



**Mary River Project 2024
Core Receiving Environment Monitoring
Program Report**

**Part 2 of 3
(Appendices A to E)**

Prepared for:
Baffinland Iron Mines Corporation
Oakville, Ontario

Prepared by:
Minnow Environmental Inc.
Georgetown, Ontario

March 2025

APPENDIX A

DATA QUALITY REVIEW

APPENDIX A DATA QUALITY REVIEW

A1	INTRODUCTION	1
A1.1	Background.....	1
A1.2	Quality Control Samples	1
A2	WATER CHEMISTRY AND PHYTOPLANKTON	4
A2.1	Lake Samples	4
A2.1.1	Laboratory Reporting Limits	4
A2.1.2	Laboratory, Equipment and Field Blanks.....	4
A2.1.3	Data Precision	5
A2.1.4	Data Accuracy	6
A2.1.5	Hold Times	6
A2.2	Stream Samples	6
A2.2.1	Laboratory Reporting Limits	6
A2.2.2	Laboratory, Equipment and Field Blanks.....	6
A2.2.3	Data Precision	7
A2.2.4	Data Accuracy	7
A2.2.5	Hold Times	8
A2.3	Data Quality Statement.....	9
A3	SEDIMENT SAMPLES	10
A3.1	Laboratory Reporting Limits.....	10
A3.2	Laboratory Blanks	10
A3.3	Data Precision	10
A3.4	Data Accuracy	10
A3.4	Data Quality Statement.....	10
A4	BENTHIC INVERTEBRATE COMMUNITY SAMPLES	11
A4.1	Lake Samples	11
A4.1.1	Subsampling Precision and Accuracy	11
A4.1.2	Sorting Efficiency.....	11
A4.2	Stream Samples	11
A4.2.1	Subsampling Precision and Accuracy	11
A4.2.2	Sorting Efficiency.....	11
A4.3	Data Quality Statement.....	12
A5	FISH AGING	13
A5.1	Data Accuracy	13
A6	DATA QUALITY STATEMENT	14



A1 INTRODUCTION

A1.1 Background

A variety of factors can influence the physical, chemical, and biological measurements made in an environmental study and thus affect the accuracy and/or precision of the data. Depending on their magnitude, inaccuracy and/or imprecision have the potential to affect the reliability of conclusions made from data; therefore, it is important to ensure that programs incorporate appropriate steps to control non-natural sources of data variability (i.e., minimize variability that does not reflect authentic spatial and temporal variability in the environment) and thus assure the quality of the data. Data quality as a concept is meaningful only when it relates to the intended use of the data. That is, one must know the context in which the data will be interpreted in order to establish a relevant basis for judging whether or not the data set is adequate. A data quality review (DQR) involves the comparison of field and laboratory measurement performance to Data Quality Objectives (DQOs) established for a particular study, such as evaluation of Laboratory Reporting Limits (LRL), blank sample data, data precision (based on field and laboratory duplicate samples), and data accuracy (based on matrix spike recoveries and/or analysis of standards or certified reference materials). Trusted analytical laboratories certified by the Canadian Association for Laboratory Accreditation (CALA) or the National Environmental Laboratory Accreditation Program (NELAP), with a rigorous internal quality assurance program, were selected to ensure the highest possible data quality. Data quality objectives were established a priori to reflect reasonable and achievable performance expectations. Programs involving many samples and analytes may sometimes yield results that exceed DQOs, which is particularly true for multi-element scans, as the analytical conditions are not necessarily optimal for every element included in the scan. Generally, scan results may be considered acceptable if no more than 20% of the parameters fail to meet DQOs. Overall, the intent of a DQR is not to reject any measurement that did not meet a DQO, but to ensure that any questionable data received more scrutiny to determine what effect, if any, this had on interpretation of results within the context of the project.

A1.2 Quality Control Samples

A DQR was conducted on all laboratory data collected as part of the Mary River Project Core Receiving Environment Monitoring Program (CREMP) in 2024 and involves the examination of analytical results associated with several types of Quality Control (QC) samples collected (or prepared) in the field and laboratory. General QC samples collected for this project, and a description of each, include the following:



- **Blanks** are samples of deionized water and/or appropriate reagent(s) that are handled and analyzed the same way as regular samples. These samples reflect contamination that occurred from the equipment (in the case of equipment blanks), in the field (in the case of trip or field blanks), or in the laboratory (in the case of laboratory or method blanks). Analyte concentrations should be non-detectable, although a data quality objective of five times the laboratory reporting limit (LRL) allowed for slight “noise” around the detection limit.
- **Trip Blanks** are meant to detect any widespread contamination resulting from the container (including caps) and preservative during transport and storage. A trip blank is a bottle set to which deionized water has been added in a laboratory prior to the field sample collections, which is transported with the regular sample bottles in the field, and remains unopened throughout the trip.
- **Field Blanks** mimic the sampling and preservative process but do not come in contact with ambient water. Field blanks are exposed to the sampling environment at the sample site. Consequently, they provide information on contamination resulting from the handling technique and through exposure to the atmosphere. They are processed in the same manner as the associated field samples (i.e., they are exposed to all the same potential sources of contamination as the field sample), including handling and, in some cases, filtration and/or preservation.
- **Equipment Blanks** are samples of deionized water collected from the sampling equipment following decontamination (i.e., rinsing of the sampling device using deionized water) in the field between sampling stations and/or events. These blanks are useful in identifying cross contamination of samples in the field as a result of the sampling device.
- **Field Duplicates** are sub-sample pairs collected from randomly selected field stations using identical collection and handling methods that are then analyzed separately in the laboratory. The duplicate samples are handled and analyzed in an identical manner in the laboratory. The data from field duplicate samples reflect natural variability, as well as the variability associated with sample collection methods, and therefore provide a measure of field precision.
- **Benthic Invertebrate Taxonomic Quality Control Samples** are a randomly selected portion of a benthic invertebrate community field samples to be assessed by the laboratory using an internal quality control audit. A blind re-enumeration and re-identification of random samples is performed by an analyst uninvolved in the original sample processing. This assessment quantifies taxonomic misidentification among laboratory analysts and ensures accurate organism identities are reported.



- **Benthic Invertebrate Laboratory Subsamples** are community samples prepared by the laboratory to ensure that the fraction of the total sample examined was an accurate representation of the total number of organisms. By comparing the amount recovered between at least two sub-samples, one can assess the analytical precision. In addition, comparisons of the sub-samples from the whole community sample allows for an evaluation of sub-sampling accuracy.



A2 WATER CHEMISTRY AND PHYTOPLANKTON

A2.1 Lake Samples

A2.1.1 Laboratory Reporting Limits

The analytical reports for water quality from ALS Environmental (ALS) were examined to determine which analytes had results below the laboratory reporting limit (LRL). The LRLs for water quality analytes were assessed relative to existing Canadian Council of Ministers of the Environment (CCME 2017) and Provincial Water Quality Objectives (PWQO; MOE 1999). For analytes with results less than LRL, all reported LRLs were lower than applicable guidelines (Appendix Table A.1¹). Overall, the achieved LRLs were appropriate for this study.

A2.1.2 Laboratory, Equipment and Field Blanks

Method blank (MB) samples were analyzed in the ALS laboratory reports (n=24). Of the 2,679 reported MB results, five analyte results exceeded the laboratory DQO including one result each for total ammonia, chromium, and molybdenum, and two results for total magnesium. As a relatively low number of MBs exceeded the laboratory DQO (0.19 % of all analyte results), and the MB results were not likely to impact the reliability of the results, these laboratory flags had a negligible impact on data reliability.

Seven field blank and trip blank samples were submitted to ALS for water quality analyses to assess the potential for field and shipping/transport contamination. Field and trip blanks were subject to the same laboratory DQOs as were used for MBs (i.e., concentrations should be <LRL). Of the 721 individual field blank results, 47 resulted in analyte detections above the LRL (Appendix Table A.2). Of the 721 total trip blank analyte results, 54 resulted in analyte detection above the LRL (Appendix Table A.2). Since only 6.5% of field and 7.5% of trip blank results were above the LRL, field and travel contamination was considered negligible, and field precision and accuracy were considered acceptable for this study.

A total of six equipment blank samples were collected during the 2024 CREMP, including two during the winter lake monitoring event, two during the summer lake monitoring event, and two during the fall lake monitoring event. Of the 618 individual analyte results, 82 resulted in

¹ Tables only include constituents with at least one result below the LRL or where the LRL was above guidelines. This applies to all other LRL tables for this appendix.



Table A.1: Laboratory Reporting Limit (LRL) Evaluation for Lake Water Chemistry, Mary River Project CREMP 2024

Constituent	Units	CCME WQG Long-term	CCME WQG Short-term	PWQO	Range of LRLs	No. Sample Results < LRL
Anions and Nutrient (Water)						
Alkalinity, Total (as CaCO3)	mg/L	-	-	-	2.00	1 (1%)
Phenols, total (4AAP)	mg/L	-	-	-	0.00100	154 (89%)
Pheophytin a	mg/L	-	-	-	0.000100 to 0.000200	9 (5%)
Pheophytin a	ug/sample	-	-	-	0.0200	9 (5%)
Total Suspended Solids	mg/L	-	-	-	1.00 to 1.70	161 (93%)
Turbidity, Lab	NTU	-	-	-	0.100	28 (16%)
Ammonia, Total (as N) ^a	mg/L	0.172	-	1.67	0.00500	78 (45%)
Bromide (Br)	mg/L	-	-	-	0.100	174 (100%)
Nitrate (as N)	mg/L	3.00	124	-	0.0200	64 (37%)
Nitrite (as N)	mg/L	0.0600	-	-	0.0100	174 (100%)
Phosphorus (P)-Total	mg/L	-	-	-	0.00200	12 (7%)
Total Kjeldahl Nitrogen	mg/L	-	-	-	0.0500	8 (5%)
Total Dissolved Solids	mg/L	-	-	-	14.0 to 20.0	1 (1%)
Total Metals (Water)						
Aluminum (Al)	mg/L	0.100	-	-	0.00300	6 (3%)
Antimony (Sb)	mg/L	-	-	0.0200	0.000100	174 (100%)
Arsenic (As)	mg/L	0.00500	-	0.00500	0.000100	164 (94%)
Beryllium (Be)	mg/L	-	-	0.0110	0.0000200	174 (100%)
Bismuth (Bi)	mg/L	-	-	-	0.0000500	174 (100%)
Boron (B)	mg/L	1.50	29.0	0.200	0.0100	103 (59%)
Cadmium (Cd)	mg/L	0.0000523	0.000540	0.000100	0.00000500	135 (78%)
Cesium (Cs)	mg/L	-	-	-	0.0000100	172 (99%)
Chromium (Cr)	mg/L	0.00100	-	0.00100	0.000500	170 (98%)
Cobalt (Co)	mg/L	-	-	0.000900	0.000100	172 (99%)
Iron (Fe)	mg/L	0.300	-	0.300	0.0100	41 (24%)
Lead (Pb)	mg/L	0.00100	-	0.00100	0.0000500	161 (93%)
Lithium (Li)	mg/L	-	-	-	0.00100	90 (52%)
Mercury (Hg)	mg/L	0.0000260	-	-	0.00000500	173 (99%)
Nickel (Ni)	mg/L	0.0250	-	0.0250	0.000500	68 (39%)
Selenium (Se)	mg/L	0.00100	-	0.100	0.0000500	135 (78%)
Silver (Ag)	mg/L	0.000250	-	0.000100	0.0000100	174 (100%)
Sulphur (S)	mg/L	-	-	-	0.500	22 (13%)
Tellurium (Te)	mg/L	-	-	-	0.000200	174 (100%)
Thallium (Tl)	mg/L	0.000800	-	0.000300	0.0000100	174 (100%)
Thorium (Th)	mg/L	-	-	-	0.000100	174 (100%)
Tin (Sn)	mg/L	-	-	-	0.000100	172 (99%)
Titanium (Ti)	mg/L	-	-	-	0.000300 to 0.00200	88 (51%)
Tungsten (W)	mg/L	-	-	0.0300	0.000100	174 (100%)
Vanadium (V)	mg/L	-	-	0.00600	0.000500	174 (100%)
Zinc (Zn)	mg/L	-	-	0.0200	0.00300	174 (100%)
Zirconium (Zr)	mg/L	-	-	0.00400	0.000200	174 (100%)
Dissolved Metals (Water)						
Aluminum (Al)	mg/L	-	-	0.0750	0.00100	1 (1%)
Antimony (Sb)	mg/L	-	-	-	0.000100	174 (100%)
Arsenic (As)	mg/L	-	-	-	0.000100	171 (98%)
Beryllium (Be)	mg/L	-	-	-	0.0000200	174 (100%)
Bismuth (Bi)	mg/L	-	-	-	0.0000500	174 (100%)
Boron (B)	mg/L	-	-	-	0.0100	102 (59%)
Cadmium (Cd)	mg/L	-	-	-	0.00000500	133 (76%)
Cesium (Cs)	mg/L	-	-	-	0.0000100	174 (100%)
Chromium (Cr)	mg/L	-	-	-	0.000500	172 (99%)
Cobalt (Co)	mg/L	-	-	-	0.000100	173 (99%)
Iron (Fe)	mg/L	-	-	-	0.0100	154 (89%)
Lead (Pb)	mg/L	-	-	-	0.0000500	173 (99%)
Lithium (Li)	mg/L	-	-	-	0.00100	79 (45%)
Manganese (Mn)	mg/L	0.100	2.06	-	0.000100	17 (10%)
Mercury (Hg)	mg/L	-	-	0.000200	0.00000500	174 (100%)
Nickel (Ni)	mg/L	-	-	-	0.000500	81 (47%)
Phosphorus (P)	mg/L	-	-	-	0.0500	174 (100%)
Selenium (Se)	mg/L	-	-	-	0.0000500	132 (76%)
Silver (Ag)	mg/L	-	-	-	0.0000100	174 (100%)
Sulphur (S)	mg/L	-	-	-	0.500	25 (14%)
Tellurium (Te)	mg/L	-	-	-	0.000200	174 (100%)
Thallium (Tl)	mg/L	-	-	-	0.0000100	174 (100%)
Thorium (Th)	mg/L	-	-	-	0.000100	174 (100%)
Tin (Sn)	mg/L	-	-	-	0.000100	172 (99%)
Titanium (Ti)	mg/L	-	-	-	0.000300 to 0.000400	166 (95%)
Tungsten (W)	mg/L	-	-	-	0.000100	174 (100%)
Vanadium (V)	mg/L	-	-	-	0.000500	174 (100%)
Zinc (Zn)	mg/L	0.00331	0.0274	-	0.00100	147 (84%)
Zirconium (Zr)	mg/L	-	-	-	0.000300	174 (100%)

 At least one LRL exceeded guideline.

Notes: The total number of samples assessed (n) was 174 including 6 duplicate sample(s). Only analytes with at least one result less than LRL or greater than applicable guidelines are displayed. LRL = Laboratory Reporting Limit. '-' indicates no applicable guideline exists. CCME WQG = Canadian Council of Ministers of the Environment Water Quality Guidelines. PWQO = Provincial Water Quality Objectives.

^aBased on most conservative guideline (Temperature = 6, pH = 9).

Table A.2: Evaluation of Lake Field and Trip Blank Results, Mary River Project CREMP, 2024

Constituent	Units	Range of LRLs	No. Field Blank Sample Results > LRL	No. Trip Blank Sample Results > LRL
Physical Tests				
Alkalinity, Total (as CaCO ₃)	mg/L	2.00	1 (14%)	0 (0%)
Phenols, total (4AAP)	mg/L	0.00100 to 0.00200	2 (29%)	2 (29%)
Pheophytin a	mg/L	0.000100 to 0.0200	2 (29%)	1 (14%)
Pheophytin a	ug/sample	0.000100 to 0.0200	2 (29%)	1 (14%)
Turbidity, Lab	NTU	0.100	1 (14%)	0 (0%)
Ammonia, Total (as N)	mg/L	0.00500	2 (29%)	1 (14%)
Organic Carbon (Water)				
Total Organic Carbon	mg/L	0.500	2 (29%)	5 (71%)
Dissolved Organic Carbon	mg/L	0.500	3 (43%)	3 (43%)
Total Metals (Water)				
Aluminum (Al)-Total	mg/L	0.00300	1 (14%)	0 (0%)
Barium (Ba)-Total	mg/L	0.000100	3 (43%)	6 (86%)
Calcium (Ca)-Total	mg/L	0.0500	2 (29%)	4 (57%)
Chromium (Cr)-Total	mg/L	0.000500	0 (0%)	1 (14%)
Iron (Fe)-Total	mg/L	0.0100	1 (14%)	1 (14%)
Magnesium (Mg)-Total	mg/L	0.00500	1 (14%)	3 (43%)
Manganese (Mn)-Total	mg/L	0.000100	1 (14%)	1 (14%)
Molybdenum (Mo)-Total	mg/L	0.0000500	0 (0%)	1 (14%)
Silicon (Si)-Total	mg/L	0.100	1 (14%)	1 (14%)
Sodium (Na)-Total	mg/L	0.0500	1 (14%)	0 (0%)
Strontium (Sr)-Total	mg/L	0.000200	1 (14%)	0 (0%)
Titanium (Ti)-Total	mg/L	0.000300	1 (14%)	0 (0%)
Dissolved Metals (Water)				
Aluminum (Al)-Dissolved	mg/L	0.00100	4 (57%)	3 (43%)
Barium (Ba)-Dissolved	mg/L	0.000100	3 (43%)	5 (71%)
Calcium (Ca)-Dissolved	mg/L	0.0500	2 (29%)	4 (57%)
Magnesium (Mg)-Dissolved	mg/L	0.00500	1 (14%)	1 (14%)
Silicon (Si)-Dissolved	mg/L	0.0500	1 (14%)	1 (14%)
Sodium (Na)-Dissolved	mg/L	0.0500	0 (0%)	2 (29%)
Strontium (Sr)-Dissolved	mg/L	0.000200	1 (14%)	1 (14%)
Zinc (Zn)-Dissolved	mg/L	0.00100	1 (14%)	0 (0%)
Plant Pigments (Water)				
Chlorophyll a	mg/L	0.0000100 to 0.00200	3 (43%)	3 (43%)
Chlorophyll a	ug/sample	0.0000100 to 0.00200	3 (43%)	3 (43%)

 At least one sample was above the LRL.

Notes: LRL = Laboratory reporting limit. Seven field blanks and seven trip blanks were sampled. Only analytes with at least one result greater than the LRL are displayed.

analyte detection above the LRL (Appendix Table A.3). As only 13.3% of the equipment blank results did not meet the DQO, equipment contamination of water samples was considered of little concern and laboratory precision was acceptable for this study (Appendix Table A.3).

Overall, although analyte detections in blanks samples were low, consistency in the specific analytes that were detected across samples triggered an investigation into the source of contamination to ensure the reliability of data. More details are provided in section A2.3 below.

A2.1.3 Data Precision

Laboratory duplicate samples were used to evaluate precision within the ALS laboratory reports. All of the 2,571 individual analyte results met the laboratory DQO, and therefore laboratory analytical precision was considered acceptable for this study.

Field sampling precision looks at relative percent difference (RPD), calculated as follows:

$$RPD = \frac{|R1 - R2|}{(|R1 + R2|/2)} * 100$$

Where R1 is the value of the original (“parent”) sample and R2 is the value of the duplicate sample, with the absolute difference and sum of the two samples used. RPDs cannot be calculated if both values are below the LRL. If the original and duplicate sample have the same value, then the RPD is 0%.

There are two applicable DQOs for field duplicates:

1. Each RPD comparison between the original and duplicate result should be < 25%; and,
2. Within each original and duplicate pairing (i.e., each duplicate pair), fewer than 20% of the total comparisons should be above the DQO as outlined above.

Six field duplicate samples were collected to assess lake water quality field sampling precision (Appendix Table A.4). Several RPDs could not be calculated as both analyte concentrations were below the LRL. Of the 330 RPDs that could be calculated, only 36 results did not meet the DQO of 25% and include analytes pheophytin a, total suspended solids, turbidity, total ammonia (as N), nitrate (as N), total phosphorus, total Kjeldahl nitrogen, total organic carbon, dissolved organic carbon, total aluminum, total calcium, total calcium, total chromium, total iron, total lithium, total selenium, total titanium, dissolved aluminum, dissolved cadmium, dissolved copper, dissolved lithium, dissolved selenium, dissolved zinc, and chlorophyll-a (Appendix Table A.4). Six RPDs were above 25% due to one result in the pair being below the LRL, where greater variability is expected. Additionally, the RPDs for these analytes were not consistently above the DQO across duplicate pairs (Appendix Table A.4). Overall, as only



Table A.3: Evaluation of Lake Equipment Blank Results, Mary River Project CREMP, 2024

Constituent	Units	Range of LRLs	No. Equipment Blank Sample Results > LRL
Anions and Nutrients (Water)			
Hardness - Dissolved (as CaCO ₃)	mg/L	0.500	2 (33%)
Phenols, total (4AAP)	mg/L	0.00100	1 (17%)
Nitrate (as N)	mg/L	0.0200	1 (17%)
Phosphorus (P)-Total	mg/L	0.002	1 (17%)
Sulphate	mg/L	0.300	1 (17%)
Total Kjeldahl Nitrogen	mg/L	0.0500	1 (17%)
Organic / Inorganic Carbon (Water)			
Total Organic Carbon	mg/L	0.500	6 (100%)
Dissolved Organic Carbon	mg/L	0.500	6 (100%)
Total Dissolved Solids	mg/L	18.0 to 19.0	1 (17%)
Total Metals (Water)			
Aluminum (Al)-Total	mg/L	0.00300	3 (50%)
Barium (Ba)-Total	mg/L	0.000100	5 (83%)
Calcium (Ca)-Total	mg/L	0.0500	5 (83%)
Magnesium (Mg)-Total	mg/L	0.00500	5 (83%)
Manganese (Mn)-Total	mg/L	0.000100	3 (50%)
Molybdenum (Mo)-Total	mg/L	0.0000500	1 (17%)
Sodium (Na)-Total	mg/L	0.0500	3 (50%)
Strontium (Sr)-Total	mg/L	0.000200	4 (67%)
Dissolved Metals (Water)			
Aluminum (Al)-Dissolved	mg/L	0.00100	5 (83%)
Barium (Ba)-Dissolved	mg/L	0.000100	5 (83%)
Boron (B)-Dissolved	mg/L	0.0100	1 (17%)
Calcium (Ca)-Dissolved	mg/L	0.0500	5 (83%)
Magnesium (Mg)-Dissolved	mg/L	0.00500	5 (83%)
Manganese (Mn)-Dissolved	mg/L	0.000100	2 (33%)
Sodium (Na)-Dissolved	mg/L	0.0500	4 (67%)
Strontium (Sr)-Dissolved	mg/L	0.000200	4 (67%)
Zinc (Zn)-Dissolved	mg/L	0.00100	2 (33%)
Plant Pigments (Water)			
Chlorophyll a	mg/L	0.0000100 to 0.00200	2 (33%)
Chlorophyll a	ug/sample	0.0000100 to 0.00200	2 (33%)


 At least one LRL exceeded guideline.
Notes: LRL = Laboratory reporting limit. Six field equipment blanks were sampled. Only analytes with at least one result greater than the LRL are displayed.

Table A.4: Evaluation of Lake Water Field Duplicate Results, Mary River Project CREMP, 2024

Constituent	Unit	Duplicate Pair 1			Duplicate Pair 2		
		QD-CC2_B_2024-04-11_ALS	BL0-05-A_B_2024-04-11_ALS	RPD (%)	QD-CC1_S_2024-04-15_ALS	DL0-01-1_S_2024-04-15_ALS	RPD (%)
Physical Tests							
Alkalinity, Total (as CaCO3)	mg/L	41.1	40.8	0.733	75.0	74.0	1.34
Conductivity	uS/cm	80.5	81.1	0.743	222	227	2.23
Hardness - Dissolved (as CaCO3)	mg/L	39.8	39.7	0.252	99.6	101	1.40
Phenols, total (4AAP)	mg/L	<0.001	<0.001	-	<0.001	<0.001	-
Pheophytin a	mg/L	<0.0001	<0.0001	-	0.000340	0.000375	9.79
Pheophytin a	ug/sample	<0.02	<0.02	-	0.0680	0.0750	9.79
Total Suspended Solids	mg/L	<1	<1	-	<1	<1	-
Turbidity, Lab	NTU	<0.1	<0.1	-	<0.1	<0.1	-
pH, Lab	pH	7.41	7.41	0	7.62	7.60	0.263
Anions and Nutrient (Water)							
Ammonia, Total (as N)	mg/L	<0.005	<0.005	-	0.00670	0.00700	4.38
Bromide (Br)	mg/L	<0.1	<0.1	-	<0.1	<0.1	-
Chloride (Cl)	mg/L	2.13	2.17	1.86	8.31	8.78	5.50
Nitrate (as N)	mg/L	0.0520	0.0560	7.41	0.426	0.580	30.6
Nitrite (as N)	mg/L	<0.01	<0.01	-	<0.01	<0.01	-
Phosphorus (P)-Total	mg/L	0.00680	0.00230	98.9	0.00230	0.00220	4.44
Sulphate	mg/L	1.74	1.76	1.14	23.1	24.0	3.82
Total Kjeldahl Nitrogen	mg/L	0.0690	0.0600	13.9	0.133	0.126	5.41
Organic / inorganic Carbon (Water)							
Total Organic Carbon	mg/L	1.74	1.26	32.0	2.01	1.98	1.50
Dissolved Organic Carbon	mg/L	2.02	1.37	38.4	2.26	2.01	11.7
Total Dissolved Solids	mg/L	49.0	49.0	0	124	128	3.17
Total Metals (Water)							
Aluminum (Al)	mg/L	0.00380	0.00400	5.13	0.00600	0.00630	4.88
Antimony (Sb)	mg/L	<0.0001	<0.0001	-	<0.0001	<0.0001	-
Arsenic (As)	mg/L	<0.0001	<0.0001	-	<0.0001	<0.0001	-
Barium (Ba)	mg/L	0.00460	0.00450	2.20	0.0112	0.0113	0.889
Beryllium (Be)	mg/L	<0.00002	<0.00002	-	<0.00002	<0.00002	-
Bismuth (Bi)	mg/L	<0.00005	<0.00005	-	<0.00005	<0.00005	-
Boron (B)	mg/L	<0.01	<0.01	-	0.0220	0.0220	0
Cadmium (Cd)	mg/L	<0.000005	<0.000005	-	0.00000530	0.00000670	23.3
Calcium (Ca)	mg/L	7.55	7.63	1.05	19.2	19.7	2.57
Cesium (Cs)	mg/L	<0.00001	<0.00001	-	<0.00001	<0.00001	-
Chromium (Cr)	mg/L	<0.0005	0.000710	34.7	<0.0005	<0.0005	-
Cobalt (Co)	mg/L	<0.0001	<0.0001	-	<0.0001	<0.0001	-
Copper (Cu)	mg/L	0.000620	0.000570	8.40	0.00105	0.00106	0.948
Iron (Fe)	mg/L	<0.01	<0.01	-	<0.01	<0.01	-
Lead (Pb)	mg/L	<0.00005	<0.00005	-	<0.00005	<0.00005	-
Lithium (Li)	mg/L	<0.001	<0.001	-	0.00270	0.00280	3.64
Magnesium (Mg)	mg/L	4.66	4.66	0	12.8	12.8	0
Manganese (Mn)	mg/L	0.000310	0.000320	3.17	0.000230	0.000190	19.1
Mercury (Hg)	mg/L	<0.000005	<0.000005	-	<0.000005	<0.000005	-
Molybdenum (Mo)	mg/L	0.000163	0.000189	14.8	0.00214	0.00215	0.466
Nickel (Ni)	mg/L	<0.0005	<0.0005	-	0.000680	0.000700	2.90
Potassium (K)	mg/L	0.557	0.555	0.360	2.28	2.30	0.873
Rubidium (Rb)	mg/L	0.00100	0.00100	0	0.00422	0.00432	2.34
Selenium (Se)	mg/L	<0.00005	<0.00005	-	0.0000560	0.0000530	5.50
Silicon (Si)	mg/L	0.410	0.400	2.47	0.770	0.770	0
Silver (Ag)	mg/L	<0.00001	<0.00001	-	<0.00001	<0.00001	-
Sodium (Na)	mg/L	1.19	1.20	0.837	2.61	2.70	3.39
Strontium (Sr)	mg/L	0.00690	0.00691	0.145	0.0265	0.0260	1.90
Sulphur (S)	mg/L	0.580	0.580	0	8.48	8.51	0.353
Tellurium (Te)	mg/L	<0.0002	<0.0002	-	<0.0002	<0.0002	-
Thallium (Tl)	mg/L	<0.00001	<0.00001	-	<0.00001	<0.00001	-
Thorium (Th)	mg/L	<0.0001	<0.0001	-	<0.0001	<0.0001	-
Tin (Sn)	mg/L	<0.0001	<0.0001	-	<0.0001	<0.0001	-
Titanium (Ti)	mg/L	<0.0003	<0.0003	-	<0.0003	<0.0003	-
Tungsten (W)	mg/L	<0.0001	<0.0001	-	<0.0001	<0.0001	-
Uranium (U)	mg/L	0.000711	0.000714	0.421	0.00306	0.00305	0.327
Vanadium (V)	mg/L	<0.0005	<0.0005	-	<0.0005	<0.0005	-
Zinc (Zn)	mg/L	<0.003	<0.003	-	<0.003	<0.003	-
Zirconium (Zr)	mg/L	<0.0002	<0.0002	-	<0.0002	<0.0002	-

Parameter concentration did not meet the data quality objective of ≤ 25% RPD.

Notes: The RPD was calculated using < LRL results at the LRL if one result in a duplicate pair was below the LRL. The RPD was not calculated if both results were <LRL.
RPD = relative percent difference. "-"= no data/not calculated. LRL = Laboratory Reporting Limit.

Table A.4: Evaluation of Lake Water Field Duplicate Results, Mary River Project CREMP, 2024

Constituent	Unit	Duplicate Pair 1			Duplicate Pair 2		
		QD-CC2_B_2024-04-11_ALS	BL0-05-A_B_2024-04-11_ALS	RPD (%)	QD-CC1_S_2024-04-15_ALS	DL0-01-1_S_2024-04-15_ALS	RPD (%)
Dissolved Metals (Water)							
Aluminum (Al)	mg/L	0.00300	0.00170	55.3	0.00580	0.00490	16.8
Antimony (Sb)	mg/L	<0.0001	<0.0001	-	<0.0001	<0.0001	-
Arsenic (As)	mg/L	<0.0001	<0.0001	-	<0.0001	<0.0001	-
Barium (Ba)	mg/L	0.00453	0.00451	0.442	0.0116	0.0119	2.55
Beryllium (Be)	mg/L	<0.00002	<0.00002	-	<0.00002	<0.00002	-
Bismuth (Bi)	mg/L	<0.00005	<0.00005	-	<0.00005	<0.00005	-
Boron (B)	mg/L	<0.01	<0.01	-	0.0220	0.0220	0
Cadmium (Cd)	mg/L	<0.000005	<0.000005	-	0.0000101	0.00000600	50.9
Calcium (Ca)	mg/L	7.79	7.84	0.640	18.8	19.2	2.11
Cesium (Cs)	mg/L	<0.00001	<0.00001	-	<0.00001	<0.00001	-
Chromium (Cr)	mg/L	<0.0005	<0.0005	-	<0.0005	<0.0005	-
Cobalt (Co)	mg/L	<0.0001	<0.0001	-	<0.0001	<0.0001	-
Copper (Cu)	mg/L	0.000520	0.000470	10.1	0.000940	0.000950	1.06
Iron (Fe)	mg/L	<0.01	<0.01	-	<0.01	<0.01	-
Lead (Pb)	mg/L	<0.00005	<0.00005	-	<0.00005	<0.00005	-
Lithium (Li)	mg/L	<0.001	<0.001	-	0.00280	0.00270	3.64
Magnesium (Mg)	mg/L	4.95	4.89	1.22	12.8	13.0	1.55
Manganese (Mn)	mg/L	0.000190	0.000160	17.1	<0.0001	<0.0001	-
Mercury (Hg)	mg/L	<0.000005	<0.000005	-	<0.000005	<0.000005	-
Molybdenum (Mo)	mg/L	0.000164	0.000153	6.94	0.00202	0.00201	0.496
Nickel (Ni)	mg/L	<0.0005	<0.0005	-	0.000650	0.000680	4.51
Phosphorus (P)	mg/L	<0.05	<0.05	-	<0.05	<0.05	-
Potassium (K)	mg/L	0.594	0.591	0.506	2.31	2.31	0
Rubidium (Rb)	mg/L	0.000950	0.000980	3.11	0.00439	0.00445	1.36
Selenium (Se)	mg/L	<0.00005	<0.00005	-	0.0000760	0.0000680	11.1
Silicon (Si)	mg/L	0.404	0.398	1.50	0.727	0.742	2.04
Silver (Ag)	mg/L	<0.00001	<0.00001	-	<0.00001	<0.00001	-
Sodium (Na)	mg/L	1.32	1.31	0.760	2.64	2.76	4.44
Strontium (Sr)	mg/L	0.00692	0.00678	2.04	0.0259	0.0258	0.387
Sulphur (S)	mg/L	0.580	0.570	1.74	8.62	8.56	0.698
Tellurium (Te)	mg/L	<0.0002	<0.0002	-	<0.0002	<0.0002	-
Thallium (Tl)	mg/L	<0.00001	<0.00001	-	<0.00001	<0.00001	-
Thorium (Th)	mg/L	<0.0001	<0.0001	-	<0.0001	<0.0001	-
Tin (Sn)	mg/L	<0.0001	<0.0001	-	<0.0001	<0.0001	-
Titanium (Ti)	mg/L	<0.0003	<0.0003	-	<0.0003	<0.0003	-
Tungsten (W)	mg/L	<0.0001	<0.0001	-	<0.0001	<0.0001	-
Uranium (U)	mg/L	0.000688	0.000674	2.06	0.00298	0.00300	0.669
Vanadium (V)	mg/L	<0.0005	<0.0005	-	<0.0005	<0.0005	-
Zinc (Zn)	mg/L	0.00400	<0.001	120	0.00110	0.00120	8.70
Zirconium (Zr)	mg/L	<0.0003	<0.0003	-	<0.0003	<0.0003	-
Volume Filtered	L	0.200	0.200	0	0.200	0.200	0
Plant Pigments (Water)							
Chlorophyll a	mg/L	0.0000340	0.0000290	15.9	0.000402	0.000565	33.7
Chlorophyll a	ug/sample	0.00680	0.00580	15.9	0.0805	0.113	33.6

Parameter concentration did not meet the data quality objective of ≤ 25% RPD.

Notes: The RPD was calculated using < LRL results at the LRL if one result in a duplicate pair was below the LRL. The RPD was not calculated if both results were <LRL.
RPD = relative percent difference. "-"= no data/not calculated. LRL = Laboratory Reporting Limit.

Table A.4: Evaluation of Lake Water Field Duplicate Results, Mary River Project CREMP, 2024

Constituent	Unit	Duplicate Pair 3			Duplicate Pair 4		
		QD-CC1_B_2024-08-04_ALS	DL0-01-7_S_2024-08-04_ALS	RPD (%)	QD-CC2FD_B_2024-08-05_ALS	DL0-02-7_B_2024-08-05_ALS	RPD (%)
Physical Tests							
Alkalinity, Total (as CaCO3)	mg/L	55.8	55.5	0.539	46.6	48.5	4.00
Conductivity	uS/cm	191	191	0	145	148	2.05
Hardness - Dissolved (as CaCO3)	mg/L	86.2	86.7	0.578	64.3	66.0	2.61
Phenols, total (4AAP)	mg/L	<0.001	<0.001	-	<0.001	<0.001	-
Pheophytin a	mg/L	0.00105	0.00107	1.89	0.00116	0.00142	20.2
Pheophytin a	ug/sample	0.105	0.107	1.89	0.116	0.142	20.2
Total Suspended Solids	mg/L	<1	<1	-	1.40	2.10	40.0
Turbidity, Lab	NTU	2.73	2.59	5.26	2.48	2.63	5.87
pH, Lab	pH	7.92	7.99	0.880	8.07	7.99	0.996
Anions and Nutrient (Water)							
Ammonia, Total (as N)	mg/L	<0.005	0.00710	34.7	0.00720	0.0140	64.2
Bromide (Br)	mg/L	<0.1	<0.1	-	<0.1	<0.1	-
Chloride (Cl)	mg/L	7.20	7.05	2.11	4.47	4.61	3.08
Nitrate (as N)	mg/L	0.442	0.441	0.227	0.224	0.228	1.77
Nitrite (as N)	mg/L	<0.01	<0.01	-	<0.01	<0.01	-
Phosphorus (P)-Total	mg/L	0.00290	0.00310	6.67	0.00320	0.00400	22.2
Sulphate	mg/L	21.8	21.7	0.460	12.4	12.8	3.17
Total Kjeldahl Nitrogen	mg/L	0.112	0.185	49.2	0.143	0.100	35.4
Organic / inorganic Carbon (Water)							
Total Organic Carbon	mg/L	1.96	2.08	5.94	1.99	2.62	27.3
Dissolved Organic Carbon	mg/L	2.20	1.99	10.0	1.90	2.34	20.8
Total Dissolved Solids	mg/L	98.0	104	5.94	82.0	74.0	10.3
Total Metals (Water)							
Aluminum (Al)	mg/L	0.0196	0.0216	9.71	0.0460	0.0449	2.42
Antimony (Sb)	mg/L	<0.0001	<0.0001	-	<0.0001	<0.0001	-
Arsenic (As)	mg/L	<0.0001	<0.0001	-	<0.0001	<0.0001	-
Barium (Ba)	mg/L	0.00901	0.00921	2.20	0.00782	0.00780	0.256
Beryllium (Be)	mg/L	<0.00002	<0.00002	-	<0.00002	<0.00002	-
Bismuth (Bi)	mg/L	<0.00005	<0.00005	-	<0.00005	<0.00005	-
Boron (B)	mg/L	0.0190	0.0200	5.13	0.0120	0.0120	0
Cadmium (Cd)	mg/L	<0.000005	0.00000750	40.0	<0.000005	<0.000005	-
Calcium (Ca)	mg/L	14.7	15.2	3.34	12.2	12.2	0
Cesium (Cs)	mg/L	<0.00001	<0.00001	-	<0.00001	<0.00001	-
Chromium (Cr)	mg/L	<0.0005	<0.0005	-	<0.0005	<0.0005	-
Cobalt (Co)	mg/L	<0.0001	<0.0001	-	<0.0001	<0.0001	-
Copper (Cu)	mg/L	0.000880	0.000840	4.65	0.000790	0.000800	1.26
Iron (Fe)	mg/L	0.0210	0.0230	9.09	0.0480	0.0490	2.06
Lead (Pb)	mg/L	<0.00005	<0.00005	-	<0.00005	<0.00005	-
Lithium (Li)	mg/L	0.00140	0.00130	7.41	0.00120	0.00120	0
Magnesium (Mg)	mg/L	11.1	11.2	0.897	8.29	8.23	0.726
Manganese (Mn)	mg/L	0.00422	0.00425	0.708	0.00247	0.00244	1.22
Mercury (Hg)	mg/L	<0.000005	<0.000005	-	<0.000005	<0.000005	-
Molybdenum (Mo)	mg/L	0.00156	0.00154	1.29	0.000994	0.00101	1.60
Nickel (Ni)	mg/L	0.000600	0.000640	6.45	<0.0005	<0.0005	-
Potassium (K)	mg/L	1.91	1.90	0.525	1.48	1.46	1.36
Rubidium (Rb)	mg/L	0.00361	0.00378	4.60	0.00260	0.00282	8.12
Selenium (Se)	mg/L	0.0000500	0.0000720	36.1	<0.00005	<0.00005	-
Silicon (Si)	mg/L	0.590	0.610	3.33	0.580	0.600	3.39
Silver (Ag)	mg/L	<0.00001	<0.00001	-	<0.00001	<0.00001	-
Sodium (Na)	mg/L	2.29	2.21	3.56	1.72	1.70	1.17
Strontium (Sr)	mg/L	0.0234	0.0230	1.72	0.0156	0.0155	0.643
Sulphur (S)	mg/L	7.37	7.32	0.681	4.44	4.43	0.225
Tellurium (Te)	mg/L	<0.0002	<0.0002	-	<0.0002	<0.0002	-
Thallium (Tl)	mg/L	<0.00001	<0.00001	-	<0.00001	<0.00001	-
Thorium (Th)	mg/L	<0.0001	<0.0001	-	<0.0001	<0.0001	-
Tin (Sn)	mg/L	<0.0001	<0.0001	-	<0.0001	<0.0001	-
Titanium (Ti)	mg/L	<0.001	<0.001	-	0.00236	0.00242	2.51
Tungsten (W)	mg/L	<0.0001	<0.0001	-	<0.0001	<0.0001	-
Uranium (U)	mg/L	0.00212	0.00216	1.87	0.00143	0.00144	0.697
Vanadium (V)	mg/L	<0.0005	<0.0005	-	<0.0005	<0.0005	-
Zinc (Zn)	mg/L	<0.003	<0.003	-	<0.003	<0.003	-
Zirconium (Zr)	mg/L	<0.0002	<0.0002	-	<0.0002	<0.0002	-

Parameter concentration did not meet the data quality objective of ≤ 25% RPD.

Notes: The RPD was calculated using < LRL results at the LRL if one result in a duplicate pair was below the LRL. The RPD was not calculated if both results were <LRL.
RPD = relative percent difference. "-"= no data/not calculated. LRL = Laboratory Reporting Limit.

Table A.4: Evaluation of Lake Water Field Duplicate Results, Mary River Project CREMP, 2024

Constituent	Unit	Duplicate Pair 3			Duplicate Pair 4		
		QD-CC1_B_2024-08-04_ALS	DL0-01-7_S_2024-08-04_ALS	RPD (%)	QD-CC2FD_B_2024-08-05_ALS	DL0-02-7_B_2024-08-05_ALS	RPD (%)
Dissolved Metals (Water)							
Aluminum (Al)	mg/L	0.00450	0.00710	44.8	0.00650	0.00800	20.7
Antimony (Sb)	mg/L	<0.0001	<0.0001	-	<0.0001	<0.0001	-
Arsenic (As)	mg/L	<0.0001	<0.0001	-	<0.0001	<0.0001	-
Barium (Ba)	mg/L	0.00887	0.00910	2.56	0.00740	0.00715	3.44
Beryllium (Be)	mg/L	<0.00002	<0.00002	-	<0.00002	<0.00002	-
Bismuth (Bi)	mg/L	<0.00005	<0.00005	-	<0.00005	<0.00005	-
Boron (B)	mg/L	0.0160	0.0160	0	0.0120	0.0120	0
Cadmium (Cd)	mg/L	0.00000520	0.00000720	32.3	<0.000005	<0.000005	-
Calcium (Ca)	mg/L	15.4	15.6	1.29	12.2	12.0	1.65
Cesium (Cs)	mg/L	<0.00001	<0.00001	-	<0.00001	<0.00001	-
Chromium (Cr)	mg/L	<0.0005	<0.0005	-	<0.0005	<0.0005	-
Cobalt (Co)	mg/L	<0.0001	<0.0001	-	<0.0001	<0.0001	-
Copper (Cu)	mg/L	0.000820	0.000840	2.41	0.000700	0.000700	0
Iron (Fe)	mg/L	<0.01	<0.01	-	<0.01	<0.01	-
Lead (Pb)	mg/L	<0.00005	<0.00005	-	<0.00005	<0.00005	-
Lithium (Li)	mg/L	0.00190	0.00180	5.41	0.00140	0.00110	24.0
Magnesium (Mg)	mg/L	11.6	11.6	0	8.22	8.74	6.13
Manganese (Mn)	mg/L	0.00103	0.00108	4.74	0.000420	0.000370	12.7
Mercury (Hg)	mg/L	<0.000005	<0.000005	-	<0.000005	<0.000005	-
Molybdenum (Mo)	mg/L	0.00156	0.00158	1.27	0.00101	0.00101	0
Nickel (Ni)	mg/L	0.000610	0.000600	1.65	<0.0005	<0.0005	-
Phosphorus (P)	mg/L	<0.05	<0.05	-	<0.05	<0.05	-
Potassium (K)	mg/L	1.95	1.95	0	1.46	1.38	5.63
Rubidium (Rb)	mg/L	0.00362	0.00367	1.37	0.00264	0.00265	0.378
Selenium (Se)	mg/L	0.0000760	0.0000590	25.2	<0.00005	<0.00005	-
Silicon (Si)	mg/L	0.571	0.569	0.351	0.486	0.468	3.77
Silver (Ag)	mg/L	<0.00001	<0.00001	-	<0.00001	<0.00001	-
Sodium (Na)	mg/L	2.33	2.29	1.73	1.72	1.73	0.580
Strontium (Sr)	mg/L	0.0232	0.0238	2.55	0.0158	0.0162	2.50
Sulphur (S)	mg/L	7.67	7.84	2.19	4.70	4.37	7.28
Tellurium (Te)	mg/L	<0.0002	<0.0002	-	<0.0002	<0.0002	-
Thallium (Tl)	mg/L	<0.00001	<0.00001	-	<0.00001	<0.00001	-
Thorium (Th)	mg/L	<0.0001	<0.0001	-	<0.0001	<0.0001	-
Tin (Sn)	mg/L	<0.0001	<0.0001	-	<0.0001	<0.0001	-
Titanium (Ti)	mg/L	<0.0003	<0.0003	-	<0.0003	<0.0003	-
Tungsten (W)	mg/L	<0.0001	<0.0001	-	<0.0001	<0.0001	-
Uranium (U)	mg/L	0.00209	0.00205	1.93	0.00142	0.00139	2.14
Vanadium (V)	mg/L	<0.0005	<0.0005	-	<0.0005	<0.0005	-
Zinc (Zn)	mg/L	<0.001	<0.001	-	<0.001	<0.001	-
Zirconium (Zr)	mg/L	<0.0003	<0.0003	-	<0.0003	<0.0003	-
Volume Filtered	L	0.100	0.100	0	0.100	0.100	0
Plant Pigments (Water)							
Chlorophyll a	mg/L	0.000972	0.000967	0.516	0.00235	0.00158	39.2
Chlorophyll a	ug/sample	0.0972	0.0967	0.516	0.235	0.158	39.2

Parameter concentration did not meet the data quality objective of ≤ 25% RPD.

Notes: The RPD was calculated using < LRL results at the LRL if one result in a duplicate pair was below the LRL. The RPD was not calculated if both results were <LRL.
RPD = relative percent difference. "-"= no data/not calculated. LRL = Laboratory Reporting Limit.

Table A.4: Evaluation of Lake Water Field Duplicate Results, Mary River Project CREMP, 2024

Constituent	Unit	Duplicate Pair 5			Duplicate Pair 6		
		QD-CC2FD_S_2024-09-04_ALS	DL0-02-6_S_2024-08-04_ALS	RPD (%)	QD-CC1FD_B_2024-09-06_ALS	DL0-01-1_S_2024-09-06_ALS	RPD (%)
Physical Tests							
Alkalinity, Total (as CaCO3)	mg/L	54.9	50.0	9.34	60.3	59.3	1.67
Conductivity	uS/cm	160	163	1.86	205	205	0
Hardness - Dissolved (as CaCO3)	mg/L	73.4	73.0	0.546	93.4	94.1	0.747
Phenols, total (4AAP)	mg/L	<0.001	<0.001	-	<0.001	<0.001	-
Pheophytin a	mg/L	0.000830	0.00101	19.6	0.00262	0.000800	106
Pheophytin a	ug/sample	0.0830	0.101	19.6	0.262	0.0800	106
Total Suspended Solids	mg/L	<1	1.00	0	<1	<1	-
Turbidity, Lab	NTU	0.680	2.24	107	0.460	0.370	21.7
pH, Lab	pH	7.94	7.75	2.42	7.93	7.93	0
Anions and Nutrient (Water)							
Ammonia, Total (as N)	mg/L	0.0108	<0.005	73.4	<0.005	<0.005	-
Bromide (Br)	mg/L	<0.1	<0.1	-	<0.1	<0.1	-
Chloride (Cl)	mg/L	4.96	5.45	9.41	7.64	7.63	0.131
Nitrate (as N)	mg/L	0.300	0.310	3.28	0.594	0.590	0.676
Nitrite (as N)	mg/L	<0.01	<0.01	-	<0.01	<0.01	-
Phosphorus (P)-Total	mg/L	0.00380	0.00340	11.1	0.00290	0.00260	10.9
Sulphate	mg/L	14.2	15.9	11.3	26.2	26.1	0.382
Total Kjeldahl Nitrogen	mg/L	0.209	0.134	43.7	0.154	0.136	12.4
Organic / inorganic Carbon (Water)							
Total Organic Carbon	mg/L	2.25	1.94	14.8	2.16	1.92	11.8
Dissolved Organic Carbon	mg/L	2.23	2.29	2.65	1.57	1.92	20.1
Total Dissolved Solids	mg/L	98.0	79.0	21.5	83.0	104	22.5
Total Metals (Water)							
Aluminum (Al)	mg/L	0.0225	0.0334	39.0	0.0121	0.0112	7.73
Antimony (Sb)	mg/L	<0.0001	<0.0001	-	<0.0001	<0.0001	-
Arsenic (As)	mg/L	<0.0001	<0.0001	-	<0.0001	<0.0001	-
Barium (Ba)	mg/L	0.00837	0.00835	0.239	0.00975	0.00972	0.308
Beryllium (Be)	mg/L	<0.00002	<0.00002	-	<0.00002	<0.00002	-
Bismuth (Bi)	mg/L	<0.00005	<0.00005	-	<0.00005	<0.00005	-
Boron (B)	mg/L	0.0140	0.0150	6.90	0.0180	0.0180	0
Cadmium (Cd)	mg/L	<0.000005	0.00000620	21.4	0.00000880	0.0000105	17.6
Calcium (Ca)	mg/L	13.8	13.3	3.69	16.9	17.1	1.18
Cesium (Cs)	mg/L	<0.00001	<0.00001	-	<0.00001	<0.00001	-
Chromium (Cr)	mg/L	<0.0005	<0.0005	-	<0.0005	<0.0005	-
Cobalt (Co)	mg/L	<0.0001	<0.0001	-	<0.0001	<0.0001	-
Copper (Cu)	mg/L	0.000870	0.000880	1.14	0.000860	0.000920	6.74
Iron (Fe)	mg/L	0.0260	0.0350	29.5	0.0120	0.0110	8.70
Lead (Pb)	mg/L	<0.00005	0.0000540	7.69	<0.00005	<0.00005	-
Lithium (Li)	mg/L	0.00150	0.00100	40.0	0.00220	0.00220	0
Magnesium (Mg)	mg/L	9.31	9.31	0	12.2	12.0	1.65
Manganese (Mn)	mg/L	0.00238	0.00287	18.7	0.00494	0.00484	2.04
Mercury (Hg)	mg/L	<0.000005	<0.000005	-	<0.000005	<0.000005	-
Molybdenum (Mo)	mg/L	0.00113	0.00112	0.889	0.00181	0.00180	0.554
Nickel (Ni)	mg/L	0.000590	0.000620	4.96	0.000630	0.000750	17.4
Potassium (K)	mg/L	1.52	1.54	1.31	2.06	2.07	0.484
Rubidium (Rb)	mg/L	0.00276	0.00294	6.32	0.00388	0.00379	2.35
Selenium (Se)	mg/L	0.0000580	<0.00005	14.8	0.0000770	0.0000840	8.70
Silicon (Si)	mg/L	0.510	0.600	16.2	0.570	0.560	1.77
Silver (Ag)	mg/L	<0.00001	<0.00001	-	<0.00001	<0.00001	-
Sodium (Na)	mg/L	1.89	1.87	1.06	2.48	2.44	1.63
Strontium (Sr)	mg/L	0.0184	0.0188	2.15	0.0280	0.0286	2.12
Sulphur (S)	mg/L	5.00	5.47	8.98	9.17	9.02	1.65
Tellurium (Te)	mg/L	<0.0002	<0.0002	-	<0.0002	<0.0002	-
Thallium (Tl)	mg/L	<0.00001	<0.00001	-	<0.00001	<0.00001	-
Thorium (Th)	mg/L	<0.0001	<0.0001	-	<0.0001	<0.0001	-
Tin (Sn)	mg/L	<0.0001	<0.0001	-	<0.0001	<0.0001	-
Titanium (Ti)	mg/L	<0.001	0.00144	36.1	<0.0004	<0.0004	-
Tungsten (W)	mg/L	<0.0001	<0.0001	-	<0.0001	<0.0001	-
Uranium (U)	mg/L	0.00164	0.00166	1.21	0.00265	0.00262	1.14
Vanadium (V)	mg/L	<0.0005	<0.0005	-	<0.0005	<0.0005	-
Zinc (Zn)	mg/L	<0.003	<0.003	-	<0.003	<0.003	-
Zirconium (Zr)	mg/L	<0.0002	<0.0002	-	<0.0002	<0.0002	-

Parameter concentration did not meet the data quality objective of ≤ 25% RPD.

Notes: The RPD was calculated using < LRL results at the LRL if one result in a duplicate pair was below the LRL. The RPD was not calculated if both results were <LRL.
RPD = relative percent difference. "-"= no data/not calculated. LRL = Laboratory Reporting Limit.

Constituent	Unit	Duplicate Pair 5			Duplicate Pair 6		
		QD-CC2FD_S_2024-09-04_ALS	DL0-02-6_S_2024-08-04_ALS	RPD (%)	QD-CC1FD_B_2024-09-06_ALS	DL0-01-1_S_2024-09-06_ALS	RPD (%)
Dissolved Metals (Water)							
Aluminum (Al)	mg/L	0.0133	0.00700	62.1	0.00390	0.00400	2.53
Antimony (Sb)	mg/L	<0.0001	<0.0001	-	<0.0001	<0.0001	-
Arsenic (As)	mg/L	<0.0001	<0.0001	-	<0.0001	<0.0001	-
Barium (Ba)	mg/L	0.00793	0.00785	1.01	0.00962	0.00977	1.55
Beryllium (Be)	mg/L	<0.00002	<0.00002	-	<0.00002	<0.00002	-
Bismuth (Bi)	mg/L	<0.00005	<0.00005	-	<0.00005	<0.00005	-
Boron (B)	mg/L	0.0130	0.0120	8.00	0.0170	0.0170	0
Cadmium (Cd)	mg/L	<0.000005	<0.000005	-	0.00000510	0.00000730	35.5
Calcium (Ca)	mg/L	13.7	13.1	4.48	16.8	17.4	3.51
Cesium (Cs)	mg/L	<0.00001	<0.00001	-	<0.00001	<0.00001	-
Chromium (Cr)	mg/L	<0.0005	<0.0005	-	<0.0005	<0.0005	-
Cobalt (Co)	mg/L	<0.0001	<0.0001	-	<0.0001	<0.0001	-
Copper (Cu)	mg/L	0.000730	0.000990	30.2	0.000760	0.000780	2.60
Iron (Fe)	mg/L	<0.01	<0.01	-	<0.01	<0.01	-
Lead (Pb)	mg/L	<0.00005	<0.00005	-	<0.00005	<0.00005	-
Lithium (Li)	mg/L	0.00150	0.00110	30.8	0.00210	0.00240	13.3
Magnesium (Mg)	mg/L	9.53	9.79	2.69	12.5	12.3	1.61
Manganese (Mn)	mg/L	0.000520	0.000620	17.5	0.000160	0.000180	11.8
Mercury (Hg)	mg/L	<0.000005	<0.000005	-	<0.000005	<0.000005	-
Molybdenum (Mo)	mg/L	0.00109	0.00118	7.93	0.00175	0.00173	1.15
Nickel (Ni)	mg/L	0.000540	0.000530	1.87	0.000590	0.000580	1.71
Phosphorus (P)	mg/L	<0.05	<0.05	-	<0.05	<0.05	-
Potassium (K)	mg/L	1.53	1.58	3.22	2.07	2.10	1.44
Rubidium (Rb)	mg/L	0.00280	0.00284	1.42	0.00375	0.00384	2.37
Selenium (Se)	mg/L	<0.00005	<0.00005	-	0.0000820	0.0000720	13.0
Silicon (Si)	mg/L	0.464	0.529	13.1	0.518	0.530	2.29
Silver (Ag)	mg/L	<0.00001	<0.00001	-	<0.00001	<0.00001	-
Sodium (Na)	mg/L	2.05	1.99	2.97	2.50	2.46	1.61
Strontium (Sr)	mg/L	0.0181	0.0189	4.32	0.0279	0.0284	1.78
Sulphur (S)	mg/L	5.06	5.33	5.20	9.16	8.98	1.98
Tellurium (Te)	mg/L	<0.0002	<0.0002	-	<0.0002	<0.0002	-
Thallium (Tl)	mg/L	<0.00001	<0.00001	-	<0.00001	<0.00001	-
Thorium (Th)	mg/L	<0.0001	<0.0001	-	<0.0001	<0.0001	-
Tin (Sn)	mg/L	<0.0001	<0.0001	-	<0.0001	<0.0001	-
Titanium (Ti)	mg/L	<0.0004	<0.0003	-	<0.0003	<0.0003	-
Tungsten (W)	mg/L	<0.0001	<0.0001	-	<0.0001	<0.0001	-
Uranium (U)	mg/L	0.00158	0.00159	0.631	0.00251	0.00256	1.97
Vanadium (V)	mg/L	<0.0005	<0.0005	-	<0.0005	<0.0005	-
Zinc (Zn)	mg/L	<0.001	0.00110	9.52	<0.001	<0.001	-
Zirconium (Zr)	mg/L	<0.0003	<0.0003	-	<0.0003	<0.0003	-
Volume Filtered	L	0.100	0.100	0	0.100	0.100	0
Plant Pigments (Water)							
Chlorophyll a	mg/L	0.00143	0.00133	7.25	0.00132	0.00121	8.70
Chlorophyll a	ug/sample	0.143	0.133	7.25	0.132	0.121	8.70

Parameter concentration did not meet the data quality objective of ≤ 25% RPD.

Notes: The RPD was calculated using < LRL results at the LRL if one result in a duplicate pair was below the LRL. The RPD was not calculated if both results were <LRL.
RPD = relative percent difference. "-"= no data/not calculated. LRL = Laboratory Reporting Limit.

10.9% of all water quality duplicate comparisons did not meet the DQO, field precision and reproducibility of these samples were considered acceptable for this study.

A2.1.4 Data Accuracy

Data accuracy was evaluated based on results of Laboratory Control Samples (LCS) and Matrix Spike (MS) samples within the ALS laboratory reports. Of the 2,599 individual LCS analyte results, 211 analyte results did not meet the laboratory DQO. Out of 2,402 individual MS analyte results, 92 individual MS results did not meet the DQO. As 8.1% of LCS results and 3.8% of MS results did not meet the DQO, the accuracy achieved by the laboratory was considered acceptable for this study.

A2.1.5 Hold Times

The recommended hold times for pH (15 minutes) were exceeded in all samples, and for turbidity (three days) in 194 samples collected. However, for these physical tests, *in situ* measures were used to support data interpretation and, as such, hold time exceedances for these laboratory results have no impact on data interpretability. Several additional analytes, including dissolved orthophosphate, nitrite, and nitrate (recommended hold times ≤ 48 hours), also exceeded recommended hold times. A combination of short hold times, shipping of samples from a remote location, and laboratory sample and workload delays resulted in hold time exceedances prior to analysis for results outlined above. Analyte results with hold time exceedances were similar to those samples without hold time exceedances in 2024 and were within the range of historic results, suggesting little if any impact of the hold time exceedances on analyte results.

A2.2 Stream Samples

A2.2.1 Laboratory Reporting Limits

The analytical reports for stream water quality from ALS were examined to determine analyte results below the LRL. The LRLs for water quality analytes were assessed relative to existing Canadian Council of Ministers of the Environment (CCME 2017) and Provincial Water Quality Objectives (PWQO; MOE 1999). Several analytes had at least one result below the LRL (Appendix Table A.5). For analytes with results $< \text{LRL}$, all reported LRLs were lower than applicable guidelines and were not of concern (Appendix Table A.5). Overall, the achieved LRLs were appropriate for this study.


A2.2.2 Laboratory and Field Blanks

Method blank (MB) samples were analyzed in the ALS laboratory reports ($n=7$). Of the 965 reported MB results, only 12 results exceeded the laboratory DQO and had



Table A.5: Laboratory Reporting Limit (LRL) Evaluation for Stream Water Chemistry Relative to CCME, Mary River Project CREMP, 2024

Constituent	Units	CCME WQG Long-term	CCME WQG Short-term	PWQO	Range of LRLs	No. Sample Results < LRL
Anions and Nutrient (Water)						
Phenols, total (4AAP)	mg/L	-	-	-	0.00100	87 (96%)
Pheophytin a	mg/L	-	-	-	0.0000980 to 0.000200	25 (27%)
Pheophytin a	ug/sample	-	-	-	0.0200	25 (27%)
Total Suspended Solids	mg/L	-	-	-	1.00 to 1.60	74 (81%)
Ammonia, Total (as N) ^a	mg/L	0.172	-	1.67	0.00500 to 0.0250	52 (57%)
Bromide (Br)	mg/L	-	-	-	0.100	88 (97%)
Chloride (Cl)	mg/L	120	640	-	0.500	16 (18%)
Nitrate (as N)	mg/L	3.00	124	-	0.0200	44 (48%)
Nitrite (as N)	mg/L	0.0600	-	-	0.0100	85 (93%)
Phosphorus (P)-Total	mg/L	-	-	-	0.00200	43 (47%)
Sulphate	mg/L	-	-	-	0.300	7 (8%)
Total Kjeldahl Nitrogen	mg/L	-	-	-	0.0500	10 (11%)
Physical Tests						
Total Dissolved Solids	mg/L	-	-	-	16.0 to 22.0	3 (3%)
Total Metals (Water)						
Antimony (Sb)	mg/L	-	-	0.0200	0.000100	91 (100%)
Arsenic (As)	mg/L	0.00500	-	0.00500	0.000100	86 (95%)
Beryllium (Be)	mg/L	-	-	0.0110	0.0000200	90 (99%)
Bismuth (Bi)	mg/L	-	-	-	0.0000500	91 (100%)
Boron (B)	mg/L	1.50	29.0	0.200	0.0100	80 (88%)
Cadmium (Cd)	mg/L	0.0000400	0.000123	0.000100	0.00000500	81 (89%)
Cesium (Cs)	mg/L	-	-	-	0.0000100	27 (30%)
Chromium (Cr)	mg/L	0.00100	-	0.00100	0.000500	84 (92%)
Cobalt (Co)	mg/L	-	-	0.000900	0.000100	76 (84%)
Copper (Cu)	mg/L	0.00200	-	0.00100	0.000500	16 (18%)
Iron (Fe)	mg/L	0.300	-	0.300	0.0100	3 (3%)
Lead (Pb)	mg/L	0.00100	-	0.00100	0.0000500	42 (46%)
Lithium (Li)	mg/L	-	-	-	0.00100	69 (76%)
Mercury (Hg)	mg/L	0.0000260	-	-	0.000005	91 (100%)
Molybdenum (Mo)	mg/L	0.0730	-	0.0400	0.0000500	6 (7%)
Nickel (Ni)	mg/L	0.0250	-	0.0250	0.000500	49 (54%)
Selenium (Se)	mg/L	0.00100	-	0.100	0.0000500	71 (78%)
Silver (Ag)	mg/L	0.000250	-	0.000100	0.0000100	91 (100%)
Sulphur (S)	mg/L	-	-	-	0.500	27 (30%)
Tellurium (Te)	mg/L	-	-	-	0.000200	91 (100%)
Thallium (Tl)	mg/L	0.000800	-	0.000300	0.0000100	79 (87%)
Thorium (Th)	mg/L	-	-	-	0.000100	84 (92%)
Tin (Sn)	mg/L	-	-	-	0.000100	90 (99%)
Titanium (Ti)	mg/L	-	-	-	0.000300 to 0.00300	22 (24%)
Tungsten (W)	mg/L	-	-	0.0300	0.000100	90 (99%)
Vanadium (V)	mg/L	-	-	0.00600	0.000500	86 (95%)
Zinc (Zn)	mg/L	-	-	0.0200	0.00300	90 (99%)
Zirconium (Zr)	mg/L	-	-	0.00400	0.000200	69 (76%)
Dissolved Metals (Water)						
Antimony (Sb)	mg/L	-	-	-	0.000100	91 (100%)
Arsenic (As)	mg/L	-	-	-	0.000100	88 (97%)
Beryllium (Be)	mg/L	-	-	-	0.0000200	91 (100%)
Bismuth (Bi)	mg/L	-	-	-	0.0000500	91 (100%)
Boron (B)	mg/L	-	-	-	0.0100	80 (88%)
Cadmium (Cd)	mg/L	-	-	-	0.00000500	82 (90%)
Cesium (Cs)	mg/L	-	-	-	0.0000100	75 (82%)
Chromium (Cr)	mg/L	-	-	-	0.000500	90 (99%)
Cobalt (Co)	mg/L	-	-	-	0.000100	81 (89%)
Copper (Cu)	mg/L	-	-	-	0.000200	1 (1%)
Iron (Fe)	mg/L	-	-	-	0.0100	43 (47%)
Lead (Pb)	mg/L	-	-	-	0.0000500	86 (95%)
Lithium (Li)	mg/L	-	-	-	0.00100	60 (66%)
Manganese (Mn)	mg/L	0.0900	0.574	-	0.000100	2 (2%)
Mercury (Hg)	mg/L	-	-	0.000200	0.00000500	91 (100%)
Molybdenum (Mo)	mg/L	-	-	-	0.0000500	7 (8%)
Nickel (Ni)	mg/L	-	-	-	0.000500	60 (66%)
Phosphorus (P)	mg/L	-	-	-	0.0500	91 (100%)
Selenium (Se)	mg/L	-	-	-	0.0000500	70 (77%)
Silver (Ag)	mg/L	-	-	-	0.0000100	91 (100%)
Sulphur (S)	mg/L	-	-	-	0.500	29 (32%)
Tellurium (Te)	mg/L	-	-	-	0.000200	91 (100%)
Thallium (Tl)	mg/L	-	-	-	0.0000100	82 (90%)
Thorium (Th)	mg/L	-	-	-	0.000100	90 (99%)
Tin (Sn)	mg/L	-	-	-	0.000100	90 (99%)
Titanium (Ti)	mg/L	-	-	-	0.000300 to 0.000800	46 (51%)
Tungsten (W)	mg/L	-	-	-	0.000100	90 (99%)
Vanadium (V)	mg/L	-	-	-	0.000500	91 (100%)
Zinc (Zn)	mg/L	0.00263	0.0149	-	0.00100	80 (88%)
Zirconium (Zr)	mg/L	-	-	-	0.000300	89 (98%)

 At least one LRL exceeded guideline.

Notes: The total number of samples assessed (n) was 91 including 3 duplicate sample(s). Only analytes with at least one result less than LRL or greater than applicable guidelines are displayed. LRL = Laboratory Reporting Limit. '-' indicates no applicable guideline exists. CCME WQG = Canadian Council of Ministers of the Environment Water Quality Guidelines. PWQO = Provincial Water Quality Objectives.

^aBased on most conservative guideline (Temperature = 6, pH = 9).

detectable concentrations. As 1.2% of MB results exceeded the laboratory DQO, and the MB results were not likely to impact the reliability of the results, these laboratory flags had a negligible impact on data reliability.

Three field and three trip blank stream samples were submitted to ALS for water quality analyses to assess the potential for field sampling and shipping/transport contamination. Field and trip blanks were subject to the same laboratory DQOs as were used for MBs (i.e., concentrations should be <LRL). Of the 309 individual field blank results, 31 resulted in analyte detections above the LRL (Appendix Table A.6). Of the 309 total trip blank analyte results, 28 resulted in analyte detection above the LRL (Appendix Table A.6). Since only 10% and 9.1% of field and trip blank results were above the LRL, indicating negligible field and travel contamination, and field precision and accuracy were considered acceptable for this study.

Overall, although analyte detections in blanks samples were low, consistency in the specific analytes that were detected across samples triggered an investigation into the source of contamination to ensure the reliability of data. More details are provided in section A2.3 below.

A2.2.3 Data Precision

Laboratory duplicate samples were used to evaluate precision within the ALS laboratory reports. All of the 945 individual analyte results met the laboratory DQO, and therefore laboratory analytical precision was considered acceptable for this study.

Three field duplicate samples were collected to assess stream water quality field sampling precision (Appendix Table A.7). Several RPDs could not be calculated as both analyte concentrations were below the LRL. Of the 167 RPDs that could be calculated, only nine results did not meet the DQO of 25% including individual results for turbidity, total ammonia (as N), nitrate (as N), chloride, total Kjeldahl nitrogen, total organic carbon, dissolved aluminum, and dissolved iron (Appendix Table A.7). Two RPDs that were above 25% due to one result in the pair being below the LRL, where greater variability is expected. Additionally, the RPDs for these analytes were not consistently above the DQO across duplicate pairs (Appendix Table A.7). Overall, as only 5.3% of all stream water quality duplicate comparisons did not meet the DQO, field precision and reproducibility of these samples were considered acceptable for this study.

A2.2.4 Data Accuracy

Data accuracy was evaluated based on results of LCS and MS samples within the ALS laboratory reports. Of the 955 individual LCS results, only one analyte result for magnesium



Table A.6: Evaluation of Stream Field and Trip Blank Results, Mary River Project CREMP, 2024

Constituent	Units	Range of LRLs	No. Field Blank Sample Results > LRL	No. Trip Blank Sample Results > LRL
Physical Tests				
Phenols, total (4AAP)	mg/L	0.00100	1 (33%)	0 (0%)
Turbidity, Lab	NTU	0.100	2 (67%)	1 (33%)
Organic Carbon (Water)				
Total Organic Carbon	mg/L	0.500	3 (100%)	2 (67%)
Dissolved Organic Carbon	mg/L	0.500	3 (100%)	1 (33%)
Total Metals (Water)				
Aluminum (Al)	mg/L	0.00300	1 (33%)	1 (33%)
Barium (Ba)	mg/L	0.000100	2 (67%)	2 (67%)
Boron (B)	mg/L	0.0100	0 (0%)	1 (33%)
Calcium (Ca)	mg/L	0.0500	2 (67%)	2 (67%)
Magnesium (Mg)	mg/L	0.00500	2 (67%)	2 (67%)
Sodium (Na)	mg/L	0.0500	1 (33%)	1 (33%)
Strontium (Sr)	mg/L	0.000200	1 (33%)	1 (33%)
Dissolved Metals (Water)				
Aluminum (Al)	mg/L	0.00100	2 (67%)	2 (67%)
Barium (Ba)	mg/L	0.000100	2 (67%)	3 (100%)
Boron (B)	mg/L	0.0100	1 (33%)	0 (0%)
Calcium (Ca)	mg/L	0.0500	2 (67%)	2 (67%)
Magnesium (Mg)	mg/L	0.00500	2 (67%)	2 (67%)
Sodium (Na)	mg/L	0.0500	1 (33%)	2 (67%)
Strontium (Sr)	mg/L	0.000200	1 (33%)	1 (33%)
Plant Pigments (Water)				
Chlorophyll a	mg/L	0.0000100 to 0.00200	1 (33%)	1 (33%)
Chlorophyll a	ug/sample	0.0000100 to 0.00200	1 (33%)	1 (33%)

 At least one sample was above the LRL.

Notes: LRL = Laboratory reporting limit. Three field blanks and three trip blanks were sampled. Only analytes with at least one result greater than the LRL are displayed.

Table A.7: Evaluation of Stream Water Field Duplicate Results, Mary River Project CREMP, 2024

Constituent	Unit	Duplicate Pair 1			Duplicate Pair 2			Duplicate Pair 3		
		QD-CC1_2024-07-30_ALS	D1-05_2024-07-30_ALS	RPD (%)	QD-CC1_2024-08-31_ALS	CLT-REF3_2024-08-31_ALS	RPD (%)	QD-CC8_2024-06-29_ALS	C0-01_2024-06-29_ALS	RPD (%)
Physical Tests										
Alkalinity, Total (as CaCO3)	mg/L	68.5	68.0	0.733	56.2	56.7	0.886	12.8	12.7	0.784
Conductivity	uS/cm	682	684	0.293	108	108	0	31.4	31.3	0.319
Hardness - Dissolved (as CaCO3)	mg/L	318	313	1.58	53.1	53.5	0.750	14.7	14.6	0.683
Phenols, total (4AAP)	mg/L	<0.001	<0.001	-	<0.001	<0.001	-	<0.001	<0.001	-
Pheophytin a	mg/L	<0.0002	<0.0002	-	0.000290	0.000290	0	0.000170	0.000150	12.5
Pheophytin a	ug/sample	<0.02	<0.02	-	0.0290	0.0290	0	0.0340	0.0300	12.5
Total Suspended Solids	mg/L	1.20	<1	18.2	<1	<1	-	1.80	1.50	18.2
Turbidity, Lab	NTU	1.52	1.42	6.80	0.470	0.610	25.9	2.84	2.83	0.353
pH, Lab	pH	7.51	7.47	0.534	7.74	7.75	0.129	7.58	7.71	1.70
Anions and Nutrient (Water)										
Ammonia, Total (as N)	mg/L	0.0522	0.0687	27.3	<0.005	0.00700	33.3	<0.005	0.0166	107
Bromide (Br)	mg/L	<0.1	<0.1	-	<0.1	<0.1	-	<0.1	<0.1	-
Chloride (Cl)	mg/L	33.0	33.5	1.50	<0.5	<0.5	-	0.650	0.860	27.8
Nitrate (as N)	mg/L	5.68	5.78	1.75	<0.02	<0.02	-	0.0230	0.0250	8.33
Nitrite (as N)	mg/L	0.0240	0.0260	8.00	<0.01	<0.01	-	<0.01	<0.01	-
Phosphorus (P)-Total	mg/L	<0.002	<0.002	-	<0.002	<0.002	-	0.00530	0.00480	9.90
Sulphate	mg/L	199	201	1.00	1.76	1.78	1.13	0.920	1.08	16.0
Total Kjeldahl Nitrogen	mg/L	0.313	0.430	31.5	0.0620	0.0680	9.23	0.0820	0.105	24.6
Organic / inorganic Carbon (Water)										
Total Organic Carbon	mg/L	2.58	1.99	25.8	2.14	2.32	8.07	1.39	1.49	6.94
Dissolved Organic Carbon	mg/L	2.28	2.82	21.2	2.12	2.15	1.41	1.30	1.49	13.6
Total Dissolved Solids	mg/L	435	440	1.14	56.0	45.0	21.8	28.0	26.0	7.41
Total Metals (Water)										
Aluminum (Al)	mg/L	0.0322	0.0288	11.2	0.0330	0.0336	1.80	0.102	0.0939	8.27
Antimony (Sb)	mg/L	<0.0001	<0.0001	-	<0.0001	<0.0001	-	<0.0001	<0.0001	-
Arsenic (As)	mg/L	<0.0001	<0.0001	-	<0.0001	<0.0001	-	<0.0001	<0.0001	-
Barium (Ba)	mg/L	0.0297	0.0296	0.337	0.00618	0.00619	0.162	0.00254	0.00242	4.84
Beryllium (Be)	mg/L	<0.00002	<0.00002	-	<0.00002	<0.00002	-	<0.00002	<0.00002	-
Bismuth (Bi)	mg/L	<0.00005	<0.00005	-	<0.00005	<0.00005	-	<0.00005	<0.00005	-
Boron (B)	mg/L	0.0180	0.0180	0	<0.01	<0.01	-	<0.01	<0.01	-
Cadmium (Cd)	mg/L	0.000408	0.000407	0.245	<0.000005	<0.000005	-	<0.000005	<0.000005	-
Calcium (Ca)	mg/L	54.5	53.2	2.41	10.4	10.5	0.957	2.78	2.73	1.81
Cesium (Cs)	mg/L	0.0000200	0.0000200	0	0.0000310	0.0000320	3.17	0.0000150	0.0000130	14.3
Chromium (Cr)	mg/L	<0.0005	<0.0005	-	<0.0005	<0.0005	-	<0.0005	<0.0005	-
Cobalt (Co)	mg/L	0.00138	0.00141	2.15	<0.0001	<0.0001	-	<0.0001	<0.0001	-
Copper (Cu)	mg/L	0.00163	0.00160	1.86	0.00127	0.00125	1.59	<0.0005	<0.0005	-
Iron (Fe)	mg/L	0.0540	0.0490	9.71	0.0340	0.0340	0	0.0960	0.0880	8.70
Lead (Pb)	mg/L	0.0000620	0.0000570	8.40	0.0000910	0.0000800	12.9	0.0000860	0.0000770	11.0
Lithium (Li)	mg/L	0.0103	0.0103	0	<0.001	<0.001	-	<0.001	<0.001	-
Magnesium (Mg)	mg/L	46.1	47.1	2.15	6.69	6.85	2.36	2.08	2.05	1.45
Manganese (Mn)	mg/L	0.785	0.828	5.33	0.000690	0.000680	1.46	0.00235	0.00231	1.72
Mercury (Hg)	mg/L	<0.000005	<0.000005	-	<0.000005	<0.000005	-	<0.000005	<0.000005	-
Molybdenum (Mo)	mg/L	0.00764	0.00776	1.56	0.000655	0.000664	1.36	0.0000800	0.0000730	9.15
Nickel (Ni)	mg/L	0.00186	0.00189	1.60	0.000740	0.000730	1.36	<0.0005	<0.0005	-
Potassium (K)	mg/L	6.85	6.99	2.02	0.738	0.762	3.20	0.394	0.383	2.83
Rubidium (Rb)	mg/L	0.00949	0.00967	1.88	0.00202	0.00186	8.25	0.000890	0.000870	2.27
Selenium (Se)	mg/L	0.000768	0.000733	4.66	<0.00005	<0.00005	-	<0.00005	<0.00005	-
Silicon (Si)	mg/L	1.60	1.64	2.47	1.11	1.10	0.905	0.480	0.460	4.26
Silver (Ag)	mg/L	<0.00001	<0.00001	-	<0.00001	<0.00001	-	<0.00001	<0.00001	-
Sodium (Na)	mg/L	6.73	6.74	0.148	0.896	0.921	2.75	0.424	0.424	0
Strontium (Sr)	mg/L	0.169	0.171	1.18	0.00763	0.00786	2.97	0.00270	0.00265	1.87
Sulphur (S)	mg/L	72.0	73.4	1.93	0.640	0.640	0	<0.5	<0.5	-
Tellurium (Te)	mg/L	<0.0002	<0.0002	-	<0.0002	<0.0002	-	<0.0002	<0.0002	-
Thallium (Tl)	mg/L	0.0000240	0.0000260	8.00	<0.00001	<0.00001	-	<0.00001	<0.00001	-
Thorium (Th)	mg/L	<0.0001	<0.0001	-	<0.0001	<0.0001	-	<0.0001	<0.0001	-
Tin (Sn)	mg/L	<0.0001	<0.0001	-	<0.0001	<0.0001	-	<0.0001	<0.0001	-
Titanium (Ti)	mg/L	<0.002	<0.002	-	0.000900	0.000830	8.09	0.00548	0.00522	4.86
Tungsten (W)	mg/L	<0.0001	<0.0001	-	<0.0001	<0.0001	-	<0.0001	<0.0001	-
Uranium (U)	mg/L	0.00991	0.00972	1.94	0.00272	0.00277	1.82	0.000148	0.000143	3.44
Vanadium (V)	mg/L	<0.0005	<0.0005	-	<0.0005	<0.0005	-	<0.0005	<0.0005	-
Zinc (Zn)	mg/L	<0.003	<0.003	-	<0.003	<0.003	-	<0.003	<0.003	-
Zirconium (Zr)	mg/L	<0.0002	<0.0002	-	0.000240	0.000220	8.70	<0.0002	<0.0002	-

Parameter concentration did not meet the data quality objective of ≤ 25% RPD.

Notes: The RPD was calculated using < LRL results at the LRL if one result in a duplicate pair was below the LRL. The RPD was not calculated if both results were <LRL. RPD = relative percent difference. "-"= no data/not calculated. LRL = Laboratory Reporting Limit.

Table A.7: Evaluation of Stream Water Field Duplicate Results, Mary River Project CREMP, 2024

Constituent	Unit	Duplicate Pair 1			Duplicate Pair 2			Duplicate Pair 3		
		QD-CC1_2024-07-30_ALS	D1-05_2024-07-30_ALS	RPD (%)	QD-CC1_2024-08-31_ALS	CLT-REF3_2024-08-31_ALS	RPD (%)	QD-CC8_2024-06-29_ALS	C0-01_2024-06-29_ALS	RPD (%)
Dissolved Metals (Water)										
Aluminum (Al)	mg/L	0.00280	0.00280	0	0.0149	0.0143	4.11	0.0201	0.0150	29.1
Antimony (Sb)	mg/L	<0.0001	<0.0001		<0.0001	<0.0001		<0.0001	<0.0001	
Arsenic (As)	mg/L	<0.0001	<0.0001	-	<0.0001	<0.0001	-	<0.0001	<0.0001	-
Barium (Ba)	mg/L	0.0294	0.0292	0.683	0.00573	0.00587	2.41	0.00217	0.00207	4.72
Beryllium (Be)	mg/L	<0.00002	<0.00002	-	<0.00002	<0.00002	-	<0.00002	<0.00002	-
Bismuth (Bi)	mg/L	<0.00005	<0.00005	-	<0.00005	<0.00005	-	<0.00005	<0.00005	-
Boron (B)	mg/L	0.0180	0.0180	0	<0.01	<0.01	-	<0.01	<0.01	-
Cadmium (Cd)	mg/L	0.000418	0.000426	1.90	<0.000005	<0.000005	-	<0.000005	<0.000005	-
Calcium (Ca)	mg/L	53.8	52.0	3.40	10.3	10.4	0.966	2.86	2.79	2.48
Cesium (Cs)	mg/L	0.0000180	0.0000170	5.71	0.0000220	0.0000250	12.8	<0.00001	<0.00001	-
Chromium (Cr)	mg/L	<0.0005	<0.0005	-	<0.0005	<0.0005	-	<0.0005	<0.0005	-
Cobalt (Co)	mg/L	0.00127	0.00130	2.33	<0.0001	<0.0001	-	<0.0001	<0.0001	-
Copper (Cu)	mg/L	0.00147	0.00144	2.06	0.00103	0.00104	0.966	0.000350	0.000320	8.96
Iron (Fe)	mg/L	<0.01	<0.01	-	0.0160	0.0150	6.45	0.0140	0.0100	33.3
Lead (Pb)	mg/L	<0.00005	<0.00005	-	<0.00005	<0.00005	-	<0.00005	<0.00005	-
Lithium (Li)	mg/L	0.0113	0.0112	0.889	<0.001	<0.001	-	<0.001	<0.001	-
Magnesium (Mg)	mg/L	44.6	44.4	0.449	6.64	6.68	0.601	1.84	1.86	1.08
Manganese (Mn)	mg/L	0.715	0.771	7.54	0.000460	0.000420	9.09	0.000800	0.000730	9.15
Mercury (Hg)	mg/L	<0.000005	<0.000005	-	<0.000005	<0.000005	-	<0.000005	<0.000005	-
Molybdenum (Mo)	mg/L	0.00735	0.00742	0.948	0.000620	0.000597	3.78	0.0000790	0.0000820	3.73
Nickel (Ni)	mg/L	0.00172	0.00173	0.580	0.000630	0.000600	4.88	<0.0005	<0.0005	-
Phosphorus (P)	mg/L	<0.05	<0.05	-	<0.05	<0.05	-	<0.05	<0.05	-
Potassium (K)	mg/L	6.76	6.68	1.19	0.674	0.680	0.886	0.346	0.336	2.93
Rubidium (Rb)	mg/L	0.00926	0.00926	0	0.00189	0.00193	2.09	0.000520	0.000560	7.41
Selenium (Se)	mg/L	0.000781	0.000814	4.14	<0.00005	<0.00005	-	<0.00005	<0.00005	-
Silicon (Si)	mg/L	1.51	1.50	0.664	1.04	1.01	2.93	0.312	0.299	4.26
Silver (Ag)	mg/L	<0.00001	<0.00001	-	<0.00001	<0.00001	-	<0.00001	<0.00001	-
Sodium (Na)	mg/L	6.48	6.31	2.66	0.893	0.867	2.95	0.400	0.395	1.26
Strontium (Sr)	mg/L	0.171	0.169	1.18	0.00734	0.00742	1.08	0.00262	0.00263	0.381
Sulphur (S)	mg/L	70.7	70.2	0.710	0.660	0.660	0	<0.5	<0.5	-
Tellurium (Te)	mg/L	<0.0002	<0.0002	-	<0.0002	<0.0002	-	<0.0002	<0.0002	-
Thallium (Tl)	mg/L	0.0000250	0.0000260	3.92	<0.00001	<0.00001	-	<0.00001	<0.00001	-
Thorium (Th)	mg/L	<0.0001	<0.0001	-	<0.0001	<0.0001	-	<0.0001	<0.0001	-
Tin (Sn)	mg/L	<0.0001	<0.0001	-	<0.0001	<0.0001	-	<0.0001	<0.0001	-
Titanium (Ti)	mg/L	<0.0003	<0.0003	-	0.000400	0.000400	0	0.000590	0.000460	24.8
Tungsten (W)	mg/L	<0.0001	<0.0001	-	<0.0001	<0.0001	-	<0.0001	<0.0001	-
Uranium (U)	mg/L	0.00988	0.0102	3.19	0.00259	0.00259	0	0.000122	0.000124	1.63
Vanadium (V)	mg/L	<0.0005	<0.0005	-	<0.0005	<0.0005	-	<0.0005	<0.0005	-
Zinc (Zn)	mg/L	0.00270	0.00250	7.69	<0.001	<0.001	-	<0.001	<0.001	-
Zirconium (Zr)	mg/L	<0.0003	<0.0003	-	<0.0003	<0.0003	-	<0.0003	<0.0003	-
Plant Pigments (Water)										
Chlorophyll a	mg/L	0.0000500	0.0000600	18.2	0.000182	0.000184	1.09	0.000196	0.000182	7.41
Chlorophyll a	ug/sample	0.00500	0.00600	18.2	0.0182	0.0184	1.09	0.0393	0.0365	7.39

Parameter concentration did not meet the data quality objective of ≤ 25% RPD.

Notes: The RPD was calculated using < LRL results at the LRL if one result in a duplicate pair was below the LRL. The RPD was not calculated if both results were <LRL. RPD = relative percent difference. "-"= no data/not calculated. LRL = Laboratory Reporting Limit.

did not meet the laboratory DQO. However, this result was only marginally exceeded (by < 10% absolute) for <10% of analytes in a Multi-Elemental Scan and was considered acceptable as per OMOE and CCME. All 881 individual MS analyte results met the DQO. As only 0.1% of LCS results did not meet the DQO and all of MS results did meet the DQO, the accuracy achieved by the laboratory was considered acceptable for this study.

A2.2.5 Hold Times

The recommended hold times for pH (15 minutes) were exceeded in all samples, and for turbidity (three days) in 97 samples collected. However, for these physical tests, *in situ* measures were used to support data interpretation and, as such, hold time exceedances for these laboratory results have no impact on data interpretability. Several additional analytes, including dissolved orthophosphate, nitrite, and nitrate (recommended hold times ≤48 hours), also exceeded recommended hold times. A combination of short hold times, shipping of samples from a remote location, and laboratory sample and workload delays resulted in hold time exceedances prior to analysis for results outlined above. Analyte results with hold time exceedances were similar to those samples without hold time exceedances in 2024 and were within the range of historic results, suggesting little if any impact of the hold time exceedances on analyte results.

A2.3 Other Concerns

Upon completion of the DQR on water chemistry data, it was identified that analyte detections above the LRL occurred in both equipment, trip, and field blanks consistently for the same analytes, with the most common detections above LRL across blank sample types for lake and stream sampling being total organic carbon, dissolved organic carbon, and total and dissolved aluminum, calcium, barium, magnesium, sodium, and strontium (Tables A.2, A.3, and A.6). This prompted an investigation into potential sources of contamination. Initially, the Baffinland Environmental Department suspected the in-house deionized (DI) water machine as a possible contributor. To test this, blanks were prepared and sent to the lab for analysis. Upon reviewing the results, it was confirmed that the DI water machine was not the source of contamination. Instead, the recurring analyte detections above LRL in all blank types for both lake and stream sampling suggested potential contamination through workspace conditions and/or sampler handling during blank preparation. Further there was some indication that contamination in equipment blanks from lake sampling may have been introduced from the Kemmerer samplers used to collect lake water quality samples, potentially due to improper cleaning and storage and/or aging of the equipment. To address these issues, the Baffinland Environmental Department has increased training and awareness sessions for field personnel handling blanks and water samples. Additionally, as a precaution,



new Kemmerer samplers have been ordered to replace the aged samplers, and Standard Operating Procedures (SOPs) have been updated to include more stringent storage, cleaning, and handling protocols. Ongoing actions include maintaining proper storage of water sampling containers, ensuring a clean workspace when preparing field and equipment blanks, and documenting anomalies during blank preparation.

Overall, given that the primary source of blank sample contamination was linked to preparation of the blanks rather than sources of contamination that would have been likely to influence field collected samples, water chemistry data was considered acceptable for this study.

A2.4 Data Quality Statement

Lake and stream water quality data collected for the 2024 CREMP were considered acceptable for this study as characterized by good detectability, appropriate LRLs, negligible analyte concentrations in MBs, good laboratory precision and accuracy, and few hold time exceedances.



A3 SEDIMENT

A3.1 Laboratory Reporting Limits

The analytical reports for sediment chemistry from ALS were examined to provide an inventory of analytes for which sample results were below the LRL (Appendix Table A.8). The range of reported LRLs for these analytes were assessed relative to existing Provincial Sediment Quality Guidelines (PSQG 1993) and Canadian Sediment Quality Guidelines (CSQG; Appendix Table A.8; CCME 1995). Several analytes had results that were lower than the LRL in 100% of samples (Appendix Table A.8). For analytes with at least one result less than LRL, all reported LRLs were lower than applicable guidelines. Therefore, LRLs for sediment chemistry samples were appropriate for this study.

A3.2 Laboratory Blanks

Method blank (MB) samples for sediment chemistry were analyzed by ALS. All of the 418 reported MB results met the laboratory DQO, indicating no inadvertent contamination within the laboratory.

A3.3 Data Precision

Laboratory duplicate samples were used to evaluate precision within the ALS laboratory reports. Of the 434 individual analyte results, five results, including three for sand and two for clay, exceeded the particle size DQO ($n=6$). However, the results were within 5% absolute difference and were considered acceptable by the laboratory. Therefore, laboratory analytical precision was considered acceptable for this study.

A3.4 Data Accuracy

Data accuracy for sediment chemistry analyses completed by ALS was evaluated based on the analysis of reference material (RM) samples and LCS samples. All 423 RM and 407 LCS individual results met the laboratory DQO. Therefore, the accuracy achieved by the laboratory was considered acceptable for this study.

A3.4 Data Quality Statement

Sediment chemistry data collected for the 2024 CREMP were of acceptable quality as characterized by appropriate LRLs, appropriate detectability, negligible concentrations in MB samples, laboratory blanks, excellent laboratory precision, and acceptable laboratory accuracy. Overall, the associated data were considered acceptable for this study and can be used with a high level of confidence in the derivation of conclusions.



Table A.8: Laboratory Reporting Limit (LRL) Evaluation for Lake Sediment Chemistry Relative to PSQG, Mary River Project CREMP, 2024

Constituent	Units	PSQG LEL	PSQG SEL	CSQG PEL	Range of LRLs	No. Sample Results < LRL
Organic Carbon						
clay (<0.002mm)	%	-	-	-	1.00	1 (2%)
Metals						
Antimony	mg/kg	-	-	-	0.100	58 (92%)
Bismuth	mg/kg	-	-	-	0.200	18 (29%)
Mercury	mg/kg	0.200	2.00	0.486	0.00500	1 (2%)
Selenium	mg/kg	-	-	-	0.200	9 (14%)
Silver	mg/kg	-	-	-	0.100	16 (25%)
Sulphur	mg/kg	-	-	-	1,000	48 (76%)
Tin	mg/kg	-	-	-	2.00	62 (98%)
Tungsten	mg/kg	-	-	-	0.500	59 (94%)

Notes: The total number of samples assessed (n) was 63 including 0 duplicate sample(s). Only analytes with at least one results less than the LRL or greater than guidelines are displayed. LRL = Laboratory Reporting Limit. " - " = no applicable guideline exist. PSQG = Provincial Sediment Quality Guidelines. CSQG = Canadian Sediment Quality Guidelines. LEL = Lowest Effect Level. SEL = Severe Effect Level.

A4 BENTHIC INVERTEBRATE COMMUNITY

A4.1 Lake Samples

A4.1.1 Subsampling Precision and Accuracy

The analytical laboratory reports for benthic invertebrate community composition were assessed for subsampling. Of the 51 benthic invertebrate community samples analyzed, 12 were subsampled. The proportion of sub-sampled material ranged from 12.5% to 50% of the total sample material (Appendix Table A.9). Of the samples that were sub-sampled, three (5.8% of all samples) were assessed for precision and accuracy. All assessed samples met the laboratory DQO (<20%) for both precision and accuracy (Appendix Table A.10). Thus, the precision and accuracy for sub-sampling of the benthic invertebrate community samples was considered acceptable for this study.

A4.1.2 Sorting Efficiency

The analytical laboratory reports for benthic invertebrate community composition were assessed for the organism sorting efficiency relative to the laboratory's DQO ($\geq 90\%$) in six samples (Appendix Table A.11). The average recovery was 95.9% and organism sorting efficiency was considered acceptable.

A4.2 Stream Samples

A4.2.1 Subsampling Precision and Accuracy

The analytical laboratory reports for benthic invertebrate community composition were assessed for subsampling. Of the 65 benthic invertebrate community samples analyzed, three were subsampled. The proportion of sub-sampled material ranged from 25% to 50% of the total sample material (Appendix Table A.12). Of the samples that were sub-sampled, one (1.5% of all samples) was assessed for precision and accuracy. All assessed samples met the laboratory DQO (<20%) for both precision and accuracy (Appendix Table A.13). Thus, the precision and accuracy for sub-sampling of the benthic invertebrate community samples was considered acceptable for this study.

A4.2.2 Sorting Efficiency

The analytical laboratory reports for benthic invertebrate community composition were assessed for the organism sorting efficiency relative to the laboratory's DQO ($\geq 90\%$) in eight samples (Appendix Table A.14). One stream sample was less than the DQO by



Table A.9: Percent of Lake Benthic Invertebrate Community Samples Sorted, Mary River Project CREMP, 2024

Sample ID	% Sampled	Sample ID	% Sampled
REF-03-01	100	DLO-01-10	25
REF-03-02	100	DLO-01-11	25
REF-03-03	100	DLO-01-12	100
REF-03-04	100	DLO-01-14	100
REF-03-05	100	DLO-01-15	100
REF-03-06	100	DLO-02-01	100
REF-03-07	100	DLO-02-02	100
REF-03-08	100	DLO-02-03	100
REF-03-09	100	DLO-02-04	100 ^{a, b}
REF-03-10	100	DLO-02-08	100
BLO-01	100	DLO-02-09	100
BLO-03	100	DLO-02-10	50
BLO-04	100	DLO-02-11	50
BLO-05	25	DLO-02-12	100
BLO-06	100	DLO-02-13	100
BLO-07	100	JLO-01	100
BLO-11	50	JLO-02	100 ^{a, b}
BLO-13	100	JLO-07	100
BLO-14	100	JLO-11	50
BLO-15	100	JLO-12	100
DLO-01-02	100	JLO-16	100
DLO-01-03	12.5	JLO-18	50
DLO-01-04	50	JLO-19	100
DLO-01-05	100	JLO-20	50
DLO-01-08	100	JLO-21	100
DLO-01-09	12.5	-	-

Note : " - " indicates no data available.

^a four quarters sorted for subsampling error

^b two halves sorted for subsampling error

Table A.10: Lake Benthic Invertebrate Community Sub-sampling Precision and Accuracy, Mary River Project CREMP, 2024

Station	Whole Organisms	Organisms in Sub-Sample				Total	Precision Error		Accuracy Error	
		1	2	3	4		Min (%)	Max (%)	Min (%)	Max (%)
DLO-02-04	0	178	181	184	200	743	1.7	11.0	0.9	7.7
DLO-02-04	0	359	384	-	-	743	6.5	-	3.4	-
JLO-02	0	190	203	-	-	393	6.4	-	3.3	-
Average							4.9	11.0	2.5	7.7

Note: " - " indicates no data available.

Table A.11: Lentic Benthic Invertebrate Community Sorting Efficiency, Mary River Project CREMP, 2024

Sample ID	Number of Organisms Recovered (initial sort)	Number of Organisms in Re-sort	Sorting Efficiency (%)
REF-03-09	27	27	100
BLO-06	83	86	96.5
DLO-01-12	246	248	99.1
DLO-02-03	152	158	96.2
JLO-16	95	104	91.3
JLO-21	196	212	92.5
Average			95.9

Table A.12: Percent of Lotic Benthic Invertebrate Community Samples Sorted, Mary River Project CREMP, 2024

Sample ID	% Sampled	Sample ID	% Sampled
SDLT1-R1-B1	100	GO-03-B4	100
SDLT1-R1-B2	100	GO-03-B5	100
SDLT1-R1-B3	100	CLT2-US-B1	100
SDLT1-R1-B4 ^a	100	CLT2-US-B2	100
SDLT1-R1-B5	100	CLT2-US-B3	100
SDLT9-DS-B1	100	CLT2-US-B4	100
SDLT9-DS-B2	25	CLT2-US-B5	100
SDLT9-DS-B3	100	CLT2-DS-B1	100
SDLT9-DS-B4	50	CLT2-DS-B2	100
SDLT9-DS-B5	25	CLT2-DS-B3	100
CLTI-L2-B1	100	CLT2-DS-B4	100
CLTI-L2-B2	100	CLT2-DS-B5	100
CLTI-L2-B3	100	REF-CRK-B1	100
CLTI-L2-B4	100	REF-CRK-B2	100
CLTI-L2-B5	100	REF-CRK-B3	100
CLTI-US-B1	100	REF-CRK-B4	100
CLTI-US-B2	100	REF-CRK-B5	100
CLTI-US-B3	100	CO-05-B1	100
CLTI-US-B4	100	CO-05-B2	100
CLTI-US-B5	100	CO-05-B3	100
E0-01-B1	100	CO-05-B4	100
E0-01-B2	100	CO-05-B5	100
E0-01-B3	100	EO-20-B1	100
E0-01-B4	100	EO-20-B2	100
E0-01-B5	100	EO-20-B3	100
CLTI-DS-B1	100	EO-20-B4	100
CLTI-DS-B2	100	EO-20-B5	100
CLTI-DS-B3	100	G0-9-B1	100
CLTI-DS-B4	100	G0-9-B2	100
CLTI-DS-B5	100	G0-9-B3	100
GO-03-B1	100	G0-9-B4	100
GO-03-B2	100	G0-9-B5	100
GO-03-B3	100	-	-

Note : " - " indicates no data available

^a two halves sorted for subsampling error

Table A.13: Lotic Benthic Invertebrate Community Sub-sampling Precision and Accuracy, Mary River Project CREMP, 2024

Station	Whole Organisms	Organisms in Sub-Sample				Total	Precision Error		Accuracy Error	
		1	2	3	4		Min (%)	Max (%)	Min (%)	Max (%)
SDLT1-R1-B4	0	111	112	-	-	223	0.9	-	0.4	-

Note : " - " indicates no data available.

Table A.14: Lotic Benthic Invertebrate Community Sorting Efficiency, Mary River Project CREMP, 2024

Sample ID	Number of Organisms Recovered (initial sort)	Number of Organisms in Re-sort	Sorting Efficiency (%)
CO-05-B5	247	252	98.0
EO-20-B1	479	487	98.4
SDLT1-R1-B2	178	183	97.3
SDLT9-DS-B4	255	278	91.7
E0-01-B4	28	30	93.3
CLT1-DS-B2	89	99	89.9
CLT2-US-B3	57	57	100.0
REF-CRK-B4	285	290	98.3
Average			95.9

only 0.1%, and the average recovery was 95.9%. Therefore, organism sorting efficiency was considered acceptable.

A4.3 Data Quality Statement

Lake and stream benthic community data collected for the 2024 CREMP was considered acceptable for this study as characterized by appropriate sorting efficiency for most samples, and excellent subsampling precision and accuracy. One stream benthic community sample did not meet the internal DQO for sorting efficiency, although the lower efficiency rate may be attributed to low abundance in the sample. Overall, the associated data can be used with a high level of confidence in the derivation of conclusions.



A5 FISH AGING

A5.1 Data Accuracy


Analytical reports of fish age estimates from North South Consulting Group (North South) were examined to evaluate data accuracy. To determine the accuracy of arctic charr age, 10% of aging structures that were analyzed by North South were reprocessed by a second analyst (n = 5; Appendix Table A.15). The original and second analyst assigned a confidence index to each age estimate and check. The original and reassessed age estimates differed in one sample, by one year. As only one aging structure was reassessed at a different age, and that reassessment was within 1 year, the accuracy achieved by the laboratory in this study can be considered acceptable for this study.



Table A.15: Fish Otolith Aging Verification Results, Mary River Mine, CREMP 2024

Location	Sample ID	Species	Initial Age	QA/QC Age	Difference
BL0	7	Arctic Charr	1	1	0
DLO-01	7	Arctic Charr	3	3	0
DLO-02	6	Arctic Charr	1	1	0
JL0	4	Arctic Charr	2	1	1
REF	2	Arctic Charr	0	0	0

 Indicates difference of 1 year between initial age and QA/QC age (DQO met).

 Indicates difference greater than 1 year between initial age and QA/QC age (DQO not met).

Note: "DQO" = Data Quality Objective.

A6 DATA QUALITY STATEMENT

The DQR results indicated that the water, sediment and benthic invertebrate community data were of acceptable quality. Few water quality parameters did not meet their respective DQO. In general, most of these parameters showed low margins of error relative to respective criteria and/or were observed at low concentrations most often near the LRL. The Sediment data quality was acceptable for this study, meeting all laboratory DQO. The benthic invertebrate community data quality was also acceptable for this study, meeting most precision, accuracy, and percent recovery benchmarks. Overall, the data associated with the 2024 CREMP were considered defensible and acceptable for interpretation and derivation of conclusions with a good level of confidence.



APPENDIX B
OVERVIEW OF REFERENCE CONDITIONS

APPENDIX B OVERVIEW OF REFERENCE CONDITIONS

B1 INTRODUCTION2

B2 HABITAT3

 B2.1 Stream/Tributary Environments3

 B2.2 River Environments.....4

 B2.3 Lake Environments4

B3 WATER QUALITY6

 B3.1 Stream/Tributary Environments6

 B3.2 River Environments.....7

 B3.3 Lake Environments (Reference Lake 3)7

B4 SEDIMENT QUALITY.....9

 B4.1 Lake Environments (Reference Lake 3)9

B5 PHYTOPLANKTON (CHLOROPHYLL-A)10

 B5.1 Lotic Environments10

 B5.2 Lentic Environments (Reference Lake 3).....10

B6 BENTHIC INVERTEBRATE COMMUNITY12

 B6.1 Stream/Tributary Environments12

 B6.2 River Environments.....13

 B6.3 Lentic Environments (Reference Lake 3).....13

B7 FISH POPULATION15

 B7.1 Lotic Environments15

 B7.2 Lentic Environments (Reference Lake 3).....15

B8 CREMP IMPLICATIONS17

B9 REFERENCES19



B1 INTRODUCTION

The initial review of background (reference) data collected from lotic (i.e., streams and rivers) and lentic (i.e., lakes) study areas as part of the 2015 Mary River Project CREMP revealed naturally elevated metal concentrations above guidelines and significant differences in benthic community endpoints between reference lake littoral and profundal habitats (Minnow 2016a). Therefore, this overview of reference conditions is included to provide context and perspective regarding water quality, sediment quality, phytoplankton (chlorophyll-a), benthic invertebrate community, and fish population characteristics at the CREMP reference study areas. Key implications of reference area features for the evaluation of potential mine-related effects at mine-exposed waterbodies were also identified as part of this reference area overview.



B2 HABITAT

B2.1 Stream/Tributary Environments

Four reference stream/tributary (reference stream) stations were established among two unnamed tributaries to Angijurjuk¹ Lake (Stations CLT-REF4, MRY-REF2, and MRY-REF3) and one unnamed tributary to Mary River (Station CLT-REF3) during the Mary River Project CREMP in 2014 (see Figure 2.1). These stations were intended to provide reference information for the stream water quality and phytoplankton monitoring components of the CREMP and have been used as such in the ten studies conducted since commercial mine operations commenced at the Mary River Mine (i.e., 2015 to 2024; see Table 2.1). From 2016 to 2024, habitat conditions at the western tributary to Angijurjuk Lake that is used for Baffinland CREMP water quality monitoring (Stations CLT-REF4 and MRY-REF2) were deemed comparable to habitat conditions at the Camp Lake and Sheardown Lake tributaries. Therefore, this tributary served as a benthic reference stream (REF-CRK) for comparisons involving the various mine-exposed tributaries as part of the 2016 to 2024 annual CREMP studies (see Figure 2.3), and herein has been referred to as Unnamed Reference Creek.

The reference streams/tributaries are moderate gradient lotic systems characterized predominantly by riffle-run and riffle-rapid stream morphology, with pools occurring rarely reflecting localized topography and associated gradient. The wetted width of the benthic reference tributary averaged 11.1 m (as of sampling conducted in August 2017; Minnow 2018a), and the depth averaged 0.11 to 0.16 m during sampling conducted in August 2024. The corresponding water velocities across a representative riffle area of the benthic reference tributary ranged from 0.34 to 0.46 m/s in August 2024 (average of 0.40 m/s). As for most small lotic systems in the region, surface flow at all of the CREMP reference tributaries is limited to months in which average ambient air temperatures are near or above freezing (i.e., June to September). The substrate at the reference tributaries is composed mainly of cobble and large pebble (i.e., 50 to 256 mm diameter), with surficial areas of sand generally limited to less than 10% of stream area (Minnow 2018a).

¹ Referred to as Angajurjualuk Lake in previous CREMP reporting (i.e., KP 2015; Minnow 2016a,b, 2017, 2018a, 2021a,b, 2022, 2023). The name was changed beginning in the 2023 CREMP report (Minnow 2024a) based on an updated English translation of the Inuit place name.



In-stream vegetation at the reference tributaries is sparse and generally includes a relatively thin layer of surficial algae/periphyton attached to relatively stable substrate.

B2.2 River Environments

The area of Mary River located upstream of the mine lease property is only minimally influenced by Mary River mining activity (i.e., low amounts of dust deposition; see Baffinland 2015). Therefore, this area has been considered representative of background (reference) conditions for the mine-exposed stations/study areas situated farther downstream on the Mary River under the CREMP (Baffinland 2015; KP 2014a,b, 2015; NSC 2014). Water quality, phytoplankton productivity, and benthic invertebrate community (benthic) data collected at the Mary River reference area, referred to as G0-09 (including water quality stations G0-09A, G0-09, and G0-09B; see Figure 2.1), have been used in comparisons to areas of the Mary River that are potentially influenced by mine activity.

The Mary River reference area is a moderate gradient erosional environment characterized mainly by riffle and run stream morphology. Depending on flow conditions, average wetted width and average depth of the Mary River reference area has ranged from 30 to 55 m and 0.20 to 0.36 m, respectively, in studies conducted by Minnow (2017, 2018a) during the month of August. On average the water depth ranged from 0.15 to 0.20 m and water velocities ranged from 0.30 to 0.57 m/s at representative riffle areas of the G0-09 benthic study area during the 2024 study. The substrate at the G0-09 reference area is composed mainly of boulder and cobble, with roughly equal proportion of pebble, gravel, and sand composing the surficial substrate at much of the remaining area (Minnow 2018a). In-stream vegetation at the Mary River G0-09 reference area is sparse and generally includes a relatively thin layer of periphyton and/or scarce bryophytes (moss) growth on the upper surface of physically stable substrate.

B2.3 Lake Environments (Reference Lake 3)

A geographically expansive reconnaissance survey of local study area (LSA) lakes was conducted in 2014 to identify a waterbody that could potentially serve as a suitable reference area for the mine-exposed lakes (i.e., Camp, Sheardown NW, Sheardown SE, and Mary lakes; NSC 2015). The key criteria for the selection of the suitable reference lake included a waterbody with similar surface area, maximum water depth, substrate features, and fish species composition as the mine-exposed lakes, in addition to also being uninfluenced by current or past mining activity. Based on the results of this survey, Reference Lake 3 was selected to represent reference conditions for the mine-exposed lakes beginning in 2015 as part of the Mary River Project CREMP studies (Appendix Table B.1).



Reference Lake 3 is an unnamed lake located approximately 62 km south of the Mary River Mine (see Figures 1.2 and 2.2), well outside the area of mine influence. Reference Lake 3 is a headwater lake that is characterized by a relatively complex morphology that includes three basins and connection to a separate lake by a short, shallow channel (see Figure 2.3). The three basins reach approximately 15 m, 30 m, and 36 m in depth with progression from east to west, and the average depth of Reference Lake 3 is approximately 11.8 m (Appendix Table B.1). The outlet of Reference Lake 3, located off the south-central portion of the lake, drains into a large boulder field through which flow can occur largely as sub-surface drainage. Substrate along the shoreline and shallow littoral areas of Reference Lake 3 is composed mainly of large boulder and cobble that is commonly interrupted by areas of bedrock. Substrate of the deeper littoral and profundal areas of Reference Lake 3 is almost exclusively represented by silt loam containing approximately 15 to 35% fine sand (by dry weight) and a moderate organic carbon content of approximately 5%. No substantial aquatic plant beds have been observed at Reference Lake 3, with fish cover provided predominantly by the rocky substrates along the shoreline and shallow littoral zone of the lake.

Table B.1: Physical Characteristics for Mine-Exposed Lakes and Reference Lake 3

Lake Feature	Mine-Exposed Lakes				Reference Lake
	Camp	Sheardown NW	Sheardown SE	Mary	Reference Lake 3
Drainage Basin Area (km ²)	26.5	6.6	8.9	663.4	23.2
Lake Area (km ²)	2.21	0.68	0.25	13.6	2.05
Drainage Basin: Lake Area Ratio	11.98	9.66	35.6	48.8	11.32
Mean Depth (m)	13.0	12.1	7.4	-	11.8
Maximum Depth (m)	35.1	30.1	14.8	40.0	38.3
Volume (1,000,000 m ³)	27.5	8.18	1.8	156.4	22.6
Hydraulic Retention Time (days)	416 ± 184	511 ± 213	83 ± 35	75 ± 29	-



B3 WATER QUALITY

B3.1 Stream/Tributary Environments

Water chemistry at the reference stream stations (CLT-REF4, CLT-REF3, MRY-REF3, MRY-REF2) met all WQGs and AEMP benchmarks at lotic environments across all seasons in 2024, except for individual water samples of aluminum, chromium, and iron (Appendix Table B.2). The aluminum concentration at Station MRY-REF3 exceeded the AEMP benchmark of 0.179 mg/L and the WQG of 0.100 mg/L in the spring (0.208 mg/L), summer (0.233 mg/L), and fall (0.495 mg/L; Appendix Table B.2). Additionally, at Station MRY-REF3, chromium concentrations exceeded the WQG of 0.001 mg/L in the fall (0.00119 mg/L) and iron concentrations exceeded both the AEMP benchmark of 0.326 mg/L and WQG of 0.30 mg/L in the fall (0.462 mg/L; Appendix Table B.2). As reported in past studies, the occurrence of elevated concentrations of aluminum and iron at the reference stream stations appeared to be associated with naturally high turbidity at the time that samples were collected (Appendix Table B.2), which suggests that elevated turbidity and a corresponding elevation in aluminum and iron concentrations occur naturally in regional watercourses.

Water chemistry at the reference stream stations showed distinct seasonal changes for some parameters (Appendix Figure B.1, Appendix Table B.2). In general, where seasonal patterns were observed, conductivity, hardness, total dissolved solids, and concentrations of chloride, sulphate and metals were lowest in spring, intermediate in the summer, and highest during the fall in 2024 (Appendix Figure B.1, Appendix Table B.2). This pattern almost certainly reflected dilution from snow melt and precipitation-related sources, with the lowest parameter concentrations typically associated with the spring freshet conditions, and highest parameter concentrations generally associated with low precipitation/streamflow conditions later in the open water season. Previous baseline and 2015 to 2023 water quality monitoring conducted at reference stream stations showed similar seasonal patterns (KP 2014b; Minnow 2016a, 2017, 2018a, 2019, 2020, 2021b, 2022, 2023, 2024a). Temporal comparison of mean water chemistry for the reference stream stations indicated that water chemistry at the reference stream stations was relatively consistent year-to-year taking seasonal sampling timing into account for most parameters (e.g., see Appendix Figure C.2), with higher parameter concentrations occurring during periods of low flow. Overall, the reference stream stations were deemed to provide a meaningful benchmark for the evaluation of potential mine-related influences on water chemistry at mine-exposed stream/tributary receiving environments taking seasonality into consideration.



B3.2 River Environments

Water chemistry at the Mary River reference stations (G0-09 series) met all AEMP benchmarks and WQGs across all seasons in 2024, except for two individual water samples of aluminum (Appendix Table B.3). The aluminum concentration at Station G0-09-B exceeded the WQG of 0.100 mg/L in the spring (0.141 mg/L) and at Station G0-09-A in the summer (0.118 mg/L; Appendix Table B.3). As in previous CREMP studies, the WQG for aluminum were generally exceeded at the Mary River reference area under turbid conditions (i.e., ≥ 3 NTU), with the magnitude of elevation appearing to correlate closely with higher turbidity (Appendix Table B.3). Comparison of the ratio between dissolved and total concentrations of aluminum indicated that a high proportion of aluminum was in the total (particulate) fraction (Appendix Tables B.3 and C.60), which can be expected for metals associated with suspended particulate matter. Therefore, naturally high turbidity (and specifically, the chemical composition of suspended particulate matter) within the Mary River system can be expected to result in total concentrations of metals such as aluminum and iron being above WQG and/or AEMP benchmarks (as in previous years, Minnow 2022, 2024a).

Water chemistry at the Mary River reference stations showed distinct seasonal changes for parameters including conductivity, hardness, total dissolved solids, alkalinity, chloride, sodium, sulphate, and metals (Appendix Figure B.2, Appendix Table B.3). These seasonal changes in parameter concentrations were consistent with those observed at the reference stream stations in 2024, and in previous baseline (2005 to 2013), and 2015 to 2023 water quality monitoring data collected at the Mary River G0-09 series reference stations (KP 2014b; Minnow 2016a, 2017, 2018a, 2019, 2020, 2021b, 2022, 2023, 2024a). The seasonal changes in the Mary River reference station parameter concentrations likely reflected greater dilution during the spring snowmelt period, and consecutively lower surface runoff inputs during the summer and fall periods. Temporal comparison of the Mary River G0-09 series reference station water chemistry indicated that concentrations of parameters with AEMP benchmarks in the Mary River system were similar in 2024 compared to baseline and showed no consistent increasing or decreasing patterns over time (Appendix Figure C.23). Overall, the Mary River reference stations were deemed to provide a meaningful benchmark for the evaluation of potential mine-related influences on water chemistry at the Mary River mine-exposed study areas taking seasonality into consideration.

B3.3 Lake Environments (Reference Lake 3)

In situ water temperature profiles conducted at Reference Lake 3 indicated relatively constant temperatures throughout the water column during both the summer and fall (Appendix Figure B.3). Dissolved oxygen concentrations in Reference Lake 3 decreased



slightly with depth in the summer but dissolved oxygen saturation remained high (i.e., $\geq 96\%$) throughout the entire water column in both the summer and fall profiles (Appendix Figure B.3). The pH decreased slightly with depth at the three stations in the summer and fall (≤ 0.5 unit decrease; Appendix Figure B.3). The 2024 water quality profiles also showed no changes in specific conductance among stations and with depth during each of the summer and fall sampling events (Appendix Figure B.3). Overall, the *in situ* water quality profiles suggested relatively thorough lateral mixing within Reference Lake 3 and no substantial changes in dissolved oxygen, pH, or conductivity occurred with depth through the water column.

The evaluation of water chemistry at Reference Lake 3 indicated that all monitored parameters were below WQG in summer and fall 2024 (Appendix Figure B.4, Appendix Table B.4). No parameters were observed at concentrations above lentic AEMP benchmarks at Reference Lake 3 (Appendix Table B.4), suggesting that these water quality benchmarks were relevant for comparisons of water quality for the mine-exposed lakes. No substantial differences in water chemistry were observed between the summer and fall at Reference Lake 3 in 2024 (Appendix Figure B.4), which was similar to observations among winter, summer, and fall at local study area lakes during the mine baseline period and in summer and fall at Reference Lake 3 from 2015 to 2023 (KP 2014a; Minnow 2016a, 2017, 2018a, 2019, 2021, 2022, 2023, 2024a). Temporal comparisons also showed no consistent temporal patterns in water quality from 2015 to 2024 at Reference Lake 3 (Appendix Figure C.29).

Water chemistry data collected at Reference Lake 3 showed no consistent differences in parameter concentrations between the surface and the bottom of the water column at each individual station in 2024 (Appendix Figure B.4, Appendix Table B.4). The absence of any appreciable depth-related differences in parameter concentrations at each station was consistent with only minor differences in dissolved oxygen saturation, pH, and/or specific conductance with increased depth from the surface. Because anoxic conditions do not appear to develop in the summer or fall at Reference Lake 3, reducing conditions conducive to metal mobilization from sediment to the overlying water are less likely to occur near the lake bottom, resulting in relatively uniform water chemistry between surface and bottom waters of Reference Lake 3. Accordingly, metal concentrations can naturally be expected to be similar between surface and bottom waters of local study area lakes provided no substantial gradients in dissolved oxygen saturation, pH, and/or specific conductance occur within the water column.



B4 SEDIMENT QUALITY

B4.1 Lake Environments (Reference Lake 3)

Sediment sampling was conducted at littoral and profundal (i.e., <12 m and >12 m depths, respectively) areas of Reference Lake 3 from 2015 to 2024 for the analysis of particle size, total organic carbon (TOC) content, and total metal concentrations (see Figure 2.2). Surficial sediment at Reference Lake 3 littoral and profundal areas was predominantly composed of silt and sand sized material with moderate TOC content (mean = 4.53%; Appendix Tables B.6 and D.3). Sediment moisture and TOC did not differ significantly between the Reference Lake 3 littoral and profundal habitats in 2024 (Appendix Table B.6). For substrate particle size composition, only the proportion of clay-sized particles differed significantly between the littoral and profundal stations sampled at the reference lake in 2024 (with more clay-sized particles in the profundal areas; Appendix Table B.6). A surficial and/or sub-surface layer of oxidized material (likely iron hydroxide or oxy-hydroxides), visible as a light brown floc or distinct layer, was occasionally observed in the surficial sediment of Reference Lake 3 (Appendix Tables D.1 and D.2). In addition, sub-surface sediment of Reference Lake 3 occasionally had physical characteristics suggesting reducing (i.e., anoxic) sediment conditions in 2024 (Appendix Tables D.1 and D.2). The physical properties of sediment observed at Reference Lake 3 in 2024 were consistent with those of the 2015 to 2023 studies (see Minnow 2016a, 2017, 2018a, 2019, 2020, 2021b, 2022, 2023, 2024a).

Metal concentrations in sediment at Reference Lake 3 were generally similar at the littoral stations compared to profundal stations, and a less than a two-fold difference in concentrations was typically shown for most parameters between the littoral and profundal station depths (Appendix Table B.5; Appendix Figure B.5). Among metals with established SQG, mean concentrations of iron and manganese were elevated above SQG at littoral and profundal stations, and the concentration of phosphorus exceeded the SQG at one profundal station at Reference Lake 3 in 2024 (Appendix Table B.5). Therefore, compared to SQG, high concentrations of iron and manganese, and to a lesser degree phosphorus, appear to occur naturally in sediments of Mary River Mine local study area lakes. Arsenic, chromium, copper, iron, manganese, and phosphorus concentrations were above the most stringent (i.e., lowest) AEMP sediment quality benchmarks at Reference Lake 3 at one or more stations for each analyte (Appendix Table B.5). This suggested that the AEMP sediment benchmarks for these metals were conservative. No substantial changes in concentrations of metals were indicated from 2015 to 2023 at littoral or profundal stations of Reference Lake 3 (Appendix Figure B.5).



B5 PHYTOPLANKTON (CHLOROPHYLL-A)

B5.1 Stream/Tributary and River Environments

Chlorophyll-a concentrations, which were used as a surrogate for phytoplankton abundance, ranged from 0.08 to 0.353 µg/L at the reference stream and river stations among spring, summer, and fall sampling events in 2024 (Appendix Table B.7). Therefore, lotic reference station chlorophyll-a concentrations were consistently well below the AEMP benchmark of 3.7 µg/L, and reflected low (i.e., oligotrophic) phytoplankton productivity according to Dodds et al (1998) trophic status classification for stream environments. This trophic status classification was generally consistent with an ultra-oligotrophic to oligotrophic categorization under the CCME Phosphorus Guidance Framework for the Management of Freshwater Systems (CCME 2024) for the stream and river reference stations based on mean aqueous total phosphorus concentrations generally ranging between < 2 and ≤ 10 µg/L during each spring, summer, and fall sampling event in 2024 (Appendix Tables B.2 and B.3). Chlorophyll-a concentrations were higher in the fall compared to the spring at the reference streams, in 2024 (Appendix Tables B.7 and E.6).

Chlorophyll-a concentrations at the reference stream and Mary River reference area stations in 2024 were similar to, or lower than, those observed during the baseline period (i.e., 2005 to 2013; Appendix Figure B.6). Like-season chlorophyll-a concentrations from 2015 to 2024 showed no consistent directional changes among years over the spring, summer, and fall sampling events at either the reference stream or the Mary River reference area stations (Appendix Figure B.6). The variability in chlorophyll-a concentrations observed among seasons and years at the lotic reference areas indicated that variation in chlorophyll-a concentrations occurs naturally among years and seasons in watercourses within the Mary River Mine local study area.

B5.2 Lake Environments (Reference Lake 3)

Chlorophyll-a concentrations at Reference Lake 3 showed no consistent differences between the surface and the bottom of the water column at each individual station during both the summer and fall sampling events in 2023 (Appendix Figure B.7). Reference Lake 3 chlorophyll-a concentrations averaged 0.873 µg/L in summer and 0.985 µg/L during fall 2024, and were consistently well below the AEMP benchmark of 3.7 µg/L (Appendix Table E.9; Appendix Figure B.7). Similar to the lotic reference stations, mean chlorophyll-a concentrations observed at Reference Lake 3 in 2024 indicated low (i.e., oligotrophic) phytoplankton productivity based on the lake trophic status classification presented in Wetzel (2001). This trophic status classification was generally consistent with an



ultra-oligotrophic categorization under the CCME Phosphorus Guidance Framework for the Management of Freshwater Systems (CCME 2024) for Reference Lake 3 based on mean aqueous total phosphorus concentrations below 4 µg/L during the summer and fall sampling events in 2024, except at two bottom sampling locations in the summer (i.e. REF3-01 [11 µg/L] and REF3-03 [4.3 µg/L]; Appendix Table B.4). Chlorophyll-a concentrations in Reference Lake 3 were similar from 2015 to 2024 when considered on an annual basis. Summer chlorophyll-a concentrations in Reference Lake 3 in 2024 were similar to those in any year from 2015 to 2024, except for 2023 which had a higher concentration (Appendix Table E.5). In the fall, though concentrations varied among years, there were no consistent patterns (Appendix Table E.5). Chlorophyll-a concentrations were significantly higher in fall compared to summer at Reference Lake 3 in 2024 (Appendix Table E.4), which was similar to the 2017, 2018 and 2022 studies, but differed from the 2015 study (chlorophyll-a concentrations did not differ significantly between summer compared to fall), and the 2016 and 2021 studies (significantly higher chlorophyll-a concentrations in summer compared to fall; Minnow 2016a, 2017, 2018a, 2019, 2020, 2021b, 2022, 2023, 2024a). Therefore, although chlorophyll-a concentrations were generally comparable from 2015 to 2024 for like-seasons at Reference Lake 3, the relative seasonal changes in chlorophyll-a concentrations among years suggested naturally variable temporal patterns in phytoplankton abundance can be expected at Mary River Mine local study area lakes.



B6 BENTHIC INVERTEBRATE COMMUNITY

B6.1 Stream/Tributary Environments

The original Mary River Project CREMP design did not include/identify a reference stream from which to evaluate potential mine-related effects on benthic invertebrate communities of stream/tributary environments, instead relying solely on a before-after approach to identify potential mine influences on benthic invertebrates over time (see NSC 2014). Stemming from recommendations from the 2015 CREMP (Minnow 2016b), a reference stream was incorporated into the 2016 to 2024 CREMP benthic invertebrate community studies to provide a stronger basis for evaluating potential within-year mine-related effects to biota residing in mine-exposed tributaries of Camp and Sheardown lakes. The benthic invertebrate community (benthic) study area selected for the CREMP (REF-CRK) was located within at the same unnamed tributary to Angijurjuk Lake that is used for reference water quality sampling (Stations CLT-REF4 and MRY-REF2; Table 2.6; Figure 2.3). Criteria used for the selection of this stream as a reference area for the CREMP, which is herein referred to as Unnamed Reference Creek, included a watercourse exhibiting similar habitat characteristics (e.g., width, water velocity, substrate size) as the mine-exposed tributaries that is not/has not been influenced by mining or adverse anthropogenic disturbances. The acceptance of Unnamed Reference Creek as a reference area for the evaluation of mine-related influences on tributary water chemistry under the original CREMP (KP 2014a) was also considered an important criterion in the selection of this watercourse as a suitable reference area for the benthic invertebrate community survey.

Benthic invertebrate density at Unnamed Reference Creek ranged from 86 to 1039 individuals/m² in the 2024 study (mean of 393 individuals/m²; Appendix Table B.8), which is considered moderate for Arctic streams (Craig and McCart 1975). Unnamed Reference Creek showed relatively high richness in 2024, despite the low production that can naturally be expected in Arctic streams as the result of constraints associated with low nutrients and seasonal temperatures, as well as food limitation (Huryn and Wallace 2000). The dominant taxonomic group observed at Unnamed Reference Creek benthic stations in 2024 was Chironomidae (non-biting midges), collectively accounting for approximately 69% of the community (Appendix Table B.8). Collector-gatherers were the dominant benthic invertebrate functional feeding group (FFG) present at Unnamed Creek in 2024 (Appendix Table B.8), suggesting greatest reliance upon deposited fine particulate organic matter as a food source for benthic invertebrates. Filterers constituted a low proportion of the Unnamed Reference Creek benthic invertebrate community in 2024 (Appendix Table B.8), suggesting that suspended fine particulate organic matter was a less



important food source. In terms of benthic invertebrate habit preference group (HPG), sprawlers were the dominant group at Unnamed Reference Creek in 2024 (Appendix Table B.8), suggesting that most invertebrates were associated with substrate surfaces and were not deeply embedded in the substrate (i.e., non-burrowers).

B6.2 River Environments

The area of Mary River located upstream of the mine lease property has been considered representative of reference conditions for the mine-exposed stations/study areas situated farther downstream on the Mary River under the CREMP (Baffinland 2015; KP 2014a,b, 2015; NSC 2014). As in previous CREMP studies, the G0-09 area of Mary River was used as the benthic reference area for mine-exposed areas of Mary River as part of the 2024 CREMP (see Table 2.6; Figure 2.3).

Benthic invertebrate density at the Mary River reference area in the 2024 study ranged from 21 to 100 individuals/m². Relatively low richness and moderate Simpson's Evenness also characterized the benthic invertebrate community of the Mary River reference area, and reflected naturally low Arctic stream environment productivity as a result of low ambient temperatures and nutrient levels (Huryn and Wallace 2000). Midges of the family Chironomidae were the dominant taxonomic group observed at the Mary River reference area in 2024, with the relative abundance of this group ranging from 41.7 to 96.4% of individuals (mean of 66.0%) and chironomid taxa considered metal-sensitive constituting 0% to 68.3% of the community (Appendix Table B.8). Similar to Unnamed Reference Creek, collector-gatherers were the dominant FFG present at the Mary River reference area in 2024 (Appendix Table B.8), suggesting that fine particulate organic matter was the predominant food source for benthic invertebrates at this area. Sprawlers composed the dominant HPG at the Mary River reference area in 2024 (Appendix Table B.8), which suggested that most benthic invertebrates were associated with the surface of rocky substrates.

B6.3 Lake Environments (Reference Lake 3)

The benthic invertebrate community of Reference Lake 3 differed between littoral (<12 m depth) and profundal (>12 m depth) stations in 2024. As in previous monitoring conducted from 2015 to 2023, significantly higher benthic invertebrate density and richness was observed at littoral stations compared to profundal stations in 2024 (Appendix Table B.9). However, in 2024 study the magnitude of difference (MOD) did not exceed the Critical Effect Size (CES) of ± 2 SD for density and for richness (Appendix Table B.9). In addition, differences in benthic invertebrate community structure occurred between sampling depths as indicated by significantly higher and lower relative abundance of Ostracoda (seed shrimp)



and Chironomidae (non-biting midges), respectively, at littoral stations compared to profundal stations (Appendix Table B.9). No significant differences in the relative abundance of FFG were indicated between littoral and profundal habitats of Reference Lake 3 in 2023 but a significantly lower relative abundance of the sprawler HPG, occurred at littoral stations compared to profundal stations (Appendix Table B.9).

Littoral and profundal habitat benthic invertebrate communities at Reference Lake 3 in 2024 showed density, richness, Simpson's Evenness, and relative abundance of dominant taxonomic groups and FFGs all within the range of those observed from 2015 to 2022 (Appendix Figures F.5 and F.6). This suggested that the benthic invertebrate community at littoral and profundal habitat of Reference Lake 3 showed relatively minor changes from 2015 to 2023.



B7 FISH POPULATION

B7.1 Stream/Tributary and River Environments

Fish population sampling of lotic habitats is not required as part of the Mary River Project CREMP (see NSC 2014). In part, this reflects the fact that fish can only inhabit local study area streams/ivers for a short period each year (i.e., July to September) as a result of complete freezing/desiccation of these lotic habitats over much of the year. In addition, sampling of juvenile arctic charr within a representative lotic habitat is conducted for the federal Environmental Effects Monitoring (EEM) program to meet Metal and Diamond Mining Effluent Regulation requirements (Baffinland 2015; Minnow 2018b, 2021a, 2024b).

B7.2 Lentic Environments (Reference Lake 3)

The Reference Lake 3 fish community has historically been composed of arctic charr and ninespine stickleback. In previous studies, relative abundance of both species has been low at Reference Lake 3 based on low electrofishing and gill netting catches and catch-per-unit-effort (CPUE) for each species, although predominantly arctic charr have been captured at the reference lake (Minnow 2018a, 2019, 2020, 2021b, 2022, 2023, 2024a). Suitable numbers of arctic charr were captured at nearshore habitat of Reference Lake 3 in 2024 (i.e., 105 individuals) to allow evaluation of mine-related effects on survival, growth, and condition of fish collected at the mine-exposed lake shorelines (Appendix Table G.1). For these fish, young-of-the-year (YOY) individuals were generally distinguishable from the 1+ to 5+ age classes at a fork length of 4.0 cm based on the evaluation of length-frequency distributions coupled with supporting length and weight measurements and age determinations (Appendix Figure G.1; Appendix Table G.4). In 2015 and 2019, YOY arctic charr captured at nearshore habitat were not able to be distinguished from older age classes at Reference Lake 3 (Minnow 2023). However, population comparisons of nearshore arctic charr captured between the mine-exposed and reference lakes from 2016 to 2018, 2020, 2021, 2022, 2023 and 2024 were completed separately for YOY and non-YOY data sets. Temporal comparisons of the 2015 to 2024 nearshore arctic charr data indicated that fish length, weight, and condition in YOY and non-YOY captured in 2024 were generally lower than in fish captured in previous years, with MOD frequently outside the CES for non-YOY endpoints (Appendix Table B.10). Overall, the Reference Lake fish population data indicated that some year-to-year differences in nearshore fish population endpoints can be expected naturally at local study area lakes.

Gillnet catches in 2024 were sufficient as a basis for conducting meaningful statistical comparison with the mine-exposed lakes to evaluate mine-related effects on the population of reproductive-aged arctic charr (Appendix Tables G.8, G.15, G.21, and G.27). Because arctic



charr can show differential growth rates between the sexes (females grow faster; Jonsson et al. 1988; Skúlason et al. 1996; Gulseth and Nilssen 2001), natural differences in sex ratios between study areas could potentially result in falsely attributing differences in growth and/or condition between mine-exposed and reference areas to mine-related influences. Thus, the inability to definitively determine arctic charr sex using external characteristics when applying a non-lethal sampling approach could confound data interpretation. To determine whether differences in sex ratios could potentially confound the interpretation of the CREMP arctic charr health assessment, growth and condition were compared between male and female arctic charr collected at Camp, Sheardown and Mary lakes during the baseline period as part of the 2015 CREMP (Minnow 2016a). No significant differences in growth and condition were indicated between males and females based on this analysis, suggesting that a non-lethal study approach is unlikely to bias the evaluation of mine-related effects on fish health as part of the CREMP. Contrary to the published literature, the absence of differences in arctic charr growth and condition between males and females at Mary River Mine local study area lakes may be explained by naturally slow growth rates and low spawning frequency (i.e., once every 2 to 4 years) at high Arctic areas, and also by low gonadosomatic index (GSI) at the time that sampling is normally conducted for the Mary River Project CREMP (i.e., August). Temporal comparisons of arctic charr collected from littoral/profundal habitats from 2015 to 2024 indicated that fish captured in 2024 had lengths and weights that were often lower than fish captured in previous years, but fish condition was generally similar to most previous years, and the MOD varied relative to the CES (Appendix Table B.11). Overall, the Reference Lake 3 fish population data indicated that some year-to-year differences in littoral/profundal fish population endpoints can be expected naturally at local study area lakes.



B8 CREMP IMPLICATIONS

This overview of reference conditions was included in the CREMP to provide context and perspective regarding key chemical, physical, and biological features of the CREMP reference study areas. Key implications of reference area features that could affect the ability of the CREMP to evaluate mine-related effects at mine-exposed waterbodies that were identified through the 2016 to 2024 reference area overviews include the following:

- **Federal Water Quality Guidelines (WQG) are not applicable for aqueous phenol concentrations.** Aqueous concentrations of phenols were routinely elevated above WQG at the CREMP stream, river and lake reference stations in 2015 and 2016. Correlation analysis indicated a significant, positive relationship between phenol and both nitrate and DOC concentrations in the 2015 and 2016 CREMP, suggesting that high phenol concentrations in waterbodies near the Mary River Mine were associated with influences from natural organic composition. Therefore, phenol concentration comparisons against applicable WQG did not serve as a focus for discussion as part of the 2016 to 2024 CREMP.
- **Mine-related influences on aqueous metal concentrations at waterbodies used for the CREMP.** Total aluminum concentrations were routinely elevated, and other metals including (total) iron periodically elevated, above WQG at stream, river, and/or lake reference areas used for the CREMP from 2015 to 2024, and historically in baseline studies. Significant positive correlations between total concentrations of these metals and turbidity were identified using the 2015 to 2022 data sets which suggested that these metals were likely bound to and/or composed the physical make-up of suspended particulate materials in water samples. This was supported by a low ratio of dissolved to total concentrations of metals such as aluminum, iron, and manganese in reference water samples from 2015 to 2022. Accordingly, both total and dissolved concentrations of water chemistry parameters are considered in the interpretation of water quality results as part of the CREMP studies.
- **Use of average water chemistry and chlorophyll-a data for lake water quality/phytoplankton monitoring stations.** No consistent differences in water chemistry or chlorophyll-a concentrations were observed between the surface and bottom of the water column at Reference Lake 3 stations from 2015 to 2024. Therefore, the evaluation of water chemistry and phytoplankton productivity among stations and study areas for the 2016 to 2024 Mary River Project CREMP studies was



based on average water chemistry and chlorophyll-a values from the water column surface and bottom for each lake station.

- **Consider updating the AEMP sediment quality benchmarks.** Arsenic, chromium, copper, iron, manganese, and phosphorus have been observed at concentrations above the AEMP sediment quality benchmarks in sediment at Reference Lake 3 in CREMP studies conducted from 2015 to 2024. This suggested that the AEMP benchmarks for these metals may be overly conservative.
- **CES for benthic invertebrate community and fish population endpoints.** Year-to-year evaluation of reference stream and lake habitat used for the CREMP has indicated that benthic invertebrate and fish population differences between years can be expected to vary, sometimes outside of the CES set out for use under the federal EEM program (Munkittrick et al. 2009). Therefore, while the use of established CES for defining effects appears to be applicable to the Mary River Project CREMP, data interpretations that include comparisons to reference data should consider how reference data have varied over time.



B9 REFERENCES

- Baffinland (Baffinland Iron Mines Corporation). 2015. Mary River Project Aquatic Effects Monitoring Plan. Document No. BAF-PH1-830-P16-0039. Rev 1. June 27, 2014.
- CCME (Canadian Council of Ministers of the Environment). 2024. Canadian Environmental Quality Guidelines. Canadian Council of Ministers of the Environment. Winnipeg. <https://ccme.ca/en/current-activities/canadian-environmental-quality-guidelines>. Accessed December 2022.
- Craig, P.C. and P.J. McCart. 1975. Classification of stream types in Beaufort Sea drainages between Prudhoe Bay, Alaska, and the McKenzie Delta, N.W.T., Canada. Arctic and Alpine Research. 7 : 183 – 198.
- Dodds, W.K., J.R. Jones and E.B. Welch. 1998. Suggested classification of stream trophic state: distributions of temperate stream types by chlorophyll, total nitrogen, and phosphorus. Water Resources 12 : 1455 – 1462.
- Gulseth, O.A. and K.J. Nilssen. 2001. Life-History Traits of Charr, *Salvelinus alpinus*, from a High Arctic Watercourse on Svalbard. Arctic 54:1-11.
- Huryn, A.D. and J.B. Wallace. 2000. Life history and production of stream insects. Annual Review of Entomology 45: 83 – 110.
- Jonsson, B., S. Skulason, S.S. Snorrason, O.T. Sandlund, H.J. Malmquist, P.M. Jonasson, R. Gydmo and T. Lindem. 1988. Life History Variation of Polymorphic Arctic Charr (*Salvelinus alpinus*) in Thingvallavatn, Iceland. Can. J. Fish Aquat. Sci. 45:1537-1547.
- KP (Knight Piesold Ltd.) 2014a. Baffinland Iron Mines Corporation – Mary River Project – Water and Sediment Quality Review and CREMP Monitoring Report. KP Ref. No. NB102-181/33-1. June 25, 2014.
- KP 2014b. Baffinland Iron Mines Corporation – Mary River Project – Detailed Review of Baseline Stream Water Quality. KP Ref. No. NB102-181/33-1C. May 30, 2014.
- KP 2015. Baffinland Iron Mines Corporation – Mary River Project – 2014 Water and Sediment CREMP Monitoring Report. KP Ref. No. NB102-181/34-6. March 19, 2015.
- Minnow (Minnow Environmental Inc.). 2016a. Mary River Project 2015 Core Receiving Environment Monitoring Program Report. Prepared for Baffinland Iron Mines Corp. March 2016.
- Minnow. 2016b. Mary River Project CREMP Recommendations for Future Monitoring. Letter report to Jim Millard, Baffinland Iron Mines Corp. March 17, 2016.



- Minnow. 2017. Mary River Project 2016 Core Receiving Environment Monitoring Program Report. Prepared for Baffinland Iron Mines Corp. March 2017.
- Minnow. 2018a. Mary River Project 2017 Core Receiving Environment Monitoring Program Report. Prepared for Baffinland Iron Mines Corp. March 2018.
- Minnow. 2018b. Mary River Project Phase 1 Environmental Effects Monitoring (2017) Interpretive Report. Prepared for Baffinland Iron Mines Corp. January 2018.
- Minnow. 2019. Mary River Project 2018 Core Receiving Environment Monitoring Program Report. Prepared for Baffinland Iron Mines Corp. March 2019.
- Minnow. 2020. Mary River Project 2019 Core Receiving Environment Monitoring Program Report. Prepared for Baffinland Iron Mines Corp. March 2020.
- Minnow. 2021a. Mary River Project Second Environmental Effects Monitoring (2020) Interpretive Report. Prepared for Baffinland Iron Mines Corp. January 2021.
- Minnow. 2021b. Mary River Project 2020 Core Receiving Environment Monitoring Program Report. Prepared for Baffinland Iron Mines Corp. March. Project 207202.0045.
- Minnow. 2022. Mary River Project 2021 Core Receiving Environment Monitoring Program Report. Prepared for Baffinland Iron Mines Corp. March. Project 217202.0075.
- Minnow. 2023. Mary River Project 2022 Core Receiving Environment Monitoring Program Report. Prepared for Baffinland Iron Mines Corp. March. Project 227202.0072.
- Minnow. 2024a. Mary River Project 2023 Core Receiving Environment Monitoring Program Report. Prepared for Baffinland Iron Mines Corp. March. Project 237202.0080
- Minnow. 2024b. Mary River Project Second Environmental Effects Monitoring (2023) Interpretive Report. Prepared for Baffinland Iron Mines Corp. January 2024.
- Munkittrick, K.R., C.J. Arens, R.B. Lowell and G.P. Kaminski. 2009. A review of potential methods of determining critical effect size for designing environmental monitoring programs. *Environmental Toxicology and Chemistry* 8: 1361 – 1371.
- NSC (North/South Consultants Inc.). 2014. Mary River Project – Core Receiving Environment Monitoring Program: Freshwater Biota. Report prepared for Baffinland Iron Mines Corporation. June 2014.
- NSC. 2015. Mary River Project - Description of Biological Sampling Completed in the Mine Area: 2014. Report prepared for Baffinland Iron Mines Corporation. March 2015.



OMOE (Ontario Ministry of Environment). 1993. Guidelines for the Protection and Management of Aquatic Sediment Quality in Ontario. August 1993, Reprinted October, 1996.

OMOEE (Ontario Ministry of Environment and Energy). 1994. Water Management: Policies, Guidelines, Provincial Water Quality Objectives of the Ministry of Environment and Energy. July, 1994. Reprinted February 1999.

Skulason, S., S.S. Snorrason, D.L.G. Noakes and M.M. Ferguson. 1996. Genetic Basis of Life History Variations Among Sympatric Morphs of Arctic Char, *Salvelinus alpinus*. Can. J. Fish Aquat. Sci. 53:1807-1813

Wetzel, R.G. 2001. Limnology: Lake and River Ecosystems. Third Edition. Academic Press. San Diego, CA, USA. 1006 pp.



APPENDIX B

FIGURES

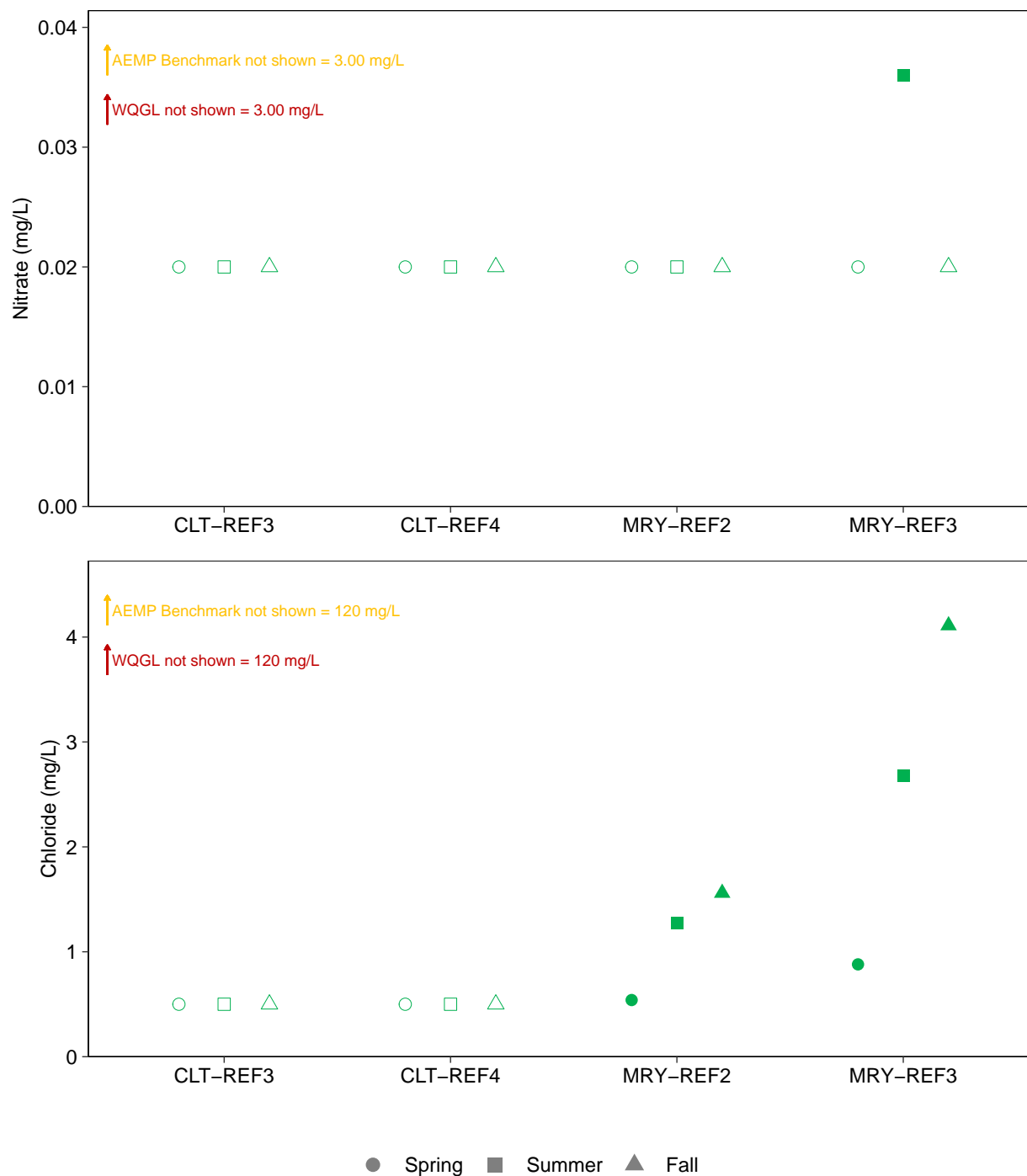


Figure B.1: Seasonal Variation in Water Chemistry at Stream/Tributary Reference Stations (CLT-REF3, CLT-REF4, MRY-REF2, MRY-REF3), Mary River Project CREMP, 2024

Notes: Concentrations below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL and the open symbol represents one or more values reported below the LRL. Red dashes indicate Water Quality Guidelines, some of which are dependent on concurrent hardness values. Orange solid line indicates AEMP Benchmark.

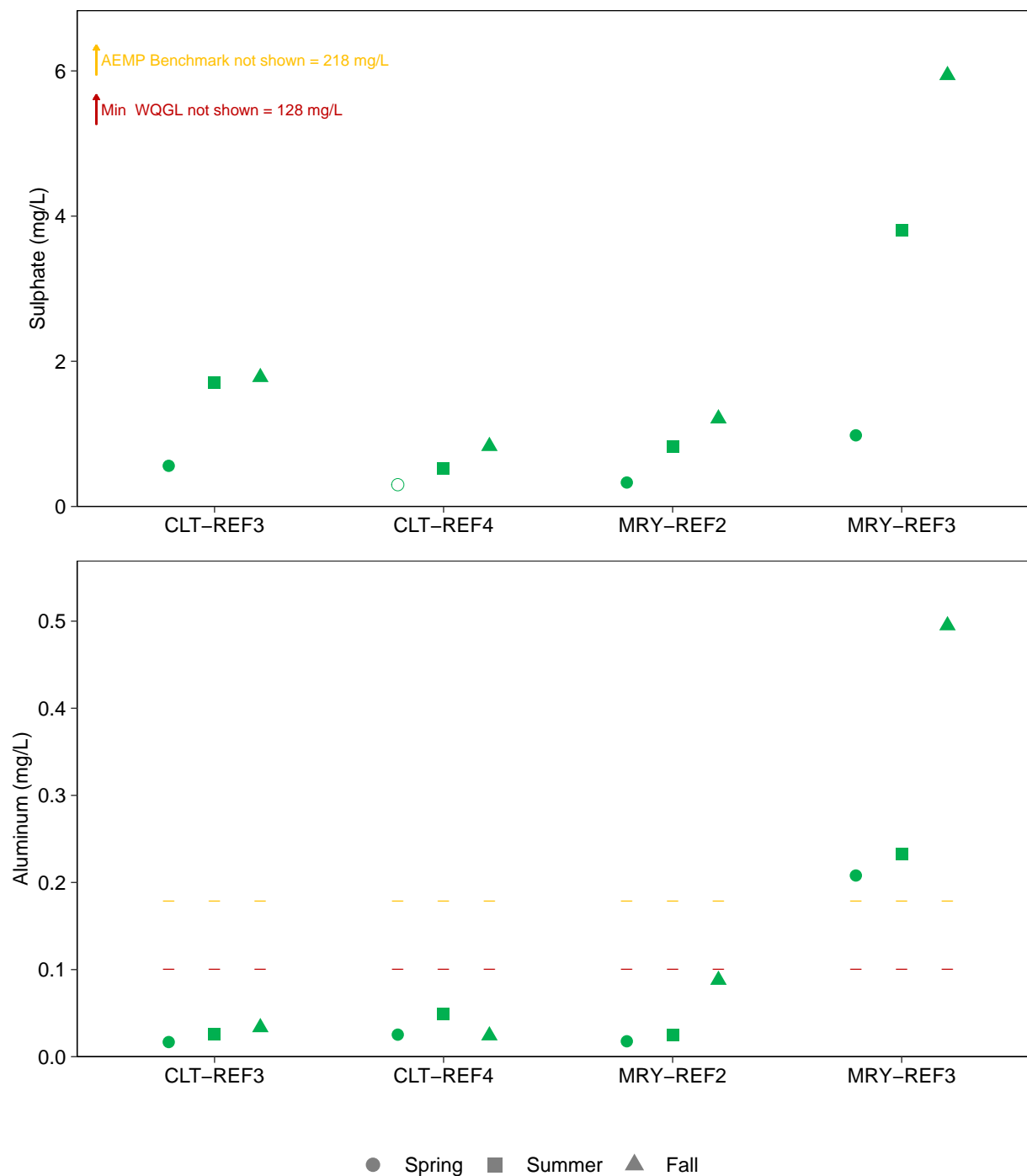


Figure B.1: Seasonal Variation in Water Chemistry at Stream/Tributary Reference Stations (CLT-REF3, CLT-REF4, MRV-REF2, MRV-REF3), Mary River Project CREMP, 2024

Notes: Concentrations below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL and the open symbol represents one or more values reported below the LRL. Red dashes indicate Water Quality Guidelines, some of which are dependent on concurrent hardness values. Orange solid line indicates AEMP Benchmark.

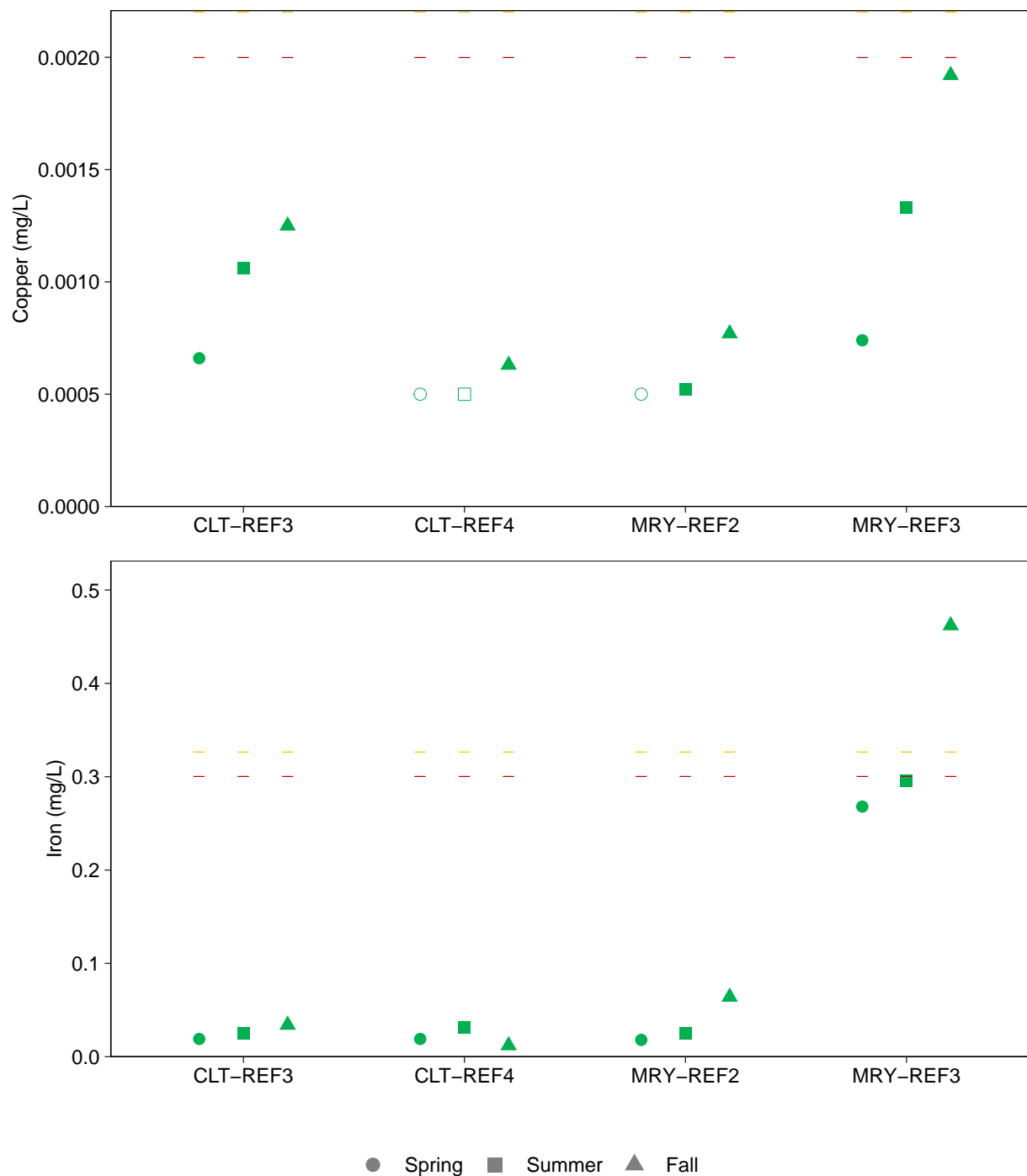


Figure B.1: Seasonal Variation in Water Chemistry at Stream/Tributary Reference Stations (CLT-REF3, CLT-REF4, MRY-REF2, MRY-REF3), Mary River Project CREMP, 2024

Notes: Concentrations below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL and the open symbol represents one or more values reported below the LRL. Red dashes indicate Water Quality Guidelines, some of which are dependent on concurrent hardness values. Orange solid line indicates AEMP Benchmark.

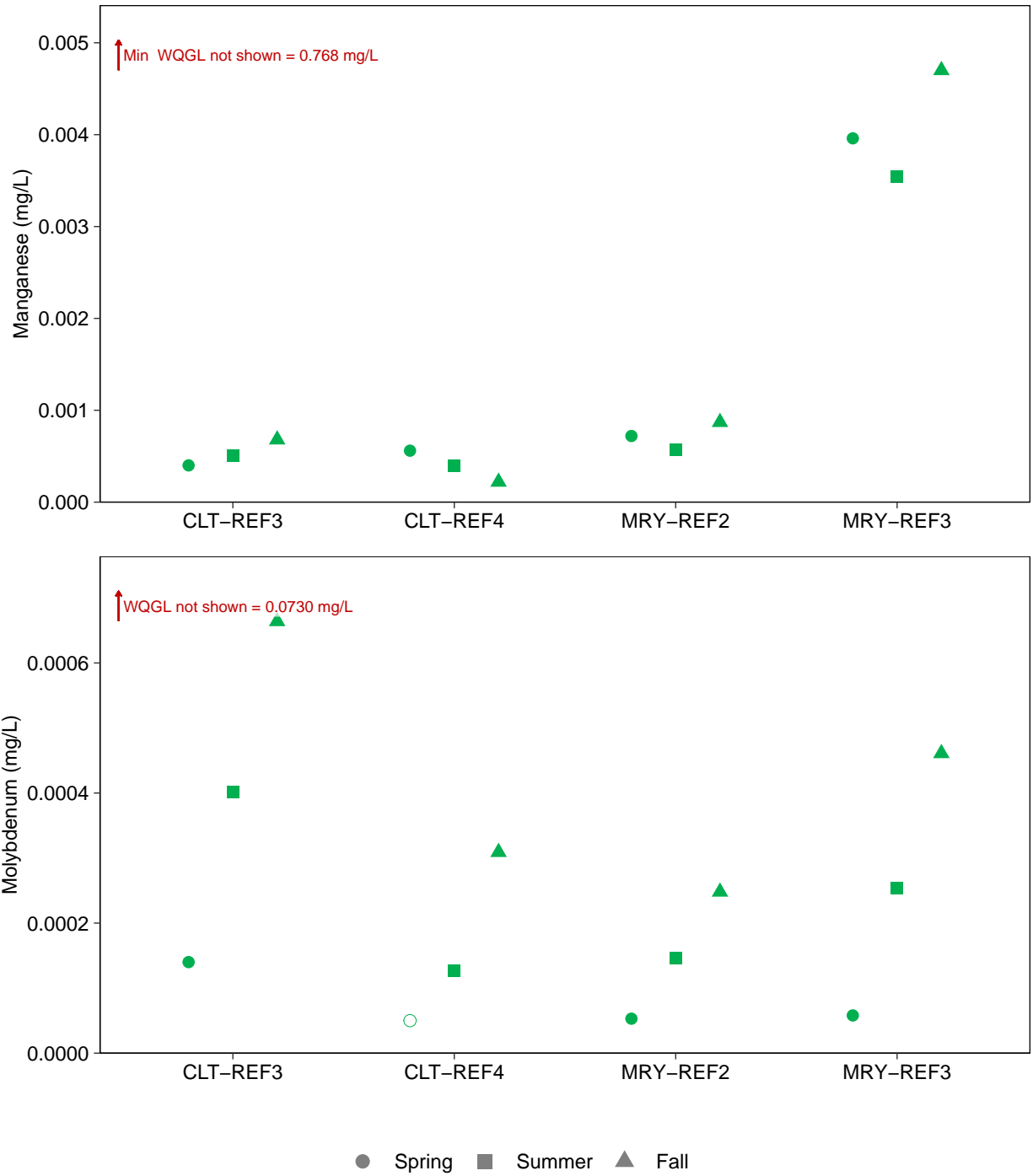


Figure B.1: Seasonal Variation in Water Chemistry at Stream/Tributary Reference Stations (CLT-REF3, CLT-REF4, MRY-REF2, MRY-REF3), Mary River Project CREMP, 2024

Notes: Concentrations below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL and the open symbol represents one or more values reported below the LRL. Red dashes indicate Water Quality Guidelines, some of which are dependent on concurrent hardness values. Orange solid line indicates AEMP Benchmark.

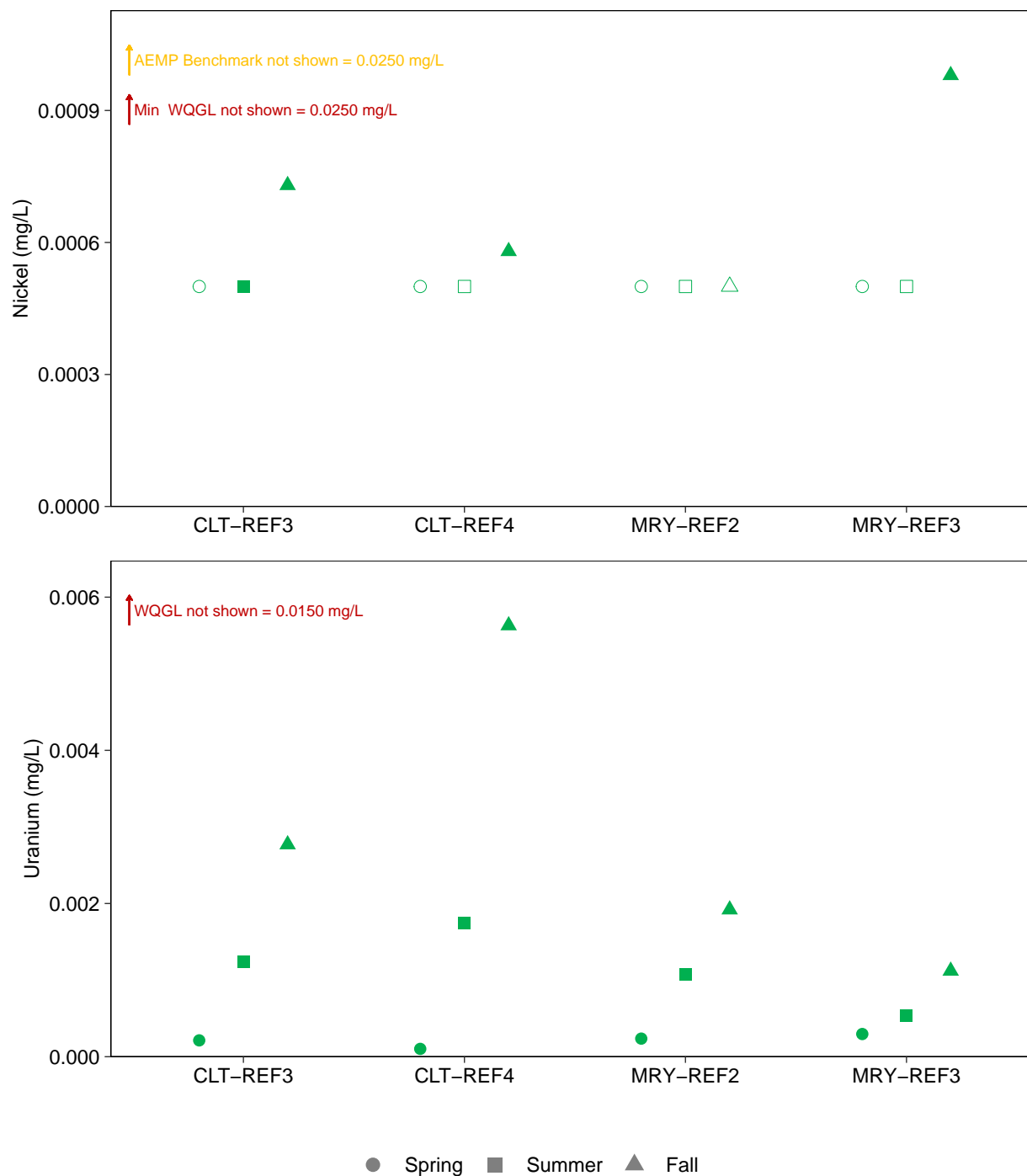


Figure B.1: Seasonal Variation in Water Chemistry at Stream/Tributary Reference Stations (CLT-REF3, CLT-REF4, MRY-REF2, MRY-REF3), Mary River Project CREMP, 2024

Notes: Concentrations below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL and the open symbol represents one or more values reported below the LRL. Red dashes indicate Water Quality Guidelines, some of which are dependent on concurrent hardness values. Orange solid line indicates AEMP Benchmark.

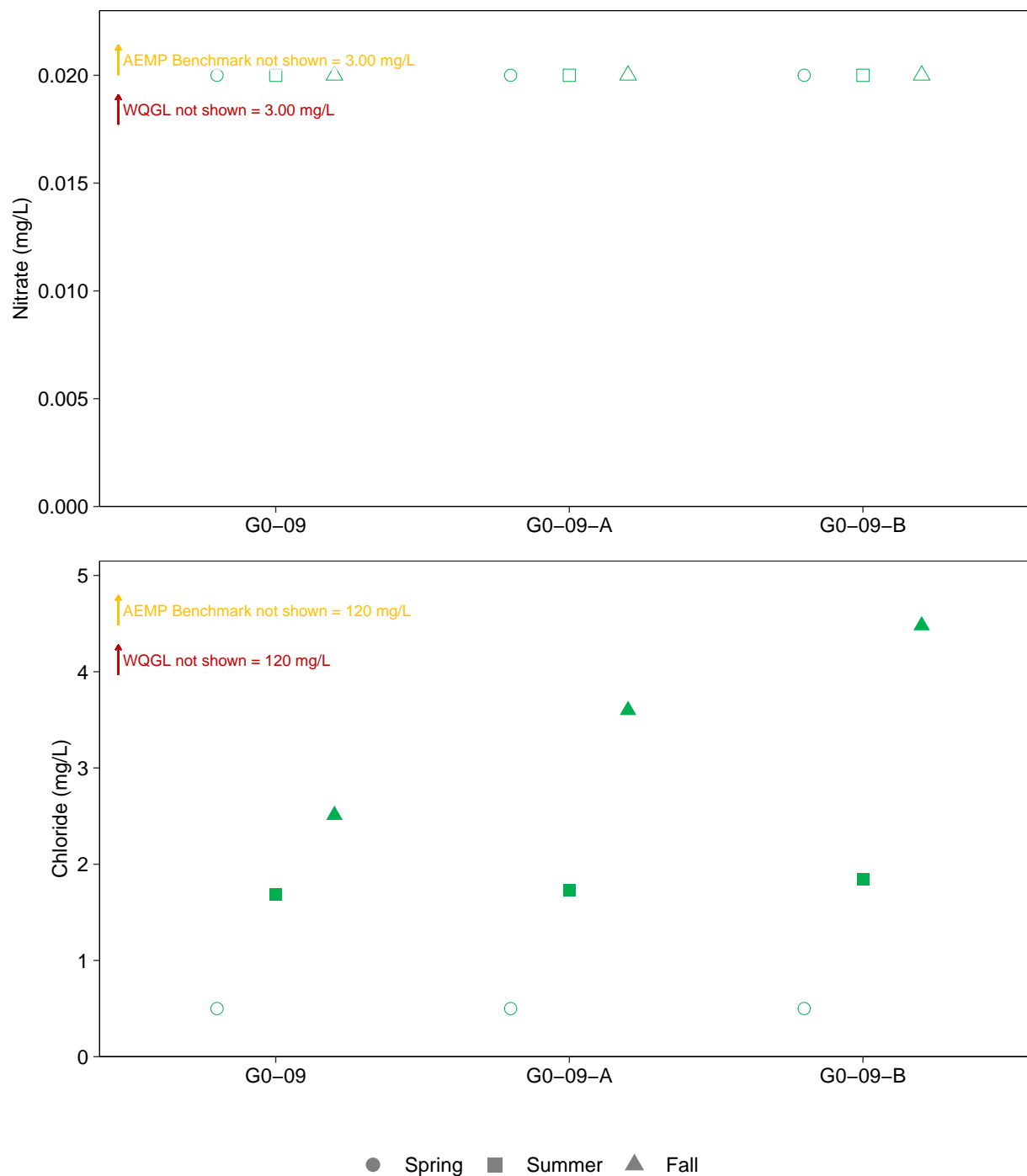


Figure B.2: Seasonal Variation in Water Chemistry at Mary River (G0-09 Series) Reference Stations, Mary River Project CREMP, 2024

Notes: Concentrations below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL and the open symbol represents one or more values reported below the LRL. Red dashes indicate Water Quality Guidelines, some of which are dependent on concurrent hardness values. Orange solid line indicates AEMP Benchmark.

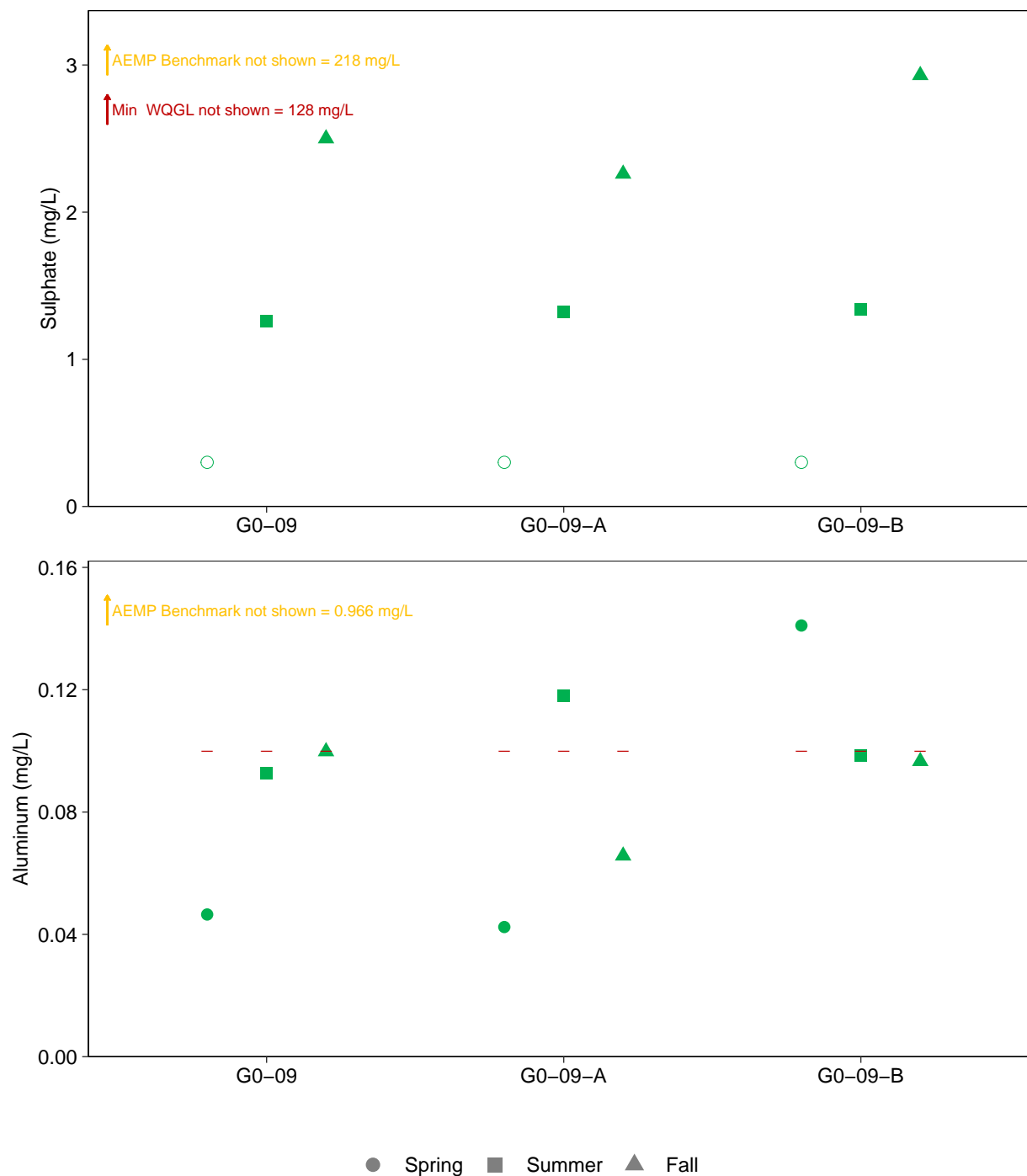


Figure B.2: Seasonal Variation in Water Chemistry at Mary River (G0-09 Series) Reference Stations, Mary River Project CREMP, 2024

Notes: Concentrations below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL and the open symbol represents one or more values reported below the LRL. Red dashes indicate Water Quality Guidelines, some of which are dependent on concurrent hardness values. Orange solid line indicates AEMP Benchmark.

