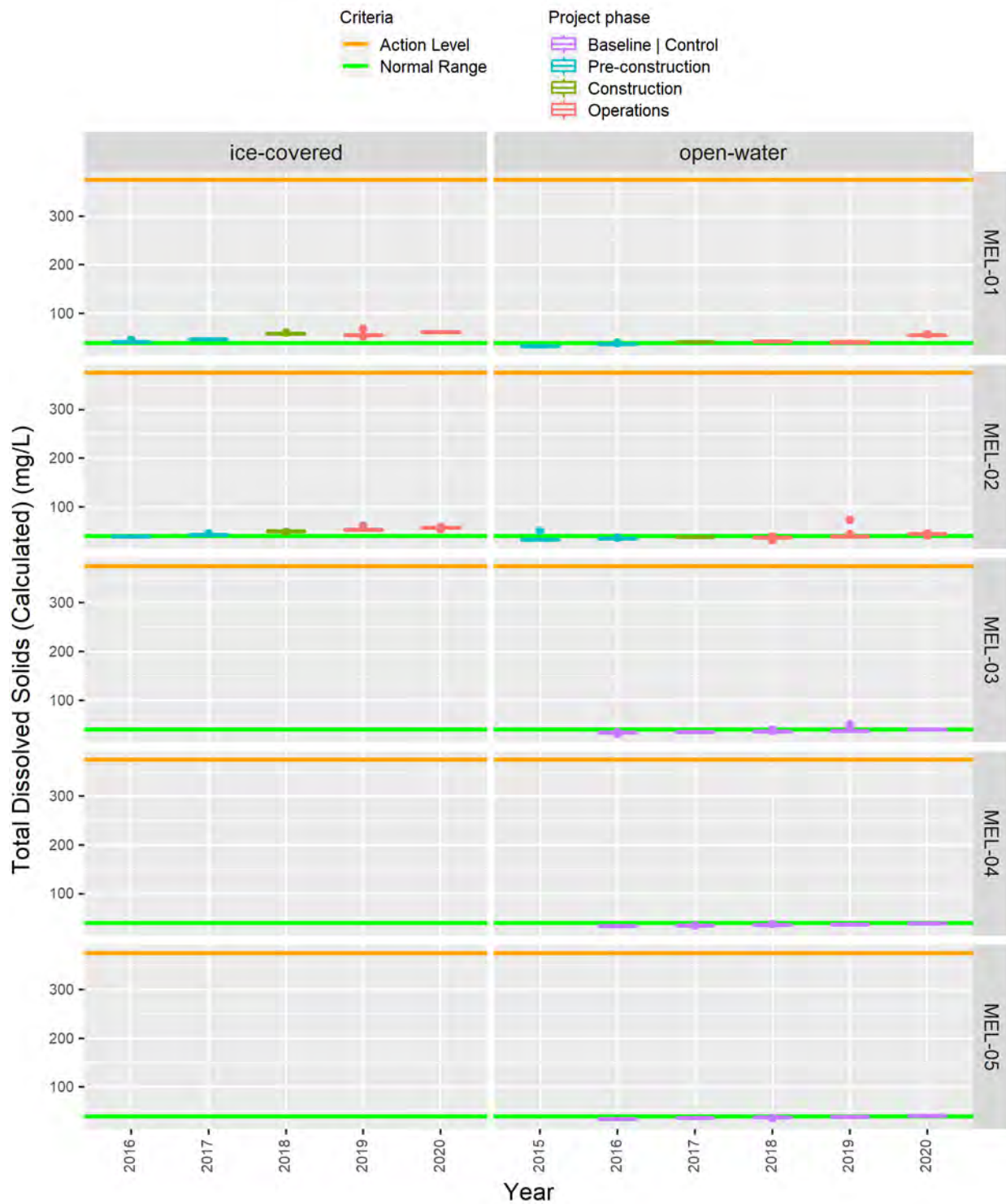


Figure C1-8. Total suspended solids (mg/L)

Notes: FEIS predictions (where applicable) represent predicted water quality at the edge of the mixing zone in the near-field area (MEL-01).

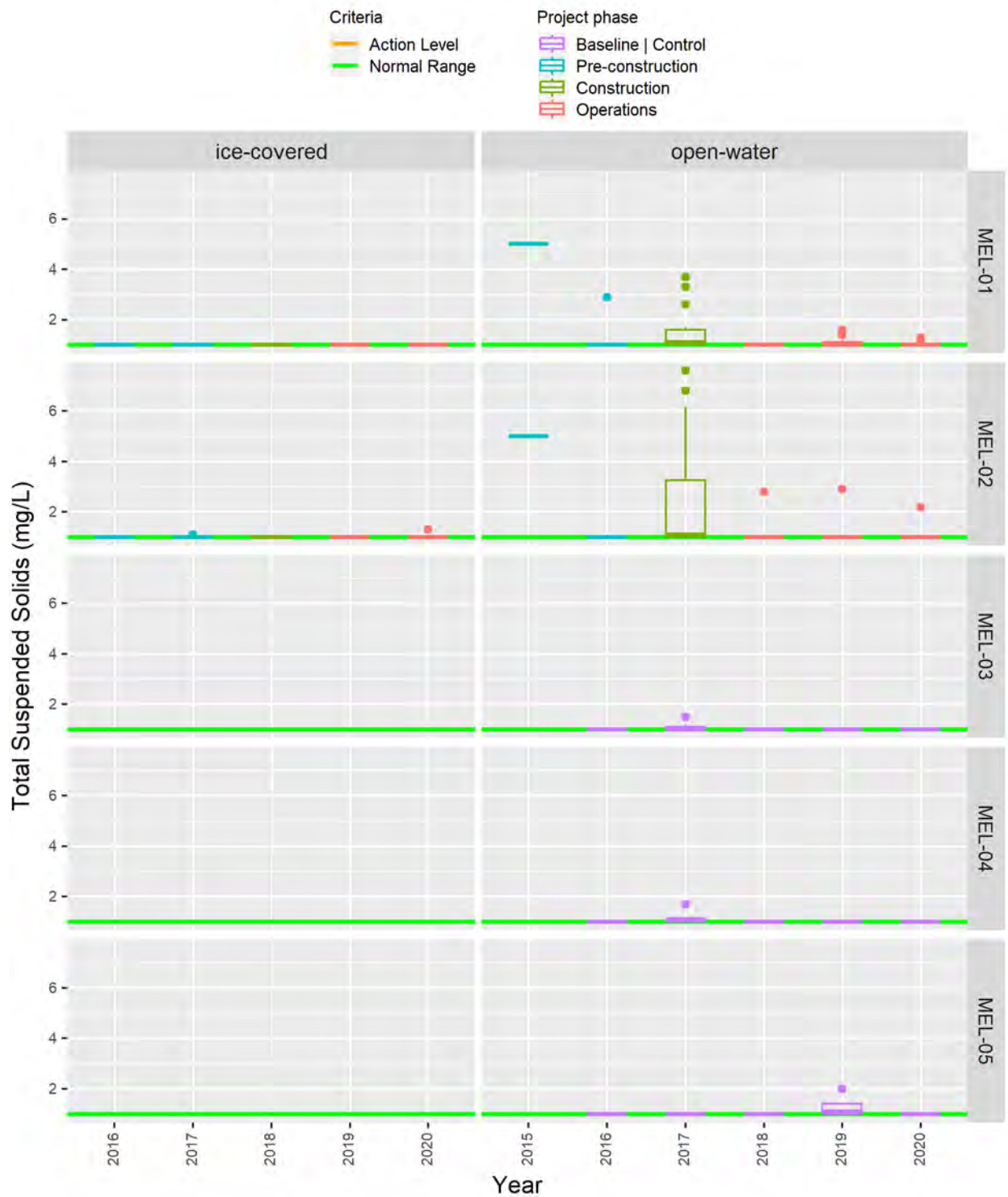


Figure C1-9. Lab measured turbidity (NTU)

Notes: FEIS predictions (where applicable) represent predicted water quality at the edge of the mixing zone in the near-field area (MEL-01).

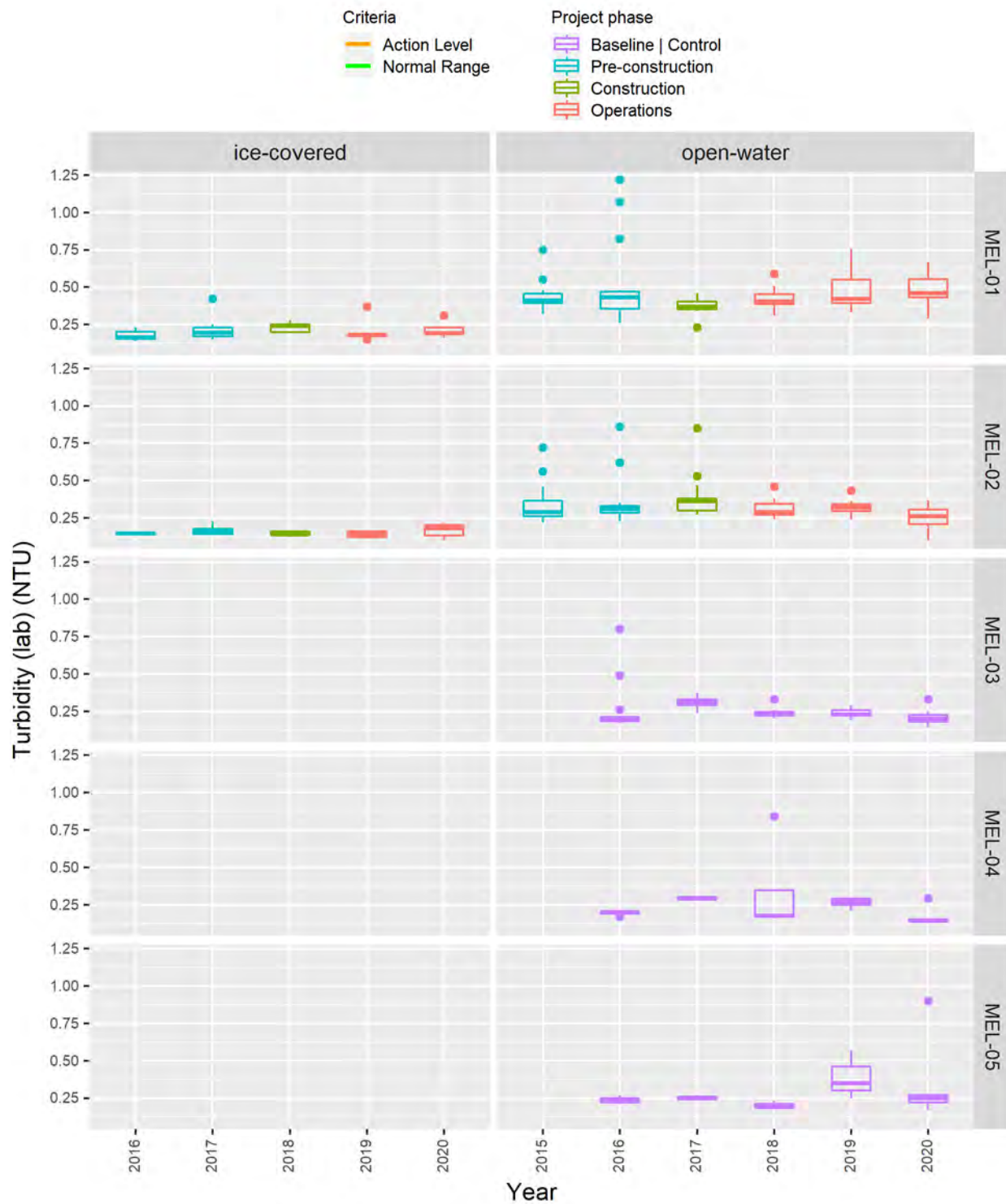


Figure C1-10. Bicarbonate alkalinity (mg/L)

Notes: FEIS predictions (where applicable) represent predicted water quality at the edge of the mixing zone in the near-field area (MEL-01).

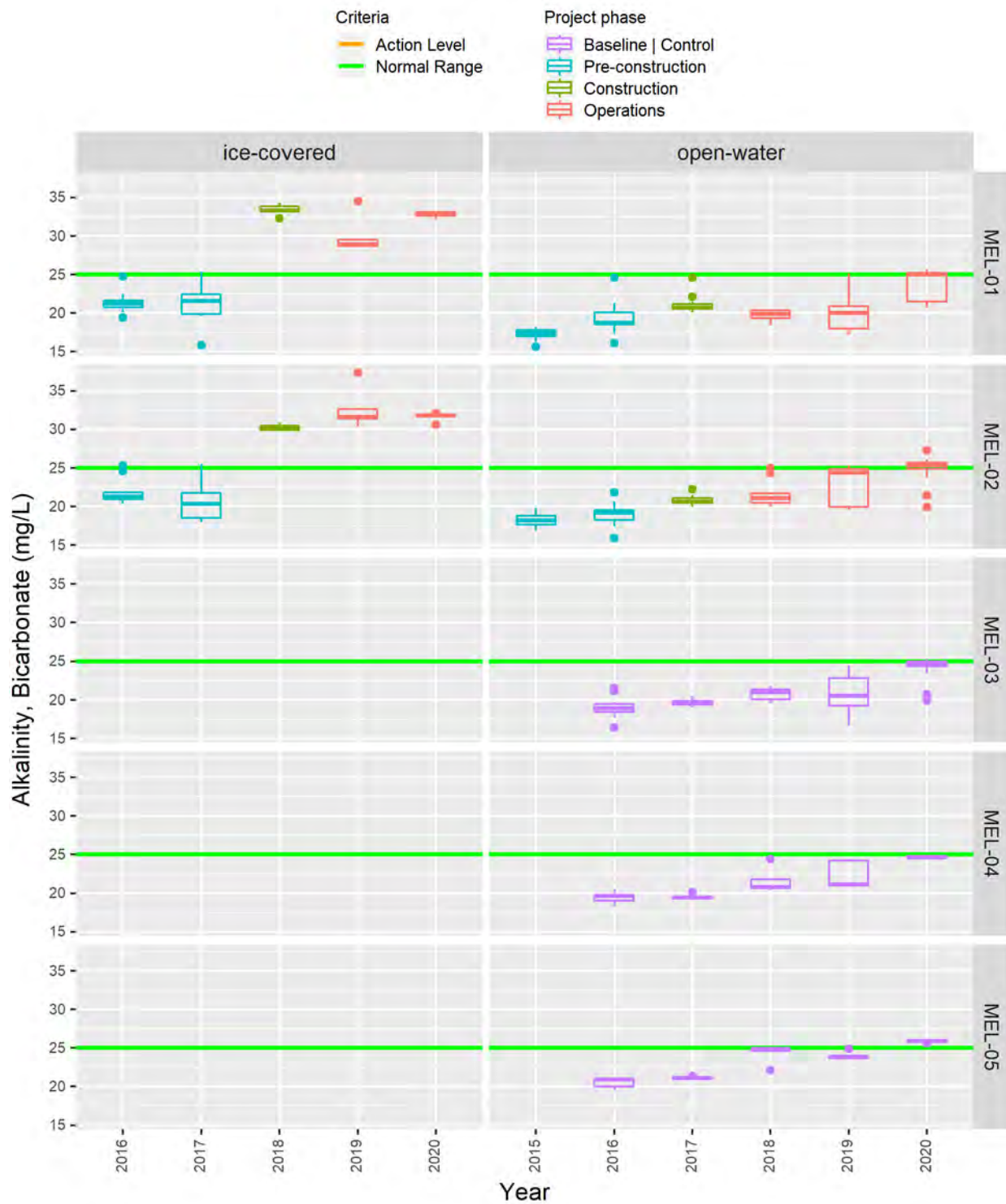


Figure C1-11. Total alkalinity (mg/L)

Notes: FEIS predictions (where applicable) represent predicted water quality at the edge of the mixing zone in the near-field area (MEL-01).

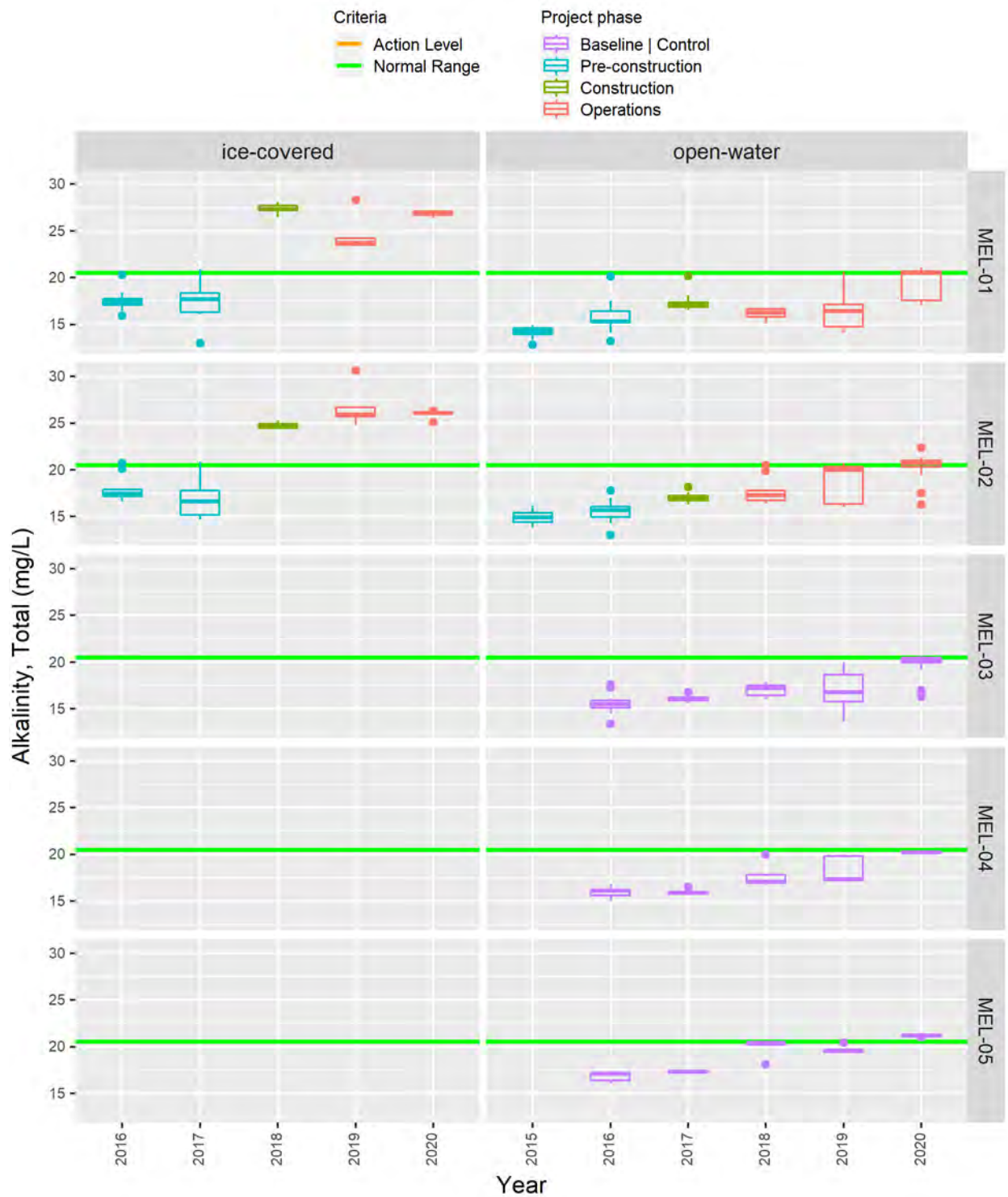


Figure C1-12. Total calcium ($\mu\text{g/L}$)

Notes: FEIS predictions (where applicable) represent predicted water quality at the edge of the mixing zone in the near-field area (MEL-01).

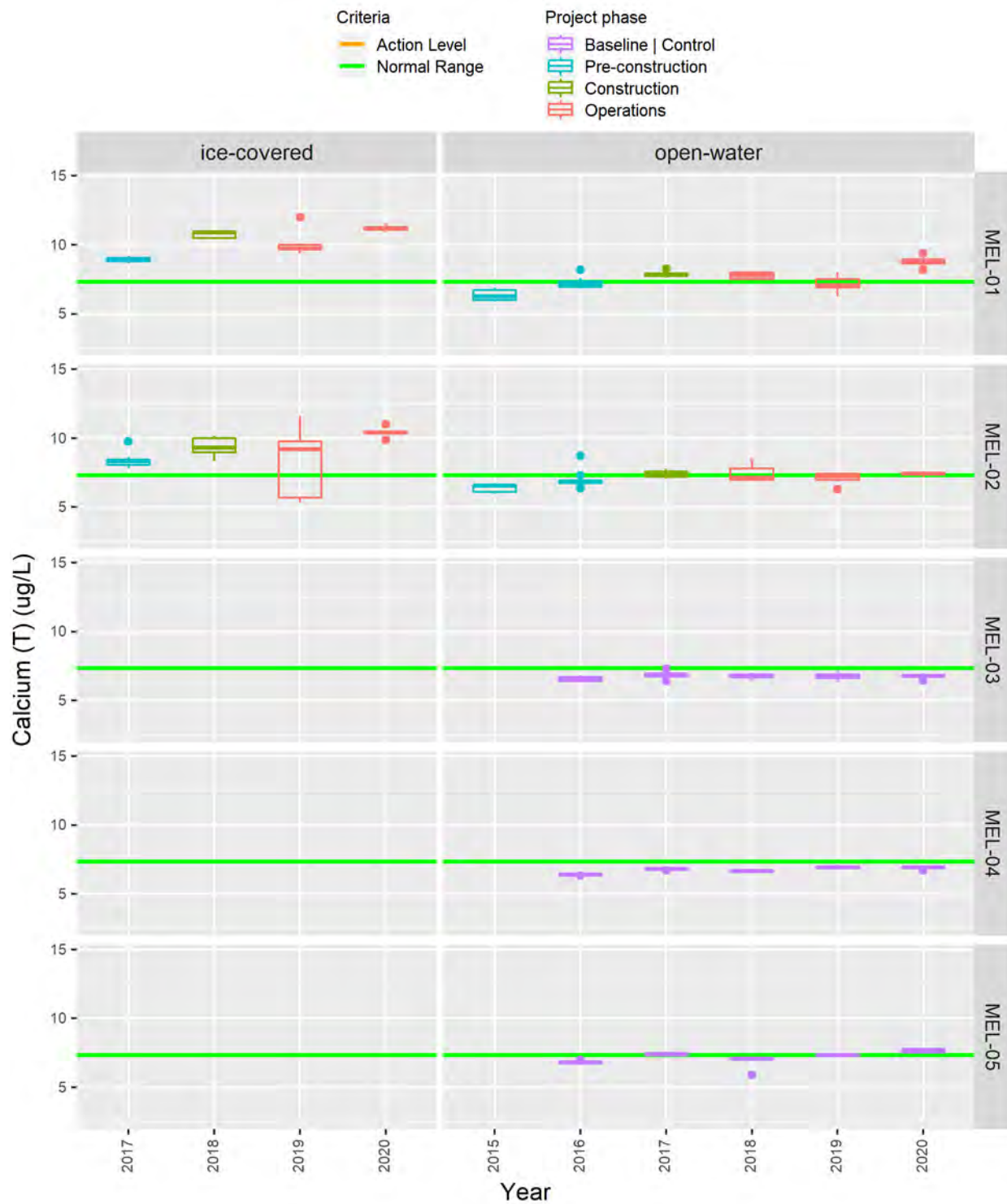


Figure C1-13. Total magnesium (mg/L)

Notes: FEIS predictions (where applicable) represent predicted water quality at the edge of the mixing zone in the near-field area (MEL-01).

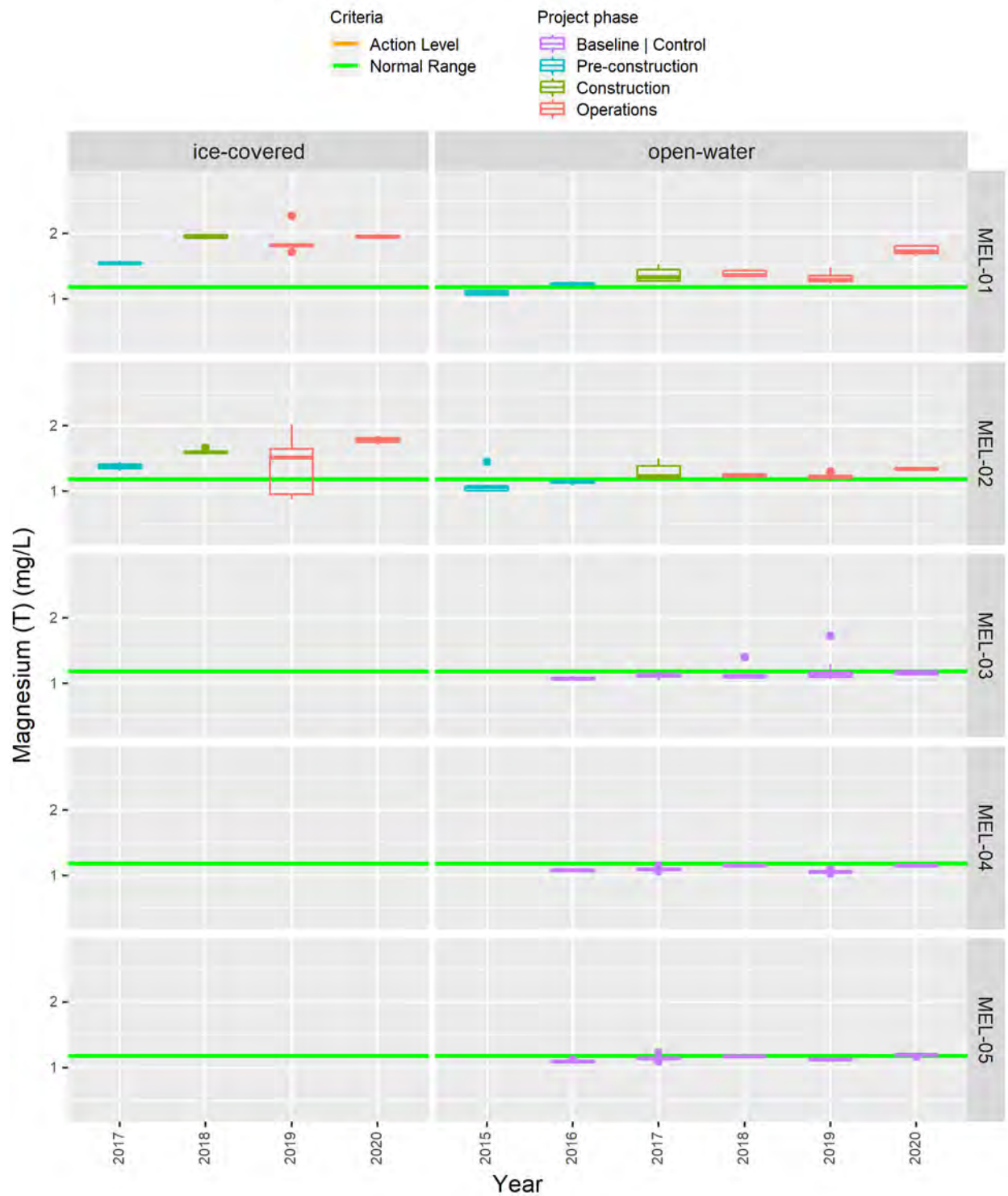


Figure C1-14. Total potassium (mg/L)

Notes: FEIS predictions (where applicable) represent predicted water quality at the edge of the mixing zone in the near-field area (MEL-01).

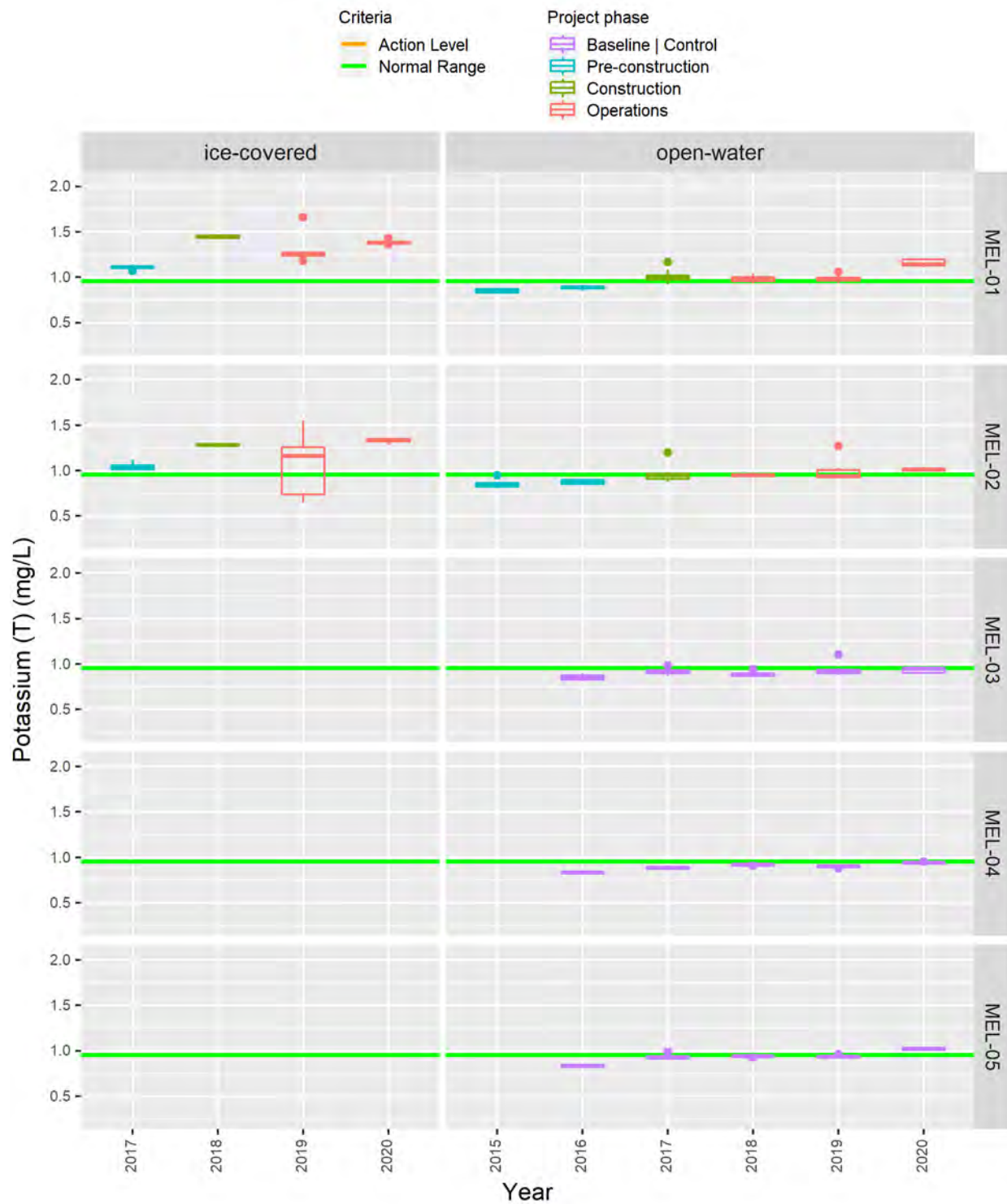


Figure C1-15. Total sodium (mg/L)

Notes: FEIS predictions (where applicable) represent predicted water quality at the edge of the mixing zone in the near-field area (MEL-01).

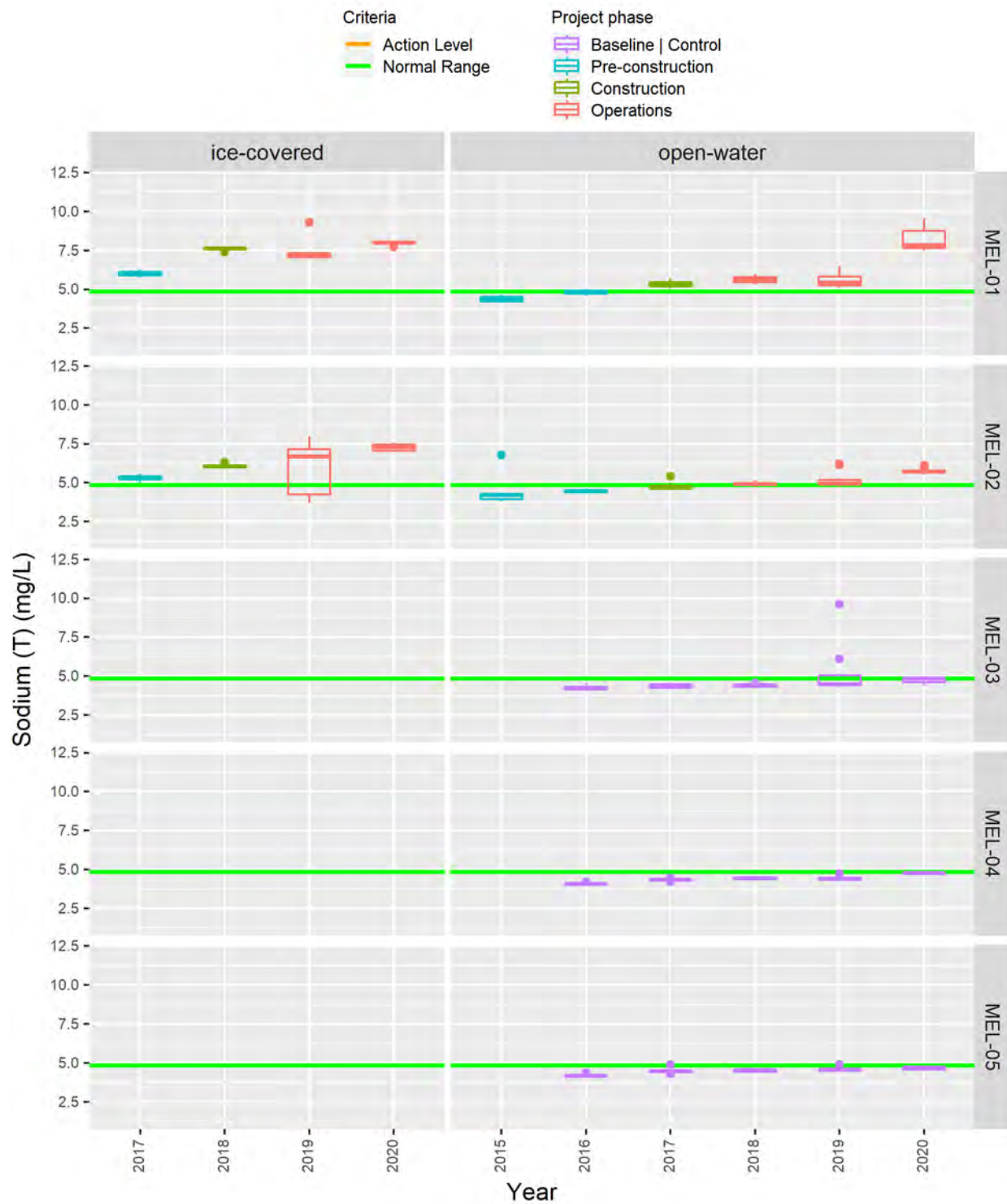


Figure C1-16. Chloride (mg/L)

Notes: FEIS predictions (where applicable) represent predicted water quality at the edge of the mixing zone in the near-field area (MEL-01).

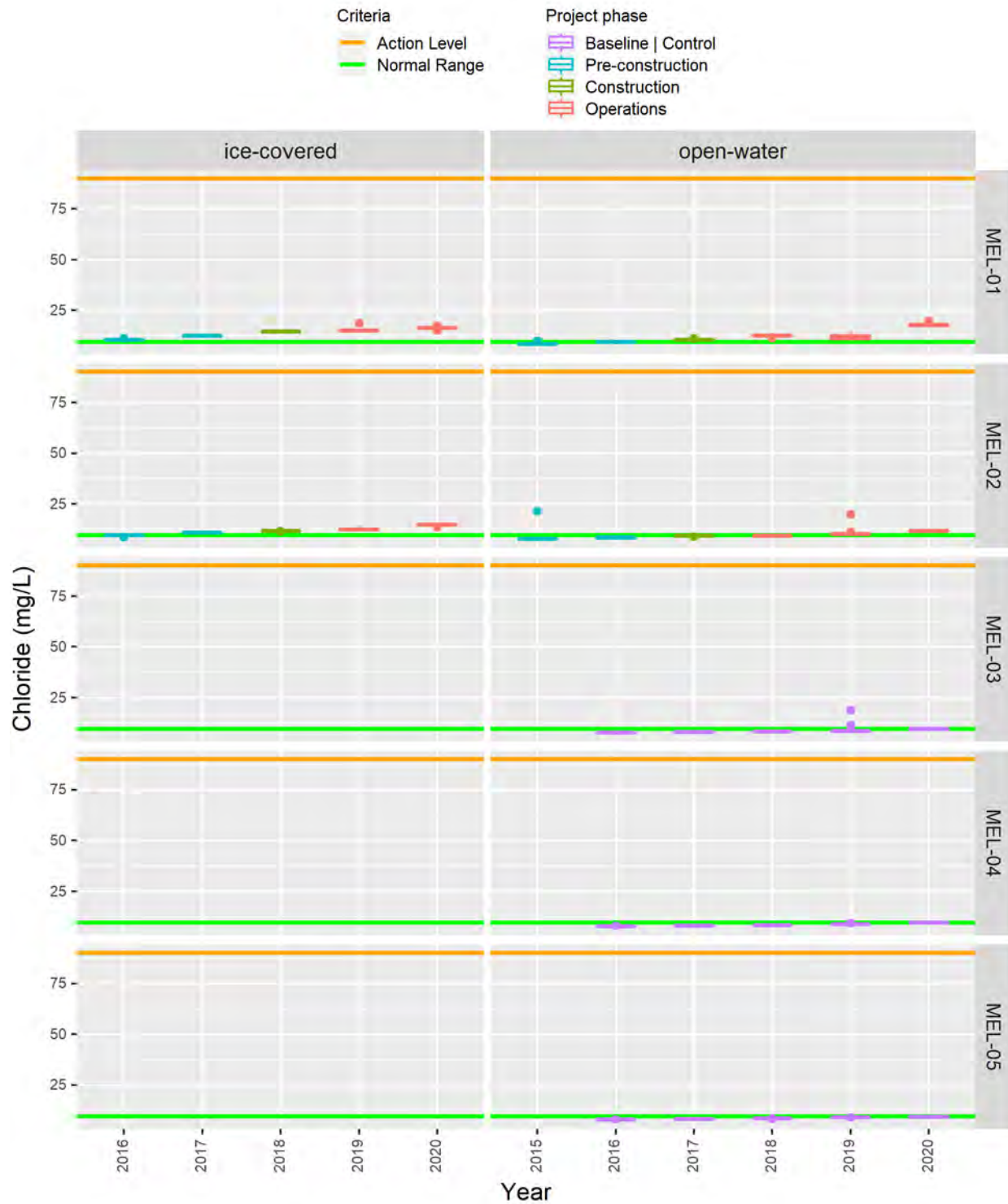


Figure C1-17. Fluoride (mg/L)

Notes: FEIS predictions (where applicable) represent predicted water quality at the edge of the mixing zone in the near-field area (MEL-01).

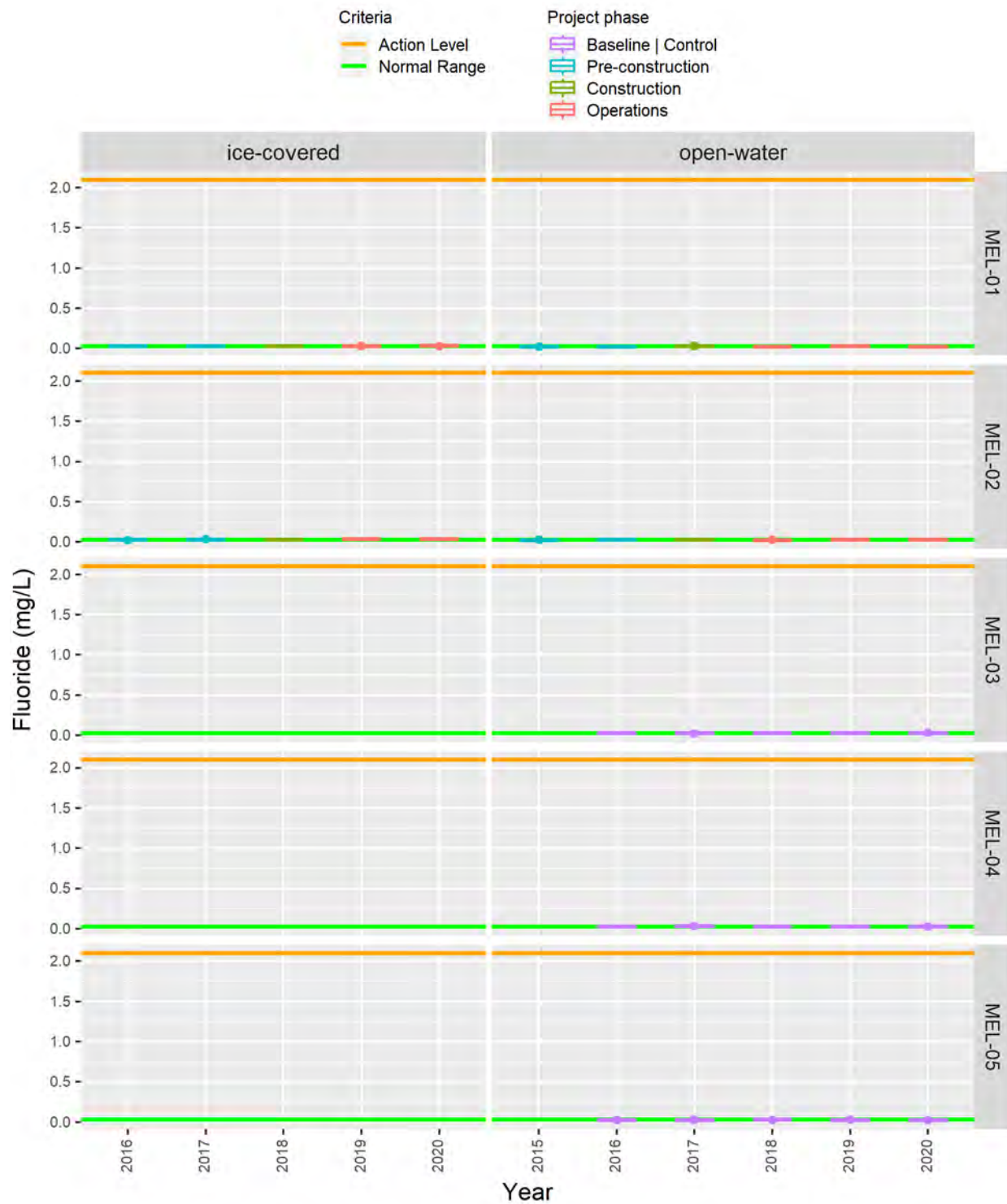


Figure C1-18. Ammonia (as nitrogen) (mg/L)

Notes: FEIS predictions (where applicable) represent predicted water quality at the edge of the mixing zone in the near-field area (MEL-01).

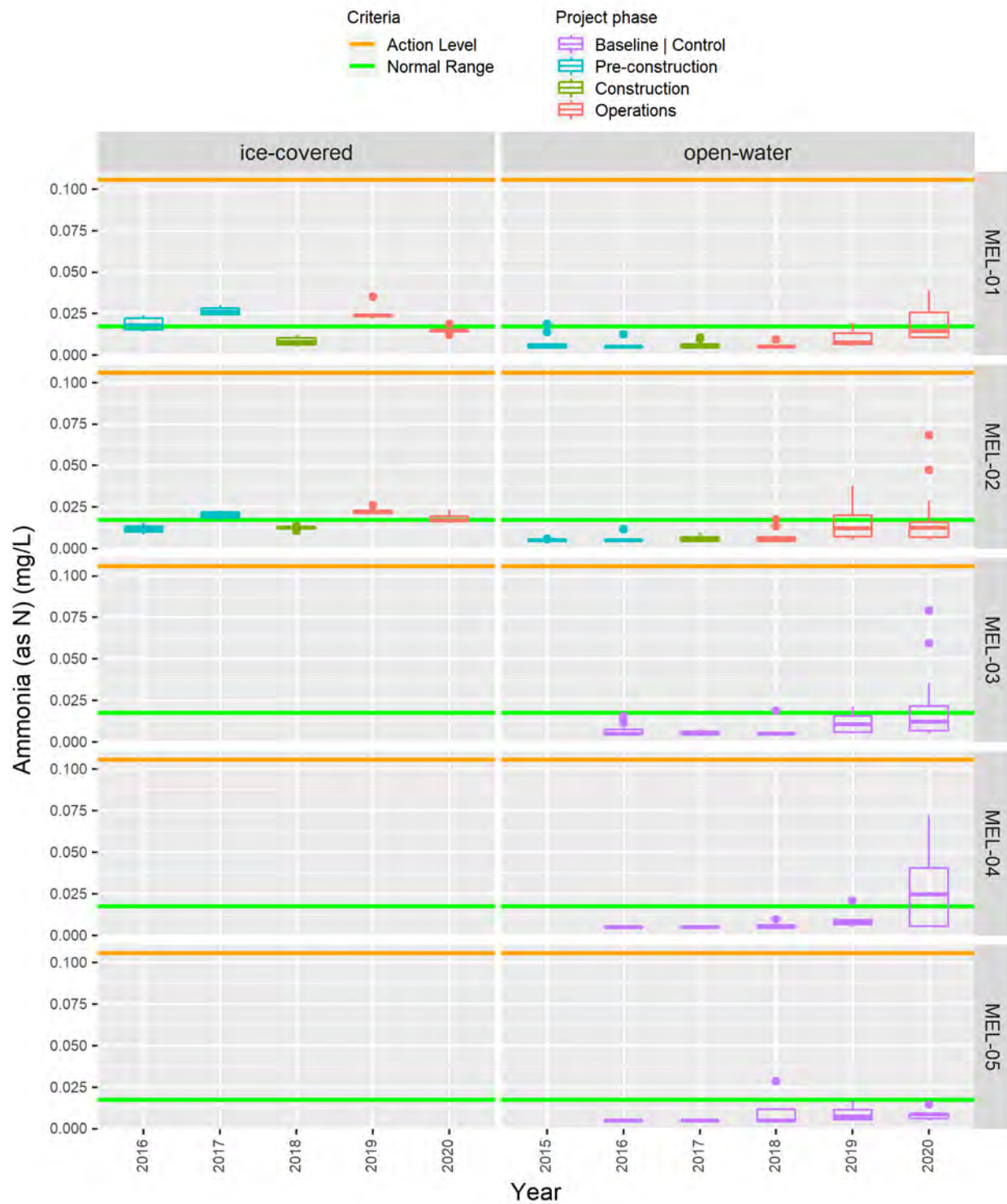


Figure C1-19. Nitrate (as nitrogen) (mg/L)

Notes: FEIS predictions (where applicable) represent predicted water quality at the edge of the mixing zone in the near-field area (MEL-01).

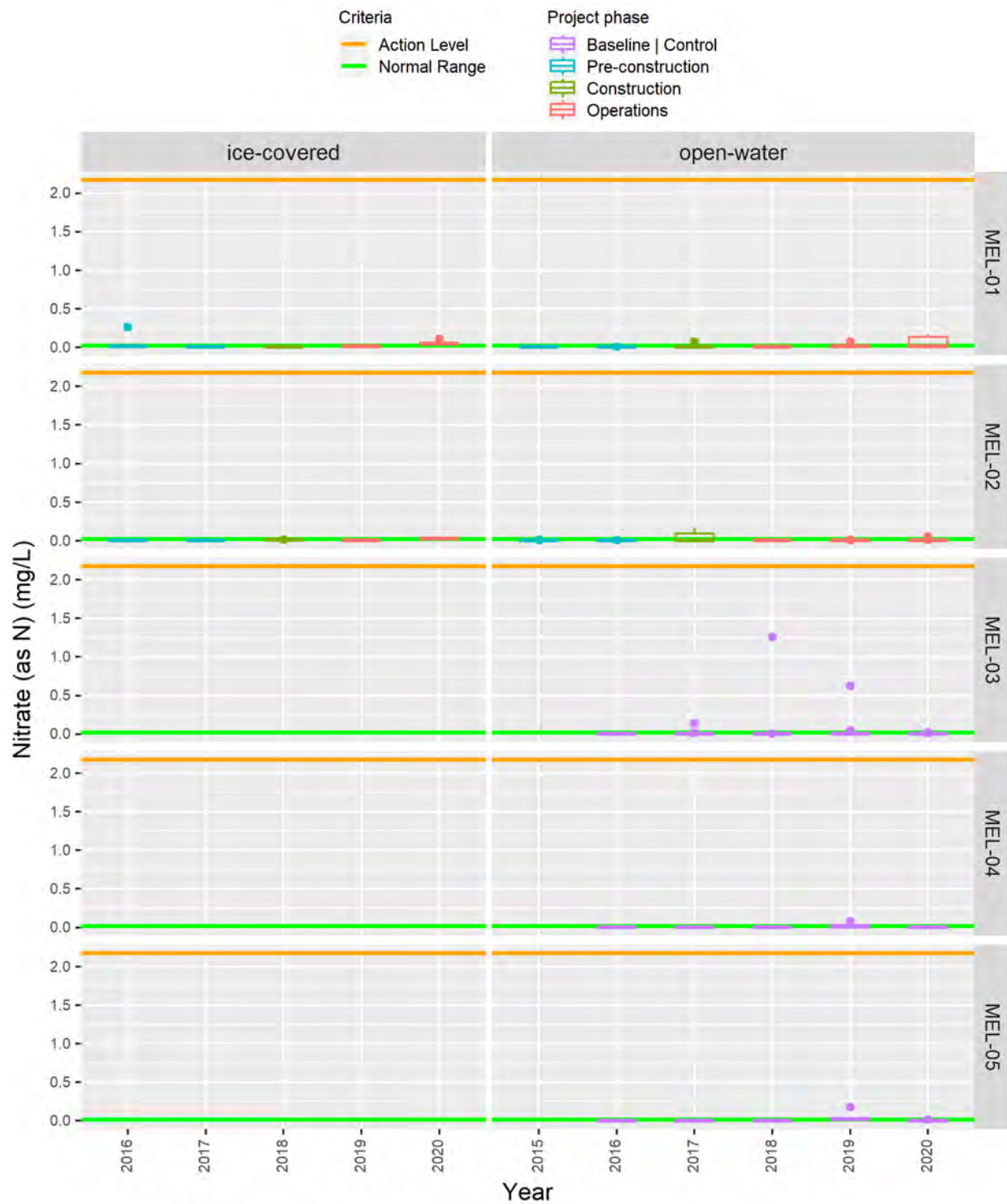


Figure C1-20. Nitrate and nitrite (as nitrogen) (mg/L)

Notes: FEIS predictions (where applicable) represent predicted water quality at the edge of the mixing zone in the near-field area (MEL-01).

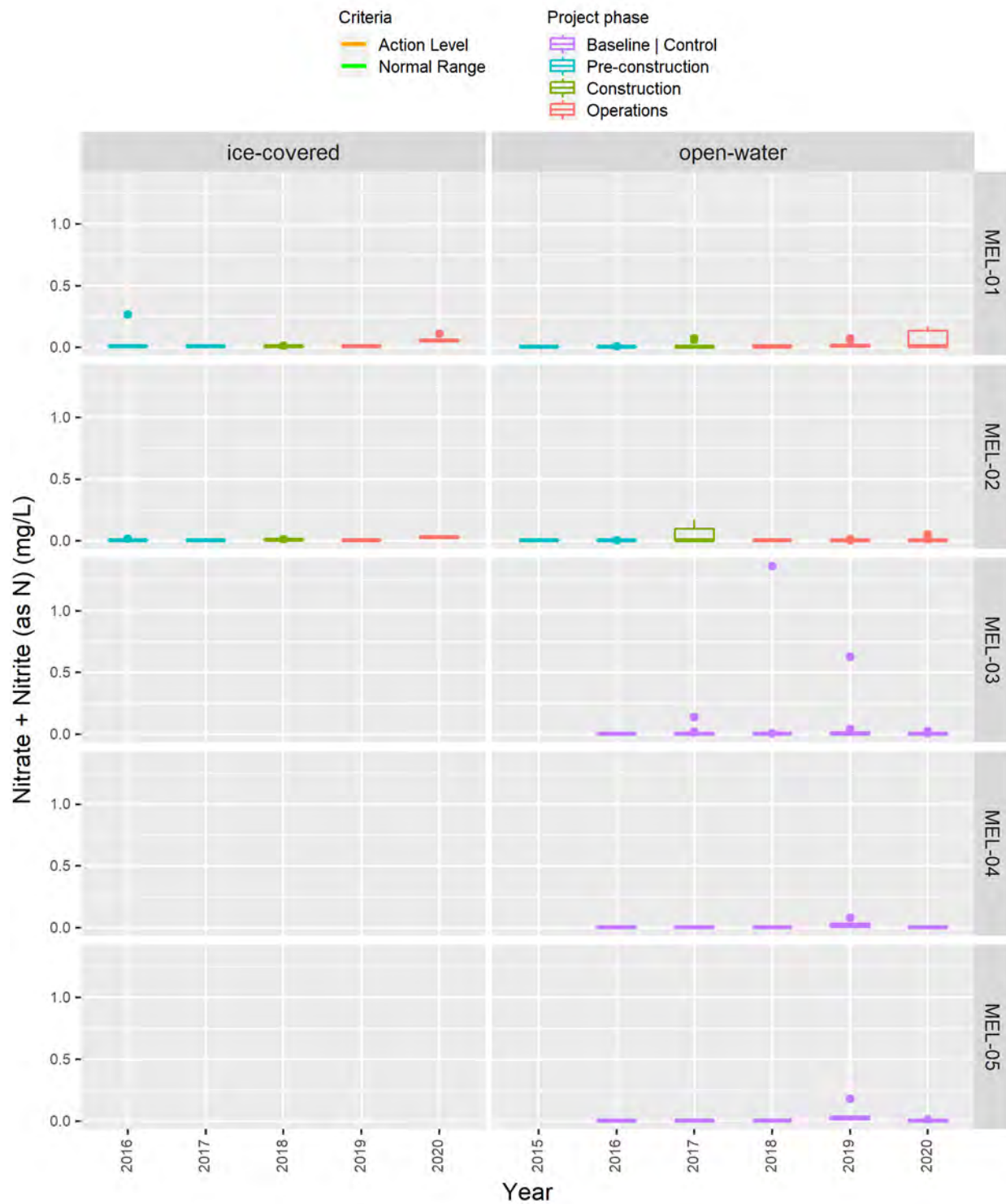


Figure C1-21. Total Kjeldahl nitrogen (mg/L)

Notes: FEIS predictions (where applicable) represent predicted water quality at the edge of the mixing zone in the near-field area (MEL-01).

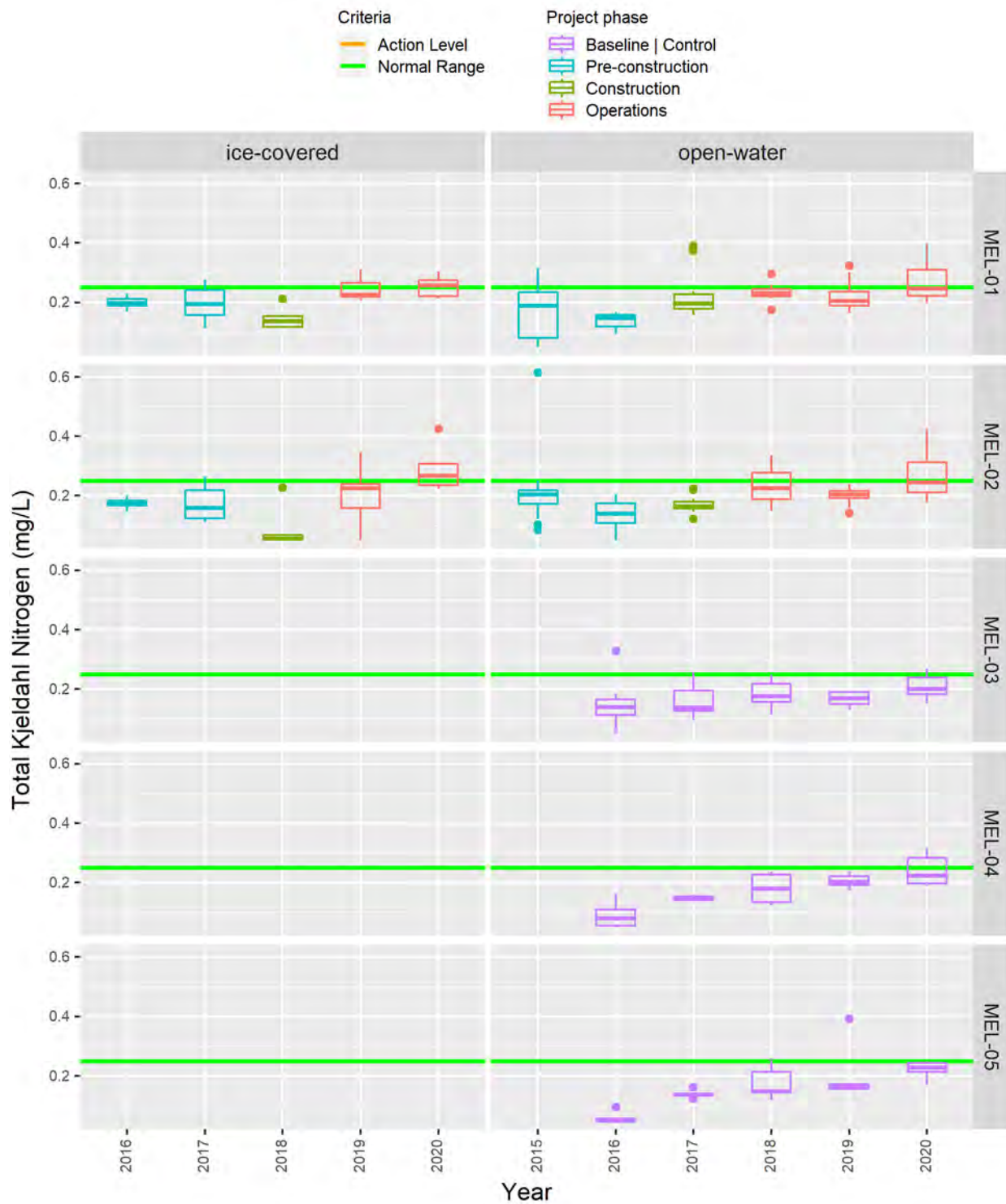


Figure C1-22. Sulphate (mg/L)

Notes: FEIS predictions (where applicable) represent predicted water quality at the edge of the mixing zone in the near-field area (MEL-01).

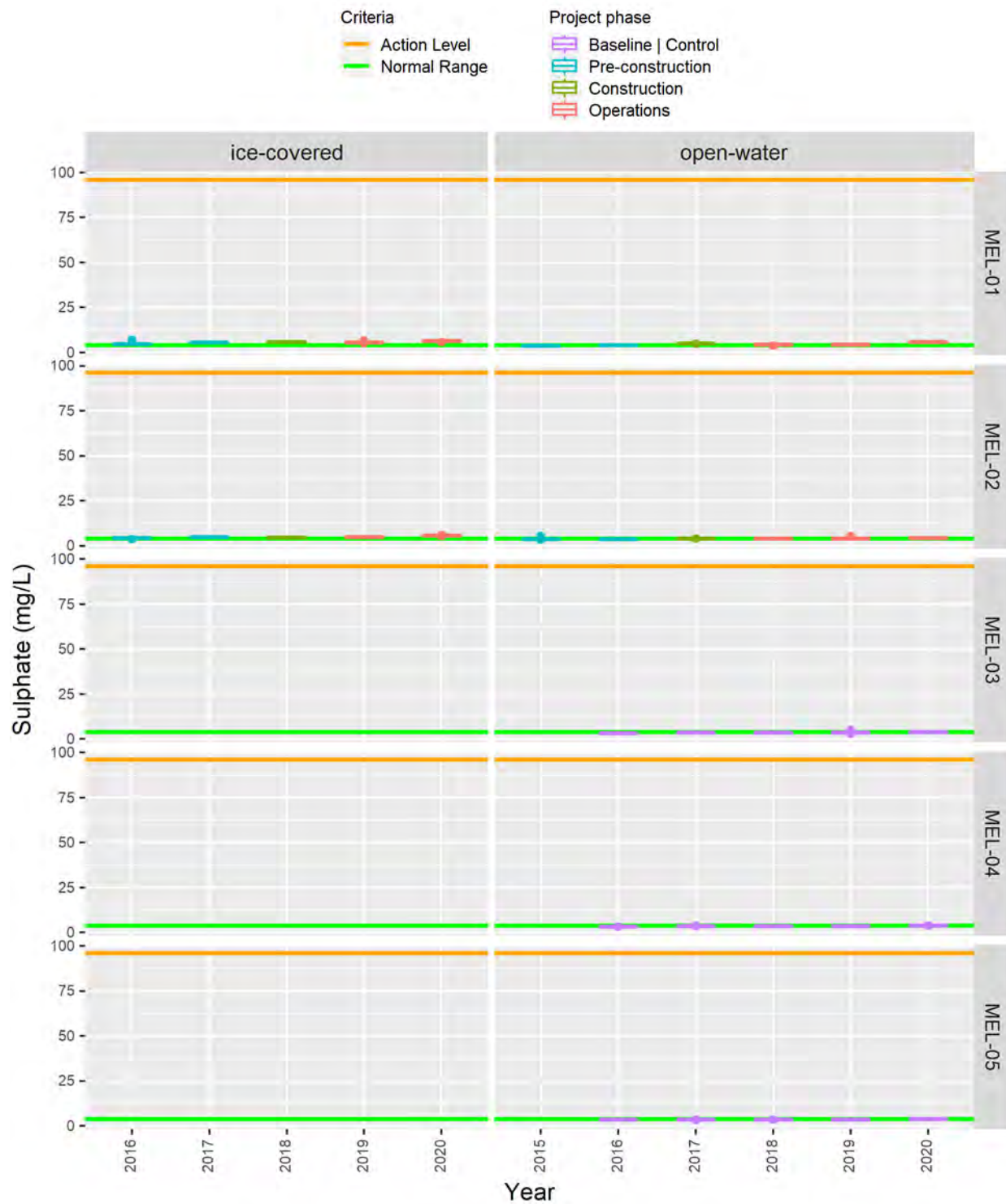


Figure C1-23. Total phosphorus (µg/)

Notes: FEIS predictions (where applicable) represent predicted water quality at the edge of the mixing zone in the near-field area (MEL-01).

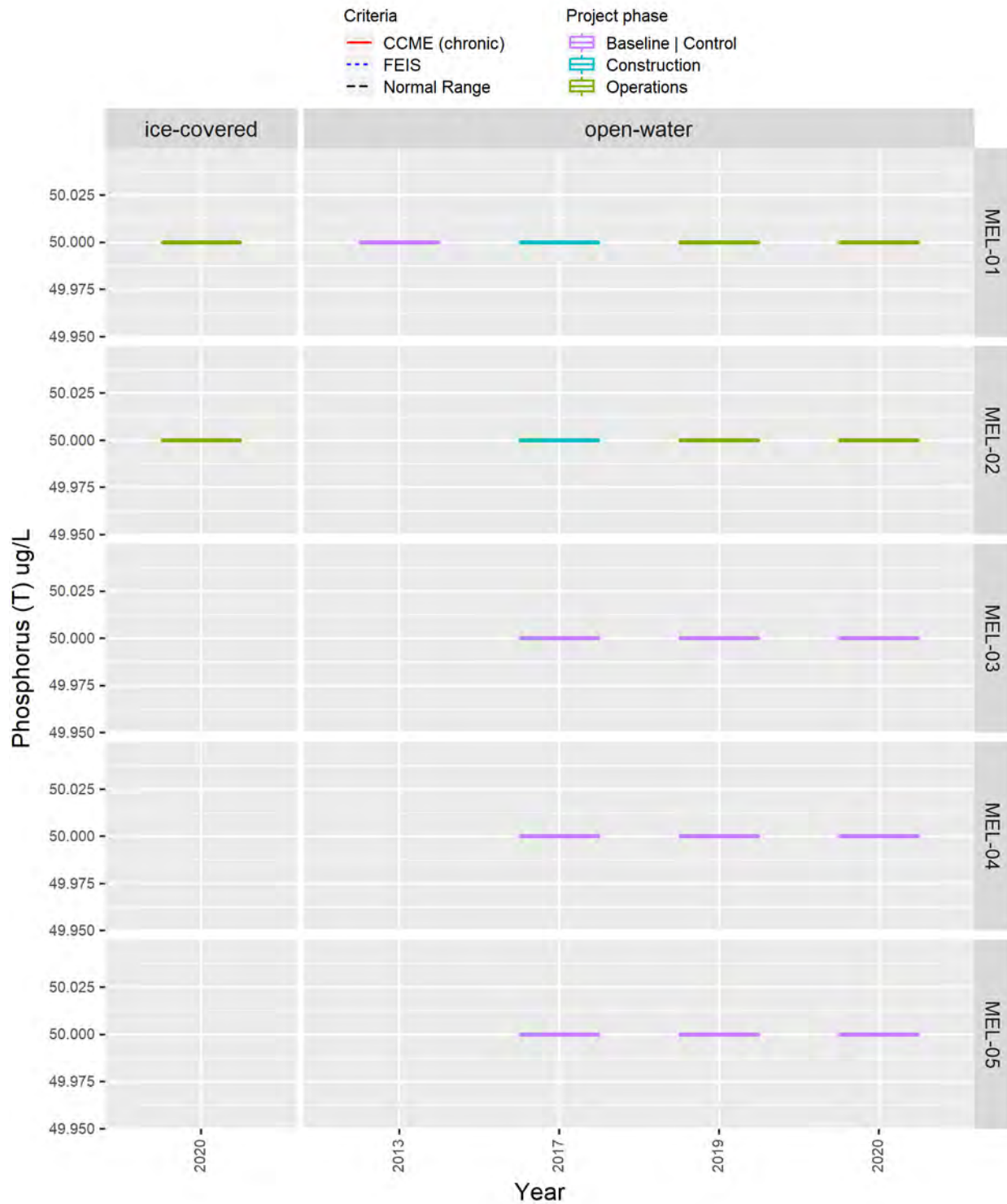


Figure C1-24. Dissolved organic carbon (mg/L)

Notes: FEIS predictions (where applicable) represent predicted water quality at the edge of the mixing zone in the near-field area (MEL-01).

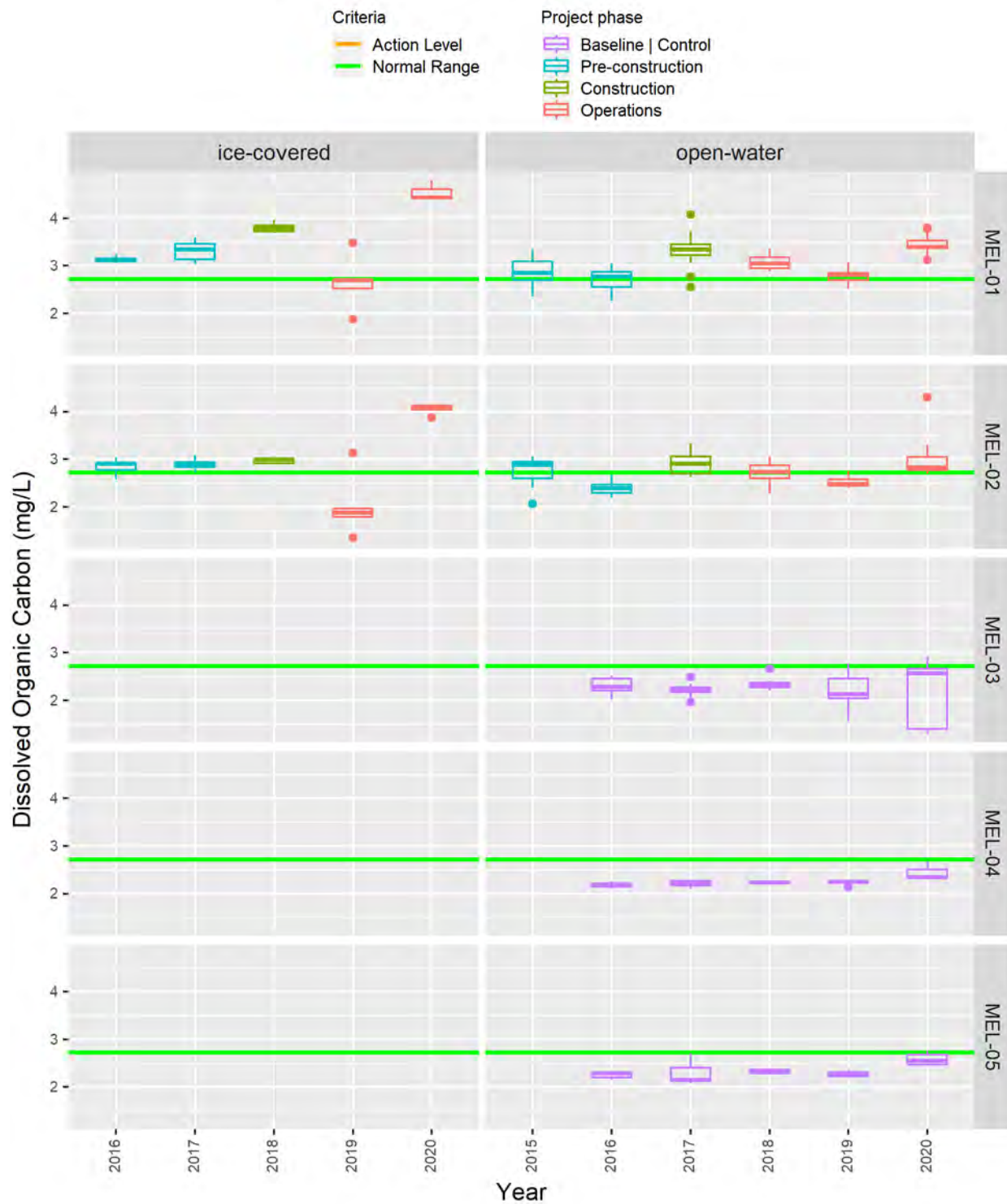


Figure C1-25. Total organic carbon (mg/L)

Notes: FEIS predictions (where applicable) represent predicted water quality at the edge of the mixing zone in the near-field area (MEL-01).

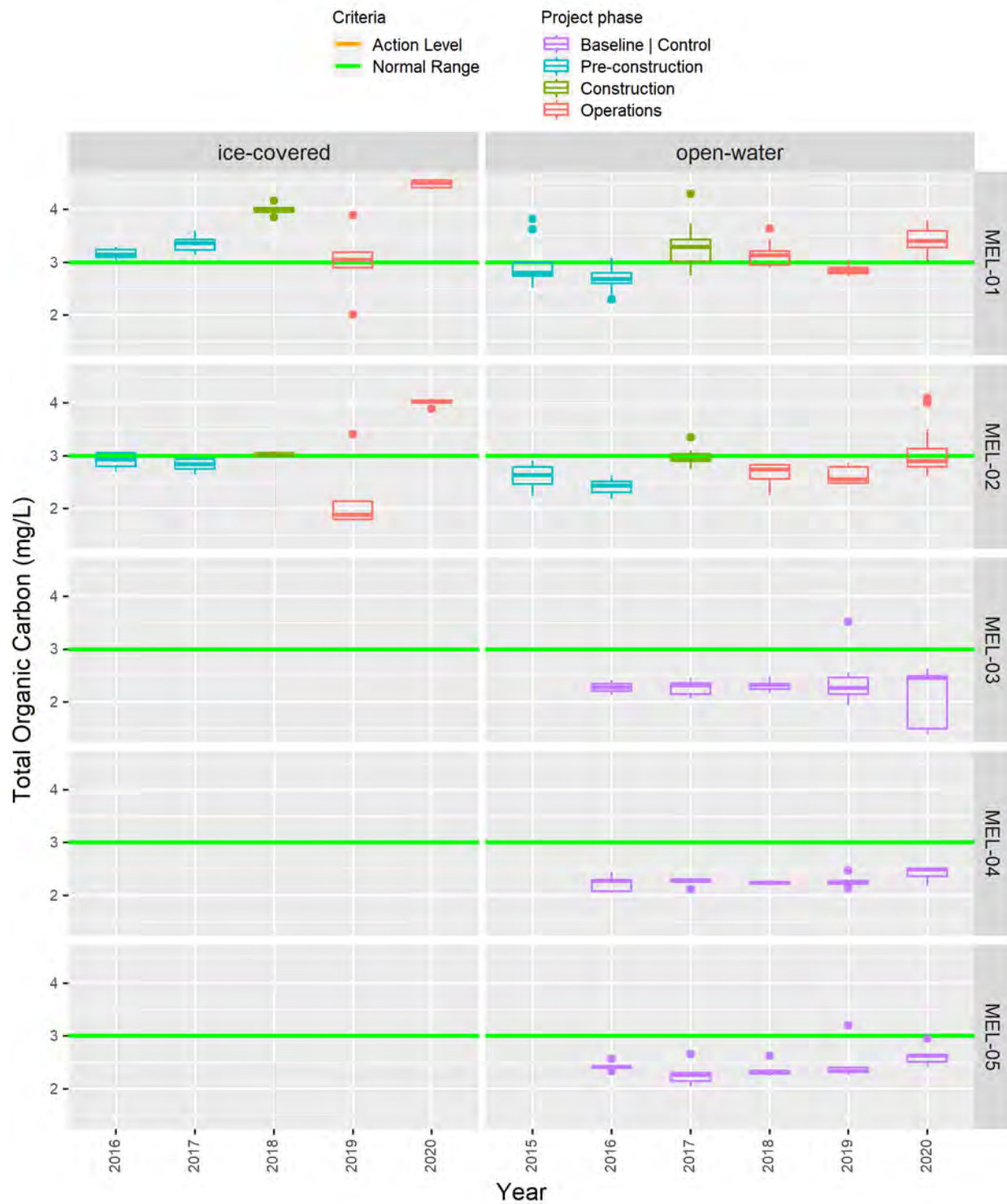


Figure C1-26. Total aluminum ($\mu\text{g/L}$)

Notes: FEIS predictions (where applicable) represent predicted water quality at the edge of the mixing zone in the near-field area (MEL-01).

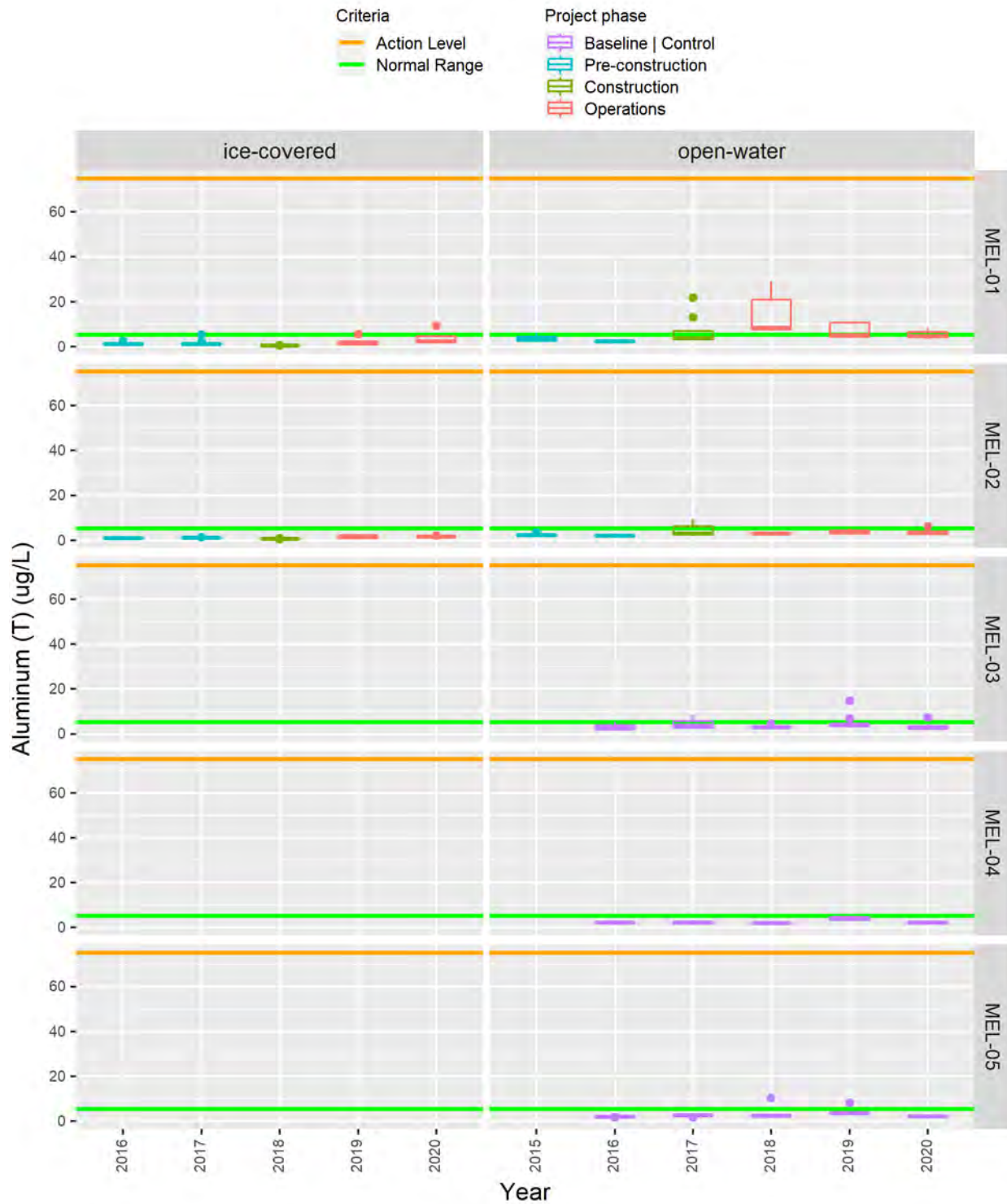


Figure C1-27. Total antimony ($\mu\text{g/L}$)

Notes: FEIS predictions (where applicable) represent predicted water quality at the edge of the mixing zone in the near-field area (MEL-01).

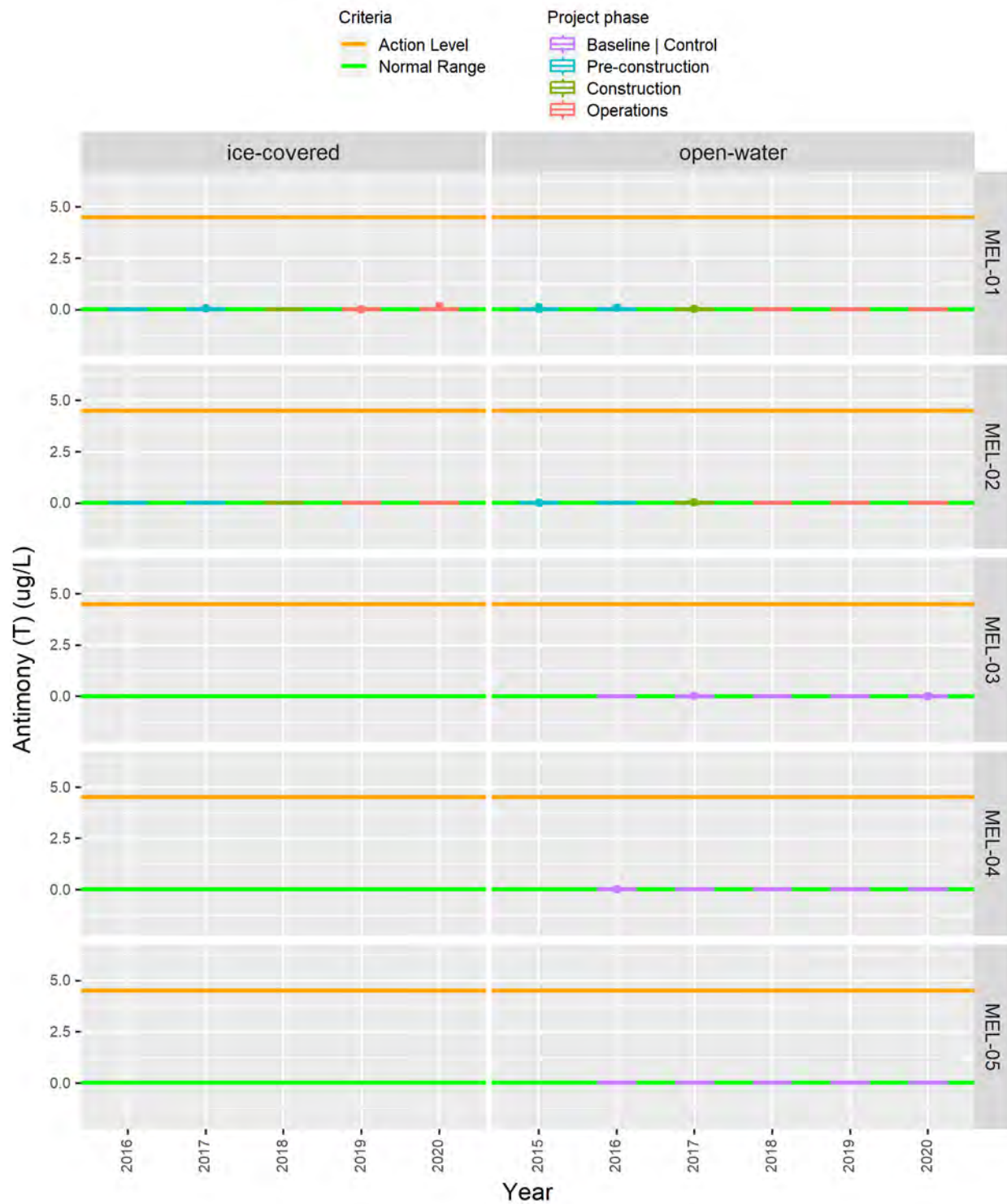


Figure C1-28. Total arsenic ($\mu\text{g/L}$)

Notes: FEIS predictions (where applicable) represent predicted water quality at the edge of the mixing zone in the near-field area (MEL-01).

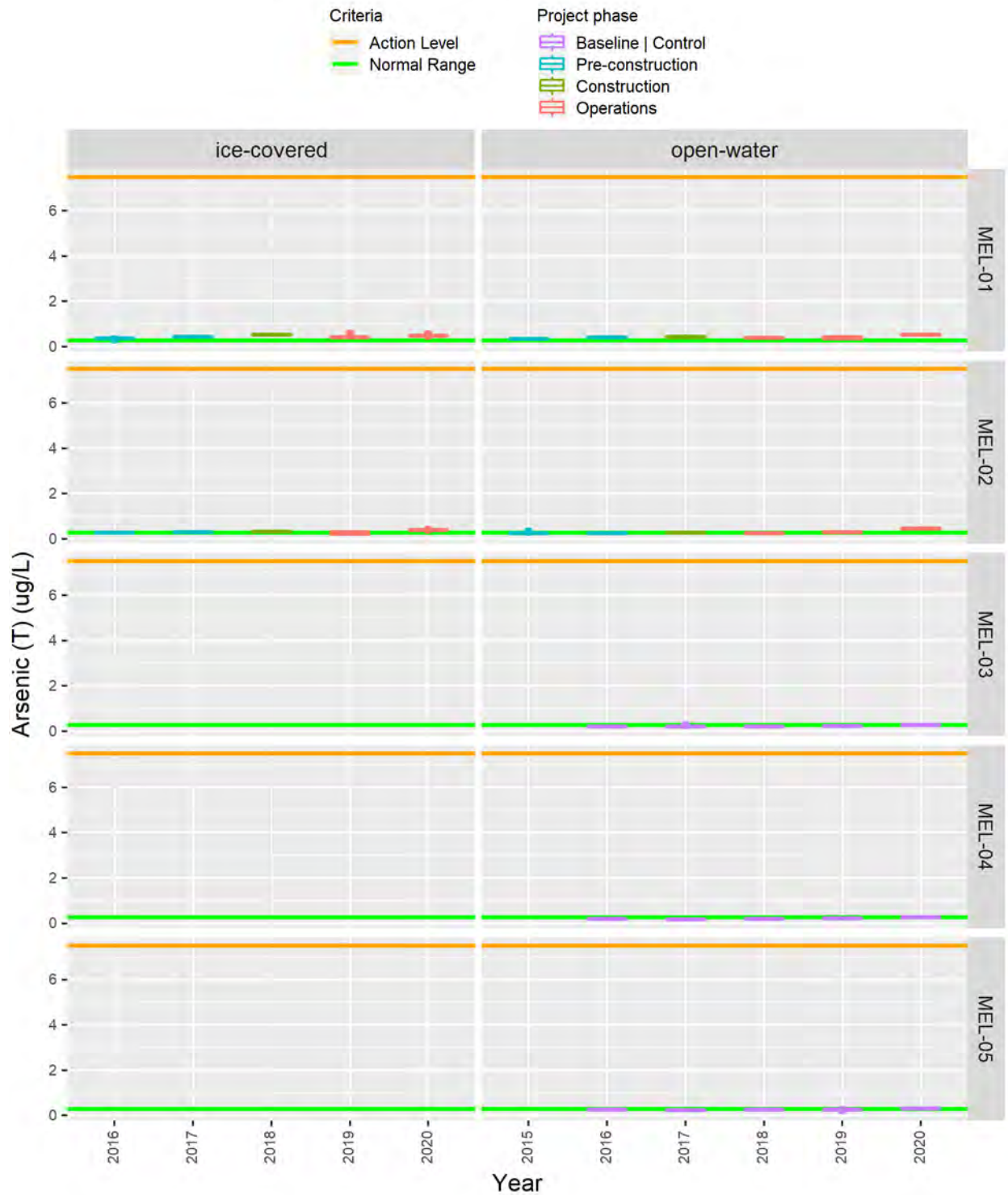


Figure C1-29. Total barium ($\mu\text{g/L}$)

Notes: FEIS predictions (where applicable) represent predicted water quality at the edge of the mixing zone in the near-field area (MEL-01).

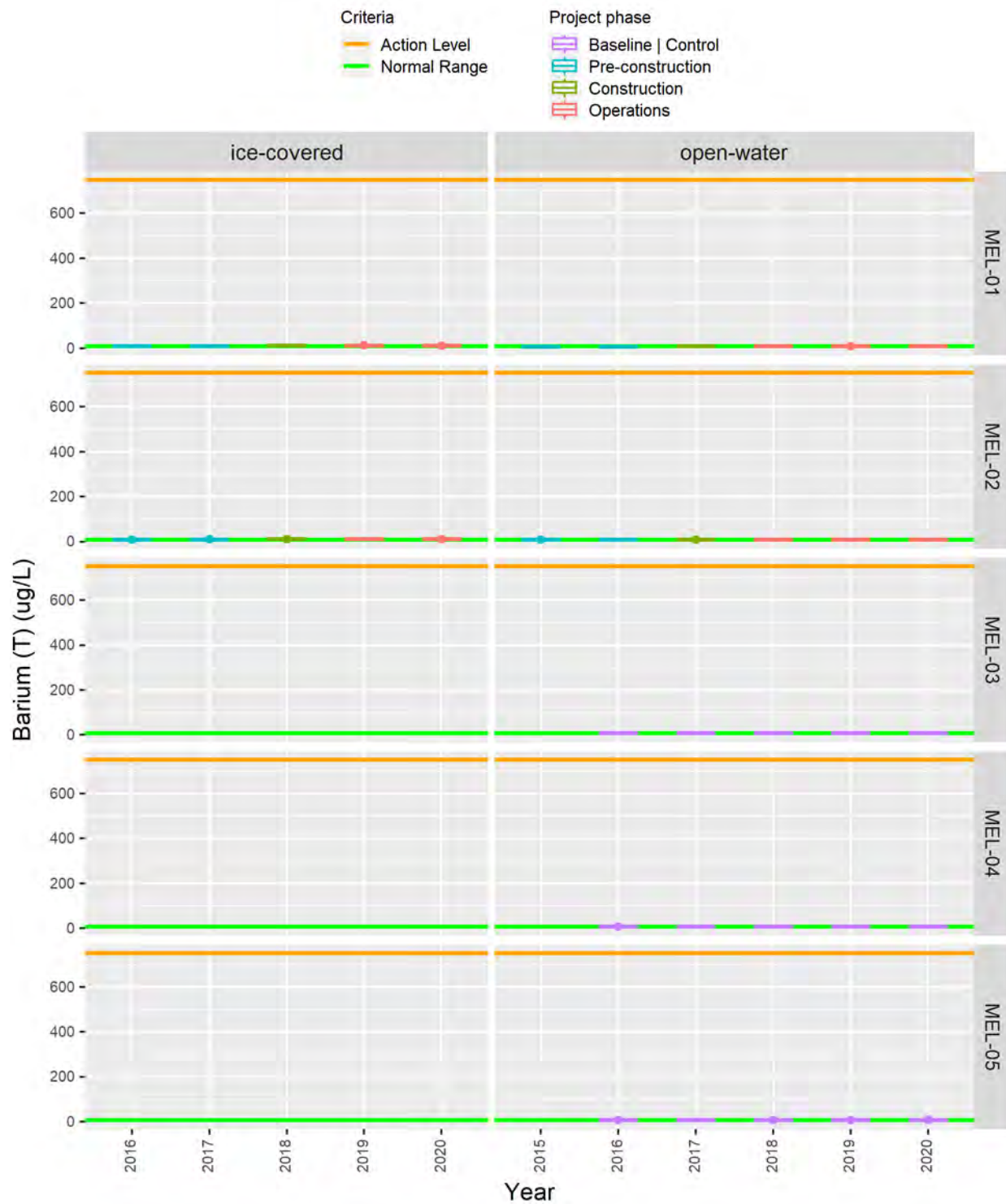


Figure C1-30. Total beryllium ($\mu\text{g/L}$)

Notes: FEIS predictions (where applicable) represent predicted water quality at the edge of the mixing zone in the near-field area (MEL-01).

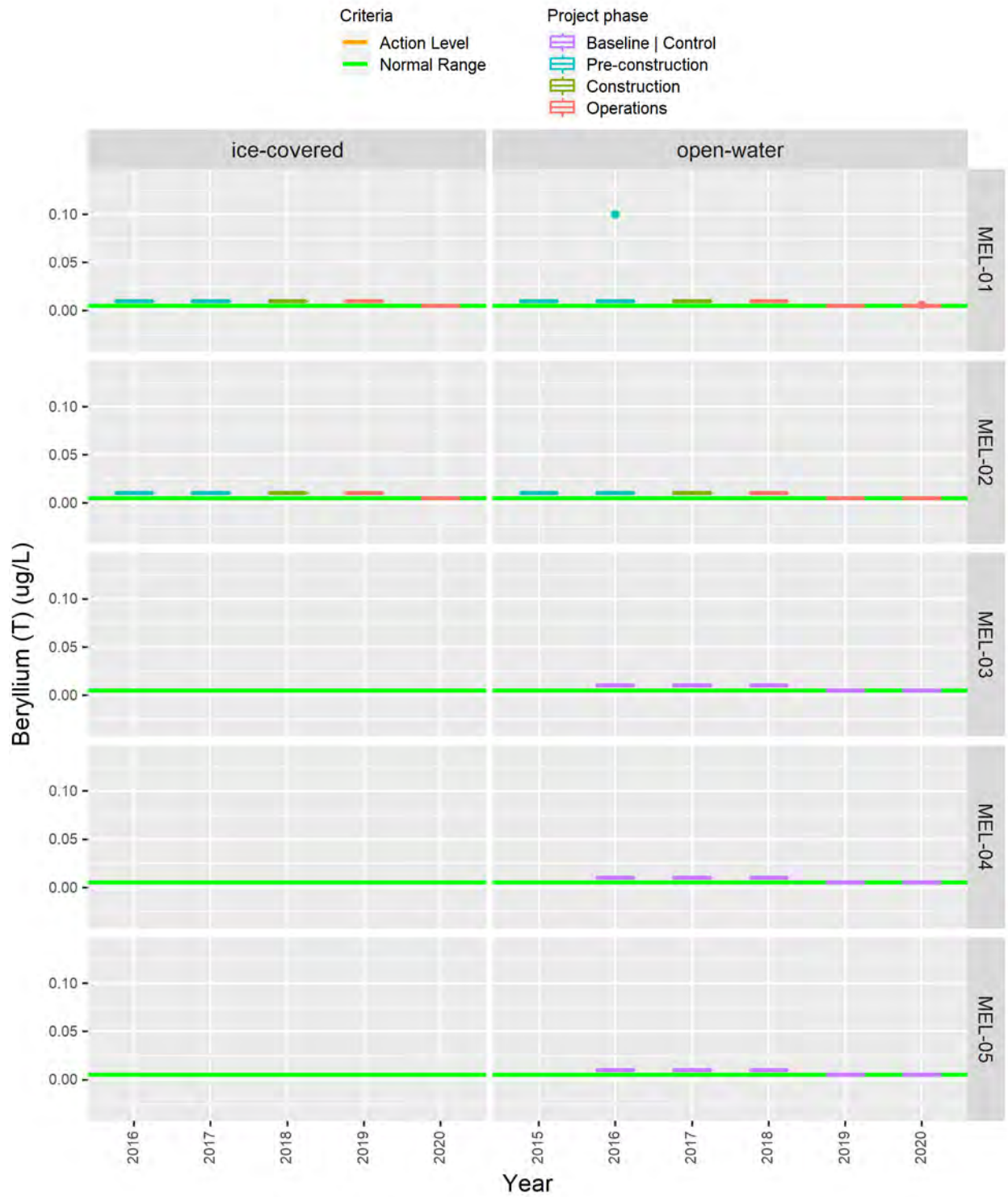


Figure C1-31. Total bismuth ($\mu\text{g/L}$)

Notes: FEIS predictions (where applicable) represent predicted water quality at the edge of the mixing zone in the near-field area (MEL-01).

