Figure 6-52. Chlorophyll-a (µg/L) in water samples from Baker Lake since 2008.

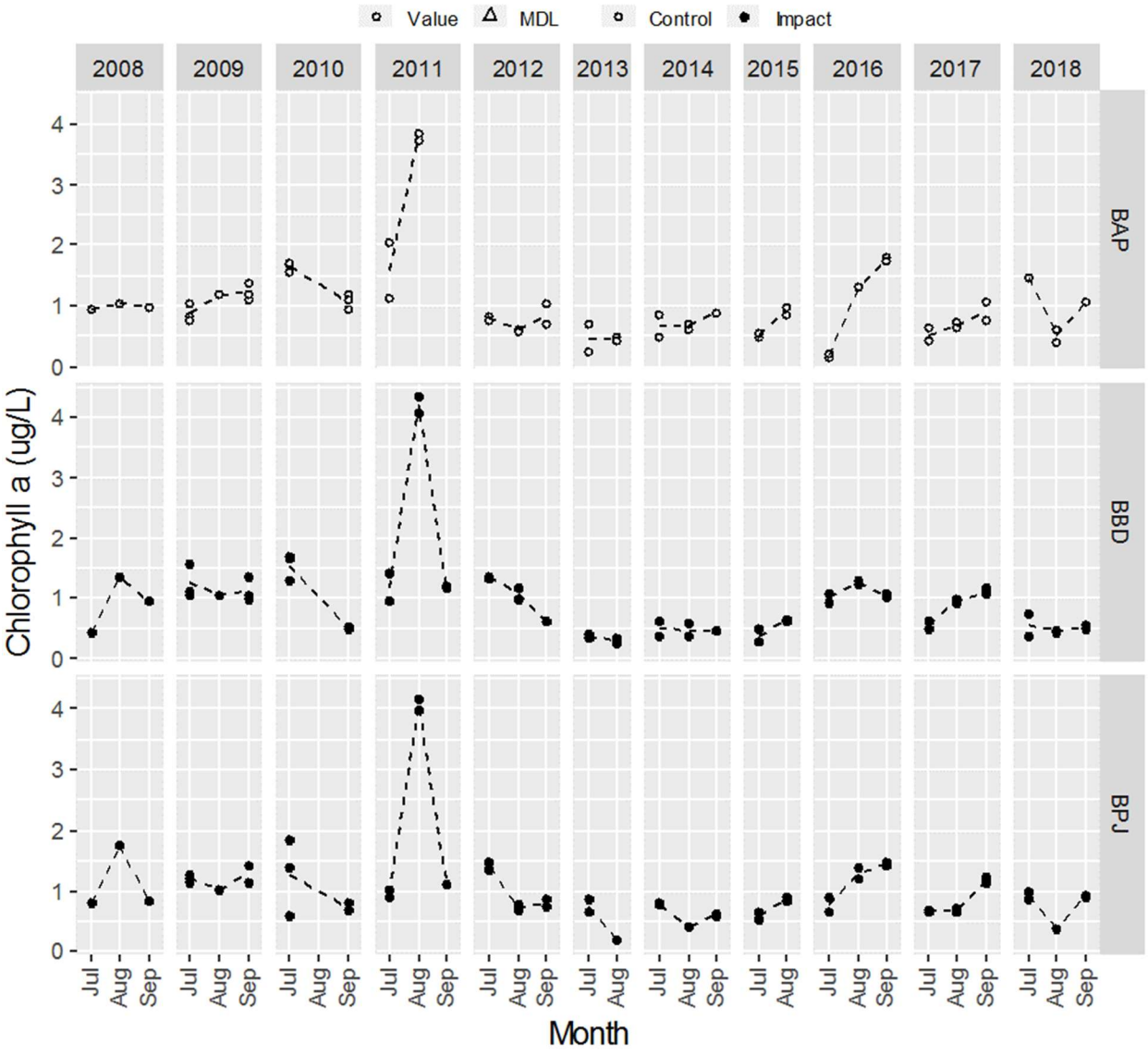


Figure 6-53. Total phytoplankton biomass (mg/m^3) from Baker Lake since 2008.

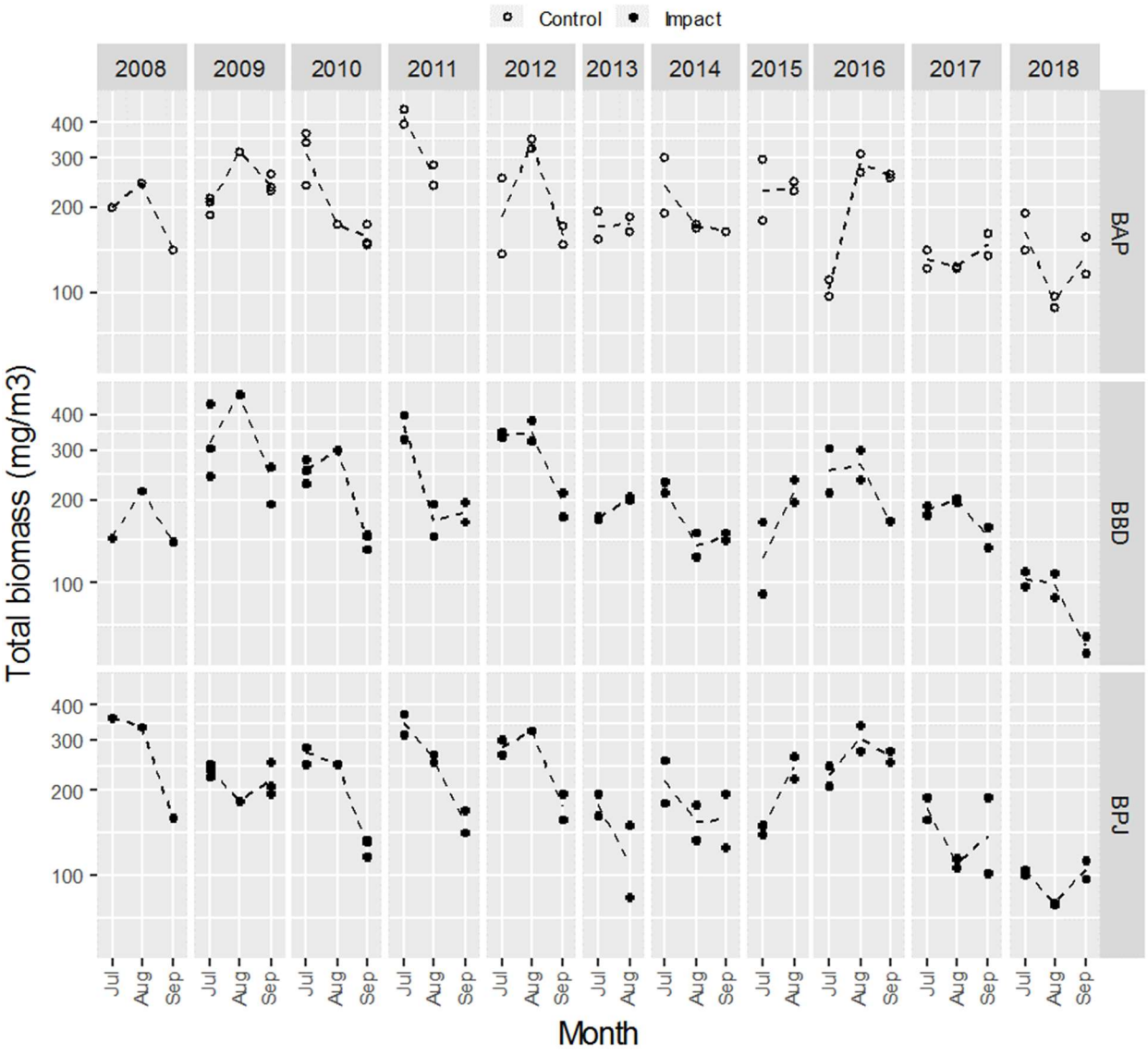


Figure 6-54. Phytoplankton biomass (mg/m^3) by major taxa group from Baker Lake since 2008.

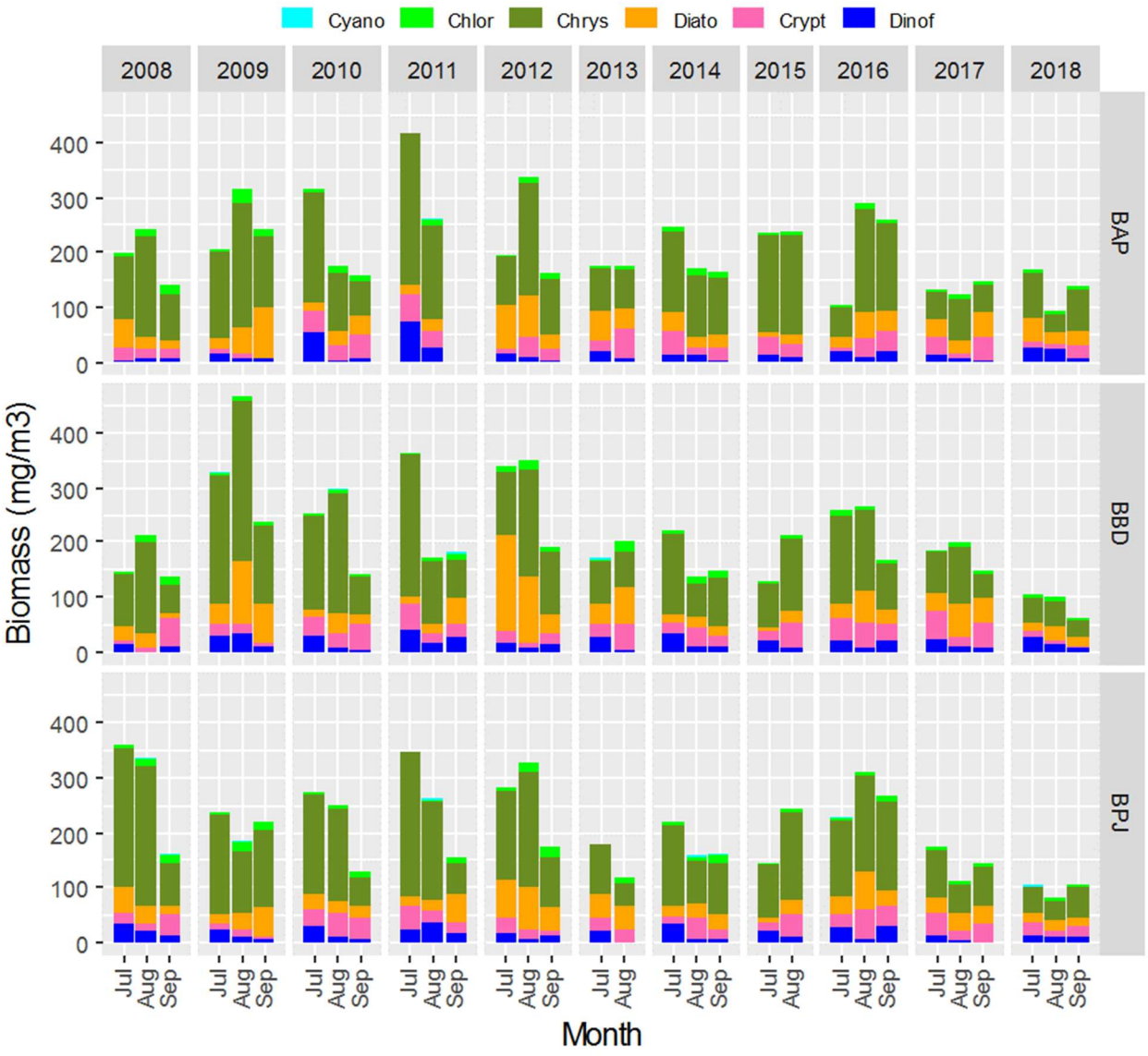


Figure 6-55. Phytoplankton relative biomass by major taxa group from Baker Lake since 2008.