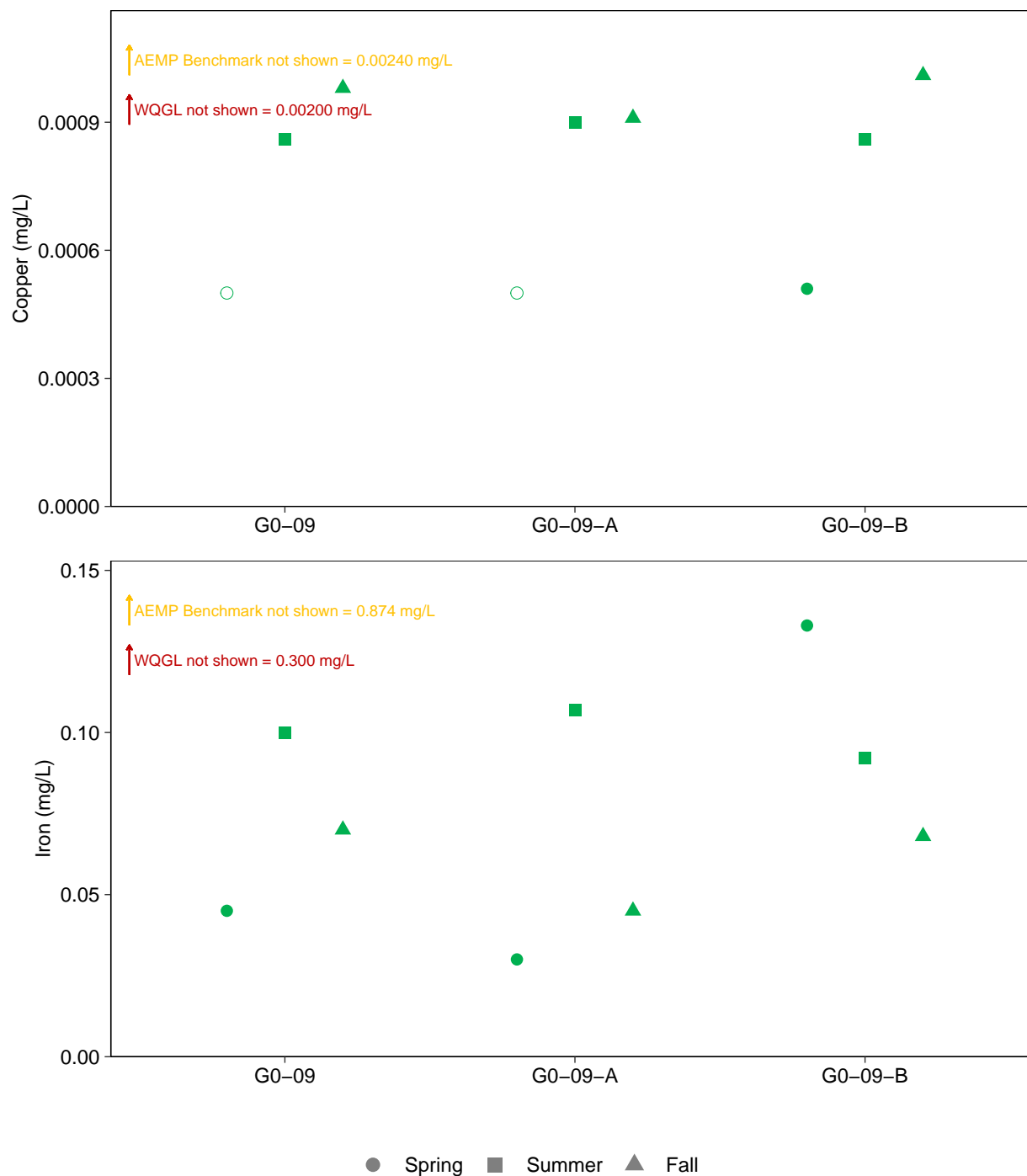


Figure B.2: Seasonal Variation in Water Chemistry at Mary River (G0-09 Series) Reference Stations, Mary River Project CREMP, 2024

Notes: Concentrations below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL and the open symbol represents one or more values reported below the LRL. Red dashes indicate Water Quality Guidelines, some of which are dependent on concurrent hardness values. Orange solid line indicates AEMP Benchmark.

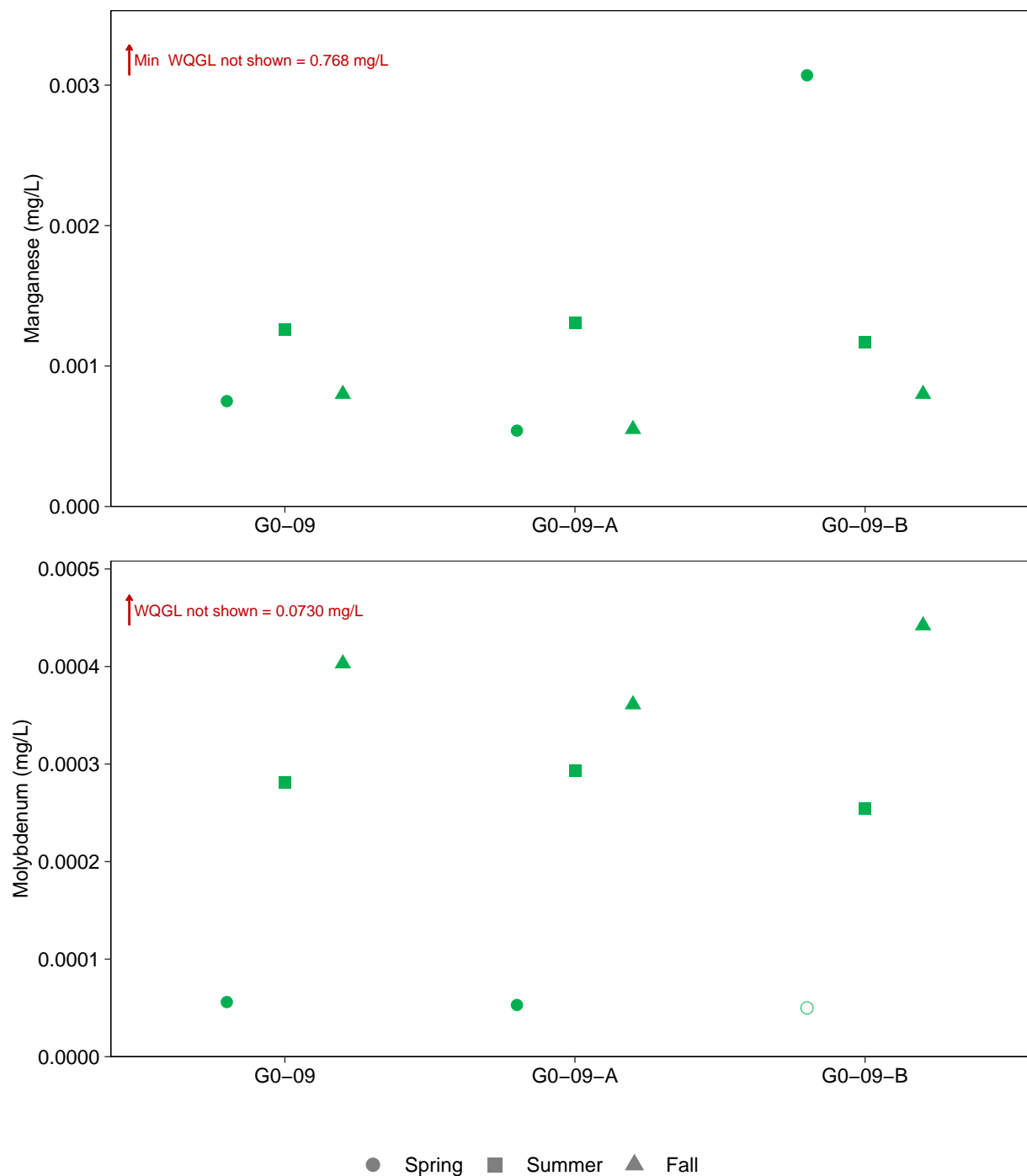


Figure B.2: Seasonal Variation in Water Chemistry at Mary River (G0-09 Series) Reference Stations, Mary River Project CREMP, 2024

Notes: Concentrations below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL and the open symbol represents one or more values reported below the LRL. Red dashes indicate Water Quality Guidelines, some of which are dependent on concurrent hardness values. Orange solid line indicates AEMP Benchmark.

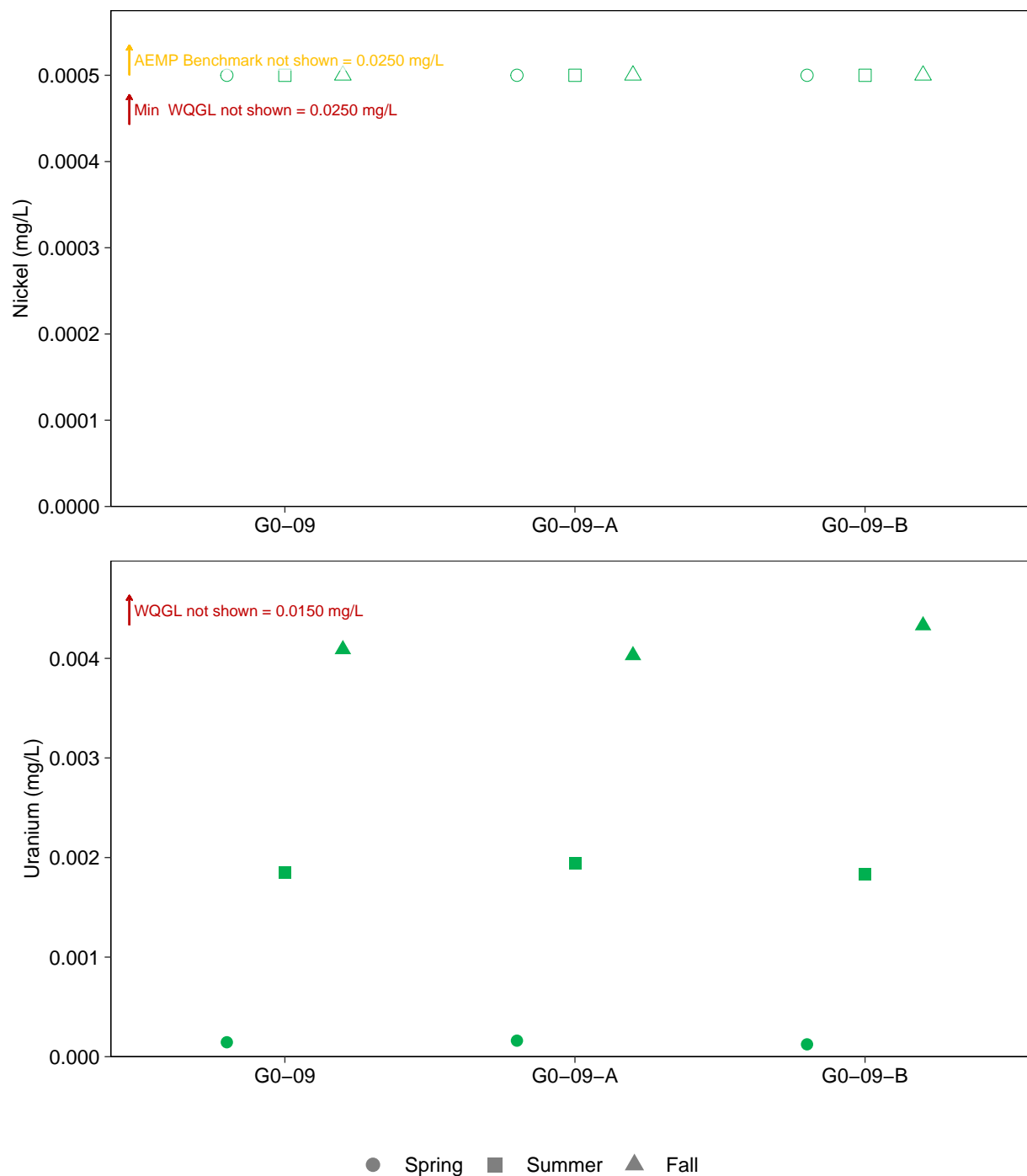


Figure B.2: Seasonal Variation in Water Chemistry at Mary River (G0-09 Series) Reference Stations, Mary River Project CREMP, 2024

Notes: Concentrations below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL and the open symbol represents one or more values reported below the LRL. Red dashes indicate Water Quality Guidelines, some of which are dependent on concurrent hardness values. Orange solid line indicates AEMP Benchmark.

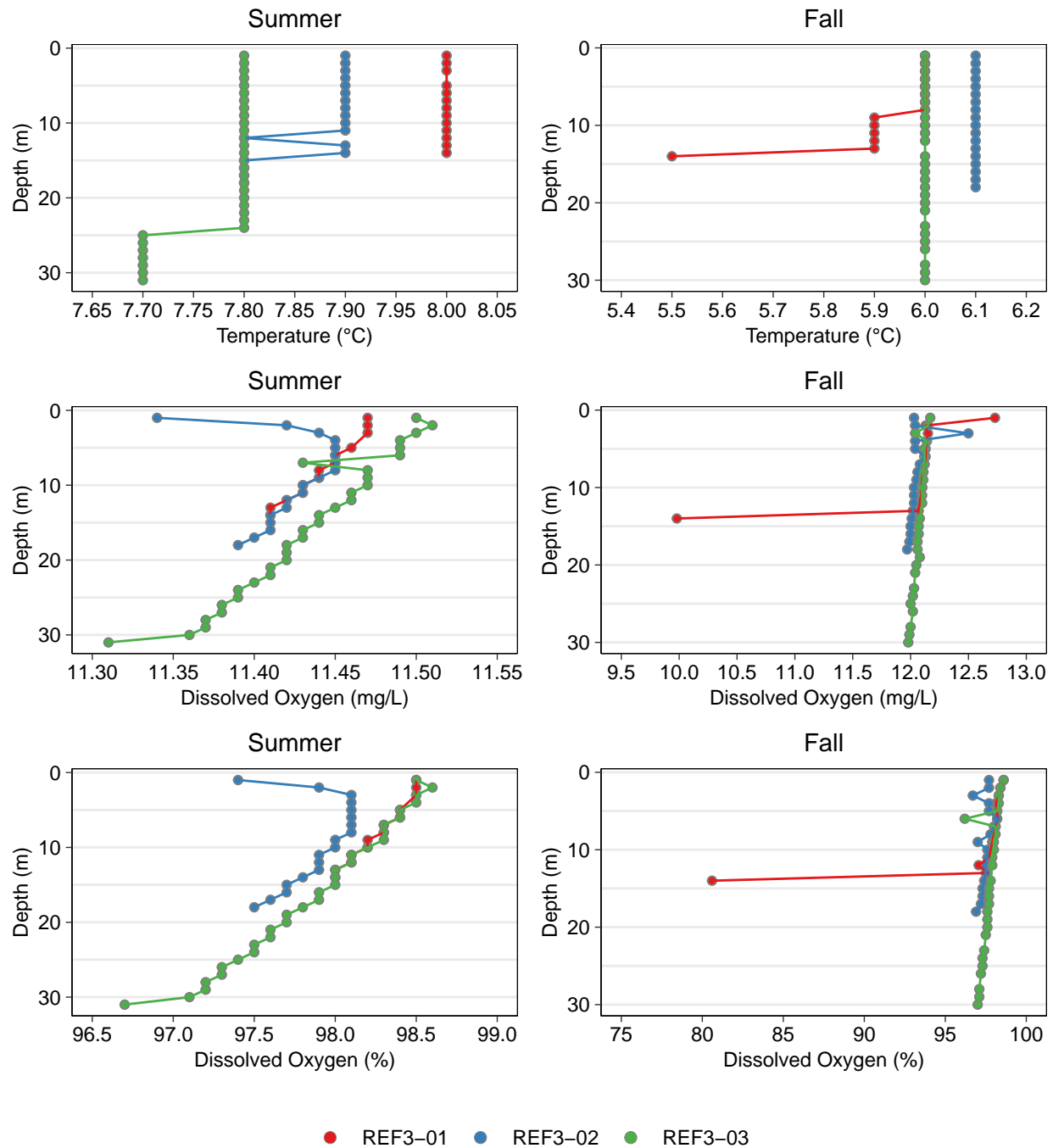


Figure B.3: *In Situ* Water Quality with Depth from Surface at Reference Lake 3 (REF-03) during Summer and Fall Sampling Events, Mary River Project CREMP, 2024

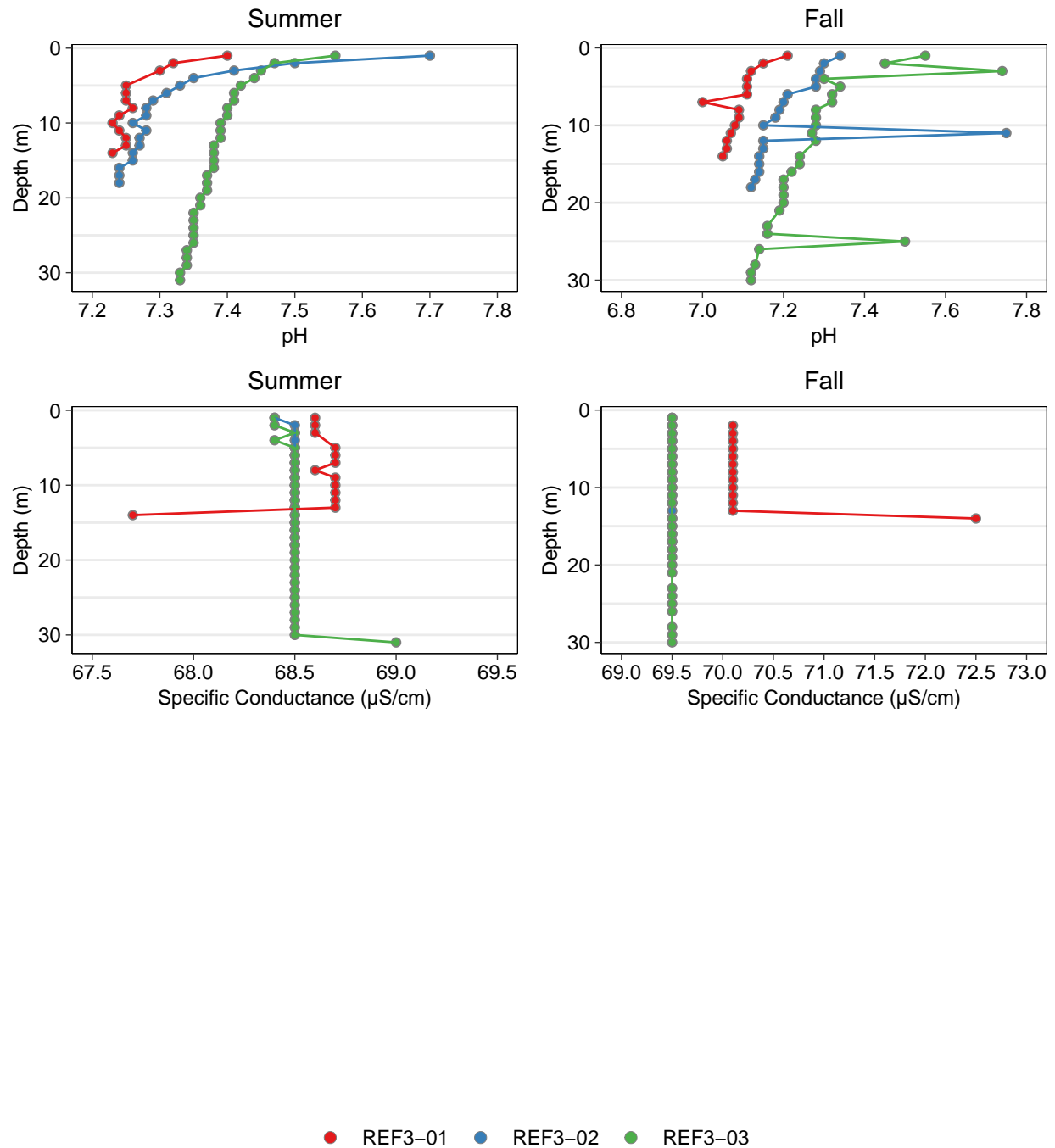


Figure B.3: *In Situ* Water Quality with Depth from Surface at Reference Lake 3 (REF-03) during Summer and Fall Sampling Events, Mary River Project CREMP, 2024

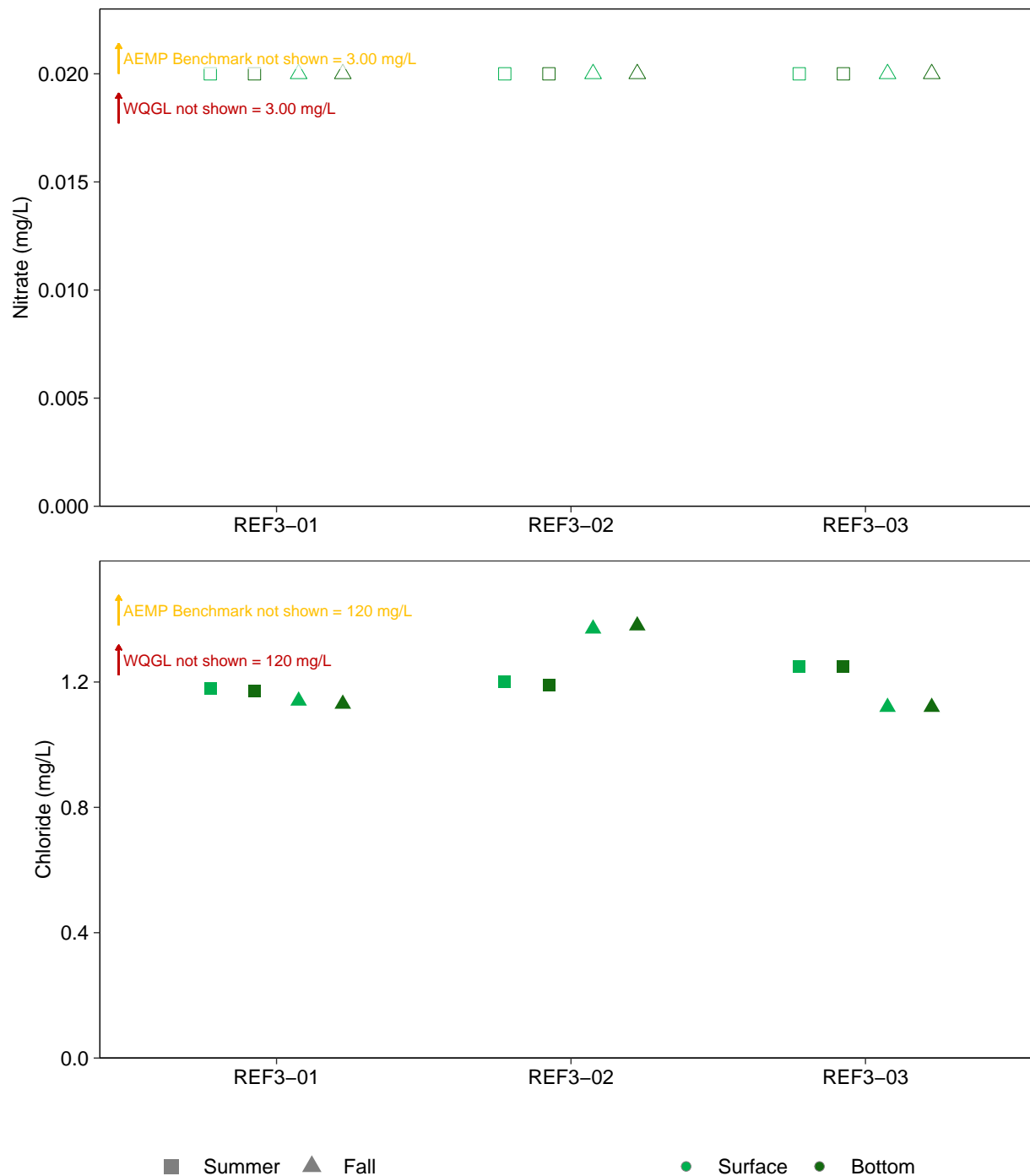


Figure B.4: Water Chemistry Comparison Between the Surface and the Bottom of the Water Column at Reference Lake 3 (REF-03) Routine Monitoring Stations during Summer and Fall, Mary River Project CREMP, 2024

Notes: Concentrations below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL and the open symbol represents one or more values reported below the LRL. Red dashes indicate Water Quality Guidelines, some of which are dependent on concurrent hardness values. Orange solid line indicates AEMP Benchmark.

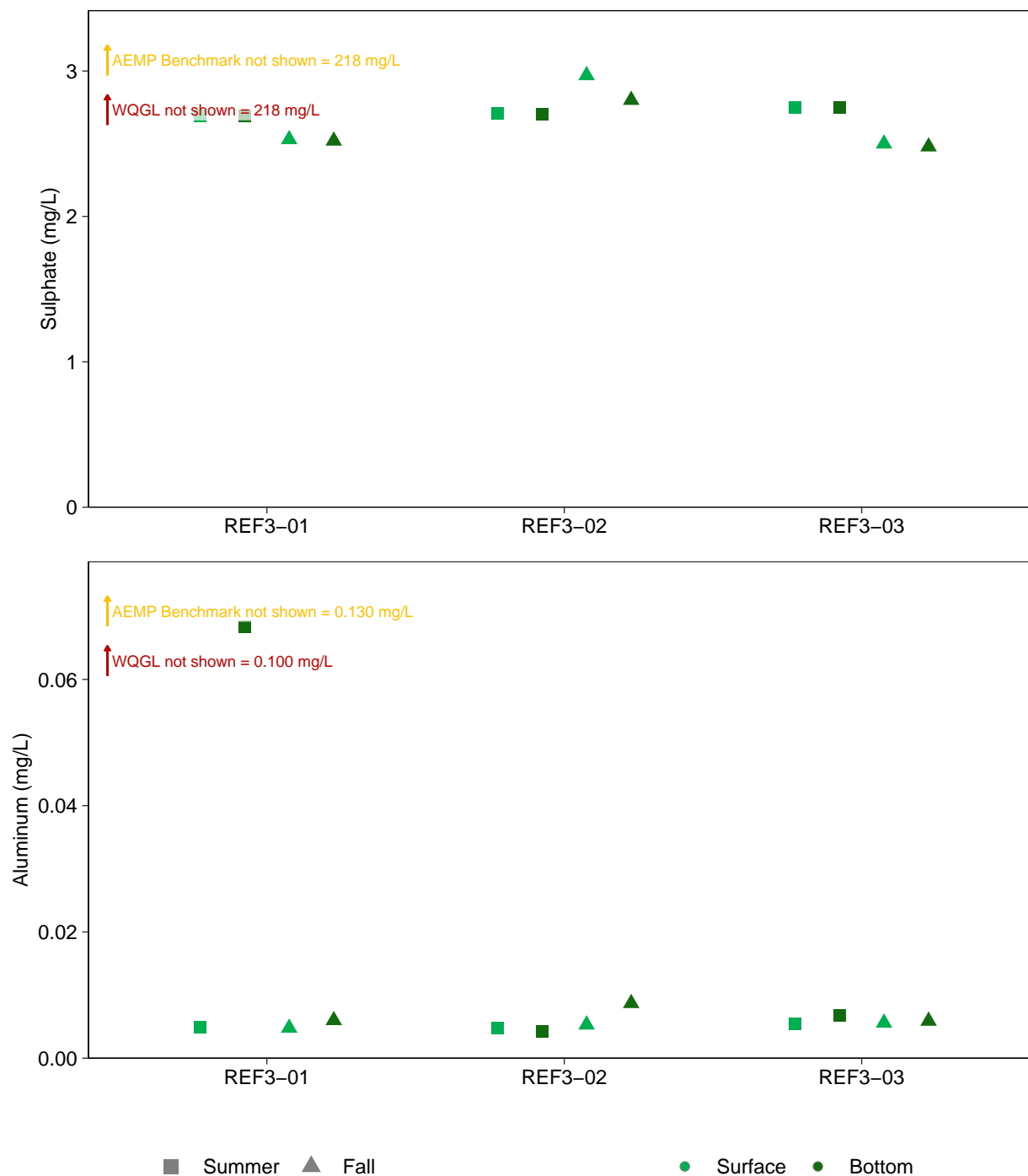


Figure B.4: Water Chemistry Comparison Between the Surface and the Bottom of the Water Column at Reference Lake 3 (REF-03) Routine Monitoring Stations during Summer and Fall, Mary River Project CREMP, 2024

Notes: Concentrations below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL and the open symbol represents one or more values reported below the LRL. Red dashes indicate Water Quality Guidelines, some of which are dependent on concurrent hardness values. Orange solid line indicates AEMP Benchmark.

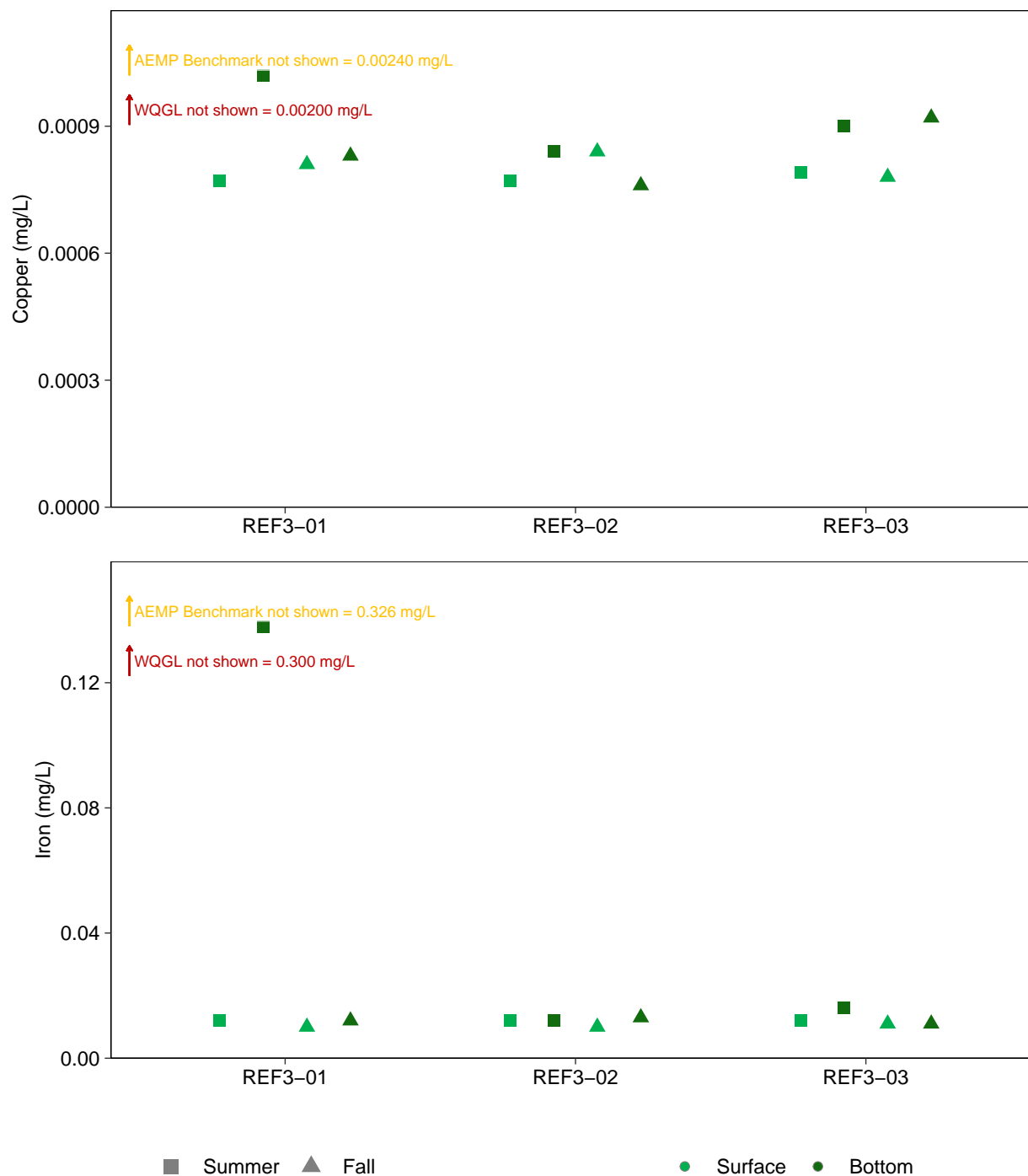


Figure B.4: Water Chemistry Comparison Between the Surface and the Bottom of the Water Column at Reference Lake 3 (REF-03) Routine Monitoring Stations during Summer and Fall, Mary River Project CREMP, 2024

Notes: Concentrations below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL and the open symbol represents one or more values reported below the LRL. Red dashes indicate Water Quality Guidelines, some of which are dependent on concurrent hardness values. Orange solid line indicates AEMP Benchmark.

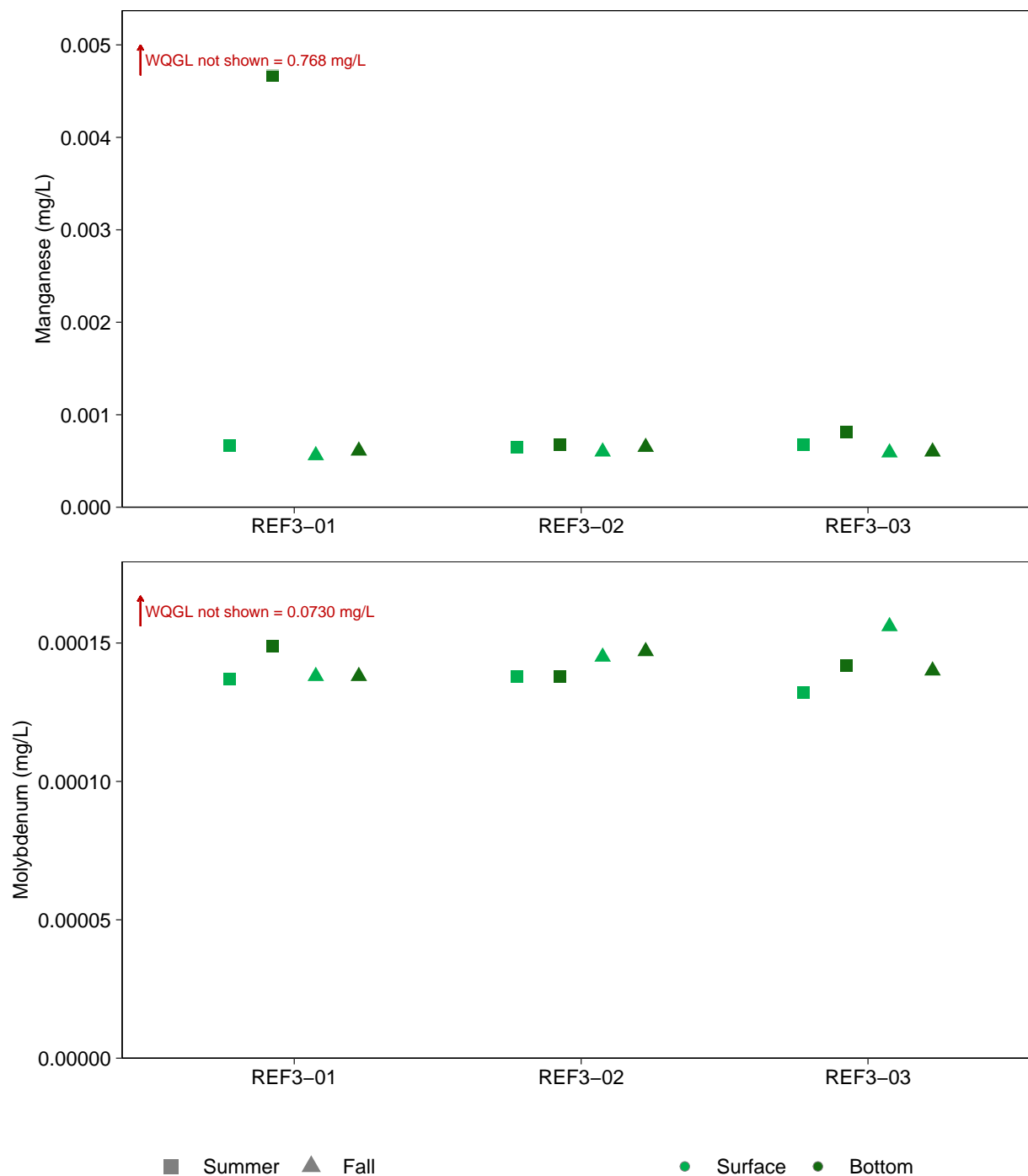


Figure B.4: Water Chemistry Comparison Between the Surface and the Bottom of the Water Column at Reference Lake 3 (REF-03) Routine Monitoring Stations during Summer and Fall, Mary River Project CREMP, 2024

Notes: Concentrations below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL and the open symbol represents one or more values reported below the LRL. Red dashes indicate Water Quality Guidelines, some of which are dependent on concurrent hardness values. Orange solid line indicates AEMP Benchmark.

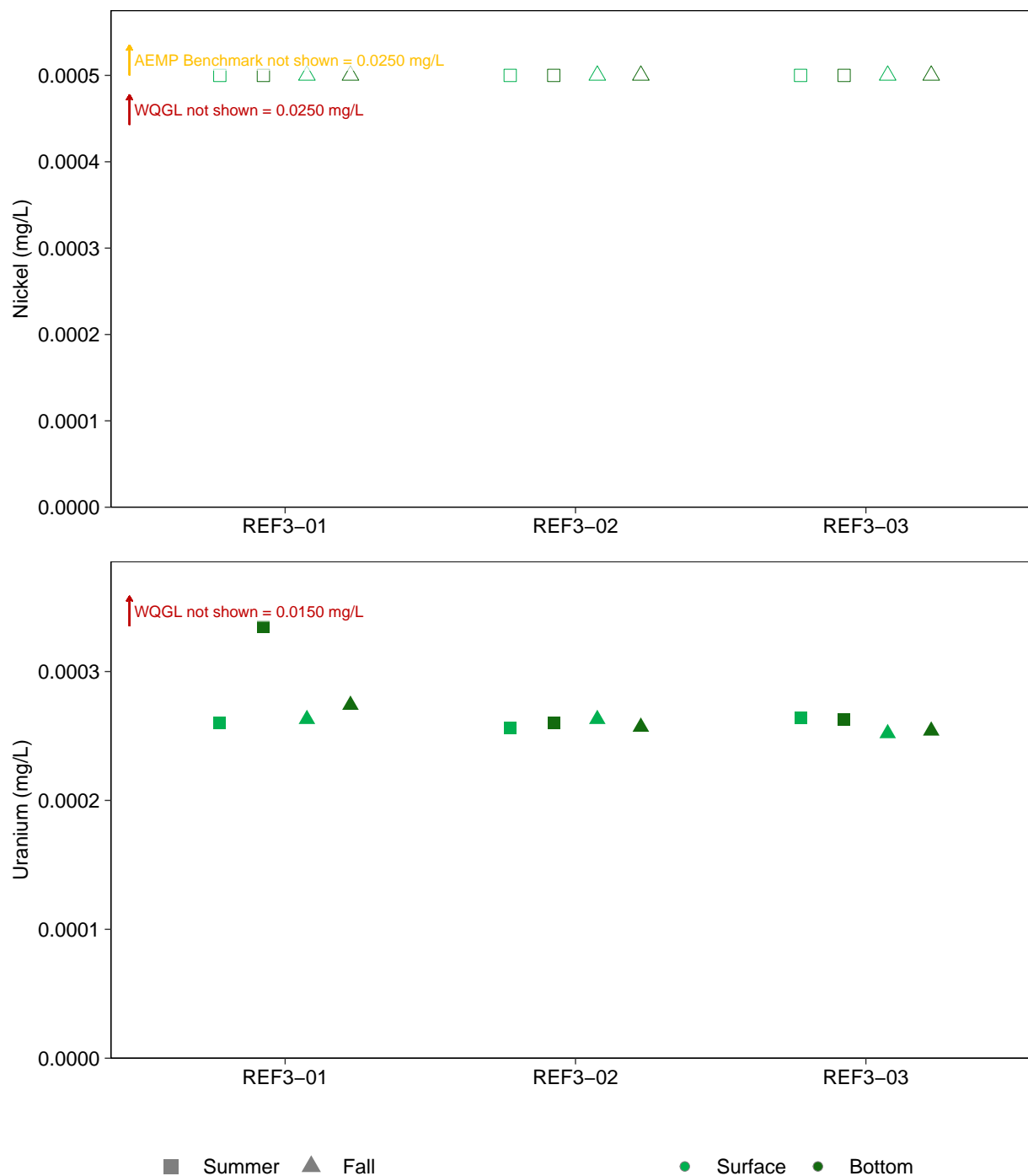


Figure B.4: Water Chemistry Comparison Between the Surface and the Bottom of the Water Column at Reference Lake 3 (REF-03) Routine Monitoring Stations during Summer and Fall, Mary River Project CREMP, 2024

Notes: Concentrations below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL and the open symbol represents one or more values reported below the LRL. Red dashes indicate Water Quality Guidelines, some of which are dependent on concurrent hardness values. Orange solid line indicates AEMP Benchmark.

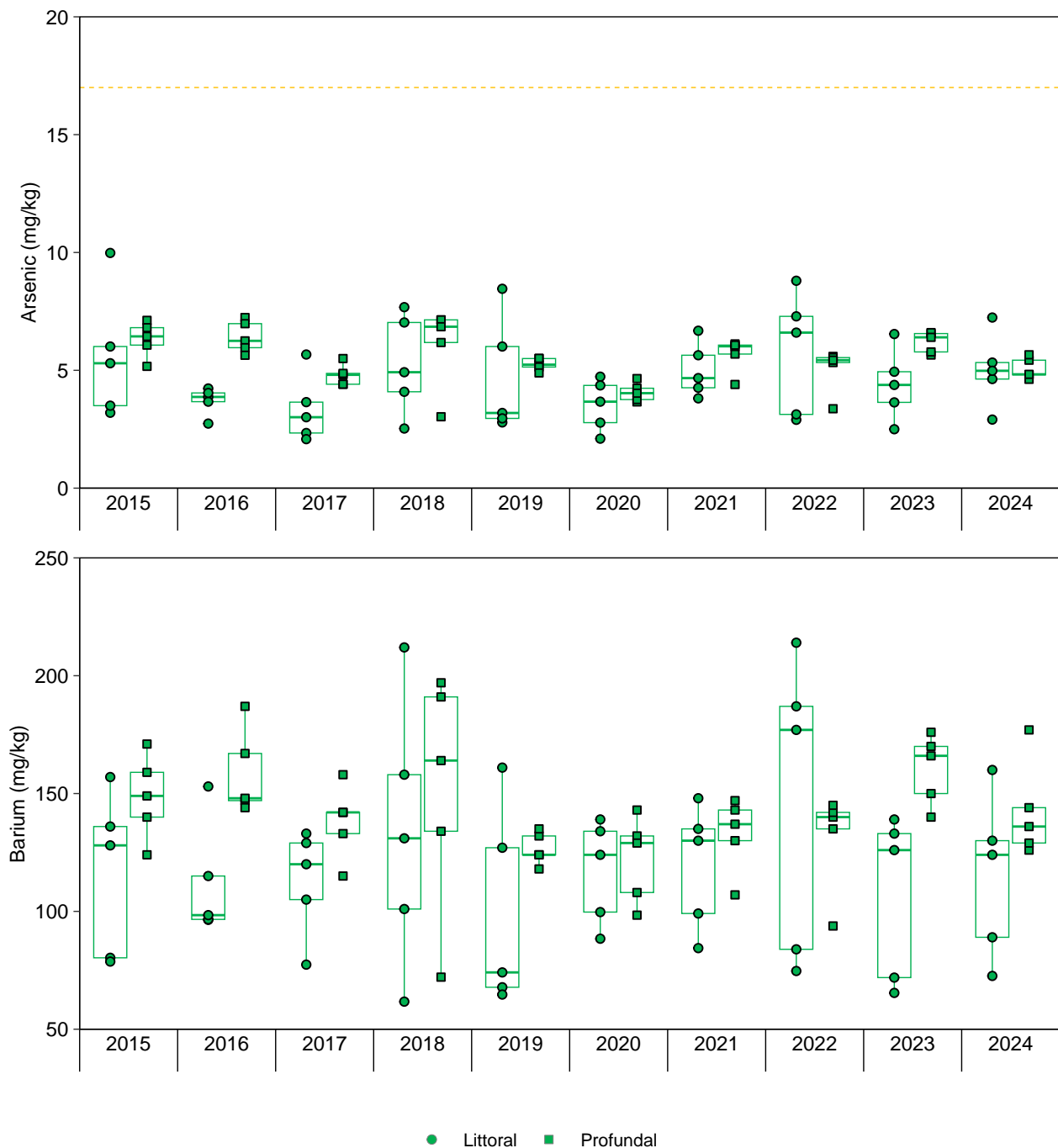


Figure B.5: Sediment Metal Concentrations at Littoral (<12m depth) and Profundal (>12m depth) Monitoring Stations of Reference Lake 3 (REF03), Mary River Project CREMP, 2015 to 2024

Notes: Concentrations below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL and the open symbol represents one or more values reported below the LRL. Orange dashed line indicates Canadian Sediment Quality Guideline, Probable Effect Level or Ontario Provincial Sediment Quality Guideline, Severe Effect Level. Boxplot lines show the 25th percentile, median, and 75th percentile with the boxplots whiskers showing the minimum and maximum (excluding potential outliers).

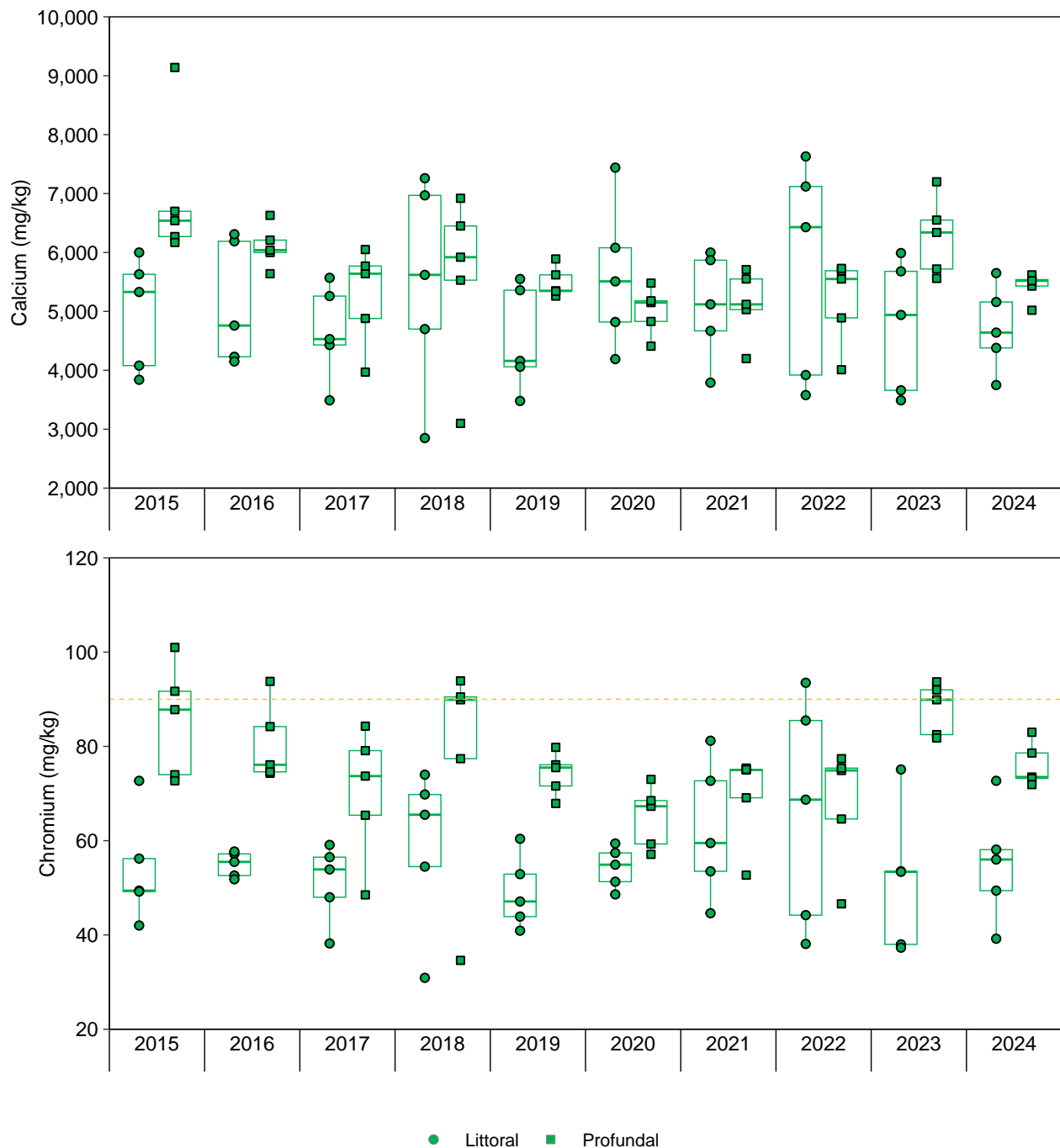


Figure B.5: Sediment Metal Concentrations at Littoral (<12m depth) and Profundal (>12m depth) Monitoring Stations of Reference Lake 3 (REF03), Mary River Project CREMP, 2015 to 2024

Notes: Concentrations below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL and the open symbol represents one or more values reported below the LRL. Orange dashed line indicates Canadian Sediment Quality Guideline, Probable Effect Level or Ontario Provincial Sediment Quality Guideline, Severe Effect Level. Boxplot lines show the 25th percentile, median, and 75th percentile with the boxplots whiskers showing the minimum and maximum (excluding potential outliers).

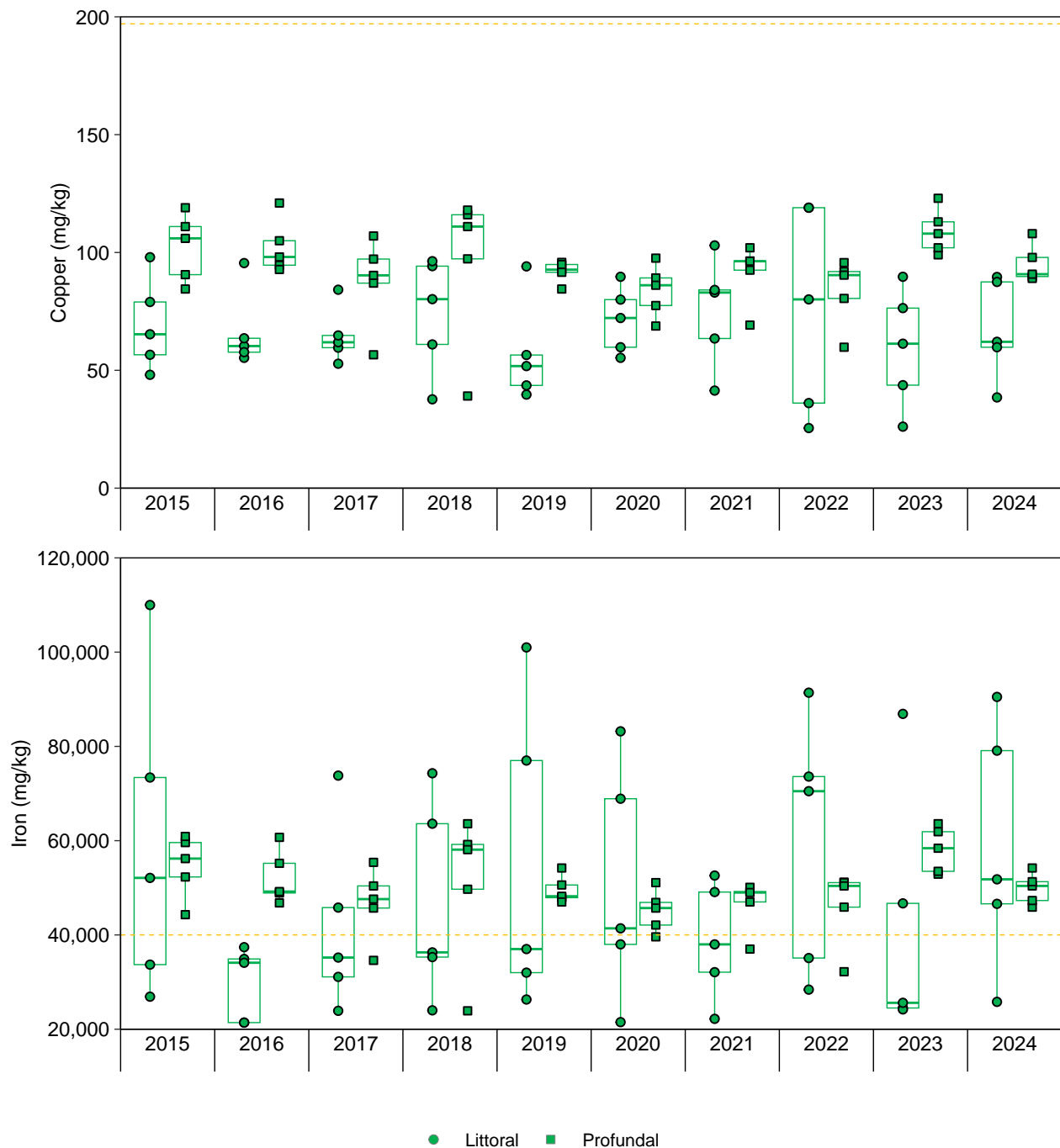


Figure B.5: Sediment Metal Concentrations at Littoral (<12m depth) and Profundal (>12m depth) Monitoring Stations of Reference Lake 3 (REF03), Mary River Project CREMP, 2015 to 2024

Notes: Concentrations below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL and the open symbol represents one or more values reported below the LRL. Orange dashed line indicates Canadian Sediment Quality Guideline, Probable Effect Level or Ontario Provincial Sediment Quality Guideline, Severe Effect Level. Boxplot lines show the 25th percentile, median, and 75th percentile with the boxplots whiskers showing the minimum and maximum (excluding potential outliers).

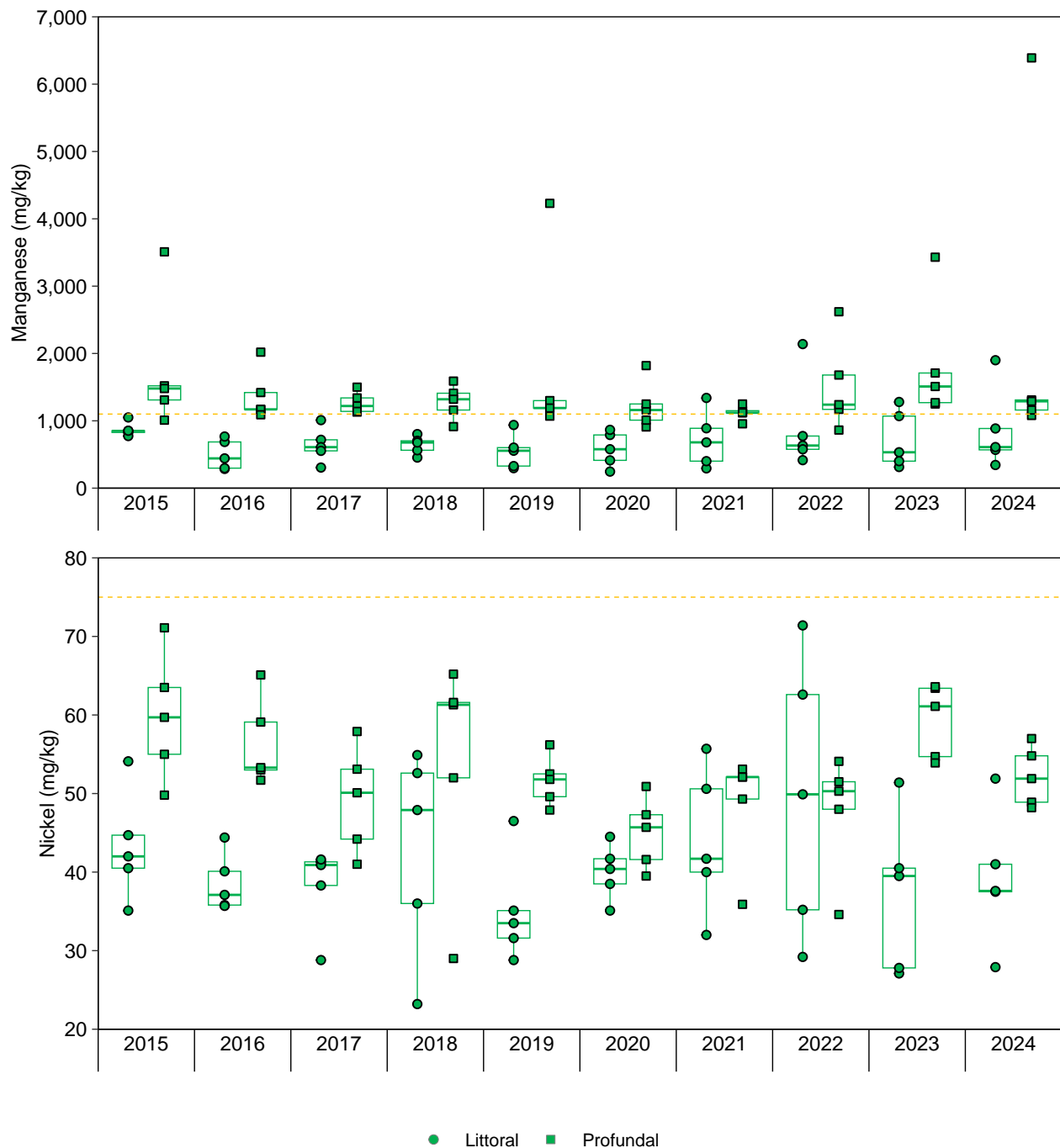


Figure B.5: Sediment Metal Concentrations at Littoral (<12m depth) and Profundal (>12m depth) Monitoring Stations of Reference Lake 3 (REF03), Mary River Project CREMP, 2015 to 2024

Notes: Concentrations below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL and the open symbol represents one or more values reported below the LRL. Orange dashed line indicates Canadian Sediment Quality Guideline, Probable Effect Level or Ontario Provincial Sediment Quality Guideline, Severe Effect Level. Boxplot lines show the 25th percentile, median, and 75th percentile with the boxplots whiskers showing the minimum and maximum (excluding potential outliers).

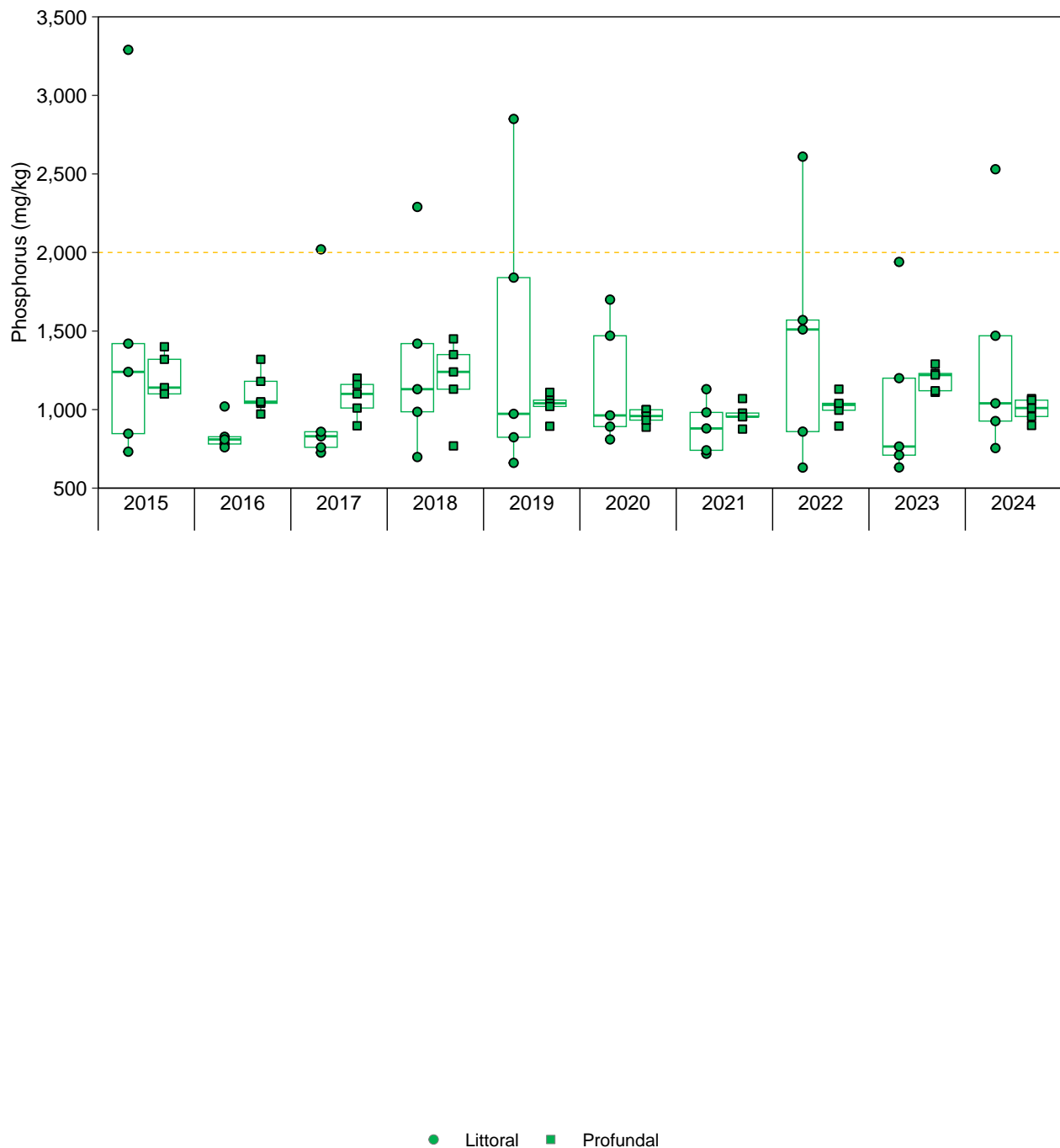


Figure B.5: Sediment Metal Concentrations at Littoral (<12m depth) and Profundal (>12m depth) Monitoring Stations of Reference Lake 3 (REF03), Mary River Project CREMP, 2015 to 2024

Notes: Concentrations below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL and the open symbol represents one or more values reported below the LRL. Orange dashed line indicates Canadian Sediment Quality Guideline, Probable Effect Level or Ontario Provincial Sediment Quality Guideline, Severe Effect Level. Boxplot lines show the 25th percentile, median, and 75th percentile with the boxplots whiskers showing the minimum and maximum (excluding potential outliers).

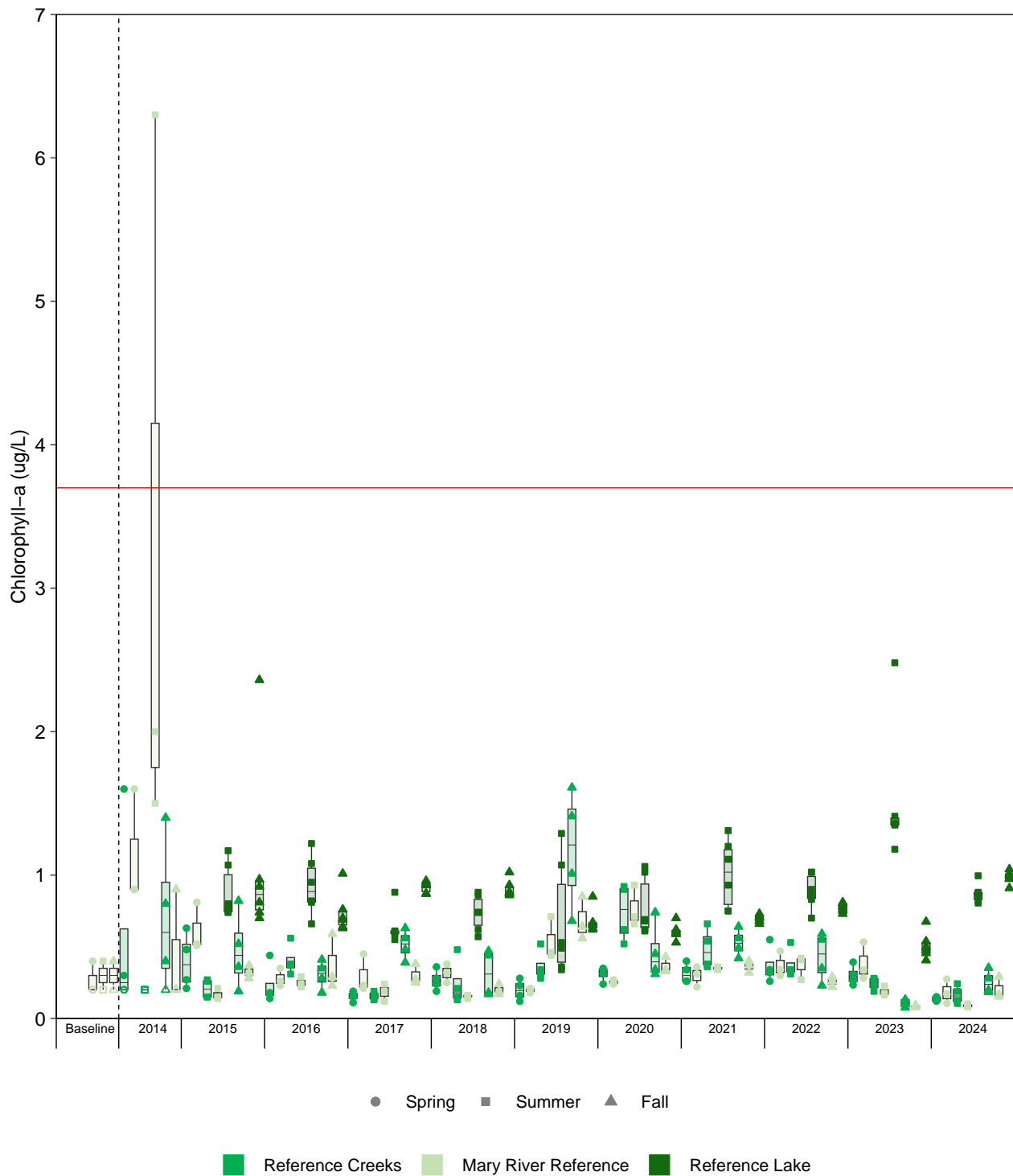


Figure B.6: Chlorophyll-a Concentration Seasonal Comparison from Mine Baseline (2005 to 2013), Construction (2014), and Operational (2015 to 2024) Periods at Creek, River, and Lake Reference Phytoplankton Monitoring Stations, Mary River Project CREMP, 2024

Notes: Concentrations below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL and the open symbol represents one or more values reported below the LRL. Red line indicates AEMP Benchmark. For each station, a chlorophyll-a concentration is provided for each of the bottom and the surface of the water column. Boxplot lines show the 25th percentile, median, and 75th percentile with the boxplots whiskers showing the minimum and maximum (excluding potential outliers).

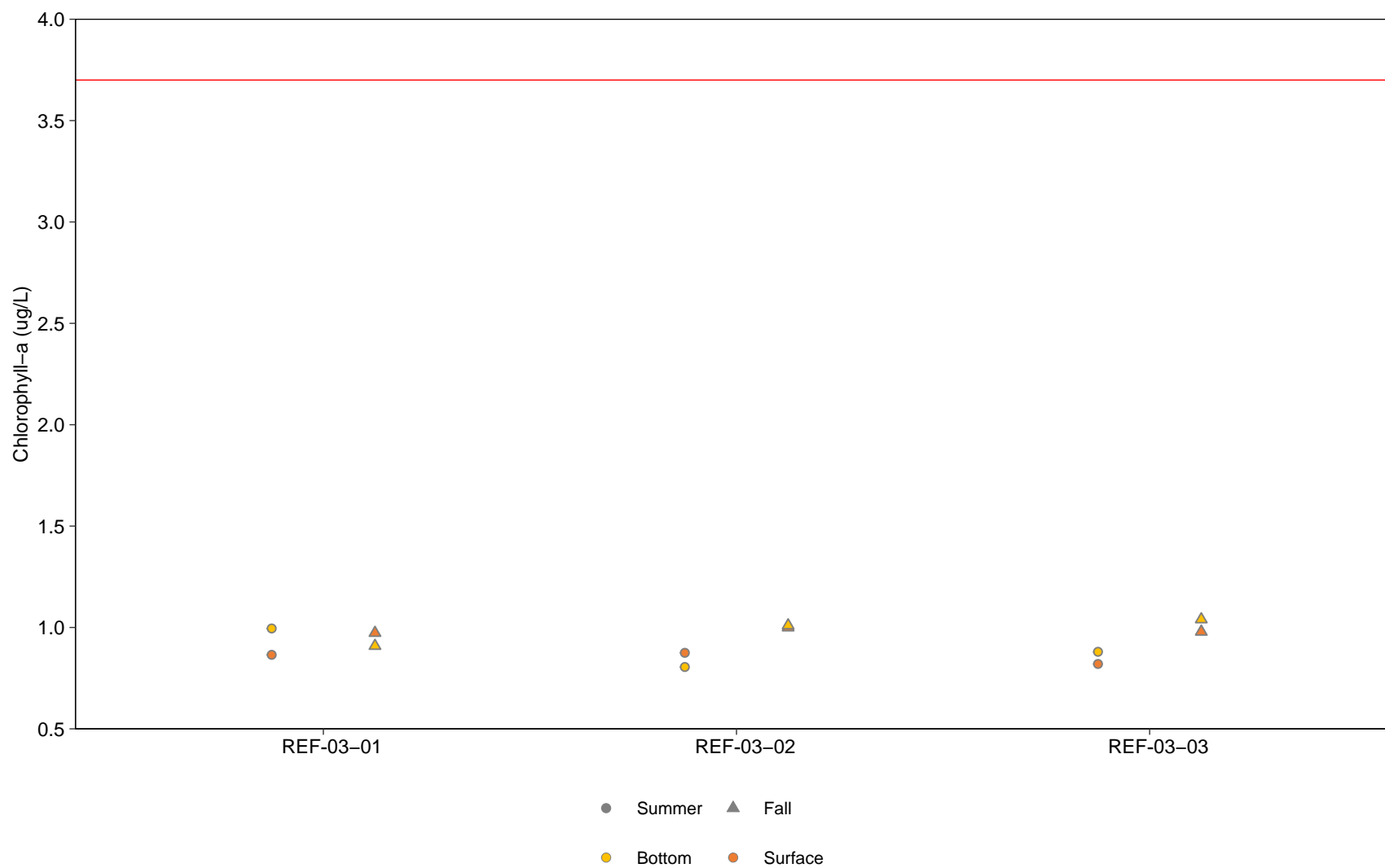


Figure B.7: Chlorophyll-a Concentrations at the Surface and Bottom of the Water Column at Reference Lake 3 Phytoplankton Monitoring Stations during Summer and Fall Sampling Events, Mary River Project CREMP, 2024

Notes: Red line indicates AEMP Benchmark.

APPENDIX B

TABLES

Table B.2: Water Chemistry at Reference Stream Stations (CLT-REF4, CLT-REF3, MRY-REF3, MRY-REF2), Mary River Project CREMP, 2024

Parameters		Units	Water Quality Guideline (WQG) ^a	AEMP Benchmark	Spring Sampling Event				Summer Sampling Event				Fall Sampling Event			
					CLT-REF4	CLT-REF3	MRY-REF3	MRY-REF2	CLT-REF4	CLT-REF3	MRY-REF3	MRY-REF2	CLT-REF4	CLT-REF3	MRY-REF3	MRY-REF2
					30-Jun-2024	29-Jun-2024	6-Jul-2024	30-Jun-2024	30-Jul-2024	30-Jul-2024	30-Jul-2024	30-Jul-2024	31-Aug-2024	31-Aug-2024	31-Aug-2024	31-Aug-2024
Conventional ^b	Conductivity (lab)	µmho/cm	-	-	22	35.6	15.5	39.4	91.5	85.3	55.3	97.8	122	108	75.9	123
	pH (lab)	pH	6.5 - 9.0	-	7.67	8.04	6.92	7.89	7.72	7.8	7.11	7.76	7.8	7.75	7.75	7.77
	Hardness (as CaCO ₃)	mg/L	-	-	10	17.4	6.13	18.4	45.2	41.8	20.9	46.5	61.6	53.5	29	57.3
	Total Suspended Solids (TSS)	mg/L	-	-	<1	<1	7.6	<1	<1	<1	2.1	<1	<1	<1	<1	<1
	Total Dissolved Solids (TDS)	mg/L	-	-	23	28	<22	28	50	50	33	60	50	45	45	54
	Turbidity	NTU	-	-	0.68	0.34	9.34	0.54	1.81	1.53	9.92	1.48	0.66	0.61	11.8	1.69
	Alkalinity (as CaCO ₃)	mg/L	-	-	9.8	16.1	4.8	18.9	46	41.3	16.8	46.8	64.1	56.7	28.4	63.6
Nutrients and Organics	Total Ammonia	mg/L	-	0.855	<0.005	<0.005	0.0087	<0.005	<0.005	0.0058	<0.005	<0.005	<0.005	0.007	<0.005	0.0056
	Nitrate	mg/L	3	3	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.036	<0.02	<0.02	<0.02	<0.02	<0.02
	Nitrite	mg/L	0.06	0.06	<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 (TKN)	mg/L	-	-	0.149	0.138	<0.05	0.067	0.059	0.078	0.097	0.073	<0.05	0.068	0.069	0.067
	Dissolved Organic Carbon	mg/L	-	-	1.15	1.78	4.1	2.1	1.97	2.2	1.78	2.84	1.73	2.15	2.22	2.47
	Total Organic Carbon	mg/L	-	-	1.72	2.61	1.27	2.1	1.48	2	1.58	2.24	1.8	2.32	2.18	2.14
	Total Phosphorus	mg/L	0.030 ^a	-	0.0038	0.0031	0.008	0.0031	<0.002	0.0021	0.0066	<0.002	<0.002	<0.002	0.0074	<0.002
Anions	Phenols	mg/L	0.004 ^a	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
	Bromide (Br)	mg/L	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Chloride (Cl)	mg/L	120	120	<0.5	<0.5	0.88	0.54	<0.5	<0.5	2.68	1.27	<0.5	<0.5	4.11	1.56
Total Metals	Sulphate (SO ₄)	mg/L	218 ^β	218	<0.3	0.56	0.98	0.33	0.52	1.71	3.81	0.83	0.83	1.78	5.94	1.21
	Aluminum (Al)	mg/L	0.100	0.179	0.0253	0.0168	0.208	0.0177	0.049	0.0255	0.233	0.0252	0.0242	0.0336	0.495	0.088
	Antimony (Sb)	mg/L	0.020 ^a	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
	Arsenic (As)	mg/L	0.005	0.005	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0001	<0.0001
	Barium (Ba)	mg/L	1 ^β	-	0.00117	0.00206	0.00291	0.00189	0.00366	0.00445	0.00633	0.00475	0.00504	0.00619	0.0104	0.00692
	Beryllium (Be)	mg/L	0.011 ^a	-	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	0.000022	<0.00002
	Bismuth (Bi)	mg/L	-	-	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
	Boron (B)	mg/L	1.5	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	Cadmium (Cd)	mg/L	0.00012	0.00008	<0.000005	0.0000063	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005
	Calcium (Ca)	mg/L	-	-	2.03	3.32	1.25	3.64	9.1	8.12	4.32	9.2	12.6	10.5	6.41	11.6
	Chromium (Cr)	mg/L	0.001	0.003	<0.0005	<0.0005	0.00059	<0.0005	<0.0005	<0.0005	0.00076	<0.0005	<0.0005	<0.0005	0.00119	<0.0005
	Cobalt (Co)	mg/L	0.0009 ^a	0.004	<0.0001	<0.0001	0.00011	<0.0001	<0.0001	<0.0001	0.00012	<0.0001	<0.0001	<0.0001	0.0002	<0.0001
	Copper (Cu)	mg/L	0.002	0.0022	<0.0005	0.00066	0.00074	<0.0005	<0.0005	0.00106	0.00133	0.00052	0.00063	0.00125	0.00192	0.00077
	Iron (Fe)	mg/L	0.30	0.326	0.019	0.019	0.268	0.018	0.031	0.025	0.296	0.025	0.012	0.034	0.462	0.064
	Lead (Pb)	mg/L	0.001	0.001	<0.00005	0.000066	0.000234	<0.00005	<0.00005	0.000096	0.000261	<0.00005	<0.00005	0.00008	0.000434	<0.00005
	Lithium (Li)	mg/L	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
	Magnesium (Mg)	mg/L	-	-	1.27	2.31	0.735	2.63	5.72	5.48	2.64	6	7.63	6.85	3.59	7.38
	Manganese (Mn)	mg/L	0.935 ^β	-	0.00056	0.0004	0.00396	0.00072	0.0004	0.00051	0.00354	0.00057	0.00022	0.00068	0.0047	0.00087
	Mercury (Hg)	mg/L	0.000026	-	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005
	Molybdenum (Mo)	mg/L	0.073	-	<0.00005	0.00014	0.000058	0.000053	0.000127	0.000401	0.000254	0.000146	0.000309	0.000664	0.000461	0.000248
	Nickel (Ni)	mg/L	0.025	0.025	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0005	<0.0005	<0.0005	0.00058	0.00073	0.00098	<0.0005
	Potassium (K)	mg/L	-	-	0.246	0.334	0.335	0.338	0.454	0.537	0.669	0.575	0.609	0.762	1.01	0.774
	Selenium (Se)	mg/L	0.001	-	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
	Silicon (Si)	mg/L	-	-	0.32	0.56	0.64	0.38	0.82	0.94	1.24	0.73	0.78	1.1	1.91	0.99
	Silver (Ag)	mg/L	0.00025	0.0001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
	Sodium (Na)	mg/L	-	-	0.21	0.339	0.524	0.458	0.581	0.687	2.05	1.16	1.02	0.921	2.91	1.56
	Strontium (Sr)	mg/L	-	-	0.00154	0.00221	0.00296	0.00281	0.00686	0.00562	0.0102	0.00766	0.0103	0.00786	0.0155	0.0106
	Thallium (Tl)	mg/L	0.0008	0.0008	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0.000012	<0.00001
	Tin (Sn)	mg/L	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
	Titanium (Ti)	mg/L	-	-	0.00071	0.00054	0.0146	0.00056	0.00178	0.00086	0.0152	0.00101	<0.0006	0.00083	0.0259	0.00307
	Uranium (U)	mg/L	0.015	-	0.000102	0.000213	0.000296	0.000236	0.00175	0.00124	0.000531	0.00107	0.00563	0.00277	0.00112	0.00192
	Vanadium (V)	mg/L	0.006 ^a	0.006	<0.0005	<0.0005	0.00053	<0.0005	<0.0005	<0.0005	0.00059	<0.0005	<0.0005	<0.0005	0.001	<0.0005
	Zinc (Zn)	mg/L	0.02 ^a	0.030	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003

Indicates parameter concentration above applicable Water Quality Guideline.

BOLDIndicates parameter concentration above AEMP benchmark applicable to the mine lotic receiving environments.

Note: "-" indicates no WQG benchmark applicable.

^a Canadian Water Quality Guideline for the protection of aquatic life (CCME 2024) except those indicated by α (Ontario Provincial Water Quality Objective [PWQO]) and β (British Columbia Water Quality Guideline [BCWQG]; BCMOE, 2024). See Table 2.2 for information regarding WQG criteria.

^b AEMP Water Quality Benchmarks developed by Intrinsik (2013) using background water quality data. The values are specific to the Camp Lake system and are compared to the Reference Stream stations for reference only.

Table B.3: Water Chemistry at Mary River (G0-09 Series) Reference Stations, Mary River Project CREMP, 2024

Parameters		Units	Water Quality Guideline (WQG) ^a	AEMP Benchmark	Spring Sampling Event			Summer Sampling Event			Fall Sampling Event		
					G0-09-A	G0-09	G0-09-B	G0-09-A	G0-09	G0-09-B	G0-09-A	G0-09	G0-09-B
					7-Jul-24	7-Jul-24	30-Jun-24	30-Jul-24	30-Jul-24	30-Jul-24	30-Aug-24	30-Aug-24	30-Aug-24
Conventional ^b	Conductivity (lab)	µmho/cm	-	-	48.7	47.3	26	100	104	112	161	179	152
	pH (lab)	pH	6.5 - 9.0	-	7.36	7.65	6.92	7.92	7.99	7.98	7.96	7.92	7.86
	Hardness (as CaCO ₃)	mg/L	-	-	24.4	23.2	11	45.6	46.5	52.6	76	75	71.5
	Total Suspended Solids (TSS)	mg/L	-	-	<1	<1	5	<1	<1.4	<1	<1.2	<1	<1
	Total Dissolved Solids (TDS)	mg/L	-	-	36	36	19	60	55	56	69	84	85
	Turbidity	NTU	-	-	1.43	2.44	3.57	4.97	4.63	3.67	2.06	1.2	2.34
	Alkalinity (as CaCO ₃)	mg/L	-	-	24.6	23.7	11.3	45.9	48.9	52.5	79.2	91.1	74.5
Nutrients and Organics	Total Ammonia	mg/L	-	0.855	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.0177	0.0057
	Nitrate	mg/L	3	3	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	Nitrite	mg/L	0.06	0.06	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	Total Kjeldahl Nitrogen (TKN)	mg/L	-	-	<0.05	<0.05	<0.05	0.069	0.067	0.084	0.117	0.114	0.107
	Dissolved Organic Carbon	mg/L	-	-	1.7	1.18	1.69	1.49	1.85	4.39	1.94	1.79	1.4
	Total Organic Carbon	mg/L	-	-	1.86	1.33	1.69	1.16	1.46	1.42	1.81	1.68	1.71
	Total Phosphorus	mg/L	0.030 ^α	-	0.0033	0.0034	0.0074	0.0045	0.003	0.0025	<0.002	0.0021	<0.002
Anions	Phenols	mg/L	0.004 ^α	-	<0.001	0.0011	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
	Bromide (Br)	mg/L	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Chloride (Cl)	mg/L	120	120	<0.5	<0.5	<0.5	1.73	1.69	1.84	3.6	2.51	4.48
Total Metals	Sulphate (SO ₄)	mg/L	218 ^β	218	<0.3	<0.3	<0.3	1.32	1.26	1.34	2.26	2.5	2.93
	Aluminum (Al)	mg/L	0.100	0.966	0.0424	0.0465	0.141	0.118	0.0927	0.0984	0.0657	0.0998	0.0966
	Antimony (Sb)	mg/L	0.020 ^α	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
	Arsenic (As)	mg/L	0.005	0.005	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
	Barium (Ba)	mg/L	1 ^β	-	0.00314	0.00298	0.00251	0.00657	0.00651	0.00679	0.00939	0.00956	0.00946
	Beryllium (Be)	mg/L	0.011 ^α	-	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002
	Bismuth (Bi)	mg/L	-	-	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
	Boron (B)	mg/L	1.5	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	Cadmium (Cd)	mg/L	0.00012	0.00006	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005
	Calcium (Ca)	mg/L	-	-	4.76	4.64	2.32	9.19	9.45	10.3	15.2	15.2	14.7
	Chromium (Cr)	mg/L	0.001	0.003	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.00052	<0.0005	<0.0005	<0.0005
	Cobalt (Co)	mg/L	0.0009 ^α	0.004	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
	Copper (Cu)	mg/L	0.002	0.0024	<0.0005	<0.0005	0.00051	0.0009	0.00086	0.00086	0.00091	0.00098	0.00101
	Iron (Fe)	mg/L	0.30	0.874	0.03	0.045	0.133	0.107	0.1	0.092	0.045	0.07	0.068
	Lead (Pb)	mg/L	0.001	0.001	<0.00005	<0.00005	0.00011	0.000091	0.000085	0.000073	<0.00005	0.000065	0.000064
	Lithium (Li)	mg/L	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
	Magnesium (Mg)	mg/L	-	-	2.82	2.67	1.48	5.62	5.91	6.53	9.34	9.11	8.9
	Manganese (Mn)	mg/L	0.935 ^β	-	0.00054	0.00075	0.00307	0.00131	0.00126	0.00117	0.00055	0.0008	0.0008
	Mercury (Hg)	mg/L	0.000026	-	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005
	Molybdenum (Mo)	mg/L	0.073	-	0.000053	0.000056	<0.00005	0.000293	0.000281	0.000254	0.000361	0.000403	0.000442
	Nickel (Ni)	mg/L	0.025	0.025	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
	Potassium (K)	mg/L	-	-	0.418	0.402	0.374	0.874	0.824	0.82	1.05	1.09	1.12
	Selenium (Se)	mg/L	0.001	-	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
	Silicon (Si)	mg/L	-	-	0.6	0.54	0.54	0.96	0.94	0.99	0.97	1.07	1.01
	Silver (Ag)	mg/L	0.00025	0.0001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
	Sodium (Na)	mg/L	-	-	0.497	0.46	0.426	1.96	1.86	1.85	3.04	3	3.21
	Strontium (Sr)	mg/L	-	-	0.00393	0.00373	0.0024	0.0112	0.0109	0.0109	0.0162	0.0167	0.0168
	Thallium (Tl)	mg/L	0.0008	0.0008	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
	Tin (Sn)	mg/L	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
	Titanium (Ti)	mg/L	-	-	0.00156	0.00248	0.00833	0.00608	0.00556	0.00554	0.00258	0.00402	0.00381
	Uranium (U)	mg/L	0.015	-	0.000161	0.000145	0.000124	0.00194	0.00185	0.00183	0.00403	0.00409	0.00433
	Vanadium (V)	mg/L	0.006 ^α	0.006	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
	Zinc (Zn)	mg/L	0.02 ^α	0.030	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003

Indicates parameter concentration above the applicable Water Quality Guideline.

BOLD

 Indicates parameter concentration above the AEMP benchmark.

Note: "-" indicates no WQG benchmark applicable.

^a Canadian Water Quality Guideline for the protection of aquatic life (CCME 2024) except those indicated by α (Ontario Provincial Water Quality Objective [PWQO]) and β (British Columbia Water Quality Guideline [BCWQG]; BCMOE, 2024). See Table 2.2 for information regarding WQG criteria.

^b AEMP Water Quality Benchmarks developed by Intrinsic (2013) using background water quality data. The indicated values are specific to the Mary River system.

Table B.4: Water Chemistry at Reference Lake 3 (REF-03), Mary River Project CREMP, 2024

Parameters		Units	Water Quality Guideline (WQG) ^a	AEMP Benchmark ^b	Summer Sampling Event						Fall Sampling Event					
					REF3-01	REF3-01	REF3-02	REF3-02	REF3-03	REF3-03	REF3-01	REF3-01	REF3-02	REF3-02	REF3-03	REF3-03
					Bottom	Surface	Bottom	Surface	Bottom	Surface	Bottom	Surface	Bottom	Surface	Bottom	Surface
					15-Aug-24	15-Aug-24	15-Aug-24	15-Aug-24	15-Aug-24	15-Aug-24	10-Sep-24	10-Sep-24	10-Sep-24	10-Sep-24	10-Sep-24	10-Sep-24
Conventional ^b	Conductivity (lab)	µmho/cm	-	-	73.4	73	72.4	72.3	72.5	71.7	72.5	72.6	72	71.5	71.8	71.7
	pH (lab)	pH	6.5 - 9.0	-	7.6	7.59	7.56	7.51	7.51	7.31	7.54	7.52	7.55	7.52	7.48	7.38
	Hardness (as CaCO ₃)	mg/L	-	-	34.6	34.4	34.3	34.7	36.6	34.2	36.1	35.6	35.1	34.7	34.9	35.6
	Total Suspended Solids (TSS)	mg/L	-	-	<1	<1	<1	<1	<1	<1.2	14.8	<1	<1	<1	<1	<1
	Total Dissolved Solids (TDS)	mg/L	-	-	65	45	52	56	48	43	45	40	40	52	34	36
	Turbidity	NTU	-	-	0.34	0.3	0.28	0.26	0.47	0.29	0.7	0.18	0.2	0.16	0.18	0.18
	Alkalinity (as CaCO ₃)	mg/L	-	-	32.1	31.6	31.3	30.8	30.7	31.7	35.8	37	35.3	38.1	35.1	35.5
Nutrients and Organics	Total Ammonia	mg/L	-	0.855	<0.005	0.009	0.0053	0.0116	<0.005	0.0084	<0.005	<0.005	0.0252	<0.005	<0.005	<0.005
	Nitrate	mg/L	3	3	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	Nitrite	mg/L	0.06	0.06	<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 (TKN)	mg/L	-	-	0.176	0.162	0.195	0.185	0.211	0.217	0.135	0.129	0.152	0.166	0.138	0.148
	Dissolved Organic Carbon	mg/L	-	-	3.07	3.48	5.15	3.24	3.18	3.57	3.25	3.23	3.22	3.3	3.78	3.85
	Total Organic Carbon	mg/L	-	-	3.01	3.3	2.92	2.91	2.96	2.96	3.44	3.82	3.21	3.59	3.4	3.59
	Total Phosphorus	mg/L	0.020 ^α	-	0.011	0.003	0.003	0.003	0.0043	0.0037	0.0023	0.0022	0.0027	0.003	0.0029	0.0026
	Phenols	mg/L	0.004 ^α	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.0011	0.002	<0.001	0.0013	0.0023	0.0014
Anions	Bromide (Br)	mg/L	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Chloride (Cl)	mg/L	120	120	1.17	1.18	1.19	1.2	1.25	1.25	1.13	1.14	1.38	1.37	1.12	1.12
	Sulphate (SO ₄)	mg/L	218 ^β	218	2.69	2.69	2.7	2.71	2.75	2.75	2.52	2.53	2.8	2.97	2.48	2.5
Total Metals	Aluminum (Al)	mg/L	0.100	0.1	0.0684	0.0049	0.0042	0.0048	0.0068	0.0055	0.006	0.0048	0.0087	0.0053	0.0059	0.0056
	Antimony (Sb)	mg/L	0.020 ^α	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
	Arsenic (As)	mg/L	0.005	0.005	<0.0001	<0.0001	0.00012	<0.0001	0.00018	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
	Barium (Ba)	mg/L	1 ^β	-	0.0066	0.00598	0.00616	0.006	0.00608	0.00602	0.00619	0.00591	0.00605	0.006	0.00581	0.00592
	Beryllium (Be)	mg/L	0.011 ^α	-	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002
	Bismuth (Bi)	mg/L	-	-	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
	Boron (B)	mg/L	1.5	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	Cadmium (Cd)	mg/L	0.00012	0.00006	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005
	Calcium (Ca)	mg/L	-	-	6.53	6.54	6.51	6.41	6.5	6.46	6.48	6.4	6.45	6.23	6.36	6.46
	Chromium (Cr)	mg/L	0.001	0.003	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
	Cobalt (Co)	mg/L	0.0009 ^α	0.004	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
	Copper (Cu)	mg/L	0.002	0.0024	0.00102	0.00077	0.00084	0.00077	0.0009	0.00079	0.00083	0.00081	0.00076	0.00084	0.00092	0.00078
	Iron (Fe)	mg/L	0.30	0.30	0.138	0.012	0.012	0.012	0.016	0.012	0.012	0.01	0.013	0.01	0.011	0.011
	Lead (Pb)	mg/L	0.001	0.001	0.000067	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
	Lithium (Li)	mg/L	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
	Magnesium (Mg)	mg/L	-	-	4.34	4.25	4.28	4.24	4.23	4.23	4.58	4.52	4.38	4.39	4.6	4.41
	Manganese (Mn)	mg/L	0.935 ^β	-	0.00467	0.00067	0.00068	0.00065	0.00081	0.00068	0.00061	0.00056	0.00065	0.0006	0.0006	0.00059
	Mercury (Hg)	mg/L	0.000026	-	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005
	Molybdenum (Mo)	mg/L	0.073	-	0.000149	0.000137	0.000138	0.000138	0.000142	0.000132	0.000138	0.000138	0.000147	0.000145	0.00014	0.000156
	Nickel (Ni)	mg/L	0.025	0.025	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
	Potassium (K)	mg/L	-	-	0.912	0.888	0.888	0.876	0.887	0.88	0.85	0.828	0.815	0.826	0.836	0.83
	Selenium (Se)	mg/L	0.001	-	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
	Silicon (Si)	mg/L	-	-	0.58	0.46	0.46	0.48	0.48	0.46	0.44	0.42	0.42	0.42	0.42	0.43
	Silver (Ag)	mg/L	0.00025	0.0001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
	Sodium (Na)	mg/L	-	-	0.886	0.87	0.882	0.872	0.872	0.868	0.854	0.84	0.839	0.841	0.835	0.849
	Strontium (Sr)	mg/L	-	-	0.00798	0.00788	0.00783	0.00779	0.00774	0.00778	0.0076	0.00753	0.0076	0.0076	0.00741	0.00752
	Thallium (Tl)	mg/L	0.0008	0.0008	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
	Tin (Sn)	mg/L	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
	Titanium (Ti)	mg/L	-	-	0.00416	<0.0003	<0.0003	<0.0003	0.00032	<0.0003	<0.0003	<0.0003	0.00035	<0.0003	<0.0003	<0.0003
	Uranium (U)	mg/L	0.015	-	0.000335	0.00026	0.00026	0.000256	0.000263	0.000264	0.000274	0.000263	0.000257	0.000263	0.000254	0.000252
	Vanadium (V)	mg/L	0.006 ^α	0.006	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
	Zinc (Zn)	mg/L	0.02 ^α	0.03	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003

Indicates parameter concentration above applicable Water Quality Guideline.

BOLD

 Indicates parameter concentration above the AEMP benchmark.

Note: "-" indicates no WQG benchmark applicable.

^a Canadian Water Quality Guideline for the protection of aquatic life (CCME 2024) except those indicated by α (Ontario Provincial Water Quality Objective [PWQO]) and β (British Columbia Water Quality Guideline [BCWQG]). See Table 2.2 for information regarding WQG.

^b AEMP Water Quality Benchmarks developed by Intrinsik (2013) using background water quality data. These are the lowest values from the lake systems.

Table B.5: Sediment Particle Sizes, Total Organic Carbon Content, and Metal Concentrations at Reference Lake 3 (REF-03) Sediment Monitoring Stations, Mary River Project CREMP, August 2024

Parameter		Units	Sediment Quality Guideline (SQG) ^a	Most Stringent AEMP Benchmark	Reference Lake 3 Station										Summary Statistics		
					REF-03-1 (littoral)	REF-03-6 (profundal)	REF-03-2 (littoral)	REF-03-7 (profundal)	REF-03-3 (littoral)	REF-03-8 (profundal)	REF-03-4 (littoral)	REF-03-9 (profundal)	REF-03-5 (littoral)	REF-03-10 (profundal)	Mean	Standard Deviation	Standard Error
Physical Parameters	Sand	%	-	-	42.6	49.8	69.2	50.5	48.6	50.3	47.4	48.1	43.5	48.5	49.9	7.31	2.31
	Silt	%	-	-	46.1	38.2	25.2	38.5	43.3	39.7	45.1	40.6	49.9	42.0	40.9	6.61	2.09
	Clay	%	-	-	11.3	12.0	5.50	11.1	8.10	10.0	7.50	11.3	6.60	9.50	9.29	2.25	0.711
	Moisture	%	-	-	88.2	83.1	86.2	86.5	78.2	86.0	44.4	80.4	85.3	80.9	79.9	12.9	4.07
	Total Organic Carbon	%	10 ^α	-	4.94	4.72	7.50	4.37	4.32	4.26	0.860	4.18	6.30	3.85	4.53	1.71	0.541
Metals	Aluminum (Al)	mg/kg	-	-	21,600	23,800	17,400	25,000	16,600	22,100	13,800	21,600	13,400	22,800	19,810	4,174	1,320
	Antimony (Sb)	mg/kg	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-
	Arsenic (As)	mg/kg	17	5.9	4.63	5.43	5.33	5.66	4.98	4.81	2.91	4.62	7.24	4.83	5.04	1.08	0.341
	Barium (Ba)	mg/kg	-	-	130	136	124	144	89.0	177	72.6	126	160	129	129	30.5	9.63
	Beryllium (Be)	mg/kg	-	-	0.870	0.870	0.680	0.940	0.640	0.870	0.560	0.800	0.480	0.940	0.765	0.164	0.0518
	Bismuth (Bi)	mg/kg	-	-	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	-	-
	Boron (B)	mg/kg	-	-	16.8	16.9	12.8	17.3	13.4	16.2	11.7	15.5	12.0	17.7	15.0	2.32	0.733
	Cadmium (Cd)	mg/kg	3.5	1.5	0.172	0.176	0.174	0.187	0.108	0.167	0.0800	0.152	0.197	0.147	0.156	0.0364	0.0115
	Calcium (Ca)	mg/kg	-	-	5,650	5,540	4,640	5,620	4,380	5,430	3,750	5,020	5,160	5,520	5,071	633	200
	Chromium (Cr)	mg/kg	90	79	72.7	78.6	58.1	83.0	56.0	73.5	39.2	73.2	49.4	71.9	65.6	14.1	4.46
	Cobalt (Co)	mg/kg	-	-	16.4	17.5	9.84	18.1	10.7	19.9	9.32	15.7	11.4	16.0	14.5	3.82	1.21
	Copper (Cu)	mg/kg	197	50	89.6	97.9	87.5	108	62.1	89.8	38.5	89.0	59.8	90.8	81.3	21.0	6.65
	Iron (Fe)	mg/kg	40,000 ^α	34,400	46,600	50,400	79,100	51,300	51,800	54,200	25,800	45,900	90,500	47,300	54,290	18,096	5,722
	Lead (Pb)	mg/kg	91.3	35	16.8	19.0	13.2	19.8	13.3	18.2	12.2	17.1	13.1	18.2	16.1	2.85	0.900
	Lithium (Li)	mg/kg	-	-	33.2	36.3	23.0	39.1	26.9	34.8	25.4	32.4	19.4	38.2	30.9	6.78	2.14
	Magnesium (Mg)	mg/kg	-	-	14,800	16,300	11,300	17,000	11,200	15,300	9,360	15,000	9,880	15,300	13,544	2,806	887
	Manganese (Mn)	mg/kg	1,100 ^{α,β}	657	1,900	1,310	569	1,290	610	6,390	344	1,080	886	1,160	1,554	1,757	556
	Mercury (Hg)	mg/kg	0.486	0.17	0.0632	0.0786	0.0540	0.0837	0.0442	0.0706	0.00820	0.0682	0.0656	0.0501	0.0586	0.0215	0.00681
	Molybdenum (Mo)	mg/kg	-	-	3.60	2.74	7.65	2.94	4.16	3.55	2.56	2.15	5.19	2.76	3.73	1.64	0.518
	Nickel (Ni)	mg/kg	75 ^{α,β}	66	51.9	54.8	41.0	57.0	37.5	51.9	27.9	48.9	37.6	48.2	45.7	9.28	2.94
	Phosphorus (P)	mg/kg	2,000 ^α	1,278	1,040	1,070	1,470	1,060	927	956	755	899	2,530	1,010	1,172	511	162
	Potassium (K)	mg/kg	-	-	5,130	5,720	4,010	6,100	4,150	5,390	3,890	5,330	3,410	5,460	4,859	912	288
	Selenium (Se)	mg/kg	-	-	0.870	0.940	1.04	0.900	0.680	0.850	0.300	0.840	0.810	0.600	0.783	0.210	0.0665
	Silver (Ag)	mg/kg	-	-	0.220	0.230	0.170	0.270	0.120	0.230	<0.1	0.240	0.120	0.220	0.192	0.0570	0.0169
	Sodium (Na)	mg/kg	-	-	388	446	297	458	327	415	265	427	279	408	371	72.3	22.9
	Strontium (Sr)	mg/kg	-	-	13.1	13.3	10.5	13.8	10.5	13.2	10.0	12.6	11.3	13.6	12.2	1.46	0.461
	Sulphur (S)	mg/kg	-	-	1,700	1,500	1,900	1,400	1,300	1,400	<1,000	1,300	2,200	1,200	1,490	330	104
	Thallium (Tl)	mg/kg	-	-	0.672	0.756	0.394	0.770	0.382	0.826	0.291	0.681	0.377	0.709	0.586	0.200	0.0633
	Tin (Sn)	mg/kg	-	-	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	-	-
	Titanium (Ti)	mg/kg	-	-	994	1,190	810	1,170	936	1,100	1,210	1,170	841	1,190	1,061	154	48.6
	Uranium (U)	mg/kg	-	-	25.2	25.3	13.8	26.0	9.22	24.1	14.6	21.8	13.9	28.1	20.2	6.64	2.10
	Vanadium (V)	mg/kg	-	-	63.9	70.0	57.9	73.4	49.8	65.3	42.3	63.7	41.9	66.3	59.5	11.2	3.53
	Zinc (Zn)	mg/kg	315	123	87.8	99.0	86.2	105	69.5	91.4	52.7	89.0	64.2	91.5	83.6	16.3	5.17
	Zirconium (Zr)	mg/kg	-	-	3.10	3.80	3.90	4.40	3.10	3.20	7.20	4.10	4.00	4.10	4.09	1.19	0.375

Indicates parameter concentration above Sediment Quality Guideline (SQG).

Bold


Indicates parameter concentration above the most stringent AEMP Benchmark.


Note: "-" indicates no SQG applicable.


^a Canadian Sediment Quality Guideline for the protection of aquatic life probable effects level (PEL; CCME 2015) except α (Ontario Provincial Sediment Quality Guideline [PSQO] severe effect level [SEL]; OMOE 1993) and β (British Columbia Working Sediment Quality Guideline [BCSQG], probable effects level [PEL; BCMC 2015]).

Table B.6: Statistical Comparison of Substrate Physical Sediment Quality between Littoral and Profundal Sediment Core Stations of Reference Lake 3, Mary River Project CREMP, August 2024

Habitat Variable	Statistical Test Results					Summary Statistics						
	Statistical Analysis ^a	Transformation	Significant Difference Between Areas?	P-value	MOD ^b	Station Type	Sample Size (n)	Mean	Standard Deviation	Standard Error	Minimum	Maximum
Sand-Sized Particles (% by weight)	M-W	Rank	NO	0.310	ns	Littoral	5	50.3	10.9	2.18	42.6	69.2
						Profundal	5	49.4	1.08	0.216	48.1	50.5
Silt-Sized Particles (% by weight)	M-W	Rank	NO	0.151	ns	Littoral	5	41.9	9.65	1.93	25.2	49.9
						Profundal	5	39.8	1.56	0.312	38.2	42.0
Clay-Sized Particles (% by weight)	tequal	None	YES	0.025	38.2	Littoral	5	7.80	2.19	0.438	5.50	11.3
						Profundal	5	10.8	1.01	0.203	9.50	12.0
Moisture (% by weight)	M-W	Rank	NO	1.000	ns	Littoral	5	76.5	18.3	3.66	44.4	88.2
						Profundal	5	83.4	2.82	0.563	80.4	86.5
Total Organic Carbon (%)	tequal	None	NO	0.666	ns	Littoral	5	4.78	2.52	0.503	0.860	7.50
						Profundal	5	4.28	0.315	0.0630	3.85	4.72

 Indicates negative MOD (profundal concentration significantly lower than littoral).

 Indicates positive MOD (littoral concentration significantly lower than profundal).

 Highlighted values indicate significant difference between study areas based on ANOVA p-value less than 0.05.

^a Statistical tests included tequal (t-test assuming equal variance) and M-W (Mann-Whitney U-test).

^b MOD is calculated as $(MCT_{\text{profundal}} - MCT_{\text{littoral}}) / MCT_{\text{littoral}} * 100$.

Table B.7: Phytoplankton Monitoring Data Collected at Lotic Reference Stations, Mary River Mine CREMP, 2024

Station		Reference Creek Stations				Mary River Reference Stations		
		CLT-REF3	CLT-REF4	MRY-REF2	MRY-REF3	G0-09-A	G0-09	G0-09-B
Sample Collection Date	Spring	29-Jun-24	30-Jun-24	30-Jun-24	6-Jul-24	7-Jul-24	7-Jul-24	30-Jun-24
	Summer	30-Jul-24	30-Jul-24	30-Jul-24	30-Jul-24	30-Jul-24	30-Jul-24	30-Jul-24
	Fall	31-Aug-24	31-Aug-24	31-Aug-24	31-Aug-24	30-Aug-24	30-Aug-24	30-Aug-24
Chlorophyll-a (µg/L)	Spring	0.122	0.122	0.149	0.151	0.170	0.106	0.274
	Summer	0.105	0.126	0.243	0.189	0.102	0.0860	0.0800
	Fall	0.184	0.280	0.353	0.197	0.292	0.153	0.166
	Average	0.137	0.176	0.248	0.179	0.188	0.115	0.173
	Standard Deviation	0.0416	0.0901	0.102	0.0246	0.0963	0.0344	0.0972
	Standard Error	0.0240	0.0520	0.0590	0.0142	0.0556	0.0199	0.0561
Phaeophytin-a (µg/L)	Spring	0.155	0.140	0.235	0.155	0.145	0.145	0.190
	Summer	<0.2	<0.2	0.310	0.220	<0.2	<0.2	<0.2
	Fall	0.290	0.350	0.390	0.440	0.340	0.280	0.370
	Average	0.200	0.210	0.312	0.272	0.210	0.190	0.250
	Standard Deviation	0.0900	0.140	0.0775	0.149	0.130	0.0900	0.120
	Standard Error	0.0520	0.0808	0.0448	0.0862	0.0751	0.0520	0.0693

Table B.8: Benthic Invertebrate Community Summary Statistics for Unnamed Reference Creek (REF-CRK) and Mary River (G0-09) Reference Areas, Mary River Project CREMP, August 2024

Endpoint	Area	Mean	Standard Deviation	Standard Error	Minimum	Median	Maximum
Density (no. organisms/m ²)	Unnamed Reference Creek	393	397	178	86.0	222	1,039
	Mary River G0-09 Reference	50.2	29.6	13.2	21.5	43.0	100
Richness (No. of Taxa)	Unnamed Reference Creek	15.6	5.90	2.64	10.0	12.0	22.0
	Mary River G0-09 Reference	4.20	0.837	0.374	3.00	4.00	5.00
Simpson's Evenness	Unnamed Reference Creek	0.949	0.0322	0.0144	0.898	0.956	0.980
	Mary River G0-09 Reference	0.864	0.0705	0.0316	0.750	0.895	0.931
% Nematoda	Unnamed Reference Creek	0.704	1.00	0.448	0	0	2.14
	Mary River G0-09 Reference	1.67	3.73	1.67	0	0	8.33
% Hydracarina	Unnamed Reference Creek	6.47	1.62	0.724	4.84	6.25	8.33
	Mary River G0-09 Reference	1.67	3.73	1.67	0	0	8.33
% Oligochaeta	Unnamed Reference Creek	0.0690	0.154	0.0690	0	0	0.345
	Mary River G0-09 Reference	-	-	-	-	-	-
% Ostracoda	Unnamed Reference Creek	2.61	2.65	1.19	0	3.23	6.25
	Mary River G0-09 Reference	-	-	-	-	-	-
% Chironomidae	Unnamed Reference Creek	68.9	9.23	4.13	56.4	70.8	79.3
	Mary River G0-09 Reference	66.0	24.6	11.0	41.7	66.7	96.4
% Metal Sensitive Chironomidae	Unnamed Reference Creek	8.62	10.7	4.79	0	4.91	25.3
	Mary River G0-09 Reference	44.7	29.0	13.0	0	57.1	68.3
% Simuliidae	Unnamed Reference Creek	9.93	6.72	3.01	3.12	8.33	20.7
	Mary River G0-09 Reference	29.1	18.8	8.42	3.57	33.3	50.0
% Tipulidae	Unnamed Reference Creek	4.83	6.79	3.04	0	1.03	16.1
	Mary River G0-09 Reference	0	0	0	0	0	0
% Collector-Gatherer FFG	Unnamed Reference Creek	60.4	11.9	5.33	44.4	61.6	77.6
	Mary River G0-09 Reference	69.3	20.5	9.18	50.0	66.7	96.4
% Filterer FFG	Unnamed Reference Creek	1.94	1.79	0.799	0	2.90	3.57
	Mary River G0-09 Reference	0	0	0	0	0	0
% Shredder FFG	Unnamed Reference Creek	13.2	9.93	4.44	5.31	6.44	25.1
	Mary River G0-09 Reference	0	0	0	0	0	0
% Clinger HPG	Unnamed Reference Creek	24.7	11.1	4.95	9.38	23.1	40.1
	Mary River G0-09 Reference	30.7	20.5	9.18	3.57	33.3	50.0
% Sprawler HPG	Unnamed Reference Creek	54.5	15.0	6.73	36.3	51.8	77.6
	Mary River G0-09 Reference	67.6	22.7	10.2	41.7	66.7	96.4
% Burrower HPG	Unnamed Reference Creek	20.7	12.5	5.59	8.05	19.3	40.7
	Mary River G0-09 Reference	1.67	3.73	1.67	0	0	8.33

Notes: "-" indicates no available data. Sample size equals five for both study areas. FFG = Functional Feeding Group. HPG = Habitat Preference Group.

Table B.9: Benthic Invertebrate Community Statistical Comparison Results between Littoral and Profundal Stations at Reference Lake 3, Mary River Project CREMP, August 2024

Metric	Statistical Test Results					Summary Statistics						
	Statistical Test	Data Transform-ation	Significant Difference Between Areas?	p-value	Magnitude of Difference	Study Lake Littoral Habitat	Mean (n = 5)	Standard Deviation	Standard Error	Minimum	Median	Maximum
Density (Individuals/m²)	tequal	log10	YES	0.015	-1.4	littoral	1,049	901	403	215	982	2,514
						profundal	202	33.7	15.1	146	207	233
Richness (Number of Taxa)	tequal	none	YES	0.030	-1.2	littoral	8.80	3.56	1.59	5.00	8.00	13.0
						profundal	4.40	1.14	0.510	3.00	4.00	6.00
Simpson's Evenness (E)	tequal	log10	YES	0.044	-3.5	littoral	0.759	0.0621	0.0278	0.669	0.755	0.840
						profundal	0.582	0.169	0.0754	0.457	0.508	0.867
Shannon's Diversity	tequal	none	YES	0.003	-3.0	littoral	2.01	0.243	0.109	1.72	2.01	2.28
						profundal	1.28	0.318	0.142	0.834	1.27	1.71
Hydracarina (%)	tequal	none	NO	0.602	0.56	littoral	2.49	2.88	1.29	0	2.33	7.02
						profundal	4.09	5.94	2.66	0	0	13.0
Ostracoda (%)	tequal	log10	YES	<0.001	-3.0	littoral	39.5	16.1	7.20	16.0	40.3	60.5
						profundal	8.37	2.08	0.929	5.88	8.33	11.5
Chironomidae (%)	tequal	none	YES	0.002	2.3	littoral	52.6	14.4	6.46	30.7	56.6	68.0
						profundal	85.2	7.71	3.45	76.9	85.2	94.1
Metal Sensitive Chironomidae (%)	tequal	log10(x+1)	NO	0.237	-0.69	littoral	22.1	17.5	7.81	0	17.3	41.3
						profundal	9.98	11.3	5.05	0	7.41	29.4
Collector Gatherers (%)	tequal	none	NO	0.372	0.57	littoral	74.9	18.1	8.08	56.4	77.0	100
						profundal	85.2	16.2	7.24	57.6	88.2	100
Filterers (%)	tequal	log10(x+1)	NO	0.156	-0.88	littoral	21.7	17.6	7.85	0	17.3	41.3
						profundal	6.70	12.8	5.72	0	0	29.4
Shredders (%)	M-W	rank	NO	0.797	_a	littoral	0.344	0.578	0.259	0	0	1.33
						profundal	0.833	1.86	0.833	0	0	4.17
Clingers (%)	tequal	log10(x+1)	NO	0.238	-0.82	littoral	24.0	17.9	8.01	0	19.0	43.6
						profundal	9.96	18.4	8.23	0	0	42.4
Sprawlers (%)	tequal	none	YES	0.097	1.2	littoral	66.2	16.9	7.56	43.2	74.5	84.0
						profundal	86.2	16.7	7.46	57.6	88.9	100
Burrowers (%)	tequal	log10(x+1)	NO	0.132	-0.95	littoral	9.82	6.40	2.86	2.30	8.16	16.9
						profundal	3.88	4.71	2.11	0	3.70	11.5

P-value < 0.1.


Blue shaded values indicate significant difference (ANOVA p-value ≤ 0.10) that was also outside of a Critical Effect Size of ±2 SD_{REF}, indicating that the difference was ecologically meaningful.

Notes: MOD = Magnitude of Difference = (MCT_{Profundal} - MCT_{Littoral}) / SD_{Littoral}; MCT = Measure of Central Tendency; SD = Standard Deviation; MAD = Median Absolute Deviation. MCT and SD reported as median and MAD for rank-transformed data, as transformed means and SD for log transformed data, and as untransformed means and SD for untransformed data.

^a Contrast MOD could not be calculated because the MAD =0.

Table B.10: Statistical Comparisons For Length, Weight, and Condition Endpoints For Arctic Charr Captured by Electrofishing from Reference Lake 3, 2015 to 2024

Group	Indicator	Endpoint	Variables		Sample Size (n)										Test ^a	Year P-Value	Year 1	Year 2	Pairwise Comparisons ^b	
			Response	Covariate	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024					P-value	Magnitude of Difference (%) ^c
Non-YOY	Body Size	Fork Length	Fork Length (cm)	-	94	68	74	92	97	79	92	85	89	90	K-W	<0.001	2015	2016	0.027	5.8
																		2017	0.572	-4.3
																		2018	0.007	-16
																		2019	<0.001	45
																		2020	0.002	12
																		2021	0.002	-20
																		2022	0.035	-14
																		2023	0.456	1.4
																	2024	<0.001	-23	
																	2016	2017	0.116	-9.6
																		2018	<0.001	-20
																		2019	<0.001	37
																		2020	0.505	5.5
																		2021	<0.001	-24
																		2022	<0.001	-19
																	2017	2023	0.134	-4.1
																		2024	<0.001	-27
																		2018	0.002	-12
																		2019	<0.001	52
																		2020	0.021	17
	2021	<0.001	-16																	
	2018	2022	0.011	-11																
		2023	0.887	6.1																
		2024	<0.001	-20																
		2019	<0.001	72																
		2020	<0.001	33																
	2019	2021	0.744	-4.3																
		2022	0.592	1.7																
		2023	<0.001	21																
		2024	0.002	-8.6																
		2020	<0.001	-23																
	2020	2021	<0.001	-44																
		2022	<0.001	-41																
		2023	<0.001	-30																
		2024	<0.001	-47																
	2021	2021	<0.001	-28																
		2022	<0.001	-23																
		2023	0.023	-9.1																
		2024	<0.001	-31																
	2022	2022	0.392	6.3																
2023		<0.001	26																	
2024		0.006	-4.5																	
2023	2023	0.005	19																	
	2024	<0.001	-10																	
Non-YOY	Body Size	Body Weight	Body Weight (g)	-	94	68	74	92	97	79	92	85	89	90	K-W	<0.001	2015	2016	0.026	23
																		2017	0.565	-8.4
																		2018	0.101	-32
																		2019	<0.001	211
																		2020	0.007	31
																		2021	0.006	-46
																		2022	0.025	-24
																		2023	0.025	36
																	2024	<0.001	-58	
																	2016	2017	0.114	-26
																		2018	<0.001	-45
																		2019	<0.001	153
																		2020	0.727	6.1
																		2021	<0.001	-56
																		2022	<0.001	-38
																		2023	0.880	10
																	2017	2024	<0.001	-66
																		2018	0.035	-26
																		2019	<0.001	240
																		2020	0.046	43
	2021	0.002	-41																	
	2018	2022	0.008	-17																
		2023	0.125	49																
		2024	<0.001	-55																
		2019	<0.001	362																
		2020	<0.001	94																
	2019	2021	0.282	-20																
		2022	0.529	13																
		2023	<0.001	102																
		2024	<0.001	-38																
		2020	<0.001	-58																
	2020	2021	<0.001	-83																
		2022	<0.001	-76																
		2023	<0.001	-56																
		2024	<0.001	-87																
	2021	2021	<0.001	-58																
		2022	<0.001	-42																
		2023	0.596	4.2																
		2024	<0.001	-68																
	2022	2022	0.671	40																
2023		<0.001	151																	
2024		<0.001	-23																	
2023	2023	<0.001	78																	
	2024	<0.001	-46																	
2023	2024	<0.001	-70																	

 Area P-value < 0.1 or Interaction P-value < 0.05.

Magnitude of Difference significant and greater than absolute Effect Size of 25% for length and weight endpoints, or 10% for condition endpoint.

^a Statistical tests included the Kruskal Wallis H-test (K-W) and Analysis of Covariance (ANCOVA).

^b Calculated as the difference in measure of central tendency (MCT) between areas (mine-exposed minus reference), expressed as a percentage of the reference area MCT.

^c The magnitude of difference calculated as: $[(\text{Year 2 mean} - \text{Year 1 mean}) / \text{Year 1 mean}] \times 100$. When there is a significant interaction in the ANCOVA, the magnitude of difference is calculated at the minimum and maximum values of overlap in covariate values as: $[(\text{Year 2 predicted mean} - \text{Year 1 area predicted mean}) / \text{Year 1 predicted mean}] \times 100$.

^d Three outliers (REF3-23-ACJ-08 Studentized residual: 4.0121; REF3-23-ACJ-61 Studentized residual: 4.084; REF3-23-ACJ-38 Studentized residual: 4.291) were removed from the analysis.

^e One outlier (REF3-24-ACJ-14 Studentized residual: 9.381) was removed from the analysis.

^f One outlier (REF317-ACJ-25 Studentized residual: 4.045) was removed from the analysis.

^g Two outliers (REF3-23-ACJ-60 Studentized residual: 6.35; REF3-23-ACJ-30 Studentized residual: 4.83) were removed from the analysis.

^h Two outliers (REF3-24-ACJ-54 Studentized residual: 4.317; REF3-24-ACJ-97 Studentized residual: 4.791) were removed from the analysis.

Table B.10: Statistical Comparisons For Length, Weight, and Condition Endpoints For Arctic Charr Captured by Electrofishing from Reference Lake 3, 2015 to 2024

Group	Indicator	Endpoint	Variables		Sample Size (n)										Test ^a	Year P-Value	Year 1	Year 2	Pairwise Comparisons ^b	
			Response	Covariate	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024					P-value	Magnitude of Difference (%) ^c
Non-YOY	Energy Storage	Condition	log10[Body Weight (g)]	log10[Fork Length (cm)]	94	68	74	92	97	79	92	85	86 ^d	88 ^e	ANCOVA	<0.001	2015	2016	0.984	1.9
																		2017	1.000	0.060
																		2018	<0.001	12
																		2019	0.605	-3.2
																		2020	0.458	-3.5
																		2021	0.751	2.8
																		2022	0.804	-2.6
																		2023	<0.001	15
																	2024	<0.001	-10	
																	2016	2017	0.991	-1.8
																		2018	<0.001	9.6
																		2019	0.089	-5.0
																		2020	0.060	-5.3
																		2021	1.000	0.89
																		2022	0.212	-4.4
																		2023	<0.001	13
																		2024	<0.001	-12
																	2017	2018	<0.001	12
																		2019	0.656	-3.2
																		2020	0.518	-3.6
																		2021	0.833	2.7
																		2022	0.838	-2.7
																		2023	<0.001	15
																	2024	<0.001	-10	
																	2018	2019	<0.001	-13
																		2020	<0.001	-14
																		2021	<0.001	-7.9
																		2022	<0.001	-13
																		2023	0.558	3.4
																		2024	<0.001	-20
2019	2020	1.000	-0.35																	
	2021	0.014	6.2																	
	2022	1.000	0.55																	
	2023	<0.001	19																	
	2024	<0.001	-7.2																	
2020	2021	0.005	6.5																	
	2022	1.000	0.90																	
	2023	<0.001	20																	
	2024	0.001	-6.9																	
2021	2022	0.023	-5.3																	
	2023	<0.001	12																	
	2024	<0.001	-13																	
2022	2023	<0.001	18																	
	2024	<0.001	-7.7																	
2023	2024	<0.001	-22																	

Area P-value < 0.1 or Interaction P-value < 0.05.

Magnitude of Difference significant and greater than absolute Effect Size of 25% for length and weight endpoints, or 10% for condition endpoint.

^a Statistical tests included the Kruskal Wallis H-test (K-W) and Analysis of Covariance (ANCOVA).

^b Calculated as the difference in measure of central tendency (MCT) between areas (mine-exposed minus reference), expressed as a percentage of the reference area MCT

^c The magnitude of difference calculated as: $[(\text{Year 2 mean} - \text{Year 1 mean}) / \text{Year 1 mean}] \times 100$. When there is a significant interaction in the ANCOVA, the magnitude of difference is calculated at the minimum and maximum values of overlap in covariate values as: $(\text{Year 2 predicted mean} - \text{Year 1 area predicted mean}) / \text{Year 1 predicted mean} \times 100$.

^d Three outliers (REF3-23-ACJ-08 Studentized residual: 4.0121; REF3-23-ACJ-61 Studentized residual: 4.084; REF3-23-ACJ-38 Studentized residual: 4.291) were removed from the analysis.

^e One outlier (REF3-24-ACJ-14 Studentized residual: 9.381) was removed from the analysis.

^f One outlier (REF317-ACJ-25 Studentized residual: 4.045) was removed from the analysis.

^gTwo outliers (REF3-23-ACJ-60 Studentized residual: 6.35; REF3-23-ACJ-30 Studentized residual: 4.83) were removed from the analysis.

^h Two outliers (REF3-24-ACJ-54 Studentized residual: 4.317; REF3-24-ACJ-97 Studentized residual: 4.791) were removed from the analysis.

Table B.10: Statistical Comparisons For Length, Weight, and Condition Endpoints For Arctic Charr Captured by Electrofishing from Reference Lake 3, 2015 to 2024

Group	Indicator	Endpoint	Variables		Sample Size (n)										Test ^a	Year P-Value	Year 1	Year 2	Pairwise Comparisons ^b	
			Response	Covariate	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024					P-value	Magnitude of Difference (%) ^c
YOY	Body Size	Fork Length	Fork Length (cm)	-	0	31	26	8	0	21	11	15	11	12	K-W	<0.001	2016	2017	0.016	-6.4
																		2018	<0.001	-18
																		2020	0.009	-7.7
																		2021	<0.001	-18
																		2022	0.007	-7.7
																		2023	<0.001	-10
																	2017	2024	<0.001	-23
																		2018	0.058	-12
																		2020	0.744	-1.4
																		2021	0.023	-12
																		2022	0.531	-1.4
																		2023	0.149	-4.1
																	2018	2024	<0.001	-18
																		2020	0.106	12
																		2021	0.916	0
																		2022	0.198	12
																	2020	2023	0.595	9.4
																		2024	0.105	-6.3
	2021	0.053	-11																	
	2022	0.751	0																	
	2021	2023	0.255	-2.8																
		2024	<0.001	-17																
		2022	0.123	12																
		2023	0.488	9.4																
	2022	2024	0.098	-6.3																
		2023	0.425	-2.8																
		2024	<0.001	-17																
		2023	2024	0.018	-14															
	Body Size	Body Weight	Body Weight (g)	-	0	31	26	8	0	21	11	15	11	12	K-W	<0.001	2016	2017	0.624	-5.0
																		2018	0.005	-45
																		2020	0.020	-24
																		2021	<0.001	-48
																		2022	0.002	-38
																		2023	0.859	-9.8
																	2017	2024	<0.001	-61
																		2018	0.014	-42
2020																		0.073	-20	
2021																		<0.001	-46	
2022																		0.010	-35	
2023																		0.850	-5.0	
2018																	2024	<0.001	-59	
																	2020	0.262	39	
																	2021	0.654	-6.5	
																	2022	0.716	12	
2020																	2023	0.023	64	
																	2024	0.417	-29	
	2021	0.070	-33																	
	2022	0.365	-19																	
2021	2023	0.110	18																	
	2024	0.021	-49																	
	2022	0.355	20																	
	2023	0.003	75																	
2022	2024	0.697	-24																	
	2023	0.023	46																	
	2024	0.171	-36																	
	2023	2024	<0.001	-56																
Energy Storage	Condition	log10[Body Weight (g)]	log10[Fork Length (cm)]	0	31	25 ^f	8	0	21	11	15	9 ^g	10 ^h	ANCOVA	<0.001	2016	2017	0.075	13	
																	2018	1.000	2.0	
																	2020	1.000	-2.2	
																	2021	0.998	-3.7	
																	2022	0.281	-11	
																	2023	0.044	20	
																2017	2024	0.245	-14	
																	2018	0.724	-9.5	
																	2020	0.032	-13	
																	2021	0.095	-15	
																	2022	<0.001	-21	
																	2023	0.957	6.5	
																2018	2024	<0.001	-24	
																	2020	0.998	-4.1	
																	2021	0.990	-5.6	
																	2022	0.457	-12	
																2020	2023	0.316	18	
																	2024	0.224	-16	
2021	1.000	-1.6																		
2022	0.599	-8.7																		
2021	2023	0.016	23																	
	2024	0.377	-12																	
	2022	0.911	-7.2																	
	2023	0.026	25																	
2022	2024	0.618	-11																	
	2023	<0.001	34																	
2023	2024	0.998	-4.2																	
2023	2024	<0.001	-29																	

 Area P-value < 0.1 or Interaction P-value < 0.05.

Magnitude of Difference significant and greater than absolute Effect Size of 25% for length and weight endpoints, or 10% for condition endpoint.

^a Statistical tests included the Kruskal Wallis H-test (K-W) and Analysis of Covariance (ANCOVA).

^b Calculated as the difference in measure of central tendency (MCT) between areas (mine-exposed minus reference), expressed as a percentage of the reference area MCT.

^a The magnitude of difference calculated as: $[(\text{Year 2 mean} - \text{Year 1 mean}) / \text{Year 1 mean}] \times 100$. When there is a significant interaction in the ANCOVA, the magnitude of difference is calculated at the minimum and maximum values of overlap in covariate values as: $[(\text{Year 2 predicted mean} - \text{Year 1 area predicted mean}) / \text{Year 1 predicted mean}] \times 100$.

^d Three outliers (REF3-23-ACJ-08 Studentized residual: 4.0121; REF3-23-ACJ-61 Studentized residual: 4.084; REF3-23-ACJ-38 Studentized residual: 4.291) were removed from the analysis.

^e One outlier (REF3-24-ACJ-14 Studentized residual: 9.381) was removed from the analysis.

^f One outlier (REF317-ACJ-25 Studentized residual: 4.045) was removed from the analysis.

^g Two outliers (REF3-23-ACJ-60 Studentized residual: 6.35; REF3-23-ACJ-30 Studentized residual: 4.83) were removed from the analysis.

^h Two outliers (REF3-24-ACJ-54 Studentized residual: 4.317; REF3-24-ACJ-97 Studentized residual: 4.791) were removed from the analysis.

Table B.11: Statistical Comparisons For Length, Weight, and Condition Endpoints For Arctic Charr Captured by Gillnetting Collected from Reference Lake 3, 2018 to 2024

Indicator	Endpoint	Variables		Sample Size (n)							Test ^a	Year P-Value	Year 1	Year 2	Pairwise Comparisons ^b	
		Response	Covariate	2018	2019	2020	2021	2022	2023	2024					P-value	Magnitude of Difference (%) ^c
Body Size	Fork Length	Fork Length (cm)	-	34	27	138	56	93	11	84	K-W	<0.001	2018	2019	<0.001	-14
														2020	<0.001	-11
														2021	<0.001	-15
														2022	<0.001	-12
														2023	0.033	-12
														2024	<0.001	-18
													2019	2020	0.103	4.0
														2021	0.339	-1.5
														2022	0.597	2.0
														2023	0.186	2.4
														2024	0.254	-5.1
													2020	2021	<0.001	-5.3
														2022	0.090	-1.9
														2023	0.677	-1.6
														2024	<0.001	-8.7
													2021	2022	0.045	3.6
														2023	0.034	3.9
														2024	0.872	-3.6
													2022	2023	0.262	0.33
														2024	0.015	-6.9
													2023	2024	0.024	-7.2
Body Size	Body Weight	Body Weight (g)	-	34	27	138	56	92	11	84	K-W	<0.001	2018	2019	<0.001	-34
														2020	<0.001	-32
														2021	<0.001	-43
														2022	<0.001	-38
														2023	0.362	-3.5
														2024	<0.001	-43
													2019	2020	0.269	2.3
														2021	0.168	-14
														2022	0.616	-7.0
														2023	0.012	46
														2024	0.227	-14
													2020	2021	<0.001	-16
														2022	0.011	-9.1
														2023	0.033	42
														2024	<0.001	-16
													2021	2022	0.208	7.6
														2023	<0.001	68
														2024	0.746	0
													2022	2023	0.002	56
														2024	0.297	-7.1
													2023	2024	<0.001	-41

Area P-value < 0.1 or Interaction P-value < 0.05.

Magnitude of Difference significant and greater than absolute Effect Size of 25% for length and weight endpoints, or 10% for condition endpoint.

^a Statistical tests included the Kruskal Wallis H-test (K-W) and Analysis of Covariance (ANCOVA).

^b Calculated as the difference in measure of central tendency (MCT) between areas (mine-exposed minus reference), expressed as a percentage of the reference area MCT.

^c The magnitude of difference calculated as: [(Year 2 mean - Year 1 mean) / Year 1 mean] x 100. When there is a significant interaction in the ANCOVA, the magnitude of difference is calculated at the minimum and maximum values of overlap in covariate values as : [(Year 2 predicted mean - Year 1 area predicted mean) / Year 1 predicted mean] x 100.

^d Two outliers (REF3-20-AC-03, Studentized residual:-4.045; REF3-20-AC-03-1, Studentized residual:-4.045) were removed from analysis.

^e Two outliers (REF3-22-AC-01, Studentized residual:-6.036; REF3-22-AC-09, Studentized residual:-4.266) were removed from analysis.

^f One outlier (REF3-23-AC-09, Studentized residual: 4.204) was removed from analysis.

^g One outlier (REF3-24-AC-54, Studentized residual: 7.889) was removed from analysis.

Table B.11: Statistical Comparisons For Length, Weight, and Condition Endpoints For Arctic Charr Captured by Gillnetting Collected from Reference Lake 3, 2018 to 2024

Indicator	Endpoint	Variables		Sample Size (n)							Test ^a	Year P-Value	Year 1	Year 2	Pairwise Comparisons ^b	
		Response	Covariate	2018	2019	2020	2021	2022	2023	2024					P-value	Magnitude of Difference (%) ^c
Energy Storage	Condition	log10[Body Weight (g)]	log10[Fork Length (cm)]	34	27	136 ^d	56	90 ^e	10 ^f	83 ^g	ANCOVA	<0.001	2018	2019	1.000	-0.017
														2020	0.092	-5.9
														2021	0.437	-5.0
														2022	<0.001	-10
														2023	0.097	12
														2024	0.266	-5.4
													2019	2020	0.161	-5.9
														2021	0.475	-5.0
														2022	<0.001	-10
														2023	0.121	12
														2024	0.316	-5.4
													2020	2021	0.999	0.97
														2022	0.028	-4.9
														2023	<0.001	19
														2024	1.000	0.60
													2021	2022	0.043	-5.8
														2023	<0.001	18
														2024	1.000	-0.37
													2022	2023	<0.001	25
														2024	0.027	5.7
													2023	2024	<0.001	-16

Area P-value < 0.1 or Interaction P-value < 0.05.

Magnitude of Difference significant and greater than absolute Effect Size of 25% for length and weight endpoints, or 10% for condition endpoint.

^a Statistical tests included the Kruskal Wallis H-test (K-W) and Analysis of Covariance (ANCOVA).

^b Calculated as the difference in measure of central tendency (MCT) between areas (mine-exposed minus reference), expressed as a percentage of the reference area MCT.

^c The magnitude of difference calculated as: [(Year 2 mean - Year 1 mean) / Year 1 mean] x 100. When there is a significant interaction in the ANCOVA, the magnitude of difference is calculated at the minimum and maximum values of overlap in covariate values as : [(Year 2 predicted mean - Year 1 area predicted mean) / Year 1 predicted mean] x 100.

^d Two outliers (REF3-20-AC-03, Studentized residual:-4.045; REF3-20-AC-03-1, Studentized residual:-4.045) were removed from analysis.

^e Two outliers (REF3-22-AC-01, Studentized residual:-6.036; REF3-22-AC-09, Studentized residual:-4.266) were removed from analysis.

^f One outlier (REF3-23-AC-09, Studentized residual: 4.204) was removed from analysis.

^g One outlier (REF3-24-AC-54, Studentized residual: 7.889) was removed from analysis.

APPENDIX C
WATER QUALITY DATA

APPENDIX C

FIGURES

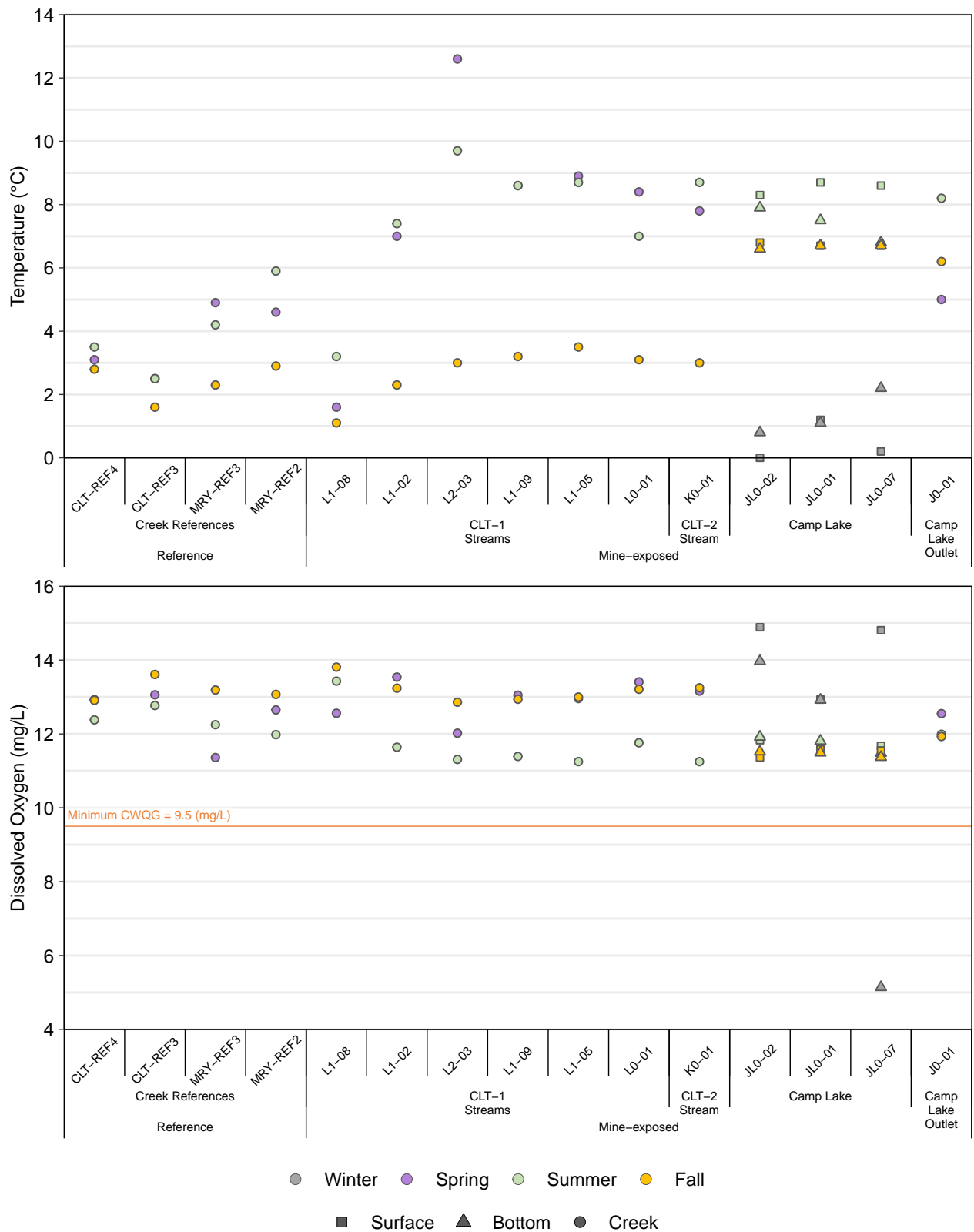


Figure C.1: Comparison of *In Situ* Water Quality Measured at Camp Lake System Water Quality Monitoring Stations in Winter, Spring, Summer, and Fall, Mary River Project CREMP, 2024

Note: Streams were not sampled in winter. Lakes were not sampled in spring.

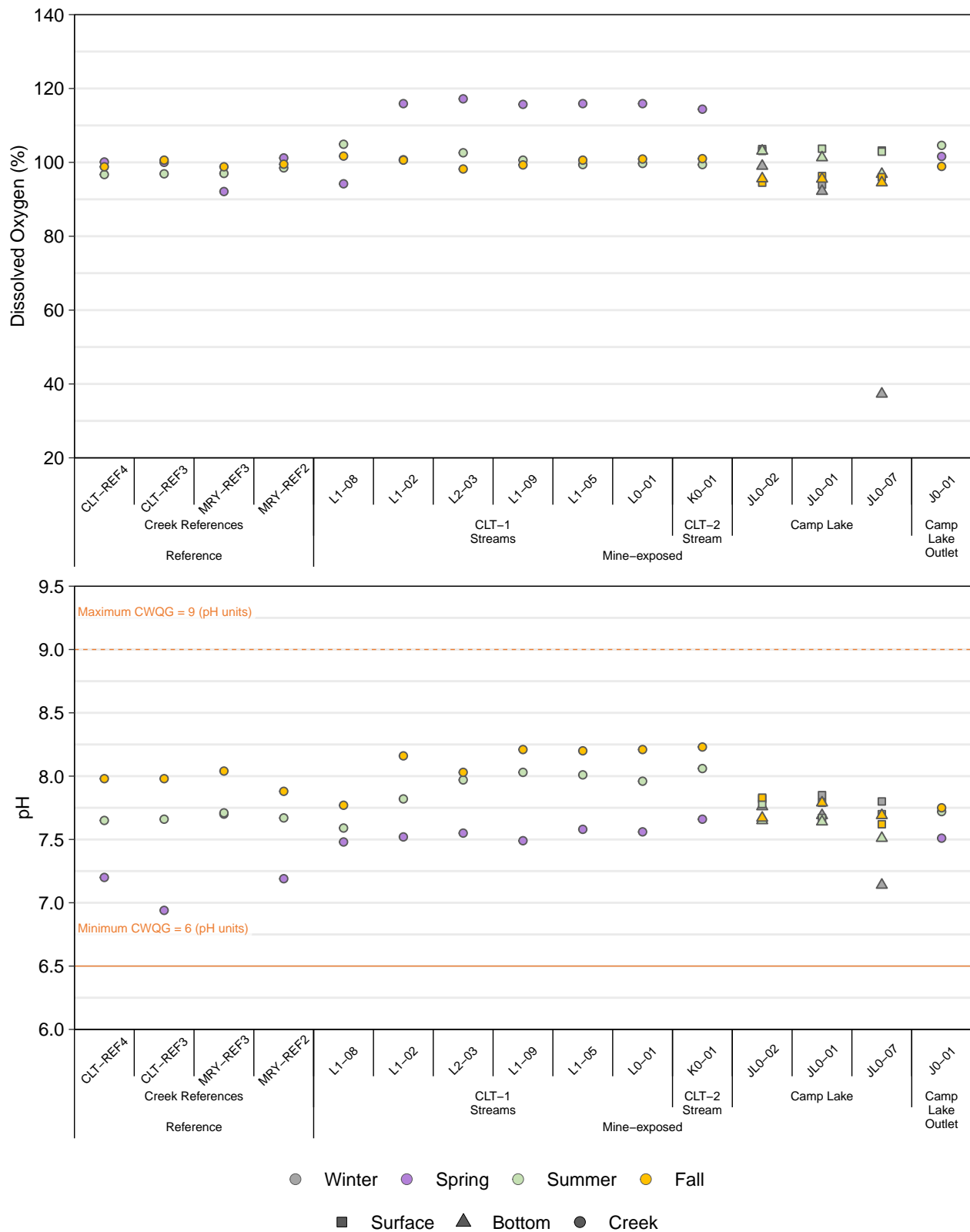


Figure C.1: Comparison of *In Situ* Water Quality Measured at Camp Lake System Water Quality Monitoring Stations in Winter, Spring, Summer, and Fall, Mary River Project CREMP, 2024

Notes: Streams were not sampled in winter. Lakes were not sampled in spring.

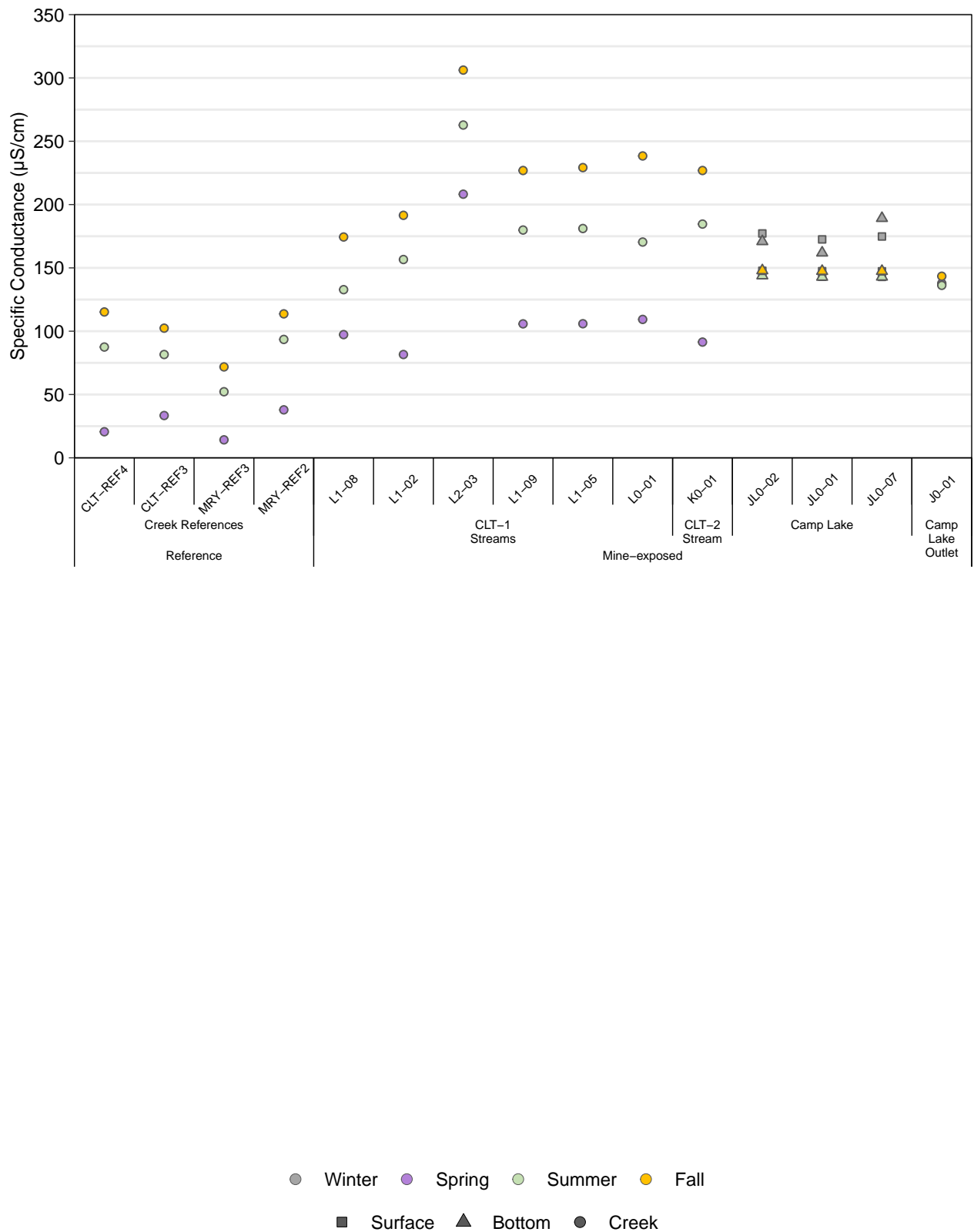


Figure C.1: Comparison of *In Situ* Water Quality Measured at Camp Lake System Water Quality Monitoring Stations in Winter, Spring, Summer, and Fall, Mary River Project CREMP, 2024

Notes: Streams were not sampled in winter. Lakes were not sampled in spring.

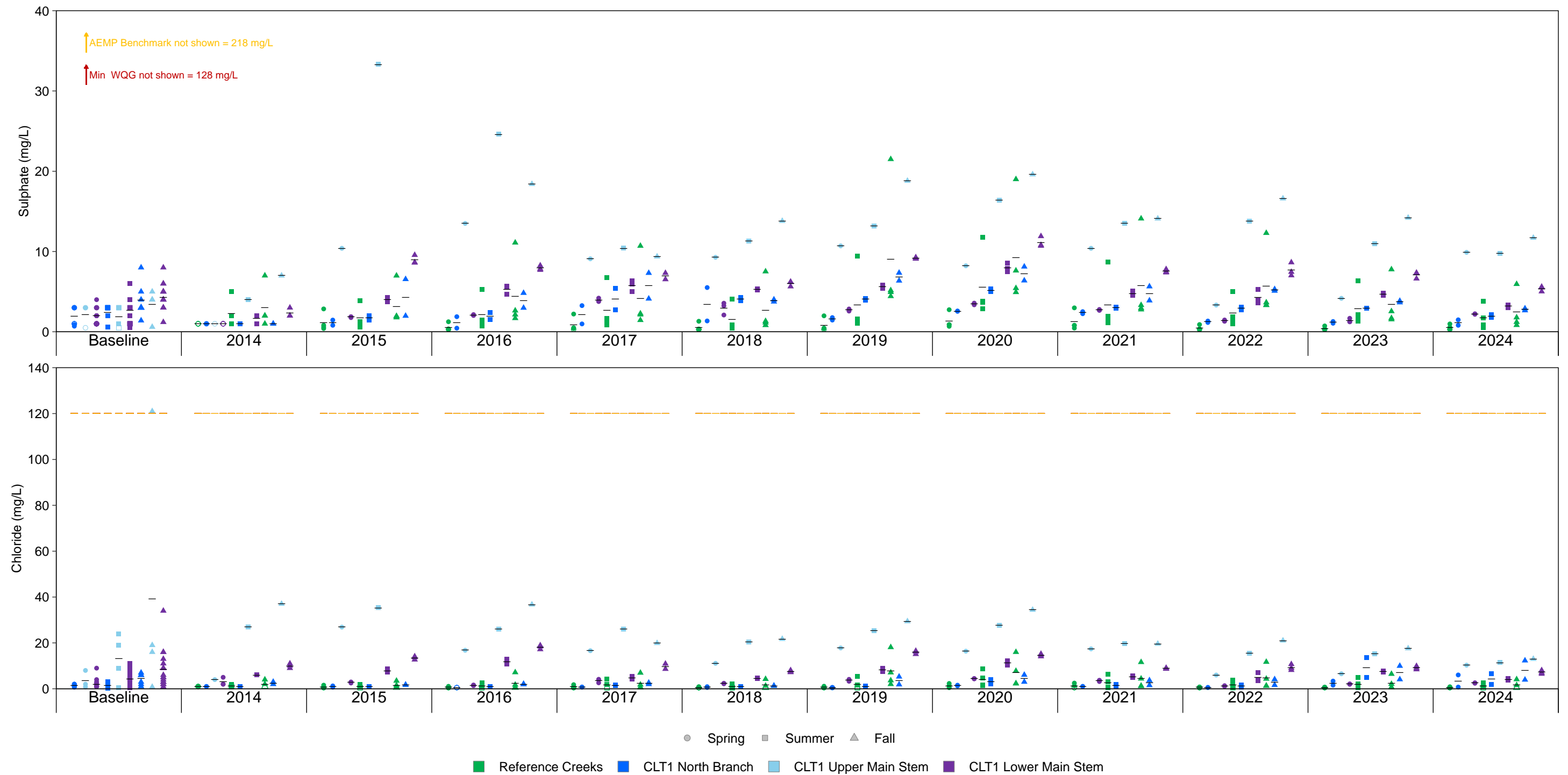


Figure C.2: Temporal Comparison of Water Chemistry at Camp Lake Tributary 1 (CLT1) Over Mine Baseline (2006 to 2013), Construction (2014), and Operational (2015 to 2024) Periods, Mary River Project CREMP

Notes: Concentrations below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL and the open symbol represents one or more values reported below the LRL. Red lines indicate Water Quality Guidelines, some of which are dependent on concurrent hardness values; orange lines indicate AEMP Benchmarks. Black bars indicate average of samples.

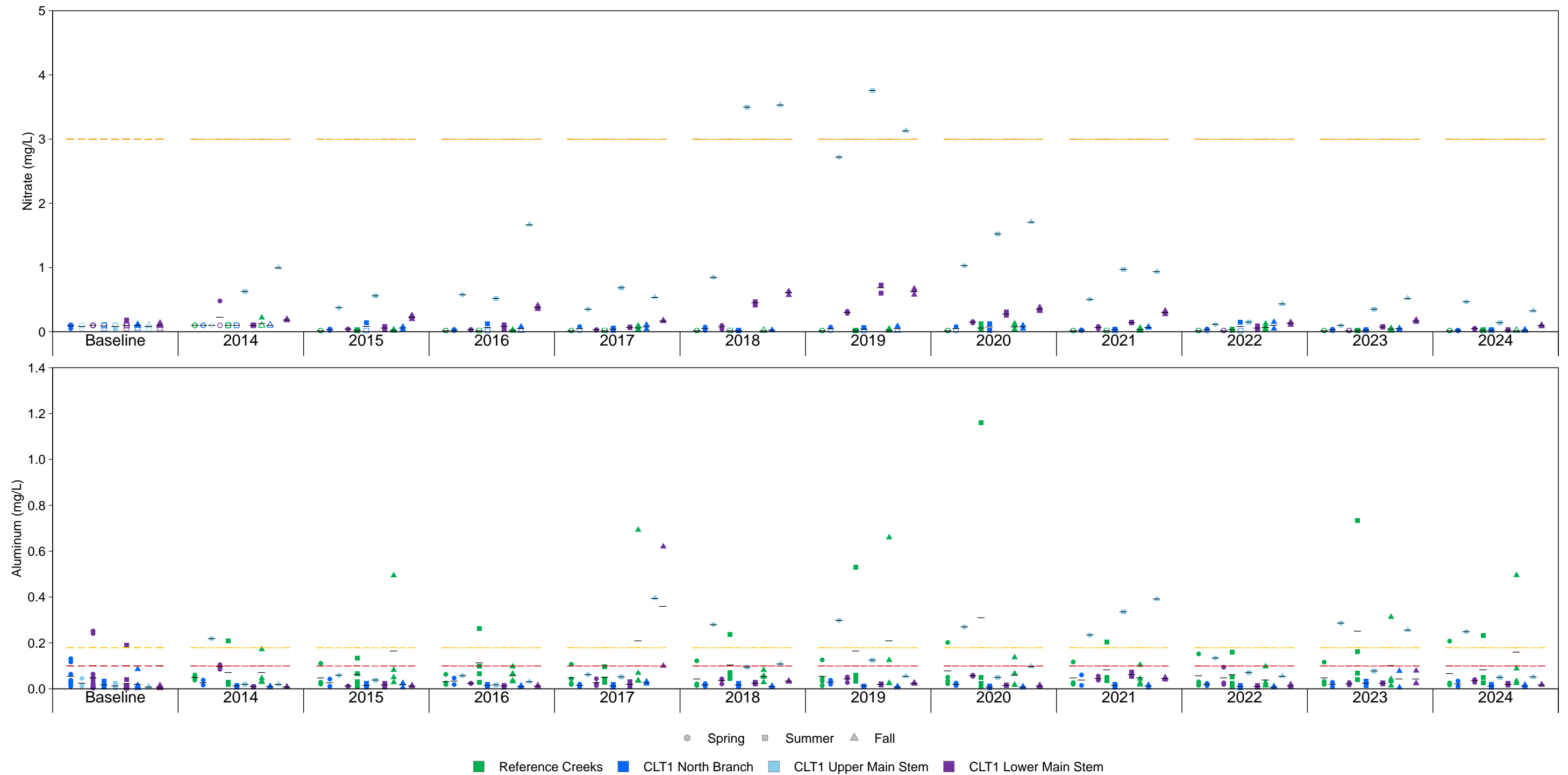


Figure C.2: Temporal Comparison of Water Chemistry at Camp Lake Tributary 1 (CLT1) Over Mine Baseline (2006 to 2013), Construction (2014), and Operational (2015 to 2024) Periods, Mary River Project CREMP

Notes: Concentrations below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL and the open symbol represents one or more values reported below the LRL. Red lines indicate Water Quality Guidelines, some of which are dependent on concurrent hardness values; orange lines indicate AEMP Benchmarks. Black bars indicate average of samples.



Figure C.2: Temporal Comparison of Water Chemistry at Camp Lake Tributary 1 (CLT1) Over Mine Baseline (2006 to 2013), Construction (2014), and Operational (2015 to 2024) Periods, Mary River Project CREMP

Notes: Concentrations below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL and the open symbol represents one or more values reported below the LRL. Red lines indicate Water Quality Guidelines, some of which are dependent on concurrent hardness values; orange lines indicate AEMP Benchmarks. Black bars indicate average of samples.



Figure C.2: Temporal Comparison of Water Chemistry at Camp Lake Tributary 1 (CLT1) Over Mine Baseline (2006 to 2013), Construction (2014), and Operational (2015 to 2024) Periods, Mary River Project CREMP

Notes: Concentrations below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL and the open symbol represents one or more values reported below the LRL. Red lines indicate Water Quality Guidelines, some of which are dependent on concurrent hardness values; orange lines indicate AEMP Benchmarks. Black bars indicate average of samples.

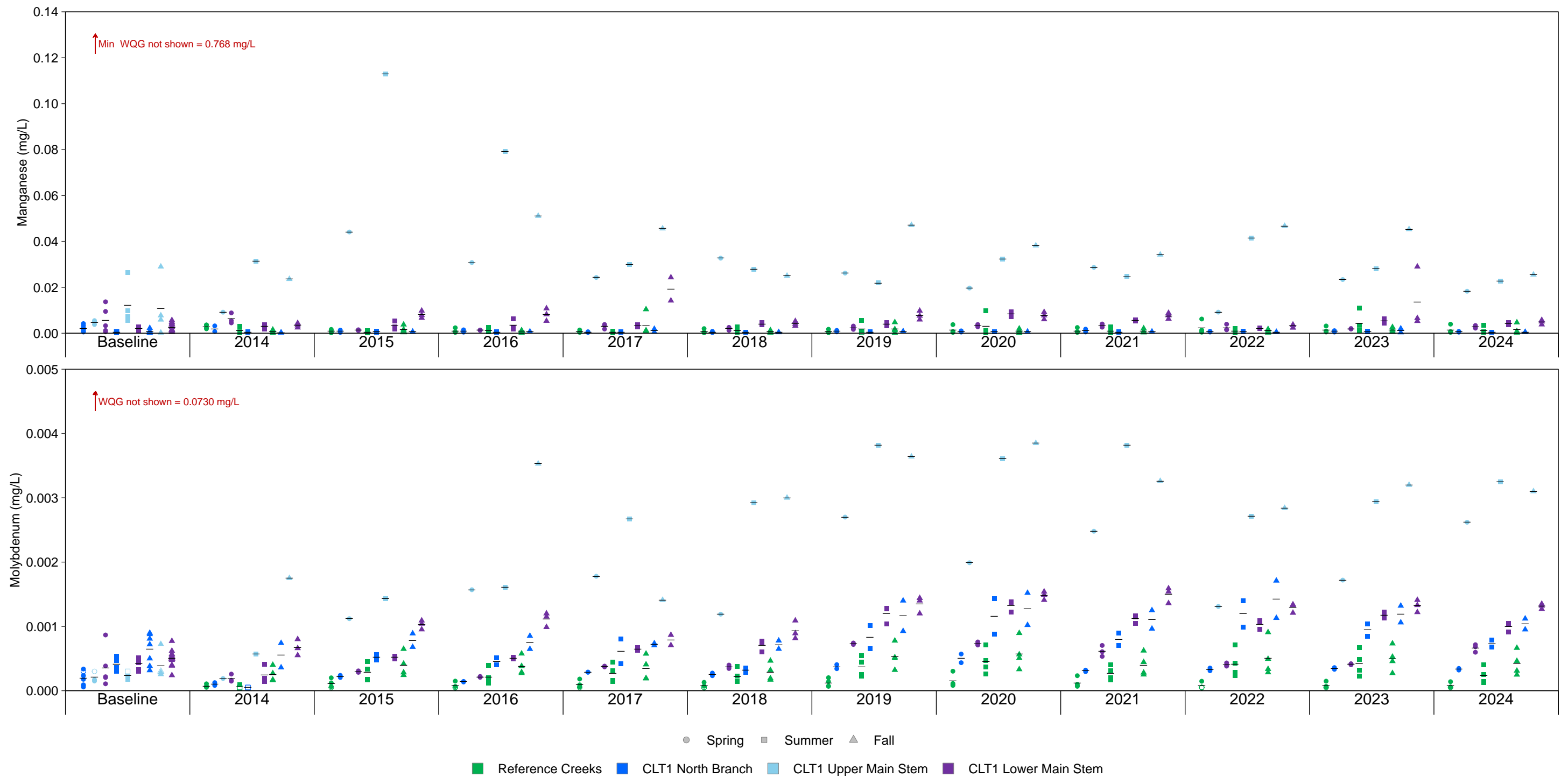


Figure C.2: Temporal Comparison of Water Chemistry at Camp Lake Tributary 1 (CLT1) Over Mine Baseline (2006 to 2013), Construction (2014), and Operational (2015 to 2024) Periods, Mary River Project CREMP

Notes: Concentrations below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL and the open symbol represents one or more values reported below the LRL. Red lines indicate Water Quality Guidelines, some of which are dependent on concurrent hardness values; orange lines indicate AEMP Benchmarks. Black bars indicate average of samples.

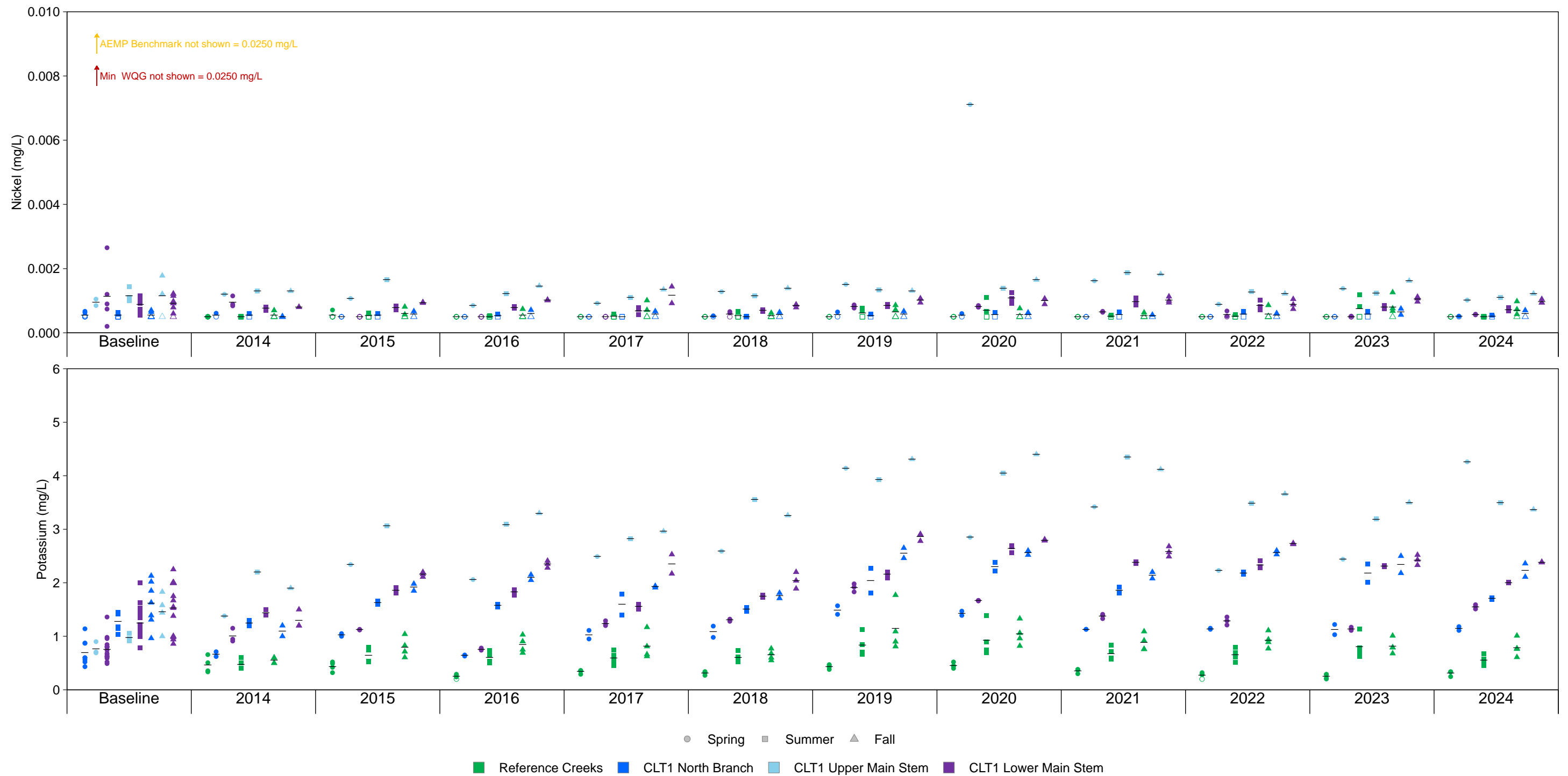


Figure C.2: Temporal Comparison of Water Chemistry at Camp Lake Tributary 1 (CLT1) Over Mine Baseline (2006 to 2013), Construction (2014), and Operational (2015 to 2024) Periods, Mary River Project CREMP

Notes: Concentrations below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL and the open symbol represents one or more values reported below the LRL. Red lines indicate Water Quality Guidelines, some of which are dependent on concurrent hardness values; orange lines indicate AEMP Benchmarks. Black bars indicate average of samples.

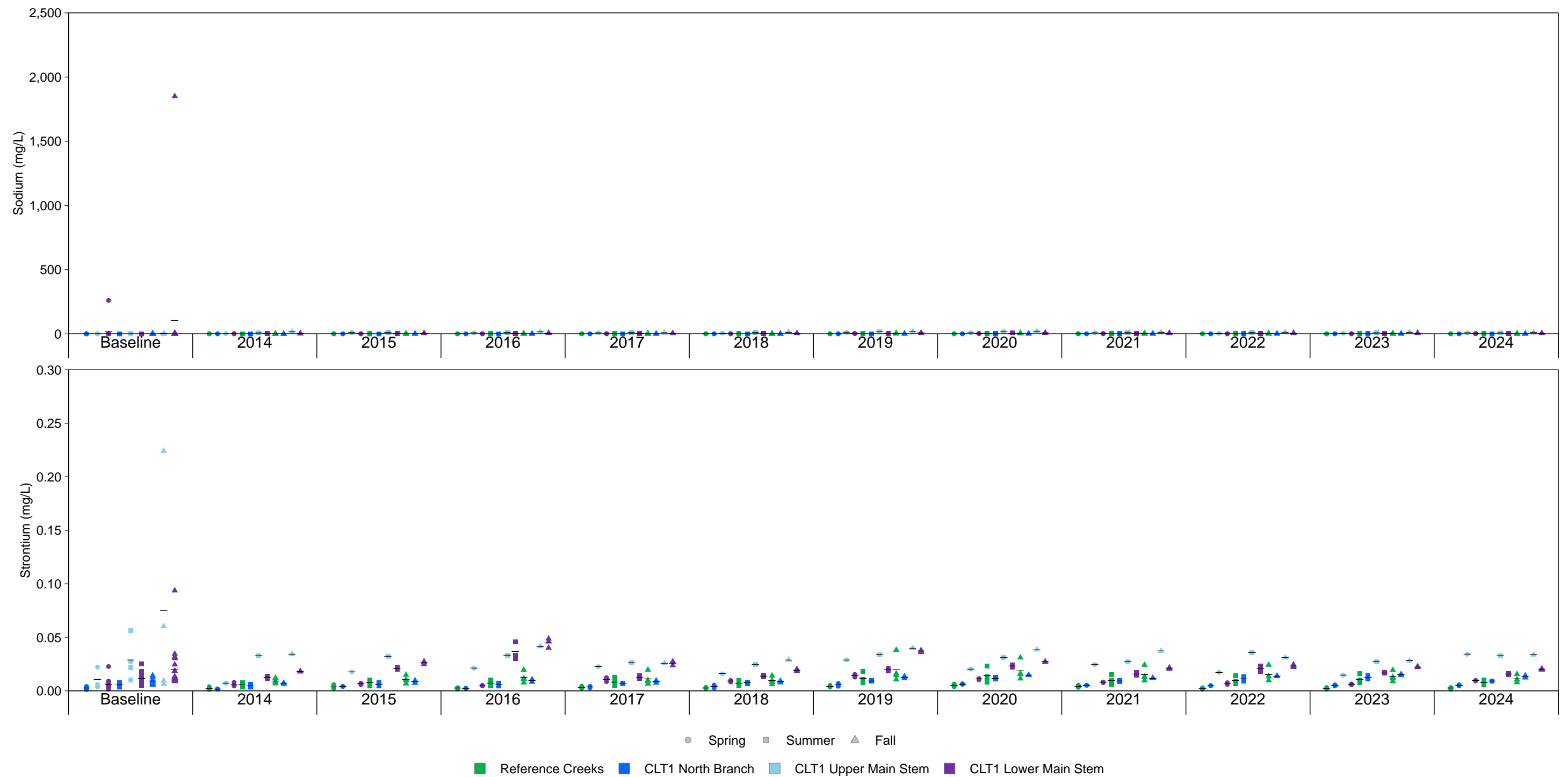


Figure C.2: Temporal Comparison of Water Chemistry at Camp Lake Tributary 1 (CLT1) Over Mine Baseline (2006 to 2013), Construction (2014), and Operational (2015 to 2024) Periods, Mary River Project CREMP

Notes: Concentrations below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL and the open symbol represents one or more values reported below the LRL. Red lines indicate Water Quality Guidelines, some of which are dependent on concurrent hardness values; orange lines indicate AEMP Benchmarks. Black bars indicate average of samples.

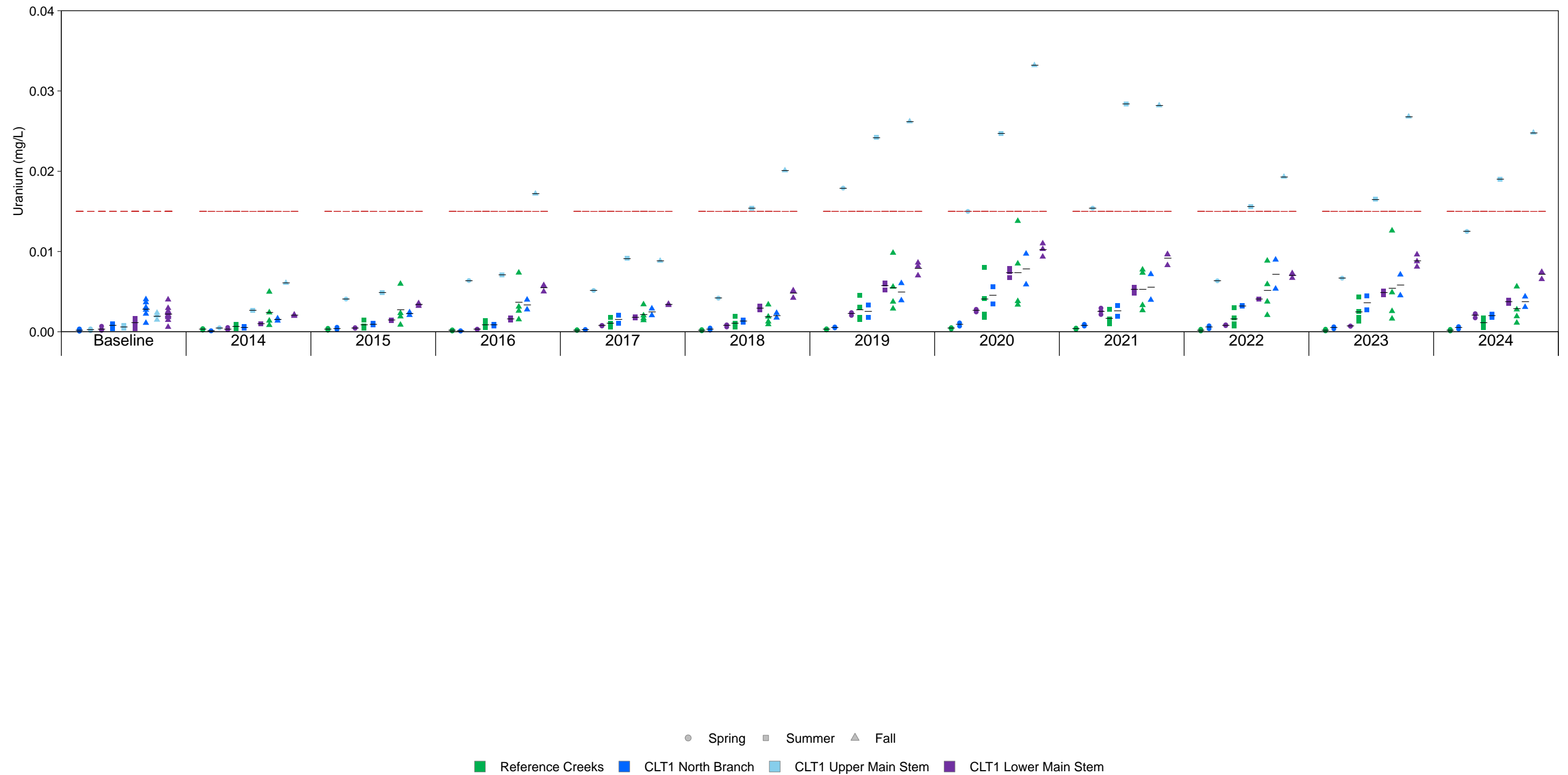


Figure C.2: Temporal Comparison of Water Chemistry at Camp Lake Tributary 1 (CLT1) Over Mine Baseline (2006 to 2013), Construction (2014), and Operational (2015 to 2024) Periods, Mary River Project CREMP

Notes: Concentrations below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL and the open symbol represents one or more values reported below the LRL. Red lines indicate Water Quality Guidelines, some of which are dependent on concurrent hardness values; orange lines indicate AEMP Benchmarks. Black bars indicate average of samples.