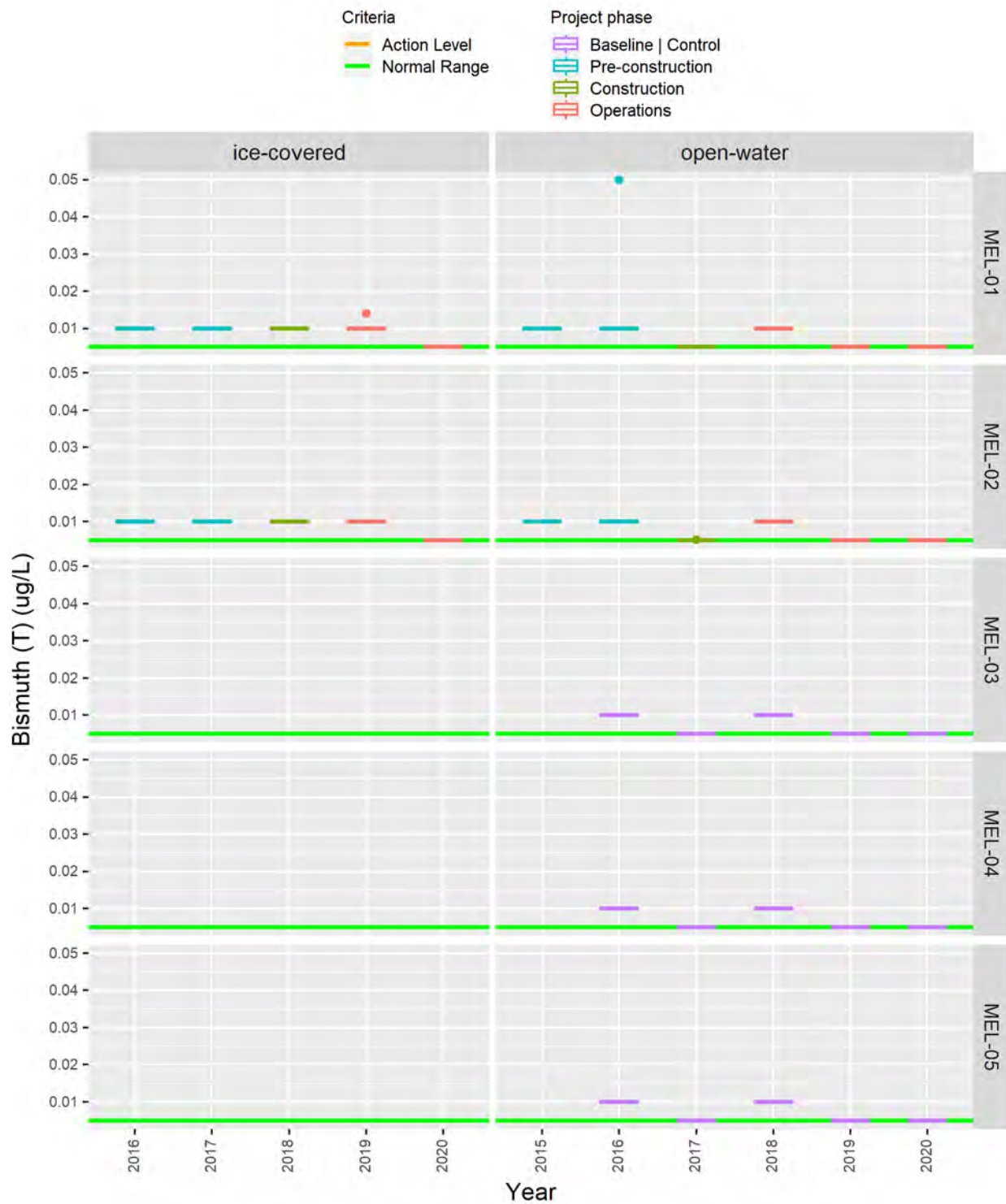


Figure C1-32. Total boron ($\mu\text{g/L}$)

Notes: FEIS predictions (where applicable) represent predicted water quality at the edge of the mixing zone in the near-field area (MEL-01).

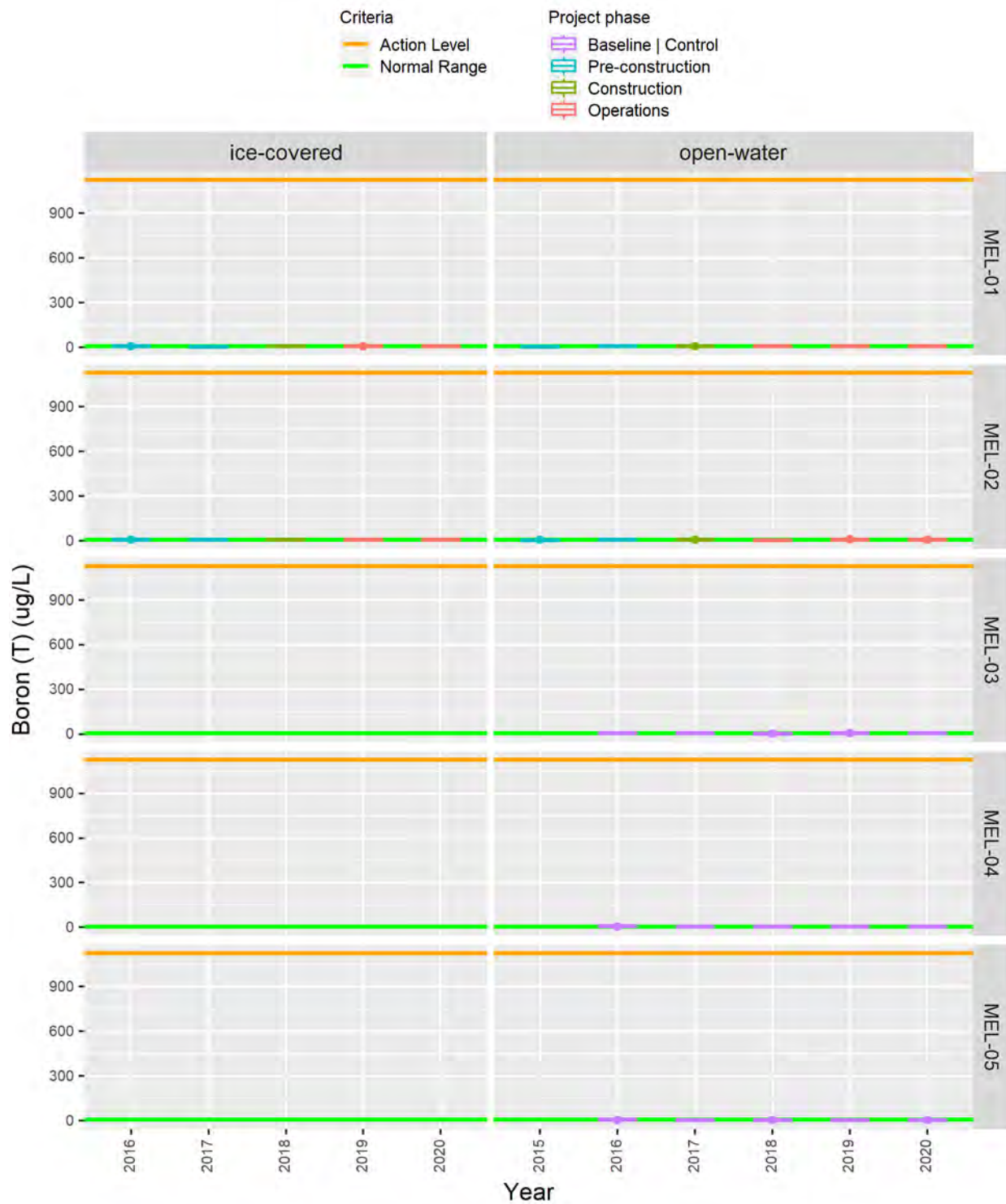


Figure C1-33. Total cadmium ($\mu\text{g/L}$)

Notes: FEIS predictions (where applicable) represent predicted water quality at the edge of the mixing zone in the near-field area (MEL-01).

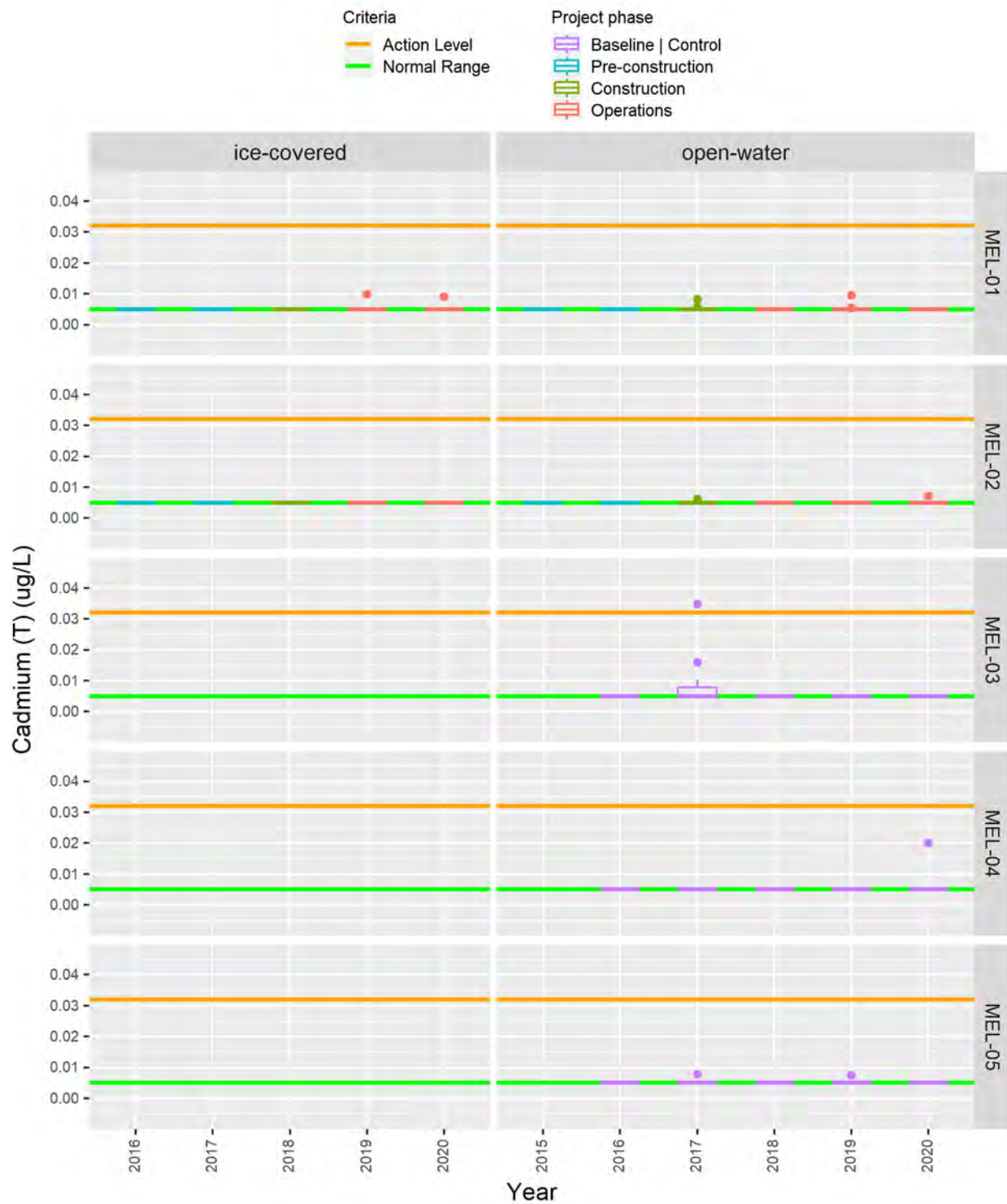


Figure C1-34. Total chromium ($\mu\text{g/L}$)

Notes: FEIS predictions (where applicable) represent predicted water quality at the edge of the mixing zone in the near-field area (MEL-01).

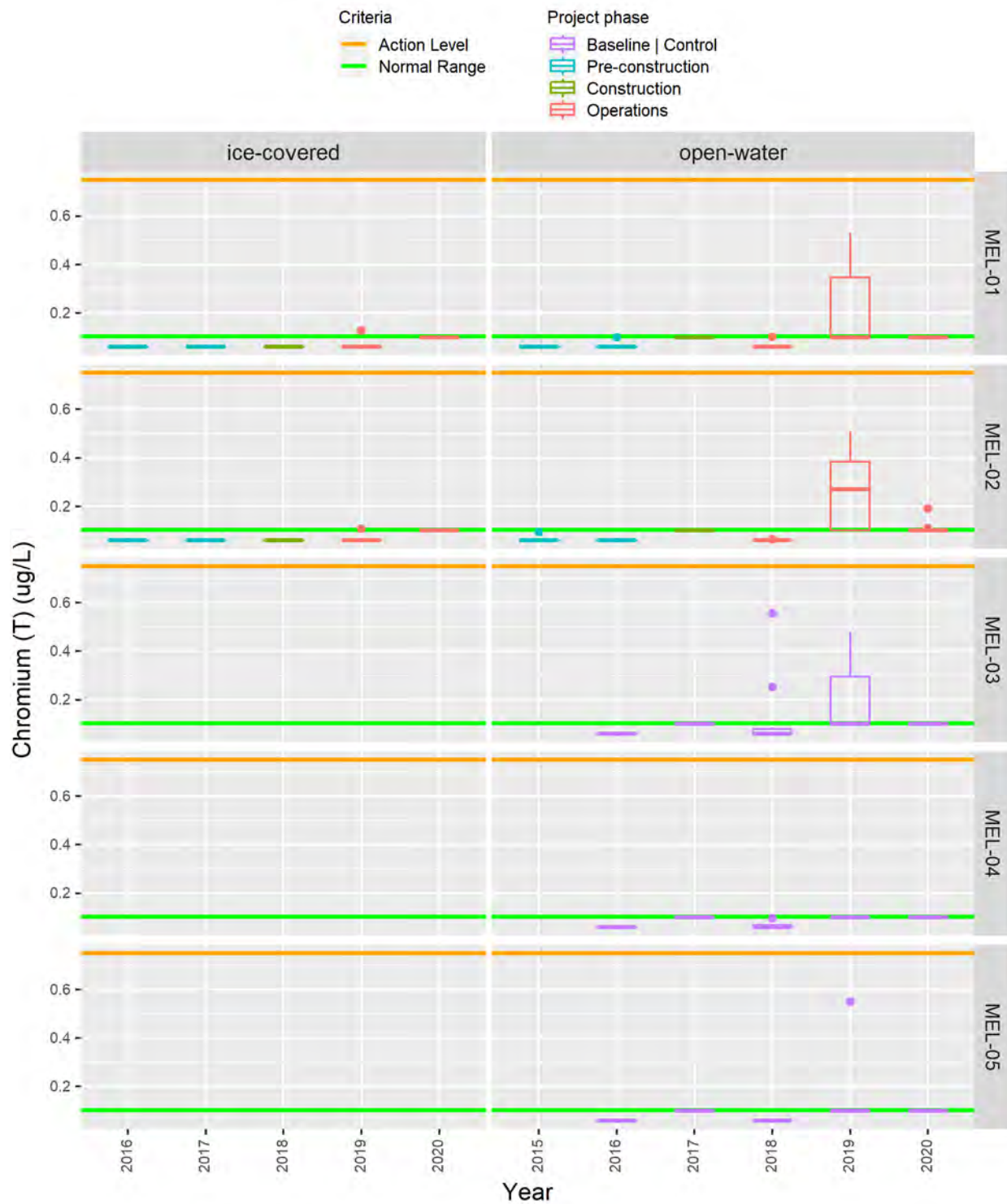


Figure C1-35. Total cobalt ($\mu\text{g/L}$)

Notes: FEIS predictions (where applicable) represent predicted water quality at the edge of the mixing zone in the near-field area (MEL-01).

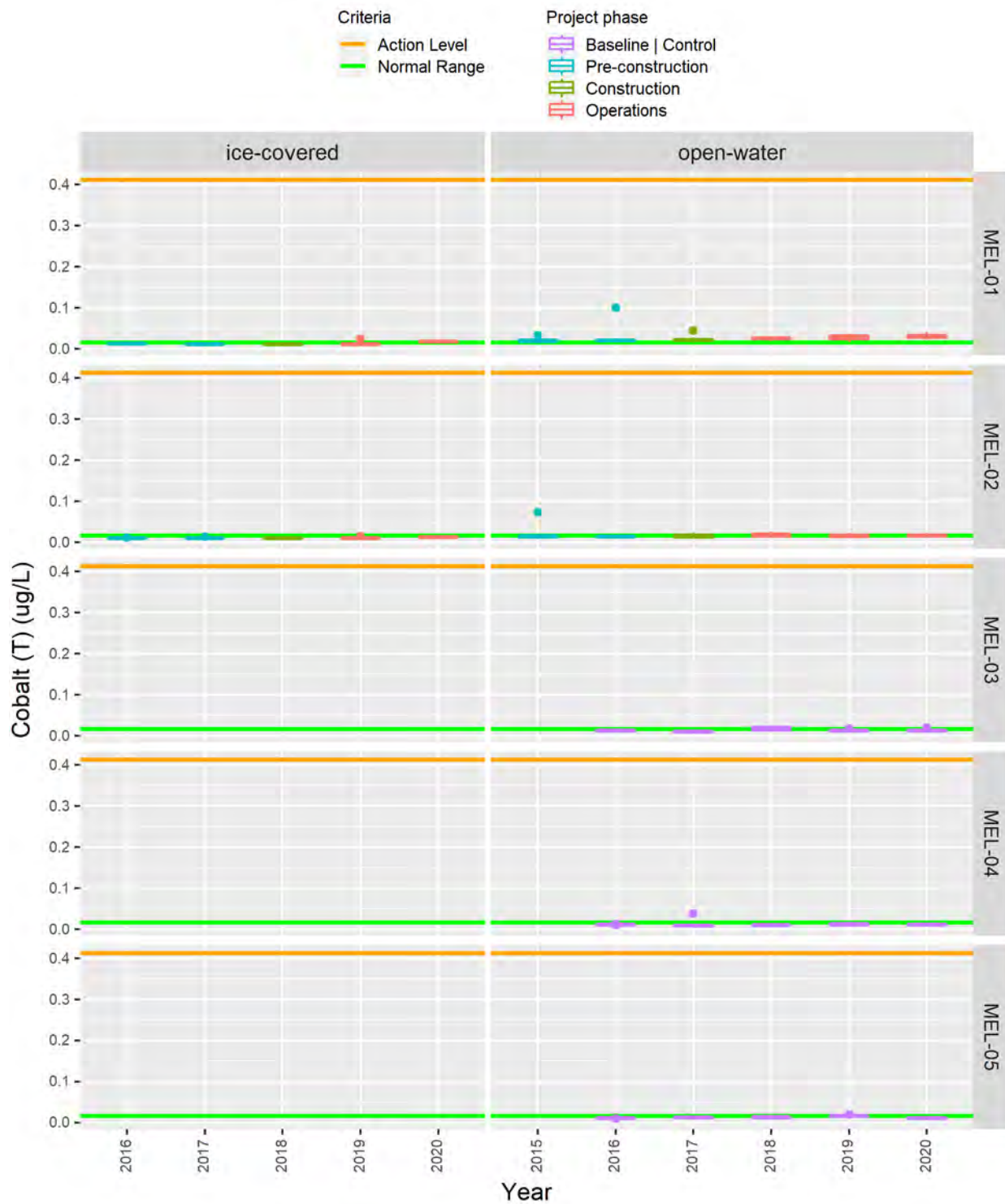


Figure C1-36. Total copper ($\mu\text{g/L}$)

Notes: FEIS predictions (where applicable) represent predicted water quality at the edge of the mixing zone in the near-field area (MEL-01).

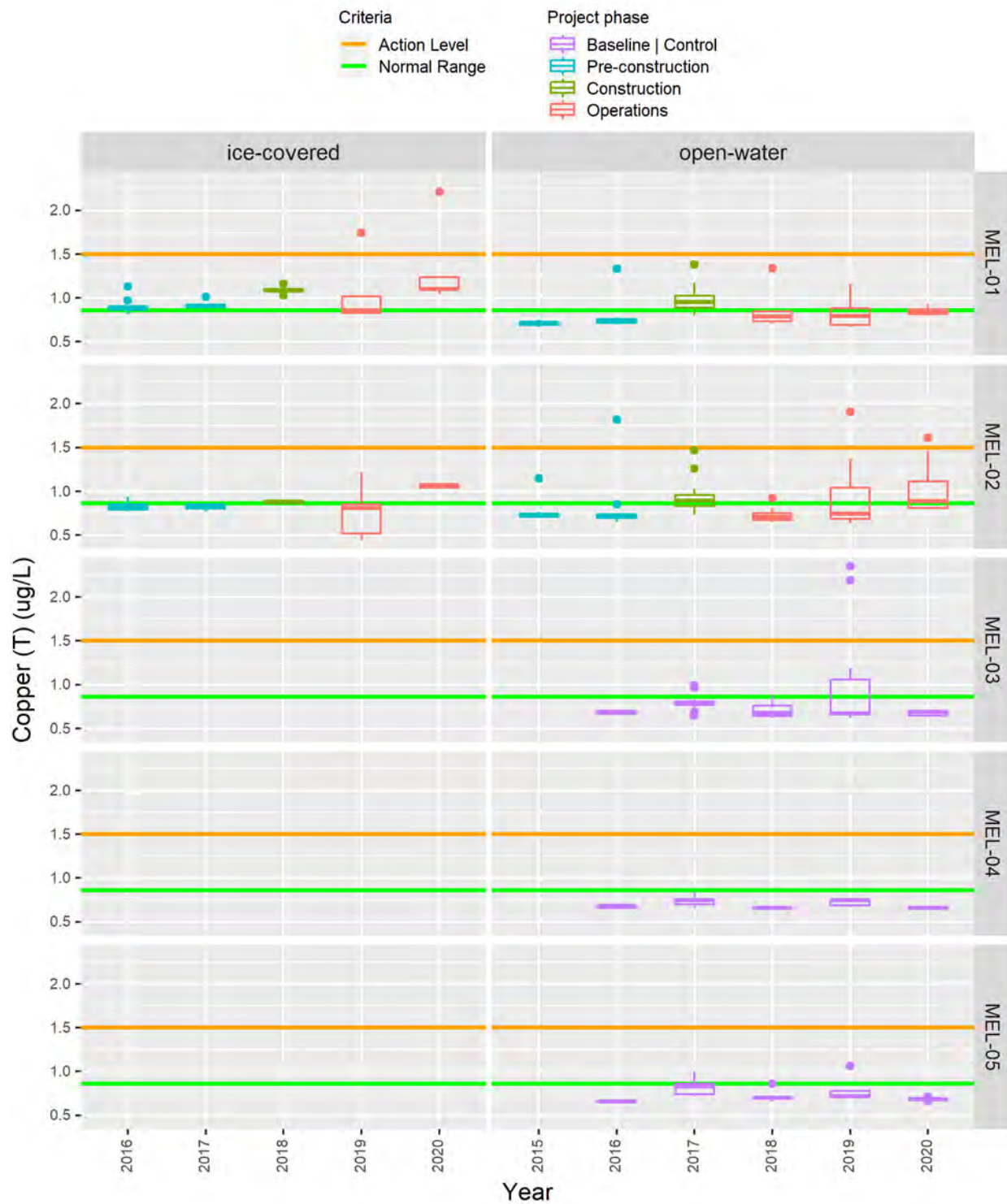


Figure C1-37. Total iron ($\mu\text{g/L}$)

Notes: FEIS predictions (where applicable) represent predicted water quality at the edge of the mixing zone in the near-field area (MEL-01).

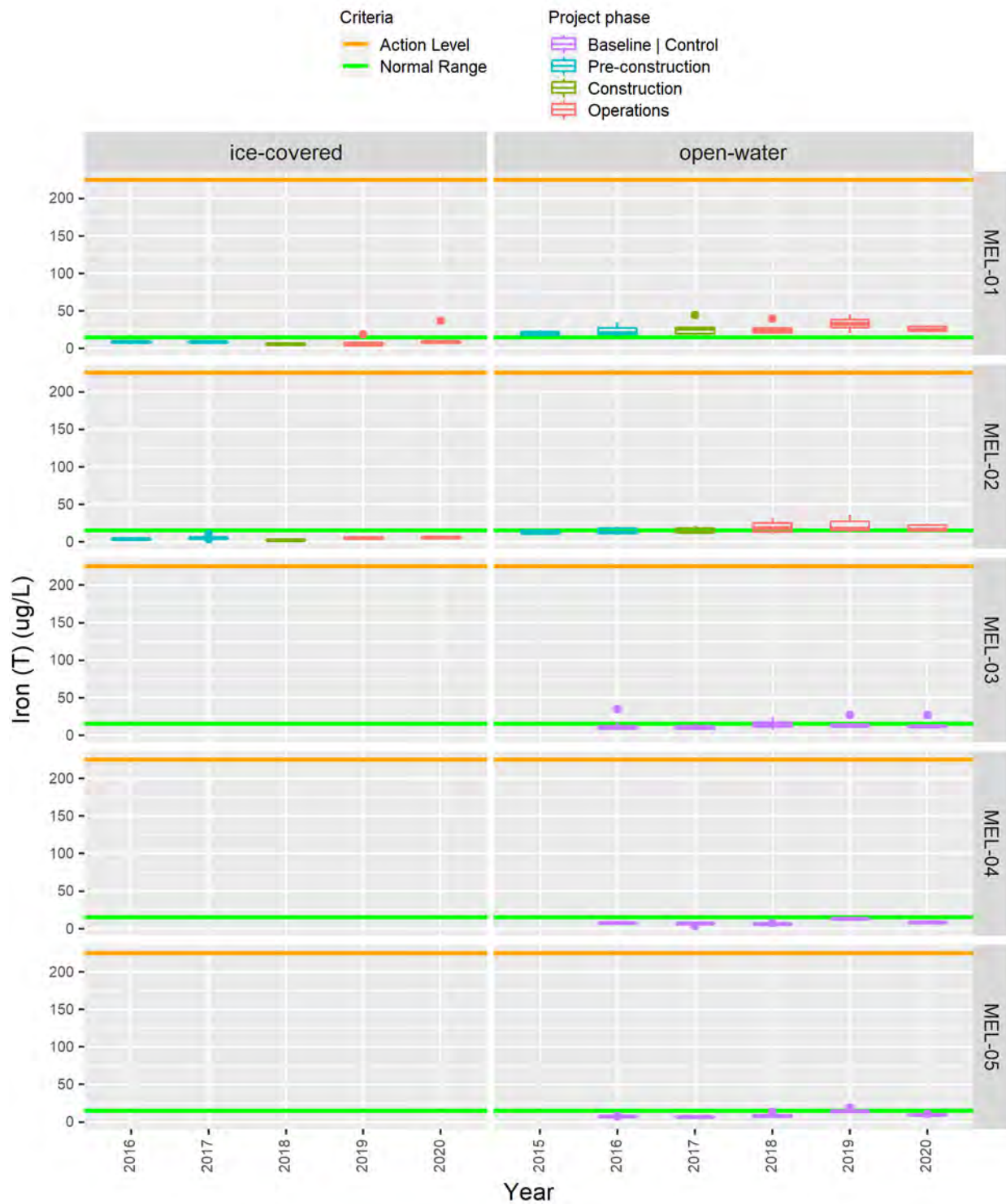


Figure C1-38. Total lead ($\mu\text{g/L}$)

Notes: FEIS predictions (where applicable) represent predicted water quality at the edge of the mixing zone in the near-field area (MEL-01).

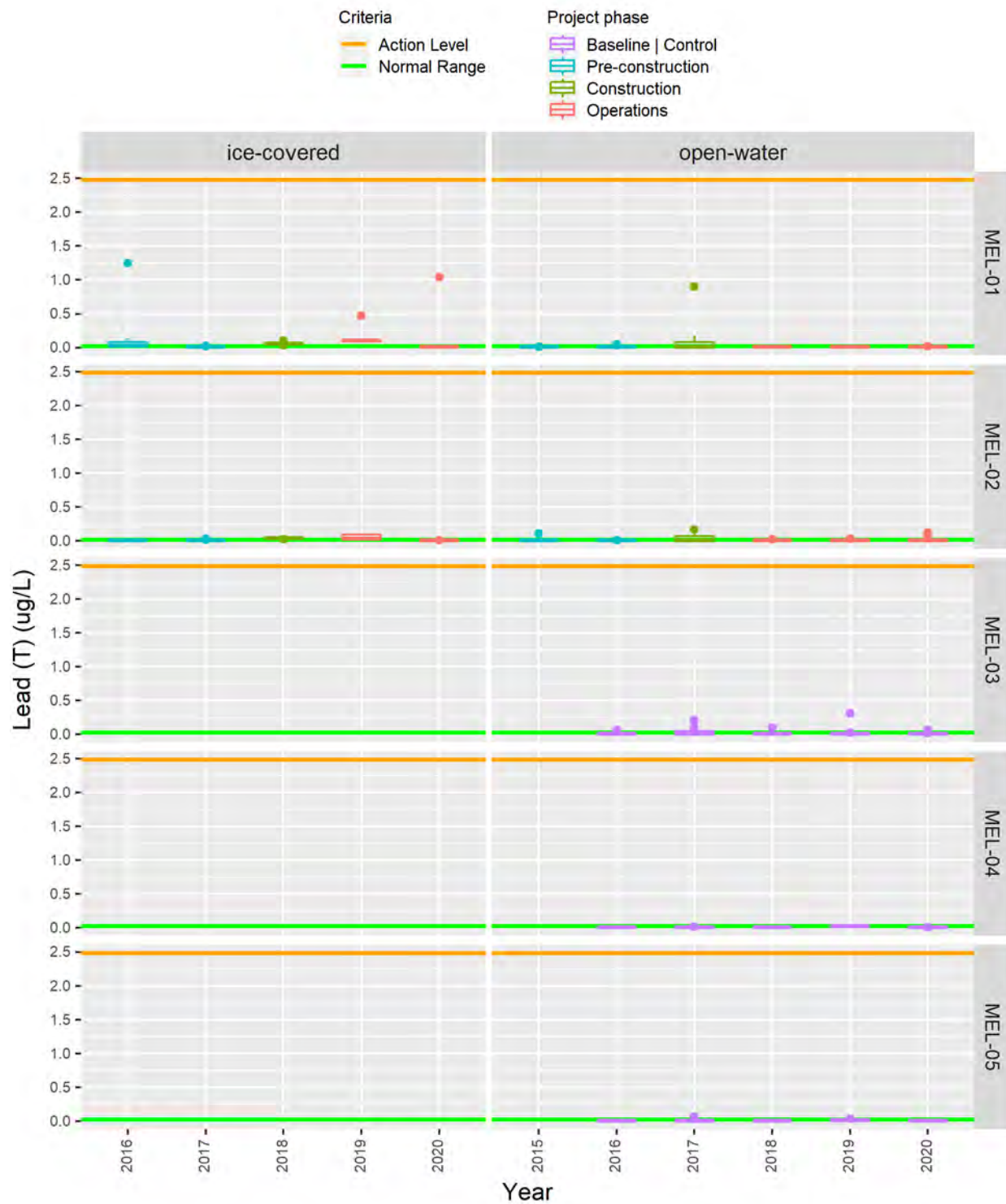


Figure C1-39. Total lithium ($\mu\text{g/L}$)

Notes: FEIS predictions (where applicable) represent predicted water quality at the edge of the mixing zone in the near-field area (MEL-01).

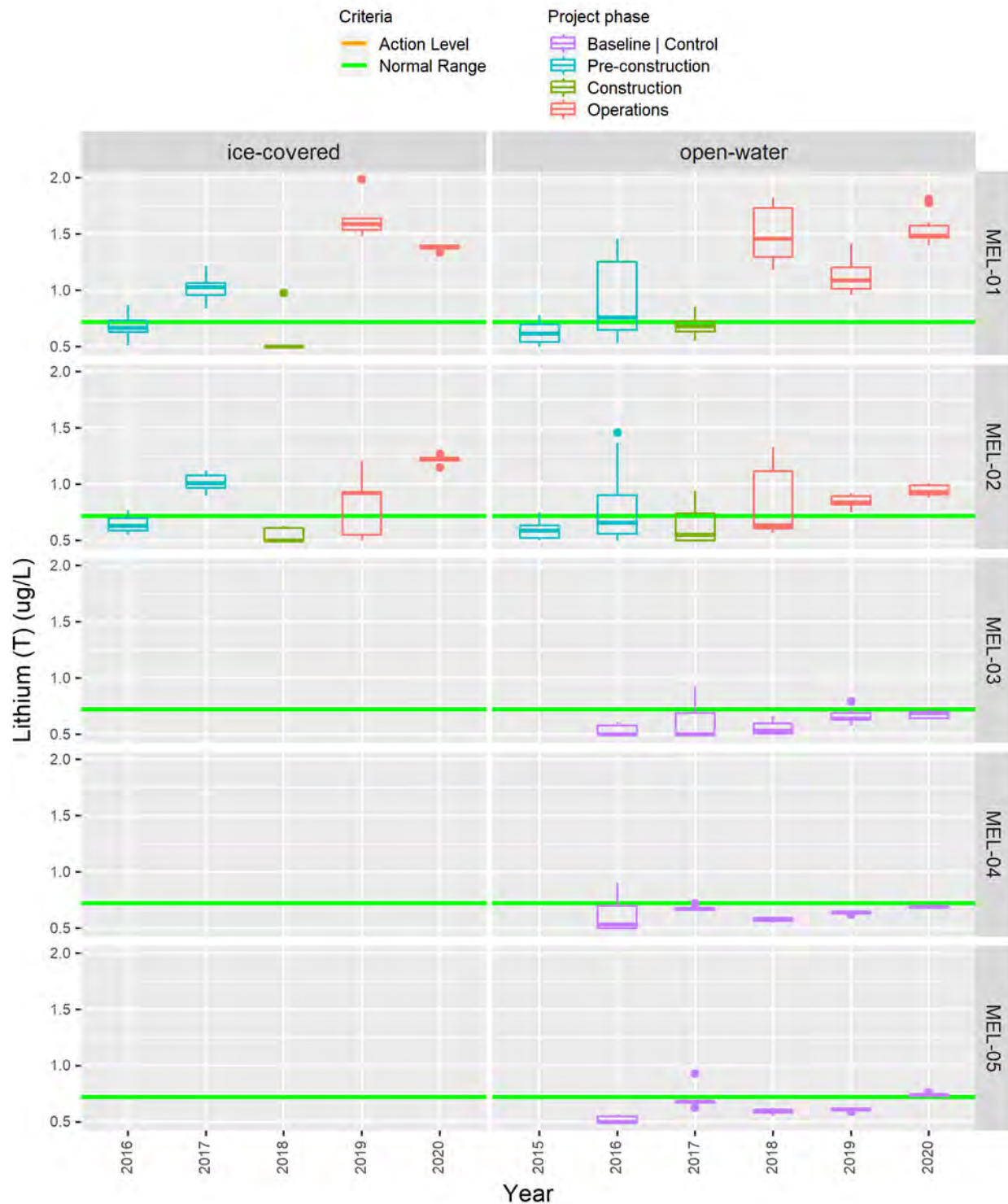


Figure C1-40. Total manganese ($\mu\text{g/L}$)

Notes: FEIS predictions (where applicable) represent predicted water quality at the edge of the mixing zone in the near-field area (MEL-01).

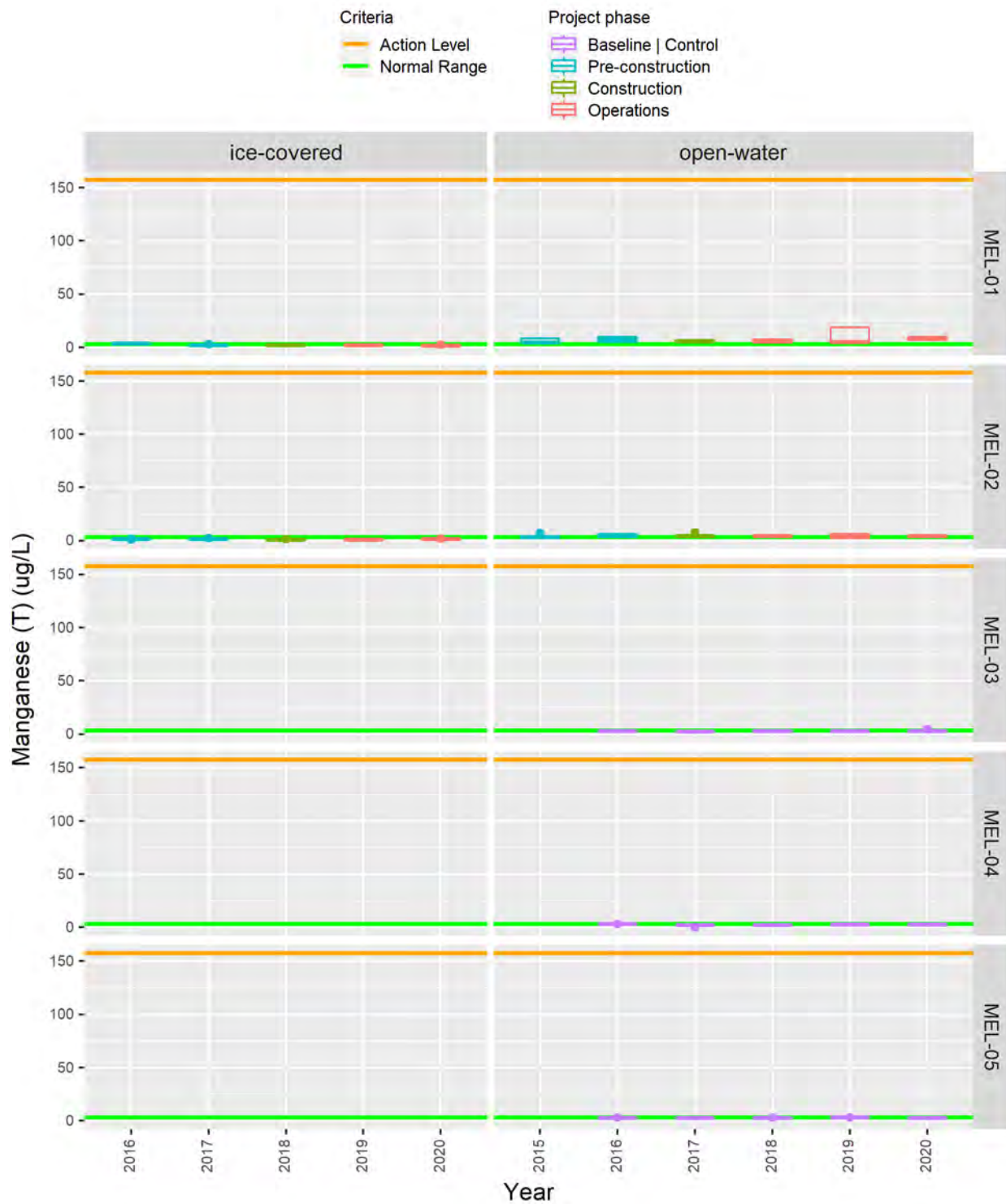


Figure C1-41. Total mercury ($\mu\text{g/L}$)

Notes: FEIS predictions (where applicable) represent predicted water quality at the edge of the mixing zone in the near-field area (MEL-01).

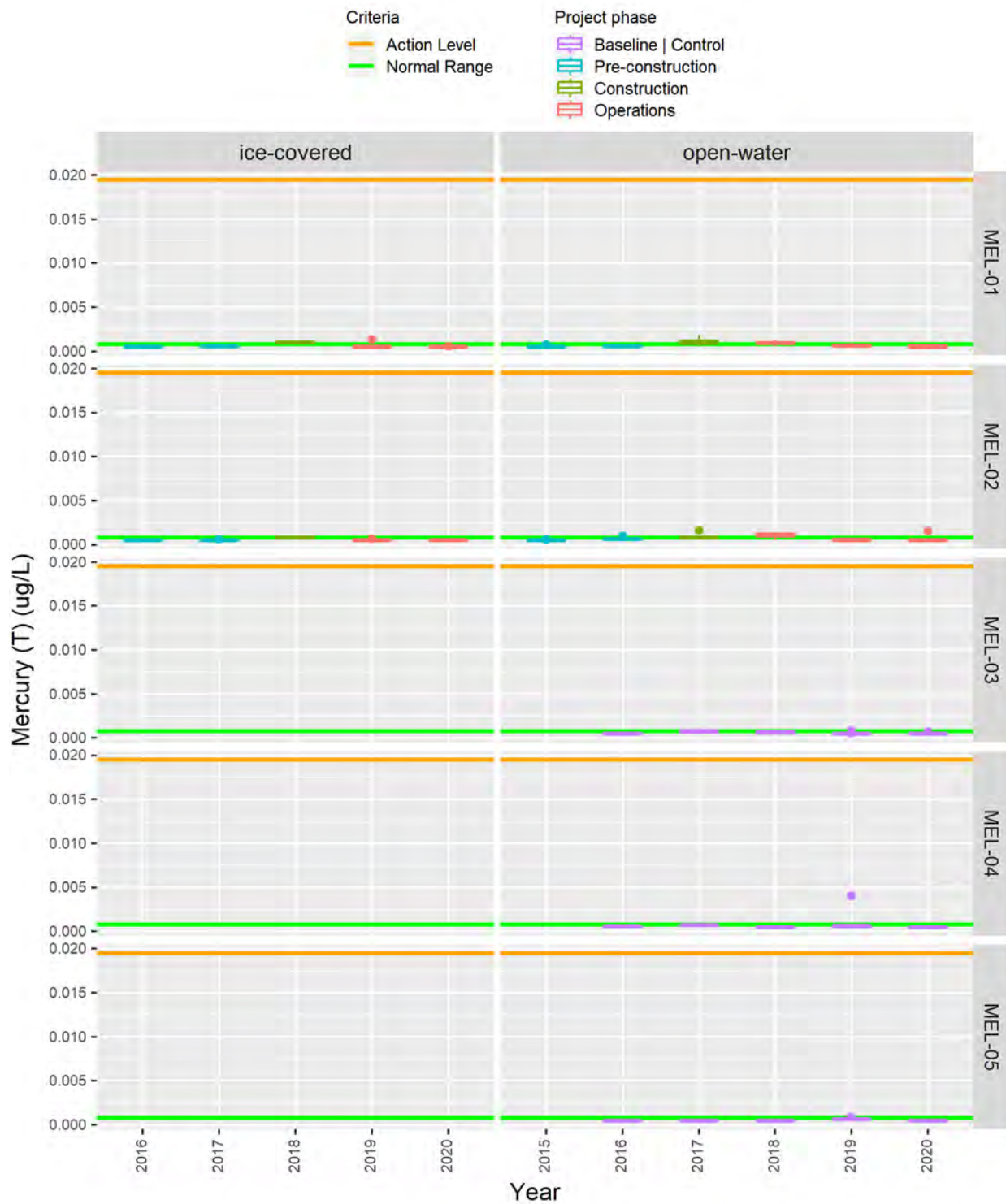


Figure C1-42. Total molybdenum (µg/L)

Notes: FEIS predictions (where applicable) represent predicted water quality at the edge of the mixing zone in the near-field area (MEL-01).

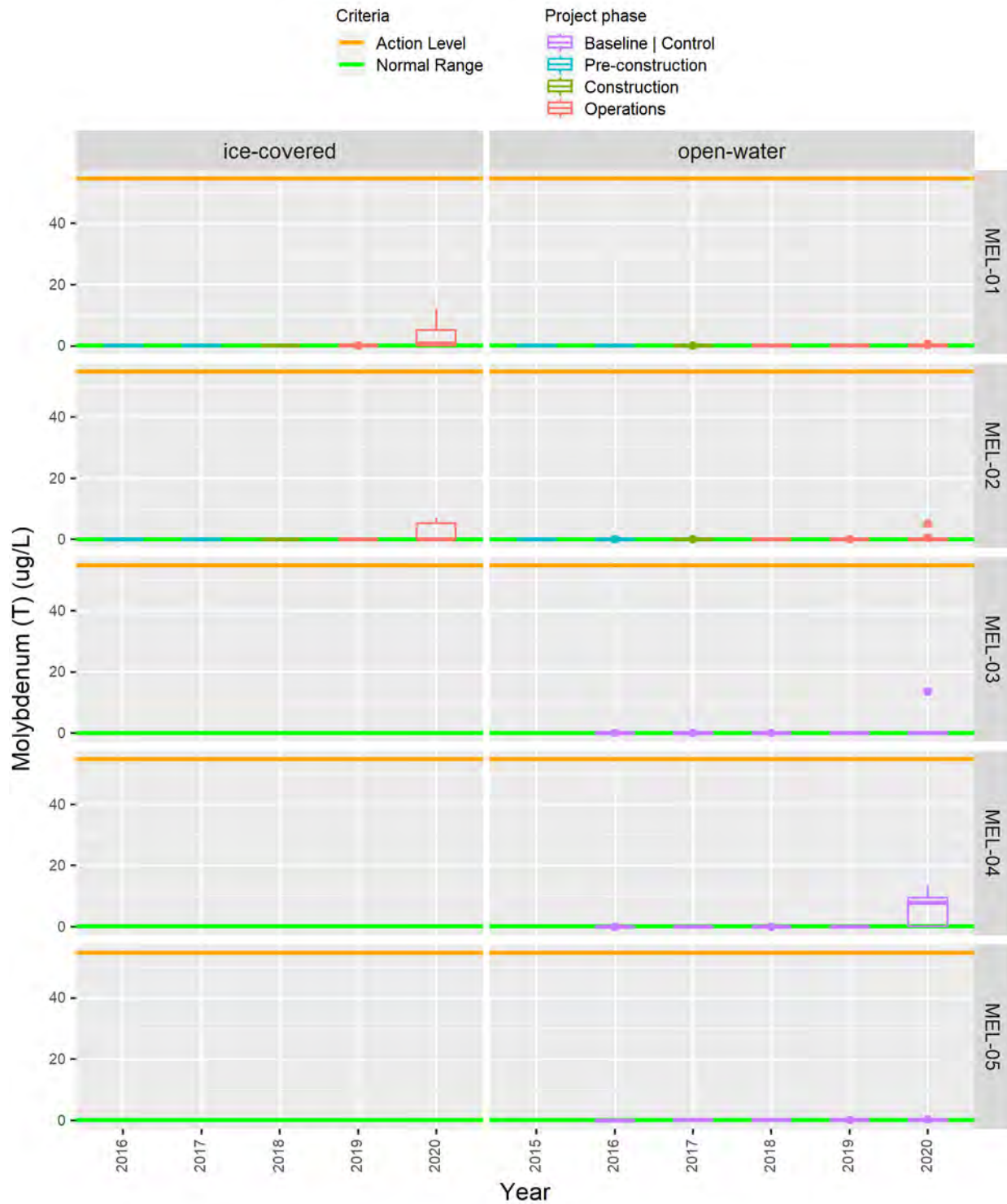


Figure C1-43. Total nickel ($\mu\text{g/L}$)

Notes: FEIS predictions (where applicable) represent predicted water quality at the edge of the mixing zone in the near-field area (MEL-01).

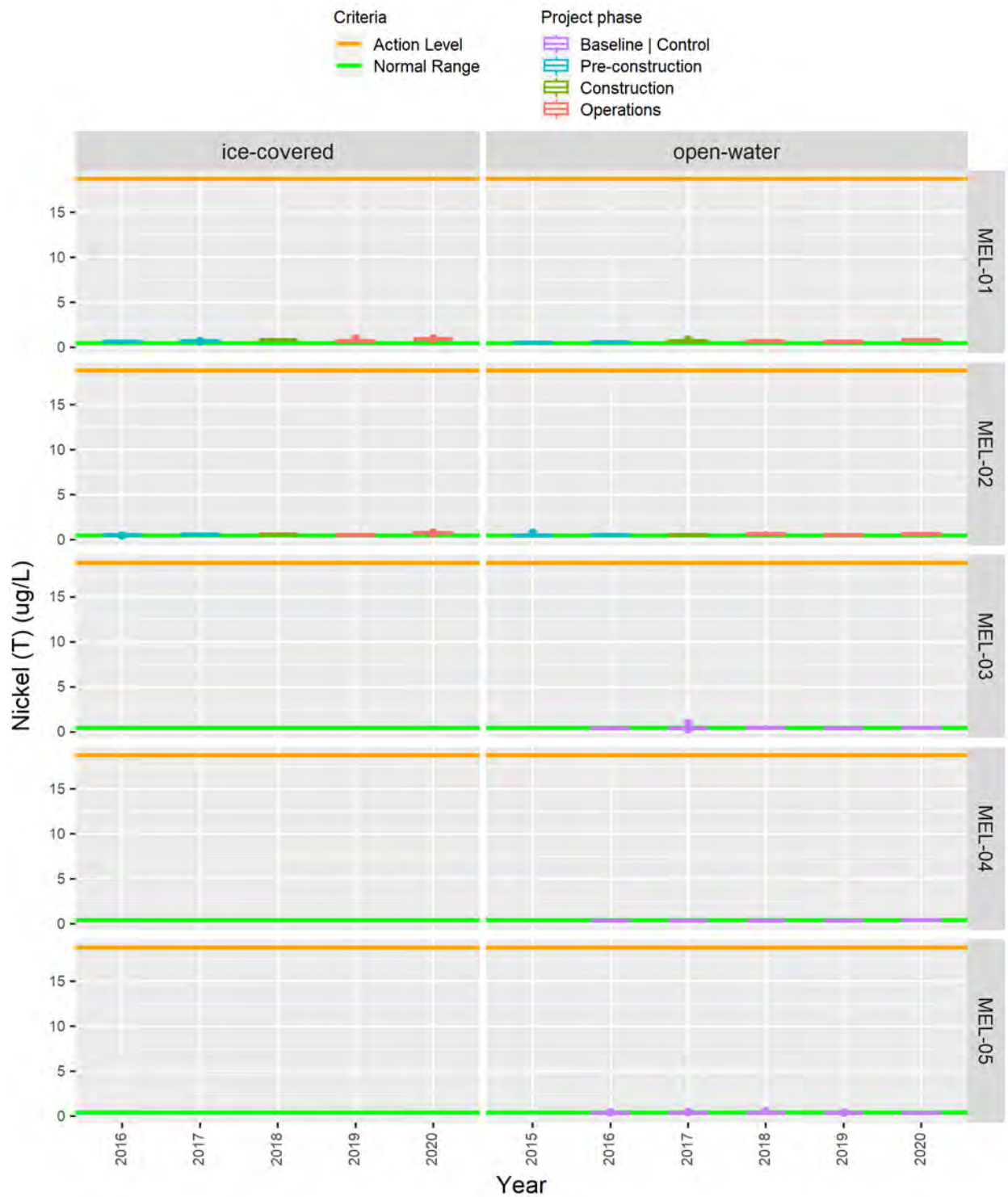


Figure C1-44. Total selenium ($\mu\text{g/L}$)

Notes: FEIS predictions (where applicable) represent predicted water quality at the edge of the mixing zone in the near-field area (MEL-01).

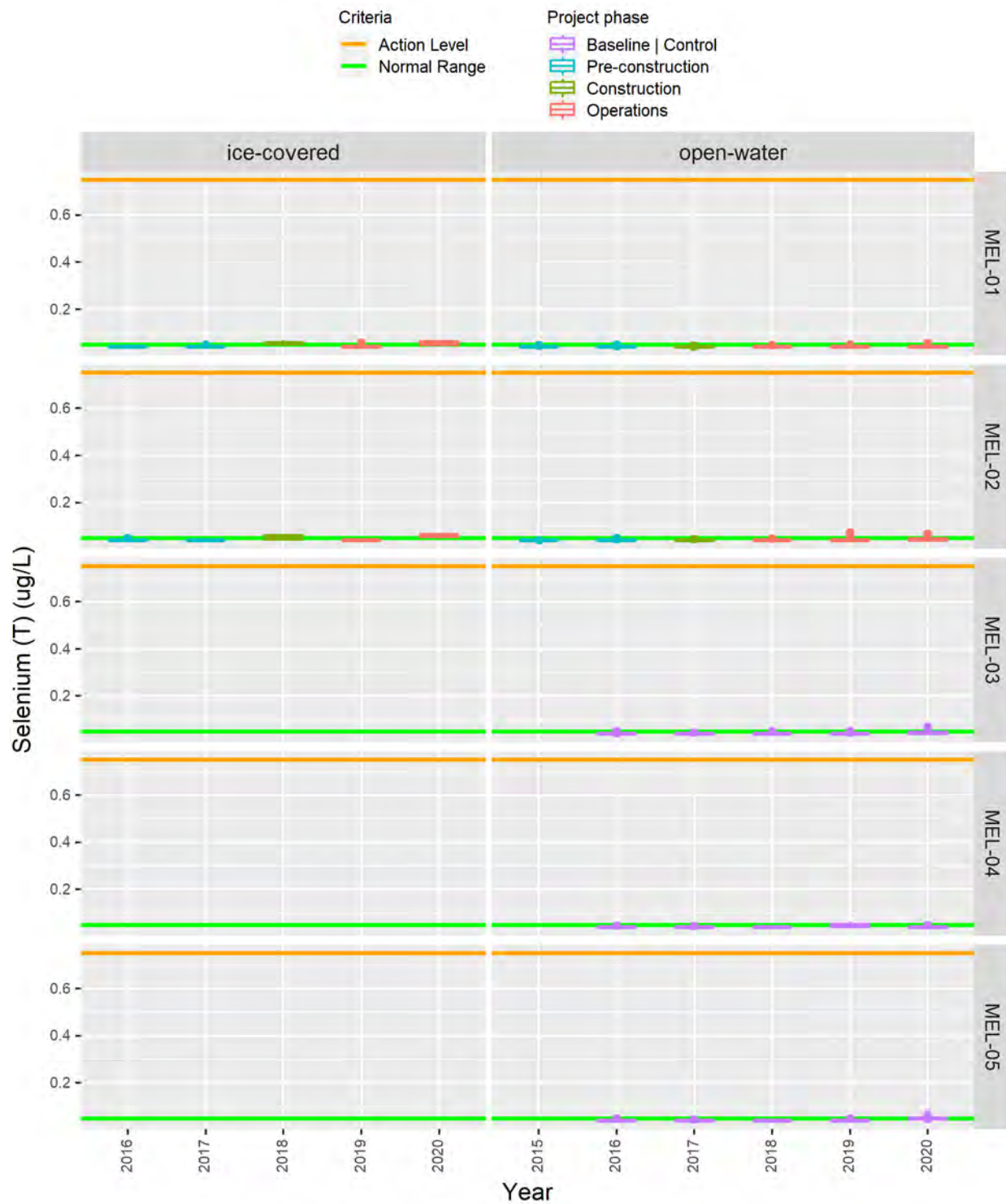


Figure C1-45. Total silver ($\mu\text{g/L}$)

Notes: FEIS predictions (where applicable) represent predicted water quality at the edge of the mixing zone in the near-field area (MEL-01).

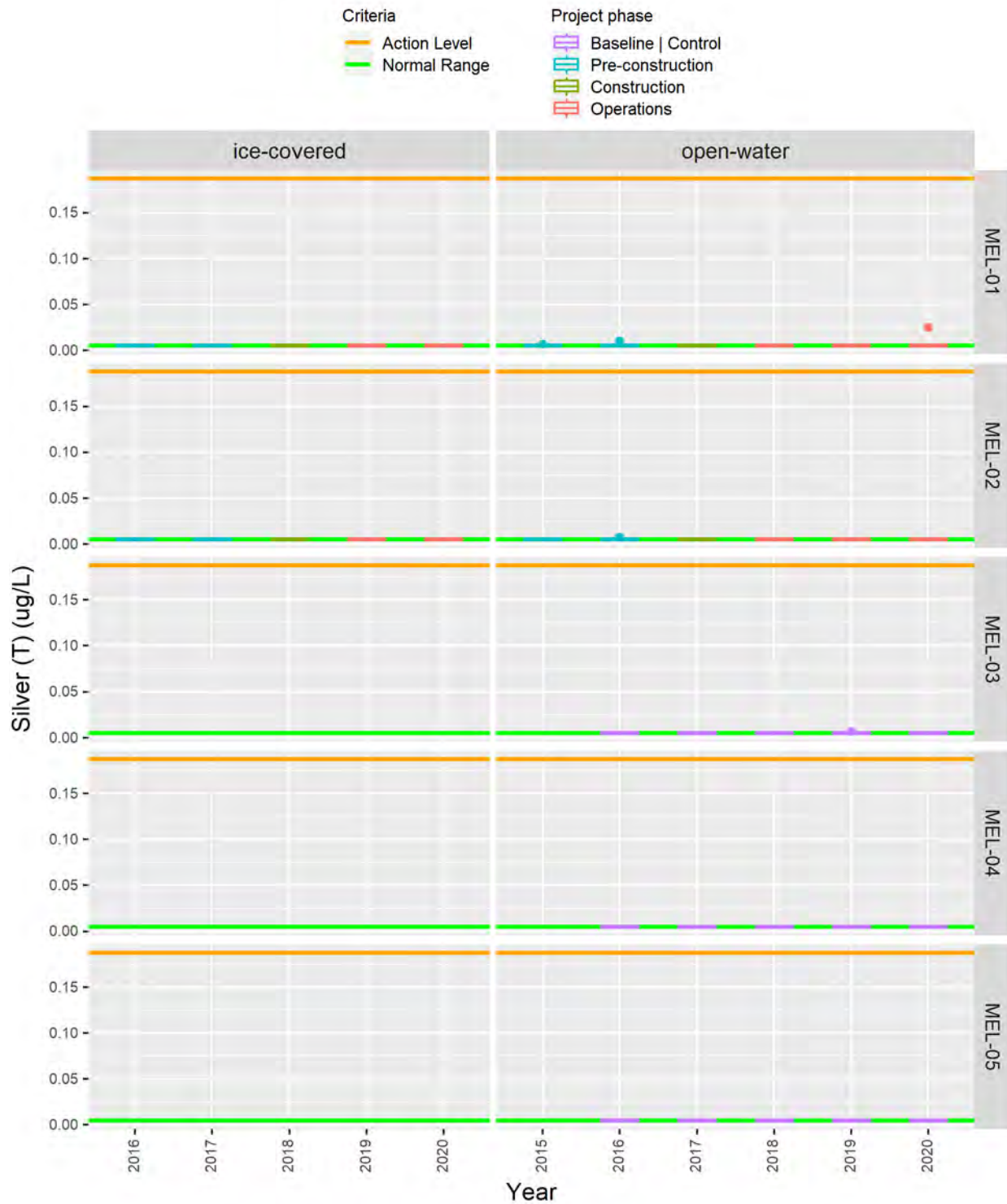


Figure C1-46. Total strontium ($\mu\text{g/L}$)

Notes: FEIS predictions (where applicable) represent predicted water quality at the edge of the mixing zone in the near-field area (MEL-01).

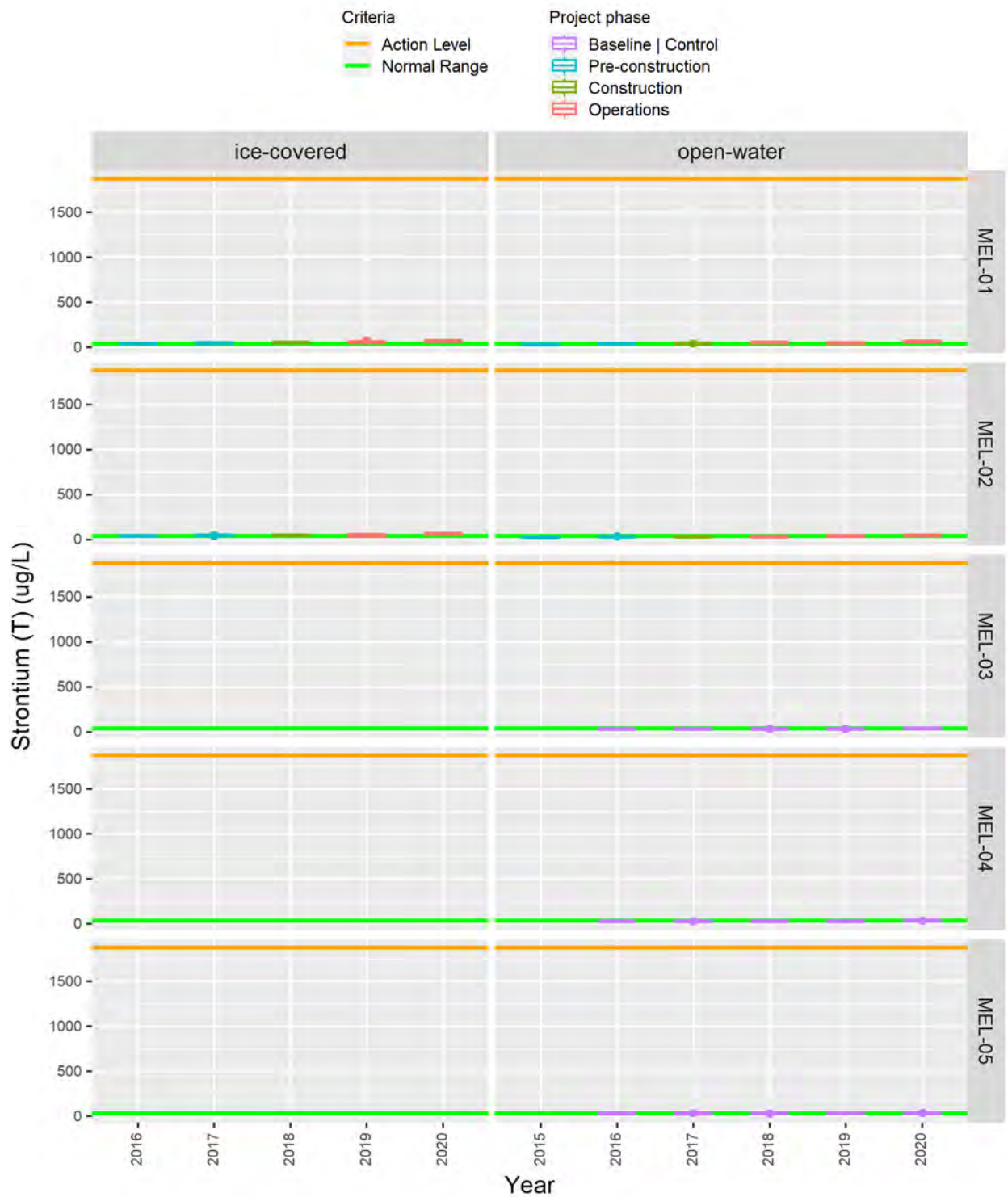


Figure C1-47. Total thallium ($\mu\text{g/L}$)

Notes: FEIS predictions (where applicable) represent predicted water quality at the edge of the mixing zone in the near-field area (MEL-01).

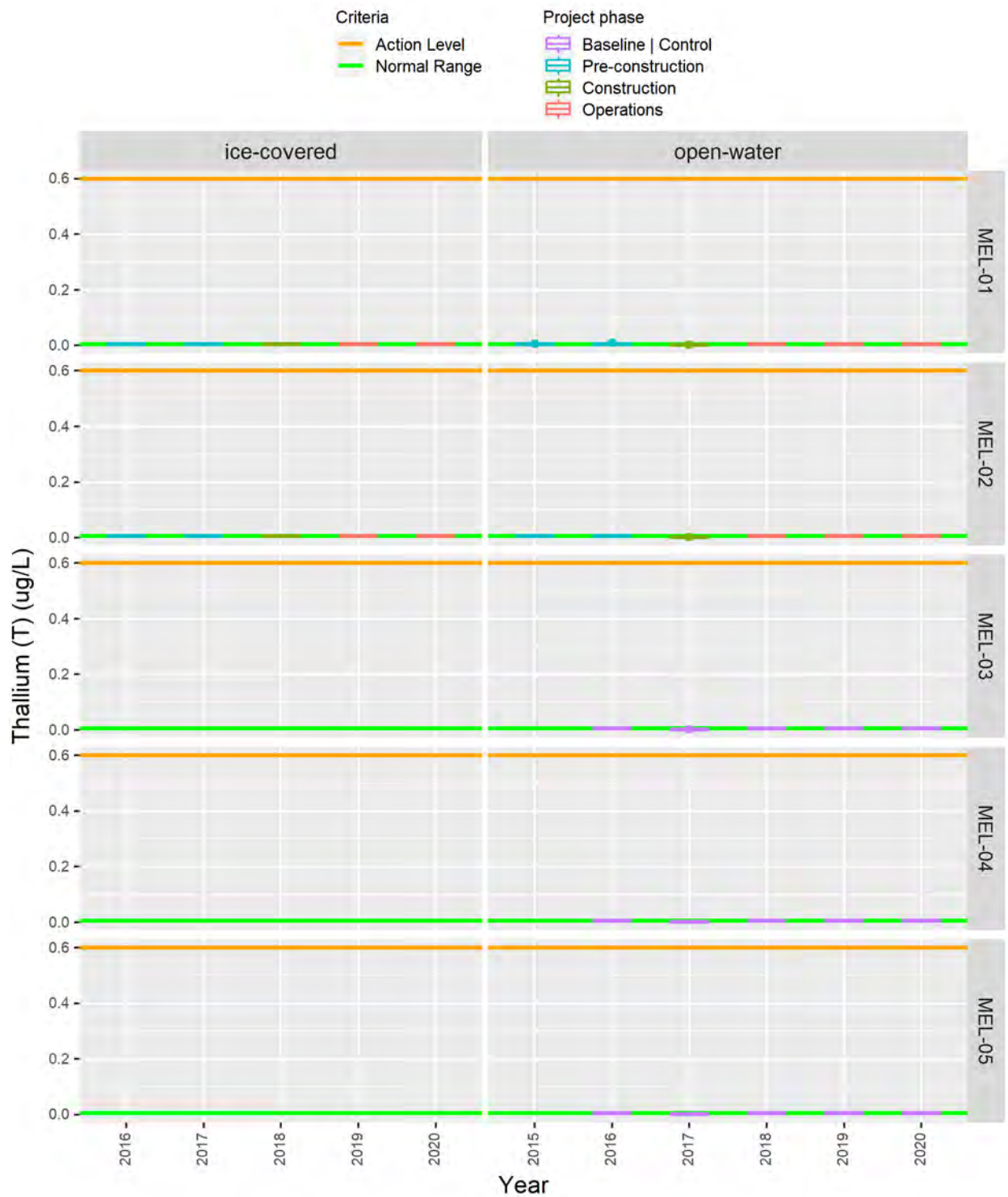


Figure C1-48. Total tin ($\mu\text{g/L}$)

Notes: FEIS predictions (where applicable) represent predicted water quality at the edge of the mixing zone in the near-field area (MEL-01).

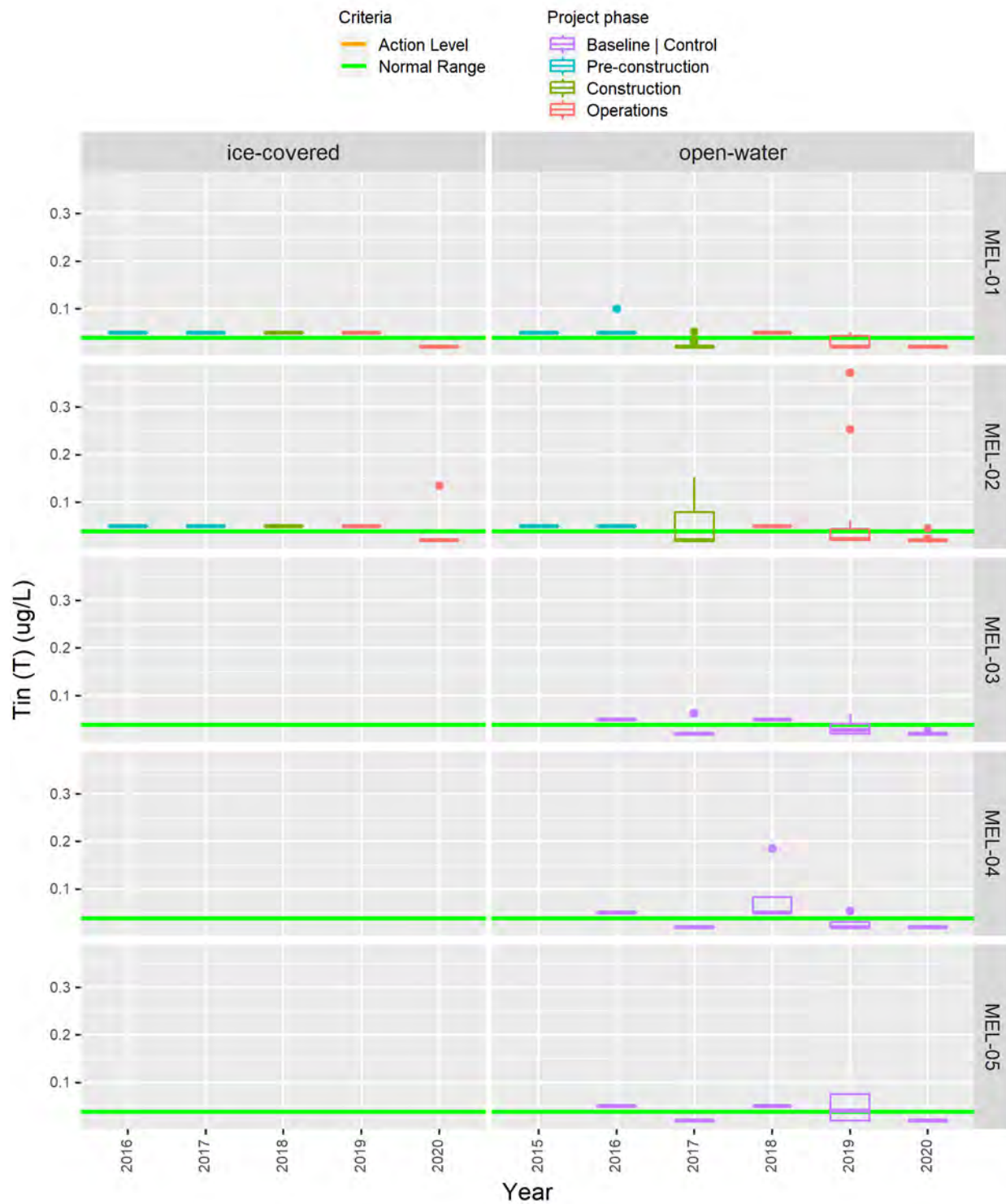


Figure C1-49. Total titanium ($\mu\text{g/L}$)

Notes: FEIS predictions (where applicable) represent predicted water quality at the edge of the mixing zone in the near-field area (MEL-01).

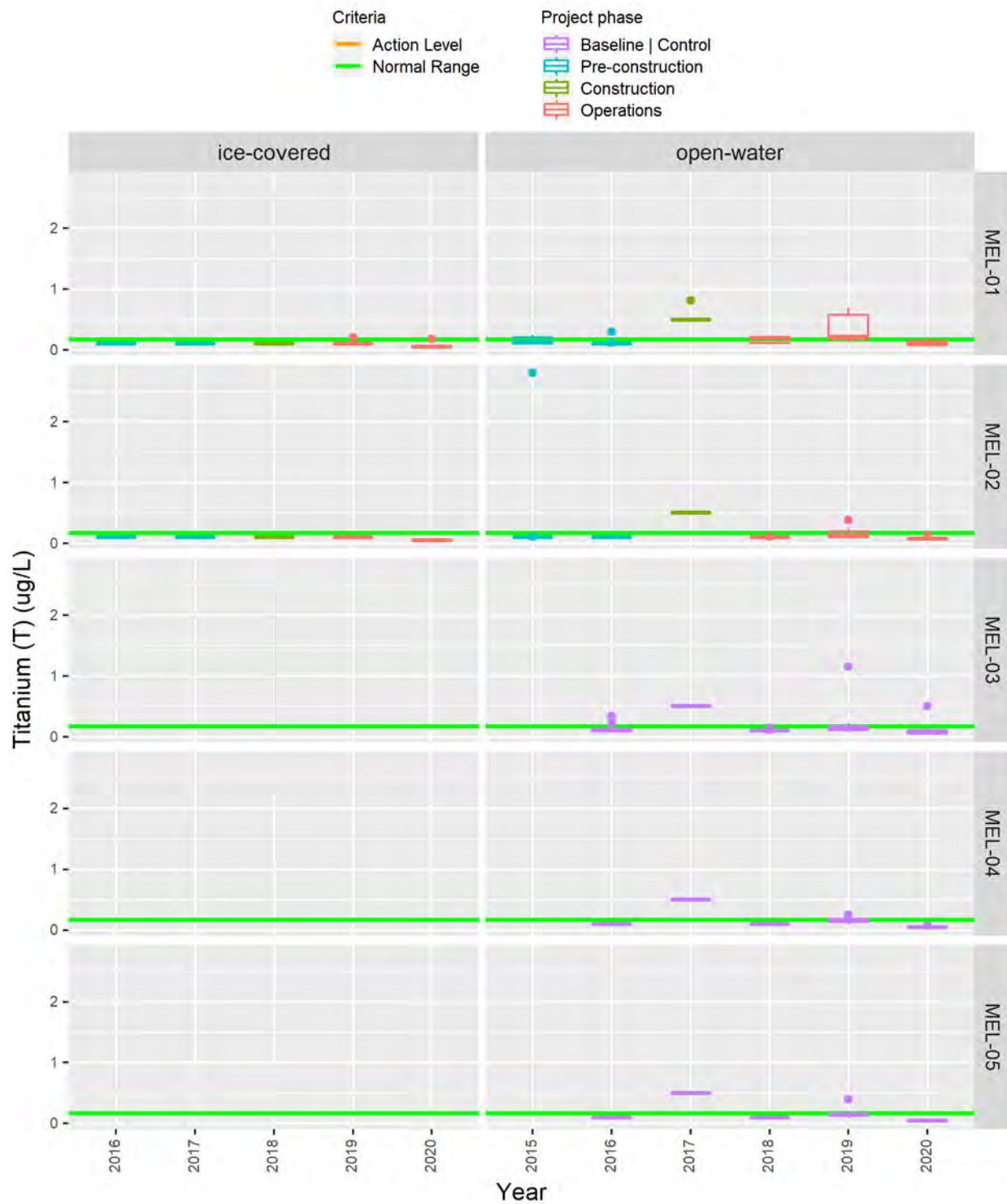


Figure C1-50. Total uranium ($\mu\text{g/L}$)

Notes: FEIS predictions (where applicable) represent predicted water quality at the edge of the mixing zone in the near-field area (MEL-01).

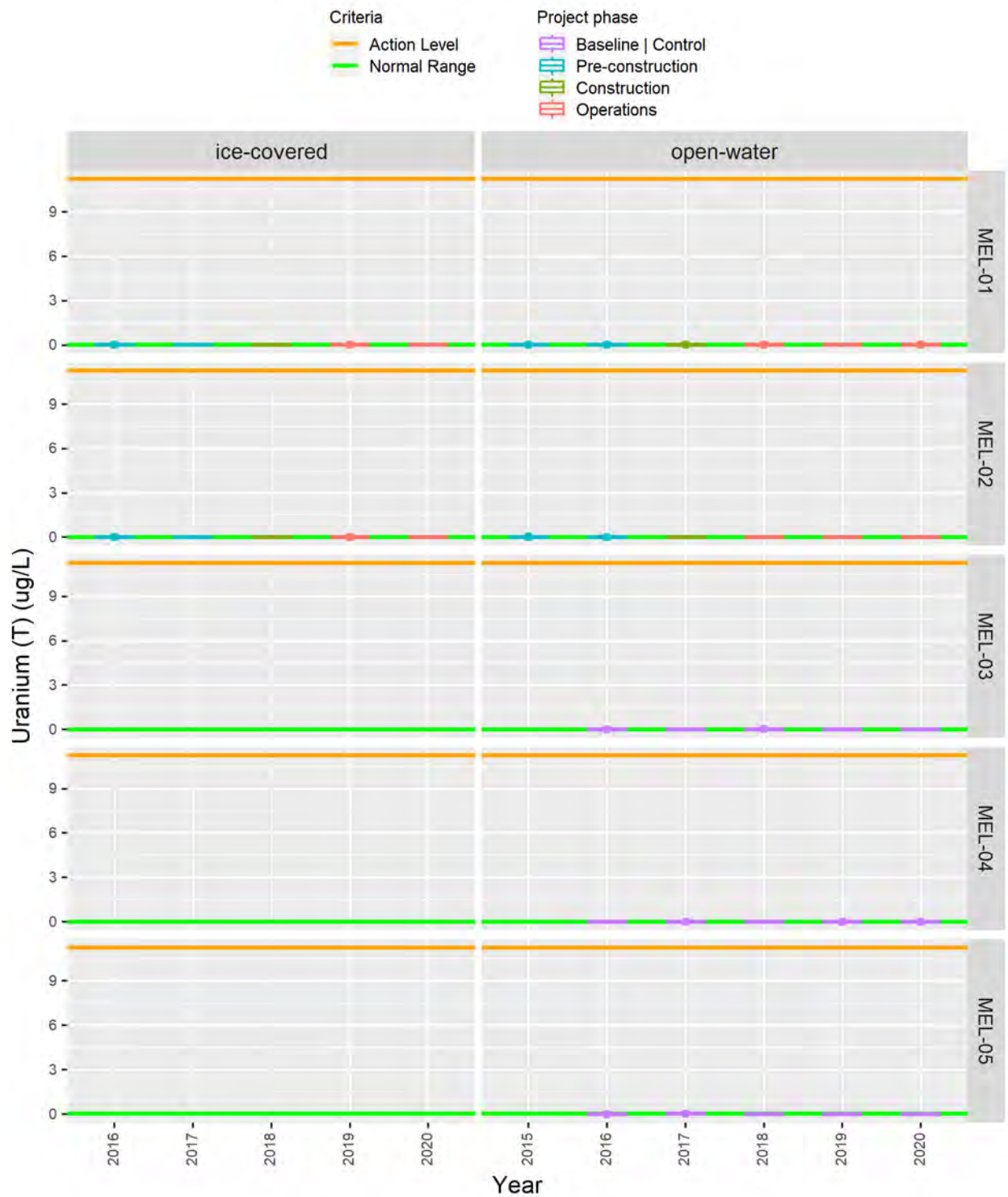


Figure C1-51. Total vanadium ($\mu\text{g/L}$)

Notes: FEIS predictions (where applicable) represent predicted water quality at the edge of the mixing zone in the near-field area (MEL-01).

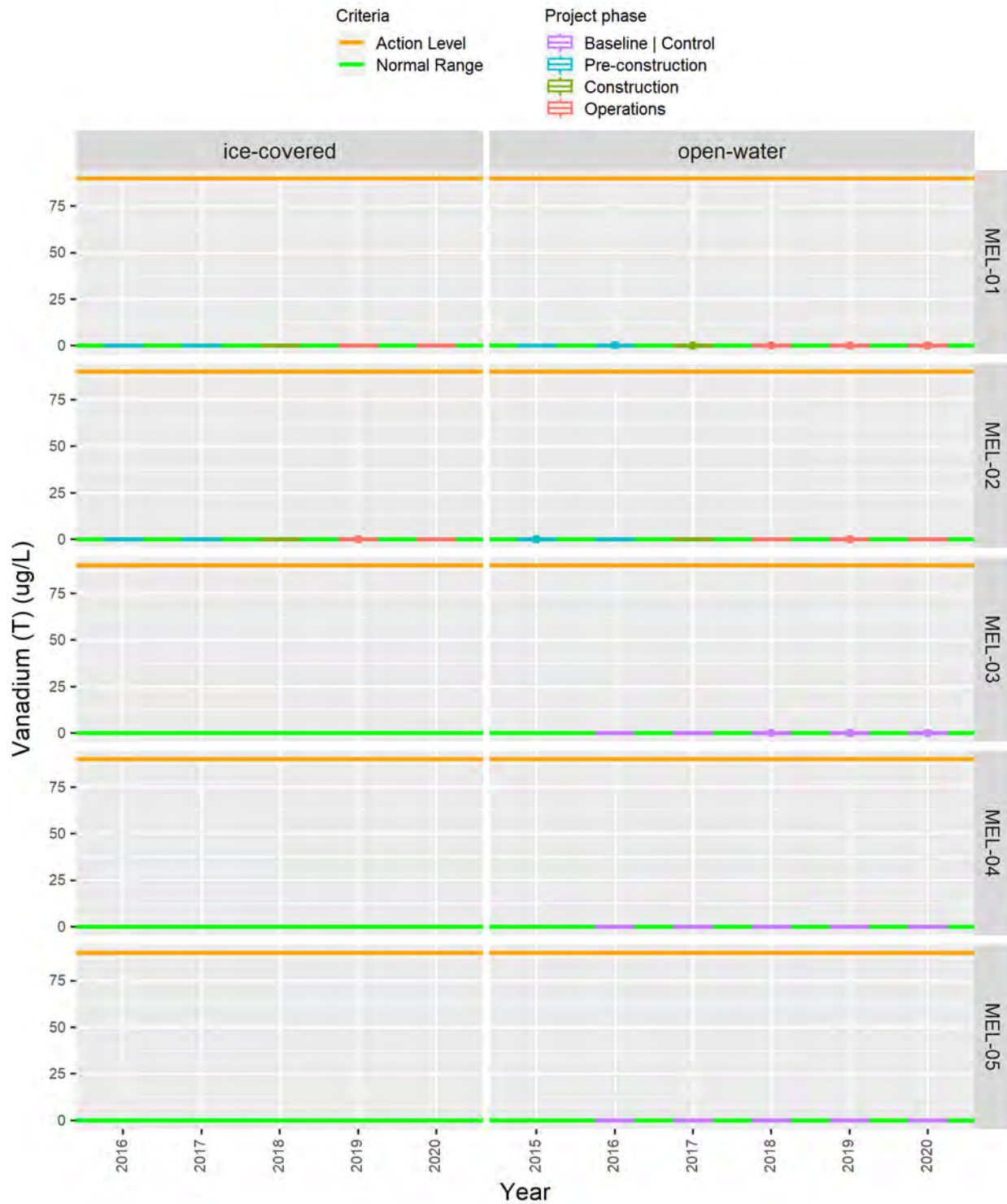


Figure C1-52. Total zinc (µg/L)

Notes: FEIS predictions (where applicable) represent predicted water quality at the edge of the mixing zone in the near-field area (MEL-01).

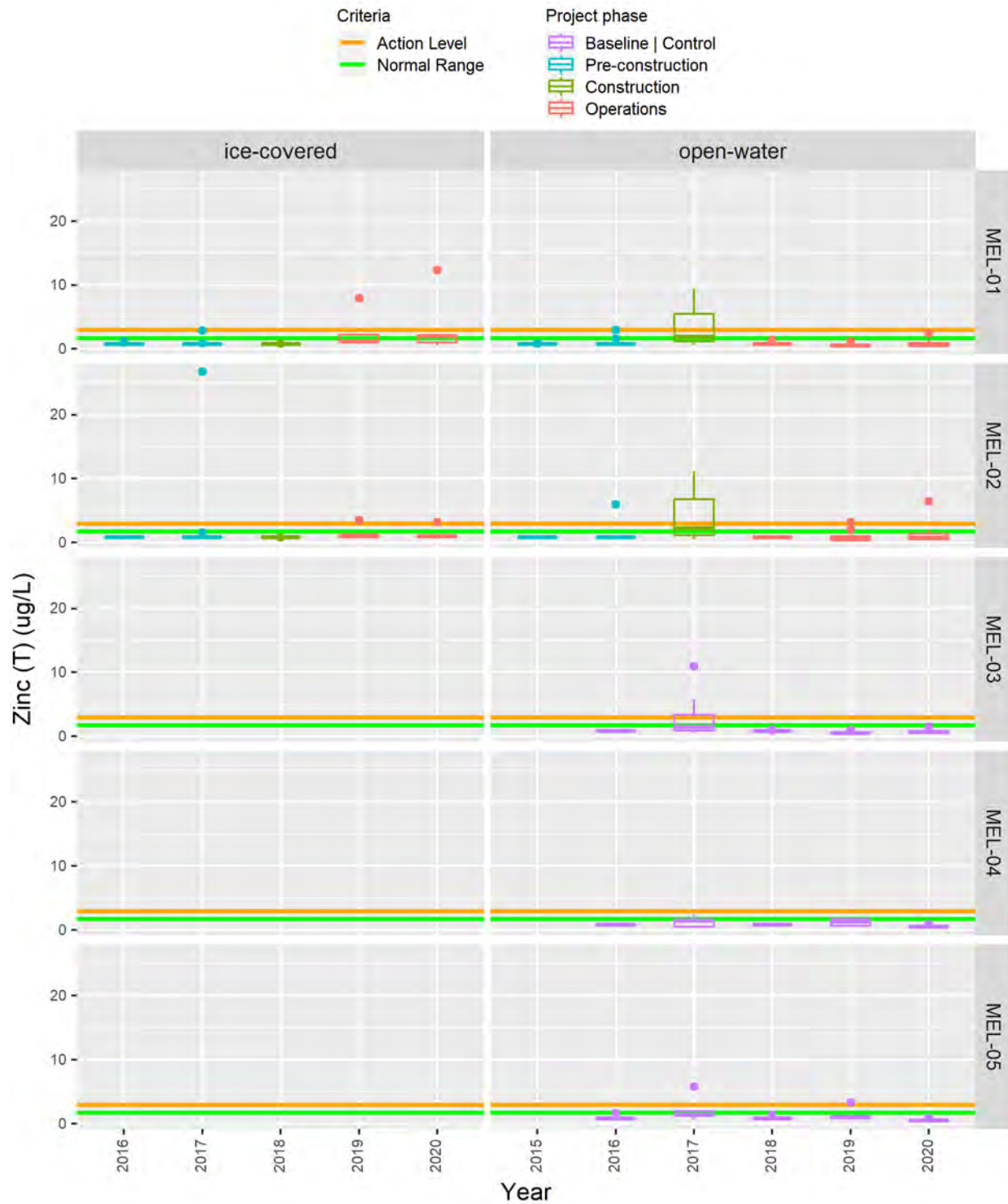


Figure C1-53. Dissolved manganese ($\mu\text{g/L}$)

Notes: FEIS predictions (where applicable) represent predicted water quality at the edge of the mixing zone in the near-field area (MEL-01).

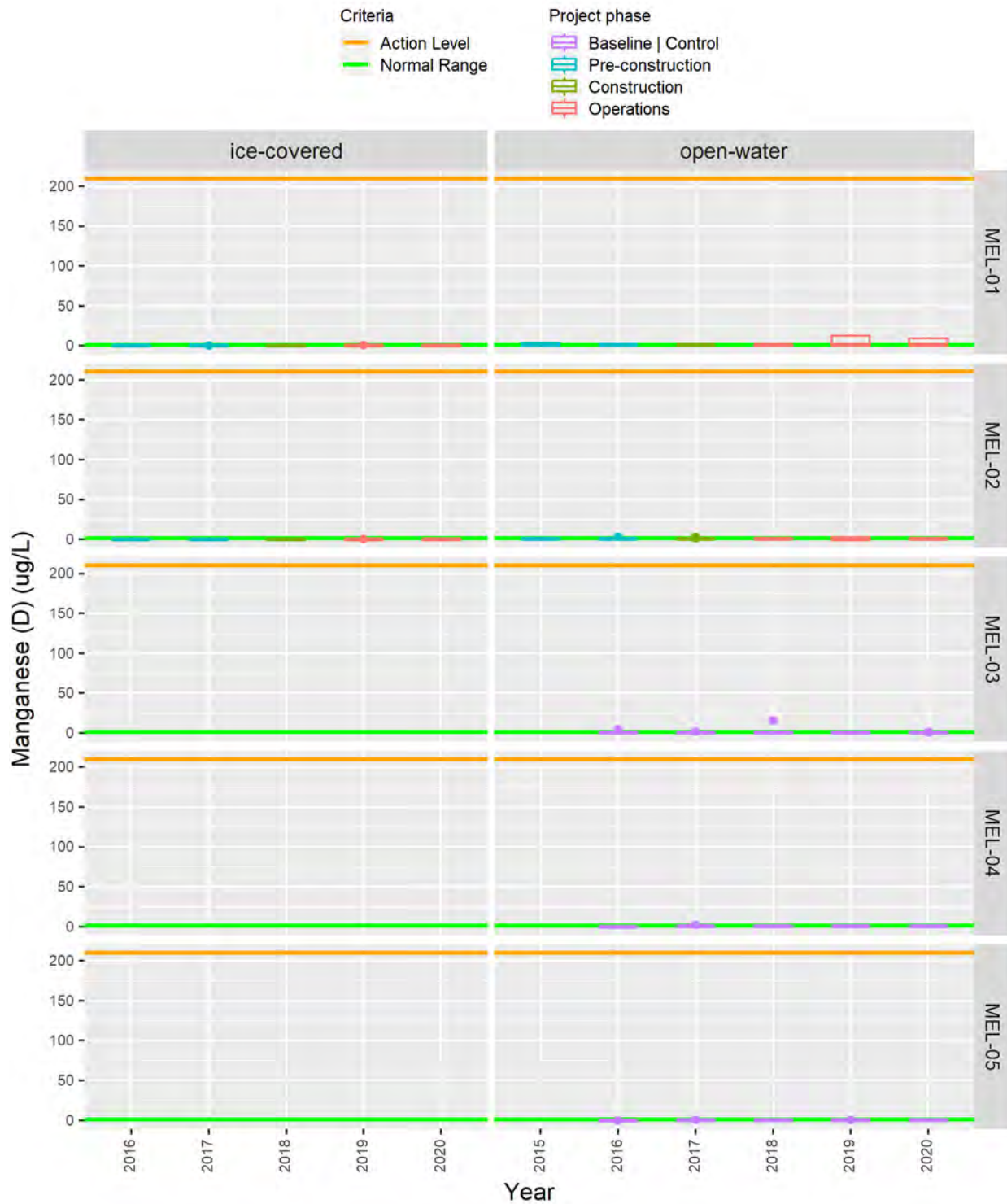
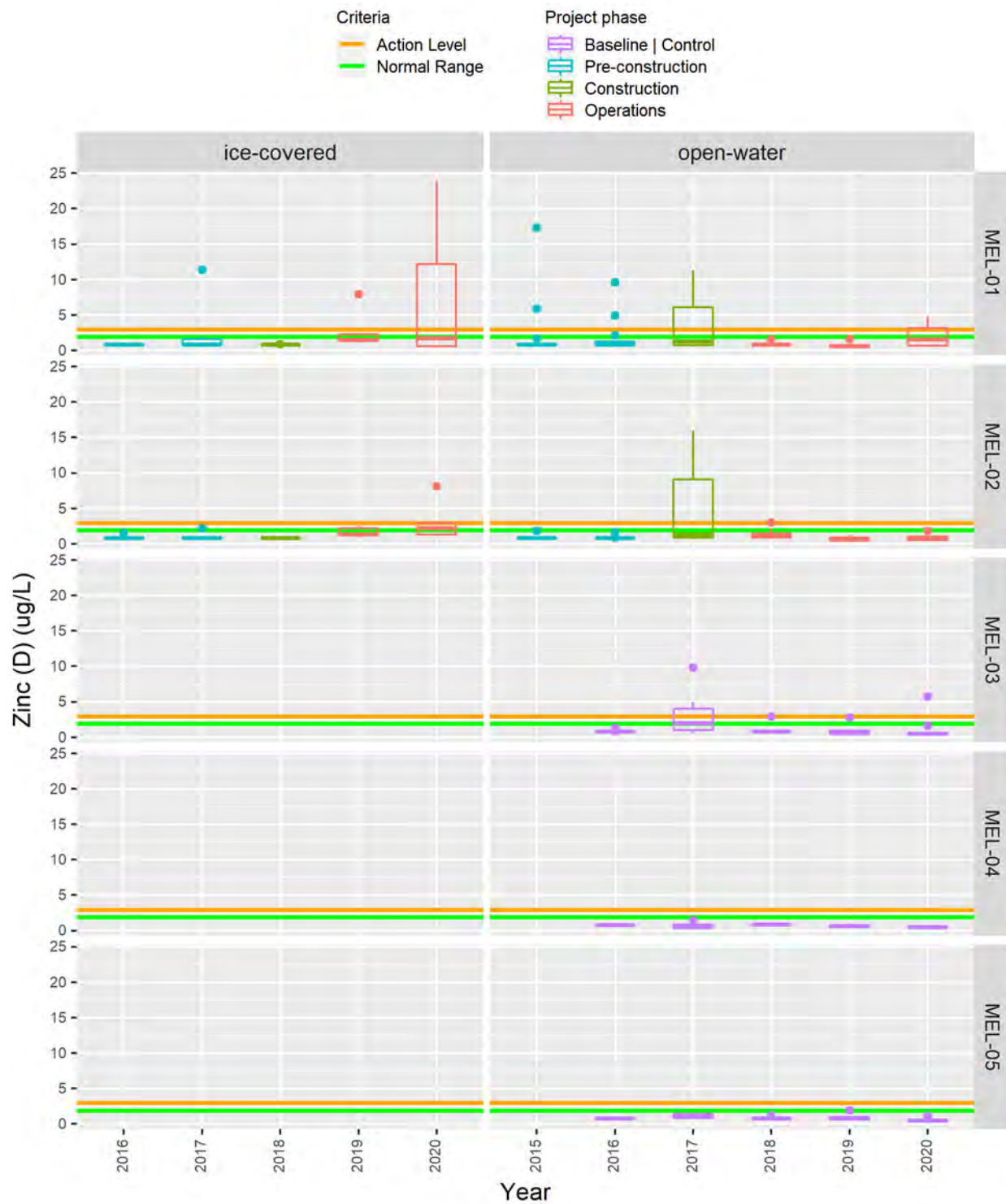


Figure C1-54. Dissolved zinc ($\mu\text{g/L}$)

Notes: FEIS predictions (where applicable) represent predicted water quality at the edge of the mixing zone in the near-field area (MEL-01).