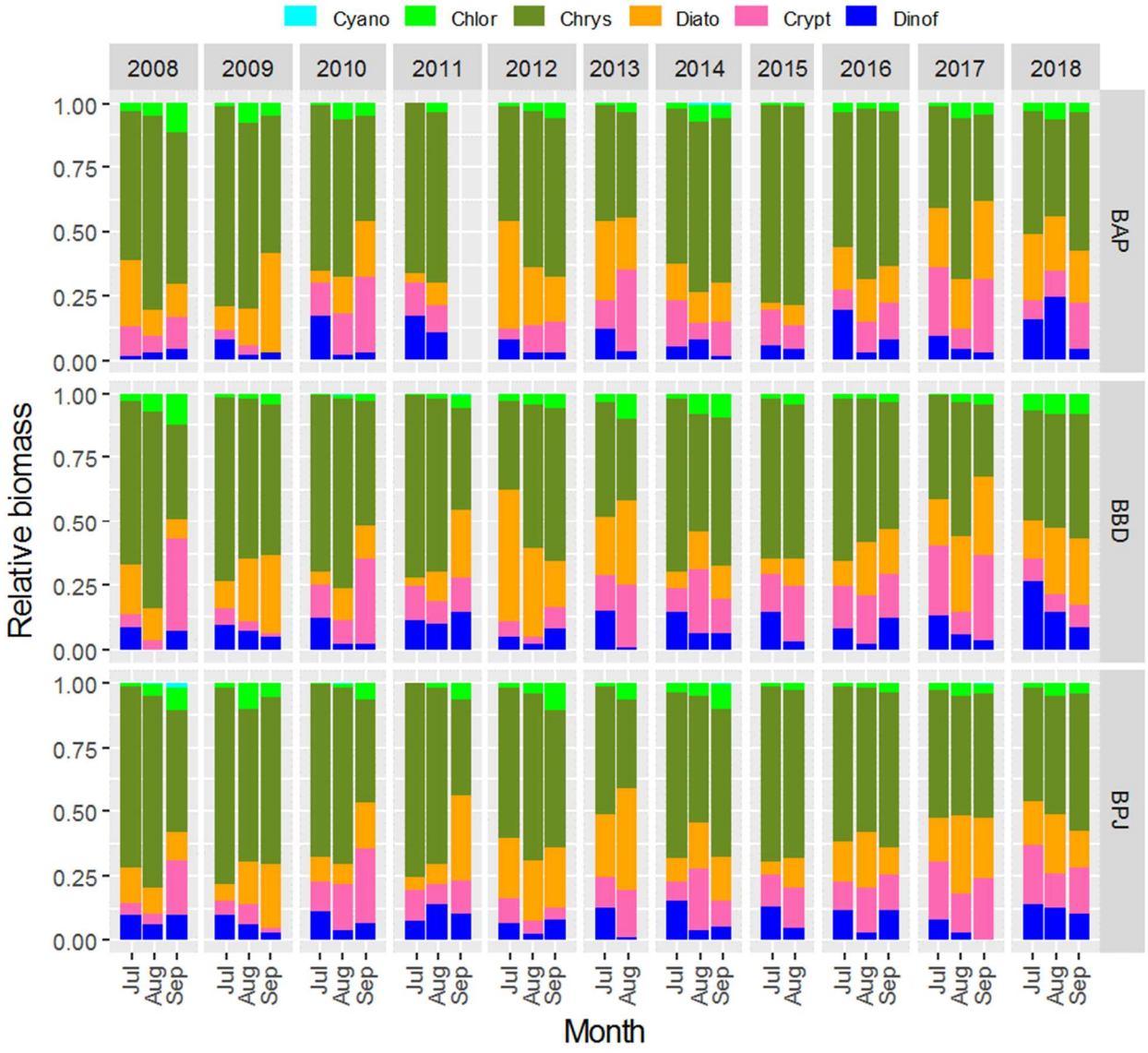
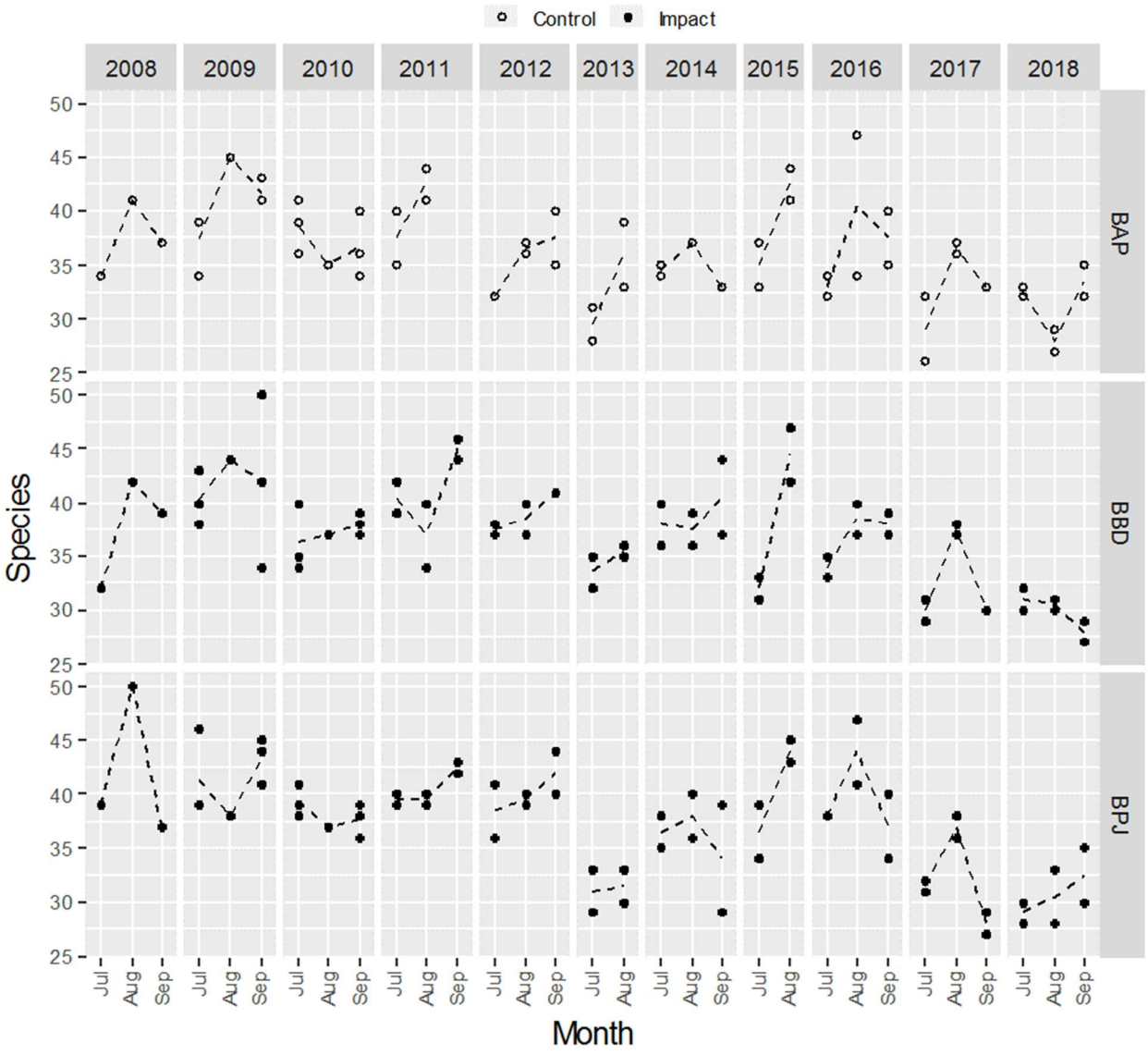


Figure 6-56. Phytoplankton species richness from Baker Lake since 2008.



Sediment Chemistry Tables and Figures

Figure 6-57. Sediment grain size composition in sediment samples from Baker Lake since 2008.

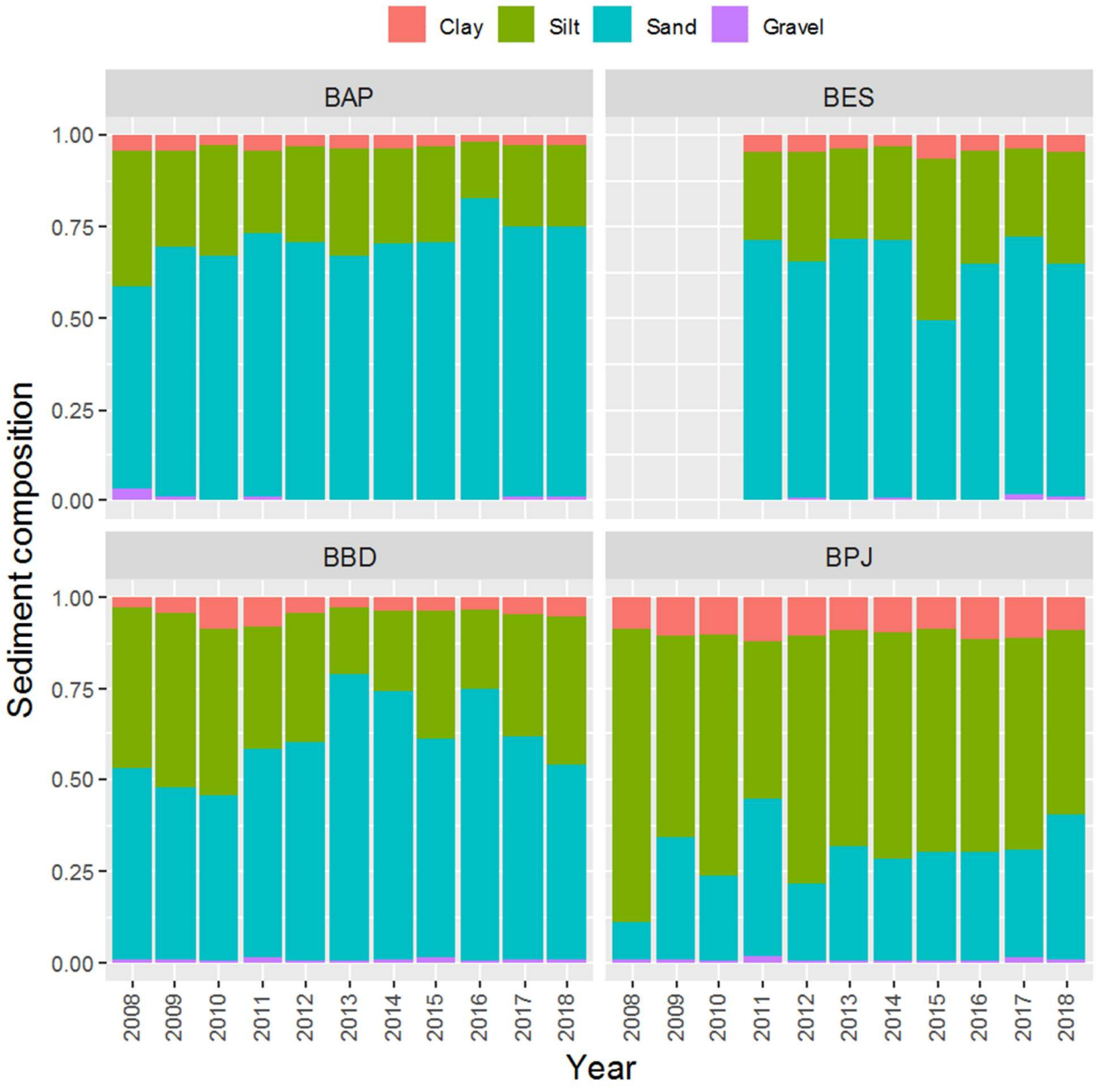


Figure 6-58. Total aluminum (mg/kg) in sediment samples from Baker Lake since 2008.

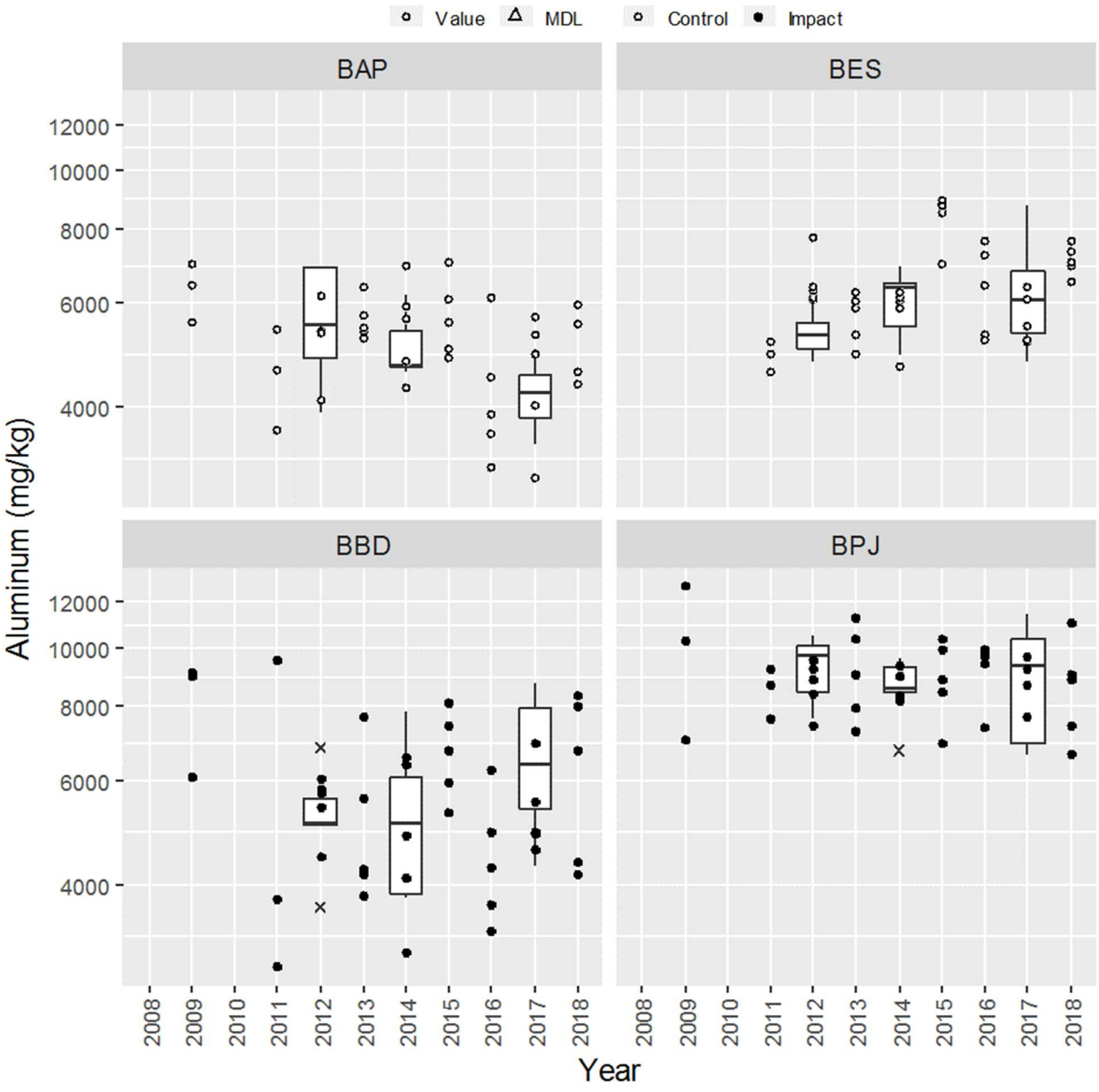


Figure 6-59. Total arsenic (mg/kg) in sediment samples from Baker Lake since 2008.