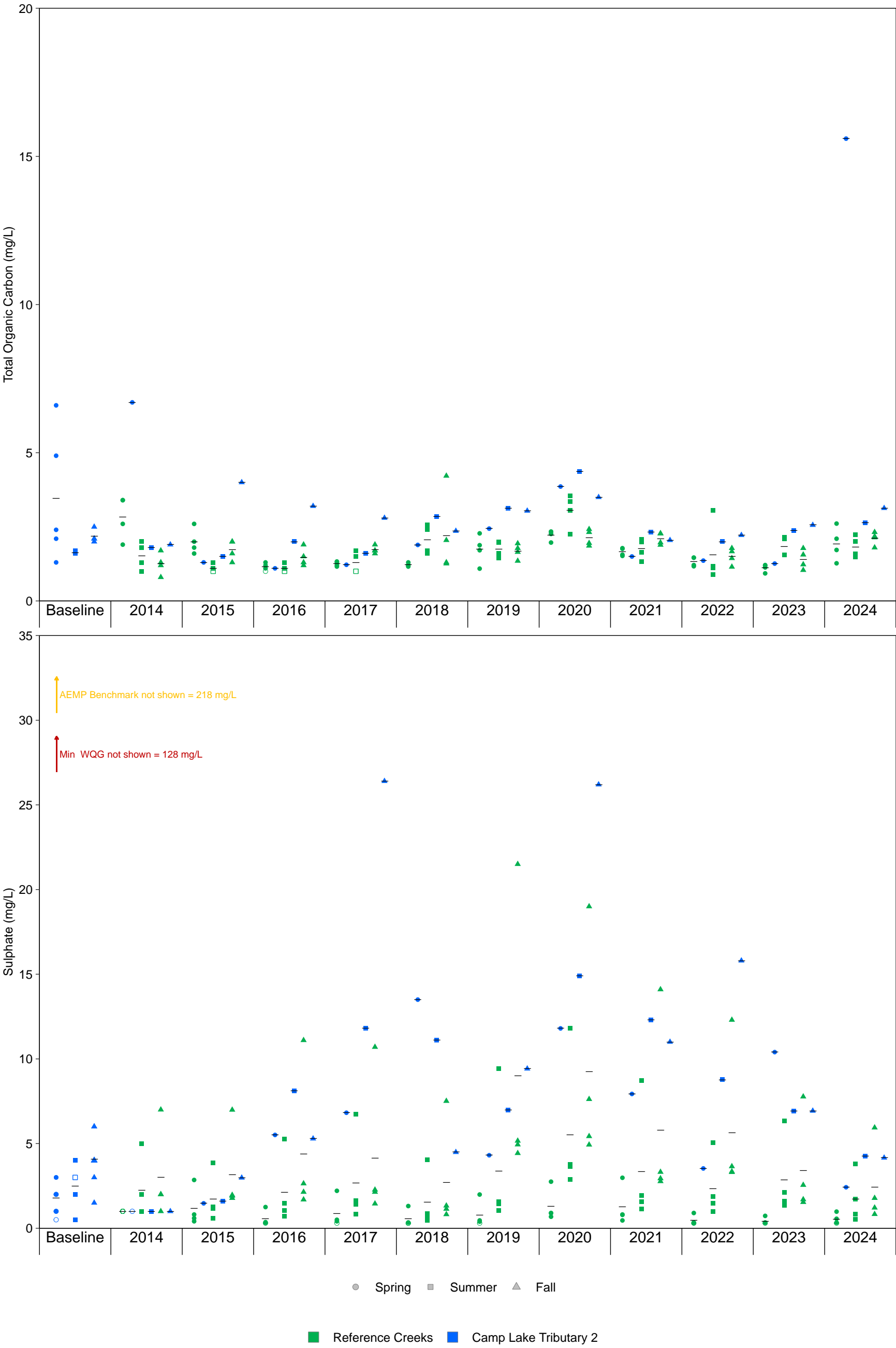


Figure C.3: Temporal Comparison of Water Chemistry at Camp Lake Tributary 2 (CLT2) Over Mine Baseline (2006 to 2013), Construction (2014), and Operational (2015 to 2024) Periods, Mary River Project CREMP

Notes: Concentrations below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL and the open symbol represents one or more values reported below the LRL. Red lines indicate Water Quality Guidelines, some of which are dependent on concurrent hardness values; orange lines indicate AEMP Benchmarks.

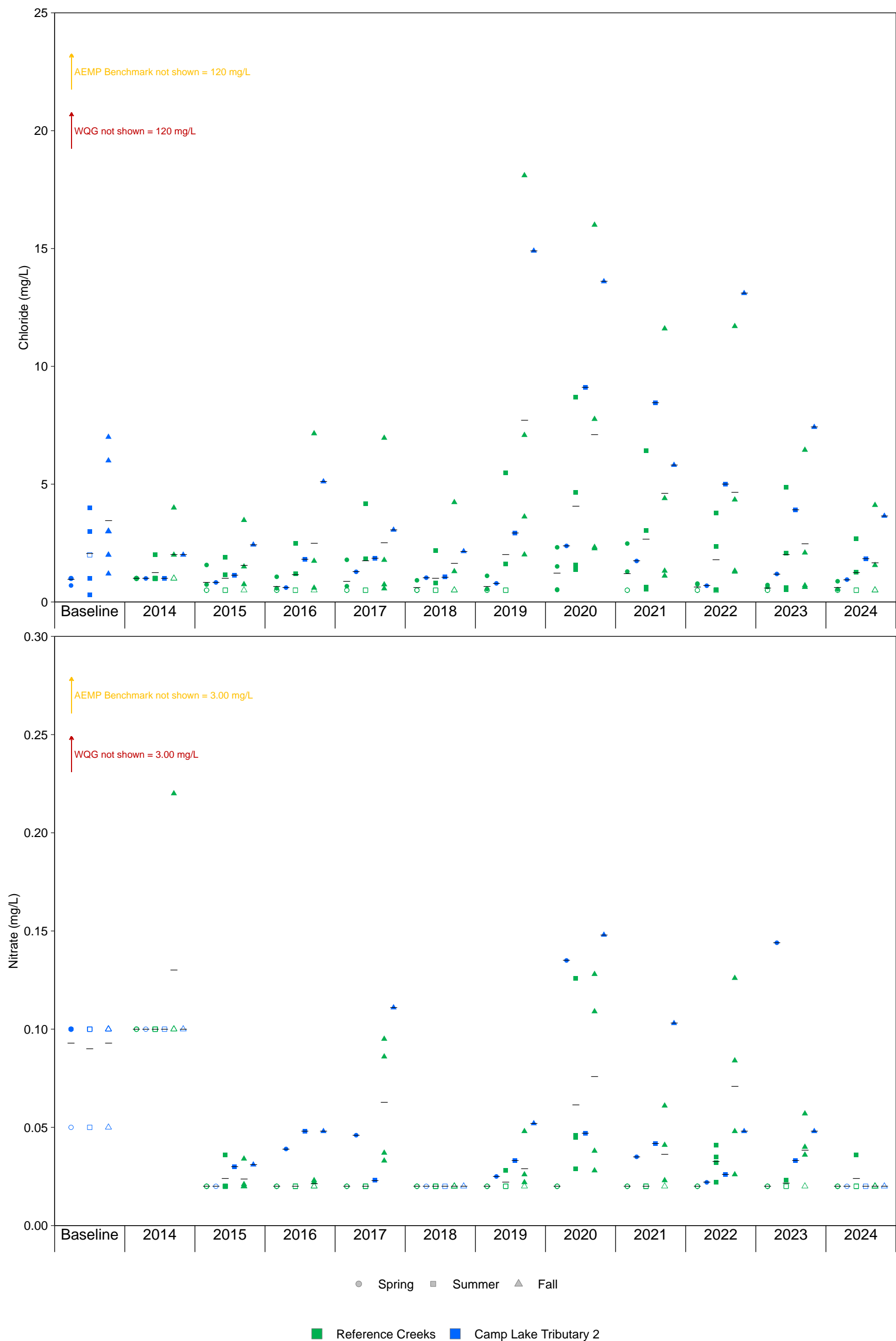


Figure C.3: Temporal Comparison of Water Chemistry at Camp Lake Tributary 2 (CLT2) Over Mine Baseline (2006 to 2013), Construction (2014), and Operational (2015 to 2024) Periods, Mary River Project CREMP

Notes: Concentrations below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL and the open symbol represents one or more values reported below the LRL. Red lines indicate Water Quality Guidelines, some of which are dependent on concurrent hardness values; orange lines indicate AEMP Benchmarks.

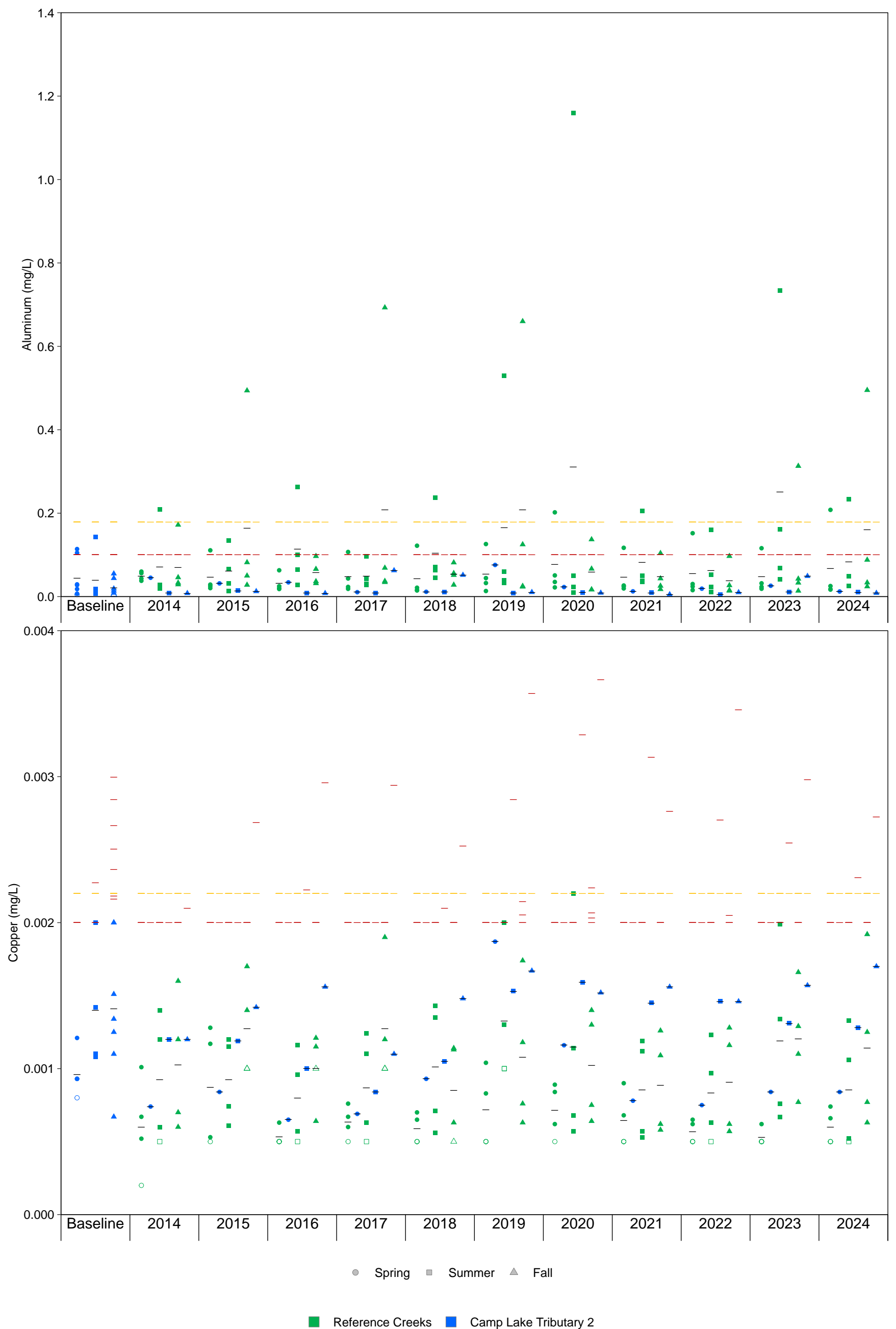


Figure C.3: Temporal Comparison of Water Chemistry at Camp Lake Tributary 2 (CLT2) Over Mine Baseline (2006 to 2013), Construction (2014), and Operational (2015 to 2024) Periods, Mary River Project CREMP

Notes: Concentrations below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL and the open symbol represents one or more values reported below the LRL. Red lines indicate Water Quality Guidelines, some of which are dependent on concurrent hardness values; orange lines indicate AEMP Benchmarks.

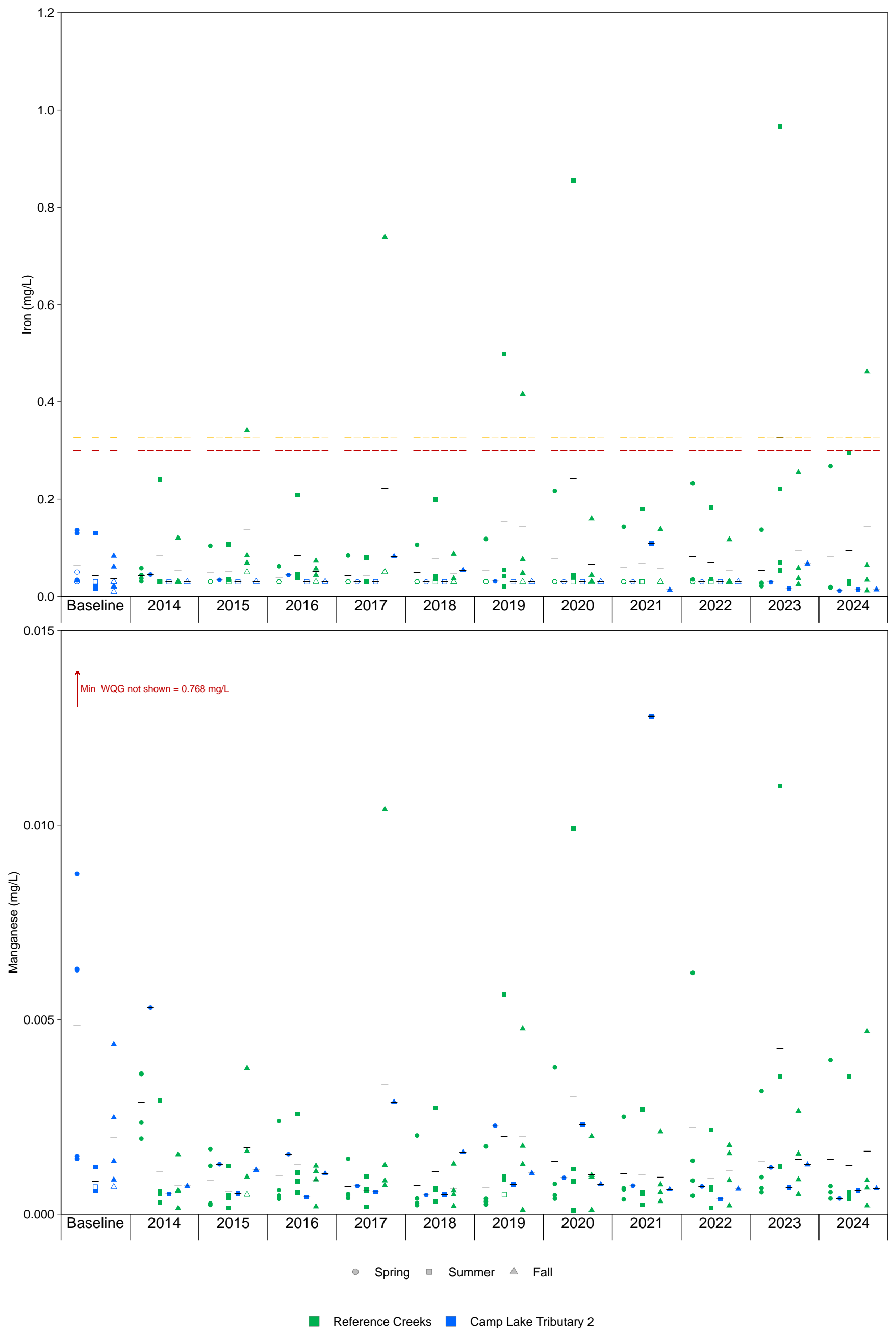


Figure C.3: Temporal Comparison of Water Chemistry at Camp Lake Tributary 2 (CLT2) Over Mine Baseline (2006 to 2013), Construction (2014), and Operational (2015 to 2024) Periods, Mary River Project CREMP

Notes: Concentrations below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL and the open symbol represents one or more values reported below the LRL. Red lines indicate Water Quality Guidelines, some of which are dependent on concurrent hardness values; orange lines indicate AEMP Benchmarks.

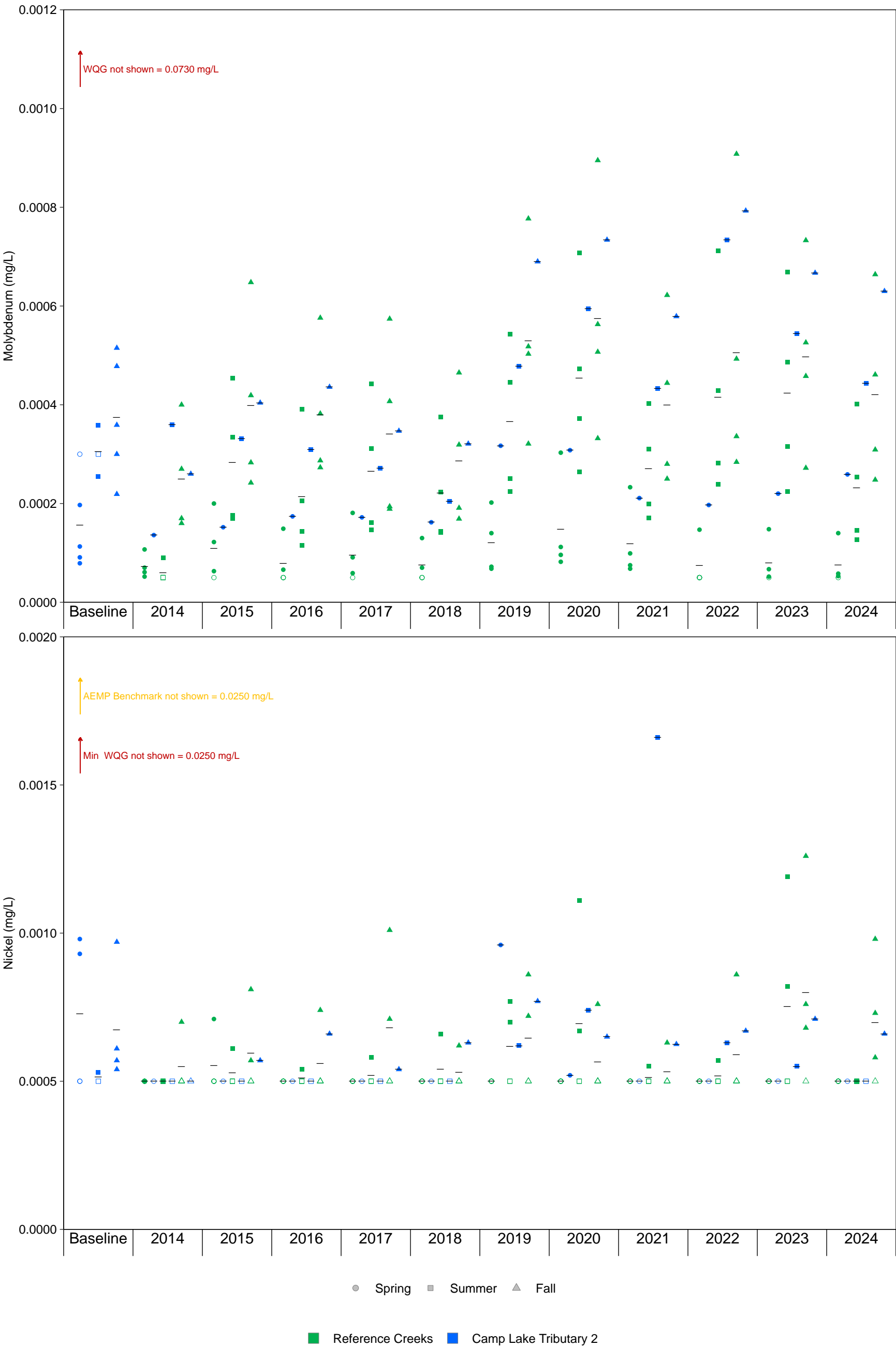


Figure C.3: Temporal Comparison of Water Chemistry at Camp Lake Tributary 2 (CLT2) Over Mine Baseline (2006 to 2013), Construction (2014), and Operational (2015 to 2024) Periods, Mary River Project CREMP

Notes: Concentrations below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL and the open symbol represents one or more values reported below the LRL. Red lines indicate Water Quality Guidelines, some of which are dependent on concurrent hardness values; orange lines indicate AEMP Benchmarks.

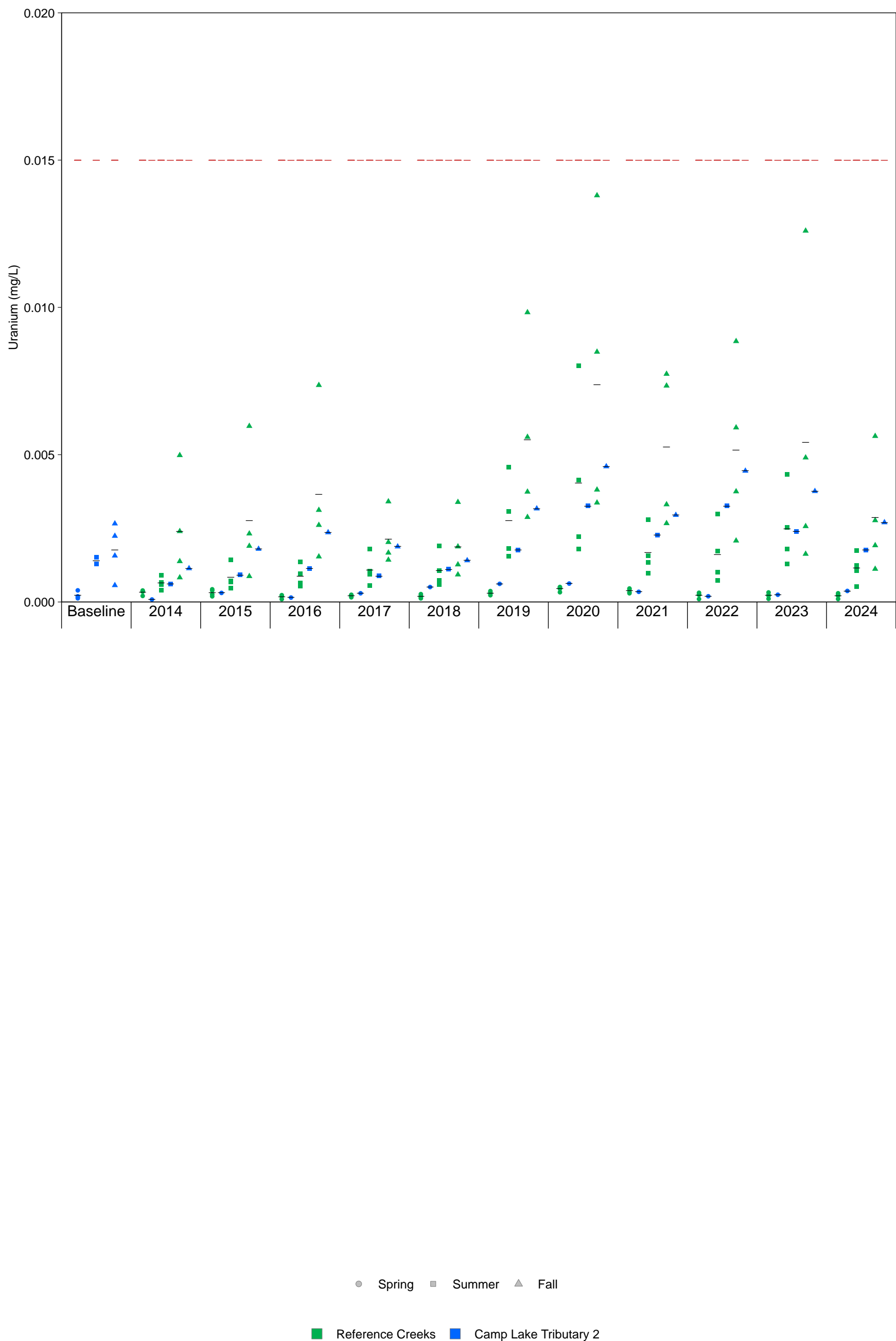


Figure C.3: Temporal Comparison of Water Chemistry at Camp Lake Tributary 2 (CLT2) Over Mine Baseline (2006 to 2013), Construction (2014), and Operational (2015 to 2024) Periods, Mary River Project CREMP

Notes: Concentrations below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL and the open symbol represents one or more values reported below the LRL. Red lines indicate Water Quality Guidelines, some of which are dependent on concurrent hardness values; orange lines indicate AEMP Benchmarks.

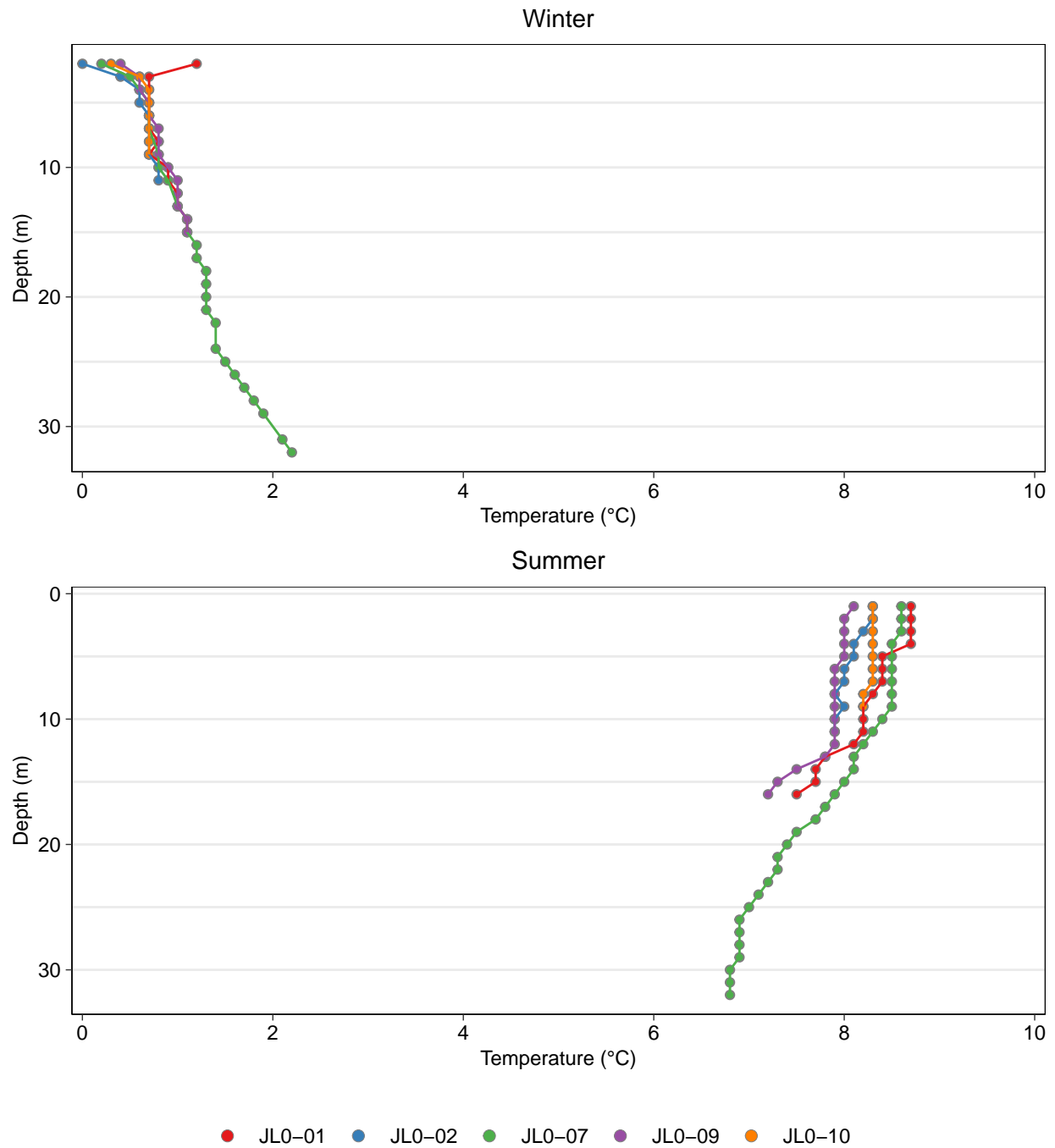
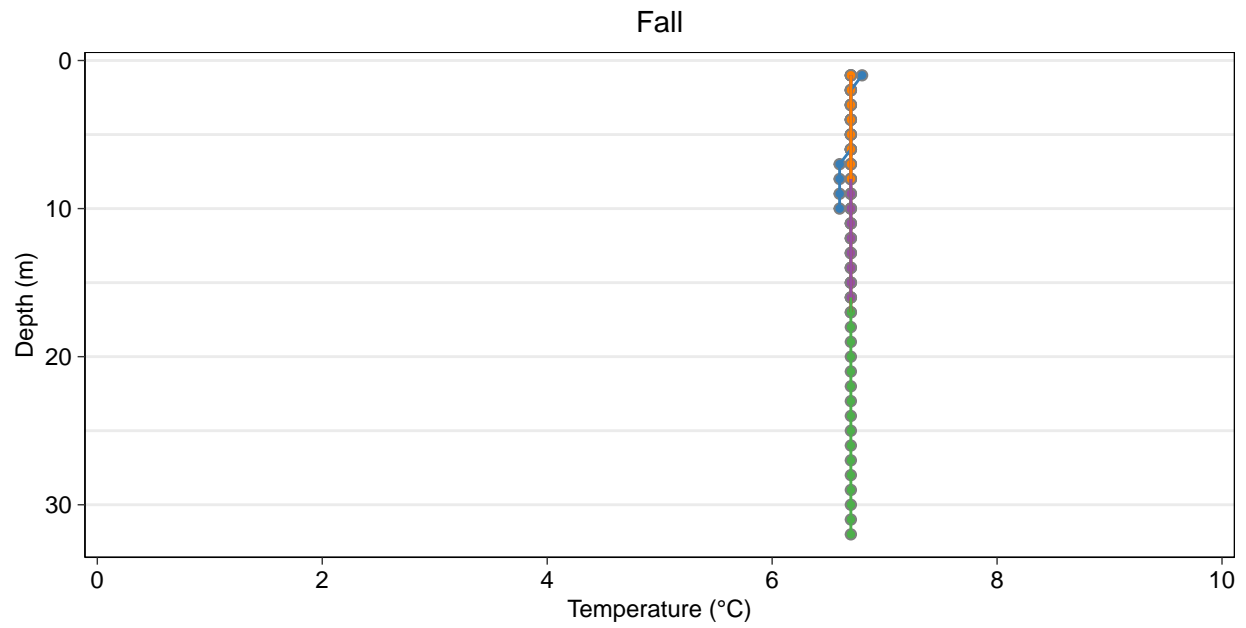


Figure C.4: Vertical Profiles of Temperature (°C) Measured at Camp Lake (JL0) Compared in Winter, Summer, and Fall, Mary River Project CREMP, 2024



● JL0-01 ● JL0-02 ● JL0-07 ● JL0-09 ● JL0-10

Figure C.4: Vertical Profiles of Temperature (°C) Measured at Camp Lake (JL0) Compared in Winter, Summer, and Fall, Mary River Project CREMP, 2024

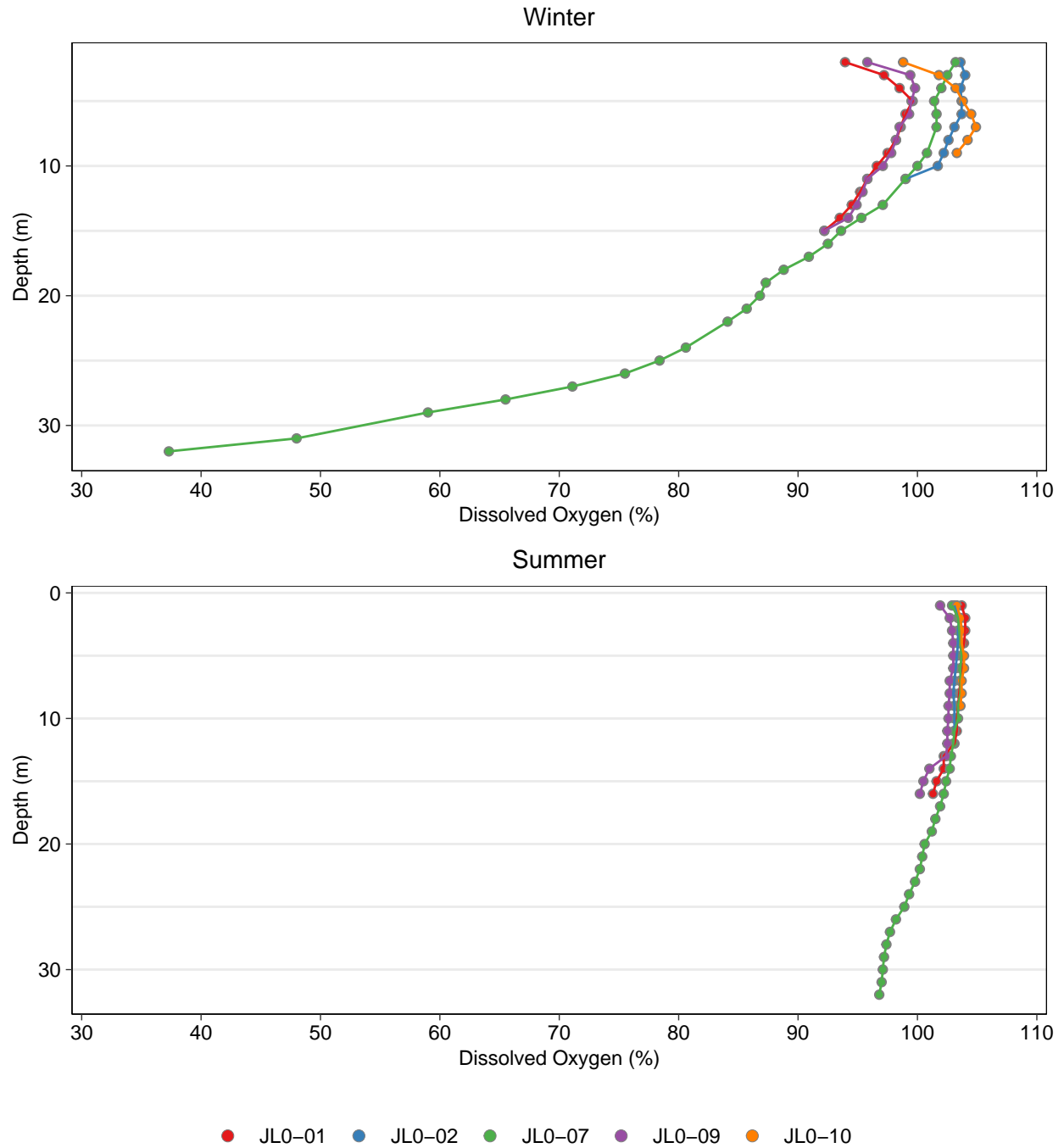
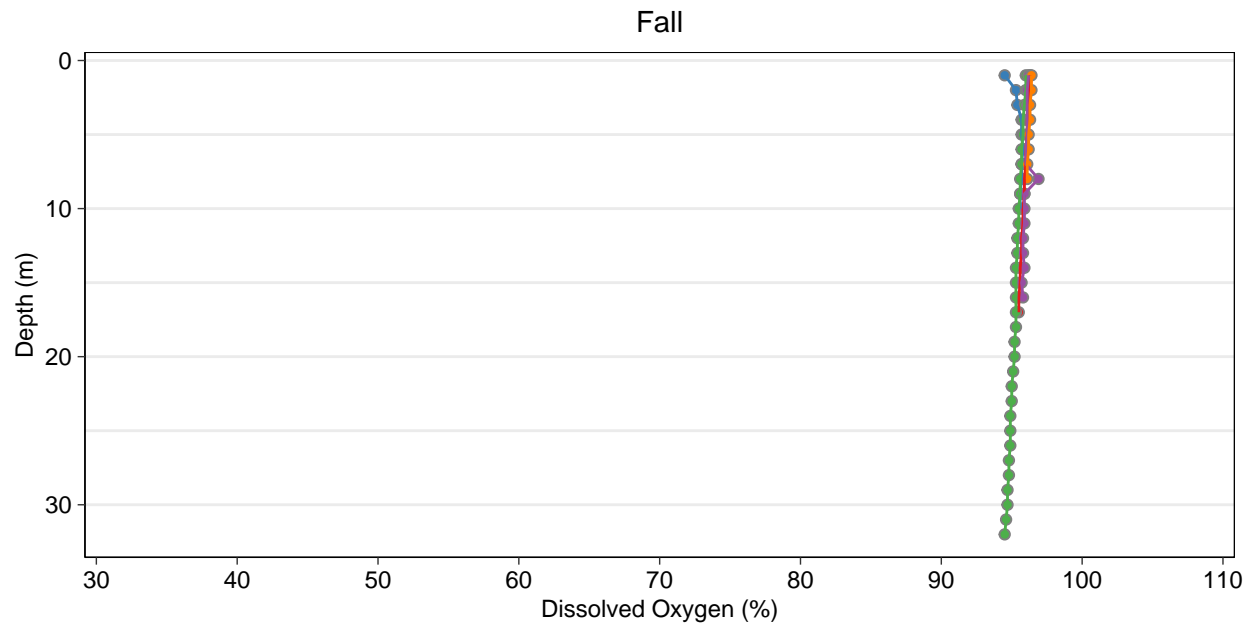


Figure C.5: Vertical Profiles of Dissolved Oxygen (%) Measured at Camp Lake (JL0) Compared in Winter, Summer, and Fall, Mary River Project CREMP, 2024



● JL0-01 ● JL0-02 ● JL0-07 ● JL0-09 ● JL0-10

Figure C.5: Vertical Profiles of Dissolved Oxygen (%) Measured at Camp Lake (JL0) Compared in Winter, Summer, and Fall, Mary River Project CREMP, 2024

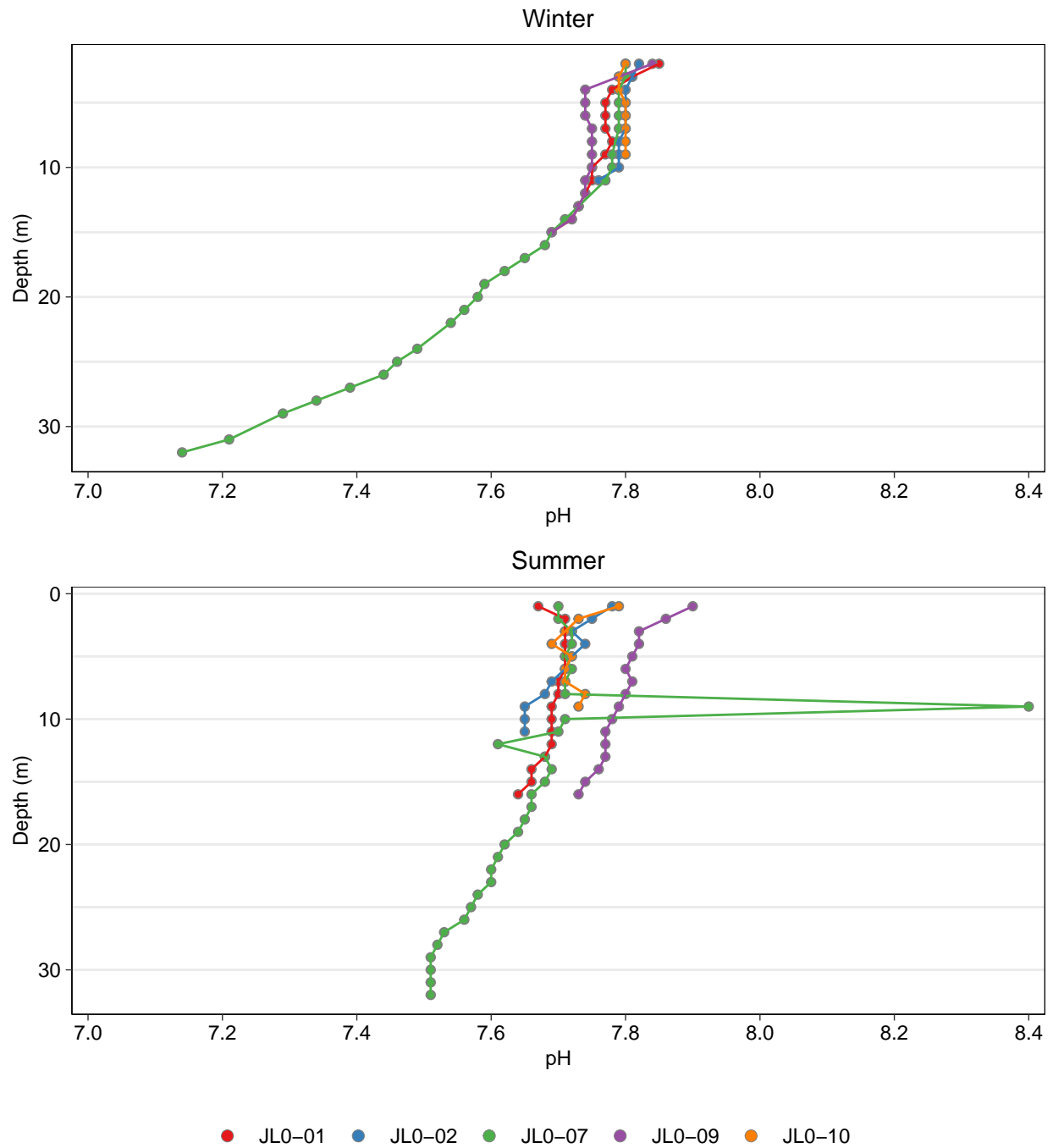
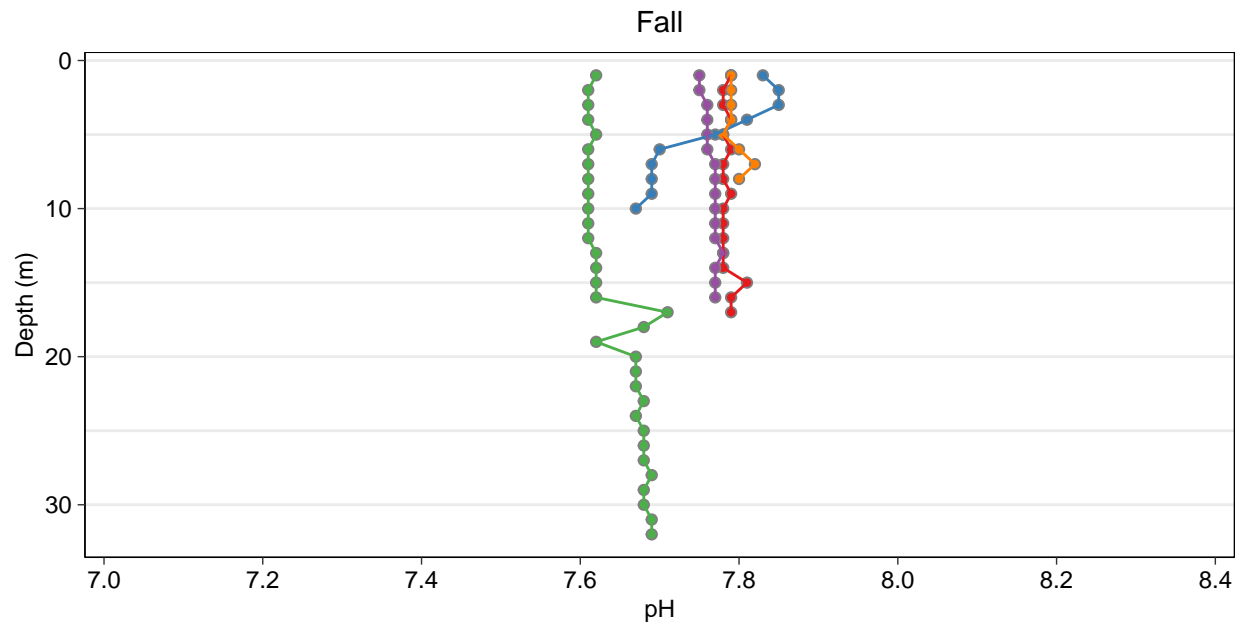


Figure C.6: Vertical Profiles of pH Measured at Camp Lake (JL0) Compared in Winter, Summer, and Fall, Mary River Project CREMP, 2024



● JL0-01 ● JL0-02 ● JL0-07 ● JL0-09 ● JL0-10

Figure C.6: Vertical Profiles of pH Measured at Camp Lake (JL0) Compared in Winter, Summer, and Fall, Mary River Project CREMP, 2024

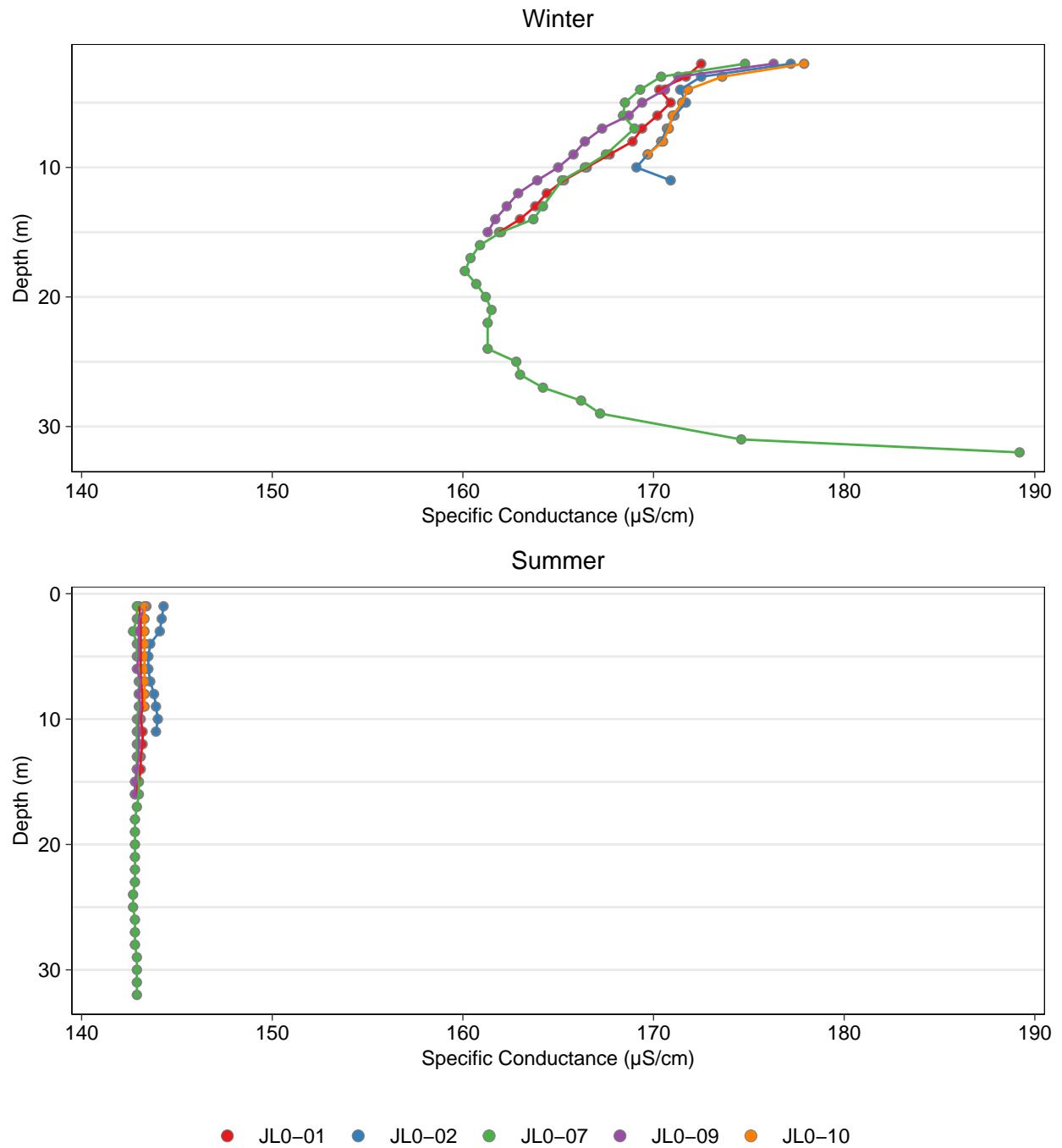
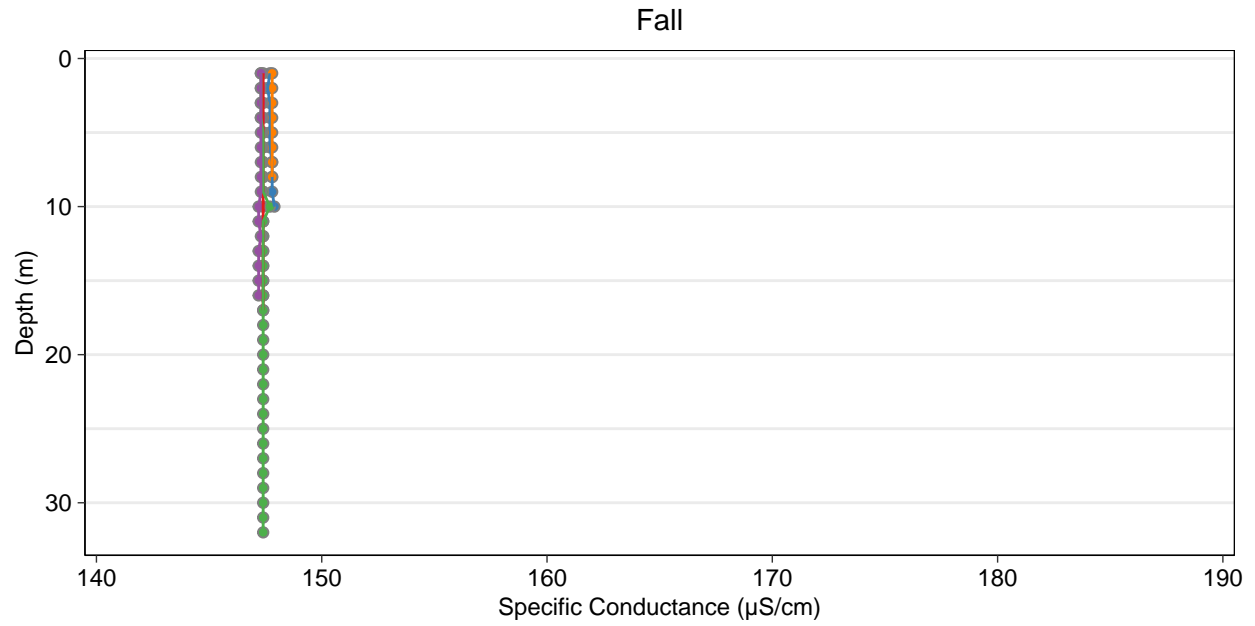


Figure C.7: Vertical Profiles of Specific Conductance ($\mu\text{S/cm}$) Measured at Camp Lake (JL0) Compared in Winter, Summer, and Fall, Mary River Project CREMP, 2024



● JL0-01 ● JL0-02 ● JL0-07 ● JL0-09 ● JL0-10

Figure C.7: Vertical Profiles of Specific Conductance ($\mu\text{S}/\text{cm}$) Measured at Camp Lake (JL0) Compared in Winter, Summer, and Fall, Mary River Project CREMP, 2024

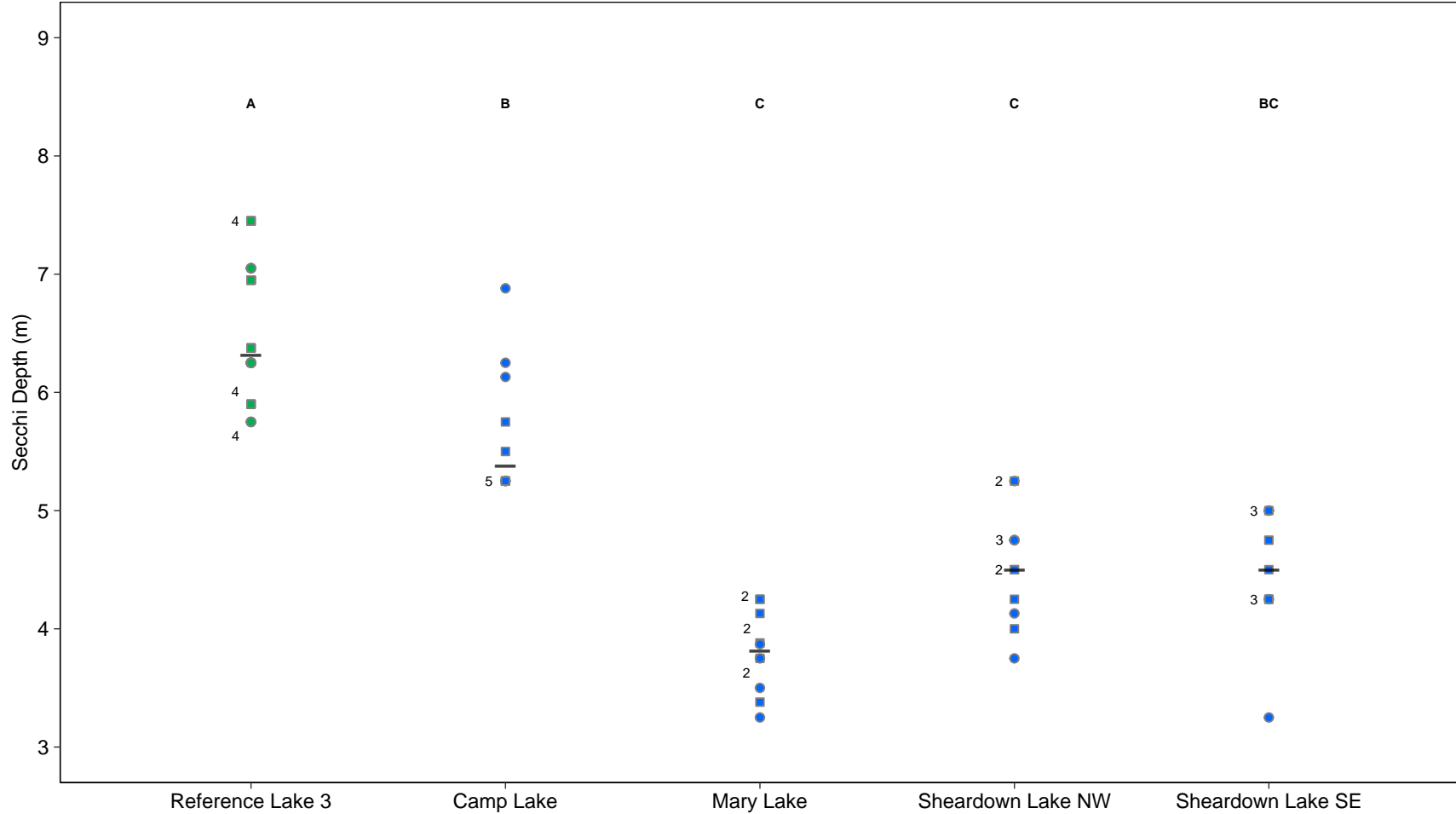


Figure C.8: Comparison of Secchi Depth Measured at Lake Benthic Invertebrate Community (BIC) Stations, Mary River Project CREMP, August 2024

Notes: Green represents reference stations and blue represents mine-exposed stations. Areas that share a letter do not differ significantly (p – value = 0.05). Bars indicate measures of central tendency of the statistical tests. Numbers indicate the number of overlapping points.

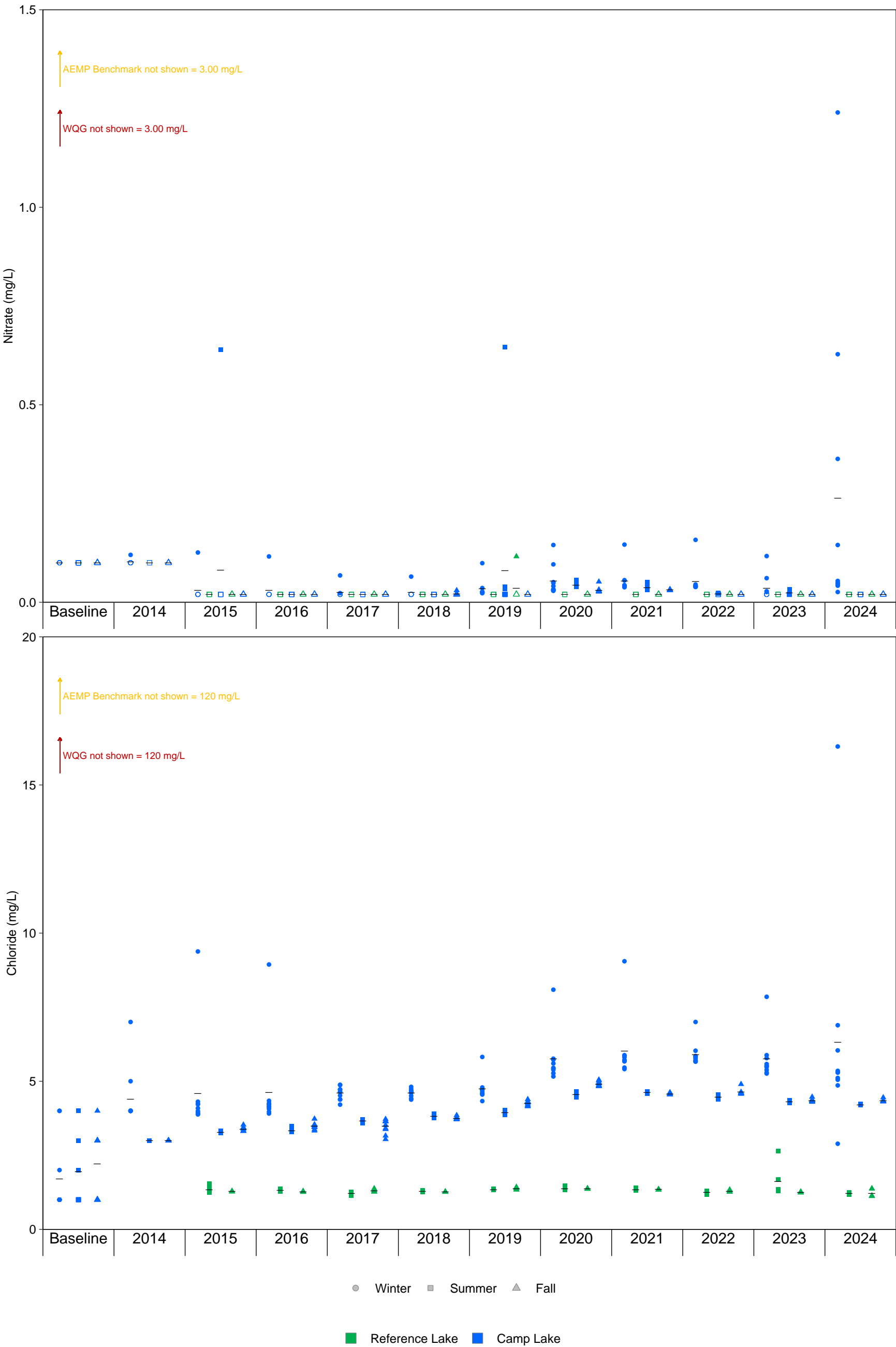


Figure C.9: Temporal Comparison of Water Chemistry at Camp Lake (JL0) Over Mine Baseline (2006 to 2013), Construction (2014), and Operational (2015 to 2024) Periods, Mary River Project CREMP

Notes: Concentrations below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL and the open symbol represents one or more values reported below the LRL. Red lines indicate Water Quality Guidelines, some of which are dependent on concurrent hardness values; orange lines indicate AEMP Benchmarks. For each station, a concentration is provided for each of the bottom and the surface of the water column.

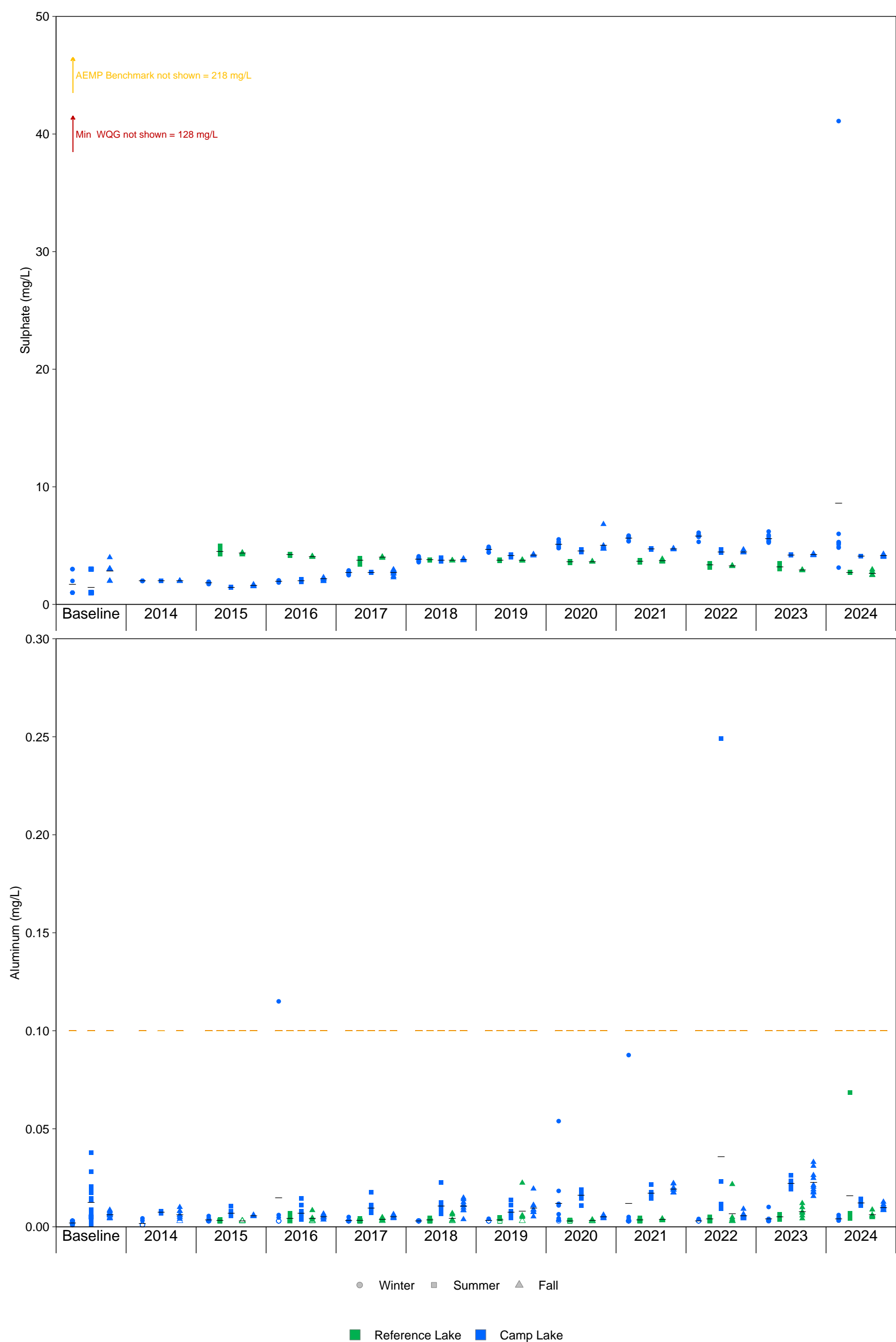


Figure C.9: Temporal Comparison of Water Chemistry at Camp Lake (JL0) Over Mine Baseline (2006 to 2013), Construction (2014), and Operational (2015 to 2024) Periods, Mary River Project CREMP

Notes: Concentrations below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL and the open symbol represents one or more values reported below the LRL. Red lines indicate Water Quality Guidelines, some of which are dependent on concurrent hardness values; orange lines indicate AEMP Benchmarks. For each station, a concentration is provided for each of the bottom and the surface of the water column.

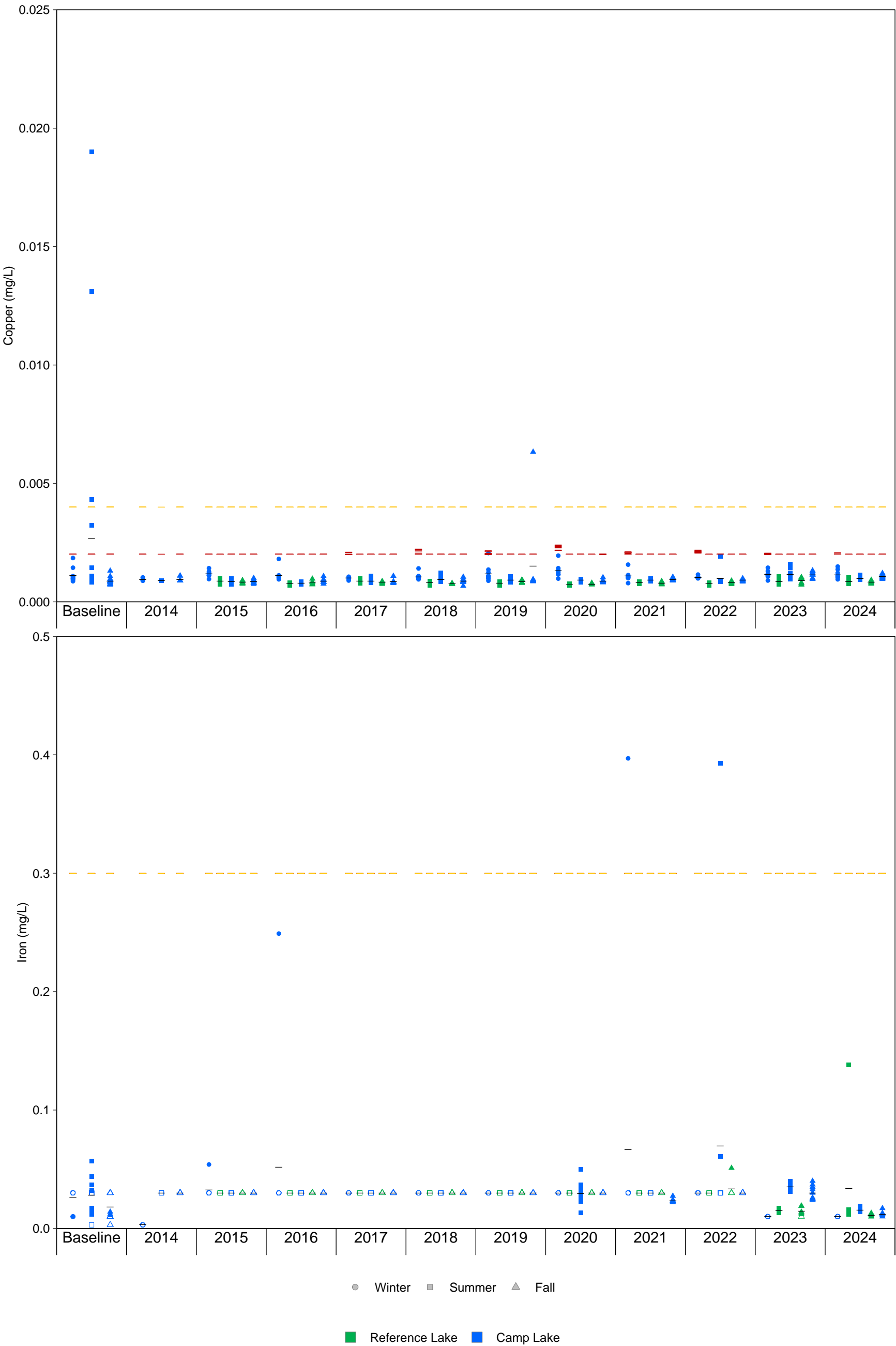


Figure C.9: Temporal Comparison of Water Chemistry at Camp Lake (JL0) Over Mine Baseline (2006 to 2013), Construction (2014), and Operational (2015 to 2024) Periods, Mary River Project CREMP

Notes: Concentrations below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL and the open symbol represents one or more values reported below the LRL. Red lines indicate Water Quality Guidelines, some of which are dependent on concurrent hardness values; orange lines indicate AEMP Benchmarks. For each station, a concentration is provided for each of the bottom and the surface of the water column.

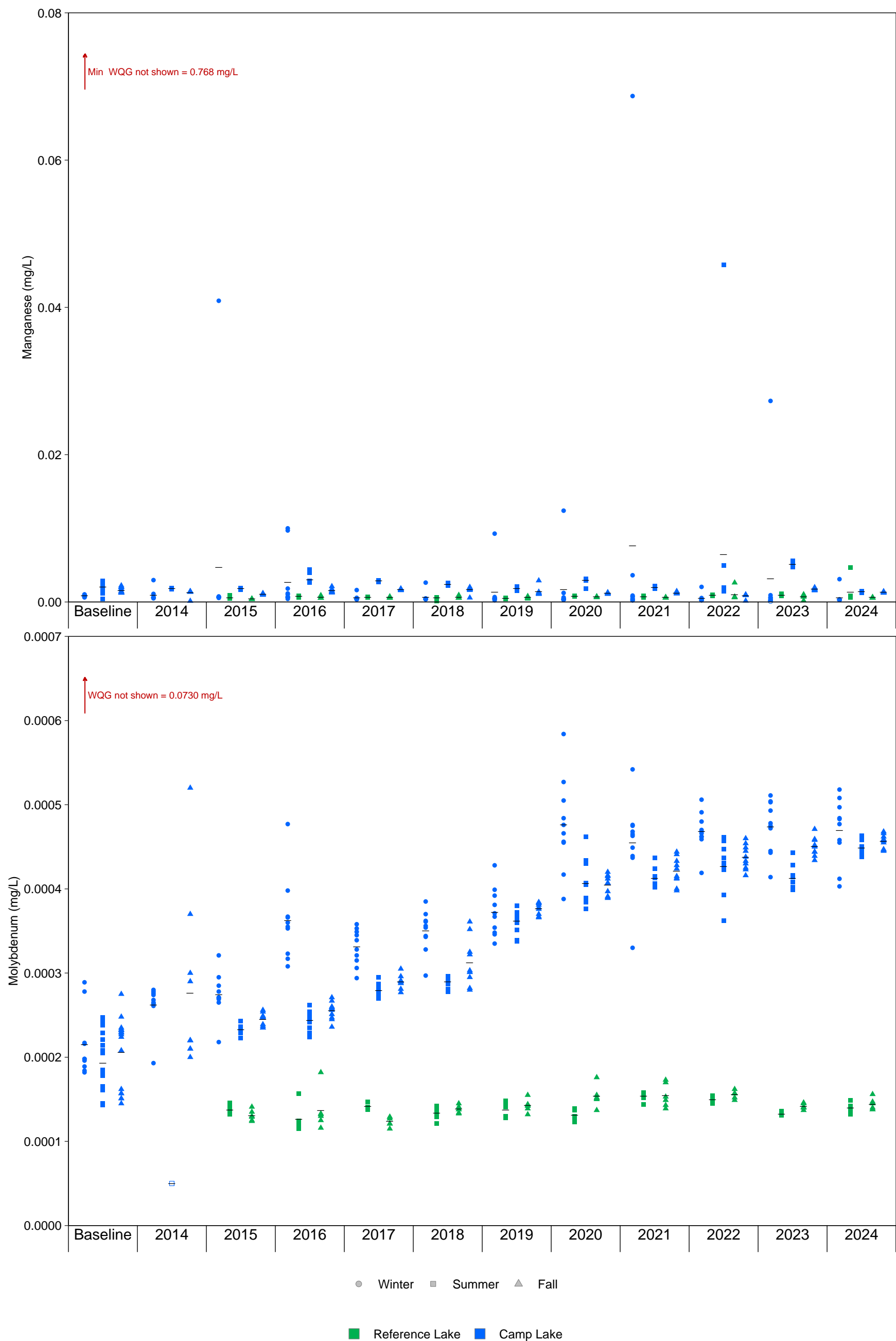


Figure C.9: Temporal Comparison of Water Chemistry at Camp Lake (JL0) Over Mine Baseline (2006 to 2013), Construction (2014), and Operational (2015 to 2024) Periods, Mary River Project CREMP

Notes: Concentrations below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL and the open symbol represents one or more values reported below the LRL. Red lines indicate Water Quality Guidelines, some of which are dependent on concurrent hardness values; orange lines indicate AEMP Benchmarks. For each station, a concentration is provided for each of the bottom and the surface of the water column.

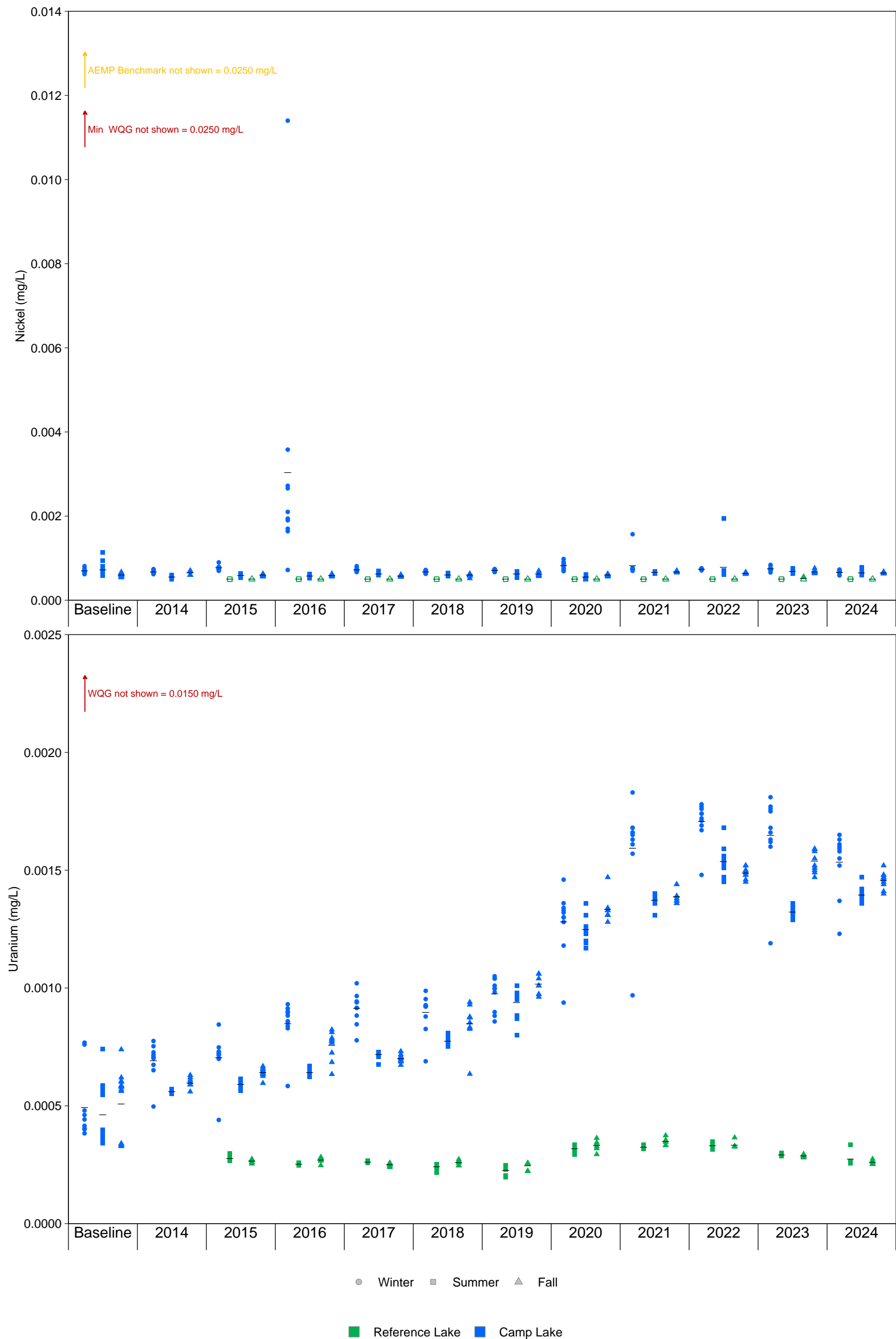


Figure C.9: Temporal Comparison of Water Chemistry at Camp Lake (JL0) Over Mine Baseline (2006 to 2013), Construction (2014), and Operational (2015 to 2024) Periods, Mary River Project CREMP

Notes: Concentrations below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL and the open symbol represents one or more values reported below the LRL. Red lines indicate Water Quality Guidelines, some of which are dependent on concurrent hardness values; orange lines indicate AEMP Benchmarks. For each station, a concentration is provided for each of the bottom and the surface of the water column.

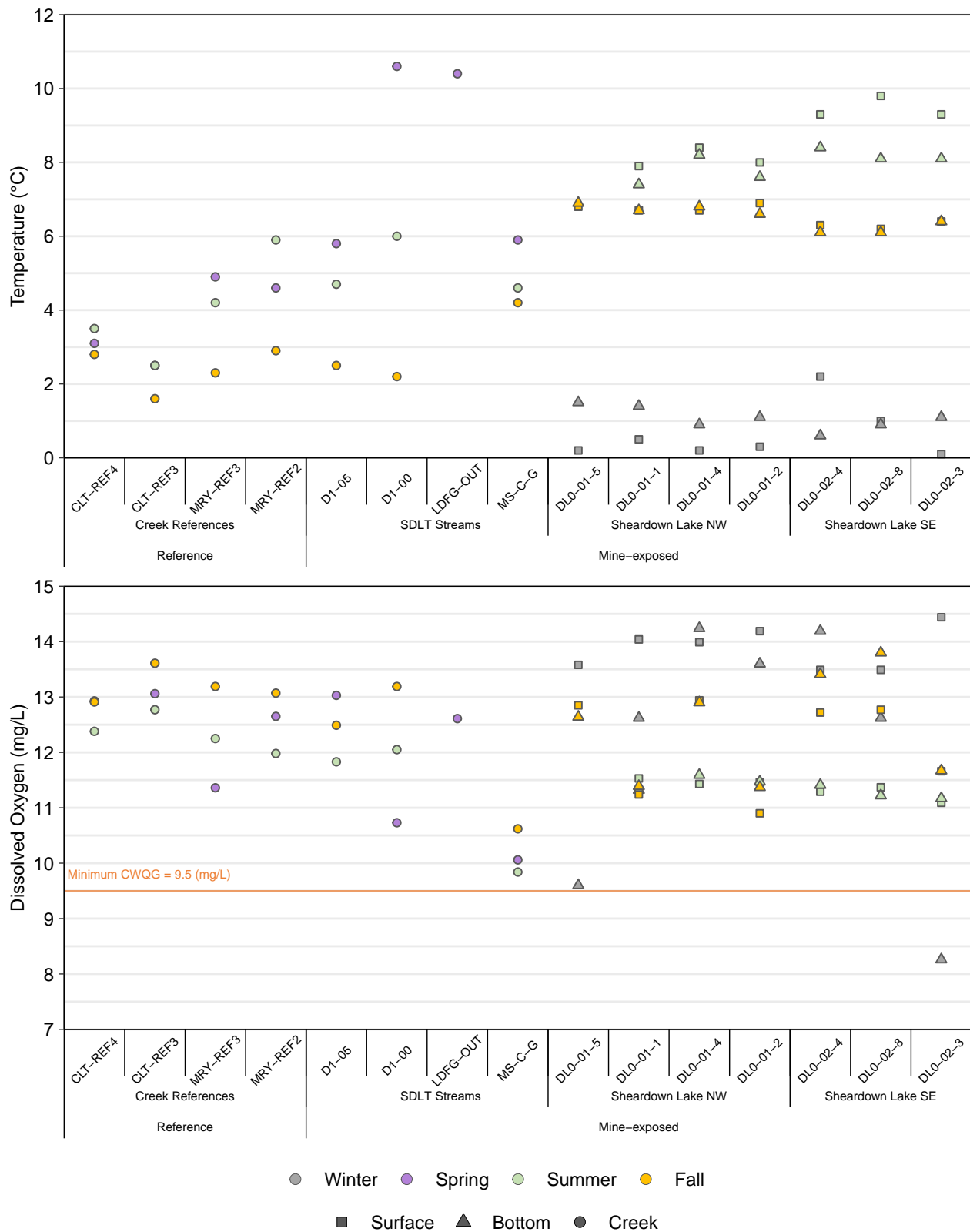


Figure C.10: Comparison of *In Situ* Water Quality Measured at Sheardown Lake System Water Quality Monitoring Stations in Winter, Spring, Summer, and Fall, Mary River Project CREMP, 2024

Notes: Streams were not sampled in winter. Lakes were not sampled in spring.

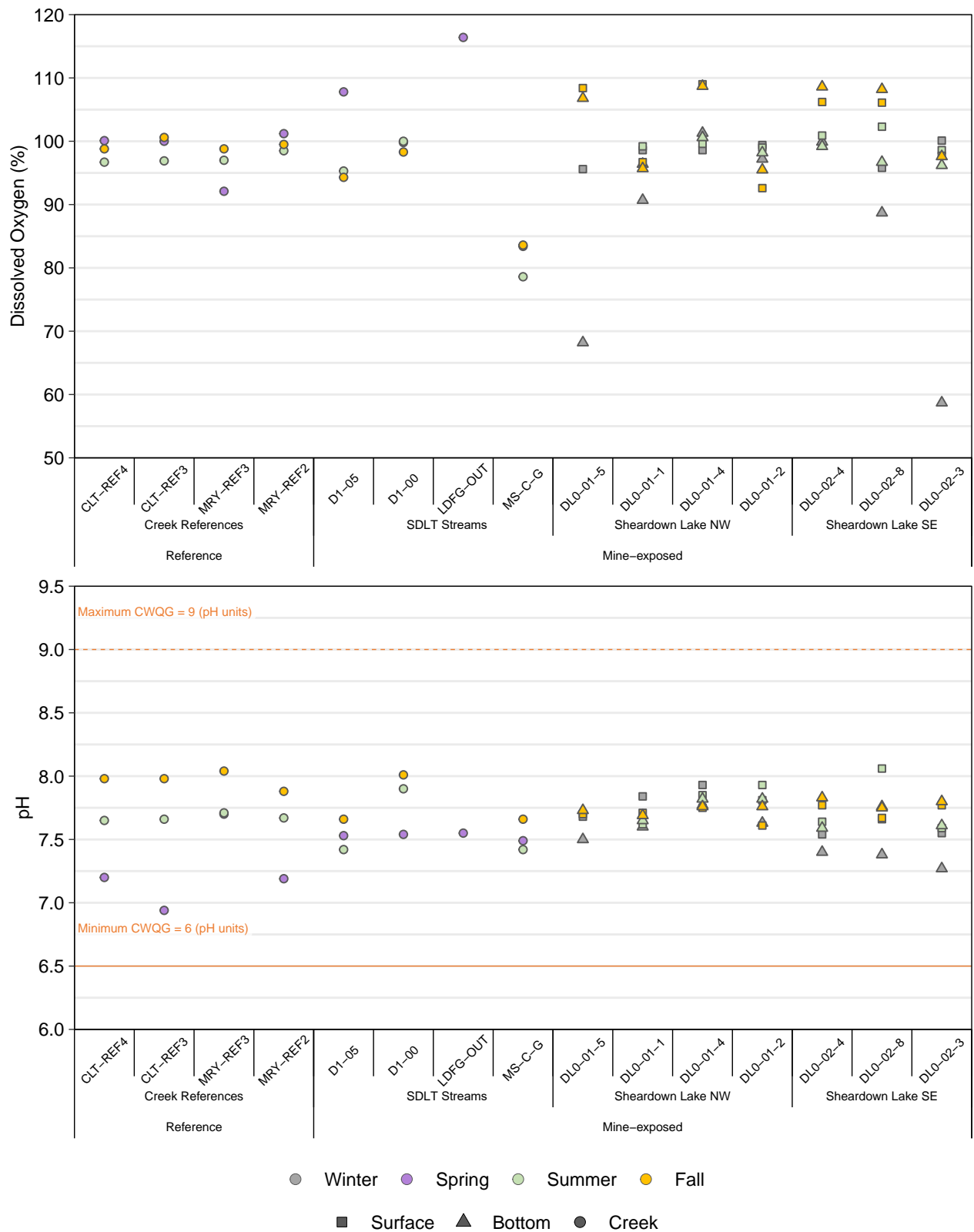


Figure C.10: Comparison of *In Situ* Water Quality Measured at Sheardown Lake System Water Quality Monitoring Stations in Winter, Spring, Summer, and Fall, Mary River Project CREMP, 2024

Notes: Streams were not sampled in winter. Lakes were not sampled in spring.

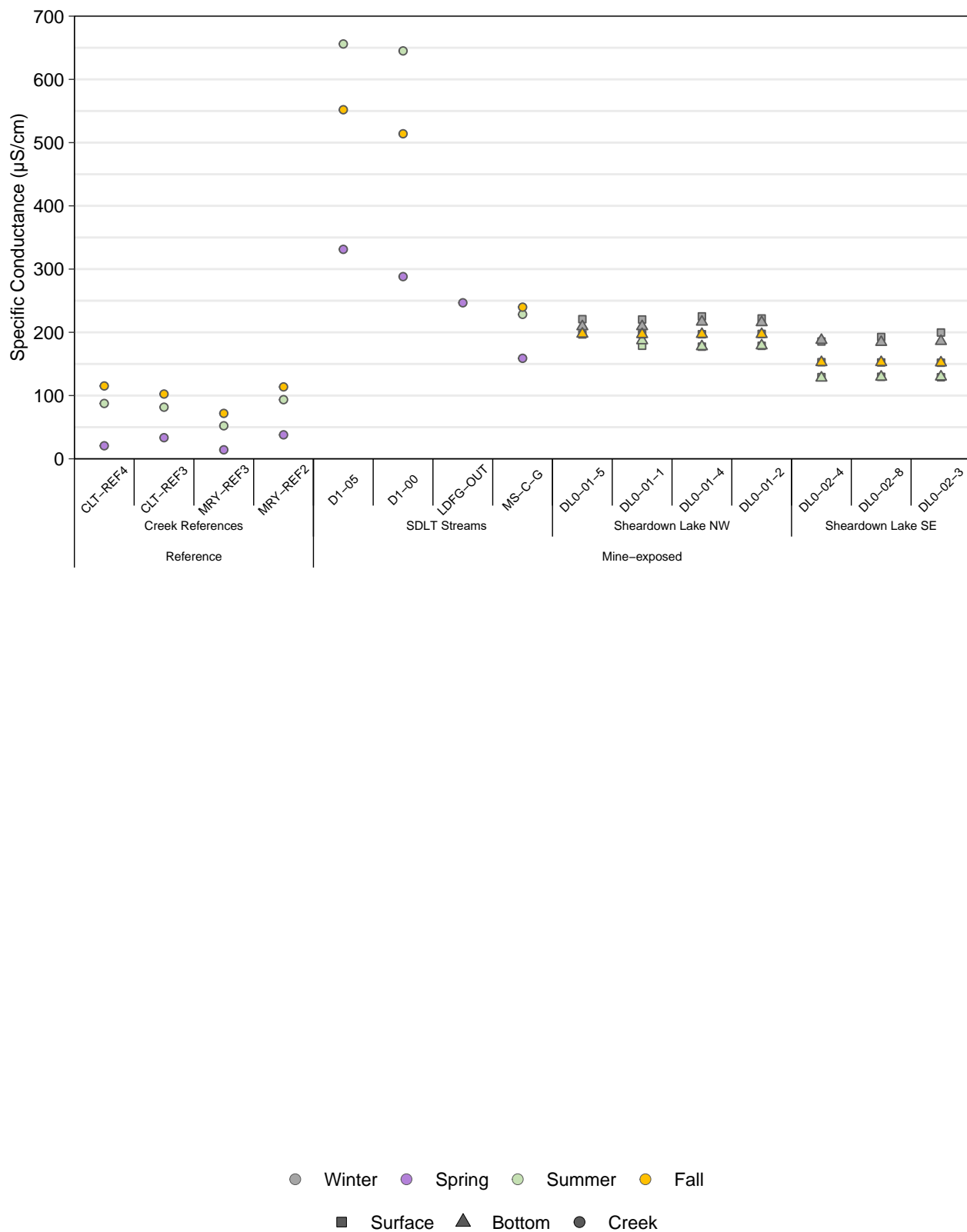


Figure C.10: Comparison of *In Situ* Water Quality Measured at Sheardown Lake System Water Quality Monitoring Stations in Winter, Spring, Summer, and Fall, Mary River Project CREMP, 2024

Notes: Streams were not sampled in winter. Lakes were not sampled in spring.

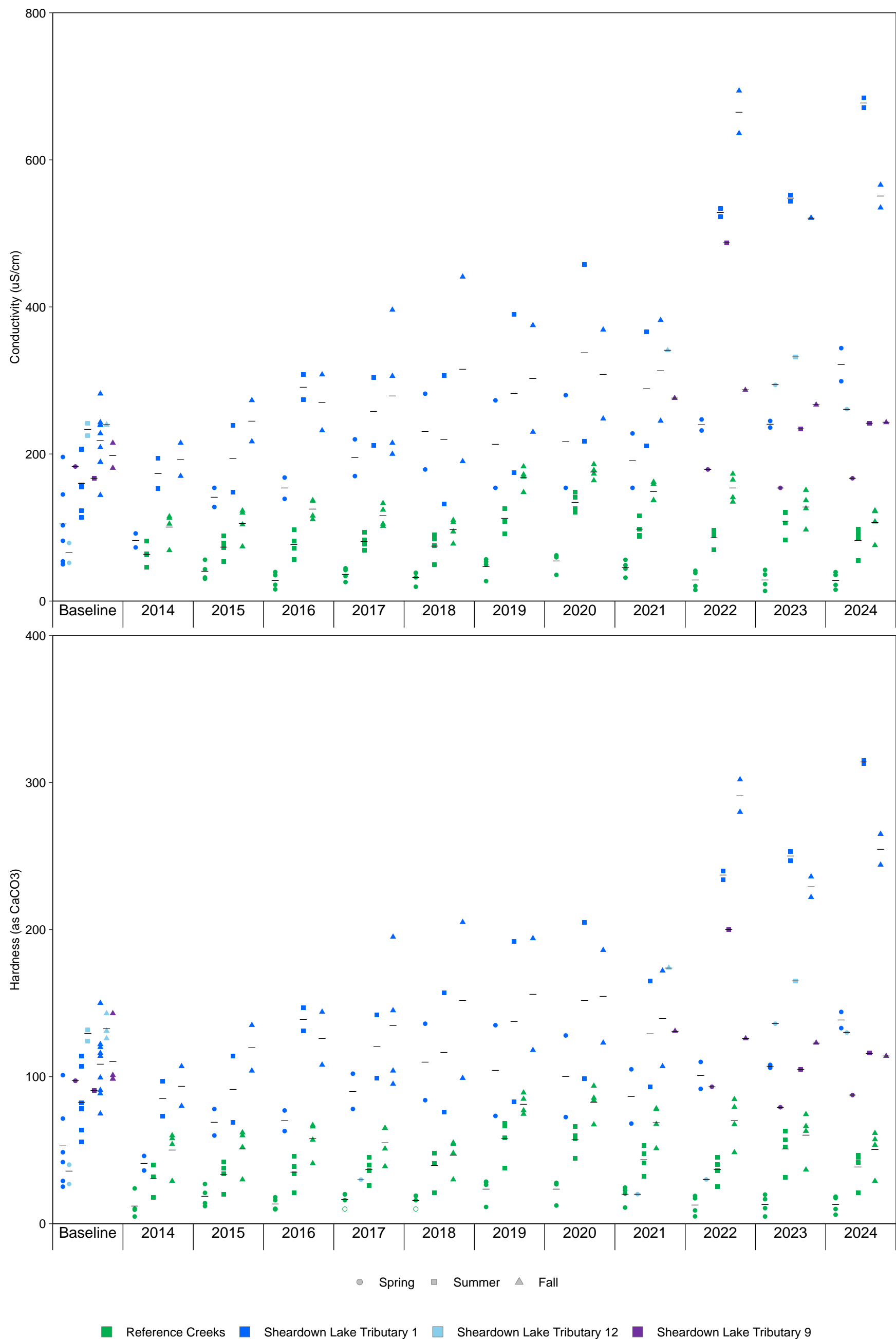


Figure C.11: Temporal Comparison of Water Chemistry at the Sheardown Lake Tributaries (SDLT1, SDLT12, SDLT9) Over Mine Baseline (2006 to 2013) and Operations (2015 to 2024) Periods, Mary River Project CREMP

Notes: Concentrations below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL and the open symbol represents one or more values reported below the LRL. Red lines indicate Water Quality Guidelines, some of which are dependent on concurrent hardness values; orange lines indicate AEMP Benchmarks. Black bars indicate mean concentrations for the corresponding data. Sheardown Lake Tributary 12 (SDLT12/ LDFG-OUT) and Sheardown Lake Tributary 9 (SDLT9/MS-C-G) stations were added to the CREMP in fall 2021.

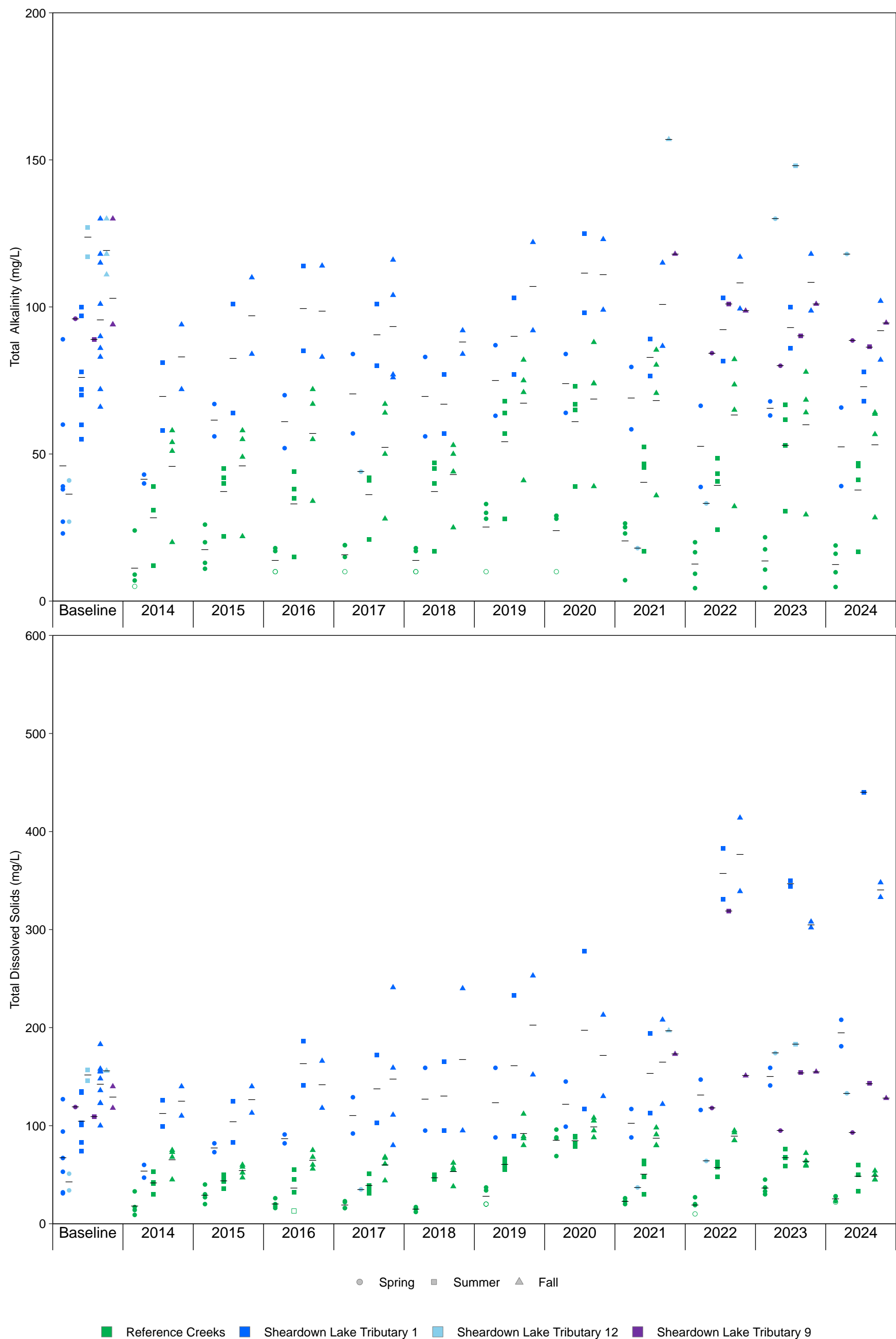


Figure C.11: Temporal Comparison of Water Chemistry at the Sheardown Lake Tributaries (SDLT1, SDLT12, SDLT9) Over Mine Baseline (2006 to 2013) and Operations (2015 to 2024) Periods, Mary River Project CREMP

Notes: Concentrations below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL and the open symbol represents one or more values reported below the LRL. Red lines indicate Water Quality Guidelines, some of which are dependent on concurrent hardness values; orange lines indicate AEMP Benchmarks. Black bars indicate mean concentrations for the corresponding data. Sheardown Lake Tributary 12 (SDLT12/ LDFG-OUT) and Sheardown Lake Tributary 9 (SDLT9/MS-C-G) stations were added to the CREMP in fall 2021.

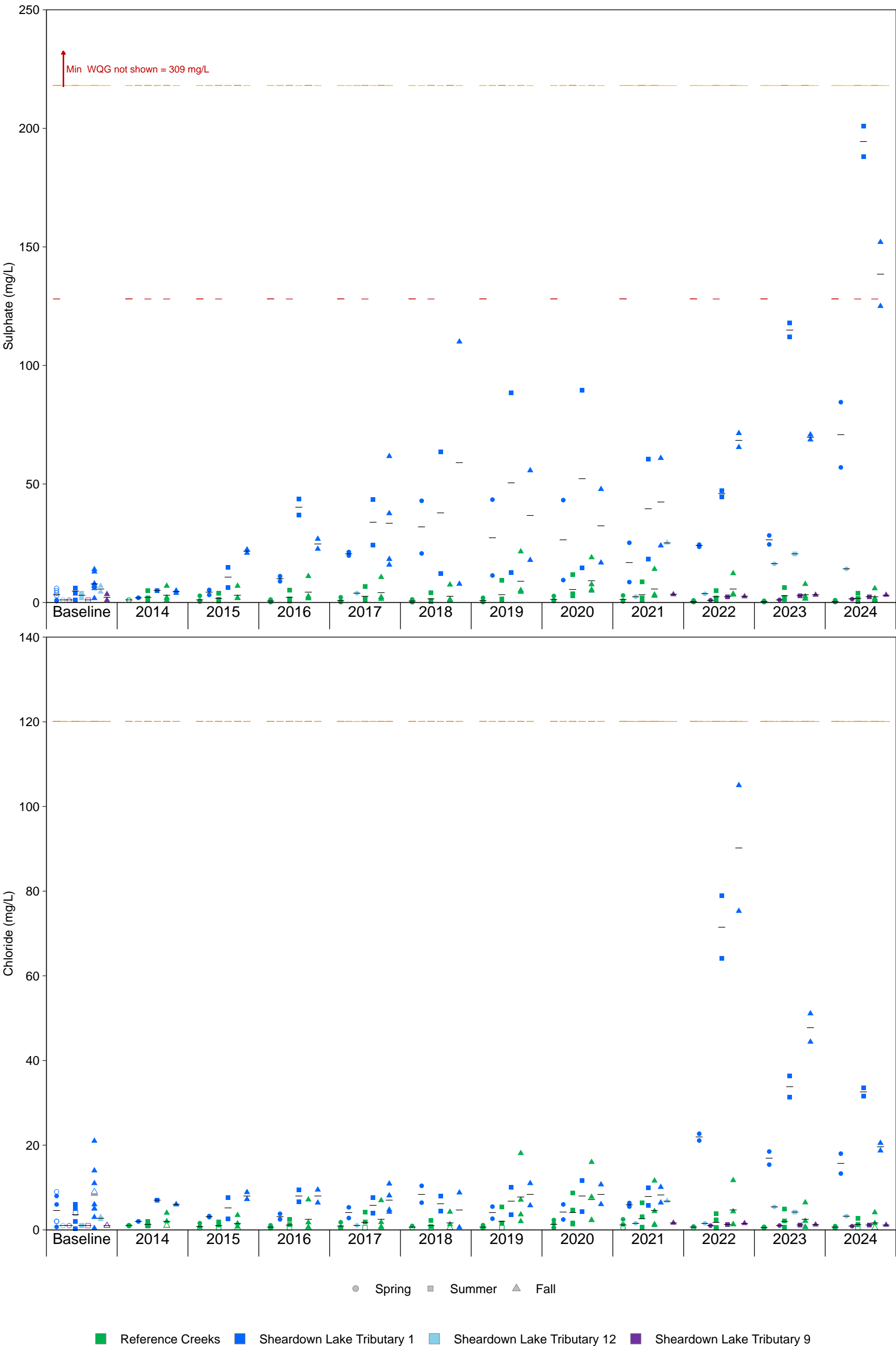


Figure C.11: Temporal Comparison of Water Chemistry at the Sheardown Lake Tributaries (SDLT1, SDLT12, SDLT9) Over Mine Baseline (2006 to 2013) and Operations (2015 to 2024) Periods, Mary River Project CREMP

Notes: Concentrations below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL and the open symbol represents one or more values reported below the LRL. Red lines indicate Water Quality Guidelines, some of which are dependent on concurrent hardness values; orange lines indicate AEMP Benchmarks. Black bars indicate mean concentrations for the corresponding data. Sheardown Lake Tributary 12 (SDLT12/ LDFG-OUT) and Sheardown Lake Tributary 9 (SDLT9/MS-C-G) stations were added to the CREMP in fall 2021.

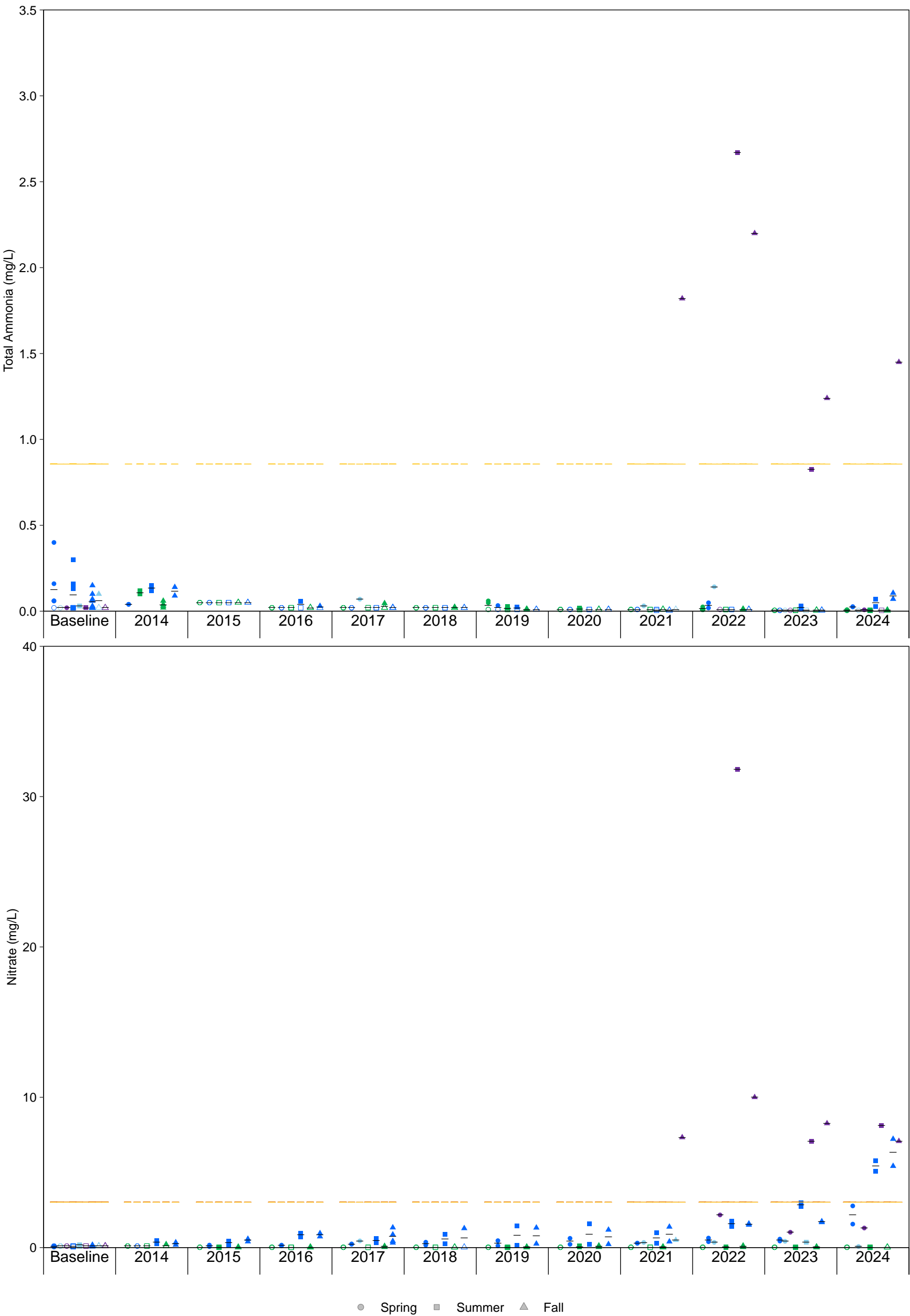


Figure C.11: Temporal Comparison of Water Chemistry at the Sheardown Lake Tributaries (SDLT1, SDLT12, SDLT9) Over Mine Baseline (2006 to 2013) and Operations (2015 to 2024) Periods, Mary River Project CREMP

Notes: Concentrations below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL and the open symbol represents one or more values reported below the LRL. Red lines indicate Water Quality Guidelines, some of which are dependent on concurrent hardness values; orange lines indicate AEMP Benchmarks. Black bars indicate mean concentrations for the corresponding data. Sheardown Lake Tributary 12 (SDLT12/ LDFG-OUT) and Sheardown Lake Tributary 9 (SDLT9/MS-C-G) stations were added to the CREMP in fall 2021.

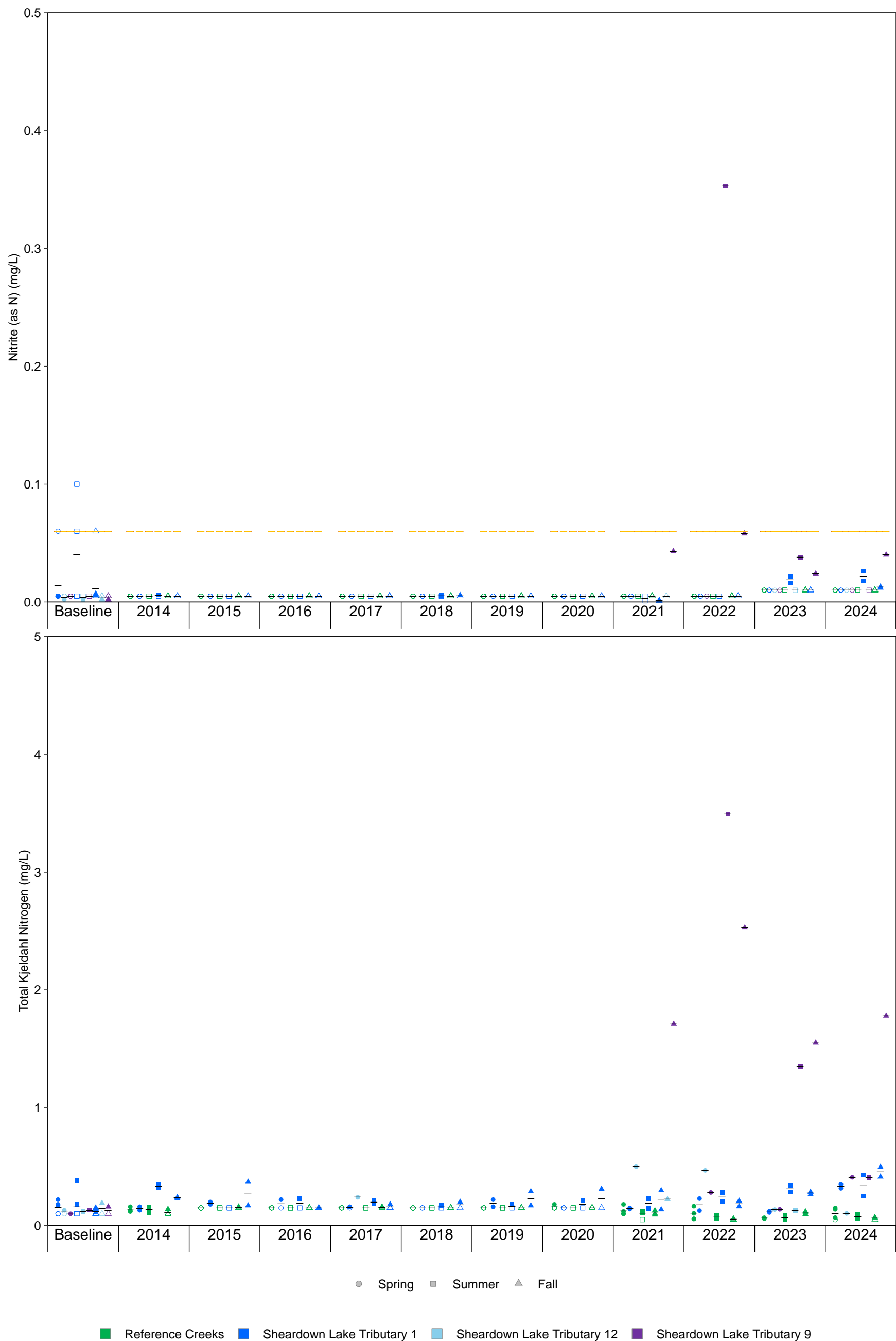


Figure C.11: Temporal Comparison of Water Chemistry at the Sheardown Lake Tributaries (SDLT1, SDLT12, SDLT9) Over Mine Baseline (2006 to 2013) and Operations (2015 to 2024) Periods, Mary River Project CREMP

Notes: Concentrations below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL and the open symbol represents one or more values reported below the LRL. Red lines indicate Water Quality Guidelines, some of which are dependent on concurrent hardness values; orange lines indicate AEMP Benchmarks. Black bars indicate mean concentrations for the corresponding data. Sheardown Lake Tributary 12 (SDLT12/ LDFG-OUT) and Sheardown Lake Tributary 9 (SDLT9/MS-C-G) stations were added to the CREMP in fall 2021.

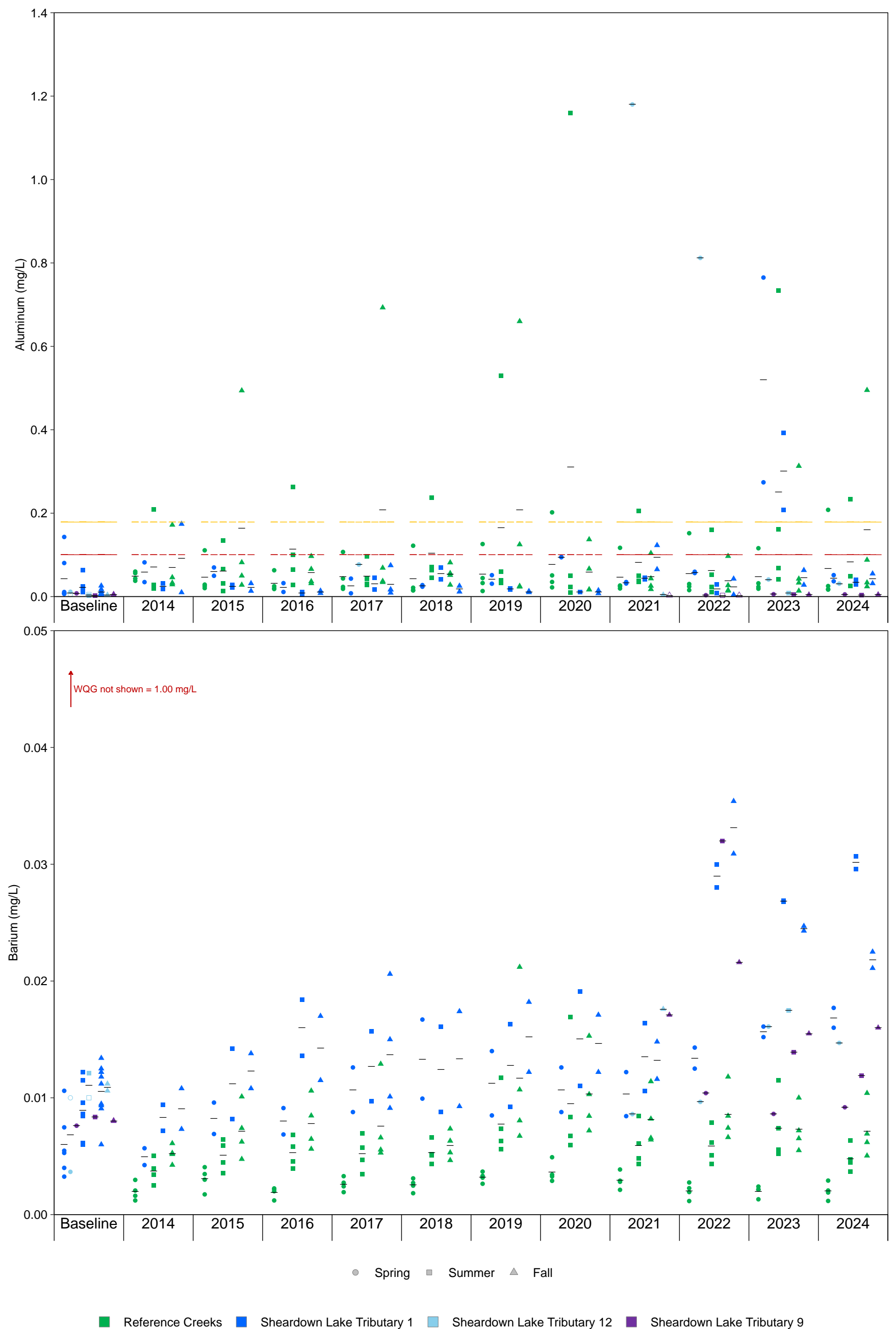


Figure C.11: Temporal Comparison of Water Chemistry at the Sheardown Lake Tributaries (SDLT1, SDLT12, SDLT9) Over Mine Baseline (2006 to 2013) and Operations (2015 to 2024) Periods, Mary River Project CREMP

Notes: Concentrations below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL and the open symbol represents one or more values reported below the LRL. Red lines indicate Water Quality Guidelines, some of which are dependent on concurrent hardness values; orange lines indicate AEMP Benchmarks. Black bars indicate mean concentrations for the corresponding data. Sheardown Lake Tributary 12 (SDLT12/ LDFG-OUT) and Sheardown Lake Tributary 9 (SDLT9/MS-C-G) stations were added to the CREMP in fall 2021.

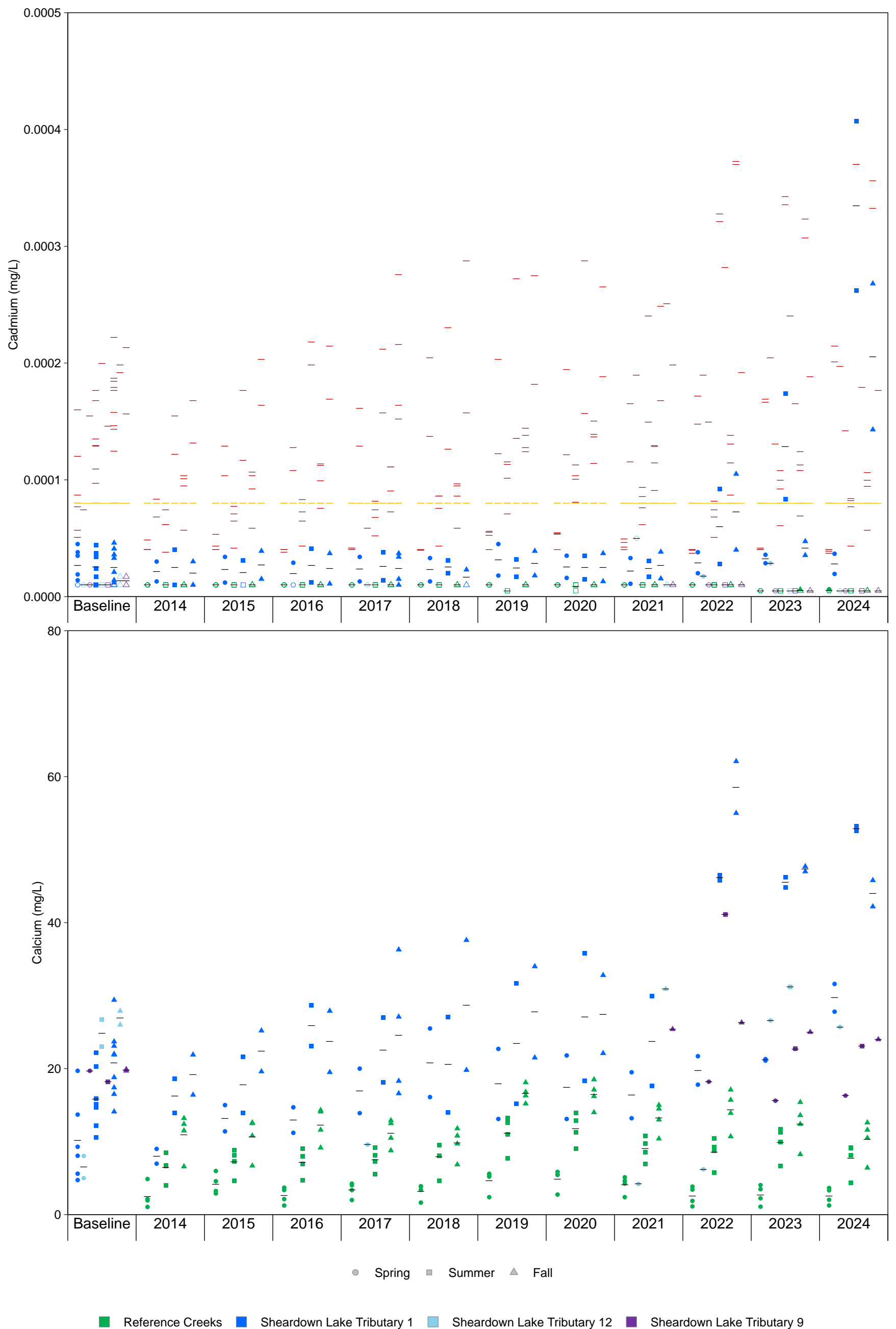


Figure C.11: Temporal Comparison of Water Chemistry at the Sheardown Lake Tributaries (SDLT1, SDLT12, SDLT9) Over Mine Baseline (2006 to 2013) and Operations (2015 to 2024) Periods, Mary River Project CREMP

Notes: Concentrations below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL and the open symbol represents one or more values reported below the LRL. Red lines indicate Water Quality Guidelines, some of which are dependent on concurrent hardness values; orange lines indicate AEMP Benchmarks. Black bars indicate mean concentrations for the corresponding data. Sheardown Lake Tributary 12 (SDLT12/ LDFG-OUT) and Sheardown Lake Tributary 9 (SDLT9/MS-C-G) stations were added to the CREMP in fall 2021.

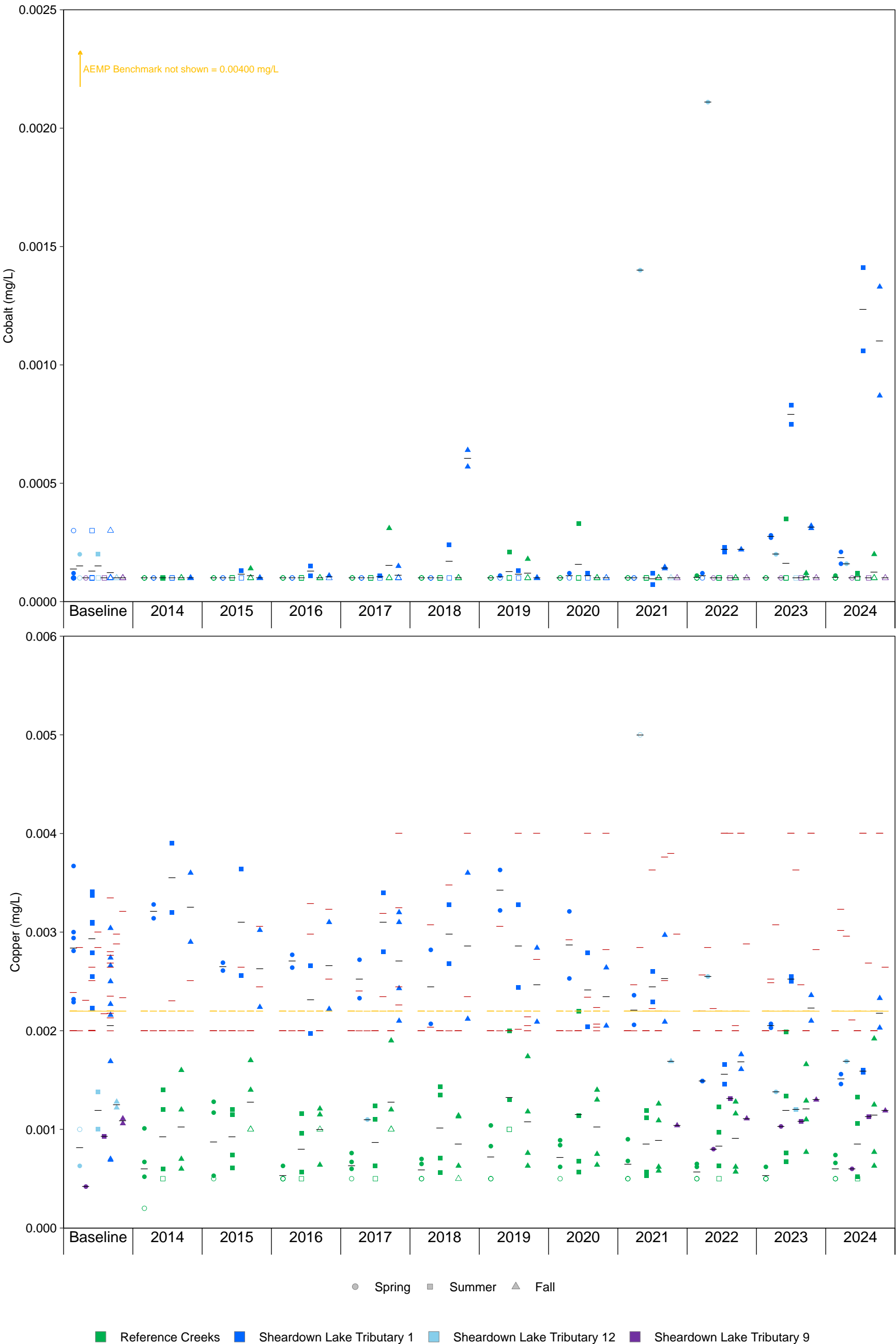


Figure C.11: Temporal Comparison of Water Chemistry at the Sheardown Lake Tributaries (SDLT1, SDLT12, SDLT9) Over Mine Baseline (2006 to 2013) and Operations (2015 to 2024) Periods, Mary River Project CREMP

Notes: Concentrations below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL and the open symbol represents one or more values reported below the LRL. Red lines indicate Water Quality Guidelines, some of which are dependent on concurrent hardness values; orange lines indicate AEMP Benchmarks. Black bars indicate mean concentrations for the corresponding data. Sheardown Lake Tributary 12 (SDLT12/ LDFG-OUT) and Sheardown Lake Tributary 9 (SDLT9/MS-C-G) stations were added to the CREMP in fall 2021.

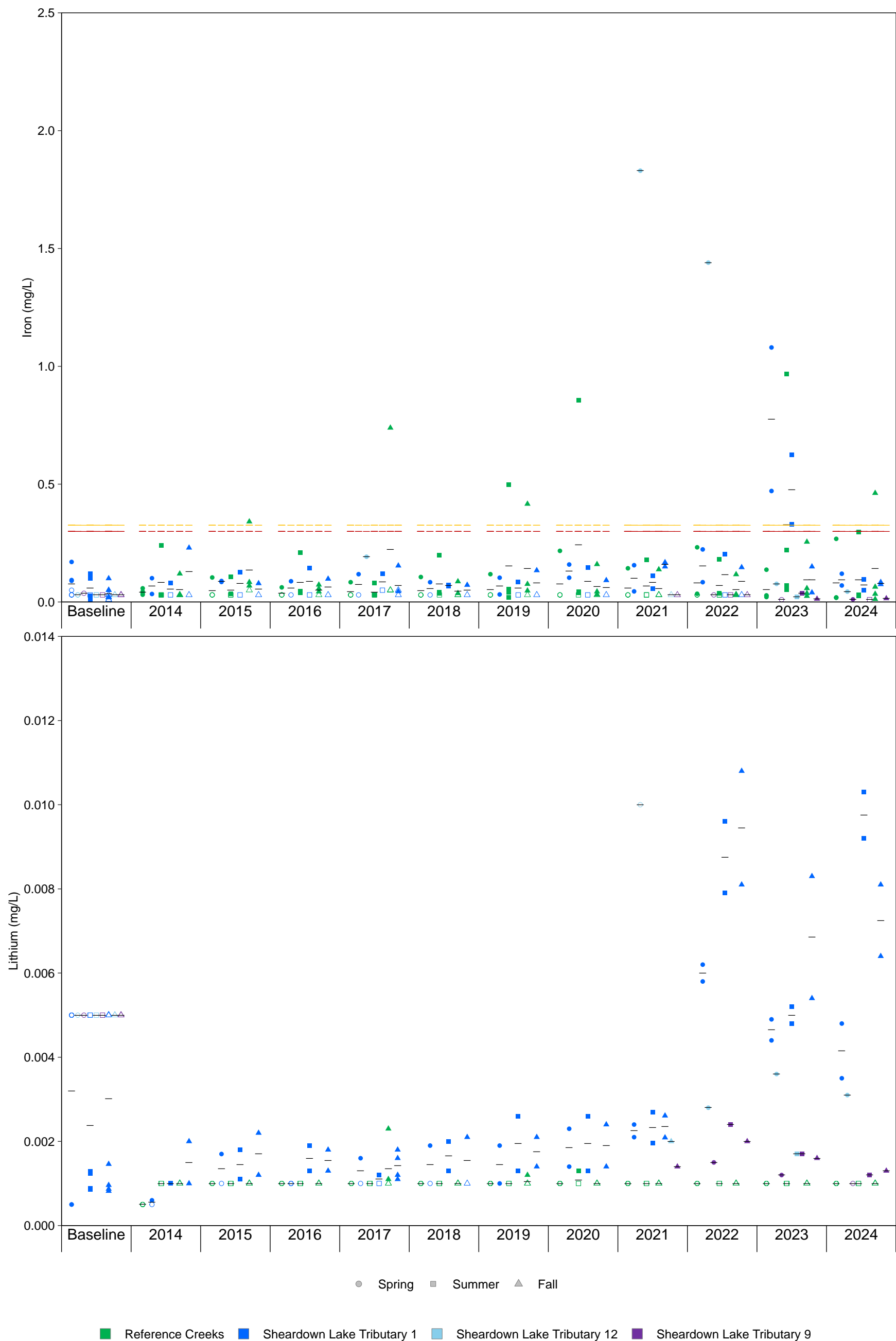


Figure C.11: Temporal Comparison of Water Chemistry at the Sheardown Lake Tributaries (SDLT1, SDLT12, SDLT9) Over Mine Baseline (2006 to 2013) and Operations (2015 to 2024) Periods, Mary River Project CREMP

Notes: Concentrations below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL and the open symbol represents one or more values reported below the LRL. Red lines indicate Water Quality Guidelines, some of which are dependent on concurrent hardness values; orange lines indicate AEMP Benchmarks. Black bars indicate mean concentrations for the corresponding data. Sheardown Lake Tributary 12 (SDLT12/ LDFG-OUT) and Sheardown Lake Tributary 9 (SDLT9/MS-C-G) stations were added to the CREMP in fall 2021.

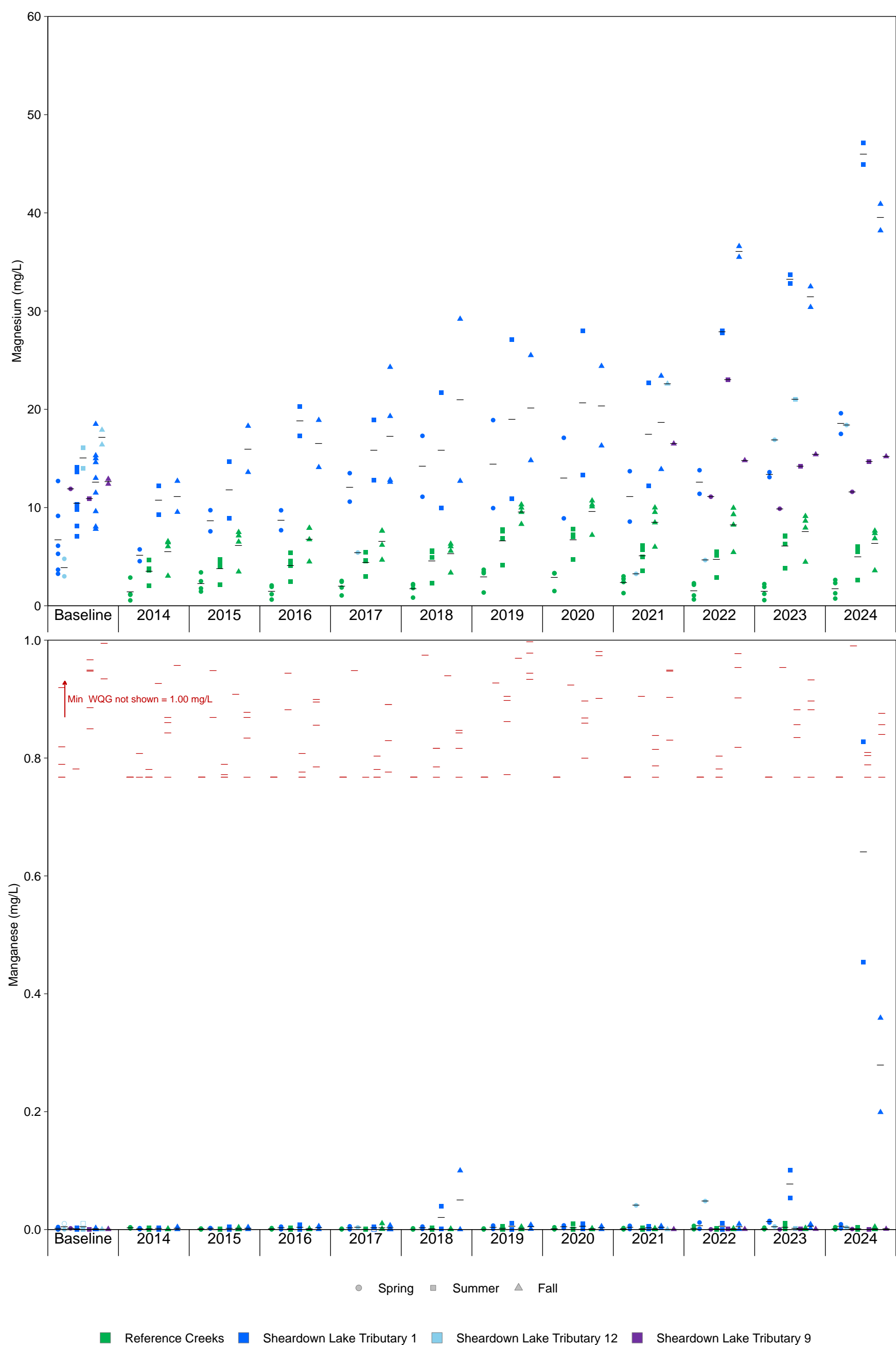


Figure C.11: Temporal Comparison of Water Chemistry at the Sheardown Lake Tributaries (SDLT1, SDLT12, SDLT9) Over Mine Baseline (2006 to 2013) and Operations (2015 to 2024) Periods, Mary River Project CREMP

Notes: Concentrations below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL and the open symbol represents one or more values reported below the LRL. Red lines indicate Water Quality Guidelines, some of which are dependent on concurrent hardness values; orange lines indicate AEMP Benchmarks. Black bars indicate mean concentrations for the corresponding data. Sheardown Lake Tributary 12 (SDLT12/ LDFG-OUT) and Sheardown Lake Tributary 9 (SDLT9/MS-C-G) stations were added to the CREMP in fall 2021.

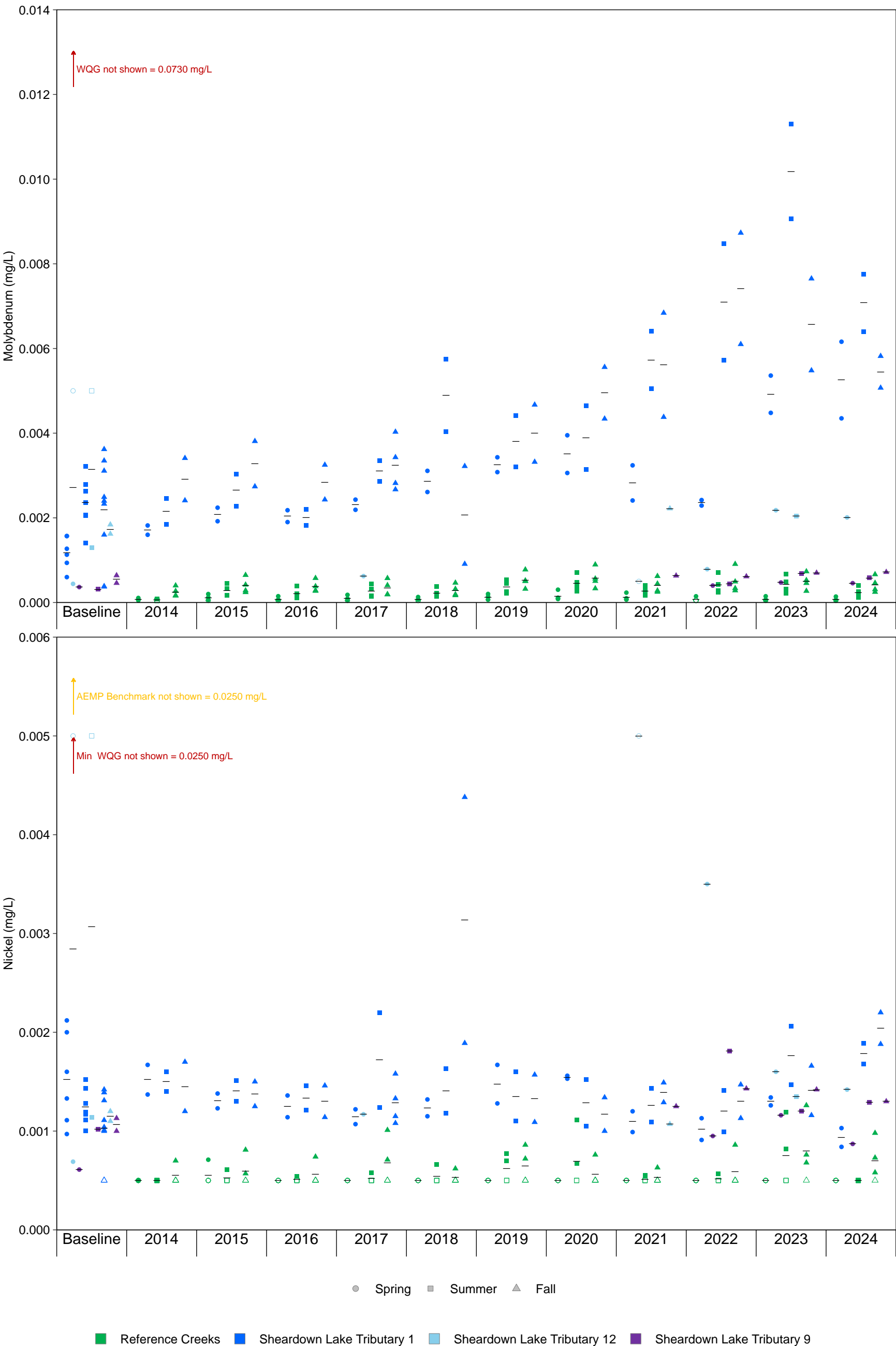


Figure C.11: Temporal Comparison of Water Chemistry at the Sheardown Lake Tributaries (SDLT1, SDLT12, SDLT9) Over Mine Baseline (2006 to 2013) and Operations (2015 to 2024) Periods, Mary River Project CREMP

Notes: Concentrations below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL and the open symbol represents one or more values reported below the LRL. Red lines indicate Water Quality Guidelines, some of which are dependent on concurrent hardness values; orange lines indicate AEMP Benchmarks. Black bars indicate mean concentrations for the corresponding data. Sheardown Lake Tributary 12 (SDLT12/ LDFG-OUT) and Sheardown Lake Tributary 9 (SDLT9/MS-C-G) stations were added to the CREMP in fall 2021.

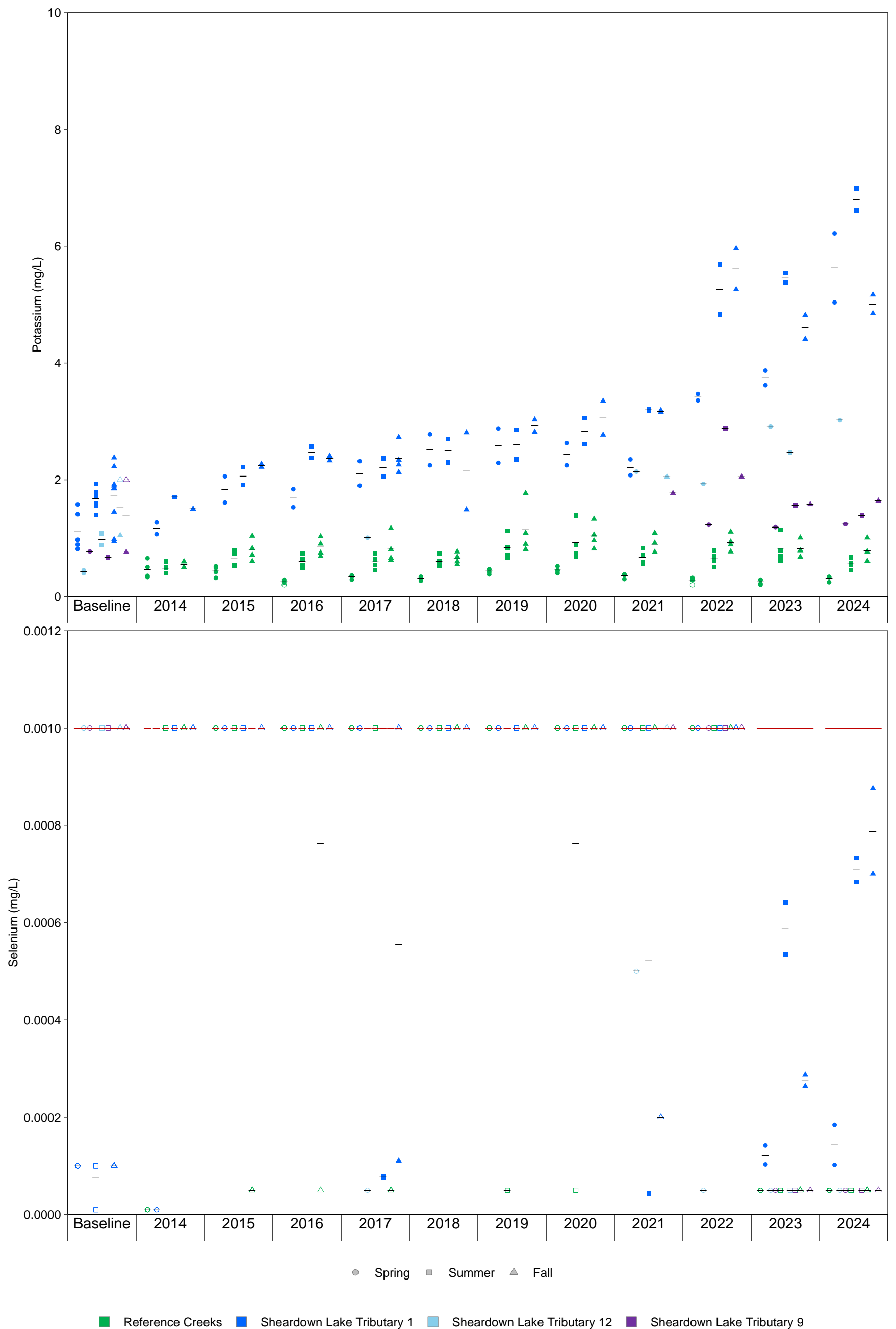


Figure C.11: Temporal Comparison of Water Chemistry at the Sheardown Lake Tributaries (SDLT1, SDLT12, SDLT9) Over Mine Baseline (2006 to 2013) and Operations (2015 to 2024) Periods, Mary River Project CREMP

Notes: Concentrations below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL and the open symbol represents one or more values reported below the LRL. Red lines indicate Water Quality Guidelines, some of which are dependent on concurrent hardness values; orange lines indicate AEMP Benchmarks. Black bars indicate mean concentrations for the corresponding data. Sheardown Lake Tributary 12 (SDLT12/ LDFG-OUT) and Sheardown Lake Tributary 9 (SDLT9/MS-C-G) stations were added to the CREMP in fall 2021.

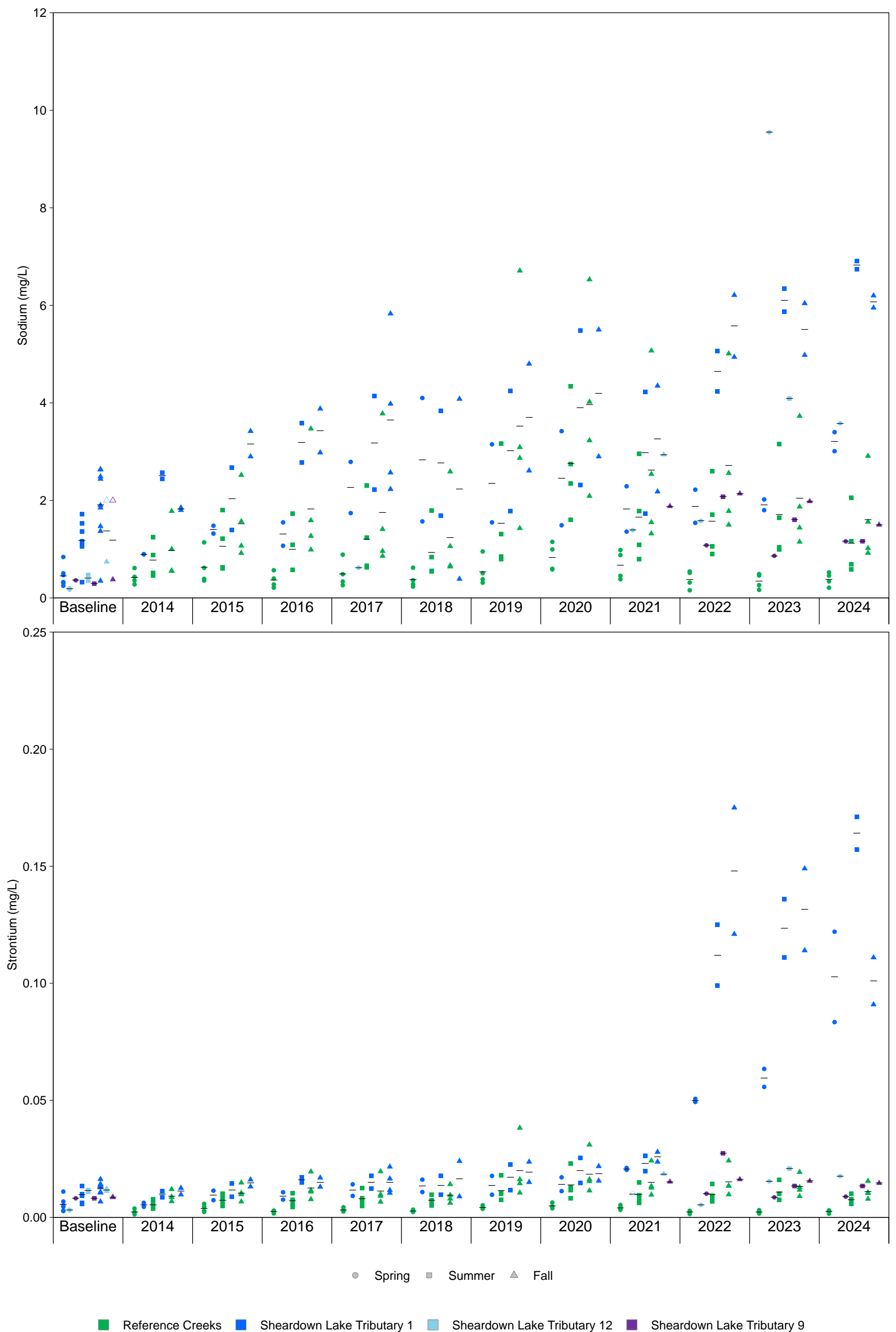


Figure C.11: Temporal Comparison of Water Chemistry at the Sheardown Lake Tributaries (SDLT1, SDLT12, SDLT9) Over Mine Baseline (2006 to 2013) and Operations (2015 to 2024) Periods, Mary River Project CREMP

Notes: Concentrations below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL and the open symbol represents one or more values reported below the LRL. Red lines indicate Water Quality Guidelines, some of which are dependent on concurrent hardness values; orange lines indicate AEMP Benchmarks. Black bars indicate mean concentrations for the corresponding data. Sheardown Lake Tributary 12 (SDLT12/ LDFG-OUT) and Sheardown Lake Tributary 9 (SDLT9/MS-C-G) stations were added to the CREMP in fall 2021.

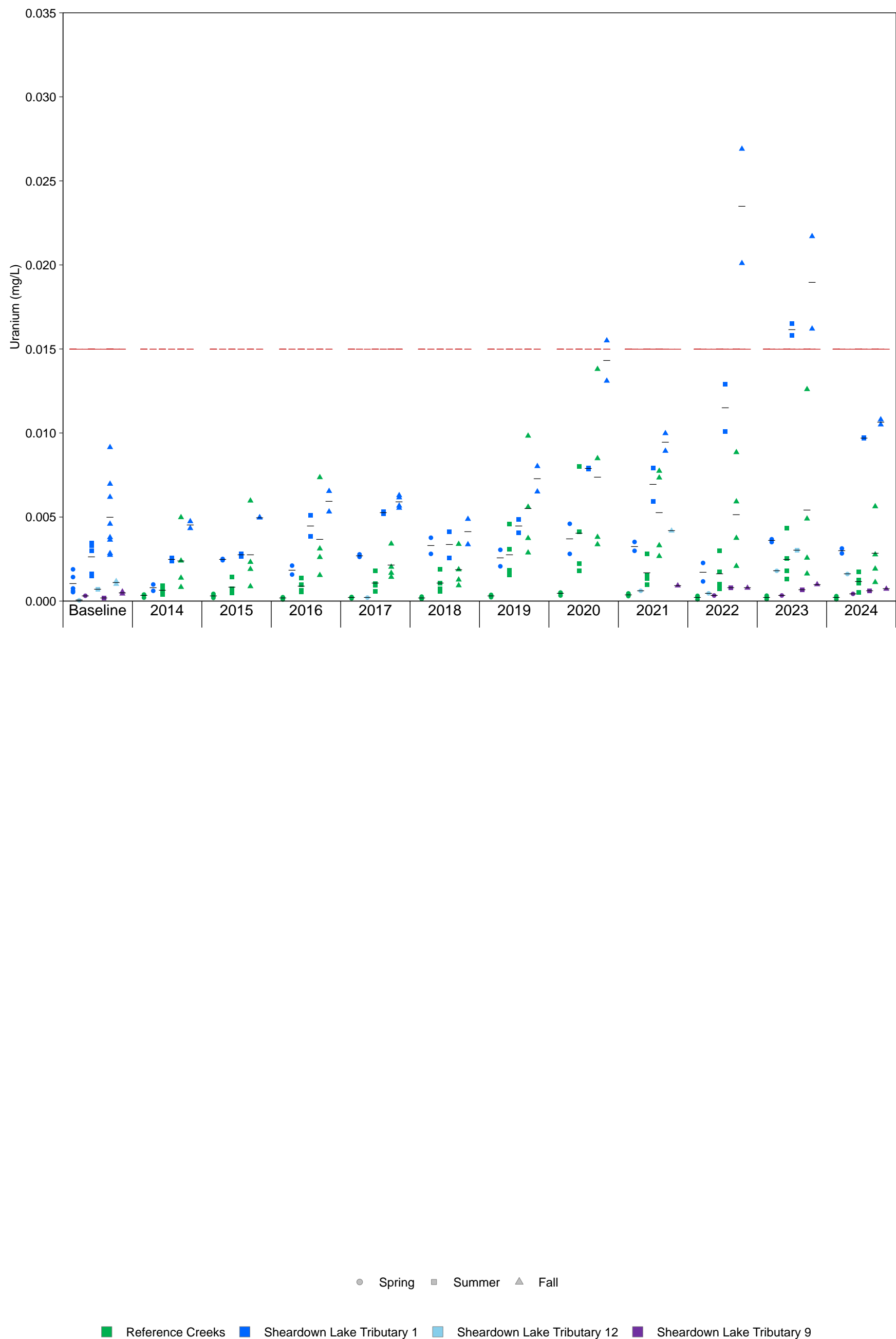


Figure C.11: Temporal Comparison of Water Chemistry at the Sheardown Lake Tributaries (SDLT1, SDLT12, SDLT9) Over Mine Baseline (2006 to 2013) and Operations (2015 to 2024) Periods, Mary River Project CREMP

Notes: Concentrations below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL and the open symbol represents one or more values reported below the LRL. Red lines indicate Water Quality Guidelines, some of which are dependent on concurrent hardness values; orange lines indicate AEMP Benchmarks. Black bars indicate mean concentrations for the corresponding data. Sheardown Lake Tributary 12 (SDLT12/ LDFG-OUT) and Sheardown Lake Tributary 9 (SDLT9/MS-C-G) stations were added to the CREMP in fall 2021.

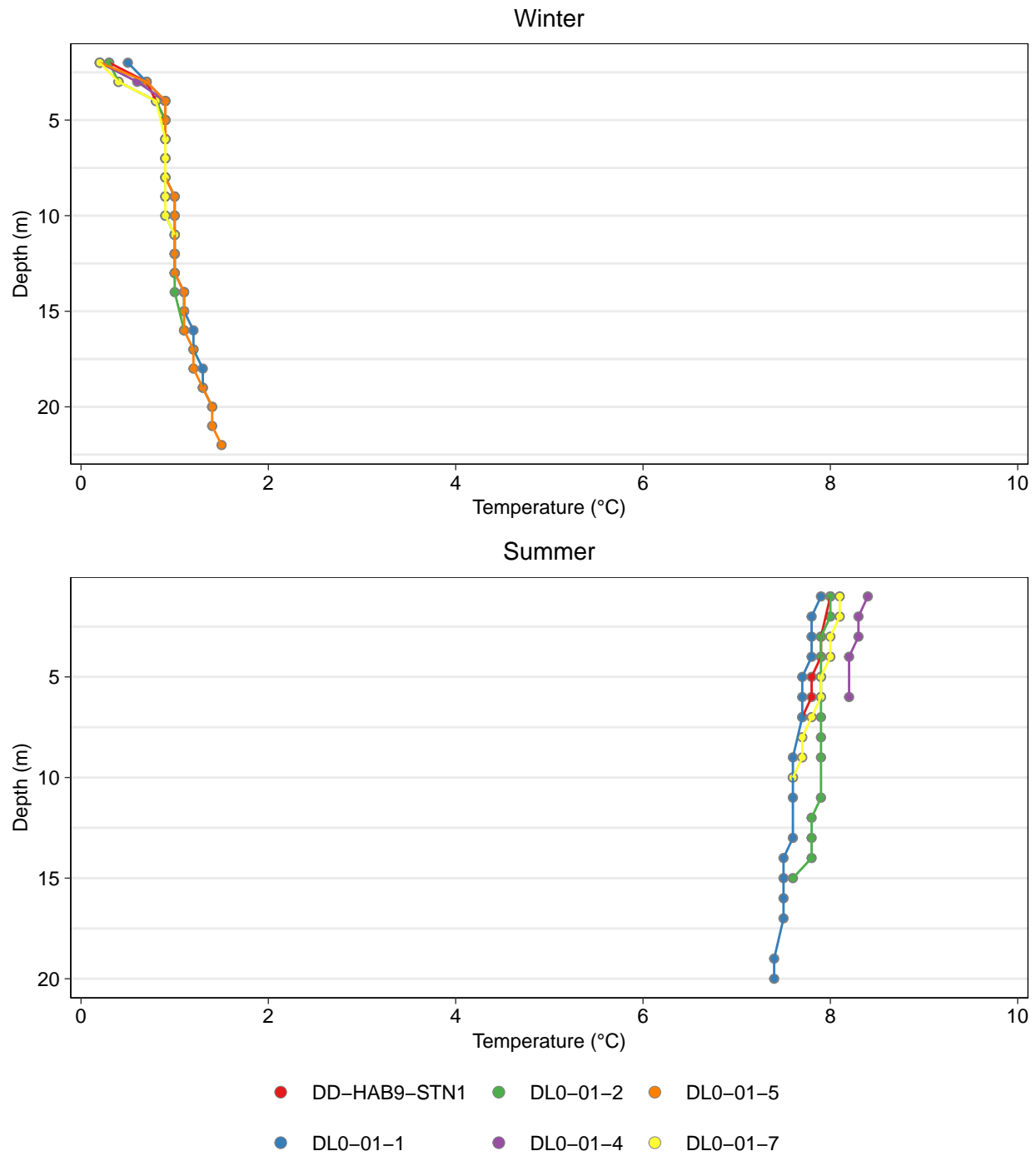


Figure C.12: Vertical Profiles of Temperature (°C) Measured at Sheardown Lake Northwest (NW; DL0-01) Compared in Winter, Summer, and Fall, Mary River Project CREMP, 2024

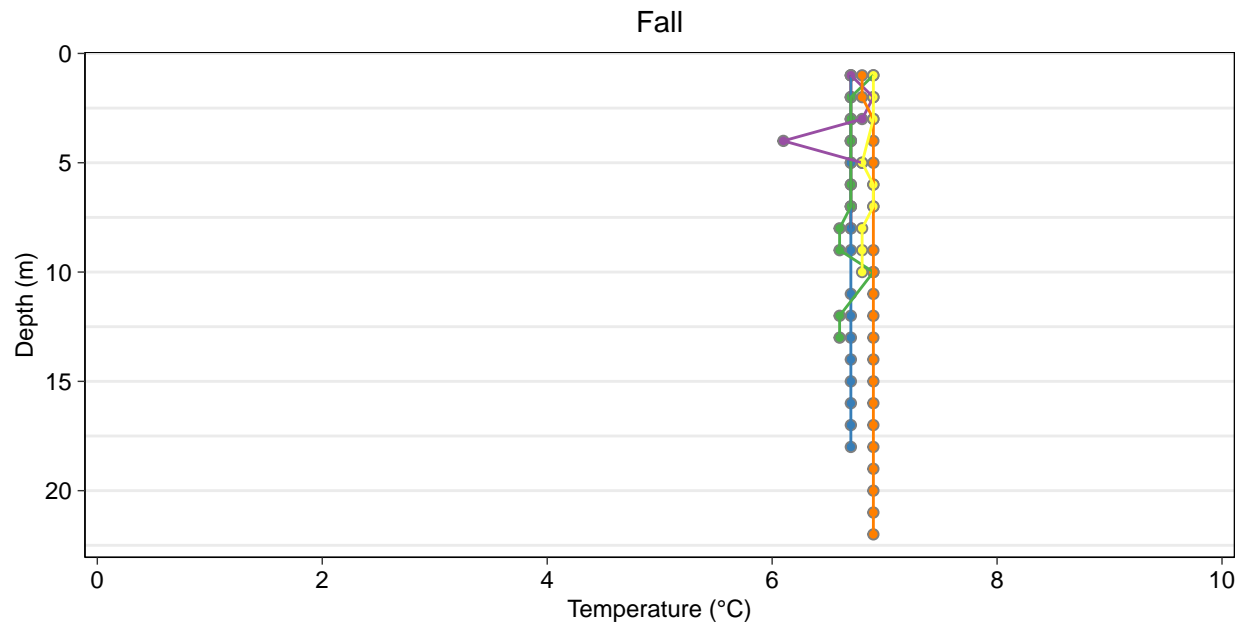


Figure C.12: Vertical Profiles of Temperature (°C) Measured at Sheardown Lake Northwest (NW; DL0-01) Compared in Winter, Summer, and Fall, Mary River Project CREMP, 2024

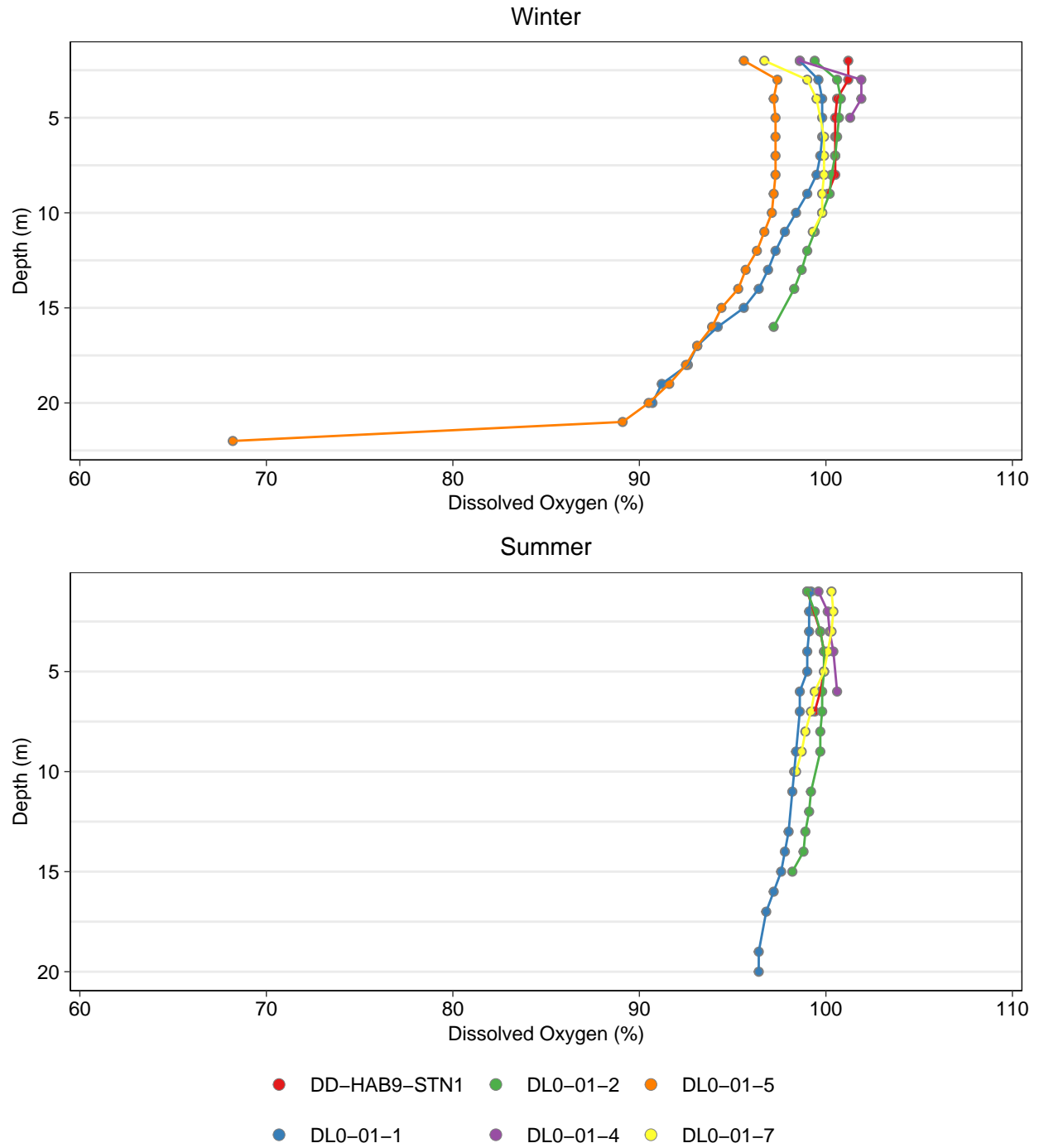
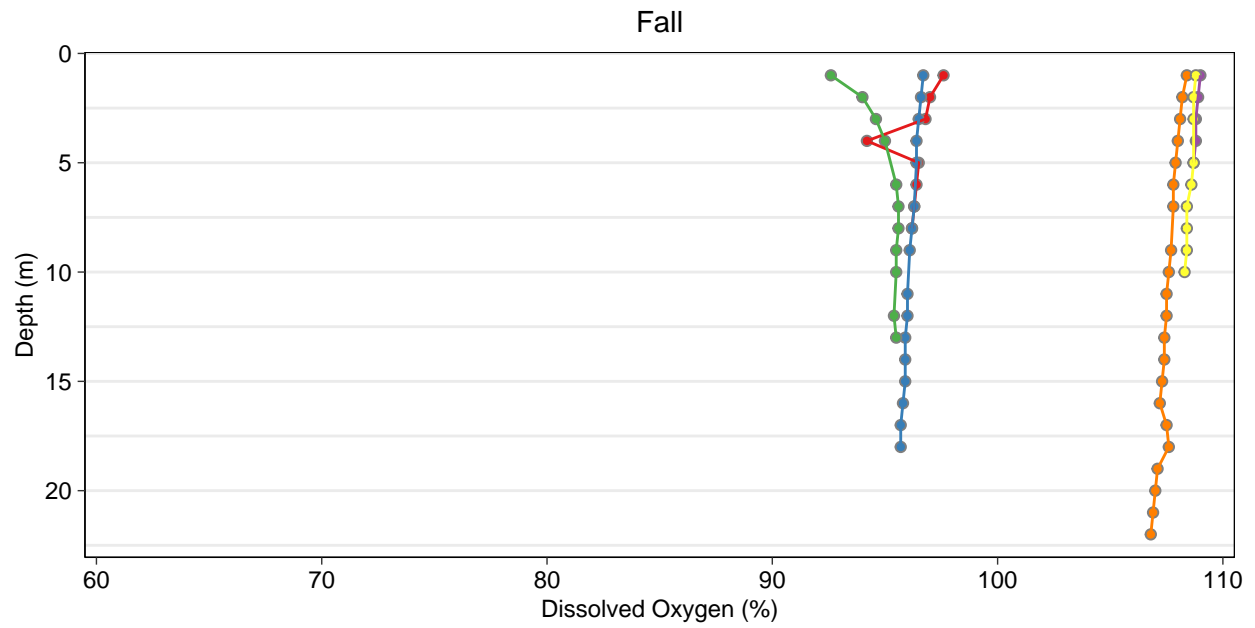


Figure C.13: Vertical Profiles of Dissolved Oxygen (%) Measured at Sheardown Lake Northwest (NW; DL0-01) Compared in Winter, Summer, and Fall, Mary River Project CREMP, 2024



● DD-HAB9-STN1 ● DL0-01-2 ● DL0-01-5
● DL0-01-1 ● DL0-01-4 ● DL0-01-7

Figure C.13: Vertical Profiles of Dissolved Oxygen (%) Measured at Sheardown Lake Northwest (NW; DL0-01) Compared in Winter, Summer, and Fall, Mary River Project CREMP, 2024

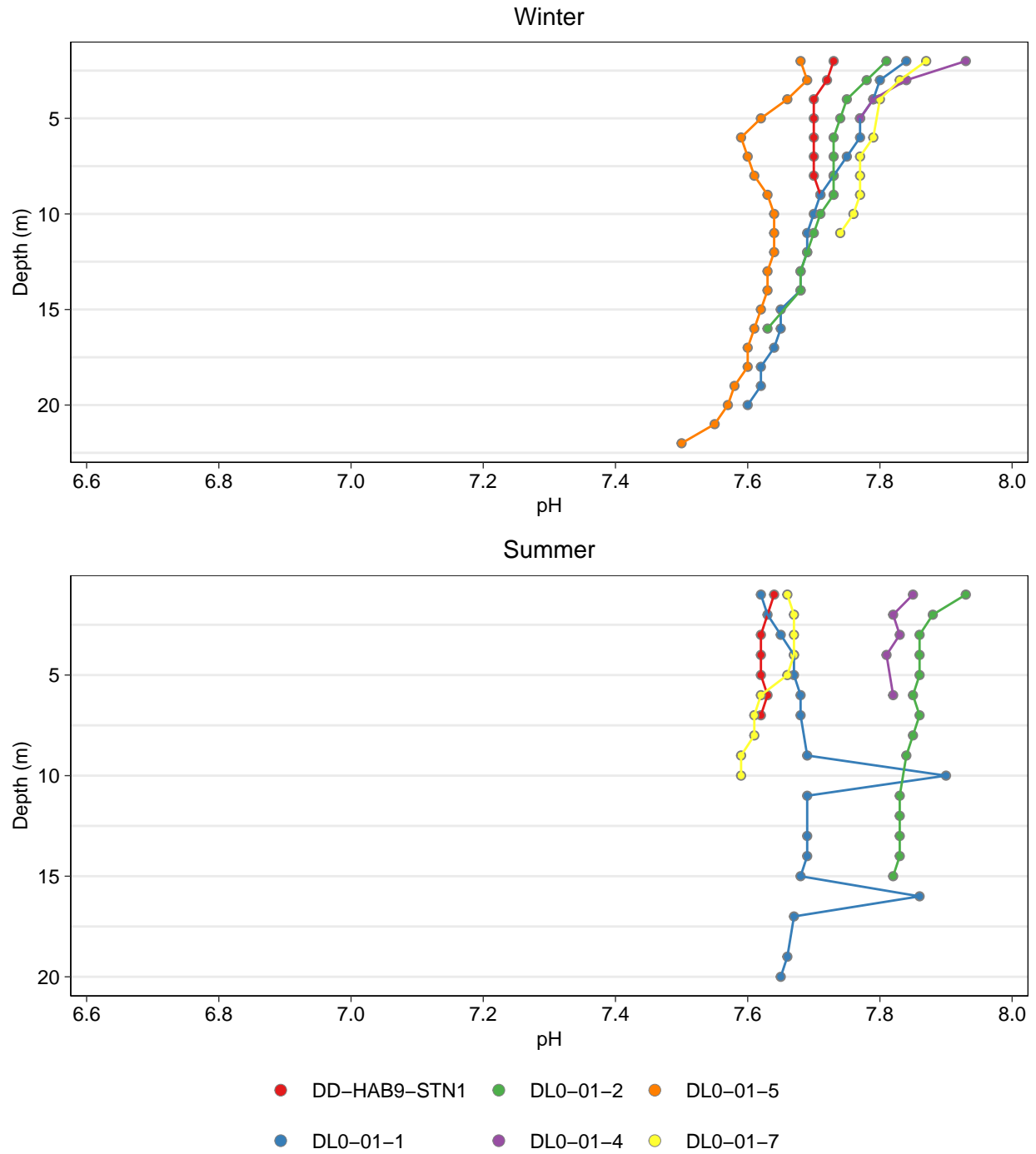
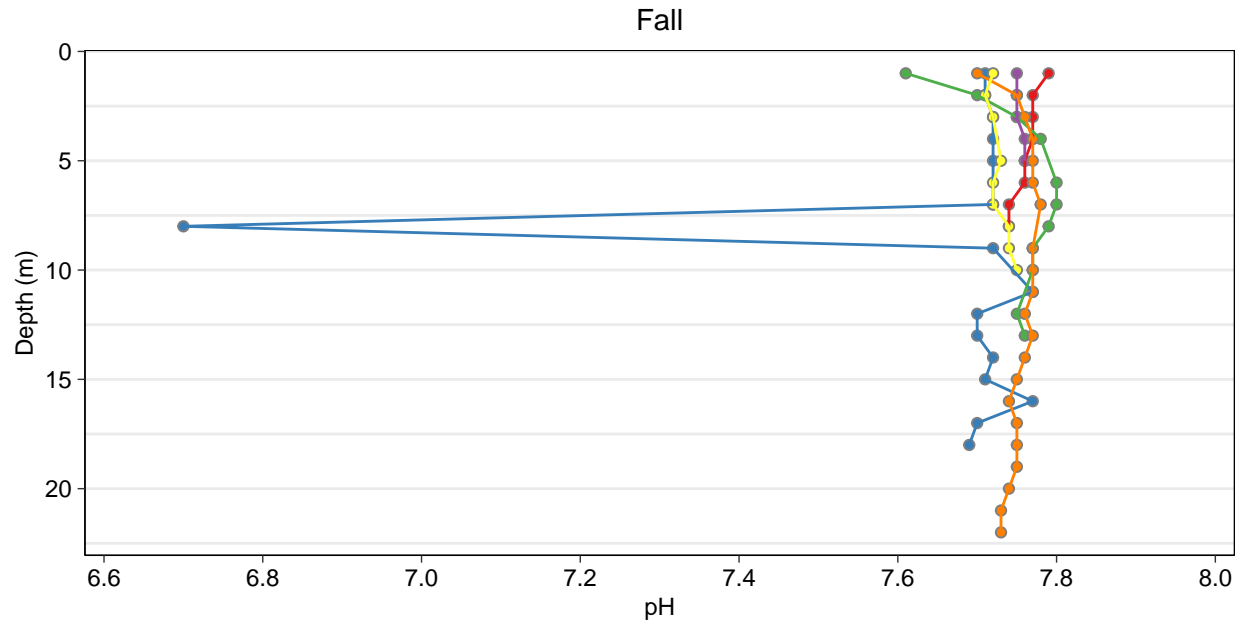


Figure C.14: Vertical Profiles of pH Measured at Sheardown Lake Northwest (NW; DL0-01) Compared in Winter, Summer, and Fall, Mary River Project CREMP, 2024



● DD-HAB9-STN1 ● DL0-01-2 ● DL0-01-5
● DL0-01-1 ● DL0-01-4 ● DL0-01-7

Figure C.14: Vertical Profiles of pH Measured at Sheardown Lake Northwest (NW; DL0-01) Compared in Winter, Summer, and Fall, Mary River Project CREMP, 2024

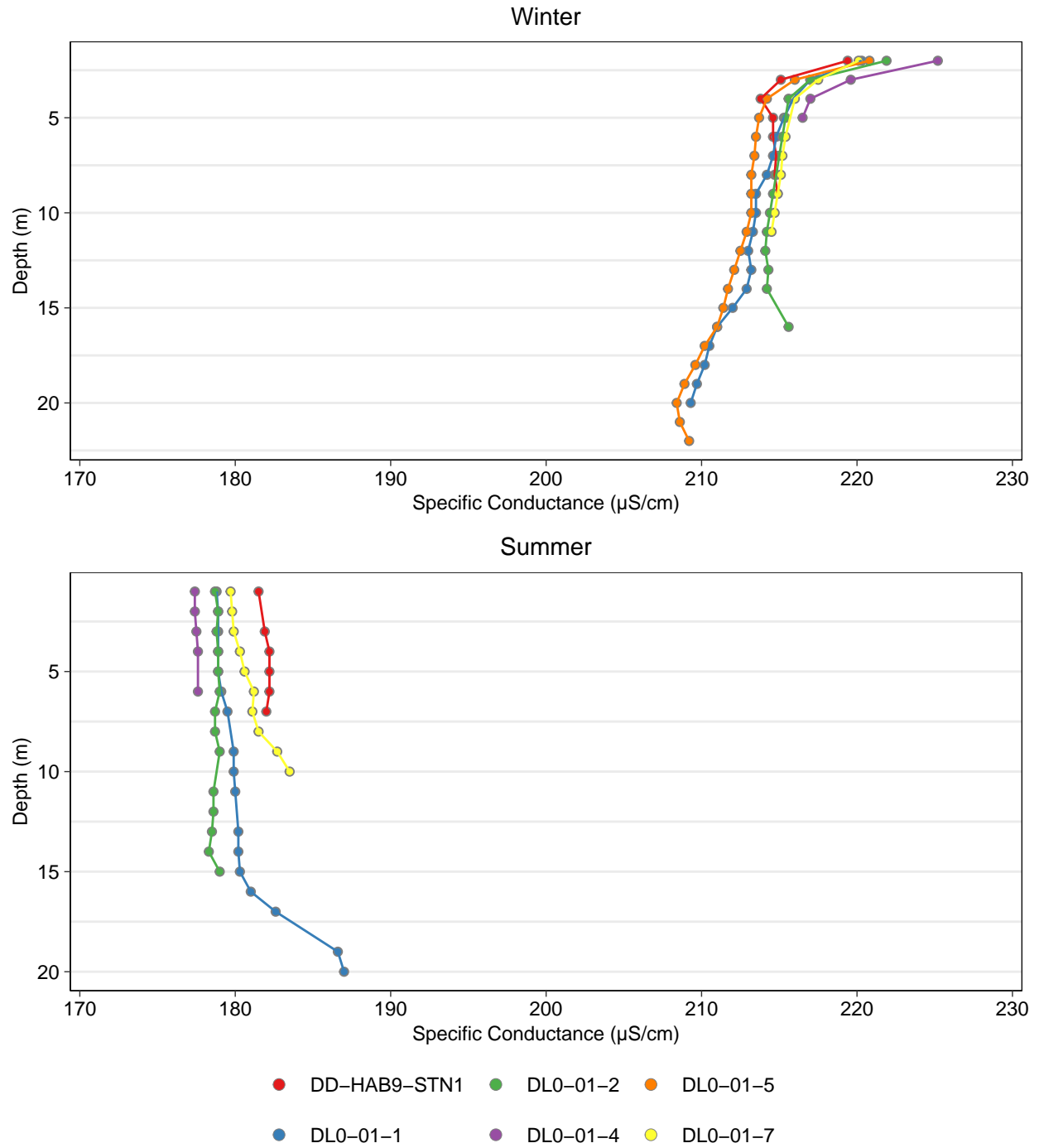
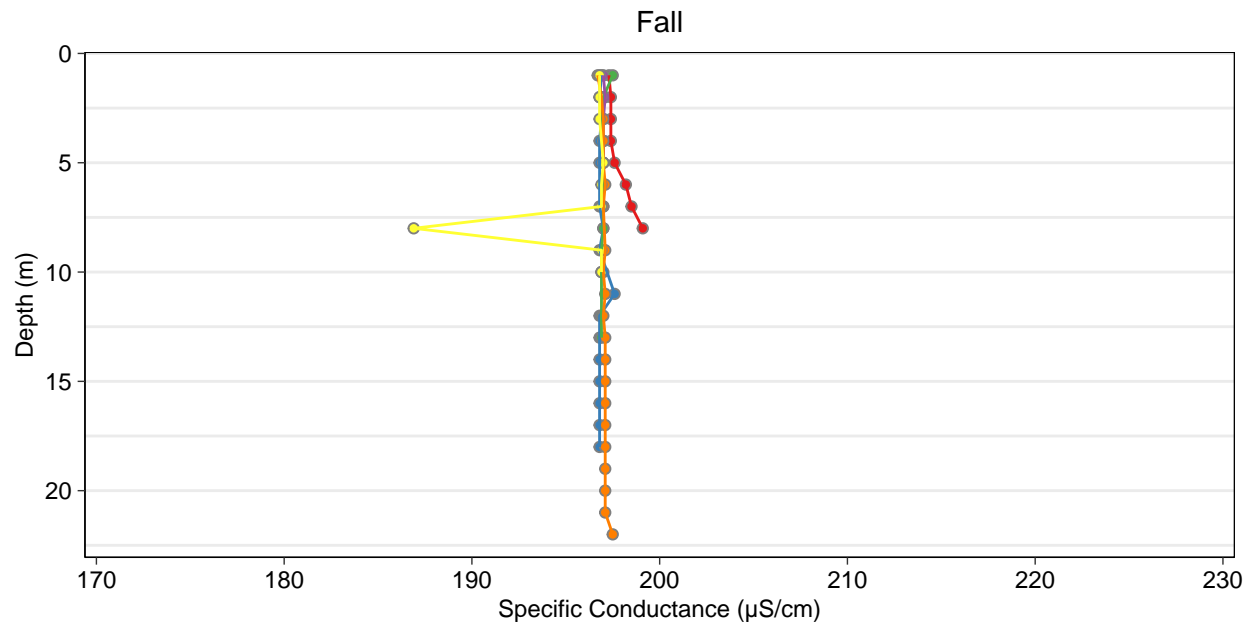


Figure C.15: Vertical Profiles of Specific Conductance ($\mu\text{S}/\text{cm}$) Measured at Sheardown Lake Northwest (NW; DL0-01) Compared in Winter, Summer, and Fall, Mary River Project CREMP, 2024



- DD-HAB9-STN1 ● DL0-01-2 ● DL0-01-5
- DL0-01-1 ● DL0-01-4 ● DL0-01-7

Figure C.15: Vertical Profiles of Specific Conductance ($\mu\text{S}/\text{cm}$) Measured at Sheardown Lake Northwest (NW; DL0-01) Compared in Winter, Summer, and Fall, Mary River Project CREMP, 2024

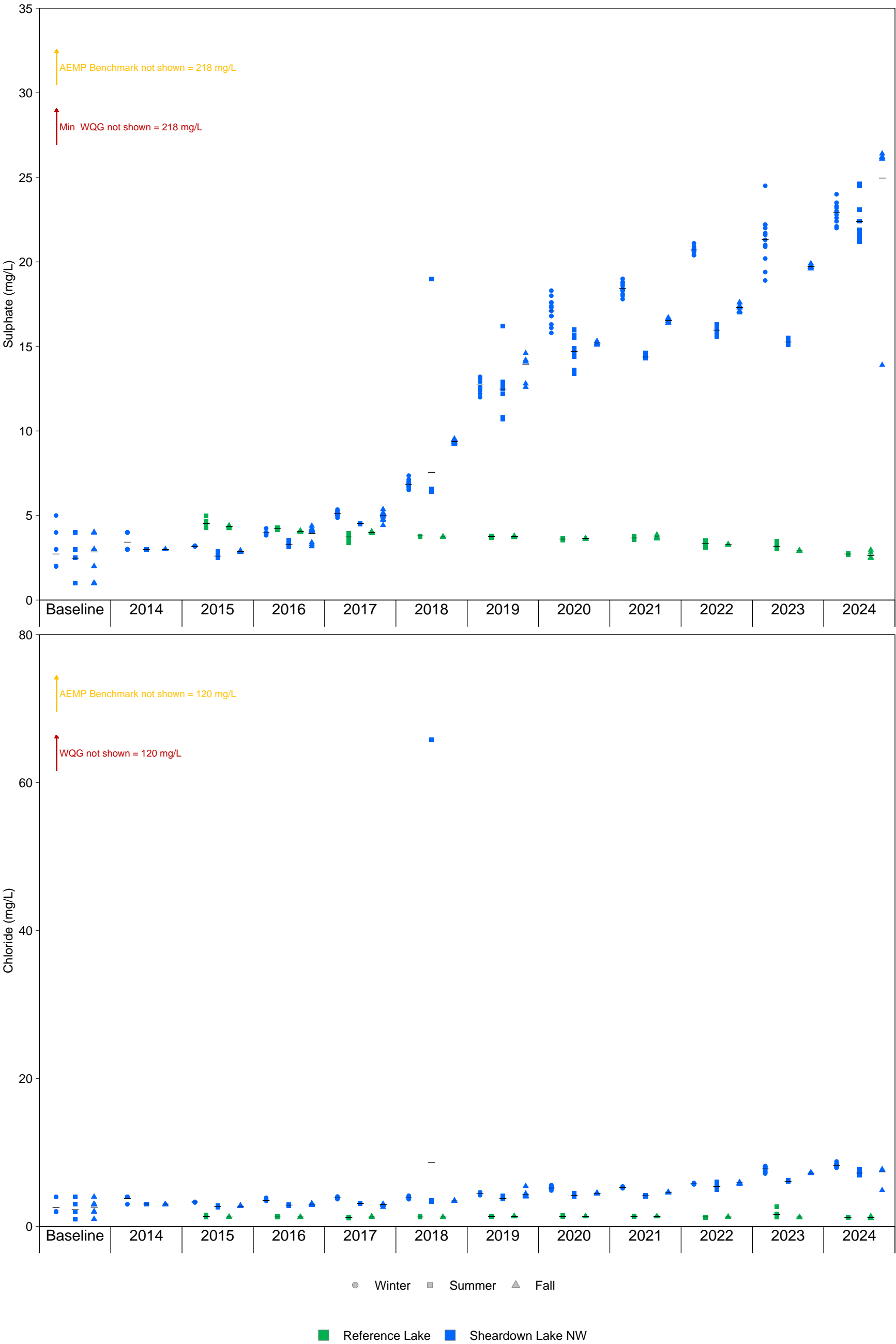


Figure C.16: Temporal Comparison of Water Chemistry at Sheardown Lake Northwest (NW; DL0-01) Over Mine Baseline (2006 to 2013), Construction (2014), and Operational (2015 to 2024) Periods, Mary River Project CREMP

Notes: Concentrations below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL and the open symbol represents one or more values reported below the LRL. Red lines indicate Water Quality Guidelines, some of which are dependent on concurrent hardness values; orange lines indicate AEMP Benchmarks.