Appendix C2

Meliadine Lake Water Chemistry – Scatter Plots

LIST OF FIGURES – APPENDIX C2

Figure C2-1. Specific conductivity ($\mu\text{S}/\text{cm}$).....	1
Figure C2-2. Field pH	2
Figure C2-3. Lab-measured conductivity ($\mu\text{S}/\text{cm}$)	3
Figure C2-4. Hardness (mg/L)	4
Figure C2-5. Lab measured pH	5
Figure C2-6. Total dissolved solids (mg/L)	6
Figure C2-7. Calculated total dissolved solids (mg/L).....	7
Figure C2-8. Total suspended solids (mg/L)	8
Figure C2-9. Lab measured turbidity (NTU).....	9
Figure C2-10. Bicarbonate alkalinity (mg/L)	10
Figure C2-11. Total alkalinity (mg/L)	11
Figure C2-12. Total calcium (mg/L).....	12
Figure C2-13. Total magnesium (mg/L)	13
Figure C2-14. Total potassium (mg/L)	14
Figure C2-15. Total sodium (mg/L)	15
Figure C2-16. Chloride (mg/L)	16
Figure C2-17. Fluoride (mg/L).....	17
Figure C2-18. Ammonia (as nitrogen) (mg/L).....	18
Figure C2-19. Nitrate (as N) (mg/L)	19
Figure C2-20. Nitrate and nitrite (as N) (mg/L)	20
Figure C2-21. Total Kjeldahl nitrogen (TKN; mg/L).....	21
Figure C2-22. Sulphate (mg/L).....	22
Figure C2-23. Total phosphorus (mg/L)	23
Figure C2-24. Dissolved organic carbon (mg/L).....	24
Figure C2-25. Total organic carbon (mg/L).....	25
Figure C2-26. Total aluminum ($\mu\text{g}/\text{L}$).....	26
Figure C2-27. Total antimony ($\mu\text{g}/\text{L}$)	27
Figure C2-28. Total arsenic ($\mu\text{g}/\text{L}$)	28
Figure C2-29. Total barium ($\mu\text{g}/\text{L}$)	29

Figure C2-30. Total beryllium ($\mu\text{g/L}$).....	30
Figure C2-31. Total bismuth ($\mu\text{g/L}$).....	31
Figure C2-32. Total boron ($\mu\text{g/L}$)	32
Figure C2-33. Total cadmium ($\mu\text{g/L}$).....	33
Figure C2-34. Total chromium ($\mu\text{g/L}$)	34
Figure C2-35. Total cobalt ($\mu\text{g/L}$).....	35
Figure C2-36. Total copper ($\mu\text{g/L}$).....	36
Figure C2-37. Total iron ($\mu\text{g/L}$)	37
Figure C2-38. Total lead ($\mu\text{g/L}$)	38
Figure C2-39. Total lithium ($\mu\text{g/L}$)	39
Figure C2-40. Total manganese ($\mu\text{g/L}$)	40
Figure C2-41. Total mercury ($\mu\text{g/L}$)	41
Figure C2-42. Total molybdenum ($\mu\text{g/L}$)	42
Figure C2-43. Total nickel ($\mu\text{g/L}$)	43
Figure C2-44. Total selenium ($\mu\text{g/L}$)	44
Figure C2-45. Total silver ($\mu\text{g/L}$)	45
Figure C2-46. Total strontium ($\mu\text{g/L}$).....	46
Figure C2-47. Total thallium ($\mu\text{g/L}$).....	47
Figure C2-48. Total tin ($\mu\text{g/L}$).....	48
Figure C2-49. Total titanium ($\mu\text{g/L}$)	49
Figure C2-50. Total uranium ($\mu\text{g/L}$)	50
Figure C2-51. Total vanadium ($\mu\text{g/L}$).....	51
Figure C2-52. Total zinc ($\mu\text{g/L}$).....	52
Figure C2-53. Dissolved manganese ($\mu\text{g/L}$)	53
Figure C2-54. Dissolved zinc ($\mu\text{g/L}$)	54

Figure C2-1. Specific conductivity ($\mu\text{S}/\text{cm}$)

Notes: FEIS predictions (where applicable) represent predicted water quality at the edge of the mixing zone in the near-field area (MEL-01).



Figure C2-2. Field pH

Notes: FEIS predictions (where applicable) represent predicted water quality at the edge of the mixing zone in the near-field area (MEL-01).

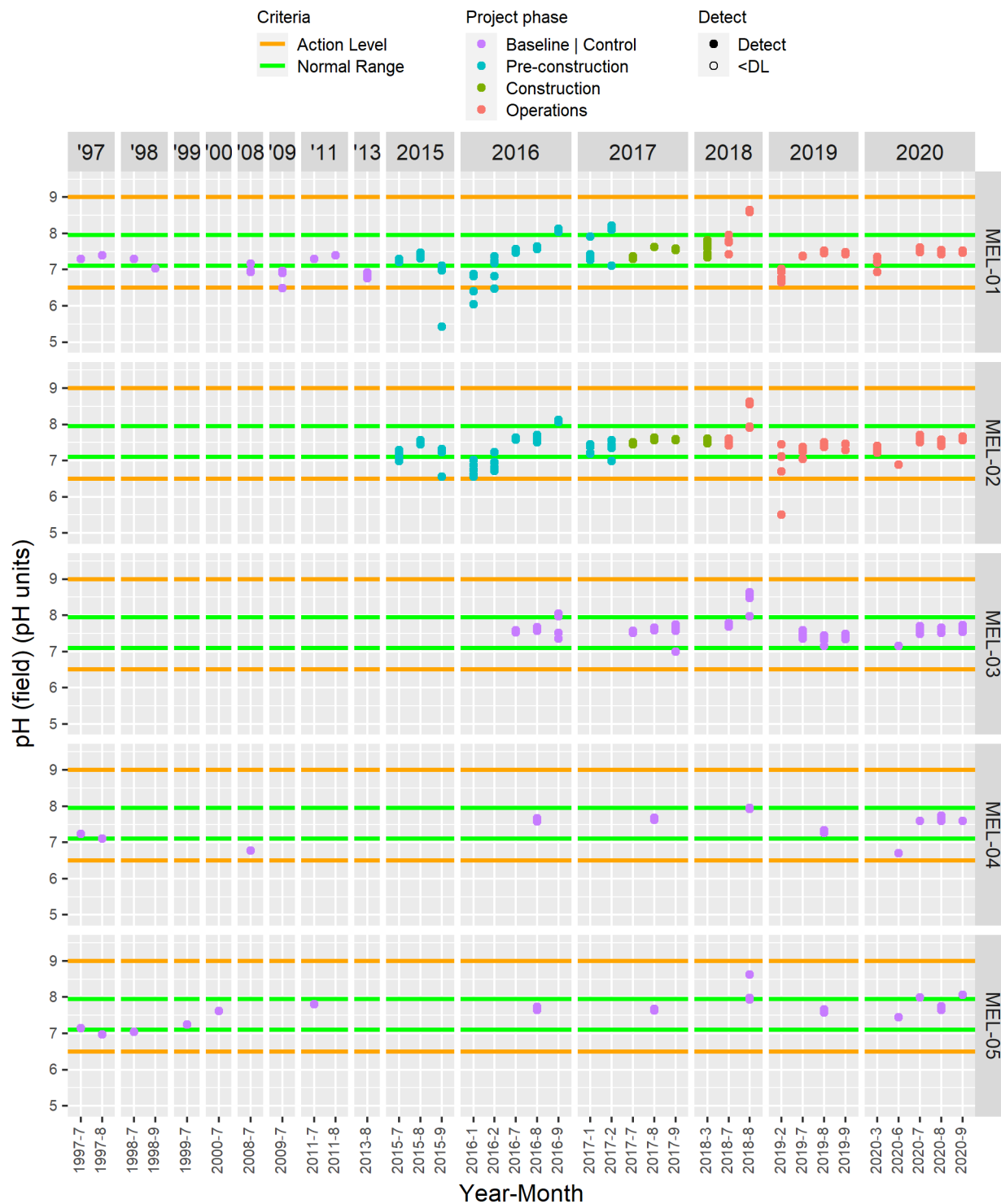


Figure C2-3. Lab-measured conductivity (µS/cm)

Notes: FEIS predictions (where applicable) represent predicted water quality at the edge of the mixing zone in the near-field area (MEL-01).

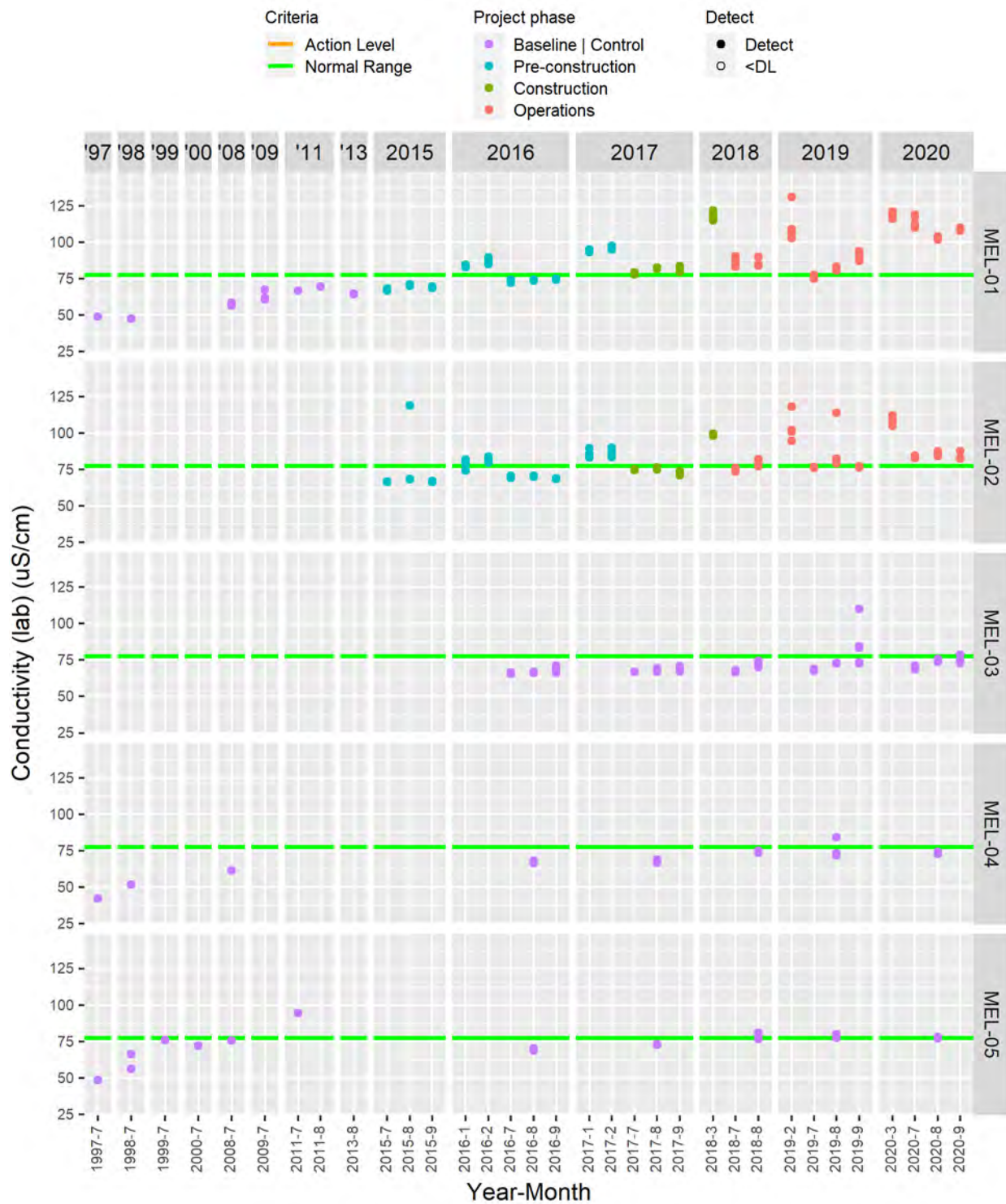


Figure C2-4. Hardness (mg/L)

Notes: FEIS predictions (where applicable) represent predicted water quality at the edge of the mixing zone in the near-field area (MEL-01).

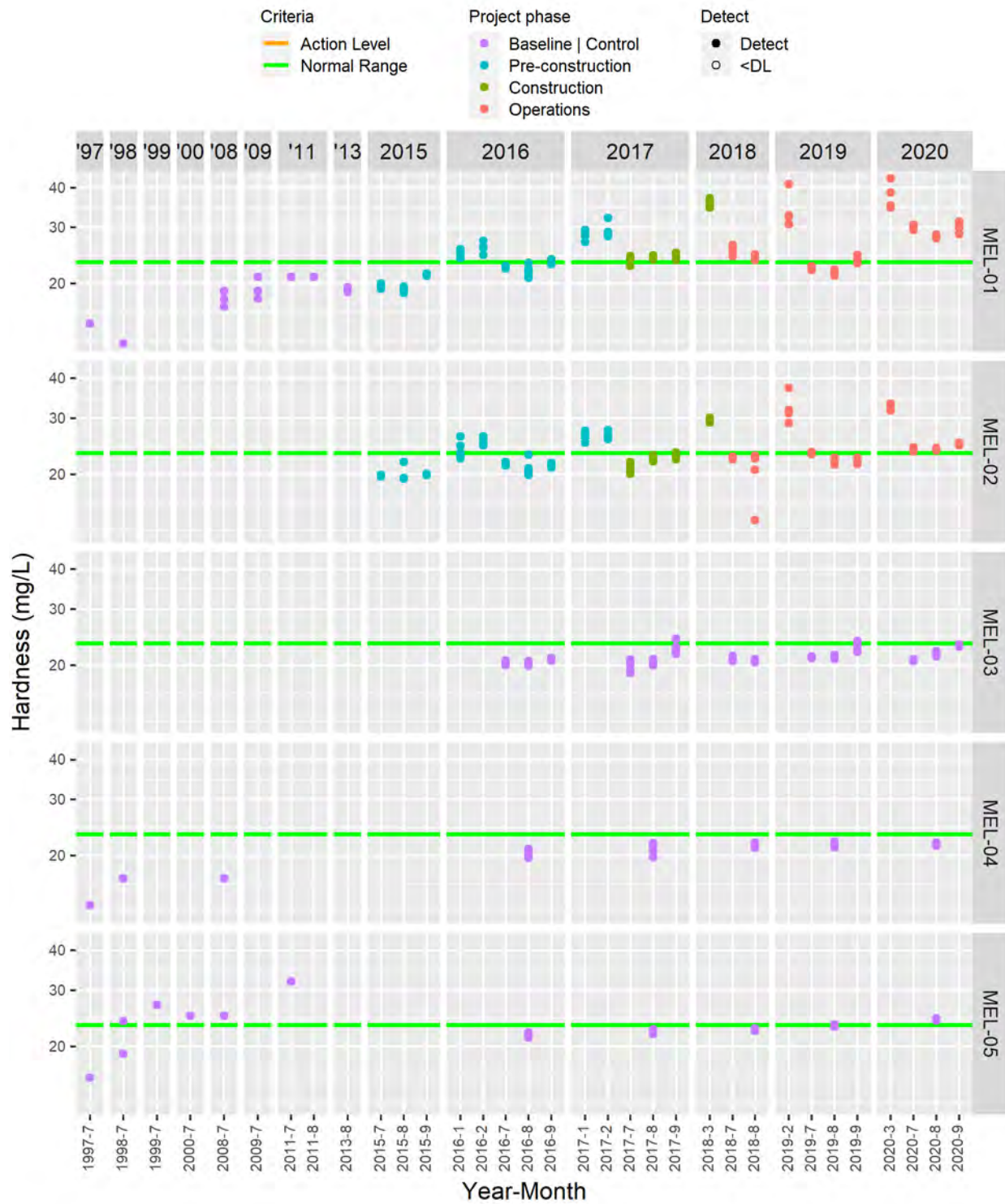


Figure C2-5. Lab measured pH

Notes: FEIS predictions (where applicable) represent predicted water quality at the edge of the mixing zone in the near-field area (MEL-01).

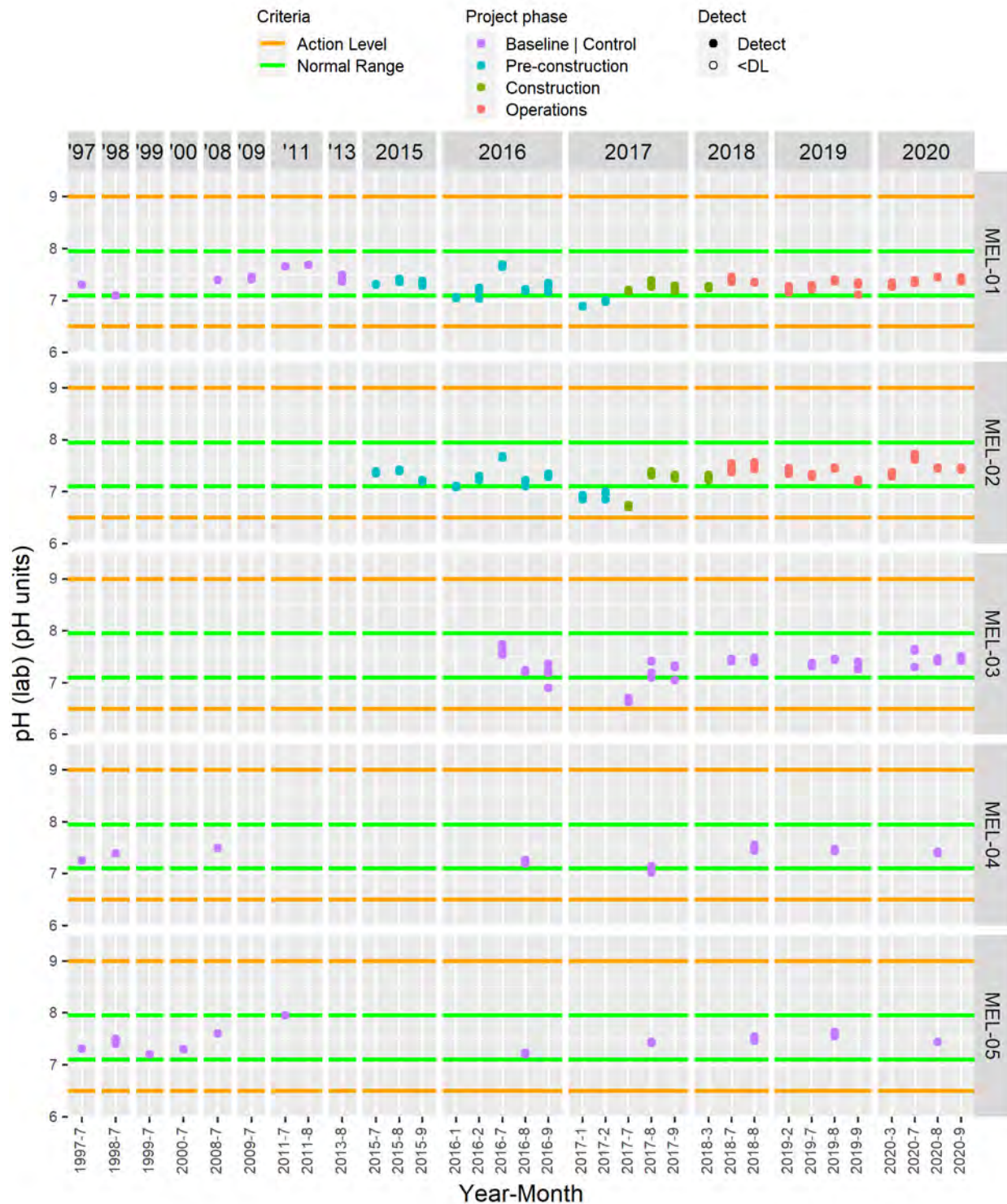


Figure C2-6. Total dissolved solids (mg/L)**2013.**

Notes: FEIS predictions (where applicable) represent predicted water quality at the edge of the mixing zone in the near-field area (MEL-01).

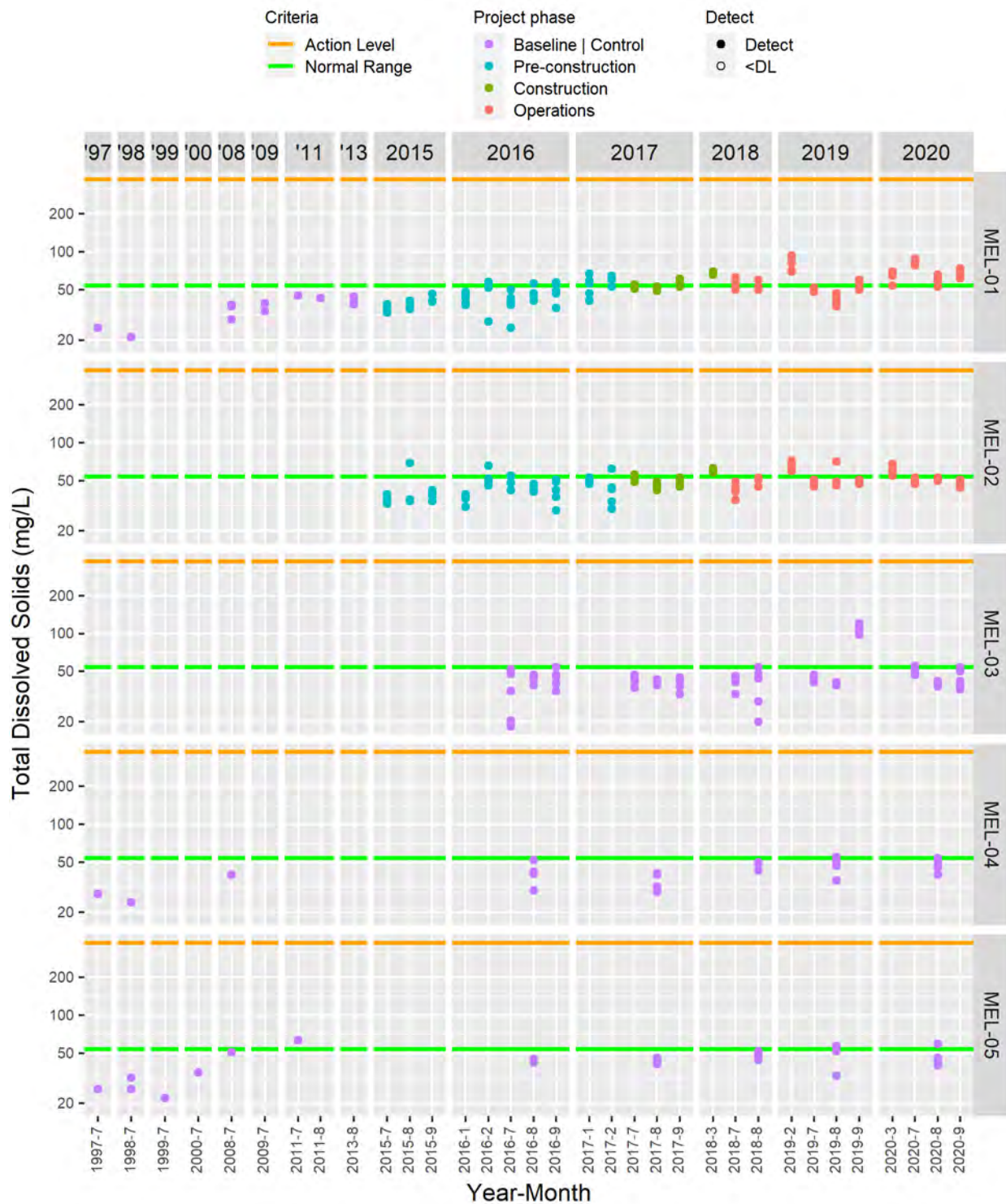


Figure C2-7. Calculated total dissolved solids (mg/L)

Notes: FEIS predictions (where applicable) represent predicted water quality at the edge of the mixing zone in the near-field area (MEL-01).

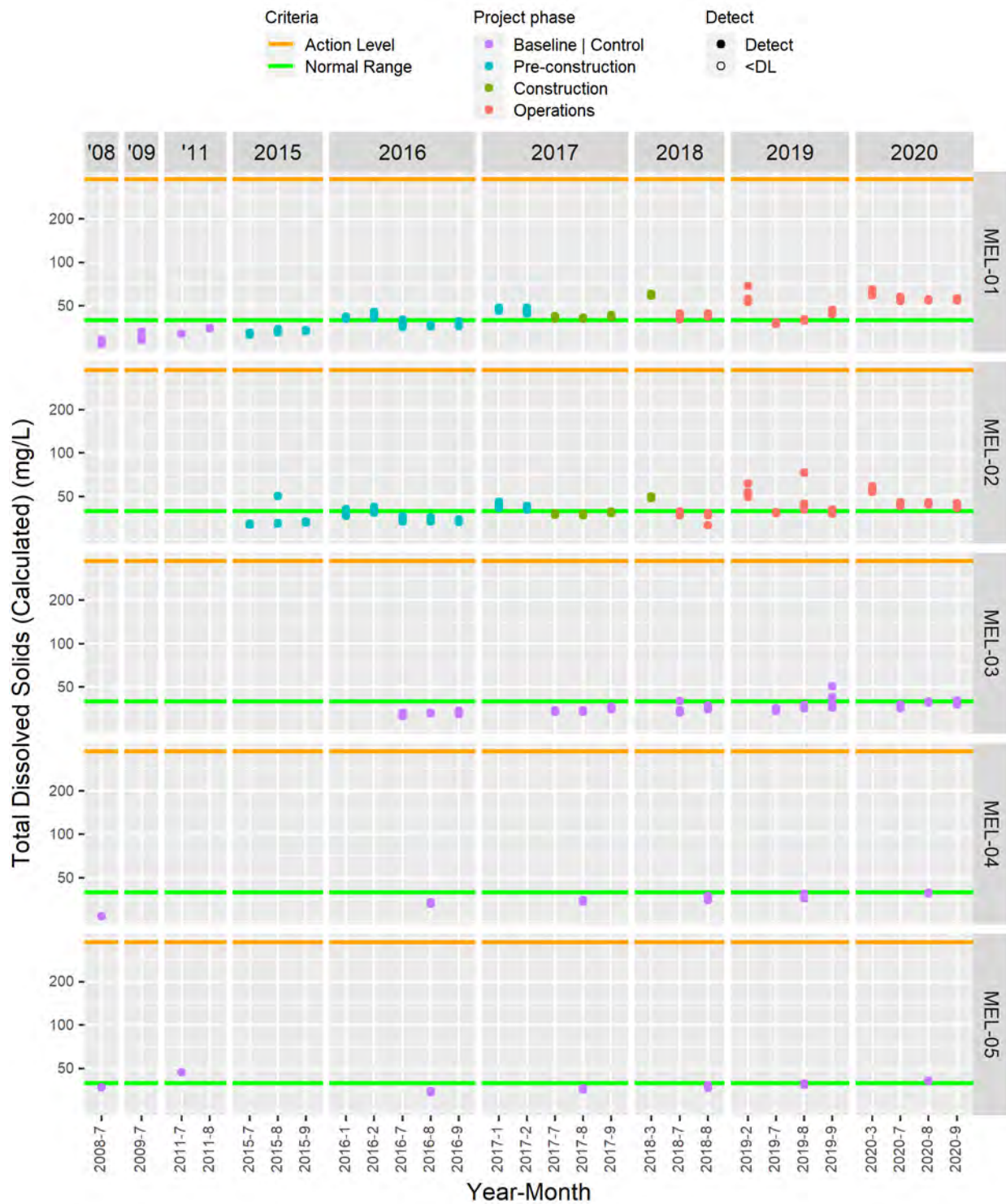


Figure C2-8. Total suspended solids (mg/L)

Notes: FEIS predictions (where applicable) represent predicted water quality at the edge of the mixing zone in the near-field area (MEL-01).

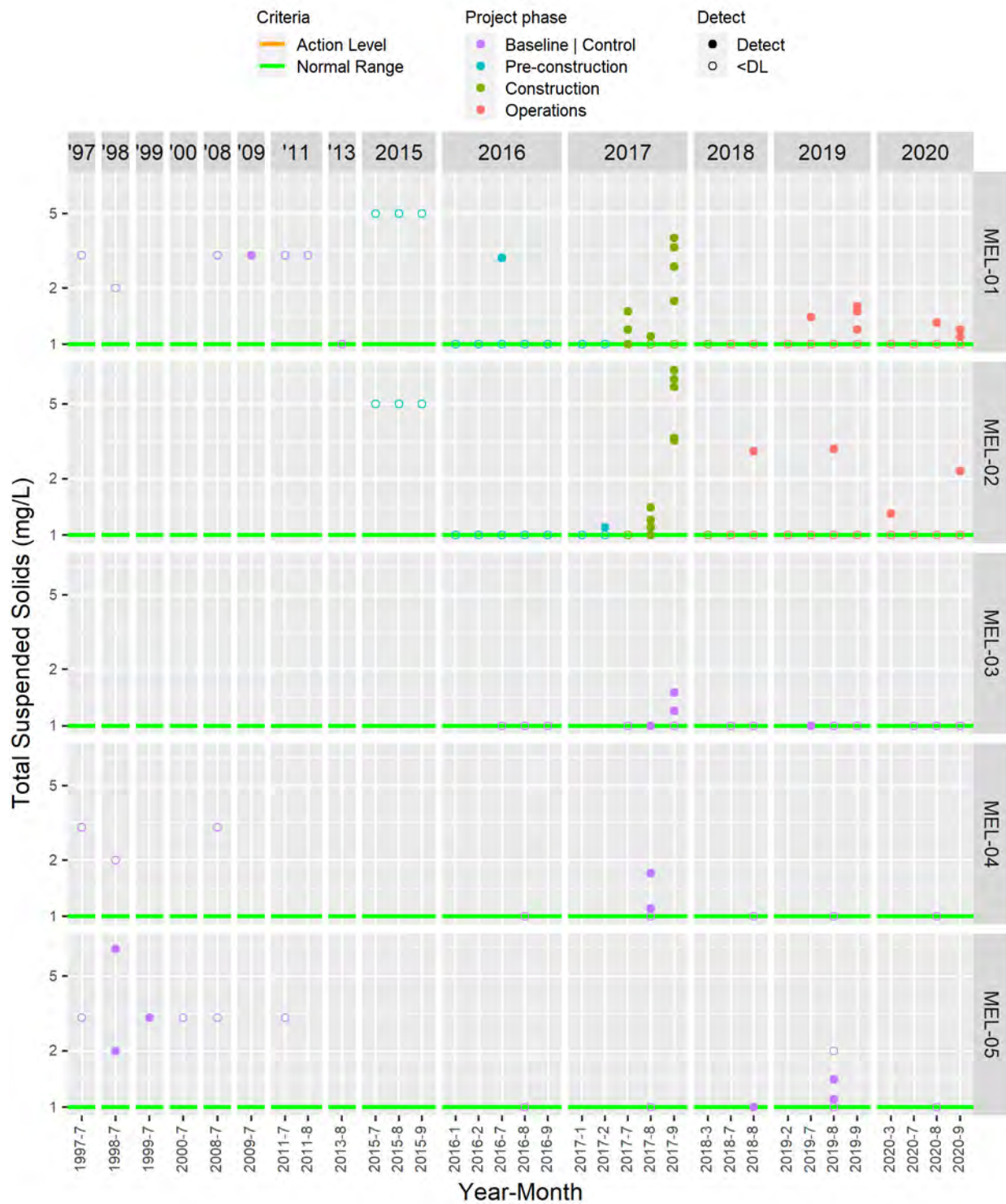


Figure C2-9. Lab measured turbidity (NTU)

Notes: FEIS predictions (where applicable) represent predicted water quality at the edge of the mixing zone in the near-field area (MEL-01).

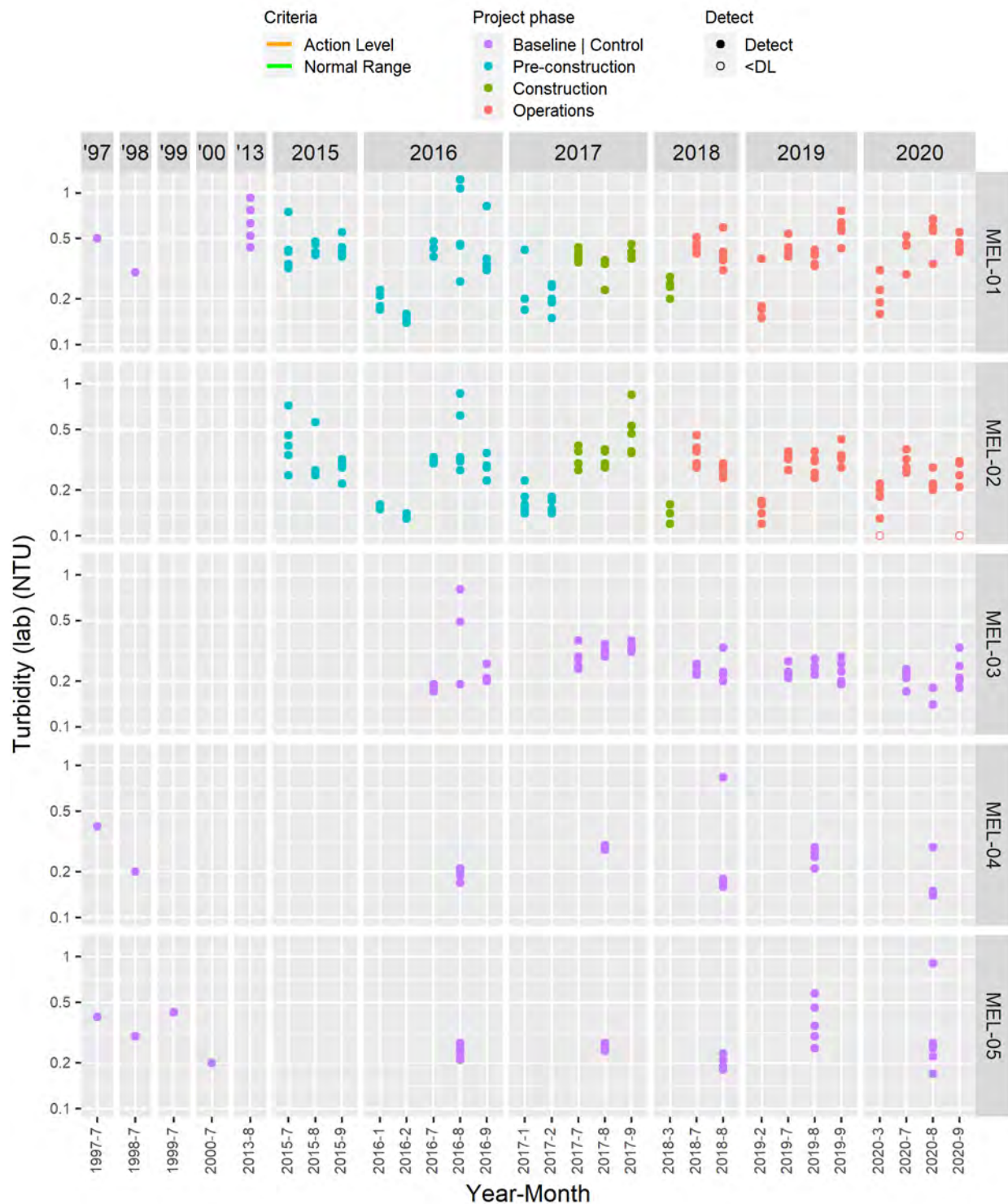


Figure C2-10. Bicarbonate alkalinity (mg/L)

Notes: FEIS predictions (where applicable) represent predicted water quality at the edge of the mixing zone in the near-field area (MEL-01).

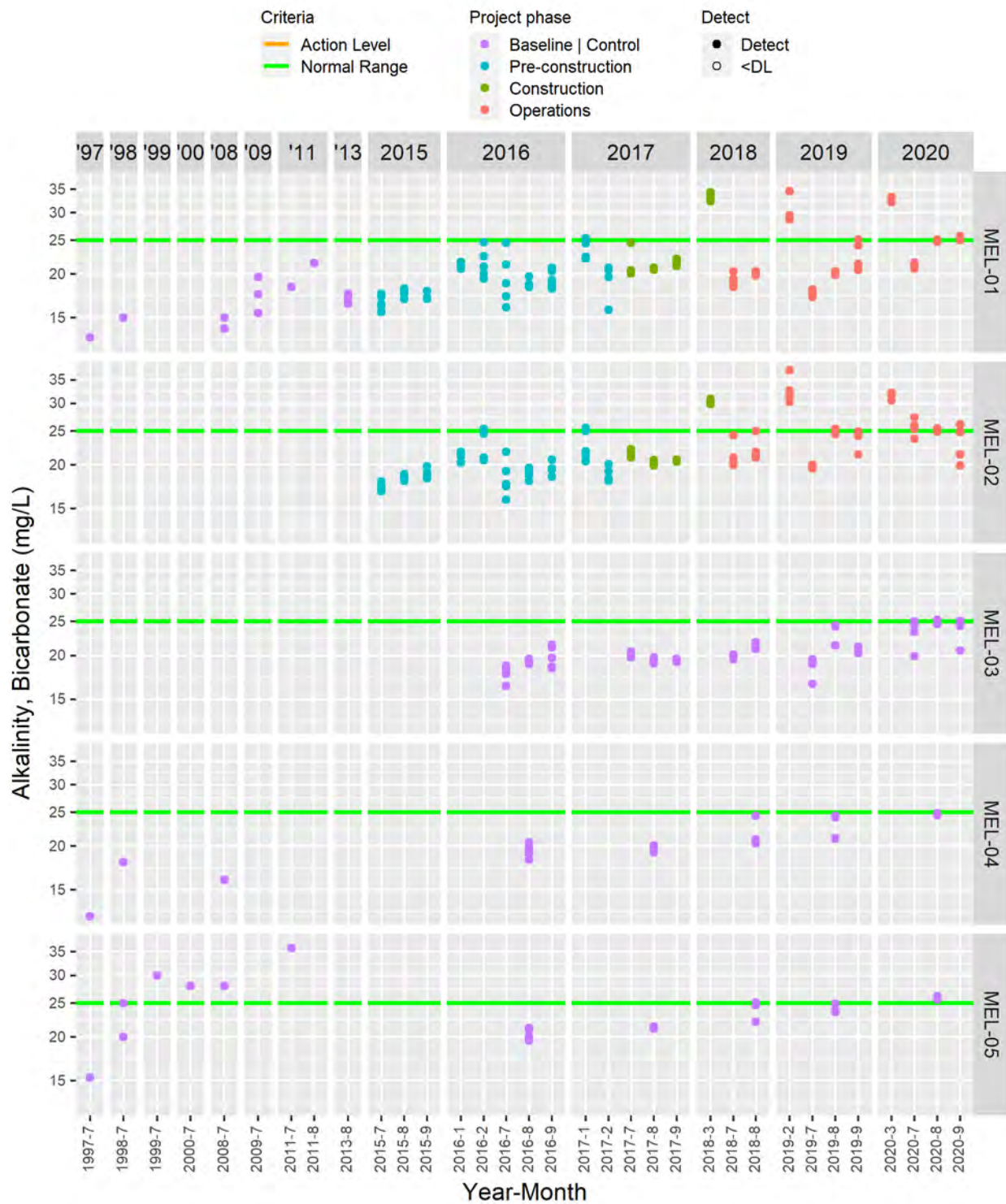


Figure C2-11. Total alkalinity (mg/L)

Notes: FEIS predictions (where applicable) represent predicted water quality at the edge of the mixing zone in the near-field area (MEL-01).

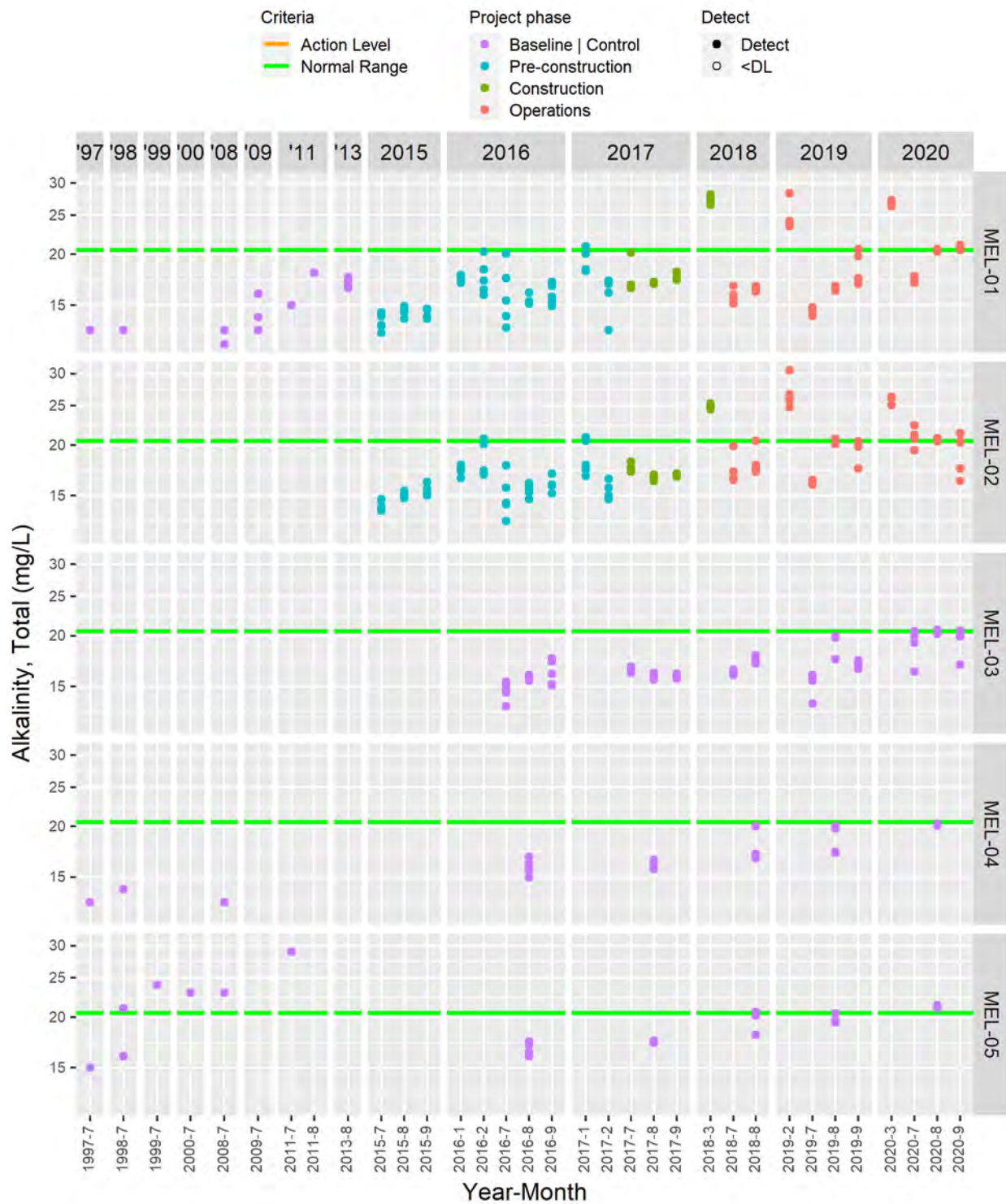


Figure C2-12. Total calcium (mg/L)

Notes: FEIS predictions (where applicable) represent predicted water quality at the edge of the mixing zone in the near-field area (MEL-01).

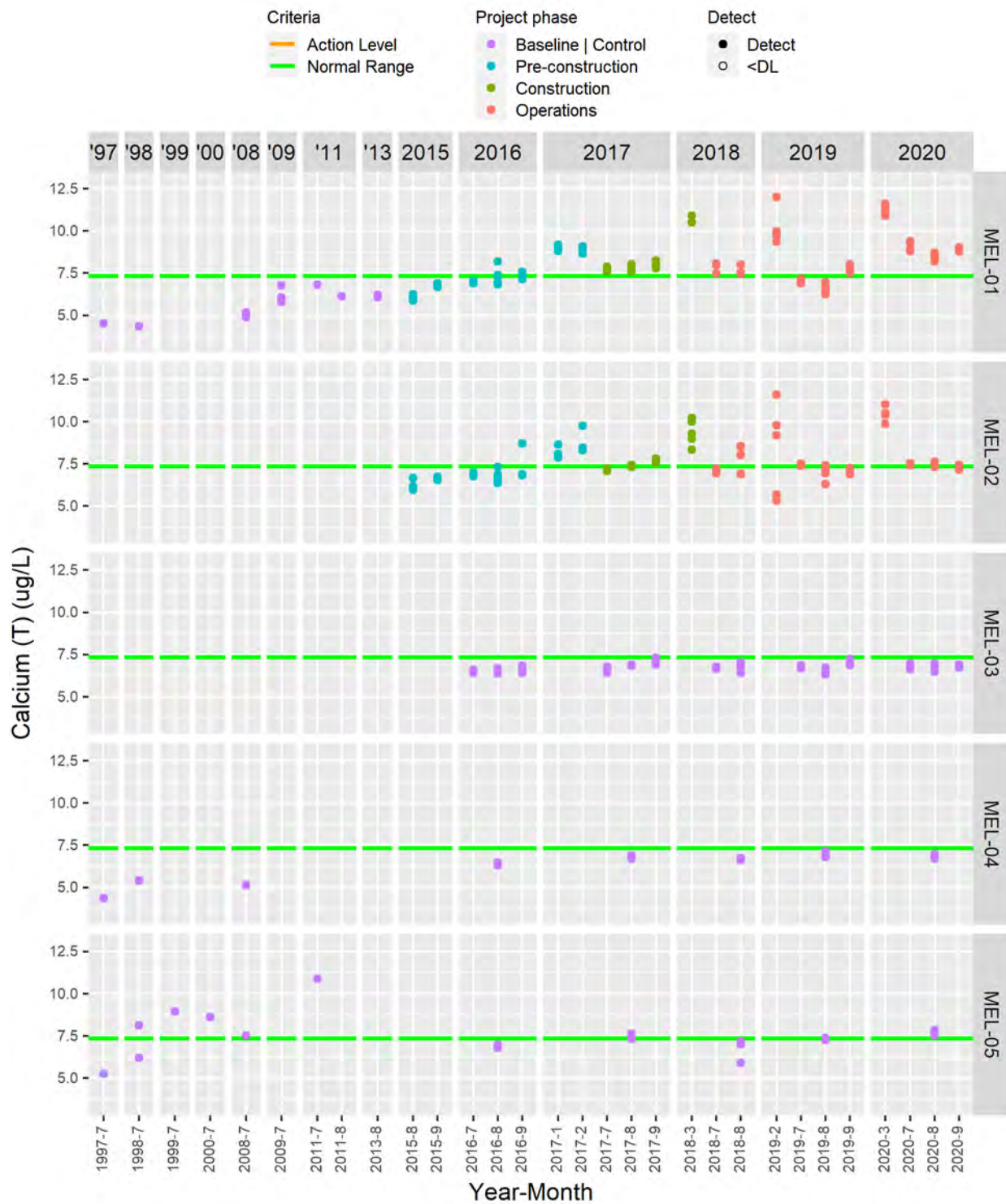


Figure C2-13. Total magnesium (mg/L)

Notes: FEIS predictions (where applicable) represent predicted water quality at the edge of the mixing zone in the near-field area (MEL-01).

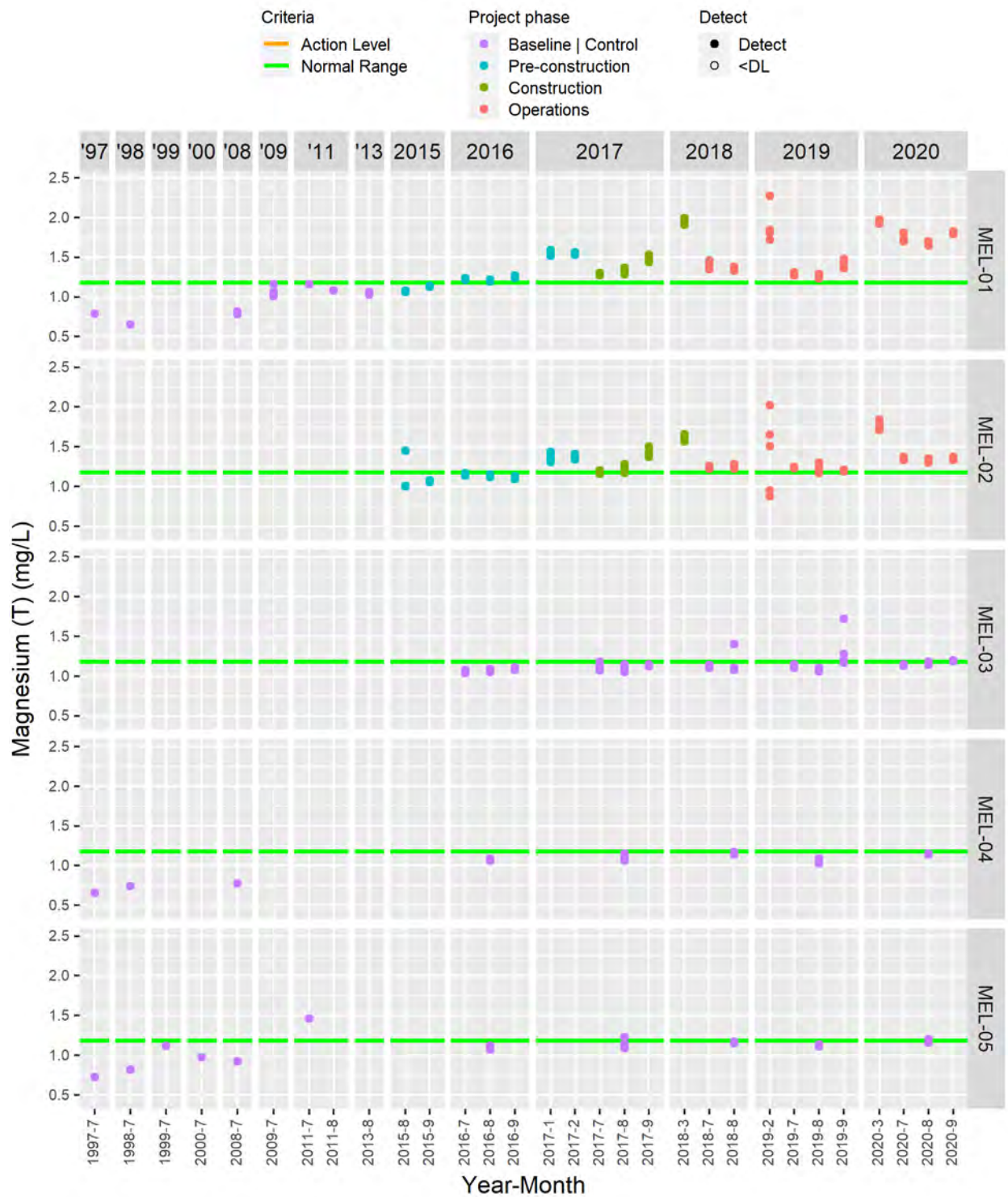


Figure C2-14. Total potassium (mg/L)

Notes: FEIS predictions (where applicable) represent predicted water quality at the edge of the mixing zone in the near-field area (MEL-01).

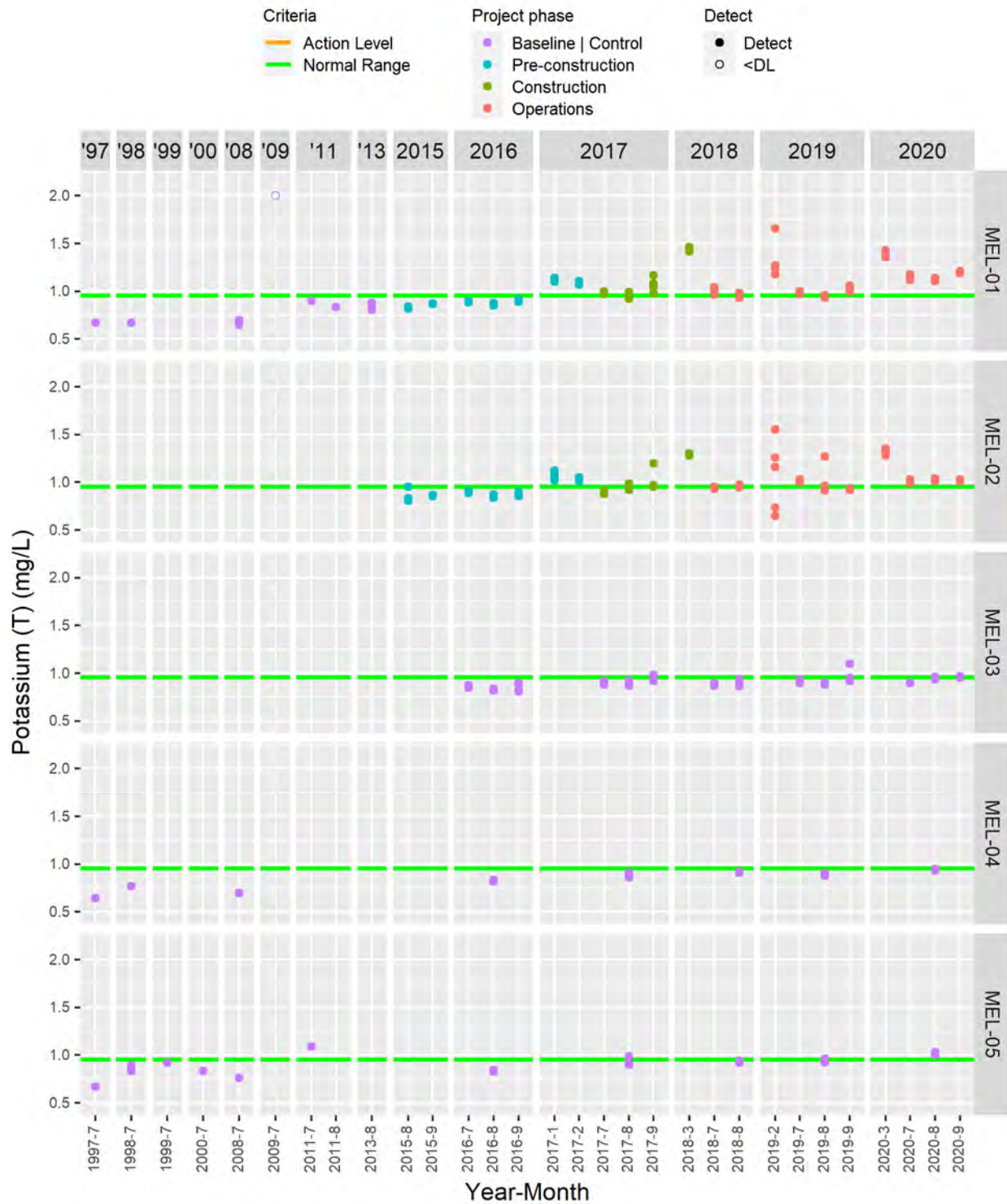


Figure C2-15. Total sodium (mg/L)

Notes: FEIS predictions (where applicable) represent predicted water quality at the edge of the mixing zone in the near-field area (MEL-01).

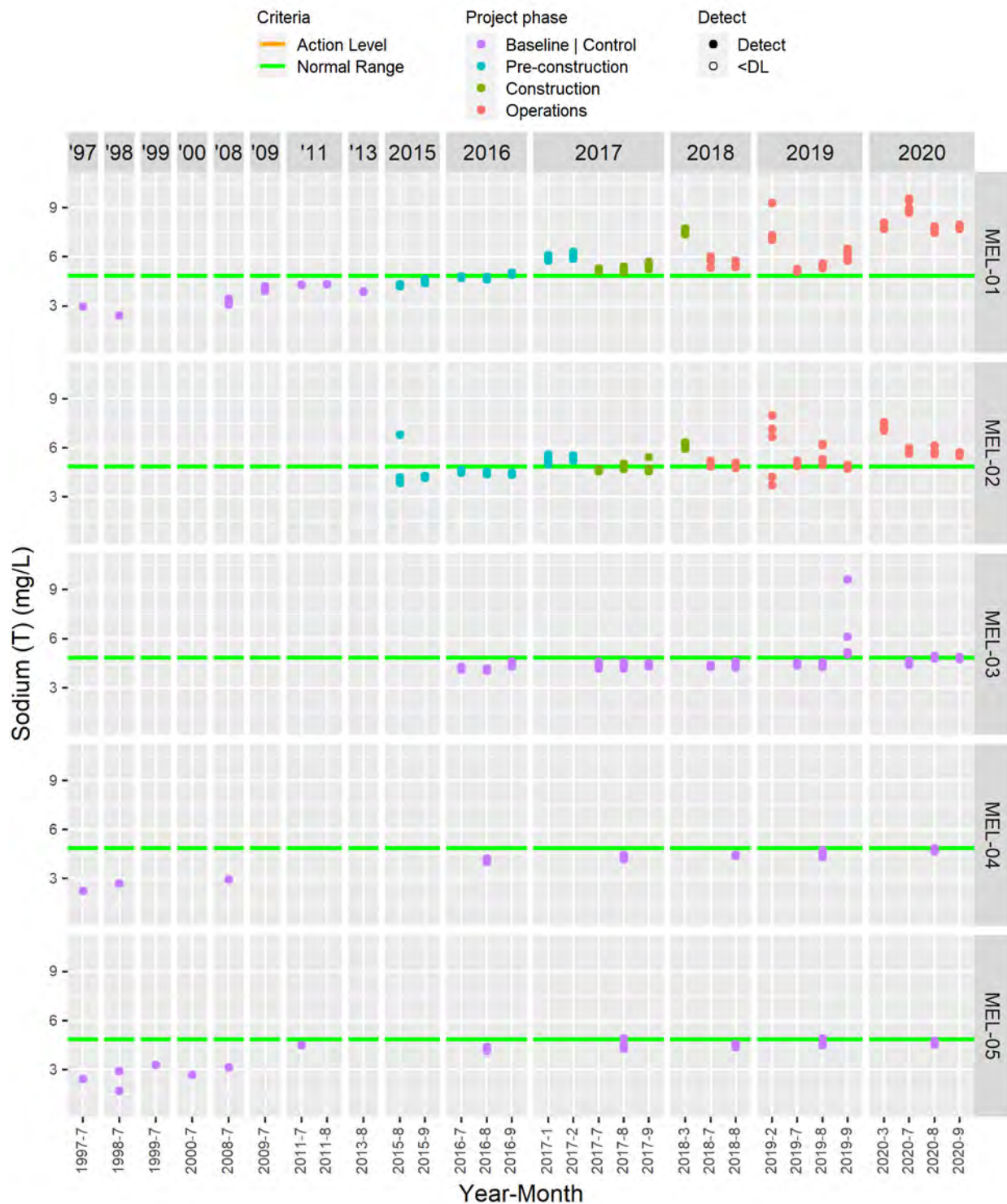


Figure C2-16. Chloride (mg/L)

Notes: FEIS predictions (where applicable) represent predicted water quality at the edge of the mixing zone in the near-field area (MEL-01).

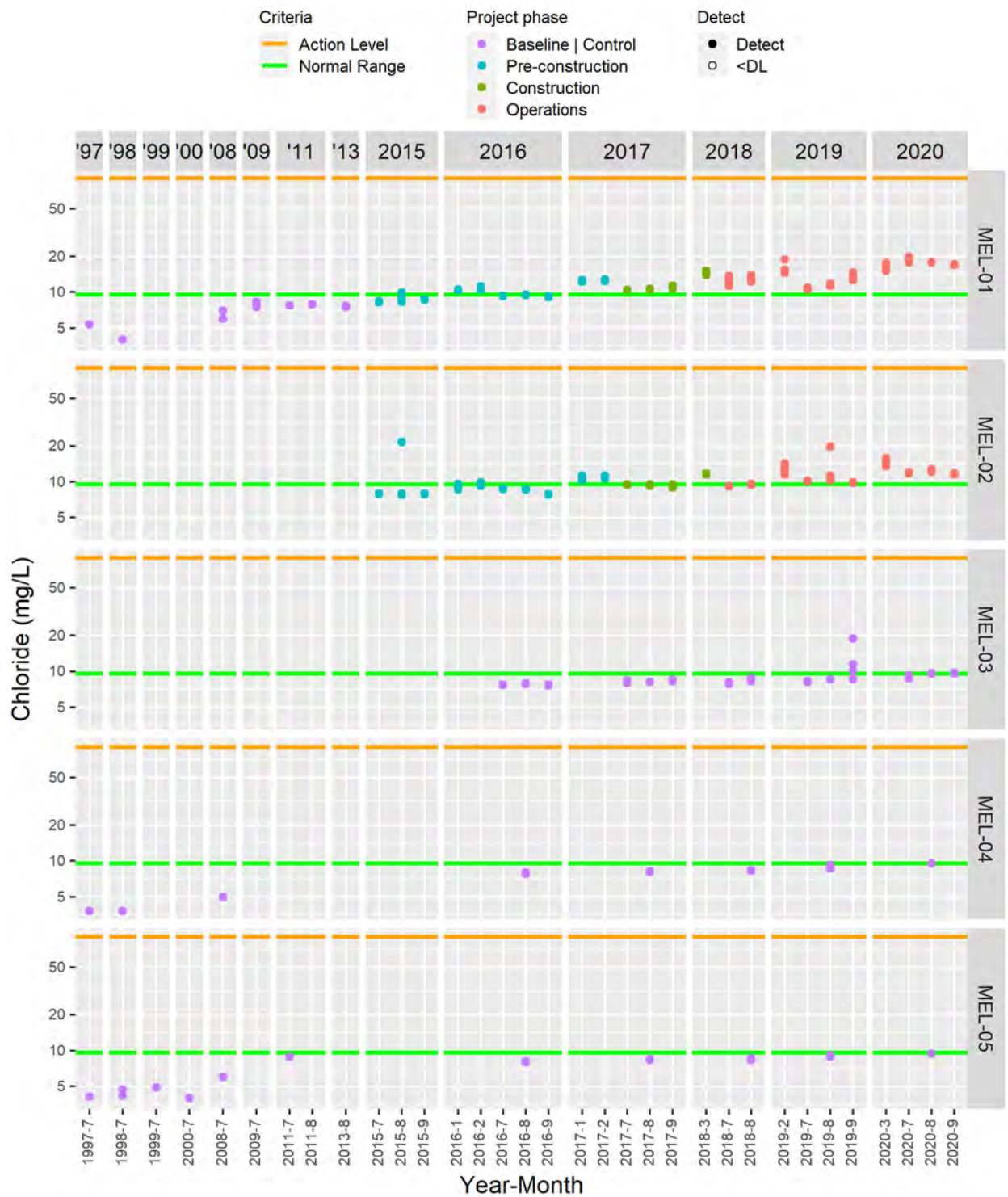


Figure C2-17. Fluoride (mg/L)

Notes: FEIS predictions (where applicable) represent predicted water quality at the edge of the mixing zone in the near-field area (MEL-01).

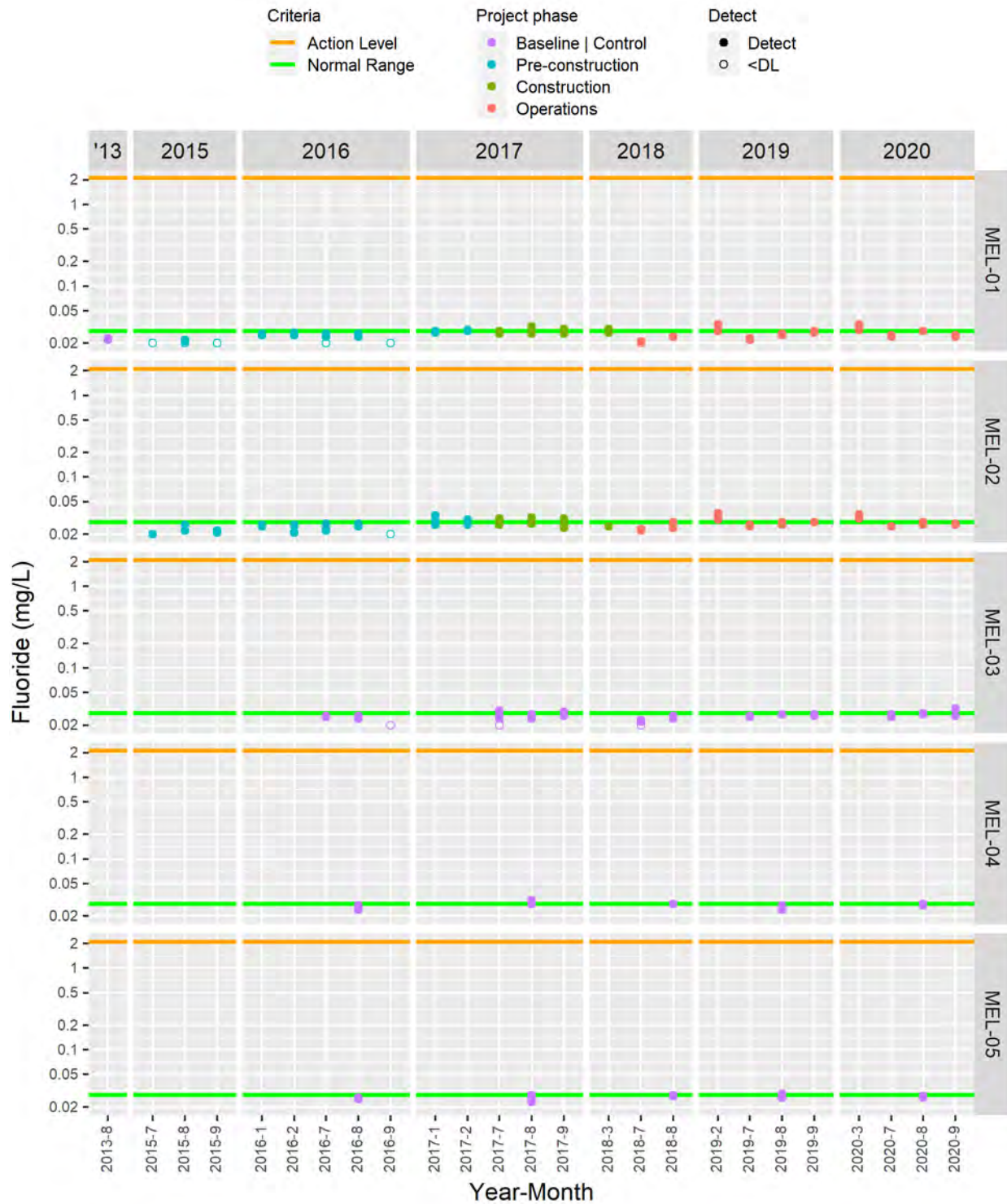


Figure C2-18. Ammonia (as nitrogen) (mg/L)

Notes: FEIS predictions (where applicable) represent predicted water quality at the edge of the mixing zone in the near-field area (MEL-01).

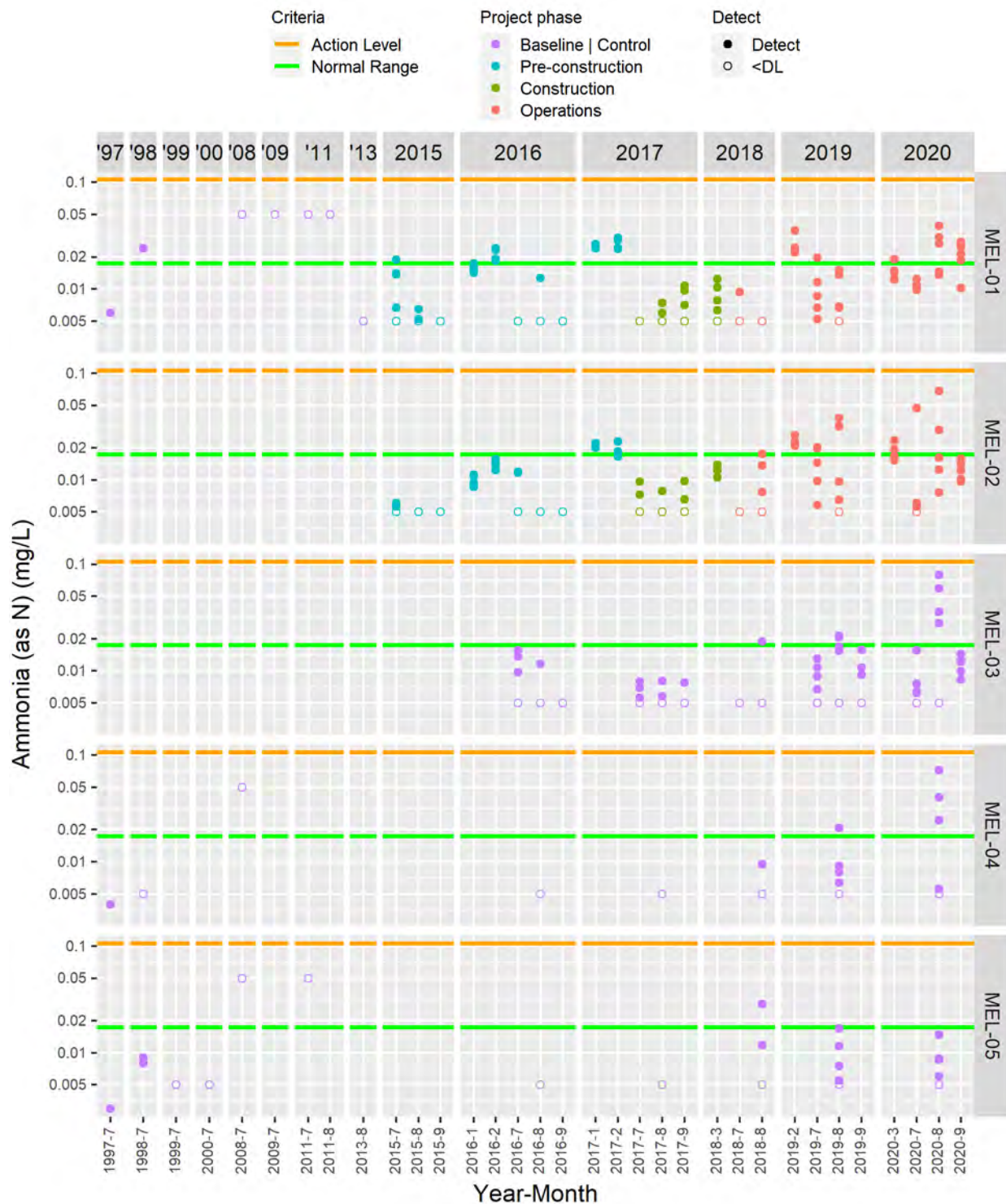


Figure C2-19. Nitrate (as N) (mg/L)

Notes: FEIS predictions (where applicable) represent predicted water quality at the edge of the mixing zone in the near-field area (MEL-01).

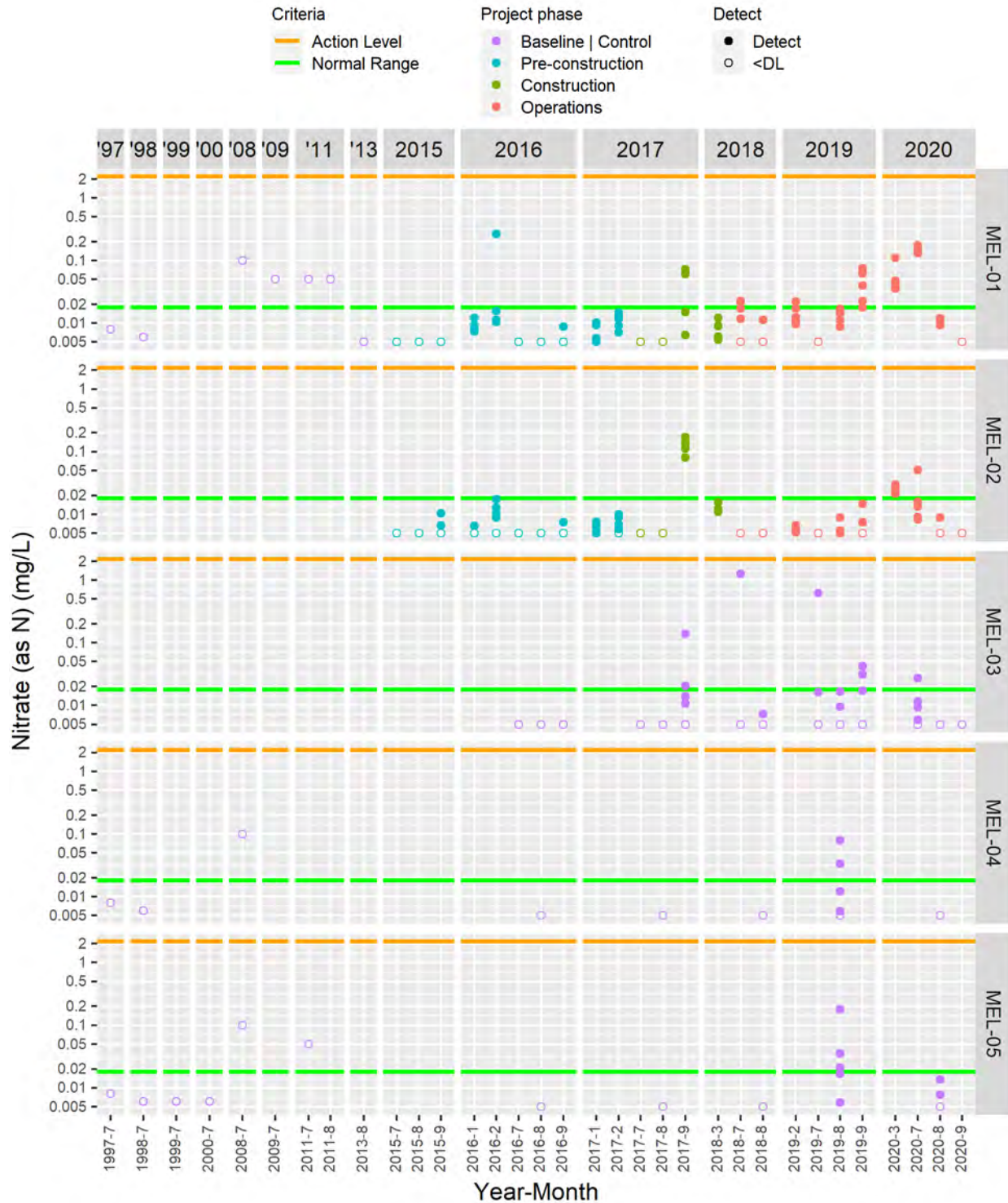


Figure C2-20. Nitrate and nitrite (as N) (mg/L)

Notes: FEIS predictions (where applicable) represent predicted water quality at the edge of the mixing zone in the near-field area (MEL-01).

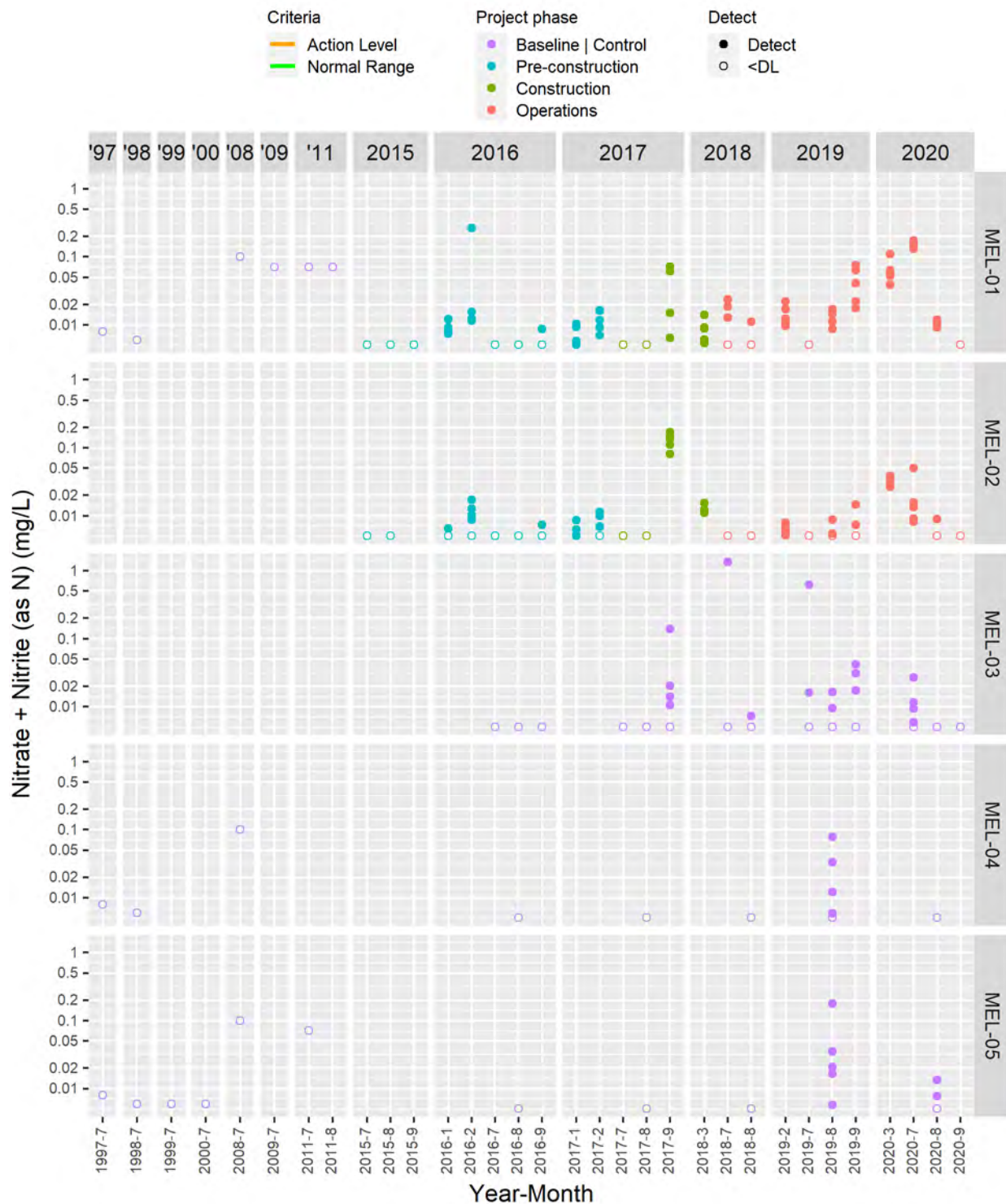


Figure C2-21. Total Kjeldahl nitrogen (TKN; mg/L)

Notes: FEIS predictions (where applicable) represent predicted water quality at the edge of the mixing zone in the near-field area (MEL-01).

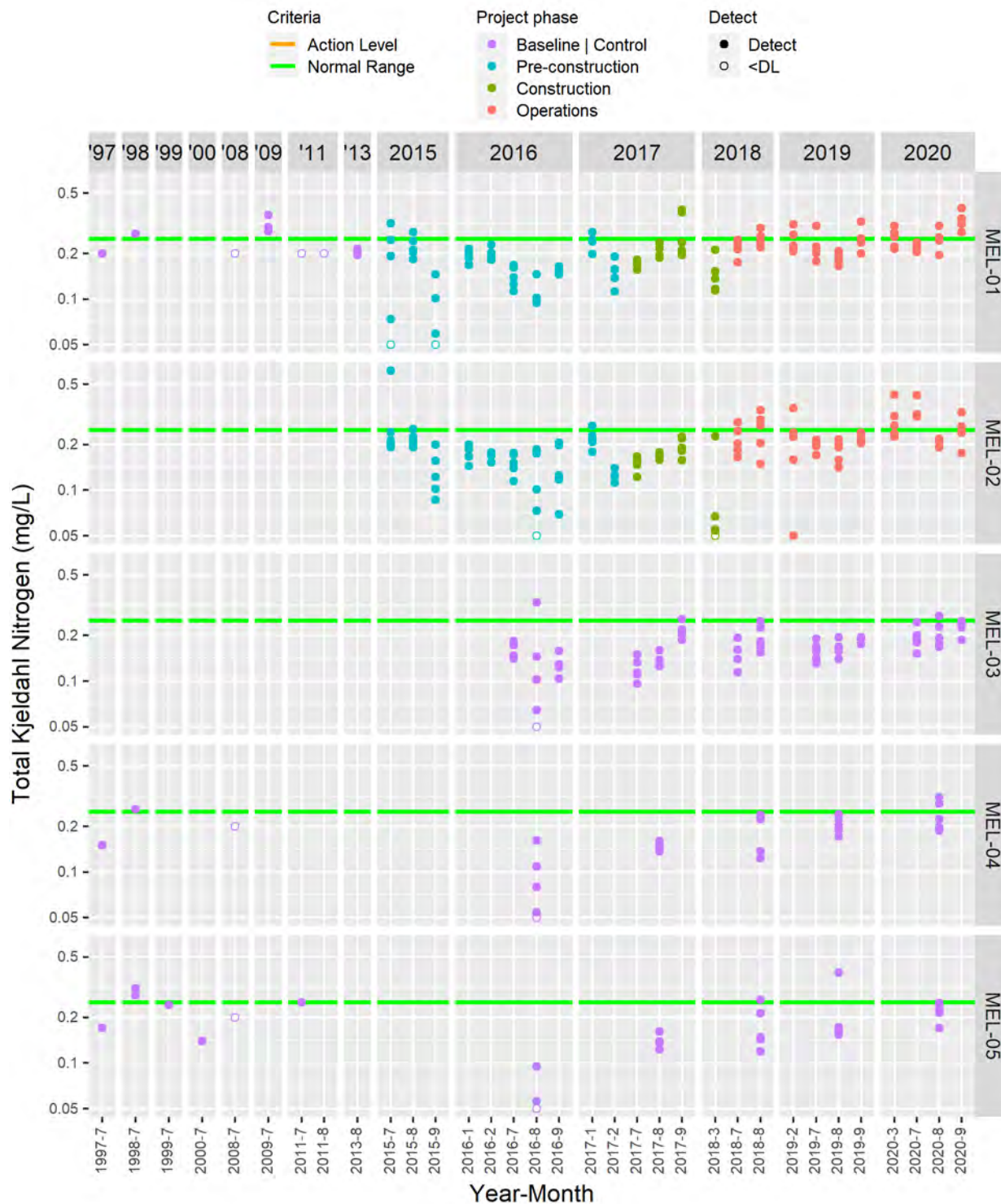


Figure C2-22. Sulphate (mg/L)

Notes: FEIS predictions (where applicable) represent predicted water quality at the edge of the mixing zone in the near-field area (MEL-01).

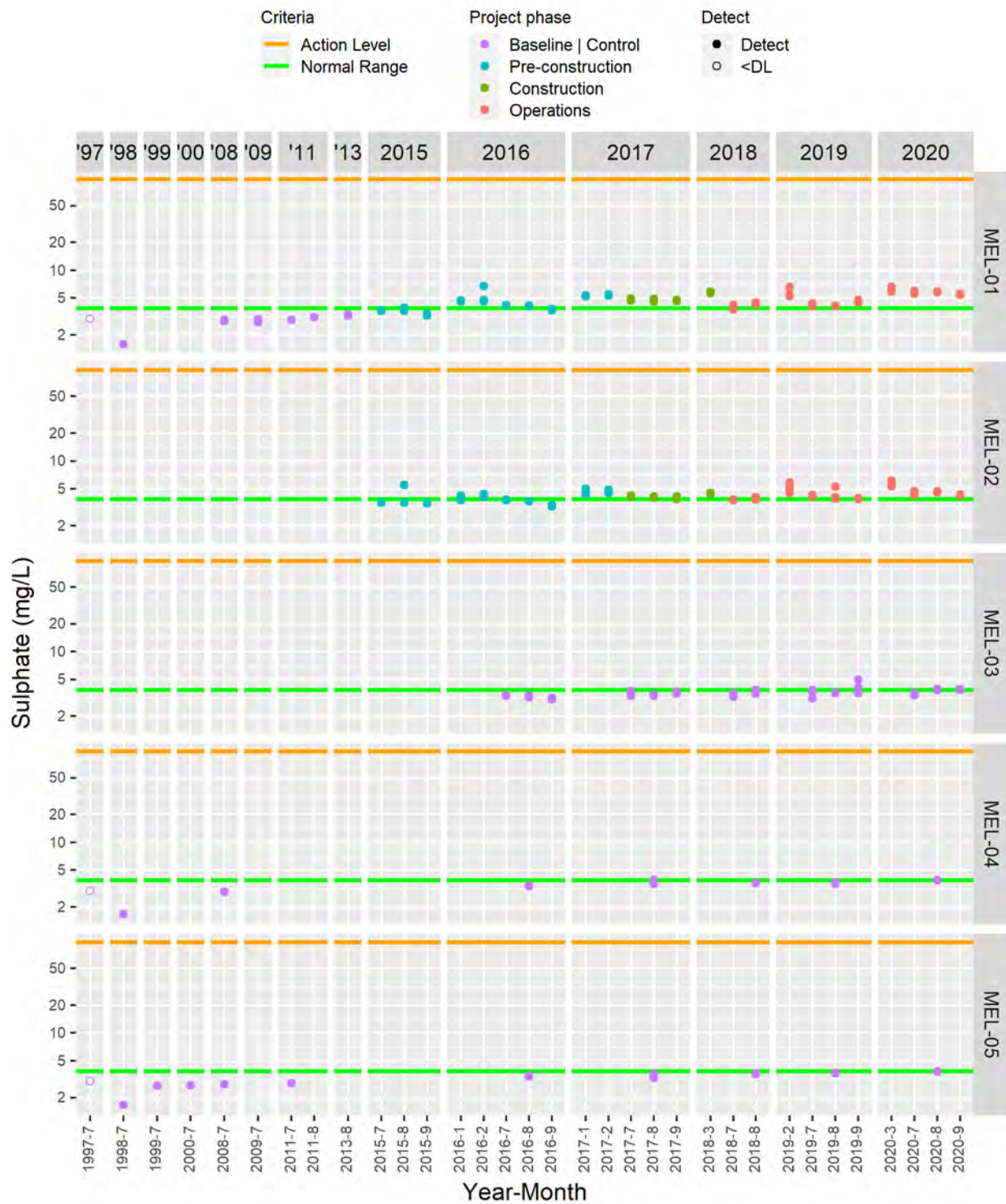


Figure C2-23. Total phosphorus (mg/)

Notes: FEIS predictions (where applicable) represent predicted water quality at the edge of the mixing zone in the near-field area (MEL-01).

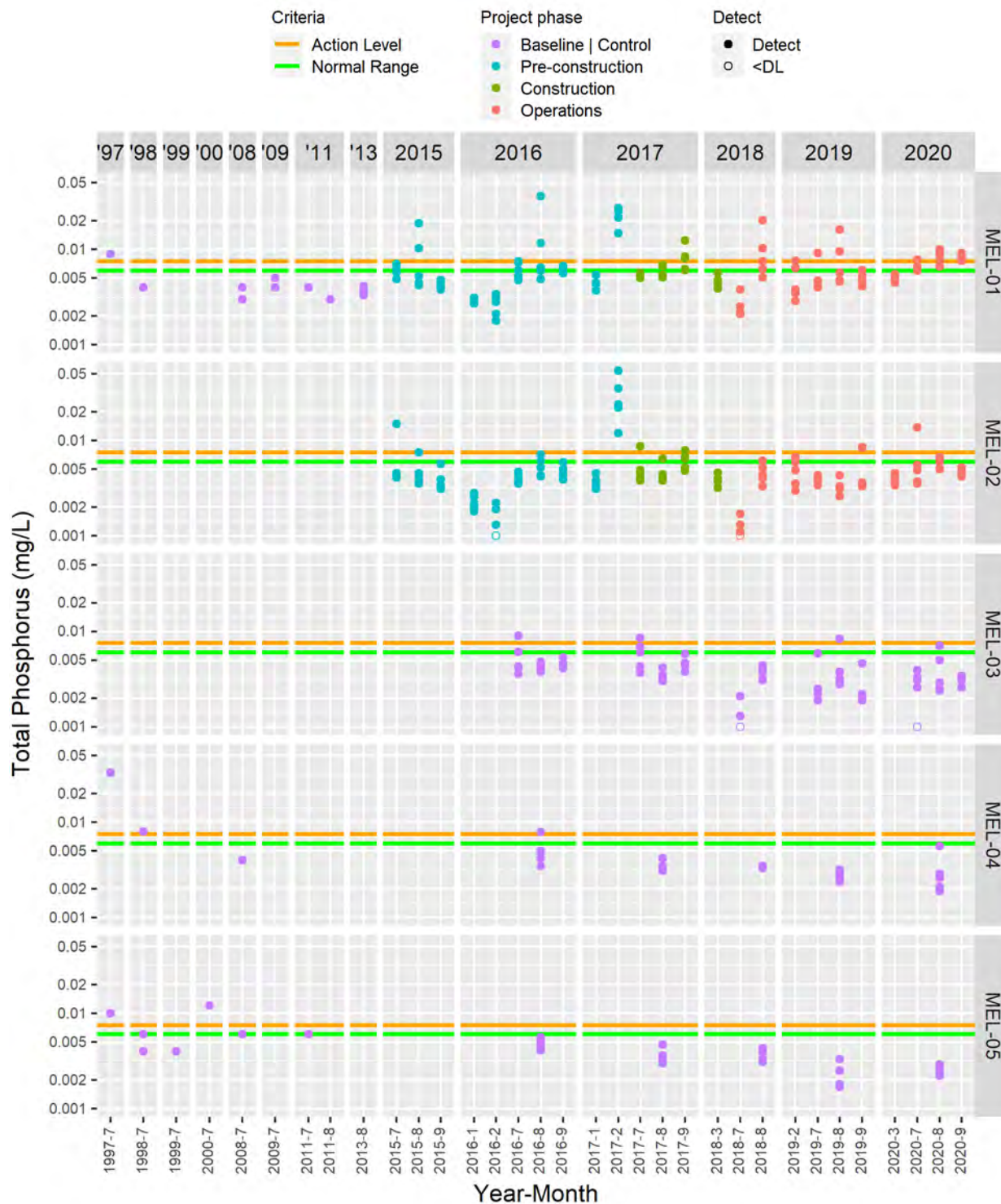


Figure C2-24. Dissolved organic carbon (mg/L)

Notes: FEIS predictions (where applicable) represent predicted water quality at the edge of the mixing zone in the near-field area (MEL-01).