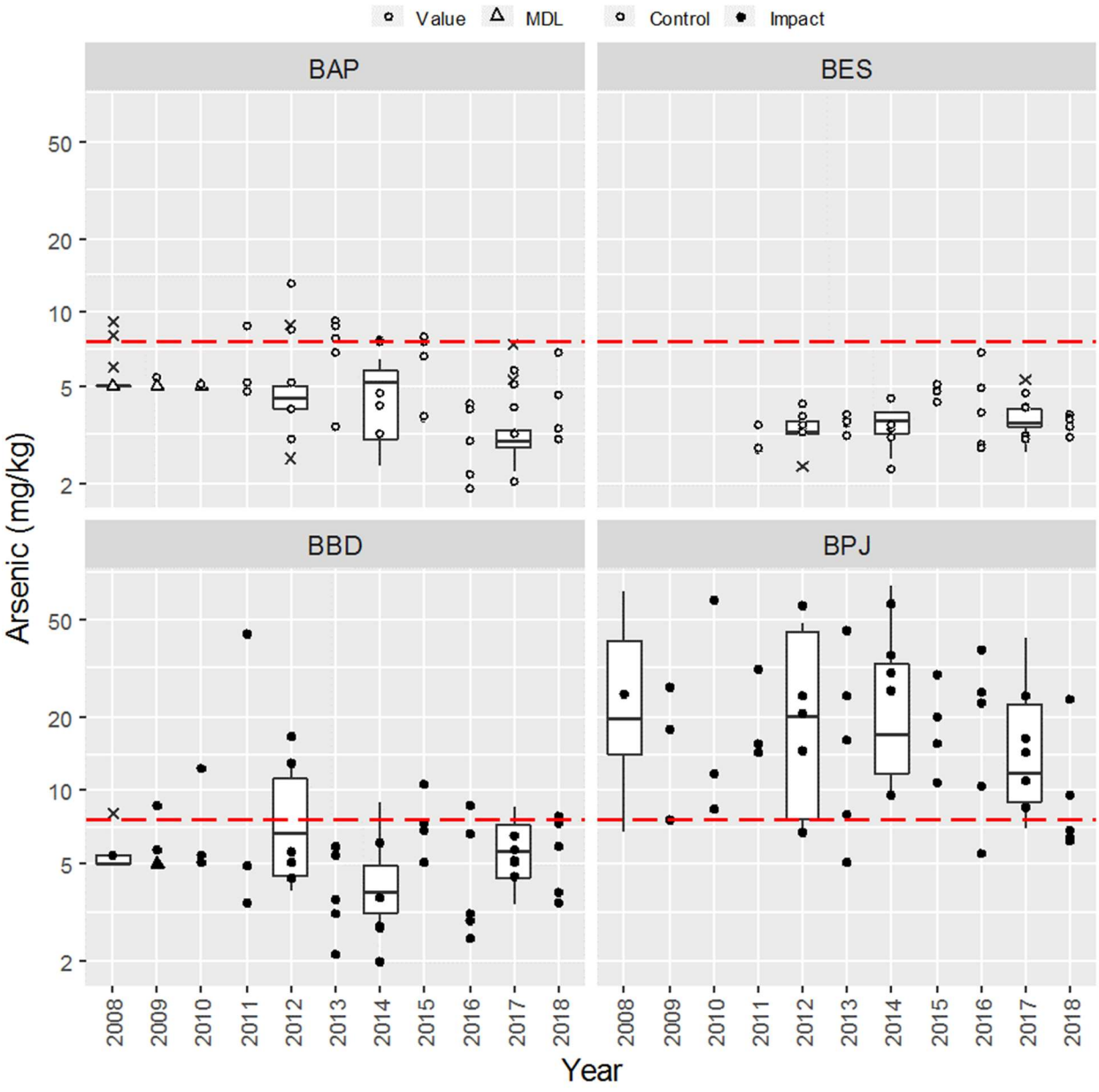


Figure 6-60. Total cadmium (mg/kg) in sediment samples from Baker Lake since 2008.

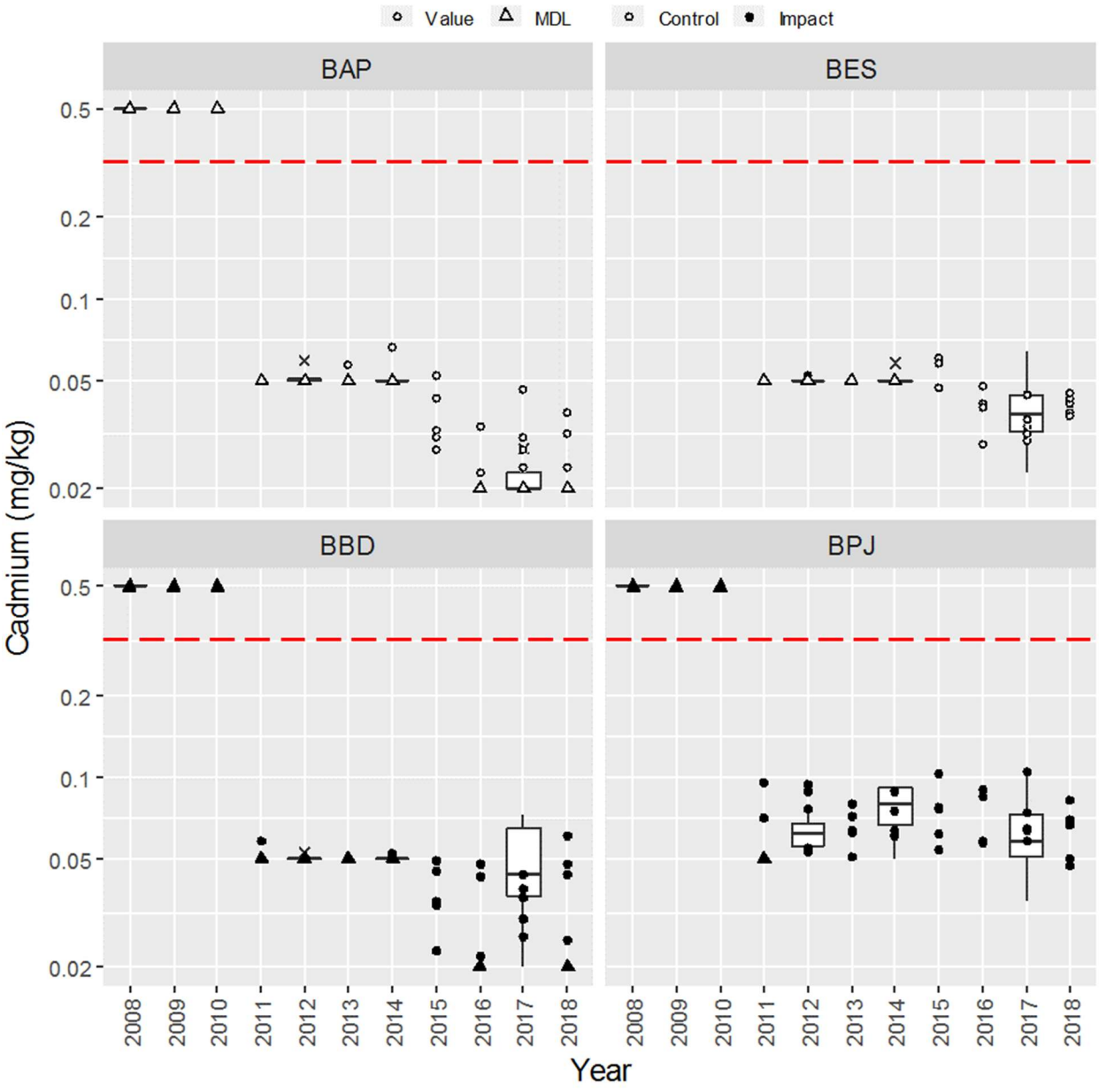


Figure 6-61. Total chromium (mg/kg) in sediment samples from Baker Lake since 2008.

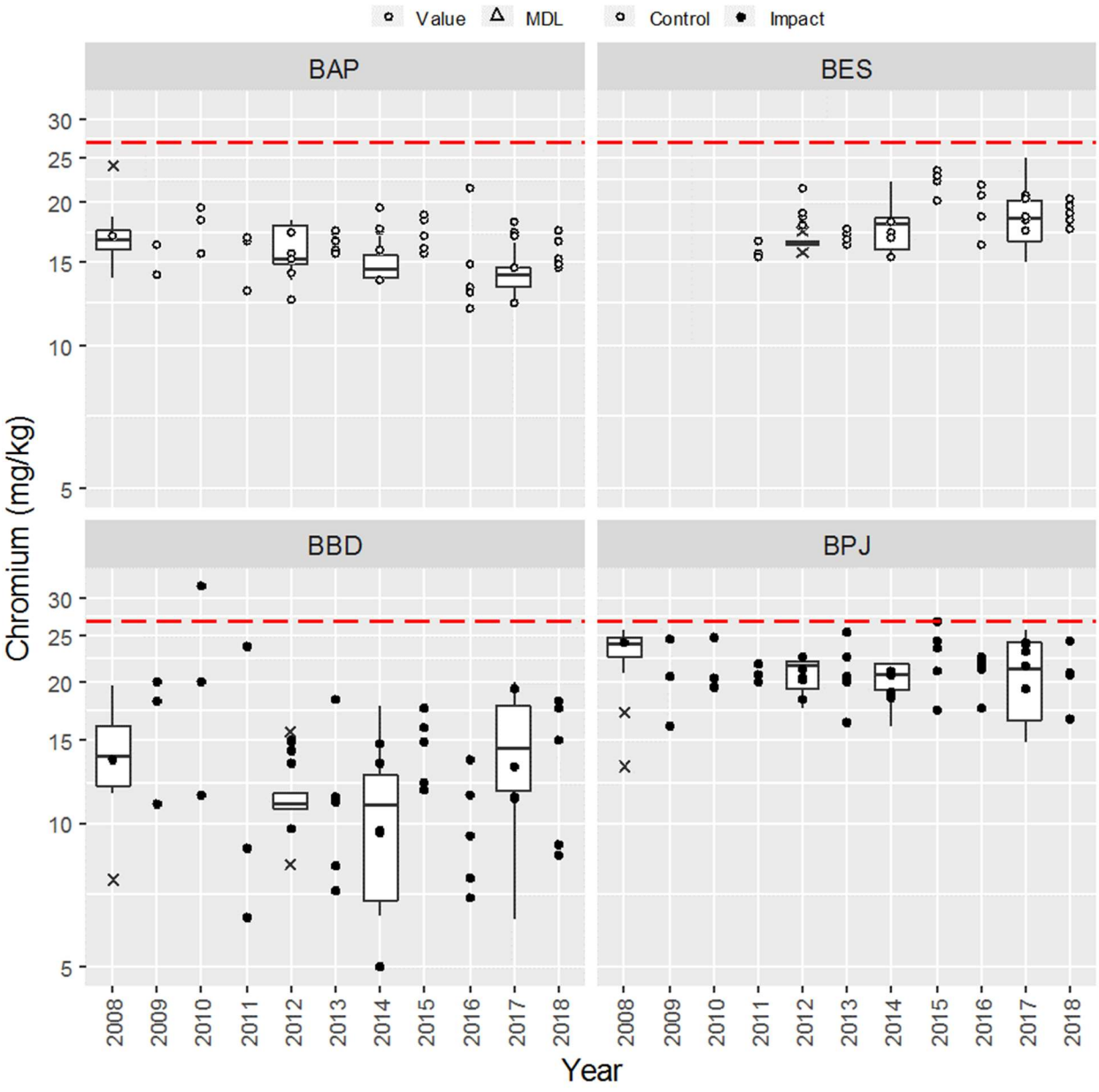


Figure 6-62. Total copper (mg/kg) in sediment samples from Baker Lake since 2008.

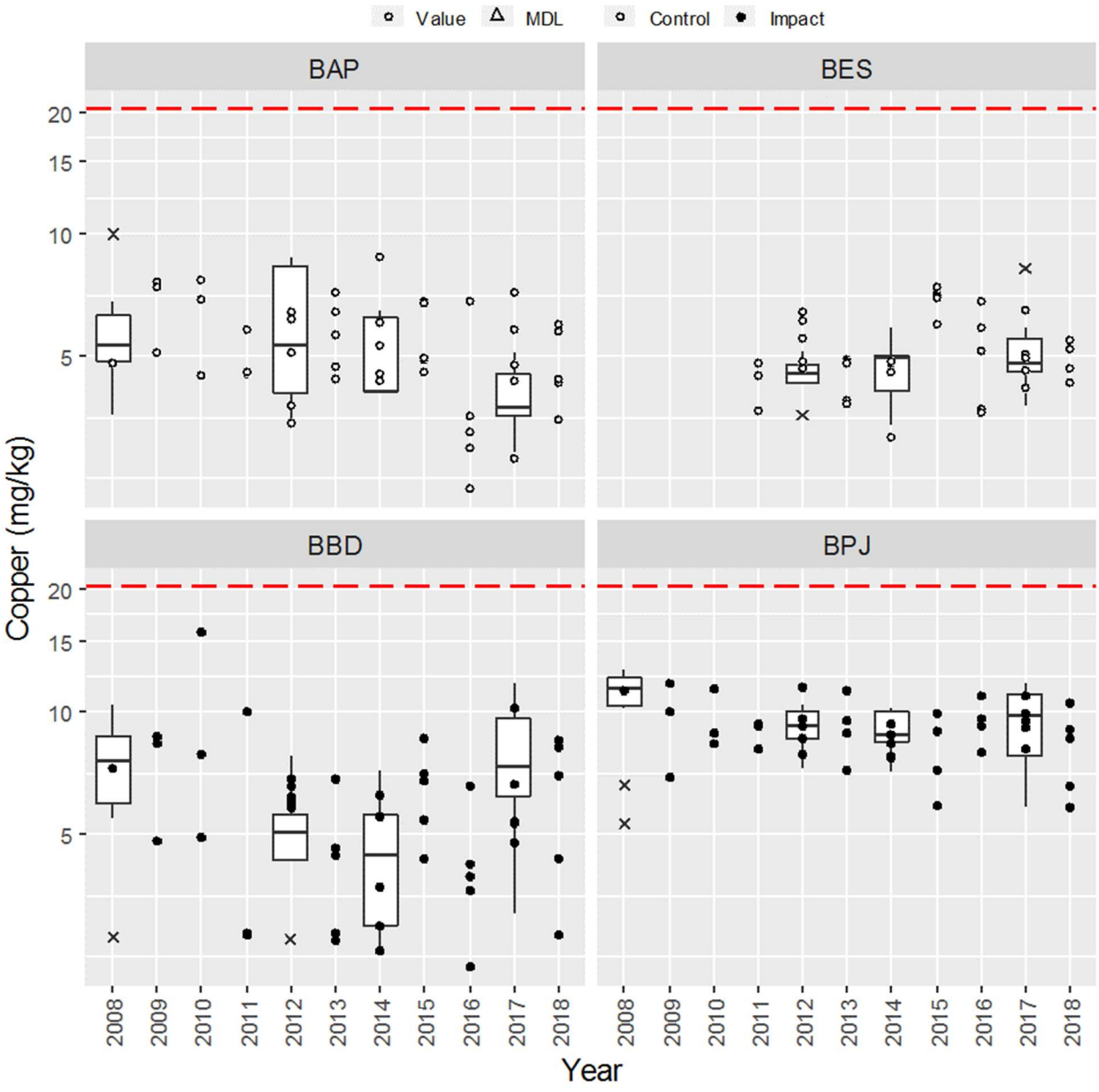


Figure 6-63. Total lead (mg/kg) in sediment samples from Baker Lake since 2008.