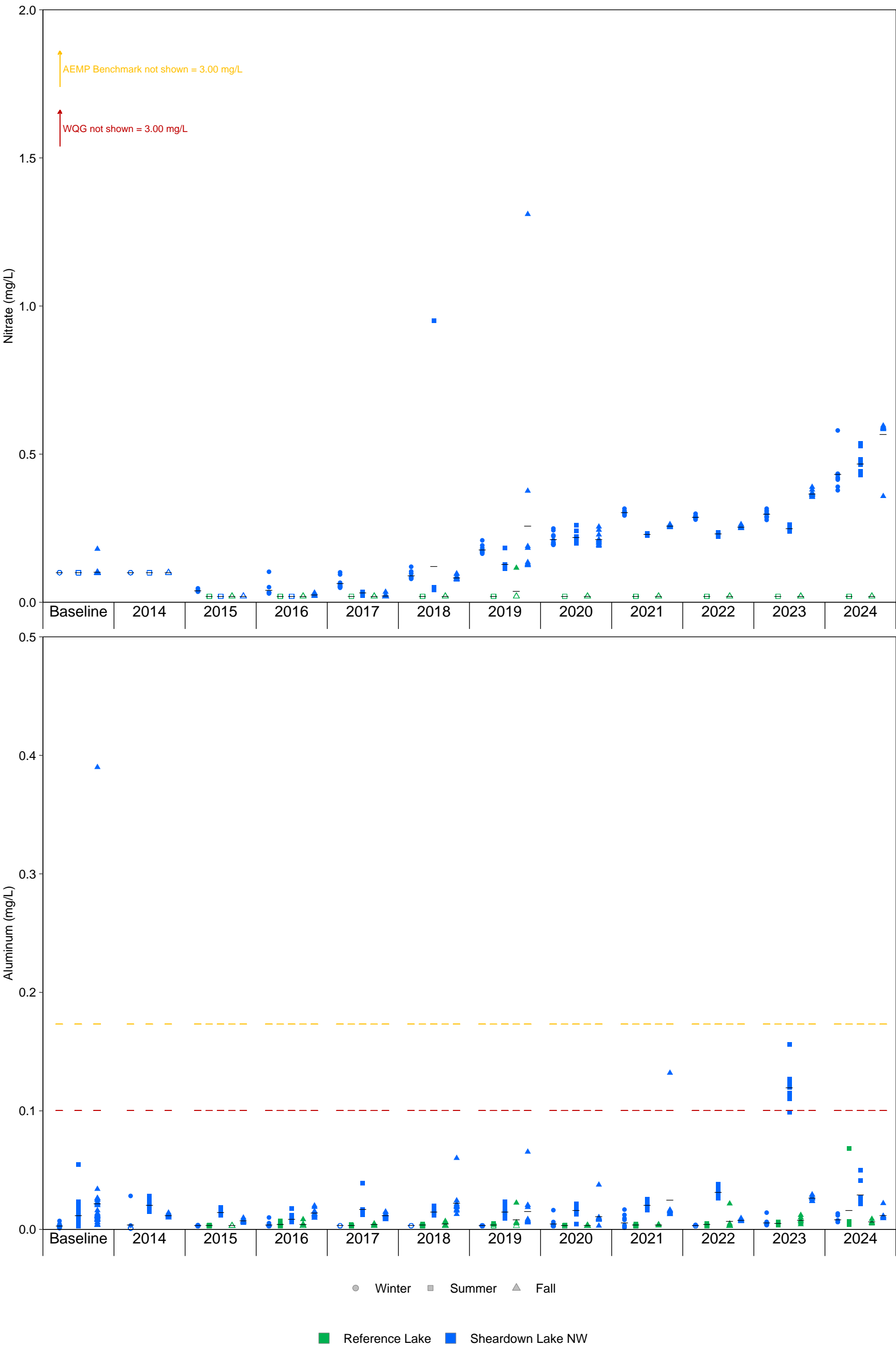


Figure C.16: Temporal Comparison of Water Chemistry at Sheardown Lake Northwest (NW; DL0-01) Over Mine Baseline (2006 to 2013), Construction (2014), and Operational (2015 to 2024) Periods, Mary River Project CREMP

Notes: Concentrations below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL and the open symbol represents one or more values reported below the LRL. Red lines indicate Water Quality Guidelines, some of which are dependent on concurrent hardness values; orange lines indicate AEMP Benchmarks.

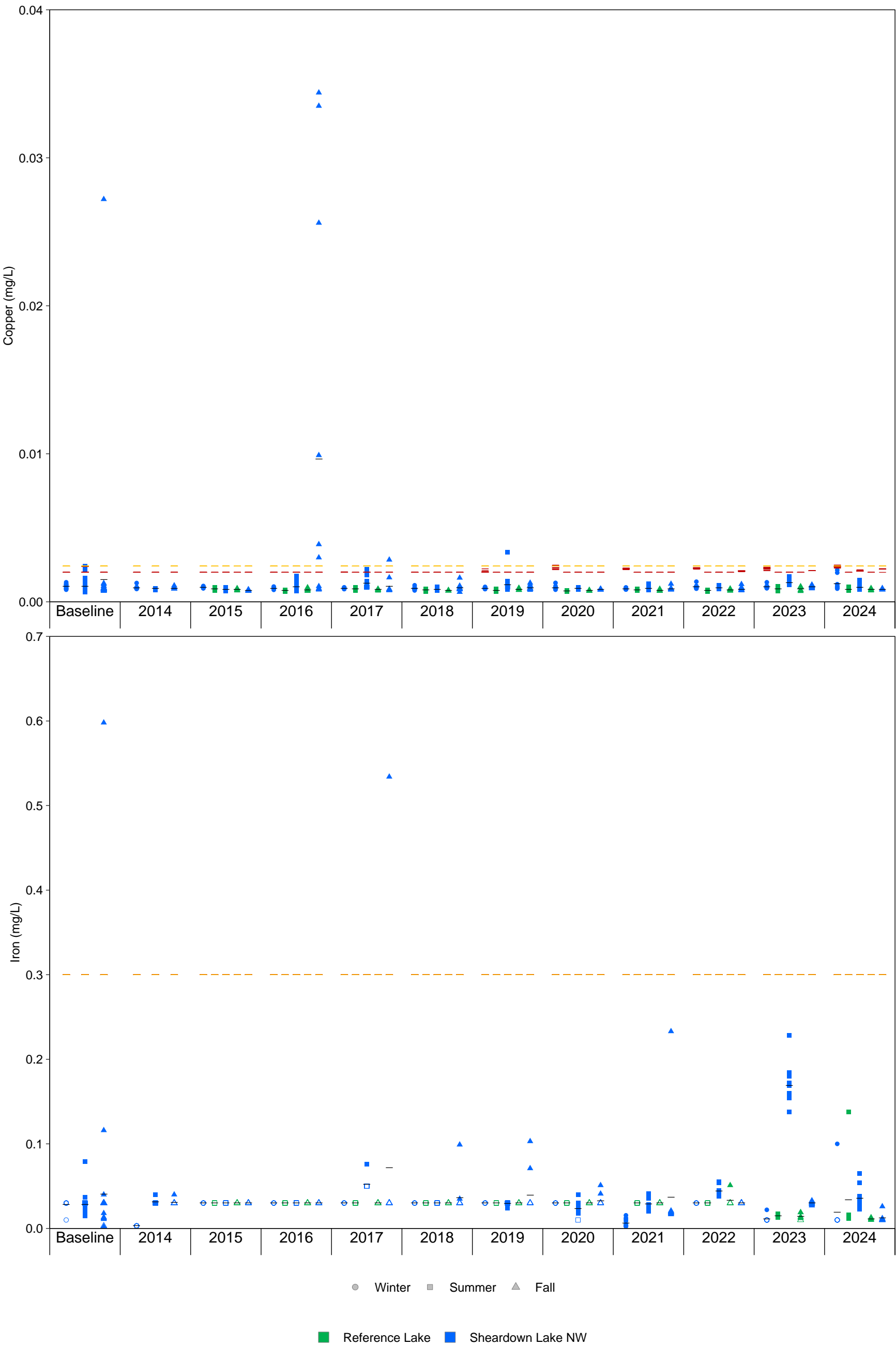


Figure C.16: Temporal Comparison of Water Chemistry at Sheardown Lake Northwest (NW; DL0-01) Over Mine Baseline (2006 to 2013), Construction (2014), and Operational (2015 to 2024) Periods, Mary River Project CREMP

Notes: Concentrations below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL and the open symbol represents one or more values reported below the LRL. Red lines indicate Water Quality Guidelines, some of which are dependent on concurrent hardness values; orange lines indicate AEMP Benchmarks.

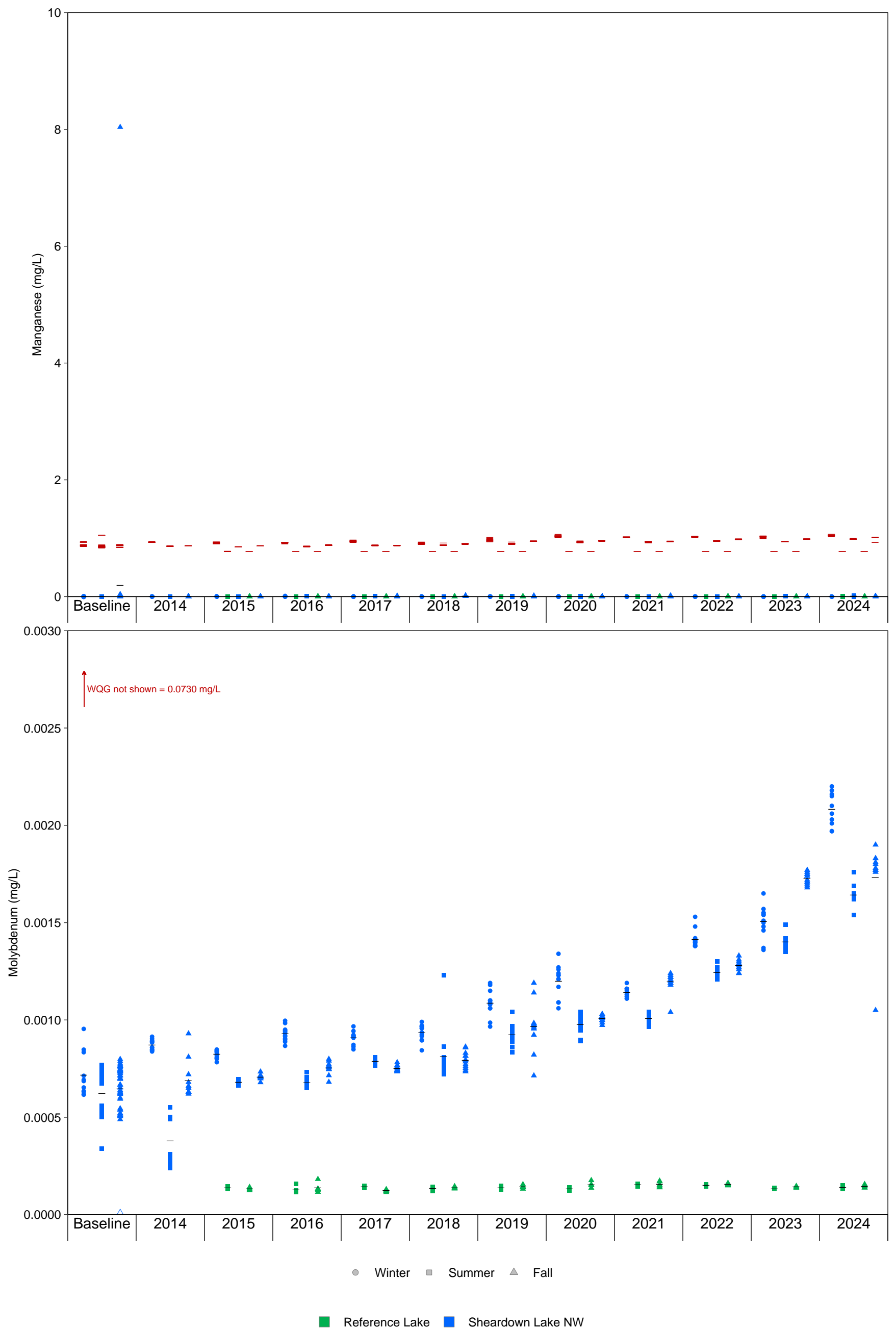


Figure C.16: Temporal Comparison of Water Chemistry at Sheardown Lake Northwest (NW; DL0-01) Over Mine Baseline (2006 to 2013), Construction (2014), and Operational (2015 to 2024) Periods, Mary River Project CREMP

Notes: Concentrations below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL and the open symbol represents one or more values reported below the LRL. Red lines indicate Water Quality Guidelines, some of which are dependent on concurrent hardness values; orange lines indicate AEMP Benchmarks.

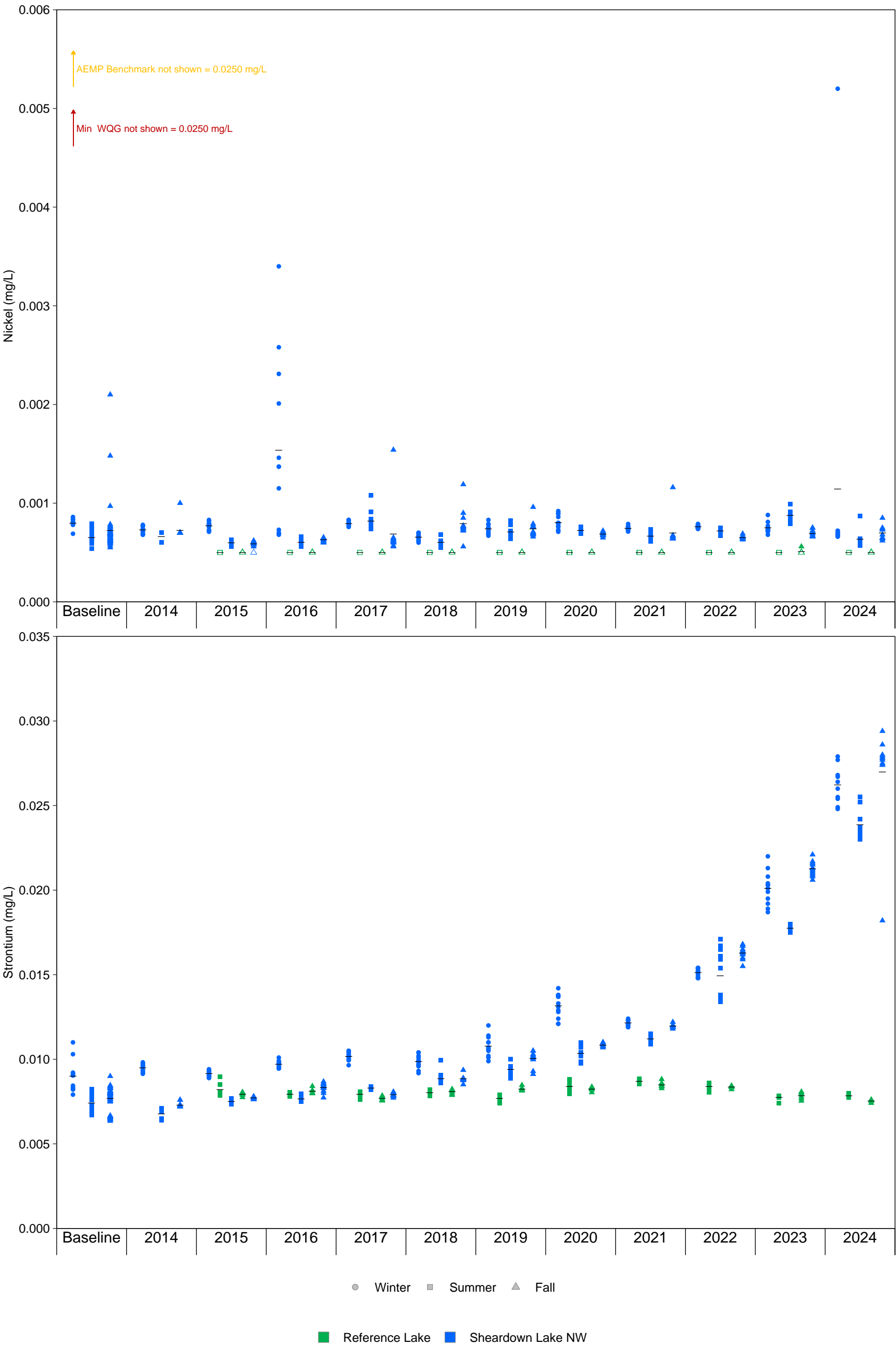


Figure C.16: Temporal Comparison of Water Chemistry at Sheardown Lake Northwest (NW; DL0-01) Over Mine Baseline (2006 to 2013), Construction (2014), and Operational (2015 to 2024) Periods, Mary River Project CREMP

Notes: Concentrations below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL and the open symbol represents one or more values reported below the LRL. Red lines indicate Water Quality Guidelines, some of which are dependent on concurrent hardness values; orange lines indicate AEMP Benchmarks.

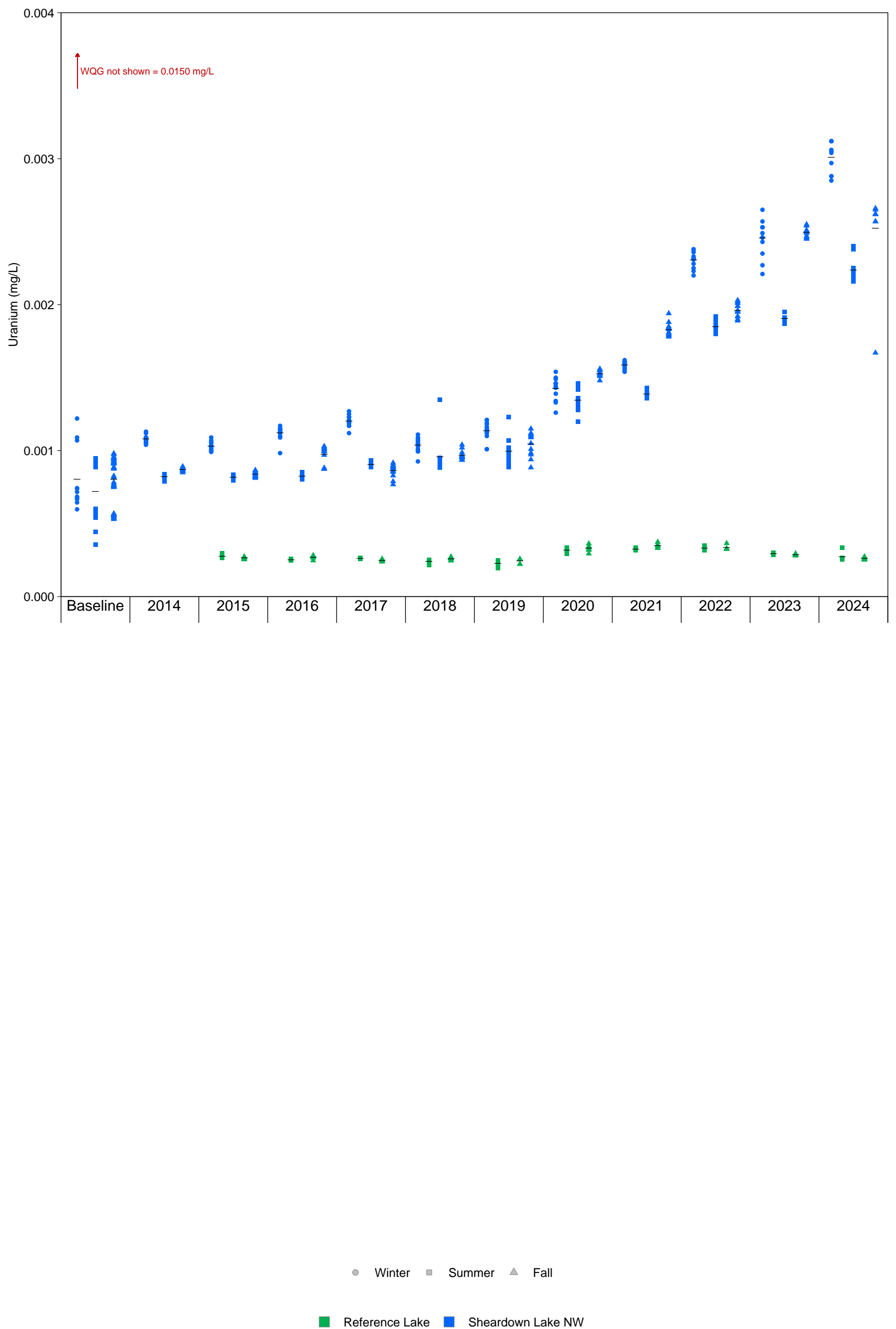


Figure C.16: Temporal Comparison of Water Chemistry at Sheardown Lake Northwest (NW; DL0-01) Over Mine Baseline (2006 to 2013), Construction (2014), and Operational (2015 to 2024) Periods, Mary River Project CREMP

Notes: Concentrations below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL and the open symbol represents one or more values reported below the LRL. Red lines indicate Water Quality Guidelines, some of which are dependent on concurrent hardness values; orange lines indicate AEMP Benchmarks.

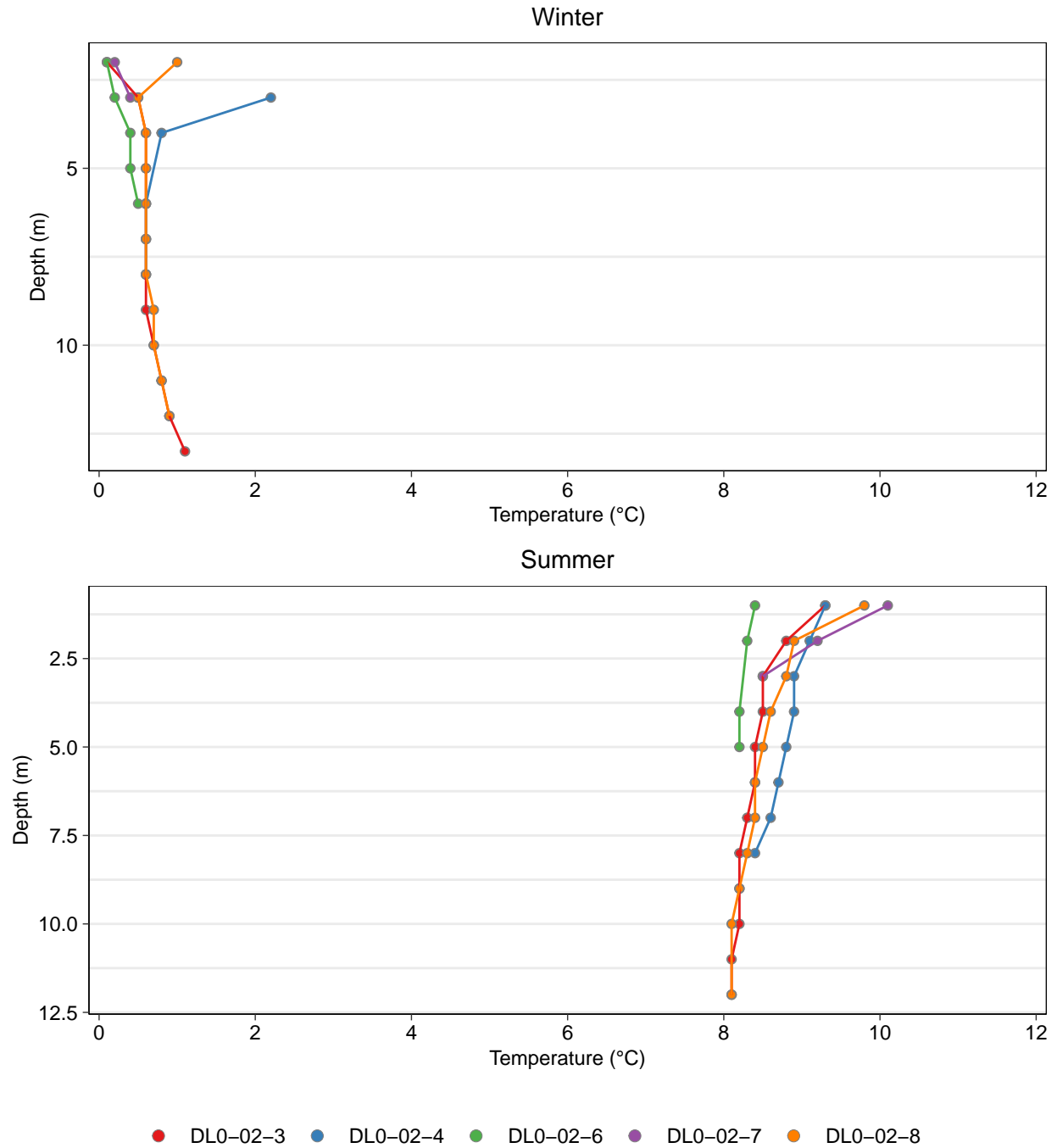
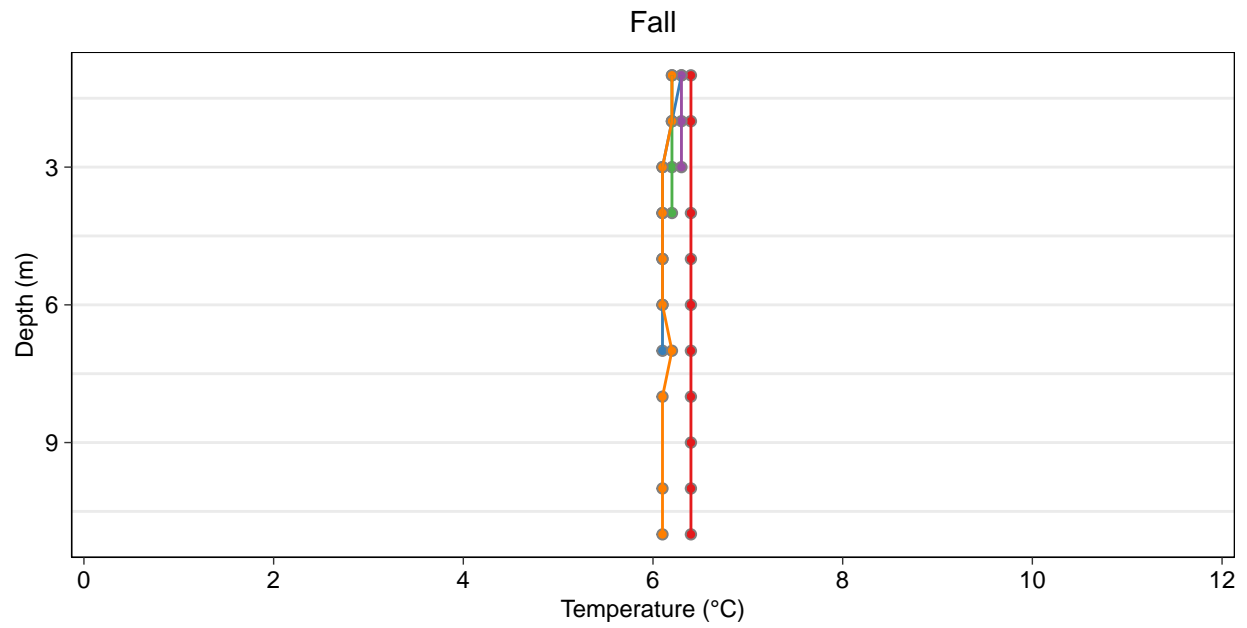


Figure C.17: Vertical Profiles of Temperature (°C) Measured at Sheardown Lake Southeast (SE; DL0-02) Compared in Winter, Summer, and Fall, Mary River Project CREMP, 2024



● DL0-02-3
 ● DL0-02-4
 ● DL0-02-6
 ● DL0-02-7
 ● DL0-02-8

Figure C.17: Vertical Profiles of Temperature (°C) Measured at Sheardown Lake Southeast (SE; DL0-02) Compared in Winter, Summer, and Fall, Mary River Project CREMP, 2024

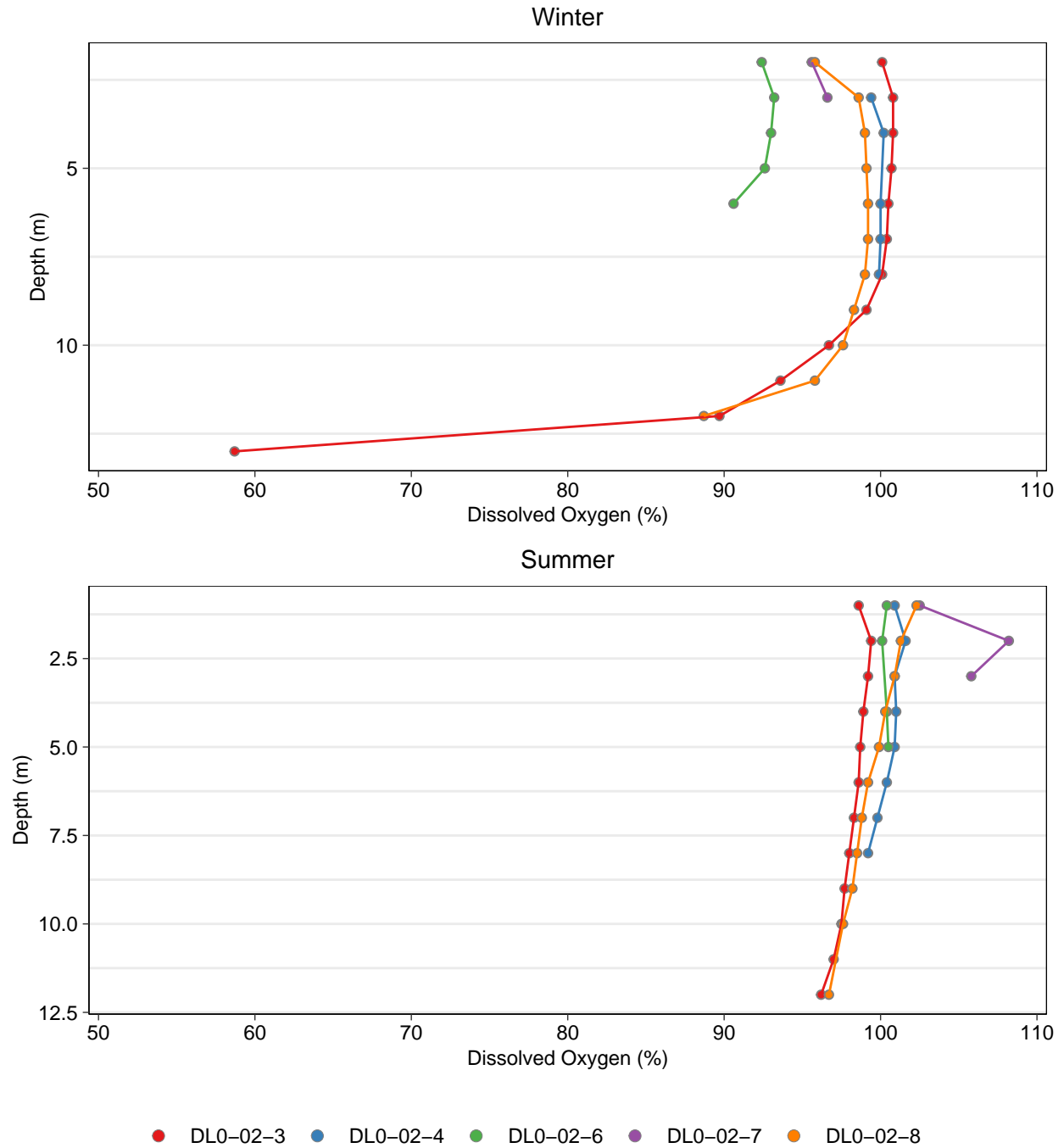


Figure C.18: Vertical Profiles of Dissolved Oxygen (%) Measured at Sheardown Lake Southeast (SE; DL0-02) Compared in Winter, Summer, and Fall, Mary River Project CREMP, 2024

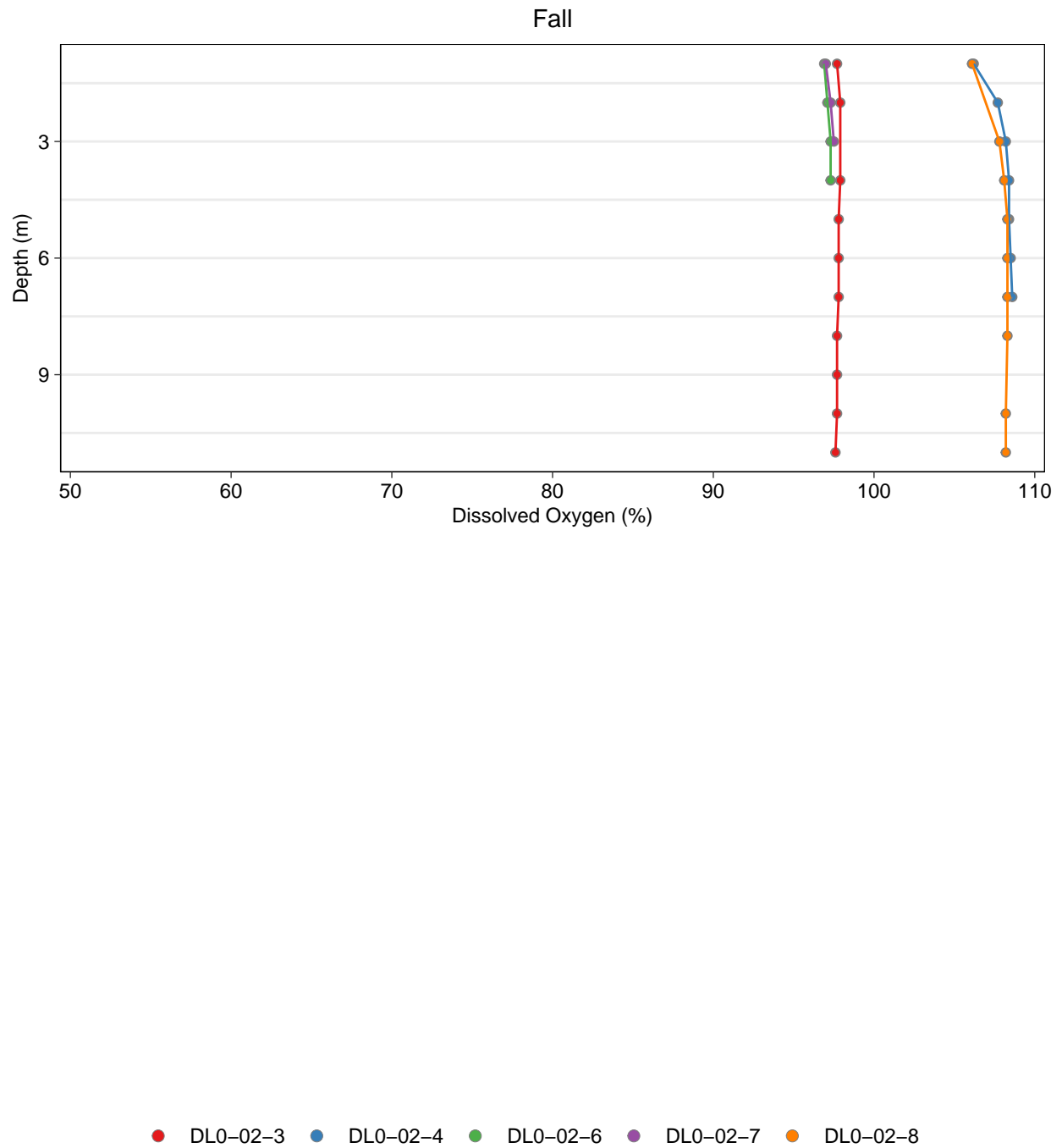


Figure C.18: Vertical Profiles of Dissolved Oxygen (%) Measured at Sheardown Lake Southeast (SE; DL0-02) Compared in Winter, Summer, and Fall, Mary River Project CREMP, 2024

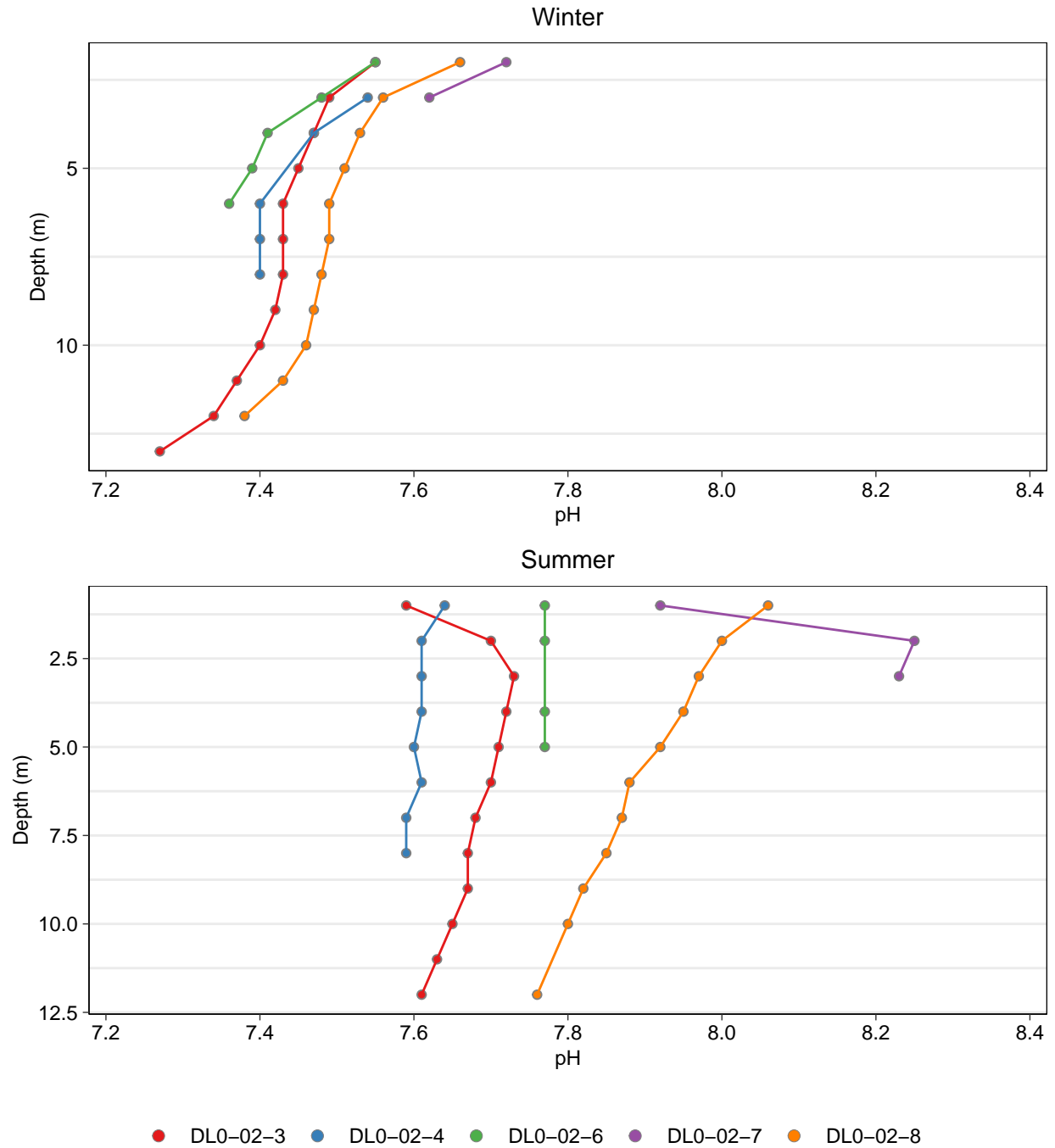
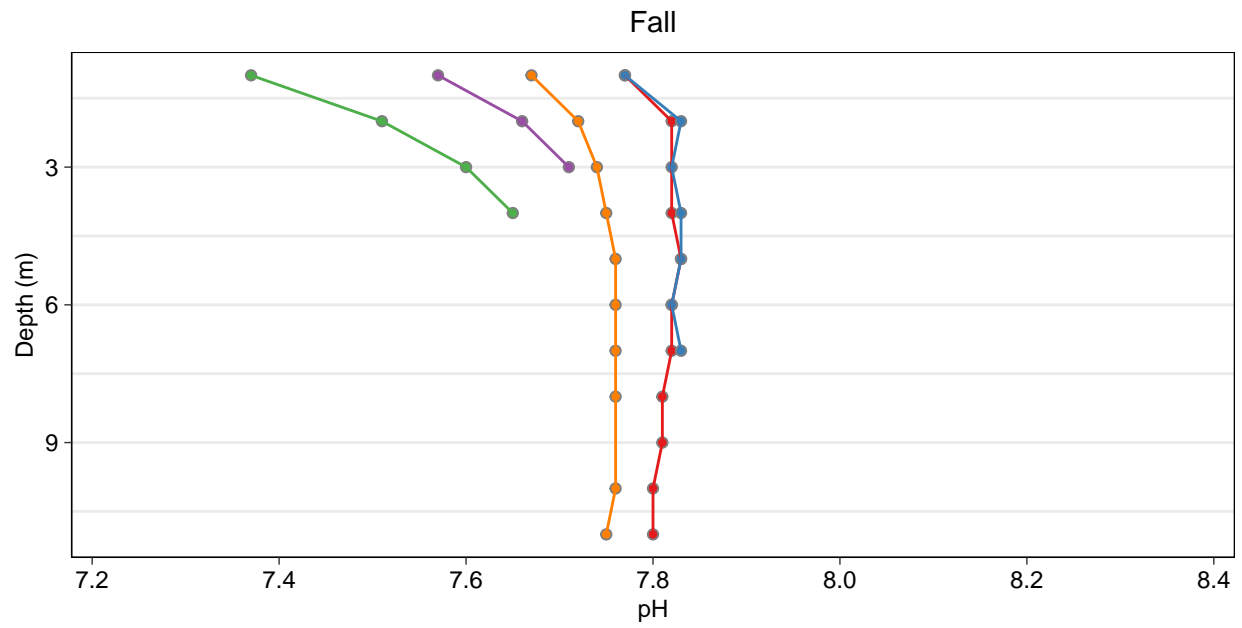


Figure C.19: Vertical Profiles of pH Measured at Sheardown Lake Southeast (SE; [DL0-02]) Compared in Winter, Summer, and Fall, Mary River Project CREMP, 2024



DL0-02-3 DL0-02-4 DL0-02-6 DL0-02-7 DL0-02-8

Figure C.19: Vertical Profiles of pH Measured at Sheardown Lake Southeast (SE; [DL0-02]) Compared in Winter, Summer, and Fall, Mary River Project CREMP, 2024

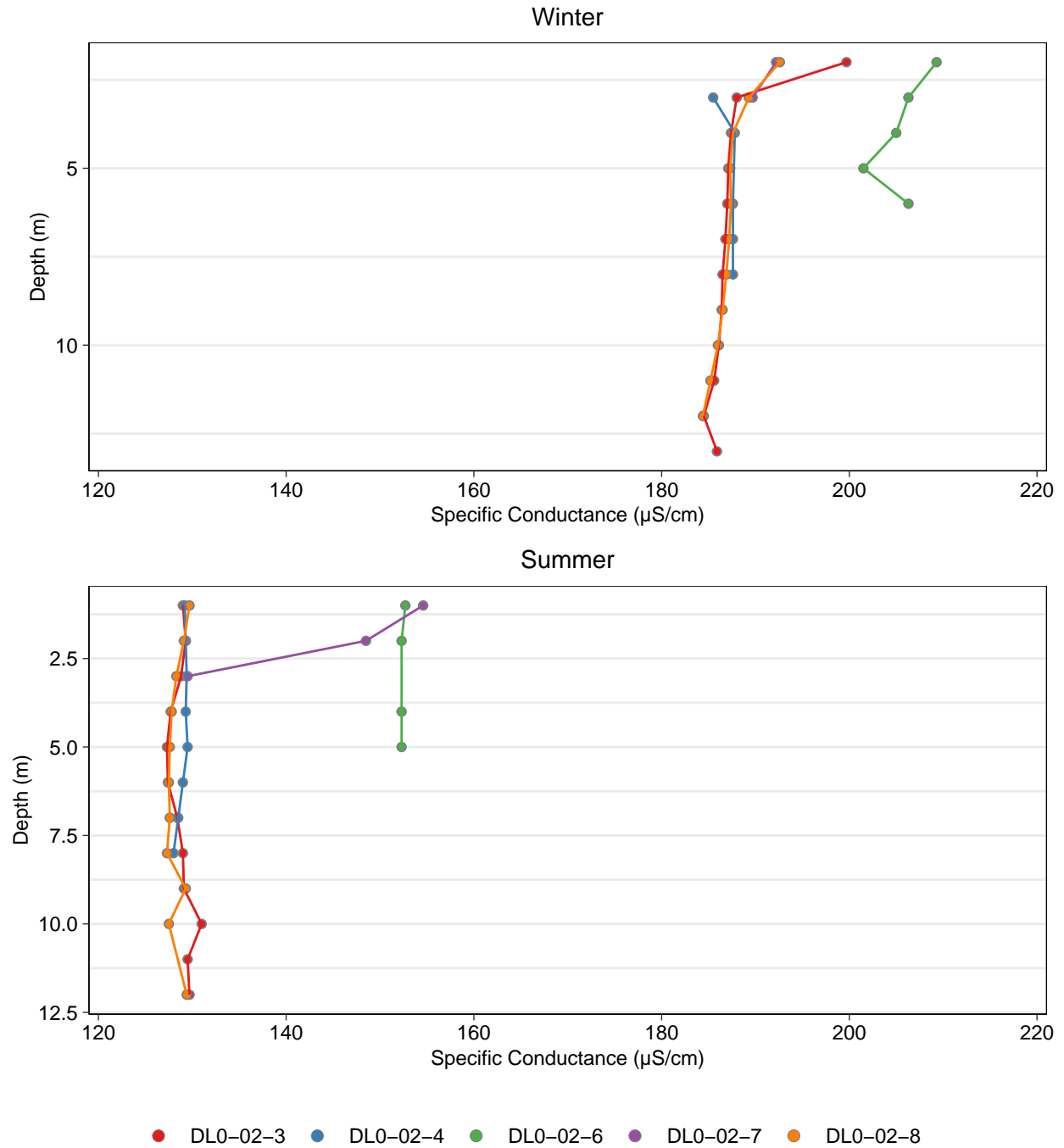


Figure C.20: Vertical Profiles of Specific Conductance ($\mu\text{S/cm}$) Measured at Sheardown Lake Southeast (SE; DL0-02) Compared in Winter, Summer, and Fall, Mary River Project CREMP, 2024

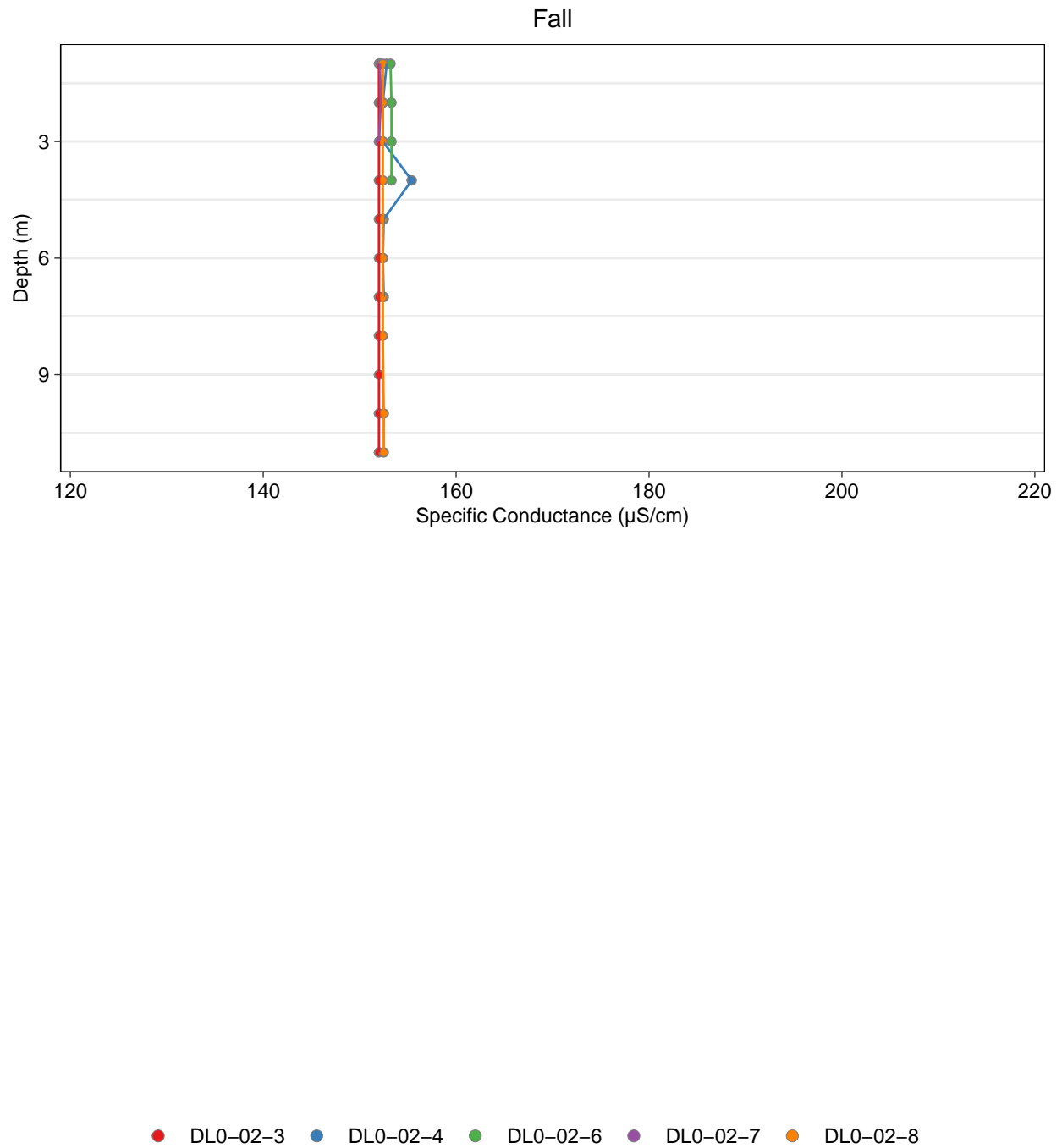
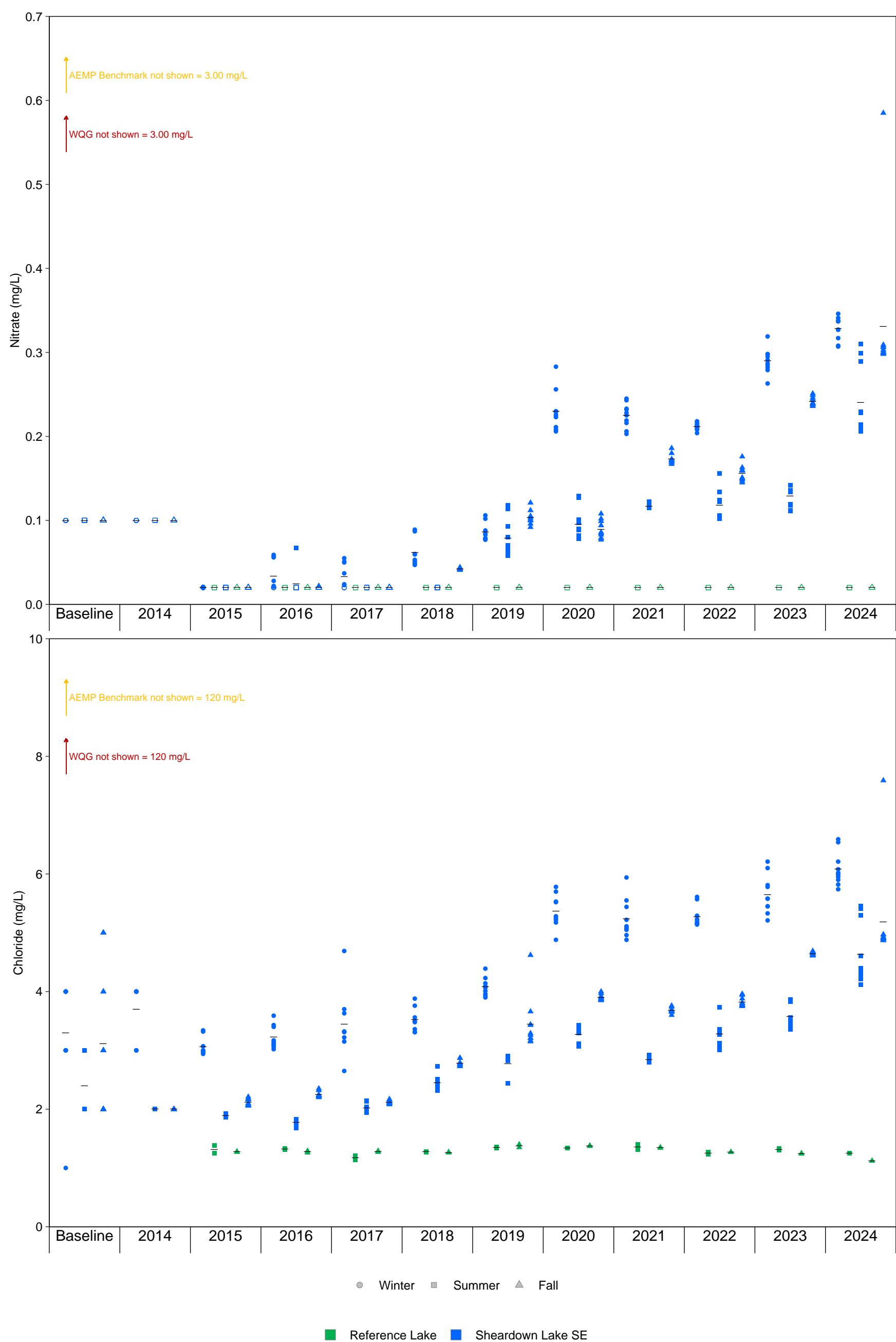


Figure C.20: Vertical Profiles of Specific Conductance ($\mu\text{S}/\text{cm}$) Measured at Sheardown Lake Southeast (SE; DL0-02) Compared in Winter, Summer, and Fall, Mary River Project CREMP, 2024



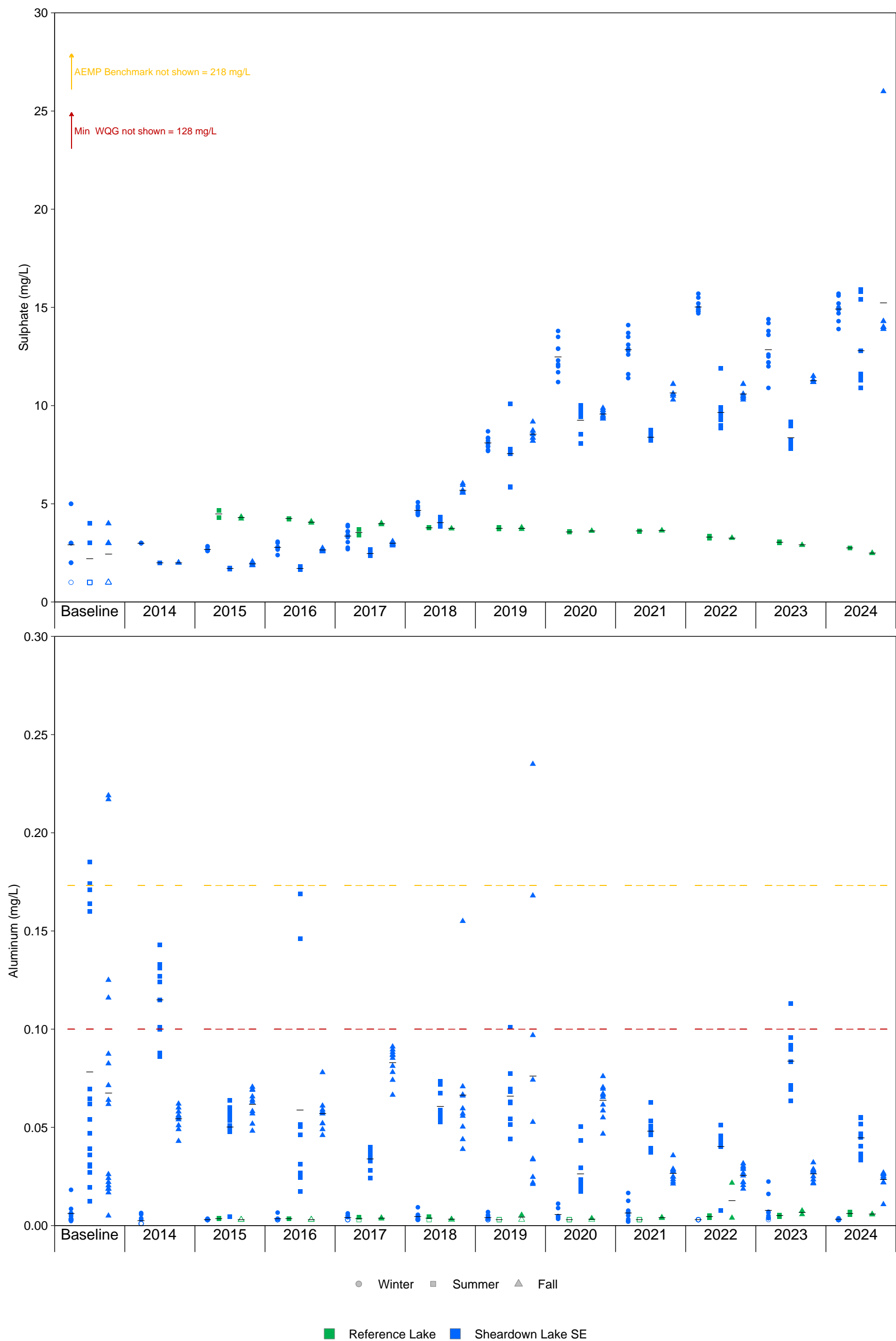


Figure C.21: Temporal Comparison of Water Chemistry at Sheardown Lake Southeast (SE; DL0-02) Over Mine Baseline (2006 to 2013), Construction (2014), and Operational (2015 to 2024) Periods, Mary River Project CREMP

Notes: Concentrations below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL and the open symbol represents one or more values reported below the LRL. Red lines indicate Water Quality Guidelines, some of which are dependent on concurrent hardness values; orange lines indicate AEMP Benchmarks. For each station, a concentration is provided for each of the bottom and the surface of the water column.

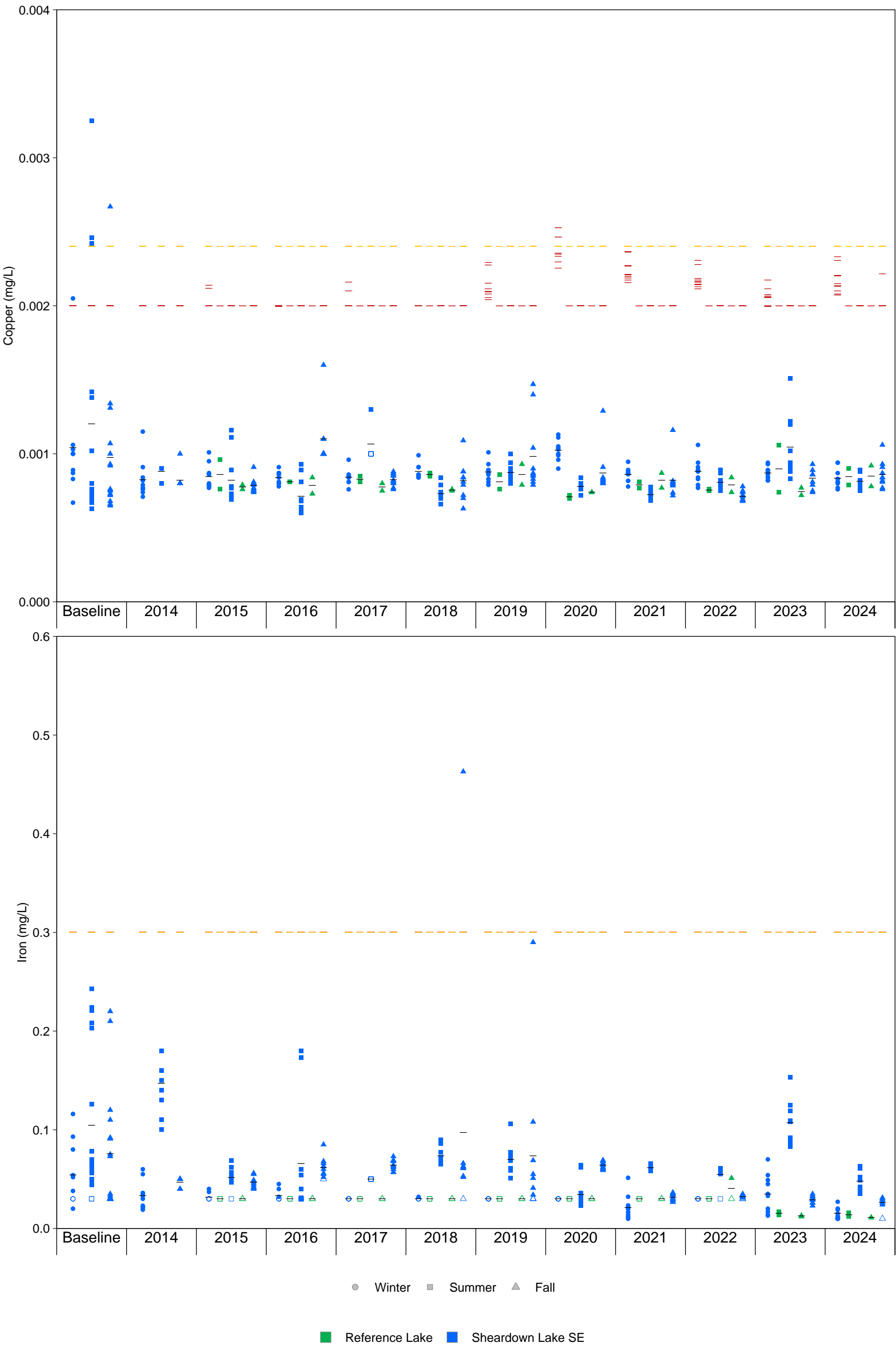


Figure C.21: Temporal Comparison of Water Chemistry at Sheardown Lake Southeast (SE; DL0-02) Over Mine Baseline (2006 to 2013), Construction (2014), and Operational (2015 to 2024) Periods, Mary River Project CREMP

Notes: Concentrations below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL and the open symbol represents one or more values reported below the LRL. Red lines indicate Water Quality Guidelines, some of which are dependent on concurrent hardness values; orange lines indicate AEMP Benchmarks. For each station, a concentration is provided for each of the bottom and the surface of the water column.

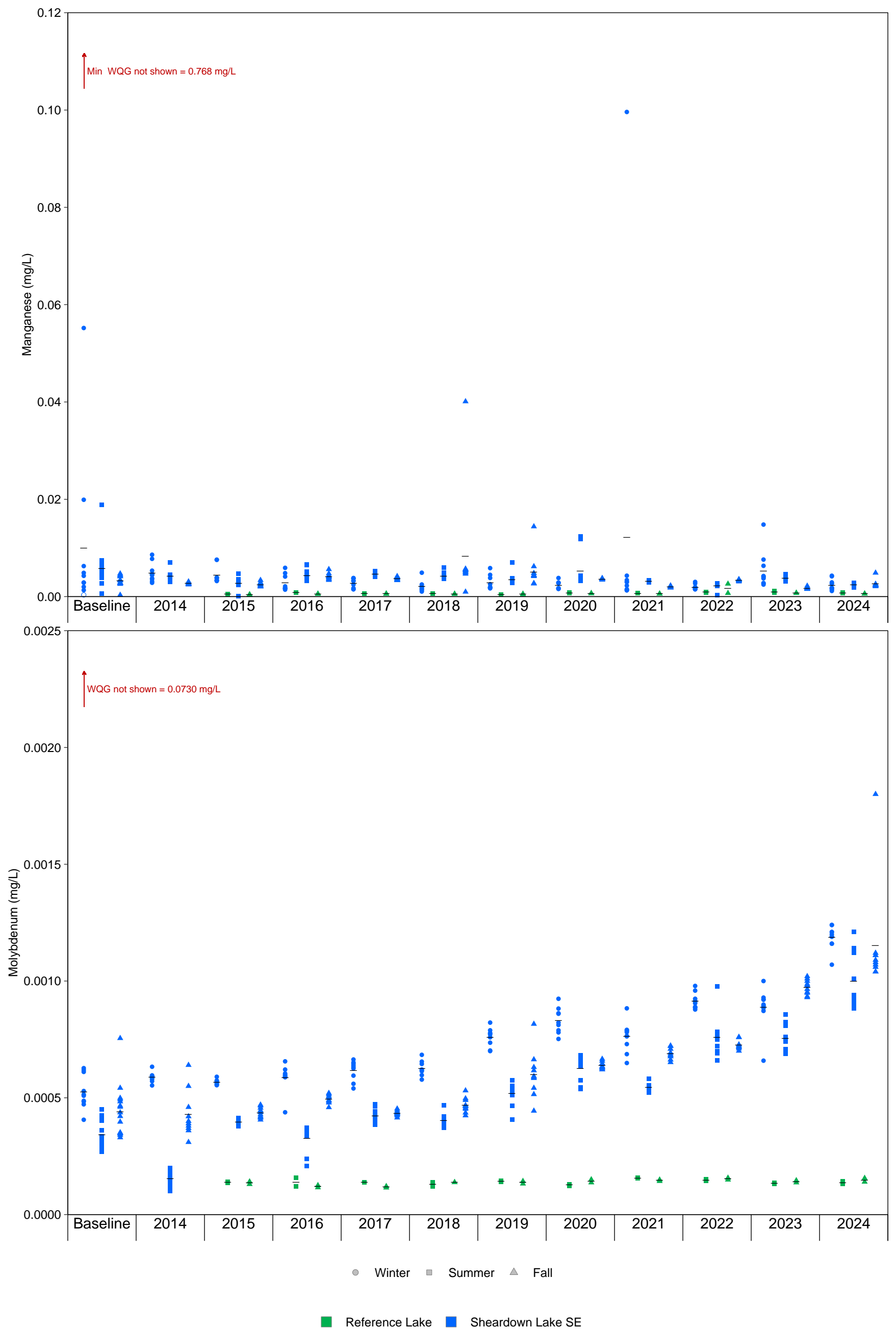


Figure C.21: Temporal Comparison of Water Chemistry at Sheardown Lake Southeast (SE; DL0-02) Over Mine Baseline (2006 to 2013), Construction (2014), and Operational (2015 to 2024) Periods, Mary River Project CREMP

Notes: Concentrations below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL and the open symbol represents one or more values reported below the LRL. Red lines indicate Water Quality Guidelines, some of which are dependent on concurrent hardness values; orange lines indicate AEMP Benchmarks. For each station, a concentration is provided for each of the bottom and the surface of the water column.

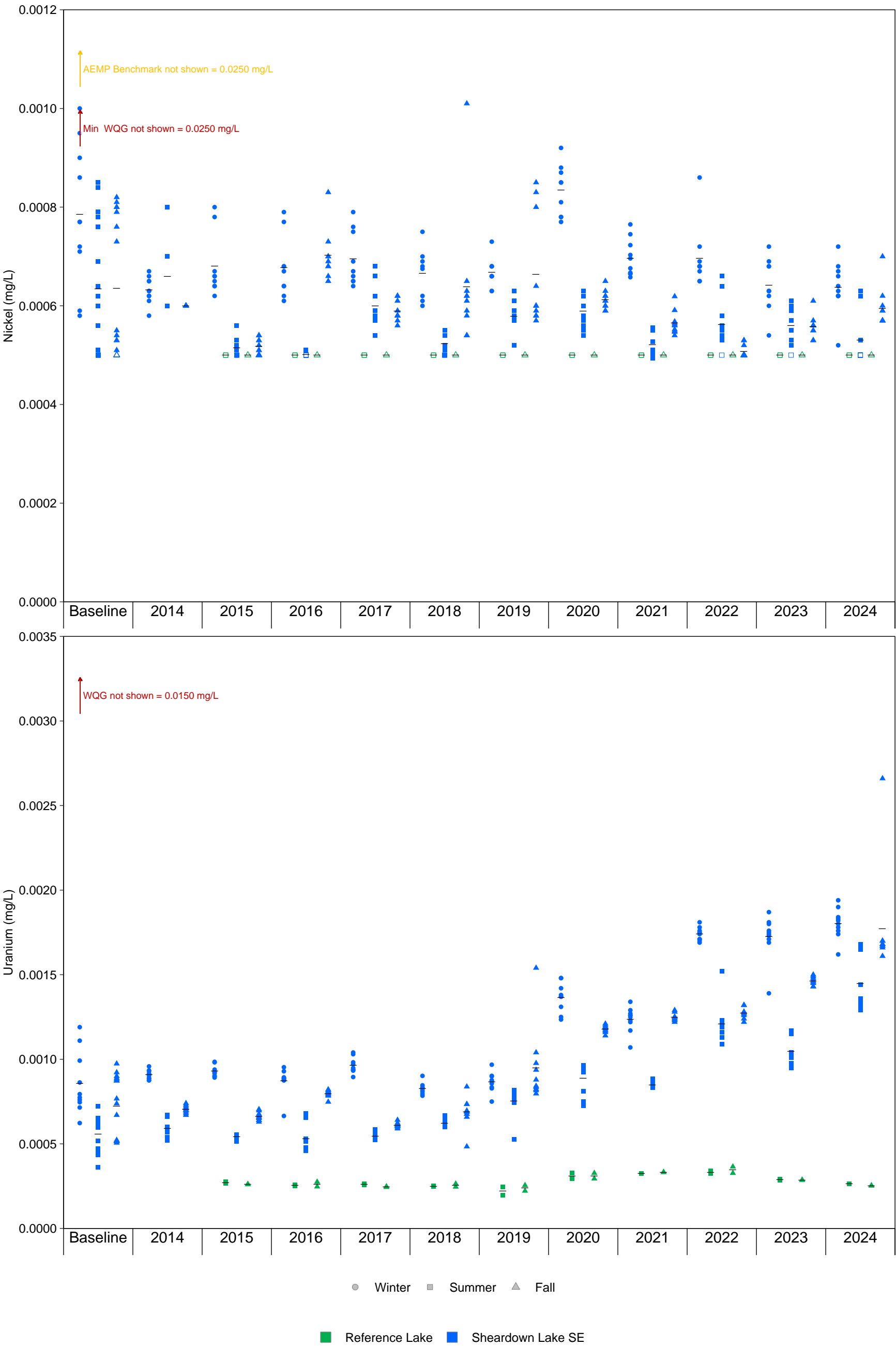


Figure C.21: Temporal Comparison of Water Chemistry at Sheardown Lake Southeast (SE; DL0-02) Over Mine Baseline (2006 to 2013), Construction (2014), and Operational (2015 to 2024) Periods, Mary River Project CREMP

Notes: Concentrations below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL and the open symbol represents one or more values reported below the LRL. Red lines indicate Water Quality Guidelines, some of which are dependent on concurrent hardness values; orange lines indicate AEMP Benchmarks. For each station, a concentration is provided for each of the bottom and the surface of the water column.

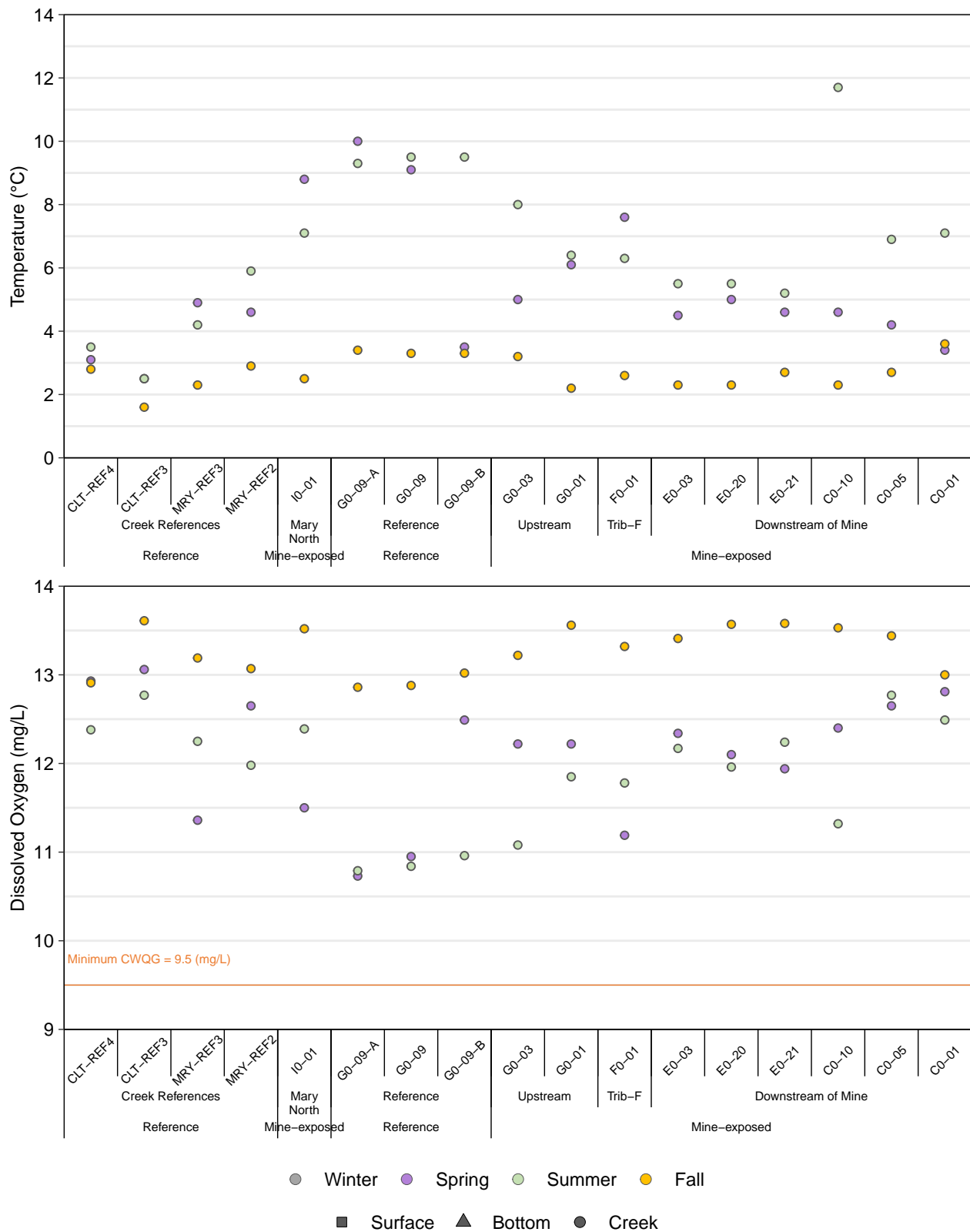


Figure C.22: Comparison of *In Situ* Water Quality Measured at Mary River Water Quality Monitoring Stations in Spring, Summer, and Fall, Mary River Project CREMP, 2024

Notes: Streams were not sampled in winter.

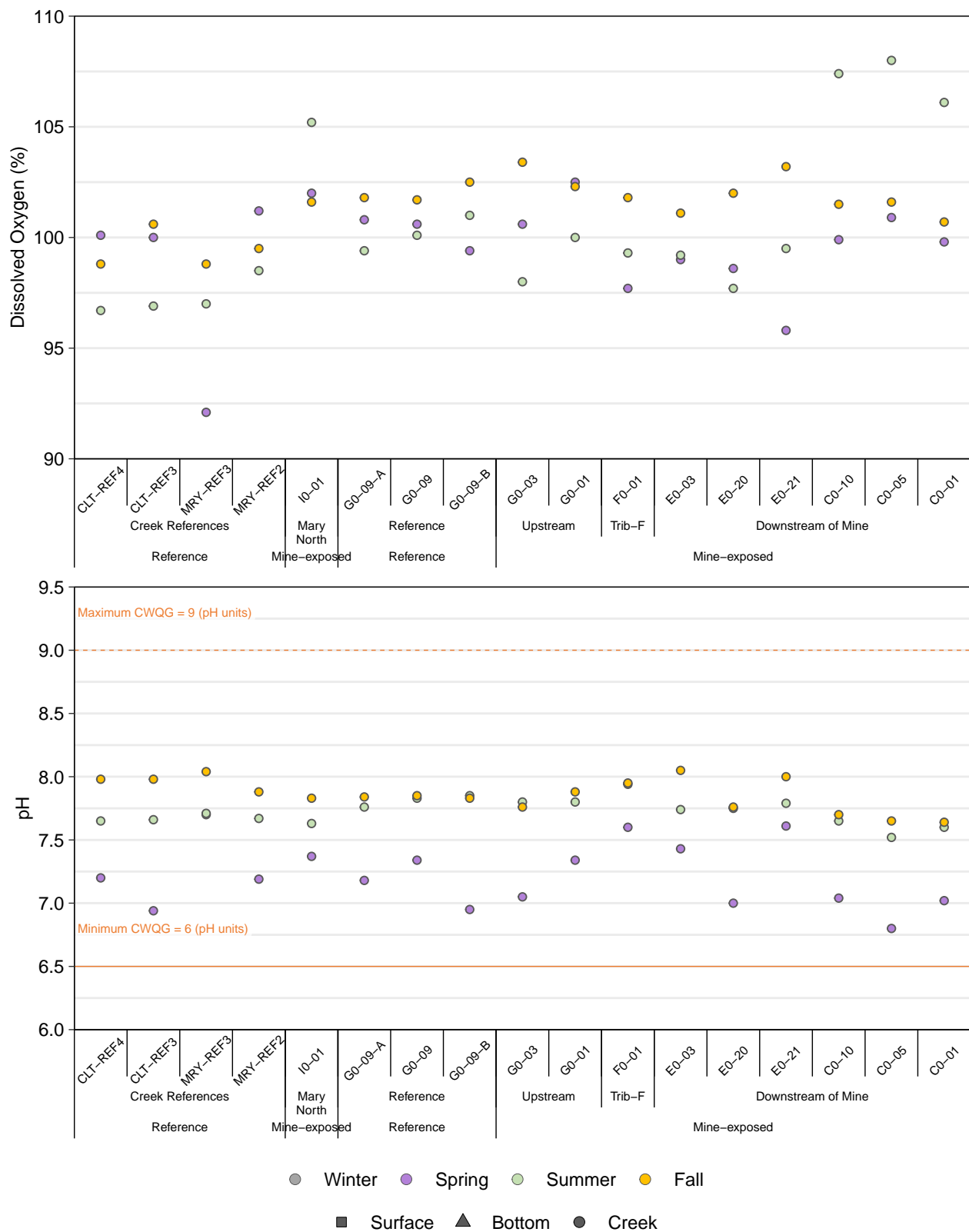


Figure C.22: Comparison of *In Situ* Water Quality Measured at Mary River Water Quality Monitoring Stations in Spring, Summer, and Fall, Mary River Project CREMP, 2024

Notes: Streams were not sampled in winter.

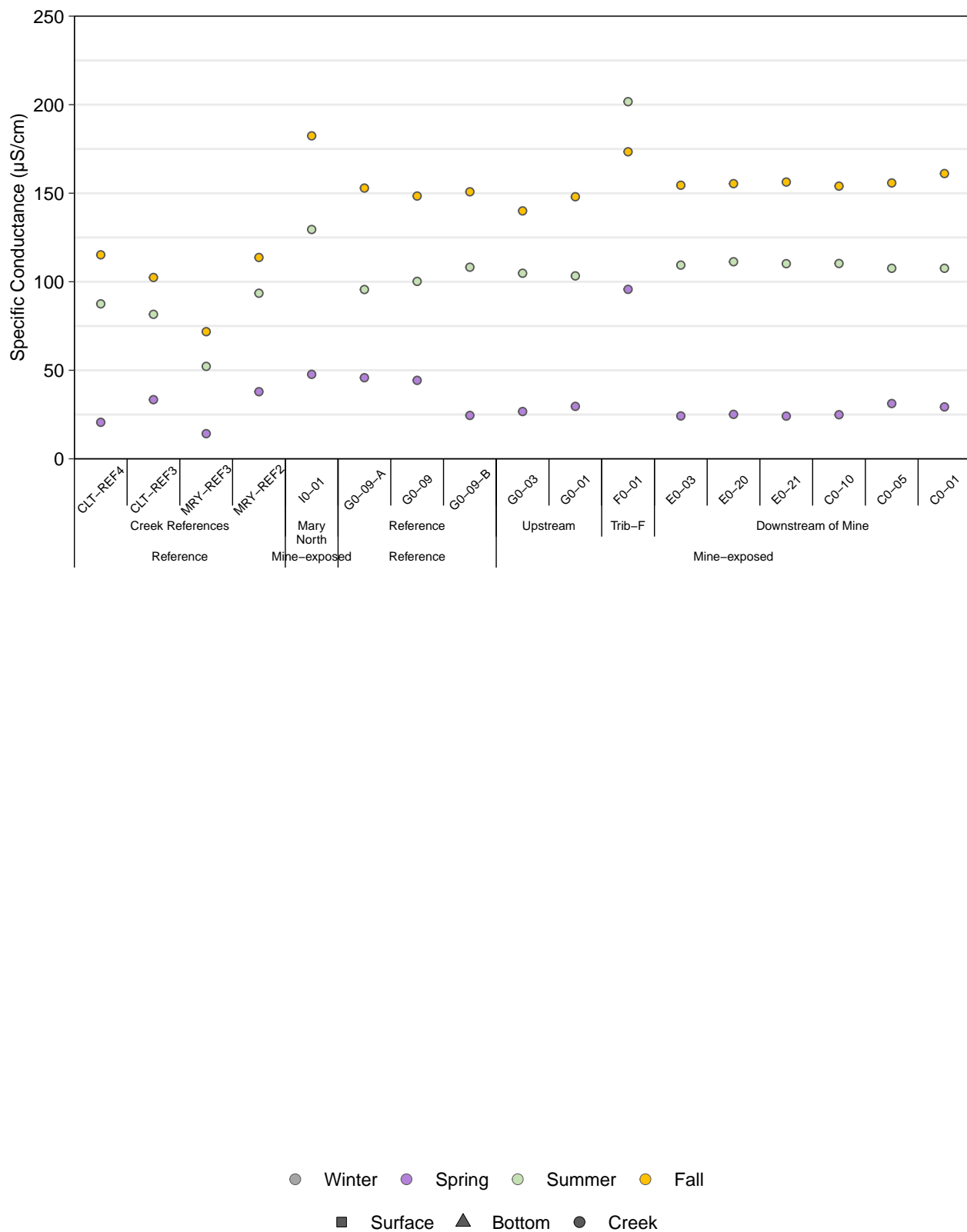


Figure C.22: Comparison of *In Situ* Water Quality Measured at Mary River Water Quality Monitoring Stations in Spring, Summer, and Fall, Mary River Project CREMP, 2024

Notes: Streams were not sampled in winter.

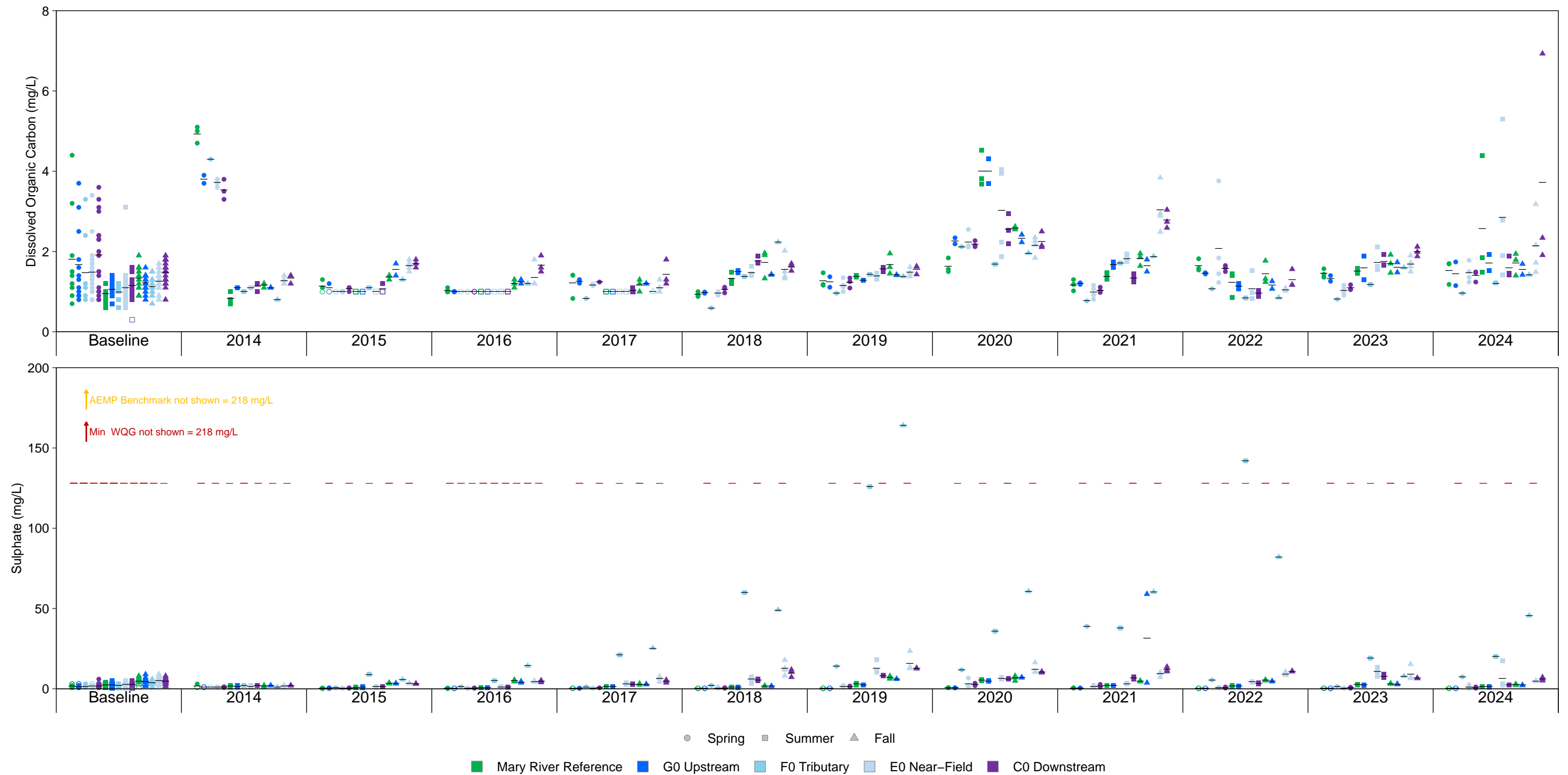


Figure C.23: Temporal Comparison of Water Chemistry at Mary River (G0, F0, E0, and C0) Over Mine Baseline (2006 to 2013), Construction (2014), and Operations (2015 to 2024) Periods, Mary River Project CREMP

Notes: Concentrations below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL and the open symbol represents one or more values reported below the LRL. Red lines indicate Water Quality Guidelines, some of which are dependent on concurrent hardness values; orange lines indicate AEMP Benchmarks. Black bars indicate mean concentrations for the corresponding data.

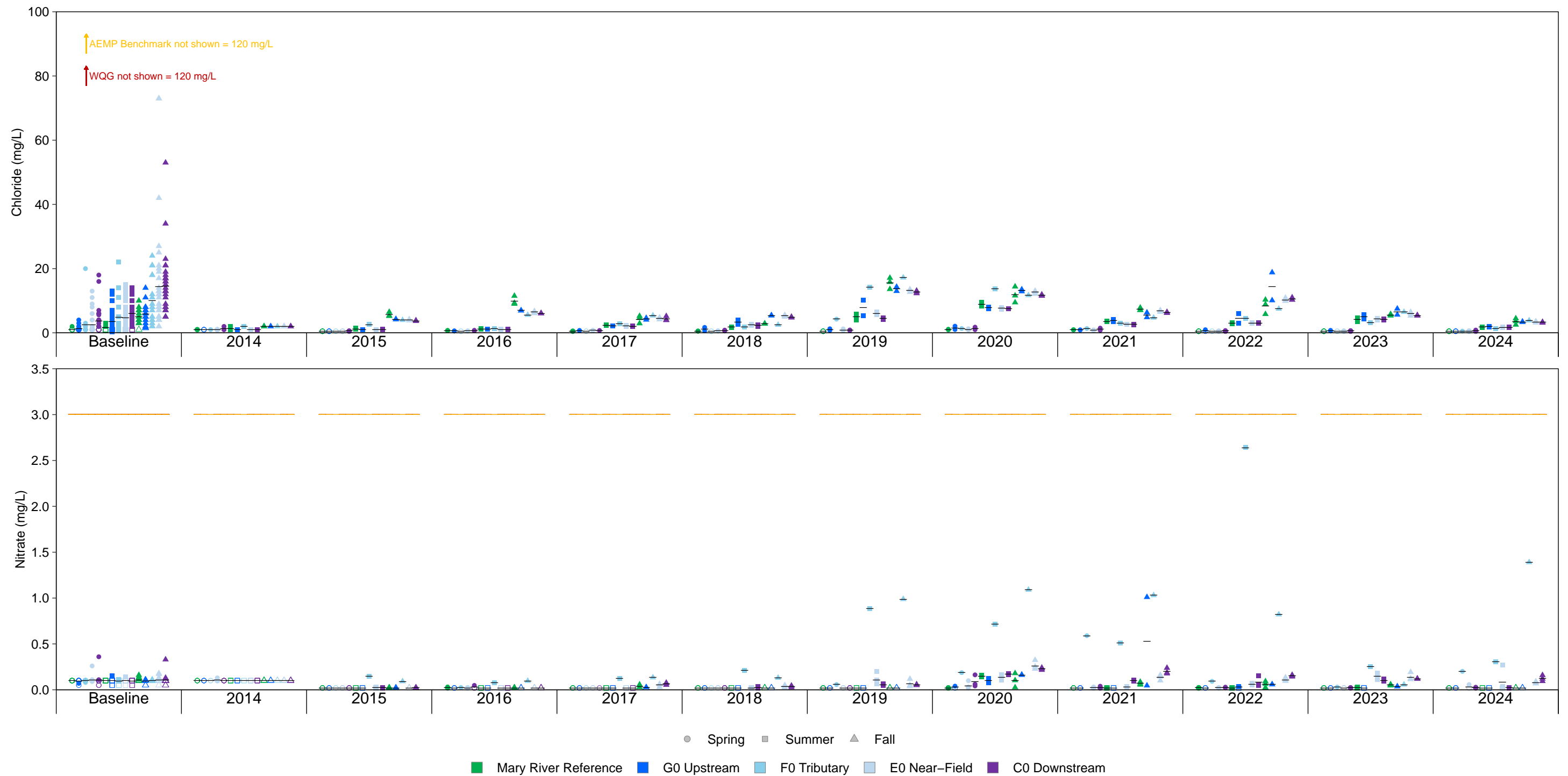


Figure C.23: Temporal Comparison of Water Chemistry at Mary River (G0, F0, E0, and C0) Over Mine Baseline (2006 to 2013), Construction (2014), and Operations (2015 to 2024) Periods, Mary River Project CREMP

Notes: Concentrations below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL and the open symbol represents one or more values reported below the LRL. Red lines indicate Water Quality Guidelines, some of which are dependent on concurrent hardness values; orange lines indicate AEMP Benchmarks. Black bars indicate mean concentrations for the corresponding data.

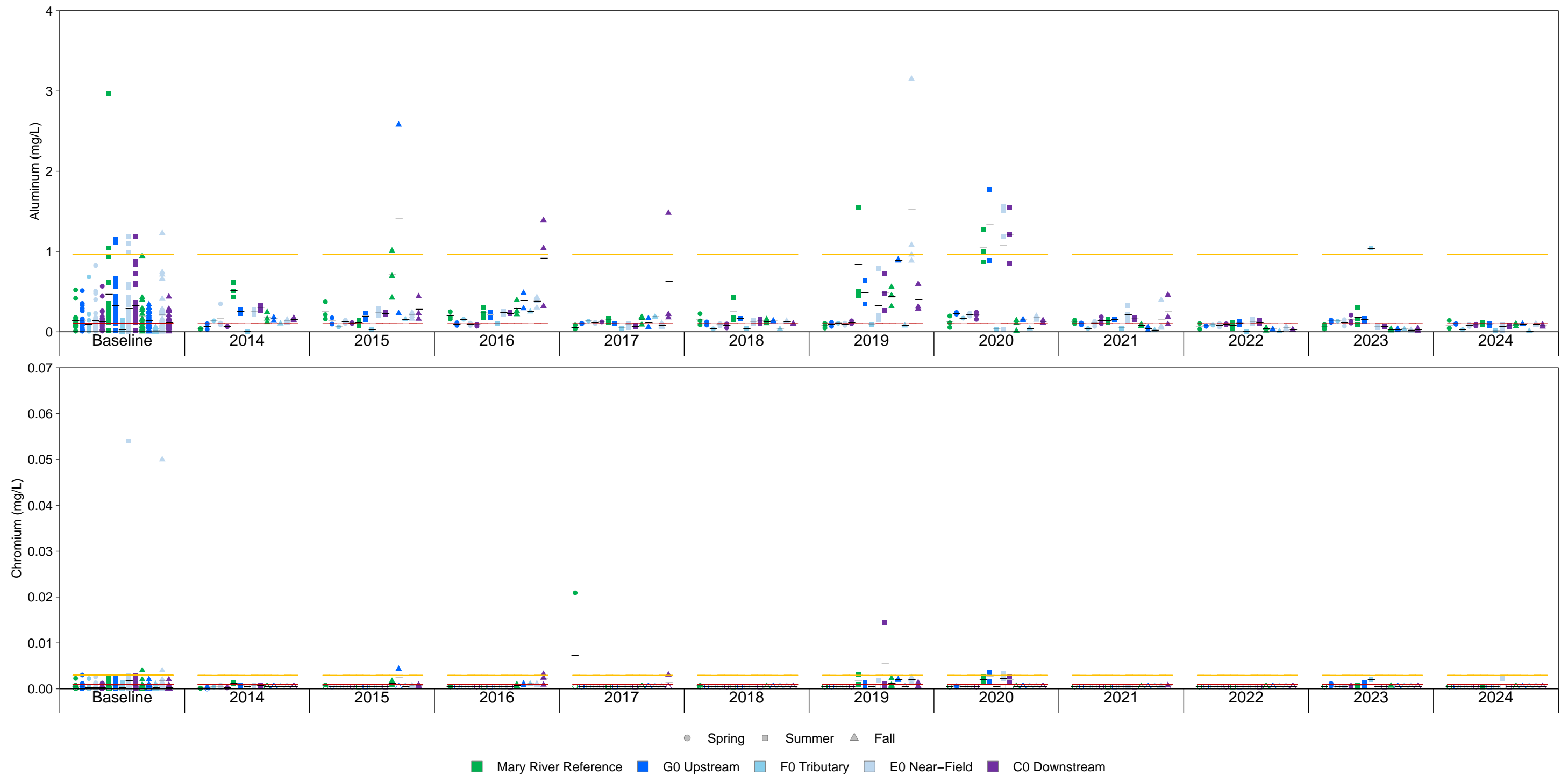


Figure C.23: Temporal Comparison of Water Chemistry at Mary River (G0, F0, E0, and C0) Over Mine Baseline (2006 to 2013), Construction (2014), and Operations (2015 to 2024) Periods, Mary River Project CREMP

Notes: Concentrations below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL and the open symbol represents one or more values reported below the LRL. Red lines indicate Water Quality Guidelines, some of which are dependent on concurrent hardness values; orange lines indicate AEMP Benchmarks. Black bars indicate mean concentrations for the corresponding data.

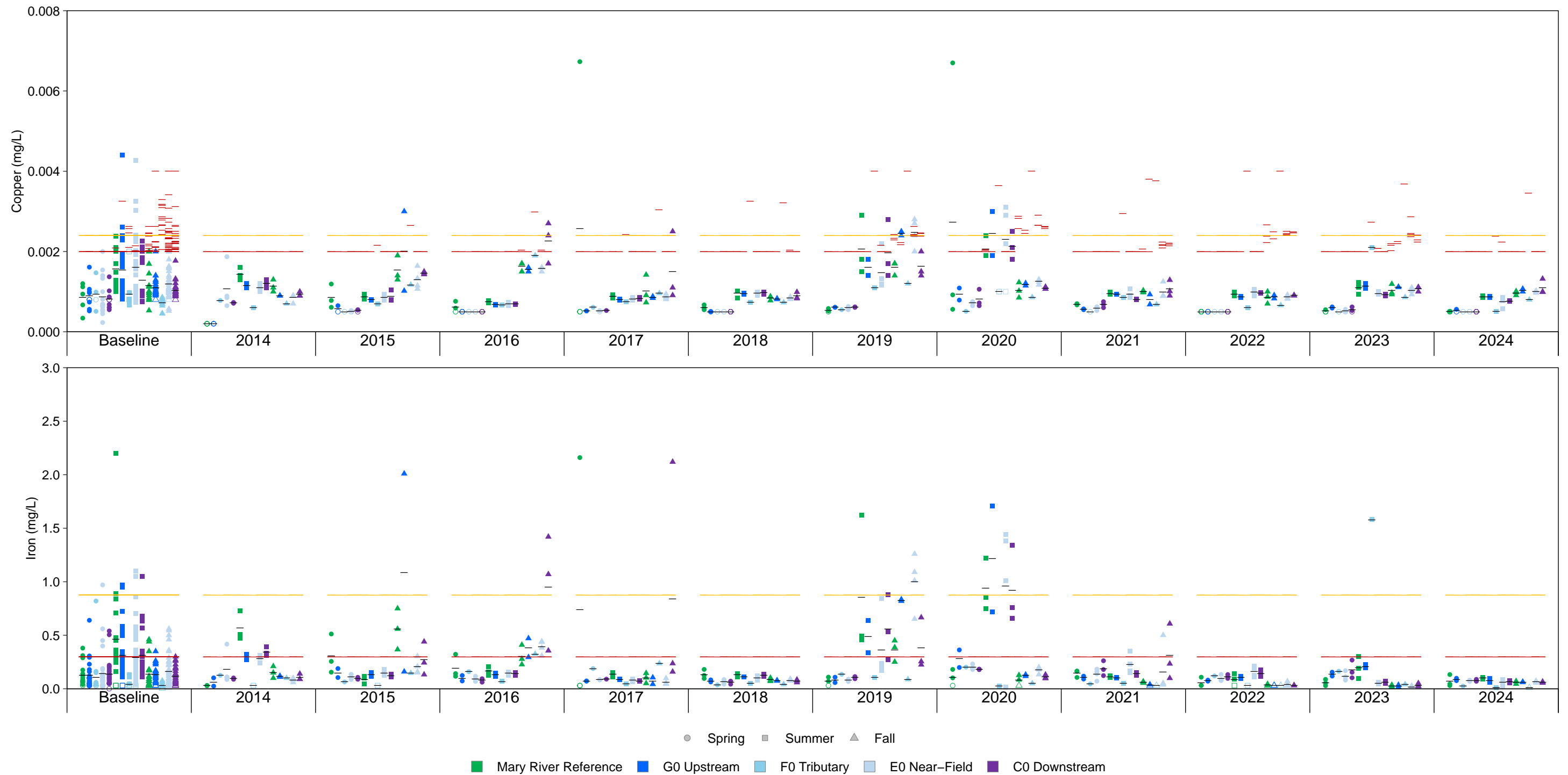


Figure C.23: Temporal Comparison of Water Chemistry at Mary River (G0, F0, E0, and C0) Over Mine Baseline (2006 to 2013), Construction (2014), and Operations (2015 to 2024) Periods, Mary River Project CREMP

Notes: Concentrations below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL and the open symbol represents one or more values reported below the LRL. Red lines indicate Water Quality Guidelines, some of which are dependent on concurrent hardness values; orange lines indicate AEMP Benchmarks. Black bars indicate mean concentrations for the corresponding data.



Figure C.23: Temporal Comparison of Water Chemistry at Mary River (G0, F0, E0, and C0) Over Mine Baseline (2006 to 2013), Construction (2014), and Operations (2015 to 2024) Periods, Mary River Project CREMP

Notes: Concentrations below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL and the open symbol represents one or more values reported below the LRL. Red lines indicate Water Quality Guidelines, some of which are dependent on concurrent hardness values; orange lines indicate AEMP Benchmarks. Black bars indicate mean concentrations for the corresponding data.

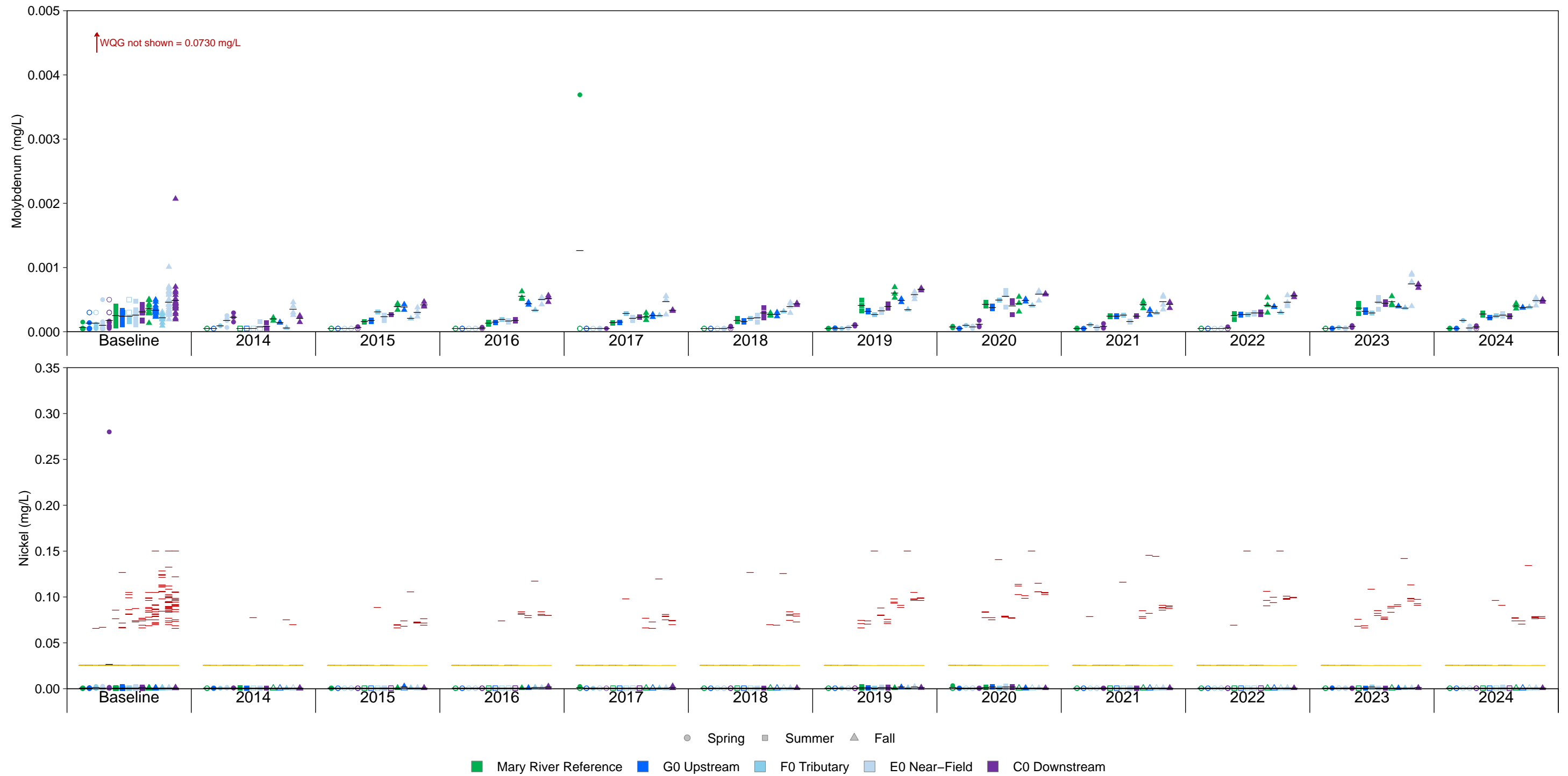


Figure C.23: Temporal Comparison of Water Chemistry at Mary River (G0, F0, E0, and C0) Over Mine Baseline (2006 to 2013), Construction (2014), and Operations (2015 to 2024) Periods, Mary River Project CREMP

Notes: Concentrations below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL and the open symbol represents one or more values reported below the LRL. Red lines indicate Water Quality Guidelines, some of which are dependent on concurrent hardness values; orange lines indicate AEMP Benchmarks. Black bars indicate mean concentrations for the corresponding data.

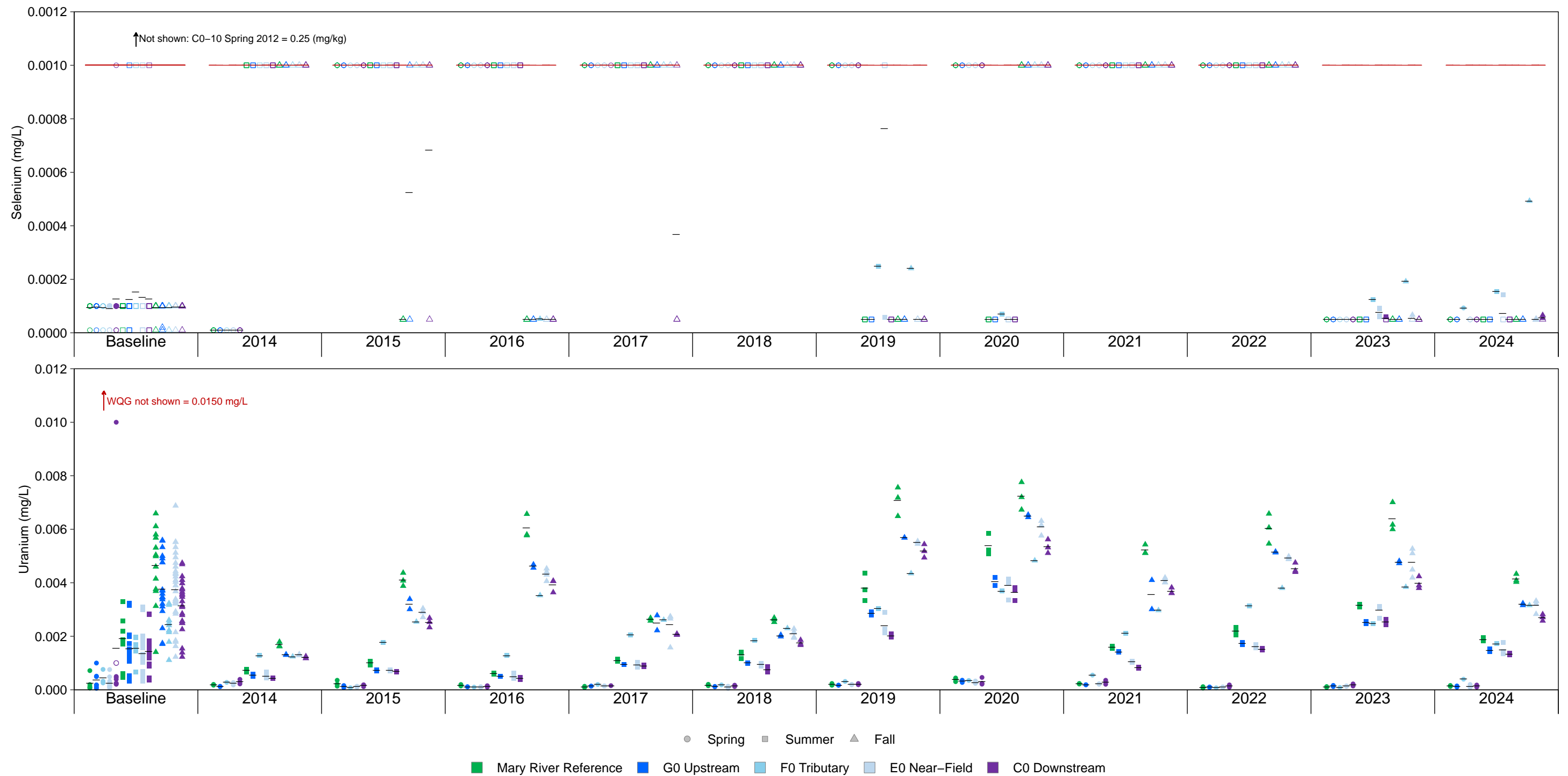


Figure C.23: Temporal Comparison of Water Chemistry at Mary River (G0, F0, E0, and C0) Over Mine Baseline (2006 to 2013), Construction (2014), and Operations (2015 to 2024) Periods, Mary River Project CREMP

Notes: Concentrations below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL and the open symbol represents one or more values reported below the LRL. Red lines indicate Water Quality Guidelines, some of which are dependent on concurrent hardness values; orange lines indicate AEMP Benchmarks. Black bars indicate mean concentrations for the corresponding data.

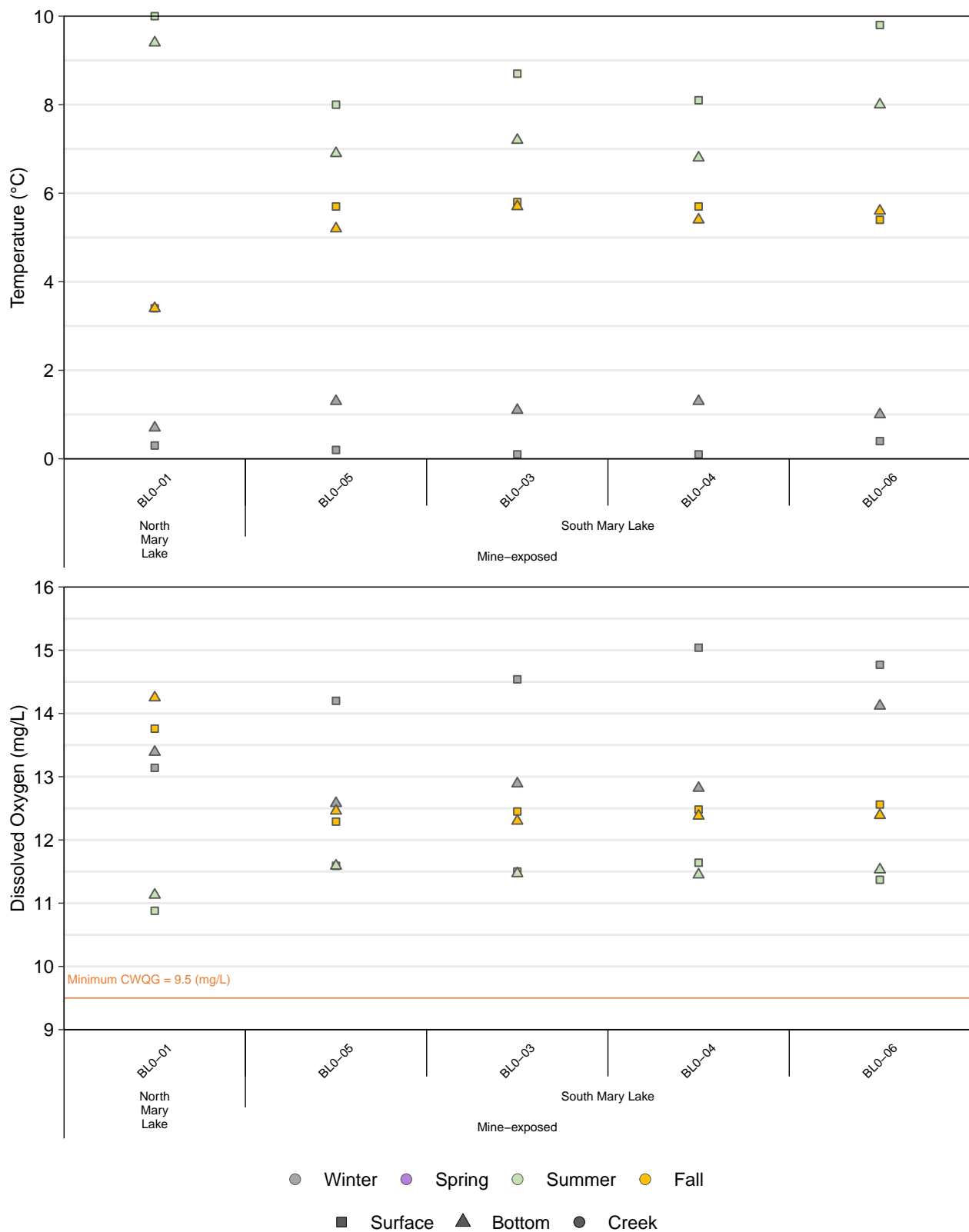


Figure C.24: Comparison of *In Situ* Water Quality Measured at Mary Lake (North Basin [BL0-01]; and South Basin [BL0]) Water Quality Monitoring Stations in Winter, Summer, and Fall, Mary River Project CREMP, 2024

Notes: Lakes were not sampled in spring.

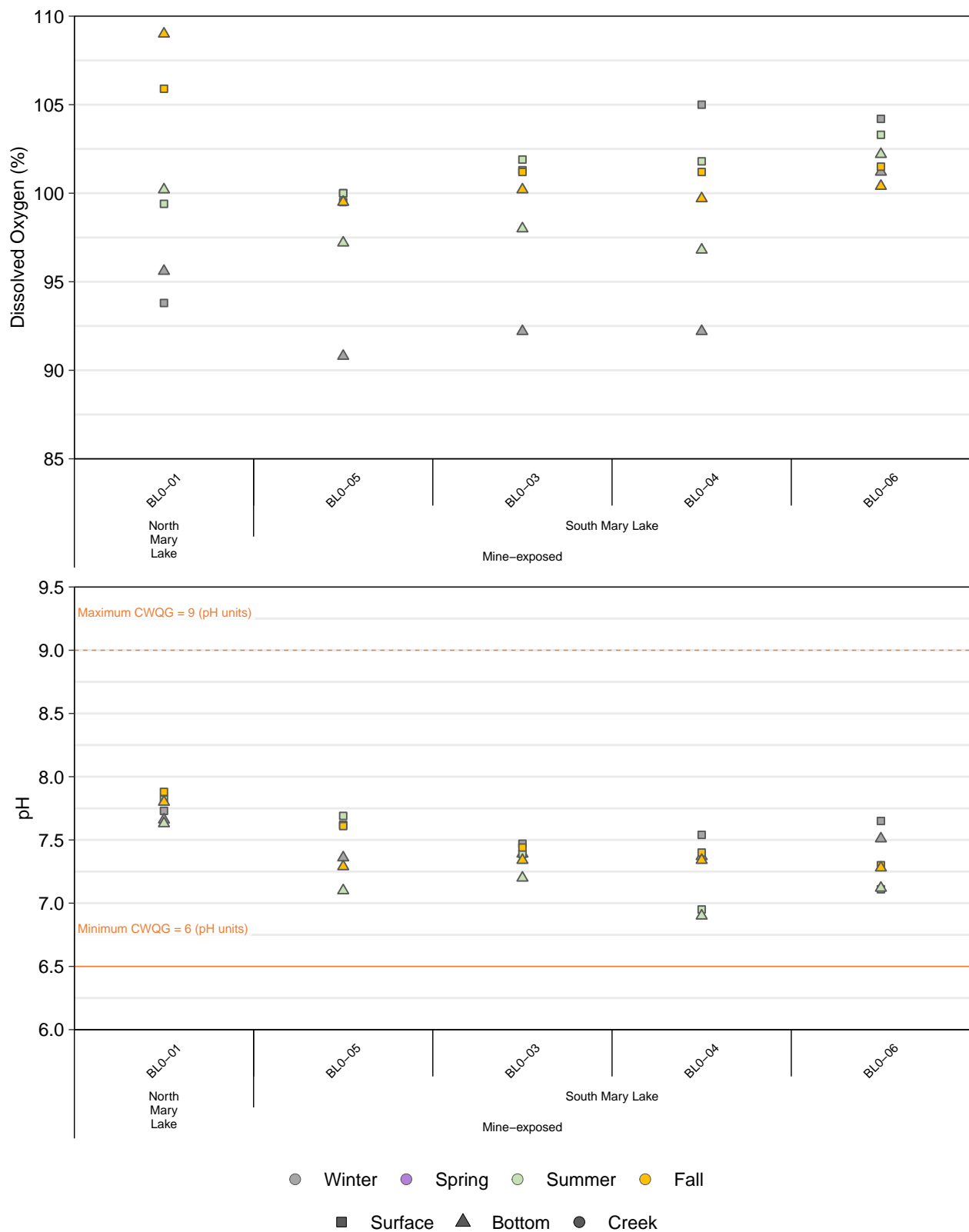


Figure C.24: Comparison of *In Situ* Water Quality Measured at Mary Lake (North Basin [BL0-01]; and South Basin [BL0]) Water Quality Monitoring Stations in Winter, Summer, and Fall, Mary River Project CREMP, 2024

Notes: Lakes were not sampled in spring.

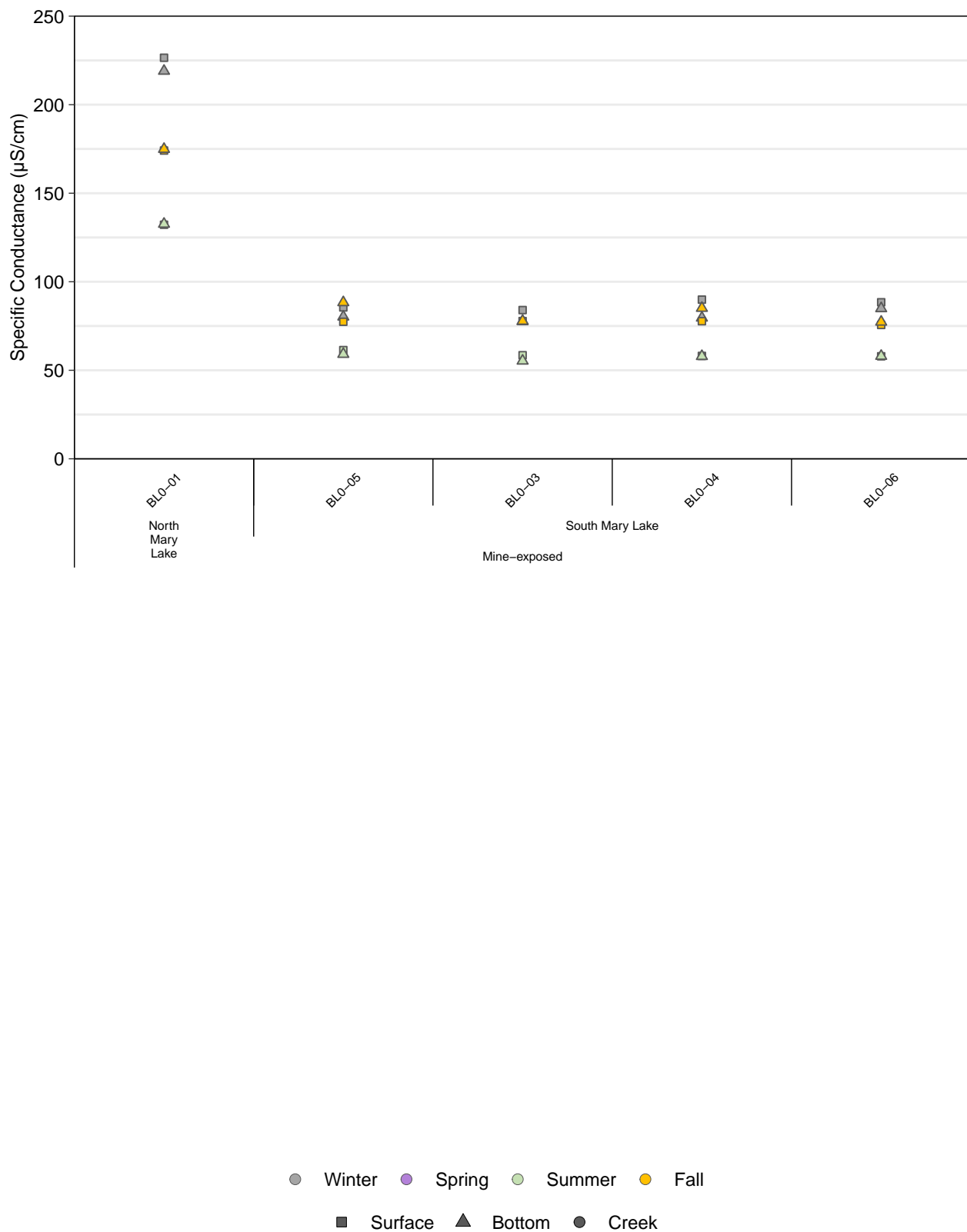


Figure C.24: Comparison of *In Situ* Water Quality Measured at Mary Lake (North Basin [BL0-01]; and South Basin [BL0]) Water Quality Monitoring Stations in Winter, Summer, and Fall, Mary River Project CREMP, 2024

Notes: Lakes were not sampled in spring.

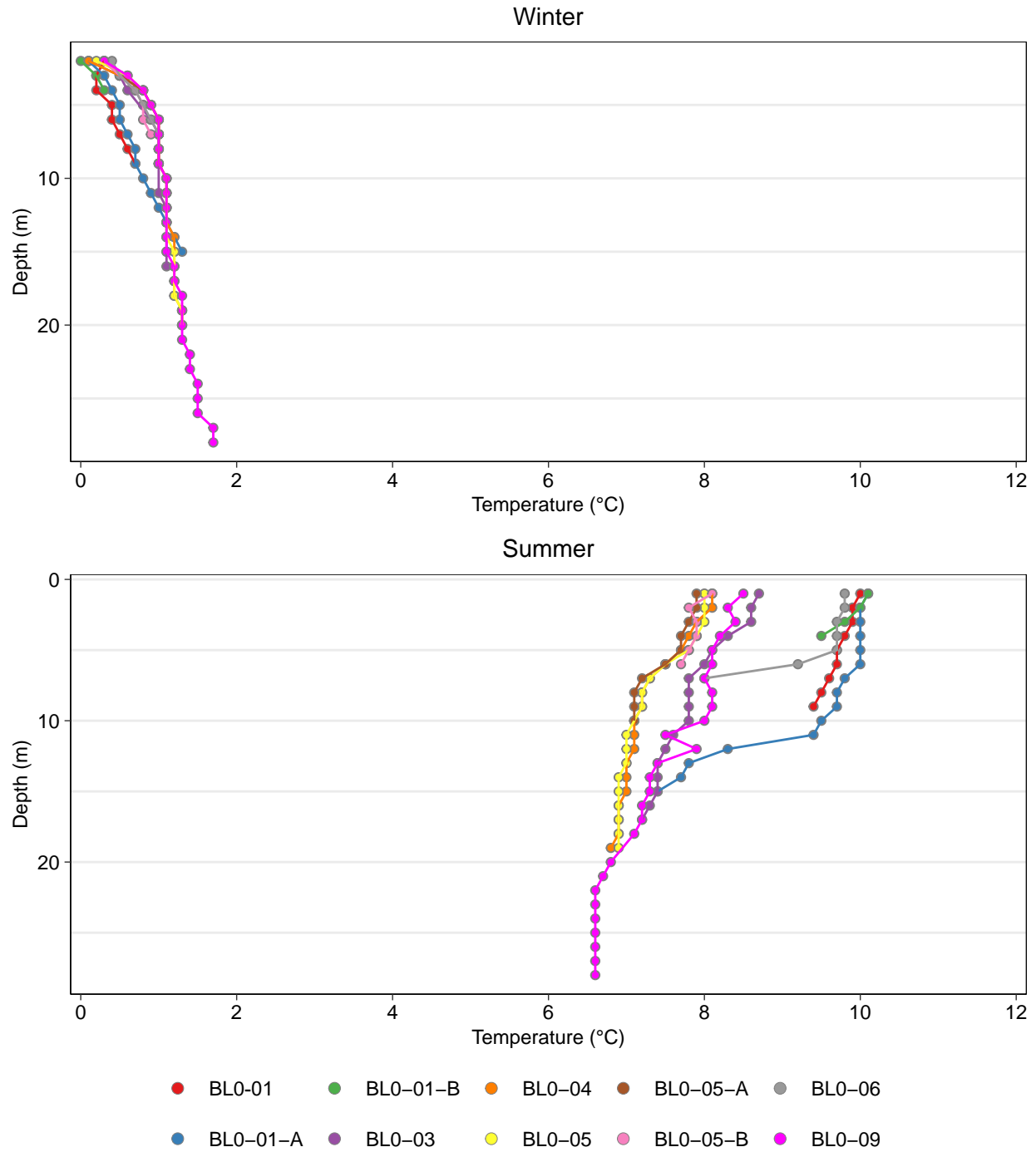


Figure C.25: Vertical Profiles of Temperature (°C) Measured at Mary Lake (North Basin [BL0-01]; and South Basin [BL0]) Compared in Winter, Summer, and Fall, Mary River Project CREMP, 2024

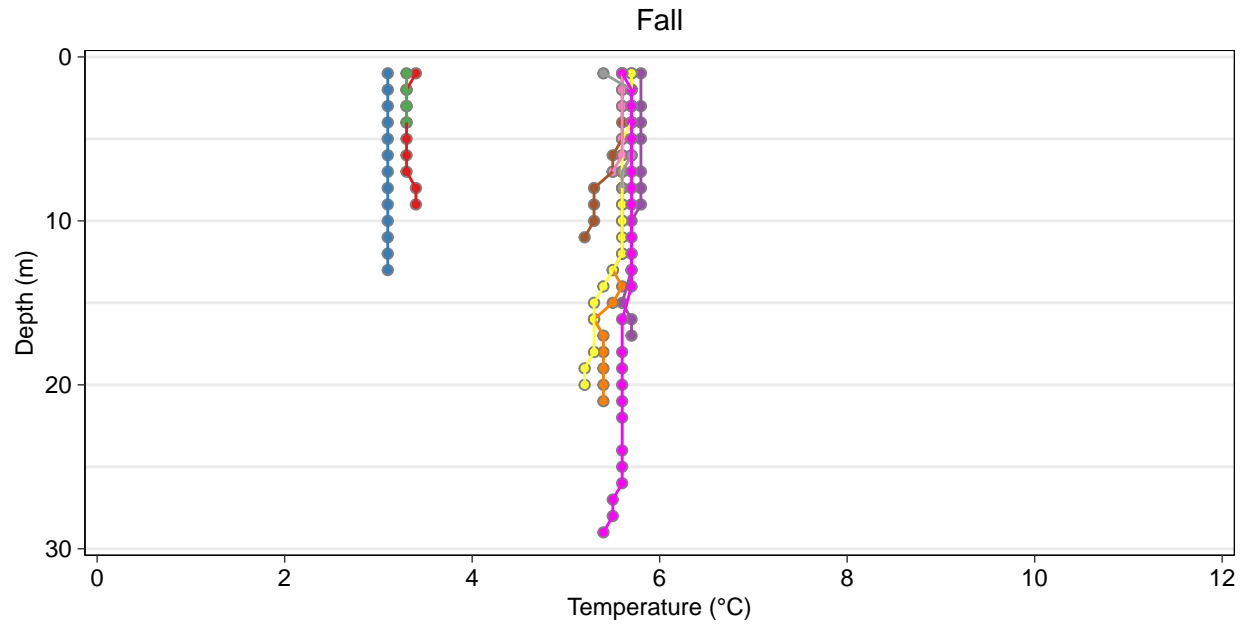


Figure C.25: Vertical Profiles of Temperature (°C) Measured at Mary Lake (North Basin [BL0-01]; and South Basin [BL0]) Compared in Winter, Summer, and Fall, Mary River Project CREMP, 2024

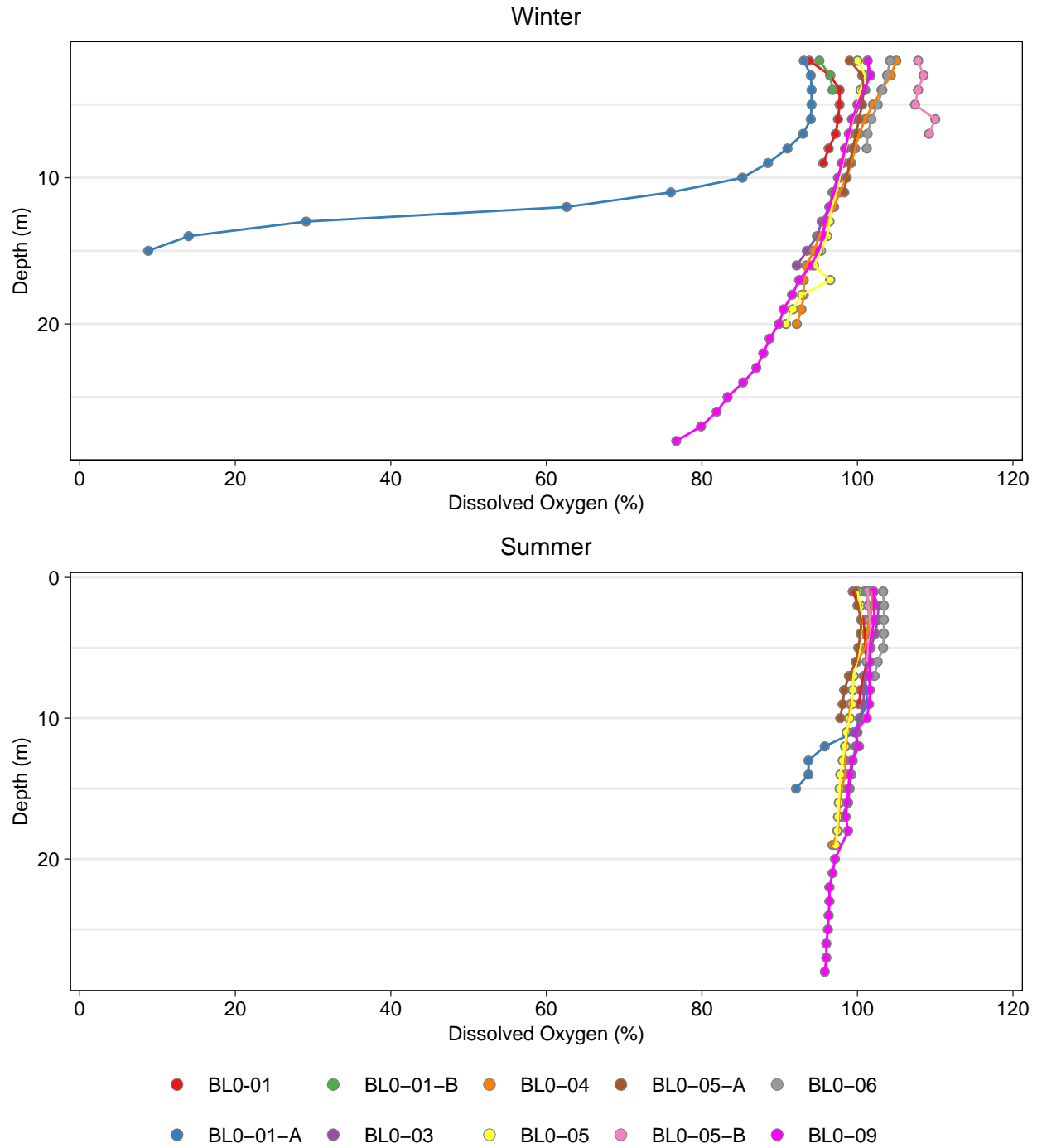
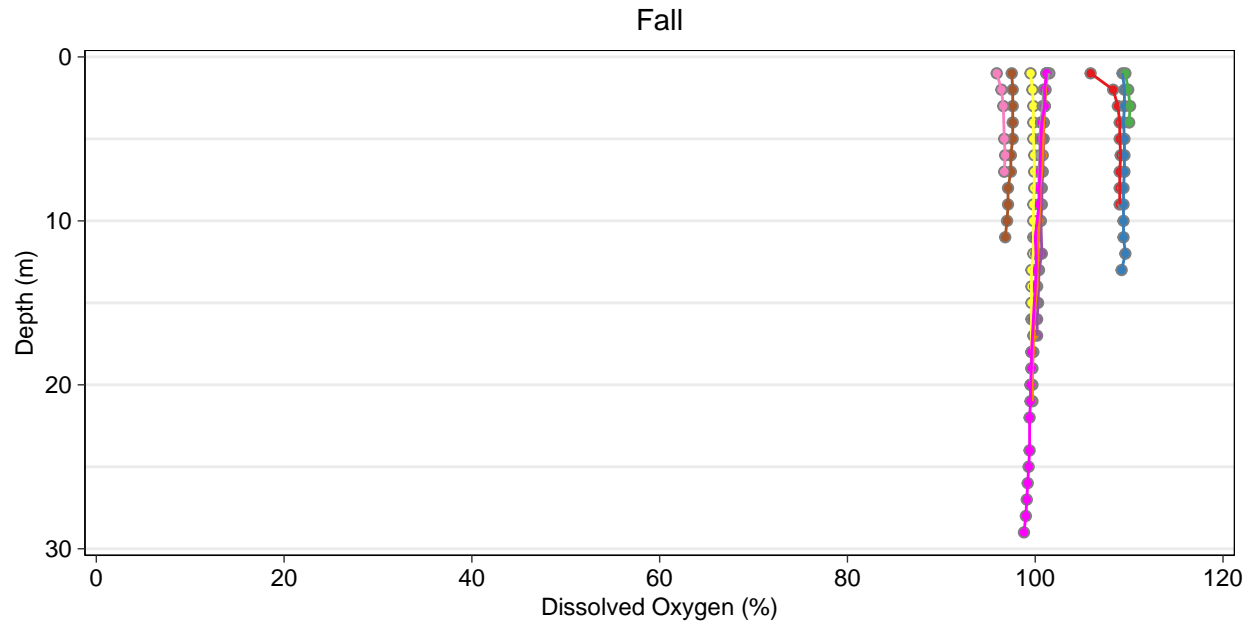


Figure C.26: Vertical Profiles of Dissolved Oxygen (%) Measured at Mary Lake (North Basin [BL0-01]; and South Basin [BL0]) Compared in Winter, Summer, and Fall, Mary River Project CREMP, 2024



- BL0-01
- BL0-01-A
- BL0-01-B
- BL0-03
- BL0-04
- BL0-05-A
- BL0-05-B
- BL0-06
- BL0-09

Figure C.26: Vertical Profiles of Dissolved Oxygen (%) Measured at Mary Lake (North Basin [BL0-01]; and South Basin [BL0]) Compared in Winter, Summer, and Fall, Mary River Project CREMP, 2024

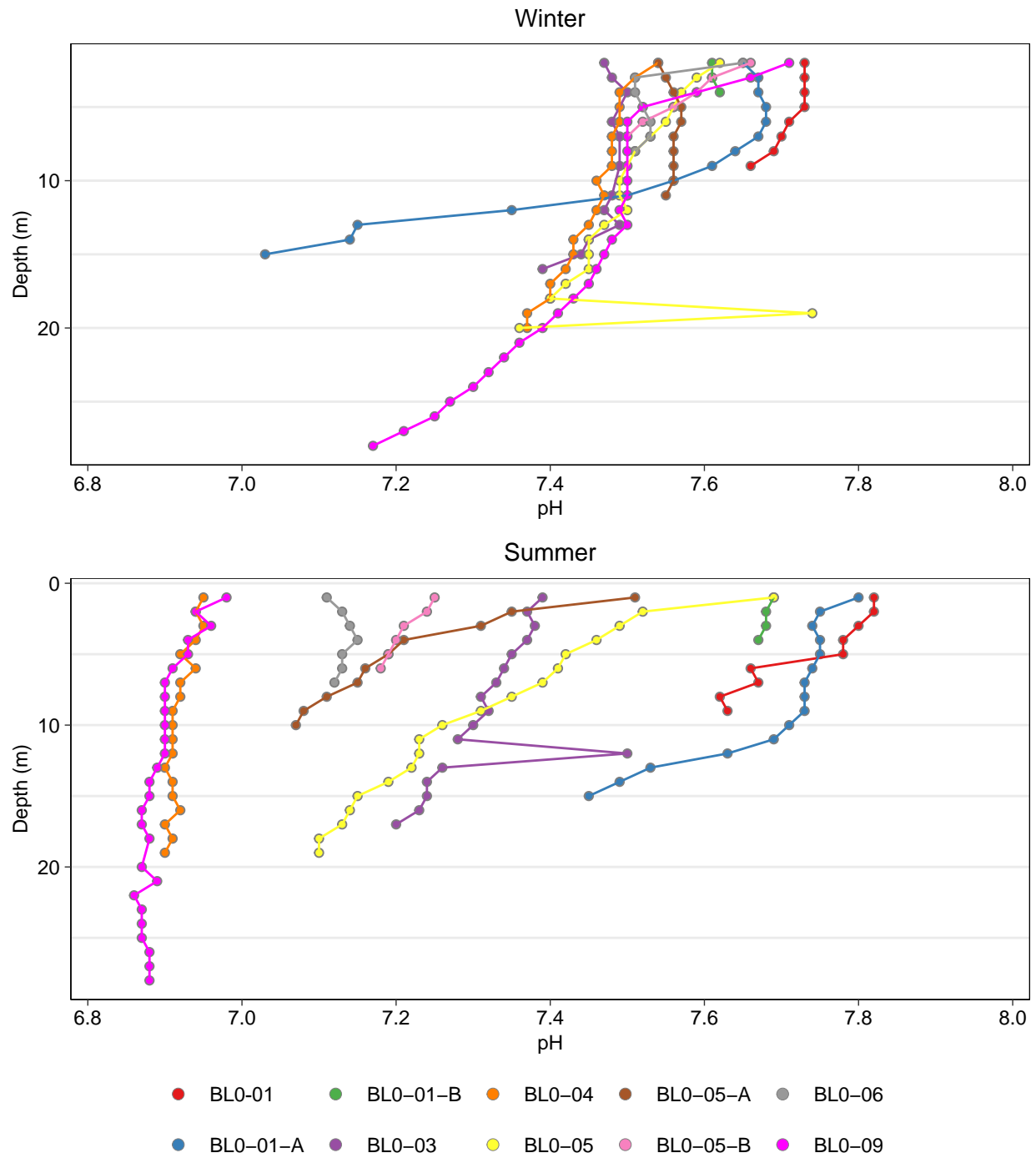


Figure C.27: Vertical Profiles of pH Measured at Mary Lake Compared in Winter, Summer, and Fall, Mary River Project CREMP, 2024

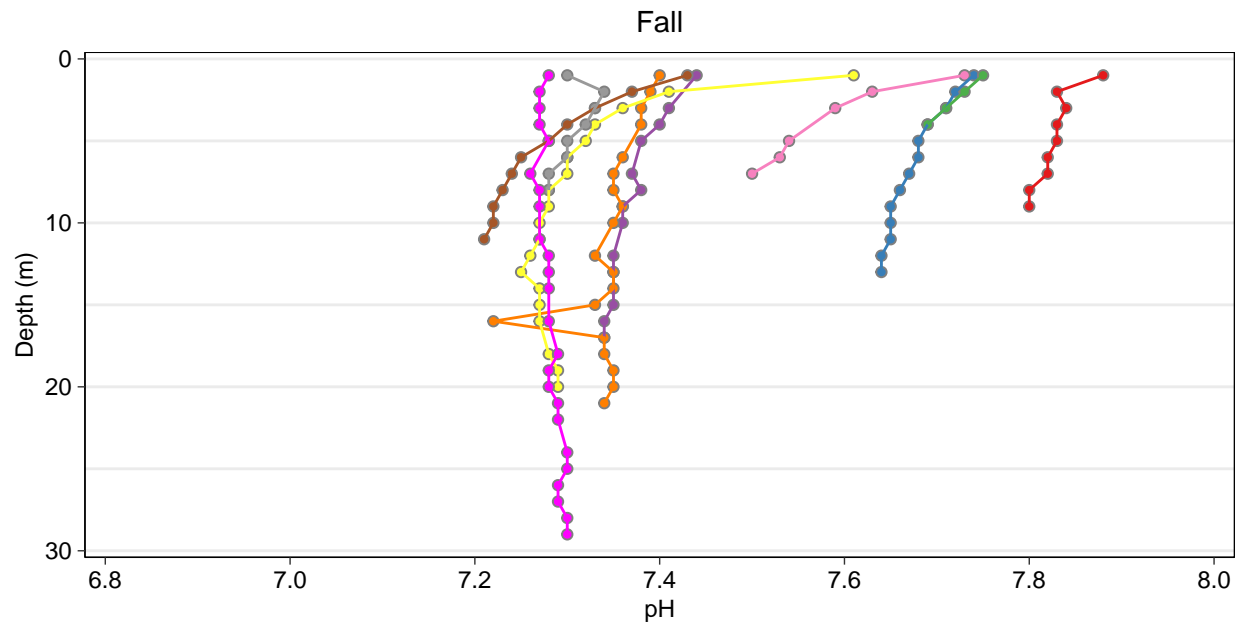


Figure C.27: Vertical Profiles of pH Measured at Mary Lake Compared in Winter, Summer, and Fall, Mary River Project CREMP, 2024

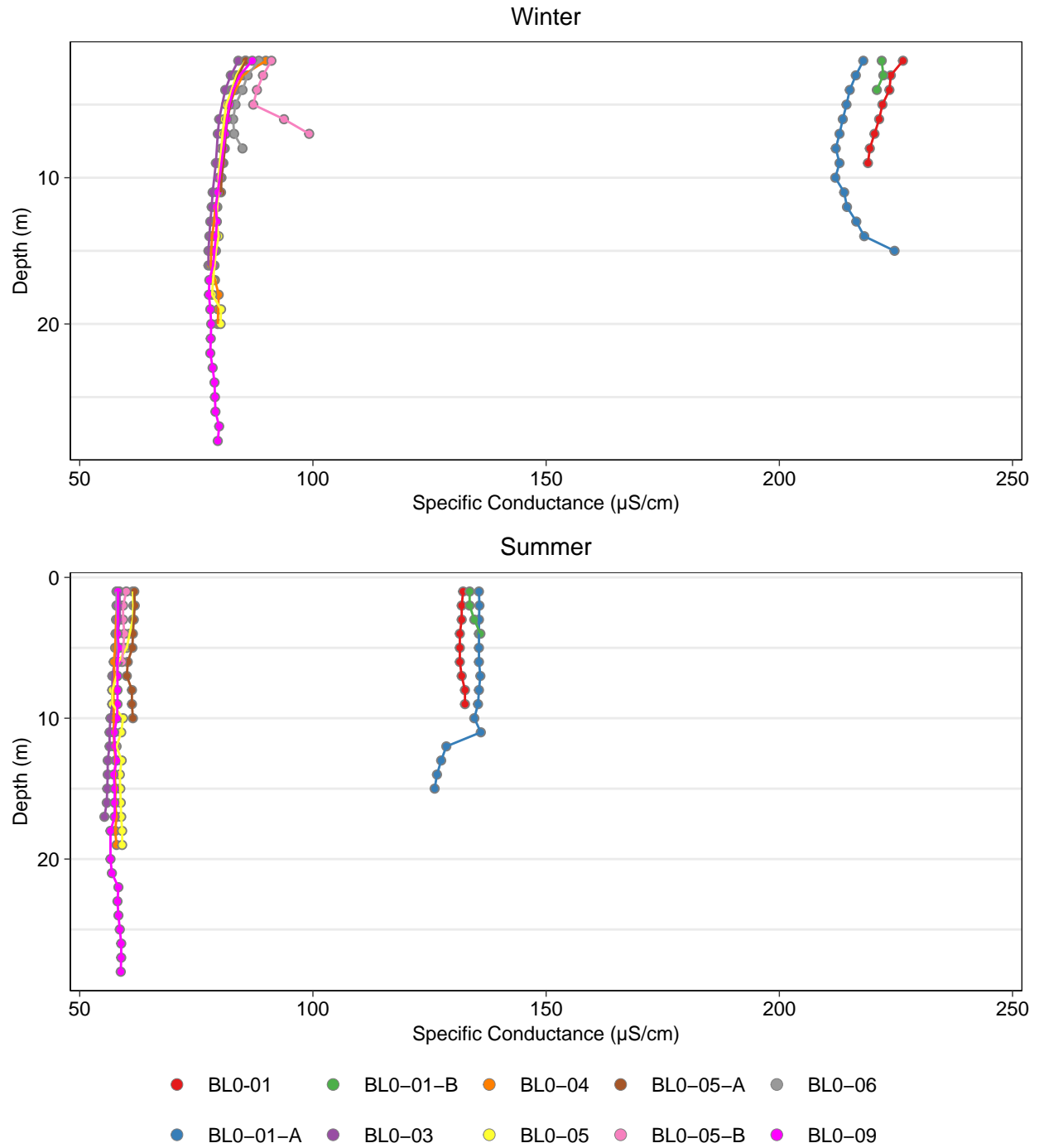
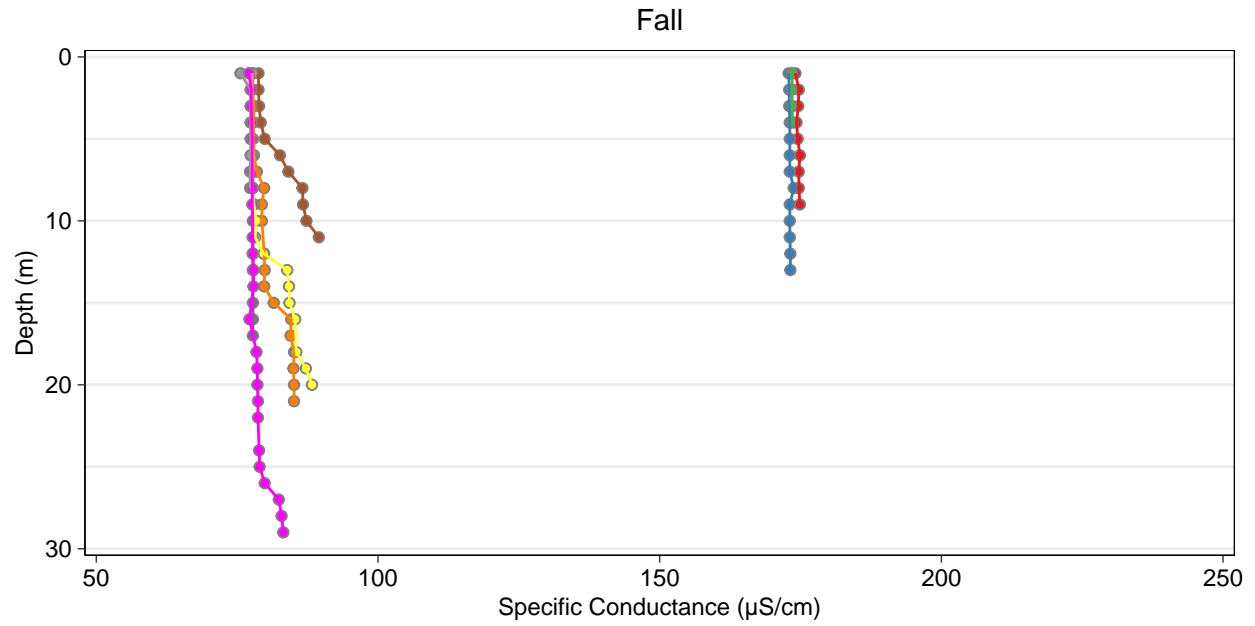


Figure C.28: Vertical Profiles of Specific Conductance ($\mu\text{S}/\text{cm}$) Measured at Mary Lake (North Basin [BL0-01]; and South Basin [BL0]) Compared in Winter, Summer, and Fall, Mary River Project CREMP, 2024



- BL0-01
- BL0-01-B
- BL0-04
- BL0-05-A
- BL0-06
- BL0-01-A
- BL0-03
- BL0-05
- BL0-05-B
- BL0-09

Figure C.28: Vertical Profiles of Specific Conductance (µS/cm) Measured at Mary Lake (North Basin [BL0-01]; and South Basin [BL0]) Compared in Winter, Summer, and Fall, Mary River Project CREMP, 2024

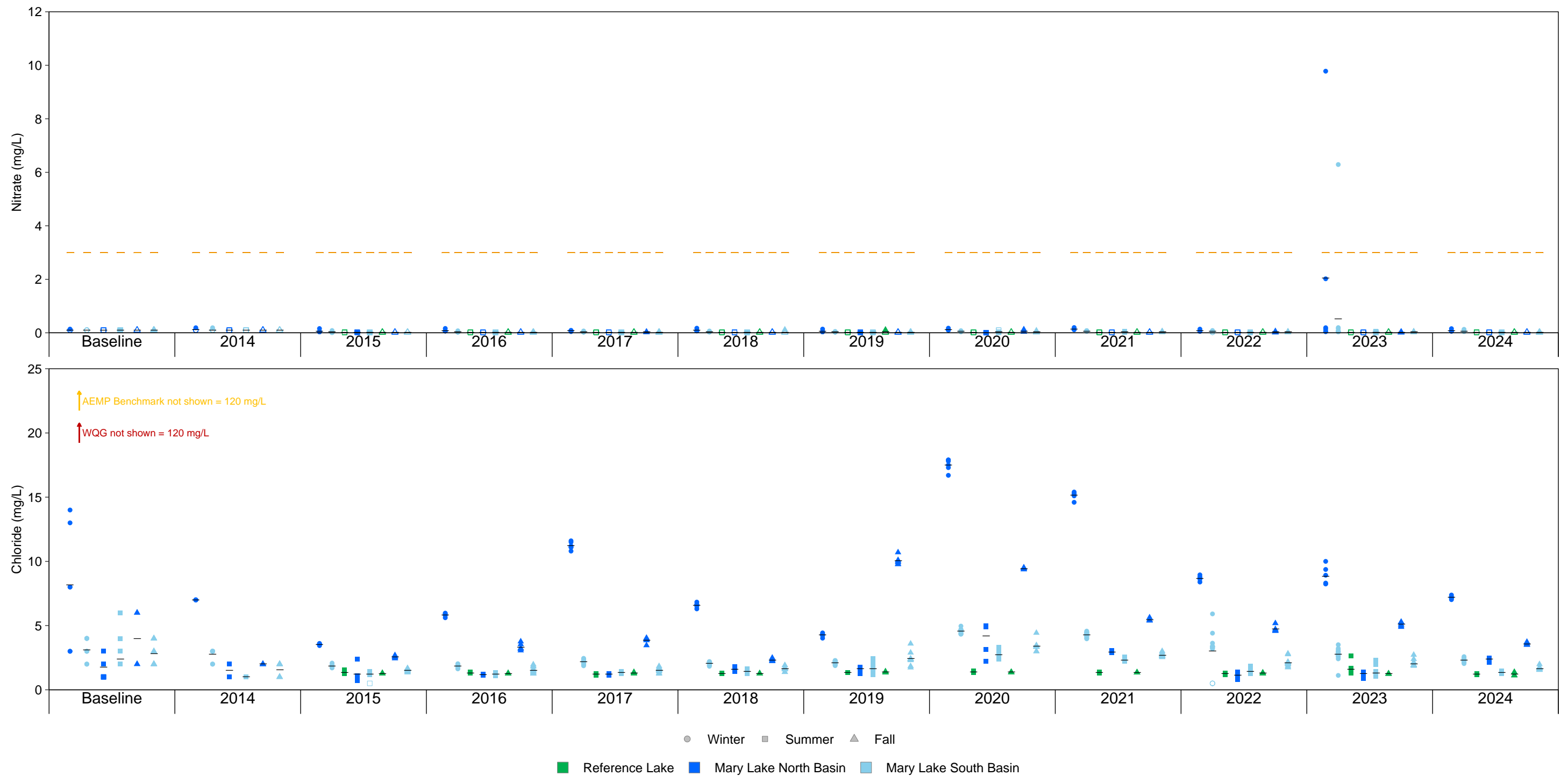


Figure C.29: Temporal Comparison of Water Chemistry at Mary Lake (North Basin [BL0]; and South Basin [BL0-01]) Over Mine Baseline (2006 to 2013), Construction (2014), and Operational (2015 to 2024) Periods, Mary River Project CREMP

Notes: Concentrations below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL and the open symbol represents one or more values reported below the LRL. Red lines indicate Water Quality Guidelines, some of which are dependent on concurrent hardness values; orange lines indicate AEMP Benchmarks. For each station, a concentration is provided for each of the bottom and the surface of the water column.

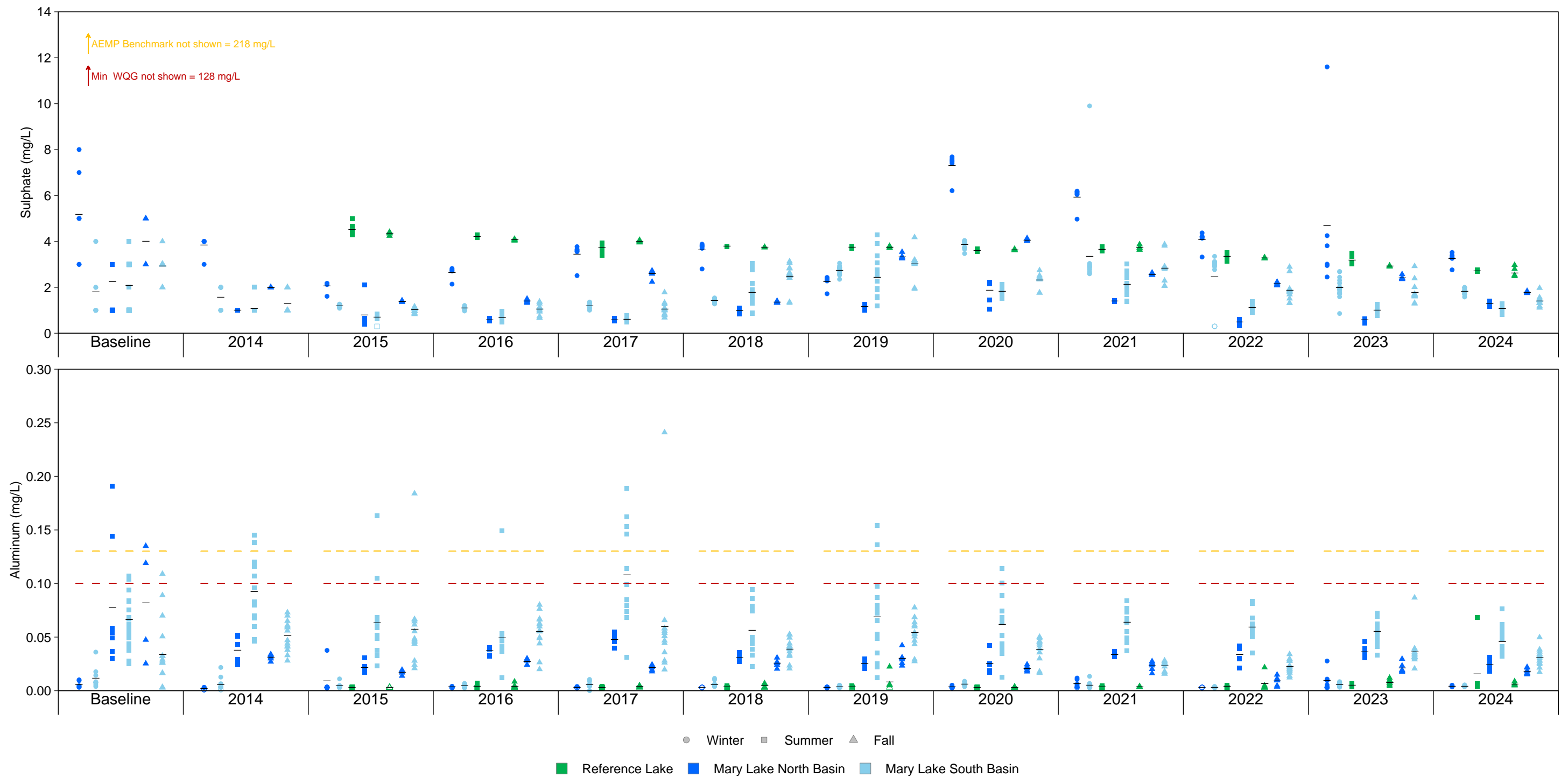


Figure C.29: Temporal Comparison of Water Chemistry at Mary Lake (North Basin [BL0]; and South Basin [BL0-01]) Over Mine Baseline (2006 to 2013), Construction (2014), and Operational (2015 to 2024) Periods, Mary River Project CREMP

Notes: Concentrations below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL and the open symbol represents one or more values reported below the LRL. Red lines indicate Water Quality Guidelines, some of which are dependent on concurrent hardness values; orange lines indicate AEMP Benchmarks. For each station, a concentration is provided for each of the bottom and the surface of the water column.

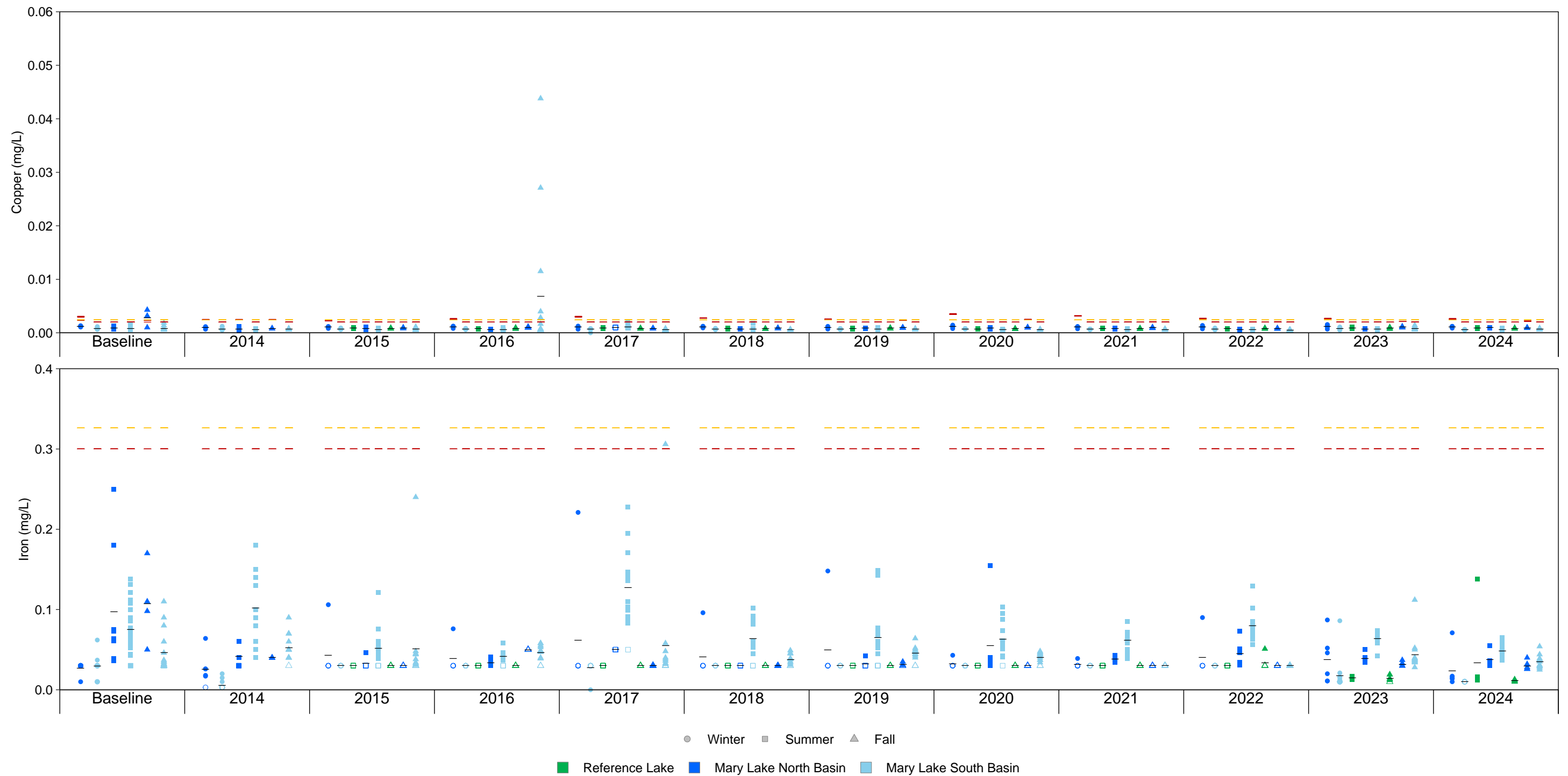


Figure C.29: Temporal Comparison of Water Chemistry at Mary Lake (North Basin [BL0]; and South Basin [BL0-01]) Over Mine Baseline (2006 to 2013), Construction (2014), and Operational (2015 to 2024) Periods, Mary River Project CREMP

Notes: Concentrations below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL and the open symbol represents one or more values reported below the LRL. Red lines indicate Water Quality Guidelines, some of which are dependent on concurrent hardness values; orange lines indicate AEMP Benchmarks. For each station, a concentration is provided for each of the bottom and the surface of the water column.