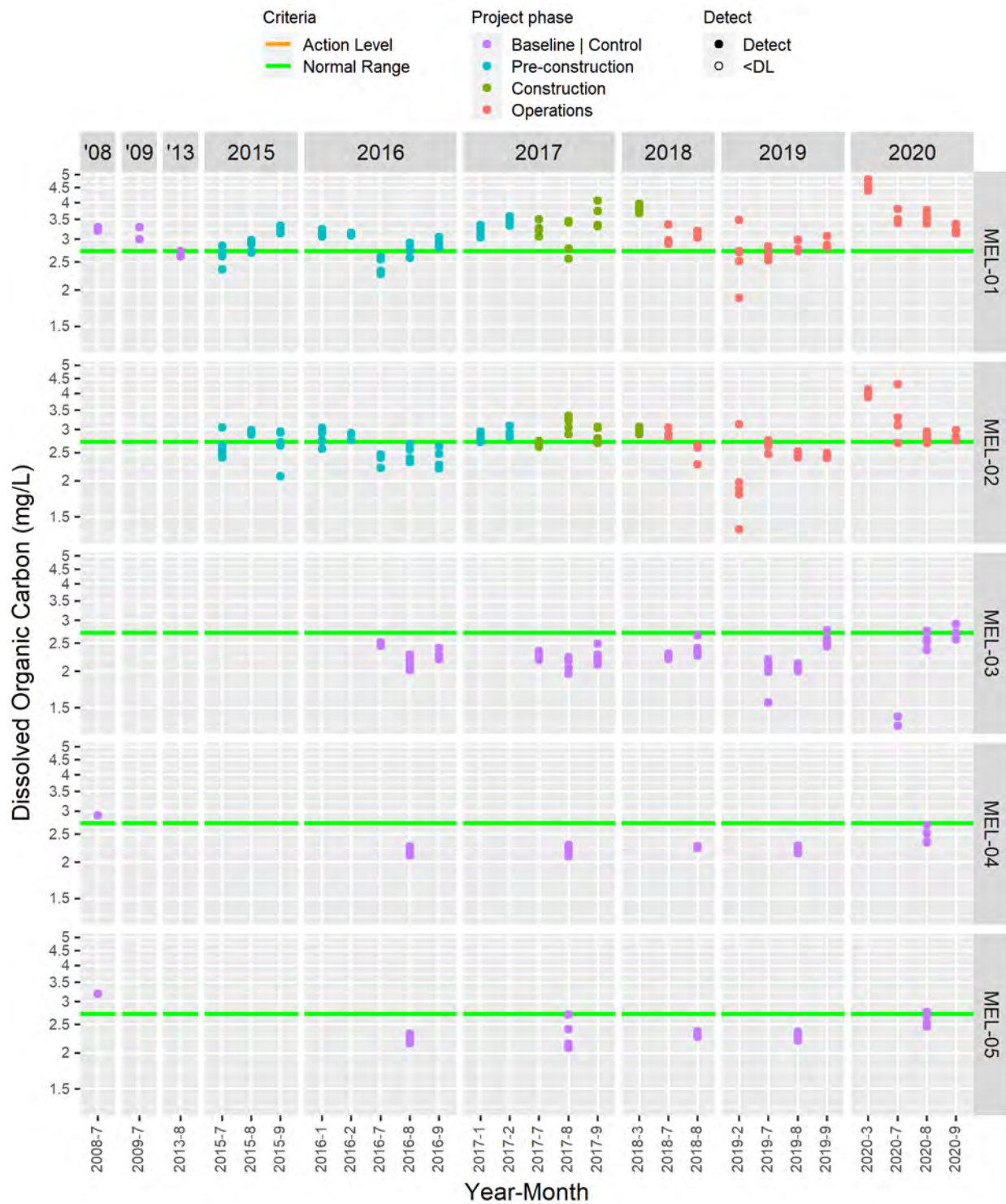


Figure C2-25. Total organic carbon (mg/L)

Notes: FEIS predictions (where applicable) represent predicted water quality at the edge of the mixing zone in the near-field area (MEL-01).

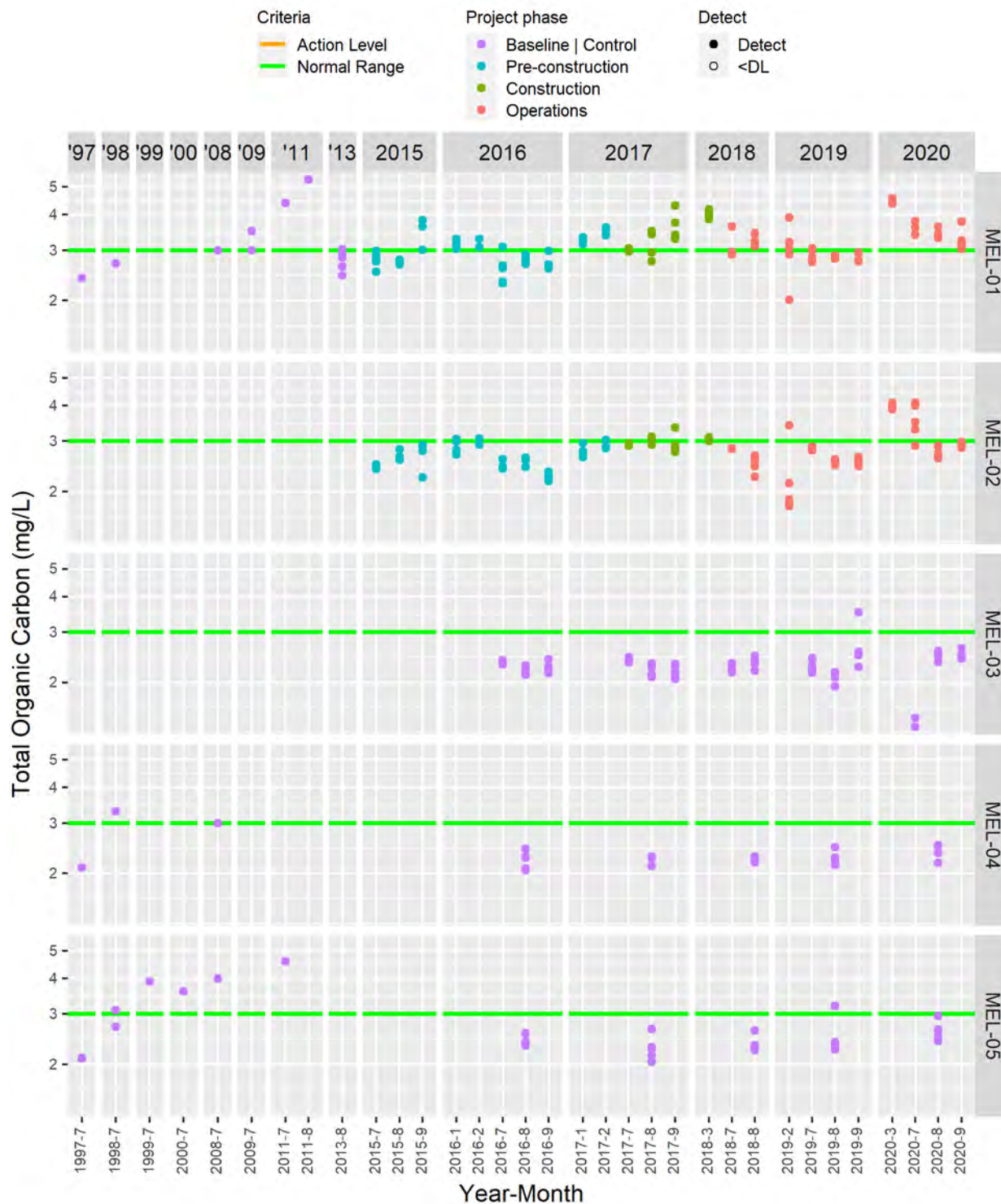


Figure C2-26. Total aluminum ($\mu\text{g/L}$)

Notes: FEIS predictions (where applicable) represent predicted water quality at the edge of the mixing zone in the near-field area (MEL-01).

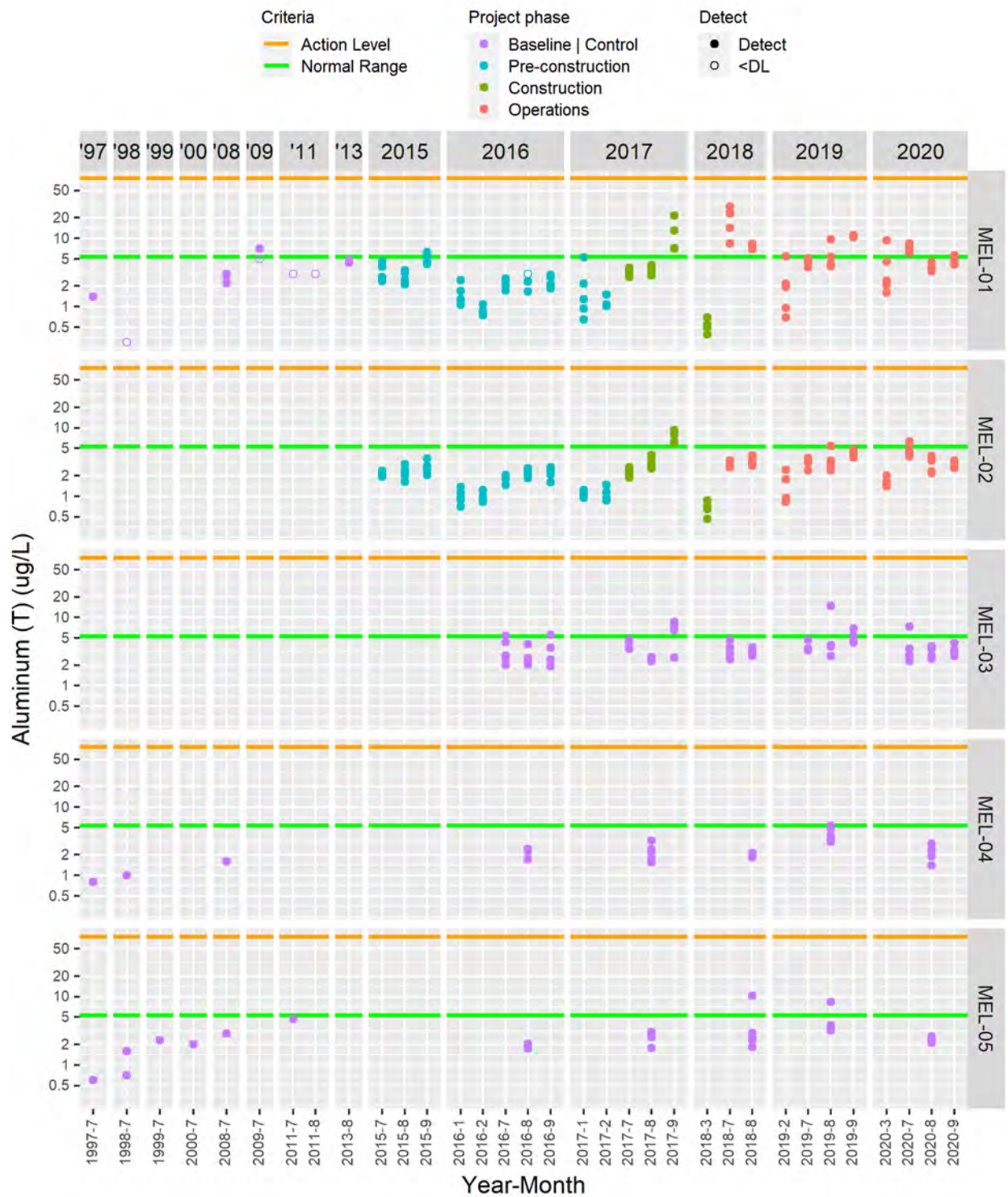


Figure C2-27. Total antimony ($\mu\text{g/L}$)

Notes: FEIS predictions (where applicable) represent predicted water quality at the edge of the mixing zone in the near-field area (MEL-01). The normal range for antimony is equal to the current detection limit.

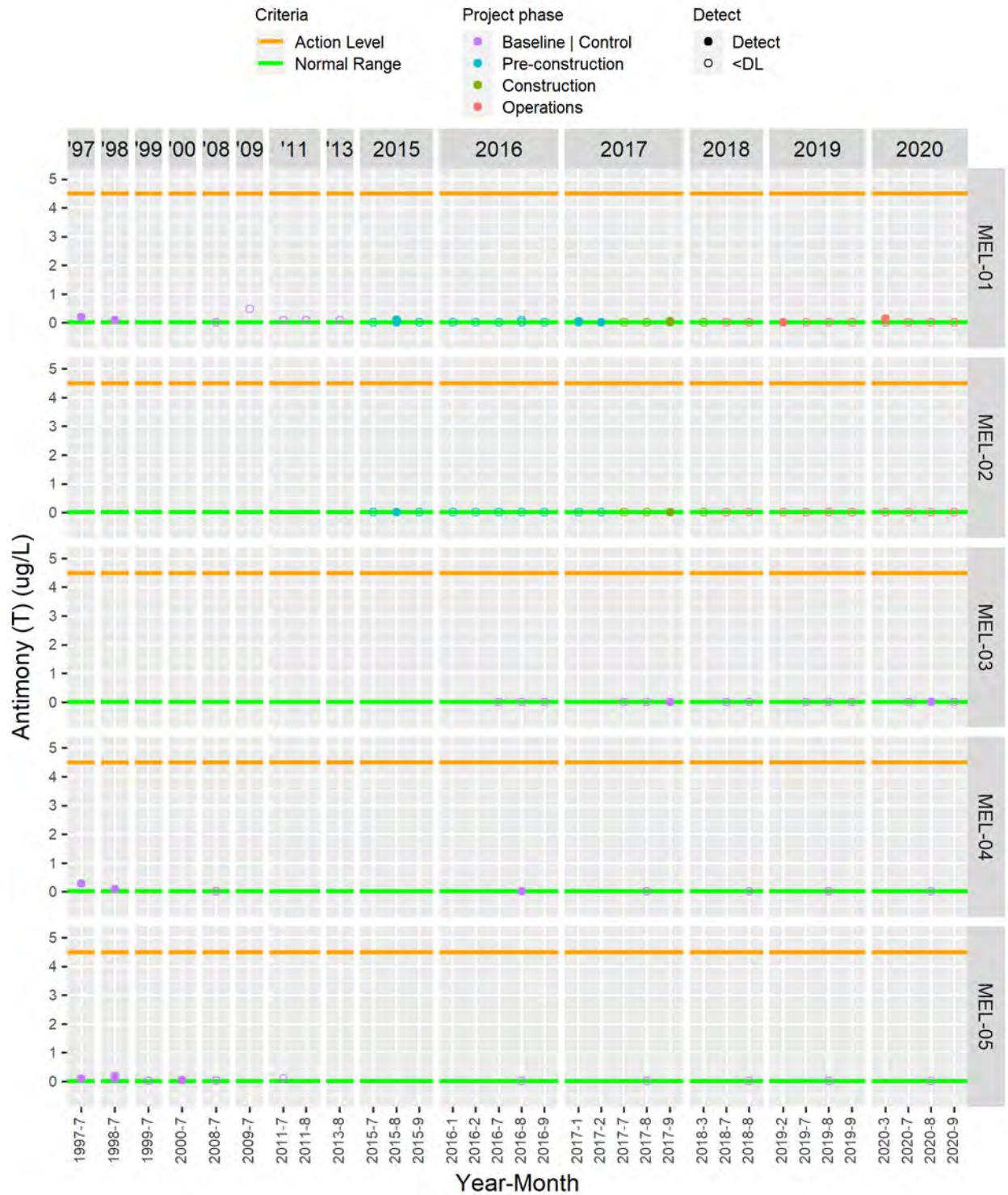


Figure C2-28. Total arsenic ($\mu\text{g/L}$)

Notes: FEIS predictions (where applicable) represent predicted water quality at the edge of the mixing zone in the near-field area (MEL-01).

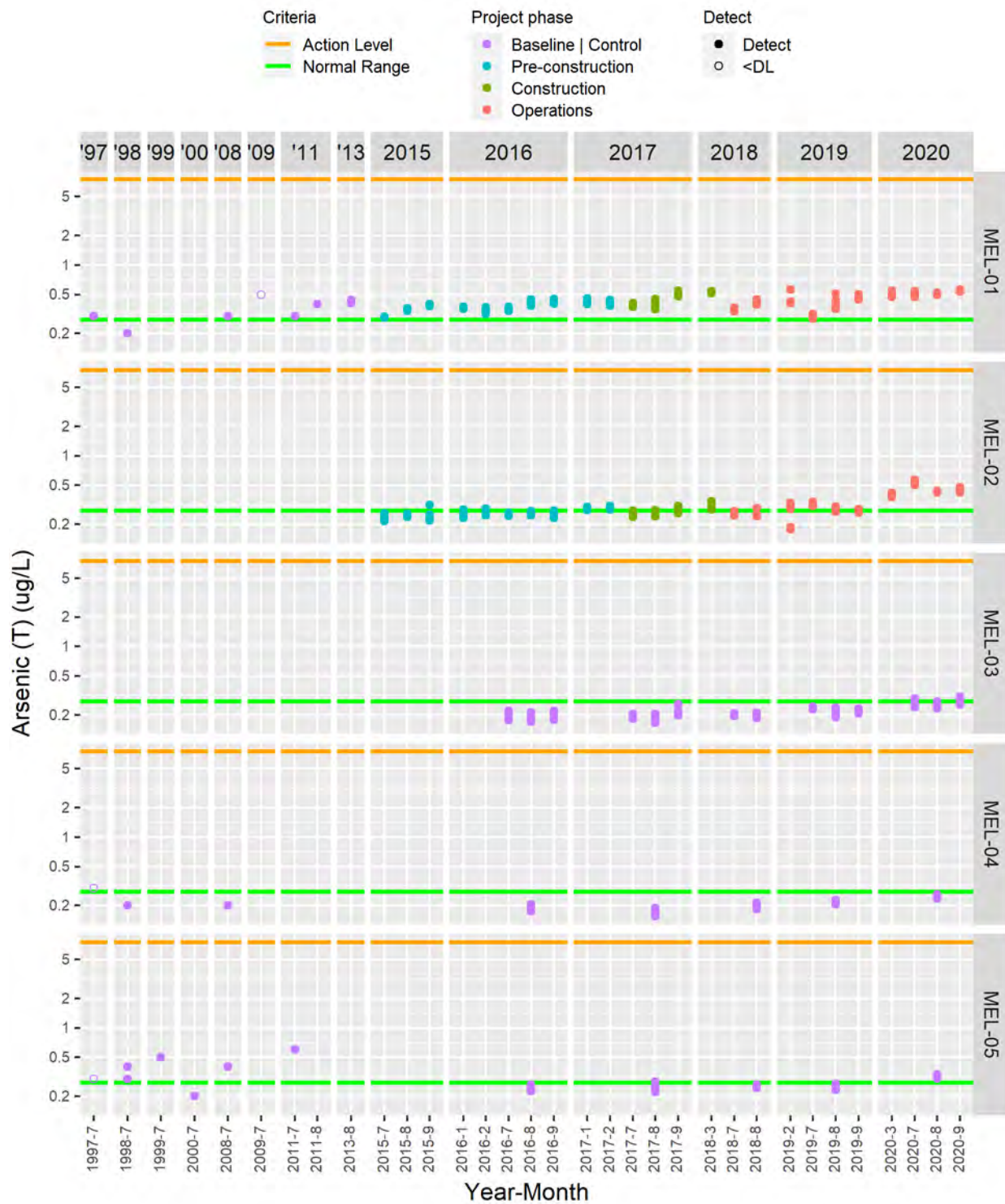


Figure C2-29. Total barium (µg/L)

Notes: FEIS predictions (where applicable) represent predicted water quality at the edge of the mixing zone in the near-field area (MEL-01).

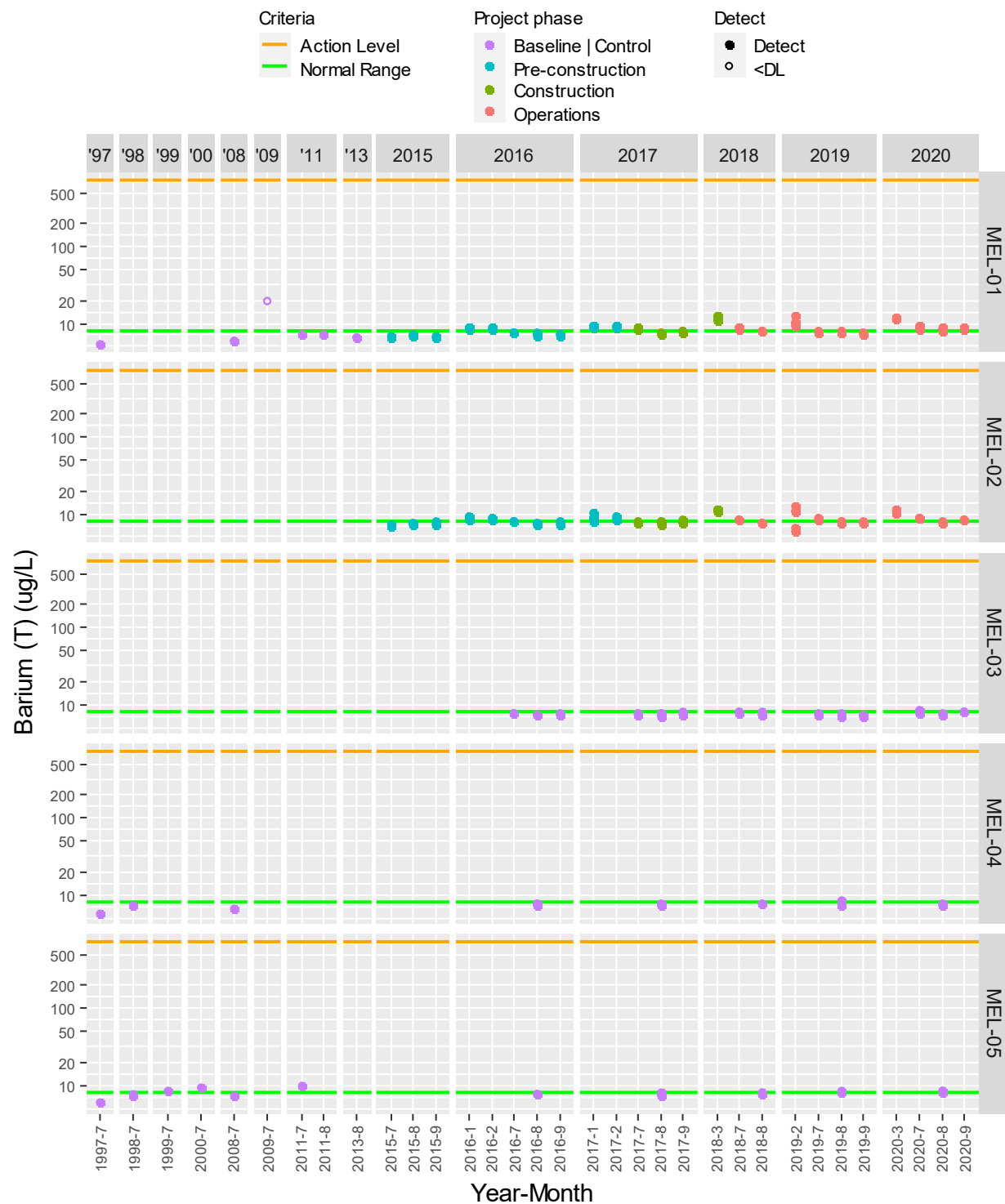


Figure C2-30. Total beryllium ($\mu\text{g/L}$)

Notes: FEIS predictions (where applicable) represent predicted water quality at the edge of the mixing zone in the near-field area (MEL-01). The normal range for beryllium is equal to the current detection limit.

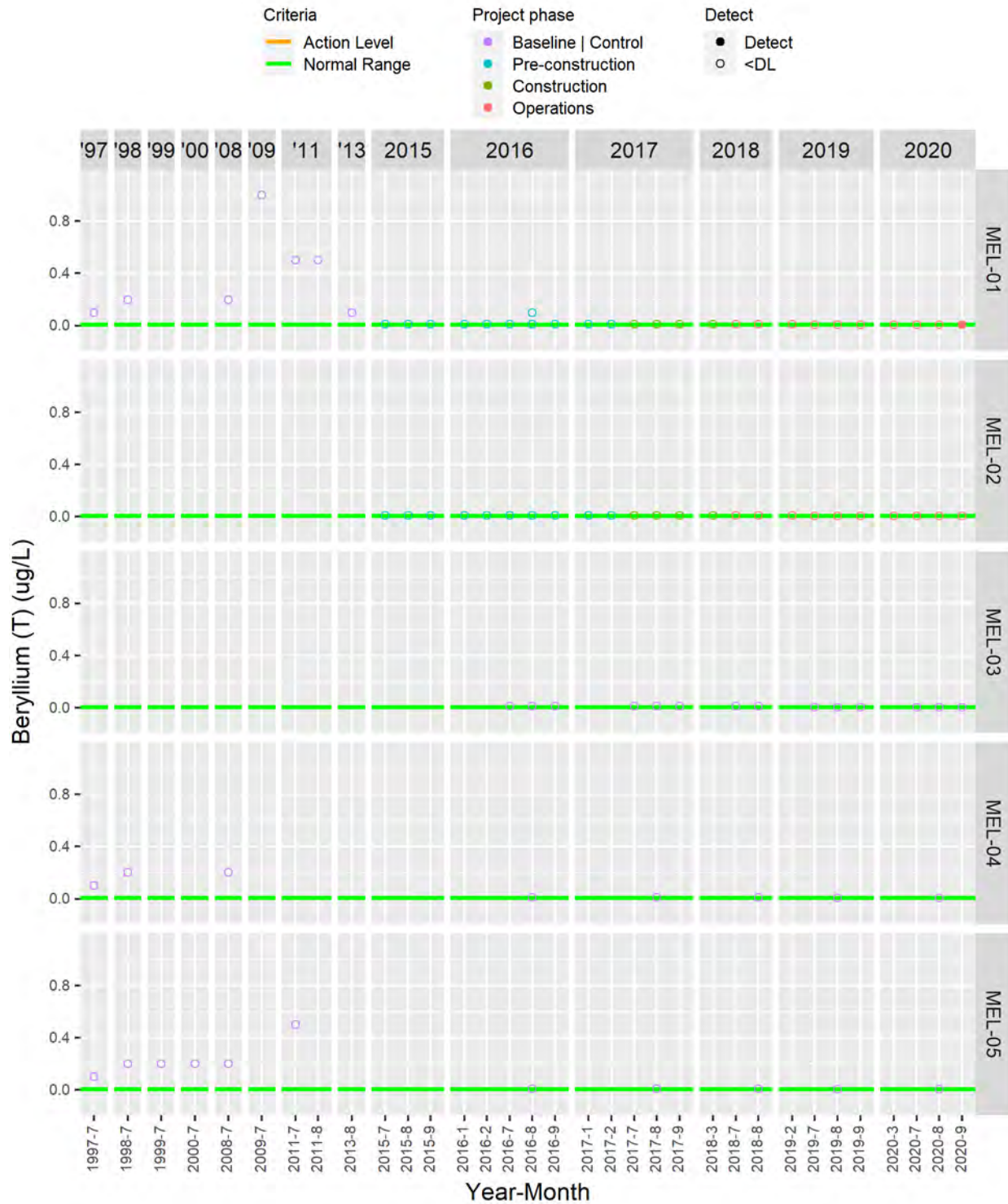


Figure C2-31. Total bismuth ($\mu\text{g/L}$)

Notes: FEIS predictions (where applicable) represent predicted water quality at the edge of the mixing zone in the near-field area (MEL-01). The normal range for bismuth is equal to the current detection limit.

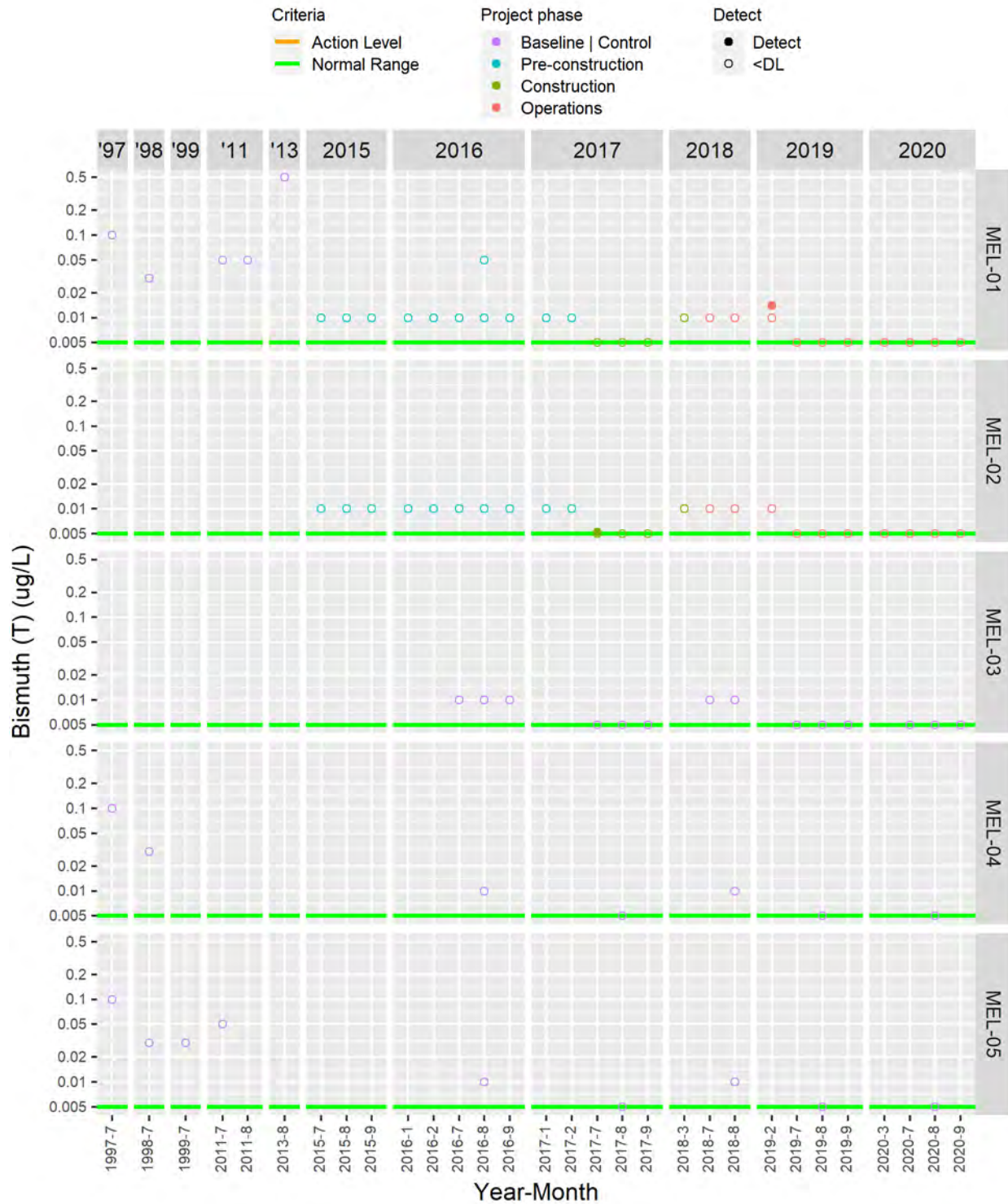


Figure C2-32. Total boron ($\mu\text{g/L}$)

Notes: FEIS predictions (where applicable) represent predicted water quality at the edge of the mixing zone in the near-field area (MEL-01).

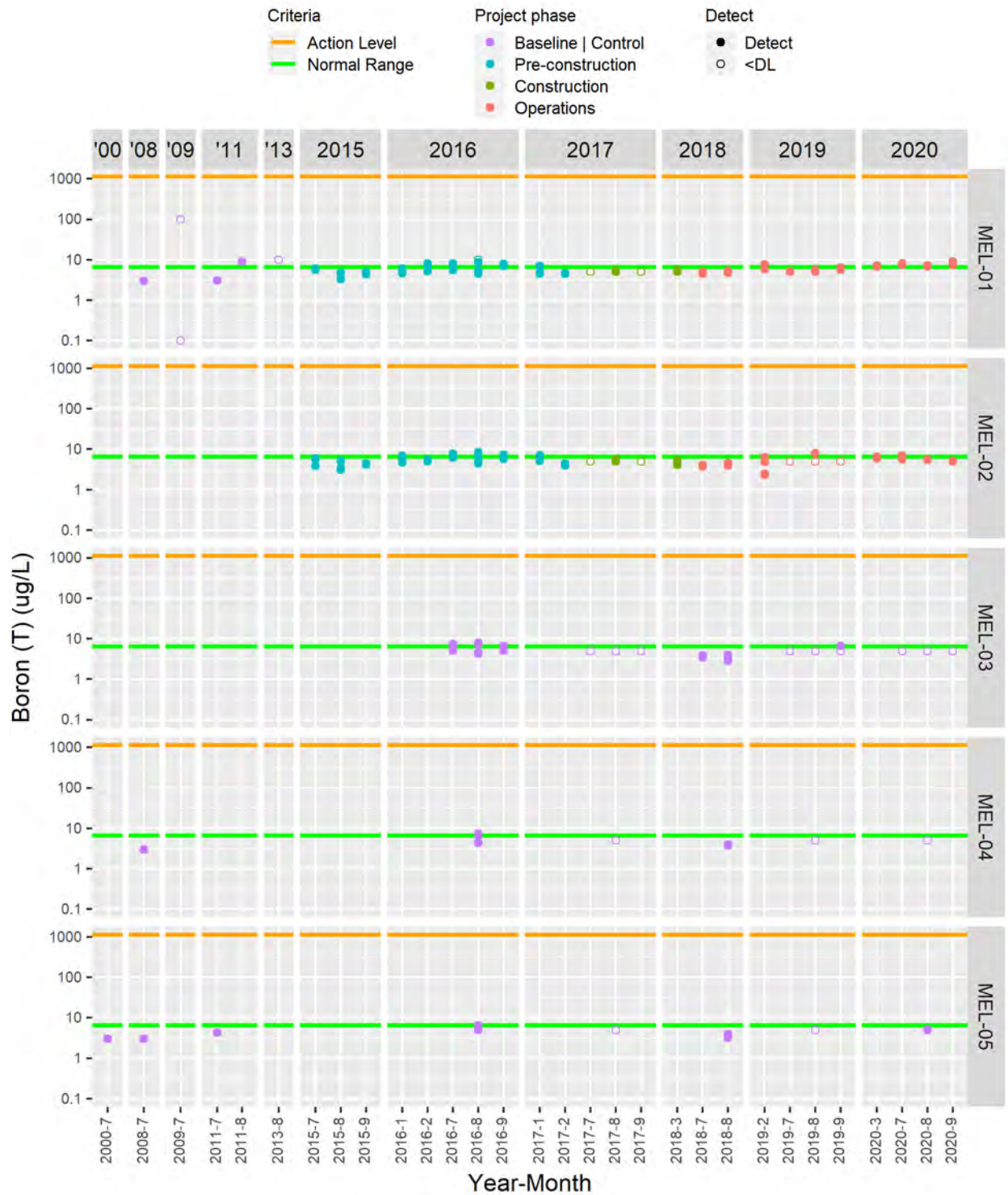


Figure C2-33. Total cadmium (µg/L)

Notes: FEIS predictions (where applicable) represent predicted water quality at the edge of the mixing zone in the near-field area (MEL-01). The normal range for cadmium is equal to the current detection limit.

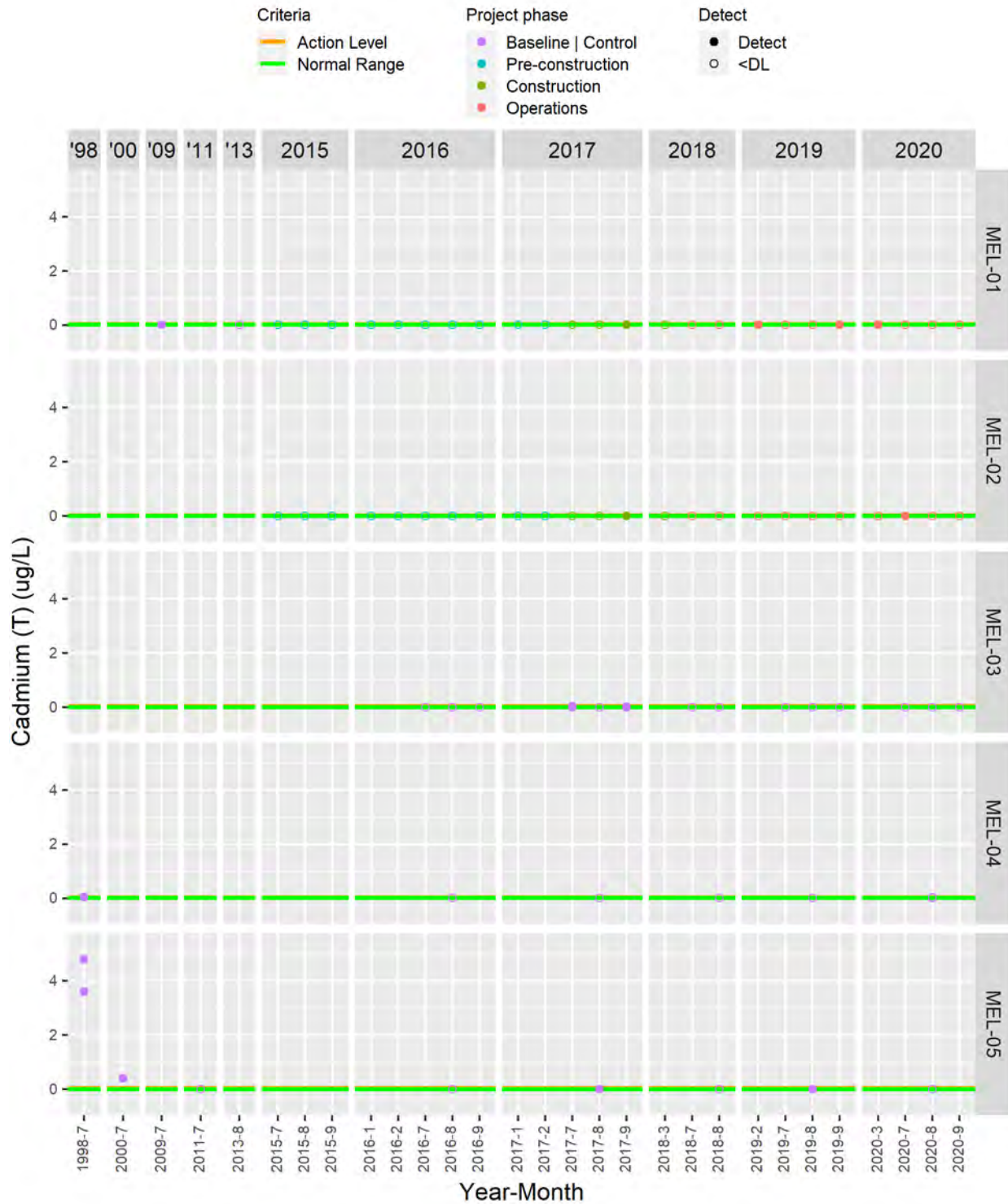


Figure C2-34. Total chromium (µg/L)

Notes: FEIS predictions (where applicable) represent predicted water quality at the edge of the mixing zone in the near-field area (MEL-01).

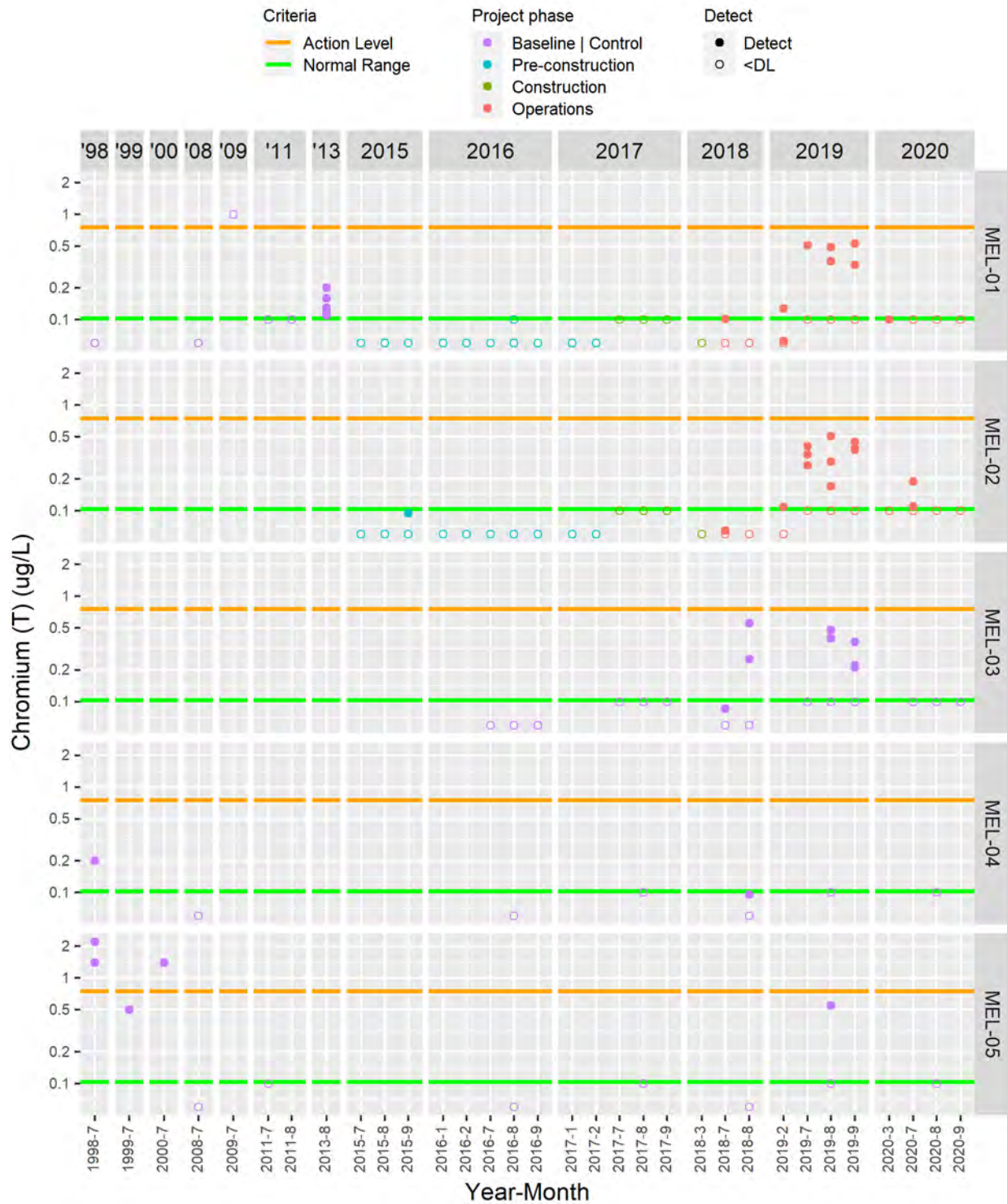


Figure C2-35. Total cobalt ($\mu\text{g/L}$)

Notes: FEIS predictions (where applicable) represent predicted water quality at the edge of the mixing zone in the near-field area (MEL-01).

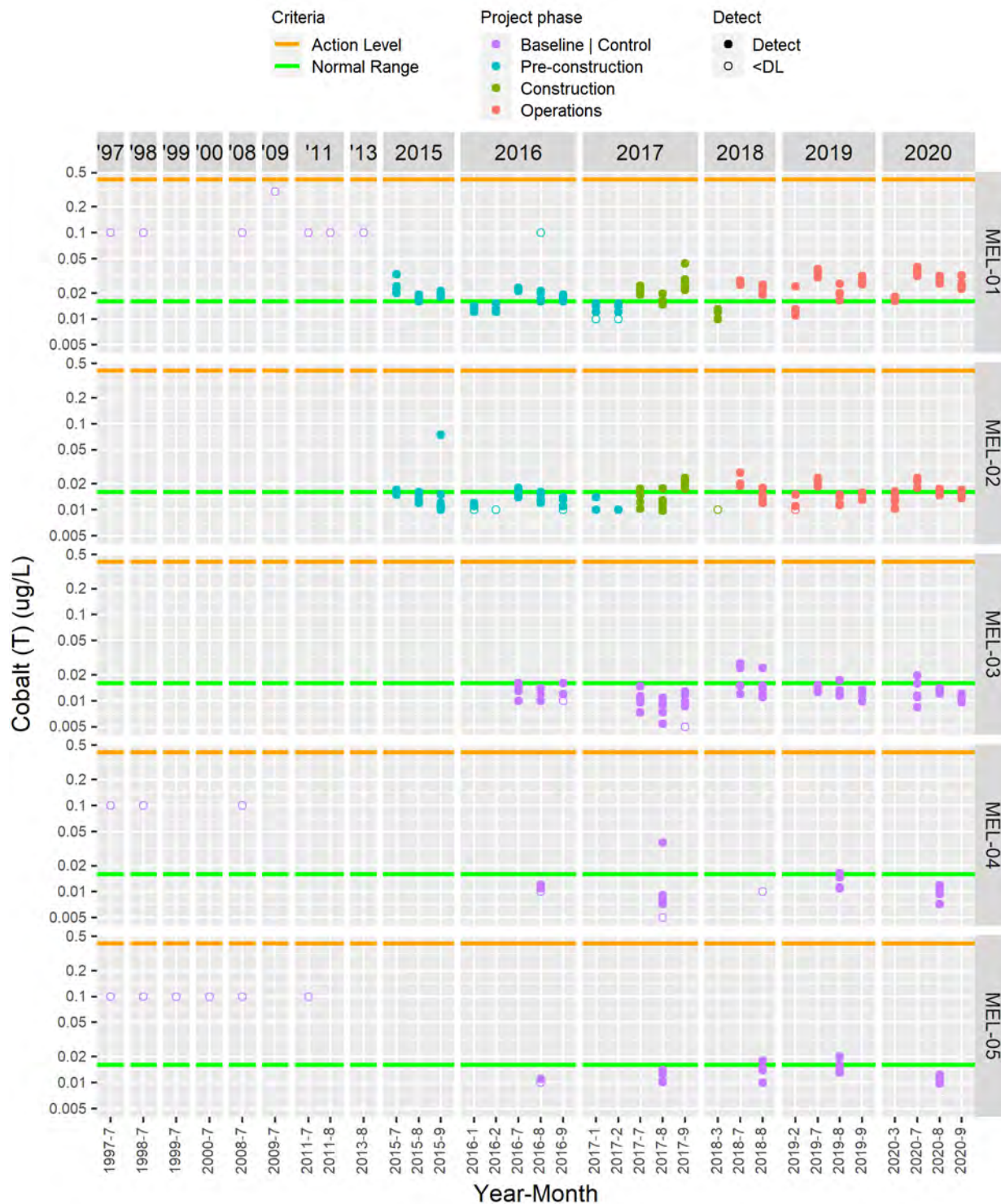


Figure C2-36. Total copper ($\mu\text{g/L}$)

Notes: FEIS predictions (where applicable) represent predicted water quality at the edge of the mixing zone in the near-field area (MEL-01).

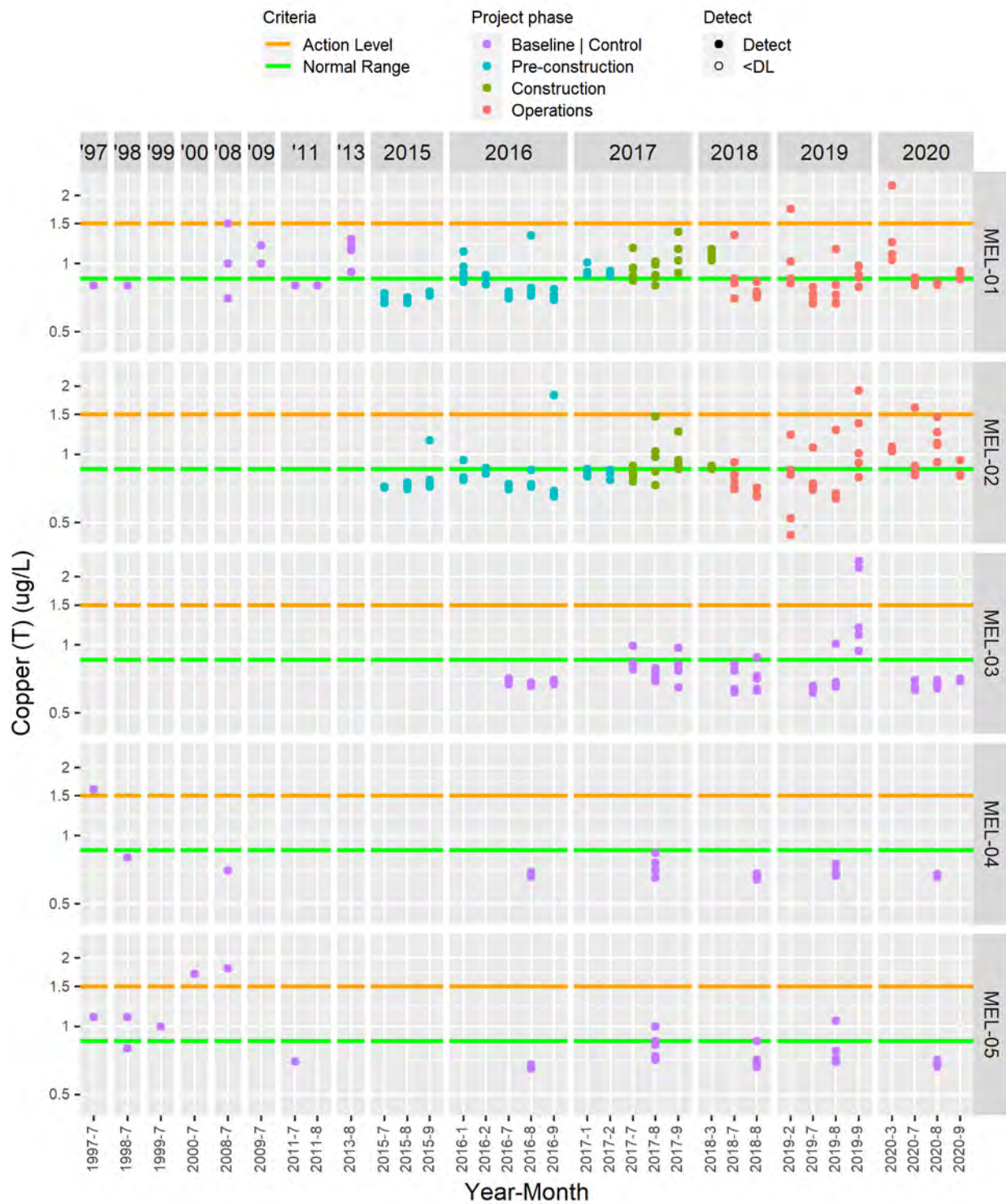


Figure C2-37. Total iron (µg/L)

Notes: FEIS predictions (where applicable) represent predicted water quality at the edge of the mixing zone in the near-field area (MEL-01).

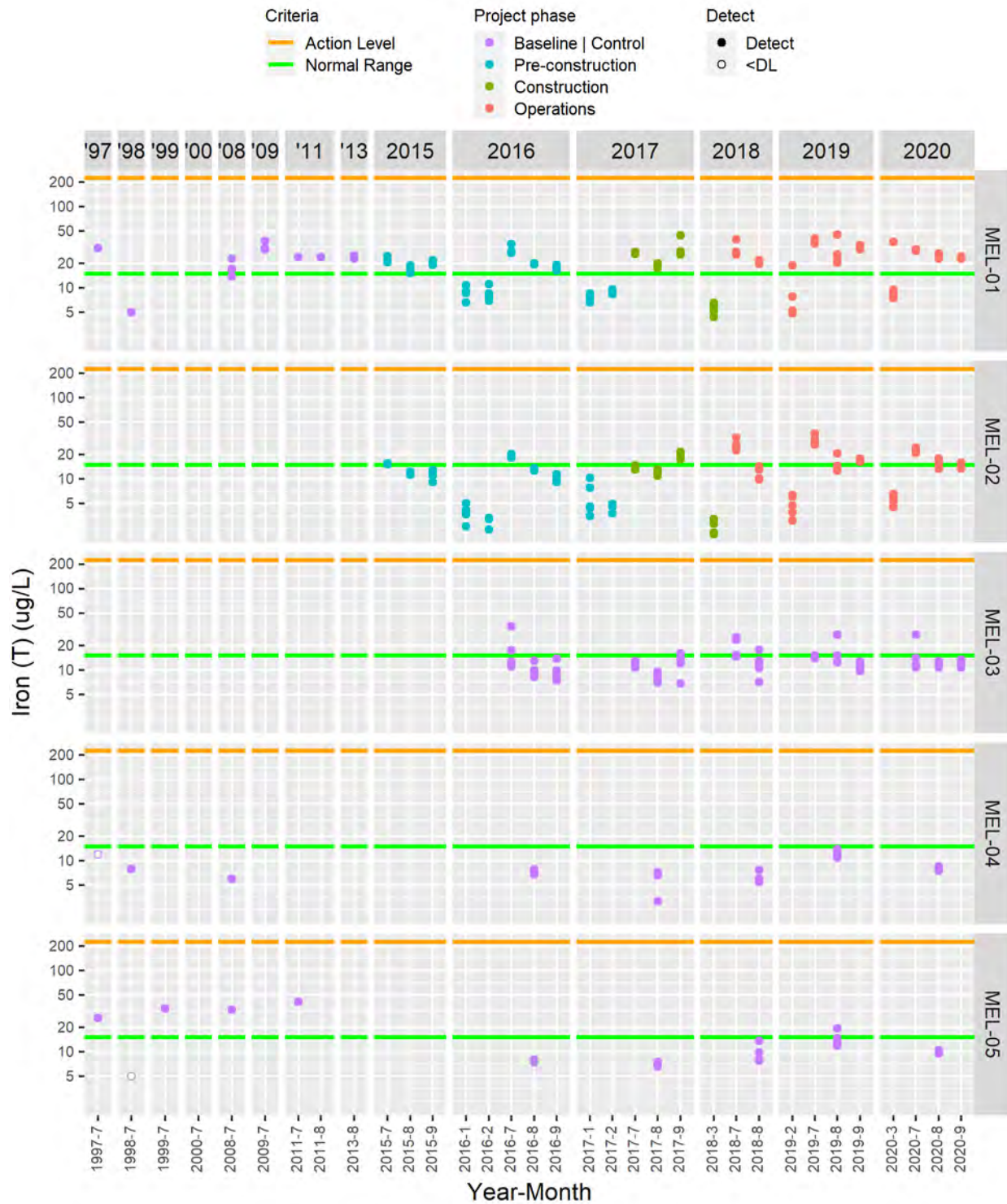


Figure C2-38. Total lead ($\mu\text{g/L}$)

Notes: FEIS predictions (where applicable) represent predicted water quality at the edge of the mixing zone in the near-field area (MEL-01).

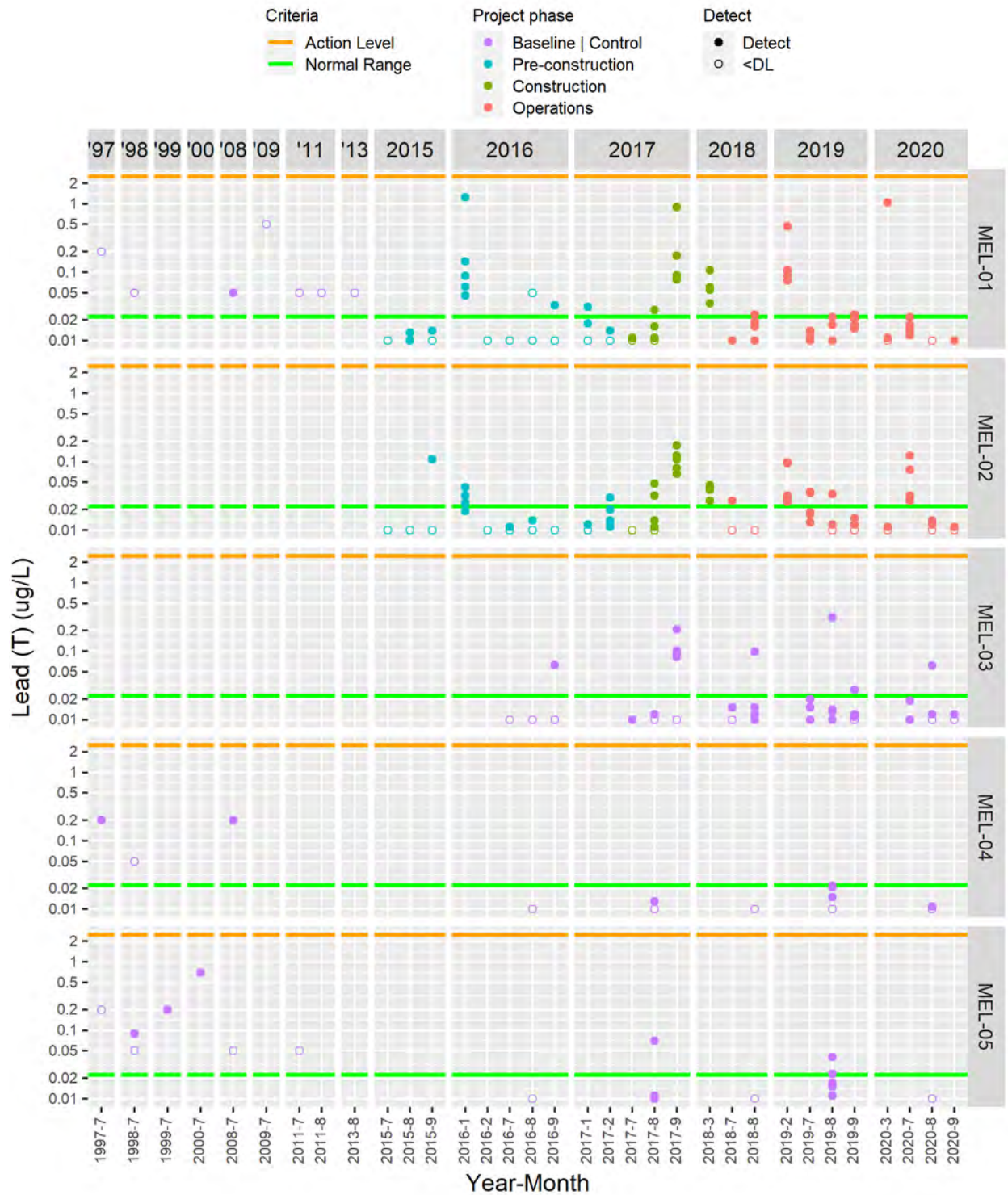


Figure C2-39. Total lithium (µg/L)

Notes: FEIS predictions (where applicable) represent predicted water quality at the edge of the mixing zone in the near-field area (MEL-01).

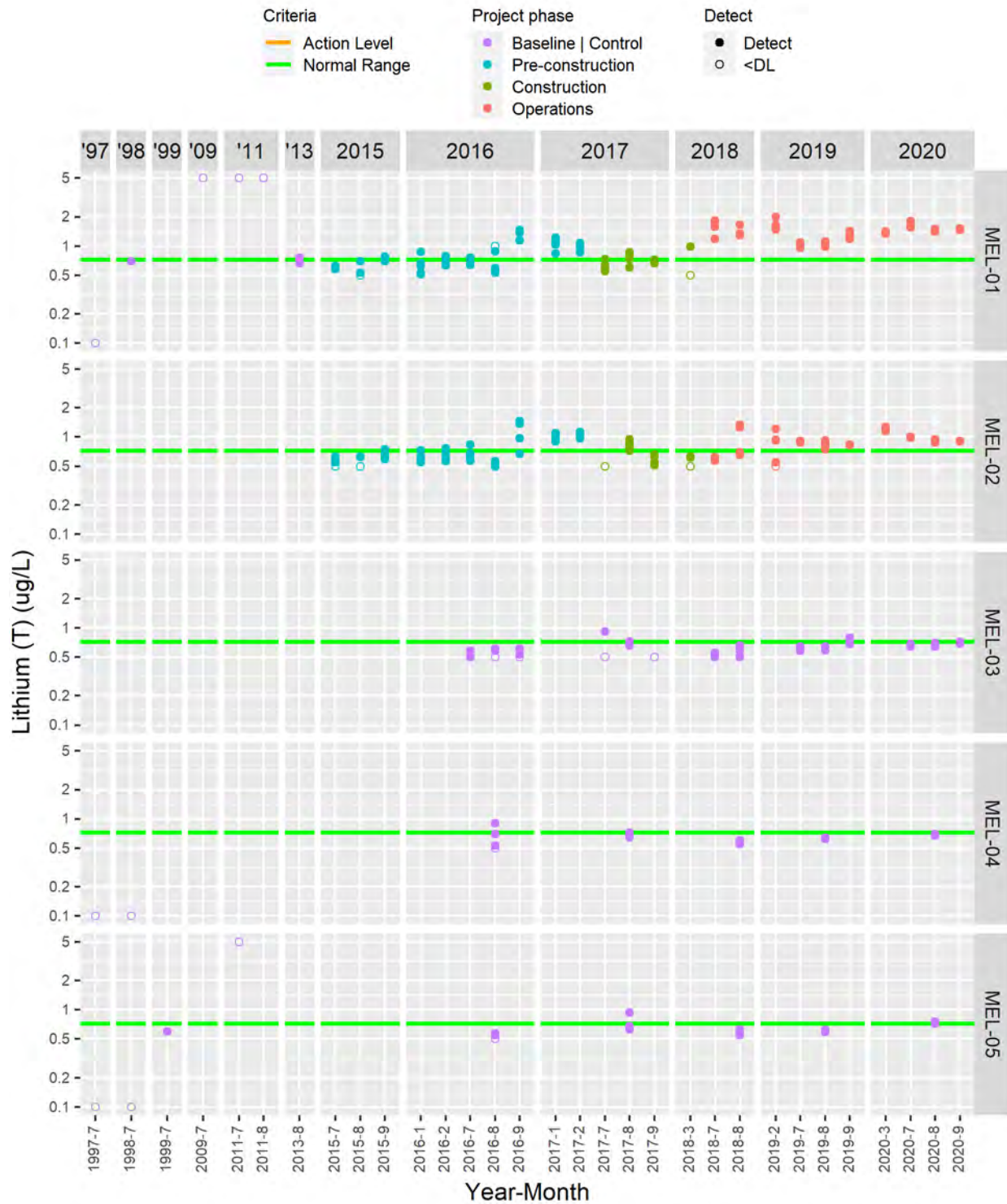


Figure C2-40. Total manganese ($\mu\text{g/L}$)

Notes: FEIS predictions (where applicable) represent predicted water quality at the edge of the mixing zone in the near-field area (MEL-01).

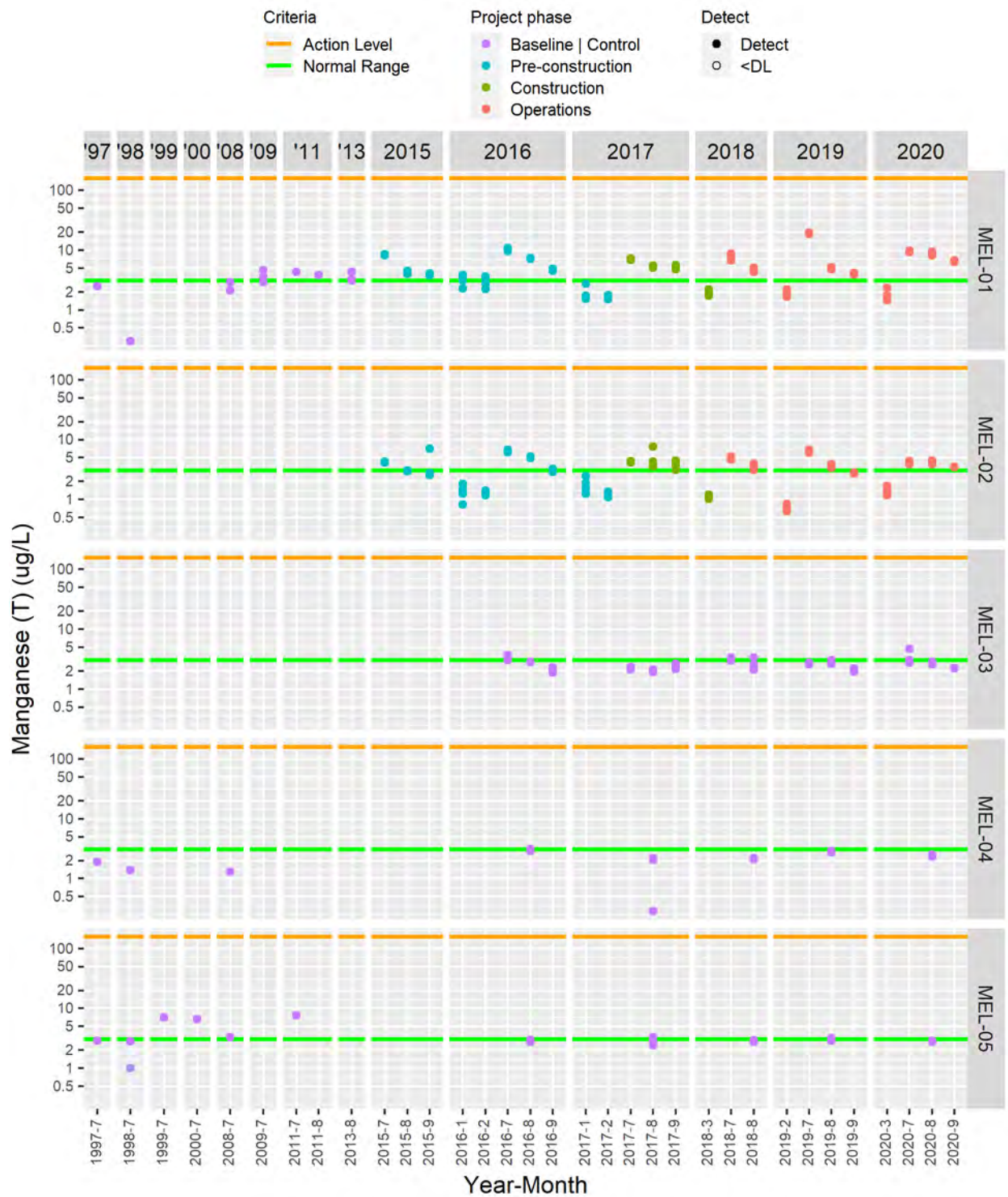


Figure C2-41. Total mercury ($\mu\text{g/L}$)

Notes: FEIS predictions (where applicable) represent predicted water quality at the edge of the mixing zone in the near-field area (MEL-01).

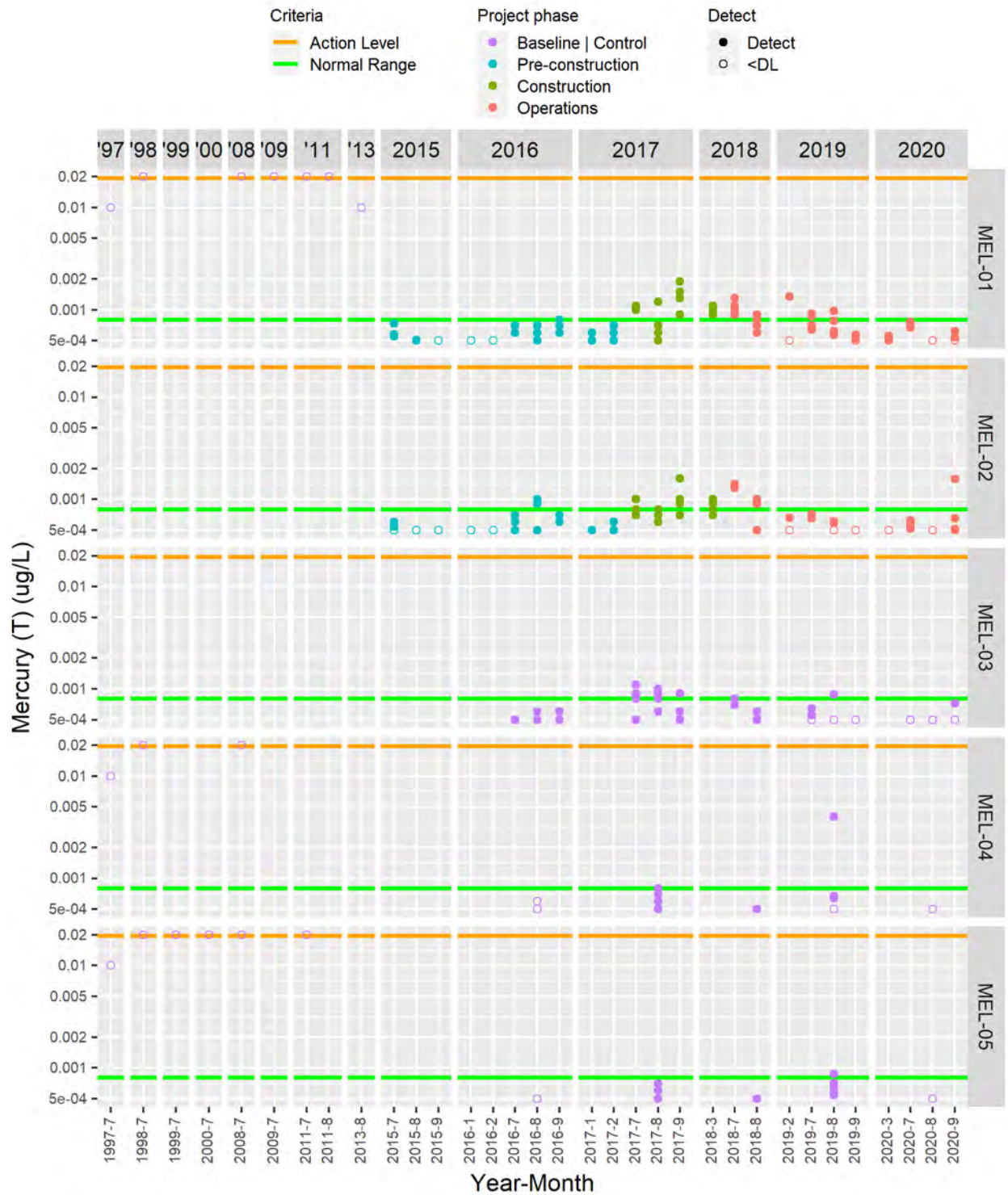


Figure C2-42. Total molybdenum (µg/L)

Notes: FEIS predictions (where applicable) represent predicted water quality at the edge of the mixing zone in the near-field area (MEL-01).

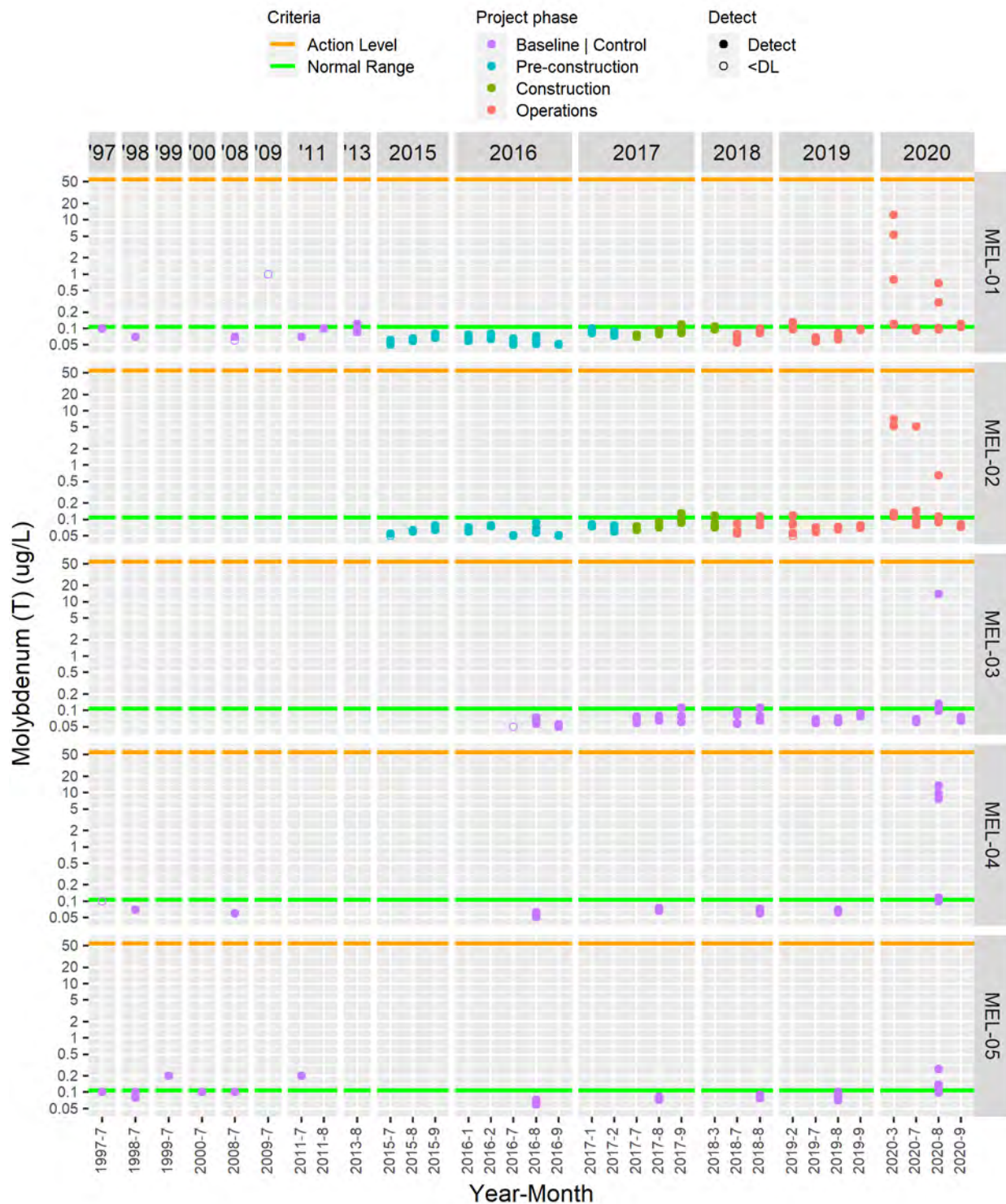


Figure C2-43. Total nickel ($\mu\text{g/L}$)

Notes: FEIS predictions (where applicable) represent predicted water quality at the edge of the mixing zone in the near-field area (MEL-01).

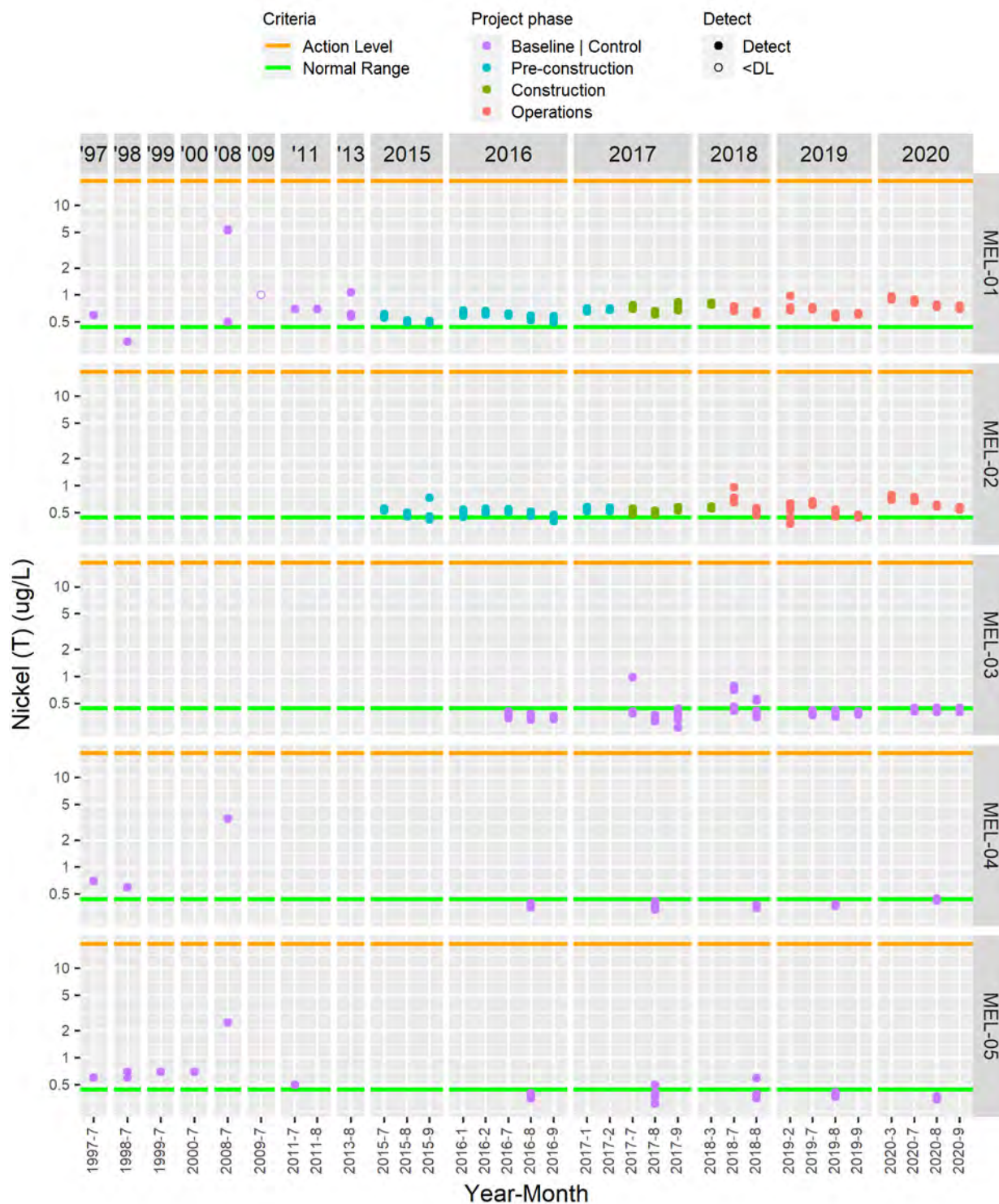


Figure C2-44. Total selenium ($\mu\text{g/L}$)

Notes: FEIS predictions (where applicable) represent predicted water quality at the edge of the mixing zone in the near-field area (MEL-01).

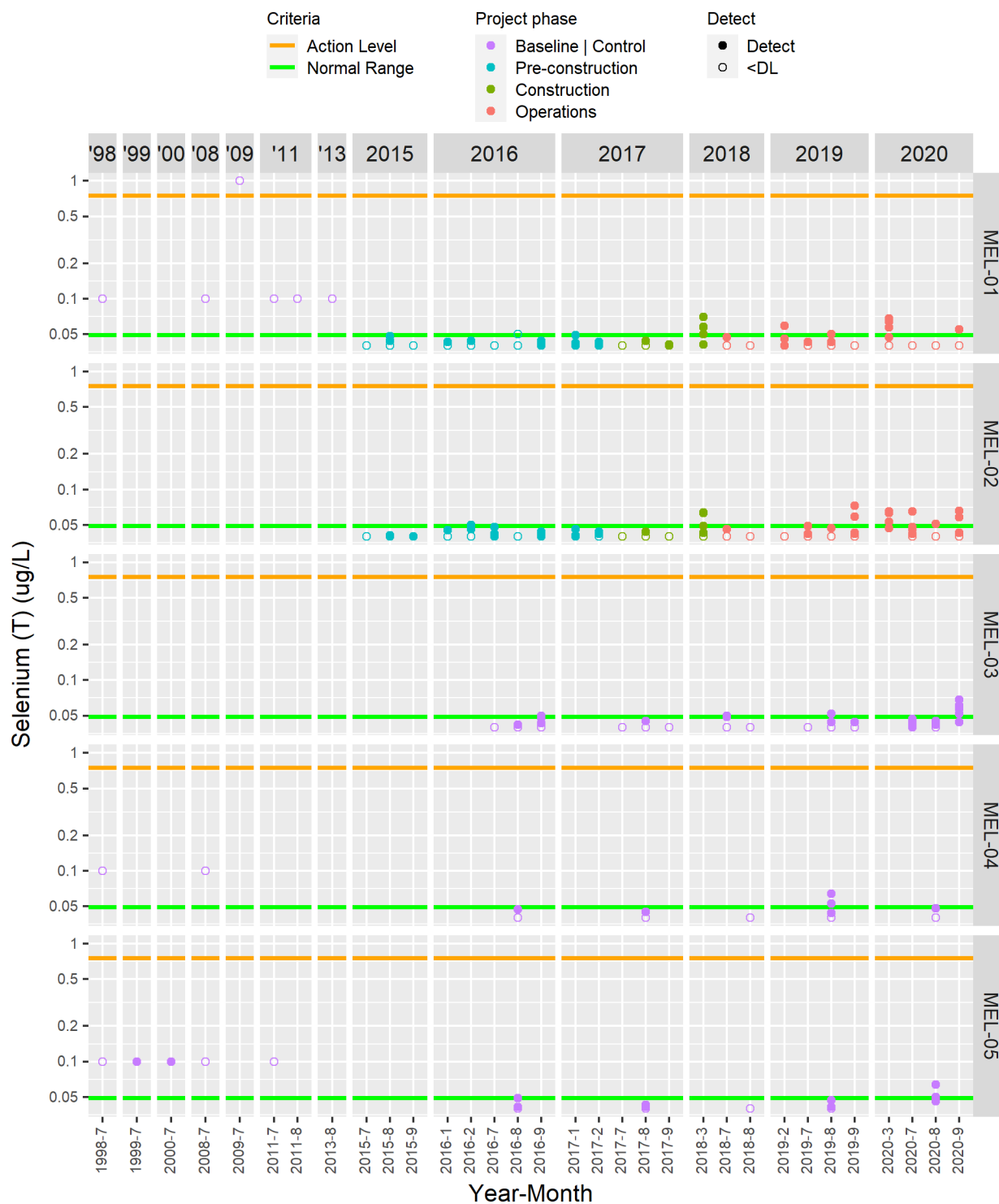


Figure C2-45. Total silver ($\mu\text{g/L}$)

Notes: FEIS predictions (where applicable) represent predicted water quality at the edge of the mixing zone in the near-field area (MEL-01). The normal range for silver is equal to the current detection limit.

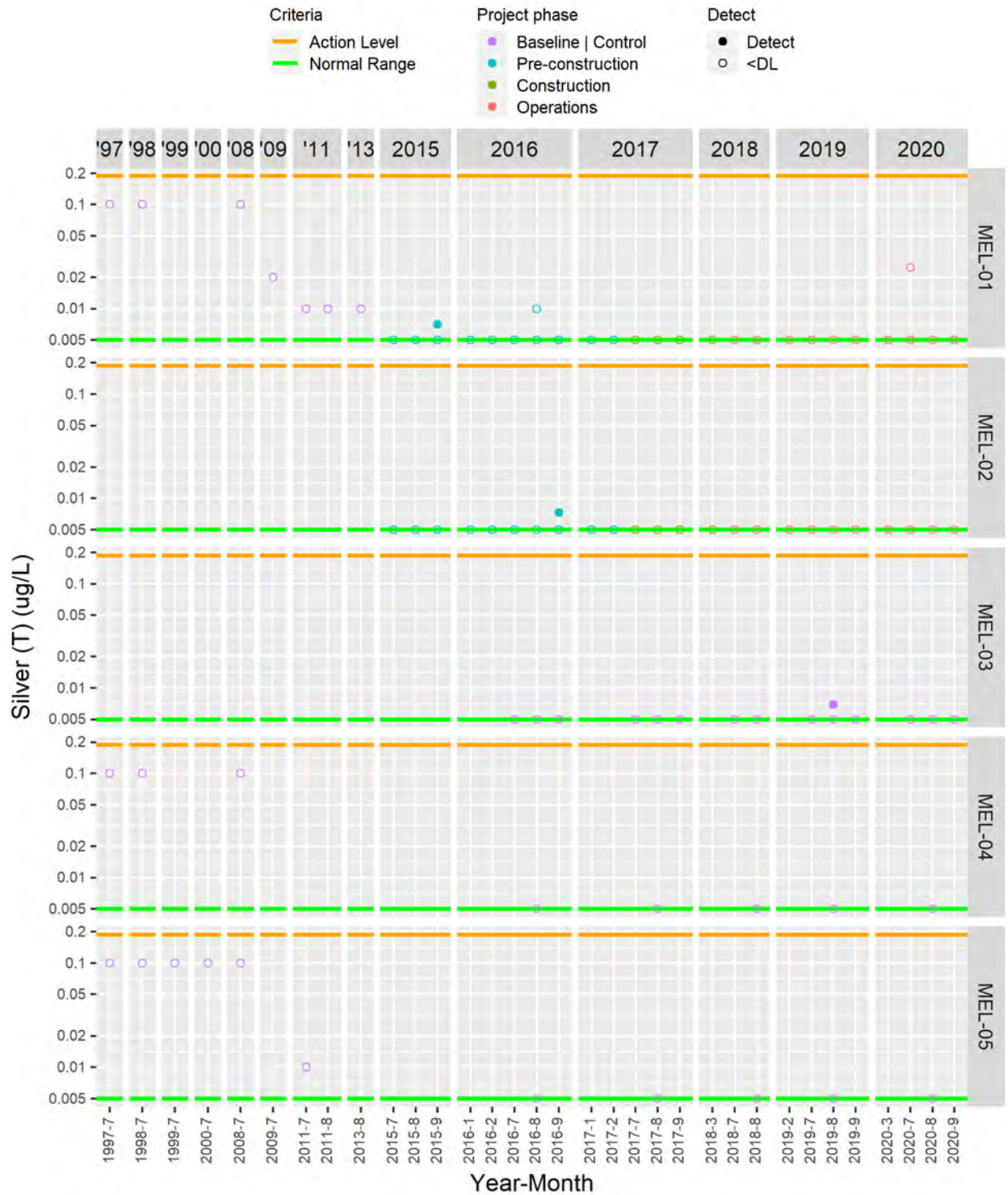


Figure C2-46. Total strontium (µg/L)

Notes: FEIS predictions (where applicable) represent predicted water quality at the edge of the mixing zone in the near-field area (MEL-01).

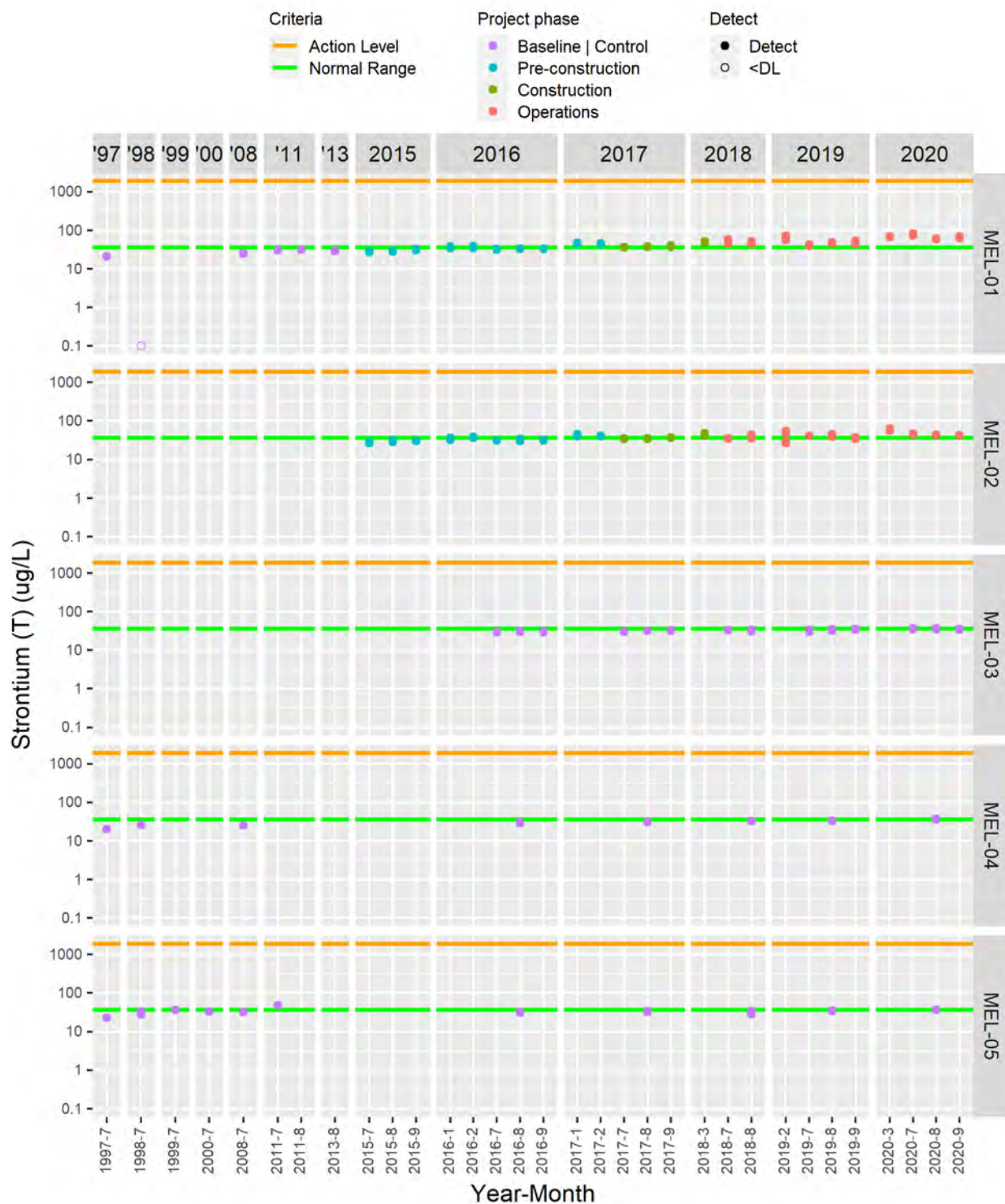


Figure C2-47. Total thallium ($\mu\text{g/L}$)

Notes: FEIS predictions (where applicable) represent predicted water quality at the edge of the mixing zone in the near-field area (MEL-01). The normal range for thallium is equal to the current detection limit.



Figure C2-48. Total tin ($\mu\text{g/L}$)

Notes: FEIS predictions (where applicable) represent predicted water quality at the edge of the mixing zone in the near-field area (MEL-01). The normal range for tin is equal to the current detection limit.

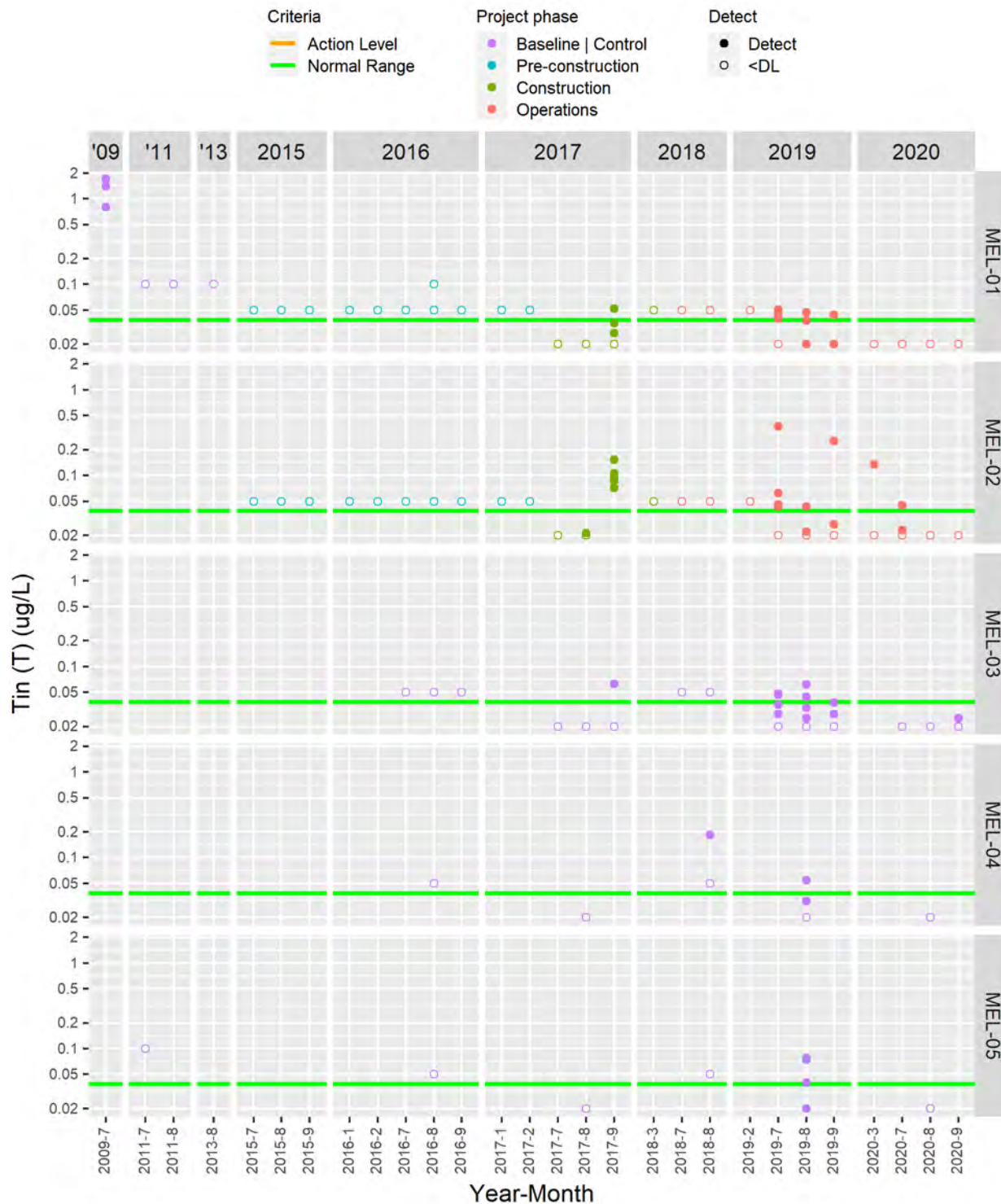


Figure C2-49. Total titanium ($\mu\text{g/L}$)

Notes: FEIS predictions (where applicable) represent predicted water quality at the edge of the mixing zone in the near-field area (MEL-01).