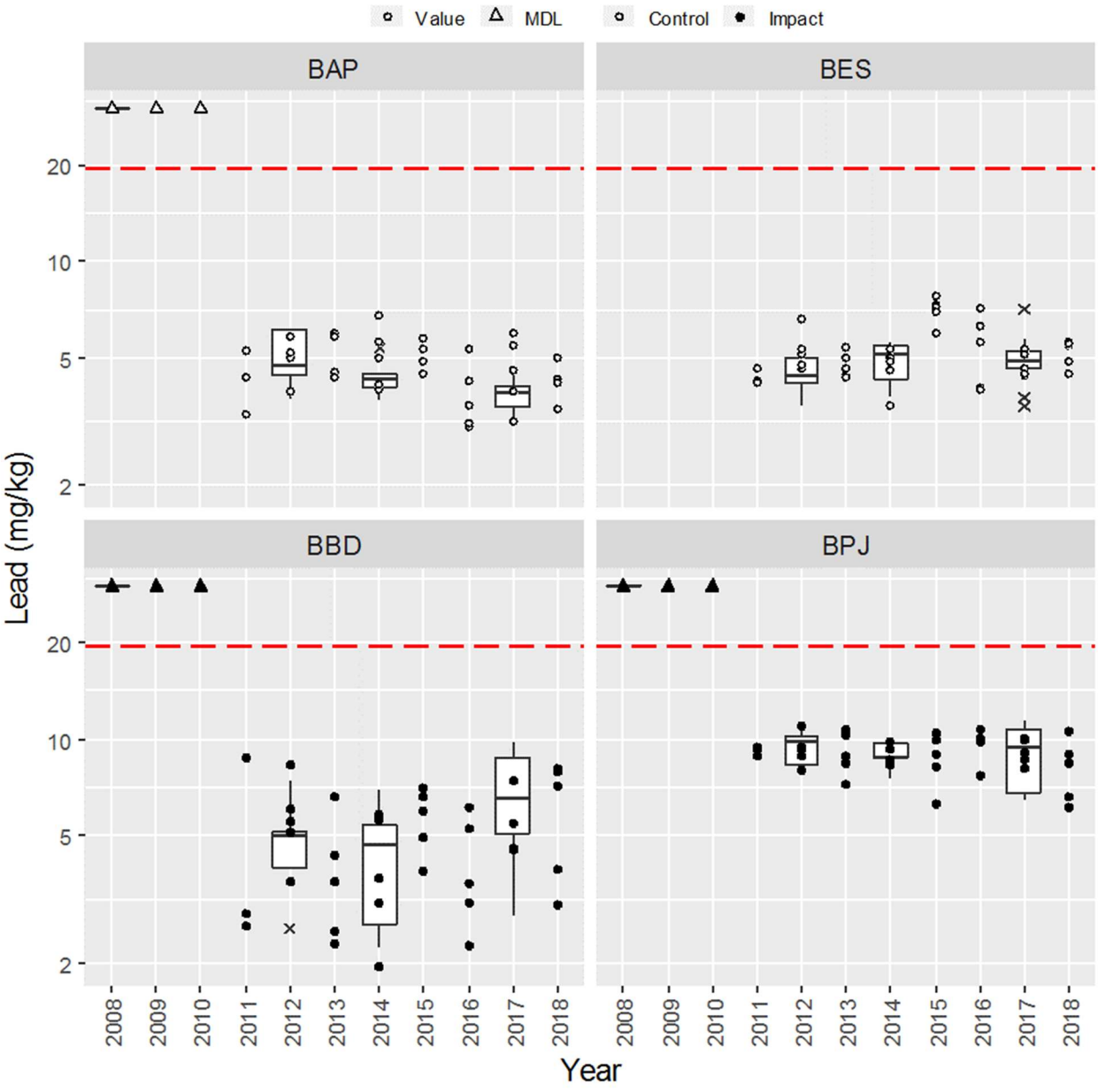


Figure 6-64. Total mercury (mg/kg) in sediment samples from Baker Lake since 2008.

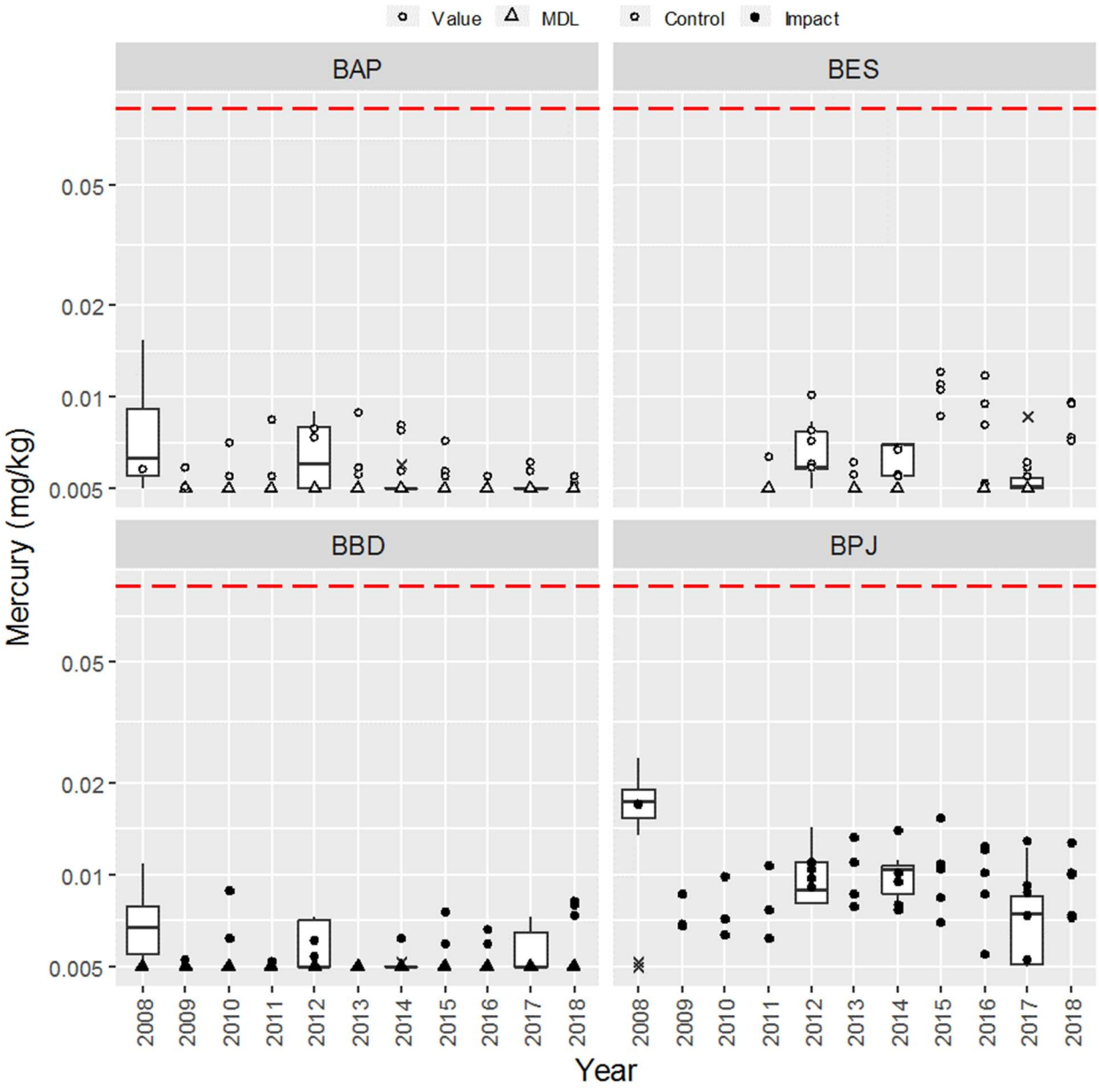
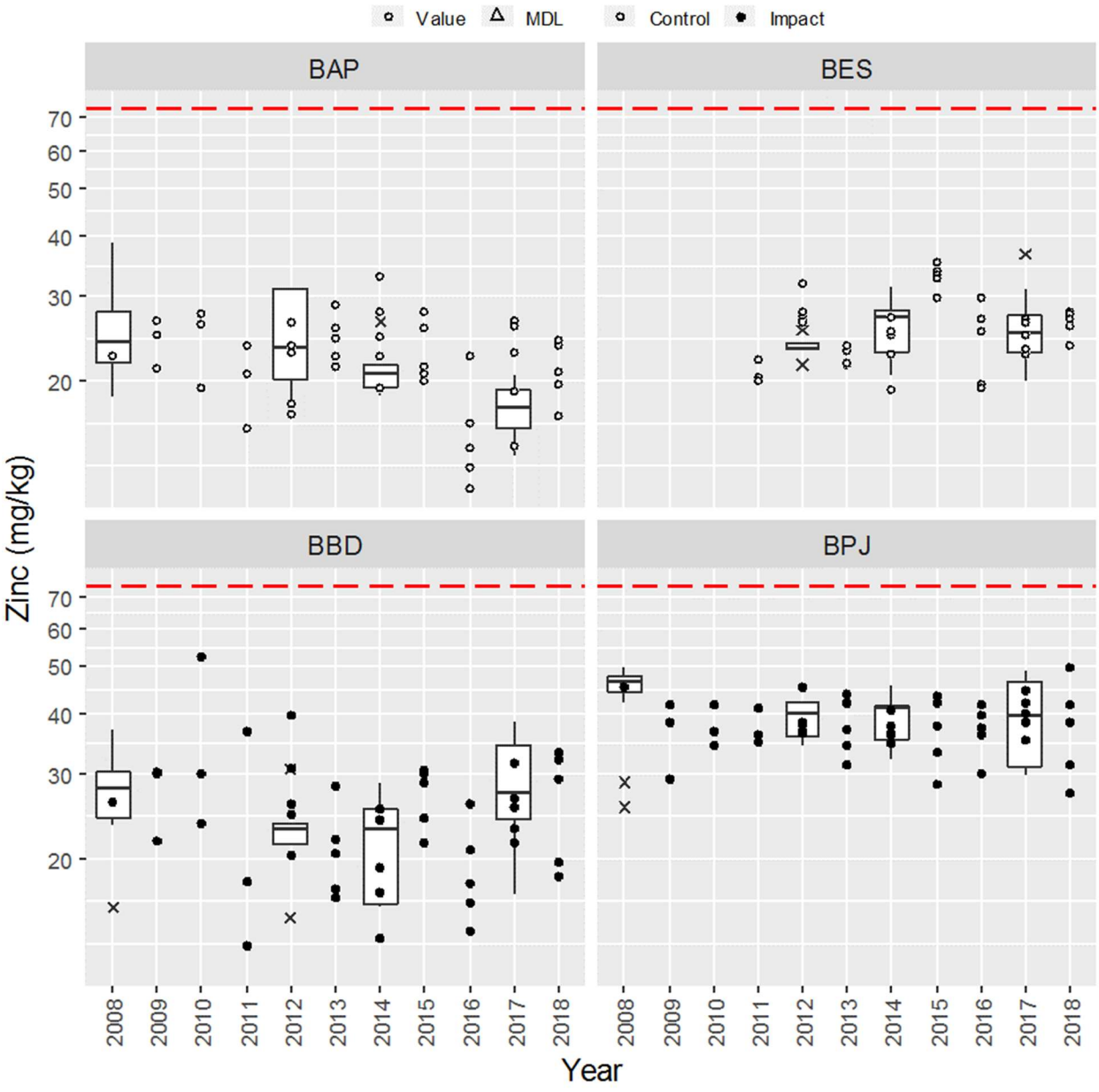


Figure 6-65. Total zinc (mg/kg) in sediment samples from Baker Lake since 2008.



Benthos Tables and Figures

Table 6-3. Results of the BACI tests for benthic invertebrate abundance at Baker Lake areas.

After Period	Test Area	n(B)	n(A)	Estimate	SE	P-value*	Effect size (%)		
							ES	LCI	UCI
2018	BBD	10	1	1.39	1.09	0.88	303	-66	4,636
	BPJ	10	1	1.47	0.97	0.92	336	-52	3,814
2017-2018	BBD	9	2	1.05	0.80	0.89	186	-53	1,658
	BPJ	9	2	1.16	0.71	0.93	218	-37	1,493
2016-2018	BBD	8	3	0.71	0.72	0.82	104	-60	947
	BPJ	8	3	1.30	0.57	0.98	265	1.4	1,215
2015-2018	BBD	7	4	0.78	0.63	0.88	117	-48	804
	BPJ	7	4	1.17	0.53	0.97	224	-2.0	968

Notes:

*** Bolded** values are P-values < 0.1

Shaded cells indicate negative effect sizes (reductions) of 20% or more

Test area = area compared to control (BAP)

n(B) = number of years in the "before" period

n(A) = number of years in the "after" period

Estimate = BACI model estimate of the after-period change in mean for log-transformed data

SE = standard error of the estimate

P-value = one-tailed test of the null hypothesis of no change or an increase in mean

ES = estimated effect size (i.e., 100%*(exp[Estimate]-1))

LCI = lower 95% confidence interval; UCI = upper 95% confidence interval

Table 6-4. Results of the BACI tests for benthic invertebrate taxa richness at Baker Lake areas.

After Period	Test Area	n(B)	n(A)	Estimate	SE	P-value*	Effect size (%)		
							ES	LCI	UCI
2018	BBD	10	1	0.36	0.30	0.87	43	-28	182
	BPJ	10	1	0.59	0.38	0.92	80	-23	322
2017-2018	BBD	9	2	0.33	0.22	0.92	38	-15	126
	BPJ	9	2	0.51	0.27	0.96	67	-8.4	205
2016-2018	BBD	8	3	0.26	0.19	0.90	29	-16	99
	BPJ	8	3	0.53	0.21	0.98	70	4.7	176
2015-2018	BBD	7	4	0.26	0.17	0.91	29	-13	91
	BPJ	7	4	0.45	0.21	0.97	57	-2.2	151

Notes:

*** Bolded** values are P-values < 0.1

Shaded cells indicate negative effect sizes (reductions) of 20% or more

Test area = area compared to control (BAP)

n(B) = number of years in the "before" period

n(A) = number of years in the "after" period

Estimate = BACI model estimate of the after-period change in mean for log-transformed data

SE = standard error of the estimate

P-value = one-tailed test of the null hypothesis of no change or an increase in mean

ES = estimated effect size (i.e., 100%*(exp[Estimate]-1))

LCI = lower 95% confidence interval; UCI = upper 95% confidence interval

Figure 6-66. Benthic invertebrate total abundance (#/m^2) from Baker Lake since 2008.