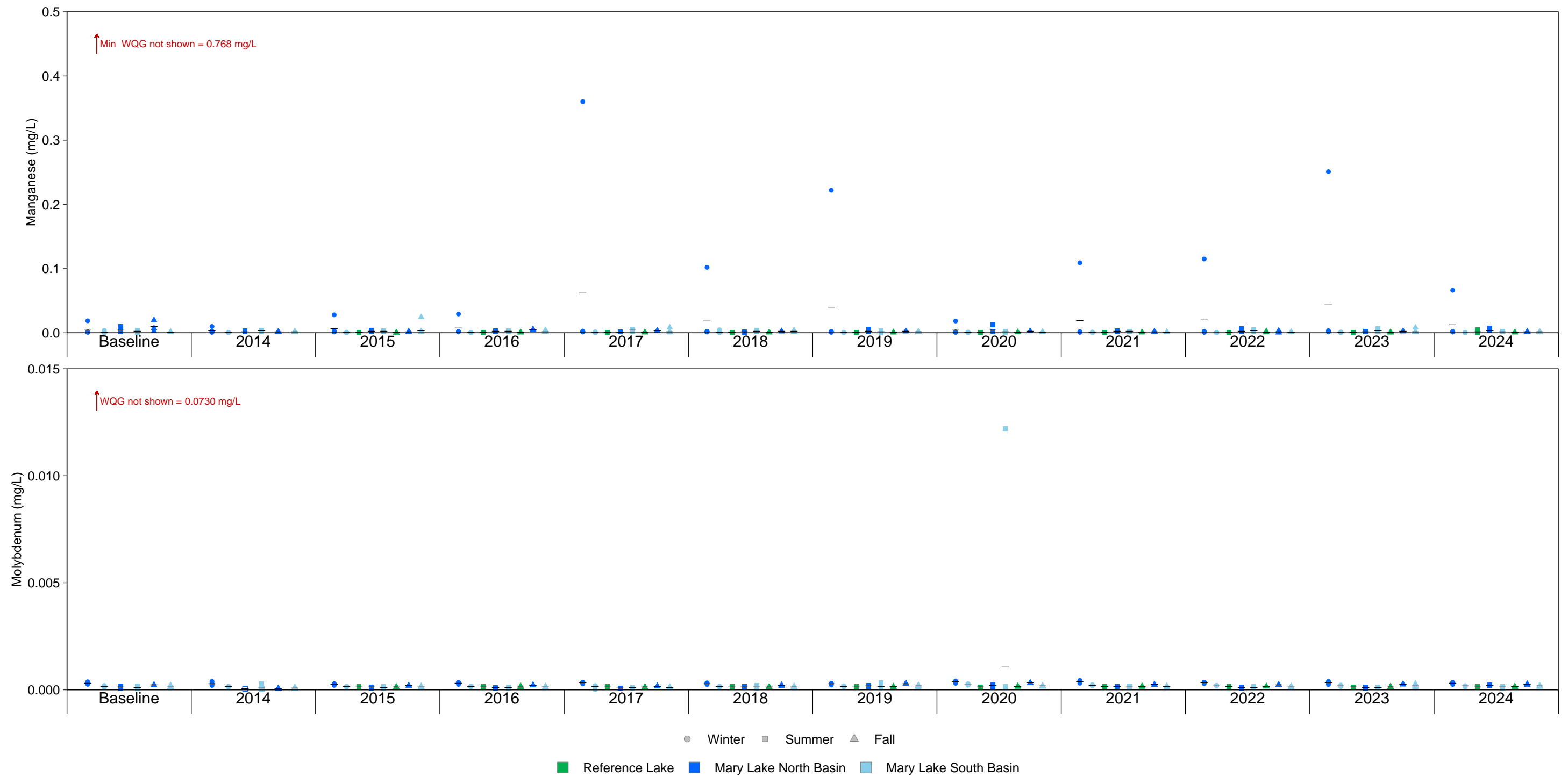


Figure C.29: Temporal Comparison of Water Chemistry at Mary Lake (North Basin [BL0]; and South Basin [BL0-01]) Over Mine Baseline (2006 to 2013), Construction (2014), and Operational (2015 to 2024) Periods, Mary River Project CREMP

Notes: Concentrations below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL and the open symbol represents one or more values reported below the LRL. Red lines indicate Water Quality Guidelines, some of which are dependent on concurrent hardness values; orange lines indicate AEMP Benchmarks. For each station, a concentration is provided for each of the bottom and the surface of the water column.

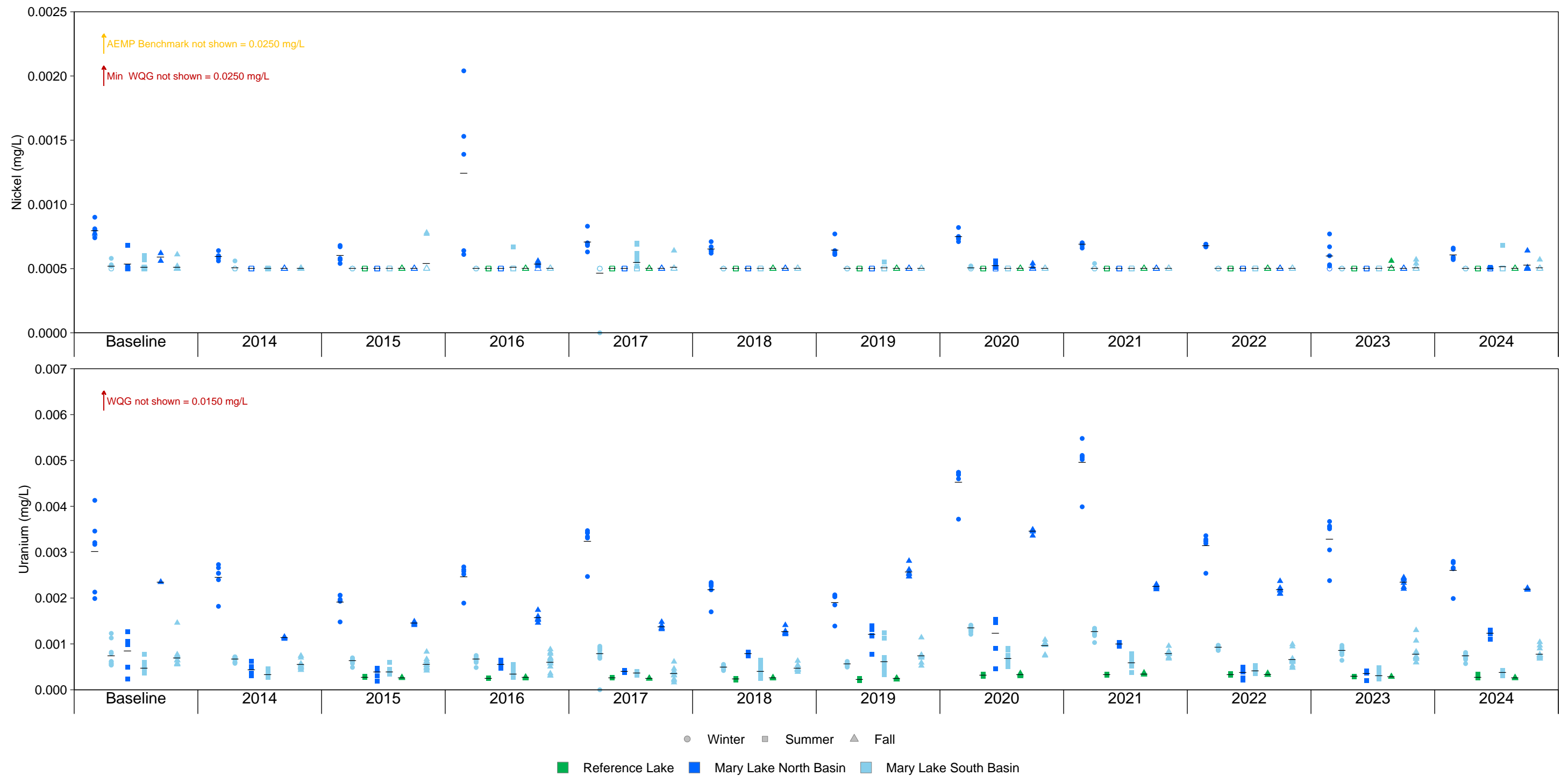


Figure C.29: Temporal Comparison of Water Chemistry at Mary Lake (North Basin [BL0]; and South Basin [BL0-01]) Over Mine Baseline (2006 to 2013), Construction (2014), and Operational (2015 to 2024) Periods, Mary River Project CREMP

Notes: Concentrations below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL and the open symbol represents one or more values reported below the LRL. Red lines indicate Water Quality Guidelines, some of which are dependent on concurrent hardness values; orange lines indicate AEMP Benchmarks. For each station, a concentration is provided for each of the bottom and the surface of the water column.

APPENDIX C

TABLES

Table C.1: *In Situ* Water Quality Data Collected from Lotic Environments for the Mary River Project CREMP, Spring 2024

Study Area		Station	Sampling Date	<i>In Situ</i> Water Quality Parameter					
				Temperature (°C)	Dissolved Oxygen		pH	Specific Conductance (µS/cm)	Turbidity (NTU)
					(% saturation)	(mg/L)			
Camp Lake System	Reference Creek Stations	CLT-REF4	25-Jun-24	1.00	118	16.8	6.64	12.9	-1.96
		CLT-REF3	29-Jun-24	2.50	100	13.1	6.94	33.4	-0.0300
		MRY-REF3	30-Jun-24	4.40	101	12.7	7.34	13.0	3.40
		MRY-REF2	30-Jun-24	4.60	101	12.6	7.19	37.9	0.0600
	CLT-1	L1-08	4-Jul-24	1.60	94.2	12.6	7.48	97.3	1.22
		L1-02	1-Jul-24	7.00	116	13.5	7.52	81.6	0.590
		L2-03	1-Jul-24	12.6	117	12.0	7.55	208	6.93
		L1-09	1-Jul-24	8.60	116	13.1	7.49	106	1.75
		L1-05	1-Jul-24	8.90	116	13.0	7.58	106	1.65
		L0-01	7-Jul-24	8.40	116	13.4	7.56	109	1.36
	CLT-2	K0-01	25-Jun-24	5.30	98.7	12.1	7.72	74.6	-0.890
	Camp Lake	J0-01	7-Jul-24	5.00	102	12.6	7.51	138	-0.130
Sheardown Lake System	SDLT-1	D1-05	1-Jun-24	0.500	108	15.2	7.63	189	15.2
		D1-00	30-Jun-24	10.6	99.8	10.7	7.54	288	1.23
	SDLT-12	LDFG-OUT	1-Jun-24	4.60	93.9	11.9	8.20	76.6	132
	SDLT-9	MS-C-G	23-Jun-24	4.70	86.1	10.8	7.79	105	-10.1
Mary River/Lake System	Tom River	I0-01	25-Jun-24	4.00	121	16.9	6.77	23.5	-0.300
	Mary River	GO-09-A	7-Jul-24	10.0	101	10.7	7.18	45.8	0.620
		G0-09	7-Jul-24	9.10	101	10.9	7.34	44.3	0.700
		G0-09-B	30-Jun-24	3.50	99.4	12.5	6.95	24.5	3.44
		G0-03	30-Jun-24	5.00	101	12.2	7.05	26.7	1.76
		G0-01	7-Jul-24	6.10	102	12.2	7.34	29.6	3.55
		F0-01	7-Jul-24	7.60	97.7	11.2	7.60	95.7	0.290
		E0-10	6-Jul-24	7.90	96.8	11.0	7.64	54.2	3.55
		E0-03	30-Jun-24	4.50	99.0	12.3	7.43	24.2	2.06
		E0-20	29-Jun-24	5.00	98.6	12.1	7.00	25.1	1.93
		E0-21	30-Jun-24	4.60	95.8	11.9	7.61	24.1	1.82
		C0-10	29-Jun-24	4.60	99.9	12.4	7.04	24.9	1.74
		C0-05	29-Jun-24	4.20	101	12.6	6.80	31.2	1.56
		C0-01	29-Jun-24	3.40	99.8	12.8	7.02	29.3	1.44

Table C.2: *In Situ* Water Quality Data Collected from Lotic Environments for the Mary River Project CREMP, Summer 2024

Study Area		Station	Sampling Date	<i>In Situ</i> Water Quality Parameter					
				Temperature (°C)	Dissolved Oxygen		pH	Specific Conductance (µS/cm)	Turbidity (NTU)
					(% saturation)	(mg/L)			
Camp Lake System	Reference Creek Stations	CLT-REF4	30-Jul-24	3.50	96.7	12.4	7.65	87.5	1.45
		CLT-REF3	30-Jul-24	2.50	96.9	12.8	7.66	81.6	0.620
		MRY-REF3	30-Jul-24	4.20	97.0	12.2	7.71	52.2	9.41
		MRY-REF2	30-Jul-24	5.90	98.5	12.0	7.67	93.5	0.650
	CLT-1	L1-08	30-Jul-24	3.20	105	13.4	7.59	133	1.08
		L1-02	30-Jul-24	7.40	101	11.6	7.82	157	2.20
		L2-03	30-Jul-24	9.70	103	11.3	7.97	263	1.47
		L1-09	30-Jul-24	8.60	101	11.4	8.03	180	1.45
		L1-05	30-Jul-24	8.70	99.4	11.2	8.01	181	0.420
		L0-01	30-Jul-24	7.00	99.7	11.8	7.96	170	3.76
	CLT-2	K0-01	30-Jul-24	8.70	99.4	11.2	8.06	185	1.06
	Camp Lake	J0-01	30-Jul-24	8.20	105	12.0	7.72	136	1.62
Sheardown Lake System	SDLT-1	D1-05	30-Jul-24	4.70	95.3	11.8	7.42	656	7.42
		D1-00	30-Jul-24	6.00	100	12.1	7.90	645	2.04
	SDLT-12	LDFG-OUT	30-Jun-24	11.6	100	10.5	7.97	251	7.30
	SDLT-9	MS-C-G	30-Jul-24	4.60	78.6	9.84	7.42	228	0.910
Mary River/Lake System	Tom River	I0-01	30-Jul-24	7.10	p	12.4	7.63	130	1.07
	Mary River	GO-09-A	30-Jul-24	9.30	99.4	10.8	7.76	95.6	4.23
		G0-09	30-Jul-24	9.50	100	10.8	7.83	100	3.45
		G0-09-B	30-Jul-24	9.50	101	11.0	7.85	108	2.65
		G0-03	30-Jul-24	8.00	98.0	11.1	7.80	105	2.46
		G0-01	30-Jul-24	6.40	100	11.8	7.80	103	2.41
		F0-01	30-Jul-24	6.30	99.3	11.8	7.94	202	0.310
		E0-10	30-Jul-24	6.80	98.6	11.6	7.92	189	0.550
		E0-03	30-Jul-24	5.50	99.2	12.2	7.74	109	2.56
		E0-20	30-Jul-24	5.50	97.7	12.0	7.75	111	2.67
		E0-21	30-Jul-24	5.20	99.5	12.2	7.79	110	2.72
		C0-10	30-Jul-24	11.7	107	11.3	7.65	110	2.34
		C0-05	30-Jul-24	6.90	108	12.8	7.52	108	3.48
		C0-01	30-Jul-24	7.10	106	12.5	7.60	108	2.33

Table C.3: *In Situ* Water Quality Data Collected from Lotic Environments for the Mary River Project CREMP, Fall 2024

Study Area		Station	Sampling Date	<i>In Situ</i> Water Quality Parameter					
				Temperature (°C)	Dissolved Oxygen		pH	Specific Conductance (µS/cm)	Turbidity (NTU)
					(% saturation)	(mg/L)			
Camp Lake System	Reference Creek Stations	CLT-REF4	31-Aug-24	2.80	98.8	12.9	7.98	115	0.900
		CLT-REF3	31-Aug-24	1.60	101	13.6	7.98	102	0.840
		MRY-REF3	31-Aug-24	2.30	98.8	13.2	8.04	71.8	8.71
		MRY-REF2	31-Aug-24	2.90	99.5	13.1	7.88	114	1.68
	CLT-1	L1-08	30-Aug-24	1.10	102	13.8	7.77	174	0.660
		L1-02	30-Aug-24	2.30	101	13.2	8.16	192	0.540
		L2-03	30-Aug-24	3.00	98.2	12.9	8.03	306	2.86
		L1-09	30-Aug-24	3.20	99.3	12.9	8.21	227	1.15
		L1-05	30-Aug-24	3.50	101	13.0	8.20	229	1.61
		L0-01	30-Aug-24	3.10	101	13.2	8.21	238	0.770
	CLT-2	K0-01	30-Aug-24	3.00	101	13.2	8.23	227	0.400
	Camp Lake	J0-01	30-Aug-24	6.20	98.9	11.9	7.75	143	0.370
Sheardown Lake System	SDLT-1	D1-05	20-Sep-24	2.50	91.6	12.2	7.60	424	9.61
		D1-00	31-Aug-24	2.20	98.3	13.2	8.01	514	1.51
	SDLT-9	MS-C-G	30-Aug-24	4.20	83.6	10.6	7.66	240	0.560
Mary River/Lake System	Tom River	I0-01	30-Aug-24	2.50	102	13.5	7.83	182	0.340
	Mary River	G0-09-A	30-Aug-24	3.40	102	12.9	7.84	153	1.85
		G0-09	30-Aug-24	3.30	102	12.9	7.85	148	2.09
		G0-09-B	30-Aug-24	3.30	102	13.0	7.83	151	2.07
		G0-03	31-Aug-24	3.20	103	13.2	7.76	140	2.20
		G0-01	30-Aug-24	2.20	102	13.6	7.88	148	2.10
		F0-01	30-Aug-24	2.60	102	13.3	7.95	173	0.180
		E0-10	30-Aug-24	2.60	104	13.6	7.78	153	1.91
		E0-03	31-Aug-24	2.30	101	13.4	8.05	154	2.22
		E0-20	30-Aug-24	2.30	102	13.6	7.76	155	1.88
		E0-21	31-Aug-24	2.70	103	13.6	8.00	156	1.83
		C0-10	30-Aug-24	2.30	102	13.5	7.70	154	1.99
		C0-05	30-Aug-24	2.70	102	13.4	7.65	156	1.70
		C0-01	30-Aug-24	3.60	101	13.0	7.64	161	2.04

Table C.5: *In Situ* Water Quality Profile Data Collected at Reference Lake 3 (REF-03) Water Quality Monitoring Stations, Mary River Project CREMP, Summer 2024

Depth (m)	Temperature (°C)			Dissolved Oxygen (mg/L)			Dissolved Oxygen (% Saturation)			pH (pH units)			Specific Conductance (µS/cm)			Turbidity (NTU)		
	REF3-03	REF3-02	REF3-01	REF3-03	REF3-02	REF3-01	REF3-03	REF3-02	REF3-01	REF3-03	REF3-02	REF3-01	REF3-03	REF3-02	REF3-01	REF3-03	REF3-02	REF3-01
	15-Aug-24	15-Aug-24	15-Aug-24	15-Aug-24	15-Aug-24	15-Aug-24	15-Aug-24	15-Aug-24	15-Aug-24	15-Aug-24	15-Aug-24	15-Aug-24	15-Aug-24	15-Aug-24	15-Aug-24	15-Aug-24	15-Aug-24	15-Aug-24
1.0	7.80	7.90	8.00	11.5	11.3	11.5	98.5	97.4	98.5	7.56	7.70	7.40	68.4	68.4	68.6	-1.05	-1.08	-1.05
2.0	7.80	7.90	8.00	11.5	11.4	11.5	98.6	97.9	98.5	7.47	7.50	7.32	68.4	68.5	68.6	-1.07	-1.07	-1.06
3.0	7.80	7.90	8.00	11.5	11.4	11.5	98.5	98.1	98.5	7.45	7.41	7.30	68.5	68.5	68.6	-1.06	-1.06	-1.04
4.0	7.80	7.90	- ^a	11.5	11.4	- ^a	98.5	98.1	- ^a	7.44	7.35	- ^a	68.4	68.5	- ^a	-1.05	-1.05	- ^a
5.0	7.80	7.90	8.00	11.5	11.4	11.5	98.4	98.1	98.4	7.42	7.33	7.25	68.5	68.5	68.7	-1.06	-1.05	-1.03
6.0	7.80	7.90	8.00	11.5	11.4	11.4	98.4	98.1	98.4	7.41	7.31	7.25	68.5	68.5	68.7	-1.08	-1.04	-1.03
7.0	7.80	7.90	8.00	11.4	11.4	11.4	98.3	98.1	98.3	7.41	7.29	7.25	68.5	68.5	68.7	-1.06	-1.07	-1.03
8.0	7.80	7.90	8.00	11.5	11.4	11.4	98.3	98.1	98.3	7.40	7.28	7.26	68.5	68.5	68.6	-1.07	-1.07	-1.06
9.0	7.80	7.90	8.00	11.5	11.4	11.4	98.3	98.0	98.2	7.40	7.28	7.24	68.5	68.5	68.7	-1.05	-1.05	-1.05
10.0	7.80	7.90	8.00	11.5	11.4	11.4	98.2	98.0	98.2	7.39	7.26	7.23	68.5	68.5	68.7	-1.06	-1.07	-1.07
11.0	7.80	7.90	8.00	11.5	11.4	11.4	98.1	97.9	98.1	7.39	7.28	7.24	68.5	68.5	68.7	-1.06	-1.08	-1.06
12.0	7.80	7.80	8.00	11.5	11.4	11.4	98.1	97.9	98.1	7.39	7.27	7.25	68.5	68.5	68.7	-1.05	-1.05	-1.05
13.0	7.80	7.90	8.00	11.4	11.4	11.4	98.0	97.9	98.0	7.38	7.27	7.25	68.5	68.5	68.7	-1.06	-1.05	-1.05
14.0	7.80	7.90	8.00	11.4	11.4	11.4	98.0	97.8	98.0	7.38	7.26	7.23	68.5	68.5	67.7	-1.06	-1.05	-1.05
15.0	7.80	7.80	-	11.4	11.4	-	98.0	97.7	-	7.38	7.26	-	68.5	68.5	-	-1.07	-1.05	-
16.0	7.80	7.80	-	11.4	11.4	-	97.9	97.7	-	7.38	7.24	-	68.5	68.5	-	-1.05	-1.05	-
17.0	7.80	7.80	-	11.4	11.4	-	97.9	97.6	-	7.37	7.24	-	68.5	68.5	-	-1.70	-1.04	-
18.0	7.80	7.80	-	11.4	11.4	-	97.8	97.5	-	7.37	7.24	-	68.5	68.5	-	-1.08	-1.07	-
19.0	7.80	-	-	11.4	-	-	97.7	-	-	7.37	-	-	68.5	-	-	-1.05	-	-
20.0	7.80	-	-	11.4	-	-	97.7	-	-	7.36	-	-	68.5	-	-	-1.05	-	-
21.0	7.80	-	-	11.4	-	-	97.6	-	-	7.36	-	-	68.5	-	-	-1.06	-	-
22.0	7.80	-	-	11.4	-	-	97.6	-	-	7.35	-	-	68.5	-	-	-1.05	-	-
23.0	7.80	-	-	11.4	-	-	97.5	-	-	7.35	-	-	68.5	-	-	-1.07	-	-
24.0	7.80	-	-	11.4	-	-	97.5	-	-	7.35	-	-	68.5	-	-	-1.05	-	-
25.0	7.70	-	-	11.4	-	-	97.4	-	-	7.35	-	-	68.5	-	-	-1.05	-	-
26.0	7.70	-	-	11.4	-	-	97.3	-	-	7.35	-	-	68.5	-	-	-1.06	-	-
27.0	7.70	-	-	11.4	-	-	97.3	-	-	7.34	-	-	68.5	-	-	-1.05	-	-
28.0	7.70	-	-	11.4	-	-	97.2	-	-	7.34	-	-	68.5	-	-	-1.07	-	-
29.0	7.70	-	-	11.4	-	-	97.2	-	-	7.34	-	-	68.5	-	-	-1.06	-	-
30.0	7.70	-	-	11.4	-	-	97.1	-	-	7.33	-	-	68.5	-	-	-1.06	-	-

Notes: "-" = data not available. The total depth of the water column at each sampling station was not recorded but deepest measurements are within 1 m of lake bottom.

^a Data was removed due to incorrect or erroneous value.

Table C.6: *In Situ* Water Quality Profile Data Collected at Reference Lake 3 (REF-03) Water Quality Monitoring Stations, Mary River Project CREMP, Fall 2024

Depth (m)	Temperature (°C)			Dissolved Oxygen (mg/L)			Dissolved Oxygen (% Saturation)			pH (pH units)			Specific Conductance (µS/cm)			Turbidity (NTU)		
	REF3-03	REF3-02	REF3-01	REF3-03	REF3-02	REF3-01	REF3-03	REF3-02	REF3-01	REF3-03	REF3-02	REF3-01	REF3-03	REF3-02	REF3-01	REF3-03	REF3-02	REF3-01
	10-Sep-24	10-Sep-24	10-Sep-24	10-Sep-24	10-Sep-24	10-Sep-24	10-Sep-24	10-Sep-24	10-Sep-24	10-Sep-24	10-Sep-24	10-Sep-24	10-Sep-24	10-Sep-24	-	-	10-Sep-24	10-Sep-24
1.0	6.00	6.10	6.00	12.2	12.0	12.7	98.6	97.7	98.6	7.55	7.34	7.21	69.5	69.5	- ^a	- ^a	0.0400	0.0300
2.0	6.00	6.10	6.00	12.2	12.0	12.1	98.4	97.7	98.4	7.45	7.30	7.15	69.5	69.5	70.1	0.0400	0.0400	0.0500
3.0	6.00	6.10	6.00	12.0	12.5	12.2	98.3	96.7	98.3	7.74	7.29	7.12	69.5	69.5	70.1	0.0200	0.0500	0.0400
4.0	6.00	6.10	6.00	12.1	12.0	12.1	98.3	97.7	98.1	7.30	7.28	7.11	69.5	69.5	70.1	0.0400	0.0600	0.0400
5.0	6.00	6.10	6.00	12.1	12.0	12.1	98.2	97.7	98.2	7.34	7.28	7.11	69.5	69.5	70.1	0.0400	- ^a	0.0700
6.0	6.00	6.10	6.00	12.1	12.1	12.1	96.2	98.2	98.2	7.32	7.21	7.11	69.5	69.5	70.1	0.0100	0.0700	0.0500
7.0	6.00	6.10	6.00	12.1	12.1	12.1	98.1	98.0	98.1	7.32	7.20	7.00	69.5	69.5	70.1	0.0300	0.0400	0.0700
8.0	6.00	6.10	6.00	12.1	12.1	12.1	98.1	97.8	98.0	7.28	7.19	7.09	69.5	69.5	70.1	0.0400	0.0600	0.0800
9.0	6.00	6.10	5.90	12.1	12.1	12.1	98.0	97.0	97.9	7.28	7.18	7.09	69.5	69.5	70.1	0.0200	0.0500	0.0700
10.0	6.00	6.10	5.90	12.1	12.0	12.1	98.0	97.6	97.8	7.28	7.15	7.08	69.5	69.5	70.1	0.0400	0.0700	0.0500
11.0	6.00	6.10	5.90	12.1	12.0	12.1	97.9	97.6	97.7	7.27	7.75	7.07	69.5	69.5	70.1	0.0400	0.0500	0.0800
12.0	6.00	6.10	5.90	12.1	12.0	12.1	97.9	97.5	97.1	7.28	7.15	7.06	69.5	69.5	70.1	0.0500	0.0600	0.0800
13.0	- ^a	6.10	5.90	- ^a	12.0	12.1	- ^a	97.5	97.6	- ^a	7.15	7.06	- ^a	69.5	70.1	- ^a	0.0600	0.0400
14.0	6.00	6.10	5.50	12.1	12.0	9.98	97.8	97.4	80.6	7.24	7.14	7.05	69.5	69.5	72.5	0.0600	0.0100	0.0500
15.0	6.00	6.10	-	12.1	12.0	-	97.7	97.3	-	7.24	7.14	-	69.5	69.5	-	0.0600	0.0700	-
16.0	6.00	6.10	-	12.1	12.0	-	97.7	97.3	-	7.22	7.14	-	69.5	69.5	-	0.0500	0.0300	-
17.0	6.00	6.10	-	12.1	12.0	-	97.7	97.2	-	7.20	7.13	-	69.5	69.5	-	0.0400	0.0500	-
18.0	6.00	6.10	-	12.1	12.0	-	97.6	96.9	-	7.20	7.12	-	69.5	69.5	-	0.0400	- ^a	-
19.0	6.00	-	-	12.1	-	-	97.6	-	-	7.20	-	-	69.5	-	-	0.0400	-	-
20.0	6.00	-	-	12.1	-	-	97.6	-	-	7.20	-	-	69.5	-	-	0.0100	-	-
21.0	6.00	-	-	12.0	-	-	97.5	-	-	7.19	-	-	69.5	-	-	0.0300	-	-
22.0	- ^a	-	-	- ^a	-	-	- ^a	-	-	- ^a	-	-	- ^a	-	-	- ^a	-	-
23.0	6.00	-	-	12.0	-	-	97.4	-	-	7.16	-	-	69.5	-	-	0.0200	-	-
24.0	6.00	-	-	12.0	-	-	97.3	-	-	7.16	-	-	69.5	-	-	0.0400	-	-
25.0	6.00	-	-	12.0	-	-	9.73	-	-	7.50	-	-	69.5	-	-	0.0600	-	-
26.0	6.00	-	-	12.0	-	-	97.2	-	-	7.14	-	-	69.5	-	-	0	-	-
27.0	- ^a	-	-	- ^a	-	-	- ^a	-	-	- ^a	-	-	- ^a	-	-	- ^a	-	-
28.0	6.00	-	-	12.0	-	-	97.1	-	-	7.13	-	-	69.5	-	-	0.0500	-	-
29.0	6.00	-	-	12.0	-	-	97.1	-	-	7.12	-	-	69.5	-	-	0.0400	-	-
30.0	6.00	-	-	12.0	-	-	97.0	-	-	7.12	-	-	69.5	-	-	0.0300	-	-

Notes: "-" = data not available. The total depth of the water column at each sampling station was not recorded but deepest measurements are within 1 m of lake bottom.


^a Data was removed due to incorrect or erroneous value.

Table C.7: Sampling Depth, Water Clarity Measures, and Surface and Bottom *In Situ* Water Quality Measures Collected at Reference Lake 3 (REF-03) Benthic Invertebrate Community (BIC) Stations, Mary River Project CREMP, August 2024

Categorization & Replicate ID		Date Sampled	Secchi Depth (m)	Colour/ Clarity	Depth Sampled	Temperature (°C)	Dissolved Oxygen		pH (units)	Specific Conductance (µS/cm)	Turbidity (NTU)
							(mg/L)	(% saturation)			
Littoral (Shallow) Stations	REF-03-1	11-Aug-24	6.25	Dark Greenish Blue	Surface	9.60	11.4	103	7.53	69.3	-0.110
					Bottom	7.20	11.8	99.9	7.47	68.9	-0.0700
	REF-03-2	11-Aug-24	6.25	Blueish Green	Surface	8.60	11.7	103	7.39	68.8	-0.0800
					Bottom	8.00	11.9	103	7.34	68.8	-0.0500
	REF-03-3	10-Aug-24	FALSE	Dark Greenish Blue	Surface	9.40	11.7	104	7.40	69.2	-2.31
					Bottom	7.70	11.8	102	7.43	68.8	-2.15
	REF-03-4	11-Aug-24	6.25	Dark Greenish Blue	Surface	8.50	11.6	101	7.39	68.8	-0.100
					Bottom	7.80	11.9	102	7.35	68.8	-0.0600
	REF-03-5	11-Aug-24	5.75	Deep Blueish Green	Surface	8.80	11.7	103	7.51	68.8	-0.0700
					Bottom	8.70	11.8	103	7.42	68.9	-0.0600
Profundal (Deep) Stations	REF-03-6	11-Aug-24	5.9	Dark Greenish Blue	Surface	9.20	11.4	101	7.52	69.0	-0.0900
					Bottom	6.90	11.9	101	7.35	70.4	1.00
	REF-03-7	10-Aug-24	6.95	Dark Greenish Blue	Surface	9.30	11.7	104	7.36	69.1	-2.31
					Bottom	6.50	11.8	98.0	7.35	68.8	-2.29
	REF-03-8	10-Aug-24	6.95	Dark Greenish Blue	Surface	9.00	11.7	104	7.51	89.1	-2.31
					Bottom	7.40	11.7	99.7	7.56	68.7	-2.31
	REF-03-9	10-Aug-24	6.375	Dark Greenish Blue	Surface	9.30	11.8	104	7.37	69.3	-2.31
					Bottom	6.80	11.6	97.3	7.29	68.8	-2.28
	REF-03-10	10-Aug-24	7.45	Dark Greenish Blue	Surface	8.60	11.8	104	7.45	68.9	-2.34
					Bottom	7.00	11.8	99.8	7.52	68.7	-2.32

Table C.8: Statistical Comparison of Bottom *In Situ* Water Quality Between Littoral and Profundal Stations of Reference Lake 3 (REF-03), Mary River Project CREMP, August 2024

Parameter	Statistical Test Results				Summary Statistics						
	Statistical Test	Transformation	Significant Difference Between Areas?	P-value	Station Type	Sample Size	Mean	Standard Deviation	Standard Error	Minimum	Maximum
Temperature (°C)	tequal	None	YES	0.010	Littoral	5	7.88	0.545	0.244	7.20	8.70
					Profundal	5	6.92	0.327	0.146	6.50	7.40
Dissolved Oxygen (mg/L)	tequal	None	NO	0.322	Littoral	5	11.8	0.0550	0.0246	11.8	11.9
					Profundal	5	11.8	0.110	0.0492	11.6	11.9
Dissolved Oxygen (% saturation)	tequal	None	YES	0.015	Littoral	5	102	1.31	0.585	99.9	103
					Profundal	5	99.2	1.49	0.667	97.3	101
pH (units)	tequal	None	NO	0.843	Littoral	5	7.40	0.0554	0.0248	7.34	7.47
					Profundal	5	7.41	0.118	0.0530	7.29	7.56
Specific Conductance (µS/cm)	M-W	Rank	NO	0.369	Littoral	5	68.8	0.0548	0.0245	68.8	68.9
					Profundal	5	69.1	0.740	0.331	68.7	70.4

 Shaded values indicate significant difference between study areas based on test p-value less than 0.05.

Notes: "-" = no data. "tequal" = Student's t-test assuming equal variance. "M-W" = Mann-Whitney test (nonparametric).

Table C.9: Dissolved Metal Concentrations at Reference Lake (REF-03) Monitoring Stations, Mary River Project CREMP, 2024

Parameters		Units	Summer Sampling Event						Fall Sampling Event					
			REF3-01	REF3-01	REF3-02	REF3-02	REF3-03	REF3-03	REF3-01	REF3-01	REF3-02	REF3-02	REF3-03	REF3-03
			Bottom	Surface	Bottom	Surface	Bottom	Surface	Bottom	Surface	Bottom	Surface	Bottom	Surface
			15-Aug-24	15-Aug-24	15-Aug-24	15-Aug-24	15-Aug-24	15-Aug-24	10-Sep-24	10-Sep-24	10-Sep-24	10-Sep-24	10-Sep-24	10-Sep-24
Dissolved Metals	Aluminum (Al)	mg/L	0.0019	0.0016	0.0016	0.0016	0.0026	0.0017	0.0016	0.0016	0.0025	0.0022	0.0019	0.0023
	Antimony (Sb)	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
	Arsenic (As)	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	0.00017	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
	Barium (Ba)	mg/L	0.00613	0.00594	0.00604	0.00588	0.00605	0.00591	0.00621	0.00615	0.0062	0.00604	0.00626	0.00624
	Beryllium (Be)	mg/L	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002
	Bismuth (Bi)	mg/L	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
	Boron (B)	mg/L	<0.01	<0.01	<0.01	<0.01	0.014	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	Cadmium (Cd)	mg/L	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005
	Calcium (Ca)	mg/L	6.6	6.51	6.46	6.55	7.34	6.56	6.93	6.62	6.68	6.36	6.56	6.69
	Chromium (Cr)	mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
	Cobalt (Co)	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
	Copper (Cu)	mg/L	0.00069	0.0007	0.0007	0.00125	0.00085	0.00068	0.00076	0.00073	0.00069	0.00068	0.00079	0.00078
	Iron (Fe)	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
	Lead (Pb)	mg/L	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
	Lithium (Li)	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
	Magnesium (Mg)	mg/L	4.41	4.4	4.42	4.46	4.43	4.32	4.57	4.62	4.47	4.57	4.49	4.58
	Manganese (Mn)	mg/L	0.00016	0.00016	0.00016	0.00016	0.00032	0.00022	0.00015	0.00011	0.00015	0.00037	<0.0001	0.00013
	Mercury (Hg)	mg/L	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005
	Molybdenum (Mo)	mg/L	0.000132	0.000136	0.000137	0.000133	0.000138	0.00013	0.000132	0.000137	0.000147	0.000142	0.00013	0.000139
	Nickel (Ni)	mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
	Potassium (K)	mg/L	0.841	0.844	0.847	0.836	0.85	0.836	0.852	0.844	0.847	0.836	0.838	0.836
	Selenium (Se)	mg/L	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
	Silicon (Si)	mg/L	0.437	0.438	0.443	0.428	0.439	0.43	0.413	0.402	0.413	0.413	0.406	0.403
	Silver (Ag)	mg/L	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
	Sodium (Na)	mg/L	0.885	0.879	0.887	0.884	0.934	0.886	0.998	0.904	0.95	0.901	0.88	0.899
	Strontium (Sr)	mg/L	0.00784	0.00783	0.0078	0.00776	0.00821	0.00774	0.00811	0.0079	0.00787	0.00777	0.00782	0.00785
	Thallium (Tl)	mg/L	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
	Tin (Sn)	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
	Titanium (Ti)	mg/L	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003
	Uranium (U)	mg/L	0.000255	0.000258	0.000259	0.000254	0.000264	0.000256	0.000251	0.00025	0.000232	0.000241	0.000242	0.000239
	Vanadium (V)	mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
	Zinc (Zn)	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.001	<0.001	<0.001	<0.001	<0.001

Table C.10: Average Relative Percent Difference (RPD) Values between Water Chemistry Samples Taken at the Top and Bottom of the Water Column at Lake Monitoring Stations, Mary River Project CREMP, 2024

Parameters		Reference Lake (REF-03)		Camp Lake (JL0)			Sheardown Lake Northwest (DL0-01)			Sheardown Lake Southeast (DL0-02)			Mary Lake North Basin (BL0-01)			Mary Lake South Basin (BL0)		
		Summer	Fall	Winter	Summer	Fall	Winter	Summer	Fall	Winter	Summer	Fall	Winter	Summer	Fall	Winter	Summer	Fall
Conventional	Conductivity (lab)	0.6	0.3	17.2	0.3	1.3	3.9	2.6	5.3	1.4	2.4	5.7	0.8	2.7	0.4	6.7	1.6	3.6
	pH (lab)	1.2	0.7	1.3	0.7	0.2	0.6	0.4	0.1	0.5	0.9	0.8	2.1	0.5	0.3	1.1	0.8	0.6
	Hardness (as CaCO ₃)	2.8	1.5	25.5	1.0	1.7	4.1	1.8	5.2	3.5	2.6	5.7	3.0	2.6	1.2	7.0	1.6	4.7
	Total Suspended Solids (TSS)	6.1	58.2	16.0	3.6	3.6	8.0	3.6	3.6	8.0	25.2	0.0	34.0	3.2	0.0	10.5	2.6	3.7
	Total Dissolved Solids (TDS)	18.2	14.5	8.0	7.4	6.2	9.9	6.7	12.7	5.1	5.8	16.9	2.6	25.2	1.5	13.9	7.9	24.0
	Turbidity	22.4	46.8	26.0	17.6	9.4	5.7	34.1	15.2	11.0	15.4	5.1	56.7	19.2	2.0	11.8	18.1	13.4
	Alkalinity (as CaCO ₃)	2.1	4.0	45.9	1.3	1.6	3.8	2.5	2.0	0.6	1.5	1.6	3.4	3.2	3.9	6.8	2.6	4.9
Nutrients and Organics	Total Ammonia	60.8	44.6	33.6	48.6	40.6	39.3	30.2	75.3	29.4	39.1	38.0	0.0	58.7	78.9	5.7	35.3	8.2
	Nitrate	0.0	0.0	70.8	0.0	0.0	9.1	7.5	10.0	4.5	7.9	13.8	25.5	0.0	0.0	9.5	5.7	10.0
	Nitrite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total Kjeldahl Nitrogen (TKN)	5.5	6.8	13.8	15.0	14.5	22.2	32.8	22.5	16.8	39.1	38.5	31.9	8.6	11.8	12.9	14.6	20.5
	Dissolved Organic Carbon	23.2	1.6	15.1	7.7	7.7	13.3	19.8	6.2	11.9	8.3	9.2	16.6	18.3	9.5	17.1	6.1	12.7
	Total Organic Carbon	3.2	9.0	7.6	12.1	5.4	12.5	14.3	5.0	11.9	10.8	9.5	7.6	5.1	9.4	12.9	13.5	7.5
	Total Phosphorus	43.1	8.6	48.2	17.5	15.6	21.1	21.9	24.1	14.6	26.5	46.4	18.9	19.0	23.3	15.6	14.4	20.2
	Phenols	0.0	44.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	28.2	0.0	0.0	26.0
Anions	Bromide (Br)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Chloride (Cl)	0.6	0.5	36.8	0.4	0.5	5.6	2.9	9.1	2.3	4.6	8.9	1.7	7.1	1.3	6.4	3.9	7.5
	Sulphate (SO ₄)	0.1	2.4	47.4	0.2	1.1	4.5	5.5	12.5	3.1	4.9	12.3	9.2	8.1	0.9	6.1	3.8	12.2
Total Metals	Aluminum (Al)	69.2	25.3	18.7	10.5	21.0	27.9	26.5	22.9	7.3	17.5	18.3	16.4	22.9	19.3	17.6	28.9	17.2
	Antimony (Sb)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Arsenic (As)	25.1	0.0	1.9	0.0	0.0	4.8	0.0	0.0	0.0	0.0	0.0	12.1	3.2	0.0	0.0	3.7	0.0
	Barium (Ba)	4.5	2.4	7.5	1.1	1.4	3.1	3.0	5.5	1.9	3.2	5.1	1.3	4.4	1.1	6.5	3.9	5.0
	Boron (B)	0.0	0.0	0.0	0.0	0.0	5.5	3.3	6.5	3.1	4.5	5.4	0.0	0.0	0.0	0.0	0.0	0.0
	Cadmium (Cd)	0.0	0.0	0.0	0.0	0.0	15.7	27.5	20.3	0.0	4.3	13.0	0.0	0.0	0.0	0.0	0.0	0.0
	Calcium (Ca)	0.8	2.1	6.1	0.9	2.3	4.0	2.2	5.9	3.5	3.0	5.4	2.3	3.6	2.2	7.6	2.3	4.1
	Chromium (Cr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0	0.0	0.0	0.0	0.0	0.0	26.0	5.0	5.0	0.0
	Cobalt (Co)	0.0	0.0	0.0	0.0	0.0	0.0	1.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Copper (Cu)	16.6	9.6	7.8	6.1	9.3	10.9	23.2	2.5	9.4	5.9	13.9	8.2	4.9	3.9	7.5	13.9	13.4
	Iron (Fe)	65.5	14.8	0.0	5.1	17.3	32.7	37.0	25.2	40.0	23.0	19.4	52.2	21.6	18.6	0.0	20.3	13.5
	Lead (Pb)	9.7	0.0	0.0	0.0	0.0	0.0	3.8	0.0	0.0	4.6	0.0	0.0	11.1	0.0	0.0	14.1	0.8
	Lithium (Li)	0.0	0.0	1.9	5.6	5.7	8.4	7.2	10.2	2.0	6.7	15.2	0.0	0.0	0.0	0.0	0.0	0.0
	Magnesium (Mg)	1.0	1.9	9.3	1.3	2.1	3.7	2.4	7.2	2.3	3.3	6.6	1.2	3.5	0.9	6.8	3.0	4.6
	Manganese (Mn)	57.3	6.1	40.4	3.5	4.2	35.8	49.9	19.1	48.0	13.2	21.3	75.2	32.8	12.4	41.6	24.8	9.9
	Mercury (Hg)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	14.8
	Molybdenum (Mo)	5.2	4.1	11.7	1.0	1.4	6.4	3.8	13.0	4.6	4.8	11.5	9.4	3.3	6.3	11.5	13.1	11.2
	Nickel (Ni)	0.0	0.0	10.3	8.4	2.8	35.1	10.0	10.3	5.9	0.3	3.5	9.2	0.7	8.9	0.0	4.4	1.9
	Potassium (K)	1.6	1.6	10.7	1.1	0.8	4.9	2.3	8.3	3.3	3.3	7.6	0.9	3.5	1.5	8.7	2.5	3.6
	Selenium (Se)	0.0	0.0	0.0	0.0	0.0	13.9	21.8	30.4	0.0	0.0	11.5	0.0	0.0	0.0	0.0	0.0	0.0
	Silicon (Si)	10.5	2.3	22.2	2.8	0.8	5.0	2.7	4.6	6.5	3.7	3.5	21.9	4.8	2.1	9.9	7.9	8.0
	Silver (Ag)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Sodium (Na)	1.1	1.2	12.3	1.0	1.9	3.1	1.5	7.0	2.8	3.3	6.6	2.4	5.3	1.5	8.4	3.0	5.6
	Strontium (Sr)	0.8	0.8	7.2	1.7	1.0	6.2	4.2	10.3	4.0	5.2	9.1	3.8	3.4	1.1	6.6	3.0	6.3
	Thallium (Tl)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Tin (Sn)	0.0	0.0	1.9	0.0	22.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Titanium (Ti)	59.9	5.1	0.0	26.8	28.4	17.8	42.4	28.6	0.0	26.6	29.6	0.0	21.6	16.0	0.0	22.2	19.2
	Uranium (U)	9.1	2.4	10.7	2.7	2.5	5.4	3.3	9.7	4.0	4.0	9.9	14.2	6.9	0.9	11.8	3.8	12.1
	Vanadium (V)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Zinc (Zn)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Note: Shaded values indicate RDP >30%.

Table C.11: *In Situ* Water Quality Measurements Collected at Camp Lake Tributary 1 (CLT1) and Tributary 2 (CLT2) Benthic Invertebrate Community (BIC) Stations, Mary River Project CREMP, August 2024

Study Area	Station	Sampling Date	Temperature (°C)	Dissolved Oxygen (mg/L)	Dissolved Oxygen (% saturation)	pH (pH units)	Specific Conductance (µS/cm)
Unnamed Reference Creek	REF-CRK-B1	10-Aug-24	13.5	9.85	97.3	7.13	91.4
	REF-CRK-B2	10-Aug-24	13.5	10.1	99.3	7.16	87.0
	REF-CRK-B3	10-Aug-24	12.9	10.2	99.5	7.16	91.5
	REF-CRK-B4	10-Aug-24	10.3	10.7	98.6	7.59	120
	REF-CRK-B5	10-Aug-24	12.5	10.3	100	7.30	90.8
Camp Lake Tributary 1 North Branch	CLT1-US-B1	9-Aug-24	7.20	11.8	100	8.17	185
	CLT1-US-B2	9-Aug-24	7.20	11.5	98.4	7.74	186
	CLT1-US-B3	8-Aug-24	10.7	12.3	115	8.11	180
	CLT1-US-B4	8-Aug-24	12.7	11.6	113	8.22	204
	CLT1-US-B5	8-Aug-24	10.9	12.4	117	8.11	180
Camp Lake Tributary 1 Upper Main Stem	CLT1-L2-B1	9-Aug-24	12.5	10.8	104	7.93	287
	CLT1-L2-B2	9-Aug-24	12.5	10.9	103	7.88	276
	CLT1-L2-B3	9-Aug-24	12.5	10.7	103	7.89	288
	CLT1-L2-B4	9-Aug-24	12.4	11.0	106	7.96	287
	CLT1-L2-B5	9-Aug-24	11.4	11.1	105	8.23	287
Camp Lake Tributary 1 Lower Main Stem	CLT1-DS-B1	7-Aug-24	11.0	12.4	115	7.95	213
	CLT1-DS-B2	7-Aug-24	11.0	12.3	114	8.01	213
	CLT1-DS-B3	7-Aug-24	10.9	12.4	114	7.95	213
	CLT1-DS-B4	7-Aug-24	10.8	12.4	114	7.99	212
	CLT1-DS-B5	7-Aug-24	10.8	12.4	114	8.03	213
Camp Lake Tributary 2 Upstream	CLT2-US-B1	8-Aug-24	12.7	11.6	113	8.22	204
	CLT2-US-B2	8-Aug-24	12.3	11.7	113	8.22	202
	CLT2-US-B3	8-Aug-24	12.0	12.0	115	8.24	202
	CLT2-US-B4	8-Aug-24	11.3	12.2	115	8.09	202
	CLT2-US-B5	8-Aug-24	10.8	12.2	114	8.10	203
Camp Lake Tributary 2 Downstream	CLT2-DS-B1	8-Aug-24	9.60	12.7	115	8.02	204
	CLT2-DS-B2	8-Aug-24	9.50	12.7	114	8.02	204
	CLT2-DS-B3	8-Aug-24	9.20	12.8	115	8.02	204
	CLT2-DS-B4	8-Aug-24	9.10	12.9	115	8.04	204
	CLT2-DS-B5	8-Aug-24	9.00	12.8	114	8.09	204

Table C.12: *In Situ* Water Quality Summary Statistics for the Camp Lake Tributary (CLT1 and CLT2) Benthic Invertebrate Community (BIC) Stations, Mary River Project CREMP, August 2024

Metric	Study Area	Sample Size	Mean	Standard Deviation	Standard Error	5th Percentile	95th Percentile	Minimum	Maximum
Water Temperature (°C)	REF-CRK Unnamed Reference Creek	5	12.5	1.32	0.591	10.7	13.5	10.3	13.5
	CLT1-US North Branch	5	9.74	2.45	1.09	7.20	12.3	7.20	12.7
	CLT1-L2 Upper Main Stem	5	12.3	0.483	0.216	11.6	12.5	11.4	12.5
	CLT1-DS Lower Main Stem	5	10.9	0.1000	0.0447	10.8	11.0	10.8	11.0
	CLT2-US Upstream	5	11.8	0.766	0.343	10.9	12.6	10.8	12.7
	CLT2-DS Downstream	5	9.28	0.259	0.116	9.02	9.58	9.00	9.60
Dissolved Oxygen (mg/L)	REF-CRK Unnamed Reference Creek	5	10.2	0.336	0.150	9.89	10.7	9.85	10.7
	CLT1-US North Branch	5	11.9	0.426	0.191	11.5	12.4	11.5	12.4
	CLT1-L2 Upper Main Stem	5	10.9	0.187	0.0838	10.7	11.1	10.7	11.1
	CLT1-DS Lower Main Stem	5	12.4	0.0305	0.0136	12.3	12.4	12.3	12.4
	CLT2-US Upstream	5	11.9	0.285	0.127	11.6	12.2	11.6	12.2
	CLT2-DS Downstream	5	12.8	0.0918	0.0410	12.7	12.9	12.7	12.9
Dissolved Oxygen (% saturation)	REF-CRK Unnamed Reference Creek	5	98.9	1.05	0.468	97.6	99.9	97.3	100
	CLT1-US North Branch	5	109	8.71	3.89	98.7	116	98.4	117
	CLT1-L2 Upper Main Stem	5	104	1.38	0.616	103	106	103	106
	CLT1-DS Lower Main Stem	5	114	0.152	0.0678	114	115	114	115
	CLT2-US Upstream	5	114	0.942	0.421	113	115	113	115
	CLT2-DS Downstream	5	115	0.517	0.231	114	115	114	115
pH (units)	REF-CRK Unnamed Reference Creek	5	7.27	0.192	0.0858	7.14	7.53	7.13	7.59
	CLT1-US North Branch	5	8.07	0.190	0.0850	7.81	8.21	7.74	8.22
	CLT1-L2 Upper Main Stem	5	7.98	0.144	0.0646	7.88	8.18	7.88	8.23
	CLT1-DS Lower Main Stem	5	7.99	0.0358	0.0160	7.95	8.03	7.95	8.03
	CLT2-US Upstream	5	8.17	0.0727	0.0325	8.09	8.24	8.09	8.24
	CLT2-DS Downstream	5	8.04	0.0303	0.0136	8.02	8.08	8.02	8.09
Specific Conductance (µS/cm)	REF-CRK Unnamed Reference Creek	5	96.2	13.7	6.12	87.8	115	87.0	120
	CLT1-US North Branch	5	187	9.83	4.40	180	201	180	204
	CLT1-L2 Upper Main Stem	5	285	5.05	2.26	278	288	276	288
	CLT1-DS Lower Main Stem	5	213	0.217	0.0970	213	213	212	213
	CLT2-US Upstream	5	203	1.15	0.516	202	204	202	204
	CLT2-DS Downstream	5	204	0.114	0.0510	204	204	204	204

Table C.13: Statistical Comparison of *In Situ* Water Quality Variables Among Camp Lake Tributary 1 (CLT1) and Unnamed Reference Creek (REF-CRK) Benthic Invertebrate Community (BIC) Stations, Mary River Project CREMP, August 2024

Metric	Overall 4-group Comparison				Pair-wise, <i>post hoc</i> comparisons ^a			
	Statistical Test ^a	Transformation	Significant Difference Between Areas?	P-value	Area 1	Area 2	Significant Difference Between Areas?	P-value
Water Temperature (°C)	K-W	Rank	NO	0.051	REF-CRK Unnamed Reference Creek	CLT1 North Branch	YES	0.021
					REF-CRK Unnamed Reference Creek	CLT1 Upper Main Stem	NO	0.667
					REF-CRK Unnamed Reference Creek	CLT1 Lower Main Stem	YES	0.047
					CLT1 North Branch	CLT1 Upper Main Stem	NO	0.060
					CLT1 Lower Main Stem	CLT1 North Branch	NO	0.747
					CLT1 Lower Main Stem	CLT1 Upper Main Stem	NO	0.119
Dissolved Oxygen (mg/L)	ANOVA	None	YES	<0.001	REF-CRK Unnamed Reference Creek	CLT1 North Branch	YES	<0.001
					REF-CRK Unnamed Reference Creek	CLT1 Upper Main Stem	YES	0.010
					REF-CRK Unnamed Reference Creek	CLT1 Lower Main Stem	YES	<0.001
					CLT1 North Branch	CLT1 Upper Main Stem	YES	<0.001
					CLT1 Lower Main Stem	CLT1 North Branch	NO	0.091
					CLT1 Lower Main Stem	CLT1 Upper Main Stem	YES	<0.001
Dissolved Oxygen (% saturation)	K-W	Rank	YES	0.012	REF-CRK Unnamed Reference Creek	CLT1 North Branch	YES	0.028
					REF-CRK Unnamed Reference Creek	CLT1 Upper Main Stem	NO	0.103
					REF-CRK Unnamed Reference Creek	CLT1 Lower Main Stem	YES	0.001
					CLT1 North Branch	CLT1 Upper Main Stem	NO	0.574
					CLT1 Lower Main Stem	CLT1 North Branch	NO	0.297
					CLT1 Lower Main Stem	CLT1 Upper Main Stem	NO	0.109
pH (units)	ANOVA	None	YES	<0.001	REF-CRK Unnamed Reference Creek	CLT1 North Branch	YES	<0.001
					REF-CRK Unnamed Reference Creek	CLT1 Upper Main Stem	YES	<0.001
					REF-CRK Unnamed Reference Creek	CLT1 Lower Main Stem	YES	<0.001
					CLT1 North Branch	CLT1 Upper Main Stem	NO	0.782
					CLT1 Lower Main Stem	CLT1 North Branch	NO	0.824
					CLT1 Lower Main Stem	CLT1 Upper Main Stem	NO	1.000
Specific Conductance (µS/cm)	K-W	Rank	YES	<0.001	REF-CRK Unnamed Reference Creek	CLT1 North Branch	NO	0.181
					REF-CRK Unnamed Reference Creek	CLT1 Upper Main Stem	YES	<0.001
					REF-CRK Unnamed Reference Creek	CLT1 Lower Main Stem	YES	0.008
					CLT1 North Branch	CLT1 Upper Main Stem	YES	0.008
					CLT1 Lower Main Stem	CLT1 North Branch	NO	0.181
					CLT1 Lower Main Stem	CLT1 Upper Main Stem	NO	0.181

Highlighted values indicate significant difference between study areas based on test p-value less than 0.05.

^a Statistical tests include Analysis of Variance (ANOVA) followed by Tukey's Honestly Significant Difference (HSD) *post hoc* tests, or Kruskal-Wallis H-test (K-W) followed by Mann-Whitney U-test (M-W).

Table C.14: Water Chemistry at Lotic Camp Lake Tributary (CLT1 and CLT2) Water Quality Monitoring Stations, Mary River Project CREMP, 2024

Parameters		Units	Water Quality Guideline (WQG) ^{a,b}	AEMP Benchmark ^c	Spring Sampling Event						
					CLT1 North Branch		CLT1 Upper Main Stem	CLT1 Lower Main Stem			CLT2
					L1-08	L1-02	L2-03	L1-09	L1-05	L0-01	K0-01
					04-Jul-24	01-Jul-24	01-Jul-24	01-Jul-24	01-Jul-24	01-Jul-24	01-Jul-24
Conventionals	Conductivity (lab)	µS/cm	-	-	97.2	87.2	219	114	112	116	97.8
	pH (lab)	pH	6.5 - 9.0	-	7.49	7.77	7.94	7.81	7.81	7.72	7.91
	Hardness (as CaCO ₃)	mg/L	-	-	48.4	44.5	91.8	53.5	53	55.4	47.8
	Total Suspended Solids (TSS)	mg/L	-	-	<1	<1	3.4	<1	<1	<1	<1
	Total Dissolved Solids (TDS)	mg/L	-	-	57	51	122	60	62	62	55
	Turbidity	NTU	-	-	0.92	0.47	9.23	1.66	1.02	1.18	0.55
	Alkalinity (as CaCO ₃)	mg/L	-	-	39.1	42.8	83.9	50.7	51.4	53.3	47.1
Nutrients and Organics	Total Ammonia	mg/L	-	0.855	0.006	0.0056	0.0416	0.0082	0.0149	0.0152	<0.005
	Nitrate	mg/L	3	3	0.023	<0.02	0.466	0.055	0.05	0.037	<0.02
	Nitrite	mg/L	0.06	0.06	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	Total Kjeldahl Nitrogen (TKN)	mg/L	-	-	0.082	0.061	0.204	0.148	0.082	0.068	0.053
	Dissolved Organic Carbon	mg/L	-	-	2.78	2.73	3.25	2.21	3.11	1.99	1.12
	Total Organic Carbon	mg/L	-	-	2.04	2.73	3.15	2.58	2.65	2.43	15.6
	Total Phosphorus	mg/L	0.030 ^α	-	0.0022	<0.002	0.0083	0.0021	0.0032	0.0026	0.0028
	Phenols	mg/L	0.004 ^α	-	0.0012	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Anions	Bromide (Br)	mg/L	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Chloride (Cl)	mg/L	120	120	6.03	0.76	10.3	2.58	2.58	2.4	0.95
	Sulphate (SO ₄)	mg/L	218 ^β	218	1.49	0.81	9.9	2.24	2.21	2.18	2.42
Total Metals	Aluminum (Al)	mg/L	0.100	0.179	0.0337	0.0106	0.249	0.0401	0.0359	0.0279	0.0122
	Antimony (Sb)	mg/L	0.020 ^α	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
	Arsenic (As)	mg/L	0.005	0.005	<0.0001	<0.0001	0.00015	<0.0001	<0.0001	<0.0001	<0.0001
	Barium (Ba)	mg/L	1 ^β	-	0.00609	0.00536	0.0126	0.00656	0.00642	0.00663	0.00514
	Beryllium (Be)	mg/L	0.011 ^α	-	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002
	Bismuth (Bi)	mg/L	-	-	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
	Boron (B)	mg/L	1.5	-	<0.01	<0.01	0.016	<0.01	<0.01	<0.01	<0.01
	Cadmium (Cd)	mg/L	0.00012	0.00008	<0.000005	<0.000005	0.0000073	<0.000005	<0.000005	<0.000005	<0.000005
	Calcium (Ca)	mg/L	-	-	9.1	8.39	18	10.1	10.2	10.5	8.95
	Chromium (Cr)	mg/L	0.001	0.003	<0.0005	<0.0005	0.00068	<0.0005	<0.0005	<0.0005	<0.0005
	Cobalt (Co)	mg/L	0.0009 ^α	0.004	<0.0001	<0.0001	0.00021	<0.0001	<0.0001	<0.0001	<0.0001
	Copper (Cu)	mg/L	0.002	0.0022	0.00184	0.00135	0.0018	0.0014	0.00136	0.00131	0.00084
	Iron (Fe)	mg/L	0.30	0.326	0.042	0.014	0.401	0.07	0.064	0.046	0.012
	Lead (Pb)	mg/L	0.001	0.001	0.000058	<0.00005	0.000342	0.000052	<0.00005	<0.00005	<0.00005
	Lithium (Li)	mg/L	-	-	<0.001	<0.001	0.0035	<0.001	<0.001	<0.001	<0.001
	Magnesium (Mg)	mg/L	-	-	6.27	6.05	12.9	7.6	7.55	7.68	6.66
	Manganese (Mn)	mg/L	0.935 ^β	-	0.00082	0.00048	0.0183	0.00338	0.00268	0.00222	0.0004
	Mercury (Hg)	mg/L	0.000026	-	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005
	Molybdenum (Mo)	mg/L	0.073	-	0.000321	0.000346	0.00262	0.000715	0.000683	0.000598	0.000259
	Nickel (Ni)	mg/L	0.025	0.025	0.00052	<0.0005	0.00102	0.00056	0.00057	0.00058	<0.0005
	Potassium (K)	mg/L	-	-	1.18	1.11	4.26	1.59	1.56	1.51	0.955
	Selenium (Se)	mg/L	0.001	-	<0.00005	<0.00005	0.000076	<0.00005	<0.00005	<0.00005	<0.00005
	Silicon (Si)	mg/L	-	-	0.7	0.52	0.97	0.59	0.59	0.58	0.47
	Silver (Ag)	mg/L	0.00025	0.0001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
	Sodium (Na)	mg/L	-	-	0.455	0.662	8.1	2.18	2.19	2.08	1.12
	Strontium (Sr)	mg/L	-	-	0.00567	0.00461	0.0341	0.00955	0.00968	0.00919	0.00605
	Thallium (Tl)	mg/L	0.0008	0.0008	0.00001	<0.00001	0.00001	<0.00001	<0.00001	<0.00001	<0.00001
	Tin (Sn)	mg/L	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
	Titanium (Ti)	mg/L	-	-	0.0014	<0.0003	0.00778	0.00113	0.00108	0.00074	0.00035
	Uranium (U)	mg/L	0.015	-	0.000645	0.000349	0.0125	0.00226	0.00217	0.00173	0.000375
	Vanadium (V)	mg/L	0.006 ^α	0.006	<0.0005	<0.0005	0.00051	<0.0005	<0.0005	<0.0005	<0.0005
	Zinc (Zn)	mg/L	0.02 ^α	0.030	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003

Indicates parameter concentration above applicable Water Quality Guideline.

BOLD

 Indicates parameter concentration above the AEMP benchmark.

Notes: AEMP: Aquatic Effects Monitoring Plan. "-" indicates no applicable WQG or AEMP benchmark.

^a Canadian Water Quality Guideline for the protection of aquatic life (CCME 2024) except those indicated by α (Ontario Provincial Water Quality Objective [PWQO]; OMOE 1994) and β (British Columbia Water Quality Guideline [BCWQG]; BCMOE 2024). See Table 2.2 for information regarding WQG criteria.

^b A conservative hardness value of 75 mg/L was used for guideline calculations dependent on hardness (i.e., sulphate, beryllium, cadmium, copper, lead, manganese, and nickel).

^c AEMP Water Quality Benchmarks developed by Intrinsik (2013) using baseline water quality data specific to the Camp Lake Tributaries.

Table C.14: Water Chemistry at Lotic Camp Lake Tributary (CLT1 and CLT2) Water Quality Monitoring Stations, Mary River Project CREMP, 2024

Parameters		Units	Water Quality Guideline (WQG) ^a	AEMP Benchmark ^b	Summer Sampling Event						
					CLT1 North Branch		CLT1 Upper Main Stem	CLT1 Lower Main Stem			CLT2
					L1-08	L1-02	L2-03	L1-09	L1-05	L0-01	K0-01
					30-Jul-24	30-Jul-24	30-Jul-24	30-Jul-24	30-Jul-24	30-Jul-24	30-Jul-24
Conventionals	Conductivity (lab)	µS/cm	-	-	142	166	275	188	192	200	190
	pH (lab)	pH	6.5 - 9.0	-	7.88	8.03	7.94	8.05	8.02	8.07	8.15
	Hardness (as CaCO ₃)	mg/L	-	-	67.1	82.1	119	89.9	89.6	95.4	97.2
	Total Suspended Solids (TSS)	mg/L	-	-	<1	<1	1	<1	<1	<1	<1
	Total Dissolved Solids (TDS)	mg/L	-	-	78	77	148	102	102	111	112
	Turbidity	NTU	-	-	1.98	0.85	3.16	1.05	1.6	0.98	0.72
	Alkalinity (as CaCO ₃)	mg/L	-	-	58.7	80.3	111	86.7	88.3	91.6	93.5
Nutrients and Organics	Total Ammonia	mg/L	-	0.855	<0.005	<0.005	0.0111	<0.005	0.0059	<0.005	<0.005
	Nitrate	mg/L	3	3	0.03	<0.02	0.141	0.023	0.031	0.034	<0.02
	Nitrite	mg/L	0.06	0.06	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	Total Kjeldahl Nitrogen (TKN)	mg/L	-	-	0.086	0.099	0.287	0.126	0.123	0.108	0.088
	Dissolved Organic Carbon	mg/L	-	-	2.32	2.61	4.08	4.3	4.17	4.07	2.75
	Total Organic Carbon	mg/L	-	-	1.94	2.82	4.46	3.95	3.84	3.86	2.64
	Total Phosphorus	mg/L	0.030 ^α	-	0.002	<0.002	0.005	<0.002	<0.002	<0.002	<0.002
	Phenols	mg/L	0.004 ^α	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Anions	Bromide (Br)	mg/L	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Chloride (Cl)	mg/L	120	120	6.66	1.91	11.4	3.78	4.03	4.58	1.83
	Sulphate (SO ₄)	mg/L	218 ^β	218	2.13	1.78	9.75	3.02	3.27	3.35	4.26
Total Metals	Aluminum (Al)	mg/L	0.100	0.179	0.0191	0.0072	0.0493	0.0181	0.0167	0.0246	0.0103
	Antimony (Sb)	mg/L	0.020 ^α	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
	Arsenic (As)	mg/L	0.005	0.005	<0.0001	<0.0001	0.00012	<0.0001	<0.0001	<0.0001	<0.0001
	Barium (Ba)	mg/L	1 ^β	-	0.00903	0.01	0.0126	0.0107	0.0109	0.0109	0.01
	Beryllium (Be)	mg/L	0.011 ^α	-	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002
	Bismuth (Bi)	mg/L	-	-	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
	Boron (B)	mg/L	1.5	-	<0.01	<0.01	0.015	<0.01	<0.01	<0.01	<0.01
	Cadmium (Cd)	mg/L	0.00012	0.00008	<0.000005	<0.000005	0.0000055	<0.000005	<0.000005	<0.000005	<0.000005
	Calcium (Ca)	mg/L	-	-	12.5	15.9	23.4	17.4	17.4	18	19.2
	Chromium (Cr)	mg/L	0.001	0.003	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
	Cobalt (Co)	mg/L	0.0009 ^α	0.004	<0.0001	<0.0001	0.00011	<0.0001	<0.0001	<0.0001	<0.0001
	Copper (Cu)	mg/L	0.002	0.0022	0.00204	0.00197	0.00127	0.00188	0.00186	0.00182	0.00128
	Iron (Fe)	mg/L	0.30	0.326	0.023	<0.01	0.273	0.064	0.06	0.063	0.014
	Lead (Pb)	mg/L	0.001	0.001	<0.00005	<0.00005	0.000072	<0.00005	<0.00005	<0.00005	<0.00005
	Lithium (Li)	mg/L	-	-	<0.001	<0.001	0.0029	0.0011	<0.001	0.0012	0.001
	Magnesium (Mg)	mg/L	-	-	8.7	10.6	15.9	11.9	12	12.8	13.2
	Manganese (Mn)	mg/L	0.935 ^β	-	0.00051	0.00044	0.0228	0.00455	0.00439	0.0038	0.0006
	Mercury (Hg)	mg/L	0.000026	-	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005
	Molybdenum (Mo)	mg/L	0.073	-	0.000789	0.000676	0.00325	0.00105	0.00103	0.00091	0.000443
	Nickel (Ni)	mg/L	0.025	0.025	<0.0005	0.00055	0.0011	0.00068	0.00071	0.00078	<0.0005
	Potassium (K)	mg/L	-	-	1.69	1.72	3.5	2	2	2.01	1.47
	Selenium (Se)	mg/L	0.001	-	<0.00005	<0.00005	0.000084	0.000051	<0.00005	<0.00005	<0.00005
	Silicon (Si)	mg/L	-	-	0.81	0.91	0.94	0.93	0.96	1.03	0.93
	Silver (Ag)	mg/L	0.00025	0.0001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
	Sodium (Na)	mg/L	-	-	0.562	1.12	8.84	2.54	2.55	2.78	1.97
	Strontium (Sr)	mg/L	-	-	0.00896	0.00902	0.0329	0.015	0.0161	0.0161	0.0119
	Thallium (Tl)	mg/L	0.0008	0.0008	0.000012	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
	Tin (Sn)	mg/L	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
	Titanium (Ti)	mg/L	-	-	0.00092	<0.0003	<0.003	<0.0009	0.00066	0.00117	<0.0006
	Uranium (U)	mg/L	0.015	-	0.00221	0.0018	0.019	0.00392	0.00384	0.00356	0.00176
	Vanadium (V)	mg/L	0.006 ^α	0.006	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
	Zinc (Zn)	mg/L	0.02 ^α	0.030	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003

Indicates parameter concentration above applicable Water Quality Guideline.

BOLD

 Indicates parameter concentration above the AEMP benchmark.

Notes: AEMP: Aquatic Effects Monitoring Plan. "-" indicates no applicable WQG or AEMP benchmark.

^a Canadian Water Quality Guideline for the protection of aquatic life (CCME 1987, 1999) except those indicated by α (Ontario Provincial Water Quality Objective [PWQO]; OMOE 1994) and β (British Columbia Water Quality Guideline [BCWQG]; BCMOE 2024). See Table 2.2 for information regarding WQG criteria.

^b A conservative hardness value of 75 mg/L was used for guideline calculations dependent on hardness (i.e., sulphate, beryllium, cadmium, copper, lead, manganese, and nickel).

^c AEMP Water Quality Benchmarks developed by Intrinsik (2013) using baseline water quality data specific to the Camp Lake Tributaries.

Table C.14: Water Chemistry at Lotic Camp Lake Tributary (CLT) Water Quality Monitoring Stations, Mary River Project CREMP, 2024

Parameters		Units	Water Quality Guideline (WQG) ^a	AEMP Benchmark ^b	Fall Sampling Event						
					CLT1 North Branch		CLT1 Upper Main Stem	CLT1 Lower Main Stem			CLT2
					L1-08	L1-02	L2-03	L1-09	L1-05	L0-01	K0-01
					30-Aug-24	17-Sep-23	16-Sep-23	16-Sep-23	16-Sep-23	16-Sep-23	16-Sep-23
Conventionals	Conductivity (lab)	µS/cm	-	-	175	201	317	233	240	247	236
	pH (lab)	pH	6.5 - 9.0	-	7.97	8.04	7.9	7.93	8.01	8.04	8.07
	Hardness (as CaCO ₃)	mg/L	-	-	82.2	99.5	141	112	113	118	118
	Total Suspended Solids (TSS)	mg/L	-	-	<1	<1	<1	<1	<1	<1	<1
	Total Dissolved Solids (TDS)	mg/L	-	-	90	105	162	117	120	133	74
	Turbidity	NTU	-	-	0.23	0.14	2.37	0.7	0.63	0.58	0.14
	Alkalinity (as CaCO ₃)	mg/L	-	-	67.7	94.7	138	110	110	113	117
Nutrients and Organics	Total Ammonia	mg/L	-	0.855	0.0143	0.0145	0.0379	0.0223	0.023	0.0126	0.0107
	Nitrate	mg/L	3	3	0.035	<0.02	0.329	0.084	0.104	0.105	<0.02
	Nitrite	mg/L	0.06	0.06	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	Total Kjeldahl Nitrogen (TKN)	mg/L	-	-	0.158	0.142	0.311	0.176	0.204	0.209	0.164
	Dissolved Organic Carbon	mg/L	-	-	5.13	2.33	6.2	3.14	3.33	3.29	2.86
	Total Organic Carbon	mg/L	-	-	2.35	2.75	4.63	3.3	3.46	3.6	3.13
	Total Phosphorus	mg/L	0.030 ^α	-	0.0022	<0.002	0.0039	<0.002	<0.002	<0.002	<0.002
	Phenols	mg/L	0.004 ^α	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Anions	Bromide (Br)	mg/L	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Chloride (Cl)	mg/L	120	120	12.3	3.93	13	6.49	7.08	8.05	3.65
	Sulphate (SO ₄)	mg/L	218 ^β	218	2.9	2.66	11.7	5.02	5.51	5.6	4.16
Total Metals	Aluminum (Al)	mg/L	0.100	0.179	0.0176	0.0086	0.0516	0.0168	0.0185	0.0186	0.0085
	Antimony (Sb)	mg/L	0.020 ^α	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
	Arsenic (As)	mg/L	0.005	0.005	<0.0001	<0.0001	0.00013	<0.0001	<0.0001	<0.0001	<0.0001
	Barium (Ba)	mg/L	1 ^β	-	0.0116	0.0126	0.0148	0.013	0.0135	0.0138	0.0126
	Beryllium (Be)	mg/L	0.011 ^α	-	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002
	Bismuth (Bi)	mg/L	-	-	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
	Boron (B)	mg/L	1.5	-	<0.01	<0.01	0.016	<0.01	<0.01	<0.01	<0.01
	Cadmium (Cd)	mg/L	0.00012	0.00008	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005
	Calcium (Ca)	mg/L	-	-	17.1	20.1	28.6	22.5	23.2	24.2	24
	Chromium (Cr)	mg/L	0.001	0.003	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
	Cobalt (Co)	mg/L	0.0009 ^α	0.004	<0.0001	<0.0001	0.00014	<0.0001	<0.0001	<0.0001	<0.0001
	Copper (Cu)	mg/L	0.002	0.0022	0.00244	0.00243	0.00136	0.00213	0.00211	0.0021	0.0017
	Iron (Fe)	mg/L	0.30	0.326	0.017	0.011	0.33	0.088	0.089	0.074	0.014
	Lead (Pb)	mg/L	0.001	0.001	<0.00005	<0.00005	0.000074	<0.00005	<0.00005	<0.00005	<0.00005
	Lithium (Li)	mg/L	-	-	<0.001	<0.001	0.0033	0.0018	0.0018	0.0019	0.0014
	Magnesium (Mg)	mg/L	-	-	11.3	13.5	19.5	15.4	15.7	16.4	15.8
	Manganese (Mn)	mg/L	0.935 ^β	-	0.00053	0.00046	0.0255	0.00574	0.00508	0.0038	0.00066
	Mercury (Hg)	mg/L	0.000026	-	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005
	Molybdenum (Mo)	mg/L	0.073	-	0.00112	0.000951	0.0031	0.00132	0.00135	0.00127	0.00063
	Nickel (Ni)	mg/L	0.025	0.025	<0.0005	0.0007	0.00122	0.00094	0.00094	0.00105	0.00066
	Potassium (K)	mg/L	-	-	2.36	2.11	3.37	2.38	2.38	2.39	1.8
	Selenium (Se)	mg/L	0.001	-	0.00005	<0.00005	0.000103	<0.00005	0.00005	<0.00005	<0.00005
	Silicon (Si)	mg/L	-	-	0.94	1.12	1.14	1.19	1.22	1.26	1.08
	Silver (Ag)	mg/L	0.00025	0.0001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
	Sodium (Na)	mg/L	-	-	0.709	1.77	10.2	4.3	4.27	4.44	3.07
	Strontium (Sr)	mg/L	-	-	0.0143	0.0123	0.0337	0.0197	0.02	0.0206	0.016
	Thallium (Tl)	mg/L	0.0008	0.0008	0.000013	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
	Tin (Sn)	mg/L	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
	Titanium (Ti)	mg/L	-	-	0.0006	<0.0003	0.00197	0.00065	<0.0006	0.00064	0.00036
	Uranium (U)	mg/L	0.015	-	0.00438	0.00308	0.0248	0.00742	0.00743	0.00655	0.0027
	Vanadium (V)	mg/L	0.006 ^α	0.006	0.00057	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
	Zinc (Zn)	mg/L	0.02 ^α	0.030	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003

Indicates parameter concentration above applicable Water Quality Guideline.

BOLD Indicates parameter concentration above the AEMP benchmark.

Notes: AEMP: Aquatic Effects Monitoring Plan. "-" indicates no applicable WQG or AEMP benchmark.

^a Canadian Water Quality Guideline for the protection of aquatic life (CCME 1987, 1999) except those indicated by α (Ontario Provincial Water Quality Objective [PWQO]; OMOE 1994) and β (British Columbia Water Quality Guideline [BCWQG]; BCMOE 2024). See Table 2.2 for information regarding WQG criteria.

^b A conservative hardness value of 75 mg/L was used for guideline calculations dependent on hardness (i.e., sulphate, beryllium, cadmium, copper, lead, manganese, and nickel).

^c AEMP Water Quality Benchmarks developed by Intrinsik (2013) using baseline water quality data specific to the Camp Lake Tributaries.

Table C.15: Magnitude of Elevation in Seasonal Average Water Chemistry and Total Metal Concentrations Between the Camp Lake Tributary (CLT1 and CLT2) and Average Reference Creek Stations, and Mine Baseline (2005 to 2013) Period, Mary River Project CREMP, 2024

Parameter	2024 vs Reference (2024)											
	Spring				Summer				Fall			
	CLT1			CLT2	CLT1			CLT2	CLT1			CLT2
	North Branch (L1-08, L1-02)	Upper Main Stem (L2-03)	Lower Main Stem (L1-09, L1-05, L0-01)	Station K0-01	North Branch (L1-08, L1-02)	Upper Main Stem (L2-03)	Lower Main Stem (L1-09, L1-05, L0-01)	Station K0-01	North Branch (L1-08, L1-02)	Upper Main Stem (L2-03)	Lower Main Stem (L1-09, L1-05, L0-01)	Station K0-01
Conductivity (lab)	3.28	7.79	4.05	3.48	1.87	3.33	2.34	2.30	1.75	2.96	2.24	2.20
pH (lab)	1.00	1.04	1.02	1.04	1.05	1.05	1.06	1.07	1.03	1.02	1.03	1.04
Hardness (as CaCO ₃)	3.58	7.07	4.16	3.68	1.93	3.08	2.37	2.52	1.80	2.80	2.27	2.34
Total Suspended Solids (TSS)	0.377	1.28	0.377	0.377	0.784	0.784	0.784	0.784	1.00	1.00	1.00	1.00
Total Dissolved Solids (TDS)	2.14	4.83	2.43	2.18	1.61	3.07	2.18	2.32	2.01	3.34	2.54	1.53
Turbidity	0.255	3.39	0.472	0.202	0.384	0.858	0.328	0.195	0.0501	0.642	0.173	0.0379
Alkalinity (as CaCO ₃)	3.30	6.77	4.18	3.80	1.84	2.94	2.36	2.48	1.53	2.59	2.09	2.20
Total Ammonia	0.979	7.02	2.15	0.844	0.962	2.13	1.02	0.962	2.55	6.71	3.42	1.89
Nitrate	1.08	23.3	2.37	1.00	1.04	5.88	1.22	0.833	1.38	16.4	4.88	1.00
Nitrite	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Total Kjeldahl Nitrogen (TKN)	0.708	2.02	0.983	0.525	1.21	3.74	1.55	1.15	2.36	4.90	3.09	2.58
Dissolved Organic Carbon	1.21	1.42	1.07	0.491	1.12	1.86	1.90	1.25	1.74	2.89	1.52	1.33
Total Organic Carbon	1.24	1.64	1.33	8.10	1.30	2.44	2.13	1.45	1.21	2.19	1.64	1.48
Total Phosphorus	0.467	1.84	0.585	0.622	0.630	1.57	0.630	0.630	0.627	1.16	0.597	0.597
Phenols	1.10	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Bromide (Br)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Chloride (Cl)	5.61	17.0	4.17	1.57	3.46	9.21	3.34	1.48	4.87	7.80	4.32	2.19
Sulphate (SO ₄)	2.12	18.2	4.07	4.46	1.14	5.68	1.87	2.48	1.14	4.80	2.20	1.70
Aluminum (Al)	0.331	3.72	0.517	0.182	0.158	0.593	0.238	0.124	0.0818	0.322	0.112	0.0531
Antimony (Sb)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Arsenic (As)	1.00	1.50	1.00	1.00	1.00	1.20	1.00	1.00	1.00	1.30	1.00	1.00
Barium (Ba)	2.85	6.28	3.26	2.56	1.98	2.63	2.26	2.08	1.70	2.07	1.88	1.77
Beryllium (Be)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.976	0.976	0.976	0.976
Bismuth (Bi)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Boron (B)	1.00	1.60	1.00	1.00	1.00	1.50	1.00	1.00	1.00	1.60	1.00	1.00
Cadmium (Cd)	0.939	1.37	0.939	0.939	1.00	1.10	1.00	1.00	1.00	1.00	1.00	1.00
Calcium (Ca)	3.42	7.03	4.01	3.50	1.85	3.04	2.29	2.50	1.81	2.78	2.27	2.34
Chromium (Cr)	0.957	1.30	0.957	0.957	0.885	0.885	0.885	0.885	0.743	0.743	0.743	0.743
Cobalt (Co)	0.976	2.05	0.976	0.976	0.952	1.05	0.952	0.952	0.800	1.12	0.800	0.800
Copper (Cu)	2.66	3.00	2.26	1.40	2.35	1.49	2.17	1.50	2.13	2.17	1.85	1.49
Iron (Fe)	0.346	4.95	0.741	0.148	0.175	2.90	0.661	0.149	0.0979	2.31	0.585	0.0979
Lead (Pb)	0.540	3.42	0.507	0.500	0.438	0.630	0.438	0.438	0.326	0.482	0.326	0.326
Lithium (Li)	1.00	3.50	1.00	1.00	1.00	2.90	1.10	1.00	1.00	3.30	1.83	1.40
Magnesium (Mg)	3.55	7.43	4.38	3.84	1.95	3.21	2.47	2.66	1.95	3.06	2.49	2.48
Manganese (Mn)	0.461	13.0	1.96	0.284	0.378	18.2	3.38	0.478	0.306	15.8	3.01	0.408
Mercury (Hg)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Molybdenum (Mo)	4.43	34.8	8.84	3.44	3.16	14.0	4.30	1.91	2.46	7.37	3.12	1.50
Nickel (Ni)	1.02	2.04	1.14	1.00	1.05	2.20	1.45	1.00	0.860	1.75	1.40	0.946
Potassium (K)	3.66	13.6	4.96	3.05	3.05	6.26	3.59	2.63	2.83	4.27	3.02	2.28
Selenium (Se)	1.00	1.52	1.00	1.00	1.00	1.68	1.01	1.00	1.00	2.06	1.00	1.00
Silicon (Si)	1.28	2.04	1.24	0.989	0.922	1.01	1.04	0.997	0.862	0.954	1.02	0.904
Silver (Ag)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Sodium (Na)	1.46	21.2	5.62	2.93	0.751	7.90	2.34	1.76	0.773	6.36	2.71	1.92
Strontium (Sr)	2.16	14.3	3.98	2.54	1.19	4.34	2.07	1.57	1.20	3.05	1.82	1.45
Thallium (Tl)	1.00	1.00	1.00	1.00	1.10	1.00	1.00	1.00	1.10	0.952	0.952	0.952
Tin (Sn)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Titanium (Ti)	0.207	1.90	0.240	0.0853	0.129	0.637	0.176	0.127	0.0592	0.259	0.0829	0.0474
Uranium (U)	2.35	59.0	9.70	1.77	1.75	16.6	3.29	1.53	1.30	8.67	2.49	0.944
Vanadium (V)	0.985	1.00	0.985	0.985	0.957	0.957	0.957	0.957	0.856	0.800	0.800	0.800
Zinc (Zn)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

- Denotes parameter with an AEMP benchmark.
- Denotes slight elevation (mean concentration three to five times higher than respective mean reference value).
- Denotes moderate elevation (mean concentration five to 10 times higher than respective mean reference value).
- Denotes highly elevated concentration (mean concentration greater than 10 times higher than respective mean reference value).
- Denotes differences in method detection limit between the indicated study area and that of the reference creeks, precluding an evaluation of magnitude of elevation; or no data available for the analyte during comparison period.

Table C.15: Magnitude of Elevation in Seasonal Average Water Chemistry and Total Metal Concentrations Between the Camp Lake Tributary (CLT1 and CLT2) and Average Reference Creek Stations, and Mine Baseline (2005 to 2013) Period, Mary River Project CREMP, 2024

Parameter	2024 vs Baseline (2005 to 2013)											
	Spring				Summer				Fall			
	CLT1			CLT2	CLT1			CLT2	CLT1			CLT2
	North Branch (L1-08, L1-02)	Upper Main Stem (L2-03)	Lower Main Stem (L1-09, L1-05, L0-01)	Station K0-01	North Branch (L1-08, L1-02)	Upper Main Stem (L2-03)	Lower Main Stem (L1-09, L1-05, L0-01)	Station K0-01	North Branch (L1-08, L1-02)	Upper Main Stem (L2-03)	Lower Main Stem (L1-09, L1-05, L0-01)	Station K0-01
Conductivity (lab)	1.89	2.15	1.39	1.27	1.42	1.35	1.19	1.36	1.12	0.887	1.08	1.14
pH (lab)	1.07	1.05	0.982	1.06	1.03	1.02	1.01	1.02	1.01	1.01	1.01	0.996
Hardness (as CaCO ₃)	-	-	-	-	-	-	-	-	-	-	-	-
Total Suspended Solids (TSS)	0.429	1.70	0.308	0.417	0.500	0.500	0.467	0.500	0.286	0.500	0.400	0.500
Total Dissolved Solids (TDS)	1.50	2.03	1.15	1.08	1.19	1.20	0.995	1.24	0.922	0.995	0.869	0.585
Turbidity	1.36	11.6	1.61	0.603	6.85	4.05	2.53	0.617	0.402	2.86	1.30	0.238
Alkalinity (as CaCO ₃)	1.78	1.81	1.30	1.23	1.28	1.29	1.13	1.31	1.02	1.16	1.09	1.14
Total Ammonia	0.0423	0.446	0.262	0.0603	0.0698	0.135	0.0978	0.0284	0.183	0.249	0.287	0.0814
Nitrate	0.307	9.32	0.473	0.350	0.500	2.82	0.516	0.400	0.401	6.58	1.67	0.400
Nitrite	2.00	2.00	5.00	4.00	2.00	2.00	2.98	2.22	2.00	1.88	2.88	2.50
Total Kjeldahl Nitrogen (TKN)	0.343	0.680	0.508	0.301	0.723	1.13	0.610	0.388	1.29	1.58	1.21	1.06
Dissolved Organic Carbon	1.59	0.823	0.912	0.352	1.60	1.01	1.64	1.65	2.43	1.66	1.32	1.47
Total Organic Carbon	1.31	0.724	0.894	4.51	1.47	1.05	1.49	1.62	1.63	1.17	1.35	1.44
Total Phosphorus	0.485	0.673	0.334	0.225	0.588	1.15	0.509	0.203	0.630	1.30	0.277	0.400
Phenols	-	-	-	-	-	-	-	-	-	-	-	-
Bromide (Br)	0.400	0.400	2.00	1.20	0.400	0.400	2.00	2.00	0.400	0.400	2.00	2.00
Chloride (Cl)	2.54	2.86	1.28	1.04	2.79	0.867	0.976	1.02	0.867	0.976	0.860	1.11
Sulphate (SO ₄)	0.852	7.43	1.16	1.59	1.05	7.43	1.30	2.37	0.754	3.44	1.25	1.09
Aluminum (Al)	0.414	10.4	0.747	0.279	0.802	3.73	0.974	0.264	0.663	7.22	2.24	0.400
Antimony (Sb)	1.00	1.00	0.575	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Arsenic (As)	1.00	1.50	0.385	1.00	0.723	1.17	1.00	1.00	1.00	1.30	1.00	1.00
Barium (Ba)	1.60	2.98	1.25	1.17	1.35	1.46	1.22	1.23	1.20	1.01	1.27	1.21
Beryllium (Be)	1.00	1.00	20.0	0.333	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Bismuth (Bi)	0.167	0.167	0.0329	0.147	0.167	0.0329	0.167	0.167	0.167	0.167	0.167	0.167
Boron (B)	0.442	1.45	1.98	1.00	1.00	1.50	0.826	1.00	1.00	1.60	1.00	1.00
Cadmium (Cd)	0.500	0.730	0.500	0.500	0.500	0.550	0.344	0.500	0.500	0.500	0.500	0.500
Calcium (Ca)	1.87	1.72	1.30	1.13	1.33	1.11	1.04	1.32	1.13	0.734	0.999	1.11
Chromium (Cr)	1.72	3.34	2.36	3.04	3.33	1.61	3.61	11.9	3.43	3.64	1.80	0.453
Cobalt (Co)	1.00	2.10	1.00	0.930	1.00	1.10	1.00	1.00	1.00	1.27	1.00	1.00
Copper (Cu)	1.08	2.18	1.04	0.875	0.914	1.09	1.06	0.914	1.51	1.35	1.38	1.21
Iron (Fe)	0.444	4.83	0.838	0.198	0.839	1.45	1.31	0.347	0.551	1.76	1.59	0.465
Lead (Pb)	0.610	6.84	0.608	0.625	0.625	1.44	0.865	1.00	0.714	1.48	1.00	0.810
Lithium (Li)	2.47	4.29	1.58	3.64	1.29	1.07	0.783	0.957	1.25	0.548	1.03	1.09
Magnesium (Mg)	2.10	2.14	1.21	1.36	1.47	1.32	1.22	1.55	1.25	1.16	1.19	1.28
Manganese (Mn)	0.321	3.84	0.487	0.0825	0.916	1.85	2.06	0.748	0.719	2.38	1.85	0.337
Mercury (Hg)	0.500	0.500	0.139	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500
Molybdenum (Mo)	2.17	16.3	1.87	2.16	1.78	15.5	2.39	1.53	1.61	8.10	2.64	1.68
Nickel (Ni)	0.927	1.07	0.501	0.687	0.965	0.957	0.810	0.971	1.07	1.05	1.05	0.981
Potassium (K)	1.64	5.56	2.05	1.46	1.33	3.60	1.61	1.47	1.39	2.30	1.70	1.42
Selenium (Se)	5.0	7.60	5.0	5.00	5.00	8.40	5.03	5.0	5.00	1.03	0.333	0.500
Silicon (Si)	1.19	1.47	0.835	0.720	1.51	1.07	1.11	1.33	1.33	1.01	1.14	1.33
Silver (Ag)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Sodium (Na)	1.66	10.1	0.137	2.47	1.26	5.90	3.08	1.65	1.01	4.95	0.0417	1.88
Strontium (Sr)	2.14	3.25	1.61	1.51	1.62	1.14	1.36	1.47	1.43	0.450	0.987	1.31
Thallium (Tl)	1.74	10.0	0.0153	1.82	1.91	10.0	3.08	10.0	1.02	1.00	1.00	1.00
Tin (Sn)	1.00	1.00	1.00	1.00	1.00	1.00	0.763	1.00	1.00	1.00	1.00	1.00
Titanium (Ti)	0.283	2.59	0.0983	0.0795	0.203	1.00	0.277	0.200	0.150	0.657	0.210	0.120
Uranium (U)	2.39	50.3	6.27	1.70	2.56	31.1	3.23	1.25	1.33	12.7	3.25	1.53
Vanadium (V)	0.556	0.567	0.500	0.547	0.556	0.556	0.556	0.556	0.594	0.556	0.552	0.556
Zinc (Zn)	3.00	3.00	1.40	1.29	1.00	1.94	1.13	3.00	9.09	2.00	3.15	2.20

- Denotes parameter with an AEMP benchmark.
- Denotes slight elevation (mean concentration three to five times higher than respective mean reference value).
- Denotes moderate elevation (mean concentration five to 10 times higher than respective mean reference value).
- Denotes highly elevated concentration (mean concentration greater than 10 times higher than respective mean reference value).
- Denotes differences in method detection limit between the indicated study area and that of the reference creeks, precluding an evaluation of magnitude of elevation; or no data available for the analyte during comparison period.

Table C.16: Dissolved Metal Concentrations at Lotic Camp Lake Tributary (CLT1 and CLT2) Water Quality Monitoring Stations, Mary River Project CREMP, 2024

Parameters		Units	Spring Sampling Event							Summer Sampling Event							Fall Sampling Event						
			L1-08	L1-02	L2-03	L1-09	L1-05	L0-01	K0-01	L1-08	L1-02	L2-03	L1-09	L1-05	L0-01	K0-01	L1-08	L1-02	L2-03	L1-09	L1-05	L0-01	K0-01
			04-Jul-24	01-Jul-24	01-Jul-24	01-Jul-24	01-Jul-24	01-Jul-24	01-Jul-24	30-Jul-24	30-Jul-24	30-Jul-24	30-Jul-24	30-Jul-24	30-Jul-24	30-Jul-24	30-Aug-24	30-Aug-24	30-Aug-24	30-Aug-24	30-Aug-24	30-Aug-24	30-Aug-24
Dissolved Metals	Aluminum (Al)	mg/L	0.0085	0.005	0.017	0.0076	0.0075	0.0074	0.0039	0.0069	0.0039	0.0085	0.0058	0.0065	0.0055	0.0031	0.0052	0.0034	0.0572	0.0043	0.0045	0.0045	0.0134
	Antimony (Sb)	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
	Arsenic (As)	mg/L	<0.0001	<0.0001	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.00011	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0001	<0.0001	<0.0001	<0.0001	<0.0001
	Barium (Ba)	mg/L	0.00657	0.00578	0.0116	0.00684	0.00668	0.00696	0.00548	0.00848	0.01	0.0124	0.0108	0.0106	0.0109	0.00991	0.0108	0.012	0.0144	0.0126	0.0128	0.0132	0.0125
	Beryllium (Be)	mg/L	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002
	Bismuth (Bi)	mg/L	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
	Boron (B)	mg/L	<0.01	<0.01	0.014	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.015	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.013	<0.01	<0.01	<0.01	<0.01
	Cadmium (Cd)	mg/L	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	0.0000051	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005
	Calcium (Ca)	mg/L	9.3	8.54	17.8	10.2	10.3	10.6	9.11	13	15.4	22.6	17.2	16.9	18.1	18.3	16.1	19.4	27.4	21.8	22.1	23.3	23.3
	Chromium (Cr)	mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
	Cobalt (Co)	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.00012	<0.0001	<0.0001	<0.0001	<0.0001
	Copper (Cu)	mg/L	0.0017	0.00127	0.00102	0.00122	0.00121	0.00114	0.00076	0.00185	0.00183	0.00113	0.00172	0.00171	0.00162	0.00117	0.002	0.00208	0.00119	0.00176	0.00183	0.00173	0.00149
	Iron (Fe)	mg/L	<0.01	<0.01	0.023	0.016	0.016	0.014	<0.01	<0.01	<0.01	0.11	0.028	0.029	0.025	<0.01	<0.01	<0.01	0.275	0.037	0.036	0.03	0.022
	Lead (Pb)	mg/L	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0.000081	<0.00005	<0.00005	<0.00005	<0.00005
	Lithium (Li)	mg/L	<0.001	<0.001	0.0036	0.0012	0.0011	0.0011	<0.001	<0.001	<0.001	0.0035	0.0016	0.0014	0.0014	0.0011	<0.001	0.0011	0.0034	0.0018	0.0018	0.0019	0.0014
	Magnesium (Mg)	mg/L	6.12	5.62	11.5	6.81	6.63	7.02	6.09	8.42	10.6	15.1	11.4	11.5	12.2	12.5	10.2	12.4	17.6	14	14	14.6	14.6
	Manganese (Mn)	mg/L	0.00014	0.00026	0.0111	0.00216	0.0014	0.00127	0.00017	0.00016	0.00029	0.0194	0.00372	0.00323	0.00276	0.00036	0.00026	0.00035	0.0236	0.00496	0.00388	0.00297	0.00128
	Mercury (Hg)	mg/L	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005
	Molybdenum (Mo)	mg/L	0.000311	0.000332	0.00269	0.000681	0.000668	0.000616	0.000251	0.000724	0.000677	0.00308	0.000955	0.000972	0.000891	0.000416	0.00107	0.000881	0.00293	0.00127	0.00132	0.00118	0.000557
	Nickel (Ni)	mg/L	<0.0005	<0.0005	0.00061	<0.0005	<0.0005	0.0005	<0.0005	<0.0005	<0.0005	0.0009	0.00063	0.00067	0.0007	<0.0005	<0.0005	0.00058	0.00101	0.00076	0.00076	0.00083	0.00058
	Potassium (K)	mg/L	1.29	1.09	3.82	1.53	1.5	1.47	0.915	1.64	1.72	3.4	1.95	1.96	1.93	1.42	2.31	2.02	3.28	2.39	2.33	2.35	1.73
	Selenium (Se)	mg/L	<0.00005	<0.00005	0.000072	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0.000094	<0.00005	<0.00005	<0.00005	<0.00005	0.000068	0.000052	0.000123	0.00005	0.000056	<0.00005	<0.00005
	Silicon (Si)	mg/L	0.666	0.479	0.542	0.516	0.506	0.509	0.436	0.769	0.859	0.804	0.88	0.905	0.92	0.851	0.892	1.06	1.1	1.1	1.15	1.16	1.05
	Silver (Ag)	mg/L	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
	Sodium (Na)	mg/L	0.446	0.632	7.45	2.02	1.98	1.93	1.04	0.563	1.12	8.29	2.4	2.48	2.64	1.88	0.644	1.62	9.17	3.8	3.89	3.85	2.72
	Strontium (Sr)	mg/L	0.00583	0.00482	0.0331	0.00969	0.0097	0.00944	0.00604	0.00857	0.00903	0.0322	0.015	0.0155	0.016	0.0123	0.0148	0.0124	0.0323	0.0199	0.0208	0.0212	0.0161
	Thallium (Tl)	mg/L	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0.000011	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0.000013	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
	Tin (Sn)	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0002	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
	Titanium (Ti)	mg/L	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	0.00187	<0.0003	<0.0003	<0.0003	0.00097
	Uranium (U)	mg/L	0.000616	0.000345	0.0112	0.00214	0.00209	0.00174	0.000366	0.00221	0.00191	0.0195	0.00411	0.00414	0.00364	0.00179	0.00428	0.00292	0.0254	0.00718	0.00709	0.00632	0.00268
	Vanadium (V)	mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
	Zinc (Zn)	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	0.0017	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.0017	<0.001	<0.001	<0.001	<0.001

Table C.17: Magnitude of Elevation in Seasonal Average Dissolved Metal Concentrations Between the Camp Lake Tributary (CLT1 and CLT2) and Average Reference Creek Stations, Mary River Project CREMP, 2024

Parameter	Spring				Summer				Fall			
	CLT1			CLT2	CLT1			CLT2	CLT1			CLT2
	North Branch (L1-08, L1-02)	Upper Main Stem (L2-03)	Lower Main Stem (L1-09, L1-05, L0-01)	Station K0-01	North Branch (L1-08, L1-02)	Upper Main Stem (L2-03)	Lower Main Stem (L1-09, L1-05, L0-01)	Station K0-01	North Branch (L1-08, L1-02)	Upper Main Stem (L2-03)	Lower Main Stem (L1-09, L1-05, L0-01)	Station K0-01
Aluminum (Al)	0.362	0.913	0.403	0.209	0.241	0.379	0.265	0.138	0.0489	0.651	0.0505	0.152
Antimony (Sb)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Arsenic (As)	1.00	1.00	1.00	1.00	1.00	1.10	1.00	1.00	1.00	1.00	1.00	1.00
Barium (Ba)	3.66	6.87	4.05	3.25	2.18	2.92	2.54	2.34	1.82	2.30	2.05	1.99
Beryllium (Be)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Bismuth (Bi)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Boron (B)	1.00	1.40	1.00	1.00	1.00	1.50	1.00	1.00	1.00	1.30	1.00	1.00
Cadmium (Cd)	0.952	0.952	0.952	0.952	1.00	1.02	1.00	1.00	1.00	1.00	1.00	1.00
Calcium (Ca)	3.52	7.01	4.09	3.59	1.85	2.94	2.27	2.38	1.74	2.68	2.19	2.28
Chromium (Cr)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.962	0.962	0.962	0.962
Cobalt (Co)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.20	1.00	1.00
Copper (Cu)	3.54	2.43	2.83	1.81	2.68	1.64	2.45	1.70	2.34	1.37	2.04	1.71
Iron (Fe)	0.755	1.74	1.16	0.755	0.563	6.20	1.54	0.563	0.163	4.49	0.561	0.359
Lead (Pb)	1.00	1.00	1.00	1.00	0.957	0.957	0.957	0.957	0.532	0.862	0.532	0.532
Lithium (Li)	1.00	3.60	1.13	1.00	1.00	3.50	1.47	1.10	1.05	3.40	1.83	1.40
Magnesium (Mg)	3.63	7.11	4.22	3.77	2.01	3.20	2.48	2.65	1.88	2.92	2.36	2.42
Manganese (Mn)	0.516	28.6	4.15	0.439	0.732	63.1	10.5	1.17	0.397	30.7	5.13	1.67
Mercury (Hg)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Molybdenum (Mo)	3.75	31.4	7.64	2.93	2.95	13.0	3.95	1.75	2.50	7.51	3.22	1.43
Nickel (Ni)	1.00	1.22	1.00	1.00	1.00	1.80	1.33	1.00	1.03	1.92	1.49	1.10
Potassium (K)	3.82	12.3	4.81	2.94	3.21	6.49	3.72	2.71	3.12	4.73	3.40	2.49
Selenium (Se)	1.00	1.44	1.00	1.00	1.00	1.88	1.00	1.00	1.20	2.46	1.04	1.00
Silicon (Si)	1.58	1.50	1.41	1.20	1.06	1.05	1.18	1.11	0.944	1.06	1.10	1.02
Silver (Ag)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Sodium (Na)	1.45	20.1	5.33	2.80	0.764	7.53	2.28	1.71	0.745	6.03	2.53	1.79
Strontium (Sr)	2.27	14.1	4.09	2.57	1.19	4.35	2.09	1.66	1.28	3.03	1.94	1.51
Thallium (Tl)	1.00	1.00	1.00	1.00	1.05	1.00	1.00	1.00	1.15	1.00	1.00	1.00
Tin (Sn)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.50	1.00	1.00	1.00
Titanium (Ti)	0.558	0.558	0.558	0.558	0.367	0.367	0.367	0.367	0.0844	0.526	0.0844	0.273
Uranium (U)	2.95	68.7	12.2	2.25	1.80	17.0	3.47	1.57	1.34	9.47	2.56	0.999
Vanadium (V)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Zinc (Zn)	0.290	0.290	0.357	0.290	1.00	1.00	1.00	1.00	1.00	1.70	1.00	1.00

Denotes slight elevation (mean concentration three to five times higher than respective mean reference value).

Denotes moderate elevation (mean concentration five to 10 times higher than respective mean reference value).

Denotes highly elevated concentration (mean concentration greater than 10 times higher than respective mean reference value).

Denotes differences in method detection limit between the indicated study area and that of the reference creeks, precluding an evaluation of magnitude of elevation.

Table C.18: Magnitude of Elevation in Seasonal Average Dissolved Metal Concentrations Between the Camp Lake Tributary (CLT1 and CLT2) in 2024 and Mine Baseline Period (2005 to 2013), Mary River Project CREMP, 2024

Variable	Spring				Summer				Fall			
	CLT1			CLT2	CLT1			CLT2	CLT1			CLT2
	North Branch (L1-08, L1-02)	Upper Main Stem (L2-03)	Lower Main Stem (L1-09, L1-05, L0-01)	Station K0-01	North Branch (L1-08, L1-02)	Upper Main Stem (L2-03)	Lower Main Stem (L1-09, L1-05, L0-01)	Station K0-01	North Branch (L1-08, L1-02)	Upper Main Stem (L2-03)	Lower Main Stem (L1-09, L1-05, L0-01)	Station K0-01
Aluminum (Al)	0.931	5.40	1.07	0.763	1.18	1.21	1.52	0.581	1.16	21.4	1.61	3.81
Antimony (Sb)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.500	1.00	1.00	1.00	0.625
Arsenic (As)	1.00	1.00	1.00	1.00	1.00	1.10	1.00	1.00	1.00	1.00	1.00	1.00
Barium (Ba)	1.80	2.57	1.38	1.32	1.32	1.39	1.21	1.42	1.14	0.857	1.21	1.27
Beryllium (Be)	0.200	0.200	0.200	0.200	0.200	0.200	0.200	0.0115	0.200	0.200	0.200	0.0185
Bismuth (Bi)	0.167	0.100	0.100	0.132	0.167	0.100	0.167	0.115	0.167	0.100	0.167	0.132
Boron (B)	1.00	1.40	1.00	1.00	1.00	1.50	1.00	1.00	1.00	1.30	1.00	1.00
Cadmium (Cd)	0.500	0.500	0.500	0.500	0.500	0.510	0.487	0.500	0.500	0.500	0.484	0.500
Calcium (Ca)	1.94	1.52	1.29	1.18	1.29	1.07	1.04	1.26	1.10	0.618	0.969	1.09
Chromium (Cr)	4.76	5.00	4.59	5.00	5.00	5.00	1.21	5.00	4.93	5.00	1.48	5.00
Cobalt (Co)	1.00	1.00	1.00	1.00	1.00	0.937	1.00	1.00	1.00	1.16	1.00	1.00
Copper (Cu)	0.000138	1.67	0.000603	0.964	0.000151	0.000678	0.000363	1.14	0.000133	1.69	0.000491	0.629
Iron (Fe)	0.667	0.657	0.646	0.368	1.00	0.579	1.01	0.500	1.00	2.66	1.17	1.03
Lead (Pb)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.500	1.00	1.62	1.00	0.556
Lithium (Li)	2.00	3.55	1.36	1.89	1.42	1.39	1.13	1.12	1.25	0.516	0.811	1.37
Magnesium (Mg)	2.06	1.74	1.50	1.30	1.41	1.29	1.17	1.50	1.11	0.856	1.04	1.12
Manganese (Mn)	0.216	3.92	0.730	0.0566	0.983	1.57	2.04	0.570	0.875	1.68	1.50	1.16
Mercury (Hg)	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500
Molybdenum (Mo)	2.00	18.5	3.42	1.80	1.74	14.9	2.26	1.34	1.44	11.2	2.41	1.31
Nickel (Ni)	0.990	0.782	0.646	0.265	1.00	0.849	0.780	0.326	1.02	0.804	0.841	0.317
Potassium (K)	1.74	4.81	2.21	1.48	1.37	3.49	1.57	1.40	1.28	2.18	1.49	1.27
Selenium (Se)	0.500	0.720	0.000106	0.500	0.500	0.940	0.500	0.500	0.600	1.23	0.520	0.500
Silicon (Si)	1.43	0.911	0.944	1.16	1.47	0.946	1.05	1.49	1.27	0.855	1.02	4.57
Silver (Ag)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Sodium (Na)	1.62	7.31	4.74	2.36	1.21	4.65	2.91	1.60	1.11	2.73	2.51	1.51
Strontium (Sr)	2.26	2.57	1.58	1.56	1.58	0.968	1.39	1.53	1.65	0.280	0.911	1.35
Thallium (Tl)	0.870	1.00	1.00	1.00	1.05	1.00	0.930	0.174	1.00	1.00	1.00	0.0205
Tin (Sn)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.50	1.00	0.863	1.00
Titanium (Ti)	0.100	0.0300	0.0300	0.0349	0.100	0.0300	0.100	0.0391	0.100	0.187	0.100	0.303
Uranium (U)	2.53	50.6	7.08	2.96	3.11	34.5	3.85	2.01	1.42	15.4	3.29	1.66
Vanadium (V)	0.556	0.500	0.500	0.556	0.410	0.500	0.459	0.500	0.437	0.500	0.476	0.500
Zinc (Zn)	0.721	0.714	0.605	0.515	1.12	0.833	0.464	0.588	1.16	1.21	0.586	1.29

Denotes slight elevation (mean concentration three to five times higher than respective mean reference value).


Denotes moderate elevation (mean concentration five to 10 times higher than respective mean reference value).

Denotes highly elevated concentration (mean concentration greater than 10 times higher than respective mean reference value).

Denotes differences in method detection limit between the 2024 and baseline data, precluding an evaluation of magnitude of elevation.

Table C.19: Statistical Comparison of *In Situ* Water Quality Variables Among Camp Lake Tributary 2 (CLT2) and Unnamed Reference Creek (REF-CRK) Benthic Invertebrate Community (BIC) Stations, Mary River Project CREMP, August 2024

Metric	Overall 3-group Comparison				Pair-wise, <i>post hoc</i> comparisons ^a			
	Statistical Test ^a	Transformation	Significant Difference Between Areas?	P-value	(I) Area	(J) Area	Significant Difference Between Areas?	P-value
Water Temperature (°C)	ANOVA	None	YES	<0.001	REF-CRK Unnamed Reference Creek	CLT2 Upstream	NO	0.436
					REF-CRK Unnamed Reference Creek	CLT2 Downstream	YES	<0.001
					CLT2 Downstream	CLT2 Upstream	YES	0.002
Dissolved Oxygen (mg/L)	ANOVA	None	YES	<0.001	REF-CRK Unnamed Reference Creek	CLT2 Upstream	YES	<0.001
					REF-CRK Unnamed Reference Creek	CLT2 Downstream	YES	<0.001
					CLT2 Downstream	CLT2 Upstream	YES	<0.001
Dissolved Oxygen (% saturation)	ANOVA	None	YES	<0.001	REF-CRK Unnamed Reference Creek	CLT2 Upstream	YES	<0.001
					REF-CRK Unnamed Reference Creek	CLT2 Downstream	YES	<0.001
					CLT2 Downstream	CLT2 Upstream	NO	0.493
pH (units)	K-W	Rank	YES	0.002	REF-CRK Unnamed Reference Creek	CLT2 Upstream	YES	<0.001
					REF-CRK Unnamed Reference Creek	CLT2 Downstream	NO	0.070
					CLT2 Downstream	CLT2 Upstream	NO	0.088
Specific Conductance (µS/cm)	K-W	Rank	YES	0.004	REF-CRK Unnamed Reference Creek	CLT2 Upstream	YES	0.044
					REF-CRK Unnamed Reference Creek	CLT2 Downstream	YES	<0.001
					CLT2 Downstream	CLT2 Upstream	NO	0.202

 Highlighted values indicate that the significant difference between study areas was based on test p-value less than 0.05.

^a Statistical tests include Analysis of Variance (ANOVA) followed by Tukey's Honestly Significant Difference (HSD) post hoc tests, or Kruskal-Wallis H-test (K-W) followed by Mann-Whitney U-test (M-W).

Table C.20: In Situ Water Quality Profile Data Collected at Camp Lake (JL0) Water Quality Monitoring Stations, Mary River Project CREMP, Winter 2024

Depth (m)	Temperature (°C)					Dissolved Oxygen (mg/L)					Dissolved Oxygen (% Saturation)				
	JL0-02	JL0-10	JL0-01	JL0-07	JL0-09	JL0-02	JL0-10	JL0-01	JL0-07	JL0-09	JL0-02	JL0-10	JL0-01	JL0-07	JL0-09
	8-Apr-24	7-Apr-24	7-Apr-24	8-Apr-24	8-Apr-24	8-Apr-24	7-Apr-24	7-Apr-24	8-Apr-24	8-Apr-24	8-Apr-24	7-Apr-24	7-Apr-24	8-Apr-24	8-Apr-24
1.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2.0	0	0.300	1.20	0.200	0.400	14.9	14.1	12.9	14.8	13.6	104	98.8	93.9	103	95.8
3.0	0.400	0.600	0.700	0.500	0.600	14.8	14.5	13.6	14.6	14.1	104	102	97.2	102	99.4
4.0	0.600	0.700	0.700	0.600	0.600	14.6	14.6	13.9	14.4	14.1	104	103	98.5	102	99.8
5.0	0.600	0.700	0.700	0.700	0.700	14.6	14.7	14.1	14.3	14.1	104	104	99.6	101	99.5
6.0	0.700	0.700	0.700	0.700	0.700	14.6	14.8	14.0	14.4	14.0	104	104	99.0	102	99.3
7.0	0.700	0.700	0.700	0.700	0.800	14.6	14.8	14.0	14.4	13.9	103	105	98.6	102	98.5
8.0	0.700	0.700	0.800	-	0.800	14.5	14.8	13.9	-	13.9	103	104	98.2	-	98.2
9.0	0.700	0.700	0.700	0.800	0.800	14.4	14.6	13.8	14.2	13.8	102	103	97.5	101	97.8
10.0	0.800	-	0.900	0.800	0.900	14.3	-	13.6	14.1	13.7	102	-	96.6	100	97.1
11.0	0.800	-	0.900	0.900	1.00	14.0	-	13.5	13.9	13.5	99.0	-	95.8	99.0	95.8
12.0	-	-	1.00	-	1.00	-	-	13.4	-	13.4	-	-	95.2	-	95.4
13.0	-	-	1.00	1.00	1.00	-	-	13.3	13.6	13.3	-	-	94.5	97.1	94.9
14.0	-	-	1.10	1.10	1.10	-	-	13.1	13.4	13.2	-	-	93.5	95.3	94.2
15.0	-	-	1.10	1.10	1.10	-	-	12.9	13.1	12.9	-	-	92.2	93.6	92.2
16.0	-	-	-	1.20	-	-	-	-	12.9	-	-	-	-	92.5	-
17.0	-	-	-	1.20	-	-	-	-	12.7	-	-	-	-	90.9	-
18.0	-	-	-	1.30	-	-	-	-	12.4	-	-	-	-	88.8	-
19.0	-	-	-	1.30	-	-	-	-	12.2	-	-	-	-	87.3	-
20.0	-	-	-	1.30	-	-	-	-	12.1	-	-	-	-	86.8	-
21.0	-	-	-	1.30	-	-	-	-	11.9	-	-	-	-	85.7	-
22.0	-	-	-	1.40	-	-	-	-	11.7	-	-	-	-	84.1	-
23.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
24.0	-	-	-	1.40	-	-	-	-	11.2	-	-	-	-	80.6	-
25.0	-	-	-	1.50	-	-	-	-	10.9	-	-	-	-	78.4	-
26.0	-	-	-	1.60	-	-	-	-	10.5	-	-	-	-	75.5	-
27.0	-	-	-	1.70	-	-	-	-	9.80	-	-	-	-	71.1	-
28.0	-	-	-	1.80	-	-	-	-	9.02	-	-	-	-	65.5	-
29.0	-	-	-	1.90	-	-	-	-	8.08	-	-	-	-	59.0	-
30.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
31.0	-	-	-	2.10	-	-	-	-	6.60	-	-	-	-	48.0	-
32.0	-	-	-	2.20	-	-	-	-	5.14	-	-	-	-	37.3	-

Notes: "-" = data not available. The total depth of the water column at each sampling station was not recorded but deepest measurements are within 1 m of lake bottom.

^a Data was removed as an erroneous value.

Table C.20: In Situ Water Quality Profile Data Collected at Camp Lake (JL0) Water Quality Monitoring Stations, Mary River Project CREMP, Winter 2024

Depth (m)	pH (pH units)					Specific Conductance (µS/cm)					Turbidity (NTU)				
	JL0-02	JL0-10	JL0-01	JL0-07	JL0-09	JL0-02	JL0-10	JL0-01	JL0-07	JL0-09	JL0-02	JL0-10	JL0-01	JL0-07	JL0-09
	8-Apr-24	7-Apr-24	7-Apr-24	8-Apr-24	8-Apr-24	8-Apr-24	7-Apr-24	7-Apr-24	8-Apr-24	8-Apr-24	8-Apr-24	7-Apr-24	7-Apr-24	8-Apr-24	8-Apr-24
1.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2.0	7.82	7.80	7.85	7.80	7.84	177	178	172	175	176	0.350	0.130	0.100	0.290	0.160
3.0	7.81	7.79	7.81	7.80	7.79	172	174	172	170	171	0.290	- ^a	0.140	0.250	0.220
4.0	7.80	7.79	7.78	7.79	7.74	171	172	170	169	171	0.260	0.200	0.150	0.250	0.220
5.0	7.80	7.80	7.77	7.79	7.74	172	172	171	168	169	0.250	0.170	0.160	0.250	0.240
6.0	7.80	7.80	7.77	7.79	7.74	171	171	170	168	169	0.260	0.150	0.160	0.250	0.230
7.0	7.80	7.80	7.77	7.79	7.75	171	171	169	169	167	0.240	0.200	0.160	0.270	0.240
8.0	7.79	7.80	7.78	-	7.75	170	170	169	-	166	0.240	0.170	0.180	-	0.240
9.0	7.79	7.80	7.77	7.78	7.75	170	170	168	168	166	0.240	0.210	0.170	0.250	0.220
10.0	7.79	-	7.75	7.78	7.75	169	-	166	166	165	0.280	-	0.160	0.260	0.250
11.0	7.76	-	7.75	7.77	7.74	171	-	165	165	164	0.270	-	0.150	0.230	0.250
12.0	-	-	7.74	-	7.74	-	-	164	-	163	-	-	0.150	-	0.240
13.0	-	-	7.73	7.73	7.73	-	-	164	164	162	-	-	0.190	0.230	0.220
14.0	-	-	7.72	7.71	7.72	-	-	163	164	162	-	-	0.180	0.260	0.240
15.0	-	-	7.69	7.69	7.69	-	-	162	162	161	-	-	0.150	0.230	0.220
16.0	-	-	-	7.68	-	-	-	-	161	-	-	-	-	0.210	-
17.0	-	-	-	7.65	-	-	-	-	160	-	-	-	-	0.250	-
18.0	-	-	-	7.62	-	-	-	-	160	-	-	-	-	0.240	-
19.0	-	-	-	7.59	-	-	-	-	161	-	-	-	-	0.250	-
20.0	-	-	-	7.58	-	-	-	-	161	-	-	-	-	0.250	-
21.0	-	-	-	7.56	-	-	-	-	162	-	-	-	-	0.270	-
22.0	-	-	-	7.54	-	-	-	-	161	-	-	-	-	0.230	-
23.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
24.0	-	-	-	7.49	-	-	-	-	161	-	-	-	-	0.250	-
25.0	-	-	-	7.46	-	-	-	-	163	-	-	-	-	0.270	-
26.0	-	-	-	7.44	-	-	-	-	163	-	-	-	-	0.260	-
27.0	-	-	-	7.39	-	-	-	-	164	-	-	-	-	0.300	-
28.0	-	-	-	7.34	-	-	-	-	166	-	-	-	-	0.280	-
29.0	-	-	-	7.29	-	-	-	-	167	-	-	-	-	0.310	-
30.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
31.0	-	-	-	7.21	-	-	-	-	175	-	-	-	-	0.310	-
32.0	-	-	-	7.14	-	-	-	-	189	-	-	-	-	0.370	-

Notes: "-" = data not available. The total depth of the water column at each sampling station was not recorded but deepest measurements are within 1 m of lake bottom.

^a Data was removed as an erroneous value.

Table C.21: *In Situ* Water Quality Profile Data Collected at Camp Lake (JL0) Water Quality Monitoring Stations, Mary River Project CREMP, Summer 2024

Depth (m)	Temperature (°C)					Dissolved Oxygen (mg/L)					Dissolved Oxygen (% Saturation)				
	JL0-02	JL0-10	JL0-01	JL0-07	JL0-09	JL0-02	JL0-10	JL0-01	JL0-07	JL0-09	JL0-02	JL0-10	JL0-01	JL0-07	JL0-09
	9-Aug-24	9-Aug-24	10-Aug-24	10-Aug-24	9-Aug-24	9-Aug-24	9-Aug-24	10-Aug-24	10-Aug-24	9-Aug-24	9-Aug-24	9-Aug-24	10-Aug-24	10-Aug-24	9-Aug-24
1.0	8.30	8.30	8.70	8.60	8.10	11.8	11.8	11.7	11.7	11.7	103	103	104	103	102
2.0	8.30	8.30	8.70	8.60	8.00	11.9	11.9	11.8	11.7	11.8	104	104	104	103	103
3.0	8.20	8.30	8.70	8.60	8.00	11.9	11.9	11.8	11.8	11.9	103	104	104	104	103
4.0	8.10	8.30	8.70	8.50	8.00	11.9	11.1	11.8	11.8	11.9	103	104	104	104	103
5.0	8.10	8.30	8.40	8.50	8.00	11.9	11.9	11.8	11.8	11.9	103	104	104	104	103
6.0	8.00	8.30	8.40	8.50	7.90	11.9	11.9	11.8	11.8	11.9	103	104	104	104	103
7.0	8.00	8.30	8.40	8.50	7.90	11.9	11.9	11.8	11.8	11.9	103	104	104	104	103
8.0	7.90	8.20	8.30	8.50	7.90	11.9	11.9	11.8	11.8	11.9	103	104	104	104	103
9.0	8.00	8.20	8.20	8.50	7.90	11.9	11.9	11.8	11.8	11.9	103	104	103	103	103
10.0	7.90	-	8.20	8.40	7.90	11.9	-	11.8	11.8	11.9	103	-	103	103	103
11.0	7.90	-	8.20	8.30	7.90	11.9	-	11.8	11.8	11.9	103	-	103	103	102
12.0	-	-	8.10	8.20	7.90	-	-	11.8	11.8	11.9	-	-	103	103	102
13.0	-	-	7.80	8.10	7.80	-	-	11.8	11.8	11.9	-	-	102	103	102
14.0	-	-	7.70	8.10	7.50	-	-	11.8	11.8	11.8	-	-	102	103	101
15.0	-	-	7.70	8.00	7.30	-	-	11.8	11.8	11.8	-	-	102	102	100
16.0	-	-	7.50	7.90	7.20	-	-	11.8	11.8	11.8	-	-	101	102	100
17.0	-	-	-	7.80	-	-	-	-	11.8	-	-	-	-	102	-
18.0	-	-	-	7.70	-	-	-	-	11.8	-	-	-	-	102	-
19.0	-	-	-	7.50	-	-	-	-	11.8	-	-	-	-	101	-
20.0	-	-	-	7.40	-	-	-	-	11.8	-	-	-	-	101	-
21.0	-	-	-	7.30	-	-	-	-	11.8	-	-	-	-	100	-
22.0	-	-	-	7.30	-	-	-	-	11.8	-	-	-	-	100	-
23.0	-	-	-	7.20	-	-	-	-	11.7	-	-	-	-	99.8	-
24.0	-	-	-	7.10	-	-	-	-	11.7	-	-	-	-	99.3	-
25.0	-	-	-	7.00	-	-	-	-	11.7	-	-	-	-	98.9	-
26.0	-	-	-	6.90	-	-	-	-	11.6	-	-	-	-	98.2	-
27.0	-	-	-	6.90	-	-	-	-	11.6	-	-	-	-	97.7	-
28.0	-	-	-	6.90	-	-	-	-	11.6	-	-	-	-	97.4	-
29.0	-	-	-	6.90	-	-	-	-	11.5	-	-	-	-	97.2	-
30.0	-	-	-	6.80	-	-	-	-	11.5	-	-	-	-	97.1	-
31.0	-	-	-	6.80	-	-	-	-	11.5	-	-	-	-	97.0	-
32.0	-	-	-	6.80	-	-	-	-	11.5	-	-	-	-	96.8	-

Notes: "-" = data not available. The total depth of the water column at each sampling station was not recorded but deepest measurements are within 1 m of lake bottom.

Table C.21: *In Situ* Water Quality Profile Data Collected at Camp Lake (JL0) Water Quality Monitoring Stations, Mary River Project CREMP, Summer 2024

Depth (m)	pH (pH units)					Specific Conductance (µS/cm)					Turbidity (NTU)				
	JL0-02	JL0-10	JL0-01	JL0-07	JL0-09	JL0-02	JL0-10	JL0-01	JL0-07	JL0-09	JL0-02	JL0-10	JL0-01	JL0-07	JL0-09
	9-Aug-24	9-Aug-24	10-Aug-24	10-Aug-24	9-Aug-24	9-Aug-24	9-Aug-24	10-Aug-24	10-Aug-24	9-Aug-24	9-Aug-24	9-Aug-24	10-Aug-24	10-Aug-24	9-Aug-24
1.0	7.78	7.79	7.67	7.70	7.90	144	143	143	143	143	-0.140	-0.120	-0.140	-0.0600	-0.160
2.0	7.75	7.73	7.71	7.70	7.86	144	143	143	143	143	-0.120	-0.100	-0.0800	-0.0800	-0.0700
3.0	7.72	7.71	7.71	7.72	7.82	144	143	143	143	143	-0.140	-0.100	-0.110	-0.140	-0.0800
4.0	7.74	7.69	7.71	7.72	7.82	144	143	143	143	143	-0.170	-0.140	-0.120	-0.100	-0.0900
5.0	7.72	7.72	7.71	7.71	7.81	144	143	143	143	143	-0.120	0.120	-0.140	-0.0800	-0.0600
6.0	7.71	7.71	7.71	7.72	7.80	144	143	143	143	143	-0.120	0.0700	-0.0900	-0.0800	-0.0900
7.0	7.69	7.71	7.70	7.71	7.81	144	143	143	143	143	-0.120	0.120	-0.100	-0.120	-0.120
8.0	7.68	7.74	7.70	7.71	7.80	144	143	143	143	143	-0.110	0.130	-0.0700	-0.110	-0.0900
9.0	7.65	7.73	7.69	8.40	7.79	144	143	143	143	143	-0.110	0.110	-0.140	-0.0800	-0.100
10.0	7.65	-	7.69	7.71	7.78	144	-	143	143	143	-0.100	-	-0.0800	-0.120	-0.130
11.0	7.65	-	7.69	7.70	7.77	144	-	143	143	143	-0.130	-	-0.100	-0.0300	-0.110
12.0	-	-	7.69	7.61	7.77	-	-	143	143	143	-	-	-0.110	-0.0600	-0.0300
13.0	-	-	7.68	7.68	7.77	-	-	143	143	143	-	-	-0.0600	-0.110	-0.0900
14.0	-	-	7.66	7.69	7.76	-	-	143	143	143	-	-	-0.0500	-0.100	-0.110
15.0	-	-	7.66	7.68	7.74	-	-	143	143	143	-	-	-0.0500	-0.0800	-0.0800
16.0	-	-	7.64	7.66	7.73	-	-	143	143	143	-	-	-0.0800	-0.0900	-0.0700
17.0	-	-	-	7.66	-	-	-	-	143	-	-	-	-	-0.0900	-
18.0	-	-	-	7.65	-	-	-	-	143	-	-	-	-	-0.160	-
19.0	-	-	-	7.64	-	-	-	-	143	-	-	-	-	-0.0200	-
20.0	-	-	-	7.62	-	-	-	-	143	-	-	-	-	-0.140	-
21.0	-	-	-	7.61	-	-	-	-	143	-	-	-	-	-0.150	-
22.0	-	-	-	7.60	-	-	-	-	143	-	-	-	-	-0.120	-
23.0	-	-	-	7.60	-	-	-	-	143	-	-	-	-	-0.120	-
24.0	-	-	-	7.58	-	-	-	-	143	-	-	-	-	-0.150	-
25.0	-	-	-	7.57	-	-	-	-	143	-	-	-	-	-0.0600	-
26.0	-	-	-	7.56	-	-	-	-	143	-	-	-	-	0.0600	-
27.0	-	-	-	7.53	-	-	-	-	143	-	-	-	-	0.0100	-
28.0	-	-	-	7.52	-	-	-	-	143	-	-	-	-	0.0300	-
29.0	-	-	-	7.51	-	-	-	-	143	-	-	-	-	0	-
30.0	-	-	-	7.51	-	-	-	-	143	-	-	-	-	0.0500	-
31.0	-	-	-	7.51	-	-	-	-	143	-	-	-	-	-0.01	-
32.0	-	-	-	7.51	-	-	-	-	143	-	-	-	-	0.04	-

Notes: "-" = data not available. The total depth of the water column at each sampling station was not recorded but deepest measurements are within 1 m of lake bottom.

Table C.22: In Situ Water Quality Profile Data Collected at Camp Lake (JL0) Water Quality Monitoring Stations, Mary River Project CREMP, Fall 2024

Depth (m)	Temperature (°C)					Dissolved Oxygen (mg/L)					Dissolved Oxygen (% Saturation)				
	JL0-02	JL0-10	JL0-01	JL0-07	JL0-09	JL0-02	JL0-10	JL0-01	JL0-07	JL0-09	JL0-02	JL0-10	JL0-01	JL0-07	JL0-09
	7-Sep-24	7-Sep-24	7-Sep-24	7-Sep-24	7-Sep-24	7-Sep-24	7-Sep-24	7-Sep-24	7-Sep-24	7-Sep-24	7-Sep-24	7-Sep-24	7-Sep-24	7-Sep-24	7-Sep-24
1.0	6.80	6.70	6.70	6.70	6.70	11.4	11.6	11.6	11.6	11.6	94.5	96.4	96.3	96.0	96.2
2.0	6.70	6.70	6.70	6.70	6.70	11.4	11.6	11.6	11.5	11.6	95.3	96.4	96.2	96.0	96.1
3.0	6.70	6.70	6.70	6.70	6.70	11.5	11.6	11.6	11.5	11.6	95.4	96.3	96.2	95.9	96.1
4.0	6.70	6.70	6.70	6.70	6.70	11.5	11.6	11.6	11.5	11.6	95.7	96.3	96.1	95.8	96.1
5.0	6.70	6.70	6.70	6.70	6.70	11.5	11.6	11.6	11.5	11.6	95.7	96.2	96.1	95.8	96.1
6.0	6.70	6.70	6.70	6.70	6.70	11.5	11.6	11.6	11.5	11.6	95.8	96.2	96.0	95.7	96.0
7.0	6.60	6.70	6.70	6.70	6.70	11.5	11.6	11.5	11.5	11.5	95.7	96.1	96.0	95.7	96.0
8.0	6.60	6.70	6.70	6.70	6.70	11.5	11.6	11.5	11.5	11.5	95.7	96.1	95.9	95.6	96.9
9.0	6.60	-	6.70	6.70	6.70	11.5	-	11.5	11.5	11.5	95.6	-	95.9	95.6	95.9
10.0	6.60	-	6.70	6.70	6.70	11.5	-	11.5	11.5	11.5	95.6	-	95.8	95.5	95.9
11.0	-	-	6.70	6.70	6.70	-	-	11.5	11.5	11.5	-	-	95.8	95.5	95.9
12.0	-	-	6.70	6.70	6.70	-	-	11.5	11.5	11.5	-	-	95.7	95.4	95.8
13.0	-	-	6.70	6.70	6.70	-	-	11.5	11.5	11.5	-	-	95.7	95.4	95.8
14.0	-	-	6.70	6.70	6.70	-	-	11.5	11.5	11.5	-	-	95.6	95.3	95.9
15.0	-	-	6.70	6.70	6.70	-	-	11.5	11.5	11.5	-	-	95.6	95.3	95.7
16.0	-	-	6.70	6.70	6.70	-	-	11.5	11.4	11.5	-	-	95.5	95.3	95.8
17.0	-	-	6.70	6.70	-	-	-	11.5	11.5	-	-	-	95.5	95.3	-
18.0	-	-	-	6.70	-	-	-	-	11.5	-	-	-	-	95.3	-
19.0	-	-	-	6.70	-	-	-	-	11.4	-	-	-	-	95.2	-
20.0	-	-	-	6.70	-	-	-	-	11.4	-	-	-	-	95.2	-
21.0	-	-	-	6.70	-	-	-	-	11.4	-	-	-	-	95.1	-
22.0	-	-	-	6.70	-	-	-	-	11.5	-	-	-	-	95.0	-
23.0	-	-	-	6.70	-	-	-	-	11.4	-	-	-	-	95.0	-
24.0	-	-	-	6.70	-	-	-	-	11.4	-	-	-	-	94.9	-
25.0	-	-	-	6.70	-	-	-	-	11.4	-	-	-	-	94.9	-
26.0	-	-	-	6.70	-	-	-	-	11.4	-	-	-	-	94.9	-
27.0	-	-	-	6.70	-	-	-	-	11.4	-	-	-	-	94.8	-
28.0	-	-	-	6.70	-	-	-	-	11.4	-	-	-	-	94.8	-
29.0	-	-	-	6.70	-	-	-	-	11.4	-	-	-	-	94.7	-
30.0	-	-	-	6.70	-	-	-	-	11.4	-	-	-	-	94.7	-
31.0	-	-	-	6.70	-	-	-	-	11.4	-	-	-	-	94.6	-
32.0	-	-	-	6.70	-	-	-	-	11.4	-	-	-	-	94.5	-

Notes: "-" = data not available. The total depth of the water column at each sampling station was not recorded but deepest measurements are within 1 m of lake bottom.

Table C.22: *In Situ* Water Quality Profile Data Collected at Camp Lake (JL0) Water Quality Monitoring Stations, Mary River Project CREMP, Fall 2024

Depth (m)	pH (pH units)					Specific Conductance (µS/cm)					Turbidity (NTU)				
	JL0-02	JL0-10	JL0-01	JL0-07	JL0-09	JL0-02	JL0-10	JL0-01	JL0-07	JL0-09	JL0-02	JL0-10	JL0-01	JL0-07	JL0-09
	7-Sep-24	7-Sep-24	7-Sep-24	7-Sep-24	7-Sep-24	7-Sep-24	7-Sep-24	7-Sep-24	7-Sep-24	7-Sep-24	7-Sep-24	7-Sep-24	7-Sep-24	7-Sep-24	7-Sep-24
1.0	7.83	7.79	7.79	7.62	7.75	148	148	147	147	147	0.070	0.110	0.100	0.100	0.100
2.0	7.85	7.79	7.78	7.61	7.75	148	148	147	147	147	0.080	0.100	0.110	0.070	0.150
3.0	7.85	7.79	7.78	7.61	7.76	148	148	147	147	147	0.100	0.140	0.130	0.130	0.130
4.0	7.81	7.79	7.79	7.61	7.76	148	148	147	147	147	0.060	0.120	0.120	0.070	0.110
5.0	7.77	7.78	7.78	7.62	7.76	148	148	147	147	147	0.080	0.100	0.140	0.110	0.080
6.0	7.70	7.80	7.79	7.61	7.76	148	148	147	147	147	0.090	0.130	0.120	0.110	0.100
7.0	7.69	7.82	7.78	7.61	7.77	148	148	147	147	147	0.090	0.120	0.110	0.090	0.140
8.0	7.69	7.80	7.78	7.61	7.77	148	148	147	147	147	0.100	0.130	0.110	0.100	0.120
9.0	7.69	-	7.79	7.61	7.77	148	-	147	147	147	0.110	-	0.100	0.140	0.100
10.0	7.67	-	7.78	7.61	7.77	148	-	147	148	147	0.060	-	0.100	0.070	0.140
11.0	-	-	7.78	7.61	7.77	-	-	147	147	147	-	-	0.100	0.090	0.110
12.0	-	-	7.78	7.61	7.77	-	-	147	147	147	-	-	0.110	0.100	0.130
13.0	-	-	7.78	7.62	7.78	-	-	147	147	147	-	-	0.110	0.120	0.170
14.0	-	-	7.78	7.62	7.77	-	-	147	147	147	-	-	0.100	0.090	0.140
15.0	-	-	7.81	7.62	7.77	-	-	147	147	147	-	-	0.180	0.100	0.120
16.0	-	-	7.79	7.62	7.77	-	-	147	147	147	-	-	0.130	0.120	0.120
17.0	-	-	7.79	7.71	-	-	-	147	147	-	-	-	0.160	0.110	-
18.0	-	-	-	7.68	-	-	-	-	147	-	-	-	-	0.090	-
19.0	-	-	-	7.62	-	-	-	-	147	-	-	-	-	0.110	-
20.0	-	-	-	7.67	-	-	-	-	147	-	-	-	-	0.090	-
21.0	-	-	-	7.67	-	-	-	-	147	-	-	-	-	0.120	-
22.0	-	-	-	7.67	-	-	-	-	147	-	-	-	-	0.100	-
23.0	-	-	-	7.68	-	-	-	-	147	-	-	-	-	0.120	-
24.0	-	-	-	7.67	-	-	-	-	147	-	-	-	-	0.100	-
25.0	-	-	-	7.68	-	-	-	-	147	-	-	-	-	0.130	-
26.0	-	-	-	7.68	-	-	-	-	147	-	-	-	-	0.120	-
27.0	-	-	-	7.68	-	-	-	-	147	-	-	-	-	0.140	-
28.0	-	-	-	7.69	-	-	-	-	147	-	-	-	-	0.120	-
29.0	-	-	-	7.68	-	-	-	-	147	-	-	-	-	0.110	-
30.0	-	-	-	7.68	-	-	-	-	147	-	-	-	-	0.060	-
31.0	-	-	-	7.69	-	-	-	-	147	-	-	-	-	0.100	-
32.0	-	-	-	7.69	-	-	-	-	147	-	-	-	-	0.070	-


Notes: "-" = data not available. The total depth of the water column at each sampling station was not recorded but deepest measurements are within 1 m of lake bottom.

Table C.23: Sampling Depth, Water Clarity Measures, and Surface and Bottom *In Situ* Water Quality Measures Collected at Camp Lake (JL0) Benthic Invertebrate Community (BIC) Stations, Mary River Project CREMP, August 2024

Categorization & Replicate ID		Date Sampled	Secchi Depth (m)	Colour/ Clarity	Depth Sampled	Temperature (°C)	Dissolved Oxygen		pH (units)	Specific Conductance (µS/cm)	Turbidity (NTU)
							(mg/L)	(% saturation)			
Littoral (Shallow) Stations	JL0-02	12-Aug-24	6.88	Dark Greenish Blue	Surface	9.00	11.4	102	7.84	144	0.310
					Bottom	9.00	11.6	102	7.86	144	0.360
	JL0-21	12-Aug-24	6.25	Blueish Green	Surface	9.00	11.5	103	7.87	145	0.400
					Bottom	9.10	11.4	103	7.87	145	0.350
	JL0-20	12-Aug-24	6.13	Dark Greenish Blue	Surface	8.80	11.5	102	7.87	144	0.470
					Bottom	8.90	11.5	102	7.82	144	0.390
	JL0-19	12-Aug-24	5.25	Dark Greenish Blue	Surface	8.80	11.5	102	7.83	144	0.410
					Bottom	8.90	11.5	102	7.81	144	0.430
Profundal (Deep) Stations	JL0-18	12-Aug-24	5.25	Deep Blueish Green	Surface	8.90	11.7	104	7.89	145	0.400
					Bottom	8.80	11.5	102	7.83	146	0.470
	JL0-01	12-Aug-24	5.5	Dark Greenish Blue	Surface	8.10	11.6	101	7.66	144	0.350
					Bottom	8.90	11.6	103	7.65	144	0.350
	JL0-07	12-Aug-24	5.25	Dark Greenish Blue	Surface	8.90	11.5	103	7.83	144	0.360
					Bottom	7.10	11.4	96.5	7.58	144	0.420
	JL0-16	12-Aug-24	5.25	Dark Greenish Blue	Surface	9.00	11.4	102	7.87	145	0.380
					Bottom	8.50	11.4	101	7.83	144	0.510
	JL0-11	12-Aug-24	5.25	Dark Greenish Blue	Surface	8.70	11.6	103	7.76	144	0.350
					Bottom	7.10	11.4	96.7	7.67	144	0.360
	JL0-12	12-Aug-24	5.75	Dark Greenish Blue	Surface	8.60	11.6	102	7.78	144	0.360
					Bottom	8.00	11.6	100	7.78	144	0.370

Table C.24: Statistical Comparison of Bottom *In Situ* Water Quality Between Camp Lake (JL0) Littoral and Profundal Stations, Mary River Project CREMP, August 2024

Parameter	Statistical Test Results				Summary Statistics						
	Statistical Test	Transformation	Significant Difference Between Areas?	P-value	Lake Zone	Sample Size	Mean	Standard Deviation	Standard Error	Minimum	Maximum
Temperature (°C)	tunequal	None	YES	0.048	Littoral	5	8.94	0.114	0.0510	8.80	9.10
					Profundal	5	7.92	0.814	0.364	7.10	8.90
Dissolved Oxygen (mg/L)	tequal	None	NO	0.467	Littoral	5	11.5	0.0415	0.0185	11.4	11.6
					Profundal	5	11.5	0.0904	0.0404	11.4	11.6
Dissolved Oxygen (% saturation)	tequal	None	NO	0.053	Littoral	5	102	0.270	0.121	102	103
					Profundal	5	99.5	2.74	1.23	96.5	103
pH (units)	tequal	None	YES	0.020	Littoral	5	7.84	0.0259	0.0116	7.81	7.87
					Profundal	5	7.70	0.101	0.0453	7.58	7.83
Specific Conductance (µS/cm)	tequal	None	YES	0.032	Littoral	5	145	0.691	0.309	144	146
					Profundal	5	144	0.268	0.120	144	144

 Shaded values indicate significant difference between study areas based on test p-value less than 0.05.

Notes: "-" = no data. "tequal" = Student's t-test assuming equal variance. "tunequal" = Student's t-test assuming unequal variance.

Table C.25: Statistical Comparison of Bottom *In Situ* Water Quality Between Camp Lake (JL0) and Reference Lake 3 (REF-03) Stations Collected at Littoral and Profundal Depths, Mary River Project CREMP, August 2024

Lake Zone	Parameter	Statistical Test Results				Summary Statistics						
		Statistical Test	Transformation	Significant Difference Between Areas?	P-value	Study Lake	Sample Size (n)	Mean	Standard Deviation	Standard Error	Minimum	Maximum
Littoral (Shallow) Stations	Temperature (°C)	tequal	None	YES	0.003	Reference	5	7.88	0.545	0.244	7.20	8.70
						Camp	5	8.94	0.114	0.0510	8.80	9.10
	Dissolved Oxygen (mg/L)	tequal	None	YES	<0.001	Reference	5	11.8	0.0550	0.0246	11.8	11.9
						Camp	5	11.5	0.0415	0.0185	11.4	11.6
	Dissolved Oxygen (% saturation)	tequal	None	NO	0.563	Reference	5	102	1.31	0.585	99.9	103
						Camp	5	102	0.270	0.121	102	103
	pH (units)	tequal	None	YES	<0.001	Reference	5	7.40	0.0554	0.0248	7.34	7.47
						Camp	5	7.84	0.0259	0.0116	7.81	7.87
Profundal (Deep) Stations	Specific Conductance (µS/cm)	M-W	Rank	YES	0.011	Reference	5	68.8	0.0548	0.0245	68.8	68.9
						Camp	5	145	0.691	0.309	144	146
	Temperature (°C)	tequal	None	YES	0.034	Reference	5	6.92	0.327	0.146	6.50	7.40
						Camp	5	7.92	0.814	0.364	7.10	8.90
	Dissolved Oxygen (mg/L)	tequal	None	YES	0.001	Reference	5	11.8	0.110	0.0492	11.6	11.9
						Camp	5	11.5	0.0904	0.0404	11.4	11.6
	Dissolved Oxygen (% saturation)	tequal	None	NO	0.835	Reference	5	99.2	1.49	0.667	97.3	101
						Camp	5	99.5	2.74	1.23	96.5	103
	pH (units)	tequal	None	YES	0.003	Reference	5	7.41	0.118	0.0530	7.29	7.56
						Camp	5	7.70	0.101	0.0453	7.58	7.83
	Specific Conductance (µS/cm)	M-W	Rank	YES	0.011	Reference	5	69.1	0.740	0.331	68.7	70.4
						Camp	5	144	0.268	0.120	144	144

Highlighted values indicate significant difference between study areas based on test p-value less than 0.05.

Notes: "-" = no data. "tequal" = Student's t-test assuming equal variance. "M-W" = Mann-Whitney test (nonparametric).

Table C.26: Water Chemistry at Camp Lake (JL0) Water Quality Monitoring Stations, Mary River Project CREMP, 2024

Parameters		Units	Water Quality Guideline (WQG) ^{a,b}	AEMP Benchmark ^c	Summer Sampling Event						Fall Sampling Event											
					JL0-07	JL0-07	JL0-09	JL0-09	J0-01	JL0-02	JL0-02	JL0-10	JL0-10	JL0-01	JL0-01	JL0-07	JL0-07	JL0-09	JL0-09	J0-01		
					bottom	surface	bottom	surface	outlet	bottom	surface	bottom	surface	bottom	surface	bottom	surface	bottom	surface	bottom	surface	outlet
					01-Aug-23	01-Aug-23	01-Aug-23	01-Aug-23	30-Aug-23	13-Sep-23	13-Sep-23	16-Sep-23	16-Sep-23	16-Sep-23	16-Sep-23	14-Sep-23	14-Sep-23	14-Sep-23	14-Sep-23	14-Sep-23	17-Sep-23	
Conventional	Conductivity (lab)	µmho/cm	-	-	150	150	149	149	148	154	155	153	153	154	153	155	154	154	147	150		
	pH (lab)	pH	6.5 - 9.0	-	7.87	7.85	7.9	7.96	8	7.79	7.77	7.98	7.98	7.96	7.98	7.93	7.91	7.95	7.95	7.95		
	Hardness (as CaCO ₃)	mg/L	-	-	71.1	71.7	71.7	71.6	68.4	74	74.6	74	72.9	74.8	73.6	73.2	74.6	74.9	73	70.8		
	Total Suspended Solids (TSS)	mg/L	-	-	<1	<1	<1	<1	<1	<1.2	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1		
	Total Dissolved Solids (TDS)	mg/L	-	-	84	86	85	91	80	81	73	74	81	77	75	80	78	78	73	81		
	Turbidity	NTU	-	-	0.44	0.44	0.59	0.34	1.39	0.36	0.33	0.31	0.32	0.21	0.25	0.31	0.28	0.28	0.26	0.34		
	Alkalinity (as CaCO ₃)	mg/L	-	-	65.7	65.2	65.4	64.8	63.1	68.2	68.6	67.1	66.1	65.3	67.6	66	67.3	67.7	67.3	64.8		
Nutrients and Organics	Total Ammonia	mg/L	-	0.855	0.014	0.0197	0.0097	0.0058	<0.005	0.0057	0.0106	<0.005	<0.005	0.0057	0.0083	<0.005	0.0143	0.0055	<0.005	0.0155		
	Nitrate	mg/L	3	3	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02		
	Nitrite	mg/L	0.06	0.06	<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	<0.01	<0.01	<0.01		
	Total Kjeldahl Nitrogen (TKN)	mg/L	-	-	0.16	0.098	0.086	0.078	0.102	0.128	0.112	0.114	0.092	0.093	0.113	0.136	0.134	0.121	0.102	0.149		
	Dissolved Organic Carbon	mg/L	-	-	2.21	2.26	2.08	2.14	2.12	2.1	1.67	2.26	2.28	2.19	2.3	2.25	2.04	1.94	1.94	2.16		
	Total Organic Carbon	mg/L	-	-	1.92	2.07	2.05	2.24	2.12	2.33	2.33	2.88	2.88	2.53	2.56	2.71	2.22	2.86	2.69	2.39		
	Total Phosphorus	mg/L	0.020 ^d	-	0.004	<0.002	0.0035	0.0034	0.0032	0.0029	0.0034	0.0032	0.0032	0.0026	0.0042	0.0033	0.0031	0.0032	0.0035	0.0024		
Phenols	mg/L	0.004 ^d	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001			
Anions	Bromide (Br)	mg/L	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		
	Chloride (Cl)	mg/L	120	120	4.23	4.21	4.2	4.2	4.12	4.32	4.33	4.33	4.33	4.33	4.33	4.32	4.31	4.35	4.45	4.29		
	Sulphate (SO ₄)	mg/L	218 ^β	218	4.1	4.1	4.09	4.1	3.94	4.17	4.2	4.04	4.04	4.05	4.08	4.14	4.16	4.14	4.29	4.14		
Total Metals	Aluminum (Al)	mg/L	0.100	0.100	0.0129	0.011	0.011	0.0132	0.0098	0.0099	0.0086	0.009	0.0114	0.0097	0.0105	0.0127	0.0084	0.0104	0.0086	0.0086		
	Antimony (Sb)	mg/L	0.020 ^d	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001		
	Arsenic (As)	mg/L	0.005	0.005	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001		
	Barium (Ba)	mg/L	1 ^β	-	0.00792	0.00774	0.00784	0.00779	0.00727	0.00772	0.0077	0.00776	0.00796	0.00773	0.00786	0.00763	0.00781	0.0076	0.00757	0.00828		
	Beryllium (Be)	mg/L	0.011 ^d	-	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002		
	Bismuth (Bi)	mg/L	-	-	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005		
	Boron (B)	mg/L	1.5	-	<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	<0.01	<0.01	<0.01		
	Cadmium (Cd)	mg/L	0.00012	0.0001	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005		
	Calcium (Ca)	mg/L	-	-	13.8	13.8	13.6	13.7	13.6	13.9	14.1	14	14	14.3	13.4	14	13.6	13.7	13.8	14.2		
	Chromium (Cr)	mg/L	0.001	0.003	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005		
	Cobalt (Co)	mg/L	0.0009 ^d	0.004	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001		
	Copper (Cu)	mg/L	0.002	0.004	0.00103	0.001	0.00113	0.00094	0.00089	0.00105	0.00096	0.00101	0.00104	0.00118	0.00099	0.0011	0.0011	0.00121	0.00102	0.00096		
	Iron (Fe)	mg/L	0.300	0.300	0.016	0.014	0.014	0.015	0.022	0.012	0.011	0.011	0.012	0.012	0.013	0.017	0.011	0.012	0.01	0.016		
	Lead (Pb)	mg/L	0.001	0.001	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005		
	Lithium (Li)	mg/L	-	-	0.0011	0.001	0.0011	0.001	<0.001	0.001	0.0011	<0.001	<0.001	0.0011	<0.001	0.0011	<0.001	<0.001	0.001	<0.001		
	Magnesium (Mg)	mg/L	-	-	9.14	9.07	9.11	9.06	9.15	9.38	9.52	9.67	9.38	9.6	9.31	9.14	9.33	9.24	9.3	9.32		
	Manganese (Mn)	mg/L	0.935 ^β	-	0.00144	0.00141	0.00134	0.0014	0.00187	0.00126	0.00132	0.00137	0.00136	0.00135	0.00143	0.00135	0.0013	0.00131	0.00123	0.00143		
	Mercury (Hg)	mg/L	0.000026	-	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005		
	Molybdenum (Mo)	mg/L	0.073	-	0.000444	0.000441	0.000458	0.000463	0.00044	0.000468	0.000462	0.000466	0.000458	0.000455	0.000457	0.000459	0.000446	0.000447	0.000445	0.000469		
	Nickel (Ni)	mg/L	0.025	0.025	0.00078	0.00064	0.0006	0.00061	0.00064	0.00063	0.00067	0.00064	0.00065	0.00065	0.00066	0.00068	0.00066	0.00064	0.00065	0.00065		
	Potassium (K)	mg/L	-	-	1.47	1.46	1.47	1.44	1.32	1.44	1.45	1.47	1.43	1.44	1.44	1.42	1.43	1.43	1.43	1.37		
	Selenium (Se)	mg/L	0.001	-	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00			

Indicates parameter concentration above applicable Water Quality Guideline.

BOLD Indicates parameter concentration above the AEMP benchmark.

Notes: AEMP: Aquatic Environment Monitoring Plan. "-"

Table C.27: Magnitude of Elevation in Seasonal Average Parameter Concentrations (Total Metal Concentration Data Provided) Between Camp Lake (JL0) and Reference Lake 3 (REF-03) in 2024, and Between Camp Lake in 2024 and Baseline (2005 to 2013) Data, Mary River Project CREMP, 2024

Parameter	Camp Lake vs Reference Lake 3 in 2024		Camp Lake in 2024 vs Baseline		
	Summer	Fall	Winter	Summer	Fall
Conductivity (lab)	2.06	2.13	1.34	1.31	1.27
pH (lab)	1.05	1.06	1.05	1.03	1.03
Hardness (as CaCO ₃)	2.05	2.09	-	-	-
Total Suspended Solids (TSS)	1.00	0.303	0.500	0.500	0.500
Total Dissolved Solids (TDS)	1.71	1.87	1.03	1.19	0.984
Turbidity	1.26	1.09	0.922	0.129	0.826
Alkalinity (as CaCO ₃)	2.06	1.86	0.967	1.12	1.15
Total Ammonia	1.71	0.838	0.0800	0.145	0.298
Nitrate	1.00	1.00	2.64	0.200	0.200
Nitrite	1.00	1.00	4.35	5.00	3.28
Total Kjeldahl Nitrogen (TKN)	0.580	0.791	0.598	0.513	0.386
Dissolved Organic Carbon	0.621	0.610	1.11	1.20	1.16
Total Organic Carbon	0.728	0.741	0.979	1.11	1.41
Total Phosphorus	0.643	1.25	0.680	0.692	0.741
Phenols	1.00	0.659	-	-	-
Bromide (Br)	1.00	1.00	2.00	2.00	2.00
Chloride (Cl)	3.49	3.59	3.71	2.15	1.96
Sulphate (SO ₄)	1.51	1.57	5.06	3.47	1.60
Aluminum (Al)	0.770	1.64	2.44	0.977	1.61
Antimony (Sb)	1.00	1.00	1.00	0.963	1.00
Arsenic (As)	0.857	1.00	1.01	1.00	1.00
Barium (Ba)	1.28	1.29	1.49	1.49	1.47
Beryllium (Be)	1.00	1.00	0.200	1.00	1.00
Bismuth (Bi)	1.00	1.00	0.100	0.100	0.100
Boron (B)	1.00	1.00	1.00	1.00	1.00
Cadmium (Cd)	1.00	1.00	0.500	0.430	0.500
Calcium (Ca)	2.11	2.17	1.17	1.17	1.18
Chromium (Cr)	1.00	1.00	4.72	5.00	5.00
Cobalt (Co)	1.00	1.00	1.00	1.00	1.00
Copper (Cu)	1.17	1.29	1.02	0.372	1.21
Iron (Fe)	0.457	1.08	1.00	0.870	2.18
Lead (Pb)	0.946	1.00	0.531	0.605	1.00
Lithium (Li)	1.05	1.03	2.02	1.84	1.31
Magnesium (Mg)	2.14	2.10	1.29	1.29	1.33
Manganese (Mn)	1.02	2.21	0.700	0.686	0.849
Mercury (Hg)	1.00	1.00	0.500	0.486	0.500
Molybdenum (Mo)	3.22	3.17	2.19	2.32	2.22
Nickel (Ni)	1.31	1.31	0.953	0.909	1.08
Potassium (K)	1.64	1.73	1.54	1.78	1.69
Selenium (Se)	1.00	1.00	0.500	5.00	5.00
Silicon (Si)	1.01	1.13	1.18	1.11	1.13
Silver (Ag)	1.00	1.00	10	10	10
Sodium (Na)	2.43	2.69	2.30	2.38	2.28
Strontium (Sr)	1.47	1.58	1.66	1.58	1.55
Thallium (Tl)	1.00	1.00	1.00	10	10
Tin (Sn)	1.00	1.25	0.0806	0.857	1.25
Titanium (Ti)	0.556	1.11	0.0300	0.0527	0.0343
Uranium (U)	5.11	5.60	3.12	3.02	2.88
Vanadium (V)	1.00	1.00	0.500	0.500	0.500
Zinc (Zn)	1.00	1.00	2.79	1.79	2.47

Denotes parameter with an AEMP benchmark.

Denotes slight elevation (mean concentration three to five times higher than respective mean reference or baseline period value).

Denotes moderate elevation (mean concentration five to 10 times higher than respective mean reference or baseline period value).

Denotes highly elevated concentration (mean concentration greater than 10 times higher than respective mean reference or baseline period value).

Denotes differences in method detection limit between the indicated study area and that of the reference area or baseline period, precluding an evaluation of magnitude of elevation

Note: "-" indicates no data available for the analyte during comparison period.

Table C.28: Dissolved Metal Concentrations at Camp Lake (JL0) Water Quality Monitoring Stations, Mary River Project CREMP, 2024

Parameters		Units	Winter Sampling Event										Spring Sampling Event	Summer Sampling Event					
			JL0-02	JL0-02	JL0-10	JL0-10	JL0-01	JL0-01	JL0-07	JL0-07	JL0-09	JL0-09	J0-01	JL0-02	JL0-02	JL0-10	JL0-10	JL0-01	JL0-01
			bottom	surface	bottom	surface	bottom	surface	bottom	surface	bottom	surface	outlet	bottom	surface	bottom	surface	bottom	surface
			08-Apr-24	08-Apr-24	07-Apr-24	07-Apr-24	07-Apr-24	07-Apr-24	08-Apr-24	08-Apr-24	08-Apr-24	08-Apr-24	07-Jul-24	09-Aug-24	09-Aug-24	09-Aug-24	09-Aug-24	10-Aug-24	10-Aug-24
Dissolved Metals	Aluminum (Al)	mg/L	0.0022	0.0017	0.0017	<0.001	0.0022	0.0021	0.005	0.002	0.0018	0.0021	0.0035	0.0041	0.0027	0.0024	0.0031	0.0022	0.0023
	Antimony (Sb)	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
	Arsenic (As)	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
	Barium (Ba)	mg/L	0.00906	0.00937	0.00917	0.00283	0.0045	0.00431	0.00917	0.00955	0.00869	0.00924	0.00794	0.0079	0.0079	0.00792	0.00786	0.00781	0.00786
	Beryllium (Be)	mg/L	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002
	Bismuth (Bi)	mg/L	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
	Boron (B)	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	<0.01	<0.01	<0.01	<0.01
	Cadmium (Cd)	mg/L	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005
	Calcium (Ca)	mg/L	15.9	15.8	15.9	5.06	8.3	7.57	15.5	16.6	15.1	16.1	14	13.6	13.8	13.4	13.6	13.3	13.7
	Chromium (Cr)	mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.00717	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.00089	<0.0005	<0.0005	<0.0005	<0.0005
	Cobalt (Co)	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.00011	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
	Copper (Cu)	mg/L	0.00091	0.00096	0.00105	0.00032	0.00055	0.00051	0.00119	0.00096	0.0009	0.00092	0.00081	0.00086	0.00097	0.00089	0.00091	0.00091	0.00089
	Iron (Fe)	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.042	<0.01	<0.01	<0.01	<0.01	<0.01	0.042	<0.01	<0.01	<0.01	<0.01
	Lead (Pb)	mg/L	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0.000093	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
	Lithium (Li)	mg/L	0.0014	0.0013	0.0014	<0.001	<0.001	<0.001	0.0012	0.0012	0.0011	0.0012	0.0011	0.0011	0.0013	0.0011	0.0012	0.0013	0.0014
	Magnesium (Mg)	mg/L	10.4	10.6	10.6	3.33	5.31	5.13	9.77	10.9	9.84	10.7	9.16	9	9.11	8.92	9.01	9.17	9.16
	Manganese (Mn)	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	0.00011	0.00012	0.00183	<0.0001	<0.0001	<0.0001	0.00099	0.00036	0.00079	0.00035	0.00031	0.00022	0.00038
	Mercury (Hg)	mg/L	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005
	Molybdenum (Mo)	mg/L	0.000478	0.000498	0.000498	0.000151	0.000226	0.000232	0.000415	0.000476	0.000462	0.000496	0.000441	0.000446	0.000437	0.000426	0.000442	0.000434	0.000438
	Nickel (Ni)	mg/L	0.00069	0.00065	0.00062	<0.0005	<0.0005	<0.0005	0.00407	0.00068	0.00063	0.00068	0.00064	0.00054	0.00094	0.00056	0.00056	0.00059	0.00061
	Potassium (K)	mg/L	1.57	1.63	1.58	0.466	0.767	0.719	1.59	1.66	1.51	1.63	1.49	1.46	1.46	1.47	1.46	1.5	1.48
	Selenium (Se)	mg/L	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
	Silicon (Si)	mg/L	0.459	0.478	0.462	0.144	0.252	0.205	1.43	0.468	0.484	0.488	0.512	0.449	0.456	0.444	0.453	0.453	0.45
	Silver (Ag)	mg/L	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
	Sodium (Na)	mg/L	2.53	2.59	2.59	0.773	1.3	1.24	3.57	2.64	2.41	2.61	2.13	2.1	2.13	2.09	2.1	2.16	2.13
	Strontium (Sr)	mg/L	0.0125	0.0134	0.0134	0.00398	0.00662	0.00622	0.013	0.0137	0.012	0.0131	0.0116	0.0113	0.0114	0.0115	0.0115	0.0113	0.0115
	Thallium (Tl)	mg/L	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
	Tin (Sn)	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
	Titanium (Ti)	mg/L	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003
	Uranium (U)	mg/L	0.00157	0.00156	0.00163	0.000482	0.000781	0.000744	0.00125	0.00161	0.00152	0.00162	0.00133	0.00136	0.00139	0.00135	0.00135	0.00134	0.00134
	Vanadium (V)	mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
	Zinc (Zn)	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.0022	<0.001	<0.001	<0.001	<0.001	<0.001	0.0033	<0.001	<0.001	<0.001	<0.001

Table C.28: Dissolved Metal Concentrations at Camp Lake (JL0) Water Quality Monitoring Stations, Mary River Project CREMP, 2024

Parameters		Units	Summer Sampling Event					Fall Sampling Event										
			JL0-07	JL0-07	JL0-09	JL0-09	J0-01	JL0-02	JL0-02	JL0-10	JL0-10	JL0-01	JL0-01	JL0-07	JL0-07	JL0-09	JL0-09	J0-01
			bottom	surface	bottom	surface	outlet	bottom	surface	bottom	surface	bottom	surface	bottom	surface	bottom	surface	outlet
			10-Aug-24	10-Aug-24	09-Aug-24	09-Aug-24	30-Jul-24	07-Sep-24	07-Sep-24	07-Sep-24	07-Sep-24	07-Sep-24	07-Sep-24	07-Sep-24	07-Sep-24	07-Sep-24	07-Sep-24	30-Aug-24
Dissolved Metals	Aluminum (Al)	mg/L	0.0024	0.0023	0.0019	0.0022	0.0022	0.0026	0.0027	0.0026	0.0027	0.0023	0.0025	0.0063	0.0023	0.0022	0.0028	0.0032
	Antimony (Sb)	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
	Arsenic (As)	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
	Barium (Ba)	mg/L	0.00768	0.00783	0.00776	0.00781	0.00706	0.00756	0.00746	0.00751	0.0075	0.00729	0.00743	0.00747	0.00759	0.00723	0.00757	0.0075
	Beryllium (Be)	mg/L	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002
	Bismuth (Bi)	mg/L	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
	Boron (B)	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	<0.01	<0.01	<0.01
	Cadmium (Cd)	mg/L	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005
	Calcium (Ca)	mg/L	13.6	13.8	13.7	13.7	13	13.8	14	13.9	13.4	14	13.6	13.6	14	13.8	13.8	14.3
	Chromium (Cr)	mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
	Cobalt (Co)	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
	Copper (Cu)	mg/L	0.00095	0.0009	0.00092	0.0009	0.0008	0.00093	0.00088	0.00089	0.00089	0.00091	0.00091	0.00097	0.00094	0.00098	0.00085	0.00076
	Iron (Fe)	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	<0.01	<0.01	<0.01
	Lead (Pb)	mg/L	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
	Lithium (Li)	mg/L	0.0013	0.0014	0.0013	0.0012	0.0012	<0.001	<0.001	0.001	<0.001	0.0011	<0.001	<0.001	0.0012	<0.001	0.0011	0.0011
	Magnesium (Mg)	mg/L	9.03	9.05	9.1	9.09	8.73	9.6	9.63	9.53	9.57	9.67	9.62	9.52	9.64	9.83	9.35	8.52
	Manganese (Mn)	mg/L	0.00016	0.00035	0.00022	0.00035	0.00059	0.00021	0.00027	0.00028	0.00035	0.00024	0.00027	0.00041	0.00022	0.00022	0.00034	0.00047
	Mercury (Hg)	mg/L	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005
	Molybdenum (Mo)	mg/L	0.000445	0.000439	0.000429	0.000454	0.00042	0.000442	0.000465	0.000433	0.00044	0.000432	0.000446	0.000471	0.000454	0.000443	0.000454	0.000441
	Nickel (Ni)	mg/L	0.00055	0.00057	0.00056	0.00058	0.00057	0.00063	0.00061	0.00062	0.00061	0.00061	0.00062	0.00062	0.00062	0.00064	0.00062	0.00056
	Potassium (K)	mg/L	1.46	1.47	1.47	1.47	1.27	1.44	1.46	1.46	1.45	1.46	1.45	1.45	1.45	1.46	1.44	1.3
	Selenium (Se)	mg/L	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
	Silicon (Si)	mg/L	0.478	0.443	0.455	0.437	0.431	0.434	0.443	0.439	0.441	0.447	0.439	0.446	0.433	0.442	0.441	0.428
	Silver (Ag)	mg/L	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
	Sodium (Na)	mg/L	2.13	2.11	2.14	2.14	2.04	2.31	2.33	2.31	2.3	2.31	2.32	2.3	2.34	2.35	2.27	1.96
	Strontium (Sr)	mg/L	0.0114	0.0116	0.0113	0.0114	0.0108	0.0116	0.0123	0.0119	0.012	0.0119	0.0119	0.0118	0.0121	0.0118	0.012	0.0118
	Thallium (Tl)	mg/L	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
	Tin (Sn)	mg/L	<0.0001	<0.0001	<0.0001	0.00176	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
	Titanium (Ti)	mg/L	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003
	Uranium (U)	mg/L	0.00134	0.00134	0.00134	0.00133	0.00136	0.00144	0.00141	0.0014	0.00142	0.00142	0.0014	0.00147	0.00144	0.00144	0.00144	0.00141
	Vanadium (V)	mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
	Zinc (Zn)	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001

Table C.29: Magnitude of Elevation in Seasonal Average Dissolved Metal Concentrations Between Camp Lake (JL0) and Reference Lake 3 (REF-03) in 2024, and Between Camp Lake in 2024 and Baseline (2005 to 2013) Data, Mary River Project, CREMP, 2024

Parameter	Camp Lake vs Reference Lake 3 in 2023		Camp Lake in 2023 vs Baseline		
	Summer	Fall	Winter	Summer	Fall
Aluminum (Al)	1.40	1.44	0.0108	0.632	1.08
Antimony (Sb)	1.00	1.00	1.00	0.000194	1.00
Arsenic (As)	0.896	1.00	1.00	1.00	1.00
Barium (Ba)	1.31	1.21	0.00545	1.58	1.41
Beryllium (Be)	1.00	1.00	0.200	0.136	0.200
Bismuth (Bi)	1.00	1.00	0.100	0.100	0.100
Boron (B)	0.937	1.00	1.00	10.5	1.00
Cadmium (Cd)	1.00	1.00	0.256	0.500	0.500
Calcium (Ca)	2.04	2.08	1.00	1.21	1.17
Chromium (Cr)	1.08	1.00	5.00	4.81	5.00
Cobalt (Co)	1.00	1.00	1.01	10.0	1.00
Copper (Cu)	1.12	1.24	0.691	0.609	1.12
Iron (Fe)	1.32	1.00	1.32	21.6	1.00
Lead (Pb)	1.00	1.00	0.628	1.00	1.00
Lithium (Li)	1.26	1.04	1.22	0.0350	1.43
Magnesium (Mg)	2.06	2.11	1.08	1.37	1.37
Manganese (Mn)	1.77	1.67	0.477	0.0188	0.416
Mercury (Hg)	1.00	1.00	0.500	0.500	0.500
Molybdenum (Mo)	3.27	3.25	1.71	0.00875	2.24
Nickel (Ni)	1.21	1.24	1.36	0.644	1.06
Potassium (K)	1.75	1.72	1.34	1.92	1.70
Selenium (Se)	1.00	1.00	0.500	0.500	5.00
Silicon (Si)	1.04	1.08	1.01	1.13	1.09
Silver (Ag)	1.00	1.00	10.0	10.0	10.0
Sodium (Na)	2.38	2.51	1.90	2.18	2.35
Strontium (Sr)	1.45	1.51	1.41	1.60	1.60
Thallium (Tl)	1.00	1.00	1.00	1.00	10.0
Tin (Sn)	2.66	1.00	0.0656	2.47	1.00
Titanium (Ti)	1.00	1.00	0.0300	0.0300	0.0300
Uranium (U)	5.23	5.89	2.61	2.99	2.87
Vanadium (V)	1.00	1.00	0.500	0.500	0.500
Zinc (Zn)	1.23	1.00	0.569	0.458	0.688





-  Denotes slight elevation (mean concentration three to five times higher than respective mean reference or baseline period value).
-  Denotes moderate elevation (mean concentration five to 10 times higher than respective mean reference or baseline period value).
-  Denotes highly elevated concentration (mean concentration greater than 10 times higher than respective mean reference or baseline period value).
-  Denotes differences in method detection limit between the 2023 and baseline data, precluding an evaluation of magnitude of elevation.