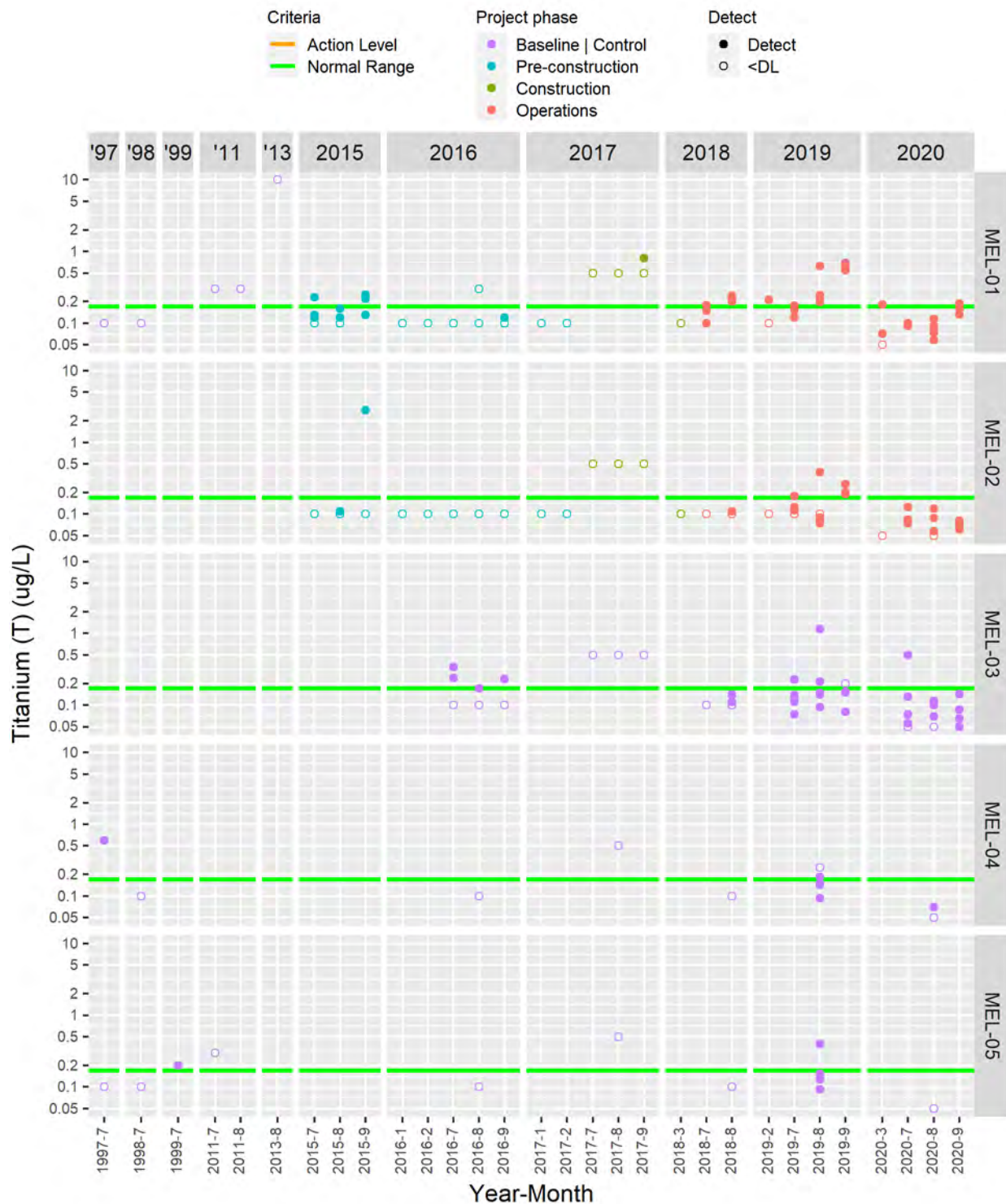


Figure C2-50. Total uranium ($\mu\text{g/L}$)

Notes: FEIS predictions (where applicable) represent predicted water quality at the edge of the mixing zone in the near-field area (MEL-01).

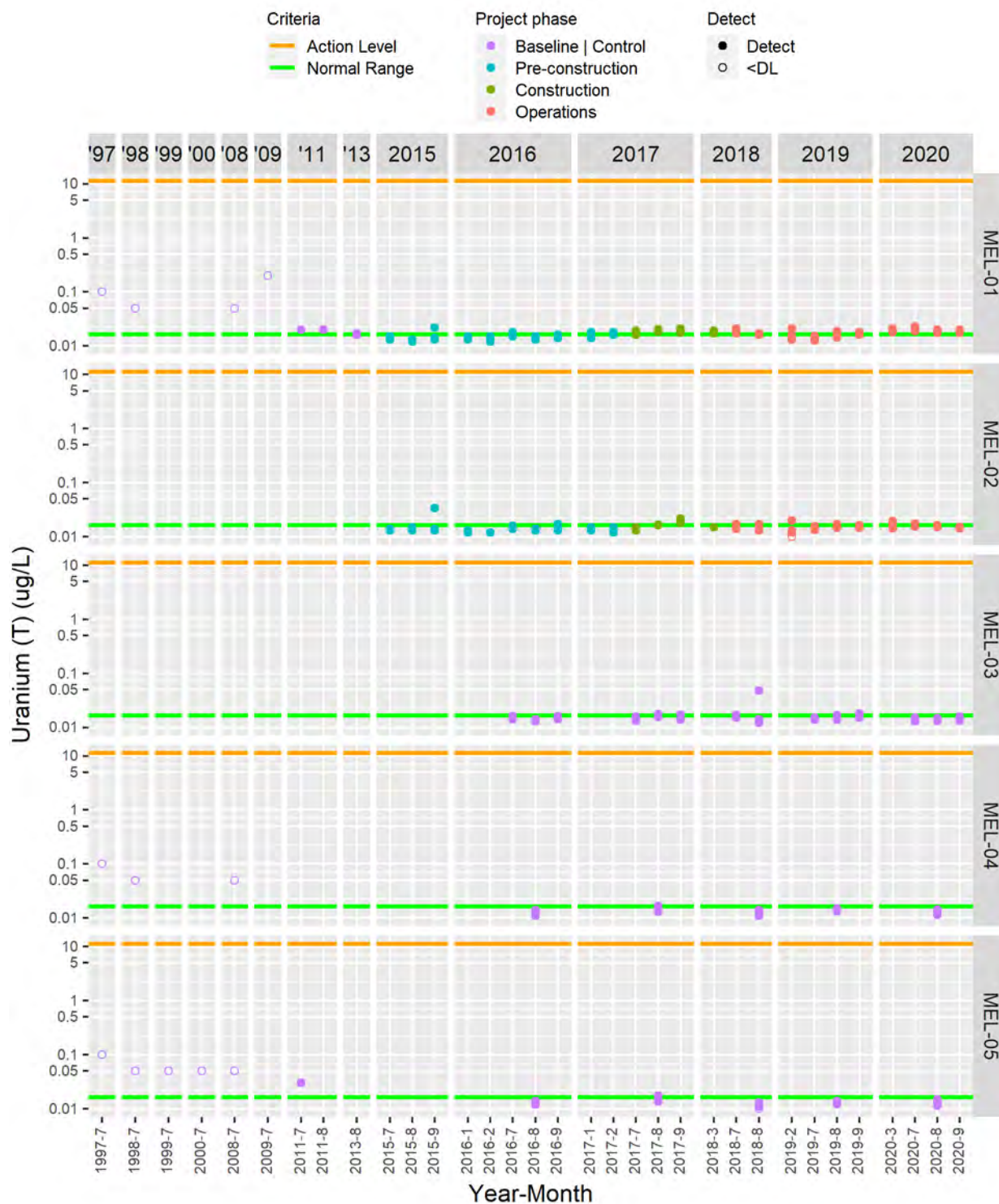


Figure C2-51. Total vanadium ($\mu\text{g/L}$)

Notes: FEIS predictions (where applicable) represent predicted water quality at the edge of the mixing zone in the near-field area (MEL-01). The normal range for vanadium is equal to the current detection limit.

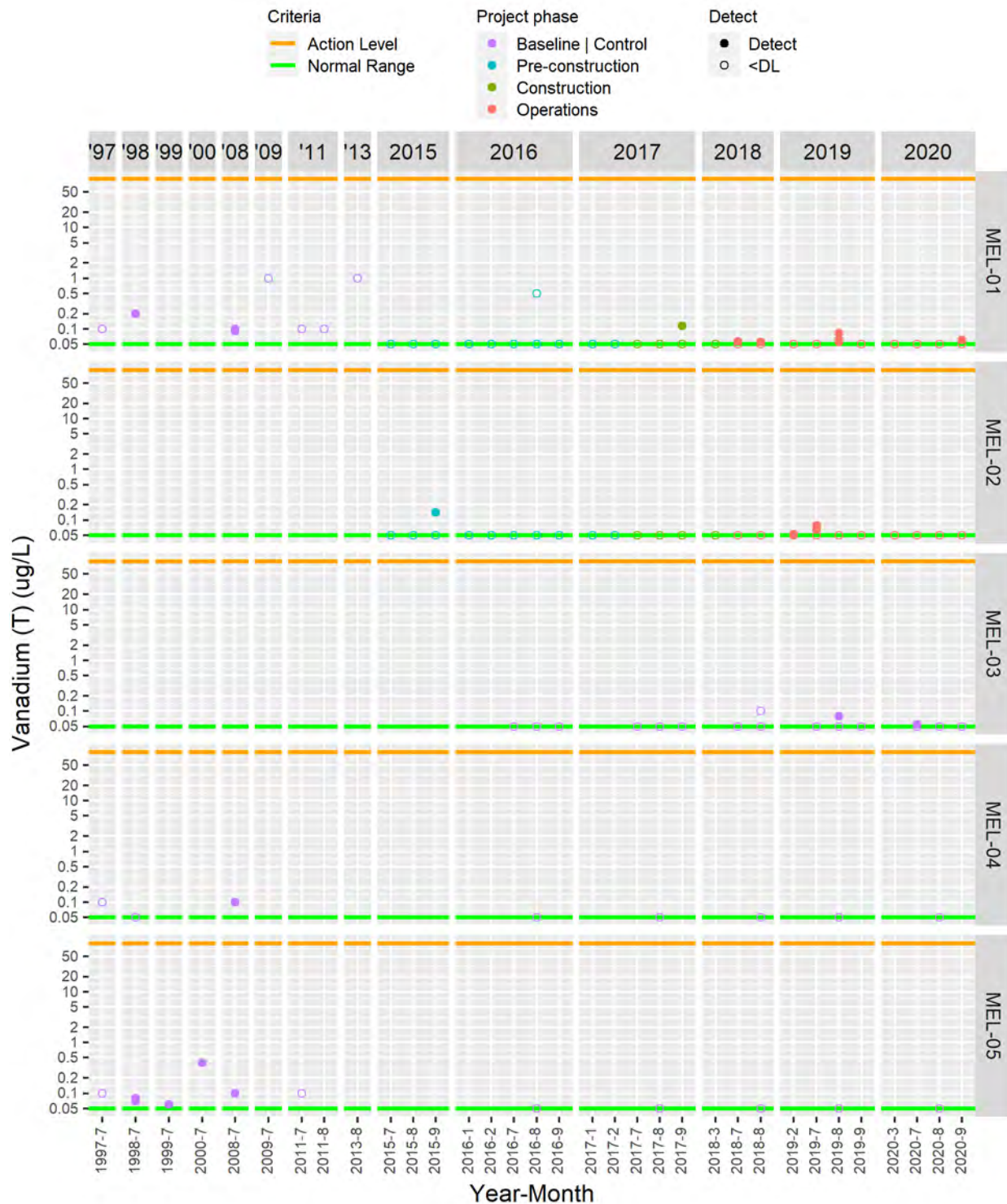


Figure C2-52. Total zinc (µg/L)

Notes: FEIS predictions (where applicable) represent predicted water quality at the edge of the mixing zone in the near-field area (MEL-01).

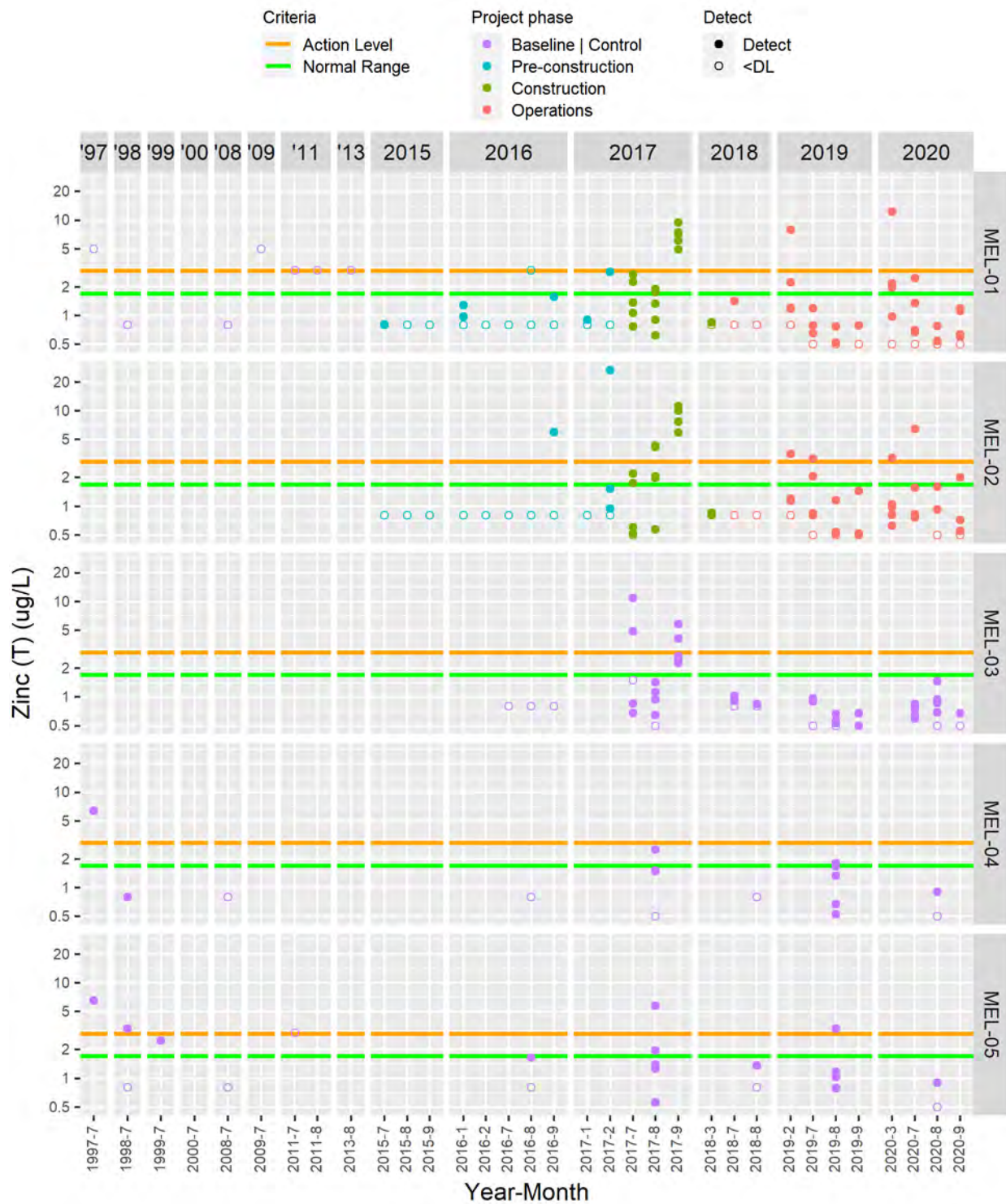


Figure C2-53. Dissolved manganese ($\mu\text{g/L}$)

Notes: FEIS predictions (where applicable) represent predicted water quality at the edge of the mixing zone in the near-field area (MEL-01).

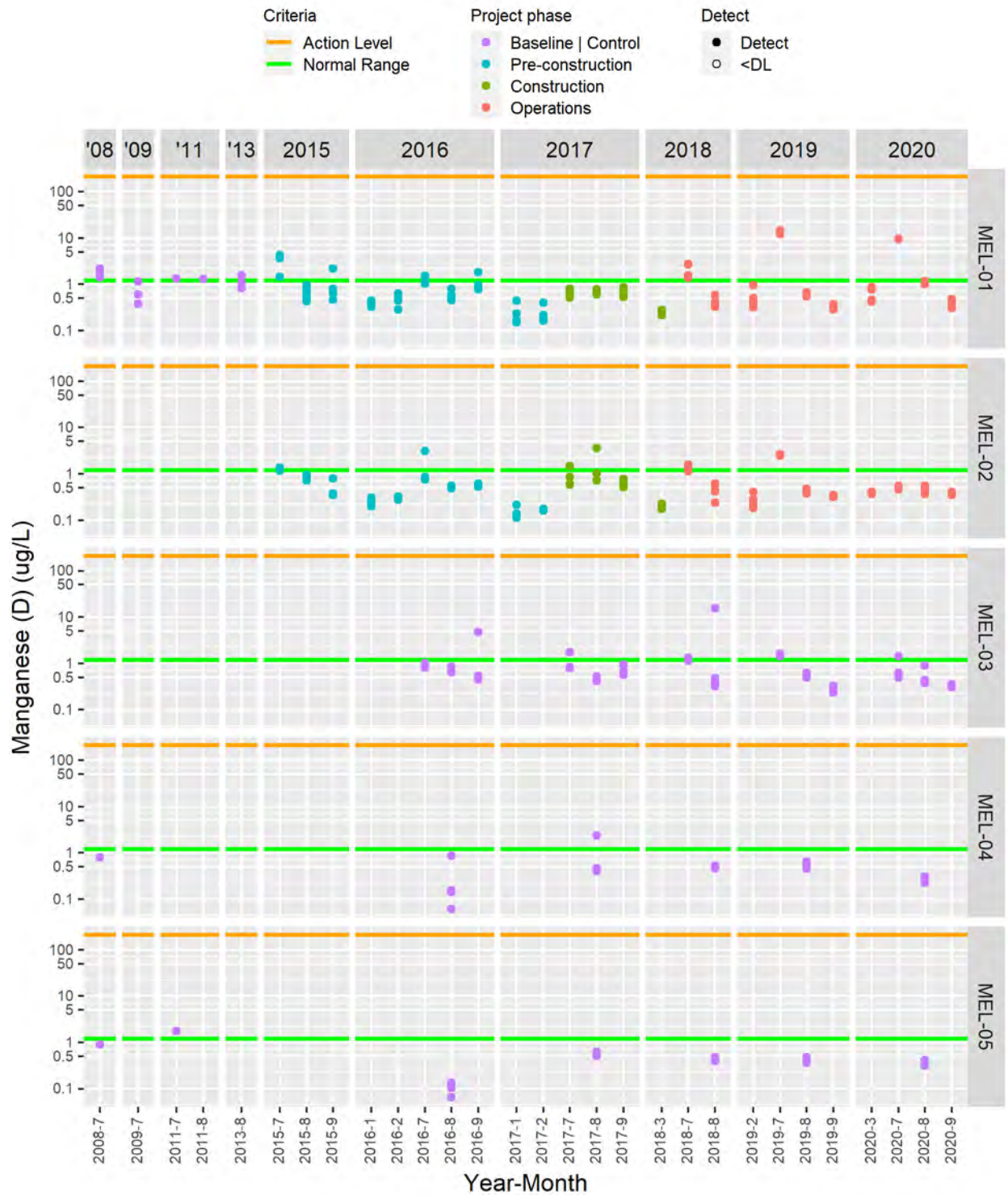
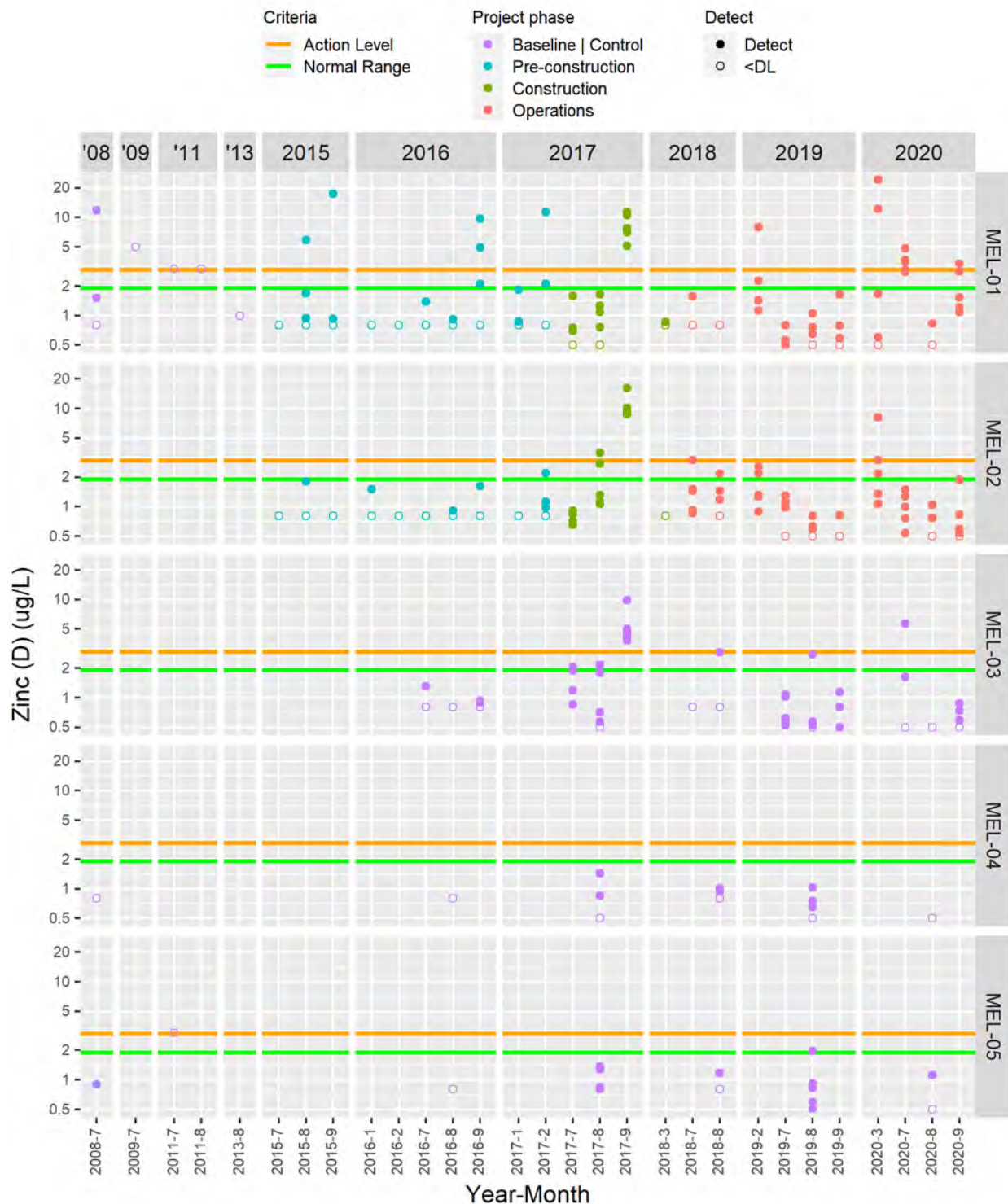


Figure C2-54. Dissolved zinc ($\mu\text{g/L}$)

Notes: FEIS predictions (where applicable) represent predicted water quality at the edge of the mixing zone in the near-field area (MEL-01). The CCME guideline for dissolved zinc is hardness-dependent. The redline corresponds to the lowest calculated guideline in 2020. The sample from MEL-01 in February was below the hardness-dependent guideline of $9.6 \mu\text{g/L}$ for that sample.



Appendix C3

Meliadine Lake Water Chemistry Results, 2020

Table C3-1. Meliadine Lake water chemistry data, Meliadine Lake AEMP 2020.

Parameter	Sample Event	March									
	Client Sample ID	MEL-01-01	MEL-01-06	MEL-01-07	MEL-01-08	MEL-01-09	MEL-02-02	MEL-02-03	MEL-02-05	MEL-02-06	MEL-02-08
	Sample Date	3/21/2020	3/21/2020	3/21/2020	3/21/2020	3/21/2020	3/21/2020	3/21/2020	3/21/2020	3/21/2020	3/21/2020
	ALS Sample ID	L2432715-1	L2432715-2	L2432715-3	L2432715-4	L2432715-5	L2432715-6	L2432715-7	L2432715-8	L2432715-9	L2432715-10
	Units										
Conventional Parameters											
Conductivity	µS/cm	121	119	118	116	117	108	109	109	105	112
Hardness (as CaCO3)	-	38.6	34.6	42.7	35.2	35.2	32.6	33.1	33.1	31.8	33.3
pH	pH units	7.35	7.33	7.29	7.27	7.28	7.29	7.29	7.34	7.33	7.37
Total Suspended Solids	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.3	<1.0	<1.0
Total Dissolved Solids	mg/L	67	67	70	65	54	59	68	62	58	55
TDS (Calculated)	mg/L	64.5	59.1	64.2	60.8	61.3	56.9	57.6	56.9	53.9	59
Turbidity	NTU	0.16	0.31	0.19	0.23	0.19	0.22	<0.10	0.2	0.13	0.18
Anions and Nutrients											
Alkalinity, Total (as CaCO3)	mg/L	26.9	27.1	27.2	26.7	26.3	26.1	26.1	26.1	25.1	26.3
Ammonia, Total (as N)	mg/L	0.019	0.0123	0.0141	0.0148	0.0148	0.0194	0.0234	0.0153	0.0168	0.0167
Bicarbonate (HCO3)	mg/L	32.8	33.1	33.2	32.6	32.1	31.8	31.8	31.8	30.6	32.1
Bromide (Br)	mg/L	-	-	-	-	-	-	-	-	-	-
Carbonate (CO3)	mg/L	<0.60	<0.60	<0.60	<0.60	<0.60	<0.60	<0.60	<0.60	<0.60	<0.60
Chloride (Cl)	mg/L	17.5	15.1	16.3	16.3	16.7	14.8	15.2	14.6	13.5	15.8
Fluoride (F)	mg/L	0.033	0.029	0.033	0.032	0.034	0.032	0.031	0.033	0.031	0.035
Hydroxide (OH)	mg/L	<0.34	<0.34	<0.34	<0.34	<0.34	<0.34	<0.34	<0.34	<0.34	<0.34
Ion Balance	%	98.4	96.2	108	95.2	95.1	94.7	94.7	96.3	96.8	93.8
Nitrate and Nitrite as N	mg/L	0.111	0.0641	0.0386	0.0525	0.0548	0.028	0.0339	0.0269	0.039	0.0318
Nitrate (as N)	mg/L	0.111	0.047	0.0355	0.0455	0.0423	0.0259	0.0296	0.0213	0.0272	0.0236
Nitrite (as N)	mg/L	<0.0010	0.0171	0.0031	0.007	0.0126	0.0021	0.0043	0.0055	0.0117	0.0082
Total Kjeldahl Nitrogen	mg/L	0.305	0.274	0.257	0.214	0.221	0.307	0.235	0.224	0.268	0.425
Total Nitrogen	mg/L	0.416	0.338	0.295	0.266	0.276	0.335	0.269	0.25	0.307	0.457
Dissolved Kjeldahl Nitrogen	mg/L	0.227	0.239	0.245	0.222	0.226	0.259	0.239	0.245	0.296	0.265
Total Dissolved Nitrogen	mg/L	0.338	0.303	0.283	0.275	0.281	0.287	0.273	0.272	0.335	0.297
Orthophosphate-Dissolved (as P)	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Phosphorus (P)-Total Dissolved	mg/L	0.002	0.0022	0.002	0.0023	0.0013	0.0018	0.0027	0.0017	0.0023	0.0018
Phosphorus (P)-Total	mg/L	0.0053	0.0055	0.0051	0.0045	0.0049	0.0045	0.0034	0.0044	0.0039	0.0039
Silica, Reactive (as SiO2)	mg/L	0.616	0.624	0.597	0.623	0.595	0.501	0.425	0.452	0.409	0.441
Sulfate (SO4)	mg/L	6.63	5.87	6.34	6.23	6.44	5.7	5.81	5.69	5.34	6.1
Organic/Inorganic Carbon											
Dissolved Organic Carbon	mg/L	4.81	4.61	4.43	4.42	4.4	4.04	4.13	4.07	3.88	4.13
Total Organic Carbon	mg/L	4.57	4.51	4.42	4.38	4.56	4.0	4.08	4.03	3.89	4.05
Total Metals											
Aluminum (Al)	mg/L	0.0021	0.0093	0.0016	0.0024	0.0046	0.002	0.0014	0.0015	0.0015	0.0016
Antimony (Sb)	mg/L	<0.000020	0.000157	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
Arsenic (As)	mg/L	0.000483	0.000547	0.000489	0.000473	0.000486	0.00038	0.000382	0.000416	0.00039	0.000382
Barium (Ba)	mg/L	0.0112	0.012	0.0113	0.0111	0.0115	0.011	0.011	0.0112	0.0104	0.0111
Beryllium (Be)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Boron (B)	mg/L	0.0068	0.0071	0.007	0.0068	0.0069	0.0065	0.0065	0.0061	0.006	0.0065
Cadmium (Cd)	mg/L	<0.0000050	0.000009	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Calcium (Ca)	mg/L	11.2	11.3	10.9	11.1	11.6	10.4	11	9.88	10.4	10.5
Cesium (Cs)	mg/L	0.0000067	0.0000066	0.0000065	0.0000065	0.0000068	0.000007	0.0000072	0.0000091	0.000007	0.000007
Chromium (Cr)	mg/L	<0.00010	0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Cobalt (Co)	mg/L	0.000018	0.0000175	0.0000161	0.0000164	0.0000178	0.0000164	0.0000149	0.0000123	0.0000103	0.0000127
Copper (Cu)	mg/L	0.00124	0.00221	0.0011	0.0011	0.00104	0.00108	0.00103	0.00104	0.00107	0.00107
Gallium (Ga)	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Iron (Fe)	mg/L	0.0095	0.0367	0.0078	0.0086	0.0075	0.0065	0.0062	0.0059	0.0045	0.0053
Lanthanum (La)	mg/L	0.000041	0.000081	0.000039	0.000042	0.000037	0.000031	0.000028	0.000034	0.000027	0.00003
Lead (Pb)	mg/L	0.000011	0.00104	<0.000010	<0.000010	<0.000010	0.000011	<0.000010	<0.000010	<0.000010	<0.000010
Lithium (Li)	mg/L	0.00138	0.0014	0.00138	0.00134	0.0014	0.00123	0.00127	0.00121	0.00115	0.00123
Magnesium (Mg)	mg/L	1.97	1.95	1.95	1.92	1.97	1.79	1.84	1.75	1.71	1.81
Manganese (Mn)	mg/L	0.00174	0.00232	0.00149	0.00158	0.00144	0.0017	0.00141	0.00124	0.00117	0.00124
Mercury (Hg)	ug/L	<0.00050	0.00051	<0.00050	0.0005	0.00056	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Molybdenum (Mo)	mg/L	0.00527	0.000123	0.0122	0.000791	0.000116	0.00013	0.000132	0.00529	0.00709	0.000114
Niobium (Nb)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0		

Table C3-1. Meliadine Lake water chemistry data, Meliadine Lake AEMP 2020.

Parameter	Sample Event	March									
	Client Sample ID	MEL-01-01	MEL-01-06	MEL-01-07	MEL-01-08	MEL-01-09	MEL-02-02	MEL-02-03	MEL-02-05	MEL-02-06	MEL-02-08
	Sample Date	3/21/2020	3/21/2020	3/21/2020	3/21/2020	3/21/2020	3/21/2020	3/21/2020	3/21/2020	3/21/2020	3/21/2020
	ALS Sample ID	L2432715-1	L2432715-2	L2432715-3	L2432715-4	L2432715-5	L2432715-6	L2432715-7	L2432715-8	L2432715-9	L2432715-10
Copper (Cu)	mg/L	0.00122	0.00107	0.00113	0.00106	0.00105	0.000956	0.000981	0.000975	0.000959	0.00103
Gallium (Ga)	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Iron (Fe)	mg/L	0.0066	0.0056	0.0086	0.0048	0.0048	0.0037	0.0039	0.0031	0.0027	0.0032
Lanthanum (La)	mg/L	0.000036	0.000034	0.000049	0.000033	0.000035	0.000029	0.000032	0.000027	0.000025	0.000028
Lead (Pb)	mg/L	0.000014	<0.000010	0.000022	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Lithium (Li)	mg/L	0.00136	0.00132	0.00134	0.00137	0.00134	0.00118	0.00121	0.00118	0.00113	0.0012
Magnesium (Mg)	mg/L	1.94	1.91	1.99	1.87	1.88	1.74	1.79	1.76	1.68	1.82
Manganese (Mn)	mg/L	0.000774	0.000422	0.000877	0.000454	0.000461	0.00039	0.000412	0.000409	0.000367	0.000378
Mercury (Hg)	ug/L	<0.00050	<0.00050	<0.00050	0.00076	<0.00050	0.00055	<0.00050	<0.00050	<0.00050	<0.00050
Molybdenum (Mo)	mg/L	0.000113	0.000102	0.000103	0.000111	0.000103	0.000093	0.000103	0.000104	0.000103	0.000139
Nickel (Ni)	mg/L	0.000935	0.000867	0.000877	0.000835	0.000864	0.000768	0.000765	0.000717	0.0007	0.000769
Niobium (Nb)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Phosphorus (P)	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Potassium (K)	mg/L	1.37	1.35	1.36	1.33	1.35	1.31	1.33	1.33	1.29	1.37
Rhenium (Re)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Rubidium (Rb)	mg/L	0.00185	0.00184	0.00183	0.0018	0.00182	0.00173	0.00179	0.00178	0.00175	0.00184
Selenium (Se)	mg/L	0.000042	<0.000040	0.00006	0.000051	0.000051	<0.000040	<0.000040	0.00005	<0.000040	0.000048
Silicon (Si)	mg/L	0.245	0.258	0.262	0.268	0.258	0.212	0.201	0.191	0.17	0.193
Silver (Ag)	mg/L	<0.0000050	<0.000010	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Sodium (Na)	mg/L	8.06	7.56	7.86	7.74	7.86	7.31	7.37	7.29	6.82	7.57
Strontium (Sr)	mg/L	0.0665	0.0663	0.0682	0.0643	0.0663	0.0596	0.0635	0.0622	0.0582	0.0648
Sulfur (S)	mg/L	2.28	2.06	2.15	2.13	2.11	1.92	2.04	2.13	1.94	1.98
Tantalum (Ta)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Tellurium (Te)	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
Thallium (Tl)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Thorium (Th)	mg/L	0.0000059	0.0000063	0.0000058	0.0000059	0.000006	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Tin (Sn)	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
Titanium (Ti)	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Tungsten (W)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Uranium (U)	mg/L	0.0000183	0.0000193	0.0000206	0.000018	0.0000194	0.0000155	0.0000169	0.0000168	0.0000164	0.0000159
Vanadium (V)	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Yttrium (Y)	mg/L	0.0000191	0.0000127	0.0000384	0.0000112	0.0000126	0.0000094	0.0000084	0.0000103	0.0000063	0.0000097
Zinc (Zn)	mg/L	0.0122	0.0006	0.0241	<0.00050	0.00166	0.00813	0.00107	0.00217	0.00296	0.00135
Zirconium (Zr)	mg/L	0.000063	0.000012	0.000014	0.000013	0.000013	<0.000010	0.00001	<0.000010	<0.000010	0.00001
Cyanides											
Cyanide, Weak Acid Diss	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0021	<0.0010	<0.0010	<0.0010
Cyanide, Total	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0024	<0.0010	<0.0010	<0.0010
Cyanide, Free	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0022	<0.0010	<0.0010	<0.0010
Radium											
Ra-226	Bq/L	<0.0075	<0.0062	<0.0064	<0.0059	<0.0085	<0.0086	0.0092	<0.0031	<0.0064	<0.0077

Notes

"<" indicates concentration was less than the detection limit

"-" = Chemical not analyzed or criteria not defined.

Table C3-1. Meliadine Lake water chemistry data, Meliadine Lake AEMP 2020.

Parameter	Sample Event	July									
	Client Sample ID	MEL-01-01	MEL-01-06	MEL-01-07	MEL-01-08	MEL-01-09	MEL-02-01	MEL-02-02	MEL-02-03	MEL-02-04	MEL-02-05
	Sample Date	7/22/2020	7/22/2020	7/22/2020	7/22/2020	7/22/2020	7/27/2020	7/27/2020	7/27/2020	7/27/2020	7/27/2020
	ALS Sample ID	L2482210-1	L2482210-2	L2482210-3	L2482210-4	L2482210-5	L2484438-1	L2484438-2	L2484438-3	L2484438-4	L2484438-5
Copper (Cu)	mg/L	0.000832	0.00083	0.000845	0.000792	0.000839	0.000776	0.000776	0.000787	0.000798	0.000761
Gallium (Ga)	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Iron (Fe)	mg/L	0.0369	0.0359	0.037	0.036	0.0361	0.0093	0.0081	0.0088	0.0087	0.008
Lanthanum (La)	mg/L	0.000037	0.000039	0.00004	0.000038	0.000039	0.000016	0.000016	0.000015	0.000016	0.000016
Lead (Pb)	mg/L	0.00002	0.000025	0.000018	0.000017	0.00002	0.000016	0.000013	0.000016	0.000013	0.000011
Lithium (Li)	mg/L	0.00173	0.00184	0.00162	0.00185	0.00167	0.00099	0.00098	0.00097	0.00099	0.001
Magnesium (Mg)	mg/L	1.71	1.81	1.72	1.81	1.69	1.31	1.31	1.31	1.36	1.31
Manganese (Mn)	mg/L	0.00948	0.00982	0.00939	0.00978	0.00938	0.000555	0.000507	0.000465	0.000553	0.000518
Mercury (Hg)	ug/L	0.00056	0.00055	0.00053	0.00078	<0.00050	<0.00050	0.00056	0.00052	<0.00050	<0.00050
Molybdenum (Mo)	mg/L	0.000095	0.000113	0.000108	0.000112	0.000101	0.000101	0.000072	0.000072	0.00008	0.000078
Nickel (Ni)	mg/L	0.000812	0.000837	0.000829	0.000815	0.000808	0.00063	0.000643	0.000658	0.000656	0.000655
Niobium (Nb)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Phosphorus (P)	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Potassium (K)	mg/L	1.09	1.13	1.09	1.12	1.08	0.984	0.984	0.986	1.02	0.979
Rhenium (Re)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Rubidium (Rb)	mg/L	0.00144	0.00151	0.00149	0.00149	0.00145	0.00143	0.0014	0.0014	0.00141	0.00141
Selenium (Se)	mg/L	0.000052	<0.000040	<0.000040	0.000056	<0.000040	0.000046	0.000043	0.000042	0.000049	<0.000040
Silicon (Si)	mg/L	0.22	0.218	0.533	0.42	0.231	0.14	0.15	0.144	0.153	0.143
Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Sodium (Na)	mg/L	7.94	8.55	8.06	8.69	7.95	5.86	5.74	5.68	5.95	5.57
Strontium (Sr)	mg/L	0.0668	0.0728	0.0654	0.0759	0.0645	0.0444	0.0444	0.0436	0.0437	0.0449
Sulfur (S)	mg/L	2.19	1.95	1.82	2.02	1.98	1.5	1.53	1.69	1.66	1.6
Tantalum (Ta)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Tellurium (Te)	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
Thallium (Tl)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Thorium (Th)	mg/L	0.0000054	<0.0000050	0.0000053	0.000005	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Tin (Sn)	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
Titanium (Ti)	mg/L	0.000119	0.000109	0.000102	0.000119	0.000151	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Tungsten (W)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Uranium (U)	mg/L	0.0000238	0.000022	0.0000236	0.000025	0.000022	0.0000175	0.0000182	0.0000185	0.0000166	0.0000173
Vanadium (V)	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Yttrium (Y)	mg/L	0.0000126	0.0000087	0.0000144	0.0000138	0.0000158	0.0000077	0.000008	0.0000101	0.0000069	0.0000053
Zinc (Zn)	mg/L	0.00369	0.0048	0.00357	0.00279	0.00292	0.00076	0.00054	0.00149	0.00099	0.00127
Zirconium (Zr)	mg/L	0.000013	0.000012	0.000011	<0.000010	0.000014	<0.000010	<0.000010	0.00001	<0.000010	<0.000010
Cyanides											
Cyanide, Weak Acid Diss	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Cyanide, Total	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Cyanide, Free	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Radium											
Ra-226	Bq/L	<0.030	<0.027	<0.025	<0.021	0.022	-	-	-	-	-

Notes
"<" indicates concentration was less than the detection limit
"- " = Chemical not analyzed or criteria not defined.

Table C3-1. Meliadine Lake water chemistry data, Meliadine Lake AEMP 2020.

Parameter	Sample Event	July					August				
	Client Sample ID	MEL-03-01	MEL-03-02	MEL-03-03	MEL-03-04	MEL-03-05	MEL-01-01	MEL-01-06	MEL-01-07	MEL-01-08	MEL-01-09
	Sample Date	7/27/2020	7/27/2020	7/27/2020	7/27/2020	7/27/2020	8/15/2020	8/15/2020	8/15/2020	8/15/2020	8/15/2020
	ALS Sample ID	L2484438-6	L2484438-7	L2484438-8	L2484438-9	L2484438-10	L2492144-1	L2492144-2	L2492144-3	L2492144-4	L2492144-5
	Units										
Conventional Parameters											
Conductivity	µS/cm	71.1	70.2	71	69.9	68.7	104	103	104	103	102
Hardness (as CaCO3)	-	20.8	20.7	20.7	20.9	20.6	28.2	28	27.9	28.5	27.8
pH	pH units	7.62	7.65	7.63	7.62	7.3	7.46	7.45	7.46	7.45	7.45
Total Suspended Solids	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.3	<1.0	<1.0	<1.0
Total Dissolved Solids	mg/L	55	54	50	47	50	64	66	53	63	59
TDS (Calculated)	mg/L	37.4	36.7	37.4	37.7	35.8	55.1	55.3	55.3	55.2	54.4
Turbidity	NTU	0.17	0.23	0.22	0.24	0.21	0.66	0.59	0.34	0.67	0.56
Anions and Nutrients											
Alkalinity, Total (as CaCO3)	mg/L	20	19.2	20.5	20.5	16.3	20.5	20.6	20.6	20.3	20.3
Ammonia, Total (as N)	mg/L	<0.0050	0.0064	0.0076	0.0062	0.0156	0.0145	0.0389	0.0135	0.0265	0.0305
Bicarbonate (HCO3)	mg/L	24.4	23.4	25	25	19.9	25	25.1	25.1	24.8	24.8
Bromide (Br)	mg/L	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Carbonate (CO3)	mg/L	<0.60	<0.60	<0.60	<0.60	<0.60	<0.60	<0.60	<0.60	<0.60	<0.60
Chloride (Cl)	mg/L	8.96	8.75	8.79	8.87	9.26	17.9	17.9	18	17.9	17.7
Fluoride (F)	mg/L	0.026	0.025	0.025	0.025	0.027	0.028	0.028	0.028	0.028	0.028
Hydroxide (OH)	mg/L	<0.34	<0.34	<0.34	<0.34	<0.34	<0.34	<0.34	<0.34	<0.34	<0.34
Ion Balance	%	Low EC	Low EC	Low EC	Low EC	Low EC	89	89.9	88.5	90.7	88.9
Nitrate and Nitrite as N	mg/L	0.0093	<0.0051	0.0059	0.0116	0.0271	0.012	0.0095	0.012	0.0109	0.0092
Nitrate (as N)	mg/L	0.0093	<0.0050	0.0059	0.0116	0.0271	0.012	0.0095	0.012	0.0109	0.0092
Nitrite (as N)	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Total Kjeldahl Nitrogen	mg/L	0.152	0.201	0.191	0.18	0.244	0.246	0.304	0.196	0.255	0.243
Total Nitrogen	mg/L	0.161	0.201	0.197	0.192	0.271	0.258	0.313	0.208	0.266	0.252
Dissolved Kjeldahl Nitrogen	mg/L	0.16	0.215	0.148	0.178	0.208	0.198	0.232	0.108	0.219	0.209
Total Dissolved Nitrogen	mg/L	0.169	0.215	0.154	0.19	0.235	0.21	0.242	0.12	0.23	0.219
Orthophosphate-Dissolved (as P)	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Phosphorus (P)-Total Dissolved	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0046	0.0041	0.0036	0.0032	0.0029
Phosphorus (P)-Total	mg/L	0.0039	<0.0010	0.0031	0.0026	0.0033	0.01	0.0076	0.0097	0.0066	0.0087
Silica, Reactive (as SiO2)	mg/L	0.202	0.206	0.21	0.204	0.208	0.327	0.319	0.329	0.331	0.327
Sulfate (SO4)	mg/L	3.45	3.53	3.36	3.43	3.55	5.84	5.8	5.85	5.81	5.76
Organic/Inorganic Carbon											
Dissolved Organic Carbon	mg/L	1.4	1.3	1.4	1.4	1.3	3.78	3.56	3.42	3.73	3.39
Total Organic Carbon	mg/L	1.5	1.5	1.5	1.5	1.4	3.4	3.39	3.42	3.62	3.31
Total Metals											
Aluminum (Al)	mg/L	0.0035	0.0028	0.0023	0.0024	0.0074	0.0045	0.0033	0.0037	0.0033	0.0045
Antimony (Sb)	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
Arsenic (As)	mg/L	0.000288	0.000254	0.000241	0.000296	0.000274	0.000512	0.00051	0.000522	0.0005	0.000498
Barium (Ba)	mg/L	0.00787	0.00766	0.00791	0.00782	0.00826	0.00866	0.00827	0.00844	0.00835	0.00814
Beryllium (Be)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Boron (B)	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0067	0.0068	0.0071	0.0071	0.0069
Cadmium (Cd)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Calcium (Ca)	mg/L	6.73	6.85	6.78	6.63	6.98	8.23	8.36	8.61	8.71	8.2
Cesium (Cs)	mg/L	0.0000086	0.0000083	0.0000087	0.000008	0.0000092	0.0000102	0.0000114	0.0000101	0.0000111	0.0000109
Chromium (Cr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Cobalt (Co)	mg/L	0.0000157	0.0000114	0.000011	0.0000084	0.0000197	0.0000264	0.0000256	0.0000284	0.0000265	0.0000317
Copper (Cu)	mg/L	0.000634	0.000655	0.000631	0.000638	0.000698	0.000822	0.000818	0.000807	0.00081	0.000812
Gallium (Ga)	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Iron (Fe)	mg/L	0.0139	0.0117	0.0107	0.0112	0.027	0.0265	0.0246	0.0255	0.0231	0.0235
Lanthanum (La)	mg/L	0.000022	0.000017	0.000019	0.000018	0.000048	0.000027	0.000023	0.000023	0.000022	0.000025
Lead (Pb)	mg/L	0.00001	<0.000010	<0.000010	<0.000010	0.000019	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Lithium (Li)	mg/L	0.00064	0.00065	0.00064	0.00064	0.00068	0.00142	0.00141	0.00148	0.00149	0.0014
Magnesium (Mg)	mg/L	1.13	1.13	1.14	1.15	1.14	1.7	1.67	1.65	1.65	1.69
Manganese (Mn)	mg/L	0.00301	0.00289	0.00277	0.00278	0.00467	0.00944	0.00867	0.00941	0.00821	0.00851
Mercury (Hg)	ug/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Molybdenum (Mo)	mg/L	0.000062	0.000063	0.00006	0.000061	0.000069	0.000095	0.000102	0.00068	0.000301	0.0001

Table C3-1. Meliadine Lake water chemistry data, Meliadine Lake AEMP 2020.

Parameter	Sample Event	July					August				
	Client Sample ID	MEL-03-01	MEL-03-02	MEL-03-03	MEL-03-04	MEL-03-05	MEL-01-01	MEL-01-06	MEL-01-07	MEL-01-08	MEL-01-09
	Sample Date	7/27/2020	7/27/2020	7/27/2020	7/27/2020	7/27/2020	8/15/2020	8/15/2020	8/15/2020	8/15/2020	8/15/2020
	ALS Sample ID	L2484438-6	L2484438-7	L2484438-8	L2484438-9	L2484438-10	L2492144-1	L2492144-2	L2492144-3	L2492144-4	L2492144-5
Copper (Cu)	mg/L	0.000616	0.000601	0.000596	0.00063	0.000605	0.0008	0.000763	0.00083	0.000827	0.000814
Gallium (Ga)	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Iron (Fe)	mg/L	0.0042	0.004	0.0034	0.0041	0.0041	0.0079	0.0075	0.0079	0.008	0.0078
Lanthanum (La)	mg/L	0.00001	<0.000010	0.00001	0.00001	0.000011	0.00001	<0.000010	<0.000010	<0.000010	<0.000010
Lead (Pb)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Lithium (Li)	mg/L	0.00063	0.00062	0.00063	0.00063	0.00063	0.00146	0.00142	0.00142	0.00148	0.00141
Magnesium (Mg)	mg/L	1.13	1.14	1.12	1.14	1.15	1.62	1.67	1.63	1.63	1.61
Manganese (Mn)	mg/L	0.000624	0.000591	0.000525	0.0005	0.00143	0.00107	0.00106	0.00117	0.00119	0.00102
Mercury (Hg)	ug/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Molybdenum (Mo)	mg/L	0.000063	0.000061	0.000052	0.000061	0.000051	0.000103	0.000114	0.000106	0.000111	0.000109
Nickel (Ni)	mg/L	0.000421	0.000429	0.000404	0.000411	0.000415	0.000706	0.000696	0.000725	0.0007	0.000718
Niobium (Nb)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Phosphorus (P)	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Potassium (K)	mg/L	0.892	0.898	0.889	0.885	0.905	1.11	1.13	1.12	1.12	1.12
Rhenium (Re)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Rubidium (Rb)	mg/L	0.0013	0.00129	0.00128	0.00126	0.00129	0.00151	0.00157	0.00154	0.00155	0.00152
Selenium (Se)	mg/L	<0.000040	<0.000040	0.000062	<0.000040	<0.000040	<0.000040	<0.000040	<0.000040	0.000041	<0.000040
Silicon (Si)	mg/L	0.099	0.099	0.098	0.107	0.094	0.161	0.163	0.156	0.152	0.155
Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Sodium (Na)	mg/L	4.5	4.47	4.49	4.47	4.67	7.62	7.88	7.72	7.76	7.54
Strontium (Sr)	mg/L	0.0322	0.0324	0.0321	0.0318	0.0341	0.0589	0.0628	0.0609	0.0594	0.061
Sulfur (S)	mg/L	1.36	1.35	1.24	1.44	1.61	1.83	1.76	1.8	1.69	1.67
Tantalum (Ta)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Tellurium (Te)	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
Thallium (Tl)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Thorium (Th)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Tin (Sn)	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
Titanium (Ti)	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Tungsten (W)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Uranium (U)	mg/L	0.0000115	0.0000119	0.0000102	0.0000128	0.0000105	0.0000202	0.0000191	0.0000202	0.0000213	0.0000187
Vanadium (V)	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Yttrium (Y)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000051	0.0000077	0.0000086	<0.0000050	0.000008
Zinc (Zn)	mg/L	<0.00050	0.0057	<0.00050	<0.00050	0.00163	<0.00050	<0.00050	0.00083	<0.00050	<0.00050
Zirconium (Zr)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Cyanides											
Cyanide, Weak Acid Diss	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Cyanide, Total	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Cyanide, Free	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Radium											
Ra-226	Bq/L	<0.0083	<0.0090	<0.0077	<0.0087	<0.0064	<0.0085	<0.0090	<0.0082	<0.0074	<0.0063

Notes

"<" indicates concentration was less than the detection limit

"-" = Chemical not analyzed or criteria not defined.

Table C3-1. Meliadine Lake water chemistry data, Meliadine Lake AEMP 2020.

Parameter	Sample Event	August									
	Client Sample ID	MEL-02-01	MEL-02-02	MEL-02-03	MEL-02-04	MEL-02-05	MEL-03-01-PC	MEL-03-02-PC	MEL-03-03-PC	MEL-03-04-PC	MEL-03-05-PC
	Sample Date	8/18/2020	8/18/2020	8/18/2020	8/18/2020	8/18/2020	8/19/2020	8/19/2020	8/19/2020	8/19/2020	8/19/2020
	ALS Sample ID	L2492826-1	L2492826-2	L2492826-3	L2492826-4	L2492826-5	L2492831-1	L2492831-2	L2492831-3	L2492831-4	L2492831-5
	Units										
Conventional Parameters											
Conductivity	µs/cm	87.5	85.3	84.8	84.1	84.2	73.9	75.2	75.7	74.9	74.6
Hardness (as CaCO3)	-	24.2	24.1	24.1	24.2	23.8	22.1	21.7	21.3	21.8	21.8
pH	pH units	7.44	7.44	7.45	7.44	7.46	7.45	7.43	7.45	7.47	7.41
Total Suspended Solids	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Total Dissolved Solids	mg/L	51	53	50	53	50	42	40	40	38	41
TDS (Calculated)	mg/L	45.7	44.5	44.5	44.5	44.1	39.5	39.6	39.1	39.6	39.5
Turbidity	NTU	0.28	0.22	0.21	0.2	0.21	0.18	0.14	0.18	0.14	0.18
Anions and Nutrients											
Alkalinity, Total (as CaCO3)	mg/L	20.8	20.4	20.4	20.7	20.8	20.2	20.7	20.4	20.5	20.2
Ammonia, Total (as N)	mg/L	0.0076	0.0162	0.0682	0.0292	0.0125	0.0594	0.0278	<0.0050	0.0793	0.0356
Bicarbonate (HCO3)	mg/L	25.4	24.9	24.9	25.3	25.4	24.6	25.3	24.9	25	24.6
Bromide (Br)	mg/L	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Carbonate (CO3)	mg/L	<0.60	<0.60	<0.60	<0.60	<0.60	<0.60	<0.60	<0.60	<0.60	<0.60
Chloride (Cl)	mg/L	12.7	12.3	12.3	12.1	12.1	9.63	9.62	9.59	9.61	9.62
Fluoride (F)	mg/L	0.027	0.028	0.026	0.027	0.028	0.027	0.028	0.027	0.027	0.028
Hydroxide (OH)	mg/L	<0.34	<0.34	<0.34	<0.34	<0.34	<0.34	<0.34	<0.34	<0.34	<0.34
Ion Balance	%	Low EC	Low EC	Low EC	Low EC	Low EC	Low EC	Low EC	Low EC	Low EC	Low EC
Nitrate and Nitrite as N	mg/L	0.0089	<0.0051	<0.0051	<0.0051	<0.0051	<0.0051	<0.0051	<0.0051	<0.0051	<0.0051
Nitrate (as N)	mg/L	0.0089	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Nitrite (as N)	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Total Kjeldahl Nitrogen	mg/L	0.213	0.211	0.217	0.207	0.192	0.192	0.176	0.168	0.268	0.228
Total Nitrogen	mg/L	0.222	0.211	0.217	0.207	0.192	0.192	0.176	0.168	0.268	0.228
Dissolved Kjeldahl Nitrogen	mg/L	0.171	0.183	0.172	0.184	0.182	0.19	0.19	0.153	0.184	0.2
Total Dissolved Nitrogen	mg/L	0.18	0.183	0.172	0.184	0.182	0.19	0.19	0.153	0.184	0.2
Orthophosphate-Dissolved (as P)	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Phosphorus (P)-Total Dissolved	mg/L	0.0019	0.0017	0.0016	0.0019	0.0014	0.0104	0.0017	0.0012	0.0011	0.0012
Phosphorus (P)-Total	mg/L	0.0064	0.0067	0.005	0.006	0.0063	0.0029	0.005	0.0071	0.0025	0.0024
Silica, Reactive (as SiO2)	mg/L	0.311	0.306	0.319	0.315	0.311	0.249	0.243	0.248	0.249	0.254
Sulfate (SO4)	mg/L	4.61	4.66	4.57	4.56	4.57	3.88	3.86	3.85	3.89	3.93
Organic/Inorganic Carbon											
Dissolved Organic Carbon	mg/L	2.83	2.7	2.96	2.84	2.77	2.72	2.76	2.51	2.59	2.37
Total Organic Carbon	mg/L	2.89	2.73	2.66	2.66	2.62	2.36	2.47	2.54	2.47	2.58
Total Metals											
Aluminum (Al)	mg/L	0.0022	0.0023	0.0033	0.0039	0.0034	0.0038	0.0034	0.0025	0.0027	0.0025
Antimony (Sb)	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	0.000021
Arsenic (As)	mg/L	0.000421	0.000439	0.000438	0.000431	0.000425	0.000268	0.000269	0.000274	0.000259	0.000234
Barium (Ba)	mg/L	0.00772	0.00764	0.00764	0.00802	0.00794	0.00742	0.00749	0.00741	0.00745	0.00729
Beryllium (Be)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Boron (B)	mg/L	0.0056	0.0054	0.0054	0.0055	0.0054	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Cadmium (Cd)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Calcium (Ca)	mg/L	7.31	7.5	7.61	7.63	7.58	6.98	6.83	6.46	6.81	6.96
Cesium (Cs)	mg/L	0.0000113	0.0000076	0.0000096	0.0000095	0.0000094	0.000011	0.0000106	0.0000085	0.0000088	0.0000075
Chromium (Cr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Cobalt (Co)	mg/L	0.0000147	0.000015	0.0000166	0.0000166	0.0000176	0.0000134	0.0000131	0.0000129	0.0000121	0.000014
Copper (Cu)	mg/L	0.00112	0.0011	0.00146	0.00125	0.00092	0.00069	0.000686	0.000698	0.000642	0.000668
Gallium (Ga)	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Iron (Fe)	mg/L	0.0135	0.0142	0.0158	0.0178	0.0147	0.0125	0.0128	0.0113	0.0108	0.0111
Lanthanum (La)	mg/L	0.000022	0.000018	0.000025	0.00003	0.000022	0.000019	0.000017	0.000015	0.000017	0.000017
Lead (Pb)	mg/L	<0.000010	<0.000010	0.000014	0.000012	<0.000010	0.000012	0.000062	<0.000010	<0.000010	<0.000010
Lithium (Li)	mg/L	0.00088	0.00091	0.00094	0.00093	0.00094	0.0007	0.00069	0.00064	0.00069	0.0007
Magnesium (Mg)	mg/L	1.35	1.3	1.31	1.34	1.33	1.15	1.14	1.18	1.14	1.14
Manganese (Mn)	mg/L	0.00387	0.00405	0.00421	0.0045	0.0041	0.00273	0.00284	0.00269	0.00259	0.00258
Mercury (Hg)	ug/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Molybdenum (Mo)	mg/L	0.000088	0.000102	0.000096	0.000113	0.00065	0.000099	0.0000990			

Table C3-1. Meliadine Lake water chemistry data, Meliadine Lake AEMP 2020.

Parameter	Sample Event	August									
	Client Sample ID	MEL-02-01	MEL-02-02	MEL-02-03	MEL-02-04	MEL-02-05	MEL-03-01-PC	MEL-03-02-PC	MEL-03-03-PC	MEL-03-04-PC	MEL-03-05-PC
	Sample Date	8/18/2020	8/18/2020	8/18/2020	8/18/2020	8/18/2020	8/19/2020	8/19/2020	8/19/2020	8/19/2020	8/19/2020
	ALS Sample ID	L2492826-1	L2492826-2	L2492826-3	L2492826-4	L2492826-5	L2492831-1	L2492831-2	L2492831-3	L2492831-4	L2492831-5
Copper (Cu)	mg/L	0.000848	0.000821	0.000965	0.000814	0.000733	0.000662	0.00068	0.000654	0.000604	0.000658
Gallium (Ga)	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Iron (Fe)	mg/L	0.0067	0.0063	0.0063	0.0063	0.006	0.0077	0.0057	0.0045	0.0049	0.0054
Lanthanum (La)	mg/L	0.000011	<0.000010	0.000011	0.000013	0.000011	0.000013	<0.000010	<0.000010	<0.000010	<0.000010
Lead (Pb)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000011	<0.000010	<0.000010	<0.000010	<0.000010
Lithium (Li)	mg/L	0.00089	0.00091	0.0009	0.00088	0.00089	0.00067	0.00067	0.00065	0.00066	0.00066
Magnesium (Mg)	mg/L	1.34	1.29	1.29	1.33	1.21	1.16	1.17	1.14	1.14	1.15
Manganese (Mn)	mg/L	0.000421	0.000498	0.000559	0.000553	0.000372	0.000887	0.000439	0.00042	0.000396	0.000374
Mercury (Hg)	ug/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Molybdenum (Mo)	mg/L	0.00009	0.000075	0.000084	0.000095	0.000089	0.000085	0.000096	0.000074	0.000078	0.000079
Nickel (Ni)	mg/L	0.000565	0.000563	0.00055	0.000563	0.000532	0.000422	0.000397	0.000428	0.000409	0.000409
Niobium (Nb)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Phosphorus (P)	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Potassium (K)	mg/L	0.994	0.978	0.984	0.988	0.903	0.93	0.939	0.914	0.927	0.927
Rhenium (Re)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Rubidium (Rb)	mg/L	0.00141	0.00139	0.00141	0.00144	0.0013	0.00138	0.00136	0.00133	0.00131	0.00138
Selenium (Se)	mg/L	<0.000040	0.000046	<0.000040	<0.000040	<0.000040	<0.000040	<0.000040	0.000048	<0.000040	<0.000040
Silicon (Si)	mg/L	0.139	0.149	0.153	0.148	0.154	0.109	0.115	0.118	0.11	0.116
Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Sodium (Na)	mg/L	6.03	5.52	5.55	5.63	5.3	4.81	4.77	4.71	4.81	4.88
Strontium (Sr)	mg/L	0.0433	0.0423	0.0447	0.0442	0.0433	0.0365	0.0346	0.0365	0.0361	0.0351
Sulfur (S)	mg/L	1.5	1.3	1.36	1.29	1.3	1.28	1.16	1.27	1.19	1.37
Tantalum (Ta)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Tellurium (Te)	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
Thallium (Tl)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Thorium (Th)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Tin (Sn)	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
Titanium (Ti)	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	0.000136	<0.000050	<0.000050	<0.000050	<0.000050
Tungsten (W)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Uranium (U)	mg/L	0.000016	0.0000153	0.0000157	0.0000161	0.0000144	0.0000136	0.0000132	0.0000126	0.000014	0.0000129
Vanadium (V)	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Yttrium (Y)	mg/L	0.0000076	0.0000058	0.0000065	<0.0000050	<0.0000050	0.0000052	<0.0000050	<0.0000050	<0.0000050	0.0000056
Zinc (Zn)	mg/L	0.00077	<0.00050	<0.00050	<0.00050	0.00104	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zirconium (Zr)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Cyanides											
Cyanide, Weak Acid Diss	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Cyanide, Total	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Cyanide, Free	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Radium											
Ra-226	Bq/L	-	-	-	-	-	<0.0080	0.031	<0.0077	<0.0082	<0.0073

Notes
"<" indicates concentration was less than the detection limit
"- " = Chemical not analyzed or criteria not defined.

Table C3-1. Meliadine Lake water chemistry data, Meliadine Lake AEMP 2020.

Parameter	Sample Event	August									
	Client Sample ID	MEL-04-01-PC	MEL-04-02-PC	MEL-04-03-PC	MEL-04-04-PC	MEL-04-05-PC	MEL-05-01	MEL-05-02	MEL-05-03	MEL-05-04	MEL-05-05
	Sample Date	8/19/2020	8/19/2020	8/19/2020	8/19/2020	8/19/2020	8/23/2020	8/23/2020	8/23/2020	8/23/2020	8/23/2020
	ALS Sample ID	L2492831-7	L2492831-8	L2492831-9	L2492831-10	L2492831-11	L2496258-1	L2496258-2	L2496258-3	L2496258-4	L2496258-5
Conventional Parameters	Units										
Conductivity	µS/cm	73.9	72.8	73.9	74.2	74	78	77.5	77.8	77.5	77.1
Hardness (as CaCO3)	-	21.5	22	21.6	21.5	22	24.3	24.5	24.4	24.3	24.1
pH	pH units	7.4	7.42	7.43	7.43	7.42	7.44	7.44	7.44	7.44	7.44
Total Suspended Solids	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Total Dissolved Solids	mg/L	54	51	40	45	47	41	40	44	46	59
TDS (Calculated)	mg/L	38.9	39.3	39.1	39.1	39.3	40.8	41.3	41	41.1	40.9
Turbidity	NTU	0.14	0.29	0.14	0.14	0.15	0.25	0.22	0.9	0.27	0.17
Anions and Nutrients											
Alkalinity, Total (as CaCO3)	mg/L	20.1	20.3	20.2	20.2	20.3	21.4	21.2	21	21.2	21.3
Ammonia, Total (as N)	mg/L	0.0405	<0.0050	0.0723	0.0056	0.0246	0.0088	0.0147	<0.0050	0.0086	0.006
Bicarbonate (HCO3)	mg/L	24.5	24.8	24.6	24.6	24.8	26.1	25.9	25.6	25.9	26
Bromide (Br)	mg/L	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Carbonate (CO3)	mg/L	<0.60	<0.60	<0.60	<0.60	<0.60	<0.60	<0.60	<0.60	<0.60	<0.60
Chloride (Cl)	mg/L	9.51	9.55	9.58	9.57	9.59	9.44	9.42	9.44	9.41	9.4
Fluoride (F)	mg/L	0.027	0.027	0.027	0.027	0.028	0.026	0.026	0.027	0.026	0.026
Hydroxide (OH)	mg/L	<0.34	<0.34	<0.34	<0.34	<0.34	<0.34	<0.34	<0.34	<0.34	<0.34
Ion Balance	%	Low EC	Low EC	Low EC	Low EC	Low EC	Low EC	Low EC	Low EC	Low EC	Low EC
Nitrate and Nitrite as N	mg/L	<0.0051	<0.0051	<0.0051	<0.0051	<0.0051	<0.0051	<0.0051	0.0134	<0.0051	0.0077
Nitrate (as N)	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0134	<0.0050	0.0077
Nitrite (as N)	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Total Kjeldahl Nitrogen	mg/L	0.314	0.223	0.283	0.188	0.196	0.228	0.248	0.17	0.244	0.214
Total Nitrogen	mg/L	0.314	0.223	0.283	0.188	0.196	0.228	0.248	0.184	0.244	0.222
Dissolved Kjeldahl Nitrogen	mg/L	0.218	0.215	0.171	0.18	0.218	0.191	0.177	0.165	0.232	0.185
Total Dissolved Nitrogen	mg/L	0.218	0.215	0.171	0.18	0.218	0.191	0.177	0.178	0.232	0.192
Orthophosphate-Dissolved (as P)	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Phosphorus (P)-Total Dissolved	mg/L	0.0012	0.0014	0.0018	0.0013	0.0012	0.0012	0.0015	0.0014	0.0014	0.0015
Phosphorus (P)-Total	mg/L	0.0056	0.0026	0.0019	0.0029	0.0021	0.0026	0.0029	0.0025	0.0022	0.0024
Silica, Reactive (as SiO2)	mg/L	0.242	0.24	0.244	0.248	0.249	0.289	0.282	0.28	0.277	0.276
Sulfate (SO4)	mg/L	3.87	3.88	3.94	3.89	3.89	3.84	3.86	3.84	3.82	3.86
Organic/Inorganic Carbon											
Dissolved Organic Carbon	mg/L	2.51	2.34	2.34	2.35	2.68	2.55	2.46	2.47	2.77	2.68
Total Organic Carbon	mg/L	2.49	2.18	2.36	2.51	2.5	2.51	2.42	2.65	2.63	2.95
Total Metals											
Aluminum (Al)	mg/L	0.0029	0.0024	0.0023	0.0014	0.0019	0.0024	0.0021	0.0026	0.0021	0.0022
Antimony (Sb)	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
Arsenic (As)	mg/L	0.000259	0.000237	0.000258	0.000239	0.000256	0.000303	0.000336	0.00031	0.00033	0.000316
Barium (Ba)	mg/L	0.00725	0.00721	0.00758	0.00749	0.00724	0.00828	0.00823	0.00829	0.00853	0.00831
Beryllium (Be)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Boron (B)	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0051
Cadmium (Cd)	mg/L	<0.000020	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Calcium (Ca)	mg/L	6.87	6.97	6.91	6.95	6.71	7.74	7.53	7.53	7.85	7.72
Cesium (Cs)	mg/L	0.000009	0.0000093	0.0000094	0.000008	0.000009	0.0000091	0.0000088	0.0000095	0.0000089	0.0000094
Chromium (Cr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Cobalt (Co)	mg/L	0.0000108	0.0000072	0.0000113	0.0000094	0.0000119	0.0000098	0.0000124	0.0000118	0.0000099	0.0000108
Copper (Cu)	mg/L	0.000658	0.000657	0.000658	0.00067	0.000675	0.000677	0.000684	0.000712	0.000665	0.000683
Gallium (Ga)	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Iron (Fe)	mg/L	0.0085	0.0079	0.0083	0.0076	0.008	0.01	0.0097	0.0097	0.0096	0.0105
Lanthanum (La)	mg/L	0.000014	0.000015	0.000016	0.000015	0.000013	0.000013	0.000014	0.000012	0.000014	0.000014
Lead (Pb)	mg/L	0.000011	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Lithium (Li)	mg/L	0.00069	0.00069	0.00068	0.0007	0.00067	0.00074	0.00072	0.00073	0.00076	0.00074
Magnesium (Mg)	mg/L	1.14	1.14	1.15	1.15	1.15	1.18	1.19	1.2	1.16	1.19
Manganese (Mn)	mg/L	0.00247	0.00237	0.00252	0.00234	0.00244	0.00277	0.00281	0.00276	0.00276	0.00287
Mercury (Hg)	ug/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Molybdenum (Mo)	mg/L	0.0135	0.00957	0.000117	0.0001	0.00776	0.000115	0.000099	0.000138		

Table C3-1. Meliadine Lake water chemistry data, Meliadine Lake AEMP 2020.

Parameter	Sample Event	August									
	Client Sample ID	MEL-04-01-PC	MEL-04-02-PC	MEL-04-03-PC	MEL-04-04-PC	MEL-04-05-PC	MEL-05-01	MEL-05-02	MEL-05-03	MEL-05-04	MEL-05-05
	Sample Date	8/19/2020	8/19/2020	8/19/2020	8/19/2020	8/19/2020	8/23/2020	8/23/2020	8/23/2020	8/23/2020	8/23/2020
	ALS Sample ID	L2492831-7	L2492831-8	L2492831-9	L2492831-10	L2492831-11	L2496258-1	L2496258-2	L2496258-3	L2496258-4	L2496258-5
Copper (Cu)	mg/L	0.00065	0.000647	0.000667	0.000627	0.000645	0.000683	0.000684	0.000706	0.000634	0.000697
Gallium (Ga)	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Iron (Fe)	mg/L	0.003	0.0028	0.0032	0.0029	0.0028	0.0043	0.0043	0.0045	0.0039	0.0049
Lanthanum (La)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Lead (Pb)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Lithium (Li)	mg/L	0.00065	0.00066	0.00063	0.00063	0.00066	0.00073	0.00074	0.00073	0.00073	0.0007
Magnesium (Mg)	mg/L	1.16	1.16	1.15	1.14	1.15	1.19	1.23	1.21	1.21	1.2
Manganese (Mn)	mg/L	0.000245	0.000308	0.000291	0.000226	0.00026	0.000421	0.000413	0.000316	0.000323	0.000413
Mercury (Hg)	ug/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Molybdenum (Mo)	mg/L	0.000073	0.00135	0.000078	0.000083	0.00297	0.00007	0.000062	0.000125	0.00012	0.000068
Nickel (Ni)	mg/L	0.000413	0.000404	0.000398	0.000417	0.000455	0.000405	0.000388	0.000418	0.000401	0.000417
Niobium (Nb)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Phosphorus (P)	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Potassium (K)	mg/L	0.922	0.917	0.919	0.909	0.923	0.949	0.962	0.954	0.938	0.937
Rhenium (Re)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Rubidium (Rb)	mg/L	0.00133	0.00136	0.00134	0.00133	0.00138	0.00137	0.0014	0.00135	0.00137	0.00136
Selenium (Se)	mg/L	0.000068	<0.000040	<0.000040	0.000052	<0.000040	0.000042	<0.000040	<0.000040	<0.000040	<0.000040
Silicon (Si)	mg/L	0.115	0.119	0.119	0.108	0.11	0.133	0.134	0.137	0.13	0.142
Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Sodium (Na)	mg/L	4.67	4.64	4.6	4.67	4.61	4.73	5.27	5.08	5.22	4.98
Strontium (Sr)	mg/L	0.0349	0.0344	0.0362	0.0351	0.0345	0.0351	0.034	0.0349	0.0346	0.0337
Sulfur (S)	mg/L	1.23	1.35	1.2	1.28	1.1	1.4	1.43	1.26	1.43	1.37
Tantalum (Ta)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Tellurium (Te)	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
Thallium (Tl)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Thorium (Th)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Tin (Sn)	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
Titanium (Ti)	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Tungsten (W)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Uranium (U)	mg/L	0.0000128	0.0000121	0.000013	0.0000122	0.0000126	0.0000158	0.0000137	0.0000131	0.000013	0.0000158
Vanadium (V)	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Yttrium (Y)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Zinc (Zn)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00112	<0.00050	<0.00050
Zirconium (Zr)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Cyanides											
Cyanide, Weak Acid Diss	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Cyanide, Total	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Cyanide, Free	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Radium											
Ra-226	Bq/L	-	-	-	-	-	-	-	-	-	-

Notes

"<" indicates concentration was less than the detection limit

"-" = Chemical not analyzed or criteria not defined.

Table C3-1. Meliadine Lake water chemistry data, Meliadine Lake AEMP 2020.

Parameter	Sample Event	September									
	Client Sample ID	MEL-02-01	MEL-02-02	MEL-02-03	MEL-02-04	MEL-02-05	MEL-03-01	MEL-03-02	MEL-03-03	MEL-03-04	MEL-03-05
	Sample Date	9/7/2020	9/7/2020	9/7/2020	9/7/2020	9/7/2020	9/8/2020	9/8/2020	9/8/2020	9/8/2020	9/8/2020
	ALS Sample ID	L2501979-1	L2501979-2	L2501979-3	L2501979-4	L2501979-5	L2502391-1	L2502391-2	L2502391-3	L2502391-4	L2502391-5
Conventional Parameters	Units										
Conductivity	µs/cm	87.3	82.3	82.6	82.6	82.4	78.7	73.2	73.3	74.8	73.5
Hardness (as CaCO3)	-	24.8	24.7	25	25	25.2	23.2	23	23.1	23	22.9
pH	pH units	7.46	7.43	7.42	7.43	7.44	7.51	7.48	7.48	7.42	7.47
Total Suspended Solids	mg/L	<1.0	2.2	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Total Dissolved Solids	mg/L	51	48	46	44	46	50	54	42	38	36
TDS (Calculated)	mg/L	43.8	41.8	44.8	41.5	44.1	40.5	39.8	39.9	37.8	39.7
Turbidity	NTU	<0.10	0.21	0.31	0.25	0.3	0.33	0.18	0.2	0.21	0.25
Anions and Nutrients											
Alkalinity, Total (as CaCO3)	mg/L	20.3	17.5	21.4	16.3	20.5	20.6	20.3	20.2	17	19.9
Ammonia, Total (as N)	mg/L	0.014	0.0158	0.0124	0.0096	0.0102	0.0099	0.0122	0.0128	0.0144	0.0083
Bicarbonate (HCO3)	mg/L	24.8	21.4	26.1	19.9	25	25.1	24.8	24.6	20.7	24.3
Bromide (Br)	mg/L	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Carbonate (CO3)	mg/L	<0.60	<0.60	<0.60	<0.60	<0.60	<0.60	<0.60	<0.60	<0.60	<0.60
Chloride (Cl)	mg/L	11.7	11.5	11.7	11.7	11.6	9.74	9.61	9.62	9.54	9.61
Fluoride (F)	mg/L	0.027	0.027	0.027	0.026	0.026	0.032	0.031	0.032	0.026	0.026
Hydroxide (OH)	mg/L	<0.34	<0.34	<0.34	<0.34	<0.34	<0.34	<0.34	<0.34	<0.34	<0.34
Ion Balance	%	Low EC	Low EC	Low EC	Low EC	Low EC	Low EC	Low EC	Low EC	Low EC	Low EC
Nitrate and Nitrite as N	mg/L	<0.0051	<0.0051	<0.0051	<0.0051	<0.0051	<0.0051	<0.0051	<0.0051	<0.0051	<0.0051
Nitrate (as N)	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Nitrite (as N)	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Total Kjeldahl Nitrogen	mg/L	0.239	0.264	0.326	0.176	0.244	0.226	0.186	0.249	0.237	0.24
Total Nitrogen	mg/L	0.239	0.264	0.326	0.176	0.244	0.226	0.186	0.249	0.237	0.24
Dissolved Kjeldahl Nitrogen	mg/L	0.206	0.293	0.215	0.185	0.218	0.177	0.157	0.231	0.202	0.2
Total Dissolved Nitrogen	mg/L	0.206	0.293	0.215	0.185	0.218	0.177	0.157	0.231	0.202	0.2
Orthophosphate-Dissolved (as P)	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Phosphorus (P)-Total Dissolved	mg/L	0.0017	0.0021	0.0014	0.0021	0.0024	0.0027	0.0023	0.0014	0.0019	0.0026
Phosphorus (P)-Total	mg/L	0.0047	0.0048	0.0047	0.0052	0.0042	0.003	0.0031	0.0034	0.0026	0.0032
Silica, Reactive (as SiO2)	mg/L	0.281	0.283	0.277	0.28	0.273	0.228	0.234	0.233	0.237	0.238
Sulfate (SO4)	mg/L	4.29	4.26	4.32	4.28	4.22	3.95	3.88	3.87	3.85	3.93
Organic/Inorganic Carbon											
Dissolved Organic Carbon	mg/L	2.83	2.75	2.77	2.99	2.83	2.57	2.91	2.58	2.72	2.6
Total Organic Carbon	mg/L	2.93	2.98	2.9	2.85	2.86	2.5	2.49	2.42	2.45	2.63
Total Metals											
Aluminum (Al)	mg/L	0.0028	0.0026	0.0028	0.0033	0.0028	0.0027	0.0027	0.0042	0.0033	0.0028
Antimony (Sb)	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
Arsenic (As)	mg/L	0.000459	0.000478	0.000448	0.000449	0.000421	0.000279	0.000284	0.000307	0.000289	0.000255
Barium (Ba)	mg/L	0.00825	0.00835	0.00841	0.00832	0.00837	0.008	0.00788	0.00796	0.00794	0.00813
Beryllium (Be)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Boron (B)	mg/L	<0.0050	0.005	0.0051	0.0051	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Cadmium (Cd)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Calcium (Ca)	mg/L	7.17	7.36	7.38	7.44	7.31	6.75	6.78	6.9	6.73	6.8
Cesium (Cs)	mg/L	0.0000087	0.0000082	0.0000076	0.0000083	0.0000084	0.0000091	0.0000099	0.0000105	0.0000081	0.0000083
Chromium (Cr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Cobalt (Co)	mg/L	0.0000166	0.0000169	0.0000167	0.0000136	0.0000141	0.000011	0.0000096	0.0000121	0.0000103	0.0000114
Copper (Cu)	mg/L	0.000942	0.000816	0.000807	0.000807	0.000804	0.000701	0.000695	0.000691	0.000707	0.000711
Gallium (Ga)	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Iron (Fe)	mg/L	0.0158	0.0134	0.0153	0.0147	0.0136	0.0108	0.0115	0.0134	0.0119	0.0126
Lanthanum (La)	mg/L	0.000023	0.000022	0.000025	0.000023	0.000022	0.000019	0.000019	0.000023	0.000021	0.00002
Lead (Pb)	mg/L	0.000011	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000012	<0.000010	<0.000010
Lithium (Li)	mg/L	0.00091	0.0009	0.00091	0.00091	0.0009	0.00069	0.0007	0.00072	0.00071	0.0007
Magnesium (Mg)	mg/L	1.34	1.33	1.36	1.37	1.35	1.19	1.19	1.19	1.2	1.19
Manganese (Mn)	mg/L	0.00347	0.00344	0.00346	0.00351	0.00347	0.00227	0.00227	0.00227	0.00227	0.00219
Mercury (Hg)	ug/L	0.00158	0.00065	<0.00050	<0.00050	0.00051	<0.00050	<0.00050	0.00072	<0.00050	<0.00050
Molybdenum (Mo)	mg/L	0.000075	0.000078	0.000072	0.000077	0.000081	0.000075	0.000072	0.000071	0.000064	0.000076

Table C3-1. Meliadine Lake water chemistry data, Meliadine Lake AEMP 2020.

Parameter	Sample Event	September									
	Client Sample ID	MEL-02-01	MEL-02-02	MEL-02-03	MEL-02-04	MEL-02-05	MEL-03-01	MEL-03-02	MEL-03-03	MEL-03-04	MEL-03-05
	Sample Date	9/7/2020	9/7/2020	9/7/2020	9/7/2020	9/7/2020	9/8/2020	9/8/2020	9/8/2020	9/8/2020	9/8/2020
	ALS Sample ID	L2501979-1	L2501979-2	L2501979-3	L2501979-4	L2501979-5	L2502391-1	L2502391-2	L2502391-3	L2502391-4	L2502391-5
Copper (Cu)	mg/L	0.000771	0.000742	0.000745	0.000731	0.000761	0.000675	0.000642	0.000705	0.00066	0.000687
Gallium (Ga)	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Iron (Fe)	mg/L	0.0044	0.0039	0.0039	0.0041	0.004	0.0039	0.0042	0.0053	0.0041	0.0051
Lanthanum (La)	mg/L	0.000012	0.000012	<0.000010	0.000011	<0.000010	0.00001	<0.000010	0.000011	<0.000010	0.000012
Lead (Pb)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000262	<0.000010	<0.000010	<0.000010	<0.000010
Lithium (Li)	mg/L	0.00098	0.00095	0.00098	0.00097	0.00098	0.00075	0.00074	0.00075	0.00075	0.00073
Magnesium (Mg)	mg/L	1.35	1.36	1.36	1.35	1.38	1.23	1.22	1.2	1.22	1.22
Manganese (Mn)	mg/L	0.000376	0.000404	0.000358	0.000387	0.000348	0.000301	0.000301	0.000353	0.000334	0.000336
Mercury (Hg)	ug/L	0.00084	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Molybdenum (Mo)	mg/L	0.000101	0.000088	0.000097	0.000102	0.000089	0.000072	0.00007	0.00008	0.000075	0.000073
Nickel (Ni)	mg/L	0.000525	0.000532	0.000559	0.000529	0.000566	0.000413	0.000448	0.000439	0.000436	0.000426
Niobium (Nb)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Phosphorus (P)	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Potassium (K)	mg/L	0.987	0.998	0.992	0.996	1.01	0.951	0.939	0.971	0.952	0.938
Rhenium (Re)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Rubidium (Rb)	mg/L	0.00142	0.00141	0.00141	0.0014	0.00146	0.00136	0.00134	0.00134	0.00135	0.00136
Selenium (Se)	mg/L	<0.000040	<0.000040	0.00005	0.000055	<0.000040	0.000051	0.000049	0.00006	<0.000040	<0.000040
Silicon (Si)	mg/L	0.149	0.141	0.139	0.135	0.126	0.123	0.121	0.12	0.132	0.109
Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Sodium (Na)	mg/L	5.52	5.48	5.76	5.56	5.72	4.95	4.78	4.85	4.85	4.86
Strontium (Sr)	mg/L	0.0437	0.0444	0.0439	0.0442	0.0433	0.036	0.0365	0.0362	0.0371	0.0365
Sulfur (S)	mg/L	1.5	1.57	1.51	1.61	1.72	1.53	1.36	1.43	1.48	1.26
Tantalum (Ta)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Tellurium (Te)	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
Thallium (Tl)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Thorium (Th)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Tin (Sn)	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
Titanium (Ti)	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	0.000093	<0.000050	<0.000050
Tungsten (W)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Uranium (U)	mg/L	0.0000157	0.0000165	0.0000157	0.000015	0.0000142	0.0000135	0.0000132	0.0000167	0.0000152	0.0000149
Vanadium (V)	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Yttrium (Y)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Zinc (Zn)	mg/L	0.00186	0.00082	<0.00050	0.00054	0.00059	0.00074	<0.00050	0.00087	0.00059	<0.00050
Zirconium (Zr)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Cyanides											
Cyanide, Weak Acid Diss	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Cyanide, Total	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Cyanide, Free	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Radium											
Ra-226	Bq/L	-	-	-	-	-	<0.0063	<0.0092	<0.0086	<0.0070	<0.0071

Notes

"<" indicates concentration was less than the detection limit

"-" = Chemical not analyzed or criteria not defined.

Table C3-1. Meliadine Lake water chemistry data, Meliadine Lake AEMP 2020.

Parameter	Sample Event	September				
	Client Sample ID	MEL-01-01	MEL-01-06	MEL-01-07	MEL-01-08	MEL-01-09
	Sample Date	9/11/2020	9/11/2020	9/11/2020	9/11/2020	9/11/2020
	ALS Sample ID	L2504254-1	L2504254-2	L2504254-3	L2504254-4	L2504254-5
Conventional Parameters	Units					
Conductivity	µS/cm	110	108	109	108	108
Hardness (as CaCO3)	-	30	30.9	31.3	31.1	28.6
pH	pH units	7.37	7.43	7.43	7.44	7.45
Total Suspended Solids	mg/L	<1.0	1.2	1.1	<1.0	<1.0
Total Dissolved Solids	mg/L	68	62	65	68	74
TDS (Calculated)	mg/L	54.9	55.7	56	55.3	54.2
Turbidity	NTU	0.41	0.44	0.42	0.55	0.47
Anions and Nutrients						
Alkalinity, Total (as CaCO3)	mg/L	20.7	21.1	20.7	20.5	21.1
Ammonia, Total (as N)	mg/L	0.0185	0.0275	0.0102	0.025	0.0212
Bicarbonate (HCO3)	mg/L	25.3	25.7	25.3	25	25.7
Bromide (Br)	mg/L	<0.10	<0.10	<0.10	<0.10	<0.10
Carbonate (CO3)	mg/L	<0.60	<0.60	<0.60	<0.60	<0.60
Chloride (Cl)	mg/L	16.8	17	17.2	16.9	16.8
Fluoride (F)	mg/L	0.024	0.024	0.025	0.024	0.024
Hydroxide (OH)	mg/L	<0.34	<0.34	<0.34	<0.34	<0.34
Ion Balance	%	98.3	98.5	100	101	93.3
Nitrate and Nitrite as N	mg/L	<0.0051	<0.0051	<0.0051	<0.0051	<0.0051
Nitrate (as N)	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Nitrite (as N)	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Total Kjeldahl Nitrogen	mg/L	0.337	0.398	0.314	0.34	0.276
Total Nitrogen	mg/L	0.337	0.398	0.314	0.34	0.276
Dissolved Kjeldahl Nitrogen	mg/L	0.281	0.359	0.288	0.293	0.275
Total Dissolved Nitrogen	mg/L	0.281	0.359	0.288	0.293	0.275
Orthophosphate-Dissolved (as P)	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Phosphorus (P)-Total Dissolved	mg/L	0.0029	0.0027	0.0031	0.0031	0.0019
Phosphorus (P)-Total	mg/L	0.0087	0.0077	0.0085	0.0076	0.0092
Silica, Reactive (as SiO2)	mg/L	0.246	0.237	0.245	0.238	0.247
Sulfate (SO4)	mg/L	5.43	5.48	5.54	5.48	5.46
Organic/Inorganic Carbon						
Dissolved Organic Carbon	mg/L	3.22	3.38	3.13	3.37	3.19
Total Organic Carbon	mg/L	3.78	3.04	3.14	3.19	3.25
Total Metals						
Aluminum (Al)	mg/L	0.0056	0.0043	0.0052	0.0047	0.0041
Antimony (Sb)	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
Arsenic (As)	mg/L	0.000551	0.000545	0.000537	0.000549	0.000561
Barium (Ba)	mg/L	0.00866	0.00837	0.00829	0.00827	0.00824
Beryllium (Be)	mg/L	0.0000061	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Boron (B)	mg/L	0.009	0.0085	0.008	0.008	0.0074
Cadmium (Cd)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Calcium (Ca)	mg/L	8.95	8.92	8.81	9.02	8.77
Cesium (Cs)	mg/L	0.0000126	0.0000104	0.0000093	0.0000096	0.0000096
Chromium (Cr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Cobalt (Co)	mg/L	0.0000316	0.0000321	0.0000253	0.0000224	0.0000262
Copper (Cu)	mg/L	0.00093	0.000852	0.000887	0.000868	0.000898
Gallium (Ga)	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Iron (Fe)	mg/L	0.0239	0.0239	0.0229	0.0243	0.0239
Lanthanum (La)	mg/L	0.000023	0.000021	0.000022	0.000022	0.000023
Lead (Pb)	mg/L	0.00001	<0.000010	<0.000010	<0.000010	<0.000010
Lithium (Li)	mg/L	0.00151	0.0015	0.00148	0.00148	0.00146
Magnesium (Mg)	mg/L	1.81	1.81	1.82	1.8	1.79
Manganese (Mn)	mg/L	0.00652	0.00664	0.00656	0.00634	0.00662
Mercury (Hg)	ug/L	0.00054	<0.00050	<0.00050	<0.00050	0.00062
Molybdenum (Mo)	mg/L	0.000121	0.000107	0.000118	0.000116	0.000112
Niobium (Nb)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Nickel (Ni)	mg/L	0.00072	0.000729	0.000759	0.000705	0.000701
Phosphorus (P)	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050
Potassium (K)	mg/L	1.2	1.21	1.2	1.2	1.19
Rhenium (Re)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Rubidium (Rb)	mg/L	0.00165	0.00163	0.00162	0.00163	0.00158
Selenium (Se)	mg/L	0.000055	<0.000040	<0.000040	<0.000040	<0.000040
Silicon (Si)	mg/L	0.141	0.145	0.163	0.137	0.154
Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Sodium (Na)	mg/L	7.78	7.96	7.78	7.71	7.82
Strontium (Sr)	mg/L	0.0641	0.0631	0.065	0.0655	0.0679
Sulfur (S)	mg/L	1.89	1.89	2.05	1.96	1.93
Tantalum (Ta)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Tellurium (Te)	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
Thallium (Tl)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Thorium (Th)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Tin (Sn)	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
Titanium (Ti)	mg/L	0.000189	0.000132	0.000158	0.000163	0.000164
Tungsten (W)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Uranium (U)	mg/L	0.0000201	0.000018	0.0000176	0.0000178	0.0000175
Vanadium (V)	mg/L	0.000061	<0.000050	<0.000050	<0.000050	<0.000050
Yttrium (Y)	mg/L	0.0000059	<0.0000050	<0.0000050	0.0000088	0.0000075
Zinc (Zn)	mg/L	0.00112	0.0006	<0.00050	0.0012	0.00064
Zirconium (Zr)	mg/L	0.00001	<0.000010	<0.000010	<0.000010	<0.000010
Dissolved Metals						
Aluminum (Al)	mg/L	0.0021	0.0027	0.0022	0.0018	0.0033
Antimony (Sb)	mg/L	0.000023	0.00002	0.00002	0.000021	<0.000020
Arsenic (As)	mg/L	0.000492	0.000488	0.000486	0.0005	0.000492
Barium (Ba)	mg/L	0.00823	0.00835	0.00818	0.00845	0.00826
Beryllium (Be)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Boron (B)	mg/L	0.007	0.0076	0.0077	0.0077	0.0077
Cadmium (Cd)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Calcium (Ca)	mg/L	9.04	9.43	9.56	9.53	8.61
Cesium (Cs)	mg/L	0.0000101	0.0000099	0.0000098	0.0000105	0.000012
Chromium (Cr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Cobalt (Co)	mg/L	0.0000129	0.0000143	0.0000127	0.0000129	0.0000148

Table C3-1. Meliadine Lake water chemistry data, Meliadine Lake AEMP 2020.