Note: All Baker Lake invertebrate plots exclude samples BBD-3 (2009), BPJ-2 (2012), and BPJ-4 (2016) as part of the QA process.

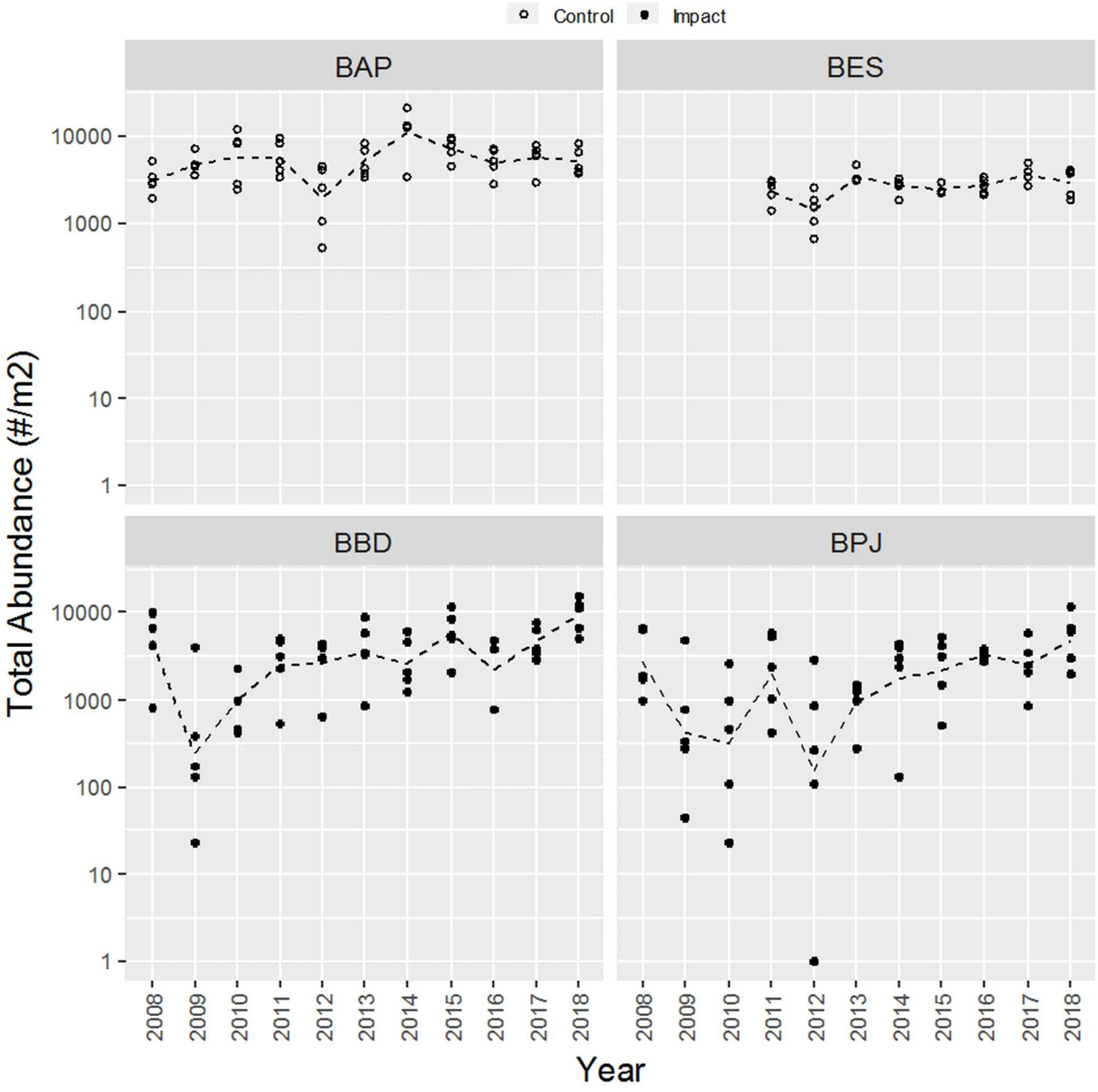


Figure 6-67. Benthic invertebrate abundance (#/m^2) by major taxa group from Baker Lake since 2008.

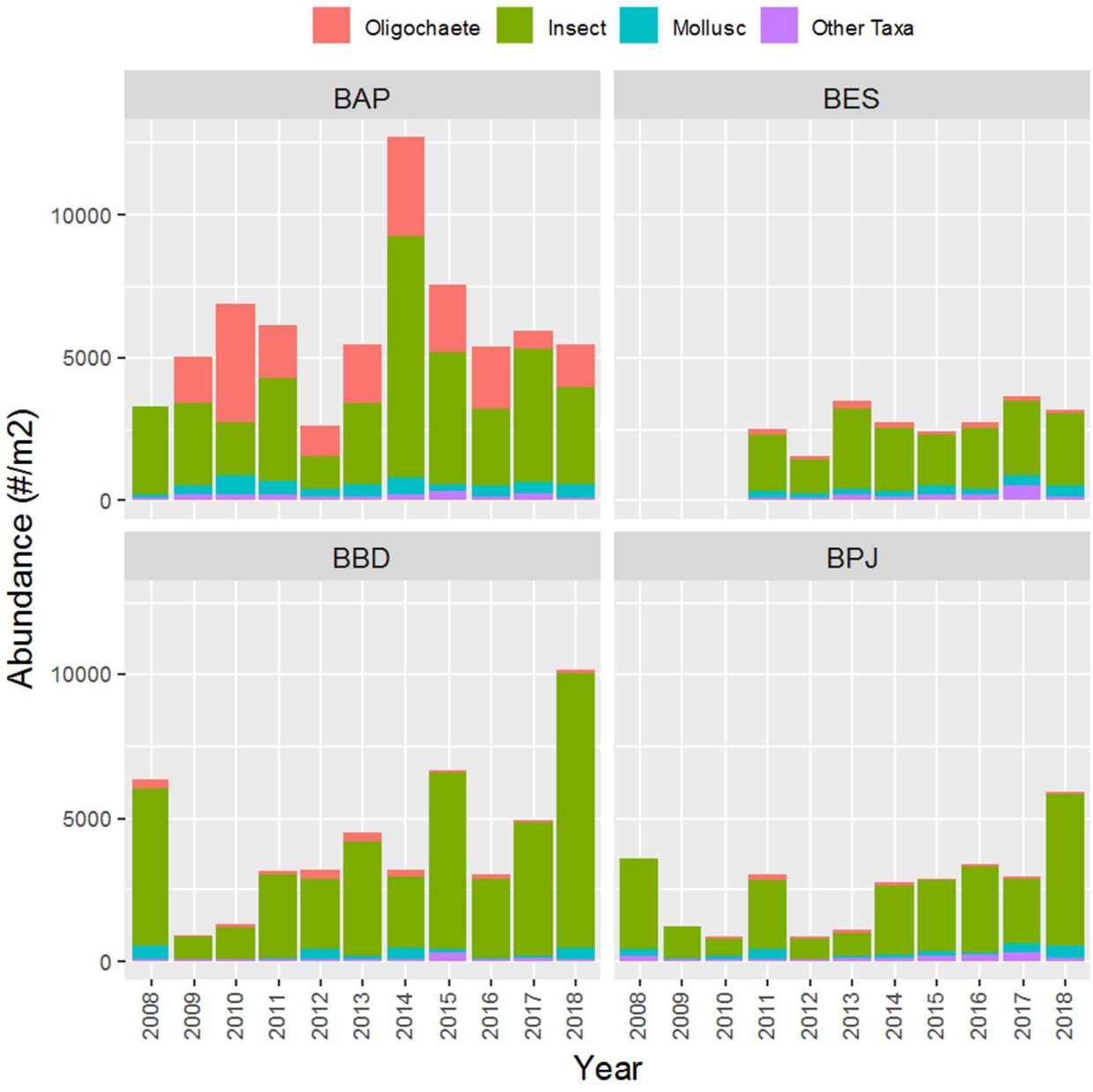


Figure 6-68. Benthic invertebrate relative abundance by major taxa group from Baker Lake since 2008.

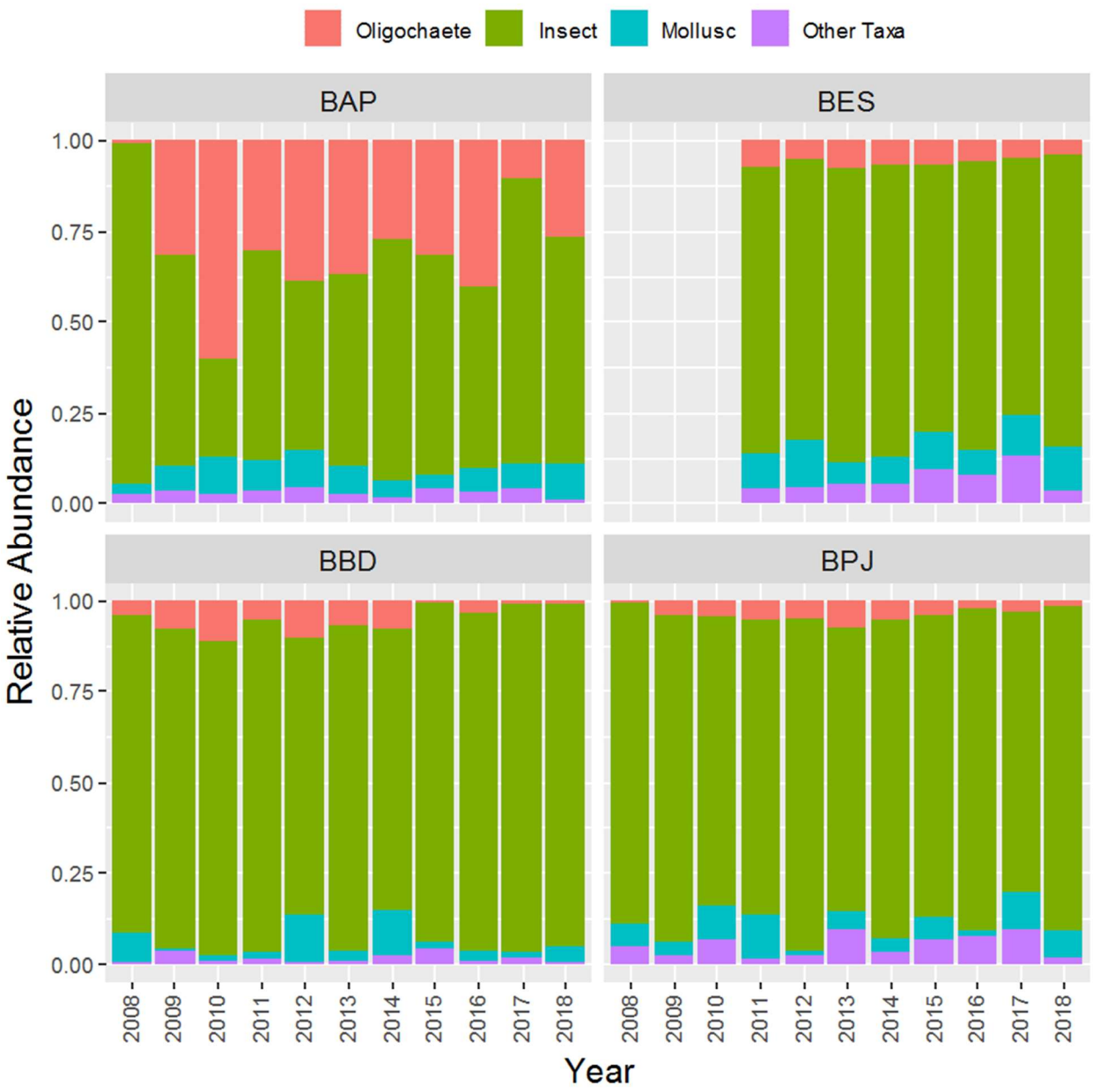


Figure 6-69. Benthic invertebrate total richness (# taxa) from Baker Lake since 2008.

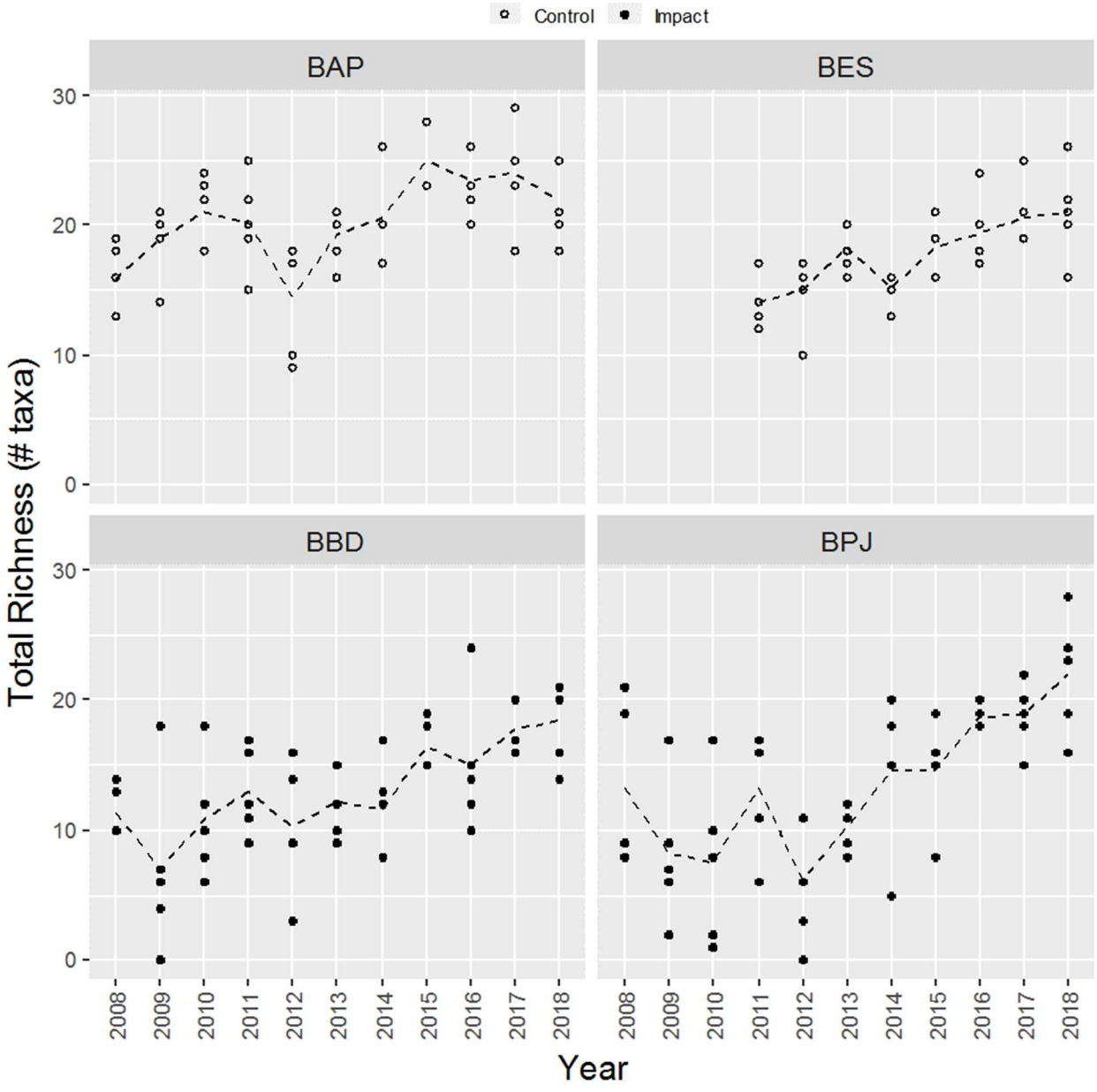


Figure 6-70. Benthic invertebrate richness (# taxa) by major taxa group from Baker Lake since 2008.