Table C.30: *In Situ* Water Quality Measurements Collected at Sheardown Lake Tributary 1 (SDLT1), Tributary 12 (SDLT12), and Tributary 9 (SDLT9) Benthic Invertebrate Community (BIC) Stations, Mary River Project CREMP, August 2024

Study Area	Station	Sampling Date	Temperature (°C)	Dissolved Oxygen (mg/L)	Dissolved Oxygen (% saturation)	pH (pH units)	Specific Conductance (µS/cm)
Unnamed Reference Creek	REF-CRK-B1	10-Aug-24	13.5	9.85	97.3	7.13	91.4
	REF-CRK-B2	10-Aug-24	13.5	10.1	99.3	7.16	87.0
	REF-CRK-B3	10-Aug-24	12.9	10.2	99.5	7.16	91.5
	REF-CRK-B4	10-Aug-24	10.3	10.7	98.6	7.59	120
	REF-CRK-B5	10-Aug-24	12.5	10.3	100	7.30	90.8
Sheardown Lake Tributary 1 Reach 1	SDLT-1-R1-B1	8-Aug-24	10.8	12.5	117	7.87	498
	SDLT-1-R1-B2	8-Aug-24	10.0	12.6	116	7.82	503
	SDLT-1-R1-B3	8-Aug-24	10.0	12.7	116	7.85	471
	SDLT-1-R1-B4	8-Aug-24	9.90	12.6	115	7.83	504
	SDLT-1-R1-B5	8-Aug-24	9.70	12.7	116	7.85	511
Sheardown Lake Tributary 9 Upstream	SDLT-9-DS-B1	9-Aug-24	12.7	9.74	94.4	7.72	187
	SDLT-9-DS-B2	9-Aug-24	10.4	7.55	69.5	7.49	301
	SDLT-9-DS-B3	9-Aug-24	8.90	8.42	74.7	7.71	282
	SDLT-9-DS-B4	9-Aug-24	8.90	9.40	83.4	7.49	280
	SDLT-9-DS-B5	9-Aug-24	9.10	9.39	83.8	7.53	280

Note: Due to limited availability of appropriate habitat area (i.e., the stream was not flowing), SDLT12 could not be sampled in 2024.

Table C.31: *In Situ* Water Quality Summary Statistics for the Sheardown Lake Tributaries (SDLT1 and SDLT9) Benthic Invertebrate Community (BIC) Stations, Mary River Project CREMP, August 2024

Metric	Study Area	Sample Size	Mean	Standard Deviation	Standard Error	5th Percentile	95th Percentile	Minimum	Maximum
Water Temperature (°C)	Unnamed Reference Creek	5	12.5	1.32	0.591	10.7	13.5	10.3	13.5
	Sheardown Lake Tributary 1 (SDLT1)	5	10.1	0.421	0.188	9.74	10.6	9.70	10.8
	Sheardown Lake Tributary 9 (SDLT9)	5	10.0	1.63	0.731	8.90	12.2	8.90	12.7
Dissolved Oxygen (mg/L)	Unnamed Reference Creek	5	10.2	0.336	0.150	9.89	10.7	9.85	10.7
	Sheardown Lake Tributary 1 (SDLT1)	5	12.6	0.0672	0.0301	12.6	12.7	12.5	12.7
	Sheardown Lake Tributary 9 (SDLT9)	5	8.90	0.901	0.403	7.72	9.67	7.55	9.74
Dissolved Oxygen (% Saturation)	Unnamed Reference Creek	5	98.9	1.05	0.468	97.6	99.9	97.3	100
	Sheardown Lake Tributary 1 (SDLT1)	5	116	0.876	0.392	115	117	115	117
	Sheardown Lake Tributary 9 (SDLT9)	5	81.2	9.55	4.27	70.5	92.3	69.5	94.4
pH (units)	Unnamed Reference Creek	5	7.27	0.192	0.0858	7.14	7.53	7.13	7.59
	Sheardown Lake Tributary 1 (SDLT1)	5	7.84	0.0195	0.00872	7.82	7.87	7.82	7.87
	Sheardown Lake Tributary 9 (SDLT9)	5	7.59	0.117	0.0524	7.49	7.72	7.49	7.72
Specific Conductance (µS/cm)	Unnamed Reference Creek	5	96.2	13.7	6.12	87.8	115	87.0	120
	Sheardown Lake Tributary 1 (SDLT1)	5	497	15.4	6.88	476	510	471	511
	Sheardown Lake Tributary 9 (SDLT9)	5	266	45.2	20.2	205	297	187	301

Note: Station LDFG-OUT (Sheardown Lake Tributary 12) was dry during August 2024 sampling, therefore no data are available.

Table C.32: Statistical Comparison of *In Situ* Water Quality Variables Among Sheardown Lake Tributaries (SDLT1 and SDLT9) and Unnamed Reference Creek (REF-CRK) Benthic Invertebrate Community (BIC) Stations, Mary River Project CREMP, August 2024

Metric	Overall 3-group Comparison				Pair-wise, <i>post hoc</i> comparisons ^a			
	Statistical Test ^a	Transformation	Significant Difference Between Areas?	P-value	(I) Area	(J) Area	Significant Difference Between Areas?	P-value
Water Temperature (°C)	ANOVA	None	YES	0.011	Unnamed Reference Creek	Sheardown Tributary 1	YES	0.021
					Unnamed Reference Creek	Sheardown Tributary 9	YES	0.018
					Sheardown Tributary 1	Sheardown Tributary 9	NO	0.994
Dissolved Oxygen (mg/L)	ANOVA	None	YES	<0.001	Unnamed Reference Creek	Sheardown Tributary 1	YES	<0.001
					Unnamed Reference Creek	Sheardown Tributary 9	YES	0.007
					Sheardown Tributary 1	Sheardown Tributary 9	YES	<0.001
Dissolved Oxygen (% saturation)	K-W	Rank	YES	0.002	Unnamed Reference Creek	Sheardown Tributary 1	NO	0.077
					Unnamed Reference Creek	Sheardown Tributary 9	NO	0.077
					Sheardown Tributary 1	Sheardown Tributary 9	YES	<0.001
pH (units)	K-W	Rank	YES	0.004	Unnamed Reference Creek	Sheardown Tributary 1	YES	<0.001
					Unnamed Reference Creek	Sheardown Tributary 9	NO	0.178
					Sheardown Tributary 1	Sheardown Tributary 9	YES	0.047
Specific Conductance (µS/cm)	ANOVA	log10	YES	<0.001	Unnamed Reference Creek	Sheardown Tributary 1	YES	<0.001
					Unnamed Reference Creek	Sheardown Tributary 9	YES	<0.001
					Sheardown Tributary 1	Sheardown Tributary 9	YES	<0.001

Highlighted values indicate significant difference between study areas based on test p-value less than 0.05.

Note: Station LDFG-OUT (Sheardown Lake Tributary 12) was dry during August 2024 sampling event, therefore no data are available.

^a Statistical tests include Analysis of Variance (ANOVA) followed by Tukey's Honestly Significant Difference (HSD) *post hoc* tests, or Kruskal-Wallis H-test (K-W) followed by Mann-Whitney U-test (M-W).

Table C.33: Water Chemistry at Sheardown Lake Tributaries (SDLT1, SDLT12, and SDLT9) Water Quality Monitoring Stations, Mary River Project CREMP, 2024

Parameters		Units	Water Quality Guideline (WQG) ^{a,b}	AEMP Benchmark ^c	Spring Sampling Event				Summer Sampling Event			Fall Sampling Event		
					Sheardown Lake Tributary 1		Sheardown Lake Tributary 12	Sheardown Lake Tributary 9	Sheardown Lake Tributary 1		Sheardown Lake Tributary 9	Sheardown Lake Tributary 1		Sheardown Lake Tributary 9
					D1-05	D1-00	LDFG-OUT	MS-C-G	D1-05	D1-00	MS-C-G	D1-05	D1-00	MS-C-G
					16-Jul-23	16-Jul-23	16-Jul-23	16-Jul-23	24-Aug-23	24-Aug-23	31-Aug-23	19-Sep-23	16-Sep-23	17-Sep-23
Conventional	Conductivity (lab)	µmho/cm	-	-	344	299	261	167	684	671	242	566	535	243
	pH (lab)	pH	6.5 - 9.0	-	7.74	7.82	8.1	7.73	7.47	7.85	7.44	7.48	7.84	7.37
	Hardness (as CaCO ₃)	mg/L	-	-	144	133	130	87.5	313	315	116	265	244	114
	Total Suspended Solids (TSS)	mg/L	-	-	1	1.8	1	<1	<1	<1	<1	<1	<1	<1
	Total Dissolved Solids (TDS)	mg/L	-	-	208	181	133	93	440	440	143	348	333	128
	Turbidity	NTU	-	-	1.9	1.84	3.04	0.38	1.42	1.73	1.33	1.54	1.02	0.16
	Alkalinity (as CaCO ₃)	mg/L	-	-	39.1	65.8	118	88.6	68	77.9	86.4	82	102	94.6
Nutrients and Organics	Total Ammonia	mg/L	-	0.855	0.0248	0.0266	<0.005	0.008	0.0687	0.0286	<0.005	0.106	0.0707	1.45
	Nitrate	mg/L	3	3	2.77	1.56	0.07	1.3	5.78	5.08	8.12	7.22	5.42	7.08
	Nitrite	mg/L	0.06	0.06	<0.01	<0.01	<0.01	<0.01	0.026	0.018	<0.01	0.013	0.012	0.04
	Total Kjeldahl Nitrogen (TKN)	mg/L	-	-	0.316	0.35	0.103	0.41	0.43	0.25	0.406	0.496	0.414	1.78
	Dissolved Organic Carbon	mg/L	-	-	1.62	2.5	2.99	2.15	2.82	2.44	2.46	3.35	2.49	2.7
	Total Organic Carbon	mg/L	-	-	1.83	2.09	3.06	2.35	1.99	2.47	2.71	2.38	2.74	3
	Total Phosphorus	mg/L	0.030 ^a	-	0.0026	0.0031	0.0028	0.0028	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Anions	Phenols	mg/L	0.004 ^a	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
	Bromide (Br)	mg/L	-	-	<0.1	0.16	<0.1	<0.1	<0.1	<0.1	<0.1	0.18	0.2	<0.1
	Chloride (Cl)	mg/L	120	120	18	13.3	3.23	0.86	33.5	31.6	1.16	20.5	18.7	1.16
	Sulphate (SO ₄)	mg/L	218 ^β	218	84.5	57	14.2	1.43	201	188	2.35	152	125	3.18
Total Metals	Aluminum (Al)	mg/L	0.100	0.179	0.0515	0.0368	0.0311	0.0053	0.0288	0.0402	0.0034	0.055	0.0316	0.0049
	Antimony (Sb)	mg/L	0.030 ^a	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
	Arsenic (As)	mg/L	0.005	0.005	<0.0001	<0.0001	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
	Barium (Ba)	mg/L	1 ^β	-	0.0177	0.016	0.0147	0.00919	0.0296	0.0307	0.0119	0.0225	0.0211	0.016
	Beryllium (Be)	mg/L	0.011 ^a	-	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002
	Bismuth (Bi)	mg/L	-	-	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
	Boron (B)	mg/L	1.5	-	0.015	0.014	0.012	<0.01	0.018	0.018	<0.01	0.018	0.017	<0.01
	Cadmium (Cd)	mg/L	0.00012	0.00008	0.0000367	0.0000194	<0.000005	<0.000005	0.000407	0.000262	<0.000005	0.000268	0.000143	<0.000005
	Calcium (Ca)	mg/L	-	-	31.6	27.8	25.7	16.3	53.2	52.6	23.1	45.8	42.2	24
	Chromium (Cr)	mg/L	0.001	0.003	0.00058	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
	Cobalt (Co)	mg/L	0.0009 ^a	0.004	0.00021	0.00016	0.00016	<0.0001	0.00141	0.00106	<0.0001	0.00133	0.00087	<0.0001
	Copper (Cu)	mg/L	0.002	0.0022	0.00146	0.00156	0.00169	0.0006	0.0016	0.00158	0.00113	0.00233	0.00203	0.00119
	Iron (Fe)	mg/L	0.30	0.326	0.07	0.12	0.044	0.011	0.049	0.095	<0.01	0.084	0.075	0.015
	Lead (Pb)	mg/L	0.001	0.001	0.000138	0.000059	<0.00005	<0.00005	0.000057	<0.00005	<0.00005	0.000069	<0.00005	<0.00005
	Lithium (Li)	mg/L	-	-	0.0048	0.0035	0.0031	<0.001	0.0103	0.0092	0.0012	0.0081	0.0064	0.0013
	Magnesium (Mg)	mg/L	-	-	19.6	17.5	18.4	11.6	47.1	44.9	14.7	40.9	38.2	15.2
	Manganese (Mn)	mg/L	0.935 ^β	-	0.00191	0.00893	0.00347	0.00078	0.828	0.454	0.00014	0.359	0.199	0.00088
	Mercury (Hg)	mg/L	0.000026	-	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005
	Molybdenum (Mo)	mg/L	0.073	-	0.00616	0.00435	0.00201	0.000457	0.00776	0.0064	0.000581	0.00582	0.00507	0.000718
	Nickel (Ni)	mg/L	0.025	0.025	0.00084	0.00103	0.00142	0.00087	0.00189	0.00168	0.00129	0.0022	0.00188	0.0013
	Potassium (K)	mg/L	-	-	6.22	5.04	3.02	1.24	6.99	6.61	1.39	5.17	4.85	1.64
	Selenium (Se)	mg/L	0.001	-	0.000184	0.000102	<0.00005	<0.00005	0.000733	0.000684	<0.00005	0.000876	0.0007	<0.00005
	Silicon (Si)	mg/L	-	-	1.32	1.02	0.81	1.06	1.64	1.62	0.98	1.85	1.81	0.88
	Silver (Ag)	mg/L	0.00025	0.0001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
	Sodium (Na)	mg/L	-	-	3.4	3.01	3.58	1.16	6.74	6.91	1.16	5.95	6.2	1.5
	Strontium (Sr)	mg/L	-	-	0.122	0.0834	0.0176	0.00883	0.171	0.157	0.0133	0.111	0.0909	0.0146
	Thallium (Tl)	mg/L	0.0008	0.0008	0.000018	0.000016	<0.00001	<0.00001	0.000026	0.000022	<0.00001	0.000022	0.000015	<0.00001
	Tin (Sn)	mg/L	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
	Titanium (Ti)	mg/L	-	-	<0.002	<0.002	<0.0008	<0.0003	<0.002	<0.003	<0.0003	<0.003	<0.0015	<0.0003
	Uranium (U)	mg/L	0.015	-	0.00313	0.00284	0.00161	0.00043	0.00972	0.00969	0.000606	0.0108	0.0105	0.000723
	Vanadium (V)	mg/L	0.006 ^a	0.006	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
	Zinc (Zn)	mg/L	0.02 ^a	0.030	<0.003	<0.003	<0.003	<0.003	<0.003	0.0035	<0.003	<0.003	<0.003	<0.003

Indicates parameter concentration above applicable Water Quality Guideline.

BOLD

 Indicates parameter concentration above the AEMP benchmark.

Note: AEMP: Aquatic Effects Monitoring Plan. "-" indicates no WQG benchmark applicable. Station LDFG-OUT (Sheardown Lake Tributary 12) was dry during summer and fall sampling events in 2024, therefore no data are available.

^a Canadian Water Quality Guideline for the protection of aquatic life (CCME 2024) except α (Ontario Provincial Water Quality Objective [PWQO]; OMOE 1994) and β (British Columbia Water Quality Guideline [BCWQG]; BCMOE 2024). See Table 2.2 for WQG information.

^b A conservative hardness value of 75 mg/L was used for guideline calculations dependent on hardness (i.e., sulphate, beryllium, cadmium, copper, lead, manganese, and nickel).

^c AEMP Water Quality Benchmarks developed by Intrinsik (2013) using baseline water quality data and adopted from the Sheardown Lake Tributaries.

^d Station LDFG-OUT (Sheardown Lake Tributary 12) was dry during Fall sampling event in 2023, therefore no data are available.

Table C.34: Magnitude of Elevation in Seasonal Average Parameter Concentrations between Sheardown Lake Tributaries (SDLT1, SDLT 12 and SDLT9) and Reference Creek Stations in 2024, and between 2024 and the Baseline Period (2005 to 2013), Mary River Project CREMP, 2024

Parameter		SDLT1 Station D1-05 (Reach 4) 2024 vs Reference Creek 2024			SDLT1 Station D1-00 (Reach 1) 2024 vs Reference Creek 2024			SDLT12 2024 vs Reference Creek 2024	SDLT9 2024 vs Reference Creek 2024		
		Spring	Summer	Fall	Spring	Summer	Fall	Spring	Spring	Summer	Fall
Total Metals	Conductivity (lab)	12.2	8.29	5.28	10.6	8.14	4.99	9.28	5.94	2.93	2.27
	pH (lab)	1.01	0.983	0.963	1.02	1.03	1.01	1.06	1.01	0.979	0.949
	Hardness (as CaCO ₃)	11.1	8.11	5.26	10.2	8.16	4.85	10.0	6.74	3.01	2.26
	Total Suspended Solids (TSS)	0.377	0.784	1.00	0.679	0.784	1.00	0.377	0.377	0.784	1.00
	Total Dissolved Solids (TDS)	8.24	9.12	7.18	7.17	9.12	6.87	5.27	3.68	2.96	2.64
	Turbidity	0.697	0.385	0.417	0.675	0.469	0.276	1.12	0.139	0.361	0.0434
	Alkalinity (as CaCO ₃)	3.15	1.80	1.54	5.31	2.06	1.92	9.52	7.15	2.29	1.78
	Total Ammonia	4.19	13.2	18.8	4.49	5.50	12.5	0.844	1.35	0.962	257
	Nitrate	138	241	361	78.0	212	271	3.50	65.0	338	354
	Nitrite	1.00	2.60	1.30	1.00	1.80	1.20	1.00	1.00	1.00	4.00
	Total Kjeldahl Nitrogen (TKN)	3.13	5.60	7.81	3.47	3.26	6.52	1.02	4.06	5.29	28.0
	Dissolved Organic Carbon	0.710	1.28	1.56	1.10	1.11	1.16	1.31	0.942	1.12	1.26
	Total Organic Carbon	0.951	1.09	1.13	1.09	1.35	1.30	1.59	1.22	1.48	1.42
	Total Phosphorus	0.578	0.630	0.597	0.689	0.630	0.597	0.622	0.622	0.630	0.597
	Phenols	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	Bromide (Br)	1.00	1.00	1.80	1.60	1.00	2.00	1.00	1.00	1.00	1.00
	Chloride (Cl)	29.8	27.1	12.3	22.0	25.5	11.2	5.34	1.42	0.937	0.696
	Sulphate (SO ₄)	156	117	62.3	105	109	51.2	26.2	2.64	1.37	1.30
	Aluminum (Al)	0.769	0.346	0.343	0.550	0.483	0.197	0.465	0.0792	0.0409	0.0306
	Antimony (Sb)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	Arsenic (As)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	Barium (Ba)	8.82	6.17	3.15	7.97	6.40	2.96	7.32	4.58	2.48	2.24
	Beryllium (Be)	1.00	1.00	0.976	1.00	1.00	0.976	1.00	1.00	1.00	0.976
	Bismuth (Bi)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	Boron (B)	1.50	1.80	1.80	1.40	1.80	1.70	1.20	1.00	1.00	1.00
	Cadmium (Cd)	6.89	81.4	53.6	3.64	52.4	28.6	0.939	0.939	1.00	1.00
	Calcium (Ca)	12.3	6.92	4.46	10.9	6.84	4.11	10.0	6.37	3.01	2.34
	Chromium (Cr)	1.11	0.885	0.743	0.957	0.885	0.743	0.957	0.957	0.885	0.743
	Cobalt (Co)	2.05	13.4	10.6	1.56	10.1	6.96	1.56	0.976	0.952	0.800
	Copper (Cu)	2.43	1.88	2.04	2.60	1.85	1.78	2.82	1.00	1.33	1.04
	Iron (Fe)	0.864	0.520	0.587	1.48	1.01	0.524	0.543	0.136	0.106	0.105
	Lead (Pb)	1.38	0.499	0.450	0.590	0.438	0.326	0.500	0.500	0.438	0.326
	Lithium (Li)	4.80	10.3	8.10	3.50	9.20	6.40	3.10	1.00	1.20	1.30
	Magnesium (Mg)	11.3	9.50	6.43	10.1	9.05	6.00	10.6	6.68	2.96	2.39
	Manganese (Mn)	1.35	660	222	6.33	362	123	2.46	0.553	0.112	0.544
	Mercury (Hg)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	Molybdenum (Mo)	81.9	33.4	13.8	57.8	27.6	12.1	26.7	6.07	2.50	1.71
	Nickel (Ni)	1.68	3.78	3.15	2.06	3.36	2.70	2.84	1.74	2.58	1.86
	Potassium (K)	19.9	12.5	6.55	16.1	11.8	6.15	9.64	3.96	2.49	2.08
	Selenium (Se)	3.68	14.7	17.5	2.04	13.7	14.0	1.00	1.00	1.00	1.00
	Silicon (Si)	2.78	1.76	1.55	2.15	1.74	1.51	1.71	2.23	1.05	0.736
	Silver (Ag)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	Sodium (Na)	8.88	6.02	3.71	7.86	6.17	3.87	9.35	3.03	1.04	0.936
	Strontium (Sr)	51.3	22.5	10.0	35.0	20.7	8.22	7.39	3.71	1.75	1.32
	Thallium (Tl)	1.80	2.60	2.10	1.60	2.20	1.43	1.00	1.00	1.00	0.952
	Tin (Sn)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	Titanium (Ti)	0.488	0.424	0.395	0.488	0.637	0.197	0.195	0.0731	0.0637	0.0395
	Uranium (U)	14.8	8.47	3.78	13.4	8.44	3.67	7.60	2.03	0.528	0.253
	Vanadium (V)	0.985	0.957	0.800	0.985	0.957	0.800	0.985	0.985	0.957	0.800
	Zinc (Zn)	1.00	1.00	1.00	1.00	1.17	1.00	1.00	1.00	1.00	1.00



Denotes parameters with an Aquatic Environment Monitoring Plan (AEMP) benchmark.

Denotes slight elevation (mean concentration three to five times higher than respective mean reference or baseline period value).

Denotes moderate elevation (mean concentration five to 10 times higher than respective mean reference or baseline period value).

Denotes highly elevated concentration (mean concentration greater than 10 times higher than respective mean reference or baseline period value).

Denotes differences in method detection limit between the indicated study area and that of the reference creeks, precluding an evaluation of magnitude of elevation; or no data available for the analyte during comparison period.

Table C.34: Magnitude of Elevation in Seasonal Average Parameter Concentrations between Sheardown Lake Tributaries (SDLT1, SDLT 12 and SDLT9) and Reference Creek Stations in 2024, and between 2024 and the Baseline Period (2005 to 2013), Mary River Project CREMP, 2024

Parameter		SDLT1 Station D1-05 (Reach 4) 2024 vs Baseline			SDLT1 Station D1-00 (Reach 1) 2024 vs Baseline			SDLT12 2024 vs Baseline	SDLT9 2024 vs Baseline		
		Spring	Summer	Fall	Spring	Summer	Fall	Spring	Spring	Summer	Fall
Total Metals	Conductivity (lab)	3.91	4.96	2.91	2.15	3.54	2.16	3.98	0.913	1.45	1.34
	pH (lab)	1.04	0.980	1.01	1.01	0.993	0.987	1.04	0.960	0.934	0.918
	Hardness (as CaCO ₃)	-	-	-	-	-	-	3.24	0.900	1.28	1.16
	Total Suspended Solids (TSS)	0.500	0.500	0.500	0.900	0.500	0.500	0.500	0.500	0.500	0.286
	Total Dissolved Solids (TDS)	3.71	4.86	2.72	2.01	3.57	2.07	3.13	0.782	1.31	1.08
	Turbidity	3.28	3.74	4.67	0.783	2.08	2.91	5.53	0.760	6.65	0.533
	Alkalinity (as CaCO ₃)	1.05	1.06	1.00	1.04	0.850	0.901	3.25	0.923	0.971	1.01
	Total Ammonia	0.184	0.585	1.43	0.242	0.429	2.36	0.250	0.400	0.250	72.5
	Nitrate	44.3	116	70.8	15.6	50.8	51.6	0.700	13.0	81.2	70.8
	Nitrite	2.00	5.20	2.36	2.00	3.60	2.29	5.00	2.00	2.00	20.0
	Total Kjeldahl Nitrogen (TKN)	2.56	3.39	4.31	1.75	1.29	3.38	0.936	4.10	3.12	13.7
	Dissolved Organic Carbon	0.517	1.16	1.51	0.694	0.822	1.01	1.30	0.768	1.07	0.964
	Total Organic Carbon	0.578	0.786	1.03	0.522	0.814	1.06	1.22	0.758	1.13	0.984
	Total Phosphorus	0.260	0.429	0.667	0.443	0.353	0.286	0.933	0.933	0.667	0.667
	Phenols	-	-	-	-	-	-	1.00	1.00	1.00	1.00
	Bromide (Br)	0.400	0.400	0.720	0.640	0.400	0.800	2.00	0.400	0.400	0.400
	Chloride (Cl)	5.74	10.1	2.36	3.32	9.48	2.88	3.23	0.860	1.16	1.16
	Sulphate (SO ₄)	106	47.3	21.2	11.4	35.2	14.3	14.2	1.43	2.35	1.59
	Aluminum (Al)	1.94	1.72	5.27	0.488	1.34	2.87	3.75	0.679	1.55	1.01
	Antimony (Sb)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	Arsenic (As)	1.00	1.00	1.00	1.00	0.968	1.00	1.00	1.00	1.00	1.00
	Barium (Ba)	3.54	4.05	2.46	1.99	2.77	1.71	4.02	1.21	1.43	1.99
	Beryllium (Be)	0.200	1.00	1.00	0.200	1.00	1.00	0.0400	0.0400	0.0400	0.0400
	Bismuth (Bi)	0.143	0.167	0.167	0.100	0.100	0.100	0.100	0.100	0.100	0.100
	Boron (B)	1.50	1.26	1.30	1.33	1.10	1.28	1.20	1.00	1.00	1.00
	Cadmium (Cd)	1.15	13.0	8.07	1.18	15.4	10.0	0.500	0.500	0.500	0.500
	Calcium (Ca)	3.79	3.99	2.58	2.00	2.74	1.72	3.94	0.827	1.27	1.21
	Chromium (Cr)	3.87	1.94	3.47	1.67	1.18	3.28	1.00	1.00	1.00	1.00
	Cobalt (Co)	2.10	14.1	13.3	1.45	10.6	8.70	1.07	1.00	1.00	1.00
	Copper (Cu)	0.496	0.493	1.00	0.593	0.626	1.19	2.68	1.43	1.22	1.10
	Iron (Fe)	1.56	2.67	6.30	0.913	0.864	1.42	1.47	0.297	0.333	0.500
	Lead (Pb)	0.806	0.465	1.20	0.303	0.833	0.952	-	-	-	-
	Lithium (Li)	9.60	11.8	8.85	7.00	7.27	5.61	0.620	0.200	0.240	0.260
	Magnesium (Mg)	3.53	5.31	3.58	1.95	3.59	2.72	4.73	0.975	1.35	1.20
	Manganese (Mn)	2.91	1,117	630	2.69	164	134	13.6	0.380	0.278	1.32
	Mercury (Hg)	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500
	Molybdenum (Mo)	5.82	3.09	2.41	3.06	2.96	2.67	4.56	1.25	1.86	1.31
	Nickel (Ni)	0.592	1.69	2.36	0.597	1.19	1.63	2.06	1.43	1.26	1.22
	Potassium (K)	6.08	4.31	3.01	3.95	3.78	2.80	7.10	1.60	2.07	2.15
	Selenium (Se)	1.84	73.3	8.76	1.02	68.4	7.00	0.0500	0.0500	0.0500	0.0500
	Silicon (Si)	1.38	1.41	1.60	0.776	1.23	1.38	2.07	0.763	0.970	0.973
	Silver (Ag)	2.86	10.0	10.0	10.0	10.0	10.0	1.00	1.00	1.00	1.00
	Sodium (Na)	10.1	6.42	3.42	4.48	5.12	2.94	19.4	3.20	3.92	3.97
	Strontium (Sr)	28.9	21.9	9.93	10.4	13.1	6.38	5.67	1.08	1.63	1.70
	Thallium (Tl)	1.80	1.93	1.83	1.60	2.00	1.50	0.100	0.100	0.100	0.100
	Tin (Sn)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	Titanium (Ti)	0.421	0.667	1.00	0.200	0.300	0.150	0.0800	0.0300	0.0300	0.0300
	Uranium (U)	3.46	3.53	1.92	2.27	3.83	2.41	35.8	1.36	3.59	1.45
	Vanadium (V)	0.541	0.556	0.556	0.500	0.500	0.500	0.500	0.500	0.500	0.500
	Zinc (Zn)	2.40	1.30	2.90	0.896	0.972	1.67	3.00	3.00	3.00	2.14



Denotes parameters with an Aquatic Environment Monitoring Plan (AEMP) benchmark.

Denotes slight elevation (mean concentration three to five times higher than respective mean reference or baseline period value).

Denotes moderate elevation (mean concentration five to 10 times higher than respective mean reference or baseline period value).

Denotes highly elevated concentration (mean concentration greater than 10 times higher than respective mean reference or baseline period value).

Denotes differences in method detection limit between the indicated study area and that of the reference creeks, precluding an evaluation of magnitude of elevation; or no data available for the analyte during comparison period.

Table C.35: Dissolved Metal Concentrations at Sheardown Lake Tributary 1 (SDLT1), Sheardown Lake Tributary 9 (SDLT9), and Sheardown Lake Tributary 12 (SDLT12) Water Quality Monitoring Stations, Mary River Project CREMP, 2024

Parameters		Units	Spring Sampling Event				Summer Sampling Event			Fall Sampling Event		
			Sheardown Lake Tributary 1		Sheardown Lake Tributary 12	Sheardown Lake Tributary 9	Sheardown Lake Tributary 1		Sheardown Lake Tributary 9	Sheardown Lake Tributary 1		Sheardown Lake Tributary 9
			D1-05	D1-00	LDFG-OUT	MS-C-G	D1-05	D1-00	MS-C-G	D1-05	D1-00	MS-C-G
			1-Jul-24	30-Jun-24	1-Jul-24	30-Jun-24	30-Jul-24	30-Jul-24	30-Jul-24	30-Aug-24	31-Aug-24	30-Aug-24
Dissolved Metals	Aluminum (Al)	mg/L	0.0056	0.0081	0.0053	0.003	0.0028	0.0029	0.0033	0.0036	0.0029	0.0017
	Antimony (Sb)	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
	Arsenic (As)	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
	Barium (Ba)	mg/L	0.0184	0.0154	0.0154	0.00906	0.0292	0.0298	0.0123	0.0211	0.0201	0.0149
	Beryllium (Be)	mg/L	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002
	Bismuth (Bi)	mg/L	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
	Boron (B)	mg/L	0.014	0.013	0.011	<0.01	0.018	0.019	<0.01	0.016	0.016	<0.01
	Cadmium (Cd)	mg/L	0.0000361	0.0000175	<0.000005	<0.000005	0.000426	0.000261	<0.000005	0.000253	0.000132	<0.000005
	Calcium (Ca)	mg/L	30.6	25.8	25.7	16.4	52	53.9	22.3	43.3	40.3	22.8
	Chromium (Cr)	mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
	Cobalt (Co)	mg/L	0.00017	0.00014	0.00011	<0.0001	0.0013	0.00101	<0.0001	0.00115	0.00077	<0.0001
	Copper (Cu)	mg/L	0.00121	0.00137	0.00094	0.00056	0.00144	0.00147	0.00108	0.00187	0.00173	0.00107
	Iron (Fe)	mg/L	<0.01	0.052	<0.01	<0.01	<0.01	0.016	<0.01	<0.01	0.018	<0.01
	Lead (Pb)	mg/L	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
	Lithium (Li)	mg/L	0.0047	0.0034	0.0035	<0.001	0.0112	0.0103	0.0014	0.0079	0.0064	0.0015
	Magnesium (Mg)	mg/L	16.5	16.6	16	11.3	44.4	43.8	14.6	38	34.9	13.9
	Manganese (Mn)	mg/L	0.00077	0.00746	0.00167	0.00064	0.771	0.446	0.00014	0.33	0.184	0.0005
	Mercury (Hg)	mg/L	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005
	Molybdenum (Mo)	mg/L	0.00639	0.00422	0.00204	0.000446	0.00742	0.00611	0.000523	0.00564	0.00482	0.000665
	Nickel (Ni)	mg/L	0.00067	0.00089	0.001	0.00084	0.00173	0.00151	0.00127	0.00183	0.00156	0.00116
	Potassium (K)	mg/L	5.52	4.77	2.74	1.21	6.68	6.52	1.37	5.06	4.65	1.54
	Selenium (Se)	mg/L	0.000189	0.000126	<0.00005	<0.00005	0.000814	0.000752	<0.00005	0.000919	0.000692	<0.00005
	Silicon (Si)	mg/L	1.18	0.918	0.737	1.01	1.5	1.48	0.956	1.7	1.66	0.845
	Silver (Ag)	mg/L	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
	Sodium (Na)	mg/L	2.99	2.93	3.18	1.07	6.31	6.71	1.19	5.36	5.69	1.37
	Strontium (Sr)	mg/L	0.118	0.08	0.0171	0.00851	0.169	0.153	0.0136	0.114	0.0894	0.0147
	Thallium (Tl)	mg/L	0.000018	0.000014	<0.00001	<0.00001	0.000026	0.000021	<0.00001	0.00002	0.000016	<0.00001
	Tin (Sn)	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
	Titanium (Ti)	mg/L	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003
	Uranium (U)	mg/L	0.00296	0.00258	0.00155	0.000405	0.0102	0.00995	0.000646	0.011	0.011	0.000738
	Vanadium (V)	mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
	Zinc (Zn)	mg/L	<0.001	0.0014	<0.001	<0.001	0.0025	0.0032	0.0024	0.0022	0.0026	<0.001

Note: Station LDFG-OUT (Sheardown Lake Tributary 12) was dry during summer and fall sampling events in 2024, therefore no data are available.

Table C.36: Magnitude of Elevation in Seasonal Average Parameter Concentrations between Sheardown Lake Tributaries (SDLT1, SDLT12 and SDLT9) and Reference Creek Stations in 2024, and at SDLT1 between 2024 and the Baseline Period (2005 to 2013), Mary River Project CREMP, 2024

Parameter		SDLT1 Station D1-05 (Reach 4) 2024 vs Reference Creek 2024			SDLT1 Station D1-00 (Reach 1) 2024 vs Reference Creek 2024			SDLT12 2024 vs Reference Creek 2024	SDLT9 2024 vs Reference Creek 2024 vs Reference Creek 2024			SDLT1 Station D1-05 (Reach 4) 2024 vs Baseline			SDLT1 Station D1-00 (Reach 1) 2024 vs Baseline			SDLT12 2024 vs Baseline	SDLT9 2024 vs Baseline		
		Spring	Summer	Fall	Spring	Summer	Fall	Spring	Spring	Summer	Fall	Spring	Summer	Fall	Spring	Summer	Fall	Spring	Spring	Summer	Fall
Dissolved Metals	Aluminum (Al)	0.301	0.125	0.0410	0.435	0.129	0.0330	0.285	0.161	0.147	0.0193	0.709	0.659	1.07	1.19	1.02	1.30	2.12	2.73	1.94	0.944
	Antimony (Sb)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	Arsenic (As)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	Barium (Ba)	10.9	6.88	3.37	9.13	7.02	3.21	9.13	5.00	2.90	2.38	4.02	3.95	2.25	3.85	3.72	2.01	4.24	1.23	1.36	1.83
	Beryllium (Be)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.200	0.200	0.200	0.0667	0.0857	0.0667	0.0400	0.0400	0.0400	0.0400
	Bismuth (Bi)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.167	0.167	0.167	0.100	0.100	0.100	0.100	0.100	0.100	0.100
	Boron (B)	1.40	1.80	1.60	1.30	1.90	1.60	1.10	1.00	1.00	1.00	1.40	1.80	1.45	1.30	1.46	1.60	1.10	1.00	1.00	1.00
	Cadmium (Cd)	6.88	85.2	50.6	3.33	52.2	26.4	0.952	0.952	1.00	1.00	1.95	42.6	25.3	1.75	23.7	13.2	0.500	0.500	0.500	0.500
	Calcium (Ca)	12.1	6.78	4.23	10.2	7.02	3.94	10.1	6.46	2.91	2.23	3.72	3.81	2.44	1.88	2.92	1.67	3.18	0.854	1.22	1.16
	Chromium (Cr)	1.00	1.00	0.962	1.00	1.00	0.962	1.00	1.00	1.00	0.962	4.65	5.00	2.43	5.00	5.00	5.00	1.00	1.00	1.00	1.00
	Cobalt (Co)	1.70	13.0	11.5	1.40	10.1	7.70	1.10	1.00	1.00	1.00	1.70	13.0	8.21	1.40	10.1	7.70	1.10	1.00	1.00	1.00
	Copper (Cu)	2.88	2.09	2.15	3.26	2.14	1.99	2.24	1.33	1.57	1.23	0.430	0.500	0.717	0.547	0.663	0.891	1.47	1.60	1.15	0.973
	Iron (Fe)	0.755	0.563	0.163	3.92	0.901	0.294	0.755	0.755	0.563	0.163	0.375	0.571	0.500	1.12	0.343	0.379	0.333	0.333	0.333	0.333
	Lead (Pb)	1.00	0.957	0.532	1.00	0.957	0.532	1.00	1.00	0.957	0.532	0.536	1.00	0.625	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	Lithium (Li)	4.70	11.2	7.90	3.40	10.3	6.40	3.50	1.00	1.40	1.50	2.35	4.75	2.62	4.05	7.63	4.57	0.700	0.200	0.280	0.300
	Magnesium (Mg)	10.2	9.40	6.31	10.3	9.27	5.79	9.90	6.99	3.09	2.31	2.97	5.05	3.16	1.88	3.68	2.24	3.31	0.950	1.34	1.15
	Manganese (Mn)	1.99	2,507	430	19.3	1,450	240	4.31	1.65	0.455	0.651	1.90	1,365	738	3.75	224	114	13.1	0.525	0.367	2.55
	Mercury (Hg)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500
	Molybdenum (Mo)	74.5	31.2	14.5	49.2	25.7	12.4	23.8	5.20	2.20	1.70	7.86	4.32	2.02	3.43	2.86	2.12	4.31	1.21	1.54	1.03
	Nickel (Ni)	1.34	3.46	3.49	1.78	3.02	2.97	2.00	1.68	2.54	2.21	0.657	2.01	1.79	0.612	1.16	1.19	1.39	1.56	1.21	1.03
	Potassium (K)	17.7	12.7	7.29	15.3	12.4	6.70	8.79	3.88	2.61	2.22	5.46	4.41	2.62	3.83	3.92	2.40	6.23	1.69	1.83	2.03
	Selenium (Se)	3.78	16.3	18.4	2.52	15.0	13.8	1.00	1.00	1.00	1.00	1.89	8.14	9.19	1.26	7.52	6.92	0.0500	0.0500	0.0500	0.0500
	Silicon (Si)	3.26	1.96	1.64	2.54	1.93	1.61	2.04	2.79	1.25	0.817	1.33	1.55	1.34	0.802	1.23	1.15	1.95	0.737	0.966	1.01
	Silver (Ag)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	10.0	10.0	10.0	10.0	10.0	10.0	1.00	1.00	1.00	1.00
	Sodium (Na)	8.06	5.73	3.53	7.90	6.09	3.74	8.57	2.88	1.08	0.901	8.99	6.08	3.33	4.29	4.95	2.96	18.1	3.18	3.72	3.58
	Strontium (Sr)	50.3	22.8	10.7	34.1	20.7	8.39	7.28	3.63	1.84	1.38	29.2	20.2	11.1	11.1	12.9	6.49	5.18	1.08	1.57	1.67
	Thallium (Tl)	1.80	2.60	2.00	1.40	2.10	1.60	1.00	1.00	1.00	1.00	0.450	2.60	1.67	0.255	0.525	0.291	0.100	0.100	0.100	0.100
	Tin (Sn)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	Titanium (Ti)	0.558	0.367	0.0844	0.558	0.367	0.0844	0.558	0.558	0.367	0.0844	0.0462	0.0632	0.0417	0.0300	0.0300	0.0300	0.0300	0.0300	0.0300	0.0300
	Uranium (U)	18.2	8.92	4.10	15.8	8.70	4.10	9.51	2.48	0.565	0.275	3.49	4.57	1.71	2.25	4.07	2.40	34.4	1.36	3.61	1.30
	Vanadium (V)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.541	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500
	Zinc (Zn)	0.290	2.50	2.20	0.406	3.20	2.60	0.290	0.290	2.40	1.00	0.800	1.25	2.20	0.262	1.20	0.832	1.00	1.00	2.40	1.00

- Denotes parameters with an Aquatic Environment Monitoring Plan (AEMP) benchmark.
- Denotes slight elevation (mean concentration three to five times higher than respective mean reference or baseline period value).
- Denotes moderate elevation (mean concentration five to 10 times higher than respective mean reference or baseline period value).
- Denotes highly elevated concentration (mean concentration greater than 10 times higher than respective mean reference or baseline period value).
- Denotes differences in method detection limit between the 2023 and reference area or baseline data, precluding an evaluation of magnitude of elevation.

Table C.37: *In Situ* Water Quality Profile Data Collected at Sheardown Lake Northwest (NW; DL0-01) Water Quality Monitoring Stations, Mary River Project CREMP, Winter 2024

Depth (m)	Temperature (°C)						Dissolved Oxygen (mg/L)						Dissolved Oxygen (% Saturation)					
	DD-HAB9-STN1	DL0-01-5	DL0-01-1	DL0-01-4	DL0-01-2	DL0-01-7	DD-HAB9-STN1	DL0-01-5	DL0-01-1	DL0-01-4	DL0-01-2	DL0-01-7	DD-HAB9-STN1	DL0-01-5	DL0-01-1	DL0-01-4	DL0-01-2	DL0-01-7
	15-Apr-24	15-Apr-24	15-Apr-24	15-Apr-24	15-Apr-24	16-Apr-24	15-Apr-24	15-Apr-24	15-Apr-24	15-Apr-24	15-Apr-24	16-Apr-24	15-Apr-24	15-Apr-24	15-Apr-24	15-Apr-24	15-Apr-24	16-Apr-24
1.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2.0	0.300	0.200	0.500	0.200	0.300	0.200	14.5	13.6	14.0	14.0	14.2	13.9	101	95.6	98.6	98.6	99.4	96.7
3.0	0.700	0.700	0.700	0.600	0.400	0.400	14.3	13.7	14.1	14.3	14.2	14.1	101	97.4	99.6	102	101	99.0
4.0	0.800	0.900	0.900	0.900	0.800	0.800	14.2	13.7	14.0	14.3	14.2	14.1	101	97.2	99.8	102	101	99.5
5.0	0.900	0.900	0.900	0.900	0.900	-	14.1	13.6	14.0	14.2	14.2	-	100	97.3	99.8	101	101	-
6.0	0.900	0.900	0.900	-	0.900	0.900	14.1	13.7	14.0	-	14.2	14.1	100	97.3	99.8	-	101	99.9
7.0	0.900	0.900	0.900	-	0.900	0.900	14.1	13.7	14.0	-	14.1	14.1	100	97.3	99.7	-	100	99.9
8.0	0.900	0.900	0.900	-	0.900	0.900	14.1	13.7	14.0	-	14.1	14.1	100	97.3	99.5	-	100	99.9
9.0	0.900	1.00	1.00	-	0.900	0.900	14.1	13.6	13.9	-	14.1	14.1	100	97.2	99.0	-	100	99.8
10.0	-	1.00	1.00	-	0.900	0.900	-	13.6	13.8	-	14.0	14.1	-	97.1	98.4	-	99.8	99.8
11.0	-	1.00	1.00	-	1.00	1.00	-	13.6	13.7	-	14.0	14.0	-	96.7	97.8	-	99.4	99.3
12.0	-	1.00	1.00	-	1.00	-	-	13.5	13.8	-	13.9	-	-	96.3	97.3	-	99.0	-
13.0	-	1.00	1.00	-	1.00	-	-	13.4	13.6	-	13.8	-	-	95.7	96.9	-	98.7	-
14.0	-	1.10	1.10	-	1.00	-	-	13.3	13.5	-	13.8	-	-	95.3	96.4	-	98.3	-
15.0	-	1.10	1.10	-	-	-	-	13.2	13.4	-	-	-	-	94.4	95.6	-	-	-
16.0	-	1.10	1.20	-	1.10	-	-	13.1	13.2	-	13.6	-	-	93.9	94.2	-	97.2	-
17.0	-	1.20	1.20	-	-	-	-	13.0	13.0	-	-	-	-	93.1	93.1	-	-	-
18.0	-	1.20	1.30	-	-	-	-	12.9	12.9	-	-	-	-	92.5	92.6	-	-	-
19.0	-	1.30	1.30	-	-	-	-	12.7	12.7	-	-	-	-	91.6	91.2	-	-	-
20.0	-	1.40	1.40	-	-	-	-	12.6	12.6	-	-	-	-	90.5	90.7	-	-	-
21.0	-	1.40	-	-	-	-	-	12.3	-	-	-	-	-	89.1	-	-	-	-
22.0	-	1.50	-	-	-	-	-	9.60	-	-	-	-	-	68.2	-	-	-	-

Notes: "-" = data not available. The total depth of the water column at each sampling station was not recorded but deepest measurements are within 1 m of lake bottom.

Table C.37: *In Situ* Water Quality Profile Data Collected at Sheardown Lake Northwest (NW; DL0-01) Water Quality Monitoring Stations, Mary River Project CREMP, Winter 2024

Depth (m)	pH (pH units)						Specific Conductance (µS/cm)						Turbidity (NTU)					
	DD-HAB9-STN1	DL0-01-5	DL0-01-1	DL0-01-4	DL0-01-2	DL0-01-7	DD-HAB9-STN1	DL0-01-5	DL0-01-1	DL0-01-4	DL0-01-2	DL0-01-7	DD-HAB9-STN1	DL0-01-5	DL0-01-1	DL0-01-4	DL0-01-2	DL0-01-7
	15-Apr-24	15-Apr-24	15-Apr-24	15-Apr-24	15-Apr-24	16-Apr-24	15-Apr-24	15-Apr-24	15-Apr-24	15-Apr-24	15-Apr-24	16-Apr-24	15-Apr-24	15-Apr-24	15-Apr-24	15-Apr-24	15-Apr-24	16-Apr-24
1.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2.0	7.73	7.68	7.84	7.93	7.81	7.87	219	221	220	225	222	220	0.260	0.150	0.240	0.210	0.200	0.290
3.0	7.72	7.69	7.80	7.84	7.78	7.83	215	216	217	220	217	218	0.240	0.190	0.240	0.240	0.250	0.300
4.0	7.70	7.66	7.79	7.79	7.75	7.80	214	214	216	217	216	216	0.220	0.220	0.210	0.260	0.250	0.310
5.0	7.70	7.62	7.77	7.77	7.74	-	215	214	215	216	215	-	0.260	0.200	0.260	0.250	0.240	-
6.0	7.70	7.59	7.77	-	7.73	7.79	215	214	215	-	215	215	0.240	0.270	0.240	-	0.230	0.290
7.0	7.70	7.60	7.75	-	7.73	7.77	215	213	215	-	215	215	0.230	0.240	0.260	-	0.260	0.320
8.0	7.70	7.61	7.73	-	7.73	7.77	215	213	214	-	215	215	0.260	0.250	0.260	-	0.240	0.310
9.0	7.71	7.63	7.71	-	7.73	7.77	215	213	214	-	215	215	0.250	0.270	0.270	-	0.280	0.280
10.0	-	7.64	7.70	-	7.71	7.76	-	213	214	-	214	215	-	0.260	0.270	-	0.260	0.320
11.0	-	7.64	7.69	-	7.70	7.74	-	213	213	-	214	214	-	0.260	0.270	-	0.280	0.330
12.0	-	7.64	7.69	-	7.69	-	-	212	213	-	214	-	-	0.290	0.280	-	0.270	-
13.0	-	7.63	7.68	-	7.68	-	-	212	213	-	214	-	-	0.250	0.300	-	0.260	-
14.0	-	7.63	7.68	-	7.68	-	-	212	213	-	214	-	-	0.290	0.300	-	0.300	-
15.0	-	7.62	7.65	-	-	-	-	211	212	-	-	-	-	0.270	0.330	-	-	-
16.0	-	7.61	7.65	-	7.63	-	-	211	211	-	216	-	-	0.310	0.270	-	0.350	-
17.0	-	7.60	7.64	-	-	-	-	210	210	-	-	-	-	0.300	0.280	-	-	-
18.0	-	7.60	7.62	-	-	-	-	210	210	-	-	-	-	0.290	0.230	-	-	-
19.0	-	7.58	7.62	-	-	-	-	209	210	-	-	-	-	0.290	0.320	-	-	-
20.0	-	7.57	7.60	-	-	-	-	208	209	-	-	-	-	0.300	0.340	-	-	-
21.0	-	7.55	-	-	-	-	-	209	-	-	-	-	-	0.350	-	-	-	-
22.0	-	7.50	-	-	-	-	-	209	-	-	-	-	-	0.650	-	-	-	-

Notes: "-" = data not available. The total depth of the water column at each sampling station was not recorded but deepest measurements are within 1 m of lake bottom.

Table C.38: *In Situ* Water Quality Profile Data Collected at Sheardown Lake Northwest (NW; DL0-01) Water Quality Monitoring Stations, Mary River Project CREMP, Summer 2024

Depth (m)	Temperature (°C)						Dissolved Oxygen (mg/L)						Dissolved Oxygen (% Saturation)					
	DD-HAB9-STN1	DL0-01-5	DL0-01-1	DL0-01-4	DL0-01-2	DL0-01-7	DD-HAB9-STN1	DL0-01-5	DL0-01-1	DL0-01-4	DL0-01-2	DL0-01-7	DD-HAB9-STN1	DL0-01-5	DL0-01-1	DL0-01-4	DL0-01-2	DL0-01-7
	4-Aug-24	-	3-Aug-24	3-Aug-24	3-Aug-24	4-Aug-24	4-Aug-24	-	3-Aug-24	3-Aug-24	3-Aug-24	4-Aug-24	4-Aug-24	-	3-Aug-24	3-Aug-24	3-Aug-24	4-Aug-24
1.0	8.00	-	7.90	8.40	8.00	8.10	11.5	-	11.5	11.4	11.5	11.6	99.0	-	99.2	99.6	99.0	100
2.0	-	-	7.80	8.30	8.00	8.10	-	-	11.5	11.5	11.5	11.6	-	-	99.1	100	99.4	100
3.0	7.90	-	7.80	8.30	7.90	8.00	11.6	-	11.5	11.5	11.6	11.6	99.7	-	99.1	100	99.7	100
4.0	7.90	-	7.80	8.20	7.90	8.00	11.6	-	11.5	11.6	11.6	11.6	99.9	-	99.0	100	99.9	100
5.0	7.80	-	7.70	-	7.90	7.90	11.6	-	11.5	-	11.6	11.6	99.9	-	99.0	-	99.9	99.9
6.0	7.80	-	7.70	8.20	7.90	7.90	11.7	-	11.5	11.6	11.6	11.6	99.7	-	98.6	101	99.8	99.4
7.0	7.70	-	7.70	-	7.90	7.80	11.6	-	11.5	-	11.6	11.6	99.4	-	98.6	-	99.8	99.2
8.0	-	-	-	-	7.90	7.70	-	-	-	-	11.6	11.6	-	-	-	-	99.7	98.9
9.0	-	-	7.60	-	7.90	7.70	-	-	11.5	-	11.5	11.6	-	-	98.4	-	99.7	98.7
10.0	-	-	7.60	-	-	7.60	-	-	11.5	-	-	11.5	-	-	98.3	-	-	98.4
11.0	-	-	7.60	-	7.90	-	-	-	11.4	-	11.5	-	-	-	98.2	-	99.2	-
12.0	-	-	-	-	7.80	-	-	-	-	-	11.5	-	-	-	-	-	99.1	-
13.0	-	-	7.60	-	7.80	-	-	-	11.5	-	11.5	-	-	-	98.0	-	98.9	-
14.0	-	-	7.50	-	7.80	-	-	-	11.4	-	11.5	-	-	-	97.8	-	98.8	-
15.0	-	-	7.50	-	7.60	-	-	-	11.4	-	11.5	-	-	-	97.6	-	98.2	-
16.0	-	-	7.50	-	-	-	-	-	11.4	-	-	-	-	-	97.2	-	-	-
17.0	-	-	7.50	-	-	-	-	-	11.4	-	-	-	-	-	96.8	-	-	-
18.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
19.0	-	-	7.40	-	-	-	-	-	11.3	-	-	-	-	-	96.4	-	-	-
20.0	-	-	7.40	-	-	-	-	-	11.3	-	-	-	-	-	96.4	-	-	-
21.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
22.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes: "-" = data not available. The total depth of the water column at each sampling station was not recorded but deepest measurements are within 1 m of lake bottom.

Table C.38: In Situ Water Quality Profile Data Collected at Sheardown Lake Northwest (NW; DL0-01) Water Quality Monitoring Stations, Mary River Project CREMP, Summer 2024

Depth (m)	pH (pH units)						Specific Conductance (µS/cm)						Turbidity (NTU)					
	DD-HAB9-STN1	DL0-01-5	DL0-01-1	DL0-01-4	DL0-01-2	DL0-01-7	DD-HAB9-STN1	DL0-01-5	DL0-01-1	DL0-01-4	DL0-01-2	DL0-01-7	DD-HAB9-STN1	DL0-01-5	DL0-01-1	DL0-01-4	DL0-01-2	DL0-01-7
	4-Aug-24	-	3-Aug-24	3-Aug-24	3-Aug-24	4-Aug-24	4-Aug-24	-	3-Aug-24	3-Aug-24	3-Aug-24	4-Aug-24	4-Aug-24	-	3-Aug-24	3-Aug-24	3-Aug-24	4-Aug-24
1.0	7.64	-	7.62	7.85	7.93	7.66	182	-	179	177	179	180	0.370	-	0.360	0.280	0.350	0.330
2.0	-	-	7.63	7.82	7.88	7.67	-	-	179	177	179	180	-	-	0.420	0.400	0.350	0.350
3.0	7.62	-	7.65	7.83	7.86	7.67	182	-	179	178	179	180	0.330	-	0.390	0.370	0.350	0.340
4.0	7.62	-	7.67	7.81	7.86	7.67	182	-	179	178	179	180	0.380	-	0.380	0.350	0.380	0.400
5.0	7.62	-	7.67	-	7.86	7.66	182	-	179	-	179	181	0.300	-	0.390	-	0.400	0.410
6.0	7.63	-	7.68	7.82	7.85	7.62	182	-	179	178	179	181	0.320	-	0.420	2.10	0.380	0.400
7.0	7.62	-	7.68	-	7.86	7.61	182	-	180	-	179	181	0.410	-	0.430	-	0.400	0.400
8.0	-	-	-	-	7.85	7.61	-	-	-	-	179	182	-	-	-	-	0.370	0.510
9.0	-	-	7.69	-	7.84	7.59	-	-	180	-	179	183	-	-	0.350	-	0.370	0.710
10.0	-	-	7.90	-	-	7.59	-	-	180	-	-	184	-	-	0.370	-	-	0.650
11.0	-	-	7.69	-	7.83	-	-	-	180	-	179	-	-	-	0.350	-	0.330	-
12.0	-	-	-	-	7.83	-	-	-	-	-	179	-	-	-	-	-	0.390	-
13.0	-	-	7.69	-	7.83	-	-	-	180	-	178	-	-	-	0.370	-	0.350	-
14.0	-	-	7.69	-	7.83	-	-	-	180	-	178	-	-	-	0.330	-	0.340	-
15.0	-	-	7.68	-	7.82	-	-	-	180	-	179	-	-	-	0.380	-	0.420	-
16.0	-	-	7.86	-	-	-	-	-	181	-	-	-	-	-	0.580	-	-	-
17.0	-	-	7.67	-	-	-	-	-	183	-	-	-	-	-	0.570	-	-	-
18.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
19.0	-	-	7.66	-	-	-	-	-	187	-	-	-	-	-	1.07	-	-	-
20.0	-	-	7.65	-	-	-	-	-	187	-	-	-	-	-	1.18	-	-	-
21.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
22.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes: "-" = data not available. The total depth of the water column at each sampling station was not recorded but deepest measurements are within 1 m of lake bottom.

Table C.39: *In Situ* Water Quality Profile Data Collected at Sheardown Lake Northwest (NW; DL0-01) Water Quality Monitoring Stations, Mary River Project CREMP, Fall 2024

Depth (m)	Temperature (°C)						Dissolved Oxygen (mg/L)						Dissolved Oxygen (% Saturation)					
	DD-HAB9-STN1	DL0-01-5	DL0-01-1	DL0-01-4	DL0-01-2	DL0-01-7	DD-HAB9-STN1	DL0-01-5	DL0-01-1	DL0-01-4	DL0-01-2	DL0-01-7	DD-HAB9-STN1	DL0-01-5	DL0-01-1	DL0-01-4	DL0-01-2	DL0-01-7
	6-Sep-24	5-Sep-24	6-Sep-24	5-Sep-24	6-Sep-24	5-Sep-24	6-Sep-24	5-Sep-24	6-Sep-24	5-Sep-24	6-Sep-24	5-Sep-24	6-Sep-24	5-Sep-24	6-Sep-24	5-Sep-24	6-Sep-24	5-Sep-24
1.0	6.70	6.80	6.70	6.70	6.90	6.90	11.6	12.8	11.2	12.9	10.9	12.9	97.6	108	96.7	109	92.6	109
2.0	6.70	6.80	6.70	6.90	6.70	6.90	11.6	12.8	11.4	12.9	11.2	12.9	97.0	108	96.6	109	94.0	109
3.0	6.70	6.90	6.70	6.80	6.70	6.90	11.8	12.8	11.8	12.9	11.2	12.9	96.8	108	96.5	109	94.6	109
4.0	6.70	6.90	6.70	6.10	6.70	-	11.4	12.8	11.5	12.9	11.3	-	94.2	108	96.4	109	95.0	-
5.0	6.70	6.90	6.70	6.80	-	6.80	11.5	12.8	11.5	12.9	-	12.9	96.5	108	96.4	109	-	109
6.0	6.70	6.90	-	-	6.70	6.90	11.5	12.8	-	-	11.4	12.8	96.4	108	-	-	95.5	109
7.0	6.70	6.90	6.70	-	6.70	6.90	11.5	12.6	11.4	-	11.4	12.8	96.3	108	96.3	-	95.6	108
8.0	6.70	-	6.70	-	6.60	6.80	11.4	-	11.4	-	11.4	12.8	96.2	-	96.2	-	95.6	108
9.0	-	6.90	6.70	-	6.60	6.80	-	12.7	11.4	-	11.4	12.9	-	108	96.1	-	95.5	108
10.0	-	6.90	-	-	6.90	6.80	-	12.7	-	-	11.3	12.8	-	108	-	-	95.5	108
11.0	-	6.90	6.70	-	-	-	-	12.7	11.4	-	-	-	-	108	96.0	-	-	-
12.0	-	6.90	6.70	-	6.60	-	-	12.7	11.4	-	11.4	-	-	108	96.0	-	95.4	-
13.0	-	6.90	6.70	-	6.60	-	-	12.7	11.4	-	11.4	-	-	107	95.9	-	95.5	-
14.0	-	6.90	6.70	-	-	-	-	12.7	11.4	-	-	-	-	107	95.9	-	-	-
15.0	-	6.90	6.70	-	-	-	-	12.7	11.4	-	-	-	-	107	95.9	-	-	-
16.0	-	6.90	6.70	-	-	-	-	12.6	11.4	-	-	-	-	107	95.8	-	-	-
17.0	-	6.90	6.70	-	-	-	-	12.7	11.4	-	-	-	-	108	95.7	-	-	-
18.0	-	6.90	6.70	-	-	-	-	12.7	11.4	-	-	-	-	108	95.7	-	-	-
19.0	-	6.90	-	-	-	-	-	12.7	-	-	-	-	-	107	-	-	-	-
20.0	-	6.90	-	-	-	-	-	12.7	-	-	-	-	-	107	-	-	-	-
21.0	-	6.90	-	-	-	-	-	12.6	-	-	-	-	-	107	-	-	-	-
22.0	-	6.90	-	-	-	-	-	12.6	-	-	-	-	-	107	-	-	-	-

Notes: "-" = data not available. The total depth of the water column at each sampling station was not recorded but deepest measurements are within 1 m of lake bottom.

^a Data was removed as an erroneous value.

Table C.39: In Situ Water Quality Profile Data Collected at Sheardown Lake Northwest (NW; DL0-01) Water Quality Monitoring Stations, Mary River Project CREMP, Fall 2024

Depth (m)	pH (pH units)						Specific Conductance (µS/cm)						Turbidity (NTU)					
	DD-HAB9-STN1	DL0-01-5	DL0-01-1	DL0-01-4	DL0-01-2	DL0-01-7	DD-HAB9-STN1	DL0-01-5	DL0-01-1	DL0-01-4	DL0-01-2	DL0-01-7	DD-HAB9-STN1	DL0-01-5	DL0-01-1	DL0-01-4	DL0-01-2	DL0-01-7
	6-Sep-24	5-Sep-24	6-Sep-24	5-Sep-24	6-Sep-24	5-Sep-24	6-Sep-24	5-Sep-24	6-Sep-24	5-Sep-24	6-Sep-24	5-Sep-24	6-Sep-24	5-Sep-24	6-Sep-24	5-Sep-24	6-Sep-24	5-Sep-24
1.0	7.79	7.70	7.71	7.75	7.61	7.72	197	197	197	197	198	197	0.240	0.270	0.230	0.230	0.200	0.250
2.0	7.77	7.75	7.71	7.75	7.70	7.71	197	197	197	197	197	197	0.290	0.250	0.300	0.250	0.190	0.220
3.0	7.77	7.76	7.72	7.75	7.75	7.72	197	197	197	197	197	197	- ^a	0.270	0.570	0.260	0.250	0.220
4.0	7.77	7.77	7.72	7.76	7.78	-	197	197	197	197	197	-	0.260	0.220	0.230	0.280	0.260	-
5.0	7.76	7.77	7.72	7.76	-	7.73	198	197	197	197	-	197	0.260	0.250	0.250	0.350	-	0.250
6.0	7.76	7.77	-	-	7.80	7.72	198	197	-	-	197	197	0.260	0.260	-	-	0.250	0.200
7.0	7.74	7.78	7.72	-	7.80	7.72	198	197	197	-	197	197	0.260	0.250	0.240	-	0.250	0.230
8.0	7.74	-	6.70	-	7.79	7.74	199	-	197	-	197	187	0.240	-	0.240	-	0.220	0.250
9.0	-	7.77	7.72	-	7.77	7.74	-	197	197	-	197	197	-	0.250	0.210	-	0.230	0.240
10.0	-	7.77	-	-	7.77	7.75	-	197	-	-	197	197	-	0.250	-	-	0.260	0.340
11.0	-	7.77	7.77	-	-	-	-	197	198	-	-	-	-	0.250	0.250	-	-	-
12.0	-	7.76	7.70	-	7.75	-	-	197	197	-	197	-	-	0.220	0.260	-	0.200	-
13.0	-	7.77	7.70	-	7.76	-	-	197	197	-	197	-	-	0.250	0.230	-	0.240	-
14.0	-	7.76	7.72	-	-	-	-	197	197	-	-	-	-	0.240	0.260	-	-	-
15.0	-	7.75	7.71	-	-	-	-	197	197	-	-	-	-	0.260	0.250	-	-	-
16.0	-	7.74	7.77	-	-	-	-	197	197	-	-	-	-	0.270	0.250	-	-	-
17.0	-	7.75	7.70	-	-	-	-	197	197	-	-	-	-	0.250	0.240	-	-	-
18.0	-	7.75	7.69	-	-	-	-	197	197	-	-	-	-	0.230	0.240	-	-	-
19.0	-	7.75	-	-	-	-	-	197	-	-	-	-	-	0.260	-	-	-	-
20.0	-	7.74	-	-	-	-	-	197	-	-	-	-	-	0.250	-	-	-	-
21.0	-	7.73	-	-	-	-	-	197	-	-	-	-	-	0.260	-	-	-	-
22.0	-	7.73	-	-	-	-	-	198	-	-	-	-	-	0.250	-	-	-	-

Notes: "-" = data not available. The total depth of the water column at each sampling station was not recorded but deepest measurements are within 1 m of lake bottom.


^a Data was removed as an erroneous value.

Table C.40: Sampling Depth, Water Clarity Measures, and Surface and Bottom *In Situ* Water Quality Measures Collected at Sheardown Lake Northwest (NW; DL0-01) Benthic Invertebrate Community (BIC) Stations, Mary River Project CREMP, August 2024

Categorization & Replicate ID		Date Sampled	Secchi Depth (m)	Colour/ Clarity	Depth Sampled	Temperature (°C)	Dissolved Oxygen		pH (units)	Specific Conductance (µS/cm)	Turbidity (NTU)
							(mg/L)	(% saturation)			
Littoral (Shallow) Stations	DL0-01-9	08-Aug-24	-	Green/ Clear	Surface	10.2	13.2	121	7.98	185	0.0800
					Bottom	10.0	13.4	123	7.92	185	0.190
	DL0-01-4	13-Aug-24	3.75	Green/ Clear	Surface	9.10	11.3	102	7.78	187	0.540
					Bottom	9.00	11.2	101	7.79	187	0.520
	DL0-01-3	13-Aug-24	4.75	Colourless/ Murky	Surface	9.20	11.4	103	7.72	187	0.540
					Bottom	9.20	11.4	103	7.75	187	0.520
	DL0-01-11	13-Aug-24	4.75	Colourless/ Murky	Surface	9.00	11.4	103	7.71	187	0.530
					Bottom	8.70	11.4	102	7.72	186	0.680
	DL0-01-10	13-Aug-24	4.75	Colourless/ Murky	Surface	9.10	11.4	103	7.73	187	0.510
					Bottom	9.00	11.4	103	7.75	186	1.70
Profundal (Deep) Stations	DL0-01-5	09-Aug-24	4.5	Green	Surface	9.20	11.5	102	7.62	185	0.280
					Bottom	7.90	11.3	97.9	7.54	187	0.430
	DL0-01-14	09-Aug-24	4.5	Clear/ Colourless	Surface	8.80	11.4	101	7.67	186	0.330
					Bottom	7.70	11.3	97.0	7.65	187	0.580
	DL0-01-15	09-Aug-24	4	Green/ Clear	Surface	9.40	11.3	102	7.66	185	0.540
					Bottom	7.90	11.2	97.2	7.64	187	0.300
	DL0-01-2	13-Aug-24	4.25	Colourless/ Murky	Surface	9.30	11.3	187	7.72	187	0.550
					Bottom	8.10	11.3	187	7.71	187	0.680
	DL0-01-12	09-Aug-24	5.25	Colourless/ Murky	Surface	9.60	11.3	102	7.86	185	0.330
					Bottom	7.80	11.2	97.0	7.78	187	0.600

Table C.41: Statistical Comparison of Bottom *In Situ* Water Quality Between Sheardown Lake Northwest (NW; DL0-01) Littoral and Profundal Stations, Mary River Project CREMP, August 2024

Parameter	Statistical Test Results				Summary Statistics						
	Statistical Test	Transformation	Significant Difference Between Areas?	P-value	Lake Zone	Sample Size	Mean	Standard Deviation	Standard Error	Minimum	Maximum
Temperature (°C)	tequal	None	YES	0.001	Littoral	7	9.16	0.613	0.232	8.30	10.0
					Profundal	5	7.88	0.148	0.0663	7.70	8.10
Dissolved Oxygen (mg/L)	M-W	Rank	NO	0.624	Littoral	7	11.6	0.810	0.306	11.1	13.4
					Profundal	5	11.3	0.0406	0.0182	11.2	11.3
Dissolved Oxygen (% saturation)	M-W	Rank	NO	0.103	Littoral	7	105	8.47	3.20	98.0	123
					Profundal	5	115	40.0	17.9	97.0	187
pH (units)	tequal	None	YES	0.013	Littoral	7	7.80	0.0711	0.0269	7.72	7.92
					Profundal	5	7.66	0.0891	0.0398	7.54	7.78
Specific Conductance (µS/cm)	M-W	Rank	NO	0.082	Littoral	7	180	17.1	6.47	141	187
					Profundal	5	187	0.261	0.117	187	187

 Shaded values indicate significant difference between study areas based on test p-value less than 0.05.

Notes: "-" = no data. "tequal" = Student's t-test assuming equal variance. "M-W" = Mann-Whitney test (nonparametric).

Table C.42: Statistical Comparison of Bottom *In Situ* Water Quality Between Sheardown Lake Northwest (NW; DL0-01) and Reference Lake 3 (REF-03) Stations Collected at Littoral and Profundal Depths, Mary River Project CREMP, August 2024


Lake Zone	Parameter	Statistical Test Results				Summary Statistics						
		Statistical Test	Transformation	Significant Difference Between Areas?	P-value	Study Lake	Sample Size (n)	Mean	Standard Deviation	Standard Error	Minimum	Maximum
Littoral (Shallow) Stations	Temperature (°C)	tequal	None	YES	0.004	Reference	5	7.88	0.545	0.244	7.20	8.70
						SDNW	7	9.16	0.613	0.232	8.30	10.0
	Dissolved Oxygen (mg/L)	M-W	Rank	YES	0.048	Reference	5	11.8	0.0550	0.0246	11.8	11.9
						SDNW	7	11.6	0.810	0.306	11.1	13.4
	Dissolved Oxygen (% saturation)	M-W	Rank	NO	0.870	Reference	5	102	1.31	0.585	99.9	103
						SDNW	7	105	8.47	3.20	98.0	123
	pH (units)	tequal	None	YES	<0.001	Reference	5	7.40	0.0554	0.0248	7.34	7.47
						SDNW	7	7.80	0.0711	0.0269	7.72	7.92
Profundal (Deep) Stations	Temperature (°C)	tequal	None	YES	<0.001	Reference	5	6.92	0.327	0.146	6.50	7.40
						SDNW	5	7.88	0.148	0.0663	7.70	8.10
	Dissolved Oxygen (mg/L)	tequal	None	YES	<0.001	Reference	5	11.8	0.110	0.0492	11.6	11.9
						SDNW	5	11.3	0.0406	0.0182	11.2	11.3
	Dissolved Oxygen (% saturation)	M-W	Rank	NO	0.209	Reference	5	99.2	1.49	0.667	97.3	101
						SDNW	5	115	40.0	17.9	97.0	187
	pH (units)	tequal	None	YES	0.005	Reference	5	7.41	0.118	0.0530	7.29	7.56
						SDNW	5	7.66	0.0891	0.0398	7.54	7.78
	Specific Conductance (µS/cm)	M-W	Rank	YES	0.011	Reference	5	69.1	0.740	0.331	68.7	70.4
						SDNW	5	187	0.261	0.117	187	187


Highlighted values indicate significant difference between study areas based on test p-value less than 0.05.

Notes: "-" = no data. "tequal" = Student's t-test assuming equal variance. "M-W" = Mann-Whitney test (nonparametric).

Table C.43: Water Chemistry at Sheardown Lake Northwest (NW; DL0-01) Water Quality Monitoring Stations, Mary River Project CREMP, 2024

Parameters		Units	Water Quality Guideline (WQG) ^{a,b}	AEMP Benchmark ^c	Winter Sampling Event										
					DD-HAB9-STN1	DD-HAB9-STN1	DL0-01-5	DL0-01-5	DL0-01-1	DL0-01-1	DL0-01-4	DL0-01-4	DL0-01-2	DL0-01-2	DL0-01-7
					bottom	surface	bottom	surface	bottom	surface	bottom	surface	bottom	surface	bottom
					15-Apr-24	15-Apr-24	15-Apr-24	15-Apr-24	15-Apr-24	15-Apr-24	15-Apr-24	15-Apr-24	15-Apr-24	15-Apr-24	16-Apr-24
Conventionals	Conductivity (lab)	µmho/cm	-	-	218	223	213	223	212	227	217	223	216	223	218
	pH (lab)	pH	6.5 - 9.0	-	7.64	7.64	7.49	7.57	7.53	7.6	7.63	7.65	7.6	7.65	7.58
	Hardness (as CaCO ₃)	mg/L	-	-	101	101	94.8	99.7	96.8	101	100	106	101	105	99.5
	Total Suspended Solids (TSS)	mg/L	-	-	<1	<1	<1	<1.5	<1	<1	<1	<1	<1	<1	<1
	Total Dissolved Solids (TDS)	mg/L	-	-	104	112	109	121	109	128	109	120	106	107	113
	Turbidity	NTU	-	-	<0.1	<0.1	<0.1	0.11	<0.1	<0.1	<0.1	0.11	0.1	<0.1	0.11
	Alkalinity (as CaCO ₃)	mg/L	-	-	72.8	76.5	71.4	75	70.2	74	72.9	74.6	72.9	75.4	73.2
Nutrients and Organics	Total Ammonia	mg/L	-	0.855	0.005	0.0083	0.0052	0.0062	<0.005	0.007	0.0146	0.006	<0.005	0.0071	0.0057
	Nitrate	mg/L	3	3	0.424	0.429	0.421	0.434	0.419	0.58	0.418	0.432	0.414	0.43	0.378
	Nitrite	mg/L	0.06	0.06	<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 (TKN)	mg/L	-	-	0.145	0.137	0.14	0.102	0.129	0.126	0.122	0.124	0.228	0.118	0.103
	Dissolved Organic Carbon	mg/L	-	-	1.98	1.75	1.72	2.12	1.6	2.01	1.62	1.93	2.07	1.96	1.75
	Total Organic Carbon	mg/L	-	-	1.96	2.11	1.9	2.29	2.02	1.98	1.74	2.11	2.02	2.16	2.33
	Total Phosphorus	mg/L	0.020 ^a	-	0.0023	0.004	0.0024	0.0028	<0.002	0.0022	0.0029	0.0027	0.0023	0.0025	0.0025
Anions	Phenols	mg/L	0.004 ^a	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
	Bromide (Br)	mg/L	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Chloride (Cl)	mg/L	120	120	8.1	8.35	7.92	8.55	7.94	8.78	8.17	8.48	8.12	8.4	8.18
Total Metals	Sulphate (SO ₄)	mg/L	218 ^β	218	22.6	23.2	22	23.2	22.1	24	22.8	23.5	22.6	23.3	22.4
	Aluminum (Al)	mg/L	0.100	0.179, 0.173 ^d	0.0064	0.0055	0.0076	0.0118	0.0068	0.0063	0.0134	0.0064	0.0074	0.0063	0.0062
	Antimony (Sb)	mg/L	0.020 ^a	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
	Arsenic (As)	mg/L	0.005	0.005	<0.0001	<0.0001	0.00014	0.00011	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
	Barium (Ba)	mg/L	1 ^β	-	0.0115	0.0119	0.0112	0.0118	0.0112	0.0113	0.0114	0.0119	0.0111	0.0117	0.0116
	Beryllium (Be)	mg/L	0.011 ^a	-	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002
	Bismuth (Bi)	mg/L	-	-	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
	Boron (B)	mg/L	1.5	-	0.021	0.022	0.021	0.022	0.021	0.022	0.022	0.022	0.021	0.023	0.021
	Cadmium (Cd)	mg/L	0.00012	0.00009	<0.000005	0.0000076	0.0000058	0.0000062	0.0000051	0.0000067	0.0000073	0.0000091	0.0000073	0.0000065	0.0000057
	Calcium (Ca)	mg/L	-	-	19.2	20.1	18.9	19.7	18.7	19.7	19.6	20.1	19.1	20.3	18.7
	Chromium (Cr)	mg/L	0.001	0.003	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
	Cobalt (Co)	mg/L	0.0009 ^a	0.004	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
	Copper (Cu)	mg/L	0.002	0.0024	0.00107	0.00095	0.00197	0.00215	0.00095	0.00106	0.00094	0.00119	0.00104	0.00098	0.00089
	Iron (Fe)	mg/L	0.30	0.300	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.1	<0.01	<0.01	<0.01
	Lead (Pb)	mg/L	0.001	0.001	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
	Lithium (Li)	mg/L	-	-	0.0026	0.0027	0.0026	0.0027	0.0026	0.0028	0.0028	0.0028	0.0025	0.003	0.0022
	Magnesium (Mg)	mg/L	-	-	12.5	12.8	12.3	13.2	12.6	12.8	12.9	13.3	12.9	13.3	13
	Manganese (Mn)	mg/L	0.935 ^β	-	0.0002	0.00024	0.00031	0.00026	0.00031	0.00019	0.00033	0.00094	0.00033	0.00029	0.00021
	Mercury (Hg)	mg/L	0.000026	-	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005
	Molybdenum (Mo)	mg/L	0.073	-	0.00208	0.00218	0.00203	0.00216	0.00197	0.00215	0.0021	0.0022	0.00201	0.00218	0.00197
	Nickel (Ni)	mg/L	0.025	0.025	0.00065	0.00069	0.00067	0.00072	0.00067	0.0007	0.00068	0.0052	0.0007	0.00069	0.00066
	Potassium (K)	mg/L	-	-	2.23	2.31	2.2	2.28	2.16	2.3	2.27	2.37	2.23	2.37	2.19
	Selenium (Se)	mg/L	0.001	-	<0.00005	0.000072	0.000054	0.000062	<0.00005	0.000053	0.000057	0.000064	<0.00005	0.000067	0.000055
	Silicon (Si)	mg/L	-	-	0.77	0.76	0.84	0.79	0.86	0.77	0.77	0.8	0.77	0.78	0.75
	Silver (Ag)	mg/L	0.00025	0.0001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
	Sodium (Na)	mg/L	-	-	2.58	2.67	2.59	2.66	2.56	2.7	2.67	2.77	2.68	2.73	2.57
	Strontium (Sr)	mg/L	-	-	0.0264	0.026	0.0248	0.0267	0.0249	0.026	0.0264	0.0279	0.0254	0.0277	0.0255
	Thallium (Tl)	mg/L	0.0008	0.0008	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
	Tin (Sn)	mg/L	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
	Titanium (Ti)	mg/L	-	-	<0.0003	<0.0003	<0.0003	0.00035	<0.0003	<0.0003	0.00065	<0.0003	<0.0003	<0.0003	<0.0003
	Uranium (U)	mg/L	0.015	-	0.00298	0.00301	0.00288	0.00312	0.00288	0.00305	0.00306	0.00312	0.00297	0.00312	0.00285
	Vanadium (V)	mg/L	0.006 ^a	0.006	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
	Zinc (Zn)	mg/L	0.02 ^a	0.030	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003

 Indicates parameter concentration above applicable Water Quality Guideline.

BOLD  Indicates parameter concentration above the AEMP benchmark.

Notes: AEMP: Aquatic Environment Monitoring Plan. "-" indicates no applicable WQG or AEMP benchmark.

^a Canadian Water Quality Guideline for the protection of aquatic life (CCME 2024) except those indicated by α (Ontario Provincial Water Quality Objective [PWQO]; OMOE 1994) and β (British Columbia Water Quality Guideline [BCWQG]; BCMOE 2024). See Table 2.2 for information regarding WQG criteria.

^b A conservative hardness value of 75 mg/L was used for guideline calculations dependent on hardness (i.e., sulphate, beryllium, cadmium, copper, lead, manganese, and nickel).

^c AEMP Water Quality Benchmarks developed by Intrinsik (2013) using baseline water quality data specific to Sheardown Lake NW.

^d Benchmark is 0.179 mg/L and 0.173 mg/L for shallow and deep stations, respectively.

Table C.43: Water Chemistry at Sheardown Lake Northwest (NW; DL0-01) Water Quality Monitoring Stations, Mary River Project CREMP, 2024

Parameters		Units	Water Quality Guideline (WQG) ^a	AEMP Benchmark ^b	Summer Sampling Event										
					DD-HAB9-STN1	DD-HAB9-STN1	DL0-01-5	DL0-01-5	DL0-01-1	DL0-01-1	DL0-01-4	DL0-01-4	DL0-01-2	DL0-01-2	DL0-01-7
					bottom	surface	bottom	surface	bottom	surface	bottom	surface	bottom	surface	bottom
					04-Aug-24	04-Aug-24	03-Aug-24	03-Aug-24	03-Aug-24	03-Aug-24	03-Aug-24	03-Aug-24	03-Aug-24	03-Aug-24	04-Aug-24
Conventionals	Conductivity (lab)	µmho/cm	-	-	193	194	197	187	198	188	186	185	187	188	194
	pH (lab)	pH	6.5 - 9.0	-	7.9	7.86	7.81	7.82	7.87	7.85	7.91	7.89	7.87	7.88	7.99
	Hardness (as CaCO ₃)	mg/L	-	-	87.2	86	88.4	86.5	89.9	86.1	85.6	84.7	86.3	86.1	87.6
	Total Suspended Solids (TSS)	mg/L	-	-	<1	<1	<1	<1	1.2	<1	<1	<1	<1	<1	<1
	Total Dissolved Solids (TDS)	mg/L	-	-	112	114	92	93	102	95	93	100	85	93	95
	Turbidity	NTU	-	-	2.3	2.28	1.26	0.75	1.37	0.61	0.77	0.74	0.79	0.89	1.97
Nutrients and Organics	Alkalinity (as CaCO ₃)	mg/L	-	-	56.3	55.2	57.4	56	57.3	56.9	56.7	55.6	54.2	57.3	56.4
	Total Ammonia	mg/L	-	0.855	<0.005	0.0073	<0.005	<0.005	0.0139	<0.005	<0.005	0.0076	<0.005	<0.005	0.0083
	Nitrate	mg/L	3	3	0.463	0.476	0.536	0.464	0.527	0.467	0.429	0.434	0.437	0.442	0.482
	Nitrite	mg/L	0.06	0.06	<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 (TKN)	mg/L	-	-	0.132	0.154	0.129	0.106	0.138	0.1	0.131	0.205	0.181	0.136	0.123
	Dissolved Organic Carbon	mg/L	-	-	1.99	1.84	2.44	2.1	2.52	1.74	1.76	2.16	1.83	2.23	1.85
	Total Organic Carbon	mg/L	-	-	1.87	1.86	2.06	1.66	2.25	1.79	2.16	1.82	1.97	1.85	2
	Total Phosphorus	mg/L	0.020 ^a	-	0.0024	0.0024	0.003	0.0028	0.0024	0.0026	0.0035	0.0024	0.0029	0.0022	0.0023
Anions	Phenols	mg/L	0.004 ^a	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
	Bromide (Br)	mg/L	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Chloride (Cl)	mg/L	120	120	7.18	7.24	7.7	7.42	7.52	7.18	6.95	7.06	7.04	7.09	7.32
Total Metals	Sulphate (SO ₄)	mg/L	218 ^β	218	22.4	22.9	24.6	22.4	24.5	21.9	21.2	21.3	21.6	21.6	23.1
	Aluminum (Al)	mg/L	0.100	0.179, 0.173 ^c	0.0228	0.0248	0.0413	0.027	0.0498	0.0252	0.0237	0.0257	0.0258	0.0246	0.0244
	Antimony (Sb)	mg/L	0.020 ^a	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
	Arsenic (As)	mg/L	0.005	0.005	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
	Barium (Ba)	mg/L	1 ^β	-	0.00916	0.00956	0.0101	0.00969	0.0103	0.00977	0.00981	0.00977	0.00981	0.00954	0.009
	Beryllium (Be)	mg/L	0.011 ^a	-	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002
	Bismuth (Bi)	mg/L	-	-	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
	Boron (B)	mg/L	1.5	-	0.018	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.016	0.018
	Cadmium (Cd)	mg/L	0.00012	0.00009	0.0000077	0.0000108	0.0000115	0.0000084	0.0000121	0.0000067	0.000005	0.0000073	0.0000073	0.0000071	0.0000082
	Calcium (Ca)	mg/L	-	-	15.6	15.7	16.2	15.8	16.2	15.6	15.8	15.6	15.6	15.5	15.6
	Chromium (Cr)	mg/L	0.001	0.003	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
	Cobalt (Co)	mg/L	0.0009 ^a	0.004	<0.0001	<0.0001	0.00011	<0.0001	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
	Copper (Cu)	mg/L	0.002	0.0024	0.00092	0.00088	0.00147	0.00087	0.00123	0.00088	0.0009	0.00085	0.00101	0.00088	0.00095
	Iron (Fe)	mg/L	0.30	0.300	0.026	0.027	0.054	0.033	0.065	0.028	0.027	0.03	0.038	0.029	0.028
	Lead (Pb)	mg/L	0.001	0.001	<0.00005	<0.00005	0.000052	<0.00005	0.000058	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
	Lithium (Li)	mg/L	-	-	0.0014	0.0016	0.0018	0.002	0.0019	0.0017	0.0018	0.0018	0.0018	0.0018	0.0015
	Magnesium (Mg)	mg/L	-	-	11.3	11.1	11.1	11	11.2	10.6	10.9	10.7	10.8	10.6	11.4
	Manganese (Mn)	mg/L	0.935 ^β	-	0.00636	0.00728	0.0133	0.00525	0.0124	0.00404	0.00351	0.00368	0.00403	0.00398	0.00749
	Mercury (Hg)	mg/L	0.000026	-	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005
	Molybdenum (Mo)	mg/L	0.073	-	0.00163	0.00162	0.00176	0.00165	0.00169	0.00162	0.00162	0.00164	0.00164	0.00163	0.00164
	Nickel (Ni)	mg/L	0.025	0.025	0.00064	0.00065	0.00087	0.00057	0.00063	0.00063	0.00062	0.00059	0.0006	0.0006	0.00062
	Potassium (K)	mg/L	-	-	1.93	1.94	2.11	2.07	2.12	2.01	2.04	2.01	2.04	2.02	1.93
	Selenium (Se)	mg/L	0.001	-	0.000056	0.000075	0.000092	0.000065	0.000087	0.000065	0.000056	0.000057	0.000066	0.000061	0.00005
	Silicon (Si)	mg/L	-	-	0.61	0.63	0.68	0.65	0.69	0.64	0.63	0.64	0.63	0.63	0.61
	Silver (Ag)	mg/L	0.00025	0.0001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
	Sodium (Na)	mg/L	-	-	2.2	2.19	2.26	2.26	2.26	2.19	2.25	2.2	2.21	2.19	2.24
	Strontium (Sr)	mg/L	-	-	0.0235	0.0242	0.0255	0.0237	0.0252	0.0236	0.0231	0.0234	0.0235	0.0233	0.0242
	Thallium (Tl)	mg/L	0.0008	0.0008	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
	Tin (Sn)	mg/L	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
	Titanium (Ti)	mg/L	-	-	<0.002	<0.001	0.00231	0.00138	0.00287	0.00119	0.00123	0.00133	0.0012	0.00115	<0.002
	Uranium (U)	mg/L	0.015	-	0.00217	0.00224	0.0024	0.00225	0.00238	0.00223	0.00219	0.0022	0.00217	0.00219	0.00221
	Vanadium (V)	mg/L	0.006 ^a	0.006	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
	Zinc (Zn)	mg/L	0.02 ^a	0.030	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003

Indicates parameter concentration above applicable Water Quality Guideline.

BOLD Indicates parameter concentration above the AEMP benchmark.

Notes: AEMP: Aquatic Environment Monitoring Plan. "-" indicates no applicable WQG or AEMP benchmark.

^a Canadian Water Quality Guideline for the protection of aquatic life (CCME 2024) except those indicated by α (Ontario Provincial Water Quality Objective [PWQO]; OMOE 1994) and β (British Columbia Water Quality Guideline [BCWQG]; BCMOE 2024). See Table 2.2 for information regarding WQG criteria.


^β A conservative hardness value of 75 mg/L was used for guideline calculations dependent on hardness (i.e., sulphate, beryllium, cadmium, copper, lead, manganese, and nickel).


^c AEMP Water Quality Benchmarks developed by Intrinsik (2013) using baseline water quality data specific to Sheardown Lake NW.

^d Benchmark is 0.179 mg/L and 0.173 mg/L for shallow and deep stations, respectively.

Table C.43: Water Chemistry at Sheardown Lake Northwest (NW; DL0-01) Water Quality Monitoring Stations, Mary River Project CREMP, 2024

Parameters		Units	Water Quality Guideline (WQG) ^a	AEMP Benchmark ^b	Fall Sampling Event										
					DD-HAB9-STN1	DD-HAB9-STN1	DL0-01-5	DL0-01-5	DL0-01-1	DL0-01-1	DL0-01-4	DL0-01-4	DL0-01-2	DL0-01-2	DL0-01-7
					bottom	surface	bottom	surface	bottom	surface	bottom	surface	bottom	surface	bottom
					06-Sep-24	06-Sep-24	05-Sep-24	05-Sep-24	06-Sep-24	06-Sep-24	05-Sep-24	05-Sep-24	06-Sep-24	06-Sep-24	05-Sep-24
Conventionals	Conductivity (lab)	µmho/cm	-	-	205	204	205	206	208	205	160	204	205	206	206
	pH (lab)	pH	6.5 - 9.0	-	7.94	7.92	7.89	7.9	7.93	7.93	7.91	7.9	7.92	7.92	7.89
	Hardness (as CaCO ₃)	mg/L	-	-	92.3	92.3	92.4	92.4	92.6	94.1	73.5	92.2	92.9	92.2	92.8
	Total Suspended Solids (TSS)	mg/L	-	-	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1.2	<1
	Total Dissolved Solids (TDS)	mg/L	-	-	93	94	113	104	83	104	88	93	100	84	109
	Turbidity	NTU	-	-	0.36	0.62	0.34	0.32	0.37	0.37	0.34	0.4	0.32	0.52	0.34
	Alkalinity (as CaCO ₃)	mg/L	-	-	60.2	59.9	58.7	58.6	59.7	59.3	55.4	59.2	59.3	58.2	57.6
Nutrients and Organics	Total Ammonia	mg/L	-	0.855	<0.005	0.008	0.0107	0.0168	0.0193	<0.005	0.0159	0.0194	<0.005	0.0358	0.0114
	Nitrate	mg/L	3	3	0.613	0.612	0.59	0.591	0.589	0.59	0.358	0.586	0.59	0.596	0.584
	Nitrite	mg/L	0.06	0.06	<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 (TKN)	mg/L	-	-	0.113	0.155	0.167	0.181	0.136	0.136	0.158	0.232	0.107	0.135	0.204
	Dissolved Organic Carbon	mg/L	-	-	1.94	1.73	2.07	2.02	1.63	1.92	2.17	2.25	1.83	1.97	1.98
	Total Organic Carbon	mg/L	-	-	2.09	2.17	2.08	2.11	2	1.92	2.15	2.04	2.08	2.26	2.1
	Total Phosphorus	mg/L	0.030 ^a	-	0.0033	0.0025	0.0026	0.0021	0.0024	0.0026	0.0031	0.0044	0.0026	0.0026	0.005
Anions	Phenols	mg/L	0.004 ^a	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
	Bromide (Br)	mg/L	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Chloride (Cl)	mg/L	120	120	7.72	7.96	7.63	7.62	7.65	7.63	4.9	7.6	7.64	7.73	7.68
Total Metals	Sulphate (SO ₄)	mg/L	218 ^β	218	26.5	26.6	26.2	26.2	26.2	26.1	13.9	26.1	26.2	26.4	26.1
	Aluminum (Al)	mg/L	0.100	0.179, 0.173 ^c	0.0108	0.0115	0.0112	0.0106	0.0109	0.0112	0.022	0.0096	0.0093	0.0109	0.0093
	Antimony (Sb)	mg/L	0.020 ^a	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
	Arsenic (As)	mg/L	0.005	0.005	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
	Barium (Ba)	mg/L	-	-	0.0101	0.00999	0.00979	0.00967	0.00992	0.00972	0.00808	0.00985	0.00983	0.00961	0.00976
	Beryllium (Be)	mg/L	0.011 ^a	-	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002
	Bismuth (Bi)	mg/L	-	-	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
	Boron (B)	mg/L	1.5	-	0.017	0.018	0.018	0.018	0.018	0.018	0.013	0.018	0.018	0.018	0.018
	Cadmium (Cd)	mg/L	0.00012	0.00009	0.0000102	0.0000099	0.0000101	0.0000092	0.0000118	0.0000105	<0.000005	0.0000092	0.000009	0.000011	0.0000086
	Calcium (Ca)	mg/L	-	-	16.8	16.9	17.1	16.7	17.1	17.1	13.6	17.2	16.5	16.9	17
	Chromium (Cr)	mg/L	0.0089	0.0089	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.00058	<0.0005	<0.0005
	Cobalt (Co)	mg/L	0.0009 ^a	0.004	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
	Copper (Cu)	mg/L	0.002	0.0024	0.00088	0.00091	0.00085	0.00085	0.00083	0.00092	0.00082	0.00083	0.00085	0.00086	0.00086
	Iron (Fe)	mg/L	0.30	0.300	0.011	0.011	0.011	0.01	0.012	0.011	0.026	<0.01	0.011	0.01	0.011
	Lead (Pb)	mg/L	0.001	0.001	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
	Lithium (Li)	mg/L	-	-	0.002	0.0023	0.0021	0.0019	0.0023	0.0022	0.0016	0.0021	0.0022	0.0023	0.002
	Magnesium (Mg)	mg/L	-	-	12.3	12.1	12.1	12.3	11.8	12	9.55	12.5	12	12.4	11.9
	Manganese (Mn)	mg/L	0.935 ^β	-	0.00496	0.00505	0.00525	0.00505	0.0049	0.00484	0.00205	0.00493	0.00476	0.00498	0.00479
	Mercury (Hg)	mg/L	0.000026	-	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005
	Molybdenum (Mo)	mg/L	0.073	-	0.00182	0.00182	0.0019	0.00178	0.00183	0.0018	0.00105	0.00183	0.00177	0.00181	0.00176
	Nickel (Ni)	mg/L	0.025	0.025	0.00064	0.0007	0.00074	0.00073	0.00065	0.00075	0.00062	0.00068	0.00085	0.00065	0.00064
	Potassium (K)	mg/L	-	-	2.1	2.08	2.09	2.04	2.06	2.07	1.46	2.13	2.06	2.08	2.06
	Selenium (Se)	mg/L	0.001	-	0.000078	0.000066	0.000096	0.000065	0.000091	0.000084	<0.00005	0.000084	0.000083	0.000092	0.000065
	Silicon (Si)	mg/L	-	-	0.56	0.56	0.56	0.56	0.57	0.56	0.47	0.57	0.57	0.57	0.55
	Silver (Ag)	mg/L	0.00025	0.0001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
	Sodium (Na)	mg/L	-	-	2.48	2.42	2.51	2.48	2.41	2.44	1.93	2.55	2.46	2.53	2.43
	Strontium (Sr)	mg/L	-	-	0.0281	0.0277	0.0277	0.0274	0.0279	0.0286	0.0182	0.0294	0.0275	0.0274	0.0278
	Thallium (Tl)	mg/L	0.0008	0.0008	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
	Tin (Sn)	mg/L	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
	Titanium (Ti)	mg/L	-	-	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.001	<0.0004	<0.0003	<0.0004	<0.0003
	Uranium (U)	mg/L	0.015	-	0.00263	0.00271	0.00262	0.00257	0.00262	0.00262	0.00167	0.00262	0.00266	0.00265	0.00257
	Vanadium (V)	mg/L	0.006 ^d	0.006	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
	Zinc (Zn)	mg/L	0.030	0.030	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003

 Indicates parameter concentration above applicable Water Quality Guideline.

BOLD  Indicates parameter concentration above the AEMP benchmark.

Notes: AEMP: Aquatic Environment Monitoring Plan. "-" indicates no applicable WQG or AEMP benchmark.

^a Canadian Water Quality Guideline for the protection of aquatic life (CCME 2024) except those indicated by α (Ontario Provincial Water Quality Objective [PWQO]; OMOE 1994) and β (British Columbia Water Quality Guideline [BCWQG]; BCMOE 2024). See Table 2.2 for information regarding WQG criteria.

^b A conservative hardness value of 75 mg/L was used for guideline calculations dependent on hardness (i.e., sulphate, beryllium, cadmium, copper, lead, manganese, and nickel).

^c AEMP Water Quality Benchmarks developed by Intrinsik (2013) using baseline water quality data specific to Sheardown Lake NW.

^d Benchmark is 0.179 mg/L and 0.173 mg/L for shallow and deep stations, respectively.

Table C.44: Summary of the Magnitude of Elevation in Seasonal Average Parameter Concentrations (Total Metal Concentration Data Provided) Between Sheardown Lake Northwest (NW; DL0-01), Sheardown Lake Southeast (SE; DL0-02) and Reference Lake 3 (REF-03) in 2024, and at the Sheardown Lakes Between 2024 and the Baseline Period, Mary River Project CREMP, 2024

Variable	Sheardown Lake NW					Sheardown Lake SE				
	2024 vs Reference Lake 3		2024 vs Baseline			2024 vs Reference Lake 3		2024 vs Baseline		
	Summer	Fall	Winter	Summer	Fall	Summer	Fall	Winter	Summer	Fall
Conductivity (lab)	2.62	2.79	1.69	1.69	1.70	2.02	2.26	1.25	1.52	1.44
pH (lab)	1.05	1.05	1.04	1.02	1.03	1.05	1.05	0.968	1.02	1.02
Hardness (as CaCO ₃)	2.49	2.57	-	-	-	1.88	2.13	-	-	-
Total Suspended Solids (TSS)	1.02	0.303	0.500	0.306	0.449	1.43	0.303	0.444	0.629	0.400
Total Dissolved Solids (TDS)	1.85	2.42	1.36	1.30	1.30	1.46	2.04	1.10	1.20	1.14
Turbidity	3.63	1.36	0.00405	0.798	0.216	8.24	2.51	0.480	0.721	0.184
Alkalinity (as CaCO ₃)	1.80	1.62	1.14	1.03	1.03	1.54	1.52	0.982	1.06	1.06
Total Ammonia	0.906	1.75	0.179	0.127	0.293	0.903	1.26	0.0537	0.267	0.325
Nitrate	23.3	28.3	4.32	4.66	5.55	12.0	16.5	3.28	2.40	3.31
Nitrite	1.00	1.00	5.00	5.00	4.18	1.00	1.00	4.00	5.00	5.00
Total Kjeldahl Nitrogen (TKN)	0.751	1.10	1.16	0.787	0.947	0.622	0.845	0.551	0.807	0.604
Dissolved Organic Carbon	0.570	0.576	1.04	1.16	1.17	0.556	0.603	1.13	1.32	1.40
Total Organic Carbon	0.652	0.598	1.17	1.07	1.18	0.652	0.657	1.02	1.25	1.44
Total Phosphorus	0.583	1.15	0.750	0.384	0.582	0.776	1.44	0.608	0.511	0.752
Phenols	1.00	0.659	-	-	-	1.00	0.659	-	-	-
Bromide (Br)	1.00	1.00	2.00	2.00	1.83	1.00	1.00	2.00	0.400	0.400
Chloride (Cl)	5.99	6.09	3.32	3.35	2.87	3.84	4.28	1.80	2.04	1.56
Sulphate (SO ₄)	8.25	9.48	8.72	9.25	8.88	4.71	5.79	4.77	5.63	6.10
Aluminum (Al)	1.83	1.91	2.72	2.49	0.529	2.82	3.88	0.552	0.528	0.347
Antimony (Sb)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Arsenic (As)	0.857	1.00	1.05	1.00	1.00	0.857	1.00	0.988	1.00	1.00
Barium (Ba)	1.58	1.60	1.94	2.02	1.89	1.28	1.41	1.57	1.59	1.55
Beryllium (Be)	1.00	1.00	0.200	0.422	0.625	1.00	1.00	0.200	1.00	1.00
Bismuth (Bi)	1.00	1.00	0.100	0.100	0.100	1.00	1.00	0.100	0.100	0.100
Boron (B)	1.73	1.75	2.05	1.73	1.75	1.25	1.42	1.83	1.25	1.42
Cadmium (Cd)	1.62	1.86	0.648	0.811	0.929	1.02	1.10	0.500	0.512	0.548
Calcium (Ca)	2.42	2.60	1.51	1.40	1.42	1.88	2.19	1.09	1.42	1.23
Chromium (Cr)	1.00	1.02	4.21	4.62	2.87	1.00	1.00	3.85	4.00	2.01
Cobalt (Co)	1.01	1.00	1.00	1.01	0.946	1.00	1.00	1.00	0.990	0.984
Copper (Cu)	1.16	1.04	1.14	0.941	0.554	0.960	1.05	0.784	0.693	0.837
Iron (Fe)	1.05	1.09	0.633	1.61	0.408	1.42	2.36	0.337	0.434	0.343
Lead (Pb)	0.965	1.00	0.932	1.00	0.0599	0.969	1.00	0.533	0.443	0.550
Lithium (Li)	1.74	2.08	2.64	5.23	0.0275	1.12	1.48	2.36	22.4	1.70
Magnesium (Mg)	2.57	2.65	1.62	1.59	1.70	1.95	2.16	1.22	1.66	1.46
Manganese (Mn)	4.55	7.73	0.503	3.49	0.0228	1.79	4.31	0.247	0.423	0.784
Mercury (Hg)	1.00	1.00	0.500	0.500	0.127	1.00	1.00	0.500	0.500	0.500
Molybdenum (Mo)	11.8	12.0	2.93	2.67	2.70	7.17	8.00	2.18	2.93	2.70
Nickel (Ni)	1.27	1.39	1.43	0.985	0.959	1.06	1.19	0.858	0.813	0.941
Potassium (K)	2.28	2.42	2.26	2.56	2.38	1.63	1.87	1.78	2.53	2.01
Selenium (Se)	1.34	1.62	0.562	4.47	6.69	1.00	1.10	0.500	5.00	5.48
Silicon (Si)	1.32	1.30	0.979	1.03	0.855	1.23	1.20	0.822	0.856	0.693
Silver (Ag)	1.00	1.00	10.0	10.0	10.0	1.00	1.00	10.0	10.0	5.45
Sodium (Na)	2.55	2.87	1.72	2.06	2.06	1.95	2.37	1.83	2.69	1.96
Strontium (Sr)	3.04	3.58	2.89	3.23	3.52	2.02	2.55	1.58	2.02	2.01
Thallium (Tl)	1.00	1.00	1.00	1.50	2.88	1.00	1.00	1.00	10.0	10.0
Tin (Sn)	1.00	1.00	0.0879	0.967	0.998	1.00	1.00	0.142	0.595	1.00
Titanium (Ti)	1.57	0.973	0.0340	0.149	0.0288	2.46	3.50	0.0300	0.209	0.0925
Uranium (U)	8.20	9.68	3.77	3.14	3.17	5.30	6.80	2.01	2.73	2.42
Vanadium (V)	1.00	1.00	0.500	0.500	0.500	1.00	1.00	0.500	0.500	0.500
Zinc (Zn)	1.00	1.00	1.80	1.90	1.73	1.00	1.00	1.04	2.12	2.31

- Denotes parameter with an AEMP benchmark.
- Denotes slight elevation (mean concentration three to five times higher than respective mean reference or baseline period value).
- Denotes moderate elevation (mean concentration five to 10 times higher than respective mean reference or baseline period value).
- Denotes highly elevated concentration (mean concentration greater than 10 times higher than respective mean reference or baseline period value).
- Denotes differences in method detection limit between the indicated study area and that of the reference area or baseline period, precluding an evaluation of magnitude of elevation; '-' = no data available for the analyte during comparison period.

Table C.45: Dissolved metals concentrations at Sheardown Lake Northwest (NW; DL0-01) Water Quality Monitoring Stations, Mary River Project CREMP, 2024

Parameters		Units	Winter Sampling Event												Summer Sampling Event					
			DD-HAB9-STN1	DD-HAB9-STN1	DL0-01-5	DL0-01-5	DL0-01-1	DL0-01-1	DL0-01-4	DL0-01-4	DL0-01-2	DL0-01-2	DL0-01-7	DL0-01-7	DD-HAB9-STN1	DD-HAB9-STN1	DL0-01-5	DL0-01-5	DL0-01-1	DL0-01-1
			bottom	surface	bottom	surface	bottom	surface	bottom	surface	bottom	surface	bottom	surface	bottom	surface	bottom	surface	bottom	surface
			15-Apr-24	15-Apr-24	15-Apr-24	15-Apr-24	15-Apr-24	15-Apr-24	15-Apr-24	15-Apr-24	15-Apr-24	15-Apr-24	16-Apr-24	16-Apr-24	4-Aug-24	4-Aug-24	3-Aug-24	3-Aug-24	3-Aug-24	3-Aug-24
Dissolved Metals	Aluminum (Al)	mg/L	0.0048	0.0051	0.0056	0.0044	0.0038	0.0049	0.0051	0.0052	0.0051	0.0052	0.0044	0.0049	0.0048	0.0044	0.0046	0.0044	0.0053	0.0049
	Antimony (Sb)	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
	Arsenic (As)	mg/L	<0.0001	<0.0001	0.0002	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
	Barium (Ba)	mg/L	0.0114	0.0117	0.0112	0.0117	0.0112	0.0119	0.0112	0.0119	0.0113	0.0117	0.0116	0.0117	0.0093	0.0091	0.0093	0.0091	0.0094	0.0090
	Beryllium (Be)	mg/L	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002
	Bismuth (Bi)	mg/L	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
	Boron (B)	mg/L	0.0230	0.0230	0.0210	0.0210	0.0210	0.0220	0.0220	0.0230	0.0220	0.0240	0.0220	0.0220	0.0160	0.0160	0.0150	0.0150	0.0160	0.0160
	Cadmium (Cd)	mg/L	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	Calcium (Ca)	mg/L	19.4000	19.2000	18.0000	19.0000	18.0000	19.2000	19.0000	20.1000	18.9000	20.1000	19.4000	19.1000	15.8000	15.8000	15.6000	15.5000	16.2000	15.7000
	Chromium (Cr)	mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
	Cobalt (Co)	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
	Copper (Cu)	mg/L	0.0009	0.0009	0.0009	0.0010	0.0009	0.0010	0.0009	0.0010	0.0009	0.0010	0.0009	0.0009	0.0009	0.0008	0.0008	0.0008	0.0009	0.0008
	Iron (Fe)	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	<0.01	<0.01	<0.01	<0.01	<0.01
	Lead (Pb)	mg/L	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
	Lithium (Li)	mg/L	0.0029	0.0029	0.0027	0.0027	0.0026	0.0027	0.0030	0.0031	0.0028	0.0031	0.0028	0.0028	0.0018	0.0018	0.0017	0.0018	0.0020	0.0019
	Magnesium (Mg)	mg/L	12.8000	13.0000	12.1000	12.7000	12.6000	13.0000	12.9000	13.5000	13.0000	13.4000	12.4000	13.0000	11.6000	11.3000	12.0000	11.6000	12.0000	11.4000
	Manganese (Mn)	mg/L	0.0001	<0.0001	0.0001	<0.0001	0.0001	<0.0001	<0.0001	<0.0001	0.0001	<0.0001	<0.0001	<0.0001	0.0029	0.0038	0.0100	0.0017	0.0083	0.0009
	Mercury (Hg)	mg/L	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005
	Molybdenum (Mo)	mg/L	0.0020	0.0020	0.0019	0.0020	0.0019	0.0020	0.0020	0.0021	0.0020	0.0020	0.0020	0.0020	0.0017	0.0016	0.0017	0.0016	0.0017	0.0015
	Nickel (Ni)	mg/L	0.0007	0.0007	0.0007	0.0007	0.0006	0.0007	0.0007	0.0007	0.0007	0.0007	0.0007	0.0007	0.0006	0.0006	0.0006	0.0006	0.0007	0.0006
	Potassium (K)	mg/L	2.2600	2.3700	2.1700	2.3000	2.1900	2.3100	2.2600	2.4000	2.2800	2.3400	2.2700	2.3400	1.9900	1.9700	2.0400	1.9700	2.0400	1.9600
	Selenium (Se)	mg/L	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
	Silicon (Si)	mg/L	0.7370	0.7530	0.7940	0.7410	0.8060	0.7420	0.7210	0.7390	0.7560	0.7610	0.7300	0.7420	0.5980	0.5830	0.6120	0.5610	0.5980	0.5880
	Silver (Ag)	mg/L	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
	Sodium (Na)	mg/L	2.8000	2.8000	2.5500	2.7400	2.5900	2.7600	2.6900	2.9000	2.7500	2.7900	2.7100	2.7600	2.3400	2.2800	2.3800	2.3000	2.3900	2.3200
	Strontium (Sr)	mg/L	0.0251	0.0264	0.0240	0.0262	0.0247	0.0258	0.0250	0.0268	0.0248	0.0264	0.0252	0.0262	0.0249	0.0245	0.0263	0.0242	0.0261	0.0239
	Thallium (Tl)	mg/L	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
	Tin (Sn)	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
	Titanium (Ti)	mg/L	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003
	Uranium (U)	mg/L	0.0030	0.0030	0.0029	0.0031	0.0028	0.0030	0.0030	0.0031	0.0029	0.0031	0.0029	0.0030	0.0022	0.0022	0.0023	0.0022	0.0022	0.0021
	Vanadium (V)	mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
	Zinc (Zn)	mg/L	<0.001	<0.001	<0.001	<0.001	0.0010	0.0012	<0.001	<0.001	0.0024	<0.001	<0.001	<0.001	0.0012	<0.001	<0.001	<0.001	<0.001	<0.001

Table C.45: Dissolved metals concentrations at Sheardown Lake Northwest (NW; DL0-01) Water Quality Monitoring Stations, Mary River Project CREMP, 2024

Parameters		Units	Summer Sampling Event						Fall Sampling Event											
			DL0-01-4	DL0-01-4	DL0-01-2	DL0-01-2	DL0-01-7	DL0-01-7	DD-HAB9-STN1	DD-HAB9-STN1	DL0-01-5	DL0-01-5	DL0-01-1	DL0-01-1	DL0-01-4	DL0-01-4	DL0-01-2	DL0-01-2	DL0-01-7	DL0-01-7
			bottom	surface	bottom	surface	bottom	surface	bottom	surface	bottom	surface	bottom	surface	bottom	surface	bottom	surface	bottom	surface
			3-Aug-24	3-Aug-24	3-Aug-24	3-Aug-24	4-Aug-24	4-Aug-24	06-Sep-24	06-Sep-24	05-Sep-24	05-Sep-24	06-Sep-24	06-Sep-24	05-Sep-24	05-Sep-24	06-Sep-24	06-Sep-24	05-Sep-24	05-Sep-24
Dissolved Metals	Aluminum (Al)	mg/L	0.0061	0.0048	0.0050	0.0050	0.0046	0.0071	0.0039	0.0039	0.0039	0.0044	0.0076	0.0040	0.0046	0.0045	0.0037	0.0041	0.0049	0.0044
	Antimony (Sb)	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
	Arsenic (As)	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
	Barium (Ba)	mg/L	0.0090	0.0090	0.0090	0.0089	0.0092	0.0091	0.0097	0.0098	0.0096	0.0097	0.0096	0.0098	0.0080	0.0097	0.0097	0.0096	0.0097	0.0098
	Beryllium (Be)	mg/L	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002
	Bismuth (Bi)	mg/L	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
	Boron (B)	mg/L	0.0160	0.0160	0.0160	0.0160	0.0160	0.0160	0.0160	0.0160	0.0170	0.0170	0.0170	0.0170	0.0120	0.0170	0.0170	0.0170	0.0170	0.0170
	Cadmium (Cd)	mg/L	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	<0.000005	0.0000	0.0000	0.0000	0.0000	0.0000
	Calcium (Ca)	mg/L	15.3000	15.3000	15.6000	16.0000	15.8000	15.6000	16.5000	17.0000	16.9000	16.9000	16.8000	17.4000	13.6000	16.8000	17.1000	16.8000	16.9000	16.9000
	Chromium (Cr)	mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
	Cobalt (Co)	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
	Copper (Cu)	mg/L	0.0009	0.0008	0.0008	0.0008	0.0008	0.0008	0.0008	0.0008	0.0008	0.0008	0.0008	0.0008	0.0007	0.0008	0.0008	0.0008	0.0008	0.0008
	Iron (Fe)	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	<0.01	<0.01	<0.01	<0.01	<0.01
	Lead (Pb)	mg/L	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
	Lithium (Li)	mg/L	0.0018	0.0018	0.0018	0.0019	0.0018	0.0018	0.0020	0.0020	0.0022	0.0022	0.0021	0.0024	0.0013	0.0022	0.0024	0.0023	0.0022	0.0023
	Magnesium (Mg)	mg/L	11.5000	11.3000	11.5000	11.2000	11.7000	11.6000	12.4000	12.1000	12.2000	12.2000	12.3000	12.3000	9.6100	12.2000	12.2000	12.2000	12.3000	12.1000
	Manganese (Mn)	mg/L	0.0007	0.0008	0.0008	0.0009	0.0040	0.0011	0.0002	0.0002	0.0002	0.0002	0.0003	0.0002	0.0003	0.0003	0.0002	0.0002	0.0003	0.0002
	Mercury (Hg)	mg/L	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005
	Molybdenum (Mo)	mg/L	0.0015	0.0015	0.0015	0.0016	0.0016	0.0016	0.0017	0.0018	0.0018	0.0018	0.0018	0.0018	0.0017	0.0010	0.0017	0.0017	0.0018	0.0017
	Nickel (Ni)	mg/L	0.0006	0.0006	0.0006	0.0006	0.0006	0.0006	0.0006	0.0006	0.0006	0.0006	0.0006	0.0006	0.0006	0.0005	0.0006	0.0006	0.0006	0.0006
	Potassium (K)	mg/L	1.9200	1.9300	1.9200	1.9300	2.0100	1.9500	2.1000	2.0800	2.0900	2.1100	2.0700	2.1000	1.4800	2.0900	2.0900	2.1000	2.0800	2.1000
	Selenium (Se)	mg/L	0.0001	0.0001	<0.00005	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	<0.00005	0.0001	0.0001	0.0001	0.0001	0.0001
	Silicon (Si)	mg/L	0.5750	0.5610	0.5700	0.5730	0.5920	0.5690	0.5240	0.5150	0.5300	0.5370	0.5330	0.5300	0.4260	0.5170	0.5180	0.5220	0.5250	0.5250
	Silver (Ag)	mg/L	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
	Sodium (Na)	mg/L	2.3200	2.2700	2.2700	2.2600	2.3400	2.2900	2.4800	2.5000	2.4800	2.4900	2.4700	2.4600	1.9600	2.5200	2.4600	2.4600	2.4500	2.4400
	Strontium (Sr)	mg/L	0.0233	0.0240	0.0229	0.0239	0.0246	0.0238	0.0278	0.0280	0.0278	0.0278	0.0282	0.0284	0.0183	0.0277	0.0285	0.0277	0.0279	0.0279
	Thallium (Tl)	mg/L	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
	Tin (Sn)	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
	Titanium (Ti)	mg/L	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003
	Uranium (U)	mg/L	0.0021	0.0021	0.0021	0.0021	0.0022	0.0021	0.0025	0.0026	0.0026	0.0026	0.0025	0.0026	0.0016	0.0026	0.0026	0.0026	0.0026	0.0026
	Vanadium (V)	mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
	Zinc (Zn)	mg/L	<0.001	<0.001	<0.001	0.0015	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001

Table C.46: Magnitude of Elevation in Seasonal Average Dissolved Metal Concentrations Between Sheardown Lake Northwest (NW; DL0-01), Sheardown Lake Southeast (SE; DL0-02), and Reference Lake 3 (REF-03) in 2024, and at Sheardown Lakes Between 2024 and the Baseline Period (2005 to 2013), Mary River Project CREMP, 2024

Dissolved Metal	Sheardown Lake NW					Sheardown Lake SE				
	2024 vs Reference Lake 3 2024		2024 vs Baseline			2024 vs Reference Lake 3 2024		2024 vs Baseline		
	Summer	Fall	Winter	Summer	Fall	Summer	Fall	Winter	Summer	Fall
Aluminum (Al)	2.83	2.29	0.00647	2.45	1.67	4.25	2.75	0.00173	0.625	0.843
Antimony (Sb)	1.00	1.00	1.00	0.783	1.00	1.00	1.00	1.00	0.575	1.00
Arsenic (As)	0.896	1.00	1.07	1.00	1.00	0.896	1.00	1.00	1.00	1.00
Barium (Ba)	1.52	1.54	0.00752	1.90	1.94	1.23	1.32	0.00328	1.67	1.63
Beryllium (Be)	1.00	1.00	0.200	0.163	0.182	1.00	1.00	0.200	0.200	0.200
Bismuth (Bi)	1.00	1.00	0.100	0.100	0.100	1.00	1.00	0.100	0.100	0.100
Boron (B)	1.48	1.65	2.00	1.58	1.65	1.10	1.31	1.69	1.17	1.31
Cadmium (Cd)	1.54	1.30	0.289	0.752	0.650	1.00	1.05	0.500	0.500	0.524
Calcium (Ca)	2.35	2.50	1.50	1.42	1.41	1.81	2.10	1.13	1.27	1.21
Chromium (Cr)	1.00	1.00	4.65	5.00	4.86	1.00	1.00	4.76	5.00	5.00
Cobalt (Co)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Copper (Cu)	1.01	1.06	0.900	0.966	0.964	0.902	0.974	0.834	0.920	0.948
Iron (Fe)	1.00	1.00	0.333	0.902	0.955	1.00	1.00	0.721	0.588	1.00
Lead (Pb)	1.00	1.00	0.787	0.728	0.830	1.00	1.00	1.00	0.975	1.00
Lithium (Li)	1.83	2.16	3.06	1.39	2.74	1.21	1.53	3.17	1.39	1.83
Magnesium (Mg)	2.63	2.63	1.62	1.72	1.68	1.94	2.16	1.24	1.55	1.49
Manganese (Mn)	14.8	1.35	0.288	6.12	0.578	1.99	1.62	0.0908	0.180	0.340
Mercury (Hg)	1.00	1.00	0.500	0.500	0.500	1.00	1.00	0.500	0.500	0.500
Molybdenum (Mo)	11.8	12.2	2.79	2.64	2.39	7.34	8.10	2.24	2.83	2.74
Nickel (Ni)	1.20	1.18	0.883	0.961	0.959	1.01	1.05	0.938	1.01	1.01
Potassium (K)	2.34	2.41	2.32	2.60	2.46	1.68	1.85	1.88	2.29	2.16
Selenium (Se)	1.30	1.67	0.669	0.652	0.837	1.01	1.08	0.501	0.503	0.540
Silicon (Si)	1.33	1.26	0.934	0.977	0.850	1.16	1.11	0.829	0.959	0.799
Silver (Ag)	1.00	1.00	10.0	10.0	10.0	1.00	1.00	10.0	10.0	10.0
Sodium (Na)	2.59	2.62	1.79	2.04	2.07	1.95	2.21	1.94	2.16	2.17
Strontium (Sr)	3.09	3.43	2.86	3.30	3.62	2.02	2.45	1.64	2.08	2.09
Thallium (Tl)	1.00	1.00	1.00	0.660	0.816	1.00	1.00	1.00	1.00	1.00
Tin (Sn)	1.00	1.00	0.103	1.00	0.993	1.00	1.00	0.125	0.885	0.133
Titanium (Ti)	1.00	1.00	0.0300	0.0300	0.0300	1.02	1.00	0.0300	0.0307	0.0300
Uranium (U)	8.27	10.2	3.80	3.01	3.17	5.36	7.11	2.06	2.70	2.53
Vanadium (V)	1.00	1.00	0.500	0.500	0.500	1.00	1.00	0.500	0.500	0.500
Zinc (Zn)	1.05	1.00	0.791	0.595	0.899	1.13	1.00	0.506	0.882	1.16

- Denotes slight elevation (mean concentration three to five times higher than respective mean reference or baseline period value).
- Denotes moderate elevation (mean concentration five to 10 times higher than respective mean reference or baseline period value).
- Denotes highly elevated concentration (mean concentration≥ 10 times higher than respective mean reference or baseline period value).
- Denotes differences in method detection limit between the indicated study area and that of the reference area or baseline period, precluding an evaluation of magnitude of elevation.

Table C.47: *In Situ* Water Quality Profile Data Collected at Sheardown Lake Southeast (SE; DL0-02) Water Quality Monitoring Stations, Mary River Project CREMP, Winter 2024

Depth (m)	Temperature (°C)					Dissolved Oxygen (mg/L)					Dissolved Oxygen (% Saturation)					pH (pH units)				
	DL0-02-6	DL0-02-7	DL0-02-8	DL0-02-4	DL0-02-3	DL0-02-6	DL0-02-7	DL0-02-8	DL0-02-4	DL0-02-3	DL0-02-6	DL0-02-7	DL0-02-8	DL0-02-4	DL0-02-3	DL0-02-6	DL0-02-7	DL0-02-8	DL0-02-4	DL0-02-3
	16-Apr-24	16-Apr-24	16-Apr-24	16-Apr-24	16-Apr-24	16-Apr-24	16-Apr-24	16-Apr-24	16-Apr-24	16-Apr-24	16-Apr-24	16-Apr-24	16-Apr-24	16-Apr-24	16-Apr-24	16-Apr-24	16-Apr-24	16-Apr-24	16-Apr-24	16-Apr-24
1.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2.0	0.100	0.200	1.00	-	0.100	13.3	13.7	13.5	-	14.4	92.4	95.6	95.8	-	100	7.55	7.72	7.66	-	7.55
3.0	0.200	0.400	0.500	2.20	0.500	13.4	13.8	14.0	13.5	14.4	93.2	96.6	98.6	99.4	101	7.48	7.62	7.56	7.54	7.49
4.0	0.400	-	0.600	0.800	0.600	13.3	-	14.1	14.2	14.3	93.0	-	99.0	100	101	7.41	-	7.53	7.47	7.47
5.0	0.400	-	0.600	-	0.600	13.2	-	14.1	-	14.3	92.6	-	99.1	-	101	7.39	-	7.51	-	7.45
6.0	0.500	-	0.600	0.600	0.600	13.0	-	14.1	14.2	14.3	90.6	-	99.2	100	100	7.36	-	7.49	7.40	7.43
7.0	-	-	0.600	0.600	0.600	-	-	14.1	14.2	14.3	-	-	99.2	100	100	-	-	7.49	7.40	7.43
8.0	-	-	0.600	0.600	0.600	-	-	14.0	14.2	14.2	-	-	99.0	99.9	100	-	-	7.48	7.40	7.43
9.0	-	-	0.700	-	0.600	-	-	13.9	-	14.1	-	-	98.3	-	99.1	-	-	7.47	-	7.42
10.0	-	-	0.700	-	0.700	-	-	13.8	-	13.8	-	-	97.6	-	96.7	-	-	7.46	-	7.40
11.0	-	-	0.800	-	0.800	-	-	13.6	-	13.3	-	-	95.8	-	93.6	-	-	7.43	-	7.37
12.0	-	-	0.900	-	0.900	-	-	12.6	-	12.7	-	-	88.7	-	89.7	-	-	7.38	-	7.34
13.0	-	-	-	-	1.10	-	-	-	-	8.26	-	-	-	-	58.7	-	-	-	-	7.27

Notes: "-" = data not available. The total depth of the water column at each sampling station was not recorded but deepest measurements are within 1 m of lake bottom.

Table C.47: *In Situ* Water Quality Profile Data Collected at Sheardown Lake Southeast (SE; DL0-02) Water Quality Monitoring Stations, Mary River Project CREMP, Winter 2024

Depth (m)	Specific Conductance (µS/cm)					Turbidity (NTU)				
	DL0-02-6	DL0-02-7	DL0-02-8	DL0-02-4	DL0-02-3	DL0-02-6	DL0-02-7	DL0-02-8	DL0-02-4	DL0-02-3
	16-Apr-24	16-Apr-24	16-Apr-24	16-Apr-24	16-Apr-24	16-Apr-24	16-Apr-24	16-Apr-24	16-Apr-24	16-Apr-24
1.0	-	-	-	-	-	-	-	-	-	-
2.0	209	192	193	-	200	0.430	0.300	0.330	-	0.420
3.0	206	190	189	186	188	0.360	0.350	0.330	0.340	0.360
4.0	205	-	188	188	187	0.360	-	0.350	0.350	0.370
5.0	202	-	187	-	187	0.370	-	0.360	-	0.370
6.0	206	-	187	188	187	0.440	-	0.340	0.370	0.350
7.0	-	-	187	188	187	-	-	0.360	0.350	0.370
8.0	-	-	187	188	186	-	-	0.350	0.330	0.340
9.0	-	-	186	-	186	-	-	0.350	-	0.370
10.0	-	-	186	-	186	-	-	0.360	-	0.400
11.0	-	-	185	-	186	-	-	0.380	-	0.400
12.0	-	-	184	-	184	-	-	0.400	-	0.390
13.0	-	-	-	-	186	-	-	-	-	0.450

Notes: "-" = data not available. The total depth of the water column at each sampling station was not recorded but deepest measurements are within 1 m of lake bottom.

Table C.48: *In Situ* Water Quality Profile Data Collected at Sheardown Lake Southeast (SE; DL0-02) Water Quality Monitoring Stations, Mary River Project CREMP, Summer 2024

Depth (m)	Temperature (°C)					Dissolved Oxygen (mg/L)					Dissolved Oxygen (% Saturation)					pH (pH units)				
	DL0-02-6	DL0-02-7	DL0-02-8	DL0-02-4	DL0-02-3	DL0-02-6	DL0-02-7	DL0-02-8	DL0-02-4	DL0-02-3	DL0-02-6	DL0-02-7	DL0-02-8	DL0-02-4	DL0-02-3	DL0-02-6	DL0-02-7	DL0-02-8	DL0-02-4	DL0-02-3
	4-Aug-24	5-Aug-24	5-Aug-24	5-Aug-24	5-Aug-24	4-Aug-24	5-Aug-24	5-Aug-24	5-Aug-24	5-Aug-24	4-Aug-24	5-Aug-24	5-Aug-24	5-Aug-24	5-Aug-24	4-Aug-24	5-Aug-24	5-Aug-24	5-Aug-24	5-Aug-24
1.0	8.40	10.1	9.80	9.30	9.30	11.5	11.3	11.4	11.3	11.1	100	102	102	101	98.6	7.77	7.92	8.06	7.64	7.59
2.0	8.30	9.20	8.90	9.10	8.80	11.6	12.2	11.5	11.4	11.3	100	108	101	102	99.4	7.77	8.25	8.00	7.61	7.70
3.0	-	8.50	8.80	8.90	8.50	-	12.1	11.5	11.5	11.4	-	106	101	101	99.2	-	8.23	7.97	7.61	7.73
4.0	8.20	-	8.60	8.90	8.50	11.6	-	11.5	11.5	11.4	100	-	100	101	98.9	7.77	-	7.95	7.61	7.72
5.0	8.20	-	8.50	8.80	8.40	11.6	-	11.4	11.5	11.3	100	-	99.9	101	98.7	7.77	-	7.92	7.60	7.71
6.0	-	-	8.40	8.70	8.40	-	-	11.4	11.5	11.3	-	-	99.2	100	98.6	-	-	7.88	7.61	7.70
7.0	-	-	8.40	8.60	8.30	-	-	11.4	11.4	11.3	-	-	98.8	99.8	98.3	-	-	7.87	7.59	7.68
8.0	-	-	8.30	8.40	8.20	-	-	11.3	11.4	11.3	-	-	98.5	99.2	98.0	-	-	7.85	7.59	7.67
9.0	-	-	8.20	-	8.20	-	-	11.3	-	11.3	-	-	98.2	-	97.7	-	-	7.82	-	7.67
10.0	-	-	8.10	-	8.20	-	-	11.3	-	11.3	-	-	97.6	-	97.5	-	-	7.80	-	7.65
11.0	-	-	-	-	8.10	-	-	-	-	11.2	-	-	-	-	97.0	-	-	-	-	7.63
12.0	-	-	8.10	-	8.10	-	-	11.2	-	11.2	-	-	96.7	-	96.2	-	-	7.76	-	7.61
13.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes: "-" = data not available. The total depth of the water column at each sampling station was not recorded but deepest measurements are within 1 m of lake bottom.

Table C.48: *In Situ* Water Quality Profile Data Collected at Sheardown Lake Southeast (SE; DL0-02) Water Quality Monitoring Stations, Mary River Project CREMP, Summer 2024

Depth (m)	Specific Conductance (µS/cm)					Turbidity (NTU)				
	DL0-02-6	DL0-02-7	DL0-02-8	DL0-02-4	DL0-02-3	DL0-02-6	DL0-02-7	DL0-02-8	DL0-02-4	DL0-02-3
	4-Aug-24	5-Aug-24	5-Aug-24	5-Aug-24	5-Aug-24	4-Aug-24	5-Aug-24	5-Aug-24	5-Aug-24	5-Aug-24
1.0	153	155	130	129	129	0.590	1.08	1.39	1.32	1.34
2.0	152	148	129	129	129	0.630	1.28	1.59	1.41	1.48
3.0	-	130	128	129	129	-	1.52	1.59	7.62	1.56
4.0	152	-	128	129	128	0.660	-	1.63	1.36	1.58
5.0	152	-	128	130	127	0.620	-	1.64	1.35	1.45
6.0	-	-	128	129	127	-	-	1.66	1.35	1.54
7.0	-	-	128	128	128	-	-	1.63	1.40	1.56
8.0	-	-	127	128	129	-	-	1.68	1.43	1.52
9.0	-	-	129	-	129	-	-	1.71	-	1.43
10.0	-	-	128	-	131	-	-	1.63	-	1.63
11.0	-	-	-	-	130	-	-	-	-	1.57
12.0	-	-	129	-	130	-	-	1.79	-	1.80
13.0	-	-	-	-	-	-	-	-	-	-

Notes: "-" = data not available. The total depth of the water column at each sampling station was not recorded but deepest measurements are within 1 m of lake bottom.

Table C.49: *In Situ* Water Quality Profile Data Collected at Sheardown Lake Southeast (SE; DL0-02) Water Quality Monitoring Stations, Mary River Project CREMP, Fall 2024

Depth (m)	Temperature (°C)					Dissolved Oxygen (mg/L)					Dissolved Oxygen (% Saturation)					pH (pH units)				
	DL0-02-6	DL0-02-7	DL0-02-8	DL0-02-4	DL0-02-3	DL0-02-6	DL0-02-7	DL0-02-8	DL0-02-4	DL0-02-3	DL0-02-6	DL0-02-7	DL0-02-8	DL0-02-4	DL0-02-3	DL0-02-6	DL0-02-7	DL0-02-8	DL0-02-4	DL0-02-3
	4-Sep-24	4-Sep-24	5-Sep-24	5-Sep-24	4-Sep-24	4-Sep-24	4-Sep-24	5-Sep-24	5-Sep-24	4-Sep-24	4-Sep-24	4-Sep-24	5-Sep-24	5-Sep-24	4-Sep-24	4-Sep-24	4-Sep-24	5-Sep-24	5-Sep-24	4-Sep-24
1.0	6.20	6.30	6.20	6.30	6.40	11.6	11.6	12.8	12.7	11.7	96.9	97.0	106	106	97.7	7.37	7.57	7.67	7.77	7.77
2.0	6.20	6.30	6.20	6.20	6.40	11.6	11.6	12.9	13.0	11.7	97.1	97.3	- ^a	108	97.9	7.51	7.66	7.72	7.83	7.82
3.0	6.20	6.30	6.10	6.10	-	11.6	11.7	13.0	13.0	-	97.3	97.5	108	108	-	7.60	7.71	7.74	7.82	-
4.0	6.20	-	6.10	6.10	6.40	11.7	-	13.0	13.1	11.7	97.3	-	108	108	97.9	7.65	-	7.75	7.83	7.82
5.0	-	-	6.10	6.10	6.40	-	-	13.1	13.7	11.7	-	-	108	108	97.8	-	-	7.76	7.83	7.83
6.0	-	-	6.10	6.10	6.40	-	-	13.1	13.1	11.7	-	-	108	108	97.8	-	-	7.76	7.82	7.82
7.0	-	-	6.20	6.10	6.40	-	-	13.1	13.4	11.7	-	-	108	109	97.8	-	-	7.76	7.83	7.82
8.0	-	-	6.10	-	6.40	-	-	13.1	-	11.7	-	-	108	-	97.7	-	-	7.76	-	7.81
9.0	-	-	-	-	6.40	-	-	-	-	11.7	-	-	-	-	97.7	-	-	-	-	7.81
10.0	-	-	6.10	-	6.40	-	-	13.1	-	11.7	-	-	108	-	97.7	-	-	7.76	-	7.80
11.0	-	-	6.10	-	6.40	-	-	13.8	-	11.7	-	-	108	-	97.6	-	-	7.75	-	7.80
12.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes: "-" = data not available. The total depth of the water column at each sampling station was not recorded but deepest measurements are within 1 m of lake bottom.

^a Data was removed as an erroneous value.

Table C.49: *In Situ* Water Quality Profile Data Collected at Sheardown Lake Southeast (SE; DL0-02) Water Quality Monitoring Stations, Mary River Project CREMP, Fall 2024

Depth (m)	Specific Conductance (µS/cm)					Turbidity (NTU)				
	DL0-02-6	DL0-02-7	DL0-02-8	DL0-02-4	DL0-02-3	DL0-02-6	DL0-02-7	DL0-02-8	DL0-02-4	DL0-02-3
	4-Sep-24	4-Sep-24	5-Sep-24	5-Sep-24	4-Sep-24	4-Sep-24	4-Sep-24	5-Sep-24	5-Sep-24	4-Sep-24
1.0	153	152	152	153	152	0.430	0.500	0.520	0.510	0.460
2.0	153	152	152	152	152	0.450	0.540	0.580	0.560	0.450
3.0	153	152	152	152	-	0.420	0.490	0.590	0.540	-
4.0	153	-	152	155	152	0.440	-	0.610	0.560	0.560
5.0	-	-	152	152	152	-	-	0.590	0.580	0.490
6.0	-	-	152	152	152	-	-	0.610	0.580	0.480
7.0	-	-	152	152	152	-	-	0.670	0.500	0.490
8.0	-	-	152	-	152	-	-	0.620	-	0.440
9.0	-	-	-	-	152	-	-	-	-	0.460
10.0	-	-	152	-	152	-	-	0.600	-	0.450
11.0	-	-	152	-	152	-	-	0.610	-	0.410
12.0	-	-	-	-	-	-	-	-	-	-
13.0	-	-	-	-	-	-	-	-	-	-

Notes: "-" = data not available. The total depth of the water column at each sampling station was not recorded but deepest measurements are within 1 m of lake bottom.

^a Data was removed as an erroneous value.


Table C.50: Sampling Depth, Water Clarity Measures, and Surface and Bottom *In Situ* Water Quality Measures Collected at Sheardown Lake Southeast (SE; DL0-02) Benthic Invertebrate Community (BIC) Stations, Mary River Project CREMP, August 2024

Categorization & Replicate ID		Date Sampled	Secchi Depth (m)	Colour/ Clarity	Depth Sampled	Temperature (°C)	Dissolved Oxygen		pH (units)	Conductivity (µS/cm)	Specific Conductance (µS/cm)	Turbidity (NTU)
							(mg/L)	(% saturation)				
Littoral (Shallow) Stations	DL0-02-9	18-Aug-24	5	Green-grey-blue. Clear	surface	9.40	11.4	102	7.73	98.8	141	0.510
					bottom	9.30	11.3	101	7.74	98.5	141	0.540
	DL0-02-4	18-Aug-24	4.25	Colourless, murky	surface	9.30	11.2	100	7.61	98.1	140	-0.890
					bottom	9.30	11.3	100	7.65	98.1	140	-0.860
	DL0-02-10	18-Aug-24	5	Grey-green, clear	surface	9.50	11.4	102	7.98	99.6	142	0.550
					bottom	9.50	11.3	102	7.99	99.6	142	0.570
	DL0-02-11	18-Aug-24	3.25	Grey-green, clear	surface	9.40	10.9	98.1	7.76	98.2	140	-0.890
					bottom	9.30	11.2	100	7.80	98.1	140	-0.890
	DL0-02-1	13-Aug-24	4.13	-	surface	9.90	11.2	103	7.86	100	141	0.640
					bottom	9.90	11.1	102	7.86	100	141	0.660
Profundal (Deep) Stations	DL0-02-3	18-Aug-24	4.5	Dull green	surface	9.30	11.3	100	7.75	98.4	140	0.540
					bottom	9.30	11.3	100	7.80	98.3	141	0.540
	DL0-02-12	18-Aug-24	5	Dull green	surface	9.40	11.4	102	7.87	99.2	141	0.530
					bottom	9.40	11.3	101	7.88	98.7	141	0.600
	DL0-02-2	13-Aug-24	4.25	Dull green	surface	10.1	11.2	103	7.83	99.4	139	0.650
					bottom	8.80	10.9	97.7	7.67	92.3	134	0.950
	DL0-02-8	18-Aug-24	4.75	Colourless, murky	surface	9.40	11.3	101	7.66	98.7	141	0.590
					bottom	9.30	11.3	101	7.69	98.4	140	0.550
	DL0-02-13	18-Aug-24	4.25	Dull green	surface	9.30	11.3	100	7.62	98.5	141	0.590
					bottom	9.30	11.2	99.5	7.65	98.3	140	0.650

Note: "-" indicates data not available.

Table C.51: Statistical Comparison of Bottom *In Situ* Water Quality Between Sheardown Lake Southeast (SE; DL0-02) Littoral and Profundal Stations, Mary River Project CREMP, August 2024

Parameter	Statistical Test Results				Summary Statistics						
	Statistical Test	Transformation	Significant Difference Between Areas?	P-value	Lake Zone	Sample Size	Mean	Standard Deviation	Standard Error	Minimum	Maximum
Temperature (°C)	M-W	Rank	NO	0.561	Littoral	4	9.35	0.1000	0.0500	9.30	9.50
					Profundal	5	9.22	0.239	0.107	8.80	9.40
Dissolved Oxygen (mg/L)	M-W	Rank	NO	1.000	Littoral	4	11.3	0.0300	0.0150	11.2	11.3
					Profundal	5	11.2	0.158	0.0707	10.9	11.3
Dissolved Oxygen (% saturation)	tequal	None	NO	0.202	Littoral	4	101	0.707	0.354	100	102
					Profundal	5	99.8	1.29	0.577	97.7	101
pH (units)	tequal	None	NO	0.502	Littoral	4	7.80	0.144	0.0719	7.65	7.99
					Profundal	5	7.74	0.0983	0.0440	7.65	7.88
Specific Conductance (µS/cm)	M-W	Rank	NO	1.000	Littoral	4	141	0.732	0.366	140	142
					Profundal	5	139	3.13	1.40	134	141

 Shaded values indicate significant difference between study areas based on test p-value less than 0.05.

Notes: "-" = no data. "tequal" = Student's t-test assuming equal variance. "M-W" = Mann-Whitney test (nonparametric).

Table C.52: Statistical Comparison of Bottom *In Situ* Water Quality Between Sheardown Lake Southeast (SE; DL0-02) and Reference Lake 3 (REF-03) Stations Collected at Littoral and Profundal Depths, Mary River Project CREMP, August 2024

Lake Zone	Parameter	Statistical Test Results				Summary Statistics						
		Statistical Test	Transformation	Significant Difference Between Areas?	P-value	Study Lake	Sample Size (n)	Mean	Standard Deviation	Standard Error	Minimum	Maximum
Littoral (Shallow) Stations	Temperature (°C)	tequal	None	YES	0.001	Reference	5	7.88	0.545	0.244	7.20	8.70
						SDSE	4	9.35	0.1000	0.0500	9.30	9.50
	Dissolved Oxygen (mg/L)	tequal	None	YES	<0.001	Reference	5	11.8	0.0550	0.0246	11.8	11.9
						SDSE	4	11.3	0.0300	0.0150	11.2	11.3
	Dissolved Oxygen (% saturation)	tequal	None	NO	0.177	Reference	5	102	1.31	0.585	99.9	103
						SDSE	4	101	0.707	0.354	100	102
	pH (units)	tequal	None	YES	<0.001	Reference	5	7.40	0.0554	0.0248	7.34	7.47
						SDSE	4	7.80	0.144	0.0719	7.65	7.99
	Specific Conductance (µS/cm)	tequal	log10	YES	<0.001	Reference	5	68.8	0.0548	0.0245	68.8	68.9
						SDSE	4	141	0.732	0.366	140	142
Profundal (Deep) Stations	Temperature (°C)	tequal	None	YES	<0.001	Reference	5	6.92	0.327	0.146	6.50	7.40
						SDSE	5	9.22	0.239	0.107	8.80	9.40
	Dissolved Oxygen (mg/L)	tequal	None	YES	<0.001	Reference	5	11.8	0.110	0.0492	11.6	11.9
						SDSE	5	11.2	0.158	0.0707	10.9	11.3
	Dissolved Oxygen (% saturation)	tequal	None	NO	0.502	Reference	5	99.2	1.49	0.667	97.3	101
						SDSE	5	99.8	1.29	0.577	97.7	101
	pH (units)	tequal	None	YES	0.002	Reference	5	7.41	0.118	0.0530	7.29	7.56
						SDSE	5	7.74	0.0983	0.0440	7.65	7.88
	Specific Conductance (µS/cm)	M-W	Rank	YES	0.011	Reference	5	69.1	0.740	0.331	68.7	70.4
						SDSE	5	139	3.13	1.40	134	141

Highlighted values indicate significant difference between study areas based on test p-value less than 0.05.

Notes: "-" = no data. "tequal" = Student's t-test assuming equal variance. "M-W" = Mann-Whitney test (nonparametric).

Table C.53: Water Chemistry at Sheardown Lake Southeast (SE; DL0-02) Water Quality Monitoring Stations, Mary River Project CREMP, 2024

Parameters		Units	Water Quality Guideline (WQG) ^{a,b}	AEMP Benchmark ^c	Winter Sampling Event									
					DL0-02-6	DL0-02-6	DL0-02-7	DL0-02-7	DL0-02-4	DL0-02-4	DL0-02-8	DL0-02-8	DL0-02-3	DL0-02-3
					bottom	surface	bottom	surface	bottom	surface	bottom	surface	bottom	surface
					16-Apr-24	16-Apr-24	16-Apr-24	16-Apr-24	16-Apr-24	16-Apr-24	16-Apr-24	16-Apr-24	16-Apr-24	16-Apr-24
Conventional	Conductivity (lab)	µmho/cm	-	-	208	213	190	193	192	192	191	194	189	192
	pH (lab)	pH	6.5 - 9.0	-	7.27	7.29	7.33	7.34	7.33	7.27	7.31	7.33	7.3	7.37
	Hardness (as CaCO ₃)	mg/L	-	-	98.3	97.2	88.8	92.1	85.7	89.4	86	88.6	87	92
	Total Suspended Solids (TSS)	mg/L	-	-	<1	<1	<1	<1	<1	<1.5	<1	<1	<1	<1
	Total Dissolved Solids (TDS)	mg/L	-	-	130	115	111	111	108	112	100	100	109	120
	Turbidity	NTU	-	-	0.14	0.13	0.14	0.15	0.14	0.15	0.15	0.13	0.17	0.14
	Alkalinity (as CaCO ₃)	mg/L	-	-	78.6	79.3	73.6	73.5	71.6	71.8	72.1	73.4	73.6	73.6
Nutrients and Organics	Total Ammonia	mg/L	-	0.855	0.0065	0.0058	0.0096	0.0061	<0.005	<0.005	0.0134	<0.005	<0.005	<0.005
	Nitrate	mg/L	3	3	0.317	0.308	0.327	0.338	0.337	0.346	0.327	0.341	0.307	0.337
	Nitrite	mg/L	0.06	0.06	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	Total Kjeldahl Nitrogen (TKN)	mg/L	-	-	0.11	0.113	0.122	0.107	0.209	0.196	0.115	0.183	0.096	0.113
	Dissolved Organic Carbon	mg/L	-	-	2.06	1.85	2.04	1.89	2.22	1.86	2.16	1.86	2.21	2.41
	Total Organic Carbon	mg/L	-	-	2.4	1.84	1.95	1.82	1.86	1.88	1.75	1.93	1.69	1.97
	Total Phosphorus	mg/L	0.020 ^a	-	0.0029	0.0034	0.0028	<0.002	0.0034	0.0034	0.0026	0.0032	0.0034	0.0033
Anions	Phenols	mg/L	0.004 ^a	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
	Bromide (Br)	mg/L	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Chloride (Cl)	mg/L	120	120	6.54	6.59	5.9	5.99	6.08	6.21	5.82	6.02	5.74	5.95
	Sulphate (SO ₄)	mg/L	218 ^b	218	15.6	15.7	14.7	14.9	14.9	15.2	14.3	15	13.9	14.9
Total Metals	Aluminum (Al)	mg/L	0.100	0.179, 0.173 ^d	<0.003	<0.003	0.0037	0.003	<0.003	0.0034	<0.003	<0.003	0.0031	<0.003
	Antimony (Sb)	mg/L	0.020 ^a	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
	Arsenic (As)	mg/L	0.005	0.005	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
	Barium (Ba)	mg/L	1 ^β	-	0.0119	0.0121	0.0106	0.0107	0.0103	0.0102	0.0105	0.0103	0.0104	0.0108
	Beryllium (Be)	mg/L	0.011 ^a	-	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002
	Bismuth (Bi)	mg/L	-	-	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
	Boron (B)	mg/L	1.5	-	0.022	0.022	0.02	0.02	0.02	0.019	0.019	0.02	0.019	0.02
	Cadmium (Cd)	mg/L	0.00012	0.00009	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005
	Calcium (Ca)	mg/L	-	-	18.1	19.1	16.4	17.4	16.6	16.9	16.2	16.9	16.8	16.8
	Chromium (Cr)	mg/L	0.001	0.003	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
	Cobalt (Co)	mg/L	0.0009 ^a	0.004	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
	Copper (Cu)	mg/L	0.002	0.0024	0.00087	0.00081	0.00081	0.00083	0.00077	0.00094	0.00076	0.0008	0.00094	0.00083
	Iron (Fe)	mg/L	0.30	0.300	0.027	0.02	0.02	0.012	0.01	0.012	0.015	0.01	0.019	<0.01
	Lead (Pb)	mg/L	0.001	0.001	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
	Lithium (Li)	mg/L	-	-	0.0021	0.0022	0.0019	0.0019	0.0018	0.0018	0.0018	0.0019	0.0019	0.0019
	Magnesium (Mg)	mg/L	-	-	12.4	12.6	11.3	11.4	11.2	11.2	10.9	11.4	11	11.5
	Manganese (Mn)	mg/L	0.935 ^β	-	0.00429	0.00292	0.00417	0.00163	0.00175	0.00163	0.00184	0.00138	0.00266	0.00116
	Mercury (Hg)	mg/L	0.000026	-	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005
	Molybdenum (Mo)	mg/L	0.073	-	0.0012	0.00124	0.00121	0.00121	0.00116	0.00119	0.00116	0.00119	0.00107	0.00124
	Nickel (Ni)	mg/L	0.025	0.025	0.00068	0.00072	0.00066	0.00067	0.00063	0.00062	0.00062	0.00064	0.00052	0.00062
	Potassium (K)	mg/L	-	-	1.98	2.01	1.83	1.87	1.78	1.78	1.72	1.85	1.72	1.82
	Selenium (Se)	mg/L	0.001	-	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
	Silicon (Si)	mg/L	-	-	0.78	0.76	0.62	0.61	0.59	0.59	0.66	0.61	0.75	0.61
	Silver (Ag)	mg/L	0.00025	0.0001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
	Sodium (Na)	mg/L	-	-	2.56	2.63	2.38	2.45	2.33	2.33	2.31	2.43	2.34	2.42
	Strontium (Sr)	mg/L	-	-	0.0205	0.0215	0.019	0.0193	0.0181	0.019	0.0192	0.0196	0.0182	0.0195
	Thallium (Tl)	mg/L	0.0008	0.0008	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
	Tin (Sn)	mg/L	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
	Titanium (Ti)	mg/L	-	-	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003
	Uranium (U)	mg/L	0.015	-	0.0019	0.00194	0.00182	0.00184	0.00176	0.00183	0.00174	0.0018	0.00162	0.00178
	Vanadium (V)	mg/L	0.006 ^a	0.006	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
	Zinc (Zn)	mg/L	0.02 ^a	0.030	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003

Indicates parameter concentration above applicable Water Quality Guideline.

BOLD Indicates parameter concentration above the AEMP benchmark.

Notes: AEMP: Aquatic Environment Monitoring Plan. "-" indicates no applicable WQG or AEMP benchmark.

^a Canadian Water Quality Guideline for the protection of aquatic life (CCME 2024) except those indicated by α (Ontario Provincial Water Quality Objective [PWQO]; OMOE 1994) and β (British Columbia Water Quality Guideline [BCWQG]; BCMOE 2024). See Table 2.2 for information regarding WQG criteria.

^b A conservative hardness value of 75 mg/L was used for guideline calculations dependent on hardness (i.e., sulphate, beryllium, cadmium, copper, lead, manganese, and nickel).

^c AEMP Water Quality Benchmarks developed by Intrinsic (2013) using baseline water quality data specific to Sheardown Lake SE.

^d Benchmark is 0.179 mg/L and 0.173 mg/L for shallow and deep stations, respectively.

Table C.53: Water Chemistry at Sheardown Lake Southeast (SE; DL0-02) Water Quality Monitoring Stations, Mary River Project CREMP, 2024

Parameters		Units	Water Quality Guideline (WQG) ^{a,b}	AEMP Benchmark ^c	Summer Sampling Event									
					DL0-02-6	DL0-02-6	DL0-02-7	DL0-02-7	DL0-02-4	DL0-02-4	DL0-02-8	DL0-02-8	DL0-02-3	DL0-02-3
					bottom	surface	bottom	surface	bottom	surface	bottom	surface	bottom	surface
					4-Aug-24	4-Aug-24	5-Aug-24	5-Aug-24	5-Aug-24	5-Aug-24	5-Aug-24	5-Aug-24	5-Aug-24	5-Aug-24
Conventional	Conductivity (lab)	µmho/cm	-	-	162	163	148	161	137	139	138	138	139	137
	pH (lab)	pH	6.5 - 9.0	-	7.82	7.75	7.99	7.87	7.82	7.85	7.87	7.85	7.92	7.88
	Hardness (as CaCO ₃)	mg/L	-	-	72.7	73	66	70.6	61.8	60.7	61.2	61.8	63.3	61.4
	Total Suspended Solids (TSS)	mg/L	-	-	1	1	2.1	<1	1.2	<1	2.1	1.9	1.7	1.3
	Total Dissolved Solids (TDS)	mg/L	-	-	88	79	74	83	67	67	72	75	74	72
	Turbidity	NTU	-	-	2.47	2.24	2.63	2.58	2.97	2.2	3.09	2.63	3.19	2.63
	Alkalinity (as CaCO ₃)	mg/L	-	-	49.9	50	48.5	51.4	46.8	47.3	46.8	46.7	47.3	47.1
Nutrients and Organics	Total Ammonia	mg/L	-	0.855	<0.005	<0.005	0.014	<0.005	0.0063	0.0056	0.0085	0.005	0.0073	0.005
	Nitrate	mg/L	3	3	0.299	0.31	0.228	0.289	0.229	0.206	0.207	0.208	0.214	0.211
	Nitrite	mg/L	0.06	0.06	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	Total Kjeldahl Nitrogen (TKN)	mg/L	-	-	0.152	0.134	0.1	0.117	0.111	0.082	0.089	0.142	0.071	0.19
	Dissolved Organic Carbon	mg/L	-	-	1.9	2.29	2.34	2.22	2.16	2.23	1.64	1.65	1.96	1.71
	Total Organic Carbon	mg/L	-	-	1.88	1.94	2.62	1.82	2.13	2.04	1.74	1.74	1.96	1.76
	Total Phosphorus	mg/L	0.020 ^a	-	0.0038	0.0034	0.004	0.0028	0.0035	0.0028	0.0037	0.0045	0.0047	0.003
Anions	Phenols	mg/L	0.004 ^a	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
	Bromide (Br)	mg/L	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Chloride (Cl)	mg/L	120	120	5.41	5.45	4.61	5.3	4.12	4.24	4.21	4.33	4.4	4.28
	Sulphate (SO ₄)	mg/L	218 ^b	218	15.8	15.9	12.8	15.4	10.9	11.3	11.3	11.4	11.6	11.5
Total Metals	Aluminum (Al)	mg/L	0.100	0.179, 0.173 ^d	0.0405	0.0334	0.0449	0.0355	0.0459	0.0364	0.0551	0.0518	0.0548	0.0468
	Antimony (Sb)	mg/L	0.020 ^a	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
	Arsenic (As)	mg/L	0.005	0.005	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0001	<0.0001
	Barium (Ba)	mg/L	1 ^β	-	0.00809	0.00835	0.0078	0.00857	0.00753	0.00747	0.00762	0.00751	0.00773	0.00766
	Beryllium (Be)	mg/L	0.011 ^a	-	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002
	Bismuth (Bi)	mg/L	-	-	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
	Boron (B)	mg/L	1.5	-	0.014	0.015	0.012	0.014	0.012	0.012	0.012	0.012	0.011	0.011
	Cadmium (Cd)	mg/L	0.00012	0.00009	<0.000005	0.0000062	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005
	Calcium (Ca)	mg/L	-	-	12.9	13.3	12.2	13.5	11.7	11.6	11.8	11.7	11.8	11.8
	Chromium (Cr)	mg/L	0.001	0.003	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
	Cobalt (Co)	mg/L	0.0009 ^a	0.004	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
	Copper (Cu)	mg/L	0.002	0.0024	0.00082	0.00088	0.0008	0.00081	0.00081	0.00075	0.00077	0.0008	0.00089	0.00081
	Iron (Fe)	mg/L	0.30	0.300	0.042	0.035	0.049	0.037	0.052	0.04	0.061	0.05	0.063	0.05
	Lead (Pb)	mg/L	0.001	0.001	<0.00005	0.000054	<0.00005	<0.00005	<0.00005	<0.00005	0.000053	<0.00005	0.000055	0.00005
	Lithium (Li)	mg/L	-	-	<0.001	0.001	0.0012	0.0014	0.0011	0.0011	0.0012	0.0011	0.001	0.0011
	Magnesium (Mg)	mg/L	-	-	9.5	9.31	8.23	9.15	7.78	7.8	7.82	7.94	7.73	7.9
	Manganese (Mn)	mg/L	0.935 ^β	-	0.00285	0.00287	0.00244	0.0027	0.00208	0.00186	0.00245	0.00213	0.00286	0.00211
	Mercury (Hg)	mg/L	0.000026	-	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005
	Molybdenum (Mo)	mg/L	0.073	-	0.00114	0.00112	0.00101	0.00121	0.000884	0.000901	0.000931	0.00092	0.00094	0.000929
	Nickel (Ni)	mg/L	0.025	0.025	0.00063	0.00062	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.00053	0.00053
	Potassium (K)	mg/L	-	-	1.53	1.54	1.46	1.65	1.37	1.38	1.38	1.4	1.38	1.4
	Selenium (Se)	mg/L	0.001	-	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
	Silicon (Si)	mg/L	-	-	0.61	0.6	0.6	0.61	0.59	0.56	0.61	0.59	0.63	0.59
	Silver (Ag)	mg/L	0.00025	0.0001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
	Sodium (Na)	mg/L	-	-	1.83	1.87	1.7	1.88	1.63	1.62	1.62	1.65	1.62	1.65
	Strontium (Sr)	mg/L	-	-	0.0179	0.0188	0.0155	0.018	0.0143	0.0146	0.0148	0.0147	0.0151	0.0146
	Thallium (Tl)	mg/L	0.0008	0.0008	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
	Tin (Sn)	mg/L	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
	Titanium (Ti)	mg/L	-	-	0.00207	0.00144	0.00242	0.00184	0.00244	0.00183	0.00303	0.0026	0.00315	0.00243
	Uranium (U)	mg/L	0.015	-	0.00165	0.00166	0.00144	0.00168	0.00129	0.00132	0.00136	0.00134	0.00136	0.00136
	Vanadium (V)	mg/L	0.006 ^a	0.006	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
	Zinc (Zn)	mg/L	0.02 ^a	0.030	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003

Indicates parameter concentration above applicable Water Quality Guideline.

BOLD Indicates parameter concentration above the AEMP benchmark.

Notes: AEMP: Aquatic Environment Monitoring Plan. "-" indicates no applicable WQG or AEMP benchmark.

^a Canadian Water Quality Guideline for the protection of aquatic life (CCME 2024) except those indicated by α (Ontario Provincial Water Quality Objective [PWQO]; OMOE 1994) and β (British Columbia Water Quality Guideline [BCWQG]; BCMOE 2024). See Table 2.2 for information regarding WQG criteria.

^b A conservative hardness value of 75 mg/L was used for guideline calculations dependent on hardness (i.e., sulphate, beryllium, cadmium, copper, lead, manganese, and nickel).

^c AEMP Water Quality Benchmarks developed by Intrinsic (2013) using baseline water quality data specific to Sheardown Lake SE.

^d Benchmark is 0.179 mg/L and 0.173 mg/L for shallow and deep stations, respectively.

Table C.53: Water Chemistry at Sheardown Lake Southeast (SE; DLO-02) Water Quality Monitoring Stations, Mary River Project CREMP, 2024

Parameters		Units	Water Quality Guideline (WQG) ^{a,b}	AEMP Benchmark ^c	Fall Sampling Event									
					DL0-02-6	DL0-02-6	DL0-02-7	DL0-02-7	DL0-02-4	DL0-02-4	DL0-02-8	DL0-02-8	DL0-02-3	DL0-02-3
					bottom	surface	bottom	surface	bottom	surface	bottom	surface	bottom	surface
					4-Sep-24	4-Sep-24	4-Sep-24	4-Sep-24	5-Sep-24	5-Sep-24	5-Sep-24	5-Sep-24	4-Sep-24	4-Sep-24
Conventional	Conductivity (lab)	µmho/cm	-	-	159	159	157	154	205	158	160	159	158	158
	pH (lab)	pH	6.5 - 9.0	-	7.93	7.93	7.95	8.02	7.8	7.59	7.85	7.82	7.93	7.93
	Hardness (as CaCO ₃)	mg/L	-	-	74.6	72.7	72.7	72	92.7	74	74.2	73.2	73.2	72.4
	Total Suspended Solids (TSS)	mg/L	-	-	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
	Total Dissolved Solids (TDS)	mg/L	-	-	100	77	91	100	93	82	91	89	68	48
	Turbidity	NTU	-	-	0.62	0.64	0.7	0.71	0.66	0.62	0.73	0.66	0.69	0.66
	Alkalinity (as CaCO ₃)	mg/L	-	-	55.5	54.8	54.6	54.5	58.4	55.2	54.3	54.6	54.2	54.5
Nutrients and Organics	Total Ammonia	mg/L	-	0.855	0.0092	0.0159	0.0092	0.0173	0.009	0.0104	0.0104	0.0058	0.0094	0.009
	Nitrate	mg/L	3	3	0.307	0.3	0.303	0.301	0.585	0.306	0.299	0.299	0.298	0.309
	Nitrite	mg/L	0.06	0.06	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	Total Kjeldahl Nitrogen (TKN)	mg/L	-	-	0.077	0.241	0.095	0.098	0.091	0.116	0.185	0.13	0.108	0.082
	Dissolved Organic Carbon	mg/L	-	-	1.73	1.66	2.68	2.02	2.1	2.07	1.92	1.8	2.44	2.3
	Total Organic Carbon	mg/L	-	-	2.3	2.02	2.49	2.5	2.3	3.03	2.07	1.97	2.16	2.2
	Total Phosphorus	mg/L	0.020 ^a	-	<0.002	0.0039	0.0062	0.003	0.0024	0.0037	0.0043	0.003	0.0041	0.005
Anions	Phenols	mg/L	0.004 ^a	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
	Bromide (Br)	mg/L	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Chloride (Cl)	mg/L	120	120	4.97	4.97	4.93	4.92	7.59	4.88	4.87	4.9	4.9	4.91
Total Metals	Sulphate (SO ₄)	mg/L	218 ^b	218	14.3	14.3	14	13.9	26	14	14	14	13.9	14
	Aluminum (Al)	mg/L	0.100	0.179, 0.173 ^d	0.0269	0.026	0.025	0.0265	0.0108	0.0242	0.022	0.0219	0.025	0.0264
	Antimony (Sb)	mg/L	0.020 ^a	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
	Arsenic (As)	mg/L	0.005	0.005	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
	Barium (Ba)	mg/L	-	-	0.00814	0.00832	0.00837	0.00852	0.00981	0.00805	0.00801	0.00803	0.00845	0.00859
	Beryllium (Be)	mg/L	0.011 ^a	-	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002
	Bismuth (Bi)	mg/L	-	-	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
	Boron (B)	mg/L	1.5	-	0.014	0.014	0.014	0.013	0.017	0.014	0.014	0.014	0.014	0.014
	Cadmium (Cd)	mg/L	0.00012	0.00009	<0.000005	<0.000005	<0.000005	<0.000005	0.0000098	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005
	Calcium (Ca)	mg/L	-	-	14	13.6	14	13.7	16.8	13.8	13.4	13.4	13.6	13.9
	Chromium (Cr)	mg/L	0.001	0.003	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
	Cobalt (Co)	mg/L	0.0009 ^a	0.004	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
	Copper (Cu)	mg/L	0.002	0.0024	0.00087	0.00084	0.00084	0.00081	0.00091	0.00076	0.00106	0.00077	0.00093	0.00082
	Iron (Fe)	mg/L	0.30	0.300	0.029	0.029	0.029	0.029	<0.01	0.026	0.026	0.024	0.031	0.031
	Lead (Pb)	mg/L	0.001	0.001	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
	Lithium (Li)	mg/L	-	-	0.0014	0.0015	0.0016	0.0015	0.002	0.0012	0.0012	0.0012	0.0015	0.0017
	Magnesium (Mg)	mg/L	-	-	9.64	9.41	9.28	9.24	12.5	9.44	9.5	9.52	9.02	9.2
	Manganese (Mn)	mg/L	0.935 ^b	-	0.00247	0.00235	0.0024	0.00229	0.00488	0.00219	0.00234	0.0021	0.00259	0.00234
	Mercury (Hg)	mg/L	0.000026	-	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005
	Molybdenum (Mo)	mg/L	0.073	-	0.00111	0.00112	0.00111	0.00108	0.0018	0.00107	0.00104	0.00104	0.00109	0.00106
	Nickel (Ni)	mg/L	0.025	0.025	0.00057	0.00057	0.00059	0.0006	0.00062	0.0007	0.00059	0.00057	0.00057	0.00057
	Potassium (K)	mg/L	-	-	1.53	1.52	1.49	1.52	2.09	1.46	1.47	1.47	1.49	1.49
	Selenium (Se)	mg/L	0.001	-	<0.00005	<0.00005	0.000052	<0.00005	0.000086	0.000055	<0.00005	<0.00005	<0.00005	0.000055
	Silicon (Si)	mg/L	-	-	0.52	0.51	0.51	0.51	0.56	0.49	0.47	0.48	0.52	0.52
	Silver (Ag)	mg/L	0.00025	0.0001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
	Sodium (Na)	mg/L	-	-	2.02	1.93	1.97	1.94	2.5	1.94	1.95	1.96	1.88	1.9
	Strontium (Sr)	mg/L	-	-	0.0182	0.0183	0.0183	0.0181	0.0281	0.0186	0.0184	0.0187	0.0178	0.0181
	Thallium (Tl)	mg/L	0.0008	0.0008	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
	Tin (Sn)	mg/L	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
	Titanium (Ti)	mg/L	-	-	0.0012	0.00111	0.00129	0.0012	<0.0004	0.00112	0.00101	0.00098	0.0014	<0.002
	Uranium (U)	mg/L	0.015	-	0.00161	0.00166	0.0017	0.0017	0.00266	0.00168	0.00167	0.00168	0.00168	0.00167
	Vanadium (V)	mg/L	0.006 ^a	0.006	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
	Zinc (Zn)	mg/L	0.030	0.030	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003

Indicates parameter concentration above applicable Water Quality Guideline.

BOLD Indicates parameter concentration above the AEMP benchmark.

Notes: AEMP: Aquatic Environment Monitoring Plan. "-" indicates no applicable WQG or AEMP benchmark.

^a Canadian Water Quality Guideline for the protection of aquatic life (CCME 2024) except those indicated by α (Ontario Provincial Water Quality Objective [PWQO]; OMOE 1994) and β (British Columbia Water Quality Guideline [BCWQG]; BCMOE 2024). See Table 2.2 for information regarding WQG criteria.

^b A conservative hardness value of 75 mg/L was used for guideline calculations dependent on hardness (i.e., sulphate, beryllium, cadmium, copper, lead, manganese, and nickel).

^c AEMP Water Quality Benchmarks developed by Intrinsic (2013) using baseline water quality data specific to Sheardown Lake SE.

^d Benchmark is 0.179 mg/L and 0.173 mg/L for shallow and deep stations, respectively.