Parameter	Sample Event	September				
	Client Sample ID	MEL-01-01	MEL-01-06	MEL-01-07	MEL-01-08	MEL-01-09
	Sample Date	9/11/2020	9/11/2020	9/11/2020	9/11/2020	9/11/2020
	ALS Sample ID	L2504254-1	L2504254-2	L2504254-3	L2504254-4	L2504254-5
Copper (Cu)	mg/L	0.000897	0.000826	0.000856	0.00081	0.000841
Gallium (Ga)	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Iron (Fe)	mg/L	0.0058	0.0076	0.0067	0.0072	0.0074
Lanthanum (La)	mg/L	<0.000010	0.000011	<0.000010	0.000011	0.000011
Lead (Pb)	mg/L	<0.000010	<0.000010	<0.000010	0.000014	0.000014
Lithium (Li)	mg/L	0.00144	0.00154	0.00156	0.00155	0.00146
Magnesium (Mg)	mg/L	1.8	1.78	1.82	1.78	1.73
Manganese (Mn)	mg/L	0.000403	0.000368	0.000481	0.000309	0.000443
Mercury (Hg)	ug/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Molybdenum (Mo)	mg/L	0.000132	0.000119	0.000126	0.000135	0.000121
Nickel (Ni)	mg/L	0.000746	0.000668	0.000726	0.00068	0.000739
Niobium (Nb)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Phosphorus (P)	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050
Potassium (K)	mg/L	1.22	1.21	1.23	1.22	1.15
Rhenium (Re)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Rubidium (Rb)	mg/L	0.00167	0.00168	0.00163	0.00165	0.00154
Selenium (Se)	mg/L	0.00005	0.000045	0.000048	<0.000040	0.000045
Silicon (Si)	mg/L	0.133	0.126	0.134	0.14	0.125
Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Sodium (Na)	mg/L	8.15	8.07	8.22	8.1	7.8
Strontium (Sr)	mg/L	0.0653	0.0638	0.0644	0.0653	0.0623
Sulfur (S)	mg/L	1.91	1.87	2.31	1.87	2.19
Tantalum (Ta)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Tellurium (Te)	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
Thallium (Tl)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Thorium (Th)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Tin (Sn)	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
Titanium (Ti)	mg/L	<0.000050	0.000056	<0.000050	<0.000050	<0.000050
Tungsten (W)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Uranium (U)	mg/L	0.0000175	0.0000172	0.0000187	0.0000172	0.0000189
Vanadium (V)	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Yttrium (Y)	mg/L	0.0000056	0.0000053	<0.0000050	<0.0000050	<0.0000050
Zinc (Zn)	mg/L	0.00153	0.0028	0.0034	0.00121	0.00109
Zirconium (Zr)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Cyanides						
Cyanide, Weak Acid Diss	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Cyanide, Total	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Cyanide, Free	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Radium						
Ra-226	Bq/L	<0.0094	<0.0050	<0.0053	<0.0074	0.0089
Notes						

"<" indicates concentration was less than the detection limit

"-" = Chemical not analyzed or criteria not defined.

APPENDIX D

PENINSULA LAKES – SUPPORTING TABLES

Table D1-1. Peninsula Lakes laboratory water chemistry data, Meliadine Lake AEMP 2020.

Parameter	Sample Event Client Sample ID Sample Date ALS Sample ID	July								
		A8-01	A8-02	A8-03	B7-01	B7-02	B7-03	D7-01	D7-02	D7-03
		7/28/2020	7/28/2020	7/28/2020	7/27/2020	7/27/2020	7/27/2020	7/31/2020	7/31/2020	7/31/2020
		L2484438-11	L2484438-12	L2484438-13	L2484438-14	L2484438-15	L2484438-16	L2485199-1	L2485199-2	L2485199-3
	Units									
Dissolved Metals										
Aluminum (Al)	mg/L	0.0029	0.0022	0.002	0.0025	0.0029	0.0029	0.0025	0.0025	0.0022
Antimony (Sb)	mg/L	0.00003	0.000036	0.00003	0.000034	0.000034	0.000034	<0.000020	<0.000020	<0.000020
Arsenic (As)	mg/L	0.00489	0.00502	0.00494	0.00624	0.00444	0.00482	0.00111	0.00103	0.00104
Barium (Ba)	mg/L	0.0241	0.0251	0.0239	0.0248	0.0241	0.0245	0.0162	0.0164	0.0157
Beryllium (Be)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Boron (B)	mg/L	0.0052	0.0054	0.0054	0.0149	0.0148	0.0151	0.015	0.0147	0.0142
Cadmium (Cd)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Calcium (Ca)	mg/L	27.5	27.8	28.2	27.1	26.6	27	12.4	12.4	12.5
Cesium (Cs)	mg/L	0.0000174	0.0000194	0.0000175	0.000043	0.0000416	0.0000418	0.000068	0.000064	0.00006
Chromium (Cr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	0.00023	<0.00010	<0.00010	<0.00010	<0.00010
Cobalt (Co)	mg/L	0.0000196	0.0000239	0.0000231	0.0000531	0.0000509	0.0000691	0.0000187	0.0000168	0.0000173
Copper (Cu)	mg/L	0.000791	0.00155	0.00161	0.000929	0.000912	0.000893	0.000785	0.000747	0.00077
Gallium (Ga)	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Iron (Fe)	mg/L	0.0331	0.0309	0.0324	0.0343	0.0347	0.0658	0.0302	0.0321	0.0312
Lanthanum (La)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	0.00001	0.000017	<0.000010	0.00001	<0.000010
Lead (Pb)	mg/L	0.000037	0.000039	0.000038	0.000045	0.000043	0.000068	0.000013	0.000011	0.00001
Lithium (Li)	mg/L	0.00728	0.00739	0.00735	0.0196	0.0193	0.0198	0.00133	0.00134	0.00134
Magnesium (Mg)	mg/L	3.85	3.9	3.88	2.73	2.74	2.7	2.41	2.42	2.39
Manganese (Mn)	mg/L	0.00101	0.00109	0.00121	0.000512	0.000407	0.00061	0.000758	0.000444	0.000418
Mercury (Hg)	ug/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00061	0.00063	0.0005
Molybdenum (Mo)	mg/L	0.000259	0.000392	0.000306	0.00028	0.00029	0.00526	0.000443	0.000461	0.000464
Niobium (Nb)	mg/L	0.000711	0.000765	0.000716	0.000876	0.000886	0.000853	0.000652	0.000676	0.000627
Nickel (Ni)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Phosphorus (P)	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Potassium (K)	mg/L	1.8	1.81	1.83	1.75	1.75	1.73	1.19	1.2	1.16
Rhenium (Re)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Rubidium (Rb)	mg/L	0.00192	0.00189	0.00191	0.00197	0.002	0.00195	0.00109	0.00108	0.00105
Selenium (Se)	mg/L	<0.000040	<0.000040	0.000044	<0.000040	<0.000040	<0.000040	0.000041	0.000046	<0.000040
Silicon (Si)	mg/L	0.283	0.27	0.273	0.338	0.356	0.364	0.15	0.151	0.145
Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Sodium (Na)	mg/L	7.29	7.21	7.38	6.57	6.59	6.36	6.74	6.58	6.53
Strontium (Sr)	mg/L	0.194	0.2	0.201	0.271	0.271	0.277	0.0661	0.0693	0.0692
Sulfur (S)	mg/L	2.73	2.7	2.84	3.04	3.01	3.01	1.32	1.27	1.42
Tantalum (Ta)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Tellurium (Te)	mg/L	0.000021	0.000021	0.000025	0.00003	0.000027	0.000035	<0.000020	<0.000020	<0.000020
Thallium (Tl)	mg/L	<0.0000050	<0.0000050	<0.0000050	0.0000067	0.0000063	0.0000067	<0.0000050	<0.0000050	<0.0000050
Thorium (Th)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Tin (Sn)	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	0.000035	<0.000020	<0.000020	<0.000020
Titanium (Ti)	mg/L	0.000057	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	0.000055	<0.000050	<0.000050
Tungsten (W)	mg/L	0.000061	0.000057	0.000057	0.000047	0.000038	0.000041	<0.000010	<0.000010	<0.000010
Uranium (U)	mg/L	0.0000493	0.0000515	0.0000478	0.0000447	0.000042	0.000045	0.0000556	0.0000537	0.0000573
Vanadium (V)	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Yttrium (Y)	mg/L	<0.0000050	<0.0000050	<0.0000050	0.0000055	0.00001	<0.0000050	<0.0000050	<0.0000050	0.0000057
Zinc (Zn)	mg/L	0.0011	0.00106	0.00052	<0.00050	0.00459	0.00062	0.00062	<0.00050	<0.00050
Zirconium (Zr)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010

Notes

" < " indicates parameter was below the detection limit

" - " = Chemical not analyzed or criteria not defined

Table D1-1. Peninsula Lakes laboratory water chemistry data, Meliadine Lake AEMP 2020.

Parameter	Sample Event Client Sample ID Sample Date ALS Sample ID	August								
		D7-01	D7-02	D7-03	A8-01	A8-02	A8-03	B7-01	B7-02	B7-03
		8/24/2020	8/24/2020	8/24/2020	8/21/2020	8/21/2020	8/21/2020	8/22/2020	8/22/2020	8/22/2020
		L2496238-1	L2496238-2	L2496238-3	L2496246-1	L2496246-2	L2496246-3	L2496246-4	L2496246-5	L2496246-6
	Units									
Physical Tests										
Conductivity	umhos/cm	133	133	133	256	251	234	235	232	232
Hardness (as CaCO3)	-	49.3	48.9	49.4	103	103	96.8	94.6	91.1	91.9
pH	pH units	7.69	7.7	7.72	7.82	7.82	7.82	7.71	7.75	7.78
Total Suspended Solids	mg/L	2	2	1.6	<1.0	1.2	<1.0	2.8	1.7	1.3
Total Dissolved Solids	mg/L	82	76	79	174	172	149	152	161	164
Turbidity	NTU	0.9	0.95	0.74	0.48	0.45	0.71	0.41	0.44	0.44
Anions and Nutrients										
Alkalinity, Total (as CaCO3)	mg/L	49.3	48.9	49	52.1	51.9	57.5	45.4	46.5	46.6
Ammonia, Total (as N)	mg/L	0.0153	0.0719	0.0076	0.0506	0.0438	0.0656	0.0127	0.0098	0.0444
Bicarbonate (HCO3)	mg/L	60.1	59.7	59.8	63.6	63.3	70.2	55.4	56.7	56.9
Bromide (Br)	mg/L	<0.10	<0.10	<0.10	0.24	0.26	0.21	0.16	0.16	0.16
Carbonate (CO3)	mg/L	<0.60	<0.60	<0.60	<0.60	<0.60	<0.60	<0.60	<0.60	<0.60
Chloride (Cl)	mg/L	10.2	10.2	10.1	43.8	43.8	36	41	40.3	40.1
Fluoride (F)	mg/L	0.044	0.044	0.044	0.034	0.035	0.038	0.033	0.034	0.034
Hydroxide (OH)	mg/L	<0.34	<0.34	<0.34	<0.34	<0.34	<0.34	<0.34	<0.34	<0.34
Ion Balance	%	98	99.6	99.7	101	101	99.6	100	97.8	98.4
Nitrate and Nitrite as N	mg/L	0.0071	<0.0051	0.0058	<0.0051	0.0069	<0.0051	<0.0051	<0.0051	<0.0051
Nitrate (as N)	mg/L	0.0071	<0.0050	0.0058	<0.0050	0.0069	<0.0050	<0.0050	<0.0050	<0.0050
Nitrite (as N)	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Total Kjeldahl Nitrogen	mg/L	0.406	0.453	0.365	0.406	0.431	0.469	0.438	0.394	0.423
Total Nitrogen	mg/L	0.413	0.453	0.37	0.406	0.437	0.469	0.438	0.394	0.423
Dissolved Kjeldahl Nitrogen	mg/L	0.328	0.337	0.343	0.403	0.312	0.368	0.38	0.434	0.362
Total Dissolved Nitrogen	mg/L	0.336	0.337	0.349	0.403	0.319	0.368	0.38	0.434	0.362
Orthophosphate-Dissolved (as P)	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Phosphorus (P)-Total Dissolved	mg/L	0.0034	0.0033	0.0035	0.003	0.0027	0.0026	0.0026	0.0027	0.0027
Phosphorus (P)-Total	mg/L	0.0112	0.0113	0.0108	0.0056	0.0064	0.007	0.0133	0.0061	0.0065
Silica, Reactive (as SiO2)	mg/L	0.488	0.495	0.499	0.915	0.881	1.3	0.967	1.03	1
TDS (Calculated)	mg/L	71.5	71.2	70.9	131	132	122	121	120	120
Sulfate (SO4)	mg/L	4.82	4.6	4.44	8.02	7.99	6.39	8.23	8.15	8.14
Cyanides										
Cyanide, Weak Acid Diss	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Cyanide, Total	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Cyanide, Free	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Organic / Inorganic Carbon										
Dissolved Organic Carbon	mg/L	4.62	4.64	4.77	4.11	3.86	5.11	4.93	4.88	5.1
Total Organic Carbon	mg/L	4.6	4.72	4.63	4.12	4.04	5.05	4.83	4.74	4.89
Total Metals (Undigested)										
Aluminum (Al)	mg/L	0.0077	0.0082	0.0082	0.004	0.0049	0.0079	0.0032	0.0047	0.0016
Antimony (Sb)	mg/L	<0.000020	<0.000020	<0.000020	0.000043	0.000312	0.000057	0.000117	0.000144	0.000047
Arsenic (As)	mg/L	0.00122	0.00123	0.00118	0.00575	0.0054	0.00358	0.00568	0.00482	0.00462
Barium (Ba)	mg/L	0.0148	0.0161	0.0162	0.0243	0.0239	0.0245	0.0234	0.024	0.024
Beryllium (Be)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Boron (B)	mg/L	0.0158	0.0164	0.0166	0.0057	<0.0050	<0.0050	0.0145	0.0148	0.0146
Cadmium (Cd)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000076	<0.0000050	<0.0000050	<0.0000050
Calcium (Ca)	mg/L	14.6	14.8	14.9	32.7	34.1	31.8	32.8	33.1	31.2
Cesium (Cs)	mg/L	0.0000068	0.0000066	0.0000088	0.0000182	0.0000187	0.0000169	0.0000388	0.000039	0.0000432
Chromium (Cr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Cobalt (Co)	mg/L	0.0000639	0.0000644	0.0000663	0.0000492	0.0000401	0.0000633	0.0000706	0.0000607	0.0000585
Copper (Cu)	mg/L	0.000919	0.000955	0.000932	0.000955	0.000758	0.0019	0.000878	0.000888	0.000957
Gallium (Ga)	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Iron (Fe)	mg/L	0.0693	0.0699	0.0687	0.0723	0.0623	0.113	0.0577	0.0548	0.0507
Lanthanum (La)	mg/L	0.000041	0.000042	0.000039	0.000019	0.00002	0.000025	0.00002	0.000031	0.000014
Lead (Pb)	mg/L	0.000025	0.000029	0.000023	0.000072	0.000059	0.000049	0.000045	0.000047	0.000025
Lithium (Li)	mg/L	0.00144	0.00148	0.00148	0.00753	0.00742	0.00603	0.02	0.0195	0.019
Magnesium (Mg)	mg/L	2.82	2.8	2.84	4.56	4.63	4.19	3.11	3.2	3.07
Manganese (Mn)	mg/L	0.0135	0.0136	0.0124	0.00985	0.00839	0.0184	0.00522	0.00533	0.00571
Mercury (Hg)	ug/L	0.00053	0.00056	0.00054	<0.00050	<0.00050	0.00059	<0.00050	<0.00050	<0.00050
Molybdenum (Mo)	mg/L	0.000468	0.00047	0.000452	0.000275	0.000261	0.000263	0.000263	0.000275	0.000241
Niobium (Nb)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Nickel (Ni)	mg/L	0.00082	0.000862	0.000809	0.000871	0.000744	0.001	0.000851	0.000781	0.000809
Phosphorus (P)	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Potassium (K)	mg/L	1.32	1.34	1.34	1.95	1.92	1.78	1.8	1.83	1.8
Rhenium (Re)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Rubidium (Rb)	mg/L	0.00122	0.00125	0.00122	0.00207	0.00203	0.00189	0.00202	0.00209	0.00202
Selenium (Se)	mg/L	0.00007	0.000057	0.000052	<0.000040	<0.000040	0.000043	0.000054	<0.000040	0.000052
Silicon (Si)	mg/L	0.258	0.253	0.245	0.451	0.443	0.677	0.472	0.541	0.531
Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Sodium (Na)	mg/L	7.65	7.48	8.37	8.41	8.32	6.96	7.21	7.45	7.11
Strontium (Sr)	mg/L	0.0677	0.0683	0.068	0.184	0.189	0.173	0.254	0.27	0.263
Sulfur (S)	mg/L	1.7	1.7	1.68	2.87	2.88	2.29	2.92	3.1	2.81
Tantalum (Ta)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Tellurium (Te)	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	0.000021	<0.000020	0.000024	0.000024	<0.000020
Thallium (Tl)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Thorium (Th)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Tin (Sn)	mg/L	0.000022	<0.000020	<0.000020	<0.000020	0.000022	<0.000020	<0.000020	0.000035	<0.000020
Titanium (Ti)	mg/L	0.000518	<0.00050	0.000536	0.000164	0.000138	0.000346	<0.00020	0.000303	<0.000050
Tungsten (W)	mg/L	<0.000010	<0.000010	<0.000010	0.000059	0.000061	0.000023	0.000035	0.000036	0.000037
Uranium (U)	mg/L	0.0000617	0.0000635	0.0000604	0.0000557	0.000051	0.0000467	0.0000477	0.0000488	0.0000439
Vanadium (V)	mg/L	0.000097	0.000105	0.000101	0.000053	0.000051	0.000064	0.000059	0.000063	0.000051
Yttrium (Y)	mg/L	0.0000072	0.0000105	0.0000085	0.0000076	0.0000055	0.0000064	0.000007	0.0000106	<0.0000050
Zinc (Zn)	mg/L	0.00144	0.00195	0.00053	0.00109	0.00092	0.00157	0.00078	0.00067	0.00052
Zirconium (Zr)	mg/L	0.000025	<0.000010	<0.000010	0.000132	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010

Table D1-1. Peninsula Lakes laboratory water chemistry data, Meliadine Lake AEMP 2020.

Parameter	Sample Event Client Sample ID Sample Date ALS Sample ID	August								
		D7-01	D7-02	D7-03	A8-01	A8-02	A8-03	B7-01	B7-02	B7-03
		8/24/2020	8/24/2020	8/24/2020	8/21/2020	8/21/2020	8/21/2020	8/22/2020	8/22/2020	8/22/2020
		L2496238-1	L2496238-2	L2496238-3	L2496246-1	L2496246-2	L2496246-3	L2496246-4	L2496246-5	L2496246-6
	Units									
Dissolved Metals										
Aluminum (Al)	mg/L	0.0034	0.0022	0.0019	0.0021	0.0011	0.0026	0.0023	0.002	0.0013
Antimony (Sb)	mg/L	<0.000020	<0.000020	<0.000020	0.000106	0.000084	0.000062	0.000107	0.000208	0.000045
Arsenic (As)	mg/L	0.000991	0.000918	0.00095	0.00446	0.00456	0.0028	0.00494	0.00407	0.00414
Barium (Ba)	mg/L	0.0154	0.0156	0.0152	0.0229	0.0233	0.0234	0.023	0.0225	0.0226
Beryllium (Be)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Boron (B)	mg/L	0.0156	0.0154	0.0158	0.0053	0.0051	<0.0050	0.0143	0.0143	0.0145
Cadmium (Cd)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000062	<0.0000050	<0.0000050	<0.0000050
Calcium (Ca)	mg/L	15	14.8	14.9	33.5	33.9	31.9	32.6	31.3	31.8
Cesium (Cs)	mg/L	0.0000066	0.0000065	0.0000062	0.000017	0.0000168	0.0000139	0.0000403	0.0000444	0.0000433
Chromium (Cr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Cobalt (Co)	mg/L	0.0000202	0.0000197	0.000018	0.0000198	0.0000197	0.0000305	0.0000474	0.0000465	0.0000451
Copper (Cu)	mg/L	0.000842	0.000847	0.000852	0.000702	0.00077	0.00072	0.000837	0.00094	0.000832
Gallium (Ga)	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Iron (Fe)	mg/L	0.0226	0.0215	0.0202	0.0286	0.0256	0.0512	0.0328	0.0287	0.0282
Lanthanum (La)	mg/L	0.00001	0.000012	0.000012	0.000011	<0.000010	0.00001	<0.000010	0.000012	<0.000010
Lead (Pb)	mg/L	0.000011	<0.000010	<0.000010	0.000029	0.000021	0.00002	0.000034	0.000023	0.000018
Lithium (Li)	mg/L	0.00148	0.00146	0.00148	0.00763	0.00769	0.00601	0.0198	0.0194	0.0194
Magnesium (Mg)	mg/L	2.86	2.91	2.97	4.78	4.51	4.16	3.19	3.16	3.03
Manganese (Mn)	mg/L	0.00051	0.000561	0.000605	0.00107	0.000879	0.00329	0.00123	0.000856	0.000587
Mercury (Hg)	ug/L	<0.00050	<0.00050	<0.00050	<0.00050	0.00108	0.00216	0.00075	<0.00050	<0.00050
Molybdenum (Mo)	mg/L	0.00444	0.000607	0.00533	0.000295	0.0003	0.000263	0.000294	0.000259	0.000265
Niobium (Nb)	mg/L	0.000746	0.000796	0.000768	0.000778	0.000741	0.000993	0.000815	0.000871	0.000839
Nickel (Ni)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Phosphorus (P)	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Potassium (K)	mg/L	1.31	1.33	1.32	1.89	1.94	1.78	1.8	1.82	1.79
Rhenium (Re)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Rubidium (Rb)	mg/L	0.00118	0.0012	0.00119	0.00199	0.00205	0.00186	0.0021	0.00211	0.00206
Selenium (Se)	mg/L	0.000041	0.000058	0.00006	<0.000040	<0.000040	0.000043	<0.000040	<0.000040	0.000042
Silicon (Si)	mg/L	0.242	0.232	0.232	0.42	0.439	0.652	0.478	0.489	0.503
Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Sodium (Na)	mg/L	7.62	7.96	7.69	8.03	8.16	7.18	6.95	7.35	7.29
Strontium (Sr)	mg/L	0.0681	0.0725	0.0667	0.187	0.192	0.177	0.293	0.258	0.267
Sulfur (S)	mg/L	1.75	1.66	1.63	2.82	2.78	2.27	2.86	2.71	2.78
Tantalum (Ta)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Tellurium (Te)	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	0.00002	<0.000020	0.000024	0.000027	0.000025
Thallium (Tl)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Thorium (Th)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Tin (Sn)	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	0.000065	<0.000020
Titanium (Ti)	mg/L	<0.000050	0.000056	<0.000050	<0.000050	<0.000050	0.000097	0.000063	<0.000050	<0.000050
Tungsten (W)	mg/L	<0.000010	<0.000010	<0.000010	0.000061	0.000056	0.000015	0.000038	0.000035	0.000037
Uranium (U)	mg/L	0.0000635	0.00006	0.000064	0.0000539	0.0000511	0.0000439	0.0000486	0.0000443	0.0000451
Vanadium (V)	mg/L	<0.000050	0.00005	0.000053	<0.000050	<0.000050	<0.000050	<0.000050	0.000051	<0.000050
Yttrium (Y)	mg/L	0.0000057	0.0000069	0.0000057	0.0000066	<0.0000050	<0.0000050	<0.0000050	0.0000056	<0.0000050
Zinc (Zn)	mg/L	0.00116	0.00056	<0.00050	0.001	0.00081	0.00104	0.00054	0.00054	<0.00050
Zirconium (Zr)	mg/L	<0.000010	0.000016	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010

Notes

" < " indicates parameter was below the detection limit

" - " = Chemical not analyzed or criteria not defined

APPENDIX E

PHYTOPLANKTON DATA

Appendix E1

2020 Phytoplankton Taxonomy (Plankton R Us)

Table E1-1. Phytoplankton species data, Meliadine study lakes, 2020.

Phytoplankton species data for Meliadine 2020
** 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	Date	Species	Species name	Density	Biomass	Length	Width	Cell Volume
		code		cells/L ⁻¹	mg/m ⁻³	μ	μ	μ ³
DUP - 01 - PC	1-Aug-20	1073	Snowella sp	3600	1.8	0	0	500
DUP - 01 - PC	1-Aug-20	2112	Sphaerocystis Schroeteri Chodat	854896	12.05403	3	3	14.1
DUP - 01 - PC	1-Aug-20	2121	Oocystis lacustris Chodat	114944	5.78168	6	4	50.3
DUP - 01 - PC	1-Aug-20	2167	Elakatothrix gelatinosa Willen	7184	0.12428	11	2	17.3
DUP - 01 - PC	1-Aug-20	2178	Cosmarium sp.	1000	1.3963	20	20	1396.3
DUP - 01 - PC	1-Aug-20	2187	Staurodesmus extensus (Andersson) Teiling	1000	0.4105	14	12	410.5
DUP - 01 - PC	1-Aug-20	2199	Spondylosium planum (Wolle) W. and G.S. West	86208	3.25004	6	6	37.7
DUP - 01 - PC	1-Aug-20	4351	Small chrysophyceae	272992	2.23853	2.5	2.5	8.2
DUP - 01 - PC	1-Aug-20	4357	Chrysococcus sp.	201152	13.15534	5	5	65.4
DUP - 01 - PC	1-Aug-20	4358	Chrysostephanosphaera globulifera Scherffel	7184	2.2292	8.4	8.4	310.3
DUP - 01 - PC	1-Aug-20	4361	Kephyrion boreale Skuja	7184	0.85346	6.1	6.1	118.8
DUP - 01 - PC	1-Aug-20	4362	Kephyrion sp.	21552	0.27587	2.9	2.9	12.8
DUP - 01 - PC	1-Aug-20	4368	Mallomonas crassisquama (Asmund) Fott	600	0.60948	19.4	10	1015.8
DUP - 01 - PC	1-Aug-20	4375	Synura sphagnicola Korschikow	400	6.28	0	0	15700
DUP - 01 - PC	1-Aug-20	4388	Dinobryon sertularia Ehrenberg	7184	1.62502	12	6	226.2
DUP - 01 - PC	1-Aug-20	4388	Dinobryon sertularia Ehrenberg	3000	15.255	0	0	5085
DUP - 01 - PC	1-Aug-20	4414	Stichogloea spp.	244256	12.28608	6	4	50.3
DUP - 01 - PC	1-Aug-20	4415	Bicosoeca lacustris Clark	7184	0.34268	4.5	4.5	47.7
DUP - 01 - PC	1-Aug-20	4418	Salpingoeca frequentissima (Zach.) Lemmermann	308912	9.94697	6	3.2	32.2
DUP - 01 - PC	1-Aug-20	5507	Cyclotella stelligera Cleve and Grunow	3800	9.0782	11.5	23	2389
DUP - 01 - PC	1-Aug-20	5509	Cyclotella ocellata Pant.	43104	4.33195	4	8	100.5
DUP - 01 - PC	1-Aug-20	5513	Tabellaria fenestrata (Lyngbye) Kutzinger	3600	2.98584	88	6	829.4
DUP - 01 - PC	1-Aug-20	5515	Fragilaria crotonensis Kitton	200	0.05446	65	4	272.3
DUP - 01 - PC	1-Aug-20	5524	Asterionella formosa Hassall	49200	5.30868	103	2	107.9
DUP - 01 - PC	1-Aug-20	5551	Cyclotella michiganiana Skvortzow	229888	3.83913	2.2	4.4	16.7
DUP - 01 - PC	1-Aug-20	6554	Rhodomonas minuta Skuja	193968	14.79976	9.9	4.7	76.3
DUP - 01 - PC	1-Aug-20	6558	Cryptomonas erosa Ehrenberg	28600	45.39678	23.2	14	1587.3
DUP - 01 - PC	1-Aug-20	6562	Cryptomonas reflexa (Marsson) Skuja	15200	11.1416	21	10	733
DUP - 01 - PC	1-Aug-20	6565	Cryptomonas rostratiformis Skuja	3800	9.09948	35	14	2394.6
DUP - 01 - PC	1-Aug-20	7632	Gymnodinium sp.	7184	2.64802	11	8	368.6
DUP - 01 - PC	1-Aug-20	7639	Peridinium pusillum (Penard) Lemmermann	2800	11.38032	19.8	19.8	4064.4
DUP - 02 - PC	1-Aug-20	1073	Snowella sp	1200	0.6	0	0	500
DUP - 02 - PC	1-Aug-20	2112	Sphaerocystis Schroeteri Chodat	14368	0.20259	3	3	14.1
DUP - 02 - PC	1-Aug-20	2121	Oocystis lacustris Chodat	114944	5.78168	6	4	50.3
DUP - 02 - PC	1-Aug-20	2143	Monoraphidium minutum (Nag.) Komarkova-Legnerova	7184	0.45116	10	4	62.8
DUP - 02 - PC	1-Aug-20	2182	Euastrum spp.	200	0.37168	22	22	1858.4
DUP - 02 - PC	1-Aug-20	2187	Staurodesmus extensus (Andersson) Teiling	1200	0.46488	13.6	12	387.4
DUP - 02 - PC	1-Aug-20	2199	Spondylosium planum (Wolle) W. and G.S. West	57472	2.16669	6	6	37.7
DUP - 02 - PC	1-Aug-20	2206	Botryococcus braunii Kutzinger	200	0.28736	14	14	1436.8
DUP - 02 - PC	1-Aug-20	4351	Small chrysophyceae	589088	6.06761	2.7	2.7	10.3
DUP - 02 - PC	1-Aug-20	4352	Large chrysophyceae	71840	12.90246	7	7	179.6
DUP - 02 - PC	1-Aug-20	4357	Chrysococcus sp.	617824	40.40569	5	5	65.4
DUP - 02 - PC	1-Aug-20	4363	Spiniferomonas serrata	14368	1.70692	6.1	6.1	118.8
DUP - 02 - PC	1-Aug-20	4368	Mallomonas crassisquama (Asmund) Fott	400	0.41888	20	10	1047.2
DUP - 02 - PC	1-Aug-20	4381	Dinobryon mucronatum Nygaard	7184	0.94039	10	5	130.9
DUP - 02 - PC	1-Aug-20	4388	Dinobryon sertularia Ehrenberg	7184	1.62502	12	6	226.2
DUP - 02 - PC	1-Aug-20	4388	Dinobryon sertularia Ehrenberg	800	2.712	0	0	3390
DUP - 02 - PC	1-Aug-20	4390	Dinobryon sociale Ehrenberg	7184	1.62502	12	6	226.2
DUP - 02 - PC	1-Aug-20	4401	Uroglena volvox Ehrenberg	79024	8.93761	6	6	113.1
DUP - 02 - PC	1-Aug-20	4411	Bitrichia chodatii (Reverdin) Chodat	7184	0.36136	6	4	50.3
DUP - 02 - PC	1-Aug-20	4413	Chrysochromulina laurentiana Kling	7184	2.92892	9.2	9.2	407.7
DUP - 02 - PC	1-Aug-20	4414	Stichogloea spp.	21552	1.08407	6	4	50.3
DUP - 02 - PC	1-Aug-20	4418	Salpingoeca frequentissima (Zach.) Lemmermann	136496	4.39517	6	3.2	32.2
DUP - 02 - PC	1-Aug-20	5507	Cyclotella stelligera Cleve and Grunow	4800	11.4672	11.5	23	2389
DUP - 02 - PC	1-Aug-20	5509	Cyclotella ocellata Pant.	7184	0.72199	4	8	100.5
DUP - 02 - PC	1-Aug-20	5514	Tabellaria flocculosa (Roth) Kutzinger	600	0.75738	24.6	14	1262.3
DUP - 02 - PC	1-Aug-20	5515	Fragilaria crotonensis Kitton	400	0.10892	65	4	272.3
DUP - 02 - PC	1-Aug-20	5524	Asterionella formosa Hassall	36800	3.97072	103	2	107.9
DUP - 02 - PC	1-Aug-20	5551	Cyclotella michiganiana Skvortzow	201152	3.842	2.3	4.6	19.1
DUP - 02 - PC	1-Aug-20	5720	Cyclotella bodanica Eulenstein	800	6.7348	17.5	35	8418.5
DUP - 02 - PC	1-Aug-20	6554	Rhodomonas minuta Skuja	265808	17.78256	9.9	4.4	66.9
DUP - 02 - PC	1-Aug-20	6558	Cryptomonas erosa Ehrenberg	6200	10.1804	24	14	1642
DUP - 02 - PC	1-Aug-20	6562	Cryptomonas reflexa (Marsson) Skuja	4200	2.96142	20.2	10	705.1
DUP - 02 - PC	1-Aug-20	6565	Cryptomonas rostratiformis Skuja	1200	2.87352	35	14	2394.6
DUP - 02 - PC	1-Aug-20	7639	Peridinium pusillum (Penard) Lemmermann	2200	8.94168	19.8	19.8	4064.4
DUP - 03 - PC	1-Aug-20	1073	Snowella sp	200	0.1	0	0	500
DUP - 03 - PC	1-Aug-20	2112	Sphaerocystis Schroeteri Chodat	86208	1.21553	3	3	14.1
DUP - 03 - PC	1-Aug-20	2121	Oocystis lacustris Chodat	7184	0.36136	6	4	50.3
DUP - 03 - PC	1-Aug-20	2167	Elakatothrix gelatinosa Willen	7184	0.12428	11	2	17.3
DUP - 03 - PC	1-Aug-20	2178	Cosmarium sp.	400	0.55852	20	20	1396.3
DUP - 03 - PC	1-Aug-20	4351	Small chrysophyceae	890816	7.30469	2.5	2.5	8.2
DUP - 03 - PC	1-Aug-20	4352	Large chrysophyceae	7184	1.29025	7	7	179.6
DUP - 03 - PC	1-Aug-20	4355	Chrysochromulina parva Lackey	7184	0.46983	5	5	65.4
DUP - 03 - PC	1-Aug-20	4357	Chrysococcus sp.	589088	38.52636	5	5	65.4
DUP - 03 - PC	1-Aug-20	4362	Kephyrion sp.	71840	1.01294	3	3	14.1
DUP - 03 - PC	1-Aug-20	4363	Spiniferomonas serrata	35920	4.2673	6.1	6.1	118.8
DUP - 03 - PC	1-Aug-20	4368	Mallomonas crassisquama (Asmund) Fott	200	0.20526	19.6	10	1026.3
DUP - 03 - PC	1-Aug-20	4388	Dinobryon sertularia Ehrenberg	400	0.7964	0	0	1991
DUP - 03 - PC	1-Aug-20	4390	Dinobryon sociale Ehrenberg	136496	30.8754	12	6	226.2
DUP - 03 - PC	1-Aug-20	4401	Uroglena volvox Ehrenberg	100576	11.37515	6	6	113.1
DUP - 03 - PC	1-Aug-20	4413	Chrysochromulina laurentiana Kling	71840	29.28917	9.2	9.2	407.7
DUP - 03 - PC	1-Aug-20	4418	Salpingoeca frequentissima (Zach.) Lemmermann	107760	3.46987	6	3.2	32.2
DUP - 03 - PC	1-Aug-20	5509	Cyclotella ocellata Pant.	86208	9.33633	4.1	8.2	108.3

Table E1-1. Phytoplankton species data, Meliadine study lakes, 2020.

Station	Date	Species	Species name	Density	Biomass	Length	Width	Cell Volume
		code		cells/L ⁻¹	mg/m ⁻³	μ	μ	μ ³
DUP - 03 - PC	1-Aug-20	5551	Cyclotella michiganiana Skvortzow	57472	1.40806	2.5	5	24.5
DUP - 03 - PC	1-Aug-20	6554	Rhodomonas minuta Skuja	208336	14.08351	10	4.4	67.6
DUP - 03 - PC	1-Aug-20	6558	Cryptomonas erosa Ehrenberg	1600	2.57248	23.5	14	1607.8
DUP - 03 - PC	1-Aug-20	6562	Cryptomonas reflexa (Marsson) Skuja	2000	1.466	21	10	733
DUP - 03 - PC	1-Aug-20	6565	Cryptomonas rostratiformis Skuja	200	0.45156	33	14	2257.8
DUP - 03 - PC	1-Aug-20	6568	Katablepharis ovalis Skuja	21552	0.96337	8	4	44.7
DUP - 03 - PC	1-Aug-20	7632	Gymnodinium sp.	600	5.52168	26	26	9202.8
DUP - 03 - PC	1-Aug-20	7639	Peridinium pusillum (Penard) Lemmermann	1600	5.9296	19.2	19.2	3706
MEL - 0108R - PC	15-Aug-20	1073	Snowella sp	2600	1.3	0	0	500
MEL - 0108R - PC	15-Aug-20	2112	Sphaerocystis schroeteri Chodat	215520	3.03883	3	3	14.1
MEL - 0108R - PC	15-Aug-20	2121	Oocystis lacustris Chodat	64656	3.2522	6	4	50.3
MEL - 0108R - PC	15-Aug-20	2167	Elakatothrix gelatinosa Willen	21552	0.37285	11	2	17.3
MEL - 0108R - PC	15-Aug-20	2178	Cosmarium sp.	400	0.55852	20	20	1396.3
MEL - 0108R - PC	15-Aug-20	2187	Staurodesmus extensus (Andersson) Teiling	400	0.1642	14	12	410.5
MEL - 0108R - PC	15-Aug-20	2193	Staurodesmus paradoxum Meyen	400	0.73864	23	20	1846.6
MEL - 0108R - PC	15-Aug-20	2199	Spondylosium planum (Wolle) W. and G.S. West	150864	5.68757	6	6	37.7
MEL - 0108R - PC	15-Aug-20	2206	Botryococcus braunii Kutzing	200	0.28736	14	14	1436.8
MEL - 0108R - PC	15-Aug-20	4351	Small chrysophyceae	280176	2.29744	2.5	2.5	8.2
MEL - 0108R - PC	15-Aug-20	4352	Large chrysophyceae	21552	3.87074	7	7	179.6
MEL - 0108R - PC	15-Aug-20	4357	Chrysococcus sp.	50288	3.28884	5	5	65.4
MEL - 0108R - PC	15-Aug-20	4358	Chrysostephanosphaera globulifera Scherffel	14368	4.45839	8.4	8.4	310.3
MEL - 0108R - PC	15-Aug-20	4361	Kephyrion boreale Skuja	7184	0.85346	6.1	6.1	118.8
MEL - 0108R - PC	15-Aug-20	4362	Kephyrion sp.	64656	0.91165	3	3	14.1
MEL - 0108R - PC	15-Aug-20	4363	Spiniferomonas serrata	14368	1.88077	6.3	6.3	130.9
MEL - 0108R - PC	15-Aug-20	4368	Mallomonas crassisquama (Asmund) Fott	400	0.41888	20	10	1047.2
MEL - 0108R - PC	15-Aug-20	4388	Dinobryon sertularia Ehrenberg	50288	11.37515	12	6	226.2
MEL - 0108R - PC	15-Aug-20	4388	Dinobryon sertularia Ehrenberg	3000	15.255	0	0	5085
MEL - 0108R - PC	15-Aug-20	4413	Chrysochromulina laurentiana Kling	14368	6.65526	9.6	9.6	463.2
MEL - 0108R - PC	15-Aug-20	4414	Stichogloea spp.	258624	13.00879	6	4	50.3
MEL - 0108R - PC	15-Aug-20	4418	Salpingoeca frequentissima (Zach.) Lemmermann	14368	0.46265	6	3.2	32.2
MEL - 0108R - PC	15-Aug-20	5507	Cyclotella stelligera Cleve and Grunow	5000	11.945	11.5	23	2389
MEL - 0108R - PC	15-Aug-20	5509	Cyclotella ocellata Pant.	28736	2.88797	4	8	100.5
MEL - 0108R - PC	15-Aug-20	5513	Tabellaria fenestrata (Lyngbye) Kutzing	7800	6.46932	88	6	829.4
MEL - 0108R - PC	15-Aug-20	5515	Fragilaria crotonensis Kitton	4800	1.30704	65	4	272.3
MEL - 0108R - PC	15-Aug-20	5524	Asterionella formosa Hassall	59200	6.38768	103	2	107.9
MEL - 0108R - PC	15-Aug-20	5551	Cyclotella michiganiana Skvortzow	186784	3.11929	2.2	4.4	16.7
MEL - 0108R - PC	15-Aug-20	5720	Cyclotella bodanica Eulenst.	400	3.08692	17	34	7717.3
MEL - 0108R - PC	15-Aug-20	6554	Rhodomonas minuta Skuja	158048	12.05906	9.9	4.7	76.3
MEL - 0108R - PC	15-Aug-20	6558	Cryptomonas erosa Ehrenberg	26400	42.44592	23.5	14	1607.8
MEL - 0108R - PC	15-Aug-20	6562	Cryptomonas reflexa (Marsson) Skuja	12400	9.0458	20.9	10	729.5
MEL - 0108R - PC	15-Aug-20	6565	Cryptomonas rostratiformis Skuja	3800	8.57964	33	14	2257.8
MEL - 0108R - PC	15-Aug-20	7632	Gymnodinium sp.	7184	2.64802	11	8	368.6
MEL - 0108R - PC	15-Aug-20	7639	Peridinium pusillum (Penard) Lemmermann	2800	11.38032	19.8	19.8	4064.4
MEL - 0108R - PC	15-Aug-20	7641	Peridinium aciculiferum Lemmermann	400	3.61912	30	24	9047.8
MEL - 0101 - PC	15-Aug-20	1073	Snowella sp	2600	1.3	0	0	500
MEL - 0101 - PC	15-Aug-20	2112	Sphaerocystis schroeteri Chodat	21552	0.3	3	3	14.1
MEL - 0101 - PC	15-Aug-20	2113	Pediastrum duplex Meyen	4800	0.4	9.4	5.6	86.4
MEL - 0101 - PC	15-Aug-20	2121	Oocystis lacustris Chodat	43104	2.2	6	4	50.3
MEL - 0101 - PC	15-Aug-20	2130	Scenedesmus quadricauda (Turp.) Brebisson	28736	1.3	8.2	4	45.8
MEL - 0101 - PC	15-Aug-20	2178	Cosmarium sp.	600	0.8	20	20	1396.3
MEL - 0101 - PC	15-Aug-20	2187	Staurodesmus extensus (Andersson) Teiling	200	0.1	14	12	410.5
MEL - 0101 - PC	15-Aug-20	2193	Staurodesmus paradoxum Meyen	200	0.4	23	20	1846.6
MEL - 0101 - PC	15-Aug-20	2206	Botryococcus braunii Kutzing	800	1.1	14	14	1436.8
MEL - 0101 - PC	15-Aug-20	2247	Oocystis gigas Archer	200	0.5	18	16	2412.7
MEL - 0106 - PC	15-Aug-20	4415	Bicosoeca lacustris Clark	7184	0.34268	4.5	4.5	47.7
MEL - 0101 - PC	15-Aug-20	4413	Chrysochromulina laurentiana Kling	7184	3.3	9.6	9.6	463.2
MEL - 0107 - PC	15-Aug-20	4413	Chrysochromulina laurentiana Kling	7184	3.32763	9.6	9.6	463.2
MEL - 0108 - PC	15-Aug-20	4413	Chrysochromulina laurentiana Kling	7184	3.32763	9.6	9.6	463.2
MEL - 0109 - PC	15-Aug-20	4413	Chrysochromulina laurentiana Kling	7184	3.32763	9.6	9.6	463.2
MEL - 0107 - PC	15-Aug-20	4355	Chrysochromulina parva Lackey	7184	0.46983	5	5	65.4
MEL - 0101 - PC	15-Aug-20	4357	Chrysococcus sp.	64656	4.2	5	5	65.4
MEL - 0106 - PC	15-Aug-20	4357	Chrysococcus sp.	136496	8.92684	5	5	65.4
MEL - 0107 - PC	15-Aug-20	4357	Chrysococcus sp.	150864	9.86651	5	5	65.4
MEL - 0108 - PC	15-Aug-20	4357	Chrysococcus sp.	7184	0.46983	5	5	65.4
MEL - 0101 - PC	15-Aug-20	5507	Cyclotella stelligera Cleve and Grunow	4800	11.5	11.5	23	2389
MEL - 0101 - PC	15-Aug-20	5509	Cyclotella ocellata Pant.	35920	3.6	4	8	100.5
MEL - 0101 - PC	15-Aug-20	5513	Tabellaria fenestrata (Lyngbye) Kutzing	22000	18.2	88	6	829.4
MEL - 0101 - PC	15-Aug-20	5515	Fragilaria crotonensis Kitton	200	0.1	65	4	272.3
MEL - 0101 - PC	15-Aug-20	5524	Asterionella formosa Hassall	78400	8.5	103	2	107.9
MEL - 0101 - PC	15-Aug-20	5551	Cyclotella michiganiana Skvortzow	186784	3.1	2.2	4.4	16.7
MEL - 0101 - PC	15-Aug-20	5720	Cyclotella bodanica Eulenst.	800	6.2	17	34	7717.3
MEL - 0101 - PC	15-Aug-20	6554	Rhodomonas minuta Skuja	114944	8.4	9.9	4.6	73.1
MEL - 0101 - PC	15-Aug-20	6558	Cryptomonas erosa Ehrenberg	32400	52.1	23.5	14	1607.8
MEL - 0101 - PC	15-Aug-20	6562	Cryptomonas reflexa (Marsson) Skuja	12200	8.9	20.9	10	729.5
MEL - 0101 - PC	15-Aug-20	6565	Cryptomonas rostratiformis Skuja	6200	14.0	33	14	2257.8
MEL - 0101 - PC	15-Aug-20	6568	Katablepharis ovalis Skuja	21552	0.9	7.9	4	43.6
MEL - 0101 - PC	15-Aug-20	7639	Peridinium pusillum (Penard) Lemmermann	2000	8.1	19.8	19.8	4064.4
MEL - 0101 - PC	15-Aug-20	7641	Peridinium aciculiferum Lemmermann	400	3.6	30	24	9047.8
MEL - 0106 - PC	15-Aug-20	1073	Snowella sp	3000	1.5	0	0	500
MEL - 0106 - PC	15-Aug-20	2112	Sphaerocystis schroeteri Chodat	689664	9.72426	3	3	14.1
MEL - 0106 - PC	15-Aug-20	2121	Oocystis lacustris Chodat	193968	9.75659	6	4	50.3
MEL - 0106 - PC	15-Aug-20	2167	Elakatothrix gelatinosa Willen	21552	0.37285	11	2	17.3
MEL - 0106 - PC	15-Aug-20	2178	Cosmarium sp.	600	0.83778	20	20	1396.3
MEL - 0106 - PC	15-Aug-20	2187	Staurodesmus extensus (Andersson) Teiling	400	0.1642	14	12	410.5
MEL - 0106 - PC	15-Aug-20	2199	Spondylosium planum (Wolle) W. and G.S. West	64656	2.43753	6	6	37.7
MEL - 0109 - PC	15-Aug-20	4357	Chrysococcus sp.	100576	6.57767	5	5	65.4
MEL - 0106 - PC	15-Aug-20	4358	Chrysostephanosphaera globulifera Scherffel	7184	2.2292	8.4	8.4	310.3
MEL - 0101 - PC	15-Aug-20	4383	Dinobryon bavaricum Imhof	7184	1.6	12	6	226.2
MEL - 0108 - PC	15-Aug-20	4383	Dinobryon bavaricum Imhof	35920	8.1251	12	6	226.2
MEL - 0101 - PC	15-Aug-20	4388	Dinobryon sertularia Ehrenberg	3200	16.3	0	0	5085
MEL - 0106 - PC	15-Aug-20	4388	Dinobryon sertularia Ehrenberg	43104	9.75012	12	6	226.2
MEL - 0106 - PC	15-Aug-20	4388	Dinobryon sertularia Ehrenberg	2200	11.187	0	0	5085
MEL - 0107 - PC	15-Aug-20	4388	Dinobryon sertularia Ehrenberg	57472	13.00017	12	6	226.2
MEL - 0107 - PC	15-Aug-20	4388	Dinobryon sertularia Ehrenberg	1800	9.153	0	0	5085

Table E1-1. Phytoplankton species data, Meliadine study lakes, 2020.

Station	Date	Species	Species name	Density	Biomass	Length	Width	Cell Volume
		code		cells/L ⁻¹	mg/m ⁻³	μ	μ	μ ³
MEL - 0108 - PC	15-Aug-20	4388	Dinobryon sertularia Ehrenberg	2600	13.221	0	0	5085
MEL - 0109 - PC	15-Aug-20	4388	Dinobryon sertularia Ehrenberg	100576	22.75029	12	6	226.2
MEL - 0109 - PC	15-Aug-20	4388	Dinobryon sertularia Ehrenberg	1600	8.136	0	0	5085
MEL - 0106 - PC	15-Aug-20	5507	Cyclotella stelligera Cleve and Grunow	3000	7.167	11.5	23	2389
MEL - 0106 - PC	15-Aug-20	5509	Cyclotella ocellata Pant.	28736	2.88797	4	8	100.5
MEL - 0106 - PC	15-Aug-20	5513	Tabellaria fenestrata (Lyngbye) Kutzing	6000	4.9764	88	6	829.4
MEL - 0106 - PC	15-Aug-20	5524	Asterionella formosa Hassall	44400	4.79076	103	2	107.9
MEL - 0106 - PC	15-Aug-20	5551	Cyclotella michiganiana Skvortzow	258624	4.31902	2.2	4.4	16.7
MEL - 0106 - PC	15-Aug-20	5720	Cyclotella bodanica Eulenst.	400	2.82248	16.5	33	7056.2
MEL - 0106 - PC	15-Aug-20	6554	Rhodomonas minuta Skuja	150864	10.0928	9.9	4.4	66.9
MEL - 0106 - PC	15-Aug-20	6558	Cryptomonas erosa Ehrenberg	33000	52.3809	23.2	14	1587.3
MEL - 0106 - PC	15-Aug-20	6562	Cryptomonas reflexa (Marsson) Skuja	13000	9.529	21	10	733
MEL - 0106 - PC	15-Aug-20	6565	Cryptomonas rostratiformis Skuja	2800	6.70488	35	14	2394.6
MEL - 0106 - PC	15-Aug-20	6568	Katablepharis ovalis Skuja	7184	0.32112	8	4	44.7
MEL - 0106 - PC	15-Aug-20	7632	Gymnodinium sp.	21552	7.94407	11	8	368.6
MEL - 0106 - PC	15-Aug-20	7639	Peridinium pusillum (Penard) Lemmermann	2400	9.75456	19.8	19.8	4064.4
MEL - 0107 - PC	15-Aug-20	1008	Aphanocapsa sp.	64656	6.4656	0	0	100
MEL - 0107 - PC	15-Aug-20	1012	Aphanothece sp.	7184	0.3592	0	0	50
MEL - 0107 - PC	15-Aug-20	1073	Snowella sp	3600	1.8	0	0	500
MEL - 0107 - PC	15-Aug-20	2112	Sphaerocystis Schroeteri Chodat	272992	3.84919	3	3	14.1
MEL - 0107 - PC	15-Aug-20	2113	Pediastrum duplex Meyen	4000	0.2756	8.8	5.1	68.9
MEL - 0107 - PC	15-Aug-20	2121	Oocystis lacustris Chodat	93392	4.69762	6	4	50.3
MEL - 0107 - PC	15-Aug-20	2143	Monoraphidium minutum (Nag.) Komarkova-Legnerova	7184	0.45116	10	4	62.8
MEL - 0107 - PC	15-Aug-20	2167	Elakatothrix gelatinosa Willen	21552	0.37285	11	2	17.3
MEL - 0107 - PC	15-Aug-20	2178	Cosmarium sp.	400	0.55852	20	20	1396.3
MEL - 0107 - PC	15-Aug-20	2182	Euastrum spp.	200	0.37168	22	22	1858.4
MEL - 0107 - PC	15-Aug-20	2187	Staurodesmus extensus (Andersson) Teiling	800	0.3284	14	12	410.5
MEL - 0107 - PC	15-Aug-20	2193	Staurodesmus paradoxum Meyen	200	0.56632	26	24	2831.6
MEL - 0107 - PC	15-Aug-20	2199	Spondylosium planum (Wolle) W. and G.S. West	43104	1.62502	6	6	37.7
MEL - 0107 - PC	15-Aug-20	2206	Botryococcus braunii Kutzing	800	1.14944	14	14	1436.8
MEL - 0109 - PC	15-Aug-20	4361	Kephyrion boreale Skuja	7184	0.85346	6.1	6.1	118.8
MEL - 0101 - PC	15-Aug-20	4362	Kephyrion sp.	43104	0.6	3	3	14.1
MEL - 0106 - PC	15-Aug-20	4362	Kephyrion sp.	35920	0.45978	2.9	2.9	12.8
MEL - 0107 - PC	15-Aug-20	4362	Kephyrion sp.	35920	0.45978	2.9	2.9	12.8
MEL - 0108 - PC	15-Aug-20	4362	Kephyrion sp.	35920	0.50647	3	3	14.1
MEL - 0109 - PC	15-Aug-20	4362	Kephyrion sp.	7184	0.10129	3	3	14.1
MEL - 0101 - PC	15-Aug-20	4352	Large chrysophyceae	35920	6.5	7	7	179.6
MEL - 0106 - PC	15-Aug-20	4352	Large chrysophyceae	14368	2.58049	7	7	179.6
MEL - 0107 - PC	15-Aug-20	4352	Large chrysophyceae	79024	14.19271	7	7	179.6
MEL - 0108 - PC	15-Aug-20	4352	Large chrysophyceae	21552	3.87074	7	7	179.6
MEL - 0109 - PC	15-Aug-20	4352	Large chrysophyceae	35920	6.45123	7	7	179.6
MEL - 0107 - PC	15-Aug-20	4364	Mallomonas caudata Ivanov	200	1.07234	40	16	5361.7
MEL - 0107 - PC	15-Aug-20	5507	Cyclotella stelligera Cleve and Grunow	4000	9.556	11.5	23	2389
MEL - 0107 - PC	15-Aug-20	5509	Cyclotella ocellata Pant.	64656	6.49793	4	8	100.5
MEL - 0107 - PC	15-Aug-20	5513	Tabellaria fenestrata (Lyngbye) Kutzing	5800	4.81052	88	6	829.4
MEL - 0107 - PC	15-Aug-20	5515	Fragilaria crotonensis Kitton	1200	0.32676	65	4	272.3
MEL - 0107 - PC	15-Aug-20	5524	Asterionella formosa Hassall	62400	6.73296	103	2	107.9
MEL - 0107 - PC	15-Aug-20	5551	Cyclotella michiganiana Skvortzow	287360	4.79891	2.2	4.4	16.7
MEL - 0107 - PC	15-Aug-20	5720	Cyclotella bodanica Eulenst.	400	2.82248	16.5	33	7056.2
MEL - 0107 - PC	15-Aug-20	6554	Rhodomonas minuta Skuja	258624	17.30195	9.9	4.4	66.9
MEL - 0107 - PC	15-Aug-20	6558	Cryptomonas erosa Ehrenberg	22400	36.01472	23.5	14	1607.8
MEL - 0107 - PC	15-Aug-20	6562	Cryptomonas reflexa (Marsson) Skuja	11400	8.3163	20.9	10	729.5
MEL - 0107 - PC	15-Aug-20	6565	Cryptomonas rostratiformis Skuja	2200	4.96716	33	14	2257.8
MEL - 0107 - PC	15-Aug-20	6568	Katablepharis ovalis Skuja	7184	0.31322	7.9	4	43.6
MEL - 0107 - PC	15-Aug-20	7631	Gymnodinium helveticum Penard	200	4.24116	45	30	21205.8
MEL - 0107 - PC	15-Aug-20	7639	Peridinium pusillum (Penard) Lemmermann	2600	10.56744	19.8	19.8	4064.4
MEL - 0107 - PC	15-Aug-20	7641	Peridinium aciculiferum Lemmermann	400	3.61912	30	24	9047.8
MEL - 0108 - PC	15-Aug-20	1073	Snowella sp	3000	1.5	0	0	500
MEL - 0108 - PC	15-Aug-20	2112	Sphaerocystis Schroeteri Chodat	229888	3.24142	3	3	14.1
MEL - 0108 - PC	15-Aug-20	2121	Oocystis lacustris Chodat	114944	5.78168	6	4	50.3
MEL - 0108 - PC	15-Aug-20	2178	Cosmarium sp.	200	0.27926	20	20	1396.3
MEL - 0108 - PC	15-Aug-20	2182	Euastrum spp.	200	0.37168	22	22	1858.4
MEL - 0108 - PC	15-Aug-20	2193	Staurodesmus paradoxum Meyen	400	0.73864	23	20	1846.6
MEL - 0108 - PC	15-Aug-20	2199	Spondylosium planum (Wolle) W. and G.S. West	114944	4.33339	6	6	37.7
MEL - 0108 - PC	15-Aug-20	2206	Botryococcus braunii Kutzing	200	0.28736	14	14	1436.8
MEL - 0108 - PC	15-Aug-20	2247	Oocystis gigas Archer	200	0.48254	18	16	2412.7
MEL - 0108 - PC	15-Aug-20	4364	Mallomonas caudata Ivanov	200	1.07234	40	16	5361.7
MEL - 0109 - PC	15-Aug-20	4364	Mallomonas caudata Ivanov	600	3.21702	40	16	5361.7
MEL - 0106 - PC	15-Aug-20	4368	Mallomonas crassisquama (Asmund) Fott	400	0.40632	19.4	10	1015.8
MEL - 0107 - PC	15-Aug-20	4368	Mallomonas crassisquama (Asmund) Fott	200	0.20944	20	10	1047.2
MEL - 0108 - PC	15-Aug-20	4368	Mallomonas crassisquama (Asmund) Fott	200	0.20944	20	10	1047.2
MEL - 0108 - PC	15-Aug-20	4400	Ochromonas sp.	7184	0.44541	7.4	4	62
MEL - 0109 - PC	15-Aug-20	4400	Ochromonas sp.	7184	0.40949	6.8	4	57
MEL - 0101 - PC	15-Aug-20	4418	Salpingoeca frequentissima (Zach.) Lemmermann	21552	0.7	6	3.2	32.2
MEL - 0106 - PC	15-Aug-20	4418	Salpingoeca frequentissima (Zach.) Lemmermann	316096	10.17829	6	3.2	32.2
MEL - 0107 - PC	15-Aug-20	4418	Salpingoeca frequentissima (Zach.) Lemmermann	1020128	32.84812	6	3.2	32.2
MEL - 0108 - PC	15-Aug-20	4418	Salpingoeca frequentissima (Zach.) Lemmermann	7184	0.23132	6	3.2	32.2
MEL - 0109 - PC	15-Aug-20	4418	Salpingoeca frequentissima (Zach.) Lemmermann	294544	9.48432	6	3.2	32.2
MEL - 0108 - PC	15-Aug-20	5507	Cyclotella stelligera Cleve and Grunow	5800	13.8562	11.5	23	2389
MEL - 0108 - PC	15-Aug-20	5509	Cyclotella ocellata Pant.	43104	4.33195	4	8	100.5
MEL - 0108 - PC	15-Aug-20	5513	Tabellaria fenestrata (Lyngbye) Kutzing	6600	5.47404	88	6	829.4
MEL - 0108 - PC	15-Aug-20	5515	Fragilaria crotonensis Kitton	3000	0.8169	65	4	272.3
MEL - 0108 - PC	15-Aug-20	5524	Asterionella formosa Hassall	56000	6.0424	103	2	107.9
MEL - 0108 - PC	15-Aug-20	5551	Cyclotella michiganiana Skvortzow	215520	3.59918	2.2	4.4	16.7
MEL - 0108 - PC	15-Aug-20	6554	Rhodomonas minuta Skuja	186784	14.25162	9.9	4.7	76.3
MEL - 0108 - PC	15-Aug-20	6558	Cryptomonas erosa Ehrenberg	24200	38.90876	23.5	14	1607.8
MEL - 0108 - PC	15-Aug-20	6562	Cryptomonas reflexa (Marsson) Skuja	15400	11.2343	20.9	10	729.5
MEL - 0108 - PC	15-Aug-20	6565	Cryptomonas rostratiformis Skuja	3400	7.67652	33	14	2257.8
MEL - 0108 - PC	15-Aug-20	7632	Gymnodinium sp.	7184	2.64802	11	8	368.6
MEL - 0108 - PC	15-Aug-20	7639	Peridinium pusillum (Penard) Lemmermann	3000	12.1932	19.8	19.8	4064.4
MEL - 0108 - PC	15-Aug-20	7641	Peridinium aciculiferum Lemmermann	200	1.80956	30	24	9047.8
MEL - 0109 - PC	15-Aug-20	1073	Snowella sp	3000	1.5	0	0	500
MEL - 0109 - PC	15-Aug-20	2112	Sphaerocystis Schroeteri Chodat	114944	1.62071	3	3	14.1
MEL - 0109 - PC	15-Aug-20	2121	Oocystis lacustris Chodat	193968	9.75659	6	4	50.3

Table E1-1. Phytoplankton species data, Meliadine study lakes, 2020.

Station	Date	Species	Species name	Density	Biomass	Length	Width	Cell Volume
		code		cells/L ⁻¹	mg/m ⁻³	μ	μ	μ ³
MEL - 0109 - PC	15-Aug-20	2143	Monoraphidium minutum (Nag.) Komarkova-Legnerova	7184	0.4059	9	4	56.5
MEL - 0109 - PC	15-Aug-20	2164	Quadrigula closterioides (Bohl.) Printz	143680	3.16096	14	2	22
MEL - 0109 - PC	15-Aug-20	2167	Elakatothrix gelatinosa Willen	21552	0.33837	10	2	15.7
MEL - 0109 - PC	15-Aug-20	2187	Staurodesmus extensus (Andersson) Teiling	400	0.1642	14	12	410.5
MEL - 0109 - PC	15-Aug-20	2193	Staurodesmus paradoxum Meyen	200	0.36932	23	20	1846.6
MEL - 0109 - PC	15-Aug-20	2199	Spondylosium planum (Wolle) W. and G.S. West	57472	2.16669	6	6	37.7
MEL - 0109 - PC	15-Aug-20	2206	Botryococcus braunii Kutzing	600	0.86208	14	14	1436.8
MEL - 0101 - PC	15-Aug-20	4351	Small chrysophyceae	373568	3.1	2.5	2.5	8.2
MEL - 0106 - PC	15-Aug-20	4351	Small chrysophyceae	287360	2.35635	2.5	2.5	8.2
MEL - 0107 - PC	15-Aug-20	4351	Small chrysophyceae	308912	2.53308	2.5	2.5	8.2
MEL - 0108 - PC	15-Aug-20	4351	Small chrysophyceae	308912	2.53308	2.5	2.5	8.2
MEL - 0109 - PC	15-Aug-20	4351	Small chrysophyceae	215520	1.76726	2.5	2.5	8.2
MEL - 0108 - PC	15-Aug-20	4363	Spiniferomonas serrata	7184	0.94039	6.3	6.3	130.9
MEL - 0101 - PC	15-Aug-20	4414	Stichogloea spp.	57472	2.9	6	4	50.3
MEL - 0106 - PC	15-Aug-20	4414	Stichogloea spp.	215520	10.84066	6	4	50.3
MEL - 0107 - PC	15-Aug-20	4414	Stichogloea spp.	301728	15.17692	6	4	50.3
MEL - 0109 - PC	15-Aug-20	4414	Stichogloea spp.	316096	15.89963	6	4	50.3
MEL - 0106 - PC	15-Aug-20	4375	Synura sphagnicola Korschikow	600	9.42	0	0	15700
MEL - 0101 - PC	15-Aug-20	4401	Uroglena volvox Ehrenberg	100576	11.4	6	6	113.1
MEL - 0109 - PC	15-Aug-20	5507	Cyclotella stelligera Cleve and Grunow	4200	10.0338	11.5	23	2389
MEL - 0109 - PC	15-Aug-20	5509	Cyclotella ocellata Pant.	57472	5.77594	4	8	100.5
MEL - 0109 - PC	15-Aug-20	5515	Fragilaria crotonensis Kitton	200	0.05446	65	4	272.3
MEL - 0109 - PC	15-Aug-20	5524	Asterionella formosa Hassall	47200	5.09288	103	2	107.9
MEL - 0109 - PC	15-Aug-20	5551	Cyclotella michiganiana Skvortzow	143680	2.39946	2.2	4.4	16.7
MEL - 0109 - PC	15-Aug-20	5720	Cyclotella bodanica Eulenst.	200	1.41124	16.5	33	7056.2
MEL - 0109 - PC	15-Aug-20	6554	Rhodomonas minuta Skuja	373568	20.65831	9.9	4	55.3
MEL - 0109 - PC	15-Aug-20	6558	Cryptomonas erosa Ehrenberg	26000	41.8028	23.5	14	1607.8
MEL - 0109 - PC	15-Aug-20	6562	Cryptomonas reflexa (Marsson) Skuja	9200	6.7436	21	10	733
MEL - 0109 - PC	15-Aug-20	6565	Cryptomonas rostratiformis Skuja	4800	10.83744	33	14	2257.8
MEL - 0109 - PC	15-Aug-20	7639	Peridinium pusillum (Penard) Lemmermann	2000	8.1288	19.8	19.8	4064.4
MEL - 0204R - PC	18-Aug-20	1073	Snowella sp	400	0.2	0	0	500
MEL - 0204R - PC	18-Aug-20	2112	Sphaerocystis Schroeteri Chodat	86208	1.21553	3	3	14.1
MEL - 0204R - PC	18-Aug-20	2121	Oocystis lacustris Chodat	28736	1.44542	6	4	50.3
MEL - 0204R - PC	18-Aug-20	2167	Elakatothrix gelatinosa Willen	28736	0.49713	11	2	17.3
MEL - 0204R - PC	18-Aug-20	2178	Cosmarium sp.	400	0.55852	20	20	1396.3
MEL - 0204R - PC	18-Aug-20	2187	Staurodesmus extensus (Andersson) Teiling	200	0.0821	14	12	410.5
MEL - 0204R - PC	18-Aug-20	2199	Spondylosium planum (Wolle) W. and G.S. West	28736	1.08335	6	6	37.7
MEL - 0204R - PC	18-Aug-20	2206	Botryococcus braunii Kutzing	200	0.28736	14	14	1436.8
MEL - 0204R - PC	18-Aug-20	4351	Small chrysophyceae	617824	6.36359	2.7	2.7	10.3
MEL - 0204R - PC	18-Aug-20	4352	Large chrysophyceae	71840	12.90246	7	7	179.6
MEL - 0204R - PC	18-Aug-20	4357	Chrysococcus sp.	581904	38.05652	5	5	65.4
MEL - 0204R - PC	18-Aug-20	4362	Kephyrion sp.	14368	0.20259	3	3	14.1
MEL - 0204R - PC	18-Aug-20	4388	Dinobryon sertularia Ehrenberg	64656	14.62519	12	6	226.2
MEL - 0204R - PC	18-Aug-20	4388	Dinobryon sertularia Ehrenberg	200	1.017	0	0	5085
MEL - 0204R - PC	18-Aug-20	4401	Uroglena volvox Ehrenberg	150864	17.06272	6	6	113.1
MEL - 0204R - PC	18-Aug-20	4411	Bitrichia chodatii (Reverdin) Chodat	7184	0.36136	6	4	50.3
MEL - 0204R - PC	18-Aug-20	4413	Chrysochromulina laurentiana Kling	43104	19.96577	9.6	9.6	463.2
MEL - 0204R - PC	18-Aug-20	4418	Salpingoeca frequentissima (Zach.) Lemmermann	28736	0.9253	6	3.2	32.2
MEL - 0204R - PC	18-Aug-20	5507	Cyclotella stelligera Cleve and Grunow	3800	9.0782	11.5	23	2389
MEL - 0204R - PC	18-Aug-20	5509	Cyclotella ocellata Pant.	14368	1.44398	4	8	100.5
MEL - 0204R - PC	18-Aug-20	5513	Tabellaria fenestrata (Lyngbye) Kutzing	8000	6.2584	83	6	782.3
MEL - 0204R - PC	18-Aug-20	5514	Tabellaria flocculosa (Roth) Kutzing	400	0.53364	26	14	1334.1
MEL - 0204R - PC	18-Aug-20	5515	Fragilaria crotonensis Kitton	3000	0.8169	65	4	272.3
MEL - 0204R - PC	18-Aug-20	5524	Asterionella formosa Hassall	12800	1.38112	103	2	107.9
MEL - 0204R - PC	18-Aug-20	5551	Cyclotella michiganiana Skvortzow	79024	1.50936	2.3	4.6	19.1
MEL - 0204R - PC	18-Aug-20	5720	Cyclotella bodanica Eulenst.	1200	10.1022	17.5	35	8418.5
MEL - 0204R - PC	18-Aug-20	6554	Rhodomonas minuta Skuja	380752	25.47231	9.9	4.4	66.9
MEL - 0204R - PC	18-Aug-20	6558	Cryptomonas erosa Ehrenberg	8800	14.4496	24	14	1642
MEL - 0204R - PC	18-Aug-20	6562	Cryptomonas reflexa (Marsson) Skuja	3800	2.67938	20.2	10	705.1
MEL - 0204R - PC	18-Aug-20	6565	Cryptomonas rostratiformis Skuja	3000	7.1838	35	14	2394.6
MEL - 0204R - PC	18-Aug-20	7639	Peridinium pusillum (Penard) Lemmermann	600	2.43864	19.8	19.8	4064.4
MEL - 0201 - PC	18-Aug-20	1073	Snowella sp	800	0.4	0	0	500
MEL - 0201 - PC	18-Aug-20	2112	Sphaerocystis Schroeteri Chodat	28736	0.40518	3	3	14.1
MEL - 0201 - PC	18-Aug-20	2113	Pediastrum duplex Meyen	2800	0.23828	8.8	6.3	85.1
MEL - 0201 - PC	18-Aug-20	2121	Oocystis lacustris Chodat	459776	23.12673	6	4	50.3
MEL - 0201 - PC	18-Aug-20	2178	Cosmarium sp.	200	0.27926	20	20	1396.3
MEL - 0201 - PC	18-Aug-20	2187	Staurodesmus extensus (Andersson) Teiling	400	0.1642	14	12	410.5
MEL - 0201 - PC	18-Aug-20	2193	Staurodesmus paradoxum Meyen	600	2.13462	28	26	3557.7
MEL - 0201 - PC	18-Aug-20	2199	Spondylosium planum (Wolle) W. and G.S. West	7184	0.27084	6	6	37.7
MEL - 0201 - PC	18-Aug-20	2206	Botryococcus braunii Kutzing	600	0.86208	14	14	1436.8
MEL - 0201 - PC	18-Aug-20	4351	Small chrysophyceae	524432	5.40165	2.7	2.7	10.3
MEL - 0201 - PC	18-Aug-20	4352	Large chrysophyceae	7184	1.29025	7	7	179.6
MEL - 0201 - PC	18-Aug-20	4357	Chrysococcus sp.	244256	15.97434	5	5	65.4
MEL - 0201 - PC	18-Aug-20	4362	Kephyrion sp.	7184	0.10129	3	3	14.1
MEL - 0201 - PC	18-Aug-20	4363	Spiniferomonas serrata	35920	4.2673	6.1	6.1	118.8
MEL - 0201 - PC	18-Aug-20	4364	Mallomonas caudata Ivanov	200	1.07234	40	16	5361.7
MEL - 0201 - PC	18-Aug-20	4381	Dinobryon mucronatom Nygaard	21552	2.82116	10	5	130.9
MEL - 0201 - PC	18-Aug-20	4383	Dinobryon bavaricum Imhof	7184	1.62502	12	6	226.2
MEL - 0201 - PC	18-Aug-20	4388	Dinobryon sertularia Ehrenberg	35920	8.1251	12	6	226.2
MEL - 0201 - PC	18-Aug-20	4388	Dinobryon sertularia Ehrenberg	600	1.1946	0	0	1991
MEL - 0201 - PC	18-Aug-20	4401	Uroglena volvox Ehrenberg	100576	11.37515	6	6	113.1
MEL - 0201 - PC	18-Aug-20	4413	Chrysochromulina laurentiana Kling	50288	23.2934	9.6	9.6	463.2
MEL - 0201 - PC	18-Aug-20	4414	Stichogloea spp.	7184	0.36136	6	4	50.3
MEL - 0201 - PC	18-Aug-20	4418	Salpingoeca frequentissima (Zach.) Lemmermann	35920	1.15662	6	3.2	32.2
MEL - 0201 - PC	18-Aug-20	5507	Cyclotella stelligera Cleve and Grunow	4000	9.556	11.5	23	2389
MEL - 0201 - PC	18-Aug-20	5509	Cyclotella ocellata Pant.	43104	4.33195	4	8	100.5
MEL - 0201 - PC	18-Aug-20	5513	Tabellaria fenestrata (Lyngbye) Kutzing	3600	2.78208	82	6	772.8
MEL - 0201 - PC	18-Aug-20	5515	Fragilaria crotonensis Kitton	400	0.10892	65	4	272.3
MEL - 0201 - PC	18-Aug-20	5524	Asterionella formosa Hassall	18400	1.98536	103	2	107.9
MEL - 0201 - PC	18-Aug-20	5551	Cyclotella michiganiana Skvortzow	186784	3.56757	2.3	4.6	19.1
MEL - 0201 - PC	18-Aug-20	5720	Cyclotella bodanica Eulenst.	1800	12.70116	16.5	33	7056.2
MEL - 0201 - PC	18-Aug-20	6554	Rhodomonas minuta Skuja	359200	24.03048	9.9	4.4	66.9
MEL - 0201 - PC	18-Aug-20	6558	Cryptomonas erosa Ehrenberg	4200	6.8964	24	14	1642
MEL - 0201 - PC	18-Aug-20	6562	Cryptomonas reflexa (Marsson) Skuja	3600	2.53836	20.2	10	705.1

Table E1-1. Phytoplankton species data, Meliadine study lakes, 2020.

Station	Date	Species	Species name	Density	Biomass	Length	Width	Cell Volume
		code		cells/L ⁻¹	mg/m ⁻³	μ	μ	μ ³
MEL - 0201 - PC	18-Aug-20	6565	Cryptomonas rostratiformis Skuja	1600	3.83136	35	14	2394.6
MEL - 0201 - PC	18-Aug-20	7639	Peridinium pusillum (Penard) Lemmermann	800	3.25152	19.8	19.8	4064.4
MEL - 0202 - PC	18-Aug-20	1073	Snowella sp	800	0.4	0	0	500
MEL - 0202 - PC	18-Aug-20	2112	Sphaerocystis schroeteri Chodat	86208	1.21553	3	3	14.1
MEL - 0202 - PC	18-Aug-20	2113	Pediastrum duplex Meyen	2000	0.1134	7.3	6.1	56.7
MEL - 0202 - PC	18-Aug-20	2121	Oocystis lacustris Chodat	7184	0.36136	6	4	50.3
MEL - 0202 - PC	18-Aug-20	2145	Crucigenia quadrata Morr.	229888	0.32184	2	2	1.4
MEL - 0202 - PC	18-Aug-20	2167	Elakatothrix gelatinosa Willen	21552	0.37285	11	2	17.3
MEL - 0202 - PC	18-Aug-20	2206	Botryococcus braunii Kutzing	1200	1.72416	14	14	1436.8
MEL - 0202 - PC	18-Aug-20	2247	Oocystis gigas Archer	200	0.48254	18	16	2412.7
MEL - 0202 - PC	18-Aug-20	4351	Small chrysophyceae	732768	7.54751	2.7	2.7	10.3
MEL - 0202 - PC	18-Aug-20	4352	Large chrysophyceae	64656	11.61222	7	7	179.6
MEL - 0202 - PC	18-Aug-20	4357	Chrysococcus sp.	229888	15.03468	5	5	65.4
MEL - 0202 - PC	18-Aug-20	4362	Kephyrion sp.	7184	0.10129	3	3	14.1
MEL - 0202 - PC	18-Aug-20	4363	Spiniferomonas serrata	14368	1.54456	5.9	5.9	107.5
MEL - 0202 - PC	18-Aug-20	4368	Mallomonas crassisquama (Asmund) Fott	200	0.20526	19.6	10	1026.3
MEL - 0202 - PC	18-Aug-20	4388	Dinobryon sertularia Ehrenberg	28736	6.50008	12	6	226.2
MEL - 0202 - PC	18-Aug-20	4388	Dinobryon sertularia Ehrenberg	200	0.678	0	0	3390
MEL - 0202 - PC	18-Aug-20	4401	Uroglena volvox Ehrenberg	57472	6.50008	6	6	113.1
MEL - 0202 - PC	18-Aug-20	4411	Bitrichia chodatii (Reverdin) Chodat	7184	0.36136	6	4	50.3
MEL - 0202 - PC	18-Aug-20	4413	Chrysochromulina laurentiana Kling	21552	8.78675	9.2	9.2	407.7
MEL - 0202 - PC	18-Aug-20	4414	Stichogloea spp.	28736	1.44542	6	4	50.3
MEL - 0202 - PC	18-Aug-20	4418	Salpingoeca frequentissima (Zach.) Lemmermann	7184	0.23132	6	3.2	32.2
MEL - 0202 - PC	18-Aug-20	5507	Cyclotella stelligera Cleve and Grunow	4800	11.4672	11.5	23	2389
MEL - 0202 - PC	18-Aug-20	5509	Cyclotella ocellata Pant.	7184	0.72199	4	8	100.5
MEL - 0202 - PC	18-Aug-20	5513	Tabellaria fenestrata (Lyngbye) Kutzing	72600	56.10528	82	6	772.8
MEL - 0202 - PC	18-Aug-20	5515	Fragilaria crotonensis Kitton	400	0.10892	65	4	272.3
MEL - 0202 - PC	18-Aug-20	5524	Asterionella formosa Hassall	16800	1.81272	103	2	107.9
MEL - 0202 - PC	18-Aug-20	5551	Cyclotella michiganiana Skvortzow	172416	3.29315	2.3	4.6	19.1
MEL - 0202 - PC	18-Aug-20	5720	Cyclotella bodanica Eulenst.	800	5.64496	16.5	33	7056.2
MEL - 0202 - PC	18-Aug-20	6554	Rhodomonas minuta Skuja	265808	17.78256	9.9	4.4	66.9
MEL - 0202 - PC	18-Aug-20	6558	Cryptomonas erosa Ehrenberg	7600	12.4792	24	14	1642
MEL - 0202 - PC	18-Aug-20	6562	Cryptomonas reflexa (Marsson) Skuja	3000	2.1153	20.2	10	705.1
MEL - 0202 - PC	18-Aug-20	6565	Cryptomonas rostratiformis Skuja	1600	3.83136	35	14	2394.6
MEL - 0202 - PC	18-Aug-20	7632	Gymnodinium sp.	400	3.68112	26	26	9202.8
MEL - 0202 - PC	18-Aug-20	7639	Peridinium pusillum (Penard) Lemmermann	1000	4.0644	19.8	19.8	4064.4
MEL - 0203 - PC	18-Aug-20	1073	Snowella sp	1000	0.5	0	0	500
MEL - 0203 - PC	18-Aug-20	2121	Oocystis lacustris Chodat	28736	1.44542	6	4	50.3
MEL - 0203 - PC	18-Aug-20	2145	Crucigenia quadrata Morr.	28736	0.32184	4	4	11.2
MEL - 0203 - PC	18-Aug-20	2178	Cosmarium sp.	200	0.27926	20	20	1396.3
MEL - 0203 - PC	18-Aug-20	2187	Staurodesmus extensus (Andersson) Teiling	400	0.1642	14	12	410.5
MEL - 0203 - PC	18-Aug-20	2193	Staurodesmus paradoxum Meyen	200	1.1404	33	30	5702
MEL - 0203 - PC	18-Aug-20	2199	Spondylosium planum (Wolle) W. and G.S. West	7184	0.27084	6	6	37.7
MEL - 0203 - PC	18-Aug-20	4351	Small chrysophyceae	538800	5.54964	2.7	2.7	10.3
MEL - 0203 - PC	18-Aug-20	4352	Large chrysophyceae	43104	7.74148	7	7	179.6
MEL - 0203 - PC	18-Aug-20	4355	Chrysochromulina parva Lackey	7184	0.46983	5	5	65.4
MEL - 0203 - PC	18-Aug-20	4357	Chrysococcus sp.	215520	14.09501	5	5	65.4
MEL - 0203 - PC	18-Aug-20	4361	Kephyrion boreale Skuja	7184	0.85346	6.1	6.1	118.8
MEL - 0203 - PC	18-Aug-20	4362	Kephyrion sp.	28736	0.40518	3	3	14.1
MEL - 0203 - PC	18-Aug-20	4363	Spiniferomonas serrata	7184	0.85346	6.1	6.1	118.8
MEL - 0203 - PC	18-Aug-20	4368	Mallomonas crassisquama (Asmund) Fott	400	0.41052	19.6	10	1026.3
MEL - 0203 - PC	18-Aug-20	4388	Dinobryon sertularia Ehrenberg	57472	13.00017	12	6	226.2
MEL - 0203 - PC	18-Aug-20	4388	Dinobryon sertularia Ehrenberg	400	2.034	0	0	5085
MEL - 0203 - PC	18-Aug-20	4401	Uroglena volvox Ehrenberg	21552	2.43753	6	6	113.1
MEL - 0203 - PC	18-Aug-20	4413	Chrysochromulina laurentiana Kling	35920	16.63814	9.6	9.6	463.2
MEL - 0203 - PC	18-Aug-20	4418	Salpingoeca frequentissima (Zach.) Lemmermann	7184	0.23132	6	3.2	32.2
MEL - 0203 - PC	18-Aug-20	4437	Pteridomonas sp.	7184	1.59485	8.6	8.6	222
MEL - 0203 - PC	18-Aug-20	5507	Cyclotella stelligera Cleve and Grunow	4600	10.9894	11.5	23	2389
MEL - 0203 - PC	18-Aug-20	5509	Cyclotella ocellata Pant.	7184	0.72199	4	8	100.5
MEL - 0203 - PC	18-Aug-20	5513	Tabellaria fenestrata (Lyngbye) Kutzing	2800	2.16384	82	6	772.8
MEL - 0203 - PC	18-Aug-20	5515	Fragilaria crotonensis Kitton	400	0.10892	65	4	272.3
MEL - 0203 - PC	18-Aug-20	5524	Asterionella formosa Hassall	7200	0.77688	103	2	107.9
MEL - 0203 - PC	18-Aug-20	5551	Cyclotella michiganiana Skvortzow	208336	3.97922	2.3	4.6	19.1
MEL - 0203 - PC	18-Aug-20	5720	Cyclotella bodanica Eulenst.	400	3.3674	17.5	35	8418.5
MEL - 0203 - PC	18-Aug-20	6554	Rhodomonas minuta Skuja	136496	9.13158	9.9	4.4	66.9
MEL - 0203 - PC	18-Aug-20	6558	Cryptomonas erosa Ehrenberg	5800	9.5236	24	14	1642
MEL - 0203 - PC	18-Aug-20	6559	Cryptomonas ovata Ehrenberg	200	1.11702	40	20	5585.1
MEL - 0203 - PC	18-Aug-20	6562	Cryptomonas reflexa (Marsson) Skuja	4000	2.8204	20.2	10	705.1
MEL - 0203 - PC	18-Aug-20	6565	Cryptomonas rostratiformis Skuja	1200	2.87352	35	14	2394.6
MEL - 0203 - PC	18-Aug-20	7639	Peridinium pusillum (Penard) Lemmermann	1200	4.87728	19.8	19.8	4064.4
MEL - 0204 - PC	18-Aug-20	1073	Snowella sp	1000	0.5	0	0	500
MEL - 0204 - PC	18-Aug-20	2112	Sphaerocystis schroeteri Chodat	43104	0.60777	3	3	14.1
MEL - 0204 - PC	18-Aug-20	2121	Oocystis lacustris Chodat	57472	2.89084	6	4	50.3
MEL - 0204 - PC	18-Aug-20	2167	Elakatothrix gelatinosa Willen	21552	0.37285	11	2	17.3
MEL - 0204 - PC	18-Aug-20	2178	Cosmarium sp.	600	0.83778	20	20	1396.3
MEL - 0204 - PC	18-Aug-20	2187	Staurodesmus extensus (Andersson) Teiling	400	0.1642	14	12	410.5
MEL - 0204 - PC	18-Aug-20	2199	Spondylosium planum (Wolle) W. and G.S. West	7184	0.27084	6	6	37.7
MEL - 0204 - PC	18-Aug-20	2206	Botryococcus braunii Kutzing	400	0.57472	14	14	1436.8
MEL - 0204 - PC	18-Aug-20	4351	Small chrysophyceae	646560	6.65957	2.7	2.7	10.3
MEL - 0204 - PC	18-Aug-20	4352	Large chrysophyceae	71840	12.90246	7	7	179.6
MEL - 0204 - PC	18-Aug-20	4357	Chrysococcus sp.	502880	32.88835	5	5	65.4
MEL - 0204 - PC	18-Aug-20	4362	Kephyrion sp.	21552	0.30388	3	3	14.1
MEL - 0204 - PC	18-Aug-20	4388	Dinobryon sertularia Ehrenberg	50288	11.37515	12	6	226.2
MEL - 0204 - PC	18-Aug-20	4401	Uroglena volvox Ehrenberg	143680	16.25021	6	6	113.1
MEL - 0204 - PC	18-Aug-20	4413	Chrysochromulina laurentiana Kling	43104	19.96577	9.6	9.6	463.2
MEL - 0204 - PC	18-Aug-20	4418	Salpingoeca frequentissima (Zach.) Lemmermann	7184	0.23132	6	3.2	32.2
MEL - 0204 - PC	18-Aug-20	5507	Cyclotella stelligera Cleve and Grunow	4600	10.9894	11.5	23	2389
MEL - 0204 - PC	18-Aug-20	5509	Cyclotella ocellata Pant.	21552	2.16598	4	8	100.5
MEL - 0204 - PC	18-Aug-20	5513	Tabellaria fenestrata (Lyngbye) Kutzing	8800	6.88424	83	6	782.3
MEL - 0204 - PC	18-Aug-20	5514	Tabellaria flocculosa (Roth) Kutzing	800	0.9852	24	14	1231.5
MEL - 0204 - PC	18-Aug-20	5515	Fragilaria crotonensis Kitton	3800	1.03474	65	4	272.3
MEL - 0204 - PC	18-Aug-20	5524	Asterionella formosa Hassall	10400	1.12216	103	2	107.9
MEL - 0204 - PC	18-Aug-20	5551	Cyclotella michiganiana Skvortzow	107760	2.05822	2.3	4.6	19.1
MEL - 0204 - PC	18-Aug-20	5720	Cyclotella bodanica Eulenst.	800	6.7348	17.5	35	8418.5

Table E1-1. Phytoplankton species data, Meliadine study lakes, 2020.