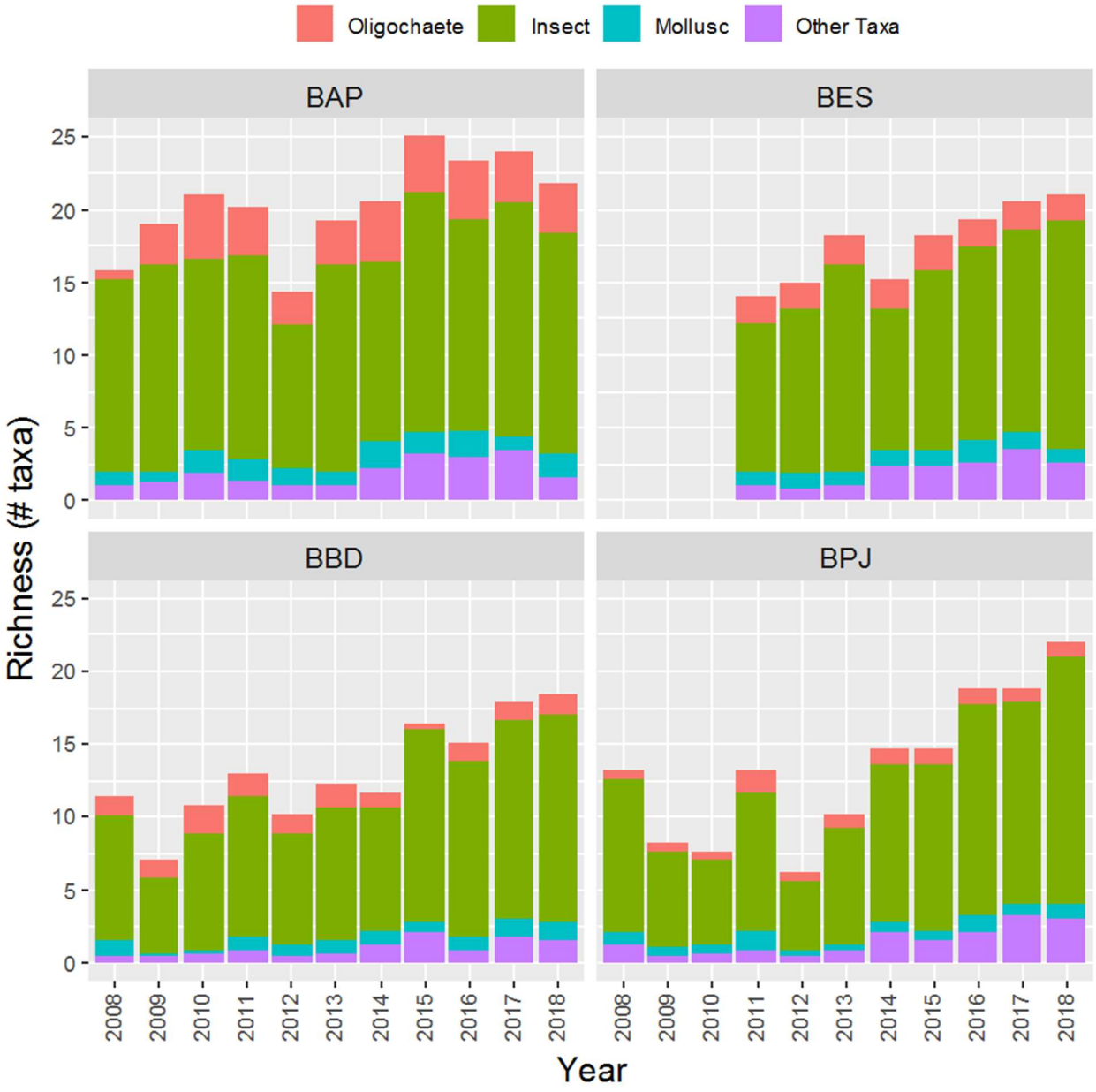
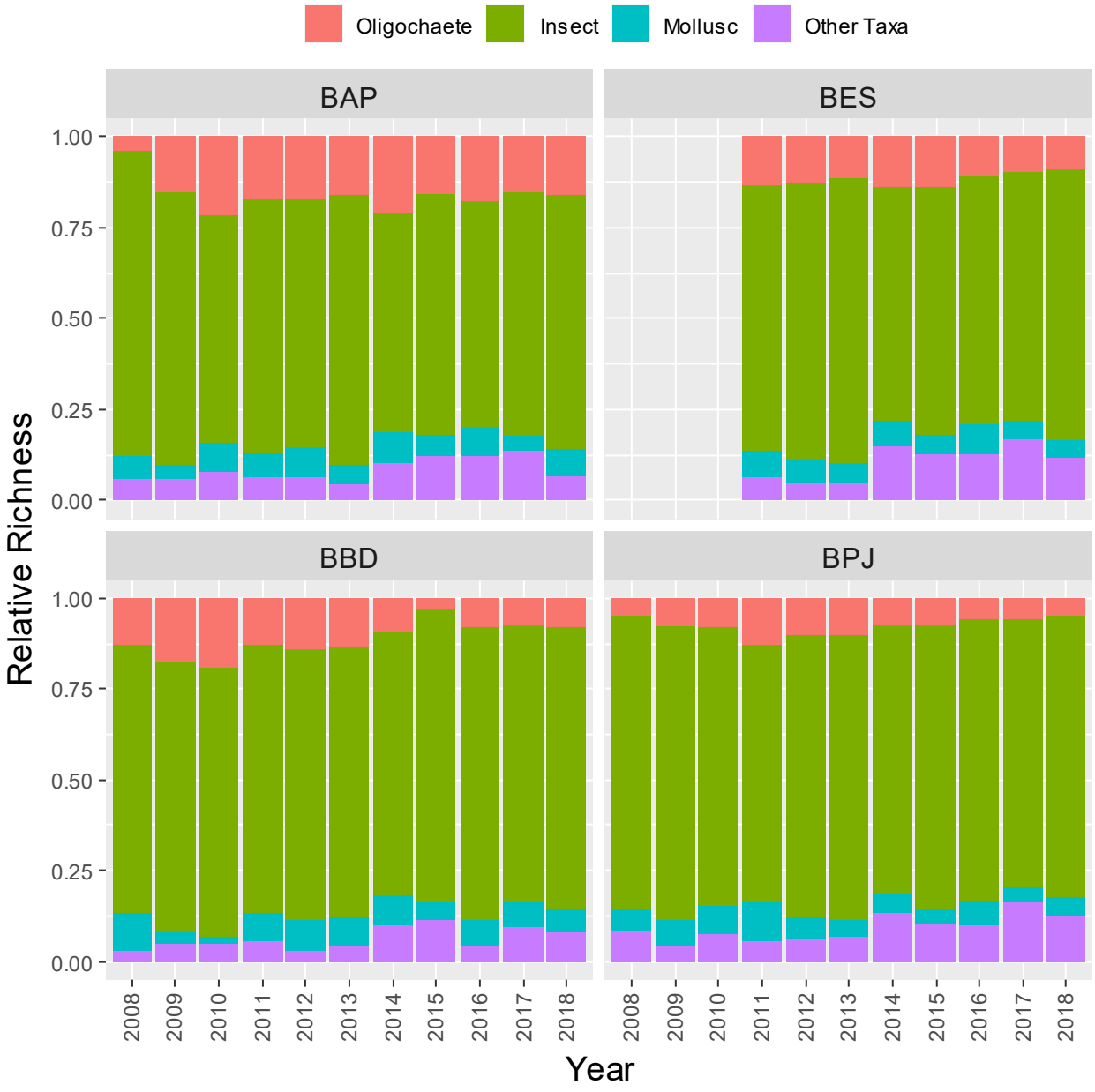


Figure 6-71. Benthic invertebrate relative richness by major taxa group from Baker Lake since 2008.



7. SCOPE OF THE 2019 CREMP

The CREMP focuses on identifying changes in limnology, water and sediment chemistry, and primary (phytoplankton) and secondary (benthic invertebrate community) aquatic producers that may be associated with mine development activities. This is accomplished through the application of a temporal/spatial trend assessment that includes application of quantitative decision criteria (i.e., early warning "triggers" and action "thresholds") to facilitate immediate and objective decision-making regarding appropriate management actions. CREMP results are integrated annually into the Aquatic Ecosystem Monitoring Program (AEMP) for holistic environmental management and decision making. Recommendations for the scope of the 2019 CREMP are provide for Meadowbank, Whale Tail, and Baker Lake based on the 2018 monitoring results discussed in **Sections 4**, **5**, and **6**, respectively.

7.1. Meadowbank

Based on the 2018 results and the annual decision framework for the sampling strategy (**Section 2.2.3**), the components and schedule for the 2019 CREMP for the Meadowbank study area is summarized in **Table 7-1**. The scope of work proposed for 2019 includes:

- Water quality – water sampling for 3 open water and 2 through ice sampling events is recommended at the NF areas in 2019. Through-ice limnology and water chemistry sampling at TPS, TE, and TEFF is planned for a minimum of one, but ideally two events in 2019 depending on ice conditions. In addition, contingency water samples may need to be collected during the limnology-only through ice sampling event(s) at the NF areas if anomalous *in-situ* limnology results are observed.
- Phytoplankton – routine sampling at the NF areas, synoptic with the 3 open water and 2 through-ice sampling events. Sampling at MF and FF areas is not required.
- Sediment chemistry - A repeat of the coring program is recommended in 2019 to provide three-consecutive years of core chemistry data for interpreting the temporal trend in chromium concentrations.
- Benthos – routine sampling at the NF areas in 2019.
- Sediment Metals Bioavailability – repeat of the sediment toxicity testing (chironomid and amphipod tests) at TPE with additional porewater characterization.

7.2. Whale Tail

Timing of the field sampling at the Whale Tail study area lakes matches the schedule for Meadowbank because of share-reference area sampling at INUG and PDL. The frequency of sampling and study components at each area are outlined in **Table 7-2**.

- Water quality – the full CREMP program (through ice and open water) is recommended at the NF, MF, and FF areas 2019. Though-ice limno profiles are recommended at MAM and WTS in the months when water sampling is not completed. In addition, contingency water samples may need to be collected during the limnology-only through ice sampling event(s) if anomalous *in-situ* limnology results are observed (see the MAM limno profile results from November and December as an example).
- Phytoplankton – routine sampling synoptic with the full water quality sampling program.
- Sediment chemistry – routine sediment grab chemistry sampling synoptic with the replicate benthos sampling stations in each area.
- Benthos – sampling at NF areas (WTS and MAM) to monitor for changes in the community due to construction. Sampling at NEM, A20, A76 and DS1 to provide more information on the range of normal conditions to support future BACI-style analysis.

7.3. Baker Lake

The scope of the 2019 Baker Lake CREMP is presented in **Table 7-3**. Monthly water quality monitoring is planned for July, August, and September consistent with previous years. Sediment chemistry and benthos sampling will be completed in August.

Table 7-1. Monitoring components planned for 2019 Meadowobank CREMP.

Area ID	Through-Ice					Open-Water			Through-Ice	
	Jan	Feb	Mar	April	May	Jul	Aug	Sep	Nov	Dec
Reference Areas										
INUG			WQ Phyto		WQ Phyto	WQ Phyto	WQ Phyto Sed Benthos	WQ Phyto		
PDL			WQ Phyto		WQ Phyto	WQ Phyto	WQ Phyto Sed Benthos	WQ Phyto		
Near-Field Areas										
TPE	Limno	Limno	WQ Phyto	Limno	WQ Phyto	WQ Phyto	WQ Phyto Sed Benthos	WQ Phyto	Limno	Limno
TPN	Limno	Limno	WQ Phyto	Limno	WQ Phyto	WQ Phyto	WQ Phyto Sed Benthos	WQ Phyto	Limno	Limno
SP	Limno	Limno	WQ Phyto	Limno	WQ Phyto	WQ Phyto	WQ Phyto Sed Benthos	WQ Phyto	Limno	Limno
WAL	Limno	Limno	WQ Phyto	Limno	WQ Phyto	WQ Phyto	WQ Phyto Sed Benthos	WQ Phyto	Limno	Limno
Mid- and Far-Field Areas										
TPS, TE, TEFF			WQ		WQ					

Notes:
No sampling in June and October due to unsafe ice conditions.
Limno: 1 limno depth profile should be collected at key near-field areas (MAM and WTS) to reduce uncertainty regarding the potential occurrence of changes over winter; water chemistry will also be collected if profiling shows unusual results.
WQ: 2 replicate samples from 3m depth and limno profiles at each location.
Phyto: 2 replicate samples from 3m depth; same locations as limno.
Sed: 1 composite for organics (LEPH, HEPH, PAH (low), Mineral Oil and Grease); 5 replicates for physical (metals, TOC, Grain Size, Moisture)
Benthos: 5 replicate samples (2 grab composite/sample); same locations as sediment.

Table 7-2. Monitoring components planned for the 2019 Whale Tail CREMP.