Table C.54: Dissolved metals concentrations at Sheardown Lake Southeast (SE; DL0-02) Water Quality Monitoring Stations, Mary River Project CREMP, 2024

Parameters		Units	Winter Sampling Event										Summer Sampling Event					
			DL0-02-6	DL0-02-6	DL0-02-7	DL0-02-7	DL0-02-4	DL0-02-4	DL0-02-8	DL0-02-8	DL0-02-3	DL0-02-3	DL0-02-6	DL0-02-6	DL0-02-7	DL0-02-7	DL0-02-4	DL0-02-4
			bottom	surface	bottom	surface	bottom	surface	bottom	surface	bottom	surface	bottom	surface	bottom	surface	bottom	surface
			16-Apr-24	16-Apr-24	16-Apr-24	16-Apr-24	16-Apr-24	16-Apr-24	16-Apr-24	16-Apr-24	16-Apr-24	16-Apr-24	4-Aug-24	4-Aug-24	5-Aug-24	5-Aug-24	5-Aug-24	5-Aug-24
Dissolved Metals	Aluminum (Al)	mg/L	0.0032	0.0012	0.0014	0.0016	0.0018	0.0020	0.0011	0.0012	0.0014	0.0024	0.0071	0.0070	0.0080	0.0069	0.0066	0.0071
	Antimony (Sb)	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
	Arsenic (As)	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
	Barium (Ba)	mg/L	0.0118	0.0116	0.0107	0.0104	0.0106	0.0105	0.0102	0.0108	0.0103	0.0107	0.0079	0.0079	0.0072	0.0083	0.0067	0.0073
	Beryllium (Be)	mg/L	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002
	Bismuth (Bi)	mg/L	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
	Boron (B)	mg/L	0.0210	0.0210	0.0200	0.0200	0.0190	0.0190	0.0190	0.0190	0.0190	0.0200	0.0130	0.0120	0.0120	0.0140	0.0100	0.0110
	Cadmium (Cd)	mg/L	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005
	Calcium (Ca)	mg/L	18.6000	18.8000	17.1000	17.6000	16.5000	17.0000	16.3000	17.0000	16.7000	17.9000	13.2000	13.1000	12.0000	13.4000	11.3000	11.5000
	Chromium (Cr)	mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
	Cobalt (Co)	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
	Copper (Cu)	mg/L	0.0009	0.0008	0.0008	0.0008	0.0008	0.0008	0.0007	0.0008	0.0007	0.0008	0.0007	0.0010	0.0007	0.0007	0.0007	0.0007
	Iron (Fe)	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	<0.01	<0.01	<0.01
	Lead (Pb)	mg/L	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
	Lithium (Li)	mg/L	0.0025	0.0023	0.0023	0.0024	0.0021	0.0020	0.0020	0.0021	0.0021	0.0024	0.0013	0.0011	0.0011	0.0017	<0.001	0.0013
	Magnesium (Mg)	mg/L	12.6000	12.2000	11.2000	11.7000	10.8000	11.4000	11.0000	11.2000	11.0000	11.5000	9.6500	9.7900	8.7400	9.0300	8.1500	7.7700
	Manganese (Mn)	mg/L	0.0010	0.0008	0.0022	0.0003	0.0002	0.0003	0.0002	0.0002	0.0002	0.0002	0.0005	0.0006	0.0004	0.0006	0.0002	0.0004
	Mercury (Hg)	mg/L	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005
	Molybdenum (Mo)	mg/L	0.0012	0.0012	0.0012	0.0012	0.0012	0.0012	0.0011	0.0011	0.0011	0.0012	0.0012	0.0012	0.0010	0.0012	0.0009	0.0009
	Nickel (Ni)	mg/L	0.0007	0.0007	0.0007	0.0007	0.0007	0.0007	0.0006	0.0007	0.0006	0.0006	0.0005	0.0005	<0.0005	<0.0005	<0.0005	<0.0005
	Potassium (K)	mg/L	2.0400	2.0600	1.8800	1.8700	1.8200	1.8800	1.7800	1.8700	1.8000	1.9000	1.5800	1.5800	1.3800	1.6200	1.2700	1.3700
	Selenium (Se)	mg/L	<0.00005	0.0001	<0.00005	<0.00005	<0.00005	0.0001	<0.00005	<0.00005	<0.00005	<0.00005	0.0001	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
	Silicon (Si)	mg/L	0.7600	0.7480	0.5950	0.5930	0.5650	0.5760	0.6000	0.5760	0.7360	0.5920	0.5450	0.5290	0.4680	0.5360	0.4870	0.4910
	Silver (Ag)	mg/L	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
	Sodium (Na)	mg/L	2.6200	2.6400	2.4600	2.4600	2.4300	2.5000	2.4100	2.4900	2.3700	2.4900	1.9000	1.9900	1.7300	1.8700	1.6700	1.6300
	Strontium (Sr)	mg/L	0.0214	0.0216	0.0187	0.0198	0.0191	0.0190	0.0187	0.0191	0.0187	0.0196	0.0187	0.0189	0.0162	0.0182	0.0140	0.0144
	Thallium (Tl)	mg/L	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
	Tin (Sn)	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
	Titanium (Ti)	mg/L	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003
	Uranium (U)	mg/L	0.0019	0.0019	0.0018	0.0018	0.0018	0.0018	0.0017	0.0018	0.0017	0.0018	0.0016	0.0016	0.0014	0.0016	0.0012	0.0013
	Vanadium (V)	mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
	Zinc (Zn)	mg/L	0.0012	<0.001	<0.001	<0.001	0.0015	0.0021	<0.001	<0.001	0.0011	0.0012	<0.001	0.0011	<0.001	<0.001	<0.001	<0.001

Table C.54: Dissolved metals concentrations at Sheardown Lake Southeast (SE; DL0-02) Water Quality Monitoring Stations, Mary River Project CREMP, 2024

Parameters		Units	Summer Sampling Event				Fall Sampling Event									
			DL0-02-8	DL0-02-8	DL0-02-3	DL0-02-3	DL0-02-6	DL0-02-6	DL0-02-7	DL0-02-7	DL0-02-4	DL0-02-4	DL0-02-8	DL0-02-8	DL0-02-3	DL0-02-3
			bottom	surface	bottom	surface	bottom	surface	bottom	surface	bottom	surface	bottom	surface	bottom	surface
			5-Aug-24	5-Aug-24	5-Aug-24	5-Aug-24	4-Sep-24	4-Sep-24	4-Sep-24	4-Sep-24	5-Sep-24	5-Sep-24	5-Sep-24	5-Sep-24	4-Sep-24	4-Sep-24
Dissolved Metals	Aluminum (Al)	mg/L	0.0111	0.0084	0.0076	0.0081	0.0047	0.0066	0.0062	0.0053	0.0041	0.0054	0.0050	0.0064	0.0058	0.0060
	Antimony (Sb)	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
	Arsenic (As)	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
	Barium (Ba)	mg/L	0.0074	0.0073	0.0069	0.0068	0.0080	0.0078	0.0081	0.0081	0.0097	0.0079	0.0080	0.0079	0.0080	0.0080
	Beryllium (Be)	mg/L	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002
	Bismuth (Bi)	mg/L	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
	Boron (B)	mg/L	0.0120	0.0120	0.0110	0.0100	0.0130	0.0130	0.0130	0.0120	0.0160	0.0120	0.0130	0.0130	0.0130	0.0130
	Cadmium (Cd)	mg/L	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	0.0000	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005
	Calcium (Ca)	mg/L	11.6000	11.7000	11.4000	11.2000	14.0000	13.5000	13.6000	13.4000	16.5000	13.8000	13.9000	13.5000	13.4000	13.6000
	Chromium (Cr)	mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
	Cobalt (Co)	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
	Copper (Cu)	mg/L	0.0007	0.0007	0.0007	0.0007	0.0007	0.0007	0.0007	0.0007	0.0008	0.0007	0.0007	0.0007	0.0007	0.0007
	Iron (Fe)	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	<0.01
	Lead (Pb)	mg/L	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
	Lithium (Li)	mg/L	0.0013	0.0013	<0.001	<0.001	0.0014	0.0015	0.0016	0.0014	0.0022	0.0014	0.0015	0.0014	0.0014	0.0015
	Magnesium (Mg)	mg/L	7.8200	7.9200	8.4500	8.1300	9.6400	9.4600	9.4100	9.3500	12.5000	9.6000	9.5800	9.5800	9.6500	9.3300
	Manganese (Mn)	mg/L	0.0003	0.0004	0.0002	0.0003	0.0004	0.0003	0.0003	0.0003	0.0002	0.0003	0.0003	0.0002	0.0003	0.0003
	Mercury (Hg)	mg/L	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005
	Molybdenum (Mo)	mg/L	0.0009	0.0009	0.0009	0.0009	0.0011	0.0011	0.0011	0.0011	0.0017	0.0010	0.0010	0.0011	0.0011	0.0010
	Nickel (Ni)	mg/L	<0.0005	<0.0005	<0.0005	<0.0005	0.0005	0.0005	<0.0005	0.0005	0.0006	0.0005	<0.0005	0.0005	0.0005	0.0005
	Potassium (K)	mg/L	1.3700	1.3900	1.3100	1.2900	1.5300	1.5400	1.5100	1.5000	2.0800	1.4700	1.4800	1.4800	1.5100	1.5100
	Selenium (Se)	mg/L	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0.0001	<0.00005	<0.00005	0.0001	<0.00005	<0.00005
	Silicon (Si)	mg/L	0.5100	0.4990	0.4930	0.4840	0.4540	0.4560	0.4590	0.4520	0.5240	0.4290	0.4320	0.4300	0.4510	0.4560
	Silver (Ag)	mg/L	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
	Sodium (Na)	mg/L	1.6500	1.6400	1.6700	1.6400	2.0400	2.0800	2.0000	1.9200	2.4900	1.9500	1.9800	1.9900	1.9900	1.9500
	Strontium (Sr)	mg/L	0.0146	0.0146	0.0147	0.0147	0.0184	0.0182	0.0182	0.0178	0.0276	0.0186	0.0189	0.0186	0.0182	0.0184
	Thallium (Tl)	mg/L	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
	Tin (Sn)	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
	Titanium (Ti)	mg/L	0.0004	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003
	Uranium (U)	mg/L	0.0013	0.0013	0.0013	0.0012	0.0016	0.0016	0.0016	0.0016	0.0025	0.0017	0.0017	0.0017	0.0016	0.0017
	Vanadium (V)	mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
	Zinc (Zn)	mg/L	0.0020	<0.001	0.0012	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001

Table C.55: *In Situ* Water Quality Measurements Collected at Mary River (G0, E0, C0 Series) Benthic Invertebrate Community (BIC) Stations, Mary River Project CREMP, August 2024

Study Area	Station	Sampling Date	Temperature (°C)	Dissolved Oxygen (mg/L)	Dissolved Oxygen (% saturation)	pH (pH units)	Specific Conductance (µS/cm)
Mary River Upstream	G0-09-B1	11-Aug-24	9.00	11.0	101	8.04	103
	G0-09-B2	11-Aug-24	8.60	11.1	100	8.03	102
	G0-09-B3	11-Aug-24	8.00	11.3	101	8.04	102
	G0-09-B4	11-Aug-24	7.40	11.3	99.7	8.04	112
	G0-09-B5	11-Aug-24	6.80	112	97.7	8.02	112
Mary River Upstream	G0-03-B1	11-Aug-24	11.4	10.4	99.9	8.10	106
	G0-03-B2	11-Aug-24	11.3	10.4	99.5	8.12	106
	G0-03-B3	11-Aug-24	11.0	10.6	101	8.09	105
	G0-03-B4	11-Aug-24	10.7	10.3	97.6	8.05	105
	G0-03-B5	11-Aug-24	9.00	11.0	101	8.04	103
Mary River Downstream	E0-01-B1	13-Aug-24	6.80	11.9	102	8.09	138
	E0-01-B2	13-Aug-24	6.80	11.8	101	8.08	137
	E0-01-B3	13-Aug-24	6.80	11.8	103	8.07	137
	E0-01-B4	13-Aug-24	6.80	11.8	101	7.98	136
	E0-01-B5	13-Aug-24	6.80	11.0	99.4	7.68	137
Mary River Downstream	E0-20-B1	12-Aug-24	7.70	11.6	101	8.16	135
	E0-20-B2	12-Aug-24	7.60	11.7	101	8.17	135
	E0-20-B3	12-Aug-24	7.70	11.6	100	8.14	136
	E0-20-B4	12-Aug-24	7.70	11.6	101	8.17	136
	E0-20-B5	12-Aug-24	7.70	11.6	100	8.16	136
Mary River Downstream	C0-05-B1	10-Aug-24	10.3	10.7	98.6	7.59	120
	C0-05-B2	10-Aug-24	11.1	10.7	99.9	7.26	122
	C0-05-B3	10-Aug-24	10.8	10.8	101	7.31	121
	C0-05-B4	10-Aug-24	10.3	10.7	98.6	7.59	120
	C0-05-B5	10-Aug-24	10.3	10.7	98.6	7.59	120

Table C.56: *In Situ* Water Quality Summary for Mary River (G0, E0, C0 Series) Benthic Invertebrate Community (BIC) Study Areas, Mary River Project CREMP, August 2024

Metric	Station	Sample Size	Mean	Standard Deviation	Standard Error	95%		Minimum	Maximum
						Lower Bound	Upper Bound		
Temperature (°C)	G0-09	5	7.96	0.888	0.397	6.92	8.92	6.80	9.00
	G0-03	5	10.7	0.978	0.437	9.34	11.4	9.00	11.4
	E0-01	5	6.80	0	0	6.80	6.80	6.80	6.80
	E0-20	5	7.68	0.0447	0.0200	7.62	7.70	7.60	7.70
	C0-05	5	10.6	0.371	0.166	10.3	11.0	10.3	11.1
Dissolved Oxygen (mg/L)	G0-09	5	11.2	0.152	0.0678	11.0	11.3	11.0	11.3
	G0-03	5	10.5	0.267	0.120	10.4	10.9	10.3	11.0
	E0-01	5	11.7	0.361	0.161	11.2	11.9	11.0	11.9
	E0-20	5	11.6	0.0335	0.0150	11.6	11.6	11.6	11.7
	C0-05	5	10.7	0.0602	0.0269	10.7	10.8	10.7	10.8
Dissolved Oxygen (% saturation)	G0-09	5	99.9	1.38	0.615	98.1	101	97.7	101
	G0-03	5	99.7	1.25	0.561	98.0	101	97.6	101
	E0-01	5	101	1.41	0.631	99.7	103	99.4	103
	E0-20	5	101	0.297	0.133	100	101	100	101
	C0-05	5	99.3	1.01	0.452	98.6	101	98.6	101
pH (pH units)	G0-09	5	8.03	0.00894	0.00400	8.02	8.04	8.02	8.04
	G0-03	5	8.08	0.0339	0.0152	8.04	8.12	8.04	8.12
	E0-01	5	7.98	0.173	0.0775	7.74	8.09	7.68	8.09
	E0-20	5	8.16	0.0122	0.00548	8.14	8.17	8.14	8.17
	C0-05	5	7.47	0.168	0.0751	7.27	7.59	7.26	7.59
Specific Conductance (µS/cm)	G0-09	5	106	5.25	2.35	102	112	102	112
	G0-03	5	105	1.31	0.584	103	106	103	106
	E0-01	5	137	0.493	0.220	136	138	136	138
	E0-20	5	135	0.568	0.254	135	136	135	136
	C0-05	5	121	0.657	0.294	120	122	120	122

Table C.57: Statistical Comparison of *In Situ* Water Quality Variables Among Mary River (G0, E0, C0 Series) Benthic Invertebrate Community (BIC) Stations, Mary River Project CREMP, August 2024

<i>In Situ</i> Variable	Overall 5-group Comparison				Pair-wise, <i>post hoc</i> comparisons ^a			
	Statistical Test ^a	Transformation	Significant Difference Between Areas?	P-value	(I) Area	(J) Area	Significant Difference Between Areas?	P-value
Temperature (°C)	K-W	Rank	YES	<0.001	G0-09	G0-03	YES	0.020
					G0-09	E0-01	NO	0.124
					G0-09	E0-20	NO	0.896
					G0-09	C0-05	NO	0.051
					G0-03	E0-01	YES	<0.001
					G0-03	E0-20	YES	0.014
					G0-03	C0-05	NO	0.712
					E0-01	E0-20	NO	0.159
					E0-01	C0-05	YES	<0.001
					E0-20	C0-05	YES	0.037
Dissolved Oxygen (mg/L)	K-W	Rank	YES	<0.001	G0-09	G0-03	YES	0.039
					G0-09	E0-01	NO	0.107
					G0-09	E0-20	NO	0.254
					G0-09	C0-05	NO	0.149
					G0-03	E0-01	YES	<0.001
					G0-03	E0-20	YES	0.001
					G0-03	C0-05	NO	0.533
					E0-01	E0-20	NO	0.636
					E0-01	C0-05	YES	0.002
					E0-20	C0-05	YES	0.010
Dissolved Oxygen (% Saturation)	ANOVA	None	NO	0.085	G0-09	G0-03	NO	0.996
					G0-09	E0-01	NO	0.375
					G0-09	E0-20	NO	0.843
					G0-09	C0-05	NO	0.909
					G0-03	E0-01	NO	0.217
					G0-03	E0-20	NO	0.647
					G0-03	C0-05	NO	0.987
					E0-01	E0-20	NO	0.919
					E0-01	C0-05	NO	0.089
					E0-20	C0-05	NO	0.361
pH (pH units)	K-W	Rank	YES	<0.001	G0-09	G0-03	NO	0.189
					G0-09	E0-01	NO	0.666
					G0-09	E0-20	YES	0.006
					G0-09	C0-05	NO	0.116
					G0-03	E0-01	NO	0.377
					G0-03	E0-20	NO	0.155
					G0-03	C0-05	YES	0.004
					E0-01	E0-20	YES	0.021
					E0-01	C0-05	YES	0.045
					E0-20	C0-05	YES	<0.001
Specific Conductance (uS/cm)	K-W	Rank	YES	<0.001	G0-09	G0-03	NO	0.863
					G0-09	E0-01	YES	<0.001
					G0-09	E0-20	YES	0.006
					G0-09	C0-05	NO	0.089
					G0-03	E0-01	YES	<0.001
					G0-03	E0-20	YES	0.009
					G0-03	C0-05	NO	0.127
					E0-01	E0-20	NO	0.282
					E0-01	C0-05	YES	0.032
					E0-20	C0-05	NO	0.282

Shaded values indicate significant difference between study areas based on test p-value less than 0.05.

^a Statistical tests include Analysis of Variance (ANOVA) followed by Tukey's Honestly Significant Difference (HSD) *post hoc* tests, or Kruskal-Wallis H-test (K-W) followed by Mann-Whitney U-test (M-W).

Table C.58: Water Chemistry at Mary River (G0, E0, F0, C0 Series) Water Quality Monitoring Stations, Mary River Project CREMP, 2024

Parameters		Units	Water Quality Guideline (WQG) ^{a,b}	AEMP Benchmark ^c	Spring Sampling Event												
					G0-09-A	G0-09	G0-09-B	G0-03	G0-01	F0-01	E0-10	E0-03	E0-21	E0-20	C0-10	C0-05	C0-01
					07-Jul-24	07-Jul-24	30-Jun-24	30-Jun-24	07-Jul-24	07-Jul-24	06-Jul-24	30-Jun-24	30-Jun-24	29-Jun-24	29-Jun-24	29-Jun-24	29-Jun-24
Conventionals	Conductivity (lab)	µmho/cm	-	-	48.7	47.3	26	28.2	31.7	103	54.3	25.8	25.6	27.1	27.6	33.9	31.3
	pH (lab)	pH	6.5 - 9.0	-	7.36	7.65	6.92	7.42	7.86	7.8	7.44	7.46	7.52	7.34	7.41	7.44	7.71
	Hardness (as CaCO ₃)	mg/L	-	-	24.4	23.2	11	12.6	14.8	51	27.9	11.4	11.4	13	12.4	15.8	14.6
	Total Suspended Solids (TSS)	mg/L	-	-	<1	<1	5	<1	1	<1	2.6	1.8	1.8	3.2	1	<1	1.5
	Total Dissolved Solids (TDS)	mg/L	-	-	36	36	19	33	27	54	24	<18	25	19	<20	20	26
	Turbidity	NTU	-	-	1.43	2.44	3.57	2.65	5.54	0.78	3.66	2.75	2.74	3.07	2.92	2.74	2.83
	Alkalinity (as CaCO ₃)	mg/L	-	-	24.6	23.7	11.3	12.5	13.9	42.8	24.7	11.1	10.9	11.7	11.7	13.6	12.7
Nutrients and Organics	Total Ammonia	mg/L	-	0.855	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.0166
	Nitrate	mg/L	3	3	<0.02	<0.02	<0.02	<0.02	<0.02	0.201	0.057	<0.02	<0.02	<0.02	<0.02	0.028	0.025
	Nitrite	mg/L	0.06	0.06	<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 (TKN)	mg/L	-	-	<0.05	<0.05	<0.05	0.053	<0.05	0.056	<0.05	<0.05	<0.05	<0.05	0.099	0.076	0.105
	Dissolved Organic Carbon	mg/L	-	-	1.7	1.18	1.69	1.74	1.15	0.96	1.78	1.5	1.24	1.36	1.24	1.47	1.49
	Total Organic Carbon	mg/L	-	-	1.86	1.33	1.69	1.76	1.22	1.69	2.58	2.81	1.63	1.83	1.72	1.88	1.49
	Total Phosphorus	mg/L	0.030 ^a	-	0.0033	0.0034	0.0074	0.0052	0.0036	<0.002	0.0035	0.0051	0.0056	0.0049	0.0043	0.0045	0.0048
Anions	Phenols	mg/L	0.004 ^a	-	<0.001	0.0011	<0.001	<0.001	0.0011	0.0011	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
	Bromide (Br)	mg/L	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Chloride (Cl)	mg/L	120	120	<0.5	<0.5	<0.5	<0.5	<0.5	0.54	0.66	<0.5	<0.5	<0.5	<0.5	0.71	0.86
	Sulphate (SO ₄)	mg/L	218 ^β	218	<0.3	<0.3	<0.3	<0.3	<0.3	7.43	2.55	0.38	0.39	0.38	0.4	1.11	1.08
Total Metals	Aluminum (Al)	mg/L	0.100	0.966	0.0424	0.0465	0.141	0.0929	0.102	0.0267	0.0662	0.0725	0.0771	0.0928	0.0724	0.0855	0.0939
	Antimony (Sb)	mg/L	0.020 ^a	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
	Arsenic (As)	mg/L	0.005	0.005	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
	Barium (Ba)	mg/L	1 ^β	-	0.00314	0.00298	0.00251	0.00239	0.00284	0.00404	0.00299	0.00212	0.00224	0.00225	0.00216	0.00252	0.00242
	Boron (B)	mg/L	1.5	-	<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
	Cadmium (Cd)	mg/L	0.00012	0.00006	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005
	Calcium (Ca)	mg/L	-	-	4.76	4.64	2.32	2.67	2.92	8.81	5.14	2.3	2.33	2.47	2.44	3.02	2.73
	Chromium (Cr)	mg/L	0.001	0.003	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
	Cobalt (Co)	mg/L	0.0009 ^a	0.004	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
	Copper (Cu)	mg/L	0.002	0.0024	<0.0005	<0.0005	0.00051	<0.0005	0.00056	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
	Iron (Fe)	mg/L	0.30	0.874	0.03	0.045	0.133	0.076	0.098	0.025	0.08	0.069	0.076	0.08	0.07	0.075	0.088
	Lead (Pb)	mg/L	0.001	0.001	<0.00005	<0.00005	0.00011	0.00007	0.000105	<0.00005	0.000078	0.000069	0.000076	0.000078	0.000073	0.000072	0.000077
	Magnesium (Mg)	mg/L	-	-	2.82	2.67	1.48	1.61	1.73	6.71	3.76	1.53	1.52	1.63	1.6	2.23	2.05
	Manganese (Mn)	mg/L	0.935 ^β	-	0.00054	0.00075	0.00307	0.0018	0.00154	0.00068	0.00179	0.0018	0.00234	0.00211	0.00172	0.0021	0.00231
	Mercury (Hg)	mg/L	0.000026	-	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005
	Molybdenum (Mo)	mg/L	0.073	-	0.000053	0.000056	<0.00005	<0.00005	0.000057	0.000176	0.000089	<0.00005	0.000052	<0.00005	<0.00005	0.000095	0.000073
	Nickel (Ni)	mg/L	0.025	0.025	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
	Potassium (K)	mg/L	-	-	0.418	0.402	0.374	0.363	0.358	0.582	0.435	0.326	0.333	0.337	0.327	0.407	0.383
	Selenium (Se)	mg/L	0.001	-	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0.000093	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
	Silicon (Si)	mg/L	-	-	0.6	0.54	0.54	0.52	0.56	0.51	0.49	0.42	0.42	0.46	0.42	0.45	0.46
	Silver (Ag)	mg/L	0.00025	0.0001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
	Sodium (Na)	mg/L	-	-	0.497	0.46	0.426	0.326	0.428	0.41	0.372	0.316	0.328	0.331	0.346	0.443	0.424
	Strontium (Sr)	mg/L	-	-	0.00393	0.00373	0.0024	0.00311	0.00298	0.00653	0.00389	0.00217	0.00218	0.00218	0.00217	0.00293	0.00265
	Thallium (Tl)	mg/L	0.0008	0.0008	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
	Tin (Sn)	mg/L	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
	Titanium (Ti)	mg/L	-	-	0.00156	0.00248	0.00833	0.0047	0.00548	0.00116	0.0043	0.0039	0.00421	0.0049	0.00384	0.00407	0.00522
	Uranium (U)	mg/L	0.015	-	0.000161	0.000145	0.000124	0.0001	0.000144	0.000396	0.000197	0.000095	0.000098	0.000102	0.000101	0.000178	0.000143
	Vanadium (V)	mg/L	0.006 ^a	0.006	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
	Zinc (Zn)	mg/L	0.02 ^a	0.030	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003

Indicates parameter concentration above applicable Water Quality Guideline.

BOLD

 Indicates parameter concentration above the AEMP benchmark.

Notes: AEMP: Aquatic Effects Monitoring Plan. "-" indicates no applicable WQG or AEMP benchmark.

^a Canadian Water Quality Guideline for the protection of aquatic life (CCME 2024) except those indicated by α (Ontario Provincial Water Quality Objective [PWQO]; OMOE 1994) and β (British Columbia Water Quality Guideline [BCWQG]; BCMOE 2024). See Table 2.2 for information regarding WQG criteria.

^b A conservative hardness value of 75 mg/L was used for guideline calculations dependent on hardness (i.e., sulphate, beryllium, cadmium, copper, lead, manganese, and nickel).

^c AEMP Water Quality Benchmarks developed by Intrinsic (2013) using baseline water quality data specific to the Mary River system.

Table C.58: Water Chemistry at Mary River (G0, E0, F0, C0 Series) Water Quality Monitoring Stations, Mary River Project CREMP, 2024

Parameters		Units	Water Quality Guideline (WQG) ^{a,b}	AEMP Benchmark ^c	Summer Sampling Event												
					G0-09-A	G0-09-B	G0-09	G0-03	G0-01	F0-01	E0-10	E0-03	E0-21	E0-20	C0-10	C0-05	C0-01
					30-Jul-24	30-Jul-24	30-Jul-24	30-Jul-24	30-Jul-24	30-Jul-24	30-Jul-24	30-Jul-24	30-Jul-24	30-Jul-24	30-Jul-24	30-Jul-24	30-Jul-24
Conventionals	Conductivity (lab)	µmho/cm	-	-	100	112	104	108	113	208	192	113	114	116	116	116	116
	pH (lab)	pH	6.5 - 9.0	-	7.92	7.98	7.99	7.98	8.01	8.04	7.87	7.86	7.87	7.99	7.84	7.79	7.89
	Hardness (as CaCO ₃)	mg/L	-	-	45.6	52.6	46.5	50	57.4	101	93.8	53.1	53.4	54.7	53.6	53.8	54.3
	Total Suspended Solids (TSS)	mg/L	-	-	<1	<1	<1.4	<1	<1	<1	<1	<1	<1.3	<1	<1	<1	<1
	Total Dissolved Solids (TDS)	mg/L	-	-	60	56	55	62	57	102	100	62	61	57	56	69	73
	Turbidity	NTU	-	-	4.97	3.67	4.63	3.16	3.4	0.9	0.95	3.69	3.06	2.94	2.76	2.98	3.01
	Alkalinity (as CaCO ₃)	mg/L	-	-	45.9	52.5	48.9	49.8	53.3	81.5	76.4	51.7	50.8	53.5	53.5	53.5	52.8
Nutrients and Organics	Total Ammonia	mg/L	-	0.855	<0.005	<0.005	<0.005	<0.005	0.0058	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
	Nitrate	mg/L	3	3	<0.02	<0.02	<0.02	<0.02	<0.02	0.305	0.27	<0.02	<0.02	0.034	0.024	0.021	0.025
	Nitrite	mg/L	0.06	0.06	<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 (TKN)	mg/L	-	-	0.069	0.084	0.067	0.059	0.091	0.065	0.096	0.053	0.066	0.082	0.077	0.067	0.06
	Dissolved Organic Carbon	mg/L	-	-	1.49	4.39	1.85	1.92	1.52	1.21	5.3	1.42	2.78	1.9	1.42	1.46	1.89
	Total Organic Carbon	mg/L	-	-	1.16	1.42	1.46	1.54	1.71	1.19	1.5	1.36	1.59	1.84	1.51	1.74	1.91
	Total Phosphorus	mg/L	0.030 ^a	-	0.0045	0.0025	0.003	0.0024	0.0038	<0.002	<0.002	0.0021	0.0026	<0.002	<0.002	0.0023	<0.002
Anions	Phenols	mg/L	0.004 ^a	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
	Bromide (Br)	mg/L	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Chloride (Cl)	mg/L	120	120	1.73	1.84	1.69	1.99	1.86	1.38	1.65	1.72	1.71	1.74	1.67	1.78	1.75
	Sulphate (SO ₄)	mg/L	218 ^β	218	1.32	1.34	1.26	1.13	1.37	20.1	17.3	2.47	2.67	3.11	2.5	2.49	2.36
Total Metals	Aluminum (Al)	mg/L	0.100	0.966	0.118	0.0984	0.0927	0.0752	0.104	0.0115	0.0224	0.0655	0.0858	0.0877	0.0608	0.0772	0.0751
	Antimony (Sb)	mg/L	0.020 ^a	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
	Arsenic (As)	mg/L	0.005	0.005	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
	Barium (Ba)	mg/L	1 ^β	-	0.00657	0.00679	0.00651	0.00689	0.00703	0.00746	0.00784	0.00656	0.00666	0.00683	0.00665	0.00667	0.00673
	Boron (B)	mg/L	1.5	-	<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
	Cadmium (Cd)	mg/L	0.00012	0.00006	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005
	Calcium (Ca)	mg/L	-	-	9.19	10.3	9.45	10.3	10.8	16.9	16.7	10.6	10.5	10.5	10.8	10.7	10.8
	Chromium (Cr)	mg/L	0.001	0.003	<0.0005	0.00052	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.00221	<0.0005	<0.0005	<0.0005
	Cobalt (Co)	mg/L	0.0009 ^a	0.004	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
	Copper (Cu)	mg/L	0.002	0.0024	0.0009	0.00086	0.00086	0.00088	0.00085	0.00051	0.00057	0.00078	0.00078	0.00086	0.00076	0.00078	0.00076
	Iron (Fe)	mg/L	0.30	0.874	0.107	0.092	0.1	0.061	0.094	0.011	0.019	0.063	0.075	0.088	0.058	0.074	0.069
	Lead (Pb)	mg/L	0.001	0.001	0.000091	0.000073	0.000085	0.000058	0.000078	<0.00005	<0.00005	0.000061	0.000065	0.000592	0.000051	0.000055	0.00006
	Magnesium (Mg)	mg/L	-	-	5.62	6.53	5.91	6.65	7.02	15.5	13.5	6.77	7	7.12	7.21	7.36	7.07
	Manganese (Mn)	mg/L	0.935 ^β	-	0.00131	0.00117	0.00126	0.00074	0.00149	0.0004	0.00046	0.00105	0.00115	0.00137	0.00102	0.00143	0.00132
	Mercury (Hg)	mg/L	0.000026	-	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005
	Molybdenum (Mo)	mg/L	0.073	-	0.000293	0.000254	0.000281	0.000214	0.000225	0.000246	0.000282	0.000239	0.000253	0.000253	0.000247	0.000237	0.000246
	Nickel (Ni)	mg/L	0.025	0.025	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0016	<0.0005	<0.0005	<0.0005
	Potassium (K)	mg/L	-	-	0.874	0.82	0.824	0.822	0.855	0.99	0.953	0.771	0.798	0.796	0.786	0.812	0.778
	Selenium (Se)	mg/L	0.001	-	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0.000154	0.000143	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
	Silicon (Si)	mg/L	-	-	0.96	0.99	0.94	1.01	1.1	0.8	0.82	0.94	1	1	0.94	1	0.96
	Silver (Ag)	mg/L	0.00025	0.0001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
	Sodium (Na)	mg/L	-	-	1.96	1.85	1.86	1.64	2.04	1.05	1.08	1.63	1.67	1.64	1.68	1.78	1.63
	Strontium (Sr)	mg/L	-	-	0.0112	0.0109	0.0109	0.0135	0.0108	0.0149	0.0141	0.0104	0.0104	0.0102	0.01	0.01	0.00995
	Thallium (Tl)	mg/L	0.0008	0.0008	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
	Tin (Sn)	mg/L	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.00013	<0.0001	<0.0001	<0.0001
	Titanium (Ti)	mg/L	-	-	0.00608	0.00554	0.00556	0.00367	0.00534	<0.0006	0.00112	0.00378	0.00431	0.00433	0.00331	0.0037	0.00374
	Uranium (U)	mg/L	0.015	-	0.00194	0.00183	0.00185	0.00142	0.00152	0.00172	0.00177	0.00142	0.0014	0.00134	0.00131	0.00131	0.00137
	Vanadium (V)	mg/L	0.006 ^a	0.006	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
	Zinc (Zn)	mg/L	0.02 ^a	0.030	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003

Indicates parameter concentration above applicable Water Quality Guideline.

BOLD

 Indicates parameter concentration above the AEMP benchmark.

Notes: AEMP: Aquatic Effects Monitoring Plan. "-" indicates no applicable WQG or AEMP benchmark.

^a Canadian Water Quality Guideline for the protection of aquatic life (CCME 2024) except those indicated by α (Ontario Provincial Water Quality Objective [PWQO]; OMOE 1994) and β (British Columbia Water Quality Guideline [BCWQG]; BCMOE 2024). See Table 2.2 for information regarding WQG criteria.

^b A conservative hardness value of 75 mg/L was used for guideline calculations dependent on hardness (i.e., sulphate, beryllium, cadmium, copper, lead, manganese, and nickel).

^b AEMP Water Quality Benchmarks developed by Intrinsic (2013) using baseline water quality data specific to the Mary River system.

Table C.58: Water Chemistry at Mary River (G0, E0, F0, C0 Series) Water Quality Monitoring Stations, Mary River Project CREMP, 2024

Parameters		Units	Water Quality Guideline (WQG) ^{a,b}	AEMP Benchmark ^c	Fall Sampling Event												
					G0-09-A	G0-09	G0-09-B	G0-03	G0-01	F0-01	E0-10	E0-03	E0-21	E0-20	C0-10	C0-05	C0-01
					30-Aug-24	30-Aug-24	30-Aug-24	30-Aug-24	30-Aug-24	30-Aug-24	30-Aug-24	31-Aug-24	31-Aug-24	30-Aug-24	30-Aug-24	30-Aug-24	30-Aug-24
Conventionals	Conductivity (lab)	µmho/cm	-	-	161	179	152	143	148	309	156	164	162	159	160	159	163
	pH (lab)	pH	6.5 - 9.0	-	7.96	7.92	7.86	7.92	7.98	8.04	7.94	7.9	7.88	7.97	7.86	7.8	7.79
	Hardness (as CaCO ₃)	mg/L	-	-	76	75	71.5	66.6	71	156	74.3	76.9	76.2	75.9	75.1	75.3	77.3
	Total Suspended Solids (TSS)	mg/L	-	-	<1.2	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1.2
	Total Dissolved Solids (TDS)	mg/L	-	-	69	84	85	74	59	175	89	75	78	83	79	95	87
	Turbidity	NTU	-	-	2.06	1.2	2.34	2.31	2.28	0.21	2.15	2.25	2.2	1.98	1.78	1.78	1.7
	Alkalinity (as CaCO ₃)	mg/L	-	-	79.2	91.1	74.5	67.4	69.1	107	71.6	75.7	75.7	73.5	73.6	72.7	71.7
Nutrients and Organics	Total Ammonia	mg/L	-	0.855	<0.005	0.0177	0.0057	<0.005	0.0053	<0.005	0.0067	<0.005	0.0068	<0.005	<0.005	<0.005	0.0055
	Nitrate	mg/L	3	3	<0.02	<0.02	<0.02	<0.02	<0.02	1.39	0.068	0.074	0.071	0.09	0.094	0.12	0.159
	Nitrite	mg/L	0.06	0.06	<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 (TKN)	mg/L	-	-	0.117	0.114	0.107	0.108	0.103	0.313	0.122	0.151	0.156	0.133	0.121	0.131	0.189
	Dissolved Organic Carbon	mg/L	-	-	1.94	1.79	1.4	1.42	1.69	1.42	1.49	2.16	1.72	3.18	6.93	2.34	1.91
	Total Organic Carbon	mg/L	-	-	1.81	1.68	1.71	1.74	1.67	1.86	1.61	1.83	1.81	1.85	1.93	2.27	2.38
	Total Phosphorus	mg/L	0.030 ^a	-	<0.002	0.0021	<0.002	<0.002	<0.002	<0.002	0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Anions	Phenols	mg/L	0.004 ^a	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
	Bromide (Br)	mg/L	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Chloride (Cl)	mg/L	120	120	3.6	2.51	4.48	3.48	3.33	3.85	3.37	3.52	3.49	3.18	3.12	3.34	3.33
	Sulphate (SO ₄)	mg/L	218 ^β	218	2.26	2.5	2.93	2.18	2.31	45.6	4.58	4.72	4.68	5.06	5.1	6.01	7.18
Total Metals	Aluminum (Al)	mg/L	0.100	0.966	0.0657	0.0998	0.0966	0.0977	0.0923	0.008	0.0815	0.0991	0.1	0.0901	0.0892	0.069	0.063
	Antimony (Sb)	mg/L	0.020 ^a	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
	Arsenic (As)	mg/L	0.005	0.005	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
	Barium (Ba)	mg/L	-	-	0.00939	0.00956	0.00946	0.00948	0.00983	0.0136	0.0102	0.0104	0.0104	0.0103	0.0104	0.0102	0.01
	Boron (B)	mg/L	1.5	-	<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
	Cadmium (Cd)	mg/L	0.00012	0.00006	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005
	Calcium (Ca)	mg/L	-	-	15.2	15.2	14.7	14.4	15.1	27.7	15.6	15.4	15.1	15.9	15.6	15.5	15.8
	Chromium (Cr)	mg/L	0.001	0.003	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
	Cobalt (Co)	mg/L	0.0009 ^a	0.004	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.00011	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
	Copper (Cu)	mg/L	0.002	0.0024	0.00091	0.00098	0.00101	0.00107	0.001	0.0008	0.00097	0.001	0.00101	0.00102	0.00132	0.001	0.00099
	Iron (Fe)	mg/L	0.30	0.874	0.045	0.07	0.068	0.065	0.061	<0.01	0.055	0.073	0.068	0.064	0.066	0.061	0.055
	Lead (Pb)	mg/L	0.001	0.001	<0.00005	0.000065	0.000064	0.000061	0.000063	<0.00005	0.000055	0.000071	0.000066	0.00006	0.000055	<0.00005	0.000052
	Magnesium (Mg)	mg/L	-	-	9.34	9.11	8.9	8.81	9.3	23.7	9.79	9.75	9.83	10.4	10.3	10.2	10.1
	Manganese (Mn)	mg/L	0.935 ^β	-	0.00055	0.0008	0.0008	0.0008	0.00073	0.0003	0.00068	0.00235	0.00207	0.00201	0.00171	0.0022	0.00209
	Mercury (Hg)	mg/L	0.000026	-	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005
	Molybdenum (Mo)	mg/L	0.073	-	0.000361	0.000403	0.000442	0.000381	0.000372	0.000385	0.000408	0.000529	0.000522	0.000486	0.000467	0.000491	0.000502
	Nickel (Ni)	mg/L	0.025	0.025	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.00052	0.00052	0.00068	0.00078	0.00073	0.00072
	Potassium (K)	mg/L	-	-	1.05	1.09	1.12	1.03	1.03	1.38	1.03	1.12	1.14	1.07	1.06	1.08	1.06
	Selenium (Se)	mg/L	0.001	-	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0.000493	<0.00005	<0.00005	<0.00005	0.000052	0.000055	<0.00005	0.000066
	Silicon (Si)	mg/L	-	-	0.97	1.07	1.01	1.07	1.08	0.75	1.04	1.1	1.06	1.11	1.08	1.02	1
	Silver (Ag)	mg/L	0.00025	0.0001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
	Sodium (Na)	mg/L	-	-	3.04	3	3.21	2.75	2.71	2.43	2.66	2.6	2.63	2.67	2.6	2.64	2.56
	Strontium (Sr)	mg/L	-	-	0.0162	0.0167	0.0168	0.0164	0.0153	0.0228	0.0156	0.0165	0.0164	0.0152	0.015	0.0158	0.0152
	Thallium (Tl)	mg/L	0.0008	0.0008	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
	Tin (Sn)	mg/L	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
	Titanium (Ti)	mg/L	-	-	0.00258	0.00402	0.00381	0.00366	0.00362	<0.0005	0.00313	0.00414	0.00389	0.00329	0.00345	0.00267	0.00246
	Uranium (U)	mg/L	0.015	-	0.00403	0.00409	0.00433	0.00316	0.00323	0.00316	0.00321	0.00331	0.00332	0.00283	0.00282	0.00271	0.00258
	Vanadium (V)	mg/L	0.006 ^a	0.006	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
	Zinc (Zn)	mg/L	0.030	0.030	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003

Indicates parameter concentration above applicable Water Quality Guideline.

BOLD

Indicates parameter concentration above the AEMP benchmark.

Notes: AEMP: Aquatic Effects Monitoring Plan. "-" indicates no applicable WQG or AEMP benchmark.

^a Canadian Water Quality Guideline for the protection of aquatic life (CCME 2024) except those indicated by α (Ontario Provincial Water Quality Objective [PWQO]; OMOE 1994) and β (British Columbia Water Quality Guideline [BCWQG]; BCMOE 2024). See Table 2.2 for information regarding WQG criteria.

^b A conservative hardness value of 75 mg/L was used for guideline calculations dependent on hardness (i.e., sulphate, beryllium, cadmium, copper, lead, manganese, and nickel).

^b AEMP Water Quality Benchmarks developed by Intrinsic (2013) using baseline water quality data specific to the Mary River system.

Table C.59: Summary of the Magnitude of Elevation in Seasonal Average Parameter Concentrations (Total Metal Concentration Data Provided) Between Mary River Mine-Exposed (G0, F0, E0, and C0 Series) and Reference (G0-09) Stations in 2024, and Between Mary River 2024 and Mine Baseline (2005 to 2013) Periods, Mary River Project CREMP, 2024

Variable	2024 vs Reference (G0-09) 2024																													
	Spring										Summer										Fall									
	G0-03	G0-01	F0-01	E0-10	E0-03	E0-21	E0-20	C0-10	C0-05	C0-01	G0-03	G0-01	F0-01	E0-10	E0-03	E0-21	E0-20	C0-10	C0-05	C0-01	G0-03	G0-01	F0-01	E0-10	E0-03	E0-21	E0-20	C0-10	C0-05	C0-01
Conductivity (lab)	0.693	0.780	2.53	1.34	0.634	0.630	0.666	0.679	0.834	0.770	1.03	1.07	1.97	1.82	1.07	1.08	1.10	1.10	1.10	1.10	0.872	0.902	1.88	0.951	1.00	0.988	0.970	0.976	0.970	0.994
pH (lab)	1.02	1.08	1.07	1.02	1.02	1.03	1.00	1.01	1.02	1.05	1.00	1.01	1.01	0.988	0.987	0.988	1.00	0.985	0.978	0.991	1.00	1.01	1.02	1.00	0.998	0.996	1.01	0.993	0.986	0.984
Hardness (as CaCO ₃)	0.645	0.758	2.61	1.43	0.584	0.584	0.666	0.635	0.809	0.747	1.04	1.19	2.09	1.94	1.10	1.11	1.13	1.11	1.12	1.13	0.898	0.957	2.10	1.00	1.04	1.03	1.02	1.01	1.02	1.04
Total Suspended Solids (TSS)	0.429	0.429	0.429	1.11	0.771	0.771	1.37	0.429	0.429	0.643	1.00	1.00	1.00	1.00	1.00	1.30	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.20
Total Dissolved Solids (TDS)	1.09	0.890	1.78	0.791	0.593	0.824	0.626	0.659	0.659	0.857	1.09	1.00	1.79	1.75	1.09	1.07	1.00	0.982	1.21	1.28	0.933	0.744	2.21	1.12	0.945	0.983	1.05	0.996	1.20	1.10
Turbidity	1.07	2.23	0.315	1.48	1.11	1.10	1.24	1.18	1.10	1.14	0.714	0.769	0.203	0.215	0.834	0.692	0.665	0.624	0.674	0.680	1.24	1.22	0.112	1.15	1.21	1.18	1.06	0.954	0.954	0.911
Alkalinity (as CaCO ₃)	0.629	0.700	2.15	1.24	0.559	0.549	0.589	0.589	0.685	0.639	1.01	1.09	1.66	1.56	1.05	1.03	1.09	1.09	1.09	1.08	0.826	0.847	1.31	0.877	0.928	0.928	0.901	0.902	0.891	0.879
Total Ammonia	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	3.32	1.00	1.16	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.528	0.560	0.528	0.708	0.528	0.718	0.528	0.528	0.528	0.581
Nitrate	1.00	1.00	10.0	2.85	1.00	1.00	1.00	1.00	1.40	1.25	1.00	1.00	15.2	13.5	1.00	1.00	1.70	1.20	1.05	1.25	1.00	1.00	69.5	3.40	3.70	3.55	4.50	4.70	6.00	7.95
Nitrite	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Total Kjeldahl Nitrogen (TKN)	1.06	1.00	1.12	1.00	1.00	1.00	1.00	1.98	1.52	2.10	0.805	1.24	0.886	1.31	0.723	0.900	1.12	1.05	0.914	0.818	0.959	0.914	2.78	1.08	1.34	1.38	1.18	1.07	1.16	1.68
Dissolved Organic Carbon	1.14	0.755	0.630	1.17	0.985	0.814	0.893	0.814	0.965	0.978	0.745	0.590	0.470	2.06	0.551	1.08	0.737	0.551	0.567	0.734	0.830	0.988	0.830	0.871	1.26	1.01	1.86	4.05	1.37	1.12
Total Organic Carbon	1.08	0.750	1.04	1.59	1.73	1.00	1.12	1.06	1.16	0.916	1.14	1.27	0.884	1.11	1.01	1.18	1.37	1.12	1.29	1.42	1.00	0.963	1.07	0.929	1.06	1.04	1.07	1.11	1.31	1.37
Total Phosphorus	1.11	0.766	0.426	0.745	1.09	1.19	1.04	0.915	0.957	1.02	0.720	1.14	0.600	0.600	0.630	0.780	0.600	0.600	0.690	0.600	0.984	0.984	0.984	0.984	0.984	0.984	0.984	0.984	0.984	0.984
Phenols	0.968	1.06	1.06	0.968	0.968	0.968	0.968	0.968	0.968	0.968	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Bromide (Br)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Chloride (Cl)	1.00	1.00	1.08	1.32	1.00	1.00	1.00	1.00	1.42	1.72	1.13	1.06	0.787	0.941	0.981	0.975	0.992	0.952	1.02	0.998	0.986	0.943	1.09	0.955	0.997	0.989	0.901	0.884	0.946	0.943
Sulphate (SO ₄)	1.00	1.00	24.8	8.50	1.27	1.30	1.27	1.33	3.70	3.60	0.865	1.05	15.4	13.2	1.89	2.04	2.38	1.91	1.91	1.81	0.850	0.901	17.8	1.79	1.84	1.83	1.97	1.99	2.34	2.80
Aluminum (Al)	1.21	1.33	0.348	0.864	0.946	1.01	1.21	0.945	1.12	1.23	0.730	1.01	0.112	0.217	0.636	0.833	0.851	0.590	0.749	0.729	1.12	1.06	0.0916	0.933	1.13	1.14	1.03	1.02	0.790	0.721
Antimony (Sb)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Arsenic (As)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Barium (Ba)	0.831	0.987	1.40	1.04	0.737	0.779	0.782	0.751	0.876	0.841	1.04	1.06	1.13	1.18	0.990	1.01	1.03	1.00	1.01	1.02	1.00	1.04	1.44	1.08	1.10	1.10	1.09	1.10	1.08	1.06
Boron (B)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Cadmium (Cd)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Calcium (Ca)	0.683	0.747	2.26	1.32	0.589	0.596	0.632	0.625	0.773	0.699	1.07	1.12	1.75	1.73	1.10	1.09	1.09	1.12	1.11	1.12	0.958	1.00	1.84	1.04	1.02	1.00	1.06	1.04	1.03	1.05
Chromium (Cr)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.987	0.987	0.987	0.987	0.987	0.987	4.36	0.987	0.987	0.987	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Cobalt (Co)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.10	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Copper (Cu)	0.993	1.11	0.993	0.993	0.993	0.993	0.993	0.993	0.993	0.993	1.01	0.973	0.584	0.653	0.893	0.893	0.985	0.870	0.893	0.870	1.11	1.03	0.828	1.00	1.03	1.04	1.06	1.37	1.03	1.02
Iron (Fe)	1.10	1.41	0.361	1.15	0.995	1.10	1.15	1.01	1.08	1.27	0.612	0.943	0.110	0.191	0.632	0.753	0.883	0.582	0.742	0.692	1.07	1.00	0.164	0.902	1.20	1.11	1.05	1.08	1.00	0.902
Lead (Pb)																														

Table C.59: Summary of the Magnitude of Elevation in Seasonal Average Parameter Concentrations (Total Metal Concentration Data Provided) Between Mary River Mine-Exposed (G0, F0, E0, and C0 Series) and Reference (G0-09) Stations in 2024, and Between Mary River 2024 and Mine Baseline (2005 to 2013) Periods, Mary River Project CREMP, 2024

Variable	2024 vs Baseline (2005 to 2013)																													
	Spring										Summer										Fall									
	G0-03	G0-01	F0-01	E0-10	E0-03	E0-21	E0-20	C0-10	C0-05	C0-01	G0-03	G0-01	F0-01	E0-10	E0-03	E0-21	E0-20	C0-10	C0-05	C0-01	G0-03	G0-01	F0-01	E0-10	E0-03	E0-21	E0-20	C0-10	C0-05	C0-01
Conductivity (lab)	0.812	0.784	1.58	1.12	0.594	1.14	0.968	0.548	0.458	0.634	1.08	1.26	1.28	1.93	1.06	1.32	1.29	1.07	1.34	1.15	0.879	0.971	1.34	0.885	0.748	0.877	0.859	0.797	0.854	0.929
pH (lab)	1.01	1.02	1.00	0.986	1.00	1.02	1.01	0.988	0.974	1.02	1.03	1.04	1.01	1.00	1.02	1.00	1.02	1.00	1.01	1.01	1.01	1.00	0.986	0.979	0.984	0.995	1.01	0.982	0.992	0.994
Hardness (as CaCO ₃)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Suspended Solids (TSS)	0.132	0.412	0.158	0.418	0.281	0.0857	0.237	0.182	0.500	0.172	0.196	0.316	0.500	0.366	0.211	0.650	0.500	0.255	0.222	0.219	0.456	0.414	0.452	0.343	0.386	0.300	0.429	0.486	0.500	0.417
Total Dissolved Solids (TDS)	1.46	1.01	1.29	0.755	0.615	1.67	1.03	0.612	0.417	0.750	0.962	0.969	0.982	1.55	0.897	1.08	0.966	0.825	1.23	1.11	0.671	0.602	1.21	0.777	0.536	0.648	0.690	0.616	0.787	0.783
Turbidity	1.06	1.98	0.483	1.43	0.917	0.870	0.903	0.936	0.990	1.06	0.297	0.386	1.44	0.123	0.333	0.494	0.555	0.280	0.222	0.323	0.647	0.398	0.425	0.408	0.458	0.327	0.483	0.533	0.454	0.587
Alkalinity (as CaCO ₃)	0.814	0.728	1.43	1.14	0.664	1.28	1.02	0.484	0.448	0.577	1.17	1.27	1.06	1.65	1.22	1.27	1.27	1.20	1.34	1.18	0.982	1.02	1.04	0.930	1.02	0.971	0.923	1.02	0.999	1.06
Total Ammonia	0.0526	0.0413	0.0783	0.110	0.0644	0.111	0.0139	0.0429	0.107	0.0593	0.0556	0.104	0.0759	0.123	0.0759	0.125	0.0588	0.0630	0.250	0.0672	0.0413	0.0912	0.0833	0.203	0.0928	0.185	0.214	0.0643	0.105	0.0556
Nitrate	0.400	0.286	2.43	0.512	0.220	0.200	0.200	0.374	0.280	0.296	0.400	0.358	5.40	2.70	0.367	0.200	0.340	0.480	0.210	0.500	0.338	0.372	13.7	0.637	1.12	0.710	0.900	1.73	1.14	2.04
Nitrite	5.00	5.00	4.44	4.29	5.00	2.00	2.00	4.33	3.00	5.00	3.33	1.53	3.06	1.90	1.60	2.00	2.00	2.04	1.67	2.29	3.60	2.88	2.23	2.42	2.58	1.76	1.76	2.69	5.00	3.00
Total Kjeldahl Nitrogen (TKN)	0.136	0.278	0.484	0.566	0.335	0.370	0.0735	0.270	0.400	0.259	0.486	0.769	0.506	0.693	0.366	0.550	0.443	0.510	0.312	0.438	1.07	0.922	1.77	0.859	1.20	1.42	1.17	0.743	0.759	1.35
Dissolved Organic Carbon	1.00	0.711	0.651	1.28	1.00	0.752	0.824	0.670	0.621	0.836	1.82	1.42	1.22	4.47	1.33	3.48	2.00	1.23	1.27	1.65	1.21	1.36	1.27	1.17	1.67	1.47	2.81	4.62	1.61	1.31
Total Organic Carbon	0.978	0.697	1.06	1.64	1.71	0.858	1.02	0.891	0.752	0.751	1.46	1.64	1.24	1.25	1.27	1.99	1.75	1.18	1.66	1.45	1.39	1.26	1.61	1.30	1.37	1.55	1.59	1.26	1.46	1.56
Total Phosphorus	0.639	0.873	0.119	0.222	0.439	0.303	0.350	0.0511	0.675	0.543	0.175	0.396	0.585	0.235	0.166	0.260	0.333	0.140	0.288	0.0952	0.304	0.219	0.259	0.223	0.162	0.222	0.353	0.278	0.276	0.420
Phenols	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bromide (Br)	2.00	2.00	1.20	2.00	1.76	0.400	0.400	1.51	2.00	2.00	2.00	2.00	1.00	2.00	1.82	0.400	0.400	2.00	0.400	2.00	2.00	2.00	0.919	2.00	0.994	0.400	0.400	1.67	0.400	2.00
Chloride (Cl)	0.484	0.349	0.214	0.343	0.148	0.500	0.500	0.120	0.142	0.412	0.382	0.742	0.287	0.584	0.238	0.684	0.696	0.252	0.509	0.326	0.662	0.546	0.381	0.522	0.158	0.419	0.398	0.187	0.267	0.287
Sulphate (SO ₄)	0.323	0.231	4.85	1.75	0.306	0.130	0.127	0.260	0.833	0.583	0.884	0.654	9.90	7.58	1.27	0.763	0.889	0.982	0.996	1.10	0.512	0.533	12.6	0.976	1.02	0.669	0.723	1.11	1.09	1.75
Aluminum (Al)	0.600	0.890	0.283	0.469	0.534	0.267	1.81	0.591	0.960	0.664	0.217	0.336	0.440	0.0939	0.189	0.295	0.435	0.173	0.340	0.254	0.837	0.569	0.643	0.400	0.511	0.326	0.478	0.758	0.457	0.698
Antimony (Sb)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.957	1.00	1.00	1.00	0.971	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Arsenic (As)	1.00	1.00	0.968	0.946	1.00	1.00	1.00	1.00	1.00	1.00	0.968	1.00	1.00	1.00	0.980	1.00	0.909	0.960	1.00	0.909	0.960	0.920	1.00	0.993	0.991	1.00	1.00	0.984	1.00	0.541
Barium (Ba)	0.695	0.701	0.992	0.717	0.590	0.651	1.05	0.548	0.468	0.576	0.773	0.873	0.952	0.987	0.763	0.918	0.984	0.783	0.922	0.823	0.918	0.991	1.43	1.05	0.823	0.817	0.860	0.904	0.891	0.978
Boron (B)	1.00	0.706	0.714	1.00	0.773	1.00	1.00	1.00	1.00	0.615	0.992	0.994	1.00	0.990	0.939	1.00	1.00	0.837	1.00	1.00	0.992	0.988	1.00	0.993	0.972	0.909	0.909	0.990	0.952	0.990
Cadmium (Cd)	0.470	0.500	0.493	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.232	0.425	0.500	0.475	0.427	0.500	0.500	0.497	0.500	0.484	0.409	0.500	0.500	0.488	0.435	0.500	0.500	0.452	0.417	0.489
Calcium (Ca)	0.800	0.794	1.34	1.08	0.528	1.11	0.990	0.465	0.407	0.570	1.05	1.20	0.964	1.64	0.951	1.21	1.17	0.945	1.25	1.04	0.896	0.968	1.14	0.919	0.662	0.868	0.909	0.727	0.808	0.871
Chromium (Cr)	1.24	1.27	1.82	1.66	1.85	0.585	1.96	1.91	5.00	2.05	0.592	1.05	2.53	1.25	0.759	0.0182	4.91	0.783	5.00	0.802	1.71	0.966	2.31	0.137	0.810	0.679	1.25	1.62	1.02	3.25
Cobalt (Co)	0.759	0.714	0.785	0.741	0.742	0.465	1.00	0.833	1.00	0.784	0.539	0.657	1.00	0.713	0.548	0.741	0.952	0.528	1.00	0.594	0.980	0.962	1.10	0.962	0.838	0.698	0.857	0.970	0.909	0.976
Copper (Cu)	0.599	0.587	0.575	0.610	0.466	0.680	1.18	0.605	0.645	0.728	0.570	0.554	0.666	0.346	0.508	0.339	0.699	0.572	0.796	0.584	1.02	0.888	1.14	0.823	0.847	0.703	1.03	1.26	0.948	1.01
Iron (Fe)	0.535	0.958	0.240	0.560	0.521	0.230	1.60	0.586	0.495	0.559	0.180	0.324	0.316	0.0805	0.185	0.169	0.496	0.182	0.296	0.216	0.597	0.414	0.833	0.361	0.457	0.291	0.376	0.6		

Table C.60: Dissolved metal Concentrations at Mary River (G0, E0, F0, C0 Series) Water Quality Monitoring Stations, Mary River Project CREMP, 2024


Parameters		Units	Spring Sampling Event													Summer Sampling Event					
			G0-09-A	G0-09	G0-09-B	G0-03	G0-01	F0-01	E0-10	E0-03	E0-21	E0-20	C0-10	C0-05	C0-01	G0-09-A	G0-09	G0-09-B	G0-03	G0-01	F0-01
			7-Jul-24	7-Jul-24	30-Jun-24	30-Jun-24	7-Jul-24	7-Jul-24	6-Jul-24	30-Jun-24	30-Jun-24	29-Jun-24	29-Jun-24	29-Jun-24	29-Jun-24	30-Jul-24	30-Jul-24	30-Jul-24	30-Jul-24	30-Jul-24	30-Jul-24
Dissolved Metals	Aluminum (Al)	mg/L	0.0173	0.0144	0.0399	0.0128	0.0324	0.0046	0.0142	0.0149	0.0125	0.0159	0.0159	0.0159	0.0150	0.0400	0.0207	0.0305	0.0268	0.0263	0.0024
	Antimony (Sb)	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
	Arsenic (As)	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
	Barium (Ba)	mg/L	0.0032	0.0030	0.0018	0.0018	0.0025	0.0042	0.0028	0.0016	0.0017	0.0017	0.0019	0.0022	0.0021	0.0060	0.0057	0.0063	0.0064	0.0067	0.0078
	Beryllium (Be)	mg/L	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002
	Bismuth (Bi)	mg/L	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
	Boron (B)	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	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	Cadmium (Cd)	mg/L	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005
	Calcium (Ca)	mg/L	4.9800	4.8600	2.1700	2.5100	3.0600	9.2800	5.2100	2.1800	2.2200	2.4200	2.4300	3.0400	2.7900	9.1000	9.3300	10.6000	9.9700	11.6000	16.9000
	Chromium (Cr)	mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
	Cobalt (Co)	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
	Copper (Cu)	mg/L	0.0004	0.0004	0.0003	0.0004	0.0004	0.0003	0.0004	0.0003	0.0003	0.0003	0.0003	0.0004	0.0003	0.0008	0.0007	0.0007	0.0008	0.0007	0.0005
	Iron (Fe)	mg/L	0.0100	<0.01	0.0190	<0.01	0.0200	<0.01	<0.01	<0.01	<0.01	0.0120	0.0100	0.0110	0.0100	0.0180	0.0150	0.0120	0.0160	0.0140	<0.01
	Lead (Pb)	mg/L	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
	Lithium (Li)	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.0010
	Magnesium (Mg)	mg/L	2.9000	2.6900	1.3500	1.5300	1.7400	6.7500	3.6100	1.4400	1.4200	1.6800	1.5400	2.0000	1.8600	5.5600	5.6400	6.3600	6.0900	6.9000	14.3000
	Manganese (Mn)	mg/L	0.0002	0.0003	0.0011	0.0006	0.0004	0.0001	0.0003	0.0006	0.0005	0.0007	0.0006	0.0008	0.0007	0.0003	0.0003	0.0002	0.0003	0.0003	0.0001
	Mercury (Hg)	mg/L	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005
	Molybdenum (Mo)	mg/L	0.0001	0.0001	<0.00005	<0.00005	0.0001	0.0002	0.0001	<0.00005	<0.00005	<0.00005	<0.00005	0.0001	0.0001	0.0003	0.0003	0.0002	0.0002	0.0002	0.0002
	Nickel (Ni)	mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
	Potassium (K)	mg/L	0.4680	0.4380	0.3190	0.3220	0.3680	0.6380	0.4330	0.2980	0.2930	0.2900	0.2920	0.3630	0.3360	0.8230	0.7760	0.7930	0.7520	0.8140	0.9470
	Selenium (Se)	mg/L	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0.0001	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0.0002
	Silicon (Si)	mg/L	0.5760	0.5040	0.3430	0.3390	0.4380	0.4790	0.4060	0.2800	0.2730	0.2900	0.3000	0.3080	0.2990	0.8020	0.7400	0.8280	0.8570	0.9110	0.7190
	Silver (Ag)	mg/L	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
	Sodium (Na)	mg/L	0.5300	0.4780	0.3990	0.3140	0.4480	0.4290	0.3540	0.3080	0.3070	0.3280	0.3200	0.4160	0.3950	1.8600	1.7600	1.8600	1.5300	2.0700	1.0200
	Strontium (Sr)	mg/L	0.0042	0.0039	0.0021	0.0030	0.0031	0.0069	0.0040	0.0020	0.0020	0.0021	0.0021	0.0029	0.0026	0.0113	0.0103	0.0114	0.0128	0.0115	0.0144
	Thallium (Tl)	mg/L	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
	Tin (Sn)	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
	Titanium (Ti)	mg/L	0.0006	0.0006	0.0010	0.0004	0.0011	<0.0003	0.0005	0.0005	0.0005	0.0005	0.0004	0.0004	0.0005	0.0010	0.0008	0.0007	0.0008	<0.0008	<0.0003
	Uranium (U)	mg/L	0.0001	0.0001	0.0001	0.0001	0.0001	0.0004	0.0002	0.0001	0.0001	0.0001	0.0001	0.0002	0.0001	0.0020	0.0019	0.0019	0.0015	0.0017	0.0018
	Vanadium (V)	mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
	Zinc (Zn)	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001


Table C.60: Dissolved metal Concentrations at Mary River (G0, E0, F0, C0 Series) Water Quality Monitoring Stations, Mary River Project CREMP, 2024


Parameters		Units	Summer Sampling Event							Fall Sampling Event												
			E0-10	E0-03	E0-21	E0-20	C0-10	C0-05	C0-01	G0-09-A	G0-09	G0-09-B	G0-03	G0-01	F0-01	E0-10	E0-03	E0-21	E0-20	C0-10	C0-05	C0-01
			30-Jul-24	30-Jul-24	30-Jul-24	30-Jul-24	30-Jul-24	30-Jul-24	30-Jul-24	30-Jul-24	30-Aug-24	30-Aug-24	30-Aug-24	30-Aug-24	30-Aug-24	30-Aug-24	30-Aug-24	31-Aug-24	31-Aug-24	30-Aug-24	30-Aug-24	30-Aug-24
Dissolved Metals	Aluminum (Al)	mg/L	0.0074	0.0465	0.0304	0.0284	0.0209	0.0184	0.0165	0.0114	0.0168	0.0166	0.0234	0.0146	0.0030	0.0224	0.0258	0.0218	0.0189	0.1170	0.0192	0.0095
	Antimony (Sb)	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	1.0095
	Arsenic (As)	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	2.0095
	Barium (Ba)	mg/L	0.0074	0.0062	0.0063	0.0064	0.0065	0.0063	0.0063	0.0086	0.0084	0.0084	0.0086	0.0088	0.0129	0.0092	0.0094	0.0093	0.0093	0.0099	0.0093	3.0095
	Beryllium (Be)	mg/L	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	4.0095
	Bismuth (Bi)	mg/L	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	5.0095
	Boron (B)	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	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	6.0095
	Cadmium (Cd)	mg/L	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	7.0095
	Calcium (Ca)	mg/L	15.8000	10.2000	10.4000	10.5000	10.4000	10.4000	10.5000	15.6000	15.3000	14.3000	13.7000	14.6000	27.0000	14.8000	15.4000	15.2000	15.4000	14.8000	14.8000	8.0095
	Chromium (Cr)	mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	9.0095
	Cobalt (Co)	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	10.0095
	Copper (Cu)	mg/L	0.0005	0.0007	0.0007	0.0007	0.0007	0.0007	0.0006	0.0007	0.0008	0.0008	0.0008	0.0008	0.0006	0.0007	0.0008	0.0008	0.0008	0.0009	0.0008	11.0095
	Iron (Fe)	mg/L	<0.01	0.0120	0.0130	0.0140	0.0120	0.0160	0.0120	<0.01	<0.01	<0.01	0.0100	<0.01	<0.01	<0.01	0.0100	<0.01	<0.01	0.0660	0.0150	12.0095
	Lead (Pb)	mg/L	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0.0001	<0.00005	13.0095
	Lithium (Li)	mg/L	0.0010	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.0016	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	14.0095
	Magnesium (Mg)	mg/L	13.2000	6.7000	6.6500	6.9200	6.7100	6.7600	6.8300	9.0000	8.9300	8.7000	7.8800	8.4000	21.6000	9.0600	9.3300	9.2800	9.1000	9.2700	9.3100	15.0095
	Manganese (Mn)	mg/L	0.0001	0.0003	0.0003	0.0004	0.0004	0.0007	0.0005	0.0001	0.0001	0.0002	0.0002	0.0001	<0.0001	0.0002	0.0016	0.0013	0.0011	0.0019	0.0014	16.0095
	Mercury (Hg)	mg/L	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	17.0095
	Molybdenum (Mo)	mg/L	0.0002	0.0002	0.0003	0.0003	0.0003	0.0003	0.0002	0.0003	0.0003	0.0004	0.0004	0.0004	0.0004	0.0004	0.0004	0.0005	0.0005	0.0005	0.0005	18.0095
	Nickel (Ni)	mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0006	0.0006	19.0095
	Potassium (K)	mg/L	0.9290	0.7480	0.7590	0.7620	0.7540	0.7460	0.7390	0.9200	0.9690	0.9930	0.9500	0.9580	1.3200	0.9770	1.0000	1.0100	0.9820	1.0400	1.0100	20.0095
	Selenium (Se)	mg/L	0.0001	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0.0005	<0.00005	<0.00005	<0.00005	0.0001	0.0001	<0.00005	21.0095
	Silicon (Si)	mg/L	0.7450	0.8070	0.8560	0.8530	0.8140	0.8210	0.7820	0.8300	0.8360	0.7870	0.8890	0.8760	0.7070	0.8980	0.8840	0.8490	0.9090	1.0900	0.8670	22.0095
	Silver (Ag)	mg/L	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	23.0095
	Sodium (Na)	mg/L	1.1300	1.5900	1.5700	1.6100	1.5900	1.5600	1.6000	2.7800	2.9400	3.1000	2.4200	2.4900	2.1200	2.4600	2.5000	2.5400	2.3900	2.3400	2.3500	24.0095
	Strontium (Sr)	mg/L	0.0139	0.0101	0.0105	0.0100	0.0102	0.0100	0.0099	0.0161	0.0165	0.0176	0.0167	0.0155	0.0229	0.0161	0.0162	0.0163	0.0154	0.0154	0.0157	25.0095
	Thallium (Tl)	mg/L	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	26.0095
	Tin (Sn)	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	27.0095
	Titanium (Ti)	mg/L	<0.0003	0.0008	0.0009	0.0007	<0.0006	0.0006	0.0005	0.0004	0.0005	0.0005	0.0006	0.0004	<0.0003	0.0006	0.0006	0.0006	0.0005	0.0039	0.0006	28.0095
	Uranium (U)	mg/L	0.0018	0.0014	0.0015	0.0014	0.0014	0.0014	0.0014	0.0037	0.0037	0.0039	0.0030	0.0030	0.0030	0.0031	0.0031	0.0031	0.0027	0.0028	0.0026	29.0095
	Vanadium (V)	mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	30.0095
	Zinc (Zn)	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.0012	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	31.0095

Table C.61: Summary of the Magnitude of Elevation in Seasonal Average Dissolved Metal Concentrations Between Mary River Mine-Exposed (G0, F0, E0, and C0 Series) and Reference (G0-09) Stations in 2024 and between Mary River Mine-Exposed and Mine Baseline Period (2005 to 2013), Mary River Project CREMP, 2024

Variable	Mary River and Mary River Tributary F 2024 vs Mary River Reference 2024																													
	Spring										Summer										Fall									
	G0-03	G0-01	F0-01	E0-10	E0-03	E0-21	E0-20	C0-10	C0-05	C0-01	G0-03	G0-01	F0-01	E0-10	E0-03	E0-21	E0-20	C0-10	C0-05	C0-01	G0-03	G0-01	F0-01	E0-10	E0-03	E0-21	E0-20	C0-10	C0-05	C0-01
Aluminum (Al)	0.536	1.36	0.193	0.595	0.624	0.524	0.666	0.666	0.666	0.628	0.882	0.865	0.0789	0.243	1.53	1.00	0.934	0.688	0.605	0.543	1.57	0.978	0.201	1.50	1.73	1.46	1.27	7.83	1.29	1.18
Antimony (Sb)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Arsenic (As)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Barium (Ba)	0.691	0.924	1.58	1.07	0.608	0.620	0.653	0.695	0.826	0.777	1.07	1.12	1.30	1.24	1.04	1.04	1.06	1.08	1.05	1.05	1.02	1.04	1.53	1.09	1.12	1.10	1.10	1.17	1.09	1.09
Beryllium (Be)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Bismuth (Bi)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Boron (B)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Cadmium (Cd)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Calcium (Ca)	0.627	0.764	2.32	1.30	0.545	0.555	0.604	0.607	0.759	0.697	1.03	1.20	1.75	1.63	1.05	1.07	1.09	1.07	1.07	1.09	0.909	0.969	1.79	0.982	1.02	1.01	1.02	0.982	0.982	1.02
Chromium (Cr)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Cobalt (Co)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Copper (Cu)	0.921	1.03	0.816	0.921	0.816	0.763	0.789	0.737	1.00	0.842	1.12	0.968	0.650	0.719	0.995	0.940	0.982	0.940	0.899	0.857	1.04	1.05	0.865	0.973	1.07	1.05	1.05	1.19	1.07	1.07
Iron (Fe)	0.769	1.54	0.769	0.769	0.769	0.769	0.923	0.769	0.846	0.769	1.07	0.933	0.667	0.667	0.800	0.867	0.933	0.800	1.07	0.800	1.00	1.00	1.00	1.00	1.00	1.00	1.00	6.60	1.50	1.30
Lead (Pb)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.36	1.00	1.00
Lithium (Li)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.60	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Magnesium (Mg)	0.661	0.752	2.92	1.56	0.622	0.614	0.726	0.666	0.865	0.804	1.04	1.18	2.44	2.26	1.14	1.14	1.18	1.15	1.15	1.17	0.888	0.946	2.43	1.02	1.05	1.05	1.03	1.04	1.05	1.07
Manganese (Mn)	1.12	0.784	0.235	0.627	1.14	1.06	1.27	1.22	1.55	1.43	1.15	1.00	0.385	0.423	1.15	1.08	1.46	1.46	2.73	1.81	1.29	1.00	0.714	1.29	11.4	9.21	8.14	13.5	9.79	8.71
Mercury (Hg)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Molybdenum (Mo)	0.893	1.09	3.14	1.77	0.893	0.893	0.893	0.893	1.73	1.46	0.888	0.833	0.844	0.855	0.859	0.921	0.928	0.943	0.917	0.892	1.03	1.06	1.03	1.06	1.35	1.32	1.32	1.27	1.35	1.40
Nickel (Ni)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.24	1.12	1.18
Potassium (K)	0.789	0.901	1.56	1.06	0.730	0.718	0.710	0.715	0.889	0.823	0.943	1.02	1.19	1.17	0.938	0.952	0.956	0.946	0.936	0.927	0.989	0.997	1.37	1.02	1.04	1.05	1.02	1.08	1.05	1.06
Selenium (Se)	1.00	1.00	2.04	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	3.38	2.72	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	10.7	1.00	1.00	1.00	1.08	1.00	1.00	1.16
Silicon (Si)	0.715	0.923	1.01	0.856	0.590	0.576	0.611	0.632	0.649	0.630	1.08	1.15	0.910	0.943	1.02	1.08	1.08	1.03	1.04	0.990	1.09	1.07	0.865	1.10	1.08	1.04	1.11	1.33	1.06	1.06
Silver (Ag)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Sodium (Na)	0.670	0.955	0.915	0.755	0.657	0.655	0.699	0.682	0.887	0.842	0.838	1.13	0.558	0.619	0.870	0.859	0.881	0.870	0.854	0.876	0.823	0.847	0.721	0.837	0.850	0.864	0.813	0.796	0.799	0.786
Strontium (Sr)	0.863	0.895	2.00	1.17	0.574	0.571	0.612	0.618	0.848	0.767	1.16	1.05	1.31	1.26	0.918	0.955	0.909	0.927	0.908	0.901	0.998	0.926	1.37	0.962	0.968	0.974	0.920	0.920	0.938	0.920
Thallium (Tl)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Tin (Sn)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Titanium (Ti)	0.475	1.48	0.407	0.679	0.611	0.652	0.679	0.570	0.557	0.624	0.901	0.949	0.356	0.356	0.949	1.06	0.830	0.711	0.711	0.593	1.31	0.880	0.677	1.31	1.44	1.33	1.08	8.84	1.29	0.947
Uranium (U)	0.633	0.879	3.11	1.41	0.600	0.616	0.641	0.658	1.24	1.02	0.772	0.854	0.926	0.911	0.741	0.751	0.726	0.700	0.705	0.720	0.807	0.810	0.807	0.816	0.840	0.824	0.725	0.735	0.695	0.655
Vanadium (V)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Zinc (Zn)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.937	0.937	0.937	0.937	0.937	0.937	0.937	0.937	0.937	0.937

 Denotes slight elevation (mean concentration three to five times higher than respective mean reference or baseline period value).

 Denotes moderate elevation (mean concentration five to 10 times higher than respective mean reference or baseline period value).

 Denotes highly elevated concentration (mean concentration≥ 10 times higher than respective mean reference or baseline period value).





 Denotes differences in method detection limit between the indicated study area and that of the reference area or baseline period, precluding an evaluation of magnitude of elevation.

Table C.61: Summary of the Magnitude of Elevation in Seasonal Average Dissolved Metal Concentrations Between Mary River Mine-Exposed (G0, F0, E0, and C0 Series) and Reference (G0-09) Stations in 2024 and between Mary River Mine-Exposed and Mine Baseline Period (2005 to 2013), Mary River Project CREMP, 2024

Variable	Mary River and Mary River Tributary F 2024 vs Baseline																													
	Spring										Summer										Fall									
	G0-03	G0-01	F0-01	E0-10	E0-03	E0-21	E0-20	C0-10	C0-05	C0-01	G0-03	G0-01	F0-01	E0-10	E0-03	E0-21	E0-20	C0-10	C0-05	C0-01	G0-03	G0-01	F0-01	E0-10	E0-03	E0-21	E0-20	C0-10	C0-05	C0-01
Aluminum (Al)	0.0826	0.283	0.510	0.101	0.110	0.0433	0.311	0.0896	0.179	0.0557	0.0775	0.0850	0.521	0.0310	0.134	0.104	0.141	0.0594	0.127	0.195	0.201	0.0900	0.857	0.110	0.133	0.0710	0.100	0.995	0.127	0.195
Antimony (Sb)	1.00	1.00	0.571	1.00	1.00	1.00	1.00	0.800	1.00	1.00	0.957	1.00	0.727	1.00	0.971	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Arsenic (As)	1.00	1.00	1.00	0.946	1.00	1.00	1.00	0.944	1.00	0.909	0.968	1.00	1.00	1.00	0.980	1.00	0.909	0.960	1.00	0.541	0.960	0.920	1.00	0.993	0.991	1.00	1.00	0.984	1.00	0.541
Barium (Ba)	0.535	0.607	0.607	0.681	0.451	0.480	0.809	0.0291	0.408	0.768	0.721	0.833	0.939	0.936	0.701	0.864	0.918	0.735	0.808	0.901	0.835	0.876	1.43	0.930	0.738	0.730	0.778	0.851	0.808	0.901
Beryllium (Be)	0.333	0.0400	0.0151	1.00	0.333	0.333	0.333	0.121	0.0400	1.00	1.00	1.00	0.0262	1.00	1.00	1.00	1.00	1.00	0.0400	1.00	0.500	1.00	0.0600	1.00	1.00	1.00	1.00	1.00	0.0400	1.00
Bismuth (Bi)	0.150	0.167	0.125	0.100	0.150	0.100	0.100	0.139	0.100	0.167	0.167	0.167	0.133	0.100	0.167	0.100	0.100	0.167	0.100	0.167	0.167	0.167	0.114	0.100	0.167	0.100	0.100	0.167	0.100	0.167
Boron (B)	1.00	0.706	1.00	1.00	0.773	1.00	1.00	0.937	1.00	1.00	0.992	0.994	1.00	0.990	0.939	1.00	1.00	0.837	0.952	0.990	0.992	0.988	1.00	0.993	0.972	0.909	0.909	0.990	0.952	0.990
Cadmium (Cd)	0.470	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.484	0.232	0.425	0.500	0.475	0.427	0.500	0.500	0.497	0.417	0.489	0.409	0.500	0.480	0.488	0.435	0.500	0.500	0.452	0.417	0.489
Calcium (Ca)	0.752	0.832	1.46	1.09	0.501	1.05	0.970	0.379	0.410	1.01	1.01	1.29	0.967	1.55	0.915	1.20	1.17	0.910	0.772	0.844	0.852	0.936	1.08	0.872	0.662	0.874	0.880	0.689	0.772	0.844
Chromium (Cr)	1.24	1.27	5.00	1.66	1.85	0.585	1.96	1.87	5.00	0.802	0.592	1.05	5.00	1.25	0.759	0.0182	1.11	0.783	1.02	3.25	1.71	0.966	1.61	0.137	0.810	0.679	1.25	1.62	1.02	3.25
Cobalt (Co)	0.759	0.714	0.824	0.741	0.742	0.465	1.00	0.833	1.00	0.594	0.539	0.657	0.842	0.713	0.548	0.741	0.952	0.528	0.909	0.976	0.980	0.962	0.783	0.906	0.838	0.698	0.857	0.970	0.909	0.976
Copper (Cu)	0.419	0.409	0.311	0.427	0.289	0.395	0.706	0.00139	0.490	0.476	0.525	0.456	0.0000798	0.316	0.468	0.296	0.577	0.512	0.749	0.808	0.731	0.693	0.930	0.611	0.669	0.543	0.791	0.843	0.749	0.808
Iron (Fe)	0.104	0.196	0.366	0.0700	0.0754	0.0303	0.240	0.0570	0.0725	0.0376	0.0861	0.0482	0.432	0.0424	0.0353	0.0293	0.0789	0.0377	0.0932	0.116	0.124	0.0678	0.394	0.0656	0.0626	0.0429	0.0588	0.604	0.0932	0.116
Lead (Pb)	0.288	0.204	0.571	0.124	0.195	0.167	0.667	0.278	0.345	0.167	0.148	0.142	0.678	0.198	0.127	0.233	0.312	0.128	0.366	0.488	0.472	0.392	0.813	0.444	0.288	0.254	0.395	0.738	0.366	0.488
Lithium (Li)	1.56	0.200	2.00	1.02	3.64	2.78	3.64	0.554	0.200	3.45	1.20	1.24	0.505	1.00	1.12	1.20	1.30	2.94	0.200	1.14	0.939	1.04	1.18	1.02	0.837	0.985	0.465	0.813	0.200	1.14
Magnesium (Mg)	0.819	0.820	1.91	1.37	0.647	1.01	1.07	0.507	0.482	1.25	1.08	1.39	1.50	2.32	1.22	1.39	1.37	1.18	1.24	1.03	0.853	0.951	1.56	0.926	0.874	0.878	0.746	0.862	1.24	1.03
Manganese (Mn)	0.119	0.106	0.115	0.0445	0.124	0.0629	0.192	0.102	0.130	0.0979	0.0641	0.0562	0.457	0.0275	0.0533	0.0533	0.166	0.0643	0.441	0.484	0.122	0.0807	0.410	0.116	0.699	0.457	0.238	0.855	0.441	0.484
Mercury (Hg)	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.469	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500
Molybdenum (Mo)	0.733	0.433	1.34	1.46	0.344	0.885	0.794	0.000250	0.795	0.854	1.06	0.991	1.22	1.10	0.812	0.810	1.05	0.850	1.15	1.36	1.12	1.13	1.62	1.19	0.893	0.838	1.08	0.784	1.15	1.36
Nickel (Ni)	0.674	0.862	0.141	0.484	0.735	0.552	1.00	0.00708	0.621	0.507	0.499	0.589	0.311	0.521	0.510	0.469	0.806	0.448	0.671	0.819	0.801	0.901	0.327	0.907	0.684	0.694	0.586	0.701	0.671	0.819
Potassium (K)	0.749	0.892	2.02	1.17	0.740	0.807	0.959	0.547	0.593	0.859	0.833	0.993	1.36	1.19	0.858	0.888	0.937	0.901	0.896	1.09	0.951	1.02	1.21	0.999	0.925	0.684	0.753	0.993	0.896	1.09
Selenium (Se)	5.00	0.500	1.02	5.00	3.33	5.00	5.00	0.00337	0.500	5.00	5.00	5.00	1.69	13.6	5.00	5.00	5.00	5.00	5.00	5.80	2.50	5.00	5.35	5.00	5.00	5.00	0.540	0.500	0.500	5.80
Silicon (Si)	0.466	0.429	1.75	0.444	0.402	0.366	0.906	0.285	0.382	0.522	0.562	0.553	1.02	0.533	0.493	0.719	0.879	0.465	0.778	0.798	0.766	0.778	0.878	0.876	0.712	0.672	0.777	0.978	0.778	0.798
Silver (Ag)	10.0	1.00	1.32	10.0	1.47	10.0	10.0	0.000515	1.00	0.759	1.32	1.63	1.47	10.0	1.30	10.0	10.0	1.06	10.0	10.0	10.0	10.0	0.424	10.0	5.77	10.0	10.0	10.0	10.0	10.0
Sodium (Na)	0.807	1.33	1.33	1.16	0.894	0.660	0.697	0.605	0.601	1.39	1.14	1.92	1.56	1.13	1.31	1.16	1.17	1.39	0.922	1.13	1.06	1.25	1.56	1.20	1.00	0.805	0.692	1.25	0.922	1.13
Strontium (Sr)	1.02	0.980	1.74	1.12	0.248	0.781	0.879	0.0290	0.333	0.712	1.36	1.32	1.22	1.53	0.561	1.24	1.21	0.607	0.638	0.561	1.15	1.09	1.23	1.09	0.362	1.01	0.553	0.461	0.638	0.561
Thallium (Tl)	1.67	0.100	0.217	0.909	1.82	1.54	1.82	0.340	0.100	10.0	1.67	10.0	0.571	10.0	1.82	1.43	1.82	10.0	0.100	10.0	1.54	10.0	0.182	10.0	1.18	0.769	1.00	1.00	0.100	10.0
Tin (Sn)	0.610	1.00	0.132	1.00	0.725	1.00	1.00	0.750	1.00	0.984	0.818	0.824	0.0791	0.938	0.505	1.00	1.00	0.921	1.00	1.00	1.00	1.00	0.591	1.00	0.993	1.00	1.00	1.00	1.00	1.00
Titanium (Ti)	0.0259	0.0948	0.0462	0.0222	0.0360	0.0192	0.0500	0.0402	0.0390	0.0226	0.0304	0.0330	0.0364	0.0121	0.0272	0.0445	0.0467	0.0211	0.0456	0.0804	0.0928	0.0505	0.0336	0.0479	0.0742	0.0295	0.0360	0.819	0.0456	0.0804
Uranium (U)	0.227	0.218	1.08	0.480	0.354	0.348	0.467	0.220	0.427	1.00	0.999	1.06	1.23	1.20	1.01	1.62	1.73	0.889	0.799	0.902	0.804	0.801	1.22	0.865	0.802	0.791	0.783	0.819	0.799	0.902
Vanadium (V)	0.532	0.556	0.547	0.470	0.552	0.435	0.500	0.494	0.500	0.409	0.441	0.497	0.472	0.477	0.448	0.500	0.500	0.445	0.500	0.556	0.556	0.552	0.452	0.500	0.536	0.484	0.500	0.556	0.500	0.556
Zinc (Zn)	0.200	0.148	0.755	0.203	0.381	1.00	0.333	0.533	1.00	0.382	0.339	0.380	0.640	0.245	0.374	0.308	1.00	0.400	1.00	0.843	0.429	0.865	0.000271	0.458	0.757	3.03	0.556	0.875	1.00	0.843

 Denotes slight elevation (mean concentration three to five times higher than respective mean reference or baseline period value).

 Denotes moderate elevation (mean concentration five to 10 times higher than respective mean reference or baseline period value).

 Denotes highly elevated concentration (mean concentration ≥ 10 times higher than respective mean reference or baseline period value).


 Denotes differences in method detection limit between the indicated study area and that of the reference area or baseline period, precluding an evaluation of magnitude of elevation.

Table C.62: *In Situ* Water Quality Profile Data Collected at Mary Lake (North Basin [BL0-01]; and South Basin [BL0]) Water Quality Monitoring Stations, Mary River Project CREMP, Winter 2024

Depth (m)	Temperature (°C)										Dissolved Oxygen (mg/L)									
	BL0-01-A	BL0-01	BL0-01-B	BL0-05-A	BL0-05	BL0-05-B	BL0-03	BL0-04	BL0-09	BL0-06	BL0-01-A	BL0-01	BL0-01-B	BL0-05-A	BL0-05	BL0-05-B	BL0-03	BL0-04	BL0-09	BL0-06
	10-Apr-24	10-Apr-24	10-Apr-24	11-Apr-24	11-Apr-24	11-Apr-24	12-Apr-24	12-Apr-24	12-Apr-24	11-Apr-24	10-Apr-24	10-Apr-24	10-Apr-24	11-Apr-24	11-Apr-24	11-Apr-24	12-Apr-24	12-Apr-24	12-Apr-24	11-Apr-24
1.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2.0	0.100	0.300	0	0.300	0.200	0.300	0.100	0.100	0.300	0.400	13.2	13.1	13.6	13.9	14.2	15.3	14.5	15.0	14.5	14.8
3.0	0.300	0.200	0.200	0.500	0.600	0.500	0.500	0.500	0.600	0.500	13.3	13.7	13.7	14.2	14.2	15.3	14.4	14.8	14.4	14.6
4.0	0.400	0.200	0.300	0.800	0.800	0.700	0.600	0.800	0.800	0.700	13.3	13.8	13.7	14.2	14.2	15.2	14.3	14.6	14.2	14.5
5.0	0.500	0.400	-	0.900	0.900	0.800	-	0.900	0.900	0.800	13.3	13.8	-	14.1	14.0	15.0	-	14.3	14.1	14.4
6.0	0.500	0.400	-	1.00	1.00	0.800	0.900	1.00	1.00	0.900	13.2	13.7	-	14.0	13.9	15.4	14.0	14.2	13.9	14.2
7.0	0.600	0.500	-	1.00	1.00	0.900	1.00	1.00	1.00	1.00	13.1	13.7	-	13.9	13.8	15.3	13.9	14.1	13.9	14.2
8.0	0.700	0.600	-	1.00	1.00	-	-	1.00	1.00	1.00	12.8	13.5	-	13.9	13.8	-	-	14.0	13.8	14.1
9.0	0.700	0.700	-	1.00	1.00	-	1.00	1.00	1.00	-	12.4	13.4	-	13.8	13.7	-	13.8	13.9	13.7	-
10.0	0.800	-	-	1.10	1.10	-	-	1.10	1.10	-	11.9	-	-	13.8	13.6	-	-	13.8	13.7	-
11.0	0.900	-	-	1.10	1.10	-	1.00	1.10	1.10	-	10.8	-	-	13.7	13.6	-	13.6	13.7	13.6	-
12.0	1.00	-	-	-	1.10	-	1.10	1.10	1.10	-	_a	-	-	-	13.5	-	13.5	13.6	13.5	-
13.0	1.10	-	-	-	1.10	-	1.10	1.10	1.10	-	4.02	-	-	-	13.4	-	13.3	13.4	13.4	-
14.0	1.20	-	-	-	1.10	-	1.10	1.20	1.10	-	2.00	-	-	-	13.4	-	13.3	13.3	13.4	-
15.0	1.30	-	-	-	1.20	-	1.10	1.20	1.10	-	1.21	-	-	-	13.2	-	13.1	13.2	13.3	-
16.0	-	-	-	-	1.20	-	1.10	1.20	1.20	-	-	-	-	-	13.1	-	12.9	13.0	13.1	-
17.0	-	-	-	-	1.20	-	-	1.20	1.20	-	-	-	-	-	13.0	-	-	13.0	12.9	-
18.0	-	-	-	-	1.20	-	-	1.20	1.30	-	-	-	-	-	12.9	-	-	13.0	12.8	-
19.0	-	-	-	-	1.30	-	-	1.30	1.30	-	-	-	-	-	12.7	-	-	12.9	12.6	-
20.0	-	-	-	-	1.30	-	-	1.30	1.30	-	-	-	-	-	12.6	-	-	12.8	12.5	-
21.0	-	-	-	-	-	-	-	-	1.30	-	-	-	-	-	-	-	-	-	12.3	-
22.0	-	-	-	-	-	-	-	-	1.40	-	-	-	-	-	-	-	-	-	12.2	-
23.0	-	-	-	-	-	-	-	-	1.40	-	-	-	-	-	-	-	-	-	12.1	-
24.0	-	-	-	-	-	-	-	-	1.50	-	-	-	-	-	-	-	-	-	11.8	-
25.0	-	-	-	-	-	-	-	-	1.50	-	-	-	-	-	-	-	-	-	11.5	-
26.0	-	-	-	-	-	-	-	-	1.50	-	-	-	-	-	-	-	-	-	11.3	-
27.0	-	-	-	-	-	-	-	-	1.70	-	-	-	-	-	-	-	-	-	11.0	-
28.0	-	-	-	-	-	-	-	-	1.70	-	-	-	-	-	-	-	-	-	10.5	-
29.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
30.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes: "-" = data not available. The total depth of the water column at each sampling station was not recorded but deepest measurements are within 1 m of lake bottom.

Table C.62: *In Situ* Water Quality Profile Data Collected at Mary Lake (North Basin [BL0-01]; and South Basin [BL0]) Water Quality Monitoring Stations, Mary River Project CREMP, Winter 2024

Depth (m)	Dissolved Oxygen (% Saturation)										pH (pH units)									
	BL0-01-A	BL0-01	BL0-01-B	BL0-05-A	BL0-05	BL0-05-B	BL0-03	BL0-04	BL0-09	BL0-06	BL0-01-A	BL0-01	BL0-01-B	BL0-05-A	BL0-05	BL0-05-B	BL0-03	BL0-04	BL0-09	BL0-06
	10-Apr-24	10-Apr-24	10-Apr-24	11-Apr-24	11-Apr-24	11-Apr-24	12-Apr-24	12-Apr-24	12-Apr-24	11-Apr-24	10-Apr-24	10-Apr-24	10-Apr-24	11-Apr-24	11-Apr-24	11-Apr-24	12-Apr-24	12-Apr-24	12-Apr-24	11-Apr-24
1.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2.0	93.1	93.8	95.1	99.0	100	108	101	105	101	104	7.65	7.73	7.61	7.54	7.62	7.66	7.47	7.54	7.71	7.65
3.0	94.0	96.5	96.5	101	101	108	102	104	102	104	7.67	7.73	7.61	7.55	7.59	7.61	7.48	7.51	7.66	7.51
4.0	94.1	97.7	96.8	101	100	108	101	103	101	103	7.67	7.73	7.62	7.56	7.57	7.59	7.50	7.49	7.59	7.51
5.0	94.1	97.7	-	101	100	107	-	102	100	103	7.68	7.73	-	7.57	7.56	7.56	-	7.49	7.52	7.52
6.0	94.0	97.5	-	100	99.4	110	99.5	101	99.3	102	7.68	7.71	-	7.57	7.55	7.52	7.48	7.49	7.50	7.53
7.0	93.0	97.2	-	99.8	99.0	109	98.9	100	98.9	101	7.67	7.70	-	7.56	7.53	7.50	7.49	7.48	7.50	7.53
8.0	91.0	96.3	-	99.4	98.5	-	-	99.7	98.4	101	7.64	7.69	-	7.56	7.51	-	-	7.48	7.50	7.51
9.0	88.5	95.6	-	99.0	98.1	-	98.1	99.2	98.0	-	7.61	7.66	-	7.56	7.50	-	7.49	7.48	7.50	-
10.0	85.2	.	-	98.6	97.7	-	-	98.6	97.5	-	7.56	-	-	7.56	7.49	-	-	7.46	7.50	-
11.0	76.0	-	-	98.3	97.3	-	96.8	97.7	97.0	-	7.50	-	-	7.55	7.49	-	7.48	7.47	7.50	-
12.0	62.6	-	-	-	96.7	-	96.4	97.0	96.4	-	7.35	-	-	-	7.50	-	7.47	7.46	7.49	-
13.0	29.1	-	-	-	96.4	-	95.4	96.2	95.8	-	7.15	-	-	-	7.47	-	7.49	7.45	7.50	-
14.0	14.0	-	-	-	96.1	-	94.8	95.1	95.6	-	7.14	-	-	-	7.45	-	7.45	7.43	7.48	-
15.0	8.80	-	-	-	95.3	-	93.5	94.4	95.0	-	7.03	-	-	-	7.45	-	7.44	7.43	7.47	-
16.0	-	-	-	-	94.4	-	92.2	93.4	94.0	-	-	-	-	-	7.45	-	7.39	7.42	7.46	-
17.0	-	-	-	-	96.5	-	-	93.1	92.5	-	-	-	-	-	7.42	-	-	7.40	7.45	-
18.0	-	-	-	-	92.9	-	-	93.1	91.6	-	-	-	-	-	7.40	-	-	7.40	7.43	-
19.0	-	-	-	-	91.7	-	-	92.8	90.5	-	-	-	-	-	7.74	-	-	7.37	7.41	-
20.0	-	-	-	-	90.8	-	-	92.2	89.9	-	-	-	-	-	7.36	-	-	7.37	7.39	-
21.0	-	-	-	-	-	-	-	-	88.7	-	-	-	-	-	-	-	-	-	7.36	-
22.0	-	-	-	-	-	-	-	-	87.9	-	-	-	-	-	-	-	-	-	7.34	-
23.0	-	-	-	-	-	-	-	-	87.0	-	-	-	-	-	-	-	-	-	7.32	-
24.0	-	-	-	-	-	-	-	-	85.3	-	-	-	-	-	-	-	-	-	7.30	-
25.0	-	-	-	-	-	-	-	-	83.3	-	-	-	-	-	-	-	-	-	7.27	-
26.0	-	-	-	-	-	-	-	-	81.9	-	-	-	-	-	-	-	-	-	7.25	-
27.0	-	-	-	-	-	-	-	-	79.9	-	-	-	-	-	-	-	-	-	7.21	-
28.0	-	-	-	-	-	-	-	-	76.7	-	-	-	-	-	-	-	-	-	7.17	-
29.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
30.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes: "-" = data not available. The total depth of the water column at each sampling station was not recorded but deepest measurements are within 1 m of lake bottom.

Table C.62: *In Situ* Water Quality Profile Data Collected at Mary Lake (North Basin [BL0-01]; and South Basin [BL0]) Water Quality Monitoring Stations, Mary River Project CREMP, Winter 2024

Depth (m)	Specific Conductance (µS/cm)									
	BL0-01-A	BL0-01	BL0-01-B	BL0-05-A	BL0-05	BL0-05-B	BL0-03	BL0-04	BL0-09	BL0-06
	10-Apr-24	10-Apr-24	10-Apr-24	11-Apr-24	11-Apr-24	11-Apr-24	12-Apr-24	12-Apr-24	12-Apr-24	11-Apr-24
1.0	-	-	-	-	-	-	-	-	-	-
2.0	218	226	222	85.6	85.5	91.1	84.0	89.9	87.0	88.4
3.0	216	224	222	84.0	83.6	89.3	82.4	85.0	84.3	86.0
4.0	215	224	221	83.0	82.6	88.0	81.2	83.4	82.9	84.9
5.0	214	222	-	82.3	81.4	87.2	-	82.1	82.1	83.4
6.0	214	221	-	81.7	81.0	93.8	79.9	81.5	81.6	82.9
7.0	213	220	-	81.3	80.6	99.2	79.6	81.1	81.2	83.1
8.0	212	219	-	81.1	80.4	-	-	80.8	80.8	84.9
9.0	213	219	-	80.8	80.0	-	79.2	80.5	80.4	-
10.0	212	-	-	80.4	79.8	-	-	80.0	80.0	-
11.0	214	-	-	80.3	79.7	-	78.5	79.7	79.6	-
12.0	214	-	-	-	79.5	-	78.3	79.1	79.2	-
13.0	216	-	-	-	79.3	-	78.0	78.8	79.4	-
14.0	218	-	-	-	79.8	-	77.8	78.4	79.2	-
15.0	225	-	-	-	79.2	-	77.6	78.2	78.9	-
16.0	-	-	-	-	78.9	-	77.6	78.1	78.6	-
17.0	-	-	-	-	78.6	-	-	79.0	77.8	-
18.0	-	-	-	-	78.4	-	-	79.8	77.7	-
19.0	-	-	-	-	80.3	-	-	79.7	78.0	-
20.0	-	-	-	-	80.2	-	-	79.6	78.2	-
21.0	-	-	-	-	-	-	-	-	78.1	-
22.0	-	-	-	-	-	-	-	-	78.0	-
23.0	-	-	-	-	-	-	-	-	78.5	-
24.0	-	-	-	-	-	-	-	-	78.9	-
25.0	-	-	-	-	-	-	-	-	79.0	-
26.0	-	-	-	-	-	-	-	-	79.1	-
27.0	-	-	-	-	-	-	-	-	79.9	-
28.0	-	-	-	-	-	-	-	-	79.6	-
29.0	-	-	-	-	-	-	-	-	-	-
30.0	-	-	-	-	-	-	-	-	-	-

Notes: "-" = data not available. The total depth of the water column at each sampling station was not recorded but deepest measurements are within 1 m of lake bottom.

Table C.62: *In Situ* Water Quality Profile Data Collected at Mary Lake (North Basin [BL0-01]; and South Basin [BL0]) Water Quality Monitoring Stations, Mary River Project CREMP, Winter 2024

Depth (m)	Turbidity (NTU)									
	BL0-01-A	BL0-01	BL0-01-B	BL0-05-A	BL0-05	BL0-05-B	BL0-03	BL0-04	BL0-09	BL0-06
	10-Apr-24	10-Apr-24	10-Apr-24	11-Apr-24	11-Apr-24	11-Apr-24	12-Apr-24	12-Apr-24	12-Apr-24	11-Apr-24
1.0	-	-	-	-	-	-	-	-	-	-
2.0	0.230	0.430	0.450	0.170	0.180	0.200	0.380	0.310	0.300	0.140
3.0	0.220	0.450	0.460	0.180	0.180	0.200	0.390	0.280	0.310	0.160
4.0	0.230	0.450	0.440	0.200	0.170	0.200	0.350	0.290	0.280	0.190
5.0	0.220	0.460	-	0.170	0.170	0.220	-	0.290	0.290	0.180
6.0	0.230	0.450	-	0.180	0.180	0.240	0.340	0.300	0.290	0.180
7.0	0.240	0.440	-	0.190	0.180	0.340	0.370	0.290	0.280	0.190
8.0	0.250	0.440	-	0.200	0.190	-	-	0.300	0.300	0.200
9.0	0.260	0.440	-	0.180	0.180	-	0.330	0.290	0.310	-
10.0	0.240	-	-	0.180	0.190	-	-	0.300	0.290	-
11.0	0.420	-	-	0.180	0.220	-	0.360	0.290	0.300	-
12.0	0.460	-	-	-	0.190	-	0.340	0.280	0.300	-
13.0	0.560	-	-	-	0.170	-	0.350	0.280	0.280	-
14.0	0.800	-	-	-	0.200	-	0.350	0.300	0.300	-
15.0	0.710	-	-	-	0.200	-	0.370	0.300	0.300	-
16.0	-	-	-	-	0.200	-	0.360	0.300	0.300	-
17.0	-	-	-	-	0.210	-	-	0.340	0.330	-
18.0	-	-	-	-	0.210	-	-	0.350	0.300	-
19.0	-	-	-	-	0.250	-	-	0.350	0.310	-
20.0	-	-	-	-	0.250	-	-	0.330	0.320	-
21.0	-	-	-	-	-	-	-	-	0.330	-
22.0	-	-	-	-	-	-	-	-	0.350	-
23.0	-	-	-	-	-	-	-	-	0.350	-
24.0	-	-	-	-	-	-	-	-	0.350	-
25.0	-	-	-	-	-	-	-	-	0.410	-
26.0	-	-	-	-	-	-	-	-	0.400	-
27.0	-	-	-	-	-	-	-	-	0.400	-
28.0	-	-	-	-	-	-	-	-	0.410	-
29.0	-	-	-	-	-	-	-	-	-	-
30.0	-	-	-	-	-	-	-	-	-	-

Notes: "-" = data not available. The total depth of the water column at each sampling station was not recorded but deepest measurements are within 1 m of lake bottom.

Table C.63: In Situ Water Quality Profile Data Collected at Mary Lake (North Basin [BL0-01]; and South Basin [BL0]) Water Quality Monitoring Stations, Mary River Project CREMP, Summer 2024

Depth (m)	Temperature (°C)										Dissolved Oxygen (mg/L)									
	BL0-01-A	BL0-01	BL0-01-B	BL0-05-A	BL0-05	BL0-05-B	BL0-03	BL0-04	BL0-09	BL0-06	BL0-01-A	BL0-01	BL0-01-B	BL0-05-A	BL0-05	BL0-05-B	BL0-03	BL0-04	BL0-09	BL0-06
	11-Aug-24	11-Aug-24	11-Aug-24	7-Aug-24	7-Aug-24	7-Aug-24	8-Aug-24	8-Aug-24	8-Aug-24	8-Aug-24	11-Aug-24	11-Aug-24	11-Aug-24	7-Aug-24	7-Aug-24	7-Aug-24	8-Aug-24	8-Aug-24	8-Aug-24	8-Aug-24
1.0	10.1	10.0	10.1	7.90	8.00	8.10	8.70	8.10	8.50	9.80	11.0	10.9	11.0	11.6	11.6	11.7	11.5	11.6	11.6	11.4
2.0	10.0	9.90	10.0	7.90	8.00	7.80	8.60	8.10	8.30	9.80	11.1	11.0	11.1	11.6	11.6	11.8	11.6	11.7	11.6	11.4
3.0	10.0	9.90	9.80	7.80	8.00	7.90	8.60	7.90	8.40	9.70	11.1	11.1	11.2	11.7	11.7	11.8	11.6	11.7	11.6	11.4
4.0	10.0	9.80	9.50	7.70	7.90	7.90	8.30	7.80	8.20	9.70	11.1	11.1	11.2	11.7	11.7	11.8	11.6	11.7	11.6	11.4
5.0	10.0	9.70	-	7.70	7.80	7.80	8.10	7.70	8.10	9.70	11.1	11.1	-	11.7	11.7	11.8	11.6	11.7	11.6	11.4
6.0	10.0	9.70	-	7.50	7.50	7.70	8.00	7.50	8.10	9.20	11.1	11.2	-	11.7	11.7	11.8	11.6	11.7	11.6	11.5
7.0	9.80	9.60	-	7.20	7.30	-	7.80	7.30	8.00	8.00	11.1	11.1	-	11.7	11.8	-	11.6	11.6	11.6	11.5
8.0	9.70	9.50	-	7.10	7.20	-	7.80	7.20	8.10	-	11.1	11.1	-	11.7	11.8	-	11.6	11.6	11.6	-
9.0	9.70	9.40	-	7.10	7.20	-	7.80	7.20	8.10	-	11.1	11.1	-	11.6	11.8	-	11.6	11.6	11.6	-
10.0	9.50	-	-	7.10	7.10	-	7.80	7.10	8.00	-	11.1	-	-	11.6	11.7	-	11.6	11.6	11.6	-
11.0	9.40	-	-	-	7.00	-	7.60	7.10	7.50	-	11.1	-	-	-	11.7	-	11.6	11.6	11.6	-
12.0	8.30	-	-	-	7.00	-	7.50	7.10	7.90	-	10.9	-	-	-	11.7	-	11.6	11.6	11.6	-
13.0	7.80	-	-	-	7.00	-	7.40	7.00	7.40	-	10.8	-	-	-	11.7	-	11.6	11.6	11.6	-
14.0	7.70	-	-	-	6.90	-	7.40	7.00	7.30	-	10.8	-	-	-	11.6	-	11.5	11.6	11.6	-
15.0	7.40	-	-	-	6.90	-	7.40	7.00	7.30	-	10.8	-	-	-	11.6	-	11.5	11.5	11.6	-
16.0	-	-	-	-	6.90	-	7.30	6.90	7.20	-	-	-	-	-	11.6	-	11.5	11.5	11.6	-
17.0	-	-	-	-	6.90	-	7.20	6.90	7.20	-	-	-	-	-	11.6	-	11.5	11.5	11.5	-
18.0	-	-	-	-	6.90	-	-	6.90	7.10	-	-	-	-	-	11.6	-	-	11.5	11.5	-
19.0	-	-	-	-	6.90	-	-	6.80	-	-	-	-	-	-	11.6	-	-	11.4	-	-
20.0	-	-	-	-	-	-	-	-	6.80	-	-	-	-	-	-	-	-	-	11.5	-
21.0	-	-	-	-	-	-	-	-	6.70	-	-	-	-	-	-	-	-	-	11.5	-
22.0	-	-	-	-	-	-	-	-	6.60	-	-	-	-	-	-	-	-	-	11.4	-
23.0	-	-	-	-	-	-	-	-	6.60	-	-	-	-	-	-	-	-	-	11.4	-
24.0	-	-	-	-	-	-	-	-	6.60	-	-	-	-	-	-	-	-	-	11.4	-
25.0	-	-	-	-	-	-	-	-	6.60	-	-	-	-	-	-	-	-	-	11.4	-
26.0	-	-	-	-	-	-	-	-	6.60	-	-	-	-	-	-	-	-	-	11.4	-
27.0	-	-	-	-	-	-	-	-	6.60	-	-	-	-	-	-	-	-	-	11.4	-
28.0	-	-	-	-	-	-	-	-	6.60	-	-	-	-	-	-	-	-	-	11.4	-
29.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
30.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes: "-" = data not available. The total depth of the water column at each sampling station was not recorded but deepest measurements are within 1 m of lake bottom.

Table C.63: *In Situ* Water Quality Profile Data Collected at Mary Lake (North Basin [BL0-01]; and South Basin [BL0]) Water Quality Monitoring Stations, Mary River Project CREMP, Summer 2024

Depth (m)	Dissolved Oxygen (% Saturation)										pH (pH units)									
	BL0-01-A	BL0-01	BL0-01-B	BL0-05-A	BL0-05	BL0-05-B	BL0-03	BL0-04	BL0-09	BL0-06	BL0-01-A	BL0-01	BL0-01-B	BL0-05-A	BL0-05	BL0-05-B	BL0-03	BL0-04	BL0-09	BL0-06
	11-Aug-24	11-Aug-24	11-Aug-24	7-Aug-24	7-Aug-24	7-Aug-24	8-Aug-24	8-Aug-24	8-Aug-24	8-Aug-24	11-Aug-24	11-Aug-24	11-Aug-24	7-Aug-24	7-Aug-24	7-Aug-24	8-Aug-24	8-Aug-24	8-Aug-24	8-Aug-24
1.0	101	99.4	101	99.7	100	101	102	102	102	103	7.80	7.82	7.69	7.51	7.69	7.25	7.39	6.95	6.98	7.11
2.0	101	100	102	100	100	101	103	102	102	103	7.75	7.82	7.68	7.35	7.52	7.24	7.37	6.94	6.94	7.13
3.0	102	101	102	100	100	102	103	102	102	103	7.74	7.80	7.68	7.31	7.49	7.21	7.38	6.95	6.96	7.14
4.0	102	101	101	100	100	102	102	101	102	103	7.75	7.78	7.67	7.21	7.46	7.20	7.37	6.94	6.93	7.15
5.0	102	101	-	100	100	101	102	101	102	103	7.75	7.78	-	7.19	7.42	7.19	7.35	6.92	6.93	7.13
6.0	101	101	-	99.8	99.9	101	101	99.9	102	103	7.74	7.66	-	7.16	7.41	7.18	7.34	6.94	6.91	7.13
7.0	101	101	-	98.9	99.5	-	101	99.5	102	102	7.73	7.67	-	7.15	7.39	-	7.33	6.92	6.90	7.12
8.0	101	100	-	98.3	99.4	-	101	99.4	102	-	7.73	7.62	-	7.11	7.35	-	7.31	6.92	6.90	-
9.0	101	100	-	98.1	99.3	-	101	99.1	102	-	7.73	7.63	-	7.08	7.31	-	7.32	6.91	6.90	-
10.0	100	-	-	97.8	99.0	-	100	98.9	101	-	7.71	-	-	7.07	7.26	-	7.30	6.91	6.90	-
11.0	99.6	-	-	-	98.6	-	100	98.7	99.6	-	7.69	-	-	-	7.23	-	7.28	6.91	6.90	-
12.0	95.8	-	-	-	98.4	-	99.8	98.5	100	-	7.63	-	-	-	7.23	-	7.50	6.91	6.90	-
13.0	93.7	-	-	-	98.1	-	99.4	98.4	99.3	-	7.53	-	-	-	7.22	-	7.26	6.90	6.89	-
14.0	93.7	-	-	-	97.8	-	99.2	98.5	99.0	-	7.49	-	-	-	7.19	-	7.24	6.91	6.88	-
15.0	92.1	-	-	-	97.7	-	99.0	97.9	98.8	-	7.45	-	-	-	7.15	-	7.24	6.91	6.88	-
16.0	-	-	-	-	97.6	-	98.8	97.7	98.7	-	-	-	-	-	7.14	-	7.23	6.92	6.87	-
17.0	-	-	-	-	97.5	-	98.0	97.6	98.5	-	-	-	-	-	7.13	-	7.20	6.90	6.87	-
18.0	-	-	-	-	97.4	-	-	97.5	98.8	-	-	-	-	-	7.10	-	-	6.91	6.88	-
19.0	-	-	-	-	97.2	-	-	96.8	-	-	-	-	-	-	7.10	-	-	6.90	-	-
20.0	-	-	-	-	-	-	-	-	97.1	-	-	-	-	-	-	-	-	-	6.87	-
21.0	-	-	-	-	-	-	-	-	96.8	-	-	-	-	-	-	-	-	-	6.89	-
22.0	-	-	-	-	-	-	-	-	96.4	-	-	-	-	-	-	-	-	-	6.86	-
23.0	-	-	-	-	-	-	-	-	96.4	-	-	-	-	-	-	-	-	-	6.87	-
24.0	-	-	-	-	-	-	-	-	96.3	-	-	-	-	-	-	-	-	-	6.87	-
25.0	-	-	-	-	-	-	-	-	96.2	-	-	-	-	-	-	-	-	-	6.87	-
26.0	-	-	-	-	-	-	-	-	96.0	-	-	-	-	-	-	-	-	-	6.88	-
27.0	-	-	-	-	-	-	-	-	96.0	-	-	-	-	-	-	-	-	-	6.88	-
28.0	-	-	-	-	-	-	-	-	95.8	-	-	-	-	-	-	-	-	-	6.88	-
29.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
30.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes: "-" = data not available. The total depth of the water column at each sampling station was not recorded but deepest measurements are within 1 m of lake bottom.

Table C.63: *In Situ* Water Quality Profile Data Collected at Mary Lake (North Basin [BL0-01]; and South Basin [BL0]) Water Quality Monitoring Stations, Mary River Project CREMP, Summer 2024

Depth (m)	Specific Conductance (µS/cm)										Turbidity (NTU)									
	BL0-01-A	BL0-01	BL0-01-B	BL0-05-A	BL0-05	BL0-05-B	BL0-03	BL0-04	BL0-09	BL0-06	BL0-01-A	BL0-01	BL0-01-B	BL0-05-A	BL0-05	BL0-05-B	BL0-03	BL0-04	BL0-09	BL0-06
	11-Aug-24	11-Aug-24	11-Aug-24	7-Aug-24	7-Aug-24	7-Aug-24	8-Aug-24	8-Aug-24	8-Aug-24	8-Aug-24	11-Aug-24	11-Aug-24	11-Aug-24	7-Aug-24	7-Aug-24	7-Aug-24	8-Aug-24	8-Aug-24	8-Aug-24	8-Aug-24
1.0	136	132	134	61.7	61.4	60.0	58.5	58.1	58.2	57.9	0.220	0.370	0.250	0.920	0.930	0.780	0.300	0.620	0.620	0.390
2.0	136	132	134	61.8	61.5	59.3	58.6	58.0	58.2	57.9	0.190	0.320	0.220	0.990	0.900	0.830	0.330	0.700	0.600	0.360
3.0	136	132	135	61.6	61.4	59.3	58.6	57.8	58.2	58.1	0.160	0.370	0.250	0.960	0.890	0.850	0.370	0.770	0.600	0.400
4.0	136	132	136	61.4	60.7	59.6	58.1	57.7	58.1	58.0	0.200	0.300	0.510	1.00	0.890	0.910	0.430	0.770	0.650	0.370
5.0	136	132	-	61.3	60.1	59.3	57.8	57.6	58.4	58.1	0.200	0.300	-	0.970	0.900	0.860	0.400	0.710	0.710	0.340
6.0	136	132	-	60.3	58.3	59.1	57.5	57.3	58.1	58.2	0.170	0.310	-	0.970	0.910	0.950	0.380	0.970	0.680	0.560
7.0	136	132	-	60.1	57.9	-	57.0	57.5	58.1	58.0	0.260	0.330	-	1.03	0.970	-	0.480	0.910	0.670	0.680
8.0	136	133	-	61.2	57.0	-	57.0	57.2	58.1	-	0.200	0.270	-	1.23	0.940	-	0.490	0.880	0.710	-
9.0	135	133	-	61.2	57.0	-	57.0	57.3	58.1	-	0.210	0.320	-	1.18	0.930	-	0.430	0.900	0.700	-
10.0	135	-	-	61.4	59.3	-	56.6	57.3	58.0	-	0.210	-	-	1.16	1.01	-	0.560	1.01	0.750	-
11.0	136	-	-	-	58.9	-	56.4	57.3	57.4	-	0.160	-	-	-	1.08	-	0.430	1.23	0.830	-
12.0	129	-	-	-	57.9	-	56.4	57.4	57.5	-	0.420	-	-	-	1.11	-	0.500	0.990	0.800	-
13.0	128	-	-	-	59.0	-	56.0	57.7	57.9	-	0.580	-	-	-	1.12	-	0.500	1.00	0.900	-
14.0	127	-	-	-	58.6	-	56.0	57.5	57.3	-	0.530	-	-	-	1.08	-	0.450	0.990	0.930	-
15.0	126	-	-	-	58.7	-	55.9	57.7	57.5	-	0.720	-	-	-	1.10	-	0.440	1.26	1.02	-
16.0	-	-	-	-	58.8	-	55.8	57.6	57.5	-	-	-	-	-	1.20	-	0.510	1.10	0.980	-
17.0	-	-	-	-	58.9	-	55.3	57.9	57.5	-	-	-	-	-	1.15	-	0.450	1.20	0.890	-
18.0	-	-	-	-	59.1	-	-	57.6	56.6	-	-	-	-	-	1.19	-	-	1.07	0.840	-
19.0	-	-	-	-	59.1	-	-	57.9	-	-	-	-	-	-	1.11	-	-	1.20	-	-
20.0	-	-	-	-	-	-	-	-	56.6	-	-	-	-	-	-	-	-	-	1.00	-
21.0	-	-	-	-	-	-	-	-	56.9	-	-	-	-	-	-	-	-	-	1.12	-
22.0	-	-	-	-	-	-	-	-	58.3	-	-	-	-	-	-	-	-	-	1.45	-
23.0	-	-	-	-	-	-	-	-	58.1	-	-	-	-	-	-	-	-	-	1.29	-
24.0	-	-	-	-	-	-	-	-	58.3	-	-	-	-	-	-	-	-	-	1.38	-
25.0	-	-	-	-	-	-	-	-	58.6	-	-	-	-	-	-	-	-	-	1.35	-
26.0	-	-	-	-	-	-	-	-	58.9	-	-	-	-	-	-	-	-	-	1.39	-
27.0	-	-	-	-	-	-	-	-	58.9	-	-	-	-	-	-	-	-	-	1.39	-
28.0	-	-	-	-	-	-	-	-	58.8	-	-	-	-	-	-	-	-	-	1.35	-
29.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
30.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes: "-" = data not available. The total depth of the water column at each sampling station was not recorded but deepest measurements are within 1 m of lake bottom.

Table C.64: *In Situ* Water Quality Profile Data Collected at Mary Lake (North Basin [BL0-01]; and South Basin [BL0]) Water Quality Monitoring Stations, Mary River Project CREMP, Fall 2024

Depth (m)	Temperature (°C)										Dissolved Oxygen (mg/L)									
	BL0-01-A	BL0-01	BL0-01-B	BL0-05-A	BL0-05	BL0-05-B	BL0-03	BL0-04	BL0-09	BL0-06	BL0-01-A	BL0-01	BL0-01-B	BL0-05-A	BL0-05	BL0-05-B	BL0-03	BL0-04	BL0-09	BL0-06
	11-Sep-24	11-Sep-24	11-Sep-24	16-Sep-24	15-Sep-24	16-Sep-24	15-Sep-24	15-Sep-24	15-Sep-24	15-Sep-24	11-Sep-24	11-Sep-24	11-Sep-24	16-Sep-24	15-Sep-24	16-Sep-24	15-Sep-24	15-Sep-24	15-Sep-24	15-Sep-24
1.0	3.10	3.40	3.30	5.60	5.70	5.60	5.80	5.70	5.60	5.40	14.4	13.8	14.3	12.0	12.3	11.8	12.4	12.5	12.5	12.6
2.0	3.10	3.30	3.30	5.60	5.70	5.60	-	5.70	5.70	5.70	14.4	14.2	14.4	12.0	12.3	11.9	-	12.5	12.5	12.5
3.0	3.10	3.30	3.30	5.60	5.70	5.60	5.80	5.70	5.70	5.70	14.4	14.2	14.4	12.0	12.3	11.9	12.4	12.5	12.4	12.4
4.0	3.10	3.30	3.30	5.60	5.70	-	5.80	5.70	5.70	5.70	14.4	14.2	14.4	12.0	12.3	-	12.4	12.5	12.4	12.4
5.0	3.10	3.30	-	5.60	5.60	5.60	5.80	-	5.70	5.70	14.4	14.2	-	12.0	12.3	11.9	12.4	-	12.4	12.4
6.0	3.10	3.30	-	5.50	5.60	5.60	-	5.70	-	5.70	14.4	14.3	-	12.0	12.3	11.9	-	12.4	-	12.4
7.0	3.10	3.30	-	5.50	5.60	5.50	5.80	5.60	5.70	5.60	14.4	14.2	-	12.1	12.3	11.9	12.4	12.4	12.4	12.4
8.0	3.10	3.40	-	5.30	5.60	-	5.80	5.60	5.70	5.60	14.4	14.2	-	12.1	12.3	-	12.4	12.4	12.4	12.4
9.0	3.10	3.40	-	5.30	5.60	-	5.80	5.60	5.70	-	14.4	14.2	-	12.1	12.3	-	12.4	12.4	12.4	-
10.0	3.10	-	-	5.30	5.60	-	5.70	5.60	-	-	14.4	-	-	12.1	12.3	-	12.4	12.4	-	-
11.0	3.10	-	-	5.20	5.60	-	-	-	5.70	-	14.4	-	-	12.1	12.3	-	-	-	12.4	-
12.0	3.10	-	-	-	5.60	-	5.70	5.60	5.70	-	14.4	-	-	-	12.3	-	12.4	12.4	12.4	-
13.0	3.10	-	-	-	5.50	-	5.70	5.50	5.70	-	14.4	-	-	-	12.4	-	12.4	12.4	12.4	-
14.0	-	-	-	-	5.40	-	-	5.60	5.70	-	-	-	-	-	12.4	-	-	12.4	12.3	-
15.0	-	-	-	-	5.30	-	5.60	5.50	-	-	-	-	-	-	12.4	-	12.3	12.4	-	-
16.0	-	-	-	-	5.30	-	5.70	5.30	5.60	-	-	-	-	-	12.4	-	12.3	12.4	12.3	-
17.0	-	-	-	-	-	-	5.70	5.40	-	-	-	-	-	-	-	-	12.3	12.4	-	-
18.0	-	-	-	-	5.30	-	-	5.40	5.60	-	-	-	-	-	12.4	-	-	12.7	12.3	-
19.0	-	-	-	-	5.20	-	-	5.40	5.60	-	-	-	-	-	12.4	-	-	12.4	12.3	-
20.0	-	-	-	-	5.20	-	-	5.40	5.60	-	-	-	-	-	12.5	-	-	12.4	12.3	-
21.0	-	-	-	-	-	-	-	5.40	5.60	-	-	-	-	-	-	-	-	12.4	12.3	-
22.0	-	-	-	-	-	-	-	-	5.60	-	-	-	-	-	-	-	-	-	12.3	-
23.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
24.0	-	-	-	-	-	-	-	-	5.60	-	-	-	-	-	-	-	-	-	12.3	-
25.0	-	-	-	-	-	-	-	-	5.60	-	-	-	-	-	-	-	-	-	12.3	-
26.0	-	-	-	-	-	-	-	-	5.60	-	-	-	-	-	-	-	-	-	12.3	-
27.0	-	-	-	-	-	-	-	-	5.50	-	-	-	-	-	-	-	-	-	12.3	-
28.0	-	-	-	-	-	-	-	-	5.50	-	-	-	-	-	-	-	-	-	12.3	-
29.0	-	-	-	-	-	-	-	-	5.40	-	-	-	-	-	-	-	-	-	12.3	-
30.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes: "-" = data not available. The total depth of the water column at each sampling station was not recorded but deepest measurements are within 1 m of lake bottom.

Table C.64: In Situ Water Quality Profile Data Collected at Mary Lake (North Basin [BL0-01]; and South Basin [BL0]) Water Quality Monitoring Stations, Mary River Project CREMP, Fall 2024

Depth (m)	Dissolved Oxygen (% Saturation)										pH (pH units)									
	BL0-01-A	BL0-01	BL0-01-B	BL0-05-A	BL0-05	BL0-05-B	BL0-03	BL0-04	BL0-09	BL0-06	BL0-01-A	BL0-01	BL0-01-B	BL0-05-A	BL0-05	BL0-05-B	BL0-03	BL0-04	BL0-09	BL0-06
	11-Sep-24	11-Sep-24	11-Sep-24	16-Sep-24	15-Sep-24	16-Sep-24	15-Sep-24	15-Sep-24	15-Sep-24	15-Sep-24	11-Sep-24	11-Sep-24	11-Sep-24	16-Sep-24	15-Sep-24	16-Sep-24	15-Sep-24	15-Sep-24	15-Sep-24	15-Sep-24
1.0	109	106	110	97.5	99.5	95.9	101	101	101	102	7.74	7.88	7.75	7.43	7.61	7.73	7.44	7.40	7.28	7.30
2.0	110	108	110	97.6	99.7	96.4	-	101	101	101	7.72	7.83	7.73	7.37	7.41	7.63	-	7.39	7.27	7.34
3.0	110	109	110	97.6	99.8	96.6	101	101	101	101	7.71	7.84	7.71	7.33	7.36	7.59	7.41	7.38	7.27	7.33
4.0	109	109	110	97.6	99.8	-	101	101	101	101	7.69	7.83	7.69	7.30	7.33	-	7.40	7.38	7.27	7.32
5.0	110	109	-	97.6	99.8	96.7	101	-	101	100	7.68	7.83	-	7.28	7.32	7.54	7.38	-	7.28	7.30
6.0	110	109	-	97.4	99.9	96.8	-	101	-	100	7.68	7.82	-	7.25	7.30	7.53	-	7.36	-	7.30
7.0	110	109	-	97.4	99.9	96.7	101	101	100	100	7.67	7.82	-	7.24	7.30	7.50	7.37	7.35	7.26	7.28
8.0	109	109	-	97.1	99.9	-	101	100	100	100	7.66	7.80	-	7.23	7.28	-	7.38	7.35	7.27	7.28
9.0	109	109	-	97.1	99.8	-	101	100	100	-	7.65	7.80	-	7.22	7.28	-	7.36	7.36	7.27	-
10.0	109	-	-	97.0	99.8	-	101	100	-	-	7.65	-	-	7.22	7.27	-	7.36	7.35	-	-
11.0	109	-	-	96.8	99.8	-	-	-	100	-	7.65	-	-	7.21	7.27	-	-	-	7.27	-
12.0	110	-	-	-	99.8	-	101	100	100	-	7.64	-	-	-	7.26	-	7.35	7.33	7.28	-
13.0	109	-	-	-	99.6	-	100	100	100	-	7.64	-	-	-	7.25	-	7.35	7.35	7.28	-
14.0	-	-	-	-	99.6	-	-	100	100	-	-	-	-	-	7.27	-	-	7.35	7.28	-
15.0	-	-	-	-	99.6	-	100	100	-	-	-	-	-	-	7.27	-	7.35	7.33	-	-
16.0	-	-	-	-	99.6	-	100	99.9	99.8	-	-	-	-	-	7.27	-	7.34	7.22	7.28	-
17.0	-	-	-	-	-	-	100	99.8	-	-	-	-	-	-	-	-	7.34	7.34	-	-
18.0	-	-	-	-	99.6	-	-	99.8	99.6	-	-	-	-	-	7.28	-	-	7.34	7.29	-
19.0	-	-	-	-	99.6	-	-	99.7	99.6	-	-	-	-	-	7.29	-	-	7.35	7.28	-
20.0	-	-	-	-	99.5	-	-	99.7	99.5	-	-	-	-	-	7.29	-	-	7.35	7.28	-
21.0	-	-	-	-	-	-	-	99.7	99.5	-	-	-	-	-	-	-	-	7.34	7.29	-
22.0	-	-	-	-	-	-	-	-	99.4	-	-	-	-	-	-	-	-	-	7.29	-
23.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
24.0	-	-	-	-	-	-	-	-	99.4	-	-	-	-	-	-	-	-	-	7.30	-
25.0	-	-	-	-	-	-	-	-	99.3	-	-	-	-	-	-	-	-	-	7.30	-
26.0	-	-	-	-	-	-	-	-	99.2	-	-	-	-	-	-	-	-	-	7.29	-
27.0	-	-	-	-	-	-	-	-	99.1	-	-	-	-	-	-	-	-	-	7.29	-
28.0	-	-	-	-	-	-	-	-	99.0	-	-	-	-	-	-	-	-	-	7.30	-
29.0	-	-	-	-	-	-	-	-	98.8	-	-	-	-	-	-	-	-	-	7.30	-
30.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes: "-" = data not available. The total depth of the water column at each sampling station was not recorded but deepest measurements are within 1 m of lake bottom.

Table C.64: In Situ Water Quality Profile Data Collected at Mary Lake (North Basin [BL0-01]; and South Basin [BL0]) Water Quality Monitoring Stations, Mary River Project CREMP, Fall 2024

Depth (m)	Specific Conductance (µS/cm)										Turbidity (NTU)									
	BL0-01-A	BL0-01	BL0-01-B	BL0-05-A	BL0-05	BL0-05-B	BL0-03	BL0-04	BL0-09	BL0-06	BL0-01-A	BL0-01	BL0-01-B	BL0-05-A	BL0-05	BL0-05-B	BL0-03	BL0-04	BL0-09	BL0-06
	11-Sep-24	11-Sep-24	11-Sep-24	16-Sep-24	15-Sep-24	16-Sep-24	15-Sep-24	15-Sep-24	15-Sep-24	15-Sep-24	11-Sep-24	11-Sep-24	11-Sep-24	16-Sep-24	15-Sep-24	16-Sep-24	15-Sep-24	15-Sep-24	15-Sep-24	15-Sep-24
1.0	173	174	174	78.8	77.4	77.7	77.8	77.7	77.1	75.6	0.490	0.510	0.480	0.750	0.620	0.870	0.420	0.570	0.720	0.700
2.0	173	175	174	78.8	77.5	77.6	-	77.7	77.5	77.4	0.480	0.540	0.450	0.740	0.670	0.750	-	0.560	0.740	0.700
3.0	173	175	174	78.9	77.5	77.6	77.7	78.0	77.5	77.4	0.460	0.540	0.500	0.830	0.640	0.840	0.380	0.600	0.680	0.670
4.0	173	174	174	79.2	77.6	-	77.8	77.9	77.6	77.4	0.500	0.550	0.490	0.920	0.620	-	0.430	0.510	0.690	0.740
5.0	173	174	-	79.9	77.6	77.5	77.8	-	77.7	77.4	0.480	0.580	-	0.890	0.660	0.770	0.380	-	0.690	0.670
6.0	173	175	-	82.6	77.8	77.5	-	78.0	-	77.4	0.490	0.550	-	0.850	0.610	0.790	-	0.510	-	0.680
7.0	173	175	-	84.1	77.8	77.5	77.8	78.5	77.7	77.3	0.480	0.530	-	1.00	0.620	0.870	0.350	0.590	0.700	0.720
8.0	174	175	-	86.6	77.6	-	77.8	79.8	77.7	77.3	0.490	0.540	-	0.920	0.660	-	0.380	0.850	0.700	0.780
9.0	173	175	-	86.7	78.0	-	77.8	79.4	77.7	-	0.500	0.560	-	0.920	0.660	-	0.400	0.740	0.700	-
10.0	173	-	-	87.3	78.4	-	77.8	79.4	-	-	0.500	-	-	0.930	0.680	-	0.420	0.670	-	-
11.0	173	-	-	89.5	78.2	-	-	-	77.8	-	0.500	-	-	1.01	0.700	-	-	-	0.720	-
12.0	173	-	-	-	79.7	-	77.8	79.8	77.8	-	0.490	-	-	-	0.740	-	0.480	0.740	0.780	-
13.0	173	-	-	-	83.9	-	77.8	79.9	77.9	-	0.470	-	-	-	0.840	-	0.380	0.870	0.690	-
14.0	-	-	-	-	84.2	-	-	79.8	77.9	-	-	-	-	-	0.790	-	-	0.670	0.680	-
15.0	-	-	-	-	84.3	-	77.8	81.5	-	-	-	-	-	-	0.810	-	0.450	0.770	-	-
16.0	-	-	-	-	85.3	-	77.8	84.6	77.2	-	-	-	-	-	0.750	-	0.380	0.940	0.720	-
17.0	-	-	-	-	-	-	77.8	84.5	-	-	-	-	-	-	-	-	0.380	0.910	-	-
18.0	-	-	-	-	85.5	-	-	85.1	78.4	-	-	-	-	-	0.820	-	-	1.02	0.700	-
19.0	-	-	-	-	87.2	-	-	85.0	78.6	-	-	-	-	-	0.850	-	-	0.960	0.720	-
20.0	-	-	-	-	88.3	-	-	85.1	78.6	-	-	-	-	-	0.800	-	-	0.920	0.850	-
21.0	-	-	-	-	-	-	-	85.1	78.7	-	-	-	-	-	-	-	-	0.980	0.770	-
22.0	-	-	-	-	-	-	-	-	78.7	-	-	-	-	-	-	-	-	-	0.710	-
23.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
24.0	-	-	-	-	-	-	-	-	78.9	-	-	-	-	-	-	-	-	-	0.730	-
25.0	-	-	-	-	-	-	-	-	79.0	-	-	-	-	-	-	-	-	-	0.770	-
26.0	-	-	-	-	-	-	-	-	79.9	-	-	-	-	-	-	-	-	-	0.900	-
27.0	-	-	-	-	-	-	-	-	82.4	-	-	-	-	-	-	-	-	-	0.760	-
28.0	-	-	-	-	-	-	-	-	82.9	-	-	-	-	-	-	-	-	-	0.880	-
29.0	-	-	-	-	-	-	-	-	83.2	-	-	-	-	-	-	-	-	-	0.890	-
30.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-


Notes: "-" = data not available. The total depth of the water column at each sampling station was not recorded but deepest measurements are within 1 m of lake bottom.

Table C.65: Sampling Depth, Water Clarity Measures, and Surface and Bottom *In Situ* Water Quality Measures Collected at Mary Lake (North Basin [BL0-01]; and South Basin [BL0]) Benthic Invertebrate Community (BIC) Stations, Mary River Project CREMP, August 2024

Categorization & Replicate ID		Date Sampled	Station Depth (m)	Secchi Depth (m)	Colour/ Clarity	Depth Sampled	Temperature (°C)	Dissolved Oxygen		pH (units)	Conductance (µS/cm)	Specific Conductance (µS/cm)	Turbidity (NTU)
								(mg/L)	(% saturation)				
Littoral (Shallow) Stations	BL0-11	16-Aug-24	NA	3.87	Green/ Clear	Surface	7.50	11.5	98.0	7.08	48.4	70.9	1.03
						Bottom	7.30	11.6	97.9	7.13	54.5	82.2	1.30
	BL0-07	15-Aug-24	NA	3.25	Green/ Clear	Surface	7.90	11.2	96.4	7.59	40.5	60.2	0.820
						Bottom	7.80	11.3	97.5	7.39	40.4	60.1	0.920
	BL0-06	15-Aug-24	NA	3.5	Green/ Clear	Surface	7.90	11.8	102	7.50	40.9	60.7	0.920
						Bottom	7.90	11.6	99.6	7.30	40.8	60.6	0.920
Profundal (Deep) Stations	BL0-03	15-Aug-24	NA	4.25	Green- Blue	Surface	8.10	12.2	105	7.31	40.7	60.0	0.650
						Bottom	8.00	11.6	100	7.22	39.8	59.0	0.600
	BL0-15	15-Aug-24	NA	3.88	Green- Blue	Surface	8.00	12.0	103	7.41	39.9	59.1	0.640
						Bottom	8.00	11.4	98.6	7.28	39.8	59.0	0.690
	BL0-14	15-Aug-24	NA	4.13	Green/ Slightly Murky	Surface	8.00	11.7	101	7.25	39.9	59.0	0.610
						Bottom	8.00	11.6	99.7	7.22	39.8	59.0	1.20
	BL0-05	16-Aug-24	NA	4.25	Green- Blue/ Clear	Surface	8.00	11.1	95.6	7.20	41.1	60.8	0.750
						Bottom	7.70	11.3	96.5	6.98	42.9	64.1	0.990
	BL0-13	15-Aug-24	NA	3.38	Green/ Clear	Surface	8.10	12.4	106	7.30	41.1	60.7	0.880
						Bottom	7.80	11.6	99.7	7.23	41.2	61.3	0.980
	BL0-04	15-Aug-24	NA	3.75	Green/ Clear	Surface	8.10	11.6	99.8	7.37	41.0	60.7	0.870
						Bottom	7.90	11.4	98.1	7.26	40.7	60.6	-

Table C.66: Statistical Comparison of Bottom *In Situ* Water Quality Between Mary Lake (North Basin [BL0-01]; and South Basin [BL0]) Littoral and Profundal Stations, Mary River Project CREMP, August 2024

Parameter	Statistical Test Results				Summary Statistics						
	Statistical Test	Transformation	Significant Difference Between Areas?	P-value	Lake Zone	Sample Size	Mean	Standard Deviation	Standard Error	Minimum	Maximum
Temperature (°C)	tequal	None	NO	0.427	Littoral	4	7.78	0.340	0.170	7.30	8.10
					Profundal	6	7.90	0.126	0.0516	7.70	8.00
Dissolved Oxygen (mg/L)	tequal	None	NO	0.657	Littoral	4	11.5	0.164	0.0821	11.3	11.6
					Profundal	6	11.5	0.123	0.0504	11.3	11.6
Dissolved Oxygen (% saturation)	tequal	None	NO	0.379	Littoral	4	98.0	1.10	0.550	97.1	99.6
					Profundal	6	98.8	1.35	0.552	96.5	100
pH (units)	tequal	None	NO	0.144	Littoral	4	7.44	0.350	0.175	7.13	7.94
					Profundal	6	7.20	0.110	0.0448	6.98	7.28
Specific Conductance (µS/cm)	M-W	Rank	NO	0.194	Littoral	4	86.5	39.1	19.5	60.1	143
					Profundal	6	60.5	2.02	0.824	59.0	64.1

 Shaded values indicate significant difference between study areas based on test p-value less than 0.05.

Notes: "-" = no data. "tequal" = Student's t-test assuming equal variance. "M-W" = Mann-Whitney test (nonparametric).

Table C.67: Statistical Comparison of Bottom *In Situ* Water Quality Between Mary Lake (North Basin [BL0-01]; and South Basin [BL0]) and Reference Lake 3 (REF-03) Stations Collected at Littoral and Profundal Depths, Mary River Project CREMP, August 2024

Lake Zone	Parameter	Statistical Test Results				Summary Statistics						
		Statistical Test	Transformation	Significant Difference Between Areas?	P-value	Study Lake	Sample Size (n)	Mean	Standard Deviation	Standard Error	Minimum	Maximum
Littoral (Shallow) Stations	Temperature (°C)	tequal	None	NO	0.748	Reference	5	7.88	0.545	0.244	7.20	8.70
						Mary	4	7.78	0.340	0.170	7.30	8.10
	Dissolved Oxygen (mg/L)	tunequal	None	YES	0.017	Reference	5	11.8	0.0550	0.0246	11.8	11.9
						Mary	4	11.5	0.164	0.0821	11.3	11.6
	Dissolved Oxygen (% saturation)	tequal	None	YES	0.002	Reference	5	102	1.31	0.585	99.9	103
						Mary	4	98.0	1.10	0.550	97.1	99.6
	pH (units)	tequal	None	NO	0.815	Reference	5	7.40	0.0554	0.0248	7.34	7.47
						Mary	4	7.44	0.350	0.175	7.13	7.94
Profundal (Deep) Stations	Specific Conductance (µS/cm)	M-W	Rank	NO	1.000	Reference	5	68.8	0.0548	0.0245	68.8	68.9
						Mary	4	86.5	39.1	19.5	60.1	143
	Temperature (°C)	tequal	None	YES	<0.001	Reference	5	6.92	0.327	0.146	6.50	7.40
						Mary	6	7.90	0.126	0.0516	7.70	8.00
	Dissolved Oxygen (mg/L)	tequal	None	YES	0.005	Reference	5	11.8	0.110	0.0492	11.6	11.9
						Mary	6	11.5	0.123	0.0504	11.3	11.6
	Dissolved Oxygen (% saturation)	tequal	None	NO	0.671	Reference	5	99.2	1.49	0.667	97.3	101
						Mary	6	98.8	1.35	0.552	96.5	100
	pH (units)	tequal	None	YES	0.012	Reference	5	7.41	0.118	0.0530	7.29	7.56
						Mary	6	7.20	0.110	0.0448	6.98	7.28
	Specific Conductance (µS/cm)	M-W	Rank	YES	0.007	Reference	5	69.1	0.740	0.331	68.7	70.4
						Mary	6	60.5	2.02	0.824	59.0	64.1

Highlighted values indicate significant difference between study areas based on test p-value less than 0.05.

Notes: "-" = no data. "tequal" = Student's t-test assuming equal variance. "tunequal" = Stuent's t-test assuming unequal variance. "M-W" = Mann-Whitney test (nonparametric).

Table C.68: Water Chemistry at Mary Lake North Basin (BL0-01) Water Quality Monitoring Stations, Mary River Project CREMP, 2024

Parameter		Units	Water Quality Guideline (WQG) ^{a,b}	AEMP Benchmark ^c	Winter Sampling Event						Summer Sampling Event						Fall Sampling Event							
					BL0-01-A	BL0-01-A	BL0-01	BL0-01	BL0-01-B	BL0-01-B	BL0-01-A	BL0-01-A	BL0-01	BL0-01	BL0-01-B	BL0-01-B	BL0-01-A	BL0-01-A	BL0-01	BL0-01	BL0-01-B	BL0-01-B		
					bottom	surface	bottom	surface	bottom	surface	bottom	surface	bottom	surface	bottom	surface	bottom	surface	bottom	surface	bottom	surface	bottom	surface
					10-Apr-24	10-Apr-24	10-Apr-24	10-Apr-24	10-Apr-24	10-Apr-24	11-Aug-24	11-Aug-24	11-Aug-24	11-Aug-24	11-Aug-24	11-Aug-24	11-Sep-24	11-Sep-24	11-Sep-24	11-Sep-24	11-Sep-24	11-Sep-24	11-Sep-24	11-Sep-24
Conventional	Conductivity (lab)	µmho/cm	-	-	220	218	222	225	222	222	134	143	138	140	140	140	177	177	179	178	178	179		
	pH (lab)	pH	6.5 - 9.0	-	7.16	7.55	7.69	7.64	7.68	7.7	7.86	7.96	7.83	7.81	7.94	7.94	8.02	8.02	7.98	7.93	8.02	8.01		
	Hardness (as CaCO ₃)	mg/L	-	-	110	109	110	115	113	109	64.9	70	67.9	67.9	68.1	68.2	88.8	90.1	89.8	91	90.8	91.6		
	Total Suspended Solids (TSS)	mg/L	-	-	<1.7	<1	<1.4	<1.3	<1.1	<1.7	<1	<1	<1	<1.1	<1	<1	<1	<1	<1	<1	<1	<1		
	Total Dissolved Solids (TDS)	mg/L	-	-	109	111	115	116	118	112	50	74	60	69	78	62	88	88	88	90	87	89		
	Turbidity	NTU	-	-	0.53	<0.1	<0.1	0.12	0.14	0.12	1.17	0.91	0.9	1.17	0.97	0.91	0.68	0.68	0.68	0.7	0.65	0.67		
	Alkalinity (as CaCO ₃)	mg/L	-	-	106	104	103	110	111	109	63.8	67.9	65.8	65.1	66.1	64.6	102	98	99	94.8	100	96.6		
Nutrients and Organics	Total Ammonia	mg/L	-	0.855	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.0326	0.0057	0.0079	0.0065	0.0067	0.0057	<0.005	0.0138	<0.005	0.0132	<0.005	0.0086		
	Nitrate	mg/L	3	3	0.156	0.071	0.061	0.061	0.064	0.063	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02		
	Nitrite	mg/L	0.06	0.06	<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	<0.01	<0.01	<0.01	<0.01	<0.01		
	Total Kjeldahl Nitrogen (TKN)	mg/L	-	-	0.17	0.087	0.141	0.122	0.122	0.144	0.142	0.159	0.116	0.112	0.114	0.102	0.086	0.102	0.096	0.107	0.11	0.102		
	Dissolved Organic Carbon	mg/L	-	-	2.36	2.96	2.32	2.87	2.68	2.52	2.26	2.44	2.28	3.34	2.56	2.33	2.47	2.44	2.86	2.35	2.87	2.66		
	Total Organic Carbon	mg/L	-	-	2.24	2.39	2.52	2.75	2.64	2.45	2.17	2.2	2.25	2.04	2.19	2.1	2.85	2.72	2.74	2.39	2.28	2.52		
	Total Phosphorus	mg/L	0.020 ^a	-	0.0034	<0.002	<0.002	<0.002	0.002	0.0021	0.0041	0.0037	0.0034	0.0043	0.0034	0.0043	0.0028	0.0033	0.004	0.0027	0.0029	0.0025		
	Phenols	mg/L	0.004 ^a	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.0018	0.0017	0.0021	0.0016	0.0017	<0.001		
Anions	Bromide (Br)	mg/L	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		
	Chloride (Cl)	mg/L	120	120	7.22	7.38	7.14	7.23	7.14	7.02	2.15	2.48	2.48	2.36	2.41	2.36	3.5	3.5	3.73	3.6	3.53	3.54		
	Sulphate (SO ₄)	mg/L	218 ^β	218	2.76	3.52	3.31	3.39	3.29	3.26	1.16	1.33	1.4	1.28	1.32	1.3	1.75	1.75	1.84	1.8	1.76	1.77		
Total Metals	Aluminum (Al)	mg/L	0.100	0.13	0.0035	0.0041	0.004	0.0051	0.0041	0.0045	0.0269	0.0179	0.0221	0.0209	0.0249	0.0313	0.0156	0.0166	0.0215	0.0186	0.022	0.0151		
	Antimony (Sb)	mg/L	0.020 ^a	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001		
	Arsenic (As)	mg/L	0.005	0.005	0.00012	<0.0001	0.00012	<0.0001	<0.0001	<0.0001	0.00011	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001		
	Barium (Ba)	mg/L	1 ^β	-	0.0108	0.0106	0.0105	0.0107	0.0105	0.0105	0.0066	0.0072	0.00704	0.00696	0.00725	0.00702	0.00772	0.00789	0.00791	0.00789	0.00786	0.0078		
	Beryllium (Be)	mg/L	0.011 ^a	-	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002		
	Bismuth (Bi)	mg/L	-	-	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005		
	Boron (B)	mg/L	1.5	-	<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	<0.01	<0.01	<0.01	<0.01	<0.01		
	Cadmium (Cd)	mg/L	0.00012	0.00006	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005		
	Calcium (Ca)	mg/L	-	-	21	20.9	20.9	22	21.5	21.2	12.6	13.5	13.3	13.5	13.4	13.1	16.6	16.7	16.8	16.1	16.7	17		
	Chromium (Cr)	mg/L	0.001	0.003	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.00114	<0.0005		
	Cobalt (Co)	mg/L	0.0009 ^a	0.004	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001		
	Copper (Cu)	mg/L	0.002	0.0024	0.00088	0.00108	0.00122	0.00118	0.00116	0.00117	0.00096	0.00092	0.00102	0.00097	0.00092	0.00097	0.00096	0.00091	0.00094	0.00091	0.00094	0.00091		
	Iron (Fe)	mg/L	0.30	0.300	0.071	0.01	0.014	0.014	0.016	0.017	0.055	0.03	0.035	0.033	0.036	0.036	0.026	0.026	0.032	0.028	0.04	0.026		
	Lead (Pb)	mg/L	0.001	0.001	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0.00007	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005		
	Lithium (Li)	mg/L	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001		
	Magnesium (Mg)	mg/L	-	-	13.2	13	13.8	13.8	13.9	13.6	8.11	8.85	8.55	8.69	8.55	8.55	11.5	11.7	11.8	11.8	11.6	11.5		
	Manganese (Mn)	mg/L	0.935 ^β	-	0.0663	0.00126	0.00179	0.00134	0.00182	0.0019	0.00745	0.00299	0.0032	0.00297	0.00297	0.00281	0.00154	0.0016	0.00192	0.00171	0.00194	0.00156		
	Mercury (Hg)	mg/L	0.000026	-	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0									

Table C.69: Summary of the Magnitude of Elevation in Seasonal Average Parameter Concentrations (Total Metal Concentration Provided) Between Mary Lake (North Basin [BL0-01]; and South Basin [BL0]) and Reference Lake 3 (REF-03) in 2024, and at Mary Lake Basins Between 2024 and the Baseline Period (2005 to 2013), Mary River Project CREMP, 2024

Parameter	Mary Lake North Basin					Mary Lake South Basin				
	2024 vs Reference Lake 3 2024		2024 vs Baseline			2024 vs Reference Lake 3 2024		2024 vs Baseline		
	Summer	Fall	Winter	Summer	Fall	Summer	Fall	Winter	Summer	Fall
Conductivity (lab)	1.92	2.47	0.905	1.31	1.06	0.855	1.14	0.885	0.921	1.02
pH (lab)	1.05	1.07	0.971	1.03	0.988	0.997	1.01	1.04	1.02	1.01
Hardness (as CaCO ₃)	1.95	2.56	-	-	-	0.834	1.07	-	-	-
Total Suspended Solids (TSS)	1.00	0.303	0.500	0.500	0.500	1.00	0.303	0.500	0.300	0.500
Total Dissolved Solids (TDS)	1.27	2.15	0.714	0.946	0.812	0.763	0.970	0.761	0.895	0.763
Turbidity	3.11	2.54	1.14	0.299	0.484	4.23	2.83	0.323	0.500	0.597
Alkalinity (as CaCO ₃)	2.09	2.72	0.937	1.22	1.21	0.911	1.23	0.918	0.897	1.20
Total Ammonia	1.47	1.01	0.0545	0.119	0.0602	1.12	0.632	0.0609	0.119	0.0879
Nitrate	1.00	1.00	0.744	0.200	0.200	1.04	1.06	0.644	0.207	0.211
Nitrite	1.00	1.00	5.00	4.21	1.67	1.00	1.00	5.00	1.62	3.08
Total Kjeldahl Nitrogen (TKN)	0.650	0.695	0.629	0.394	0.410	0.433	0.728	0.450	0.518	0.642
Dissolved Organic Carbon	0.701	0.759	1.28	1.77	1.49	0.560	0.582	1.04	1.42	1.45
Total Organic Carbon	0.717	0.736	1.18	1.33	1.48	0.578	0.643	0.999	1.12	1.53
Total Phosphorus	0.829	1.16	0.363	0.462	0.758	0.744	1.48	0.690	0.632	0.639
Phenols	1.00	1.09	-	-	-	1.00	0.947	-	-	-
Bromide (Br)	1.00	1.00	2.00	2.00	2.00	1.00	1.00	2.00	1.73	1.60
Chloride (Cl)	1.97	2.95	0.880	1.36	0.892	1.11	1.37	0.742	0.560	0.589
Sulphate (SO ₄)	0.478	0.675	0.630	0.577	0.445	0.400	0.531	1.02	0.576	0.509
Aluminum (Al)	1.52	3.01	0.723	0.310	0.223	2.90	5.10	0.363	0.690	0.920
Antimony (Sb)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Arsenic (As)	0.871	1.00	1.05	1.02	0.506	0.876	1.00	1.00	1.02	0.960
Barium (Ba)	1.14	1.31	0.908	1.25	0.917	0.574	0.762	0.921	0.877	1.06
Beryllium (Be)	1.00	1.00	0.200	1.00	0.0400	1.00	1.00	0.200	1.00	1.00
Bismuth (Bi)	1.00	1.00	0.100	0.100	0.100	1.00	1.00	0.100	0.100	0.100
Boron (B)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Cadmium (Cd)	1.00	1.00	0.500	0.500	0.500	1.00	1.00	0.139	0.500	0.500
Calcium (Ca)	2.04	2.60	0.877	1.18	0.960	0.832	1.19	0.848	0.794	0.991
Chromium (Cr)	1.00	1.21	3.23	2.13	1.21	1.03	1.00	4.29	2.25	2.57
Cobalt (Co)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Copper (Cu)	1.13	1.13	0.927	1.02	0.329	0.709	0.861	0.726	0.756	0.870
Iron (Fe)	1.11	2.66	1.78	0.386	0.277	1.44	3.10	0.503	0.643	0.750
Lead (Pb)	1.01	1.00	0.909	0.746	0.719	1.02	1.00	0.856	0.657	0.894
Lithium (Li)	1.00	1.00	1.80	20.0	0.200	1.00	1.00	2.00	20.0	20.0
Magnesium (Mg)	2.01	2.60	0.931	1.35	1.15	0.828	1.09	0.898	0.945	1.13
Manganese (Mn)	2.74	2.84	3.04	0.937	0.172	1.23	2.41	0.362	0.769	1.23
Mercury (Hg)	1.00	1.00	0.500	0.500	0.500	1.00	1.15	0.500	0.500	0.576
Molybdenum (Mo)	1.53	1.71	1.01	1.60	1.08	0.884	1.16	1.15	1.15	1.18
Nickel (Ni)	1.00	1.05	0.763	0.938	0.890	1.03	1.01	0.967	1.01	0.992
Potassium (K)	1.03	1.11	0.879	1.53	1.18	0.552	0.737	0.857	1.02	1.21
Selenium (Se)	1.00	1.00	0.500	5.00	0.500	1.00	1.00	0.500	5.00	5.00
Silicon (Si)	1.72	2.20	1.10	1.22	1.02	0.994	1.10	0.923	0.913	1.06
Silver (Ag)	1.00	1.00	10.0	10.0	10.0	1.00	1.00	10.0	10.0	10.0
Sodium (Na)	2.16	3.16	1.06	2.27	1.27	0.971	1.43	0.913	1.10	1.23
Strontium (Sr)	1.24	1.56	0.991	1.38	0.995	0.593	0.886	0.770	0.724	0.888
Thallium (Tl)	1.00	1.00	1.00	10.0	0.100	1.00	1.00	1.00	10.0	10.0
Tin (Sn)	1.00	1.00	0.101	0.638	1.00	1.00	1.00	0.190	0.533	1.00
Titanium (Ti)	1.23	2.78	0.0300	0.116	0.0857	2.39	4.36	0.0300	0.227	0.134
Uranium (U)	4.51	8.43	0.864	1.46	0.935	1.37	2.99	0.995	0.787	1.12
Vanadium (V)	1.00	1.00	0.500	0.500	0.267	1.00	1.00	0.500	0.500	0.491
Zinc (Zn)	1.00	1.00	2.67	2.31	3.00	1.00	1.00	2.17	2.47	3.00

Denotes parameter with an AEMP benchmark.

Denotes slight elevation (mean concentration three to five times higher than respective mean reference or baseline period value).

Denotes moderate elevation (mean concentration five to 10 times higher than respective mean reference or baseline period value).

Denotes highly elevated concentration (mean concentration greater than 10 times higher than respective mean reference or baseline period value).

Denotes differences in method detection limit between the indicated study area and that of the reference area or baseline period, precluding an evaluation of magnitude of elevation; '-' = no data available for the analyte during comparison period

Table C.70: Dissolved Metal Concentrations at Mary Lake North (BL0-01) Basin Water Quality Monitoring Stations, Mary River Project CREMP, 2024

Parameters		Units	Winter Sampling Event						Summer Sampling Event						Fall Sampling Event					
			BL0-01-A	BL0-01-A	BL0-01	BL0-01	BL0-01-B	BL0-01-B	BL0-01-A	BL0-01-A	BL0-01	BL0-01	BL0-01-B	BL0-01-B	BL0-01-A	BL0-01-A	BL0-01	BL0-01	BL0-01-B	BL0-01-B
			bottom	surface	bottom	surface	bottom	surface	bottom	surface	bottom	surface	bottom	surface	bottom	surface	bottom	surface	bottom	surface
			10-Apr-24	10-Apr-24	10-Apr-24	10-Apr-24	10-Apr-24	10-Apr-24	11-Aug-24	11-Aug-24	11-Aug-24	11-Aug-24	11-Aug-24	11-Aug-24	11-Sep-24	11-Sep-24	11-Sep-24	11-Sep-24	11-Sep-24	11-Sep-24
Dissolved Metals	Aluminum (Al)	mg/L	0.0022	0.0023	0.0022	0.0031	0.0025	0.0038	0.0043	0.0039	0.0064	0.0075	0.0055	0.0081	0.0047	0.0051	0.0039	0.0041	0.0048	0.0045
	Antimony (Sb)	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
	Arsenic (As)	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
	Barium (Ba)	mg/L	0.0106	0.0107	0.0108	0.0113	0.0111	0.0106	0.00672	0.00718	0.00692	0.00694	0.00708	0.00695	0.0081	0.00803	0.0083	0.00827	0.0082	0.00809
	Beryllium (Be)	mg/L	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002
	Bismuth (Bi)	mg/L	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
	Boron (B)	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	<0.01	<0.01	<0.01	<0.01	<0.01
	Cadmium (Cd)	mg/L	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005
	Calcium (Ca)	mg/L	22.1	21.3	21.6	22.5	21.7	21.6	12.7	13.6	13.2	13.2	13.2	13.2	17.1	17.3	17	17.5	17.4	17.7
	Chromium (Cr)	mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
	Cobalt (Co)	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
	Copper (Cu)	mg/L	0.00075	0.00098	0.00105	0.00112	0.0011	0.00104	0.00088	0.00088	0.00089	0.00088	0.00086	0.00087	0.00087	0.00081	0.00088	0.00085	0.00086	0.00083
	Iron (Fe)	mg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.018	<0.01	0.01	0.01	<0.01	0.011	<0.01	<0.01	<0.01	<0.01	0.01	<0.01
	Lead (Pb)	mg/L	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
	Lithium (Li)	mg/L	0.001	0.001	0.001	0.0011	0.0011	0.0011	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
	Magnesium (Mg)	mg/L	13.3	13.5	13.6	14.2	14.4	13.4	8.07	8.74	8.48	8.48	8.54	8.55	11.2	11.4	11.5	11.5	11.5	11.5
	Manganese (Mn)	mg/L	0.0372	0.00044	0.0005	0.00058	0.00106	0.00117	0.00513	0.00196	0.00187	0.00181	0.0019	0.00163	0.00087	0.00089	0.00097	0.00084	0.00094	0.00085
	Mercury (Hg)	mg/L	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005
	Molybdenum (Mo)	mg/L	0.000264	0.000303	0.000313	0.000344	0.000332	0.000311	0.000196	0.000216	0.000202	0.000214	0.000215	0.000212	0.000266	0.000252	0.000258	0.000262	0.000255	0.00024
	Nickel (Ni)	mg/L	0.00067	0.00058	0.00056	0.00058	0.00062	0.00064	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
	Potassium (K)	mg/L	1.19	1.2	1.22	1.28	1.28	1.24	0.844	0.934	0.904	0.918	0.916	0.902	0.938	0.927	0.956	0.94	0.928	0.941
	Selenium (Se)	mg/L	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
	Silicon (Si)	mg/L	2.15	1.18	1.2	1.19	1.26	1.24	0.839	0.776	0.759	0.776	0.769	0.768	0.909	0.908	0.872	0.894	0.894	0.899
	Silver (Ag)	mg/L	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
	Sodium (Na)	mg/L	3.66	3.61	3.7	3.84	3.88	3.58	1.72	1.99	1.86	1.9	1.91	1.89	2.72	2.65	2.8	2.68	2.66	2.69
	Strontium (Sr)	mg/L	0.0155	0.0155	0.0156	0.0166	0.0163	0.0161	0.00935	0.00999	0.00974	0.00979	0.00998	0.00983	0.0125	0.0122	0.0129	0.0124	0.0125	0.0126
	Thallium (Tl)	mg/L	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
	Tin (Sn)	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.00013	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
	Titanium (Ti)	mg/L	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003
	Uranium (U)	mg/L	0.00196	0.00269	0.0027	0.00286	0.0027	0.00262	0.00108	0.00124	0.0012	0.0012	0.00121	0.0012	0.00214	0.00212	0.00215	0.00214	0.00213	0.00218
	Vanadium (V)	mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
	Zinc (Zn)	mg/L	<0.001	<0.001	<0.001	0.0033	0.0013	0.0075	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.0012	<0.001	<0.001	0.0012	<0.001

Table C.71: Magnitude of Elevation in Seasonal Average Dissolved Metal Concentrations Between Mary Lake (North Basin [BL0-01]; and South Basin [BL0]) and Reference Lake 3 (REF-03) in 2024, and at Mary Lake Basins Between 2024 and the Baseline Period (2005 to 2013), Mary River Project CREMP, 2024

Dissolved Metal	Mary Lake North Basin					Mary Lake South Basin				
	2024 vs Reference Lake 3 2024		2024 vs Baseline			2024 vs Reference Lake 3 2024		2024 vs Baseline		
	Summer	Fall	Winter	Summer	Fall	Summer	Fall	Winter	Summer	Fall
Aluminum (Al)	3.25	2.24	0.00571	0.476	0.287	5.14	2.68	0.00761	0.781	0.433
Antimony (Sb)	1.00	1.00	1.00	0.741	1.00	1.00	1.00	1.00	0.736	0.609
Arsenic (As)	0.896	1.00	1.00	1.00	0.635	0.896	1.00	1.00	1.00	1.00
Barium (Ba)	1.16	1.32	0.00264	1.28	0.962	0.592	0.718	0.00426	0.968	1.04
Beryllium (Be)	1.00	1.00	0.200	0.200	0.0400	1.00	1.00	0.143	0.200	0.200
Bismuth (Bi)	1.00	1.00	0.100	0.100	0.100	1.00	1.00	0.100	0.100	0.100
Boron (B)	0.937	1.00	1.00	1.00	1.00	0.937	1.00	1.00	1.00	1.00
Cadmium (Cd)	1.00	1.00	0.242	0.500	0.500	1.00	1.07	0.469	0.478	0.537
Calcium (Ca)	1.98	2.61	0.880	1.19	0.996	0.851	1.13	0.868	0.855	0.958
Chromium (Cr)	1.00	1.00	5.0	5.0	5.0	1.00	1.00	3.57	5.0	5.0
Cobalt (Co)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Copper (Cu)	1.08	1.15	0.850	1.03	0.389	0.631	0.782	0.717	0.887	0.745
Iron (Fe)	1.15	1.00	1.00	0.687	0.258	1.14	1.00	0.629	0.733	0.640
Lead (Pb)	1.00	1.00	1.00	0.829	0.840	1.00	1.00	0.973	0.738	0.592
Lithium (Li)	1.00	1.00	0.886	1.10	0.200	1.00	1.00	0.966	2.00	2.00
Magnesium (Mg)	1.92	2.51	0.955	1.32	1.12	0.819	1.01	0.965	0.976	1.08
Manganese (Mn)	12.1	5.31	3.32	1.35	0.285	2.01	0.874	0.223	0.454	0.231
Mercury (Hg)	1.00	1.00	0.500	0.500	0.500	1.00	1.00	0.500	0.500	0.500
Molybdenum (Mo)	1.56	1.85	0.979	1.49	1.10	0.903	1.13	1.10	1.14	0.938
Nickel (Ni)	1.00	1.00	0.775	0.875	0.709	1.00	1.00	0.960	0.975	0.609
Potassium (K)	1.07	1.11	0.976	1.58	1.20	0.635	0.701	0.917	1.20	1.17
Selenium (Se)	1.00	1.00	0.500	0.500	0.500	1.00	1.00	0.500	0.500	0.320
Silicon (Si)	1.79	2.19	1.13	1.25	1.03	0.953	0.956	0.940	0.988	0.983
Silver (Ag)	1.00	1.00	10.0	10.0	10.0	1.00	1.00	5.26	10.0	6.40
Sodium (Na)	2.10	2.93	1.10	2.16	1.63	0.995	1.26	0.991	1.16	1.18
Strontium (Sr)	1.24	1.59	0.993	1.42	1.15	0.634	0.822	0.775	0.803	0.861
Thallium (Tl)	1.00	1.00	1.00	1.00	0.100	1.00	1.00	0.526	1.00	0.609
Tin (Sn)	1.00	1.00	0.117	0.385	1.00	1.00	1.00	0.0929	0.369	0.609
Titanium (Ti)	1.00	1.00	0.0300	0.0300	0.0300	1.07	1.00	0.0300	0.0321	0.0280
Uranium (U)	4.61	8.84	0.865	1.44	0.908	1.52	3.17	0.966	0.890	1.13
Vanadium (V)	1.00	1.00	0.500	0.500	0.333	1.00	1.00	0.500	0.500	0.319
Zinc (Zn)	1.00	1.07	1.09	0.438	0.667	1.69	1.00	0.554	1.16	0.574

Denotes slight elevation (mean concentration three to five times higher than respective mean reference or baseline period value).

Denotes moderate elevation (mean concentration five to 10 times higher than respective mean reference or baseline period value).

Denotes highly elevated concentration (mean concentration ≥ 10 times higher than respective mean reference or baseline period value).

Denotes differences in method detection limit between the indicated study area and that of the reference area or baseline period, precluding an evaluation of magnitude of elevation.

Note: '-' = no data available for the analyte during comparison period.

Table C.72: Water Chemistry at Mary Lake South Basin (BL0) Water Quality Monitoring Stations, Mary River Project CREMP, 2024

Parameters		Units	Water Quality Guideline (WQG) ^{a,b}	AEMP Benchmark ^c	Winter Sampling Event													
					BL0-05-A	BL0-05-A	BL0-05	BL0-05	BL0-05-B	BL0-05-B	BL0-03	BL0-03	BL0-04	BL0-04	BL0-09	BL0-09	BL0-06	BL0-06
					bottom	surface	bottom	surface	bottom	surface	bottom	surface	bottom	surface	bottom	surface	bottom	surface
					11-Apr-24	11-Apr-24	11-Apr-24	11-Apr-24	11-Apr-24	11-Apr-24	12-Apr-24	12-Apr-24	12-Apr-24	12-Apr-24	12-Apr-24	12-Apr-24	11-Apr-24	11-Apr-24
Conventionals	Conductivity (lab)	µmho/cm	-	-	81.1	85.9	81.2	85.8	92.2	92.9	78	84	80.4	90	80.4	86.9	83.6	91.2
	pH (lab)	pH	6.5 - 9.0	-	7.41	7.43	7.39	7.42	7.41	7.35	7.25	7.34	7.29	7.36	7.09	7.32	7.42	7.35
	Hardness (as CaCO ₃)	mg/L	-	-	39.7	41.9	39.4	42.3	45.6	44.6	38.3	41.2	39.2	43.8	38.3	42.2	40.7	43.3
	Total Suspended Solids (TSS)	mg/L	-	-	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1.5	<1	<1.4
	Total Dissolved Solids (TDS)	mg/L	-	-	49	46	49	48	50	58	39	50	39	40	42	48	45	63
	Turbidity	NTU	-	-	<0.1	<0.1	0.11	<0.1	<0.1	<0.1	<0.1	<0.1	0.15	<0.1	0.14	<0.1	<0.1	<0.1
	Alkalinity (as CaCO ₃)	mg/L	-	-	40.8	43.4	40.9	43.1	46	45.4	39.8	42.3	39.9	45.1	40.6	43.9	42	45.8
Nutrients and Organics	Total Ammonia	mg/L	variable ^a	0.855	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.0075	<0.005
	Nitrate	mg/L	3	3	0.056	0.055	0.061	0.055	0.047	0.054	0.055	0.055	0.06	0.057	0.098	0.131	0.057	0.061
	Nitrite	mg/L	0.06	0.06	<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	<0.01
	Total Kjeldahl Nitrogen (TKN)	mg/L	-	-	0.06	<0.05	<0.05	<0.05	0.06	0.058	<0.05	<0.05	0.054	0.08	0.081	0.093	0.079	0.067
	Dissolved Organic Carbon	mg/L	-	-	1.37	1.76	1.76	1.42	1.72	1.55	1.9	1.55	1.61	1.53	1.29	1.66	1.65	1.45
	Total Organic Carbon	mg/L	-	-	1.26	1.78	1.44	1.6	1.65	1.8	1.49	1.33	1.5	1.59	1.46	1.68	1.44	1.52
	Total Phosphorus	mg/L	0.020 ^a	-	0.0023	0.0027	0.0022	0.0023	0.0025	0.0034	0.0021	0.0022	0.0029	<0.002	0.0022	0.0021	0.0023	0.0026
Anions	Phenols	mg/L	0.004 ^a	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
	Bromide (Br)	mg/L	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Chloride (Cl)	mg/L	120	120	2.17	2.29	2.14	2.29	2.46	2.49	2.04	2.22	2.1	2.37	2.36	2.31	2.37	2.58
Total Metals	Sulphate (SO ₄)	mg/L	218 ^β	218	1.76	1.85	1.73	1.85	1.99	2	1.58	1.69	1.7	1.9	1.85	1.97	1.86	1.98
	Aluminum (Al)	mg/L	0.100	0.130	0.004	0.0049	0.0047	0.0039	0.0037	0.004	0.0043	0.0036	0.0044	0.004	0.0054	0.0038	0.0038	0.0044
	Antimony (Sb)	mg/L	0.020 ^a	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
	Arsenic (As)	mg/L	0.005	0.005	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
	Barium (Ba)	mg/L	1 ^β	-	0.0045	0.00482	0.00454	0.00485	0.00523	0.00514	0.0043	0.00449	0.00452	0.005	0.00459	0.00491	0.00454	0.00498
	Beryllium (Be)	mg/L	0.011 ^a	-	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002
	Bismuth (Bi)	mg/L	-	-	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
	Boron (B)	mg/L	1.5	-	<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	<0.01
	Cadmium (Cd)	mg/L	0.00012	0.00006	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005
	Calcium (Ca)	mg/L	-	-	7.63	7.93	7.5	8.21	8.87	8.36	7.47	7.8	7.43	8.27	7.38	8.18	7.65	8.37
	Chromium (Cr)	mg/L	0.001	0.003	0.00071	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
	Cobalt (Co)	mg/L	0.0009 ^a	0.004	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
	Copper (Cu)	mg/L	0.002	0.0024	0.00057	0.00055	0.00061	0.00059	0.00058	0.00056	0.0006	0.00055	0.00056	0.00058	0.00052	0.00054	0.0005	0.00065
	Iron (Fe)	mg/L	0.30	0.326	<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	<0.01
	Lead (Pb)	mg/L	0.001	0.001	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
	Lithium (Li)	mg/L	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
	Magnesium (Mg)	mg/L	-	-	4.66	4.91	4.58	4.91	5.25	5.23	4.32	4.67	4.56	5.06	4.51	5.01	4.69	4.99
	Manganese (Mn)	mg/L	0.935 ^β	-	0.00032	0.0003	0.00078	0.00027	0.00042	0.00027	0.0004	0.00031	0.00045	0.00029	0.0006	0.00027	0.00026	0.00026
	Mercury (Hg)	mg/L	0.000026	-	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005
	Molybdenum (Mo)	mg/L	0.073	-	0.000189	0.000173	0.000148	0.000173	0.000187	0.000181	0.000141	0.000168	0.000165	0.000181	0.000147	0.000176	0.000161	0.000175
	Nickel (Ni)	mg/L	0.025	0.025	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
	Potassium (K)	mg/L	-	-	0.555	0.608	0.553	0.605	0.639	0.639	0.526	0.582	0.552	0.62	0.538	0.608	0.565	0.618
	Selenium (Se)	mg/L	0.001	-	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
	Silicon (Si)	mg/L	-	-	0.4	0.42	0.46	0.44	0.45	0.46	0.42	0.43	0.45	0.43	0.7	0.45	0.41	0.44
	Silver (Ag)	mg/L	0.00025	0.0001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
	Sodium (Na)	mg/L	-	-	1.2	1.31	1.18	1.3	1.41	1.37	1.13	1.25	1.17	1.33	1.25	1.33	1.21	1.32
	Strontium (Sr)	mg/L	-	-	0.00691	0.00732	0.0067	0.00733	0.0077	0.00771	0.00656	0.00695	0.00688	0.00762	0.0067	0.00735	0.00706	0.00748
	Thallium (Tl)	mg/L	0.0008	0.0008	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
	Tin (Sn)	mg/L	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
	Titanium (Ti)	mg/L	-	-	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003
	Uranium (U)	mg/L	0.015	-	0.000714	0.000766	0.000692	0.000774	0.000798	0.000813	0.00066	0.000732	0.000696	0.000802	0.00057	0.00078	0.000748	0.000801
	Vanadium (V)	mg/L	0.006 ^a	0.006	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
	Zinc (Zn)	mg/L	0.02 ^a	0.030	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003

Indicates parameter concentration above applicable Water Quality Guideline.

BOLD Indicates parameter concentration above the AEMP benchmark.

Notes: AEMP: Aquatic Environment Monitoring Plan. "-" indicates no applicable WQG or AEMP benchmark.

^a Canadian Water Quality Guideline for the protection of aquatic life (CCME 2024) except those indicated by α (Ontario Provincial Water Quality Objective [PWQO]; OMOE 1994) and β (British Columbia Water Quality Guideline [BCWQG]; BCMOE 2013). See Table 2.2 for information regarding WQG criteria.

^b A conservative hardness value of 75 mg/L was used for guideline calculations dependent on hardness (i.e., sulphate, beryllium, cadmium, copper, lead, manganese, and nickel).

^c AEMP Water Quality Benchmarks developed by Intrinsik (2013) using baseline water quality data specific to Mary Lake.