Station	Date	Species	Species name	Density	Biomass	Length	Width	Cell Volume
		code		cells/L ⁻¹	mg/m ⁻³	μ	μ	μ ³
MEL - 0204 - PC	18-Aug-20	6554	Rhodomonas minuta Skuja	337648	22.58865	9.9	4.4	66.9
MEL - 0204 - PC	18-Aug-20	6558	Cryptomonas erosa Ehrenberg	7400	12.1508	24	14	1642
MEL - 0204 - PC	18-Aug-20	6562	Cryptomonas reflexa (Marsson) Skuja	4800	3.38448	20.2	10	705.1
MEL - 0204 - PC	18-Aug-20	6565	Cryptomonas rostratiformis Skuja	2200	5.26812	35	14	2394.6
MEL - 0204 - PC	18-Aug-20	7631	Gymnodinium helveticum Penard	200	4.90088	52	30	24504.4
MEL - 0204 - PC	18-Aug-20	7639	Peridinium pusillum (Penard) Lemmermann	400	1.62576	19.8	19.8	4064.4
MEL - 0205 - PC	18-Aug-20	1073	Snowella sp	200	0.1	0	0	500
MEL - 0205 - PC	18-Aug-20	2121	Oocystis lacustris Chodat	495696	24.93351	6	4	50.3
MEL - 0205 - PC	18-Aug-20	2164	Quadrigula closterioides (Bohl.) Printz	28736	0.63219	14	2	22
MEL - 0205 - PC	18-Aug-20	2178	Cosmarium sp.	200	0.27926	20	20	1396.3
MEL - 0205 - PC	18-Aug-20	2199	Spondylosium planum (Wolle) W. and G.S. West	43104	1.62502	6	6	37.7
MEL - 0205 - PC	18-Aug-20	4351	Small chrysophyceae	502880	5.17966	2.7	2.7	10.3
MEL - 0205 - PC	18-Aug-20	4352	Large chrysophyceae	57472	10.32197	7	7	179.6
MEL - 0205 - PC	18-Aug-20	4357	Chrysococcus sp.	323280	21.14251	5	5	65.4
MEL - 0205 - PC	18-Aug-20	4362	Kephyrion sp.	21552	0.30388	3	3	14.1
MEL - 0205 - PC	18-Aug-20	4370	Mallomonas akrokomos Asmund and Kristiansen	7184	1.09269	15	4.4	152.1
MEL - 0205 - PC	18-Aug-20	4388	Dinobryon sertularia Ehrenberg	21552	4.87506	12	6	226.2
MEL - 0205 - PC	18-Aug-20	4388	Dinobryon sertularia Ehrenberg	600	2.034	0	0	3390
MEL - 0205 - PC	18-Aug-20	4401	Uroglena volvox Ehrenberg	100576	11.37515	6	6	113.1
MEL - 0205 - PC	18-Aug-20	4413	Chrysochromulina laurentiana Kling	35920	16.63814	9.6	9.6	463.2
MEL - 0205 - PC	18-Aug-20	4418	Salpingoeca frequentissima (Zach.) Lemmermann	150864	4.85782	6	3.2	32.2
MEL - 0205 - PC	18-Aug-20	5507	Cyclotella stelligera Cleve and Grunow	4400	10.5116	11.5	23	2389
MEL - 0205 - PC	18-Aug-20	5509	Cyclotella ocellata Pant.	7184	0.72199	4	8	100.5
MEL - 0205 - PC	18-Aug-20	5513	Tabellaria fenestrata (Lyngbye) Kutzing	400	0.30912	82	6	772.8
MEL - 0205 - PC	18-Aug-20	5515	Fragilaria crotonensis Kitton	400	0.10892	65	4	272.3
MEL - 0205 - PC	18-Aug-20	5524	Asterionella formosa Hassall	12000	1.2948	103	2	107.9
MEL - 0205 - PC	18-Aug-20	5551	Cyclotella michiganiana Skvortzow	237072	4.52808	2.3	4.6	19.1
MEL - 0205 - PC	18-Aug-20	5720	Cyclotella bodanica Eulenst.	400	3.3674	17.5	35	8418.5
MEL - 0205 - PC	18-Aug-20	6554	Rhodomonas minuta Skuja	244256	16.34073	9.9	4.4	66.9
MEL - 0205 - PC	18-Aug-20	6558	Cryptomonas erosa Ehrenberg	6800	11.1656	24	14	1642
MEL - 0205 - PC	18-Aug-20	6562	Cryptomonas reflexa (Marsson) Skuja	5800	4.08958	20.2	10	705.1
MEL - 0205 - PC	18-Aug-20	6565	Cryptomonas rostratiformis Skuja	1200	2.87352	35	14	2394.6
MEL - 0205 - PC	18-Aug-20	6568	Katablepharis ovalis Skuja	7184	0.31322	7.9	4	43.6
MEL - 0205 - PC	18-Aug-20	7632	Gymnodinium sp.	200	1.84056	26	26	9202.8
MEL - 0205 - PC	18-Aug-20	7639	Peridinium pusillum (Penard) Lemmermann	1400	5.69016	19.8	19.8	4064.4
MEL - 0301 - PC	19-Aug-20	1073	Snowella sp	200	0.1	0	0	500
MEL - 0301 - PC	19-Aug-20	2112	Sphaerocystis schroeteri Chodat	71840	1.01294	3	3	14.1
MEL - 0301 - PC	19-Aug-20	2113	Pediastrum duplex Meyen	4800	0.44928	9.3	6.2	93.6
MEL - 0301 - PC	19-Aug-20	2167	Elakatothrix gelatinosa Willen	28736	0.49713	11	2	17.3
MEL - 0301 - PC	19-Aug-20	2169	Planctonema lauterbornii Schmidle	600	1.58334	210	4	2638.9
MEL - 0301 - PC	19-Aug-20	2178	Cosmarium sp.	200	0.27926	20	20	1396.3
MEL - 0301 - PC	19-Aug-20	2187	Staurodesmus extensus (Andersson) Teiling	200	0.0821	14	12	410.5
MEL - 0301 - PC	19-Aug-20	2199	Spondylosium planum (Wolle) W. and G.S. West	28736	1.08335	6	6	37.7
MEL - 0301 - PC	19-Aug-20	2206	Botryococcus braunii Kutzing	200	0.28736	14	14	1436.8
MEL - 0301 - PC	19-Aug-20	2247	Oocystis gigas Archer	200	0.48254	18	16	2412.7
MEL - 0301 - PC	19-Aug-20	4351	Small chrysophyceae	718400	5.89088	2.5	2.5	8.2
MEL - 0301 - PC	19-Aug-20	4352	Large chrysophyceae	14368	2.58049	7	7	179.6
MEL - 0301 - PC	19-Aug-20	4357	Chrysococcus sp.	660928	43.22469	5	5	65.4
MEL - 0301 - PC	19-Aug-20	4361	Kephyrion boreale Skuja	7184	0.85346	6.1	6.1	118.8
MEL - 0301 - PC	19-Aug-20	4362	Kephyrion sp.	35920	0.50647	3	3	14.1
MEL - 0301 - PC	19-Aug-20	4363	Spiniferomonas serrata	35920	4.2673	6.1	6.1	118.8
MEL - 0301 - PC	19-Aug-20	4381	Dinobryon mucronatom Nygaard	7184	0.90303	9.6	5	125.7
MEL - 0301 - PC	19-Aug-20	4388	Dinobryon sertularia Ehrenberg	200	0.678	0	0	3390
MEL - 0301 - PC	19-Aug-20	4390	Dinobryon sociale Ehrenberg	122128	27.62535	12	6	226.2
MEL - 0301 - PC	19-Aug-20	4390	Dinobryon sociale Ehrenberg	200	0.25	0	0	1250
MEL - 0301 - PC	19-Aug-20	4396	Chrysolykos skuja (Nauwerck) Willen	28736	0.87932	5.7	3.2	30.6
MEL - 0301 - PC	19-Aug-20	4401	Uroglena volvox Ehrenberg	193968	21.93778	6	6	113.1
MEL - 0301 - PC	19-Aug-20	4413	Chrysochromulina laurentiana Kling	93392	38.07592	9.2	9.2	407.7
MEL - 0301 - PC	19-Aug-20	4418	Salpingoeca frequentissima (Zach.) Lemmermann	122128	3.93252	6	3.2	32.2
MEL - 0301 - PC	19-Aug-20	5507	Cyclotella stelligera Cleve and Grunow	800	1.9112	11.5	23	2389
MEL - 0301 - PC	19-Aug-20	5509	Cyclotella ocellata Pant.	28736	2.88797	4	8	100.5
MEL - 0301 - PC	19-Aug-20	5515	Fragilaria crotonensis Kitton	200	0.05446	65	4	272.3
MEL - 0301 - PC	19-Aug-20	5551	Cyclotella michiganiana Skvortzow	21552	0.52802	2.5	5	24.5
MEL - 0301 - PC	19-Aug-20	5720	Cyclotella bodanica Eulenst.	600	4.23372	16.5	33	7056.2
MEL - 0301 - PC	19-Aug-20	6554	Rhodomonas minuta Skuja	229888	15.54043	10	4.4	67.6
MEL - 0301 - PC	19-Aug-20	6558	Cryptomonas erosa Ehrenberg	1400	2.25092	23.5	14	1607.8
MEL - 0301 - PC	19-Aug-20	6562	Cryptomonas reflexa (Marsson) Skuja	2000	1.466	21	10	733
MEL - 0301 - PC	19-Aug-20	6565	Cryptomonas rostratiformis Skuja	200	0.45156	33	14	2257.8
MEL - 0301 - PC	19-Aug-20	7632	Gymnodinium sp.	200	1.84056	26	26	9202.8
MEL - 0301 - PC	19-Aug-20	7635	Peridinium willei Huitfeldt-Kaas	200	4.8858	36	36	24429
MEL - 0301 - PC	19-Aug-20	7639	Peridinium pusillum (Penard) Lemmermann	2000	7.2968	19.1	19.1	3648.4
MEL - 0302 - PC	19-Aug-20	2101	Carteria spp.	7184	6.50008	12	12	904.8
MEL - 0302 - PC	19-Aug-20	2113	Pediastrum duplex Meyen	4000	0.3744	9.3	6.2	93.6
MEL - 0302 - PC	19-Aug-20	2137	Dictyosphaerium simplex Sukja	57472	0.24138	2	2	4.2
MEL - 0302 - PC	19-Aug-20	2199	Spondylosium planum (Wolle) W. and G.S. West	28736	1.08335	6	6	37.7
MEL - 0302 - PC	19-Aug-20	4351	Small chrysophyceae	416672	3.41671	2.5	2.5	8.2
MEL - 0302 - PC	19-Aug-20	4352	Large chrysophyceae	21552	3.87074	7	7	179.6
MEL - 0302 - PC	19-Aug-20	4357	Chrysococcus sp.	409488	26.78052	5	5	65.4
MEL - 0302 - PC	19-Aug-20	4362	Kephyrion sp.	43104	0.60777	3	3	14.1
MEL - 0302 - PC	19-Aug-20	4364	Mallomonas caudata Ivanov	200	1.07234	40	16	5361.7
MEL - 0302 - PC	19-Aug-20	4390	Dinobryon sociale Ehrenberg	222704	50.37564	12	6	226.2
MEL - 0302 - PC	19-Aug-20	4401	Uroglena volvox Ehrenberg	71840	8.1251	6	6	113.1
MEL - 0302 - PC	19-Aug-20	4413	Chrysochromulina laurentiana Kling	186784	76.15184	9.2	9.2	407.7
MEL - 0302 - PC	19-Aug-20	4418	Salpingoeca frequentissima (Zach.) Lemmermann	186784	6.01444	6	3.2	32.2
MEL - 0302 - PC	19-Aug-20	5507	Cyclotella stelligera Cleve and Grunow	1800	4.3002	11.5	23	2389
MEL - 0302 - PC	19-Aug-20	5509	Cyclotella ocellata Pant.	28736	2.88797	4	8	100.5
MEL - 0302 - PC	19-Aug-20	5513	Tabellaria fenestrata (Lyngbye) Kutzing	200	0.16022	85	6	801.1
MEL - 0302 - PC	19-Aug-20	5551	Cyclotella michiganiana Skvortzow	114944	2.81613	2.5	5	24.5
MEL - 0302 - PC	19-Aug-20	6554	Rhodomonas minuta Skuja	301728	20.39681	10	4.4	67.6
MEL - 0302 - PC	19-Aug-20	6558	Cryptomonas erosa Ehrenberg	1600	2.57248	23.5	14	1607.8
MEL - 0302 - PC	19-Aug-20	6562	Cryptomonas reflexa (Marsson) Skuja	2200	1.6126	21	10	733
MEL - 0302 - PC	19-Aug-20	7632	Gymnodinium sp.	400	3.68112	26	26	9202.8
MEL - 0302 - PC	19-Aug-20	7639	Peridinium pusillum (Penard) Lemmermann	1000	3.6484	19.1	19.1	3648.4
MEL - 0303 - PC	19-Aug-20	2112	Sphaerocystis schroeteri Chodat	57472	0.81036	3	3	14.1

Table E1-1. Phytoplankton species data, Meliadine study lakes, 2020.

Station	Date	Species	Species name	Density	Biomass	Length	Width	Cell Volume
		code		cells/L ⁻¹	mg/m ⁻³	μ	μ	μ ³
MEL - 0303 - PC	19-Aug-20	2121	Oocystis lacustris Chodat	294544	14.81556	6	4	50.3
MEL - 0303 - PC	19-Aug-20	2137	Dictyosphaerium simplex Sukja	14368	0.06035	2	2	4.2
MEL - 0303 - PC	19-Aug-20	2143	Monoraphidium minutum (Nag.) Komarkova-Legnerova	7184	0.45116	10	4	62.8
MEL - 0303 - PC	19-Aug-20	2164	Quadrigula closterioides (Bohl.) Printz	28736	0.63219	14	2	22
MEL - 0303 - PC	19-Aug-20	2167	Elakatothrix gelatinosa Willen	143680	2.02589	9	2	14.1
MEL - 0303 - PC	19-Aug-20	2178	Cosmarium sp.	200	0.27926	20	20	1396.3
MEL - 0303 - PC	19-Aug-20	2187	Staurodesmus extensus (Andersson) Teiling	200	0.0821	14	12	410.5
MEL - 0303 - PC	19-Aug-20	2193	Staurodesmus paradoxum Meyen	200	0.56632	26	24	2831.6
MEL - 0303 - PC	19-Aug-20	2199	Spondylosium planum (Wolle) W. and G.S. West	57472	2.16669	6	6	37.7
MEL - 0303 - PC	19-Aug-20	2206	Botryococcus braunii Kutzing	600	0.86208	14	14	1436.8
MEL - 0303 - PC	19-Aug-20	4351	Small chrysophyceae	675296	5.53743	2.5	2.5	8.2
MEL - 0303 - PC	19-Aug-20	4352	Large chrysophyceae	14368	2.58049	7	7	179.6
MEL - 0303 - PC	19-Aug-20	4357	Chrysococcus sp.	474144	31.00902	5	5	65.4
MEL - 0303 - PC	19-Aug-20	4362	Kephyrion sp.	143680	2.02589	3	3	14.1
MEL - 0303 - PC	19-Aug-20	4363	Spiniferomonas serrata	21552	2.56038	6.1	6.1	118.8
MEL - 0303 - PC	19-Aug-20	4364	Mallomonas caudata Ivanov	200	1.07234	40	16	5361.7
MEL - 0303 - PC	19-Aug-20	4368	Mallomonas crassisquama (Asmund) Fott	200	0.20944	20	10	1047.2
MEL - 0303 - PC	19-Aug-20	4378	Dinobryon borgei Lemmermann	7184	0.32544	9	3.1	45.3
MEL - 0303 - PC	19-Aug-20	4383	Dinobryon bavaricum Imhof	200	0.25	0	0	1250
MEL - 0303 - PC	19-Aug-20	4388	Dinobryon sertularia Ehrenberg	7184	1.62502	12	6	226.2
MEL - 0303 - PC	19-Aug-20	4388	Dinobryon sertularia Ehrenberg	800	1.5928	0	0	1991
MEL - 0303 - PC	19-Aug-20	4390	Dinobryon sociale Ehrenberg	222704	50.37564	12	6	226.2
MEL - 0303 - PC	19-Aug-20	4401	Uroglena volvox Ehrenberg	100576	11.37515	6	6	113.1
MEL - 0303 - PC	19-Aug-20	4411	Bitrichia chodatii (Reverdin) Chodat	7184	0.36136	6	4	50.3
MEL - 0303 - PC	19-Aug-20	4413	Chrysochromulina laurentiana Kling	208336	84.93859	9.2	9.2	407.7
MEL - 0303 - PC	19-Aug-20	5507	Cyclotella stelligera Cleve and Grunow	600	1.4334	11.5	23	2389
MEL - 0303 - PC	19-Aug-20	5509	Cyclotella ocellata Pant.	21552	2.16598	4	8	100.5
MEL - 0303 - PC	19-Aug-20	5515	Fragilaria crotonensis Kitton	200	0.05446	65	4	272.3
MEL - 0303 - PC	19-Aug-20	5524	Asterionella formosa Hassall	200	0.02158	103	2	107.9
MEL - 0303 - PC	19-Aug-20	5551	Cyclotella michiganiana Skvortzow	86208	2.1121	2.5	5	24.5
MEL - 0303 - PC	19-Aug-20	6554	Rhodomonas minuta Skuja	344832	23.31064	10	4.4	67.6
MEL - 0303 - PC	19-Aug-20	6558	Cryptomonas erosa Ehrenberg	1000	1.6078	23.5	14	1607.8
MEL - 0303 - PC	19-Aug-20	6562	Cryptomonas reflexa (Marsson) Skuja	2200	1.6126	21	10	733
MEL - 0303 - PC	19-Aug-20	7632	Gymnodinium sp.	200	1.84056	26	26	9202.8
MEL - 0303 - PC	19-Aug-20	7639	Peridinium pusillum (Penard) Lemmermann	600	2.18904	19.1	19.1	3648.4
MEL - 0304 - PC	19-Aug-20	2112	Sphaerocystis Schroeteri Chodat	86208	1.21553	3	3	14.1
MEL - 0304 - PC	19-Aug-20	2121	Oocystis lacustris Chodat	28736	1.44542	6	4	50.3
MEL - 0304 - PC	19-Aug-20	2167	Elakatothrix gelatinosa Willen	14368	0.24857	11	2	17.3
MEL - 0304 - PC	19-Aug-20	2169	Planctonema lauterbornii Schmidle	200	0.37448	149	4	1872.4
MEL - 0304 - PC	19-Aug-20	2178	Cosmarium sp.	600	0.83778	20	20	1396.3
MEL - 0304 - PC	19-Aug-20	2187	Staurodesmus extensus (Andersson) Teiling	800	0.3284	14	12	410.5
MEL - 0304 - PC	19-Aug-20	2193	Staurodesmus paradoxum Meyen	400	1.13264	26	24	2831.6
MEL - 0304 - PC	19-Aug-20	2206	Botryococcus braunii Kutzing	400	0.57472	14	14	1436.8
MEL - 0304 - PC	19-Aug-20	4351	Small chrysophyceae	725584	5.94979	2.5	2.5	8.2
MEL - 0304 - PC	19-Aug-20	4352	Large chrysophyceae	14368	2.58049	7	7	179.6
MEL - 0304 - PC	19-Aug-20	4357	Chrysococcus sp.	553168	36.17719	5	5	65.4
MEL - 0304 - PC	19-Aug-20	4362	Kephyrion sp.	86208	1.21553	3	3	14.1
MEL - 0304 - PC	19-Aug-20	4363	Spiniferomonas serrata	14368	1.70692	6.1	6.1	118.8
MEL - 0304 - PC	19-Aug-20	4388	Dinobryon sertularia Ehrenberg	200	0.3982	0	0	1991
MEL - 0304 - PC	19-Aug-20	4390	Dinobryon sociale Ehrenberg	136496	30.8754	12	6	226.2
MEL - 0304 - PC	19-Aug-20	4401	Uroglena volvox Ehrenberg	136496	15.4377	6	6	113.1
MEL - 0304 - PC	19-Aug-20	4413	Chrysochromulina laurentiana Kling	71840	29.28917	9.2	9.2	407.7
MEL - 0304 - PC	19-Aug-20	4414	Stichogloea spp.	14368	0.72271	6	4	50.3
MEL - 0304 - PC	19-Aug-20	4418	Salpingoeca frequentissima (Zach.) Lemmermann	64656	2.08192	6	3.2	32.2
MEL - 0304 - PC	19-Aug-20	5507	Cyclotella stelligera Cleve and Grunow	1000	2.389	11.5	23	2389
MEL - 0304 - PC	19-Aug-20	5509	Cyclotella ocellata Pant.	71840	7.21992	4	8	100.5
MEL - 0304 - PC	19-Aug-20	5515	Fragilaria crotonensis Kitton	400	0.10892	65	4	272.3
MEL - 0304 - PC	19-Aug-20	5524	Asterionella formosa Hassall	1600	0.17264	103	2	107.9
MEL - 0304 - PC	19-Aug-20	5551	Cyclotella michiganiana Skvortzow	57472	1.40806	2.5	5	24.5
MEL - 0304 - PC	19-Aug-20	6554	Rhodomonas minuta Skuja	222704	15.05479	10	4.4	67.6
MEL - 0304 - PC	19-Aug-20	6558	Cryptomonas erosa Ehrenberg	1400	2.25092	23.5	14	1607.8
MEL - 0304 - PC	19-Aug-20	6562	Cryptomonas reflexa (Marsson) Skuja	400	0.2932	21	10	733
MEL - 0304 - PC	19-Aug-20	6565	Cryptomonas rostratiformis Skuja	200	0.45156	33	14	2257.8
MEL - 0304 - PC	19-Aug-20	7632	Gymnodinium sp.	1000	9.2028	26	26	9202.8
MEL - 0304 - PC	19-Aug-20	7635	Peridinium williei Huitfeldt-Kaas	200	4.8858	36	36	24429
MEL - 0304 - PC	19-Aug-20	7639	Peridinium pusillum (Penard) Lemmermann	1200	4.37808	19.1	19.1	3648.4
MEL - 0305 - PC	19-Aug-20	1073	Snowella sp	200	0.1	0	0	500
MEL - 0305 - PC	19-Aug-20	2121	Oocystis lacustris Chodat	7184	0.36136	6	4	50.3
MEL - 0305 - PC	19-Aug-20	2167	Elakatothrix gelatinosa Willen	7184	0.12428	11	2	17.3
MEL - 0305 - PC	19-Aug-20	2187	Staurodesmus extensus (Andersson) Teiling	200	0.0821	14	12	410.5
MEL - 0305 - PC	19-Aug-20	2193	Staurodesmus paradoxum Meyen	400	1.13264	26	24	2831.6
MEL - 0305 - PC	19-Aug-20	4351	Small chrysophyceae	660928	5.41961	2.5	2.5	8.2
MEL - 0305 - PC	19-Aug-20	4352	Large chrysophyceae	35920	6.45123	7	7	179.6
MEL - 0305 - PC	19-Aug-20	4357	Chrysococcus sp.	466960	30.53918	5	5	65.4
MEL - 0305 - PC	19-Aug-20	4362	Kephyrion sp.	71840	1.01294	3	3	14.1
MEL - 0305 - PC	19-Aug-20	4363	Spiniferomonas serrata	7184	0.85346	6.1	6.1	118.8
MEL - 0305 - PC	19-Aug-20	4388	Dinobryon sertularia Ehrenberg	7184	1.62502	12	6	226.2
MEL - 0305 - PC	19-Aug-20	4390	Dinobryon sociale Ehrenberg	107760	24.37531	12	6	226.2
MEL - 0305 - PC	19-Aug-20	4401	Uroglena volvox Ehrenberg	57472	6.50008	6	6	113.1
MEL - 0305 - PC	19-Aug-20	4413	Chrysochromulina laurentiana Kling	50288	20.50242	9.2	9.2	407.7
MEL - 0305 - PC	19-Aug-20	4414	Stichogloea spp.	28736	1.44542	6	4	50.3
MEL - 0305 - PC	19-Aug-20	4418	Salpingoeca frequentissima (Zach.) Lemmermann	86208	2.7759	6	3.2	32.2
MEL - 0305 - PC	19-Aug-20	4437	Pteridomonas sp.	7184	1.70907	8.8	8.8	237.9
MEL - 0305 - PC	19-Aug-20	5507	Cyclotella stelligera Cleve and Grunow	1200	2.8668	11.5	23	2389
MEL - 0305 - PC	19-Aug-20	5509	Cyclotella ocellata Pant.	21552	2.16598	4	8	100.5
MEL - 0305 - PC	19-Aug-20	5514	Tabellaria flocculosa (Roth) Kutzing	200	0.26682	26	14	1334.1
MEL - 0305 - PC	19-Aug-20	5551	Cyclotella michiganiana Skvortzow	71840	1.76008	2.5	5	24.5
MEL - 0305 - PC	19-Aug-20	5720	Cyclotella bodanica Eulenst.	400	2.82248	16.5	33	7056.2
MEL - 0305 - PC	19-Aug-20	5776	Rhopalodia gibba (Ehrenberg) O. Muller	200	5.57528	220	22	27876.4
MEL - 0305 - PC	19-Aug-20	5880	Didymosphenia geminata Schmidt	200	8.0073	118	36	40036.5
MEL - 0305 - PC	19-Aug-20	6554	Rhodomonas minuta Skuja	229888	15.54043	10	4.4	67.6
MEL - 0305 - PC	19-Aug-20	6558	Cryptomonas erosa Ehrenberg	1400	2.25092	23.5	14	1607.8
MEL - 0305 - PC	19-Aug-20	6562	Cryptomonas reflexa (Marsson) Skuja	600	0.4398	21	10	733
MEL - 0305 - PC	19-Aug-20	6565	Cryptomonas rostratiformis Skuja	200	0.45156	33	14	2257.8

Table E1-1. Phytoplankton species data, Meliadine study lakes, 2020.

Station	Date	Species	Species name	Density	Biomass	Length	Width	Cell Volume
		code		cells/L ⁻¹	mg/m ⁻³	μ	μ	μ ³
MEL - 0305 - PC	19-Aug-20	7639	Peridinium pusillum (Penard) Lemmermann	2200	8.02648	19.1	19.1	3648.4
MEL - 0401 - PC	19-Aug-20	1073	Snowella sp	400	0.2	0	0	500
MEL - 0401 - PC	19-Aug-20	2187	Staurodesmus extensus (Andersson) Teiling	1000	0.4105	14	12	410.5
MEL - 0401 - PC	19-Aug-20	2193	Staurodesmus paradoxum Meyen	200	0.81682	30	26	4084.1
MEL - 0401 - PC	19-Aug-20	2199	Spondylosium planum (Wolle) W. and G.S. West	7184	0.27084	6	6	37.7
MEL - 0401 - PC	19-Aug-20	2206	Botryococcus braunii Kutzing	400	0.57472	14	14	1436.8
MEL - 0401 - PC	19-Aug-20	4351	Small chrysophyceae	373568	3.06326	2.5	2.5	8.2
MEL - 0401 - PC	19-Aug-20	4352	Large chrysophyceae	7184	1.29025	7	7	179.6
MEL - 0401 - PC	19-Aug-20	4357	Chrysococcus sp.	431040	28.19002	5	5	65.4
MEL - 0401 - PC	19-Aug-20	4358	Chrysostephanosphaera globulifera Scherffel	7184	2.39227	8.6	8.6	333
MEL - 0401 - PC	19-Aug-20	4362	Kephyrion sp.	7184	0.10129	3	3	14.1
MEL - 0401 - PC	19-Aug-20	4363	Spiniferomonas serrata	7184	0.77228	5.9	5.9	107.5
MEL - 0401 - PC	19-Aug-20	4364	Mallomonas caudata Ivanov	200	1.07234	40	16	5361.7
MEL - 0401 - PC	19-Aug-20	4368	Mallomonas crassisquama (Asmund) Fott	400	0.41888	20	10	1047.2
MEL - 0401 - PC	19-Aug-20	4381	Dinobryon mucronatom Nygaard	7184	0.94039	10	5	130.9
MEL - 0401 - PC	19-Aug-20	4388	Dinobryon sertularia Ehrenberg	7184	1.62502	12	6	226.2
MEL - 0401 - PC	19-Aug-20	4388	Dinobryon sertularia Ehrenberg	400	1.356	0	0	3390
MEL - 0401 - PC	19-Aug-20	4390	Dinobryon sociale Ehrenberg	71840	16.25021	12	6	226.2
MEL - 0401 - PC	19-Aug-20	4401	Uroglena volvox Ehrenberg	93392	10.56264	6	6	113.1
MEL - 0401 - PC	19-Aug-20	4413	Chrysochromulina laurentiana Kling	86208	35.147	9.2	9.2	407.7
MEL - 0401 - PC	19-Aug-20	4418	Salpingoeca frequentissima (Zach.) Lemmermann	7184	0.23132	6	3.2	32.2
MEL - 0401 - PC	19-Aug-20	5507	Cyclotella stelligera Cleve and Grunow	1000	2.389	11.5	23	2389
MEL - 0401 - PC	19-Aug-20	5509	Cyclotella ocellata Pant.	14368	1.44398	4	8	100.5
MEL - 0401 - PC	19-Aug-20	5515	Fragilaria crotonensis Kitton	600	0.16338	65	4	272.3
MEL - 0401 - PC	19-Aug-20	5551	Cyclotella michiganiana Skvortzow	71840	1.76008	2.5	5	24.5
MEL - 0401 - PC	19-Aug-20	5720	Cyclotella bodanica Eulenst.	400	2.82248	16.5	33	7056.2
MEL - 0401 - PC	19-Aug-20	6554	Rhodomonas minuta Skuja	186784	12.6266	10	4.4	67.6
MEL - 0401 - PC	19-Aug-20	6558	Cryptomonas erosa Ehrenberg	3800	6.2396	24	14	1642
MEL - 0401 - PC	19-Aug-20	6562	Cryptomonas reflexa (Marsson) Skuja	1600	1.12816	20.2	10	705.1
MEL - 0401 - PC	19-Aug-20	6565	Cryptomonas rostratiformis Skuja	600	1.43676	35	14	2394.6
MEL - 0401 - PC	19-Aug-20	7632	Gymnodinium sp.	200	1.84056	26	26	9202.8
MEL - 0402 - PC	19-Aug-20	2112	Sphaerocystis Schroeteri Chodat	28736	0.40518	3	3	14.1
MEL - 0402 - PC	19-Aug-20	2178	Cosmarium sp.	200	0.27926	20	20	1396.3
MEL - 0402 - PC	19-Aug-20	2187	Staurodesmus extensus (Andersson) Teiling	200	0.0821	14	12	410.5
MEL - 0402 - PC	19-Aug-20	4351	Small chrysophyceae	653744	5.3607	2.5	2.5	8.2
MEL - 0402 - PC	19-Aug-20	4352	Large chrysophyceae	79024	14.19271	7	7	179.6
MEL - 0402 - PC	19-Aug-20	4357	Chrysococcus sp.	287360	18.79334	5	5	65.4
MEL - 0402 - PC	19-Aug-20	4362	Kephyrion sp.	21552	0.30388	3	3	14.1
MEL - 0402 - PC	19-Aug-20	4368	Mallomonas crassisquama (Asmund) Fott	200	0.20526	19.6	10	1026.3
MEL - 0402 - PC	19-Aug-20	4383	Dinobryon bavaricum Imhof	200	0.678	0	0	3390
MEL - 0402 - PC	19-Aug-20	4388	Dinobryon sertularia Ehrenberg	7184	1.62502	12	6	226.2
MEL - 0402 - PC	19-Aug-20	4390	Dinobryon sociale Ehrenberg	201152	45.50058	12	6	226.2
MEL - 0402 - PC	19-Aug-20	4413	Chrysochromulina laurentiana Kling	86208	35.147	9.2	9.2	407.7
MEL - 0402 - PC	19-Aug-20	4414	Stichogloea spp.	373568	18.79047	6	4	50.3
MEL - 0402 - PC	19-Aug-20	4418	Salpingoeca frequentissima (Zach.) Lemmermann	21552	0.69397	6	3.2	32.2
MEL - 0402 - PC	19-Aug-20	5507	Cyclotella stelligera Cleve and Grunow	400	0.9556	11.5	23	2389
MEL - 0402 - PC	19-Aug-20	5513	Tabellaria fenestrata (Lyngbye) Kutzing	800	0.62584	83	6	782.3
MEL - 0402 - PC	19-Aug-20	5514	Tabellaria flocculosa (Roth) Kutzing	200	0.26682	26	14	1334.1
MEL - 0402 - PC	19-Aug-20	5515	Fragilaria crotonensis Kitton	1600	0.43568	65	4	272.3
MEL - 0402 - PC	19-Aug-20	5551	Cyclotella michiganiana Skvortzow	179600	4.4002	2.5	5	24.5
MEL - 0402 - PC	19-Aug-20	6554	Rhodomonas minuta Skuja	93392	6.3133	10	4.4	67.6
MEL - 0402 - PC	19-Aug-20	6558	Cryptomonas erosa Ehrenberg	2600	4.2692	24	14	1642
MEL - 0402 - PC	19-Aug-20	6559	Cryptomonas ovata Ehrenberg	200	1.11702	40	20	5585.1
MEL - 0402 - PC	19-Aug-20	6562	Cryptomonas reflexa (Marsson) Skuja	1600	1.11696	20	10	698.1
MEL - 0402 - PC	19-Aug-20	6565	Cryptomonas rostratiformis Skuja	600	1.43676	35	14	2394.6
MEL - 0402 - PC	19-Aug-20	7639	Peridinium pusillum (Penard) Lemmermann	200	0.81288	19.8	19.8	4064.4
MEL - 0403 - PC	19-Aug-20	1073	Snowella sp	800	0.4	0	0	500
MEL - 0403 - PC	19-Aug-20	2112	Sphaerocystis Schroeteri Chodat	71840	1.01294	3	3	14.1
MEL - 0403 - PC	19-Aug-20	2169	Planctonema lauterbornii Schmidle	28736	5.77881	16	4	201.1
MEL - 0403 - PC	19-Aug-20	2178	Cosmarium sp.	200	0.27926	20	20	1396.3
MEL - 0403 - PC	19-Aug-20	2187	Staurodesmus extensus (Andersson) Teiling	2000	0.821	14	12	410.5
MEL - 0403 - PC	19-Aug-20	2199	Spondylosium planum (Wolle) W. and G.S. West	28736	1.08335	6	6	37.7
MEL - 0403 - PC	19-Aug-20	2206	Botryococcus braunii Kutzing	800	1.14944	14	14	1436.8
MEL - 0403 - PC	19-Aug-20	2247	Oocystis gigas Archer	400	0.96508	18	16	2412.7
MEL - 0403 - PC	19-Aug-20	4351	Small chrysophyceae	330464	2.7098	2.5	2.5	8.2
MEL - 0403 - PC	19-Aug-20	4357	Chrysococcus sp.	495696	32.41852	5	5	65.4
MEL - 0403 - PC	19-Aug-20	4362	Kephyrion sp.	43104	0.60777	3	3	14.1
MEL - 0403 - PC	19-Aug-20	4363	Spiniferomonas serrata	7184	0.77228	5.9	5.9	107.5
MEL - 0403 - PC	19-Aug-20	4368	Mallomonas crassisquama (Asmund) Fott	600	0.62832	20	10	1047.2
MEL - 0403 - PC	19-Aug-20	4381	Dinobryon mucronatom Nygaard	7184	0.94039	10	5	130.9
MEL - 0403 - PC	19-Aug-20	4388	Dinobryon sertularia Ehrenberg	7184	1.62502	12	6	226.2
MEL - 0403 - PC	19-Aug-20	4390	Dinobryon sociale Ehrenberg	7184	1.62502	12	6	226.2
MEL - 0403 - PC	19-Aug-20	4401	Uroglena volvox Ehrenberg	100576	11.37515	6	6	113.1
MEL - 0403 - PC	19-Aug-20	4413	Chrysochromulina laurentiana Kling	93392	38.07592	9.2	9.2	407.7
MEL - 0403 - PC	19-Aug-20	4414	Stichogloea spp.	79024	3.97491	6	4	50.3
MEL - 0403 - PC	19-Aug-20	4418	Salpingoeca frequentissima (Zach.) Lemmermann	172416	5.5518	6	3.2	32.2
MEL - 0403 - PC	19-Aug-20	4437	Pteridomonas sp.	7184	1.59485	8.6	8.6	222
MEL - 0403 - PC	19-Aug-20	5507	Cyclotella stelligera Cleve and Grunow	1000	2.389	11.5	23	2389
MEL - 0403 - PC	19-Aug-20	5509	Cyclotella ocellata Pant.	35920	3.60996	4	8	100.5
MEL - 0403 - PC	19-Aug-20	5513	Tabellaria fenestrata (Lyngbye) Kutzing	2000	1.5456	82	6	772.8
MEL - 0403 - PC	19-Aug-20	5515	Fragilaria crotonensis Kitton	800	0.21784	65	4	272.3
MEL - 0403 - PC	19-Aug-20	5524	Asterionella formosa Hassall	4000	0.4316	103	2	107.9
MEL - 0403 - PC	19-Aug-20	5551	Cyclotella michiganiana Skvortzow	35920	0.88004	2.5	5	24.5
MEL - 0403 - PC	19-Aug-20	5720	Cyclotella bodanica Eulenst.	400	2.82248	16.5	33	7056.2
MEL - 0403 - PC	19-Aug-20	6554	Rhodomonas minuta Skuja	150864	10.19841	10	4.4	67.6
MEL - 0403 - PC	19-Aug-20	6558	Cryptomonas erosa Ehrenberg	4000	6.568	24	14	1642
MEL - 0403 - PC	19-Aug-20	6562	Cryptomonas reflexa (Marsson) Skuja	400	0.27924	20	10	698.1
MEL - 0403 - PC	19-Aug-20	6568	Katablepharis ovalis Skuja	28736	1.04024	7.2	4	36.2
MEL - 0403 - PC	19-Aug-20	7631	Gymnodinium helveticum Penard	200	4.71238	50	30	23561.9
MEL - 0403 - PC	19-Aug-20	7632	Gymnodinium sp.	200	2.82744	30	30	14137.2
MEL - 0403 - PC	19-Aug-20	7639	Peridinium pusillum (Penard) Lemmermann	200	0.81288	19.8	19.8	4064.4
MEL - 0404 - PC	19-Aug-20	2121	Oocystis lacustris Chodat	7184	0.36136	6	4	50.3
MEL - 0404 - PC	19-Aug-20	2143	Monoraphidium minutum (Nag.) Komarkova-Legnerova	7184	0.4059	9	4	56.5
MEL - 0404 - PC	19-Aug-20	2167	Elakatothrix gelatinosa Willen	43104	0.67673	10	2	15.7

Table E1-1. Phytoplankton species data, Meliadine study lakes, 2020.

Station	Date	Species	Species name	Density	Biomass	Length	Width	Cell Volume
		code		cells/L ⁻¹	mg/m ⁻³	μ	μ	μ ³
MEL - 0404 - PC	19-Aug-20	2178	Cosmarium sp.	200	0.27926	20	20	1396.3
MEL - 0404 - PC	19-Aug-20	2187	Staurodesmus extensus (Andersson) Teiling	400	0.1642	14	12	410.5
MEL - 0404 - PC	19-Aug-20	2206	Botryococcus braunii Kutzing	1000	1.4368	14	14	1436.8
MEL - 0404 - PC	19-Aug-20	2216	Zygnema sp.	200	3.84846	245	10	19242.3
MEL - 0404 - PC	19-Aug-20	4351	Small chrysophyceae	344832	2.82762	2.5	2.5	8.2
MEL - 0404 - PC	19-Aug-20	4352	Large chrysophyceae	21552	3.87074	7	7	179.6
MEL - 0404 - PC	19-Aug-20	4355	Chrysochromulina parva Lackey	7184	0.46983	5	5	65.4
MEL - 0404 - PC	19-Aug-20	4357	Chrysococcus sp.	459776	30.06935	5	5	65.4
MEL - 0404 - PC	19-Aug-20	4362	Kephyrion sp.	43104	0.67242	3.1	3.1	15.6
MEL - 0404 - PC	19-Aug-20	4363	Spiniferomonas serrata	7184	0.81251	6	6	113.1
MEL - 0404 - PC	19-Aug-20	4368	Mallomonas crassisquama (Asmund) Fott	400	0.41888	20	10	1047.2
MEL - 0404 - PC	19-Aug-20	4381	Dinobryon mucronatom Nygaard	7184	0.94039	10	5	130.9
MEL - 0404 - PC	19-Aug-20	4388	Dinobryon sertularia Ehrenberg	86208	19.50025	12	6	226.2
MEL - 0404 - PC	19-Aug-20	4390	Dinobryon sociale Ehrenberg	28736	6.50008	12	6	226.2
MEL - 0404 - PC	19-Aug-20	4396	Chrysolykos skuja (Nauwerck) Willen	14368	0.49139	6	3.3	34.2
MEL - 0404 - PC	19-Aug-20	4401	Uroglena volvox Ehrenberg	21552	2.43753	6	6	113.1
MEL - 0404 - PC	19-Aug-20	4413	Chrysochromulina laurentiana Kling	107760	43.93375	9.2	9.2	407.7
MEL - 0404 - PC	19-Aug-20	4418	Salpingoeca frequentissima (Zach.) Lemmermann	79024	2.54457	6	3.2	32.2
MEL - 0404 - PC	19-Aug-20	5507	Cyclotella stelligera Cleve and Grunow	200	0.4778	11.5	23	2389
MEL - 0404 - PC	19-Aug-20	5509	Cyclotella ocellata Pant.	64656	6.49793	4	8	100.5
MEL - 0404 - PC	19-Aug-20	5515	Fragilaria crotonensis Kitton	200	0.05446	65	4	272.3
MEL - 0404 - PC	19-Aug-20	5551	Cyclotella michiganiana Skvortzow	93392	2.2881	2.5	5	24.5
MEL - 0404 - PC	19-Aug-20	5720	Cyclotella bodanica Eulenst.	200	1.41124	16.5	33	7056.2
MEL - 0404 - PC	19-Aug-20	6554	Rhodomonas minuta Skuja	172416	11.65532	10	4.4	67.6
MEL - 0404 - PC	19-Aug-20	6558	Cryptomonas erosa Ehrenberg	3800	6.2396	24	14	1642
MEL - 0404 - PC	19-Aug-20	6562	Cryptomonas reflexa (Marsson) Skuja	1400	0.98714	20.2	10	705.1
MEL - 0404 - PC	19-Aug-20	6565	Cryptomonas rostratiformis Skuja	400	0.95784	35	14	2394.6
MEL - 0404 - PC	19-Aug-20	7639	Peridinium pusillum (Penard) Lemmermann	600	2.43864	19.8	19.8	4064.4
MEL - 0405 - PC	19-Aug-20	1073	Snowella sp	200	0.1	0	0	500
MEL - 0405 - PC	19-Aug-20	2105	Chlamydomonas spp.	7184	0.36136	6	4	50.3
MEL - 0405 - PC	19-Aug-20	2145	Crucigenia quadrata Morr.	143680	0.6753	3	3	4.7
MEL - 0405 - PC	19-Aug-20	2178	Cosmarium sp.	400	0.55852	20	20	1396.3
MEL - 0405 - PC	19-Aug-20	2187	Staurodesmus extensus (Andersson) Teiling	200	0.0821	14	12	410.5
MEL - 0405 - PC	19-Aug-20	2193	Staurodesmus paradoxum Meyen	200	0.56632	26	24	2831.6
MEL - 0405 - PC	19-Aug-20	2206	Botryococcus braunii Kutzing	800	1.14944	14	14	1436.8
MEL - 0405 - PC	19-Aug-20	4351	Small chrysophyceae	574720	4.7127	2.5	2.5	8.2
MEL - 0405 - PC	19-Aug-20	4352	Large chrysophyceae	35920	6.45123	7	7	179.6
MEL - 0405 - PC	19-Aug-20	4355	Chrysochromulina parva Lackey	7184	0.46983	5	5	65.4
MEL - 0405 - PC	19-Aug-20	4357	Chrysococcus sp.	316096	20.67268	5	5	65.4
MEL - 0405 - PC	19-Aug-20	4362	Kephyrion sp.	43104	0.60777	3	3	14.1
MEL - 0405 - PC	19-Aug-20	4363	Spiniferomonas serrata	7184	0.77228	5.9	5.9	107.5
MEL - 0405 - PC	19-Aug-20	4378	Dinobryon borgei Lemmermann	7184	0.36854	9	3.3	51.3
MEL - 0405 - PC	19-Aug-20	4388	Dinobryon sertularia Ehrenberg	57472	13.00017	12	6	226.2
MEL - 0405 - PC	19-Aug-20	4388	Dinobryon sertularia Ehrenberg	400	2.034	0	0	5085
MEL - 0405 - PC	19-Aug-20	4390	Dinobryon sociale Ehrenberg	43104	9.75012	12	6	226.2
MEL - 0405 - PC	19-Aug-20	4413	Chrysochromulina laurentiana Kling	7184	2.92892	9.2	9.2	407.7
MEL - 0405 - PC	19-Aug-20	4418	Salpingoeca frequentissima (Zach.) Lemmermann	7184	0.23132	6	3.2	32.2
MEL - 0405 - PC	19-Aug-20	5507	Cyclotella stelligera Cleve and Grunow	200	0.4778	11.5	23	2389
MEL - 0405 - PC	19-Aug-20	5509	Cyclotella ocellata Pant.	21552	2.16598	4	8	100.5
MEL - 0405 - PC	19-Aug-20	5513	Tabellaria fenestrata (Lyngbye) Kutzing	400	0.30912	82	6	772.8
MEL - 0405 - PC	19-Aug-20	5515	Fragilaria crotonensis Kitton	400	0.10892	65	4	272.3
MEL - 0405 - PC	19-Aug-20	5551	Cyclotella michiganiana Skvortzow	43104	1.05605	2.5	5	24.5
MEL - 0405 - PC	19-Aug-20	5720	Cyclotella bodanica Eulenst.	400	2.82248	16.5	33	7056.2
MEL - 0405 - PC	19-Aug-20	6554	Rhodomonas minuta Skuja	179600	12.14096	10	4.4	67.6
MEL - 0405 - PC	19-Aug-20	6558	Cryptomonas erosa Ehrenberg	2600	4.2692	24	14	1642
MEL - 0405 - PC	19-Aug-20	6562	Cryptomonas reflexa (Marsson) Skuja	1000	0.7051	20.2	10	705.1
MEL - 0405 - PC	19-Aug-20	6565	Cryptomonas rostratiformis Skuja	200	0.47892	35	14	2394.6
MEL - 0405 - PC	19-Aug-20	7639	Peridinium pusillum (Penard) Lemmermann	400	1.62576	19.8	19.8	4064.4
MEL - 0503R - PC	23-Aug-20	1014	Chroococcus limneticus Lemmermann	28736	3.58625	6.2	6.2	124.8
MEL - 0503R - PC	23-Aug-20	1073	Snowella sp	400	0.2	0	0	500
MEL - 0503R - PC	23-Aug-20	2112	Sphaerocystis schroeteri Chodat	28736	0.40518	3	3	14.1
MEL - 0503R - PC	23-Aug-20	2121	Oocystis lacustris Chodat	28736	0.81323	6	3	28.3
MEL - 0503R - PC	23-Aug-20	2137	Dictyosphaerium simplex Sukja	172416	0.72415	2	2	4.2
MEL - 0503R - PC	23-Aug-20	2178	Cosmarium sp.	800	1.11704	20	20	1396.3
MEL - 0503R - PC	23-Aug-20	2187	Staurodesmus extensus (Andersson) Teiling	600	0.2463	14	12	410.5
MEL - 0503R - PC	23-Aug-20	2206	Botryococcus braunii Kutzing	600	0.86208	14	14	1436.8
MEL - 0503R - PC	23-Aug-20	4351	Small chrysophyceae	682480	6.27882	2.6	2.6	9.2
MEL - 0503R - PC	23-Aug-20	4352	Large chrysophyceae	21552	3.87074	7	7	179.6
MEL - 0503R - PC	23-Aug-20	4357	Chrysococcus sp.	337648	22.08218	5	5	65.4
MEL - 0503R - PC	23-Aug-20	4358	Chrysostephanosphaera globulifera Scherffel	7184	2.39227	8.6	8.6	333
MEL - 0503R - PC	23-Aug-20	4362	Kephyrion sp.	43104	0.74139	3.2	3.2	17.2
MEL - 0503R - PC	23-Aug-20	4363	Spiniferomonas serrata	14368	1.70692	6.1	6.1	118.8
MEL - 0503R - PC	23-Aug-20	4364	Mallomonas caudata Ivanov	200	1.07234	40	16	5361.7
MEL - 0503R - PC	23-Aug-20	4368	Mallomonas crassisquama (Asmund) Fott	200	0.20316	19.4	10	1015.8
MEL - 0503R - PC	23-Aug-20	4388	Dinobryon sertularia Ehrenberg	600	1.1946	0	0	1991
MEL - 0503R - PC	23-Aug-20	4390	Dinobryon sociale Ehrenberg	7184	1.62502	12	6	226.2
MEL - 0503R - PC	23-Aug-20	4401	Uroglena volvox Ehrenberg	28736	3.25004	6	6	113.1
MEL - 0503R - PC	23-Aug-20	4413	Chrysochromulina laurentiana Kling	86208	37.49186	9.4	9.4	434.9
MEL - 0503R - PC	23-Aug-20	4414	Stichogloea spp.	21552	1.08407	6	4	50.3
MEL - 0503R - PC	23-Aug-20	4418	Salpingoeca frequentissima (Zach.) Lemmermann	79024	2.54457	6	3.2	32.2
MEL - 0503R - PC	23-Aug-20	5507	Cyclotella stelligera Cleve and Grunow	2600	6.2114	11.5	23	2389
MEL - 0503R - PC	23-Aug-20	5509	Cyclotella ocellata Pant.	21552	2.33408	4.1	8.2	108.3
MEL - 0503R - PC	23-Aug-20	5515	Fragilaria crotonensis Kitton	800	0.21784	65	4	272.3
MEL - 0503R - PC	23-Aug-20	5551	Cyclotella michiganiana Skvortzow	165232	4.04818	2.5	5	24.5
MEL - 0503R - PC	23-Aug-20	5720	Cyclotella bodanica Eulenst.	400	2.82248	16.5	33	7056.2
MEL - 0503R - PC	23-Aug-20	6554	Rhodomonas minuta Skuja	165232	11.16968	10	4.4	67.6
MEL - 0503R - PC	23-Aug-20	6558	Cryptomonas erosa Ehrenberg	2400	3.85872	23.5	14	1607.8
MEL - 0503R - PC	23-Aug-20	6562	Cryptomonas reflexa (Marsson) Skuja	600	0.4398	21	10	733
MEL - 0503R - PC	23-Aug-20	6565	Cryptomonas rostratiformis Skuja	600	1.35468	33	14	2257.8
MEL - 0503R - PC	23-Aug-20	7632	Gymnodinium sp.	200	1.84056	26	26	9202.8
MEL - 0503R - PC	23-Aug-20	7639	Peridinium pusillum (Penard) Lemmermann	400	1.45936	19.1	19.1	3648.4
MEL - 0501 - PC	23-Aug-20	1014	Chroococcus limneticus Lemmermann	28736	2.50291	5.5	5.5	87.1
MEL - 0501 - PC	23-Aug-20	1073	Snowella sp	600	0.3	0	0	500
MEL - 0501 - PC	23-Aug-20	2167	Elakatothrix gelatinosa Willen	28736	0.49713	11	2	17.3

Table E1-1. Phytoplankton species data, Meliadine study lakes, 2020.

Station	Date	Species	Species name	Density	Biomass	Length	Width	Cell Volume
		code		cells/L ⁻¹	mg/m ⁻³	μ	μ	μ ³
MEL - 0501 - PC	23-Aug-20	2178	Cosmarium sp.	200	0.27926	20	20	1396.3
MEL - 0501 - PC	23-Aug-20	2182	Euastrum spp.	400	0.74336	22	22	1858.4
MEL - 0501 - PC	23-Aug-20	2187	Staurodesmus extensus (Andersson) Teiling	1000	0.4105	14	12	410.5
MEL - 0501 - PC	23-Aug-20	2206	Botryococcus braunii Kutzing	1200	1.72416	14	14	1436.8
MEL - 0501 - PC	23-Aug-20	4351	Small chrysophyceae	459776	4.22994	2.6	2.6	9.2
MEL - 0501 - PC	23-Aug-20	4352	Large chrysophyceae	50288	9.03172	7	7	179.6
MEL - 0501 - PC	23-Aug-20	4357	Chrysococcus sp.	452592	29.59952	5	5	65.4
MEL - 0501 - PC	23-Aug-20	4362	Kephyrion sp.	86208	1.48278	3.2	3.2	17.2
MEL - 0501 - PC	23-Aug-20	4368	Mallomonas crassisquama (Asmund) Fott	400	0.41888	20	10	1047.2
MEL - 0501 - PC	23-Aug-20	4381	Dinobryon mucronatom Nygaard	7184	0.94039	10	5	130.9
MEL - 0501 - PC	23-Aug-20	4390	Dinobryon sociale Ehrenberg	122128	27.62535	12	6	226.2
MEL - 0501 - PC	23-Aug-20	4401	Uroglena volvox Ehrenberg	201152	22.75029	6	6	113.1
MEL - 0501 - PC	23-Aug-20	4413	Chrysochromulina laurentiana Kling	71840	31.24322	9.4	9.4	434.9
MEL - 0501 - PC	23-Aug-20	4418	Salpingoeca frequentissima (Zach.) Lemmermann	50288	1.61927	6	3.2	32.2
MEL - 0501 - PC	23-Aug-20	5507	Cyclotella stelligera Cleve and Grunow	1600	3.8224	11.5	23	2389
MEL - 0501 - PC	23-Aug-20	5509	Cyclotella ocellata Pant.	7184	0.72199	4	8	100.5
MEL - 0501 - PC	23-Aug-20	5514	Tabellaria flocculosa (Roth) Kutzing	1600	2.29888	28	14	1436.8
MEL - 0501 - PC	23-Aug-20	5515	Fragilaria crotonensis Kitton	1000	0.2723	65	4	272.3
MEL - 0501 - PC	23-Aug-20	5551	Cyclotella michiganiana Skvortzow	57472	1.40806	2.5	5	24.5
MEL - 0501 - PC	23-Aug-20	5720	Cyclotella bodanica Eulenst.	800	5.64496	16.5	33	7056.2
MEL - 0501 - PC	23-Aug-20	6554	Rhodomonas minuta Skuja	136496	9.22713	10	4.4	67.6
MEL - 0501 - PC	23-Aug-20	6558	Cryptomonas erosa Ehrenberg	2400	3.85872	23.5	14	1607.8
MEL - 0501 - PC	23-Aug-20	6562	Cryptomonas reflexa (Marsson) Skuja	1400	1.0262	21	10	733
MEL - 0501 - PC	23-Aug-20	6565	Cryptomonas rostratiformis Skuja	600	1.35468	33	14	2257.8
MEL - 0501 - PC	23-Aug-20	7632	Gymnodinium sp.	200	1.84056	26	26	9202.8
MEL - 0501 - PC	23-Aug-20	7639	Peridinium pusillum (Penard) Lemmermann	200	0.72968	19.1	19.1	3648.4
MEL - 0501 - PC	23-Aug-20	7641	Peridinium aciculiferum Lemmermann	200	1.80956	30	24	9047.8
MEL - 0502 - PC	23-Aug-20	1073	Snowella sp	600	0.3	0	0	500
MEL - 0502 - PC	23-Aug-20	2112	Sphaerocystis schroeteri Chodat	57472	0.81036	3	3	14.1
MEL - 0502 - PC	23-Aug-20	2121	Oocystis lacustris Chodat	43104	1.21984	6	3	28.3
MEL - 0502 - PC	23-Aug-20	2143	Monoraphidium minutum (Nag.) Komarkova-Legnerova	7184	0.4059	9	4	56.5
MEL - 0502 - PC	23-Aug-20	2178	Cosmarium sp.	800	1.11704	20	20	1396.3
MEL - 0502 - PC	23-Aug-20	2187	Staurodesmus extensus (Andersson) Teiling	200	0.0821	14	12	410.5
MEL - 0502 - PC	23-Aug-20	2199	Spondylosium planum (Wolle) W. and G.S. West	7184	0.27084	6	6	37.7
MEL - 0502 - PC	23-Aug-20	2206	Botryococcus braunii Kutzing	200	0.28736	14	14	1436.8
MEL - 0502 - PC	23-Aug-20	2215	Tetraedron caudatum (Corda) Hansgrig	7184	0.03376	3	3	4.7
MEL - 0502 - PC	23-Aug-20	2247	Oocystis gigas Archer	200	0.48254	18	16	2412.7
MEL - 0502 - PC	23-Aug-20	4351	Small chrysophyceae	560352	5.15524	2.6	2.6	9.2
MEL - 0502 - PC	23-Aug-20	4352	Large chrysophyceae	7184	1.29025	7	7	179.6
MEL - 0502 - PC	23-Aug-20	4357	Chrysococcus sp.	409488	26.78052	5	5	65.4
MEL - 0502 - PC	23-Aug-20	4362	Kephyrion sp.	7184	0.12356	3.2	3.2	17.2
MEL - 0502 - PC	23-Aug-20	4368	Mallomonas crassisquama (Asmund) Fott	200	0.20944	20	10	1047.2
MEL - 0502 - PC	23-Aug-20	4378	Dinobryon borgei Lemmermann	7184	0.36854	9	3.3	51.3
MEL - 0502 - PC	23-Aug-20	4390	Dinobryon sociale Ehrenberg	400	0.5	0	0	1250
MEL - 0502 - PC	23-Aug-20	4401	Uroglena volvox Ehrenberg	114944	13.00017	6	6	113.1
MEL - 0502 - PC	23-Aug-20	4413	Chrysochromulina laurentiana Kling	100576	43.7405	9.4	9.4	434.9
MEL - 0502 - PC	23-Aug-20	4414	Stichogloea spp.	7184	0.36136	6	4	50.3
MEL - 0502 - PC	23-Aug-20	4437	Pteridomonas sp.	7184	1.70907	8.8	8.8	237.9
MEL - 0502 - PC	23-Aug-20	5507	Cyclotella stelligera Cleve and Grunow	2000	4.778	11.5	23	2389
MEL - 0502 - PC	23-Aug-20	5509	Cyclotella ocellata Pant.	7184	0.72199	4	8	100.5
MEL - 0502 - PC	23-Aug-20	5514	Tabellaria flocculosa (Roth) Kutzing	600	0.80046	26	14	1334.1
MEL - 0502 - PC	23-Aug-20	5515	Fragilaria crotonensis Kitton	200	0.05446	65	4	272.3
MEL - 0502 - PC	23-Aug-20	5551	Cyclotella michiganiana Skvortzow	93392	2.2881	2.5	5	24.5
MEL - 0502 - PC	23-Aug-20	6554	Rhodomonas minuta Skuja	186784	12.6266	10	4.4	67.6
MEL - 0502 - PC	23-Aug-20	6558	Cryptomonas erosa Ehrenberg	1800	2.89404	23.5	14	1607.8
MEL - 0502 - PC	23-Aug-20	6562	Cryptomonas reflexa (Marsson) Skuja	600	0.4398	21	10	733
MEL - 0502 - PC	23-Aug-20	7631	Gymnodinium helveticum Penard	200	4.71238	50	30	23561.9
MEL - 0502 - PC	23-Aug-20	7632	Gymnodinium sp.	400	3.68112	26	26	9202.8
MEL - 0502 - PC	23-Aug-20	7639	Peridinium pusillum (Penard) Lemmermann	1000	3.6484	19.1	19.1	3648.4
MEL - 0503 - PC	23-Aug-20	1014	Chroococcus limneticus Lemmermann	28736	3.58625	6.2	6.2	124.8
MEL - 0503 - PC	23-Aug-20	2112	Sphaerocystis schroeteri Chodat	28736	0.40518	3	3	14.1
MEL - 0503 - PC	23-Aug-20	2137	Dictyosphaerium simplex Sukja	222704	0.93536	2	2	4.2
MEL - 0503 - PC	23-Aug-20	2178	Cosmarium sp.	400	0.55852	20	20	1396.3
MEL - 0503 - PC	23-Aug-20	2187	Staurodesmus extensus (Andersson) Teiling	200	0.0821	14	12	410.5
MEL - 0503 - PC	23-Aug-20	2206	Botryococcus braunii Kutzing	400	0.57472	14	14	1436.8
MEL - 0503 - PC	23-Aug-20	4351	Small chrysophyceae	589088	5.41961	2.6	2.6	9.2
MEL - 0503 - PC	23-Aug-20	4352	Large chrysophyceae	35920	6.45123	7	7	179.6
MEL - 0503 - PC	23-Aug-20	4355	Chrysochromulina parva Lackey	7184	0.46983	5	5	65.4
MEL - 0503 - PC	23-Aug-20	4357	Chrysococcus sp.	308912	20.20284	5	5	65.4
MEL - 0503 - PC	23-Aug-20	4358	Chrysostephanosphaera globulifera Scherfffel	7184	2.39227	8.6	8.6	333
MEL - 0503 - PC	23-Aug-20	4363	Spiniferomonas serrata	7184	0.85346	6.1	6.1	118.8
MEL - 0503 - PC	23-Aug-20	4364	Mallomonas caudata Ivanov	200	1.07234	40	16	5361.7
MEL - 0503 - PC	23-Aug-20	4368	Mallomonas crassisquama (Asmund) Fott	200	0.20316	19.4	10	1015.8
MEL - 0503 - PC	23-Aug-20	4381	Dinobryon mucronatom Nygaard	7184	0.94039	10	5	130.9
MEL - 0503 - PC	23-Aug-20	4388	Dinobryon sertularia Ehrenberg	200	0.3982	0	0	1991
MEL - 0503 - PC	23-Aug-20	4390	Dinobryon sociale Ehrenberg	86208	19.50025	12	6	226.2
MEL - 0503 - PC	23-Aug-20	4401	Uroglena volvox Ehrenberg	57472	6.50008	6	6	113.1
MEL - 0503 - PC	23-Aug-20	4413	Chrysochromulina laurentiana Kling	86208	37.49186	9.4	9.4	434.9
MEL - 0503 - PC	23-Aug-20	4418	Salpingoeca frequentissima (Zach.) Lemmermann	50288	1.61927	6	3.2	32.2
MEL - 0503 - PC	23-Aug-20	5507	Cyclotella stelligera Cleve and Grunow	2200	5.2558	11.5	23	2389
MEL - 0503 - PC	23-Aug-20	5509	Cyclotella ocellata Pant.	7184	0.77803	4.1	8.2	108.3
MEL - 0503 - PC	23-Aug-20	5515	Fragilaria crotonensis Kitton	400	0.10892	65	4	272.3
MEL - 0503 - PC	23-Aug-20	5551	Cyclotella michiganiana Skvortzow	165232	4.04818	2.5	5	24.5
MEL - 0503 - PC	23-Aug-20	5720	Cyclotella bodanica Eulenst.	200	1.41124	16.5	33	7056.2
MEL - 0503 - PC	23-Aug-20	6554	Rhodomonas minuta Skuja	136496	9.22713	10	4.4	67.6
MEL - 0503 - PC	23-Aug-20	6558	Cryptomonas erosa Ehrenberg	1800	2.89404	23.5	14	1607.8
MEL - 0503 - PC	23-Aug-20	6562	Cryptomonas reflexa (Marsson) Skuja	800	0.5864	21	10	733
MEL - 0503 - PC	23-Aug-20	6565	Cryptomonas rostratiformis Skuja	200	0.45156	33	14	2257.8
MEL - 0503 - PC	23-Aug-20	6568	Katablepharis ovalis Skuja	7184	0.32112	8	4	44.7
MEL - 0503 - PC	23-Aug-20	7632	Gymnodinium sp.	400	3.68112	26	26	9202.8
MEL - 0503 - PC	23-Aug-20	7639	Peridinium pusillum (Penard) Lemmermann	400	1.45936	19.1	19.1	3648.4
MEL - 0503 - PC	23-Aug-20	7644	Ceratium hirundinella (Muller) Schrank	200	10.0531	60	40	50265.5
MEL - 0504 - PC	23-Aug-20	2112	Sphaerocystis schroeteri Chodat	71840	1.01294	3	3	14.1
MEL - 0504 - PC	23-Aug-20	2167	Elakatothrix gelatinosa Willen	35920	0.62142	11	2	17.3

Table E1-1. Phytoplankton species data, Meliadine study lakes, 2020.

Station	Date	Species	Species name	Density	Biomass	Length	Width	Cell Volume
		code		cells/L ⁻¹	mg/m ⁻³	μ	μ	μ ³
MEL - 0504 - PC	23-Aug-20	2182	Euastrum spp.	200	0.37168	22	22	1858.4
MEL - 0504 - PC	23-Aug-20	2185	Micrasterias sp.	200	0.20358	18	18	1017.9
MEL - 0504 - PC	23-Aug-20	2187	Staurodesmus extensus (Andersson) Teiling	600	0.2463	14	12	410.5
MEL - 0504 - PC	23-Aug-20	2193	Staurodesmus paradoxum Meyen	200	0.81682	30	26	4084.1
MEL - 0504 - PC	23-Aug-20	2199	Spondylosium planum (Wolle) W. and G.S. West	28736	1.08335	6	6	37.7
MEL - 0504 - PC	23-Aug-20	2206	Botryococcus braunii Kutzing	400	0.57472	14	14	1436.8
MEL - 0504 - PC	23-Aug-20	2247	Oocystis gigas Archer	200	0.48254	18	16	2412.7
MEL - 0504 - PC	23-Aug-20	4351	Small chrysophyceae	617824	5.68398	2.6	2.6	9.2
MEL - 0504 - PC	23-Aug-20	4352	Large chrysophyceae	7184	1.29025	7	7	179.6
MEL - 0504 - PC	23-Aug-20	4357	Chrysococcus sp.	581904	38.05652	5	5	65.4
MEL - 0504 - PC	23-Aug-20	4362	Kephyrion sp.	28736	0.49426	3.2	3.2	17.2
MEL - 0504 - PC	23-Aug-20	4363	Spiniferomonas serrata	7184	0.77228	5.9	5.9	107.5
MEL - 0504 - PC	23-Aug-20	4390	Dinobryon sociale Ehrenberg	86208	19.50025	12	6	226.2
MEL - 0504 - PC	23-Aug-20	4396	Chrysolykos skuja (Nauwerck) Willen	21552	0.69397	6	3.2	32.2
MEL - 0504 - PC	23-Aug-20	4401	Uroglena volvox Ehrenberg	143680	16.25021	6	6	113.1
MEL - 0504 - PC	23-Aug-20	4411	Bitrichia chodatii (Reverdin) Chodat	7184	0.36136	6	4	50.3
MEL - 0504 - PC	23-Aug-20	4413	Chrysochromulina laurentiana Kling	43104	18.74593	9.4	9.4	434.9
MEL - 0504 - PC	23-Aug-20	5507	Cyclotella stelligera Cleve and Grunow	2200	5.2558	11.5	23	2389
MEL - 0504 - PC	23-Aug-20	5509	Cyclotella ocellata Pant.	64656	6.49793	4	8	100.5
MEL - 0504 - PC	23-Aug-20	5515	Fragilaria crotonensis Kitton	400	0.10892	65	4	272.3
MEL - 0504 - PC	23-Aug-20	5551	Cyclotella michiganiana Skvortzow	35920	0.88004	2.5	5	24.5
MEL - 0504 - PC	23-Aug-20	5720	Cyclotella bodanica Eulenst.	600	4.23372	16.5	33	7056.2
MEL - 0504 - PC	23-Aug-20	6554	Rhodomonas minuta Skuja	172416	11.65532	10	4.4	67.6
MEL - 0504 - PC	23-Aug-20	6558	Cryptomonas erosa Ehrenberg	2800	4.50184	23.5	14	1607.8
MEL - 0504 - PC	23-Aug-20	6562	Cryptomonas reflexa (Marsson) Skuja	200	0.1466	21	10	733
MEL - 0504 - PC	23-Aug-20	6565	Cryptomonas rostratiformis Skuja	200	0.45156	33	14	2257.8
MEL - 0504 - PC	23-Aug-20	7632	Gymnodinium sp.	1200	11.04336	26	26	9202.8
MEL - 0504 - PC	23-Aug-20	7639	Peridinium pusillum (Penard) Lemmermann	1400	5.10776	19.1	19.1	3648.4
MEL - 0505 - PC	23-Aug-20	1073	Snowella sp	1000	0.5	0	0	500
MEL - 0505 - PC	23-Aug-20	2112	Sphaerocystis schroeteri Chodat	28736	0.40518	3	3	14.1
MEL - 0505 - PC	23-Aug-20	2187	Staurodesmus extensus (Andersson) Teiling	200	0.0821	14	12	410.5
MEL - 0505 - PC	23-Aug-20	2206	Botryococcus braunii Kutzing	1000	1.4368	14	14	1436.8
MEL - 0505 - PC	23-Aug-20	4351	Small chrysophyceae	704032	6.47709	2.6	2.6	9.2
MEL - 0505 - PC	23-Aug-20	4352	Large chrysophyceae	21552	3.87074	7	7	179.6
MEL - 0505 - PC	23-Aug-20	4357	Chrysococcus sp.	646560	42.28502	5	5	65.4
MEL - 0505 - PC	23-Aug-20	4362	Kephyrion sp.	57472	0.98852	3.2	3.2	17.2
MEL - 0505 - PC	23-Aug-20	4363	Spiniferomonas serrata	21552	2.31684	5.9	5.9	107.5
MEL - 0505 - PC	23-Aug-20	4390	Dinobryon sociale Ehrenberg	35920	8.1251	12	6	226.2
MEL - 0505 - PC	23-Aug-20	4400	Ochromonas sp.	7184	0.42745	7.1	4	59.5
MEL - 0505 - PC	23-Aug-20	4401	Uroglena volvox Ehrenberg	35920	4.06255	6	6	113.1
MEL - 0505 - PC	23-Aug-20	4413	Chrysochromulina laurentiana Kling	28736	12.49729	9.4	9.4	434.9
MEL - 0505 - PC	23-Aug-20	4418	Salpingoeca frequentissima (Zach.) Lemmermann	28736	0.9253	6	3.2	32.2
MEL - 0505 - PC	23-Aug-20	4437	Pteridomonas sp.	35920	8.54537	8.8	8.8	237.9
MEL - 0505 - PC	23-Aug-20	5507	Cyclotella stelligera Cleve and Grunow	2200	5.2558	11.5	23	2389
MEL - 0505 - PC	23-Aug-20	5509	Cyclotella ocellata Pant.	7184	0.72199	4	8	100.5
MEL - 0505 - PC	23-Aug-20	5524	Asterionella formosa Hassall	1600	0.17264	103	2	107.9
MEL - 0505 - PC	23-Aug-20	5551	Cyclotella michiganiana Skvortzow	57472	1.40806	2.5	5	24.5
MEL - 0505 - PC	23-Aug-20	5720	Cyclotella bodanica Eulenst.	400	2.82248	16.5	33	7056.2
MEL - 0505 - PC	23-Aug-20	6554	Rhodomonas minuta Skuja	71840	4.85638	10	4.4	67.6
MEL - 0505 - PC	23-Aug-20	6558	Cryptomonas erosa Ehrenberg	1800	2.89404	23.5	14	1607.8
MEL - 0505 - PC	23-Aug-20	6562	Cryptomonas reflexa (Marsson) Skuja	1800	1.3194	21	10	733
MEL - 0505 - PC	23-Aug-20	7632	Gymnodinium sp.	400	3.68112	26	26	9202.8
MEL - 0505 - PC	23-Aug-20	7639	Peridinium pusillum (Penard) Lemmermann	2200	8.02648	19.1	19.1	3648.4

Appendix E2

Phytoplankton Major Taxa Biomass and Density (2013-2019)

Table E2-1. Major Taxa Biomass and Density from the Phytoplankton Study in Meliadine Lake in 2019

Area-Replicate	Date	Phytoplankton Biomass (mg/m3)							Phytoplankton Density (cells/L)						
		Cyanophyte	Chlorophyte	Chrysophyte	Diatom	Cryptophyte	Dinoflagellate	TOTAL	Cyanophyte	Chlorophyte	Chrysophyte	Diatom	Cryptophyte	Dinoflagellate	TOTAL
2019															
MEL-01															
MEL -0101 - PC	8-Aug-19	0	29.82	295	28.42	28.21	63.23	445.00	600	304,528	2,363,952	149,712	38,952	7,800	2,865,544
MEL -0106 - PC	8-Aug-19	0	14.07	254	20.62	35.32	61.85	386.54	600	144,680	2,181,752	110,592	40,952	8,400	2,486,976
MEL -0107 - PC	8-Aug-19	0.40	26.43	242	35.13	37.86	79.20	421.00	800	231,488	2,334,416	164,864	91,040	10,200	2,832,808
MEL -0108 - PC	8-Aug-19	0.30	19.31	320	30.11	27.70	40.19	437.35	600	239,472	2,715,368	176,464	69,672	5,600	3,207,176
MEL -0109 - PC	8-Aug-19	0.30	24.40	279	42.54	42.90	49.16	438.66	600	339,248	2,267,160	268,256	145,312	8,000	3,028,576
Percent Density or Biomass		<0.1	5.36	65.33	7.37	8.08	13.79		<0.1	8.73	82.26	6.03	2.68	0.28	
MEL-02															
MEL -0201 - PC	10-Aug-19	0	12.06	196	30.82	6.75	21.25	266.52	0	117,144	1,553,944	129,328	52,288	2,600	1,855,304
MEL -0202 - PC	10-Aug-19	0	10.29	124	19.58	7.44	20.14	181.56	0	173,816	1,286,936	108,576	67,256	2,600	1,639,184
MEL -0203 - PC	10-Aug-19	0	8.91	174	35.21	10.66	16.75	245.13	0	140,096	1,683,256	111,192	68,056	2,400	2,005,000
MEL -0204 - PC	10-Aug-19	0.00	19.23	168	19.95	118.76	17.34	343.73	0	166,632	1,535,192	75,056	1,331,240	2,200	3,110,320
MEL -0205 - PC	10-Aug-19	0.10	13.79	187	29.17	10.31	23.35	263.86	200	155,064	1,935,896	117,960	75,240	9,384	2,293,744
Percent Density or Biomass		<0.1	4.94	65.26	10.36	11.83	7.60		<0.1	6.90	73.33	4.97	14.62	0.18	
MEL-03															
MEL -0301	9-Aug-19	0	3	154	19.91	6.67	25.31	209.29	0	122,728	1,281,952	105,176	37,720	3,000	1,550,576
MEL -0302	9-Aug-19	0	8	202	13.27	5.45	14.86	243.44	0	65,456	1,749,312	159,248	24,352	2,000	2,000,368
MEL -0303	9-Aug-19	0	13.02	206	11.36	3.95	11.00	245.03	200	102,176	1,455,568	138,496	29,736	1,600	1,727,776
MEL -0304	9-Aug-19	0	12.46	185	5.01	7.68	1	211.61	200	74,040	1,705,208	53,688	53,088	200	1,886,424
MEL -0305	9-Aug-19	1	7.59	181	27.13	8.20	11.63	237.37	28,736	87,408	1,719,976	154,264	32,936	1,400	2,024,720
Percent Density or Biomass		0.15	3.86	80.92	6.69	2.79	5.60		0.32	4.92	86.10	6.65	1.94	<0.1	
MEL-04															
MEL -0401	14-Aug-19	0.1	11.30	200	11.08	15.66	6.55	244.3	200	137,296	1,626,384	89,408	152,664	1,000	2,006,952
MEL -0402	14-Aug-19	0	5.021	183	13.18	11.41	4.74	217.2	0	166,232	1,906,960	67,872	82,024	800	2,223,888
MEL -0403	14-Aug-19	0	2.199	177	15.16	9.64	11.98	215.7	0	52,288	1,804,984	70,256	88,408	600	2,016,536
MEL -0404	14-Aug-19	0.57	4.94	144	9.09	6.50	3.65	168.40	57,472	67,056	1,337,424	110,360	65,856	1,000	1,639,168
MEL -0405	14-Aug-19	0	10.68	187	13.55	7.80	6.56	225.92	0	88,008	1,661,904	98,992	80,024	800	1,929,728
Percent Density or Biomass		<0.1	3.19	83.07	5.79	4.76	3.13		0.59	5.20	84.94	4.45	4.78	<0.1	
MEL-05															
MEL -0501 - PC	16-Aug-19	0	6.50	133	10.04	7.93	24	182.27	0	123,528	1,101,152	61,072	80,424	3,400	1,369,576
MEL -0502 - PC	16-Aug-19	0	5.41	172	18.85	20.88	32.66	249.38	0	87,608	1,676,872	93,008	197,368	2,400	2,057,256
MEL -0503 - PC	16-Aug-19	4	6.33	114	19.95	8.30	6.17	158.55	57,472	104,176	921,752	132,512	80,024	600	1,296,536
MEL -0504 - PC	16-Aug-19	1	21.45	164	14.61	13.52	11.88	226.00	1,200	109,760	1,352,392	48,104	117,344	1,800	1,630,600
MEL -0505 - PC	16-Aug-19	2	1.61	163	17.52	8.85	13.58	206.18	28,936	29,936	1,676,472	107,176	87,408	2,400	1,932,328
Percent Density or Biomass		0.59	4.04	72.96	7.92	5.82	8.67		1.06	5.49	81.20	5.33	6.79	0.13	

Table E2-2. Major Taxa Biomass and Density from the Phytoplankton Study in Meliadine Lake in 2018

Area-Replicate	Date	Phytoplankton Biomass (mg/m3)							Phytoplankton Density (cells/L)						
		Cyanophyte	Chlorophyte	Chrysophyte	Diatom	Cryptophyte	Dinoflagellate	TOTAL	Cyanophyte	Chlorophyte	Chrysophyte	Diatom	Cryptophyte	Dinoflagellate	TOTAL
2018															
MEL-01															
MEL -0101	22-Aug-18	1	28.44	165	60.69	42.39	40.64	339.11	29,336	683,680	2,321,032	448,784	179,032	4,800	3,666,664
MEL -0106	22-Aug-18	1	23.50	180	55.59	58.81	38.28	356.38	800	690,864	2,450,744	343,792	267,640	4,400	3,758,240
MEL -0107	21-Aug-18	7.29	25.13	139	60.90	46.35	57.97	336.36	1,000	698,848	2,227,440	367,712	147,312	5,800	3,448,112
MEL -0108	22-Aug-18	0.45	21.22	141	70.02	45.19	18.84	296.96	600	339,448	2,163,384	319,904	168,064	2,600	2,994,000
MEL -0109	21-Aug-18	0.75	40.28	166	63.10	58.14	38.34	366.76	1,000	620,424	2,385,488	424,448	213,568	4,200	3,649,128
Percent Density or Biomass		0.62	8.17	46.66	18.30	14.80	11.45		0.19	17.32	65.93	10.87	5.57	0.12	
MEL-02															
MEL -0202	31-Aug-18	0	8.35	36	35.09	5.47	20.64	105.32	0	252,240	538,800	366,032	3,200	2,600	1,162,872
MEL -0203	18-Aug-18	0	33.67	156	29.13	50.64	59.61	328.90	0	598,272	1,998,352	215,352	229,320	7,200	3,048,496
MEL -0205	18-Aug-18	0	26.63	120	31.12	31.53	37.59	247.05	200	367,584	2,004,336	272,024	164,248	11,384	2,819,776
MEL -0206	31-Aug-18	1.28	17.49	57	40.05	15.14	11.76	142.67	28,736	260,624	820,576	279,456	88,008	1,800	1,479,200
MEL -0208	15-Aug-18	0.00	12.87	109	37.82	27.25	21.93	208.68	0	196,168	1,401,480	261,088	134,712	3,600	1,997,048
Percent Density or Biomass		0.14	9.59	46.23	16.77	12.59	14.67		0.28	15.94	64.37	13.27	5.90	0.25	
MEL-03															
MEL -0301	20-Aug-18	0	28	193	17.99	32.91	33.22	305.55	0	195,368	2,746,488	153,080	184,800	3,400	3,283,136
MEL -0302	26-Aug-18	0	16	144	17.16	44.37	31.63	254.10	200	239,272	1,933,696	139,912	251,656	4,000	2,568,736
MEL -0303	20-Aug-18	0	9.58	187	17.90	31.75	54.74	300.70	0	138,696	3,313,424	118,760	191,384	5,600	3,767,864
MEL -0304	26-Aug-18	1	13.59	173	15.17	59.99	6	268.45	28,736	159,648	2,150,416	73,856	359,416	1,600	2,773,672
MEL -0305	26-Aug-18	0	22.33	158	21.19	35.45	14.65	251.63	200	175,616	2,364,536	129,128	205,952	2,600	2,878,032
Percent Density or Biomass		0.11	6.55	61.90	6.48	14.81	10.15		0.19	5.95	81.91	4.03	7.81	0.11	
MEL-04															
MEL -0401	2-Sep-18	0	31.81	120	20.87	31.59	24.59	228.44	0	143,096	1,904,960	130,328	203,552	2,000	2,383,936
MEL -0402	2-Sep-18	0	30.92	131	26.62	48.57	13.47	250.17	0	260,424	1,811,168	81,640	326,080	1,200	2,480,512
MEL -0403	2-Sep-18	4.92	7.77	125	14.83	63.03	11.70	227.31	1,400	181,400	1,810,768	162,648	426,456	800	2,583,472
MEL -0405	2-Sep-18	0	20.70	132	18.20	57.23	27.95	256.37	0	296,144	2,054,824	135,312	390,336	2,600	2,879,216
Percent Density or Biomass		0.51	9.48	52.74	8.37	20.83	8.07		<0.1	8.53	73.42	4.94	13.04	<0.1	
MEL-05															
MEL -0501	1-Sep-18	0	16.69	131	16.26	26.68	19	209.34	0	145,280	2,400,056	108,376	174,016	1,200	2,828,928
MEL -0502	30-Aug-18	0	11.11	70	35.87	15.77	22.58	155.23	0	118,744	1,078,800	206,768	75,240	1,200	1,480,752
MEL -0503	29-Aug-18	0	18.52	85	21.97	29.43	7.91	162.34	0	176,216	1,056,248	229,704	182,200	800	1,645,168
MEL -0504	30-Aug-18	1	24.85	68	24.85	13.63	8.48	140.19	800	232,088	1,070,816	167,448	74,040	600	1,545,792
MEL -0505	29-Aug-18	2	9.14	72	25.40	16.18	6.24	131.71	15,168	159,848	1,020,128	232,504	88,608	400	1,516,656
Percent Density or Biomass		0.36	10.05	53.26	15.57	12.73	8.02		0.18	9.23	73.48	10.48	6.59	<0.1	

Table E2-3. Major Taxa Biomass and Density from the Phytoplankton Study in Meliadine Lake in 2017

Area-Replicate	Date	Phytoplankton Biomass (mg/m3)							Phytoplankton Density (cells/L)						
		Cyanophyte	Chlorophyte	Chrysophyte	Diatom	Cryptophyte	Dinoflagellate	TOTAL	Cyanophyte	Chlorophyte	Chrysophyte	Diatom	Cryptophyte	Dinoflagellate	TOTAL
2017															
MEL-01															
MEL - 0101	16-Jul-17	1	11.55	439	26.31	23.25	99.58	600.49	28,936	72,840	4,195,272	283,824	165,648	63,936	4,810,456
MEL - 0102	16-Jul-17	0	20.83	319	38.69	22.68	58.49	460.10	0	158,848	3,415,016	401,016	206,952	7,400	4,189,232
MEL - 0103	16-Jul-17	0.00	10.96	369	32.31	22.94	51.52	486.43	0	80,624	3,560,896	293,224	220,720	23,368	4,178,832
MEL - 0104	16-Jul-17	0.10	21.52	400	35.56	21.84	55.04	533.71	200	187,384	3,730,712	315,792	144,896	8,800	4,387,784
MEL - 0105	16-Jul-17	0.54	16.00	359	32.37	14.26	57.23	479.11	600	144,080	3,662,856	352,080	119,344	7,200	4,286,160
Percent Density or Biomass		<0.1	3.16	73.66	6.46	4.10	12.57		0.14	2.95	84.95	7.53	3.92	0.51	
MEL-01															
MEL - 0101	9-Aug-17	0	23.84	164	20.51	29.55	55.07	293.36	200	259,824	1,905,560	108,824	196,768	8,200	2,479,376
MEL - 0102	9-Aug-17	1	22.39	171	8.67	36.56	19.23	258.69	1,400	210,936	2,027,688	55,536	239,272	25,552	2,560,384
MEL - 0103	9-Aug-17	0	9.49	200	28.84	44.37	60.04	342.44	200	131,512	1,913,344	105,656	270,608	9,200	2,430,520
MEL - 0104	9-Aug-17	0.11	9.72	195	9.21	52.56	82.34	349.33	200	138,096	2,108,912	85,256	348,832	19,984	2,701,280
MEL - 0105	9-Aug-17	0.66	31.01	212	15.64	27.14	50.31	336.76	1,200	339,848	2,357,552	137,560	162,248	15,584	3,013,992
Percent Density or Biomass		0.11	6.10	59.62	5.24	12.03	16.89		<0.1	8.19	78.21	3.74	9.24	0.60	
MEL-01															
MEL - 0101	4-Sep-17	0	8	103	46.24	23.15	16.63	198.00	0	130,712	1,315,672	237,824	173,016	8,784	1,866,208
MEL - 0102	4-Sep-17	0	14	105	28.09	12.17	30.59	189.92	0	223,104	1,466,936	228,624	80,424	5,200	2,004,288
MEL - 0103	4-Sep-17	0	7.83	76	34.91	11.85	38.80	169.17	200	151,664	1,279,552	197,520	86,608	5,400	1,720,944
MEL - 0104	4-Sep-17	0	9.48	111	32.08	15.94	34	203.28	0	245,056	1,509,240	248,656	115,544	10,184	2,128,680
MEL - 0105	4-Sep-17	0	21.43	64	28.65	7.46	35.87	157.57	0	332,664	798,024	183,936	44,704	11,784	1,371,112
Percent Density or Biomass		<0.1	6.59	50.03	18.52	7.69	17.03		<0.1	11.91	70.06	12.06	5.50	0.45	
MEL-02															
MEL - 0201	23-Jul-17	0	11.33	196	8.34	18.25	27.38	261.51	0	66,656	1,821,352	150,680	196,368	5,400	2,240,456
MEL - 0202	23-Jul-17	0	14.57	254	5.47	11.87	9.92	296.21	0	73,640	2,505,232	56,688	110,960	9,384	2,755,904
MEL - 0203	23-Jul-17	5.42	3.30	333	7.56	14.73	41.16	405.09	21,552	137,496	3,015,696	71,656	160,448	8,000	3,414,848
MEL - 0204	23-Jul-17	0	9.19	244	8.97	10.79	15.76	288.47	0	66,456	2,503,032	65,672	109,960	3,400	2,748,520
MEL - 0205	23-Jul-17	0	12.80	222	13.28	9.35	15.03	272.33	0	81,624	2,237,224	125,544	81,024	2,400	2,527,816
Percent Density or Biomass		0.36	3.36	81.99	2.86	4.26	7.17		0.16	3.11	88.27	3.44	4.81	0.21	
MEL-02															
MEL - 0201	11-Aug-17	0	14.83	121	19.40	32.52	21	208.99	200	274,992	1,465,736	156,664	197,568	16,568	2,111,728
MEL - 0202	11-Aug-17	0	16.20	116	21.97	35.57	18.06	207.90	600	324,280	1,523,408	88,624	224,904	17,568	2,179,384
MEL - 0203	11-Aug-17	11	24.49	127	9.69	33.91	13.30	219.31	28,736	389,536	1,466,536	27,352	217,920	2,400	2,132,480
MEL - 0204	11-Aug-17	0	58.55	147	17.50	40.39	28.22	291.71	200	353,816	1,553,544	101,192	254,640	11,784	2,275,176
MEL - 0205	11-Aug-17	0	13.65	101	7.99	36.51	21.91	180.73	0	153,064	1,394,496	61,872	219,520	5,200	1,834,152
Percent Density or Biomass		1.01	11.52	55.15	6.90	16.14	9.27		0.28	14.20	70.29	4.14	10.58	0.51	
MEL-02															
MEL - 0201	5-Sep-17	0	9	72	27.12	8.78	17.38	133.82	200	80,624	776,672	129,776	51,688	3,600	1,042,560
MEL - 0202	5-Sep-17	0	12	76	16.99	5.02	9.39	119.95	0	64,856	784,856	205,784	29,536	2,600	1,087,632
MEL - 0203	5-Sep-17	0	11.96	87	25.50	9.56	22.27	156.49	200	81,824	922,952	134,760	52,288	18,368	1,210,392
MEL - 0204	5-Sep-17	0.02	7.45	67	24.75	5.79	12.60	117.22	200	51,488	763,704	174,696	37,120	4,600	1,031,808
MEL - 0205	5-Sep-17	0	14.85	91	24.08	11.19	15.32	156.57	0	152,464	979,624	125,424	66,256	3,400	1,327,168
Percent Density or Biomass		<0.1	8.05	57.46	17.31	5.90	11.25		<0.1	7.57	74.18	13.52	4.16	0.57	
MEL-03															

Area-Replicate	Date	Phytoplankton Biomass (mg/m3)							Phytoplankton Density (cells/L)						
		Cyanophyte	Chlorophyte	Chrysophyte	Diatom	Cryptophyte	Dinoflagellate	TOTAL	Cyanophyte	Chlorophyte	Chrysophyte	Diatom	Cryptophyte	Dinoflagellate	TOTAL
MEL - 0301	21-Jul-17	0	6	185	7.80	10.77	6.69	216.21	0	36,720	1,934,296	96,192	88,608	1,400	2,157,216
MEL - 0302	21-Jul-17	0	5	158	9.92	15.62	20.66	209.56	0	50,888	1,783,632	95,008	152,464	3,800	2,085,792
MEL - 0303	21-Jul-17	0	3.79	201	8.18	16.26	15.01	244.47	600	36,520	2,207,288	132,112	139,296	2,600	2,518,416
MEL - 0304	21-Jul-17	0	5.18	184	4.65	8.00	22.23	223.59	0	52,088	2,307,664	67,656	60,072	11,184	2,498,664
MEL - 0305	21-Jul-17	0	1.84	208	8.12	10.65	8.89	237.54	200	22,352	2,157,800	145,480	109,360	3,000	2,438,192
Percent Density or Biomass		<0.1	1.93	82.71	3.42	5.42	6.49		<0.1	1.51	90.45	4.32	3.43	0.29	
MEL-03															
MEL - 0301	13-Aug-17	0	5	137	4.18	28.49	27.50	202.64	0	137,696	1,310,288	26,352	189,184	18,768	1,682,288
MEL - 0302	13-Aug-17	0	9	120	6.47	36.24	30.31	202.45	0	131,312	1,396,296	54,088	252,640	4,600	1,838,936
MEL - 0303	13-Aug-17	0	8.16	122	5.28	22.85	20.62	181.45	0	166,032	1,480,504	66,656	146,080	3,600	1,863,072
MEL - 0304	13-Aug-17	0	5.25	151	7.26	19.66	12.03	194.98	200	102,176	1,684,056	54,688	124,128	10,984	1,976,232
MEL - 0305	13-Aug-17	1	13.10	150	13.45	34.05	36.89	248.25	200	109,360	1,950,464	67,072	217,920	5,400	2,350,416
Percent Density or Biomass		<0.1	3.98	66.07	3.56	13.72	12.37		<0.1	4.89	84.00	2.81	7.91	0.38	
MEL-03															
MEL - 0301	1-Sep-17	0	7	109	19.73	19.65	11.72	167.32	0	86,808	1,243,632	99,608	137,096	2,200	1,569,344
MEL - 0302	1-Sep-17	0	3	72	10.82	5.63	4.05	95.30	0	36,120	970,240	70,456	80,024	1,000	1,157,840
MEL - 0303	1-Sep-17	0	8.39	98	10.14	6.74	12.99	136.62	200	73,840	1,100,352	50,504	43,704	4,600	1,273,200
MEL - 0304	1-Sep-17	0	8.85	104	11.59	5.28	20.46	150.15	0	95,192	814,192	84,824	29,736	3,200	1,027,144
MEL - 0305	1-Sep-17	0	7.61	95	13.36	10.39	19.73	146.14	0	87,208	1,043,680	114,760	66,056	3,200	1,314,904
Percent Density or Biomass		<0.1	4.98	68.79	9.44	6.86	9.91		<0.1	7.79	79.33	8.52	4.09	0.27	
MEL-04															
MEL - 0401	15-Aug-17	0	7	102	8.13	48.87	5.88	172.64	0	146,280	1,351,392	47,504	318,696	1,000	1,864,872
MEL - 0402	15-Aug-17	19	8	119	11.36	37.34	6.39	201.87	57,472	131,112	1,523,408	53,888	231,688	1,000	1,998,568
MEL - 0403	15-Aug-17	0	5.22	111	10.43	55.08	10.34	191.93	0	116,344	1,523,608	76,040	368,984	2,000	2,086,976
MEL - 0404	15-Aug-17	39	10.48	130	10.22	32.06	12.06	233.31	114,944	231,688	1,667,888	69,456	210,136	7,784	2,301,896
MEL - 0405	15-Aug-17	0	8.63	142	3.95	35.43	14.13	204.25	200	181,000	1,761,680	38,720	231,888	2,200	2,215,688
Percent Density or Biomass		5.80	3.97	60.19	4.39	20.79	4.86		2.55	9.14	75.92	2.39	9.78	0.22	
MEL-05															
MEL - 0501	12-Aug-17	0	9	156	13.01	57.09	19.35	254.93	400	196,368	2,012,720	119,944	364,200	10,384	2,704,016
MEL - 0502	12-Aug-17	0	14	156	14.78	28.16	13.11	225.79	0	319,096	1,776,048	126,128	183,600	2,200	2,407,072
MEL - 0503	12-Aug-17	0	10.75	128	9.72	37.79	10.70	196.75	0	102,776	1,444,584	46,104	240,872	3,200	1,837,536
MEL - 0504	12-Aug-17	0	8.23	124	10.31	35.04	19.01	196.91	0	159,448	1,660,304	48,904	225,904	9,984	2,104,544
MEL - 0505	12-Aug-17	0	4.34	130	7.34	51.93	10.13	203.63	0	108,760	1,329,840	67,456	321,496	1,800	1,829,352
Percent Density or Biomass		<0.1	4.33	64.35	5.12	19.48	6.71		<0.1	6.82	76.01	2.96	13.91	0.30	

Table E2-4. Major Taxa Biomass and Density from the Phytoplankton Study in Meliadine Lake in 2016