Area ID	Through-Ice					Open-Water			Through-Ice	
	Jan	Feb	Mar	April	May	Jul	Aug	Sep	Nov	Dec
Near-Field Areas										
WTS	Limno	Limno	WQ Phyto	Limno	WQ Phyto	WQ Phyto	WQ Phyto Sed Benthos	WQ Phyto	Limno	Limno
MAM	Limno	Limno	WQ Phyto	Limno	WQ Phyto	WQ Phyto	WQ Phyto Sed Benthos	WQ Phyto	Limno	Limno
NEM			WQ Phyto		WQ Phyto	WQ Phyto	WQ Phyto Sed Benthos	WQ Phyto		
Mid- and Far-Field Areas										
A20			WQ Phyto		WQ Phyto	WQ Phyto	WQ Phyto Sed Benthos	WQ Phyto		
A76			WQ Phyto		WQ Phyto	WQ Phyto	WQ Phyto Sed Benthos	WQ Phyto		
DS1			WQ Phyto		WQ Phyto	WQ Phyto	WQ Phyto Sed Benthos	WQ Phyto		

Notes:
No sampling in June and October due to unsafe ice conditions.
Limno: 1 limno depth profile should be collected at key near-field areas (MAM and WTS) to reduce uncertainty regarding the potential occurrence of changes over winter; water chemistry will also be collected if profiling shows unusual results.
WQ: 2 replicate samples from 3m depth and limno profiles at each location.
Phyto: 2 replicate samples from 3m depth; same locations as limno.
Sed: 1 composite for organics (LEPH, HEPH, PAH (low), Mineral Oil and Grease); 5 replicates for physical (metals, TOC, Grain Size, Moisture)
Benthos: 5 replicate samples (2 grab composite/sample); same locations as sediment.

Table 7-3. Monitoring components planned for 2019 Baker Lake CREMP.

Area ID	Open-Water		
	July	August	September
BBD	WQ Phyto	WQ Phyto Sed Benthos	WQ Phyto
BPJ	WQ Phyto	WQ Phyto Sed Benthos	WQ Phyto
BAP	WQ Phyto	WQ Phyto Sed Benthos	WQ Phyto
BES		Sed Benthos	

Notes:
No sampling in June and October due to unsafe ice conditions.
Limno: 1 limno depth profile should be collected at key near-field areas (MAM and WTS) to reduce uncertainty regarding the potential occurrence of changes over winter; water chemistry will also be collected if profiling shows unusual results.
WQ: 2 replicate samples from 3m depth and limno profiles at each location.
Phyto: 2 replicate samples from 3m depth; same locations as limno.
Sed: 1 composite for organics (LEPH, HEPH, PAH (low), Mineral Oil and Grease); 5 replicates for physical (metals, TOC, Grain Size, Moisture)
Benthos: 5 replicate samples (2 grab composite/sample); same locations as sediment.

8. REFERENCES

The references section is organized into two sections: Annual CREMP Reports and other literature cited in the report, including peer-reviewed studies and technical reports

Annual CREMP Reports and Baseline Studies

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APPENDICES

APPENDIX A
QUALITY ASSURANCE / QUALITY CONTROL ASSESSMENT

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A.1. INTRODUCTION

A.1.1. Quality Assurance / Quality Control

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

The 2018 CREMP report represents a harmonization of the CREMP program and the Whale Tail Pit program and combines QA/QC from the Meadowbank Lakes, Baker Lake, and Whale Tail Pit Lakes. This is the first CREMP reporting year to include Whale Tail Pit data and, as such, QA/QC discussion that references previous CREMP reporting years only references data from the Meadowbank Lakes and Baker Lake. An overview of the QA/QC program for each component is provided below; refer to the 2015 CREMP plan (Azimuth, 2015) update for a complete description.

A.1.2. Surface Water

A.1.2.1. Laboratory QC

The first step in the QC program involves documenting any issues with the sample submission. ALS reports these as “Sample Integrity” issues in the Sample Receipt Confirmation (SRC) email after the samples are received. Results are typically recorded in the Sample Integrity assessment for one of three reasons: (1) samples were damaged during transport, (2) the temperature inside the cooler was above 10°C when received by the laboratory, or (3) the recommend hold-time was exceeded prior to analysis. Sample integrity issues don’t necessarily mean the data are unusable; rather, this information is meant to help the client make an informed decision on how to proceed with analysis and using the results.

There are four main components of the water chemistry laboratory QC program to assess analytical precision, bias, and completeness:

- Laboratory Duplicate – a new aliquot from the same sample is analyzed from the start in the same manner as the original aliquot taken from the bottle/jar. The difference between the

two analyses is a measure of the variability associated with duplicate analyses of the same sample in the laboratory.

- Method Blank (MB) – an analyte-free matrix (e.g., water) subjected to the entire analytical process to demonstrate that the analytical system itself does not introduce contamination.
- Matrix Spike (MS) / Matrix Duplicate (MD) – a known amount of a compound similar chemically to the target analyte is added to samples to ascertain any matrix effects on recoveries and to determine the accuracy and precision of the method in this matrix.
- Laboratory Control Sample (LCS) – a well-characterized sample of known analytes and concentration. A reference material (i.e., certified reference material) containing certified amounts of target analytes, may be used as an LCS. Percent recovery of the target analytes in the LCS is compared to established control limits and assists in determining whether the methodology is in control and whether the laboratory is capable of making accurate and precise measurements at the required reporting limit.

Laboratory QC results are included in each laboratory report for CREMP water quality samples. The ALS analytical reports are presented in **Appendix F** (main report).

A.1.2.2. Field QA/QC

The standard QA procedures included thoroughly flushing the flexible tubing and pump to prevent cross-contamination between areas and thoroughly rinsing the sample containers with site water prior to sample collection. Field QC procedures include collection and/or analysis of field duplicates, travel blanks, and equipment blanks. Data quality objectives (DQOs) for each QA/QC sample type are discussed below.

A.1.2.3. Data Quality Objectives

Duplicate Samples – Quality control results of the laboratory and field duplicates are assessed by measuring the relative percent difference (RPD) between original and duplicate measurements as measure of precision by the laboratory and the magnitude of variability between original and field duplicate samples, respectively. The equation used to calculate the RPD is:

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

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

Laboratory duplicate DQOs are parameter-specific and depend on the concentration in the sample. For most parameters including metals, anions, and nutrients, the DQO is an RPD of less than 20% when the concentration is greater than 10-times the MDL. For parameters with concentrations less than 10-times the MDL, the DQO is a difference in concentration between

the original and duplicate samples of less than 2-times the MDL. The DQOs for field duplicates is RPDs less than 50% when concentrations exceed 10-times the MDL. RPD values may be either positive or negative, and ideally should provide a mix of the two, clustered around zero. RPDs are not calculated for cases where one of the samples (i.e., either A or B above) is below detection and the other is not.

Blanks (Travel, Field, Equipment) – Results from both the equipment and travel blanks are examined for detectable concentrations of any of the parameters measured; no parameter in either blank should exceed laboratory method detection limits (MDLs). If an analyte is detected in a blank, the results for the batch of samples submitted with the blank are compared with the measured concentration in the blank; results that are less than 5-times the detected analyte concentration in the equipment blank are flagged to examine the potential for cross-contamination to affect the results. Results carried forward in the QA/QC assessment are given either a cautionary flag or an unreliable flag. Cautionary flags are applied to sample results if the analyte was detected in the blank, but the effect of potential cross-contamination is considered minor (e.g., the concentration in the equipment blank is a small percentage of the concentration in the samples). Unreliable data flags are applied to water quality results that are unrepresentative of the water quality (e.g., elevated metals concentrations in a sample that are not observed in other replicate sample(s) collected during the same event). The “cautionary” and “unreliable” data flags are provided for clarity on which results should be excluded from decision making.

A.1.3. Sediment

A.1.3.1. Laboratory QC

Laboratory duplicates were analyzed for sediment chemistry parameters similar to water chemistry parameters. The full list of laboratory DQOs for each parameter are presented in the SOP appended to the CREMP: 2015 Plan Update (Azimuth, 2015b).

A.1.3.2. Field QA/QC

Field QA consisted of taking care between sampling areas, by rinsing and cleaning the sampling gear for sediment grabs (Petite Ponar grab, stainless steel compositing bowls and spoons) and sediment cores (corer and spatula) using site water and phosphate-free cleaning detergent, avoids the possibility of cross-contamination. Field QC measures included collection and analysis of the following:

- Filter Swipe – Metals analysis of an ashless filter (QA/QC Filter) that was swiped over the pre-cleaned bowl at four sampling areas to assess the cleaning procedures. The significance

of any metal detected on this filter was evaluated by comparing this amount to the measured concentrations in the sediment samples. Where comparisons were required, the concentration of metals originating from any equipment was estimated by dividing the amount detected on the filter (weight) by: the surface area of 2 Petite Ponar grabs (assuming a thickness of 3 cm was collected from each), that was multiplied by the density of sediment (assumed to be 2 g/cm3).

- Field Duplicate – Five duplicate sediment grab samples were collected for the 2016 program. The DQO for field duplicate samples is based on an RPD of 50% for concentrations that are greater than 10-times the MDL.

A.1.4. Biota

Standard procedures were used to collect phytoplankton and benthic invertebrate samples (Azimuth, 2015b). Sampling gear was thoroughly rinsed between sampling areas to ensure that there was no inadvertent introduction (i.e., cross-contamination) of biota from one area to another.

A.1.4.1. Laboratory QC

Phytoplankton – As a measure of laboratory QA/QC on the enumeration method replicate counts were performed on 10% of the samples. Replicate samples were chosen at random and processed at different times from the original analysis to reduce biases. The laboratory replicate is a new aliquot (10 mL) from the sample jar and is counted from the start in the same manner as the original aliquot (10 mL) taken from the jar. A RPD of 25% for total density and biomass concentrations is considered acceptable for laboratory replicates.

Benthic Invertebrates – ZEAS re-sorts and re-counts approximately 10% of the samples, targeting greater than 90% recovery between the original and re-sorted sample.

A.1.4.2. Field QA/QC

Phytoplankton – Field duplicates were collected for phytoplankton during each sampling event (i.e., monthly) in coordination with water sample duplicates and were taken in order to assess sampling variability and sample homogeneity. A RPD of 50% for total density and biomass concentrations is considered acceptable.

Benthic Invertebrates – Field replicates (5 per area) were collected for benthos to determine natural variability and heterogeneity. Replicates were collected at least 20 m apart from one another, within the defined sampling areas.

A.2. RESULTS AND DISCUSSIONS

The QA/QC results present below for the 2018 CREMP program are summarized in **Section 3** of the main report.

A.2.1. QA/QC

QA/QC procedures consisted of a combination of careful field collection and sample handling, the collection of field duplicate samples and the analysis of laboratory replicates and standard reference materials. A discussion of sample shipping and handling procedures is provided upfront, followed by a discussion of the results pertaining to the various CREMP components.

A.2.1.1. Sample Shipping and Handling

Sample shipping and handling concerns document in previous CREMP reports have largely been rectified in recent years. The Meadowbank Environment Department plans water sampling events to minimize the amount of time that samples are in transit between Site, Val d'Or, and ALS in Burnaby. The remote location of the mine will always present challenges with some analytes meeting recommended hold-times, but the effect of slightly exceeding hold-times on the quality of the results is considered negligible. Correspondence with the lab regarding hold time exceedance hasn't led to establishing definitive benchmarks for data quality. ALS recommends "professional judgement" when interpreting chemistry data for parameters that exceeded hold-times for analysis.

Table A-1 summarizes sample integrity observations (e.g., broken sample containers, mislabeled containers), cooler temperature upon delivery to the lab, and parameters that exceeded the recommended hold-time for analysis.

Sample shipping and handling summary

Cooler temperatures ranged from a low of 5°C in November to a high of 22°C in July. These temperature ranges are similar to past years and reflect the seasonal ambient temperatures. The effect on preserved samples is considered negligible, but for chlorophyll-a samples the increase in temperature means samples may arrive thawed. Keeping the chlorophyll-a samples frozen is a recurring challenge for this program given the logistics of shipping samples from Nunavut to Vancouver in a timely fashion.

There was one broken water sample container in May and another in August. In these cases, the ALS took an aliquot from either the conventional or TSS/TDS bottle, preserved the sample, and analyzed accordingly. There were also several broken sediment jars in the August samples and,

as such, it was not possible to analyze several samples including a grab replicate from PDL and COMP sample from SP. There were several shipments where there was a discrepancy between the CoC and the sample IDs. These were resolved for 2018 and having all CREMP sampling for 2019 under one program will reduce the potential for future discrepancies.

A.2.1.2. Water Chemistry

Field duplicates, laboratory duplicates, and blank samples were analyzed as part of the QA/QC program in each of the five sampling events in 2018. The field and laboratory duplicate results from the Whale Tail Pit Lakes have been integrated with the Meadowbank Lakes / Baker Lake; however, the blank sample results are provided separately to reflect that deionized blanks and field samples are collected at different locations by different field crews and blank samples provide an opportunity to assess sample collection procedures. Results of the QA/QC analysis are discussed below, along with a discussion on the implications of the QA/QC assessment on the sample results from 2018.

Travel Blanks

Four travel blanks sent to Site at the beginning of the program were analyzed in the May, July, August, and September sampling events – no blank samples were submitted for the Whale Tail Pit area in May. The travel blank results are shared between the Meadowbank Lakes / Baker Lakes and Whale Tail blanks assessments. The full suite of parameters (excluding dissolved metals) were analyzed. Travel blank results submitted for the Meadowbank/Baker Lake portion of the CREMP (**Table A-2**) and Whale Tail Pit CREMP (**Table A-3**) with the exception of results for the May 2018 travel blank submission submitted from the Meadowbank / Baker Lake sample areas. The presence of numerous analytes including barium, cadmium, calcium, chromium, copper, iron, lead, magnesium, manganese, sodium, strontium, and zinc were detected at varying concentrations include more than 10 X DL for calcium and manganese. The number of analytes detected suggests that this sample was comprised in the field, during shipment, or at the laboratory; however, there were no sample integrity flags for the May travel blank (though the blank sample was not indicated on the CoC), and the laboratory did not flag this sample during analytical sampling. There is no relationship between the travel blank results and the results for other samples submitted and analyzed at the same time; for example, the de-ionized (DI) blank results from May, included in the summary below, were below detection for all total metals except for sulfur which was reportedly as very close to the MDL. These May 2018 travel blank results have been flagged as unreliable and have not been used in the 2018 analysis (unreliable results are discussed in more detail at the end of this section).