Table C.72: Water Chemistry at Mary Lake South Basin (BL0) Water Quality Monitoring Stations, Mary River Project CREMP, 2024

Parameters		Units	Water Quality Guideline (WQG) ^{a,b}	AEMP Benchmark ^c	Summer Sampling Event													
					BL0-05-A	BL0-05-A	BL0-05	BL0-05	BL0-05-B	BL0-05-B	BL0-03	BL0-03	BL0-04	BL0-04	BL0-09	BL0-09	BL0-06	BL0-06
					bottom	surface	bottom	surface	bottom	surface	bottom	surface	bottom	surface	bottom	surface	bottom	surface
					07-Aug-24	07-Aug-24	07-Aug-24	07-Aug-24	07-Aug-24	07-Aug-24	08-Aug-24	08-Aug-24	08-Aug-24	08-Aug-24	08-Aug-24	08-Aug-24	08-Aug-24	08-Aug-24
Conventionals	Conductivity (lab)	µmho/cm	-	-	64.6	65.2	62.7	63.7	62.8	63.1	58.3	62.2	61.1	61	61.8	61	60.6	60.6
	pH (lab)	pH	6.5 - 9.0	-	7.41	7.5	7.4	7.44	7.52	7.51	7.53	7.6	7.53	7.54	7.49	7.56	7.52	7.37
	Hardness (as CaCO ₃)	mg/L	-	-	30.3	30.3	29.2	29.7	29.2	29.4	27.3	29.2	28.7	28.5	28.9	28.6	28.6	28.6
	Total Suspended Solids (TSS)	mg/L	-	-	<1	<1	<1	<1	<1.2	<1	<1	<1	<1	<1	<1	<1	<1	<1
	Total Dissolved Solids (TDS)	mg/L	-	-	51	45	44	45	40	45	39	40	48	40	37	38	19	<20
	Turbidity	NTU	-	-	1.71	1.59	1.7	1.49	1.41	1.53	1.16	0.9	1.62	1.35	1.48	1.08	1.18	0.93
Nutrients and Organics	Alkalinity (as CaCO ₃)	mg/L	-	-	29.4	29.9	28.4	29.2	28.1	28.6	27.5	29.1	28.4	28.3	29.2	28.1	28.2	27.6
	Total Ammonia	mg/L	variable ^c	0.855	0.0075	<0.005	0.008	0.0132	0.0058	0.0058	0.0079	0.0112	0.0149	0.0056	0.0105	0.0079	0.0064	0.0061
	Nitrate	mg/L	3	3	<0.02	<0.02	<0.02	0.02	0.03	<0.02	<0.02	<0.02	0.02	<0.02	0.02	<0.02	<0.02	<0.02
	Nitrite	mg/L	0.06	0.06	<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	<0.01
	Total Kjeldahl Nitrogen (TKN)	mg/L	-	-	0.09	0.089	0.108	0.143	0.136	0.085	0.064	0.077	0.053	<0.05	<0.05	<0.05	0.081	0.083
	Dissolved Organic Carbon	mg/L	-	-	1.72	1.84	1.73	1.74	1.88	1.67	2.08	2.04	1.92	2.3	2.19	2.22	2.47	2.53
	Total Organic Carbon	mg/L	-	-	1.51	1.71	1.69	1.46	1.47	1.84	1.81	1.74	1.4	1.73	1.88	2.01	2.2	1.92
	Total Phosphorus	mg/L	0.020 ^a	-	0.0038	0.0032	0.0036	0.0046	0.0037	0.0032	0.0033	0.0033	0.0038	0.0034	0.0031	0.003	0.0028	0.0038
Anions	Phenols	mg/L	0.004 ^d	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
	Bromide (Br)	mg/L	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Chloride (Cl)	mg/L	120	120	1.32	1.36	1.34	1.48	1.3	1.3	1.25	1.36	1.27	1.29	1.28	1.32	1.43	1.41
	Sulphate (SO ₄)	mg/L	218 ^β	218	1.23	1.25	1.19	1.28	1.11	1.12	0.82	0.86	1.08	1.04	1.1	1.06	1.06	1.01
Total Metals	Aluminum (Al)	mg/L	0.1	0.13	0.059	0.0514	0.0766	0.0394	0.0486	0.0412	0.032	0.0334	0.0542	0.0379	0.0617	0.0322	0.0375	0.0355
	Antimony (Sb)	mg/L	0.020 ^a	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
	Arsenic (As)	mg/L	0.005	0.005	<0.0001	<0.0001	0.00013	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
	Barium (Ba)	mg/L	1 ^β	-	0.0037	0.00374	0.0038	0.00357	0.00351	0.00357	0.00311	0.00328	0.00357	0.00341	0.00373	0.00346	0.00341	0.00344
	Beryllium (Be)	mg/L	0.011 ^a	-	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002
	Bismuth (Bi)	mg/L	-	-	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
	Boron (B)	mg/L	1.5	-	<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	<0.01
	Cadmium (Cd)	mg/L	0.00012	0.00006	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005
	Calcium (Ca)	mg/L	-	-	5.53	5.57	5.55	5.57	5.33	5.47	5	5.29	5.26	5.36	5.43	5.41	5.3	5.55
	Chromium (Cr)	mg/L	0.001	0.003	<0.0005	<0.0005	0.00071	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
	Cobalt (Co)	mg/L	0.0009 ^a	0.004	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
	Copper (Cu)	mg/L	0.002	0.0024	0.00061	0.0006	0.0009	0.00056	0.00063	0.00055	0.00054	0.00054	0.00057	0.00052	0.00066	0.00054	0.00058	0.00062
	Iron (Fe)	mg/L	0.3	0.326	0.061	0.054	0.06	0.047	0.05	0.046	0.041	0.037	0.058	0.042	0.065	0.038	0.04	0.039
	Lead (Pb)	mg/L	0.001	0.001	0.000055	<0.00005	0.000074	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0.000069	<0.00005	0.00006	<0.00005	<0.00005	<0.00005
	Lithium (Li)	mg/L	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
	Magnesium (Mg)	mg/L	-	-	3.72	3.67	3.68	3.6	3.62	3.57	3.19	3.43	3.41	3.37	3.54	3.42	3.5	3.66
	Manganese (Mn)	mg/L	0.935 ^β	-	0.00219	0.00175	0.00235	0.00143	0.00158	0.0015	0.00179	0.0013	0.00186	0.00142	0.00206	0.00142	0.00138	0.00135
	Mercury (Hg)	mg/L	0.000026	-	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005
	Molybdenum (Mo)	mg/L	0.073	-	0.000135	0.00013	0.000128	0.00013	0.000123	0.000132	0.000089	0.000096	0.000108	0.000141	0.000112	0.000125	0.000114	0.000161
	Nickel (Ni)	mg/L	0.025	0.025	<0.0005	<0.0005	0.00068	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
	Potassium (K)	mg/L	-	-	0.523	0.517	0.52	0.502	0.499	0.498	0.436	0.456	0.482	0.469	0.498	0.488	0.484	0.499
	Selenium (Se)	mg/L	0.001	-	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
	Silicon (Si)	mg/L	-	-	0.53	0.52	0.54	0.48	0.49	0.48	0.43	0.44	0.5	0.45	0.55	0.44	0.45	0.47
	Silver (Ag)	mg/L	0.00025	0.0001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
	Sodium (Na)	mg/L	-	-	0.89	0.907	0.918	0.873	0.856	0.871	0.759	0.804	0.812	0.829	0.849	0.835	0.832	0.858
	Strontium (Sr)	mg/L	-	-	0.00496	0.0049	0.00494	0.00474	0.00467	0.00483	0.00408	0.00428	0.00466	0.00455	0.00473	0.00459	0.00451	0.0046
	Thallium (Tl)	mg/L	0.0008	0.0008	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
	Tin (Sn)	mg/L	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
	Titanium (Ti)	mg/L	-	-	0.00308	0.00267	0.00284	0.00216	0.00236	0.00223	0.00157	0.00168	0.00292	0.00198	0.00316	0.00175	0.00161	0.00171
	Uranium (U)	mg/L	0.015	-	0.000422	0.000409	0.000401	0.000397	0.000379	0.000398	0.000307	0.000343	0.000367	0.000358	0.000378	0.000366	0.000363	0.000367
	Vanadium (V)	mg/L	0.006 ^a	0.006	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
	Zinc (Zn)	mg/L	0.02 ^a	0.03	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003

Indicates parameter concentration above applicable Water Quality Guideline.

BOLD Indicates parameter concentration above the AEMP benchmark.

Notes: AEMP: Aquatic Environment Monitoring Plan. "-" indicates no applicable WQG or AEMP benchmark.

^a Canadian Water Quality Guideline for the protection of aquatic life (CCME 2024) except those indicated by α (Ontario Provincial Water Quality Objective [PWQO]; OMOE 1994) and β (British Columbia Water Quality Guideline [BCWQG]; BCMOE 2013). See Table 2.2 for information regarding WQG criteria.

^b A conservative hardness value of 75 mg/L was used for guideline calculations dependent on hardness (i.e., sulphate, beryllium, cadmium, copper, lead, manganese, and nickel).

^c AEMP Water Quality Benchmarks developed by Intrinsik (2013) using baseline water quality data specific to Mary Lake.

Table C.72: Water Chemistry at Mary Lake South Basin (BL0) Water Quality Monitoring Stations, Mary River Project CREMP, 2024

Parameters		Units	Water Quality Guideline (WQG) ^{a,b}	AEMP Benchmark ^c	Fall Sampling Event													
					BL0-05-A	BL0-05-A	BL0-05	BL0-05	BL0-05-B	BL0-05-B	BL0-03	BL0-03	BL0-04	BL0-04	BL0-09	BL0-09	BL0-06	BL0-06
					bottom	surface	bottom	surface	bottom	surface	bottom	surface	bottom	surface	bottom	surface	bottom	surface
					16-Sep-24	16-Sep-24	15-Sep-24	15-Sep-24	16-Sep-24	16-Sep-24	15-Sep-24	15-Sep-24	15-Sep-24	15-Sep-24	15-Sep-24	15-Sep-24	15-Sep-24	15-Sep-24
Conventionals	Conductivity (lab)	µmho/cm	-	-	82	81.3	90.4	80.1	80	80.4	80	80.1	85.5	80.7	85.2	80.2	80.1	80.1
	pH (lab)	pH	6.5 - 9.0	-	7.47	7.49	7.55	7.4	7.64	7.64	7.6	7.58	7.52	7.64	7.61	7.61	7.58	7.56
	Hardness (as CaCO ₃)	mg/L	-	-	38	37.3	41.6	36.8	36.4	37.1	36.7	37.4	40.2	37.1	39	36.5	36.6	36.8
	Total Suspended Solids (TSS)	mg/L	-	-	<1	<1	<1	1	<1	<1	<1	<1	<1	<1	1	<1	<1	<1.3
	Total Dissolved Solids (TDS)	mg/L	-	-	48	51	43	26	40	41	39	39	50	36	45	26	33	42
	Turbidity	NTU	-	-	0.86	0.88	0.92	0.78	0.72	0.76	0.63	0.5	0.9	0.69	0.8	0.71	0.73	0.67
Nutrients and Organics	Alkalinity (as CaCO ₃)	mg/L	-	-	42.4	42.9	47.5	46.1	45.7	41.9	43.3	44.4	46.9	43	44.4	43.5	47.1	43.5
	Total Ammonia	mg/L	variable ^c	0.855	<0.005	<0.005	<0.005	<0.005	<0.005	0.009	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
	Nitrate	mg/L	3	3	0.027	<0.02	<0.02	<0.02	<0.02	<0.02	0.025	<0.02	0.024	<0.02	0.02	<0.02	<0.02	<0.02
	Nitrite	mg/L	0.06	0.06	<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	<0.01
	Total Kjeldahl Nitrogen (TKN)	mg/L	-	-	0.086	0.091	0.108	0.092	0.077	0.118	0.135	0.109	0.098	0.122	0.114	0.13	0.109	0.086
	Dissolved Organic Carbon	mg/L	-	-	1.95	1.53	1.75	1.57	2	2.07	2.51	2.4	1.75	2.64	2.15	2.09	1.82	1.77
	Total Organic Carbon	mg/L	-	-	2	2.14	2.01	2.12	2.07	2.27	2.37	2.41	2.27	2.67	2.18	2.32	2.46	2.29
	Total Phosphorus	mg/L	0.020 ^a	-	0.0032	0.003	0.0041	0.0038	0.0036	0.0032	0.0033	0.0032	0.0033	0.0038	0.009	0.0034	0.0035	0.0038
Anions	Phenols	mg/L	0.004 ^d	-	0.0024	0.002	0.0012	0.0016	0.0014	0.0015	0.0011	0.0018	0.0012	<0.001	<0.001	<0.001	<0.001	0.0019
	Bromide (Br)	mg/L	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Chloride (Cl)	mg/L	120	120	1.66	1.59	1.72	1.58	1.67	1.67	1.77	1.67	1.99	1.55	1.68	1.56	1.54	1.56
Total Metals	Sulphate (SO ₄)	mg/L	218 ^β	218	1.51	1.45	1.56	1.34	1.43	1.44	1.11	1.16	1.97	1.18	1.46	1.33	1.31	1.33
	Aluminum (Al)	mg/L	0.1	0.13	0.0247	0.0259	0.0341	0.0364	0.0282	0.0303	0.0214	0.0172	0.0384	0.0279	0.0497	0.0323	0.0338	0.0319
	Antimony (Sb)	mg/L	0.020 ^a	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
	Arsenic (As)	mg/L	0.005	0.005	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
	Barium (Ba)	mg/L	-	-	0.00454	0.0045	0.00506	0.00455	0.00441	0.00452	0.0043	0.00418	0.00494	0.00434	0.00482	0.00458	0.00454	0.00453
	Beryllium (Be)	mg/L	0.011 ^a	-	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002
	Bismuth (Bi)	mg/L	-	-	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
	Boron (B)	mg/L	1.5	-	<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	<0.01
	Cadmium (Cd)	mg/L	0.00012	0.00006	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005
	Calcium (Ca)	mg/L	-	-	7.53	7.47	8.38	7.6	7.17	7.21	7.64	7.62	8.27	7.65	7.95	7.4	7.54	7.39
	Chromium (Cr)	mg/L	0.001	0.003	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
	Cobalt (Co)	mg/L	0.0009 ^a	0.004	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
	Copper (Cu)	mg/L	0.002	0.0024	0.00064	0.00065	0.00075	0.00066	0.00078	0.00071	0.0008	0.00065	0.00086	0.00066	0.00083	0.00069	0.00064	0.00061
	Iron (Fe)	mg/L	0.3	0.326	0.029	0.029	0.035	0.037	0.03	0.031	0.027	0.025	0.044	0.03	0.054	0.038	0.039	0.037
	Lead (Pb)	mg/L	0.001	0.001	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0.000053	<0.00005	<0.00005	<0.00005
	Lithium (Li)	mg/L	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
	Magnesium (Mg)	mg/L	-	-	5.18	5.16	5.22	4.63	5.04	5.03	4.73	4.69	5.1	4.63	4.97	4.62	4.61	4.7
	Manganese (Mn)	mg/L	0.935 ^β	-	0.00145	0.0014	0.00131	0.00139	0.00152	0.00138	0.00134	0.00128	0.0015	0.00133	0.00189	0.00147	0.0016	0.00147
	Mercury (Hg)	mg/L	0.000026	-	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	0.0000157	<0.000005
	Molybdenum (Mo)	mg/L	0.073	-	0.000177	0.000152	0.000193	0.000171	0.000154	0.000162	0.00014	0.000144	0.000202	0.000162	0.000186	0.000164	0.000154	0.000168
	Nickel (Ni)	mg/L	0.025	0.025	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.00057	<0.0005	<0.0005	<0.0005	<0.0005
	Potassium (K)	mg/L	-	-	0.602	0.599	0.663	0.616	0.588	0.59	0.588	0.586	0.649	0.596	0.651	0.609	0.612	0.621
	Selenium (Se)	mg/L	0.001	-	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
	Silicon (Si)	mg/L	-	-	0.47	0.45	0.54	0.48	0.44	0.46	0.44	0.43	0.52	0.45	0.53	0.45	0.46	0.45
	Silver (Ag)	mg/L	0.00025	0.0001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
	Sodium (Na)	mg/L	-	-	1.2	1.23	1.33	1.18	1.22	1.17	1.14	1.14	1.3	1.16	1.27	1.17	1.17	1.18
	Strontium (Sr)	mg/L	-	-	0.0065	0.0064	0.00765	0.0067	0.0064	0.00626	0.00624	0.00618	0.00746	0.00648	0.00734	0.00663	0.00675	0.00662
	Thallium (Tl)	mg/L	0.0008	0.0008	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
	Tin (Sn)	mg/L	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
	Titanium (Ti)	mg/L	-	-	0.00113	0.00107	0.00147	0.00146	0.00117	0.00121	0.00101	0.00074	0.00174	0.00113	0.00222	0.00143	0.00158	0.00145
	Uranium (U)	mg/L	0.015	-	0.000754	0.000736	0.00104	0.000769	0.000696	0.000715	0.000678	0.000678	0.000966	0.000718	0.0009	0.00075	0.000765	0.000751
	Vanadium (V)	mg/L	0.006 ^a	0.006	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
	Zinc (Zn)	mg/L	0.03	0.03	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003

Indicates parameter concentration above applicable Water Quality Guideline.

BOLD Indicates parameter concentration above the AEMP benchmark.

Notes: AEMP: Aquatic Environment Monitoring Plan. "-" indicates no applicable WQG or AEMP benchmark.

^a Canadian Water Quality Guideline for the protection of aquatic life (CCME 2024) except those indicated by α (Ontario Provincial Water Quality Objective [PWQO]; OMOE 1994) and β (British Columbia Water Quality Guideline [BCWQG]; BCMOE 2013). See Table 2.2 for information regarding WQG criteria.

^b A conservative hardness value of 75 mg/L was used for guideline calculations dependent on hardness (i.e., sulphate, beryllium, cadmium, copper, lead, manganese, and nickel).

^c AEMP Water Quality Benchmarks developed by Intrinsik (2013) using baseline water quality data specific to Mary Lake.

Table C.73: Dissolved Metal Concentrations at Mary Lake South Basin (BL0) Water Quality Monitoring Stations, Mary River Project CREMP, 2024

Parameters		Units	Winter Sampling Event													
			BL0-05-A bottom	BL0-05-A surface	BL0-05 bottom	BL0-05 surface	BL0-05-B bottom	BL0-05-B surface	BL0-03 bottom	BL0-03 surface	BL0-04 bottom	BL0-04 surface	BL0-09 bottom	BL0-09 surface	BL0-06 bottom	BL0-06 surface
			11-Apr-24	11-Apr-24	11-Apr-24	11-Apr-24	11-Apr-24	11-Apr-24	12-Apr-24	12-Apr-24	12-Apr-24	12-Apr-24	12-Apr-24	12-Apr-24	11-Apr-24	11-Apr-24
Dissolved Metals	Aluminum (Al)	mg/L	0.0017	0.0024	0.0021	0.002	0.0019	0.0032	0.002	0.0017	0.004	0.002	0.0058	0.0025	0.0022	0.0089
	Antimony (Sb)	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
	Arsenic (As)	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
	Barium (Ba)	mg/L	0.00451	0.00484	0.0046	0.00484	0.00515	0.00502	0.00442	0.00463	0.00484	0.00499	0.00497	0.00496	0.00461	0.00502
	Beryllium (Be)	mg/L	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002
	Bismuth (Bi)	mg/L	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
	Boron (B)	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	<0.01
	Cadmium (Cd)	mg/L	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	0.0000105	<0.000005	<0.000005	<0.000005
	Calcium (Ca)	mg/L	7.84	8.13	7.59	8.11	8.95	8.79	7.49	8.07	7.56	8.66	7.57	8.26	7.93	8.33
	Chromium (Cr)	mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
	Cobalt (Co)	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
	Copper (Cu)	mg/L	0.00047	0.00052	0.00051	0.00056	0.00061	0.00053	0.00051	0.00052	0.00049	0.00064	0.00052	0.00052	0.0005	0.00064
	Iron (Fe)	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	<0.01
	Lead (Pb)	mg/L	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
	Lithium (Li)	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
	Magnesium (Mg)	mg/L	4.89	5.24	4.96	5.35	5.66	5.49	4.77	5.1	4.93	5.38	4.71	5.24	5.08	5.46
	Manganese (Mn)	mg/L	0.00016	0.00014	0.00042	0.00013	0.00019	0.00016	0.00019	0.00014	0.00027	0.00013	0.00031	0.00014	0.00015	0.00015
	Mercury (Hg)	mg/L	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005
	Molybdenum (Mo)	mg/L	0.000153	0.000166	0.000156	0.000176	0.000179	0.000185	0.000141	0.000154	0.000152	0.000178	0.000134	0.000193	0.000166	0.000167
	Nickel (Ni)	mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
	Potassium (K)	mg/L	0.591	0.633	0.586	0.634	0.676	0.67	0.562	0.607	0.581	0.654	0.569	0.638	0.596	0.647
	Selenium (Se)	mg/L	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
	Silicon (Si)	mg/L	0.398	0.425	0.459	0.426	0.424	0.446	0.43	0.425	0.449	0.444	0.768	0.435	0.41	0.431
	Silver (Ag)	mg/L	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
	Sodium (Na)	mg/L	1.31	1.4	1.29	1.33	1.48	1.48	1.27	1.35	1.28	1.46	1.41	1.43	1.34	1.42
	Strontium (Sr)	mg/L	0.00678	0.00748	0.00692	0.00743	0.00791	0.0078	0.00658	0.0069	0.00675	0.00764	0.00688	0.00757	0.00704	0.00755
	Thallium (Tl)	mg/L	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
	Tin (Sn)	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
	Titanium (Ti)	mg/L	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003
	Uranium (U)	mg/L	0.000674	0.000742	0.000642	0.000736	0.000778	0.000798	0.000639	0.000688	0.000664	0.000772	0.000544	0.000753	0.000712	0.000757
	Vanadium (V)	mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
	Zinc (Zn)	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.0037	0.0012	<0.001	0.0011

Table C.73: Dissolved Metal Concentrations at Mary Lake South Basin (BL0) Water Quality Monitoring Stations, Mary River Project CREMP, 2024

Parameters		Units	Summer Sampling Event													
			BL0-05-A bottom	BL0-05-A surface	BL0-05 bottom	BL0-05 surface	BL0-05-B bottom	BL0-05-B surface	BL0-03 bottom	BL0-03 surface	BL0-04 bottom	BL0-04 surface	BL0-09 bottom	BL0-09 surface	BL0-06 bottom	BL0-06 surface
			07-Aug-24	07-Aug-24	07-Aug-24	07-Aug-24	07-Aug-24	07-Aug-24	08-Aug-24	08-Aug-24	08-Aug-24	08-Aug-24	08-Aug-24	08-Aug-24	08-Aug-24	08-Aug-24
Dissolved Metals	Aluminum (Al)	mg/L	0.0069	0.0088	0.0122	0.0088	0.0128	0.0075	0.0058	0.0091	0.0124	0.006	0.0108	0.0115	0.0102	0.009
	Antimony (Sb)	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
	Arsenic (As)	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
	Barium (Ba)	mg/L	0.00382	0.00376	0.0036	0.00371	0.00365	0.00359	0.00317	0.00341	0.00359	0.00341	0.0036	0.00349	0.0034	0.00345
	Beryllium (Be)	mg/L	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002
	Bismuth (Bi)	mg/L	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
	Boron (B)	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	<0.01
	Cadmium (Cd)	mg/L	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005
	Calcium (Ca)	mg/L	5.93	5.92	5.74	5.8	5.73	5.71	5.32	5.72	5.62	5.55	5.67	5.6	5.56	5.6
	Chromium (Cr)	mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
	Cobalt (Co)	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
	Copper (Cu)	mg/L	0.00048	0.00057	0.00048	0.00053	0.00056	0.00049	0.00055	0.00046	0.00046	0.00048	0.00056	0.00048	0.00055	0.00052
	Iron (Fe)	mg/L	0.01	0.013	0.012	0.012	0.014	0.011	<0.01	0.01	0.012	<0.01	0.011	0.011	0.012	0.011
	Lead (Pb)	mg/L	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
	Lithium (Li)	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
	Magnesium (Mg)	mg/L	3.77	3.78	3.62	3.7	3.62	3.67	3.4	3.63	3.57	3.55	3.58	3.55	3.57	3.54
	Manganese (Mn)	mg/L	0.00066	0.0005	0.00058	0.00039	0.00044	0.00038	0.00024	0.00037	0.0003	0.0003	0.00026	0.00034	0.00037	0.00041
	Mercury (Hg)	mg/L	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005
	Molybdenum (Mo)	mg/L	0.000139	0.000146	0.000133	0.000131	0.000124	0.000124	0.000104	0.000103	0.000115	0.00012	0.00012	0.000118	0.000111	0.000111
	Nickel (Ni)	mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
	Potassium (K)	mg/L	0.557	0.558	0.543	0.559	0.545	0.539	0.501	0.523	0.537	0.523	0.529	0.535	0.523	0.512
	Selenium (Se)	mg/L	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
	Silicon (Si)	mg/L	0.434	0.429	0.431	0.421	0.403	0.411	0.371	0.401	0.44	0.389	0.456	0.408	0.412	0.408
	Silver (Ag)	mg/L	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
	Sodium (Na)	mg/L	0.928	0.934	0.89	0.909	0.904	0.899	0.829	0.873	0.883	0.875	0.883	0.876	0.878	0.867
	Strontium (Sr)	mg/L	0.00533	0.00536	0.00514	0.00522	0.00506	0.00509	0.00442	0.00476	0.00493	0.00488	0.0051	0.00489	0.00482	0.00477
	Thallium (Tl)	mg/L	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
	Tin (Sn)	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
	Titanium (Ti)	mg/L	<0.0003	<0.0003	0.00031	0.00032	0.00043	<0.0003	<0.0003	<0.0003	0.00037	<0.0003	0.00037	0.0003	0.0003	<0.0003
	Uranium (U)	mg/L	0.000432	0.00043	0.000409	0.000426	0.000408	0.000414	0.000323	0.000363	0.000378	0.000377	0.000384	0.000381	0.000376	0.000367
	Vanadium (V)	mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
	Zinc (Zn)	mg/L	<0.001	<0.001	<0.001	<0.001	0.0106	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001

Table C.73: Dissolved Metal Concentrations at Mary Lake South Basin (BL0) Water Quality Monitoring Stations, Mary River Project CREMP, 2024

Parameters		Units	Fall Sampling Event													
			BL0-05-A bottom	BL0-05-A surface	BL0-05 bottom	BL0-05 surface	BL0-05-B bottom	BL0-05-B surface	BL0-03 bottom	BL0-03 surface	BL0-04 bottom	BL0-04 surface	BL0-09 bottom	BL0-09 surface	BL0-06 bottom	BL0-06 surface
			16-Sep-24	16-Sep-24	15-Sep-24	15-Sep-24	16-Sep-24	16-Sep-24	15-Sep-24	15-Sep-24	15-Sep-24	15-Sep-24	15-Sep-24	15-Sep-24	15-Sep-24	15-Sep-24
Dissolved Metals	Aluminum (Al)	mg/L	0.0036	0.0071	0.0049	0.0069	0.0039	0.0034	0.0048	0.0061	0.006	0.0067	0.0047	0.0036	0.0061	0.0079
	Antimony (Sb)	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
	Arsenic (As)	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
	Barium (Ba)	mg/L	0.0045	0.00438	0.00492	0.00443	0.00437	0.00436	0.00423	0.00421	0.00479	0.0043	0.00465	0.00427	0.00435	0.00443
	Beryllium (Be)	mg/L	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002
	Bismuth (Bi)	mg/L	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
	Boron (B)	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	<0.01
	Cadmium (Cd)	mg/L	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	0.0000102	<0.000005
	Calcium (Ca)	mg/L	7.53	7.37	8.27	7.34	7.23	7.4	7.3	7.41	8.05	7.32	7.84	7.24	7.29	7.28
	Chromium (Cr)	mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
	Cobalt (Co)	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
	Copper (Cu)	mg/L	0.00055	0.00056	0.00063	0.00051	0.00062	0.00058	0.00053	0.00058	0.00068	0.00064	0.00057	0.00056	0.00054	0.00053
	Iron (Fe)	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	<0.01
	Lead (Pb)	mg/L	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
	Lithium (Li)	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
	Magnesium (Mg)	mg/L	4.65	4.58	5.08	4.48	4.46	4.52	4.48	4.59	4.88	4.57	4.72	4.47	4.47	4.52
	Manganese (Mn)	mg/L	0.0002	0.00023	0.00017	0.00015	0.00015	0.00011	0.00011	0.00012	0.0002	0.00016	0.00012	0.00011	0.00011	0.00012
	Mercury (Hg)	mg/L	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005
	Molybdenum (Mo)	mg/L	0.000157	0.000154	0.000171	0.000151	0.000153	0.00015	0.00014	0.000131	0.000169	0.000143	0.000168	0.000158	0.000172	0.000156
	Nickel (Ni)	mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
	Potassium (K)	mg/L	0.59	0.605	0.63	0.581	0.581	0.585	0.556	0.571	0.62	0.58	0.608	0.587	0.583	0.588
	Selenium (Se)	mg/L	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
	Silicon (Si)	mg/L	0.387	0.39	0.454	0.369	0.372	0.366	0.375	0.388	0.436	0.383	0.419	0.366	0.376	0.386
	Silver (Ag)	mg/L	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
	Sodium (Na)	mg/L	1.17	1.17	1.27	1.12	1.13	1.14	1.1	1.12	1.24	1.12	1.22	1.14	1.13	1.15
	Strontium (Sr)	mg/L	0.00648	0.00658	0.00723	0.00646	0.00632	0.00624	0.006	0.00609	0.0071	0.00632	0.00691	0.00637	0.00632	0.00638
	Thallium (Tl)	mg/L	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
	Tin (Sn)	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
	Titanium (Ti)	mg/L	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003
	Uranium (U)	mg/L	0.000799	0.00078	0.001	0.000727	0.000733	0.000746	0.000643	0.000667	0.000905	0.000701	0.000863	0.000724	0.000743	0.000729
	Vanadium (V)	mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
	Zinc (Zn)	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001

APPENDIX D
SEDIMENT QUALITY DATA

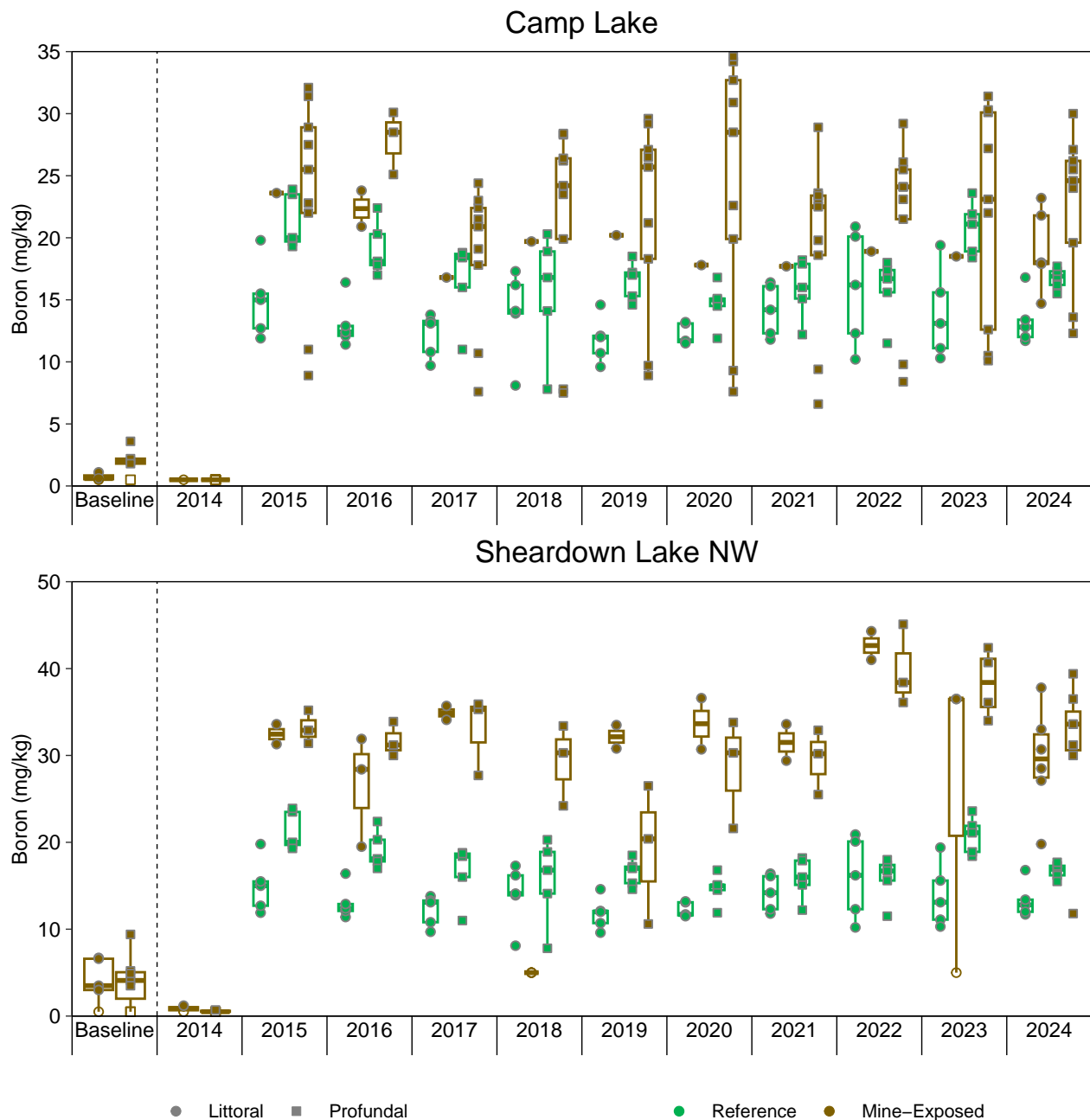


Figure D.1: Temporal Comparison of Sediment Boron Concentrations at Littoral and Profundal Stations of Camp Lake (JL0), Sheardown Lake Northwest (NW; DL0-01), Sheardown Lake SE (SE; DL0-02) and Reference Lake 3 (REF-03) for Mine Baseline (2005 to 2013), Construction (2014), and Operational (2015 to 2024) Periods, Mary River Project CREMP, 2024

Notes: Concentrations below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL and the open symbol represents one or more values reported below the LRL. Red line indicates AEMP Benchmark; orange dashed line indicates Canadian Sediment Quality Guideline Probable Effect Level or Ontario Provincial Sediment Quality Guideline Severe Effect Level. Boxplot lines show the 25th percentile, median, and 75th percentile with the boxplots whiskers showing the minimum and maximum (excluding potential outliers). Boron concentrations in sediments collected from 2015 to 2024 were considerably higher (i.e., 10- to 70-times) than those reported during both the baseline and 2014 studies at all mine-exposed lakes. The lack of any distinct gradient in the magnitude of the elevation in boron concentrations among stations within each lake and among study lakes suggested that the stark contrast in boron concentrations between recent data and data collected prior to 2015 was likely due to laboratory-based analytical differences (i.e., probable under-recovery of boron in baseline and 2014). The analytical laboratory used for the baseline study differed from the current laboratory.

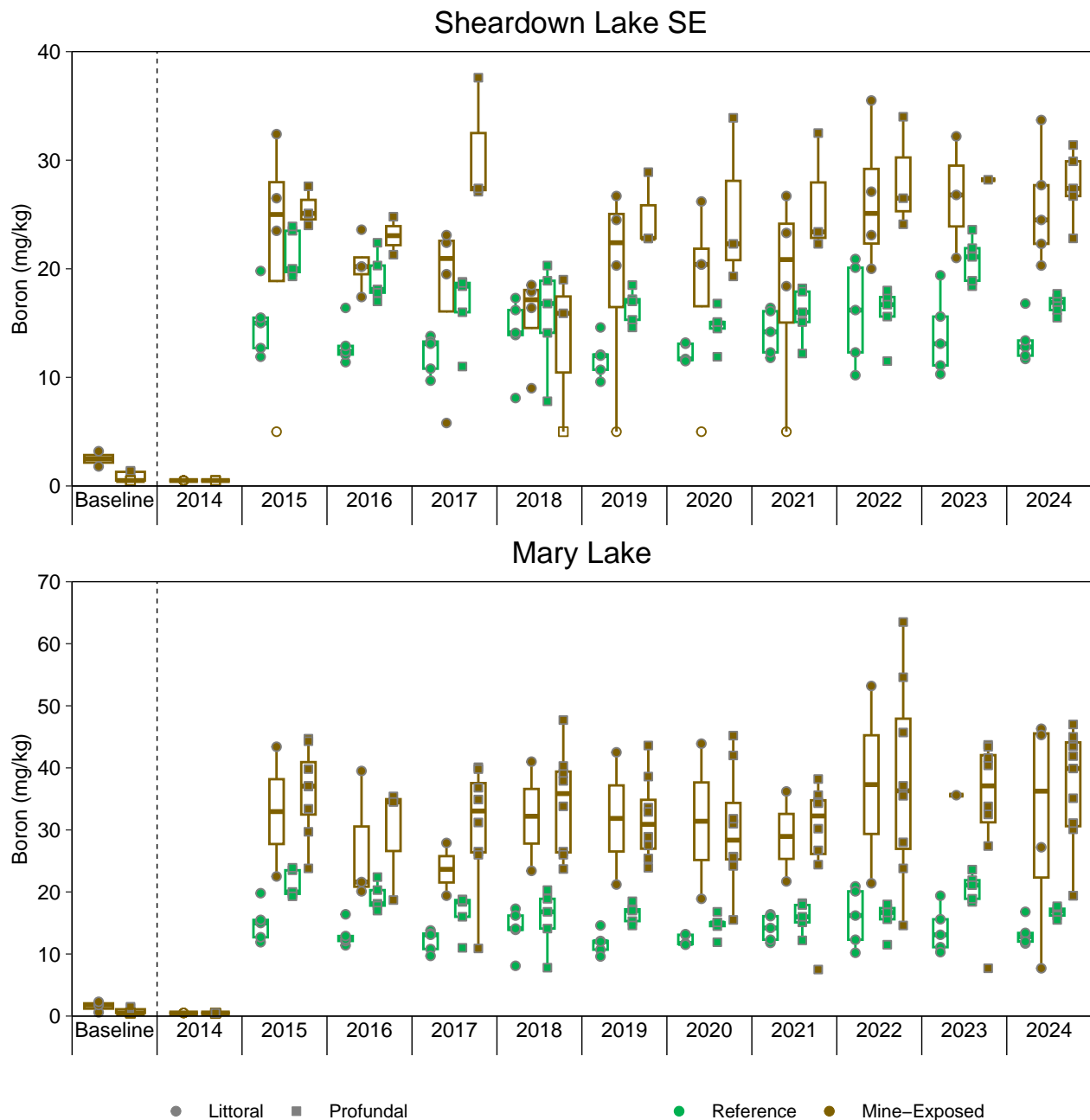


Figure D.1: Temporal Comparison of Sediment Boron Concentrations at Littoral and Profundal Stations of Camp Lake (JL0), Sheardown Lake Northwest (NW; DL0-01), Sheardown Lake SE (SE; DL0-02) and Reference Lake 3 (REF-03) for Mine Baseline (2005 to 2013), Construction (2014), and Operational (2015 to 2024) Periods, Mary River Project CREMP, 2024

Notes: Concentrations below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL and the open symbol represents one or more values reported below the LRL. Red line indicates AEMP Benchmark; orange dashed line indicates Canadian Sediment Quality Guideline Probable Effect Level or Ontario Provincial Sediment Quality Guideline Severe Effect Level. Boxplot lines show the 25th percentile, median, and 75th percentile with the boxplots whiskers showing the minimum and maximum (excluding potential outliers). Boron concentrations in sediments collected from 2015 to 2024 were considerably higher (i.e., 10- to 70-times) than those reported during both the baseline and 2014 studies at all mine-exposed lakes. The lack of any distinct gradient in the magnitude of the elevation in boron concentrations among stations within each lake and among study lakes suggested that the stark contrast in boron concentrations between recent data and data collected prior to 2015 was likely due to laboratory-based analytical differences (i.e., probable under-recovery of boron in baseline and 2014). The analytical laboratory used for the baseline study differed from the current laboratory.

Table D.1: Field Observations for Sediment Cores Collected at Reference Lake 3 (REF-03), Mary River Project CREMP, August 2024

Sample Station	Station Depth (m)	Station Type	Core Number	Core Length (cm)	Surficial Substrate Colour/Texture Description
REF-03-1	10.5	Littoral	1	23.0	Gray clay
			2	22.0	
			3	18.0	
REF-03-2	9.0	Littoral	1	29.0	Brown/ reddish silt
			2	33.5	
			3	25.5	
			4	28.5	
REF-03-3	9.5	Littoral	1	29.5	Brown/reddish silt
			2	35.5	
			3	23.0	
			4	26.0	
REF-03-4	8.4	Littoral	1	16.0	Gray clay
			2	12.5	
			3	13.0	
REF-03-5	11.0	Littoral	1	30.5	Reddish/brown silt
			2	30.5	
			3	36.0	
REF-03-6	20.5	Profundal	1	16.5	Gray clay
			2	29.0	
			3	30.0	
REF-03-7	23.0	Profundal	1	25.0	Reddish/brown silt
			2	23.0	
			3	11.0	
REF-03-8	18.5	Profundal	1	21.0	Gray clay
			2	33.5	
			3	37.0	
REF-03-9	21.1	Profundal	1	25.0	Gray clay
			2	26.5	
			3	27.0	
REF-03-10	19.0	Profundal	1	24.5	Light brown silt
			2	15.5	
			3	25.5	

Table D.2: Sediment Particle Sizes, Total Organic Carbon Content, and Metal Concentrations at Reference Lake 3 (REF-03) Sediment Monitoring Stations, Mary River Project CREMP, August 2024

Parameter		Units	Sediment Quality Guideline (SQG) ^a	Most Stringent AEMP Benchmark	Reference Lake 3 Station										Summary Statistics		
					REF-03-1 (littoral)	REF-03-6 (profundal)	REF-03-2 (littoral)	REF-03-7 (profundal)	REF-03-3 (littoral)	REF-03-8 (profundal)	REF-03-4 (littoral)	REF-03-9 (profundal)	REF-03-5 (littoral)	REF-03-10 (profundal)	Mean	Standard Deviation	Standard Error
Physical Parameters	Sand	%	-	-	42.6	49.8	69.2	50.5	48.6	50.3	47.4	48.1	43.5	48.5	49.9	7.31	2.31
	Silt	%	-	-	46.1	38.2	25.2	38.5	43.3	39.7	45.1	40.6	49.9	42.0	40.9	6.61	2.09
	Clay	%	-	-	11.3	12.0	5.50	11.1	8.10	10.0	7.50	11.3	6.60	9.50	9.29	2.25	0.711
	Moisture	%	-	-	88.2	83.1	86.2	86.5	78.2	86.0	44.4	80.4	85.3	80.9	79.9	12.9	4.07
	Total Organic Carbon	%	10 ^α	-	4.94	4.72	7.50	4.37	4.32	4.26	0.860	4.18	6.30	3.85	4.53	1.71	0.541
Metals	Aluminum (Al)	mg/kg	-	-	21,600	23,800	17,400	25,000	16,600	22,100	13,800	21,600	13,400	22,800	19,810	4,174	1,320
	Antimony (Sb)	mg/kg	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-
	Arsenic (As)	mg/kg	17	5.9	4.63	5.43	5.33	5.66	4.98	4.81	2.91	4.62	7.24	4.83	5.04	1.08	0.341
	Barium (Ba)	mg/kg	-	-	130	136	124	144	89.0	177	72.6	126	160	129	129	30.5	9.63
	Beryllium (Be)	mg/kg	-	-	0.870	0.870	0.680	0.940	0.640	0.870	0.560	0.800	0.480	0.940	0.765	0.164	0.0518
	Bismuth (Bi)	mg/kg	-	-	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	-	-
	Boron (B)	mg/kg	-	-	16.8	16.9	12.8	17.3	13.4	16.2	11.7	15.5	12.0	17.7	15.0	2.32	0.733
	Cadmium (Cd)	mg/kg	3.5	1.5	0.172	0.176	0.174	0.187	0.108	0.167	0.0800	0.152	0.197	0.147	0.156	0.0364	0.0115
	Calcium (Ca)	mg/kg	-	-	5,650	5,540	4,640	5,620	4,380	5,430	3,750	5,020	5,160	5,520	5,071	633	200
	Chromium (Cr)	mg/kg	90	79	72.7	78.6	58.1	83.0	56.0	73.5	39.2	73.2	49.4	71.9	65.6	14.1	4.46
	Cobalt (Co)	mg/kg	-	-	16.4	17.5	9.84	18.1	10.7	19.9	9.32	15.7	11.4	16.0	14.5	3.82	1.21
	Copper (Cu)	mg/kg	197	50	89.6	97.9	87.5	108	62.1	89.8	38.5	89.0	59.8	90.8	81.3	21.0	6.65
	Iron (Fe)	mg/kg	40,000 ^α	34,400	46,600	50,400	79,100	51,300	51,800	54,200	25,800	45,900	90,500	47,300	54,290	18,096	5,722
	Lead (Pb)	mg/kg	91.3	35	16.8	19.0	13.2	19.8	13.3	18.2	12.2	17.1	13.1	18.2	16.1	2.85	0.900
	Lithium (Li)	mg/kg	-	-	33.2	36.3	23.0	39.1	26.9	34.8	25.4	32.4	19.4	38.2	30.9	6.78	2.14
	Magnesium (Mg)	mg/kg	-	-	14,800	16,300	11,300	17,000	11,200	15,300	9,360	15,000	9,880	15,300	13,544	2,806	887
	Manganese (Mn)	mg/kg	1,100 ^{α,β}	657	1,900	1,310	569	1,290	610	6,390	344	1,080	886	1,160	1,554	1,757	556
	Mercury (Hg)	mg/kg	0.486	0.17	0.0632	0.0786	0.0540	0.0837	0.0442	0.0706	0.00820	0.0682	0.0656	0.0501	0.0586	0.0215	0.00681
	Molybdenum (Mo)	mg/kg	-	-	3.60	2.74	7.65	2.94	4.16	3.55	2.56	2.15	5.19	2.76	3.73	1.64	0.518
	Nickel (Ni)	mg/kg	75 ^{α,β}	66	51.9	54.8	41.0	57.0	37.5	51.9	27.9	48.9	37.6	48.2	45.7	9.28	2.94
	Phosphorus (P)	mg/kg	2,000 ^α	1,278	1,040	1,070	1,470	1,060	927	956	755	899	2,530	1,010	1,172	511	162
	Potassium (K)	mg/kg	-	-	5,130	5,720	4,010	6,100	4,150	5,390	3,890	5,330	3,410	5,460	4,859	912	288
	Selenium (Se)	mg/kg	-	-	0.870	0.940	1.04	0.900	0.680	0.850	0.300	0.840	0.810	0.600	0.783	0.210	0.0665
	Silver (Ag)	mg/kg	-	-	0.220	0.230	0.170	0.270	0.120	0.230	<0.1	0.240	0.120	0.220	0.192	0.0570	0.0169
	Sodium (Na)	mg/kg	-	-	388	446	297	458	327	415	265	427	279	408	371	72.3	22.9
	Strontium (Sr)	mg/kg	-	-	13.1	13.3	10.5	13.8	10.5	13.2	10.0	12.6	11.3	13.6	12.2	1.46	0.461
	Sulphur (S)	mg/kg	-	-	1,700	1,500	1,900	1,400	1,300	1,400	<1,000	1,300	2,200	1,200	1,490	330	104
	Thallium (Tl)	mg/kg	-	-	0.672	0.756	0.394	0.770	0.382	0.826	0.291	0.681	0.377	0.709	0.586	0.200	0.0633
	Tin (Sn)	mg/kg	-	-	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	-	-
	Titanium (Ti)	mg/kg	-	-	994	1,190	810	1,170	936	1,100	1,210	1,170	841	1,190	1,061	154	48.6
	Uranium (U)	mg/kg	-	-	25.2	25.3	13.8	26.0	9.22	24.1	14.6	21.8	13.9	28.1	20.2	6.64	2.10
	Vanadium (V)	mg/kg	-	-	63.9	70.0	57.9	73.4	49.8	65.3	42.3	63.7	41.9	66.3	59.5	11.2	3.53
	Zinc (Zn)	mg/kg	315	123	87.8	99.0	86.2	105	69.5	91.4	52.7	89.0	64.2	91.5	83.6	16.3	5.17
	Zirconium (Zr)	mg/kg	-	-	3.10	3.80	3.90	4.40	3.10	3.20	7.20	4.10	4.00	4.10	4.09	1.19	0.375

Indicates parameter concentration above Sediment Quality Guideline (SQG).

Bold

Indicates parameter concentration above the most stringent AEMP Benchmark.

Note: "-" indicates no SQG applicable.

^a Canadian Sediment Quality Guideline for the protection of aquatic life probable effects level (PEL; CCME 2015) except α (Ontario Provincial Sediment Quality Guideline [PSQO] severe effect level [SEL]; OMOE 1993) and β (British Columbia Working Sediment Quality Guideline [BCSQG], probable effects level [PEL; BCMOE 2015]).

Table D.3: Statistical Comparison of Substrate Physical Sediment Quality between Littoral and Profundal Sediment Core Stations of Individual Study Lakes, Mary River Project CREMP, August 2024

Lake	Habitat Variable	Statistical Test Results					Summary Statistics						
		Statistical Analysis ^a	Transformation	Significant Difference Between Areas?	P-value	MOD ^b	Station Type	Sample Size (n)	Mean	Standard Deviation	Standard Error	Minimum	Maximum
Camp Lake	Sand-Sized Particles (% by weight)	tequal	Median	NO	0.916	ns	Littoral	1	31.9	-	-	31.9	31.9
							Profundal	9	38.4	22.3	2.48	20.5	78.1
	Silt-Sized Particles (% by weight)	tequal	None	NO	0.580	ns	Littoral	1	63.7	-	-	63.7	63.7
							Profundal	9	52.6	18.2	2.03	20.3	73.4
	Clay-Sized Particles (% by weight)	tequal	None	NO	0.490	ns	Littoral	1	4.40	-	-	4.40	4.40
							Profundal	9	8.98	6.01	0.667	1.40	18.1
Camp Lake	Total Organic Carbon (%)	tequal	None	NO	0.216	ns	Littoral	1	2.60	-	-	2.60	2.60
							Profundal	9	1.44	0.818	0.0909	0.420	2.65
Sheardown Lake Northwest (SDNW)	Sand-Sized Particles (% by weight)	tequal	None	NO	0.121	ns	Littoral	3	29.6	12.2	4.05	15.9	39.2
							Profundal	4	16.9	5.84	1.46	11.4	22.1
	Silt-Sized Particles (% by weight)	tequal	None	NO	0.162	ns	Littoral	3	61.0	8.15	2.72	53.0	69.3
							Profundal	4	67.9	2.32	0.580	64.7	69.7
	Clay-Sized Particles (% by weight)	tequal	None	NO	0.138	ns	Littoral	3	9.37	4.82	1.61	5.60	14.8
							Profundal	4	15.3	4.08	1.02	10.3	18.9
Sheardown Lake Southeast (SDSE)	Total Organic Carbon (%)	tequal	None	NO	0.147	ns	Littoral	3	2.90	1.49	0.496	1.93	4.61
							Profundal	4	1.64	0.240	0.0600	1.40	1.97
	Sand-Sized Particles (% by weight)	tequal	None	NO	0.688	ns	Littoral	3	19.0	9.04	3.01	11.9	29.2
							Profundal	2	16.1	0.0707	0.0354	16.0	16.1
	Silt-Sized Particles (% by weight)	tequal	None	NO	0.810	ns	Littoral	3	69.5	5.12	1.71	63.6	72.8
							Profundal	2	70.5	0.283	0.141	70.3	70.7
Mary Lake	Clay-Sized Particles (% by weight)	tequal	None	NO	0.551	ns	Littoral	3	11.5	4.07	1.36	7.20	15.3
							Profundal	2	13.5	0.424	0.212	13.2	13.8
	Total Organic Carbon (%)	tequal	None	NO	0.532	ns	Littoral	3	1.07	0.200	0.0668	0.880	1.28
							Profundal	2	0.960	0.113	0.0566	0.880	1.04
	Sand-Sized Particles (% by weight)	tequal	Median	NO	0.561	ns	Littoral	2	11.6	8.41	4.21	5.70	17.6
							Profundal	8	22.5	22.2	2.78	4.80	71.9
Mary Lake	Silt-Sized Particles (% by weight)	tequal	None	NO	0.310	ns	Littoral	2	66.5	11.8	5.90	58.2	74.9
							Profundal	8	51.3	18.6	2.32	18.4	72.2
	Clay-Sized Particles (% by weight)	tequal	None	NO	0.635	ns	Littoral	2	21.8	20.3	10.2	7.40	36.1
							Profundal	8	26.2	9.43	1.18	9.70	35.6
	Total Organic Carbon (%)	tequal	None	NO	0.328	ns	Littoral	2	1.12	0.318	0.159	0.900	1.35
							Profundal	8	0.917	0.241	0.0301	0.690	1.46

Indicates negative MOD (profundal concentration significantly lower than littoral).

Indicates positive MOD (littoral concentration significantly lower than profundal).

Highlighted values indicate significant difference between study areas based on ANOVA p-value less than 0.05.


Notes: MOD = magnitude of difference. MCT = measure of central tendency (i.e., mean for untransformed, geometric mean for log10-transformed, and median for rank-transformed). ANOVA = analysis of variance.


^a Statistical tests included tequal (t-test assuming equal variance) and M-W (Mann-Whitney U-test).


^b MOD is calculated as (MCT_{profundal} - MCT_{littoral})/MCT_{littoral}*100.

Table D.4: Statistical Comparison of Substrate Physical Sediment Quality between Littoral and Profundal Sediment Stations of Individual Study Lakes collected using a Petite Ponar, Mary River Project CREMP, August 2024

Lake	Habitat Variable	Statistical Test Results					Summary Statistics						
		Statistical Analysis ^a	Transformation	Significant Difference Between Areas?	P-value	MOD ^b	Station Type	Sample Size (n)	Mean	Standard Deviation	Standard Error	Minimum	Maximum
Camp Lake	Sand-Sized Particles (% by weight)	-	-	-	-	-	Littoral	4	50.5	14.0	3.51	30.3	62.9
							Profundal	-	-	-	-	-	-
	Silt-Sized Particles (% by weight)	-	-	-	-	-	Littoral	4	46.8	13.4	3.36	35.3	66.2
							Profundal	-	-	-	-	-	-
	Clay-Sized Particles (% by weight)	-	-	-	-	-	Littoral	4	2.80	0.849	0.212	1.80	3.60
							Profundal	-	-	-	-	-	-
	Total Organic Carbon (%)	-	-	-	-	-	Littoral	4	1.97	0.524	0.131	1.49	2.71
							Profundal	-	-	-	-	-	-
Sheardown Lake Northwest (SDNW)	Sand-Sized Particles (% by weight)	tequal	None	NO	0.588	ns	Littoral	3	39.1	5.60	1.87	34.7	45.4
							Profundal	3	30.5	24.6	8.21	13.8	58.8
	Silt-Sized Particles (% by weight)	tequal	None	NO	0.696	ns	Littoral	3	51.5	6.12	2.04	44.8	56.8
							Profundal	3	56.2	18.6	6.19	34.9	68.7
	Clay-Sized Particles (% by weight)	tequal	None	NO	0.436	ns	Littoral	3	9.43	0.723	0.241	8.60	9.90
							Profundal	3	13.2	7.44	2.48	6.20	21.0
	Total Organic Carbon (%)	tequal	None	YES	0.041	-64.8	Littoral	3	3.24	0.979	0.326	2.37	4.30
							Profundal	3	1.14	0.734	0.245	0.300	1.66
Sheardown Lake Southeast (SDSE)	Sand-Sized Particles (% by weight)	tequal	None	NO	0.173	ns	Littoral	2	11.1	3.18	1.59	8.80	13.3
							Profundal	3	7.73	1.08	0.360	6.50	8.50
	Silt-Sized Particles (% by weight)	tunequal	None	NO	0.570	ns	Littoral	2	74.6	8.20	4.10	68.8	80.4
							Profundal	3	79.2	1.12	0.372	78.4	80.5
	Clay-Sized Particles (% by weight)	tunequal	None	NO	0.763	ns	Littoral	2	14.3	5.02	2.51	10.8	17.9
							Profundal	3	13.0	0.0577	0.0192	12.9	13.0
	Total Organic Carbon (%)	tunequal	None	NO	0.444	ns	Littoral	2	1.45	0.382	0.191	1.18	1.72
							Profundal	3	1.13	0.0929	0.0310	1.07	1.24
Mary Lake	Sand-Sized Particles (% by weight)	tequal	None	NO	0.532	ns	Littoral	2	49.3	54.5	27.2	10.8	87.8
							Profundal	3	26.3	20.8	6.95	8.00	49.0
	Silt-Sized Particles (% by weight)	tequal	None	NO	0.422	ns	Littoral	2	34.1	32.4	16.2	11.2	57.0
							Profundal	3	53.8	17.0	5.68	42.4	73.4
	Clay-Sized Particles (% by weight)	tequal	None	NO	0.855	ns	Littoral	2	16.6	22.1	11.0	1.00	32.2
							Profundal	3	19.8	15.2	5.06	5.30	35.6
	Total Organic Carbon (%)	tunequal	None	NO	0.780	ns	Littoral	2	0.770	0.693	0.346	0.280	1.26
							Profundal	3	0.947	0.103	0.0342	0.860	1.06

 Indicates negative MOD (profundal concentration significantly lower than littoral).

 Indicates positive MOD (littoral concentration significantly lower than profundal).

 Highlighted values indicate significant difference between study areas based on ANOVA p-value less than 0.05.

Notes: MOD = magnitude of difference. MCT = measure of central tendency (i.e., mean for untransformed, geometric mean for log10-transformed, and median for rank-transformed). ANOVA = analysis of variance. Camp Lake only had Littoral stations sampled by Petite Ponar, therefore, statistical comparisons were not possible for this area. Ponar samples were collected only at one location in Camp Lake therefore statistical comparisons between littoral and profundal stations was not possible. "-" = data not available.

^a Statistical tests included tequal (t-test assuming equal variance) and M-W (Mann-Whitney U-test).

^b MOD is calculated as (MCT_{profundal} - MCT_{littoral})/MCT_{littoral} *100.

Table D.5: Field Observations for Petite Ponar Sediment Samples Collected at Camp Lake (JL0), Mary River Project CREMP, August 2024

Sample Station	Station Depth (m)	Colour and Texture Observations	Evidence of Anoxia ^a	Plant or Algae Presence
JL0-16	16.0	Dark brown, gray silt-sand	None	Sparse Algae
JL0-18	13.0	Brown silt	None	Sparse Algae
JL0-19	7.5	Light brown silt	None	Sparse Algae
JL0-20	7.0	Light brown	None	Sparse Algae
JL0-21	10.0	Red silt on top, brown mud	Sparse	Common

Notes: "N/A" = data not available. Macrophytes were not observed at stations JL0-16, JL0-18, JL0-19, and JL0-20.


^a Evidence of anoxic sediments was assessed visually (presence of blackened substrate) and by smell (based on presence/strength of hydrogen sulphide odour).


Table D.6: Field Observations for Sediment Cores Collected at Camp Lake (JL0), Mary River Project CREMP, August 2024


Sample Station	Station Depth (m)	Station Type	Core Number	Core Length (cm)	Surficial Substrate Colour/Texture Description
JL0-01	16.5	Profundal	1	7.0	Reddish brown silt
			2	9.5	
			3	13.0	
JL0-02	12.0	Littoral	1	24.0	Darkish red/brown silt with algae
			2	24.0	
			3	21.0	
			4	18.0	
JL0-07	33.0	Profundal	1	32.5	Reddish brown silt
			2	27.0	
			3	27.0	
JL0-11	28.5	Profundal	1	27.0	Reddish/brown silt
			2	25.0	
			3	25.5	
JL0-12	16.0	Profundal	1	7.0	Reddish/brown silt
			2	6.5	
			3	7.5	
JL0-13	17.0	Profundal	1	25.0	Reddish/brown silt
			2	19.0	
			3	14.5	
JL0-14	26.0	Profundal	1	27.0	Reddish/brown silt
			2	25.0	
			3	22.0	
JL0-15	16.0	Profundal	1	21.0	Reddish/brown silt
			2	15.5	
			3	22.0	
JL0-16	16.0	Profundal	1	3.5	Dark reddish silt
			2	7.0	
			3	2.5	
JL0-17	15.0	Profundal	1	39.0	Reddish/brown silt
			2	28.0	
			3	27.0	
			4	24.0	

Table D.7: Statistical Comparison of Physical Properties for Sediment Cores Collected from Littoral and Profundal Depths in Camp Lake (JL0) and Reference Lake 3 (REF-03), Mary River Project CREMP, August 2024

Lake Zone	Sediment Variable	Statistical Test Results					Summary Statistics						
		Statistical Test ^a	Transformation	Significant Difference Between Areas?	P-value	MOD ^b	Study Lake	Sample Size (n)	Mean	Standard Deviation	Standard Error	Minimum	Maximum
Littoral (Shallow) Stations	Sand-Sized Material (%)	tequal	Median	NO	0.111	ns	Reference	5	50.3	10.9	2.18	42.6	69.2
							Camp	1	31.9	-	-	31.9	31.9
	Silt-Sized Material (%)	tequal	None	NO	0.108	ns	Reference	5	41.9	9.65	1.93	25.2	49.9
							Camp	1	63.7	-	-	63.7	63.7
	Clay-Sized Material (%)	tequal	None	NO	0.229	ns	Reference	5	7.80	2.19	0.438	5.50	11.3
							Camp	1	4.40	-	-	4.40	4.40
	Total Organic Carbon (TOC) Content (%)	tequal	None	NO	0.472	ns	Reference	5	4.78	2.52	0.503	0.860	7.50
							Camp	1	2.60	-	-	2.60	2.60
Profundal (Deep) Stations	Sand-Sized Material (%)	M-W	Rank	NO	0.112	ns	Reference	5	49.4	1.08	0.216	48.1	50.5
							Camp	9	38.4	22.3	2.48	20.5	78.1
	Silt-Sized Material (%)	M-W	Rank	NO	0.112	ns	Reference	5	39.8	1.56	0.312	38.2	42.0
							Camp	9	52.6	18.2	2.03	20.3	73.4
	Clay-Sized Material (%)	tunequal	None	NO	0.403	ns	Reference	5	10.8	1.01	0.203	9.50	12.0
							Camp	9	8.98	6.01	0.667	1.40	18.1
	Total Organic Carbon (TOC) Content (%)	tunequal	None	YES	<0.001	-66.3	Reference	5	4.28	0.315	0.0630	3.85	4.72
							Camp	9	1.44	0.818	0.0909	0.420	2.65

 Indicates negative MOD (mine-exposed concentration significantly lower than reference).

 Indicates positive MOD (mine-exposed concentration significantly higher than reference).

 Highlighted values indicate significant difference between study areas based on statistical p-value less than 0.05.

Notes: MOD = magnitude of difference. ns = not significant.

^a Statistical tests included tequal (t-test assuming equal variance), tunequal (t-test assuming unequal variance), and M-W (Mann-Whitney U-test).

^b MOD is calculated as $(MCT_{Exposed} - MCT_{Reference}) / MCT_{Reference} * 100$. MCT = measure of central tendency (i.e., mean for untransformed, geometric mean for log10-transformed, and median for rank-transformed).

Table D.8: Sediment Particle Sizes, Total Organic Carbon Content, and Metal Concentrations at Camp Lake (JL0) Sediment Monitoring Stations, Mary River Project CREMP, August 2024

Analyte		Units	Sediment Quality Guideline (SQG) ^a	AEMP Benchmark ^b	Camp Lake Coring Stations										Summary Statistics		
					JL0-02	JL0-01	JL0-14	JL0-17	JL0-07	JL0-16	JL0-15	JL0-11	JL0-13	JL0-12	Mean	Standard Deviation	Standard Error
					(littoral)	(profundal)	(profundal)	(profundal)	(profundal)	(profundal)	(profundal)	(profundal)	(profundal)	(profundal)			
Physical Parameter	Sand	%	-	-	31.9	26.1	33.3	20.6	20.5	74.1	41.0	28.1	23.7	78.1	37.7	21.2	6.69
	Silt	%	-	-	63.7	58.2	53.7	73.4	61.4	24.4	53.0	64.8	64.2	20.3	53.7	17.6	5.55
	Clay	%	-	-	4.40	15.7	13.0	5.90	18.1	1.40	5.90	7.10	12.1	1.60	8.52	5.85	1.85
	Moisture	%	-	-	67.1	55.4	74.7	71.6	68.5	25.8	40.0	60.2	62.0	44.0	56.9	15.7	4.98
	Total Organic Carbon	%	10 ^α	-	2.60	0.830	1.99	2.14	2.65	0.420	1.00	2.11	1.42	0.420	1.56	0.854	0.270
Metals	Aluminum (Al)	mg/kg	-	-	17,000	17,900	18,900	16,200	20,200	7,090	14,900	17,400	18,400	8,220	15,621	4,449	1,407
	Antimony (Sb)	mg/kg	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-
	Arsenic (As)	mg/kg	17	5.9	4.83	4.96	5.22	9.09	3.12	1.70	3.65	2.52	4.86	3.57	4.35	2.03	0.642
	Barium (Ba)	mg/kg	-	-	84.8	68.5	109	188	77.7	23.8	56.0	65.8	70.2	62.1	80.6	43.5	13.7
	Beryllium (Be)	mg/kg	-	-	0.730	0.990	0.960	0.780	1.04	0.350	0.820	0.890	1.00	0.490	0.805	0.229	0.0724
	Bismuth (Bi)	mg/kg	-	-	0.270	0.270	0.330	0.270	0.380	<0.2	0.210	0.280	0.260	<0.2	0.267	0.0552	0.0160
	Boron (B)	mg/kg	-	-	18.0	27.1	25.5	19.6	26.2	12.3	24.0	24.6	30.0	13.6	22.1	5.93	1.88
	Cadmium (Cd)	mg/kg	3.5	1.5	0.155	0.135	0.218	0.243	0.189	0.0520	0.122	0.192	0.150	0.0670	0.152	0.0615	0.0194
	Calcium (Ca)	mg/kg	-	-	4,080	4,010	4,290	4,180	4,520	9,830	3,450	4,250	3,900	2,520	4,503	1,956	618
	Chromium (Cr)	mg/kg	90	98	65.7	72.6	78.5	66.5	83.4	41.6	61.3	72.4	71.6	41.8	65.5	14.0	4.44
	Cobalt (Co)	mg/kg	-	-	16.4	18.2	19.1	21.0	15.2	6.65	13.6	12.4	17.0	10.3	15.0	4.34	1.37
	Copper (Cu)	mg/kg	197	50	39.8	44.3	52.9	44.1	58.9	14.5	32.6	49.2	42.2	18.7	39.7	14.2	4.48
	Iron (Fe)	mg/kg	40,000 ^α	52,400	49,200	33,100	38,400	56,900	36,400	17,500	28,400	31,600	33,800	33,100	35,840	10,841	3,428
	Lead (Pb)	mg/kg	91.3	35	16.4	20.8	23.7	19.1	24.5	6.35	16.5	19.8	21.3	8.27	17.7	6.07	1.92
	Lithium (Li)	mg/kg	-	-	25.8	31.7	31.4	26.6	33.8	13.6	28.2	32.1	33.3	16.9	27.3	6.97	2.20
	Magnesium (Mg)	mg/kg	-	-	14,400	13,300	14,500	13,100	16,300	11,900	11,600	14,600	13,300	8,090	13,109	2,236	707
	Manganese (Mn)	mg/kg	1,100 ^{α,β}	4,370	851	1,000	4,320	4,470	345	455	770	294	1,010	2,700	1,622	1,612	510
	Mercury (Hg)	mg/kg	0.486	0.17	0.0344	0.0264	0.0624	0.0413	0.0603	0.00610	0.0216	0.0584	0.0298	0.0114	0.0352	0.0201	0.00637
	Molybdenum (Mo)	mg/kg	-	-	1.80	0.790	1.96	3.53	1.07	1.09	0.680	0.850	0.820	0.900	1.35	0.880	0.278
	Nickel (Ni)	mg/kg	75 ^{α,β}	72	61.6	63.4	74.3	71.2	68.4	38.6	53.1	61.4	63.8	38.7	59.5	12.4	3.93
	Phosphorus (P)	mg/kg	2,000 ^α	1,580	964	961	941	1,700	913	539	778	787	960	835	938	298	94.4
	Potassium (K)	mg/kg	-	-	4,150	4,880	4,910	4,260	5,430	1,780	4,070	4,620	5,120	2,140	4,136	1,229	389
	Selenium (Se)	mg/kg	-	-	0.300	0.290	0.520	0.440	0.480	<0.2	<0.2	0.450	0.240	<0.2	0.332	0.117	0.0346
	Silver (Ag)	mg/kg	-	-	<0.1	0.110	0.150	<0.1	0.190	<0.1	<0.1	0.150	0.110	<0.1	0.121	0.0297	0.0106
	Sodium (Na)	mg/kg	-	-	174	203	248	188	379	94.0	164	233	197	98.0	198	81.1	25.6
	Strontium (Sr)	mg/kg	-	-	7.64	13.0	11.6	9.24	17.8	7.66	11.2	11.0	14.2	5.79	10.9	3.55	1.12
	Sulphur (S)	mg/kg	-	-	<1,000	<1,000	<1,000	<1,000	1,300	<1,000	<1,000	<1,000	<1,000	<1,000	1,030	-	-
	Thallium (Tl)	mg/kg	-	-	0.396	0.494	0.556	0.537	0.468	0.122	0.376	0.368	0.481	0.221	0.402	0.139	0.0440
	Tin (Sn)	mg/kg	-	-	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	-	-
	Titanium (Ti)	mg/kg	-	-	952	939	904	790	970	485	832	901	930	578	828	167	52.8
	Uranium (U)	mg/kg	-	-	5.38	5.30	7.88	5.84	7.78	1.36	4.30	6.54	5.26	2.08	5.17	2.14	0.678
	Vanadium (V)	mg/kg	-	-	53.4	61.0	63.6	54.4	62.3	24.2	49.8	55.7	60.6	31.2	51.6	13.4	4.25
	Zinc (Zn)	mg/kg	315	135	55.9	56.4	65.2	57.7	73.2	22.7	44.8	60.7	55.2	29.2	52.1	15.7	4.95
	Zirconium (Zr)	mg/kg	-	-	6.00	5.20	4.70	3.80	8.60	4.80	4.50	9.00	5.20	2.50	5.43	2.01	0.635

Indicates parameter concentration above Sediment Quality Guideline (SQG).

BOLD

 Indicates parameter concentration above the AEMP Benchmark.

Note: "-" indicates no SQG applicable, or that Standard Deviation and Standard Error could not be calculated.

^a Canadian Sediment Quality Guideline for the protection of aquatic life probable effects level (PEL; CCME 2015) except those indicated by α (Ontario Provincial Sediment Quality Guideline [PSQG] severe effect level [SEL]; OMOE 1993) and β (British Columbia Working Sediment Quality Guideline [BCSQG] probable effects level [PEL; BCMOE 2015]).

^b AEMP Sediment Quality Benchmarks developed by Intrinsik (2013) using sediment quality guidelines, background sediment quality data, and method detection limits. The indicated values are specific to Camp Lake.

Table D.9: Magnitude of Elevation for Comparisons of Mean Metal Concentrations in Sediments from Camp Lake (JL0) to Reference Lake 3 (REF-03) and Baseline Data, Mary River Project CREMP, 2024

Parameter	Camp Lake 2024 versus Reference Lake 3 2024				Camp Lake 2024 versus Baseline Period (2005 to 2013)			
	Littoral Stations (n = 5)		Profundal Stations (n = 5)		Littoral Stations (n = 1)		Profundal Stations (n = 9)	
	Reference Lake Concentration (mg/kg)	Magnitude of Elevation	Reference Lake Concentration (mg/kg)	Magnitude of Elevation	Camp Lake Baseline Concentration (mg/kg)	Magnitude of Elevation	Camp Lake Baseline Concentration (mg/kg)	Magnitude of Elevation
Aluminum (Al)	16,560	1.03	23,060	0.671	18,267	0.931	15,175	1.019
Antimony (Sb)	0.10	1.00	0.100	1.000	1.0	0.100	1.0	0.100
Arsenic (As)	5.02	0.963	5.07	0.848	2.80	1.73	3.5	1.23
Barium (Ba)	115	0.737	142	0.563	105	0.808	68	1.178
Beryllium (Be)	0.646	1.13	0.88	0.920	1.0	0.730	1.0	0.813
Bismuth (Bi)	0.20	1.35	0.200	1.33	-	-	-	-
Boron (B) ^a	13.3	1.35	16.7	1.35	1.0	18.0	2.0	11.3
Cadmium (Cd)	0.146	1.06	0.166	0.917	0.5	0.310	0.5	0.304
Calcium (Ca)	4,716	0.865	5,426	0.839	3,130	1.30	2,857	1.59
Chromium (Cr)	55.1	1.19	76.0	0.862	81.0	0.811	71	0.923
Cobalt (Co)	11.5	1.42	17.4	0.850	18.0	0.911	17	0.871
Copper (Cu)	67.5	0.590	95	0.418	45.0	0.884	40	0.993
Iron (Fe)	58,760	0.837	49,820	0.690	36,133	1.362	33,206	1.035
Lead (Pb)	13.7	1.20	18.5	0.965	18.0	0.911	19	0.937
Lithium (Li)	25.6	1.01	36.2	0.761	-	-	-	-
Magnesium (Mg)	11,308	1.27	15,780	0.822	13,967	1.03	10,113	1.28
Manganese (Mn)	862	0.99	2,246	0.76	699	1.22	942	1.81
Mercury (Hg)	0.0470	0.731	0.0702	0.503	0.1	0.344	0.1	0.353
Molybdenum (Mo)	4.63	0.389	2.83	0.459	1.0	1.80	1.0	1.30
Nickel (Ni)	39.2	1.57	52.2	1.14	67.0	0.919	63	0.940
Phosphorus (P)	1,344	0.717	999	0.936	800	1.21	1,125	0.831
Potassium (K)	4,118	1.010	5,600	0.738	3,450	1.20	3,771	1.10
Selenium (Se)	0.740	0.405	0.83	0.406	1.0	0.300	1.0	0.336
Silver (Ag)	0.146	0.685	0.238	0.518	0.30	0.333	0.3	0.410
Sodium (Na)	311	0.559	431	0.465	279	0.624	254	0.787
Strontium (Sr)	11.1	0.690	13.3	0.848	9.30	0.822	12	0.942
Sulphur (S)	1,620	0.617	1,360	0.760	-	-	-	-
Thallium (Tl)	0.423	0.936	0.748	0.538	1.0	0.396	1.0	0.403
Tin (Sn)	2.00	1.00	2.00	1.00	-	-	-	-
Titanium (Ti)	958	0.99	1,164	0.700	-	-	-	-
Uranium (U)	15.3	0.351	25.1	0.205	-	-	-	-
Vanadium (V)	51.2	1.04	67.7	0.759	69.0	0.774	57	0.902
Zinc (Zn)	72.1	0.776	95	0.543	67.0	0.834	57	0.907
Zirconium (Zr)	4.26	1.41	3.92	1.37	-	-	-	-

- Denotes slight elevation (concentration three to five times higher than respective mean reference lake or baseline period value, as applicable).
- Denotes moderate elevation (concentration five to 10 times higher than mean reference area or baseline period value, as applicable).
- Denotes high elevation (concentration is ≥ 10 times higher than mean reference area or baseline period value, as applicable).

Note: '-' indicates parameter not measured, and therefore magnitude of elevation could not be determined.

^a Boron concentrations in sediment from 2015 to 2024 were considerably higher (i.e., 10- to 70-times) than those reported during both the baseline and 2014 studies at all mine-exposed lakes. The lack of any distinct gradient in the magnitude of the elevation in boron concentrations among stations within each lake and among study lakes suggested that the stark contrast in boron concentrations between recent data and data collected prior to 2015 was likely due to laboratory-based analytical differences.

Table D.10: Field Observations for Petite Ponar Samples Collected at Sheardown Lake Northwest (NW; DL0-01), Mary River Project CREMP, August 2024

Station	Station Depth (m)	Colour and Texture Observations	Evidence of Anoxia ^a	Plant or Algae Presence
DL0-01-3	7.0	Brown/light brown sediment with clay, no odour	-	Abundant macrophytes and sparse algae
DL0-01-4	6.5	Brown-gray sediment, sulphur like smell, sandy, algae balls	Sparse sulphur like smell	Sparse algae
DL0-01-11	6.5	Red sediment with gray clay streaks overlaying dark brown sediment, algae balls	-	Sparse algae
DL0-01-12	16.1	Red brown silt with sand	-	N/A
DL0-01-14	21.0	Red silty clay, no odour	-	Common algae
DL0-01-15	24.3	Red-clay silt, no odour	-	N/A

Notes: "-" = data not available. No visible macrophytes were observed at stations DL0-01-4, DL0-01-11, and DL0-01-14.

^a Evidence of anoxic sediments was assessed visually (presence of blackened substrate) and by smell (based on presence/strength of hydrogen sulphide odour).

Table D.11: Field Observations for Sediment Cores Collected at Sheardown Lake Northwest (NW; DL0-01), Mary River Project CREMP, August 2024

Sample Station	Station Depth (m)	Station Type	Core Number	Core Length (cm)	Surficial Substrate Colour/Texture Description
DL0-01	20.5	Profundal	1	23.0	Brownish-red silt
			2	16.0	
			3	15.0	
DL0-01-2	18.0	Profundal	1	21.0	Reddish-brown silt
			2	19.0	
			3	31.0	
DL0-01-05	23.0	Profundal	1	31.0	Red-brown silt
			2	24.0	
			3	21.0	
DL0-01-08	11.0	Littoral	1	28.5	Yellow-red silt
			2	21.0	
			3	23.5	
DL0-01-9	7.5	Littoral	1	33.5	Red silt with algae, shiny crystal in sample
			2	33.0	
			3	33.0	
DD-HAB 9-STN2	10.5	Littoral	1	33.0	Red-brown silt, algae present
			2	29.5	
			3	33.5	
DL0-01-10	7.0	Littoral	1	12.5	Red silt with algae, redox layer for grab 1
			2	5.0	
			3	3.0	
DL0-01-13	18.0	Profundal	1	17.5	Red-brown silt
			2	25.0	
			3	32.5	

Table D.12: Statistical Comparison of Physical Properties for Sediment Cores Collected from Littoral and Profundal Depths in Sheardown Lake Northwest (NW; DL0-01) and Reference Lake 3 (REF-03), Mary River Project CREMP, August 2024

Lake Zone	Sediment Variable	Statistical Test Results					Summary Statistics						
		Statistical Test ^a	Transformation	Significant Difference Between Areas?	P-value	MOD ^b	Study Lake	Sample Size (n)	Mean	Standard Deviation	Standard Error	Minimum	Maximum
Littoral (Shallow) Stations	Sand-Sized Material (%)	tequal	None	YES	0.046	-41.2	Reference	5	50.3	10.9	2.18	42.6	69.2
							SDNW	3	29.6	12.2	4.05	15.9	39.2
	Silt-Sized Material (%)	tequal	None	YES	0.029	45.6	Reference	5	41.9	9.65	1.93	25.2	49.9
							SDNW	3	61.0	8.15	2.72	53.0	69.3
	Clay-Sized Material (%)	tequal	None	NO	0.541	ns	Reference	5	7.80	2.19	0.438	5.50	11.3
							SDNW	3	9.37	4.82	1.61	5.60	14.8
Profundal (Deep) Stations	Total Organic Carbon (TOC) Content (%)	tequal	None	NO	0.290	ns	Reference	5	4.78	2.52	0.503	0.860	7.50
							SDNW	3	2.90	1.49	0.496	1.93	4.61
	Sand-Sized Material (%)	tunequal	None	YES	0.001	-65.9	Reference	5	49.4	1.08	0.216	48.1	50.5
							SDNW	4	16.9	5.84	1.46	11.4	22.1
	Silt-Sized Material (%)	tequal	None	YES	<0.001	70.5	Reference	5	39.8	1.56	0.312	38.2	42.0
							SDNW	4	67.9	2.32	0.580	64.7	69.7
	Clay-Sized Material (%)	tunequal	None	NO	0.112	ns	Reference	5	10.8	1.01	0.203	9.50	12.0
							SDNW	4	15.3	4.08	1.02	10.3	18.9
	Total Organic Carbon (TOC) Content (%)	tequal	None	YES	<0.001	-61.6	Reference	5	4.28	0.315	0.0630	3.85	4.72
							SDNW	4	1.64	0.240	0.0600	1.40	1.97

Indicates negative MOD (mine-exposed concentration significantly lower than reference).

Indicates positive MOD (mine-exposed concentration significantly higher than reference).

Highlighted values indicate significant difference between study areas based on statistical p-value less than 0.05.

Notes: MOD = magnitude of difference. ns = not significant.

^a Statistical tests included tequal (t-test assuming equal variance), tunequal (t-test assuming unequal variance), and M-W (Mann-Whitney U-test).

^b MOD is calculated as $(MCT_{Exposed} - MCT_{Reference}) / MCT_{Reference} * 100$. MCT = measure of central tendency (i.e., mean for untransformed, geometric mean for log10-transformed, and median for rank-transformed).

Table D.13: Sediment Particle Sizes, Total Organic Carbon Content, and Metal Concentrations at Sheardown Lake Northwest (NW; DL0-01) Sediment Monitoring Stations, Mary River Project CREMP, August 2024

Analyte		Units	Sediment Quality Guideline (SQG) ^a	AEMP Benchmark ^b	Sheardown Lake Northwest Coring Stations								Summary Statistics		
					DL0-01-5	DD-HAB 9-STN2	DL0-01-08	DL0-01	DL0-01-13	DL0-01-02	DL0-01-9	DL0-01-10	Mean	Standard Deviation	Standard Error
					(profundal)	(littoral)	(littoral)	(profundal)	(profundal)	(profundal)	(littoral)	(littoral)			
Physical Parameters	Sand	%	-	-	12.2	26.5	15.9	11.4	21.7	22.1	39.2	33.6	22.3	10.6	4.01
	Silt	%	-	-	69.5	67.3	69.3	69.7	64.7	67.6	53.0	60.8	64.9	6.18	2.34
	Clay	%	-	-	18.3	6.10	14.8	18.9	13.6	10.3	7.70	5.60	12.7	5.10	1.93
	Moisture	%	-	-	61.6	56.6	74.3	64.5	70.8	69.5	71.9	58.8	67.3	5.77	2.18
	Total Organic Carbon	%	10 ^α	-	1.97	2.04	1.93	1.56	1.40	1.63	4.61	2.15	2.18	1.10	0.417
Metals	Aluminum (Al)	mg/kg	-	-	25,300	17,700	22,700	23,600	23,500	22,100	19,600	15,100	21,700	3,390	1,281
	Antimony (Sb)	mg/kg	-	-	0.110	0.140	<0.1	<0.1	<0.1	<0.1	0.110	0.100	0.103	0.00553	0.00218
	Arsenic (As)	mg/kg	17	6.2	3.67	10.4	5.63	4.89	4.85	4.80	8.06	3.81	5.10	1.47	0.555
	Barium (Ba)	mg/kg	-	-	105	444	127	104	127	117	106	74.6	109	18.0	6.80
	Beryllium (Be)	mg/kg	-	-	1.22	0.770	1.03	1.13	1.16	1.04	0.960	0.700	1.03	0.172	0.0649
	Bismuth (Bi)	mg/kg	-	-	0.410	0.440	0.270	0.340	0.310	0.250	0.330	0.270	0.311	0.0549	0.0208
	Boron (B)	mg/kg	-	-	33.6	14.2	33.0	31.2	36.5	33.6	27.1	19.8	30.7	5.59	2.11
	Cadmium (Cd)	mg/kg	3.5	1.5	0.320	0.284	0.314	0.257	0.276	0.255	0.461	0.169	0.293	0.0893	0.0337
	Calcium (Ca)	mg/kg	-	-	4,570	4,150	4,330	4,450	4,820	4,450	5,300	3,750	4,524	473	179
	Chromium (Cr)	mg/kg	90	97	93.3	49.2	84.4	86.3	88.9	84.7	74.5	63.2	82.2	10.1	3.83
	Cobalt (Co)	mg/kg	-	-	18.0	18.6	18.6	18.5	19.3	18.9	16.3	13.7	17.6	1.98	0.747
	Copper (Cu)	mg/kg	197	58	58.0	37.4	47.2	52.6	50.8	45.2	67.7	31.7	50.5	11.2	4.22
	Iron (Fe)	mg/kg	40,000 ^α	52,200	71,700	146,000	64,100	58,100	65,000	53,200	108,000	73,800	70,557	17,995	6,801
	Lead (Pb)	mg/kg	91.3	35	26.1	15.8	22.4	24.4	23.3	21.5	20.0	14.5	21.7	3.75	1.42
	Lithium (Li)	mg/kg	-	-	40.7	20.8	35.7	36.8	39.2	34.6	28.3	21.9	33.9	6.61	2.50
	Magnesium (Mg)	mg/kg	-	-	17,900	14,100	14,800	16,000	16,200	14,200	14,800	12,200	15,157	1,791	677
	Manganese (Mn)	mg/kg	1,100 ^{α,β}	4,530	459	10,000	2,640	1,280	5,090	2,450	525	688	1,876	1,675	633
	Mercury (Hg)	mg/kg	0.486	0.17	0.0611	0.0269	0.0347	0.0450	0.0437	0.0305	0.0589	0.0280	0.0431	0.0131	0.00496
	Molybdenum (Mo)	mg/kg	-	-	2.83	20.1	6.91	2.37	4.39	7.07	9.22	4.89	5.38	2.47	0.935
	Nickel (Ni)	mg/kg	75 ^{α,β}	77	75.2	59.7	79.8	72.1	74.9	77.7	83.4	57.3	74.3	8.36	3.16
	Phosphorus (P)	mg/kg	2,000 ^α	1,958	836	1,370	903	921	928	926	882	786	883	53.8	20.3
	Potassium (K)	mg/kg	-	-	6,760	4,860	6,120	6,000	6,100	5,770	5,200	4,020	5,710	878	332
	Selenium (Se)	mg/kg	-	-	0.610	0.480	0.510	0.420	0.470	0.450	0.780	0.330	0.510	0.146	0.0553
	Silver (Ag)	mg/kg	-	-	0.240	0.140	0.150	0.180	0.190	0.140	0.180	0.100	0.169	0.0441	0.0167
	Sodium (Na)	mg/kg	-	-	391	168	326	349	367	322	278	211	321	60.2	22.8
	Strontium (Sr)	mg/kg	-	-	13.6	9.19	12.9	13.4	14.6	13.0	11.8	9.62	12.7	1.60	0.604
	Sulphur (S)	mg/kg	-	-	1,200	<1,000	<1,000	<1,000	<1,000	<1,000	2,200	1,400	1,257	423	200
	Thallium (Tl)	mg/kg	-	-	0.564	0.405	0.586	0.609	0.629	0.590	0.560	0.312	0.550	0.108	0.0407
	Tin (Sn)	mg/kg	-	-	<2	<2	<2	<2	<2	<2	<2	<2	<2	-	-
	Titanium (Ti)	mg/kg	-	-	1,480	931	1,370	1,430	1,520	1,420	1,180	1,000	1,343	186	70.5
	Uranium (U)	mg/kg	-	-	10.8	8.89	6.59	9.45	9.02	6.26	15.1	6.86	9.15	3.12	1.18
	Vanadium (V)	mg/kg	-	-	67.3	36.8	63.4	66.4	66.4	62.9	57.3	40.9	60.7	9.35	3.53
	Zinc (Zn)	mg/kg	315	123	91.0	72.3	75.7	82.1	80.3	71.8	78.2	59.2	76.9	9.83	3.72
	Zirconium (Zr)	mg/kg	-	-	16.7	6.10	7.30	8.30	8.50	6.60	16.6	11.2	10.7	4.28	1.62

Indicates parameter concentration above Sediment Quality Guideline (SQG).

BOLD Indicates parameter concentration above the AEMP Benchmark.

Notes: "-" indicates no SQG applicable. or that Standard Deviation and Standard Error could not be calculated.

^a Canadian Sediment Quality Guideline for the protection of aquatic life probable effects level (PEL; CCME 2015) except α (Ontario Provincial Sediment Quality Guideline [PSQG] severe effect level [SEL]; OMOE 1993) and β (British Columbia Working Sediment Quality Guideline [BCSQG] probable effects level [PEL; BCMOE 2015]).

^b AEMP Sediment Quality Benchmarks developed by Intrinsik (2013) using sediment quality guidelines, background sediment quality data, and method detection limits. The indicated values are specific to Sheardown Lake Northwest.

Table D.14: Magnitude of Elevation in Mean Sediment Metal Concentrations between Sheardown Lake Northwest (NW; DL0-01) and Reference Lake 3 (REF-03), and Baseline (2005 to 2013) Data, Mary River Project CREMP, 2024

Parameter	Sheardown Lake NW versus Reference Lake 3 in 2024				Sheardown Lake NW 2024 versus Baseline Period			
	Littoral Stations (n = 5)		Profundal Stations (n = 5)		Littoral Stations (n = 3)		Profundal Stations (n = 4)	
	Reference Lake Concentration (mg/kg)	Magnitude of Elevation	Reference Lake Concentration (mg/kg)	Magnitude of Elevation	Sheardown Lake NW Baseline Concentration (mg/kg)	Magnitude of Elevation	Sheardown Lake NW Baseline Concentration (mg/kg)	Magnitude of Elevation
Aluminum (Al)	16,560	1.16	23,060	1.020	11,792	1.62	17,745	1.33
Antimony (Sb)	<0.10	1.03	<0.10	1.020	1.0	0.103	1	0.102
Arsenic (As)	5.02	1.16	5.07	0.898	3.0	1.94	3.2	1.42
Barium (Ba)	115	0.89	142	0.795	78	1.32	93	1.22
Beryllium (Be)	0.646	1.39	0.88	1.29	1.0	0.897	1.0	1.14
Bismuth (Bi)	<0.20	1.45	<0.20	1.64	-	-	-	-
Boron (B) ^a	13.3	2.00	16.7	2.02	3.0	8.87	3.0	11.2
Cadmium (Cd)	0.146	2.15	0.166	1.67	0.5	0.630	0.5	0.554
Calcium (Ca)	4,716	0.946	5,426	0.843	2,697	1.65	3,558	1.28
Chromium (Cr)	55.1	1.34	76.0	1.16	53	1.40	81	1.09
Cobalt (Co)	11.5	1.40	17.4	1.070	10	1.62	15	1.25
Copper (Cu)	67.5	0.724	95	0.543	33	1.48	48	1.08
Iron (Fe)	58,760	1.39	49,820	1.240	28,120	2.91	40,382	1.54
Lead (Pb)	13.7	1.38	18.5	1.29	13	1.46	20	1.19
Lithium (Li)	25.6	1.120	36.2	1.050	-	-	-	-
Magnesium (Mg)	11,308	1.23	15,780	1.020	7,448	1.87	11,498	1.40
Manganese (Mn)	862	1.49	2,246	1.03	756	1.70	2,164	1.07
Mercury (Hg)	0.0470	0.862	0.0702	0.642	0.1	0.405	0.1	0.451
Molybdenum (Mo)	4.63	1.51	2.83	1.47	3.4	2.06	3.5	1.19
Nickel (Ni)	39.2	1.88	52.2	1.44	49	1.50	69	1.09
Phosphorus (P)	1,344	0.64	999	0.904	863	0.99	1,400	0.645
Potassium (K)	4,118	1.24	5,600	1.100	2,681	1.91	4,612	1.34
Selenium (Se)	0.740	0.730	0.83	0.590	1.0	0.540	1.0	0.488
Silver (Ag)	0.146	0.98	0.238	0.788	0.3	0.477	0.3	0.627
Sodium (Na)	311	0.873	431	0.829	249	1.092	342	1.044
Strontium (Sr)	11.1	1.030	13.3	1.030	7.2	1.58	11.4	1.19
Sulphur (S)	1,620	0.947	1,360	0.772	-	-	-	-
Thallium (Tl)	0.423	1.15	0.748	0.799	1.0	0.486	1.0	0.598
Tin (Sn)	<2.00	1.00	2.00	1.000	-	-	-	-
Titanium (Ti)	958	1.230	1,164	1.260	-	-	-	-
Uranium (U)	15.3	0.620	25.1	0.354	-	-	-	-
Vanadium (V)	51.2	1.050	67.7	0.971	37	1.46	58	1.13
Zinc (Zn)	72.1	0.985	95	0.854	51	1.39	76	1.07
Zirconium (Zr)	4.26	2.75	3.92	2.56	-	-	-	-

- Denotes slight elevation (concentration 3 to 5 times higher than respective mean reference lake value or baseline period, as applicable).
- Denotes moderate elevation (concentration 5 to 10 times higher than mean reference area value or baseline period value, as applicable).
- Denotes high elevation (concentration is ≥ 10 times higher than mean reference area value or baseline period value, as applicable).

Note: '-' indicates baseline data not available.

^a Boron concentrations in sediment from 2015 to 2022 were considerably higher (i.e., 10- to 70-times) than those reported during both the baseline and 2014 studies at all mine-exposed lakes. The lack of any distinct gradient in the magnitude of the elevation in boron concentrations among stations within each lake and among study lakes suggested that the stark contrast in boron concentrations between recent data and data collected prior to 2015 was likely due to laboratory based analytical differences.

Table D.15: Field Observations for Petite Ponar Sediment Samples Collected at Sheardown Lake Southeast (SE; DL0-02), Mary River Project CREMP, August 2024

Station	Station Depth (m)	Colour and Texture Observations	Evidence of Anoxia ^a	Plant or Algae Presence
DL0-02-8	11.0	Brown overlaying gray silt overlaying sticky mud	-	sparse algae
DL0-02-9	8.7	Brown overlaying gray silt	-	common algae
DL0-02-10	6.5	-	-	common algae
DL0-02-12	10.5	Brown silt overlaying gray silt	-	common algae
DL0-02-13	10.6	Red-brown silt overlaying gray silt	-	common algae

Notes: "-" = data not available. Stations DL0-02-8, DL0-02-9, DL0-02-10, and DL0-02-12 had no visible macrophytes.

^a Evidence of anoxic sediments was assessed visually (presence of blackened substrate) and by smell (based on presence/strength of hydrogen sulphide odour).

Table D.16: Field Observations for Sediment Cores Collected at Sheardown Lake Southeast (SE; DL0-02), Mary River Project CREMP, August 2024

Sample Station	Station Depth (m)	Station Type	Core Number	Core Length (cm)	Surficial Substrate Colour/Texture Description
DL0-02-1	6.5	Littoral	1	16.0	Silt
			2	17.5	
			3	7.0	
DL0-02-2	15.0	Profundal	1	23.0	Silt
			2	24.0	
			3	23.5	
DL0-02-3	13.0	Profundal	1	24.0	Silt
			2	23.0	
			3	28.0	
DL0-02-4	8.0	Littoral	1	37.0	Red silt
			2	36.0	
			3	31.0	
DL0-02-11	7.0	Littoral	1	36.0	Red silt
			2	34.0	
			3	34.5	

Table D.17: Statistical Comparison of Sediment Physical Properties for Sediment Cores Collected from Littoral and Profundal Depths in Sheardown Lake Southeast (SE; DL0-02) and Reference Lake 3 (REF-03), Mary River Project CREMP, August 2024

Lake Zone	Sediment Variable	Statistical Test Results					Summary Statistics						
		Statistical Test ^a	Transformation	Significant Difference Between Areas?	P-value	MOD ^b	Study Lake	Sample Size (n)	Mean	Standard Deviation	Standard Error	Minimum	Maximum
Littoral (Shallow) Stations	Sand-Sized Material (%)	tequal	Median	YES	0.004	-64.2	Reference	5	50.3	10.9	2.18	42.6	69.2
							DL0-02	3	19.0	9.04	3.01	11.9	29.2
	Silt-Sized Material (%)	M-W	Rank	YES	0.036	59.9	Reference	5	41.9	9.65	1.93	25.2	49.9
							DL0-02	3	69.5	5.12	1.71	63.6	72.8
	Clay-Sized Material (%)	tequal	None	NO	0.140	ns	Reference	5	7.80	2.19	0.438	5.50	11.3
							DL0-02	3	11.5	4.07	1.36	7.20	15.3
	Total Organic Carbon (TOC) Content (%)	tequal	None	YES	0.048	-77.6	Reference	5	4.78	2.52	0.503	0.860	7.50
							DL0-02	3	1.07	0.200	0.0668	0.880	1.28
Profundal (Deep) Stations	Sand-Sized Material (%)	tequal	None	YES	<0.001	-67.5	Reference	5	49.4	1.08	0.216	48.1	50.5
							DL0-02	2	16.1	0.0707	0.0354	16.0	16.1
	Silt-Sized Material (%)	tequal	None	YES	<0.001	77.1	Reference	5	39.8	1.56	0.312	38.2	42.0
							DL0-02	2	70.5	0.283	0.141	70.3	70.7
	Clay-Sized Material (%)	tequal	None	YES	0.017	25.2	Reference	5	10.8	1.01	0.203	9.50	12.0
							DL0-02	2	13.5	0.424	0.212	13.2	13.8
	Total Organic Carbon (TOC) Content (%)	tequal	None	YES	<0.001	-77.5	Reference	5	4.28	0.315	0.0630	3.85	4.72
							DL0-02	2	0.960	0.113	0.0566	0.880	1.04

Indicates negative MOD (mine-exposed concentration significantly lower than reference).

Indicates positive MOD (mine-exposed concentration significantly higher than reference)

Highlighted values indicate significant difference between study areas based on statistical p-value less than 0.05.

Notes: MOD = magnitude of difference. ns = not significant.

^a Statistical tests included tequal (t-test assuming equal variance) and M-W (Mann-Whitney U-test).

^b MOD is calculated as $(MCT_{Exposed} - MCT_{Reference}) / MCT_{Reference} * 100$. MCT = measure of central tendency (i.e., mean for untransformed, geometric mean for log10-transformed, and median for rank transformed).

Table D.18: Sediment Particle Sizes, Total Organic Carbon Content, and Metal Concentrations at Sheardown Lake Southeast (SE; DL0-02) Sediment Monitoring Stations, Mary River Project CREMP, August 2024

Parameter		Units	Sediment Quality Guideline (SQG) ^a	AEMP Benchmark ^b	Sheardown Lake Southeast Basin Coring Station								Summary Statistics		
					DL0-02-1	DL0-02-11	DL0-02-4	DL0-02-12	DL0-02-9	DL0-02-8	DL0-02-13	DL0-02-2	Mean	Standard Deviation	Standard Error
					(littoral)	(littoral)	(littoral)	(profundal)	(littoral)	(profundal)	(profundal)	(profundal)			
Physical Parameter	Sand	%	-	-	29.2	11.9	16.0	8.20	8.80	8.50	6.50	16.0	17.8	6.60	2.95
	Silt	%	-	-	63.6	72.8	72.1	78.8	80.4	78.4	80.5	70.3	69.9	3.67	1.64
	Clay	%	-	-	7.20	15.3	11.9	12.9	10.8	13.0	13.0	13.8	12.3	3.09	1.38
	Moisture	%	-	-	41.5	54.1	65.4	63.6	61.5	58.8	64.4	40.7	49.8	10.2	4.58
	Total Organic Carbon	%	10 ^α	-	0.880	1.06	1.28	1.24	1.18	1.07	1.09	0.880	1.03	0.165	0.0736
Metals	Aluminum (Al)	mg/kg	-	-	17,900	20,600	22,600	21,700	20,200	21,600	21,400	18,300	19,900	1,896	848
	Antimony (Sb)	mg/kg	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-
	Arsenic (As)	mg/kg	17	5.9	4.13	4.01	6.29	6.42	5.51	5.14	6.68	2.99	4.08	1.35	0.602
	Barium (Ba)	mg/kg	-	-	91.0	107	164	158	107	129	176	87.5	109	31.8	14.2
	Beryllium (Be)	mg/kg	-	-	0.740	0.940	1.06	0.960	0.920	0.970	0.930	0.920	0.916	0.114	0.0511
	Bismuth (Bi)	mg/kg	-	-	0.210	0.260	0.270	0.250	0.250	0.250	0.260	0.210	0.234	0.0288	0.0129
	Boron (B)	mg/kg	-	-	20.3	27.7	33.7	27.4	24.5	26.7	22.8	29.9	28.6	5.13	2.29
	Cadmium (Cd)	mg/kg	3.5	1.5	0.101	0.127	0.151	0.128	0.110	0.119	0.133	0.109	0.124	0.0197	0.00882
	Calcium (Ca)	mg/kg	-	-	4,390	6,170	4,940	4,620	4,560	5,050	4,630	5,900	5,444	749	335
	Chromium (Cr)	mg/kg	90	79	70.3	100	96.6	88.6	83.4	83.5	80.8	84.8	88.3	11.7	5.22
	Cobalt (Co)	mg/kg	-	-	13.5	14.6	17.5	17.9	16.5	17.4	18.3	13.7	14.8	1.60	0.715
	Copper (Cu)	mg/kg	197	56	26.1	33.0	33.4	33.1	31.0	32.8	33.5	28.2	30.3	3.13	1.40
	Iron (Fe)	mg/kg	40,000 ^α	34,400	60,100	44,600	66,600	60,000	59,000	56,800	63,700	39,200	50,420	12,176	5,445
	Lead (Pb)	mg/kg	91.3	35	14.4	20.2	20.5	17.9	17.4	17.6	18.0	17.7	18.3	2.45	1.10
	Lithium (Li)	mg/kg	-	-	27.2	35.6	37.5	35.3	33.7	36.3	33.1	35.6	34.5	4.16	1.86
	Magnesium (Mg)	mg/kg	-	-	14,100	17,000	16,400	17,000	15,400	16,200	16,200	15,100	15,760	1,155	516
	Manganese (Mn)	mg/kg	1,100 ^{α,β}	657	1,420	1,370	3,940	4,530	2,050	3,180	6,600	754	1,664	1,307	585
	Mercury (Hg)	mg/kg	0.486	0.17	0.0174	0.0238	0.0273	0.0304	0.0250	0.0281	0.0274	0.0227	0.0234	0.00383	0.00171
	Molybdenum (Mo)	mg/kg	-	-	2.47	1.92	3.95	3.66	2.67	3.12	4.57	1.47	2.27	1.02	0.456
	Nickel (Ni)	mg/kg	75 ^{α,β}	66	53.6	72.6	70.0	76.3	65.1	64.7	66.9	60.8	64.2	7.55	3.38
	Phosphorus (P)	mg/kg	2,000 ^α	1,278	1,080	1,000	1,260	1,300	1,210	1,110	1,310	924	1,035	142	63.7
	Potassium (K)	mg/kg	-	-	4,240	5,440	5,750	5,340	5,040	5,260	5,250	4,690	5,074	605	271
	Selenium (Se)	mg/kg	-	-	0.200	0.210	0.270	0.270	0.230	0.280	0.310	<0.2	0.220	0.0301	0.0139
	Silver (Ag)	mg/kg	-	-	<0.1	0.120	0.120	0.110	0.100	0.130	0.120	0.120	0.116	0	0
	Sodium (Na)	mg/kg	-	-	230	317	345	338	307	327	323	306	306	45.1	20.2
	Strontium (Sr)	mg/kg	-	-	11.2	14.3	15.1	12.4	11.2	12.2	11.8	13.6	13.6	1.46	0.652
	Sulphur (S)	mg/kg	-	-	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	-	-
	Thallium (Tl)	mg/kg	-	-	0.313	0.448	0.486	0.450	0.416	0.423	0.457	0.393	0.409	0.0651	0.0291
	Tin (Sn)	mg/kg	-	-	<2	<2	<2	<2	<2	<2	<2	<2	<2	-	-
	Titanium (Ti)	mg/kg	-	-	1,280	1,480	1,540	1,450	1,390	1,470	1,410	1,460	1,468	115	51.6
	Uranium (U)	mg/kg	-	-	4.81	5.88	7.30	6.34	5.53	6.00	6.13	5.55	5.94	0.913	0.408
	Vanadium (V)	mg/kg	-	-	46.8	57.9	59.9	58.2	55.5	57.2	56.9	52.7	54.8	5.21	2.33
	Zinc (Zn)	mg/kg	315	135	57.5	64.7	71.2	67.7	64.0	67.1	69.2	58.5	63.0	5.49	2.46
	Zirconium (Zr)	mg/kg	-	-	13.8	22.2	15.0	14.7	13.8	16.5	13.1	24.3	20.0	5.19	2.32

Indicates parameter concentration above Sediment Quality Guideline (SQG).

BOLD Indicates parameter concentration above the AEMP Benchmark.

Note: '-' indicates no SQG applicable, or that Standard Deviation and Standard Error could not be calculated.

^a Canadian Sediment Quality Guideline for the protection of aquatic life probable effects level (PEL; CCME 2015) except α (Ontario Provincial Sediment Quality Guideline [PSQG] severe effect level [SEL]; OMOE 1993) and β (British Columbia Working Sediment Quality Guideline [BCSQG] probable effects level [PEL; BCMOE 2015]).

^b AEMP Sediment Quality Benchmarks developed by Intrinsik (2013) using sediment quality guidelines, background sediment quality data, and method detection limits. The indicated values are specific to Sheardown Lake Southeast.

Table D.19: Magnitude of Elevation for Comparisons of Mean Metal Concentrations in Sediments from Sheardown Lake Southeast (SE; DL0-02) to Reference Lake 3 (REF-03) and Baseline (2005 to 2013) Data, Mary River Project CREMP, 2024

Parameter	Sheardown Lake SE versus Reference Lake 3 in 2024				Sheardown Lake SE 2024 versus Baseline Period			
	Littoral Stations (n = 5)		Profundal Stations (n = 5)		Littoral Stations (n = 3)		Profundal Stations (n = 2)	
	Reference Lake Concentration (mg/kg)	Magnitude of Elevation	Reference Lake Concentration (mg/kg)	Magnitude of Elevation	Sheardown Lake SE Baseline Concentration (mg/kg)	Magnitude of Elevation	Sheardown Lake SE Baseline Concentration (mg/kg)	Magnitude of Elevation
Aluminum (Al)	16,560	1.23	23,060	0.833	14,950	1.36	13,133	1.46
Antimony (Sb)	<0.10	1.00	0.100	1.00	1.0	0.100	1.0	0.100
Arsenic (As)	5.02	0.96	5.07	0.591	1.9	2.53	1.5	2.00
Barium (Ba)	115	1.050	142	0.636	81	1.49	64	1.41
Beryllium (Be)	0.646	1.41	0.88	1.040	1.0	0.913	1.0	0.92
Bismuth (Bi)	<0.20	1.23	<0.20	1.07	-	-	-	-
Boron (B) ^a	13.3	2.04	16.7	1.83	2.5	10.9	1.4	21.9
Cadmium (Cd)	0.146	0.864	0.166	0.727	0.5	0.252	0.6	0.200
Calcium (Ca)	4,716	1.10	5,426	1.08	6,310	0.819	8,925	0.657
Chromium (Cr)	55.1	1.62	76.0	1.150	78	1.14	72	1.21
Cobalt (Co)	11.5	1.32	17.4	0.817	13	1.17	12	1.18
Copper (Cu)	67.5	0.457	95	0.311	30	1.03	25	1.18
Iron (Fe)	58,760	0.97	49,820	0.811	32,284	1.77	29,117	1.39
Lead (Pb)	13.7	1.34	18.5	0.980	17	1.08	14	1.29
Lithium (Li)	25.6	1.31	36.2	0.998	-	-	-	-
Magnesium (Mg)	11,308	1.40	15,780	0.992	12,634	1.25	13,742	1.14
Manganese (Mn)	862	2.60	2,246	0.354	462	4.85	410	1.94
Mercury (Hg)	0.0470	0.485	0.0702	0.347	0.1	0.228	0.1	0.244
Molybdenum (Mo)	4.63	0.600	2.83	0.532	1.5	1.85	1	1.50
Nickel (Ni)	39.2	1.67	52.2	1.20	62	1.05	62	1.01
Phosphorus (P)	1,344	0.83	999	0.919	1,150	0.968	950	0.97
Potassium (K)	4,118	1.25	5,600	0.887	3,947	1.30	3,317	1.50
Selenium (Se)	0.740	0.306	0.83	0.254	1.0	0.227	1.0	0.210
Silver (Ag)	0.146	0.776	0.238	0.504	0.4	0.283	0.3	0.400
Sodium (Na)	311	0.96	431	0.742	353	0.841	330	0.97
Strontium (Sr)	11.1	1.22	13.3	1.030	16	0.844	11	1.24
Sulphur (S)	1,620	0.617	1,360	0.735	-	-	-	-
Thallium (Tl)	0.423	0.98	0.748	0.532	1.0	0.416	1.0	0.398
Tin (Sn)	<2.00	1.00	2.00	1.000	-	-	-	-
Titanium (Ti)	958	1.50	1,164	1.31	-	-	-	-
Uranium (U)	15.3	0.391	25.1	0.234	-	-	-	-
Vanadium (V)	51.2	1.07	67.7	0.809	52	1.06	44	1.25
Zinc (Zn)	72.1	0.89	95	0.639	51	1.26	51	1.19
Zirconium (Zr)	4.26	3.99	3.92	6.24	-	-	-	-

- Denotes slight elevation (concentration three to five times higher than respective mean reference lake value or baseline period, as applicable).
- Denotes moderate elevation (concentration five to 10 times higher than mean reference area value or baseline period value, as applicable).
- Denotes high elevation (concentration is ≥ 10 times higher than mean reference area value or baseline period value, as applicable).

Note: '-' indicates parameter not measured, and therefore magnitude of elevation could not be determined.

^a Boron concentrations in sediment from 2015 to 2024 were considerably higher (i.e., 10- to 70-times) than those reported during both the baseline and 2014 studies at all mine-exposed lakes. The lack of any distinct gradient in the magnitude of the elevation in boron concentrations among stations within each lake and among study lakes suggested that the stark contrast in boron concentrations between recent data and data collected prior to 2015 was likely due to laboratory based analytical differences.

Table D.20: Field Observations for Petite Ponar Sediment Samples Collected at Mary Lake (BL0), Mary River Project CREMP, August 2024

Station	Station Depth (m)	Colour and Texture Observations	Evidence of Anoxia ^a	Plant or Algae Presence
BL0-05	20.5	Brown silt with gray/ brown clay, mostly smooth	-	Sparse Macrophytes and no algae
BL0-07	12.0	Brown silt	-	Sparse Macrophytes, Sparse Algae
BL0-11	7.5	Brown sand with mud and fine grains	-	-
BL0-13	21.0	Brown mud	-	Sparse algae
BL0-15	24.0	Brown Silt	-	Sparse algae

Notes: "-" = data not available. No visible macrophytes were observed at Stations BL0-13 and BL0-15.

^a Evidence of anoxic sediments was assessed visually (presence of blackened substrate) and by smell (based on presence/strength of hydrogen sulphide odour).

Table D.21: Field Observations for Sediment Cores Collected at Mary Lake (BL0), Mary River Project CREMP, August 2024

Sample Station	Station Depth (m)	Station Type	Core Number	Core Length (cm)	Surficial Substrate Colour/Texture Description
BL0-01	9.5	Littoral	1	18.5	Reddish brown silt
			2	22.0	
			3	18.0	
			4	18.0	
BL0-03	18.0	Profundal	1	31.0	Brown-red silt
			2	30.0	
			3	31.0	
BL0-04	19.0	Profundal	1	38.0	Brown silt
			2	25.5	
			3	34.0	
BL0-06	9.0	Littoral	1	37.0	Silt
			2	40.0	
			3	15.0	
BL0-08	26.0	Profundal	1	37.5	Silt
			2	41.0	
			3	40.0	
BL0-09	29.5	Profundal	1	25.5	Light brown silt
			2	24.5	
			3	28.0	
BL0-10	18.7	Profundal	1	28.5	Silt
			2	30.0	
			3	20.0	
BL0-12	21.5	Profundal	1	19.0	Light brown silt
			2	26.0	
			3	23.0	
BL0-14	19.0	Profundal	1	42.0	Brown silt
			2	43.5	
			3	20.0	
BL0-16	31.0	Profundal	1	17.5	Red-brown silt
			2	23.5	
			3	26.0	
			4	8.0	

Table D.22: Statistical Comparison of Physical Properties for Sediment Cores Collected from Littoral and Profundal Depths in Mary Lake (BL0) and Reference Lake 3 (REF-03), Mary River Project CREMP, August 2024

Lake Zone	Sediment Variable	Statistical Test Results					Summary Statistics						
		Statistical Test ^a	Transformation	Significant Difference Between Areas?	P-value	MOD ^b	Study Lake	Sample Size (n)	Mean	Standard Deviation	Standard Error	Minimum	Maximum
Littoral (Shallow) Stations	Sand-Sized Material (%)	tequal	None	YES	0.007	-76.8	Reference	5	50.3	10.9	2.18	42.6	69.2
							Mary	2	11.6	8.41	4.21	5.70	17.6
	Silt-Sized Material (%)	tequal	None	YES	0.033	58.8	Reference	5	41.9	9.65	1.93	25.2	49.9
							Mary	2	66.5	11.8	5.90	58.2	74.9
	Clay-Sized Material (%)	tunequal	None	NO	0.509	ns	Reference	5	7.80	2.19	0.438	5.50	11.3
							Mary	2	21.8	20.3	10.2	7.40	36.1
	Total Organic Carbon (TOC) Content (%)	tequal	None	NO	0.110	ns	Reference	5	4.78	2.52	0.503	0.860	7.50
							Mary	2	1.12	0.318	0.159	0.900	1.35
Profundal (Deep) Stations	Sand-Sized Material (%)	tequal	Median	YES	0.019	-68.7	Reference	5	49.4	1.08	0.216	48.1	50.5
							Mary	8	22.5	22.2	2.78	4.80	71.9
	Silt-Sized Material (%)	tequal	None	NO	0.202	ns	Reference	5	39.8	1.56	0.312	38.2	42.0
							Mary	8	51.3	18.6	2.32	18.4	72.2
	Clay-Sized Material (%)	tunequal	None	YES	0.002	143	Reference	5	10.8	1.01	0.203	9.50	12.0
							Mary	8	26.2	9.43	1.18	9.70	35.6
	Total Organic Carbon (TOC) Content (%)	tequal	None	YES	<0.001	-78.5	Reference	5	4.28	0.315	0.0630	3.85	4.72
							Mary	8	0.917	0.241	0.0301	0.690	1.46

Indicates negative MOD (mine-exposed concentration significantly lower than reference).

Indicates positive MOD (mine-exposed concentration is significantly higher than reference).

Highlighted values indicate significant difference between study areas based on statistical p-value less than 0.05.

Notes: MOD = magnitude of difference. ns = not significant.

^a Statistical tests included tequal (t-test assuming equal variance) and tunequal (t-test assuming unequal variance).

^b MOD is calculated as $(MCT_{\text{Exposed}} - MCT_{\text{Reference}}) / MCT_{\text{Reference}} * 100$. MCT = measure of central tendency (i.e., mean for untransformed, geometric mean for log10-transformed, and median for rank-transformed).

Table D.23: Sediment Particle Sizes, Total Organic Carbon Content, and Metal Concentrations at Mary Lake (BL0) Sediment Monitoring Stations, Mary River Project CREMP, August 2024

Parameter		Units	Sediment Quality Guideline (SQG) ^a	AEMP Benchmark ^b	Mary Lake Coring Stations									Summary Statistics		
					BL0-16	BL0-03	BL0-14	BL0-12	BL0-04	BL0-10	BL0-09	BL0-08	BL0-06	Mean	Standard Deviation	Standard Error
					(profundal)	(profundal)	(profundal)	(profundal)	(profundal)	(profundal)	(profundal)	(profundal)	(littoral)			
Physical Parameters	Sand	%	-	-	21.1	71.9	34.1	11.6	21.2	10.4	4.80	5.20	5.70	20.4	20.3	6.43
	Silt	%	-	-	47.4	18.4	30.3	72.2	56.6	56.2	68.6	60.4	58.2	54.3	18.0	5.70
	Clay	%	-	-	31.4	9.70	35.6	16.2	22.2	33.4	26.6	34.4	36.1	25.3	10.9	3.44
	Moisture	%	-	-	69.0	37.1	57.9	52.4	46.7	57.0	57.0	62.8	62.9	55.2	9.22	2.92
	Total Organic Carbon	%	10 ^α	-	1.46	0.690	0.900	0.850	0.790	0.850	1.03	0.770	0.900	0.959	0.253	0.0800
Metals	Aluminum (Al)	mg/kg	-	-	23,200	9,430	25,300	21,400	21,000	25,200	25,300	27,000	26,100	21,973	5,508	1,742
	Antimony (Sb)	mg/kg	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-
	Arsenic (As)	mg/kg	17	5.9	8.36	1.66	4.19	2.79	2.98	3.65	3.48	3.79	3.71	3.96	1.78	0.562
	Barium (Ba)	mg/kg	-	-	121	40.0	103	83.6	79.4	105	98.1	103	100	91.6	22.0	6.97
	Beryllium (Be)	mg/kg	-	-	1.29	0.530	1.36	1.11	1.07	1.38	1.38	1.40	1.35	1.17	0.289	0.0913
	Bismuth (Bi)	mg/kg	-	-	0.260	<0.2	0.260	0.260	0.240	0.260	0.280	0.280	0.240	0.248	0.0160	0.00478
	Boron (B)	mg/kg	-	-	43.5	19.4	47.0	30.1	31.1	41.9	44.7	45.0	45.3	37.5	9.68	3.06
	Cadmium (Cd)	mg/kg	3.5	1.5	0.182	0.0710	0.194	0.133	0.122	0.145	0.171	0.138	0.142	0.140	0.0371	0.0117
	Calcium (Ca)	mg/kg	-	-	3,920	1,830	4,580	4,900	4,580	5,150	5,130	5,280	4,890	4,908	1,707	540
	Chromium (Cr)	mg/kg	90	98	87.5	34.5	88.0	84.8	88.9	96.1	96.0	103	93.1	84.1	19.6	6.21
	Cobalt (Co)	mg/kg	-	-	17.1	7.09	18.3	15.7	15.6	18.0	17.7	18.8	17.3	16.0	3.42	1.08
	Copper (Cu)	mg/kg	197	50	35.8	14.0	36.3	31.0	30.2	35.9	36.2	38.2	34.8	32.2	7.05	2.23
	Iron (Fe)	mg/kg	40,000 ^α	52,400	51,400	16,800	42,900	44,000	37,800	44,300	45,600	46,600	44,800	41,240	9,438	2,985
	Lead (Pb)	mg/kg	91.3	35	23.7	10.3	25.3	19.4	20.4	26.0	24.4	27.0	25.4	21.8	5.29	1.67
	Lithium (Li)	mg/kg	-	-	44.9	18.2	48.7	38.2	38.8	52.4	48.6	53.7	52.2	42.9	11.1	3.52
	Magnesium (Mg)	mg/kg	-	-	15,600	6,360	16,800	16,200	15,300	17,600	17,200	18,400	17,500	15,616	3,423	1,082
	Manganese (Mn)	mg/kg	1,100 ^{α,β}	4,370	1,260	1,750	3,390	1,630	688	731	2,190	824	1,040	1,464	831	263
	Mercury (Hg)	mg/kg	0.486	0.17	0.0843	0.0284	0.0709	0.0350	0.0420	0.0547	0.0650	0.0580	0.0454	0.0510	0.0190	0.00601
	Molybdenum (Mo)	mg/kg	-	-	1.47	0.480	1.23	1.68	0.950	0.830	1.33	0.930	0.870	1.04	0.373	0.118
	Nickel (Ni)	mg/kg	75 ^{α,β}	72	63.3	24.6	61.6	59.7	61.9	65.8	66.6	69.3	59.2	58.8	12.6	3.99
	Phosphorus (P)	mg/kg	2,000 ^α	1,580	1,500	340	896	811	779	821	848	863	753	863	285	90
	Potassium (K)	mg/kg	-	-	6,480	2,710	7,120	5,380	5,380	7,040	6,640	7,380	7,440	5,953	1,588	502
	Selenium (Se)	mg/kg	-	-	0.330	<0.2	0.320	0.230	0.210	0.280	0.280	0.300	0.240	0.259	0.0496	0.0150
	Silver (Ag)	mg/kg	-	-	0.160	<0.1	0.170	0.160	0.150	0.180	0.190	0.190	0.160	0.156	0.0160	0.00478
	Sodium (Na)	mg/kg	-	-	589	162	404	318	368	466	445	486	446	396	121	38.2
	Strontium (Sr)	mg/kg	-	-	18.8	7.05	16.4	12.7	13.7	16.5	16.6	17.7	16.6	14.9	3.40	1.08
	Sulphur (S)	mg/kg	-	-	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	-	-
	Thallium (Tl)	mg/kg	-	-	0.556	0.255	0.643	0.477	0.485	0.636	0.616	0.646	0.657	0.533	0.138	0.0437
	Tin (Sn)	mg/kg	-	-	<2	<2	<2	<2	<2	<2	<2	<2	2.00	2.00	-	-
	Titanium (Ti)	mg/kg	-	-	1,380	659	1,590	1,560	1,520	1,830	1,730	1,900	1,900	1,520	387	122
	Uranium (U)	mg/kg	-	-	10.5	4.34	10.7	8.03	7.82	9.89	10.8	10.1	9.47	8.62	2.43	0.769
	Vanadium (V)	mg/kg	-	-	67.9	27.7	71.2	58.1	59.8	72.7	69.6	75.2	73.8	62.7	14.6	4.61
	Zinc (Zn)	mg/kg	315	135	79.0	32.0	82.4	72.8	70.7	86.3	83.4	88.6	88.7	73.9	17.9	5.67
	Zirconium (Zr)	mg/kg	-	-	17.0	8.90	19.9	19.0	22.5	28.3	23.0	29.6	26.6	20.7	6.77	2.14

Indicates parameter concentration above Sediment Quality Guideline (SQG).

BOLD Indicates parameter concentration above the AEMP Benchmark.

Note: "-" indicates no SQG applicable, or that Standard Deviation and Standard Error could not be calculated.

^a Canadian Sediment Quality Guideline for the protection of aquatic life probable effects level (PEL; CCME 2015) except α (Ontario Provincial Sediment Quality Guideline [PSQG] severe effect level [SEL]; OMOE 1993) and β (British Columbia Working Sediment Quality Guideline [BCSQG] probable effects level [PEL; BCMOE 2015]).

^b AEMP Sediment Quality Benchmarks developed by Intrinsik (2013) using sediment quality guidelines, background sediment quality data, and method detection limits. The indicated values are specific to Mary Lake

Table D.24: Magnitude of Elevation in Mean Sediment Metal Concentrations between Mary Lake (BL0) and Reference Lake 3 (REF-03) 2024 Data, and Baseline (2005 to 2013) Data, Mary River Project CREMP, 2024

Parameter	Mary Lake versus Reference Lake 3 in 2024				Mary Lake 2024 versus Baseline Period			
	Littoral Stations (n = 5)		Profundal Stations (n = 5)		Littoral Stations (n = 2)		Profundal Stations (n = 8)	
	Reference Lake Concentration (mg/kg)	Magnitude of Elevation	Reference Lake Concentration (mg/kg)	Magnitude of Elevation	Mary Lake Baseline Concentration (mg/kg)	Magnitude of Elevation	Mary Lake Baseline Concentration (mg/kg)	Magnitude of Elevation
Aluminum (Al)	16,560	1.27	23,060	0.964	18,267	1.15	17,000	1.31
Antimony (Sb)	<0.10	1.00	<0.10	1.000	1.0	0.100	1.0	0.100
Arsenic (As)	5.02	0.863	5.07	0.762	2.8	1.55	3.7	1.04
Barium (Ba)	115	0.794	142	0.644	105	0.87	76	1.21
Beryllium (Be)	0.646	1.70	0.88	1.35	1.0	1.10	1.0	1.19
Bismuth (Bi)	<0.20	1.10	<0.20	1.27	-	-	-	-
Boron (B) ^a	13.3	2.72	16.7	2.26	1.0	36.2	2.0	18.9
Cadmium (Cd)	0.146	0.828	0.166	0.872	0.5	0.242	0.5	0.288
Calcium (Ca)	4,716	1.450	5,426	0.815	3,130	2.19	2,934	1.51
Chromium (Cr)	55.1	1.47	76.0	1.120	81	1.00	76	1.12
Cobalt (Co)	11.5	1.37	17.4	0.920	18	0.878	18	0.889
Copper (Cu)	67.5	0.474	95	0.339	45	0.711	44	0.732
Iron (Fe)	58,760	0.706	49,820	0.826	36,133	1.15	35,654	1.15
Lead (Pb)	13.7	1.52	18.5	1.200	18	1.16	21	1.05
Lithium (Li)	25.6	1.66	36.2	1.190	-	-	-	-
Magnesium (Mg)	11,308	1.45	15,780	0.978	13,967	1.17	10,903	1.42
Manganese (Mn)	862	1.26	2,246	0.69	699	1.56	991	1.57
Mercury (Hg)	0.0470	0.763	0.0702	0.780	0.1	0.359	0.1	0.548
Molybdenum (Mo)	4.63	0.167	2.83	0.393	1.0	0.775	1.0	1.11
Nickel (Ni)	39.2	1.47	52.2	1.130	67	0.863	65	0.909
Phosphorus (P)	1,344	0.659	999	0.858	800	1.11	1,325	0.647
Potassium (K)	4,118	1.38	5,600	1.070	3,450	1.65	4,287	1.40
Selenium (Se)	0.740	0.297	0.83	0.325	1.0	0.220	1.0	0.269
Silver (Ag)	0.146	0.890	0.238	0.683	0.3	0.433	0.4	0.405
Sodium (Na)	311	1.16	431	0.940	279	1.29	284	1.43
Strontium (Sr)	11.1	1.35	13.3	1.120	9.3	1.60	13.3	1.12
Sulphur (S)	1,620	0.617	1,360	0.735	-	-	-	-
Thallium (Tl)	0.423	1.20	0.748	0.721	1.0	0.507	1.0	0.539
Tin (Sn)	<2.00	1.00	<2.00	1.000	-	-	-	-
Titanium (Ti)	958	1.58	1,164	1.31	-	-	-	-
Uranium (U)	15.3	0.456	25.1	0.360	-	-	-	-
Vanadium (V)	51.2	1.22	67.7	0.927	69	0.91	63	1.00
Zinc (Zn)	72.1	1.00	95	0.782	67	1.07	64	1.16
Zirconium (Zr)	4.26	4.53	3.92	5.36	-	-	-	-

- Denotes slight elevation (concentration three to five times higher than respective mean reference lake value or baseline period, as applicable).
- Denotes moderate elevation (concentration five to 10 times higher than mean reference area value or baseline period value, as applicable).
- Denotes high elevation (concentration is ≥ 10 times higher than mean reference area value or baseline period value, as applicable).

Note: '-' indicates parameter not measured, and therefore magnitude of elevation could not be determined.

^a Boron concentrations in sediment from 2015 to 2024 were considerably higher (i.e., 10- to 70-times) than those reported during both the baseline and 2014 studies at all mine-exposed lakes. The lack of any distinct gradient in the magnitude of the elevation in boron concentrations among stations within each lake and among study lakes suggested that the stark contrast in boron concentrations between recent data and data collected prior to 2015 was likely due to laboratory based analytical differences.

APPENDIX E
PHYTOPLANKTON DATA

Table E.1: Phytoplankton Monitoring Data (Chlorophyll-a and Phaeophytin-a Concentrations) Collected at Lotic Reference Stations, Camp Lake Tributaries, Sheardown Lake Tributaries, and Tom River, Mary River Project CREMP, 2024


Station		Reference Creek Stations				Camp Lake Tributary 1 (CLT1)						Camp Lake Tributary 2	Camp Lake Outlet	Sheardown Lake Tributary 1 (SDLT1)		Sheardown Tributary 12 (SDLT12) ^a	Sheardown Tributary 9 (SDLT9)	Tom River
						North Branch		Main Stem						D1-05	D1-00			
		CLT-REF4	CLT-REF3	MRY-REF3	MRY-REF2	L1-08	L1-02	L2-03	L1-09	L1-05	L0-01	K0-01	J0-01			LDFG-OUT	MS-C-G	I0-01
Sample Collection Date	Spring	30-Jun-24	29-Jun-24	6-Jul-24	30-Jun-24	4-Jul-24	1-Jul-24	1-Jul-24	1-Jul-24	1-Jul-24	1-Jul-24	1-Jul-24	7-Jul-24	1-Jul-24	30-Jun-24	1-Jul-24	30-Jun-24	7-Jul-24
	Summer	30-Jul-24	30-Jul-24	30-Jul-24	30-Jul-24	30-Jul-24	30-Jul-24	30-Jul-24	30-Jul-24	30-Jul-24	30-Jul-24	30-Jul-24	30-Jul-24	30-Jul-24	30-Jul-24	-	30-Jul-24	30-Jul-24
	Fall	31-Aug-24	31-Aug-24	31-Aug-24	31-Aug-24	30-Aug-24	30-Aug-24	30-Aug-24	30-Aug-24	30-Aug-24	30-Aug-24	30-Aug-24	30-Aug-24	30-Aug-24	31-Aug-24	-	30-Aug-24	30-Aug-24
Chlorophyll-a (µg/L)	Spring	0.122	0.122	0.151	0.149	0.0460	0.158	1.29	0.305	0.304	0.252	0.148	0.525	0.130	0.140	0.473	0.0860	0.0980
	Summer	0.126	0.105	0.189	0.243	0.0510	0.135	0.970	0.236	0.247	0.240	0.173	1.37	0.0600	0.0860	-	0.0590	0.0780
	Fall	0.280	0.184	0.197	0.353	0.0960	0.209	0.935	0.382	0.406	0.426	0.177	1.73	0.0480	0.133	-	0.322	0.226
	Average	0.176	0.137	0.179	0.248	0.0643	0.167	1.06	0.308	0.319	0.306	0.166	1.21	0.0793	0.120	0.473	0.156	0.134
	SD	0.0901	0.0416	0.0246	0.102	0.0275	0.0379	0.196	0.0730	0.0806	0.104	0.0157	0.619	0.0443	0.0294	-	0.145	0.0803
	SE	0.0520	0.0240	0.0142	0.0590	0.0159	0.0219	0.113	0.0422	0.0465	0.0601	0.00907	0.357	0.0256	0.0170	-	0.0835	0.0464
Phaeophytin-a (µg/L)	Spring	0.140	0.155	0.155	0.235	<0.1	0.225	0.665	0.298	0.295	0.250	0.205	0.600	0.150	0.150	0.270	0.145	0.110
	Summer	<0.2	<0.2	0.220	0.310	<0.2	<0.2	0.600	0.240	0.300	0.220	<0.2	1.28	<0.2	<0.2	-	<0.2	<0.2
	Fall	0.350	0.290	0.440	0.390	0.230	0.280	0.550	0.320	0.390	0.330	0.300	0.910	<0.2	0.250	-	0.530	0.380
	Average	0.210	0.200	0.272	0.312	0.143	0.235	0.605	0.286	0.328	0.267	0.235	0.930	0.150	0.183	0.270	0.273	0.200
	SD	0.140	0.0900	0.149	0.0775	-	0.0367	0.0577	0.0413	0.0535	0.0569	0.0633	0.340	-	0.0667	-	0.257	0.180
	SE	0.0808	0.0520	0.0862	0.0448	-	0.0212	0.0333	0.0239	0.0309	0.0328	0.0366	0.197	-	0.0385	-	0.148	0.104


Notes: SD = standard deviation. SE = standard error. "-" = value not available or not calculable.

^a Station LDFG-OUT (Sheardown Lake Tributary 12) was dry during the summer and fall sampling events in 2024, therefore no data are available for these sampling periods.

Table E.2: Chlorophyll-a Concentration (µg/L) Data Summary and Statistical Comparison Results between Camp Lake Tributary 1 (CLT1) Main Stem Stations and Lotic Reference Creek Stations for Spring, Summer, and Fall Sampling Events, Mary River Project CREMP, 2024

Season	Two-Area Comparison				Study Area	Sample Size (n)	Mean	Standard Deviation	Standard Error	Minimum	Maximum
	Significant Difference between Areas?	P-value	Statistical Test ^a	MOD ^b							
Spring	YES	0.029	M-W	125	Reference	4	0.136	0.0162	0.00809	0.122	0.151
					CLT1 Main Stem	4	0.538	0.502	0.251	0.252	1.29
Summer	NO	0.114	M-W	55	Reference	4	0.166	0.0627	0.0313	0.105	0.243
					CLT1 Main Stem	4	0.423	0.365	0.182	0.236	0.970
Fall	YES	0.029	M-W	74	Reference	4	0.254	0.0788	0.0394	0.184	0.353
					CLT1 Main Stem	4	0.537	0.266	0.133	0.382	0.935

 Indicates negative MOD (mine-exposed concentration significantly lower than reference).

 Indicates positive MOD (mine-exposed concentration significantly higher than reference).

 Indicates a statistically significant difference for respective comparison (p-value ≤ 0.05).

Note: "M-W" = Mann-Whitney U test. MOD = Magnitude of Difference. MCT = Measure of Central Tendency.

^a Statistical Test was Mann-Whitney (M-W) U-test (normality not satisfied) between mine-exposed and reference areas.

^b MOD is calculated as $(MCT_{\text{mine-exposed}} - MCT_{\text{reference}}) / MCT_{\text{reference}} * 100$. MCT reported as median for rank-transformed data, as transformed means for log transformed data, and as untransformed means for untransformed data.

Table E.3: Phytoplankton Monitoring Data (Chlorophyll-a and Phaeophytin-a Concentrations) Collected at Camp Lake (JL0), Mary River Project CREMP, 2024

Analyte		Chlorophyll-a (µg/L)								Analyte		Phaeophytin-a (µg/L)							
Station		JL0-02	JL0-10	JL0-01	JL0-07	JL0-09	Average	Standard Deviation	Standard Error	Station		JL0-02	JL0-10	JL0-01	JL0-07	JL0-09	Average	Standard Deviation	Standard Error
Sample Collection Date	Winter	8-Apr-24	7-Apr-24	7-Apr-24	8-Apr-24	8-Apr-24	-	-	-	Sample Collection Date	Winter	8-Apr-24	7-Apr-24	7-Apr-24	8-Apr-24	8-Apr-24	-	-	-
	Summer	9-Aug-24	9-Aug-24	10-Aug-24	10-Aug-24	9-Aug-24	-	-	-		Summer	9-Aug-24	9-Aug-24	10-Aug-24	10-Aug-24	9-Aug-24	-	-	-
	Fall	7-Sep-24	7-Sep-24	7-Sep-24	7-Sep-24	7-Sep-24	-	-	-		Fall	7-Sep-24	7-Sep-24	7-Sep-24	7-Sep-24	7-Sep-24	-	-	-
Winter	Surface	0.955	0.570	0.605	0.498	0.440	0.614	0.201	0.0900	Winter	Surface	1.82	0.870	0.605	0.715	0.550	0.912	0.522	0.233
	Bottom	0.277	0.478	0.0830	0.0720	0.0700	0.196	0.180	0.0807		Bottom	0.380	0.555	0.140	0.170	0.120	0.273	0.189	0.0845
	Average	0.616	0.524	0.344	0.285	0.255	0.405	0.158	0.0705		Average	1.10	0.712	0.372	0.442	0.335	0.592	0.320	0.143
Summer	Surface	1.33	1.16	1.06	1.03	1.46	1.21	0.183	0.0819	Summer	Surface	1.04	1.09	0.910	1.09	1.20	1.07	0.105	0.0470
	Bottom	1.04	1.16	1.30	2.22	1.50	1.44	0.466	0.209		Bottom	1.26	1.15	1.22	1.42	1.16	1.24	0.109	0.0488
	Average	1.18	1.16	1.18	1.62	1.48	1.33	0.213	0.0954		Average	1.15	1.12	1.06	1.25	1.18	1.15	0.0707	0.0316
Fall	Surface	1.47	1.56	1.48	1.62	1.66	1.56	0.0838	0.0375	Fall	Surface	1.10	1.14	1.12	1.20	1.02	1.12	0.0654	0.0293
	Bottom	1.51	1.77	1.45	1.74	1.57	1.61	0.141	0.0631		Bottom	0.960	1.05	1.15	0.980	1.20	1.07	0.105	0.0468
	Average	1.49	1.66	1.46	1.68	1.62	1.58	0.0997	0.0446		Average	1.03	1.10	1.14	1.09	1.11	1.09	0.0388	0.0174

Note: '-' indicates value not applicable.

Table E.4: Statistical Comparisons of Chlorophyll-a Concentrations Among Winter, Spring, Summer, and/or Fall Sampling Events at Mine-Exposed, Reference Creek, and Lake Study Areas, Mary River Project CREMP, 2024

Study Area	Overall Three-Group Comparison			Pair-wise, <i>post hoc</i> comparisons ^a			
	Significant Difference Among Seasons?	P-value	Statistical Test ^b	Season 1	Season 2	Significant Difference Between 3 Seasons?	P-value
Reference Creek Stations	YES	0.049	ANOVA	Spring	Summer	NO	0.761
				Spring	Fall	YES	0.048
				Summer	Fall	NO	0.143
Mary River GO-09 Reference Stations	NO	0.159	ANOVA	Spring	Summer	NO	0.268
				Spring	Fall	NO	0.926
				Summer	Fall	NO	0.168
Reference Lake 3	YES	0.036	tequal	Summer	Fall	YES	0.036
Camp Lake	YES	0.001	ANOVA	Winter	Summer	YES	<0.001
				Winter	Fall	YES	<0.001
				Summer	Fall	NO	0.069
Sheardown Lake Northwest	YES	0.001	ANOVA	Winter	Summer	YES	<0.001
				Winter	Fall	YES	<0.001
				Summer	Fall	NO	0.618
Sheardown Lake Southeast	YES	0.009	ANOVA	Winter	Summer	YES	0.042
				Winter	Fall	YES	0.009
				Summer	Fall	NO	0.667
Mary Lake North Basin	YES	0.001	ANOVA	Winter	Summer	YES	<0.001
				Winter	Fall	YES	0.007
				Summer	Fall	YES	0.034
Mary Lake South Basin	YES	0.001	K-W	Winter	Summer	NO	0.077
				Winter	Fall	YES	<0.001
				Summer	Fall	YES	0.022

 Indicates a statistically significant difference for respective comparison (p-value ≤ 0.05).

^a *Post hoc* analysis of 1-way ANOVA and Kruskal Wallis H-test (K-W) among all areas adjusted for multiple comparisons.

^b Statistical tests include Analysis of Variance (ANOVA) and Kruskal Wallis H-test (K-W), as well as T-test (tequal) for Reference Lake 3 when only two seasons were sampled.

Table E.5: Statistical Comparison of Chlorophyll-a Concentrations at Reference Lake 3 (REF-03) Among Years of Mine Operation (2015 to 2024)

Season	Data Transformation	Statistical Test ^a	Overall Ten-Year Comparison		Pair-wise, <i>post hoc</i> comparisons ^b				
			Significant Difference Among Years?	P-value	Year	Sample Size (n)	Mean	Standard Deviation	Pairwise Comparison ^c
Summer	log10	ANOVA	YES	0.001	2015	3	0.880	0.119	B
					2016	3	0.923	0.0839	B
					2017	3	0.640	0.0832	B
					2018	3	0.735	0.0737	B
					2019	3	0.680	0.213	B
					2020	3	0.780	0.0832	B
					2021	3	1.01	0.0701	AB
					2022	3	0.888	0.0448	B
					2023	3	1.52	0.369	A
					2024	3	0.873	0.0493	B
Fall	rank	K-W	YES	0.002	2015	3	1.08	0.404	ABC
					2016	3	0.738	0.0708	ABCD
					2017	3	0.917	0.0247	AB
					2018	3	0.907	0.0388	ABC
					2019	3	0.680	0.0695	CD
					2020	3	0.605	0.0100	D
					2021	3	0.693	0.00289	BCD
					2022	3	0.772	0.0115	ABCD
					2023	3	0.508	0.0778	D
					2024	3	0.985	0.0383	A
Annual	log10	ANOVA	NO	0.318	2015	6	0.982	0.289	A
					2016	6	0.831	0.123	A
					2017	6	0.778	0.161	A
					2018	6	0.821	0.108	A
					2019	6	0.680	0.142	A
					2020	6	0.693	0.110	A
					2021	6	0.851	0.178	A
					2022	6	0.830	0.0703	A
					2023	6	1.01	0.604	A
					2024	6	0.929	0.0729	A

Indicates a statistically significant difference for respective comparison (p-value ≤ 0.05).


^a Statistical tests include Analysis of Variance (ANOVA) or Kruskal Wallis H-test (K-W) for differences among years.


^b *Post hoc* analysis of 1-way ANOVA or Kruskal Wallis H-test (K-W) among all years protected for multiple comparisons.

^c Years that do not share a letter are significantly different.

Table E.6: Summary Data and Statistical Results for Chlorophyll-a Concentration (mg/L) Comparisons between Individual Mine-Exposed Lakes and Reference Lake 3 (REF-03) for Summer Sampling, Mary River Project CREMP, 2024

Study Lake	Two-Group Comparison to Reference				Sample Size (n)	MCT	Standard Deviation	Standard Error	Minimum	Maximum
	Significant Difference Between Areas?	P-value	Statistical Test ^a	MOD ^b						
Reference Lake 3	-	-	-	-	3	0.873	0.0493	0.0285	0.840	0.930
Camp Lake	YES	0.013	tequal	52	5	1.33	0.213	0.0954	1.16	1.62
Sheardown Lake Northwest	YES	0.007	tequal	29	6	1.12	0.107	0.0436	0.994	1.25
Sheardown Lake Southeast	YES	0.018	tequal	47	5	1.29	0.213	0.0951	1.06	1.50
Mary Lake North	YES	0.040	tequal	-26	3	0.648	0.121	0.0698	0.508	0.723
Mary Lake South	YES	0.003	tequal	-17	7	0.724	0.0537	0.0203	0.672	0.823

 Indicates negative MOD (mine-exposed concentration significantly lower than reference).

 Indicates positive MOD (mine-exposed concentration significantly higher than reference).

 Indicates a statistically significant difference for respective comparison (p-value ≤ 0.05).


Note: "tequal" = Student's t-test assuming equal variance. MOD = Magnitude of Difference. MCT = Measure of Central Tendency. '-' indicates no data available or no applicable data.


^a Statistical Test was t-test (tequal) between individual mine-exposed lakes and Reference Lake 3.

^b MOD is calculated as $(MCT_{\text{mine-exposed}} - MCT_{\text{reference}}) / MCT_{\text{reference}} * 100$. MCT reported as median for rank-transformed data, as transformed means for log transformed data, and as untransformed means for untransformed data.

Table E.7: Summary Data and Statistical Results for Chlorophyll-a Concentration (mg/L) Comparisons between Individual Mine-Exposed Lakes and Reference Lake 3 (REF-03) for Fall Sampling, Mary River Project CREMP, 2024

Study Lake	Two-Group Comparison to Reference				Number of Stations (n)	MCT	Standard Deviation	Standard Error	Minimum	Maximum
	Significant Difference Between Areas?	P-value	Statistical Test ^a	MOD ^b						
Reference Lake 3	-	-	-	-	3	0.985	0.0383	0.0221	0.941	1.01
Camp Lake	YES	0.001	tequal	61	5	1.58	0.0997	0.0446	1.47	1.68
Sheardown Lake Northwest	YES	0.001	tequal	22	6	1.21	0.0693	0.0283	1.13	1.30
Sheardown Lake Southeast	YES	0.001	tequal	41	5	1.39	0.0545	0.0244	1.34	1.48
Mary Lake North	YES	0.001	tequal	-56	3	0.432	0.0251	0.0145	0.406	0.456
Mary Lake South	YES	0.025	tequal	9.6	7	1.08	0.0527	0.0199	0.990	1.15

 Indicates negative MOD (mine-exposed concentration significantly lower than reference).

 Indicates positive MOD (mine-exposed concentration significantly higher than reference).

 Indicates a statistically significant difference for respective comparison (p-value ≤ 0.05).

Note: "tequal" = Student's t-test assuming equal variance. MOD = Magnitude of Difference. MCT = Measure of Central Tendency. '-' indicates no data available or no applicable data.

^a Statistical Test was t-test (tequal) between individual mine-exposed lakes and Reference Lake 3.

^b MOD is calculated as $(MCT_{\text{mine-exposed}} - MCT_{\text{reference}}) / MCT_{\text{reference}} * 100$. MCT reported as median for rank-transformed data, as transformed means for log transformed data, and as untransformed means for untransformed data.

Table E.8: Statistical Comparison of Chlorophyll-a Concentrations at Camp Lake (JL0) Among Years of Mine Construction (2014) and Operation (2015 to 2024)

Season	Data Transformation	Statistical Test ^a	Overall Ten-Year Comparison		Pair-wise, <i>post hoc</i> comparisons ^b				
			Significant Difference Among Years?	P-value	Year	Sample Size (n)	Mean	Standard Deviation	Pairwise Comparison ^c
Winter	rank	K-W	YES	0.001	2014	5	0.600	0.738	C
					2015	5	0.744	0.151	AB
					2016	5	0.652	0.127	AB
					2017	5	0.317	0.107	C
					2018	5	0.384	0.0416	BC
					2019	5	0.474	0.123	BC
					2020	5	0.468	0.239	BC
					2021	5	0.360	0.240	C
					2022	5	1.03	0.141	A
					2023	5	0.243	0.0872	C
					2024	5	0.405	0.158	BC
Summer	log10	ANOVA	YES	0.001	2014	1	0.200	-	E
					2015	5	1.26	0.166	BCD
					2016	5	1.50	0.322	ABC
					2017	5	1.24	0.154	BCD
					2018	5	2.00	0.0360	A
					2019	5	0.971	0.316	D
					2020	5	1.19	0.381	CD
					2021	5	1.44	0.0772	ABCD
					2022	5	1.90	0.300	AB
					2023	5	1.55	0.559	ABC
					2024	5	1.33	0.213	ABCD
Fall	rank	K-W	YES	0.001	2014	5	1.59	0.726	ABCD
					2015	5	0.655	0.0668	E
					2016	5	1.06	0.216	BDE
					2017	5	1.18	0.142	BCDE
					2018	5	2.13	0.0248	A
					2019	5	1.18	0.0805	BCDE
					2020	5	1.19	0.0918	BCD
					2021	5	1.72	0.0526	A
					2022	5	1.45	0.0449	ACD
					2023	5	1.01	0.111	BE
					2024	5	1.58	0.0997	AC
Annual	rank	K-W	YES	0.017	2014	11	1.01	0.864	B
					2015	15	0.886	0.302	B
					2016	15	1.07	0.420	AB
					2017	15	0.914	0.455	B
					2018	15	1.51	0.823	A
					2019	15	0.874	0.358	B
					2020	15	0.950	0.430	B
					2021	15	1.17	0.622	AB
					2022	15	1.46	0.408	A
					2023	15	0.935	0.635	B
					2024	15	1.10	0.545	AB

Indicates a statistically significant difference for respective comparison (p-value ≤ 0.05).

^a Statistical tests include Analysis of Variance (ANOVA) or Kruskal Wallis H-test (K-W) for differences among years.

^b *Post hoc* analysis of 1-way ANOVA or Kruskal Wallis H-test (K-W) among all years adjusted for multiple comparisons.

^c Years that do not share a letter are significantly different.

Table E.9: Phytoplankton Monitoring Data (Chlorophyll-a and Phaeophytin-a Concentrations) Collected at Reference Lake 3 (REF-03), Mary River Project CREMP, 2024

Analyte		Chlorophyll-a (µg/L)						Phaeophytin-a (µg/L)					
Station		REF-03-01	REF-03-02	REF-03-03	Average	Standard Deviation	Standard Error	REF-03-01	REF-03-02	REF-03-03	Average	Standard Deviation	Standard Error
Sample Collection Date	Summer	15-Aug-24			-	-	-	15-Aug-24			-	-	-
	Fall	10-Sep-24			-	-	-	10-Sep-24			-	-	-
Summer	Surface	0.865	0.875	0.820	0.853	0.0293	0.0169	0.775	0.810	0.745	0.777	0.0325	0.0188
	Bottom	0.995	0.805	0.880	0.893	0.0957	0.0553	0.865	0.725	0.725	0.772	0.0808	0.0467
	Average	0.930	0.840	0.850	0.873	0.0493	0.0285	0.820	0.768	0.735	0.774	0.0429	0.0248
Fall	Surface	0.973	1.00	0.979	0.984	0.0142	0.00819	0.760	0.820	0.850	0.810	0.0458	0.0265
	Bottom	0.909	1.01	1.04	0.986	0.0686	0.0396	0.860	0.890	0.830	0.860	0.0300	0.0173
	Average	0.941	1.00	1.01	0.985	0.0383	0.0221	0.810	0.855	0.840	0.835	0.0229	0.0132

Note: '-' indicates value not applicable.

Table E.10: Phytoplankton Monitoring Data (Chlorophyll-a and Phaeophytin-a Concentrations) Collected at Sheardown Lake Northwest (NW; DL0-01), Mary River Project CREMP, 2024

Analyte		Chlorophyll-a (µg/L)									Analyte		Phaeophytin-a (µg/L)								
Station		DD-HAB 9-STN1	DL0-01-5	DL0-01-1	DL0-01-4	DL0-01-2	DL0-01-7	Average	Standard Deviation	Standard Error	Station		DD-HAB 9-STN1	DL0-01-5	DL0-01-1	DL0-01-4	DL0-01-2	DL0-01-7	Average	Standard Deviation	Standard Error
Sample Collection Date	Winter	15-Apr-24	15-Apr-24	15-Apr-24	15-Apr-24	15-Apr-24	16-Apr-24	-	-	-	Sample Collection Date	Winter	15-Apr-24	15-Apr-24	15-Apr-24	15-Apr-24	15-Apr-24	16-Apr-24	-	-	-
	Summer	4-Aug-24	3-Aug-24	3-Aug-24	3-Aug-24	3-Aug-24	4-Aug-24	-	-	-		Summer	4-Aug-24	3-Aug-24	3-Aug-24	3-Aug-24	3-Aug-24	4-Aug-24	-	-	-
	Fall	6-Sep-24	5-Sep-24	6-Sep-24	5-Sep-24	6-Sep-24	5-Sep-24	-	-	-		Fall	6-Sep-24	5-Sep-24	6-Sep-24	5-Sep-24	6-Sep-24	5-Sep-24	-	-	-
Winter	Surface	0.540	0.288	0.565	0.860	0.362	0.580	0.532	0.200	0.0815	Winter	Surface	0.345	0.205	0.375	0.500	0.305	0.420	0.358	0.101	0.0411
	Bottom	0.498	0.116	0.246	0.865	0.232	0.290	0.374	0.271	0.111		Bottom	0.410	0.145	0.135	0.565	0.300	0.370	0.321	0.165	0.0673
	Average	0.519	0.202	0.406	0.862	0.297	0.435	0.454	0.229	0.0934		Average	0.378	0.175	0.255	0.532	0.302	0.395	0.340	0.124	0.0508
Summer	Surface	1.34	1.18	1.21	0.988	1.14	0.967	1.14	0.141	0.0576	Summer	Surface	0.970	1.04	1.07	1.06	1.11	1.07	1.05	0.0468	0.0191
	Bottom	1.16	1.26	1.05	1.02	1.15	1.02	1.11	0.0963	0.0393		Bottom	1.13	0.890	0.780	1.01	0.980	0.960	0.958	0.118	0.0480
	Average	1.25	1.22	1.13	1.00	1.14	0.994	1.12	0.107	0.0436		Average	1.05	0.965	0.925	1.03	1.04	1.01	1.01	0.0502	0.0205
Fall	Surface	1.02	1.26	1.21	1.09	1.31	1.24	1.19	0.111	0.0451	Fall	Surface	0.680	0.680	0.800	0.790	0.690	0.640	0.713	0.0656	0.0268
	Bottom	1.24	1.17	1.32	1.17	1.29	1.16	1.23	0.0689	0.0281		Bottom	1.03	0.780	0.760	0.870	0.890	0.640	0.828	0.133	0.0544
	Average	1.13	1.22	1.26	1.13	1.30	1.20	1.21	0.0693	0.0283		Average	0.855	0.730	0.780	0.830	0.790	0.640	0.771	0.0772	0.0315

Note: '-' indicates value not applicable.

Table E.11: Statistical Comparison of Chlorophyll-a Concentrations at Sheardown Lake Northwest (NW; DL0-01) Among Years of Mine Construction (2014) and Operation (2015 to 2024)

Season	Data Transformation	Statistical Test ^a	Overall Ten-Year Comparison		Pair-wise, <i>post hoc</i> comparisons ^b				
			Significant Difference Among Years?	P-value	Year	Sample Size (n)	Mean	Standard Deviation	Pairwise Comparison ^c
Winter	rank	K-W	YES	0.001	2014	6	2.55	1.34	A
					2015	6	1.11	0.0526	A
					2016	6	0.875	0.315	ABC
					2017	6	0.790	0.268	ABC
					2018	6	1.03	0.495	AB
					2019	6	0.463	0.235	CD
					2020	6	0.495	0.269	BCD
					2021	6	0.310	0.245	D
					2022	6	1.29	0.0640	A
					2023	6	0.300	0.0958	D
					2024	6	0.454	0.229	CD
Summer	rank	K-W	YES	0.001	2014	6	2.42	0.821	AB
					2015	6	1.50	0.228	ABCD
					2016	6	2.13	0.387	A
					2017	6	1.21	0.133	CDE
					2018	6	2.01	0.185	AB
					2019	6	1.81	0.246	AB
					2020	6	1.57	0.456	ABCD
					2021	6	1.50	0.197	BCD
					2022	6	0.959	0.141	E
					2023	6	1.71	0.618	ABC
					2024	6	1.12	0.107	DE
Fall	rank	K-W	YES	0.001	2014	6	0.800	0.379	D
					2015	6	1.61	0.441	BC
					2016	6	1.53	0.183	BC
					2017	6	1.55	0.225	BC
					2018	6	1.75	0.136	AB
					2019	6	1.20	0.306	CD
					2020	6	1.79	0.129	AB
					2021	6	1.97	0.159	A
					2022	6	1.61	0.0740	ABC
					2023	6	0.984	0.193	D
					2024	6	1.21	0.0693	CD
Annual	rank	K-W	YES	0.005	2014	18	1.93	1.20	A
					2015	18	1.41	0.350	AB
					2016	18	1.51	0.601	AB
					2017	18	1.19	0.380	BCD
					2018	18	1.60	0.519	A
					2019	18	1.16	0.619	BCD
					2020	18	1.28	0.653	ABC
					2021	18	1.26	0.745	ABC
					2022	18	1.29	0.288	ABCD
					2023	18	0.997	0.689	CD
					2024	18	0.928	0.375	D

 Indicates a statistically significant difference for respective comparison (p-value ≤ 0.05).

^a Statistical tests include Kruskal Wallis H-test (K-W) for differences among years.

^b *Post hoc* analysis of Kruskal Wallis H-test (K-W) among all years adjusted for multiple comparisons.

^c Years that do not share a letter are significantly different.

Table E.12: Phytoplankton Monitoring Data (Chlorophyll-a and Phaeophytin-a Concentrations) Collected at Sheardown Lake Southeast (SE; DL0-02), Mary River Project CREMP, 2024

Analyte		Chlorophyll-a (µg/L)								Analyte		Phaeophytin-a (µg/L)							
Station		DL0-02-06	DL0-02-07	DL0-02-4	DL0-02-8	DL0-02-03	Average	Standard Deviation	Standard Error	Station		DL0-02-06	DL0-02-07	DL0-02-4	DL0-02-8	DL0-02-03	Average	Standard Deviation	Standard Error
Sample Collection Date	Winter	16-Apr-24	16-Apr-24	16-Apr-24	16-Apr-24	16-Apr-24	-	-	-	Sample Collection Date	Winter	16-Apr-24	16-Apr-24	16-Apr-24	16-Apr-24	16-Apr-24	-	-	-
	Summer	4-Aug-24	5-Aug-24	5-Aug-24	5-Aug-24	5-Aug-24	-	-	-		Summer	4-Aug-24	5-Aug-24	5-Aug-24	5-Aug-24	5-Aug-24	-	-	-
	Fall	4-Sep-24	4-Sep-24	5-Sep-24	5-Sep-24	4-Sep-24	-	-	-		Fall	4-Sep-24	4-Sep-24	5-Sep-24	5-Sep-24	4-Sep-24	-	-	-
Winter	Surface	0.740	0.880	1.52	1.40	1.38	1.18	0.349	0.156	Winter	Surface	0.535	0.670	1.18	0.865	0.770	0.804	0.243	0.109
	Bottom	0.640	0.835	1.16	0.580	0.444	0.732	0.278	0.124		Bottom	0.515	0.790	0.995	0.595	0.515	0.682	0.208	0.0930
	Average	0.690	0.858	1.34	0.990	0.912	0.958	0.240	0.107		Average	0.525	0.730	1.09	0.730	0.642	0.743	0.210	0.0940
Summer	Surface	1.33	1.42	1.67	1.25	1.14	1.36	0.201	0.0897	Summer	Surface	1.01	0.920	0.810	1.30	1.25	1.06	0.211	0.0944
	Bottom	1.28	1.58	1.31	0.862	1.03	1.21	0.276	0.124		Bottom	1.14	1.42	1.25	1.05	1.15	1.20	0.141	0.0630
	Average	1.30	1.50	1.49	1.06	1.08	1.29	0.213	0.0951		Average	1.08	1.17	1.03	1.18	1.20	1.13	0.0734	0.0328
Fall	Surface	1.41	1.33	1.27	1.39	1.46	1.37	0.0736	0.0329	Fall	Surface	0.920	0.990	0.900	0.730	1.02	0.912	0.113	0.0505
	Bottom	1.42	1.41	1.42	1.31	1.49	1.41	0.0644	0.0288		Bottom	0.900	0.960	0.770	0.720	0.950	0.860	0.109	0.0487
	Average	1.42	1.37	1.34	1.35	1.48	1.39	0.0545	0.0244		Average	0.910	0.975	0.835	0.725	0.985	0.886	0.108	0.0484

Note: '-' indicates value not applicable.

Table E.13: Statistical Comparison of Chlorophyll-a Concentrations at Sheardown Lake Southeast (SE; DL0-02) Among Years of Mine Construction (2014) and Operation (2015 to 2024)

Season	Data Transformation	Statistical Test ^a	Overall Ten-Year Comparison		Pair-wise, <i>post hoc</i> comparisons ^b				
			Significant Difference Among Years?	P-value	Year	Sample Size (n)	Mean	Standard Deviation	Pairwise Comparison ^c
Winter	rank	K-W	YES	0.001	2014	5	2.67	1.01	A
					2015	5	1.57	0.525	ABC
					2016	5	1.90	0.648	AB
					2017	5	1.36	0.415	BCD
					2018	5	2.19	0.879	AB
					2019	5	1.91	0.425	AB
					2020	5	0.859	0.162	CD
					2021	5	0.955	0.548	CD
					2022	5	1.95	0.287	AB
					2023	5	0.554	0.455	D
					2024	5	0.958	0.240	CD
Summer	rank	K-W	YES	0.001	2014	5	0.200	0	E
					2015	5	0.894	0.102	DE
					2016	5	1.51	0.210	BCD
					2017	5	1.37	0.156	CDE
					2018	5	2.12	0.0721	A
					2019	5	2.16	0.242	A
					2020	5	3.21	2.67	A
					2021	5	1.90	0.0835	ABC
					2022	5	1.36	0.361	CDE
					2023	5	2.20	0.431	AB
					2024	5	1.29	0.213	CDE
Fall	rank	K-W	YES	0.001	2014	5	1.54	1.63	DE
					2015	5	0.990	0.106	E
					2016	5	2.87	0.743	A
					2017	5	1.50	0.0757	BCD
					2018	5	2.03	0.115	AB
					2019	5	2.00	0.446	ABC
					2020	5	1.35	0.0767	DE
					2021	5	2.06	0.0735	AB
					2022	5	1.27	0.0293	DE
					2023	5	1.43	0.0525	BCD
					2024	5	1.39	0.0545	CDE
Annual	rank	K-W	YES	0.001	2014	15	1.47	1.47	BC
					2015	15	1.15	0.425	C
					2016	15	2.10	0.800	A
					2017	15	1.41	0.249	BC
					2018	15	2.11	0.480	A
					2019	15	2.03	0.370	A
					2020	15	1.81	1.77	BC
					2021	15	1.64	0.586	AB
					2022	15	1.53	0.399	BC
					2023	15	1.40	0.773	BC
					2024	15	1.21	0.258	C

Indicates a statistically significant difference for respective comparison (p-value ≤ 0.05).

^a Statistical tests include Kruskal Wallis H-test (K-W) for differences among years.

^b *Post hoc* analysis of Kruskal Wallis H-test (K-W) among all years adjusted for multiple comparisons.

^c Years that do not share a letter are significantly different.

Table E.14: Phytoplankton Monitoring Data (Chlorophyll-a and Phaeophytin-a Concentrations) Collected at the Mary River (G0, F0, E0, C0), Mary River Project CREMP, 2024

Station		Upstream Reference			Upstream Mine-Exposed		Tributary-F	Downstream Mine-Exposed						
		G0-09-A	G0-09	G0-09-B	G0-03	G0-01	F0-01	E0-10	E0-03	E0-21	E0-20	C0-10	C0-05	C0-01
Sample Collection Date	Spring	7-Jul-24	7-Jul-24	30-Jun-24	30-Jun-24	7-Jul-24	7-Jul-24	6-Jul-24	30-Jun-24	30-Jun-24	29-Jun-24	29-Jun-24	29-Jun-24	29-Jun-24
	Summer	30-Jul-24	30-Jul-24	30-Jul-24	30-Jul-24	30-Jul-24	30-Jul-24	30-Jul-24	30-Jul-24	30-Jul-24	30-Jul-24	30-Jul-24	30-Jul-24	30-Jul-24
	Fall	30-Aug-24	30-Aug-24	30-Aug-24	30-Aug-24	30-Aug-24	30-Aug-24	30-Aug-24	31-Aug-24	31-Aug-24	30-Aug-24	30-Aug-24	30-Aug-24	30-Aug-24
Chlorophyll-a (µg/L)	Spring	0.170	0.106	0.274	0.138	0.116	0.0750	0.144	0.128	0.152	0.188	0.148	0.190	0.182
	Summer	0.102	0.0860	0.0800	0.0780	0.150	0.0780	0.0740	0.0720	0.101	0.121	0.0830	0.0880	0.0980
	Fall	0.292	0.153	0.166	0.146	0.155	0.194	0.164	0.185	0.169	0.206	0.208	0.277	0.194
	Average	0.188	0.115	0.173	0.121	0.140	0.116	0.127	0.128	0.141	0.172	0.146	0.185	0.158
	Standard Deviation	0.0963	0.0344	0.0972	0.0372	0.0212	0.0679	0.0473	0.0565	0.0354	0.0448	0.0625	0.0946	0.0523
	Standard Error	0.0556	0.0199	0.0561	0.0215	0.0123	0.0392	0.0273	0.0326	0.0204	0.0259	0.0361	0.0546	0.0302
Phaeophytin-a (µg/L)	Spring	0.145	0.145	0.190	0.110	0.115	<0.1	0.100	0.105	0.125	0.135	0.140	0.172	0.150
	Summer	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	0.230	<0.2	<0.2
	Fall	0.340	0.280	0.370	0.300	0.300	0.280	0.310	0.370	0.340	0.330	0.420	0.360	0.200
	Average	0.210	0.190	0.250	0.173	0.177	0.160	0.170	0.193	0.197	0.200	0.263	0.235	0.167
	Standard Deviation	0.130	0.0900	0.120	0.127	0.123	-	0.140	0.177	0.143	0.130	0.143	0.125	0.0333
	Standard Error	0.0751	0.0520	0.0693	0.0731	0.0712	-	0.0808	0.102	0.0828	0.0751	0.0825	0.0724	0.0192

Note: "-" = value not calculable.

Table E.15: Phytoplankton Monitoring Data (Chlorophyll-a and Phaeophytin-a Concentrations) Collected at Mary Lake North (BL0-01) and South (BL0), Mary River Project CREMP, 2024


Analyte		Chlorophyll-a (µg/L)												
Station		Mary Lake North			Mary Lake South							Average	Standard Deviation	Standard Error
		BL0-01-A	BL0-01	BL0-01-B	BL0-05-A	BL0-05	BL0-05-B	BL0-03	BL0-04	BL0-09	BL0-06			
Sample Collection Date	Winter	10-Apr-24	10-Apr-24	10-Apr-24	11-Apr-24	11-Apr-24	11-Apr-24	12-Apr-24	12-Apr-24	12-Apr-24	11-Apr-24	-	-	-
	Summer	11-Aug-24	11-Aug-24	11-Aug-24	7-Aug-24	7-Aug-24	7-Aug-24	8-Aug-24	8-Aug-24	8-Aug-24	8-Aug-24	-	-	-
	Fall	11-Sep-24	11-Sep-24	11-Sep-24	16-Sep-24	15-Sep-24	16-Sep-24	15-Sep-24	15-Sep-24	15-Sep-24	15-Sep-24	-	-	-
Winter	Surface	0.108	0.232	0.114	0.202	0.170	0.935	0.186	0.186	0.128	0.214	0.248	0.245	0.0775
	Bottom	0.0200	0.115	0.154	0.0290	0.0270	0.520	0.0300	0.0200	0.0340	0.0730	0.102	0.154	0.0486
	Average	0.0640	0.174	0.134	0.116	0.0985	0.728	0.108	0.103	0.0810	0.144	0.175	0.197	0.0622
Summer	Surface	0.630	0.755	0.751	0.645	0.660	0.730	0.815	0.720	0.640	0.690	0.704	0.0608	0.0192
	Bottom	0.387	0.670	0.695	0.710	0.755	0.740	0.830	0.801	0.705	0.692	0.698	0.121	0.0381
	Average	0.508	0.712	0.723	0.678	0.708	0.735	0.822	0.760	0.672	0.691	0.701	0.0807	0.0255
Fall	Surface	0.432	0.467	0.415	0.970	1.14	1.09	1.11	1.06	1.06	1.12	0.886	0.313	0.0990
	Bottom	0.438	0.444	0.396	1.01	0.980	1.07	1.19	1.07	1.09	1.15	0.884	0.322	0.102
	Average	0.435	0.456	0.406	0.990	1.06	1.08	1.15	1.06	1.08	1.14	0.885	0.316	0.0999

Analyte		Phaeophytin-a (µg/L)												
Station		Mary Lake North			Mary Lake South							Average	Standard Deviation	Standard Error
		BL0-01-A	BL0-01	BL0-01-B	BL0-05-A	BL0-05	BL0-05-B	BL0-03	BL0-04	BL0-09	BL0-06			
Sample Collection Date	Winter	10-Apr-24	10-Apr-24	10-Apr-24	11-Apr-24	11-Apr-24	11-Apr-24	12-Apr-24	12-Apr-24	12-Apr-24	11-Apr-24	-	-	-
	Summer	11-Aug-24	11-Aug-24	11-Aug-24	7-Aug-24	7-Aug-24	7-Aug-24	8-Aug-24	8-Aug-24	8-Aug-24	8-Aug-24	-	-	-
	Fall	11-Sep-24	11-Sep-24	11-Sep-24	16-Sep-24	15-Sep-24	16-Sep-24	15-Sep-24	15-Sep-24	15-Sep-24	15-Sep-24	-	-	-
Winter	Surface	0.105	0.260	0.115	0.110	0.190	0.810	0.200	0.160	0.110	0.190	0.225	0.212	0.0670
	Bottom	<0.1	<0.1	0.120	<0.1	<0.1	0.630	<0.1	<0.1	<0.1	<0.1	0.155	0.216	0.0684
	Average	0.102	0.180	0.118	0.105	0.145	0.720	0.150	0.130	0.105	0.145	0.190	0.188	0.0594
Summer	Surface	0.340	0.395	0.373	0.780	0.800	0.790	0.910	0.870	0.790	0.625	0.667	0.219	0.0691
	Bottom	0.265	0.350	0.380	0.750	0.830	0.830	0.855	0.786	0.700	0.831	0.658	0.231	0.0731
	Average	0.302	0.372	0.376	0.765	0.815	0.810	0.882	0.828	0.745	0.728	0.662	0.221	0.0698
Fall	Surface	0.430	0.480	0.460	1.75	1.64	1.91	1.65	1.70	1.58	1.79	1.34	0.616	0.195
	Bottom	0.450	0.440	0.430	1.57	1.40	1.75	1.81	1.51	1.71	1.79	1.29	0.598	0.189
	Average	0.440	0.460	0.445	1.66	1.52	1.83	1.73	1.60	1.64	1.79	1.31	0.603	0.191

Note: '-' indicates value not applicable.

Table E.16: Statistical Comparison of Chlorophyll-a Concentrations at Mary Lake North (BL0-01) Among Years of Mine Construction (2014) and Operation (2015 to 2024)

Season	Data Transformation	Statistical Test ^a	Overall Ten-Year Comparison		Pair-wise, <i>post hoc</i> comparisons ^b				
			Significant Difference Among Years?	P-value	Year	Sample Size (n)	Mean	Standard Deviation	Pairwise Comparison ^c
Winter	rank	K-W	YES	0.014	2014	3	0.583	0.664	AB
					2015	3	0.632	0.648	A
					2016	2	0.194	0.0412	ABC
					2017	3	0.178	0.0553	ABC
					2018	3	0.197	0.0425	ABC
					2019	3	0.498	0.422	A
					2020	3	0.235	0.0673	AB
					2021	3	0.110	0.00500	C
					2022	3	0.408	0.147	A
					2023	3	0.143	0.0294	BC
					2024	3	0.124	0.0555	BC
Summer	rank	K-W	YES	0.026	2014	3	0.917	0.725	ABC
					2015	3	0.827	0.246	ABC
					2016	3	1.16	0.0950	AB
					2017	3	0.267	0.0161	D
					2018	3	0.500	0.180	CD
					2019	3	0.737	0.118	ABC
					2020	3	1.67	0.475	A
					2021	3	0.688	0.0535	ABCD
					2022	3	0.662	0.219	ABCD
					2023	3	0.618	0.0373	CD
					2024	3	0.648	0.121	BCD
Fall	none	ANOVA	YES	0.001	2014	3	0.517	0.252	CD
					2015	3	0.620	0.0966	BCD
					2016	3	0.997	0.0909	A
					2017	3	0.900	0.128	AB
					2018	3	0.860	0.0661	AB
					2019	3	0.850	0.0757	AB
					2020	3	1.01	0.0275	A
					2021	3	0.832	0.0597	ABC
					2022	3	1.04	0.128	A
					2023	3	0.599	0.0479	BCD
					2024	3	0.432	0.0251	D
Annual	none	ANOVA	NO	0.059	2014	9	0.672	0.540	A
					2015	9	0.693	0.364	A
					2016	8	0.857	0.422	A
					2017	9	0.448	0.348	A
					2018	9	0.519	0.304	A
					2019	9	0.695	0.271	A
					2020	9	0.969	0.665	A
					2021	9	0.543	0.333	A
					2022	9	0.705	0.314	A
					2023	9	0.453	0.235	A
					2024	9	0.401	0.238	A

 Indicates a statistically significant difference for respective comparison (p-value ≤ 0.05).

^a Statistical tests include Analysis of Variance (ANOVA) or Kruskal Wallis H-test (K-W) for differences among years.

^b *Post hoc* analysis of 1-way ANOVA or Kruskal Wallis H-test (K-W) among all years adjusted for multiple comparisons.

^c Years that do not share a letter are significantly different.

Table E.17: Statistical Comparison of Chlorophyll-a Concentrations at Mary Lake South (BL0) Among Years of Mine Construction (2014) and Operation (2015 to 2024)

Season	Data Transformation	Statistical Test ^a	Overall Ten-Year Comparison		Pair-wise, <i>post hoc</i> comparisons ^b				
			Significant Difference Among Years?	P-value	Year	Sample Size (n)	Mean	Standard Deviation	Pairwise Comparison ^c
Winter	rank	K-W	YES	0.001	2014	7	0.879	1.46	ABCD
					2015	7	0.651	0.345	A
					2016	7	0.306	0.197	BCD
					2017	7	0.351	0.209	ABCD
					2018	7	0.496	0.339	ABC
					2019	7	0.480	0.170	AB
					2020	7	0.592	0.242	A
					2021	7	0.249	0.0971	CD
					2022	7	0.577	0.287	A
					2023	7	0.247	0.0485	CD
					2024	7	0.197	0.235	D
Summer	rank	K-W	YES	0.001	2014	7	0.864	0.594	ABCD
					2015	7	0.781	0.107	BC
					2016	7	1.08	0.172	A
					2017	7	0.809	0.0859	BCD
					2018	7	0.848	0.218	ABCD
					2019	7	0.521	0.0254	E
					2020	7	1.02	0.130	AD
					2021	7	0.815	0.118	BCD
					2022	7	0.946	0.143	ABD
					2023	7	0.974	0.379	ABCD
					2024	7	0.724	0.0537	CE
Fall	rank	K-W	YES	0.001	2014	7	0.750	0.294	BCDEF
					2015	7	0.896	0.120	BCD
					2016	7	0.763	0.224	BDEF
					2017	7	0.754	0.0746	DEF
					2018	7	0.901	0.0214	BCD
					2019	7	0.934	0.0449	ABC
					2020	7	0.672	0.1000	EF
					2021	7	0.841	0.142	BCDF
					2022	7	0.955	0.0906	AC
					2023	7	0.624	0.0630	E
					2024	7	1.08	0.0527	A
Annual	rank	K-W	NO	0.216	2014	21	0.831	0.878	A
					2015	21	0.776	0.232	A
					2016	21	0.715	0.375	A
					2017	21	0.638	0.246	A
					2018	21	0.748	0.288	A
					2019	21	0.645	0.231	A
					2020	21	0.761	0.248	A
					2021	21	0.635	0.302	A
					2022	21	0.826	0.257	A
					2023	21	0.615	0.371	A
					2024	21	0.667	0.395	A

Indicates a statistically significant difference for respective comparison (p-value ≤ 0.05).

^a Statistical tests include Kruskal Wallis H-test (K-W) for differences among years.

^b *Post hoc* analysis of Kruskal Wallis H-test (K-W) among all years adjusted for multiple comparisons.

^c Years that do not share a letter are significantly different.