Area-Replicate	Date	Phytoplankton Biomass (mg/m3)							Phytoplankton Density (cells/L)						
		Cyanophyte	Chlorophyte	Chrysophyte	Diatom	Cryptophyte	Dinoflagellate	TOTAL	Cyanophyte	Chlorophyte	Chrysophyte	Diatom	Cryptophyte	Dinoflagellate	TOTAL
2016															
MEL-01															
MEL - 0101	21-Jul-16	0	4.63	244	69.97	14.70	31.09	364.36	0	58,672	2,444,760	753,800	37,536	5,800	3,300,568
MEL - 0102	21-Jul-16	0	18.53	388	72.89	15.43	55.96	550.95	0	187,584	3,718,944	848,592	98,792	8,400	4,862,312
MEL - 0103	21-Jul-16	0.00	9.13	311	83.75	12.29	75.59	493.41	0	158,648	3,154,792	993,656	96,792	10,400	4,414,488
MEL - 0104	22-Jul-16	0.00	8.55	337	100.86	18.12	46.50	510.88	0	79,624	3,354,544	965,952	59,688	5,800	4,465,608
MEL - 0105	22-Jul-16	0.30	8.55	331	109.23	32.37	47.48	529.22	200	79,824	3,387,880	1,300,832	129,744	5,000	4,903,480
Percent Density or Biomass		<0.1	2.02	65.79	17.83	3.79	10.48		<0.1	2.57	73.18	22.16	1.93	0.16	
MEL-01															
MEL - 0101	11-Aug-16	0	22.59	229	14.54	24.20	24.63	314.93	200	246,856	2,122,280	95,824	150,880	5,800	2,621,840
MEL - 0102	11-Aug-16	13	17.91	231	12.61	24.96	28.55	328.08	114,944	245,856	2,746,688	140,112	163,048	11,384	3,422,032
MEL - 0103	11-Aug-16	1	25.78	227	5.81	27.53	51.94	338.84	3,000	325,080	1,987,484	93,208	150,480	12,984	2,572,236
MEL - 0104	11-Aug-16	0.20	23.71	301	27.68	35.79	57.89	446.25	400	239,472	2,452,344	136,344	201,568	15,184	3,045,312
MEL - 0105	11-Aug-16	0.00	16.32	227	12.75	18.12	50.33	324.41	0	231,088	2,430,592	130,944	85,624	7,400	2,885,648
Percent Density or Biomass		0.80	6.07	69.32	4.19	7.45	12.17		0.81	8.86	80.70	4.10	5.17	0.36	
MEL-01															
MEL - 0101	10-Sep-16	0	5	393	16.23	24.84	72.45	512.33	0	80,424	2,372,120	111,640	138,312	8,400	2,711,096
MEL - 0102	10-Sep-16	0	8	405	15.86	33.69	40.27	502.25	0	97,792	2,458,128	161,712	173,432	5,400	2,896,464
MEL - 0103	10-Sep-16	0	6.74	367	19.24	22.36	39.03	455.62	400	73,840	1,814,168	223,016	155,264	4,800	2,271,688
MEL - 0104	10-Sep-16	1	11.26	389	18.68	30.81	71	520.69	200	195,768	2,221,656	224,784	159,464	23,568	2,825,440
MEL - 0105	10-Sep-16	0	12.30	350	26.31	26.68	106.33	521.80	0	277,392	2,343,784	222,184	109,376	34,552	2,987,288
Percent Density or Biomass		<0.1	1.71	75.80	3.83	5.51	13.09		<0.1	5.30	81.87	6.89	5.37	0.56	
MEL-02															
MEL - 0201	23-Jul-16	2.46	9.24	357	48.62	27.33	19.67	464.75	12,600	101,976	3,529,960	485,376	116,360	5,200	4,251,472
MEL - 0202	23-Jul-16	0	1.41	49	10.78	4.034	1.26	66.45	0	32,736	668,112	58,688	72,040	400	831,976
MEL - 0203	23-Jul-16	12.36	12.78	289	32.41	20.37	26.70	393.87	114,944	144,680	2,948,656	461,392	112,360	2,600	3,784,632
MEL - 0204	23-Jul-16	1.26	8.66	347	47.93	23.12	24.68	452.83	7,184	73,840	3,064,000	364,416	92,808	4,400	3,606,648
MEL - 0205	23-Jul-16	5	6.22	398	39.18	27.50	18.69	494.99	43,704	101,376	3,250,184	340,664	107,976	2,800	3,846,704
Percent Density or Biomass		1.15	2.05	76.93	9.55	5.47	4.86		1.09	2.79	82.47	10.48	3.07	<0.1	
MEL-02															
MEL - 0201	11-Aug-16	0	16.05	102	30.74	28.90	14	192.00	0	238,472	1,530,792	81,456	172,232	9,584	2,032,536
MEL - 0202	11-Aug-16	0	11.22	127	54.19	31.24	19.34	243.25	7,384	152,464	1,537,976	101,208	185,400	4,600	1,989,032
MEL - 0203	11-Aug-16	1	11.26	173	21.86	31.54	65.97	304.27	14,968	174,016	1,855,672	41,136	181,816	18,800	2,286,408
MEL - 0204	11-Aug-16	0	16.83	121	23.76	47.89	27.99	237.22	0	239,872	1,596,048	69,472	288,976	6,000	2,200,368
MEL - 0205	11-Aug-16	0	12.56	171	29.07	42.26	29.98	284.62	0	187,784	1,847,688	125,344	235,904	18,368	2,415,088
Percent Density or Biomass		0.10	5.38	54.97	12.65	14.41	12.47		0.20	9.09	76.61	3.83	9.74	0.53	
MEL-02															
MEL - 0201	11-Sep-16	3	6	182	36.15	27.39	41.10	295.47	400	58,472	1,753,312	92,472	134,512	6,200	2,045,368
MEL - 0202	11-Sep-16	1	10	195	26.10	27.64	25.47	284.76	400	88,808	1,771,264	149,912	136,712	3,400	2,150,496
MEL - 0203	11-Sep-16	5	8.74	197	28.78	21.50	45.53	306.18	129,312	86,808	1,714,992	141,360	112,760	7,400	2,192,632
MEL - 0204	11-Sep-16	0.00	8.45	245	18.62	28.59	32.53	333.49	0	108,760	1,874,240	112,592	164,048	3,600	2,263,240
MEL - 0205	11-Sep-16	0	5.48	177	22.18	28.63	34.17	267.66	0	65,656	1,685,056	54,920	170,432	4,600	1,980,664
Percent Density or Biomass		0.57	2.63	66.93	8.86	8.99	12.02		1.22	3.84	82.76	5.18	6.76	0.24	
MEL-03															

Area-Replicate	Date	Phytoplankton Biomass (mg/m3)							Phytoplankton Density (cells/L)						
		Cyanophyte	Chlorophyte	Chrysophyte	Diatom	Cryptophyte	Dinoflagellate	TOTAL	Cyanophyte	Chlorophyte	Chrysophyte	Diatom	Cryptophyte	Dinoflagellate	TOTAL
MEL - 0301	26-Jul-16	6	3	207	10.11	18.54	32.62	276.65	200	101,976	1,639,768	87,824	105,376	10,784	1,945,928
MEL - 0302	26-Jul-16	1	11	211	33.95	17.80	27.18	302.07	14,368	296,144	1,740,544	102,408	118,544	3,200	2,275,208
MEL - 0303	26-Jul-16	1	4.46	280	21.04	27.57	25.94	359.92	14,768	101,176	2,547,152	112,176	197,168	10,184	2,982,624
MEL - 0304	26-Jul-16	0	4.66	282	10.53	16.17	24.43	337.87	0	158,248	2,263,576	99,992	96,792	4,000	2,622,608
MEL - 0305	26-Jul-16	2	7.06	215	23.17	23.81	46.50	317.53	35,920	133,912	1,826,152	74,256	162,648	4,600	2,237,488
Percent Density or Biomass		0.61	1.91	74.93	6.20	6.52	9.83		0.54	6.56	83.03	3.95	5.64	0.27	
MEL-03															
MEL - 0301	12-Aug-16	0	8	160	13.41	16.61	9.78	207.59	0	100,976	1,632,168	15,384	110,160	1,000	1,859,688
MEL - 0302	12-Aug-16	0	11	166	15.85	16.37	9.25	218.18	7,184	191,184	1,575,696	86,024	103,776	2,000	1,965,864
MEL - 0303	12-Aug-16	0	12.92	176	8.76	39.21	12.49	248.94	0	213,736	1,625,584	105,176	296,544	2,600	2,243,640
MEL - 0304	12-Aug-16	0	14.41	163	5.89	24.87	27.75	236.49	7,184	303,128	1,525,008	53,288	191,184	4,600	2,084,392
MEL - 0305	12-Aug-16	0	12.95	157	7.62	32.06	31.58	241.48	0	181,000	1,798,800	96,592	187,600	20,968	2,284,960
Percent Density or Biomass		<0.1	5.08	71.31	4.47	11.20	7.88		0.14	9.48	78.15	3.41	8.52	0.30	
MEL-03															
MEL - 0301	12-Sep-16	0	11	183	36.71	30.55	24.55	286.68	0	137,696	1,699,424	328,496	217,920	16,568	2,400,104
MEL - 0302	13-Sep-16	0	7	184	26.02	14.65	10.39	241.75	0	66,056	1,850,488	81,272	88,608	2,400	2,088,824
MEL - 0303	13-Sep-16	0	6.32	131	14.98	16.28	12.07	180.37	0	123,528	1,403,680	68,672	109,960	1,800	1,707,640
MEL - 0304	22-Sep-16	0	3.07	257	18.40	11.81	15.43	305.49	0	43,904	2,466,512	189,632	87,608	2,000	2,789,656
MEL - 0306	22-Sep-16	0	1.82	155	21.56	21.76	17.61	217.31	0	22,352	1,618,400	144,928	139,296	3,200	1,928,176
Percent Density or Biomass		<0.1	2.37	73.86	9.55	7.72	6.50		<0.1	3.61	82.81	7.45	5.89	0.24	
MEL-04															
MEL - 0401	14-Aug-16	1	9	101	6.46	28.44	13.57	159.23	14,568	216,920	949,488	32,336	181,200	2,400	1,396,912
MEL - 0402	14-Aug-16	0	14	124	11.86	31.99	10.32	192.36	7,184	288,760	1,438,800	91,608	213,736	8,184	2,048,272
MEL - 0403	14-Aug-16	0	4.61	27	9.40	1.26	0.00	42.47	0	188,143	634,952	96,053	24,923	0	944,070
MEL - 0404	14-Aug-16	0	11.60	145	11.72	30.95	3.60	203.62	7,184	208,736	1,346,208	71,856	212,736	400	1,847,120
MEL - 0405	14-Aug-16	1	7.72	117	19.11	27.69	8.30	180.71	21,552	253,640	1,366,360	62,072	203,352	7,984	1,914,960
Percent Density or Biomass		0.27	5.96	66.19	7.52	15.46	4.60		0.62	14.18	70.37	4.34	10.26	0.23	
MEL-05															
MEL - 0501	16-Aug-16	0	12	195	25.00	82.16	37.87	351.98	0	153,864	2,158,000	100,992	498,928	5,800	2,917,584
MEL - 0502	16-Aug-16	0	6	103	9.54	41.28	29.49	189.83	7,184	129,912	1,350,792	56,088	260,440	10,584	1,815,000
MEL - 0503	16-Aug-16	2	7.08	137	6.82	35.83	3.35	192.09	35,920	165,932	1,495,672	48,304	248,856	1,800	1,996,484
MEL - 0504	16-Aug-16	0	10.27	115	17.65	34.54	9.12	186.14	0	123,928	1,243,432	41,720	192,384	3,000	1,604,464
MEL - 0505	16-Aug-16	1	20.42	118	14.53	44.42	15.33	214.20	21,552	266,608	1,165,608	62,072	281,992	3,200	1,801,032
Percent Density or Biomass		0.28	4.91	58.93	6.48	21.00	8.39		0.64	8.29	73.15	3.05	14.63	0.24	

Table E2-5. Major Taxa Biomass and Density from the Phytoplankton Study in Meliadine Lake in 2013 and 2015

Area-Replicate	Date	Phytoplankton Biomass (mg/m3)							Phytoplankton Density (cells/L)						
		Cyanophyte	Chlorophyte	Chrysophyte	Diatom	Cryptophyte	Dinoflagellate	TOTAL	Cyanophyte	Chlorophyte	Chrysophyte	Diatom	Cryptophyte	Dinoflagellate	TOTAL
2013															
DP-01															
DP01 -P -1S	14-Aug-13	8	6.57	79	16.01	21.44	15.05	145.59	153,864	404,104	1,524,208	103,608	199,768	1,200	2,386,752
DP01 -P -2S	14-Aug-13	4	5.30	73	18.11	38.60	9.53	148.63	89,408	289,360	1,415,248	88,640	387,352	800	2,270,808
DP01 -P -3S	14-Aug-13	2.92	5.47	105	16.01	22.94	5.02	157.36	17,768	302,928	1,654,920	153,680	249,456	400	2,379,152
DP01 -P -4S	14-Aug-13	2.31	7.65	71	21.56	28.24	34.75	165.20	3,600	346,032	1,022,728	125,776	252,456	2,200	1,752,792
DP01 -P -5S	14-Aug-13	2.30	4.26	86	15.39	27.47	13.99	149.17	10,984	316,896	1,459,352	96,624	327,880	1,200	2,212,936
Percent Density or Biomass		2.57	3.82	53.91	11.37	18.11	10.23		2.51	15.08	64.32	5.17	12.88	<0.1	
2015															
MEL-01															
MEL - 0101	19-Jul-15	0	1.69	480	35.95	20.93	95.64	634.05	0	36,120	4,336,168	455,272	101,792	7,000	4,936,352
MEL - 0102	19-Jul-15	1	2.90	486	48.58	22.23	95.72	656.60	28,736	36,320	4,615,944	643,872	97,808	6,600	5,429,280
MEL - 0103	19-Jul-15	1	17.43	503	60.32	17.59	63.14	663.09	28,936	61,072	4,599,776	702,512	92,608	5,400	5,490,304
MEL - 0104	19-Jul-15	0.22	3.08	441	51.77	30.56	105.27	631.57	200	57,872	3,795,568	579,984	127,544	8,600	4,569,768
MEL - 0105	18-Jul-15	0.00	0.75	411	39.02	18.92	77.79	550.50	0	21,752	3,586,632	431,536	81,640	6,800	4,128,760
Percent Density or Biomass		<0.1	0.82	74.02	7.51	3.52	13.95		0.24	0.87	85.26	11.46	2.04	0.14	
MEL-01															
MEL - 0101	14-Aug-15	0	9	182	18.60	13.92	65.44	289.55	0	166,832	1,890,792	271,624	68,056	5,800	2,403,104
MEL - 0102	14-Aug-15	2	32	239	30.97	19.62	27.41	352.29	28,736	331,264	2,425,608	345,480	86,424	5,600	3,223,312
MEL - 0103	14-Aug-15	1	16.86	206	78.63	19.62	41.13	363.73	28,736	216,720	2,088,560	317,528	126,128	6,600	2,784,272
MEL - 0104	14-Aug-15	0	34.21	241	22.63	18.44	34	350.04	0	287,960	2,337,200	175,864	85,824	5,000	2,891,848
MEL - 0105	15-Aug-15	0	24.97	185	17.33	16.34	83.53	326.79	0	152,864	1,726,160	191,600	64,672	9,200	2,144,496
Percent Density or Biomass		0.16	6.96	62.61	10.00	5.23	14.95		0.43	8.59	77.85	9.68	3.21	0.24	
MEL-01															
MEL - 0101	19-Sep-15	0	8.02	133	41.28	44.24	22.81	248.89	0	302,328	1,885,808	298,160	305,728	3,600	2,795,624
MEL - 0102	19-Sep-15	0.47	8.37	156	43.00	35.89	39.28	284.81	200	181,800	2,065,408	281,344	194,184	3,200	2,726,336
MEL - 0104	19-Sep-15	0	12.58	182	33.29	29.32	43.81	301.26	0	139,896	2,509,616	307,912	184,800	4,400	3,146,624
MEL - 0105	19-Sep-15	0	8.56	194	35.70	45.10	59.26	343.25	400	111,960	2,236,824	301,216	272,208	12,384	2,934,992
Percent Density or Biomass		<0.1	3.19	56.45	13.01	13.12	14.02		<0.1	3.81	76.21	10.26	9.27	0.42	
MEL-02															
MEL - 0201	21-Jul-15	0	8.49	426	55.82	17.73	76	584.82	400	58,272	3,540,544	557,232	59,488	12,184	4,228,120
MEL - 0202	21-Jul-15	0	5.81	471	55.85	13.62	64.93	612.72	0	37,320	4,101,696	695,512	76,840	19,168	4,930,736
MEL - 0203	21-Jul-15	0	11.10	534	54.59	18.28	56.42	674.54	200	37,720	4,031,456	708,712	78,640	6,200	4,862,928
MEL - 0204	21-Jul-15	0	4.15	441	30.65	29.54	42.21	547.16	0	29,336	3,546,928	494,344	145,896	3,400	4,219,904
MEL - 0205	21-Jul-15	0	3.24	512	39.52	21.40	34.98	611.43	0	57,672	4,225,424	517,928	81,640	3,200	4,885,864
Percent Density or Biomass		<0.1	1.08	78.66	7.80	3.32	9.07		<0.1	0.95	84.08	12.86	1.91	0.19	
MEL-02															
MEL - 0201	16-Aug-15	0	19	117	14.92	16.53	33.08	200.71	0	155,264	1,236,048	125,944	76,840	9,784	1,603,880
MEL - 0202	16-Aug-15	0	15	152	26.22	40.10	28.49	261.86	200	232,888	1,639,152	156,880	236,688	9,584	2,275,392
MEL - 0203	16-Aug-15	0	18.16	150	18.38	42.49	22.60	251.24	0	202,552	1,638,952	194,600	220,336	5,400	2,261,840
MEL - 0204	16-Aug-15	0.40	14.76	102	14.99	35.17	10.72	177.86	400	168,432	1,244,432	69,488	250,456	1,800	1,735,008
MEL - 0205	17-Aug-15	2	22.01	111	27.82	30.27	14.93	207.74	1,600	221,720	1,308,488	217,568	184,400	2,600	1,936,376
Percent Density or Biomass		0.24	8.12	57.38	9.31	14.97	9.99		<0.1	10.00	72.02	7.79	9.87	0.30	
MEL-02															

Area-Replicate	Date	Phytoplankton Biomass (mg/m3)							Phytoplankton Density (cells/L)						
		Cyanophyte	Chlorophyte	Chrysophyte	Diatom	Cryptophyte	Dinoflagellate	TOTAL	Cyanophyte	Chlorophyte	Chrysophyte	Diatom	Cryptophyte	Dinoflagellate	TOTAL
MEL - 0201	10-Sep-15	3	27	151	16.57	32.13	40.40	271.46	200	159,648	1,784,032	132,344	190,584	10,584	2,277,592
MEL - 0202	10-Sep-15	1	18	163	19.56	18.68	13.89	233.56	7,384	137,296	1,742,728	98,024	118,544	8,984	2,112,960
MEL - 0203	10-Sep-15	0	21.34	112	12.74	18.01	18.17	182.44	0	188,584	1,445,384	148,712	109,560	22,752	1,914,992
MEL - 0204	10-Sep-15	0	20.29	134	19.37	19.21	15.27	207.93	0	152,864	1,496,872	159,696	111,360	16,168	1,936,960
MEL - 0205	10-Sep-15	1	34.37	146	32.07	30.92	16.85	260.49	600	246,656	1,591,664	130,776	176,816	1,800	2,148,312
Percent Density or Biomass		0.39	10.45	61.03	8.68	10.29	9.05		<0.1	9.78	75.60	7.11	7.05	0.44	

APPENDIX F

CHLOROPHYLL-A DATA

Appendix F1

2020 Chlorophyll-a (University of Alberta)



UNIVERSITY OF ALBERTA

Biogeochemical Analytical
Service Laboratory

Analytical Report

Date Reported On: November 18, 2020

ATTN: Dan Gorton

Reported To: Agnico Ealge

Date Received: August 28, 2019

Project Name: AEM Meliadine 2020

Client Name: Agnico Ealge

Supervisor: Dan Gorton

Billing Address or Speed Code:

Rankin Inlet, NU, X0C 0G0

Other Information: Not available.

Comments: Not available.

Reviewed by:

A handwritten signature in blue ink, appearing to read 'Alvin Kwan'.

Alvin Kwan, BSc.
Quality Assurance Officer

Approved by:

A handwritten signature in blue ink, appearing to read 'Mingsheng Ma'.

Mingsheng Ma, Ph. D
Laboratory Manager

RESULTS RELAY TO SAMPLE AS RECEIVED. THIS TEST REPORT SHALL NOT BE REPRODUCED EXCEPT IN FULL, WITHOUT THE WRITTEN APPROVAL OF THE LABORATORY.



Algae Parameters

UA-BASL Sample ID	Received Date	Site Info	Sampling Date	Analyzed Date	Chlorophyll- a (µg/L)
232454	8/28/2020	MEL-01-01-PC 1	08/15/2020	10/21/2020	1.62
232455	8/28/2020	MEL-01-01-PC 2	08/15/2020	10/21/2020	1.63
232456	8/28/2020	MEL-01-01-PC 3	08/15/2020	10/21/2020	2.18
232457	8/28/2020	MEL-01-06-PC 1	08/15/2020	10/21/2020	1.86
232458	8/28/2020	MEL-01-06-PC 2	08/15/2020	10/21/2020	1.73
232459	8/28/2020	MEL-01-06-PC 3	08/15/2020	10/21/2020	1.97
232460	8/28/2020	MEL-01-07-PC 1	08/15/2020	10/21/2020	1.82
232461	8/28/2020	MEL-01-07-PC 2	08/15/2020	10/21/2020	1.81
232462	8/28/2020	MEL-01-07-PC 3	08/15/2020	10/21/2020	2.04
232463	8/28/2020	MEL-01-08-PC 1	08/15/2020	10/21/2020	2.43
232464	8/28/2020	MEL-01-08-PC 2	08/15/2020	10/21/2020	2.17
232465	8/28/2020	MEL-01-08-PC 3	08/15/2020	10/21/2020	2.12
232466	8/28/2020	MEL-01-09-PC 1	08/15/2020	10/21/2020	2.14
232467	8/28/2020	MEL-01-09-PC 2	08/15/2020	10/21/2020	2.03
232468	8/28/2020	MEL-01-09-PC 3	08/15/2020	10/21/2020	2.03
232469	8/28/2020	MEL-02-01-PC 1	08/18/2020	10/21/2020	0.87
232470	8/28/2020	MEL-02-01-PC 2	08/18/2020	10/21/2020	0.98
232471	8/28/2020	MEL-02-01-PC 3	08/18/2020	10/21/2020	0.92
232472	8/28/2020	MEL-02-02-PC 1	08/18/2020	10/21/2020	0.82
232473	8/28/2020	MEL-02-02-PC 2	08/18/2020	10/21/2020	0.80
232474	8/28/2020	MEL-02-02-PC 3	08/18/2020	10/21/2020	0.75
232475	8/28/2020	MEL-02-03-PC 1	08/18/2020	10/21/2020	0.84
232476	8/28/2020	MEL-02-03-PC 2	08/18/2020	10/21/2020	0.97
232477	8/28/2020	MEL-02-03-PC 3	08/18/2020	10/21/2020	0.87
232478	8/28/2020	MEL-02-04-PC 1	08/18/2020	10/21/2020	0.77
232479	8/28/2020	MEL-02-04-PC 2	08/18/2020	10/21/2020	0.84
232480	8/28/2020	MEL-02-04-PC 3	08/18/2020	10/21/2020	0.77
232481	8/28/2020	MEL-02-05-PC 1	08/18/2020	10/21/2020	1.08
232482	8/28/2020	MEL-02-05-PC 2	08/18/2020	10/21/2020	1.06
232483	8/28/2020	MEL-02-05-PC 3	08/18/2020	10/21/2020	0.99
232484	8/28/2020	MEL-03-01-PC 1	08/19/2020	10/21/2020	0.62
232485	8/28/2020	MEL-03-01-PC 2	08/19/2020	10/21/2020	0.61
Reportable Detection Limit (µg/L)					0.04



UA-BASL Sample ID	Received Date	Site Info	Sampling Date	Analyzed Date	Chlorophyll- a (µg/L)
232486	8/28/2020	MEL-03-01-PC 3	08/19/2020	10/21/2020	0.61
232487	8/28/2020	MEL-03-02-PC 1	08/19/2020	10/21/2020	0.65
232488	8/28/2020	MEL-03-02-PC 2	08/19/2020	10/21/2020	0.64
232489	8/28/2020	MEL-03-02-PC 3	08/19/2020	10/21/2020	0.62
232490	8/28/2020	MEL-03-03-PC 1	08/19/2020	10/21/2020	0.55
232491	8/28/2020	MEL-03-03-PC 2	08/19/2020	10/21/2020	0.54
232492	8/28/2020	MEL-03-03-PC 3	08/19/2020	10/21/2020	0.59
232493	8/28/2020	MEL-03-04-PC 1	08/19/2020	10/21/2020	0.53
232494	8/28/2020	MEL-03-04-PC 2	08/19/2020	10/21/2020	0.55
232495	8/28/2020	MEL-03-04-PC 3	08/19/2020	10/21/2020	0.51
232496	8/28/2020	MEL-03-05-PC 1	08/19/2020	10/21/2020	0.54
232497	8/28/2020	MEL-03-05-PC 2	08/19/2020	10/21/2020	0.62
232498	8/28/2020	MEL-03-05-PC 3	08/19/2020	10/21/2020	0.58
232499	8/28/2020	MEL-04-01-PC 1	08/19/2020	10/21/2020	0.73
232500	8/28/2020	MEL-04-01-PC 2	08/19/2020	10/21/2020	0.77
232501	8/28/2020	MEL-04-01-PC 3	08/19/2020	10/21/2020	0.71
232502	8/28/2020	MEL-04-02-PC 1	08/19/2020	10/21/2020	0.68
232503	8/28/2020	MEL-04-02-PC 2	08/19/2020	10/21/2020	0.66
232504	8/28/2020	MEL-04-02-PC 3	08/19/2020	10/21/2020	0.71
232505	8/28/2020	MEL-04-03-PC 1	08/19/2020	10/21/2020	0.64
232506	8/28/2020	MEL-04-03-PC 2	08/19/2020	10/21/2020	0.62
232507	8/28/2020	MEL-04-03-PC 3	08/19/2020	10/21/2020	0.64
232508	8/28/2020	MEL-04-04-PC 1	08/19/2020	10/21/2020	0.72
232509	8/28/2020	MEL-04-04-PC 2	08/19/2020	10/21/2020	0.69
232510	8/28/2020	MEL-04-04-PC 3	08/19/2020	10/21/2020	0.70
232511	8/28/2020	MEL-04-05-PC 1	08/19/2020	10/21/2020	0.70
232512	8/28/2020	MEL-04-05-PC 2	08/19/2020	10/21/2020	0.72
232513	8/28/2020	MEL-04-05-PC 3	08/19/2020	10/21/2020	0.68
232514	8/28/2020	MEL-05-01-PC 1	08/23/2019	10/21/2020	0.78
232515	8/28/2020	MEL-05-01-PC 2	08/23/2019	10/21/2020	0.81
232516	8/28/2020	MEL-05-01-PC 3	08/23/2019	10/21/2020	0.80
Reportable Detection Limit (µg/L)					0.04



UA-BASL Sample ID	Received Date	Site Info	Sampling Date	Analyzed Date	Chlorophyll- a (µg/L)
232517	8/28/2020	MEL-05-02-PC 1	08/23/2019	10/21/2020	0.67
232518	8/28/2020	MEL-05-02-PC 2	08/23/2019	10/21/2020	0.68
232519	8/28/2020	MEL-05-02-PC 3	08/23/2019	10/21/2020	0.63
232520	8/28/2020	MEL-05-03-PC 1	08/23/2019	10/21/2020	0.60
232521	8/28/2020	MEL-05-03-PC 2	08/23/2019	10/21/2020	0.57
232522	8/28/2020	MEL-05-03-PC 3	08/23/2019	10/21/2020	1.09
232523	8/28/2020	MEL-05-04-PC 1	08/23/2019	10/21/2020	0.53
232524	8/28/2020	MEL-05-04-PC 2	08/23/2019	10/21/2020	0.56
232525	8/28/2020	MEL-05-04-PC 3	08/23/2019	10/21/2020	0.77
232526	8/28/2020	MEL-05-05-PC 1	08/23/2019	10/21/2020	0.61
232527	8/28/2020	MEL-05-05-PC 2	08/23/2019	10/21/2020	0.60
232528	8/28/2020	MEL-05-05-PC 3	08/23/2019	10/21/2020	0.53
232529	8/28/2020	AUG-DUP-01-PC 1	N/A	10/21/2020	2.02
232530	8/28/2020	AUG-DUP-01-PC 2	N/A	10/21/2020	2.01
232531	8/28/2020	AUG-DUP-01-PC 3	N/A	10/21/2020	2.11
232532	8/28/2020	AUG-DUP-02-PC 1	N/A	10/21/2020	0.89
232533	8/28/2020	AUG-DUP-02-PC 2	N/A	10/21/2020	0.61
232534	8/28/2020	AUG-DUP-02-PC 3	N/A	10/21/2020	0.76
232535	8/28/2020	AUG-DUP-03-PC 1	N/A	10/21/2020	0.55
232536	8/28/2020	AUG-DUP-03-PC 2	N/A	10/21/2020	0.62
232537	8/28/2020	AUG-DUP-03-PC 3	N/A	10/21/2020	0.62
232538	8/28/2020	MEL-BLANK-01	08/24/2020	10/21/2020	0.05
232539	8/28/2020	MEL-BLANK-02	08/24/2020	10/21/2020	0.06
232540	8/28/2020	MEL-BLANK-03	08/24/2020	10/21/2020	0.04
Reportable Detection Limit (µg/L)					0.04



Method of Analysis

Laboratory Method	Reference	Method	Instrument
Determination of Chlorophyll a in Water by Fluorometry	*Welschmeyer, N.A. 1994. Fluorometric Analysis of chlorophyll a in the presence of chlorophyll b and pheopigments. <i>Limnol. Oceanogr.</i> , 39(8), 1994, 1985-1992. (Modified)		Shimadzu RF-1501 Spectrofluorophotometer

* REFERENCE METHOD MODIFIED.

Appendix F2

Meliadine Lake Chlorophyll-a Database (2013, 2015-2020)

lake	area_rep	sample	station	year	Month	year_month	replicate	chl-a	MDL_flag	QA_sample	flag	flag_note
MEL	MEL-01	1	MEL-01-01	2020	August	2020-8	1	1.62				
MEL	MEL-01	1	MEL-01-01	2020	August	2020-8	2	1.63				
MEL	MEL-01	1	MEL-01-01	2020	August	2020-8	3	2.18				
MEL	MEL-01	6	MEL-01-06	2020	August	2020-8	1	1.86				
MEL	MEL-01	6	MEL-01-06	2020	August	2020-8	2	1.73				
MEL	MEL-01	6	MEL-01-06	2020	August	2020-8	3	1.97				
MEL	MEL-01	7	MEL-01-07	2020	August	2020-8	1	1.82				
MEL	MEL-01	7	MEL-01-07	2020	August	2020-8	2	1.81				
MEL	MEL-01	7	MEL-01-07	2020	August	2020-8	3	2.04				
MEL	MEL-01	8	MEL-01-08	2020	August	2020-8	1	2.43				
MEL	MEL-01	8	MEL-01-08	2020	August	2020-8	2	2.17				
MEL	MEL-01	8	MEL-01-08	2020	August	2020-8	3	2.12				
MEL	MEL-01	9	MEL-01-09	2020	August	2020-8	1	2.14				
MEL	MEL-01	9	MEL-01-09	2020	August	2020-8	2	2.03				
MEL	MEL-01	9	MEL-01-09	2020	August	2020-8	3	2.03				
MEL	MEL-02	1	MEL-02-01	2020	August	2020-8	1	0.87				
MEL	MEL-02	1	MEL-02-01	2020	August	2020-8	2	0.98				
MEL	MEL-02	1	MEL-02-01	2020	August	2020-8	3	0.92				
MEL	MEL-02	2	MEL-02-02	2020	August	2020-8	1	0.82				
MEL	MEL-02	2	MEL-02-02	2020	August	2020-8	2	0.8				
MEL	MEL-02	2	MEL-02-02	2020	August	2020-8	3	0.75				
MEL	MEL-02	3	MEL-02-03	2020	August	2020-8	1	0.84				
MEL	MEL-02	3	MEL-02-03	2020	August	2020-8	2	0.97				
MEL	MEL-02	3	MEL-02-03	2020	August	2020-8	3	0.87				
MEL	MEL-02	4	MEL-02-04	2020	August	2020-8	1	0.77				
MEL	MEL-02	4	MEL-02-04	2020	August	2020-8	2	0.84				
MEL	MEL-02	4	MEL-02-04	2020	August	2020-8	3	0.77				
MEL	MEL-02	5	MEL-02-05	2020	August	2020-8	1	1.08				
MEL	MEL-02	5	MEL-02-05	2020	August	2020-8	2	1.06				
MEL	MEL-02	5	MEL-02-05	2020	August	2020-8	3	0.99				
MEL	MEL-03	1	MEL-03-01	2020	August	2020-8	1	0.62				
MEL	MEL-03	1	MEL-03-01	2020	August	2020-8	2	0.61				
MEL	MEL-03	1	MEL-03-01	2020	August	2020-8	3	0.61				
MEL	MEL-03	2	MEL-03-02	2020	August	2020-8	1	0.65				
MEL	MEL-03	2	MEL-03-02	2020	August	2020-8	2	0.64				
MEL	MEL-03	2	MEL-03-02	2020	August	2020-8	3	0.62				
MEL	MEL-03	3	MEL-03-03	2020	August	2020-8	1	0.55				
MEL	MEL-03	3	MEL-03-03	2020	August	2020-8	2	0.54				
MEL	MEL-03	3	MEL-03-03	2020	August	2020-8	3	0.59				
MEL	MEL-03	4	MEL-03-04	2020	August	2020-8	1	0.53				
MEL	MEL-03	4	MEL-03-04	2020	August	2020-8	2	0.55				
MEL	MEL-03	4	MEL-03-04	2020	August	2020-8	3	0.51				
MEL	MEL-03	5	MEL-03-05	2020	August	2020-8	1	0.54				
MEL	MEL-03	5	MEL-03-05	2020	August	2020-8	2	0.62				
MEL	MEL-03	5	MEL-03-05	2020	August	2020-8	3	0.58				
MEL	MEL-04	1	MEL-04-01	2020	August	2020-8	1	0.73				
MEL	MEL-04	1	MEL-04-01	2020	August	2020-8	2	0.77				
MEL	MEL-04	1	MEL-04-01	2020	August	2020-8	3	0.71				
MEL	MEL-04	2	MEL-04-02	2020	August	2020-8	1	0.68				
MEL	MEL-04	2	MEL-04-02	2020	August	2020-8	2	0.66				
MEL	MEL-04	2	MEL-04-02	2020	August	2020-8	3	0.71				
MEL	MEL-04	3	MEL-04-03	2020	August	2020-8	1	0.64				
MEL	MEL-04	3	MEL-04-03	2020	August	2020-8	2	0.62				
MEL	MEL-04	3	MEL-04-03	2020	August	2020-8	3	0.64				
MEL	MEL-04	4	MEL-04-04	2020	August	2020-8	1	0.72				
MEL	MEL-04	4	MEL-04-04	2020	August	2020-8	2	0.69				
MEL	MEL-04	4	MEL-04-04	2020	August	2020-8	3	0.7				
MEL	MEL-04	5	MEL-04-05	2020	August	2020-8	1	0.7				
MEL	MEL-04	5	MEL-04-05	2020	August	2020-8	2	0.72				
MEL	MEL-04	5	MEL-04-05	2020	August	2020-8	3	0.68				
MEL	MEL-05	1	MEL-05-01	2020	August	2020-8	1	0.78				
MEL	MEL-05	1	MEL-05-01	2020	August	2020-8	2	0.81				
MEL	MEL-05	1	MEL-05-01	2020	August	2020-8	3	0.8				
MEL	MEL-05	2	MEL-05-02	2020	August	2020-8	1	0.67				
MEL	MEL-05	2	MEL-05-02	2020	August	2020-8	2	0.68				
MEL	MEL-05	2	MEL-05-02	2020	August	2020-8	3	0.63				
MEL	MEL-05	3	MEL-05-03	2020	August	2020-8	1	0.6				
MEL	MEL-05	3	MEL-05-03	2020	August	2020-8	2	0.57				
MEL	MEL-05	3	MEL-05-03	2020	August	2020-8	3	1.09				
MEL	MEL-05	4	MEL-05-04	2020	August	2020-8	1	0.53				
MEL	MEL-05	4	MEL-05-04	2020	August	2020-8	2	0.56				
MEL	MEL-05	4	MEL-05-04	2020	August	2020-8	3	0.77				
MEL	MEL-05	5	MEL-05-05	2020	August	2020-8	1	0.61				
MEL	MEL-05	5	MEL-05-05	2020	August	2020-8	2	0.6				
MEL	MEL-05	5	MEL-05-05	2020	August	2020-8	3	0.53				
MEL	MEL-01	1	AUG-DUP-01	2020	August	2020-8	1	2.02				
MEL	MEL-01	1	AUG-DUP-01	2020	August	2020-8	2	2.01				
MEL	MEL-01	1	AUG-DUP-01	2020	August	2020-8	3	2.11				
MEL	MEL-02	2	AUG-DUP-02	2020	August	2020-8	1	0.89				
MEL	MEL-02	2	AUG-DUP-02	2020	August	2020-8	2	0.61				
MEL	MEL-02	2	AUG-DUP-02	2020	August	2020-8	3	0.76				
MEL	MEL-03	3	AUG-DUP-03	2020	August	2020-8	1	0.55				
MEL	MEL-03	3	AUG-DUP-03	2020	August	2020-8	2	0.62				
MEL	MEL-03	3	AUG-DUP-03	2020	August	2020-8	3	0.62				
BLANK	BLANK	1	MEL-BLANK-01	2020	August	2020-8	1	0.05				
BLANK	BLANK	2	MEL-BLANK-02	2020	August	2020-8	2	0.06				
BLANK	BLANK	3	MEL-BLANK-03	2020	August	2020-8	3	0.04	MDL			

lake	area_rep	sample	station	year	Month	year_month	replicate	chl-a	MDL_flag	QA_sample	flag	flag_note
MEL	MEL-01	1	MEL-01-01	2019	August	2019-8	1	0.73				
MEL	MEL-01	1	MEL-01-01	2019	August	2019-8	2	0.9				
MEL	MEL-01	1	MEL-01-01	2019	August	2019-8	3	0.84				
MEL	MEL-01	6	MEL-01-06	2019	August	2019-8	1	0.58				
MEL	MEL-01	6	MEL-01-06	2019	August	2019-8	2	0.88				
MEL	MEL-01	6	MEL-01-06	2019	August	2019-8	3	0.8				
MEL	MEL-01	7	MEL-01-07	2019	August	2019-8	1	0.77				
MEL	MEL-01	7	MEL-01-07	2019	August	2019-8	2	0.84				
MEL	MEL-01	7	MEL-01-07	2019	August	2019-8	3	0.93				
MEL	MEL-01	8	MEL-01-08	2019	August	2019-8	1	0.87				
MEL	MEL-01	8	MEL-01-08	2019	August	2019-8	2	0.64				
MEL	MEL-01	8	MEL-01-08	2019	August	2019-8	3	0.65				
MEL	MEL-01	9	MEL-01-09	2019	August	2019-8	1	0.82				
MEL	MEL-01	9	MEL-01-09	2019	August	2019-8	2	0.91				
MEL	MEL-01	9	MEL-01-09	2019	August	2019-8	3	0.82				
MEL	MEL-02	1	MEL-02-01	2019	August	2019-8	1	0.19				
MEL	MEL-02	1	MEL-02-01	2019	August	2019-8	2	0.18				
MEL	MEL-02	1	MEL-02-01	2019	August	2019-8	3	0.17				
MEL	MEL-02	2	MEL-02-02	2019	August	2019-8	1	0.04	MDL			
MEL	MEL-02	2	MEL-02-02	2019	August	2019-8	2	0.09				
MEL	MEL-02	2	MEL-02-02	2019	August	2019-8	3	0.17				
MEL	MEL-02	3	MEL-02-03	2019	August	2019-8	1	0.25				
MEL	MEL-02	3	MEL-02-03	2019	August	2019-8	2	0.26				
MEL	MEL-02	3	MEL-02-03	2019	August	2019-8	3	0.21				
MEL	MEL-02	4	MEL-02-04	2019	August	2019-8	1	0.19				
MEL	MEL-02	4	MEL-02-04	2019	August	2019-8	2	0.24				
MEL	MEL-02	4	MEL-02-04	2019	August	2019-8	3	0.23				
MEL	MEL-02	5	MEL-02-05	2019	August	2019-8	1	0.3				
MEL	MEL-02	5	MEL-02-05	2019	August	2019-8	2	0.2				
MEL	MEL-02	5	MEL-02-05	2019	August	2019-8	3	0.26				
MEL	MEL-03	1	MEL-03-01	2019	August	2019-8	1	0.08				
MEL	MEL-03	1	MEL-03-01	2019	August	2019-8	2	0.07				
MEL	MEL-03	1	MEL-03-01	2019	August	2019-8	3	0.01				
MEL	MEL-03	2	MEL-03-02	2019	August	2019-8	1	0.03				
MEL	MEL-03	2	MEL-03-02	2019	August	2019-8	2	0.12				
MEL	MEL-03	2	MEL-03-02	2019	August	2019-8	3	0.02				
MEL	MEL-03	3	MEL-03-03	2019	August	2019-8	1	0.02				
MEL	MEL-03	3	MEL-03-03	2019	August	2019-8	2	0.03				
MEL	MEL-03	3	MEL-03-03	2019	August	2019-8	3	0.03				
MEL	MEL-03	4	MEL-03-04	2019	August	2019-8	1	0.03				
MEL	MEL-03	4	MEL-03-04	2019	August	2019-8	2	0.04				
MEL	MEL-03	4	MEL-03-04	2019	August	2019-8	3	0.02				
MEL	MEL-03	5	MEL-03-05	2019	August	2019-8	1	0.05				
MEL	MEL-03	5	MEL-03-05	2019	August	2019-8	2	0.04	MDL			
MEL	MEL-03	5	MEL-03-05	2019	August	2019-8	3	0.04	MDL			
MEL	MEL-04	1	MEL-04-01	2019	August	2019-8	1	0.09				
MEL	MEL-04	1	MEL-04-01	2019	August	2019-8	2	0.18				
MEL	MEL-04	1	MEL-04-01	2019	August	2019-8	3	0.23				
MEL	MEL-04	2	MEL-04-02	2019	August	2019-8	1	0.1				
MEL	MEL-04	2	MEL-04-02	2019	August	2019-8	2	0.19				
MEL	MEL-04	2	MEL-04-02	2019	August	2019-8	3	0.15				
MEL	MEL-04	3	MEL-04-03	2019	August	2019-8	1	0.11				
MEL	MEL-04	3	MEL-04-03	2019	August	2019-8	2	0.12				
MEL	MEL-04	3	MEL-04-03	2019	August	2019-8	3	0.18				
MEL	MEL-04	4	MEL-04-04	2019	August	2019-8	1	0.2				
MEL	MEL-04	4	MEL-04-04	2019	August	2019-8	2	0.13				
MEL	MEL-04	4	MEL-04-04	2019	August	2019-8	3	0.11				
MEL	MEL-04	5	MEL-04-05	2019	August	2019-8	1	0.28				
MEL	MEL-04	5	MEL-04-05	2019	August	2019-8	2	0.13				
MEL	MEL-04	5	MEL-04-05	2019	August	2019-8	3	0.21				
MEL	MEL-05	1	MEL-05-01	2019	August	2019-8	1	0.18				
MEL	MEL-05	1	MEL-05-01	2019	August	2019-8	2	0.18				
MEL	MEL-05	1	MEL-05-01	2019	August	2019-8	3	0.23				
MEL	MEL-05	2	MEL-05-02	2019	August	2019-8	1	0.26				
MEL	MEL-05	2	MEL-05-02	2019	August	2019-8	2	0.36				
MEL	MEL-05	2	MEL-05-02	2019	August	2019-8	3	0.31				
MEL	MEL-05	3	MEL-05-03	2019	August	2019-8	1	0.04	MDL		Remove	Different filter type
MEL	MEL-05	3	MEL-05-03	2019	August	2019-8	2	0.04	MDL		Remove	Different filter type
MEL	MEL-05	3	MEL-05-03	2019	August	2019-8	3	0.04	MDL		Remove	Different filter type
MEL	MEL-05	4	MEL-05-04	2019	August	2019-8	1	0.04			Remove	Different filter type
MEL	MEL-05	4	MEL-05-04	2019	August	2019-8	2	0.07			Remove	Different filter type
MEL	MEL-05	4	MEL-05-04	2019	August	2019-8	3	0.02			Remove	Different filter type
MEL	MEL-05	5	MEL-05-05	2019	August	2019-8	1	0.04	MDL		Remove	Different filter type
MEL	MEL-05	5	MEL-05-05	2019	August	2019-8	2	0.04	MDL		Remove	Different filter type
MEL	MEL-05	5	MEL-05-05	2019	August	2019-8	3	0.08			Remove	Different filter type
B7	B7	1	B7-01	2019	August	2019-8	1	0.63				
B7	B7	1	B7-01	2019	August	2019-8	2	0.59				
B7	B7	1	B7-01	2019	August	2019-8	3	0.55				
B7	B7	2	B7-02	2019	August	2019-8	1	0.56				
B7	B7	2	B7-02	2019	August	2019-8	2	0.68				
B7	B7	2	B7-02	2019	August	2019-8	3	0.55				
B7	B7	3	B7-03	2019	August	2019-8	1	0.43				
B7	B7	3	B7-03	2019	August	2019-8	2	0.61				
B7	B7	3	B7-03	2019	August	2019-8	3	0.4				
A8	A8	1	A8-01	2019	August	2019-8	1	0.79				
A8	A8	1	A8-01	2019	August	2019-8	2	0.9				
A8	A8	1	A8-01	2019	August	2019-8	3	0.75				
A8	A8	2	A8-02	2019	August	2019-8	1	0.57				
A8	A8	2	A8-02	2019	August	2019-8	2	0.77				
A8	A8	2	A8-02	2019	August	2019-8	3	0.56				
A8	A8	3	A8-03	2019	August	2019-8	1	1.11				
A8	A8	3	A8-03	2019	August	2019-8	2	0.9				
A8	A8	3	A8-03	2019	August	2019-8	3	1.11				
D7	D7	1	D7-01	2019	August	2019-8	1	1.5				
D7	D7	1	D7-01	2019	August	2019-8	2	1.69				
D7	D7	1	D7-01	2019	August	2019-8	3	1.84				
D7	D7	2	D7-02	2019	August	2019-8	1	1.44				
D7	D7	2	D7-02	2019	August	2019-8	2	1.42				
D7	D7	2	D7-02	2019	August	2019-8	3	1.51				
D7	D7	3	D7-03	2019	August	2019-8	1	1.31				
D7	D7	3	D7-03	2019	August	2019-8	2	1.65				
D7	D7	3	D7-03	2019	August	2019-8	3	1.45				
D7	D7	1	AUG-DUP-01	2019	August	2019-8	1	1.77		DUP		
D7	D7	1	AUG-DUP-01	2019	August	2019-8	2	3.1		DUP		
D7	D7	1	AUG-DUP-01	2019	August	2019-8	3	1.51		DUP		
A8	A8	1	AUG-DUP-02	2019	August	2019-8	1	0.7		DUP		
A8	A8	1	AUG-DUP-02	2019	August	2019-8	2	0.62		DUP		
A8	A8	1	AUG-DUP-02	2019	August	2019-8	3	0.64		DUP		
MEL	MEL-03	2	AUG-DUP-03	2019	August	2019-8	1	0.02		DUP		
MEL	MEL-03	2	AUG-DUP-03	2019	August	2019-8	2	0.06		DUP		
MEL	MEL-03	2	AUG-DUP-03	2019	August	2019-8	3	0.08		DUP		
MEL	MEL-04	5	AUG-DUP-04	2019	August	2019-8	1	0.14		DUP		
MEL	MEL-04	5	AUG-DUP-04	2019	August	2019-8	2	0.11		DUP		
MEL	MEL-04	5	AUG-DUP-04	2019	August	2019-8	3	0.18		DUP		
BLANK	BLANK	1	MEL-BLANK-01	2019	August	2019-8	1	0.04	MDL	BLANK		
BLANK	BLANK	2	MEL-BLANK-02	2019	August	2019-8	2	0.04	MDL	BLANK		
BLANK	BLANK	3	MEL-BLANK-03	2019	August	2019-8	3	0.04	MDL	BLANK		

lake	area_rep	sample	station	year	Month	year_month	replicate	chl-a	MDL_flag	QA_sample	flag	flag_note
A8	A8	1	A8-01	2018	August	2018-8	1	1.22				
A8	A8	1	A8-01	2018	August	2018-8	2	1.14				
A8	A8	1	A8-01	2018	August	2018-8	3	1.25				
A8	A8	2	A8-02	2018	August	2018-8	1	1.06				
A8	A8	2	A8-02	2018	August	2018-8	2	1.01				
A8	A8	2	A8-02	2018	August	2018-8	3	1				
A8	A8	3	A8-03	2018	August	2018-8	1	1.09				
A8	A8	3	A8-03	2018	August	2018-8	2	1.35				
A8	A8	3	A8-03	2018	August	2018-8	3	1.26				
B7	B7	1	B7-01	2018	August	2018-8	1	1.32				
B7	B7	1	B7-01	2018	August	2018-8	2	1.59				
B7	B7	1	B7-01	2018	August	2018-8	3	1				
B7	B7	2	B7-02	2018	August	2018-8	1	1.87				
B7	B7	2	B7-02	2018	August	2018-8	2	1.94				
B7	B7	2	B7-02	2018	August	2018-8	3	1.84				
B7	B7	3	B7-03	2018	August	2018-8	1	1.62				
B7	B7	3	B7-03	2018	August	2018-8	2	1.58				
B7	B7	3	B7-03	2018	August	2018-8	3	2.26				
MEL	MEL-01	1	MEL-01-01	2018	August	2018-8	1	2.05				
MEL	MEL-01	1	MEL-01-01	2018	August	2018-8	2	1.86				
MEL	MEL-01	1	MEL-01-01	2018	August	2018-8	3	1.73				
MEL	MEL-01	6	MEL-01-06	2018	August	2018-8	1	1.82				
MEL	MEL-01	6	MEL-01-06	2018	August	2018-8	2	1.81				
MEL	MEL-01	6	MEL-01-06	2018	August	2018-8	3	1.87				
MEL	MEL-01	7	MEL-01-07	2018	August	2018-8	1	1.97				
MEL	MEL-01	7	MEL-01-07	2018	August	2018-8	2	1.95				
MEL	MEL-01	7	MEL-01-07	2018	August	2018-8	3	1.85				
MEL	MEL-01	8	MEL-01-08	2018	August	2018-8	1	2.09				
MEL	MEL-01	8	MEL-01-08	2018	August	2018-8	2	1.99				
MEL	MEL-01	8	MEL-01-08	2018	August	2018-8	3	2.03				
MEL	MEL-01	9	MEL-01-09	2018	August	2018-8	1	1.94				
MEL	MEL-01	9	MEL-01-09	2018	August	2018-8	2	1.95				
MEL	MEL-01	9	MEL-01-09	2018	August	2018-8	3	1.81				
MEL	MEL-02	2	MEL-02-02	2018	August	2018-8	1	0.7				
MEL	MEL-02	2	MEL-02-02	2018	August	2018-8	2	0.76				
MEL	MEL-02	2	MEL-02-02	2018	August	2018-8	3	0.78				
MEL	MEL-02	3	MEL-02-03	2018	August	2018-8	1	0.92				
MEL	MEL-02	3	MEL-02-03	2018	August	2018-8	2	1.05				
MEL	MEL-02	3	MEL-02-03	2018	August	2018-8	3	1.1				
MEL	MEL-02	5	MEL-02-05	2018	August	2018-8	1	0.8				
MEL	MEL-02	5	MEL-02-05	2018	August	2018-8	2	0.84				
MEL	MEL-02	5	MEL-02-05	2018	August	2018-8	3	0.82				
MEL	MEL-02	6	MEL-02-06	2018	August	2018-8	1	0.72				
MEL	MEL-02	6	MEL-02-06	2018	August	2018-8	2	0.71				
MEL	MEL-02	6	MEL-02-06	2018	August	2018-8	3	1.17				
MEL	MEL-02	8	MEL-02-08	2018	August	2018-8	1	0.9				
MEL	MEL-02	8	MEL-02-08	2018	August	2018-8	2	0.96				
MEL	MEL-02	8	MEL-02-08	2018	August	2018-8	3	0.99				
MEL	MEL-03	1	MEL-03-01	2018	August	2018-8	1	0.74				
MEL	MEL-03	1	MEL-03-01	2018	August	2018-8	2	0.69				
MEL	MEL-03	1	MEL-03-01	2018	August	2018-8	3	0.65				
MEL	MEL-03	2	MEL-03-02	2018	August	2018-8	1	0.55				
MEL	MEL-03	2	MEL-03-02	2018	August	2018-8	2	0.58				
MEL	MEL-03	2	MEL-03-02	2018	August	2018-8	3	0.59				
MEL	MEL-03	3	MEL-03-03	2018	August	2018-8	1	0.69				
MEL	MEL-03	3	MEL-03-03	2018	August	2018-8	2	0.69				
MEL	MEL-03	3	MEL-03-03	2018	August	2018-8	3	0.67				
MEL	MEL-03	4	MEL-03-04	2018	August	2018-8	1	0.61				
MEL	MEL-03	4	MEL-03-04	2018	August	2018-8	2	0.56				
MEL	MEL-03	4	MEL-03-04	2018	August	2018-8	3	0.6				
MEL	MEL-03	5	MEL-03-05	2018	August	2018-8	1	0.53				
MEL	MEL-03	5	MEL-03-05	2018	August	2018-8	2	0.48				
MEL	MEL-03	5	MEL-03-05	2018	August	2018-8	3	0.57				
MEL	MEL-04	1	MEL-04-01	2018	August	2018-8	1	0.64				
MEL	MEL-04	1	MEL-04-01	2018	August	2018-8	2	0.62				
MEL	MEL-04	1	MEL-04-01	2018	August	2018-8	3	0.64				
MEL	MEL-04	2	MEL-04-02	2018	August	2018-8	1	0.56				
MEL	MEL-04	2	MEL-04-02	2018	August	2018-8	2	0.55				
MEL	MEL-04	2	MEL-04-02	2018	August	2018-8	3	0.55				
MEL	MEL-04	3	MEL-04-03	2018	August	2018-8	1	0.55				
MEL	MEL-04	3	MEL-04-03	2018	August	2018-8	2	0.62				
MEL	MEL-04	5	MEL-04-05	2018	August	2018-8	1	0.56				
MEL	MEL-04	5	MEL-04-05	2018	August	2018-8	2	0.58				
MEL	MEL-04	5	MEL-04-05	2018	August	2018-8	3	0.56				
MEL	MEL-05	1	MEL-05-01	2018	August	2018-8	1	0.63				
MEL	MEL-05	1	MEL-05-01	2018	August	2018-8	2	0.62				
MEL	MEL-05	1	MEL-05-01	2018	August	2018-8	3	0.62				
MEL	MEL-05	2	MEL-05-02	2018	August	2018-8	1	0.57				
MEL	MEL-05	2	MEL-05-02	2018	August	2018-8	2	0.55				
MEL	MEL-05	2	MEL-05-02	2018	August	2018-8	3	0.61				
MEL	MEL-05	3	MEL-05-03	2018	August	2018-8	1	0.5				
MEL	MEL-05	3	MEL-05-03	2018	August	2018-8	2	0.47				
MEL	MEL-05	3	MEL-05-03	2018	August	2018-8	3	0.48				
MEL	MEL-05	4	MEL-05-04	2018	August	2018-8	1	0.63				
MEL	MEL-05	4	MEL-05-04	2018	August	2018-8	2	0.61				
MEL	MEL-05	4	MEL-05-04	2018	August	2018-8	3	0.6				
MEL	MEL-05	5	MEL-05-05	2018	August	2018-8	1	0.62				
MEL	MEL-05	5	MEL-05-05	2018	August	2018-8	2	0.6				
MEL	MEL-05	5	MEL-05-05	2018	August	2018-8	3	0.64				

lake	area_rep	sample	station	year	Month	year_month	replicate	chl-a	MDL_flag	QA_sample	flag	flag_note
A8	A8	1	A8-01	2017	August	2017-8	1	0.92				
A8	A8	1	A8-01	2017	August	2017-8	2	0.92				
A8	A8	1	A8-01	2017	August	2017-8	3	0.95				
A8	A8	2	A8-02	2017	August	2017-8	1	3.11				
A8	A8	2	A8-02	2017	August	2017-8	2	0.96				
A8	A8	2	A8-02	2017	August	2017-8	3	0.89				
A8	A8	3	A8-03	2017	August	2017-8	1	1.46				
A8	A8	3	A8-03	2017	August	2017-8	2	1.44				
A8	A8	3	A8-03	2017	August	2017-8	3	0.32				
B7	B7	1	B7-01	2017	August	2017-8	1	1.03				
B7	B7	1	B7-01	2017	August	2017-8	2	1.18				
B7	B7	1	B7-01	2017	August	2017-8	3	1.16				
B7	B7	2	B7-02	2017	August	2017-8	1	1.15				
B7	B7	2	B7-02	2017	August	2017-8	2	1.27				
B7	B7	2	B7-02	2017	August	2017-8	3	1.38				
B7	B7	3	B7-03	2017	August	2017-8	1	1.4				
B7	B7	3	B7-03	2017	August	2017-8	2	1.56				
B7	B7	3	B7-03	2017	August	2017-8	3	1.47				
D7	D7	1	D7-01	2017	August	2017-8	1	2.47				
D7	D7	1	D7-01	2017	August	2017-8	2	2.32				
D7	D7	1	D7-01	2017	August	2017-8	3	1.94				
D7	D7	2	D7-02	2017	August	2017-8	1	2.16				
D7	D7	2	D7-02	2017	August	2017-8	2	2.29				
D7	D7	2	D7-02	2017	August	2017-8	3	2.18				
D7	D7	3	D7-03	2017	August	2017-8	1	2.26				
D7	D7	3	D7-03	2017	August	2017-8	2	2.25				
D7	D7	3	D7-03	2017	August	2017-8	3	2.39				
MEL	MEL-01	1	MEL-01-01	2017	August	2017-8	1	1.44				
MEL	MEL-01	1	MEL-01-01	2017	August	2017-8	2	1.7				
MEL	MEL-01	1	MEL-01-01	2017	August	2017-8	3	1.56				
MEL	MEL-01	2	MEL-01-02	2017	August	2017-8	1	1.47				
MEL	MEL-01	2	MEL-01-02	2017	August	2017-8	2	1.42				
MEL	MEL-01	2	MEL-01-02	2017	August	2017-8	3	1.52				
MEL	MEL-01	3	MEL-01-03	2017	August	2017-8	1	1.34				
MEL	MEL-01	3	MEL-01-03	2017	August	2017-8	2	1.27				
MEL	MEL-01	3	MEL-01-03	2017	August	2017-8	3	1.39				
MEL	MEL-01	4	MEL-01-04	2017	August	2017-8	1	1.55				
MEL	MEL-01	4	MEL-01-04	2017	August	2017-8	2	1.67				
MEL	MEL-01	4	MEL-01-04	2017	August	2017-8	3	1.59				
MEL	MEL-01	5	MEL-01-05	2017	August	2017-8	1	1.45				
MEL	MEL-01	5	MEL-01-05	2017	August	2017-8	2	1.4				
MEL	MEL-01	5	MEL-01-05	2017	August	2017-8	3	1.48				
MEL	MEL-02	1	MEL-02-01	2017	August	2017-8	1	0.66				
MEL	MEL-02	1	MEL-02-01	2017	August	2017-8	2	0.66				
MEL	MEL-02	1	MEL-02-01	2017	August	2017-8	3	0.65				
MEL	MEL-02	2	MEL-02-02	2017	August	2017-8	1	0.59				
MEL	MEL-02	2	MEL-02-02	2017	August	2017-8	2	0.65				
MEL	MEL-02	2	MEL-02-02	2017	August	2017-8	3	0.58				
MEL	MEL-02	3	MEL-02-03	2017	August	2017-8	1	0.6				
MEL	MEL-02	3	MEL-02-03	2017	August	2017-8	2	0.52				
MEL	MEL-02	3	MEL-02-03	2017	August	2017-8	3	0.51				
MEL	MEL-02	4	MEL-02-04	2017	August	2017-8	1	0.59				
MEL	MEL-02	4	MEL-02-04	2017	August	2017-8	2	0.63				
MEL	MEL-02	4	MEL-02-04	2017	August	2017-8	3	0.62				
MEL	MEL-02	5	MEL-02-05	2017	August	2017-8	1	0.72				
MEL	MEL-02	5	MEL-02-05	2017	August	2017-8	2	0.64				
MEL	MEL-02	5	MEL-02-05	2017	August	2017-8	3	0.46				
MEL	MEL-03	1	MEL-03-01	2017	August	2017-8	1	0.6				
MEL	MEL-03	1	MEL-03-01	2017	August	2017-8	2	0.64				
MEL	MEL-03	1	MEL-03-01	2017	August	2017-8	3	0.64				
MEL	MEL-03	2	MEL-03-02	2017	August	2017-8	1	0.62				
MEL	MEL-03	2	MEL-03-02	2017	August	2017-8	2	0.69				
MEL	MEL-03	2	MEL-03-02	2017	August	2017-8	3	0.61				
MEL	MEL-03	3	MEL-03-03	2017	August	2017-8	1	0.43				
MEL	MEL-03	3	MEL-03-03	2017	August	2017-8	2	0.51				
MEL	MEL-03	3	MEL-03-03	2017	August	2017-8	3	0.53				
MEL	MEL-03	4	MEL-03-04	2017	August	2017-8	1	0.51				
MEL	MEL-03	4	MEL-03-04	2017	August	2017-8	2	0.57				
MEL	MEL-03	4	MEL-03-04	2017	August	2017-8	3	0.57				
MEL	MEL-03	5	MEL-03-05	2017	August	2017-8	1	0.58				
MEL	MEL-03	5	MEL-03-05	2017	August	2017-8	2	0.51				
MEL	MEL-03	5	MEL-03-05	2017	August	2017-8	3	0.58				
MEL	MEL-04	1	MEL-04-01	2017	August	2017-8	1	0.52				
MEL	MEL-04	1	MEL-04-01	2017	August	2017-8	2	0.66				
MEL	MEL-04	1	MEL-04-01	2017	August	2017-8	3	0.49				
MEL	MEL-04	2	MEL-04-02	2017	August	2017-8	1	0.52				
MEL	MEL-04	2	MEL-04-02	2017	August	2017-8	2	0.54				
MEL	MEL-04	2	MEL-04-02	2017	August	2017-8	3	0.54				
MEL	MEL-04	3	MEL-04-03	2017	August	2017-8	1	0.71				
MEL	MEL-04	3	MEL-04-03	2017	August	2017-8	2	0.63				
MEL	MEL-04	3	MEL-04-03	2017	August	2017-8	3	0.71				
MEL	MEL-04	4	MEL-04-04	2017	August	2017-8	1	0.66				
MEL	MEL-04	4	MEL-04-04	2017	August	2017-8	2	0.61				
MEL	MEL-04	4	MEL-04-04	2017	August	2017-8	3	0.62				
MEL	MEL-04	5	MEL-04-05	2017	August	2017-8	1	0.67				
MEL	MEL-04	5	MEL-04-05	2017	August	2017-8	2	0.64				
MEL	MEL-04	5	MEL-04-05	2017	August	2017-8	3	0.68				
MEL	MEL-05	1	MEL-05-01	2017	August	2017-8	1	0.62				
MEL	MEL-05	1	MEL-05-01	2017	August	2017-8	2	0.63				
MEL	MEL-05	1	MEL-05-01	2017	August	2017-8	3	0.6				
MEL	MEL-05	2	MEL-05-02	2017	August	2017-8	1	0.58				
MEL	MEL-05	2	MEL-05-02	2017	August	2017-8	2	0.49				
MEL	MEL-05	2	MEL-05-02	2017	August	2017-8	3	0.6				
MEL	MEL-05	3	MEL-05-03	2017	August	2017-8	1	0.68				
MEL	MEL-05	3	MEL-05-03	2017	August	2017-8	2	0.6				
MEL	MEL-05	3	MEL-05-03	2017	August	2017-8	3	0.59				
MEL	MEL-05	4	MEL-05-04	2017	August	2017-8	1	0.56				
MEL	MEL-05	4	MEL-05-04	2017	August	2017-8	2	0.54				
MEL	MEL-05	4	MEL-05-04	2017	August	2017-8	3	0.55				
MEL	MEL-05	5	MEL-05-05	2017	August	2017-8	1	0.56				
MEL	MEL-05	5	MEL-05-05	2017	August	2017-8	2	0.55				
MEL	MEL-05	5	MEL-05-05	2017	August	2017-8	3	0.56				

lake	area_rep	sample	station	year	Month	year_month	replicate	chl-a	MDL_flag	QA_sample	flag	flag_note
A8	A8	1	A8-01	2016	August	2016-8	1	1.857				
A8	A8	1	A8-01	2016	August	2016-8	2	1.923				
A8	A8	1	A8-01	2016	August	2016-8	3	2.101				
A8	A8	2	A8-02	2016	August	2016-8	1	2.112				
A8	A8	2	A8-02	2016	August	2016-8	2	2.185				
A8	A8	2	A8-02	2016	August	2016-8	3	2.302				
A8	A8	4	A8-04	2016	August	2016-8	1	2.2				
A8	A8	4	A8-04	2016	August	2016-8	2	1.961				
A8	A8	4	A8-04	2016	August	2016-8	3	2.072				
B7	B7	1	B7-01	2016	August	2016-8	1	2.984				
B7	B7	1	B7-01	2016	August	2016-8	2	2.762				
B7	B7	1	B7-01	2016	August	2016-8	3	2.731				
B7	B7	2	B7-02	2016	August	2016-8	1	3.236				
B7	B7	2	B7-02	2016	August	2016-8	2	2.987				
B7	B7	2	B7-02	2016	August	2016-8	3	3.408				
B7	B7	3	B7-03	2016	August	2016-8	1	3.039				
B7	B7	3	B7-03	2016	August	2016-8	2	3.388				
B7	B7	3	B7-03	2016	August	2016-8	3	3.373				
D7	D7	1	D7-01	2016	August	2016-8	1	3.804				
D7	D7	1	D7-01	2016	August	2016-8	2	3.474				
D7	D7	1	D7-01	2016	August	2016-8	3	3.542				
D7	D7	2	D7-02	2016	August	2016-8	1	3.866				
D7	D7	2	D7-02	2016	August	2016-8	2	3.906				
D7	D7	2	D7-02	2016	August	2016-8	3	3.433				
D7	D7	3	D7-03	2016	August	2016-8	1	4.197				
D7	D7	3	D7-03	2016	August	2016-8	2	4.209				
D7	D7	3	D7-03	2016	August	2016-8	3	3.723				
MEL	MEL-01	1	MEL-01-01	2016	August	2016-8	1	2.269				
MEL	MEL-01	1	MEL-01-01	2016	August	2016-8	2	1.653				
MEL	MEL-01	1	MEL-01-01	2016	August	2016-8	3	1.912				
MEL	MEL-01	2	MEL-01-02	2016	August	2016-8	1	2.044				
MEL	MEL-01	2	MEL-01-02	2016	August	2016-8	2	2.063				
MEL	MEL-01	2	MEL-01-02	2016	August	2016-8	3	2.134				
MEL	MEL-01	3	MEL-01-03	2016	August	2016-8	1	1.65				
MEL	MEL-01	3	MEL-01-03	2016	August	2016-8	2	1.895				
MEL	MEL-01	3	MEL-01-03	2016	August	2016-8	3	2.259				
MEL	MEL-01	4	MEL-01-04	2016	August	2016-8	1	1.851				
MEL	MEL-01	4	MEL-01-04	2016	August	2016-8	2	1.781				
MEL	MEL-01	4	MEL-01-04	2016	August	2016-8	3	1.809				
MEL	MEL-01	5	MEL-01-05	2016	August	2016-8	1	1.334				
MEL	MEL-01	5	MEL-01-05	2016	August	2016-8	2	1.932				
MEL	MEL-01	5	MEL-01-05	2016	August	2016-8	3	1.597				
MEL	MEL-02	1	MEL-02-01	2016	August	2016-8	1	1.263				
MEL	MEL-02	1	MEL-02-01	2016	August	2016-8	2	0.337				
MEL	MEL-02	1	MEL-02-01	2016	August	2016-8	3	1.086				
MEL	MEL-02	2	MEL-02-02	2016	August	2016-8	1	0.91				
MEL	MEL-02	2	MEL-02-02	2016	August	2016-8	2	1.208				
MEL	MEL-02	2	MEL-02-02	2016	August	2016-8	3	1				
MEL	MEL-02	3	MEL-02-03	2016	August	2016-8	1	1.197				
MEL	MEL-02	3	MEL-02-03	2016	August	2016-8	2	1.372				
MEL	MEL-02	3	MEL-02-03	2016	August	2016-8	3	1.206				
MEL	MEL-02	4	MEL-02-04	2016	August	2016-8	1	1.271				
MEL	MEL-02	4	MEL-02-04	2016	August	2016-8	2	1.325				
MEL	MEL-02	4	MEL-02-04	2016	August	2016-8	3	1.184				
MEL	MEL-02	5	MEL-02-05	2016	August	2016-8	1	1.322				
MEL	MEL-02	5	MEL-02-05	2016	August	2016-8	2	1.249				
MEL	MEL-02	5	MEL-02-05	2016	August	2016-8	3	1.289				
MEL	MEL-03	1	MEL-03-01	2016	August	2016-8	1	0.763				
MEL	MEL-03	1	MEL-03-01	2016	August	2016-8	2	0.693				
MEL	MEL-03	1	MEL-03-01	2016	August	2016-8	3	0.748				
MEL	MEL-03	2	MEL-03-02	2016	August	2016-8	1	0.46				
MEL	MEL-03	2	MEL-03-02	2016	August	2016-8	2	0.659				
MEL	MEL-03	2	MEL-03-02	2016	August	2016-8	3	0.744				
MEL	MEL-03	3	MEL-03-03	2016	August	2016-8	1	0.65				
MEL	MEL-03	3	MEL-03-03	2016	August	2016-8	2	0.757				
MEL	MEL-03	3	MEL-03-03	2016	August	2016-8	3	0.708				
MEL	MEL-03	4	MEL-03-04	2016	August	2016-8	1	0.701				
MEL	MEL-03	4	MEL-03-04	2016	August	2016-8	2	0.822				
MEL	MEL-03	4	MEL-03-04	2016	August	2016-8	3	0.574				
MEL	MEL-03	5	MEL-03-05	2016	August	2016-8	1	0.824				
MEL	MEL-03	5	MEL-03-05	2016	August	2016-8	2	0.879				
MEL	MEL-03	5	MEL-03-05	2016	August	2016-8	3	0.965				
MEL	MEL-04	1	MEL-04-01	2016	August	2016-8	1	0.78				
MEL	MEL-04	1	MEL-04-01	2016	August	2016-8	2	0.826				
MEL	MEL-04	1	MEL-04-01	2016	August	2016-8	3	0.818				
MEL	MEL-04	2	MEL-04-02	2016	August	2016-8	1	0.866				
MEL	MEL-04	2	MEL-04-02	2016	August	2016-8	2	0.901				
MEL	MEL-04	2	MEL-04-02	2016	August	2016-8	3	0.863				
MEL	MEL-04	3	MEL-04-03	2016	August	2016-8	1	0.891				
MEL	MEL-04	3	MEL-04-03	2016	August	2016-8	2	0.965				
MEL	MEL-04	3	MEL-04-03	2016	August	2016-8	3	0.946				
MEL	MEL-04	4	MEL-04-04	2016	August	2016-8	1	1.083				
MEL	MEL-04	4	MEL-04-04	2016	August	2016-8	2	1				
MEL	MEL-04	4	MEL-04-04	2016	August	2016-8	3	0.943				
MEL	MEL-04	5	MEL-04-05	2016	August	2016-8	1	1.092				
MEL	MEL-04	5	MEL-04-05	2016	August	2016-8	2	1.008				
MEL	MEL-04	5	MEL-04-05	2016	August	2016-8	3	0.915				
MEL	MEL-05	1	MEL-05-01	2016	August	2016-8	1	1.401				
MEL	MEL-05	1	MEL-05-01	2016	August	2016-8	2	1.206				
MEL	MEL-05	1	MEL-05-01	2016	August	2016-8	3	1.178				
MEL	MEL-05	2	MEL-05-02	2016	August	2016-8	1	1.235				
MEL	MEL-05	2	MEL-05-02	2016	August	2016-8	2	1.296				
MEL	MEL-05	2	MEL-05-02	2016	August	2016-8	3	1.112				
MEL	MEL-05	3	MEL-05-03	2016	August	2016-8	1	1.02				
MEL	MEL-05	3	MEL-05-03	2016	August	2016-8	2	1.079				
MEL	MEL-05	3	MEL-05-03	2016	August	2016-8	3	1.048				
MEL	MEL-05	4	MEL-05-04	2016	August	2016-8	1	1.044				
MEL	MEL-05	4	MEL-05-04	2016	August	2016-8	2	0.9				
MEL	MEL-05	4	MEL-05-04	2016	August	2016-8	3	0.974				
MEL	MEL-05	5	MEL-05-05	2016	August	2016-8	1	1.134				
MEL	MEL-05	5	MEL-05-05	2016	August	2016-8	2	0.984				
MEL	MEL-05	5	MEL-05-05	2016	August	2016-8	3	0.868				

lake	area_rep	sample	station	year	Month	year_month	replicate	chl-a	MDL_flag	QA_sample	flag	flag_note
A8	A8	1	A8-01	2015	August	2015-8	1	2.019				
A8	A8	1	A8-01	2015	August	2015-8	2	1.874				
A8	A8	1	A8-01	2015	August	2015-8	3	1.98				
A8	A8	2	A8-02	2015	August	2015-8	1	1.722				
A8	A8	2	A8-02	2015	August	2015-8	2	1.502				
A8	A8	2	A8-02	2015	August	2015-8	3	1.937				
A8	A8	3	A8-03	2015	August	2015-8	1	2.267				
A8	A8	3	A8-03	2015	August	2015-8	2	2.287				
A8	A8	3	A8-03	2015	August	2015-8	3	2.437				
B7	B7	1	B7-01	2015	August	2015-8	1	1.436				
B7	B7	1	B7-01	2015	August	2015-8	2	1.238				
B7	B7	1	B7-01	2015	August	2015-8	3	1.59				
MEL	MEL-01	1	MEL-01-01	2015	August	2015-8	1	0.737				
MEL	MEL-01	1	MEL-01-01	2015	August	2015-8	2	0.866				
MEL	MEL-01	1	MEL-01-01	2015	August	2015-8	3	0.702				
MEL	MEL-01	2	MEL-01-02	2015	August	2015-8	1	0.954				
MEL	MEL-01	2	MEL-01-02	2015	August	2015-8	2	0.862				
MEL	MEL-01	2	MEL-01-02	2015	August	2015-8	3	0.84				
MEL	MEL-01	3	MEL-01-03	2015	August	2015-8	1	0.889				
MEL	MEL-01	3	MEL-01-03	2015	August	2015-8	2	0.751				
MEL	MEL-01	3	MEL-01-03	2015	August	2015-8	3		MDL		Remove	No MDL value reported
MEL	MEL-01	4	MEL-01-04	2015	August	2015-8	1	0.877				
MEL	MEL-01	4	MEL-01-04	2015	August	2015-8	2	0.899				
MEL	MEL-01	4	MEL-01-04	2015	August	2015-8	3	0.973				
MEL	MEL-01	5	MEL-01-05	2015	August	2015-8	1	0.927				
MEL	MEL-01	5	MEL-01-05	2015	August	2015-8	2	0.861				
MEL	MEL-01	5	MEL-01-05	2015	August	2015-8	3	0.883				
MEL	MEL-02	1	MEL-02-01	2015	August	2015-8	1	0.392				
MEL	MEL-02	1	MEL-02-01	2015	August	2015-8	2	0.412				
MEL	MEL-02	1	MEL-02-01	2015	August	2015-8	3	0.32				
MEL	MEL-02	2	MEL-02-02	2015	August	2015-8	1	0.349				
MEL	MEL-02	2	MEL-02-02	2015	August	2015-8	2	0.349				
MEL	MEL-02	2	MEL-02-02	2015	August	2015-8	3	0.381				
MEL	MEL-02	3	MEL-02-03	2015	August	2015-8	1	0.533				
MEL	MEL-02	3	MEL-02-03	2015	August	2015-8	2	0.327				
MEL	MEL-02	3	MEL-02-03	2015	August	2015-8	3	0.547				
MEL	MEL-02	4	MEL-02-04	2015	August	2015-8	1	0.42				
MEL	MEL-02	4	MEL-02-04	2015	August	2015-8	2	0.573				
MEL	MEL-02	4	MEL-02-04	2015	August	2015-8	3	0.409				
MEL	MEL-02	5	MEL-02-05	2015	August	2015-8	1	0.544				
MEL	MEL-02	5	MEL-02-05	2015	August	2015-8	2	0.569				
MEL	MEL-02	5	MEL-02-05	2015	August	2015-8	3	0.551				

APPENDIX G

2020 SNOW PACK SURVEY AND CHEMISTRY DATA

Table G-1. Chemistry Results from Snowpack Sample Collected in February and April, 2020

Parameter	Units	February Lowest Detection Limit	February					April Lowest Detection limits					April				
			SNOCOR4	SNOCOR5	SNOCOR6	SNOCOR7	SNOCOR BOUNDARY	SNOCOR4	SNOCOR5	SNOCOR6	SNOCOR7	SNOCOR BOUNDARY	SNOCOR4	SNOCOR5	SNOCOR6	SNOCOR7	SNOCOR BOUNDARY
Conventional Parameters																	
Conductivity (lab)	uS/cm	1	41	5.5	6.3	13	18	1	1	1	1	1	350	11	17	78	19
Hardness	mg/L	0.5	15.2	2.11	2.11	2.28	5.87	0.5	0.5	0.5	0.5	0.5	388	2.34	4.97	38.5	10.1
pH (lab)	pH units	0.1	7.99	6.21	5.88	6.34	6.74	-	-	-	-	-	9.33	6.16	6.69	8.66	6.97
Total Dissolved Solids	mg/L	13	35	< 10	< 10	< 10	25	10	10	10	10	10	275	45	40	105	30
Total Suspended Solids	mg/L	1	390	10	11	9	44	5	1	1	2	1	3800	16	30	280	44
Turbidity (lab)	NTU	0.1	63	0.6	0.7	2.1	3.5	0.1	0.1	0.1	0.1	0.1	120	1.1	4.3	53	4.5
Major Ions																	
Alkalinity, Bicarbonate	mg/L	1	10	< 1.0	< 1.0	1.2	3.2	1	1	1	1	1	21	1.1	3.3	13	5.1
Alkalinity, Carbonate	mg/L	1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	1	1	1	1	1	4.2	< 1.0	< 1.0	< 1.0	< 1.0
Alkalinity, Total	mg/L	1	11	< 1.0	< 1.0	1.2	3.2	1	1	1	1	1	26	1.1	3.3	14	5.1
Calcium (D)	mg/L	0.01	-	-	-	-	-	0.1	0.05	0.05	0.05	0.05	26.5	0.368	1.24	5.43	1.7
Calcium (T)	mg/L	0.01	3.6	0.364	0.362	0.592	1.25	5	0.25	0.05	0.25	0.25	119	0.68	1.57	10.6	2.99
Chloride (D)	mg/L	0.1	3.1	< 1.0	< 1.0	1.6	1.7	1	1	1	1	1	37	< 1.0	1.6	10	< 1.0
Magnesium (D)	mg/L	0.004	-	-	-	-	-	0.1	0.05	0.05	0.05	0.05	0.38	0.102	0.133	0.576	0.122
Magnesium (T)	mg/L	0.004	0.274	0.06	0.058	0.144	0.196	5	0.25	0.05	0.25	0.25	22.4	< 0.25	0.257	2.95	0.63
Potassium (D)	mg/L	0.02	-	-	-	-	-	0.1	0.05	0.05	0.05	0.05	3.75	0.346	0.121	0.707	0.108
Potassium (T)	mg/L	0.02	0.247	0.061	< 0.050	0.064	0.147	5	0.25	0.05	0.25	0.25	9.7	0.36	0.185	1.83	0.28
Sodium (D)	mg/L	0.02	-	-	-	-	-	0.1	0.05	0.05	0.05	0.05	29	0.58	1.02	5.3	0.658
Sodium (T)	mg/L	0.02	1.51	0.241	0.274	1.01	1.01	5	0.25	0.05	0.25	0.25	29.5	0.57	1.03	5.34	0.67
Sulphate (D)	mg/L	0.3	1.6	< 1.0	< 1.0	< 1.0	< 1.0	1	1	1	1	1	59	< 1.0	1.1	3.5	1.1
Nutrients																	
Total Phosphorus	ug/L	0.001	-	-	-	-	-	100	5	-	5	5	1880	409	-	193	49.1
Organic/Inorganic Carbon																	
Dissolved Organic Carbon	mg/L	0.5	0.83	0.57	< 0.50	0.59	0.89	0.4	0.4	0.4	0.4	0.4	5.6	2.9	3	74	0.52
Total Organic Carbon	mg/L	0.5	0.92	0.64	0.55	0.79	1.1	0.4	0.4	0.4	0.4	0.4	6.1	3.3	3.1	74	0.92
Total Metals																	
Aluminum (T)	ug/L	3	2020	302	231	141	548	60	3	0.5	3	3	31500	112	234	5060	989
Antimony (T)	ug/L	0.5	< 0.50	0.66	< 0.50	< 0.50	< 0.50	0.4	0.02	0.02	0.02	0.02	3.1	0.119	0.082	0.648	0.13
Arsenic (T)	ug/L	0.1	194	2.83	5.01	2.12	27.3	0.4	0.02	0.02	0.02	0.02	12900	3.1	59.7	735	120
Barium (T)	ug/L	1	19	5.7	3.9	4.9	5.8	1	0.05	0.02	0.05	0.05	375	3.89	3.79	47.5	8.68
Beryllium (T)	ug/L	0.1	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	0.2	0.01	0.01	0.01	0.01	0.81	< 0.010	< 0.010	0.104	0.019
Bismuth (T)	ug/L	1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	0.2	0.01	-	0.01	0.01	2.81	< 0.010	-	0.38	0.045
Boron (T)	ug/L	50	< 50	< 50	< 50	< 50	< 50	200	10	10	10	10	< 200	< 10	< 10	< 10	< 10
Cadmium (T)	ug/L	0.01	0.076	0.202	0.229	0.099	0.501	0.1	0.005	0.005	0.005	0.005	0.99	0.0444	0.0351	0.293	0.0376
Calcium (T)	ug/L	50	4370	598	601	661	1690	5000	250	10	250	250	119000	680	1570	10600	2990
Chromium (T)	ug/L	1	4.2	< 1.0	< 1.0	< 1.0	1	2	0.1	0.1	0.1	0.1	61.3	0.55	0.6	10.4	1.55
Cobalt (T)	ug/L	0.2	1.04	< 0.20	< 0.20	< 0.20	< 0.20	0.2	0.01	0.005	0.01	0.01	21.1	0.11	0.128	2.55	0.306

Parameter	Units	February Lowest Detection Limit	February					April Lowest Detection limits					April				
			SNOCOR4	SNOCOR5	SNOCOR6	SNOCOR7	SNOCOR BOUNDARY	SNOCOR4	SNOCOR5	SNOCOR6	SNOCOR7	SNOCOR BOUNDARY	SNOCOR4	SNOCOR5	SNOCOR6	SNOCOR7	SNOCOR BOUNDARY
Copper (T)	ug/L	0.5	8.7	5.45	1.45	6.05	9.34	2	0.1	0.05	0.1	0.1	294	2.91	3.61	31.3	8.82
Iron (T)	ug/L	10	3840	364	504	80	1150	100	5	1	5	5	142000	173	819	14000	3320
Lead (T)	ug/L	0.2	25.5	1.94	2.59	3.2	9.61	0.4	0.02	0.005	0.02	0.02	2520	1.75	10.3	142	24.2
Lithium (T)	ug/L	2	2	<2.0	<2.0	<2.0	<2.0	10	0.5	0.5	0.5	0.5	28	<0.50	<0.50	5.72	0.87
Magnesium (T)	ug/L	50	1040	150	148	153	402	5000	250	10	250	250	22400	<250	257	2950	630
Manganese (T)	ug/L	1	35.4	6	16.3	3	14.2	2	0.1	0.05	0.1	0.1	1490	14.4	11.9	116	31.8
Molybdenum (T)	ug/L	1	<1.0	<1.0	<1.0	<1.0	<1.0	1	0.05	0.05	0.05	0.05	11.1	0.069	0.109	1.02	0.131
Nickel (T)	ug/L	1	3.4	<1.0	<1.0	<1.0	<1.0	2	0.1	0.02	0.1	0.1	56.5	0.64	0.423	8.56	1.33
Potassium (T)	ug/L	50	698	103	123	77	223	5000	250	10	250	250	9700	360	185	1830	280
Selenium (T)	ug/L	0.1	<0.10	<0.10	<0.10	<0.10	<0.10	0.8	0.04	0.04	0.04	0.04	1.08	<0.040	<0.040	0.14	<0.040
Silicon (T)	ug/L	100	2710	236	239	<100	482	1000	50	-	50	50	35300	118	-	6550	1000
Silver (T)	ug/L	0.02	<0.020	<0.020	0.027	<0.020	<0.020	0.2	0.01	0.005	0.01	0.01	0.37	<0.010	0.0068	0.115	0.017
Sodium (T)	ug/L	50	1730	270	608	936	1040	5000	250	10	250	250	29500	570	1030	5340	670
Strontium (T)	ug/L	1	24.7	2.2	3.1	3	8.8	1	0.05	0.05	0.05	0.05	552	2.89	8.83	59.1	15.3
Sulfur (T)	ug/L	3000	<3000	<3000	<3000	<3000	<3000	12000	600	-	600	600	25700	<600	-	1530	<600
Thallium (T)	ug/L	0.01	0.02	<0.010	<0.010	<0.010	<0.010	0.04	0.002	0.002	0.002	0.002	0.23	<0.0020	0.0033	0.042	0.0093
Tin (T)	ug/L	5	<5.0	<5.0	<5.0	<5.0	<5.0	4	0.2	0.2	0.2	0.2	<4.0	<0.20	<0.20	0.35	<0.20
Titanium (T)	ug/L	5	73.4	6.3	<5.0	<5.0	9.5	40	2	0.5	2	2	622	2.3	8.45	124	22.8
Uranium (T)	ug/L	0.1	0.11	<0.10	<0.10	<0.10	<0.10	0.1	0.005	0.002	0.005	0.005	1.2	<0.0050	0.0119	0.208	0.0246
Vanadium (T)	ug/L	5	<5.0	<5.0	<5.0	<5.0	<5.0	4	0.2	0.2	0.2	0.2	41.9	0.23	0.4	7.33	1.1
Zinc (T)	ug/L	5	11.4	11.4	6.2	8.5	12.7	20	1	0.1	1	1	213	12.6	5.45	67.5	11.9
Zirconium (T)	ug/L	0.1	0.95	<0.10	<0.10	<0.10	0.12	2	0.1	-	0.1	0.1	3.6	<0.10	-	3.29	0.15

Date: 24/02/2020

Snow Corer Radius = 4.1 cm

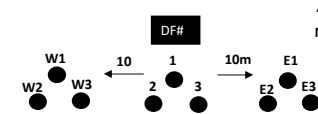
SNOCOR 5											
Sample	Depth (cm)	SPD/SWE	Total Depth (cm)	Snow Volume (cm3)	Total Mass (g or ml)	Snow Density	SWE				
1	11	SWE	91	4806	1670	35%	31.6227				
2	22	SWE									
3	21	SWE									
E1	21	SWE									
E2	16	SPD									
E3	20	SPD									
W1	18	SPD									
W2	23	SPD									
W3	21	SPD									

SNOCOR 4							
Sample	Depth (cm)	SPD/SWE	Total Depth (cm)	Snow Volume (cm3)	Total Mass (g or ml)	Snow Density	SWE
1	40	SWE	89	2038	1505	74%	65.71418
2	49	SWE					
3	58	SPD					
E1	55	SPD					
E2	61	SPD					
E3	54	SPD					
W1	55	SPD					
W2	54	SPD					
W3	58	SPD					

SNOCOR 6											
Sample	Depth (cm)	SPD/SWE	Total Depth (cm)	Snow Volume (cm3)	Total Mass (g or ml)	Snow Density	SWE				
1	5	SWE	76	1741	1692	97%	73.87933				
2	5	SWE									
3	3	SWE									
E1	7	SWE									
E2	12	SWE									
E3	11	SWE									
W1	13	SWE									
W2	12	SWE									
W3	8	SWE									
W4	15	SWE									

SNOCOR 7							
Sample	Depth (cm)	SPD/SWE	Total Depth (cm)	Snow Volume (cm3)	Total Mass (g or ml)	Snow Density	SWE
1	55	SWE	103	2359	1610	68%	70.29889
2	48	SWE					
3	45	SPD					
E1	45	SPD					
E2	44	SPD					
E3	41	SPD					
W1	44	SPD					
W2	47	SPD					
W3	39	SPD					

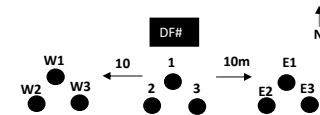
SNOCOR Boundary											
Sample	Depth (cm)	SPD/SWE	Total Depth (cm)	Snow Volume (cm3)	Total Mass (g or ml)	Snow Density	SWE				
1	17	SWE	174	3985	1355	34%	59.16459				
2	17	SWE									
3	18	SWE									
E1	21	SWE									
E2	23	SPD									
E3	23	SPD									
W1	22	SPD									
W2	14	SPD									
W3	19	SPD									



Date: 20/04/2020

Snow Corer Radius = 4.1 cm

SNOCOR 5							
Sample	Depth (cm)	SPD/SWE	Total Depth (cm)	Snow Volume (cm3)	Total Mass (g or ml)	Snow Density	SWE
1	7	SWE	49	2588	2380	92%	45.06707
2	13	SWE					
3	5	SWE					
E1	5	SWE					
E2	6	SWE					
E3	8	SWE					
W1	2	SWE					
W2	3	SWE					
W3	8	SPD					



SNOCOR 4							
Sample	Depth (cm)	SPD/SWE	Total Depth (cm)	Snow Volume (cm3)	Total Mass (g or ml)	Snow Density	SWE
1	55	SWE	113	5968	3360	56%	63.62411
2	58	SWE					
3	58	SPD					
E1	55	SPD					
E2	64	SPD					
E3	63	SPD					
W1	65	SPD					
W2	71	SPD					
W3	73	SPD					

Comment

SNOCOR 6							
Sample	Depth (cm)	SPD/SWE	Total Depth (cm)	Snow Volume (cm3)	Total Mass (g or ml)	Snow Density	SWE
1	6	SWE	45	2376	680	29%	12.87631
2	9	SWE					
3	10	SWE					
E1	6	SWE					
E2	6	SWE					
E3	8	SWE					
W1	10	SPD					
W2	7	SPD					
W3	10	SPD					

SNOCOR 7							
Sample	Depth (cm)	SPD/SWE	Total Depth (cm)	Snow Volume (cm3)	Total Mass (g or ml)	Snow Density	SWE
1	16	SWE	63	3327	1330	40%	25.18454
2	11	SWE					
3	13	SWE					
E1	9	SWE					
E2	14	SWE					
E3	7	SPD					
W1	14	SPD					
W2	14	SPD					
W3	14	SPD					

SNOCOR Boundary							
Sample	Depth (cm)	SPD/SWE	Total Depth (cm)	Snow Volume (cm3)	Total Mass (g or ml)	Snow Density	SWE
1	15	SWE	52	2746	970	35%	18.36767
2	15	SWE					
3	22	SWE					
E1	9	SPD					
E2	16	SPD					
E3	30	SPD					
W1	18	SPD					
W2	8	SPD					
W3	5	SPD					

Snow Density Survey - On Site

Sampler: JAB/GL

Date: 30/04/2020

Location	Core	Depth (cm)	Mass (g)	Density (g/cm ³)	Lat	Long
SNODENS PILE 1	1	70	4460	0.303	539075	6990167
	2	57	4250	0.323	539075	6990167
	3	74	4550	0.303	539075	6990167
SNODENS PILE 2	1	71	4660	0.336	539685	6990142
	2	65	4490	0.332	539676	6990136
	3	90	5280	0.356	539665	6990136
SNODENS PAD 1	1	60	4270	0.312	540326	6988695
	2	65	4190	0.271	540339	6988704
	3	88	4730	0.282	540353	6988719
SNODENS PAD 2	1	25	3450	0.313	541771	6988859
	2	15	3240	0.336	541760	6988876
	3	28	3660	0.379	541767	6988889
SNODENS NAT 1	1					
	2					
	3					
SNODENS NAT 2	1					
	2					
	3					

Location	Average Density (g/cm ³)
Snow Pile	0.325687336
Snow Pad	0.315340895
Natural Ground	#DIV/0!

Snow Density Survey - On Site

Sampler: JB/GL

Date: 2020-04-30

Location	Core	Depth (cm)	Mass (g) ^{kg}	Density (g/cm ³)	Lat	Long	Comments
SNODENS PILE 1	1	70	4.46		539075	6990167	Behind main camp
	2	57	4.25		"	"	1/10 in snow
	3	74	4.55		"	"	1/10 in snow (GPS too low)
SNODENS PILE 2	1	71	4.66		539685	6992142	CPI Snow Dump
	2	65	4.49		539176	6990136	
	3	90	5.28		539665	6990136	
SNODENS PAD 1	1	60	4.27		540326	6988665	CPS
	2	65	4.19		540339	6988704	CPS On N (H.1.1.1)
	3	88 (83)	4.73		540353	6988791	CPS (H.1.1.1)
SNODENS PAD 2	1	25	3.45		541771	6988859	Expo Camp
	2	15	3.24		541762	6988876	
	3	28	3.66		541767	6988859	
SNODENS NAT 1	1						
	2						
	3						
SNODENS NAT 2	1						
	2						
	3						

Location	Average Density (g/cm ³)
Snow Pile	#DIV/0!
Snow Pad	#DIV/0!
Natural Ground	#DIV/0!

TSF high density, could not core through.

CPS - Lots of ice from H19... will need > Avg than core shows
Also not much packing