De-ionized Blanks

The goal of these blanks is to test the quality of the DI water batch and/or variability in laboratory analytical methods. One DI blank with the full suite of analyses was submitted for each event. Blanks were collected for the Meadowbank and Baker Lake CREMP and the Whale Tail Pit CREMP; results are reported in **Table A-2** (Meadowbank / Baker Lake) and **Table A-3** (Whale Tail Pit). A summary of the DI blanks is provided below.

- Meadowbank Lakes and Baker Lake – The May DI blank had detectable concentrations of dissolved orthophosphate, total organic carbon, total magnesium at concentrations nearly equal to the detection limit. Total ammonia was detected in the July DI blank at 0.011 mg/L, two-fold higher than the MDL (0.005 mg/L). Similar total ammonia results were reported for the September DI blank and total cadmium was also two-fold higher than the MDL (0.000005 mg/L). Total phosphorus (0.0032 mg/L) and barium (0.00018 mg/L) were two-fold higher than MDL in November and both dissolved and total organic carbon (1.8 mg/L and 1.9 mg/L respectively) were three-fold higher than MDL. No analytes were detected in the August DI blank. In all events, the equipment blank (EB) collected concurrently had concentrations of the parameters in question measured at concentrations below the MDLs, indicating the quality of the DI water is high with the exception of total magnesium and ammonia in May and September respectively. The plausible explanation(s) for detected concentrations are 1) variability in the analytical method, or 2) particulate debris falling into the sample container during collection. The holistic review of the DI blanks did not identify any parameters with low confidence in the analytical results.
- Whale Tail Pit Lakes – The May DI blank had detectable concentrations of total sulfur and dissolved barium, sodium, and tin. Both total sulfur and dissolved barium were close to the MDLs (MDLs: 0.52 mg/L and 0.00018 mg/L respectively). Dissolved sodium (0.135 mg/L) was three-fold higher than the MDL (0.05 mg/L). Dissolved tin (0.00083 mg/L) was eight-fold higher than the MDL (0.0001 mg/L); however, for dissolved tin the low MDL tends to magnify the apparent difference despite the relatively low reported concentrations. Both total sodium and total tin were below MDLs in the same sample. In July the total organic carbon was just above the MDL. The total ammonia was 0.011 mg/L, two-fold higher than MDL (0.005 mg/L) in August. In September the reported lead was just above the MDL of 0.00005 mg/L as was the dissolved zinc (MDL=0.001 mg/L). There were no detectable analytes for the DI blank in November and the holistic review of the DI blanks did not identify any parameters with low confidence in the analytical results.

Equipment Blanks

Several parameters were detected in at least one of the equipment blanks submitted in 2018 for both Meadowbank Lakes and Baker Lake (**Table A-2**), and Whale Tail Pit Lakes (**Table A-3**). The EB with at least one detected result are shown in **Table A-4**.

- Meadowbank Lakes and Baker Lake – Results for the EB analysis were detected at concentrations less than 10-times the MDL. Detected concentrations of certain parameters, particularly lead, barium, and strontium have been recorded since the more expansive QA of the water quality data was implemented in 2015; however, while low levels of total barium and total lead were detected in the May and September EB results from 2018, strontium was not detected in EB samples. There were no analytes detected in the EB results from August and November 2018. The detected analytes are indicated in the table below. Most of the detected analytes were close to or less than two-fold higher from the MDL with the exception of magnesium (five-fold higher over MDL of 0.005 mg/L) in May, total and dissolved magnesium (three-fold over MDL of 0.005mg/L) and total and dissolved sodium (four-fold over MDL of 0.05 mg/L) in July. The pump and tubing method for collecting samples has certain advantages, particularly when collecting water samples for the winter through-ice sampling events. In the vast majority of cases where a metal is detect in the EB, the implication of possible cross-contamination on interpreting the water quality data from the same event is considered inconsequential. A more detailed discussion of the EB results in the context of the 2018 water quality data is discussed at the end of this section.
- Whale Tail Pit Lakes – Results from the EB analysis are varied by month. July had the most detects including 10 X MDL for total lead and magnesium – reported 0.00244 mg/L and 0.0697 mg/L respectively. The other detected analytes in July were close to or less than two-fold higher than the MDL with the exception of magnesium which was five-fold higher than the MDL of 0.005. There were no analytes detected in the EB samples from the Whale Tail Pit area in August and September. Detected analytes for EB samples are provided in the table below.

Field Duplicates

Field duplicate analysis has been combined for the Meadowbank / Baker Lake and Whale Tail Pit study areas. The target frequency of duplicate sample collection is approximately 10% of the total number of samples. There was a combined total of 13 duplicates collected in 2018 between the Meadowbank Lakes, Baker Lake, and the Whale Tail Pit Lakes, corresponding to 10.9% of the total number of water samples (142). Across all CREMP study areas, three field duplicates were collected in each event with the exception of September where only two were collected (**Table A-5**).

The field duplicate samples showed a high level of consistency with the original samples. Of the over 1,200 paired RPD comparisons in 2018, there were only 13 instances where the RPD exceeded 50%. A detail review of the sample handling, both in the field and in the laboratory, suggests that four of the RPD exceedances are not related to sample collection review.

- Two chlorophyll-a samples collected in July exceeded the RPD criteria of 50%; however, both chlorophyll-a duplicate samples were labelled with the same name in the field and all chlorophyll-a samples for all study areas collected in July were archived for processing at the end of the month. As such, there is low confidence that the duplicate results for these chlorophyll-a samples were paired with the correct samples.
- The dissolved metals RPD results for sample collected at SP-111 in May have been discarded as unreliable. Two RPDs exceeded 50% when comparing the dissolved metals concentrations in the duplicate and the original sample – dissolved aluminum RPD = 63.2% and dissolved zinc RPD = 131%. There are several reasons why these RPDs are considered unreliable: (1) The dissolved SP-111 concentrations were flagged as potentially unreliable (discussed below); (2) The sample IDs for this event did not match field records or the CoC submitted to the laboratory; and, (3) Filtered water was not submitted for the duplicate and laboratory filtration methods do not necessarily replicate field sampling methods which is what the QA/QC duplicate review is assessing. We are not confident that these results provide a reliable comparison for field duplicate review.

Removing the four questionable RPD results discussed above leaves nine instances where the RPD exceeded 50% and only one chlorophyll-a sample collected in September was greater than 10 times the MDL. The original sample for BAP-59 was 1.07 µg/L and the paired duplicate was 0.571 µg/L. The calculated RPD was 60.8%. This result has been flagged for discussion with the collection team; however, we do not feel that this one result suggests poor replication in 2018 between sample collection techniques and sample handling. Furthermore, the overall low number of RPD values that exceed 50% suggests that sample collection and sample handling in 2018 have maintained the high standard we saw in 2017.

Laboratory QC Samples

ALS provides a thorough account of their QA assessment in each COA that is issued. The various components of the QA assessment are provided to help make informed decisions when interpreting the data. The QA program is comprised of four main elements:

- Laboratory Duplicates – The laboratory DQO for most parameters is an RPD of less than 20%. There were two instances where the laboratory DQOs was exceeded in 2018 (**Table A-5**) one for total silver and one for total aluminum.

- Method blanks (MB) – The MB is a blank matrix sample that is taken through the entire analytical procedure to test variability in the analytical method and report any bias in the analysis. MB results are equal to the limit of reporting (or MDL as termed here). MDLs were adjusted for water samples with detected concentrations below 5x blank level (termed MB-LOR in **Table A-1**). For most sample analysis there were no flags or very few flags (e.g., one or two analytes in one sample may have been flagged for MB-LOR) in the method blank results. In one July submission for Whale Tail Pit and two in May and one in July for the Meadowbank Lakes submissions the laboratory reported more than 2 parameters that were flagged for MB-LOR or MS-B. These results meant that the laboratory may have increased MDLs for several samples. However, the limited number of cases with DQO flags for MB samples were reviewed; the results do not affect the interpretation of the 2018 water quality data.
- Matrix Spike (MS) – MS recovery is periodically flagged in the QC assessment due to high concentrations of the analyte in the sample. These instances are rare, and are typically associated with parameters such as major cations (e.g., magnesium) or certain metals with detected results above the MDL (i.e., strontium). The limited number of cases with DQO flags for MS samples were reviewed; the results do not affect the interpretation of the 2018 water quality data.
- Laboratory Control Samples (LCS) / Certified Reference Material (CRM) / Internal Reference Material (IRM) – reference material analysis met the ALS DQOs for all samples analyzed as part of the 2018 with the exception of one parameter (total Sulphur) in one July sample submission and three parameters (dissolved barium, manganese, and vanadium) in one May sample submission. The limited number of cases with DQO flags for LCS samples were reviewed; the results do not affect the interpretation of the 2018 water quality data.

Unreliable Results

Part of the QA assessment involves comparing the paired sampling events collected at each station within a given event to confirm the data are representative of current conditions. If the paired samples vary drastically in their concentrations, and no plausible reason for different concentrations is identified, the result is flagged as unreliable. Four instances were noted in the 2018 CREMP report when comparing the paired monthly samples: total copper at WAL-79 in May, dissolved zinc at SP-110 in May, dissolved chromium at TPS-60 in May, and dissolved lead at WAL-81 in July. The copper result from WAL, the dissolved zinc result from SP, and the dissolved chromium from TPS were clearly outliers when compared to the other samples from the same lakes in May, the rest of 2018, and compared to historical data. The dissolved lead at WAL in July was only slightly over the trigger value but did not compare to total lead values

which were below the MDL, the paired dissolved concentration (also below MDL), or the historical data. These four results are not considered representative of water quality in each area, and as such, were excluded from formal data analysis.

The May travel blank was also flagged as unreliable and was removed from the comparative analysis with the May equipment and de-ionized blanks.

- The total copper concentrations for May in Wally Lake were reported as: WAL-79 = 0.0055 mg/L; and, WAL-80 = 0.0012 mg/L. For context, the trigger value for copper is 0.001459 mg/L and copper concentrations for Wally Lake have consistently been below the trigger value since Wally Lake became an "impact" area in 2013. Dissolved copper concentrations for the May Wally Lake samples were 0.0011 mg/L and 0.001 mg/L. Furthermore, there were no mine discharges into Wally Lake in 2018. The WAL-79 copper result has been flagged as unreliable and has been removed from the analysis.
- The dissolved zinc concentrations for May in Second Portage Lake were reported as: SP-110 = <MDL; and, SP-111 = 0.012 mg/L. Nine out of 10 total zinc concentrations were below MDL including the total zinc concentrations for samples collected in May. Likewise, eight out of nine dissolved zinc samples were below MDL in 2018 (excludes SP-111 results). The samples collected from SP in May (depicted as #5 in Figure X) are not near the dike face which is the only potential source of mine discharge for 2018. The dissolved zinc concentration result for SP-111 has been flagged as unreliable and has been removed from the analysis.
- The dissolved chromium concentrations for May in Third Portage Lake south basin were reported as: TPS-59 = <MDL; and, TPS-60 = 0.0011 mg/L. For context the trigger value for dissolved chromium is 0.00055 mg/L. Total chromium concentrations were below MDL in 2018 in TPS. Dissolved (and total) chromium has not exceeded trigger concentrations in TPS since 2013. The dissolved chromium concentration result for TPS-60 has been flagged as unreliable and has been removed from the analysis.
- The dissolved lead concentrations for July in Wally Lake were reported as: WAL-81 = 0.00075 mg/L; and, WAL-82 = <MDL. For context the trigger value for dissolved lead is 0.000525 mg/L. Total lead concentrations in WAL for all samples collected in 2018 were below the MDL. Only one other dissolved lead samples was above the MDL in 2018: WAL-87 collected in October was reported 0.00006 mg/L. Though the WAL-81 lead concentrations does not exceed the trigger by much, the reported concentration is flagged as unreliable based on the other lead results, both total and dissolved, reported for all months in 2018.
- Blank results provide important context for the reliability of field samples and provides a comparable sample for equipment and de-ionized blanks submitted during the same sampling event. It is rare to question blank results; however, in 2018 the May travel blank

had a high number of "hits" for total concentrations. Travel blanks are samples of analyte free material provided by the laboratory. They are kept unopened and travel to the field and back to the laboratory. All travel results were below MDL for 2018 with the exception of the May travel blank. There were no flags for sample handling that suggest a source of potential contamination and there were no flags to indicate potential laboratory errors. The travel blank results for May 2018 have been flagged as unreliable and have not been compared to the equipment and de-ionized blanks.

Water Chemistry Summary

The field and laboratory duplicate analyses showed a high degree of similarity in 2018. The few exceedances of the established DQOs represent much less than 1% of the total for QA samples and parameters measured. When comparing results for a large number of parameters, many of which are near detection limits, simple odds dictate that a few parameters will exceed DQOs due to laboratory variability (i.e., a false positive). Overall, there was no pattern in the nature of the exceedances that indicates a bias of specific parameters one way or another.

Four results were flagged as unreliable and excluded from formal analysis: (total copper in WAL-79 [May], dissolved Zinc in SP-111 [May], dissolved chromium in TSP-60 [May], and dissolved lead WAL-81 [July]). The results were flagged as outliers during initial analysis of the data. For transparency the results are shown in the water quality data provided in the tables in **Appendix B** (main report), but they are excluded from the formal temporal and spatial trend assessment.

Travel and DI blank samples were assessed in detail for all CREMP study areas. The holistic review of the DI blanks and travel blanks did not identify any parameters with low confidence in the analytical results.

The implication of possible cross-contamination on interpretation of the 2018 water quality data was evaluated by comparing the sample concentrations with the equipment blank results from the same event. Sample results in the complete datasets were given a cautionary flag using underlining (e.g., 0.001) to indicate that the measured concentration was less than 5-times the concentration detected in the equipment blank. Of the analytes detected in the equipment blanks, lead, manganese, barium, calcium, and strontium (among others) were routinely given a "cautionary" flag because the concentrations were consistently within 5-times the MDL, meaning there is potential for cross-contamination to bias the sample results higher. Analysis of the water quality data relative to the triggers and thresholds was done on the entire data set, including the cautionary flagged data. No analyte given a cautionary flag exceeded the trigger or threshold values for 2018. Overall, potential cross-contamination is considered unlikely to bias interpretation of the 2018 water quality analysis.

A.2.1.3. Sediment Chemistry

The QA/QC assessment of the 2018 sediment chemistry includes a review of the field and laboratory duplicate results, filter swipes for cross-contamination, and the QC report from ALS for sediment grab and core samples submitted in 2018. The 2018 sediment chemistry QA data is presented in the following three tables:

- Sediment swipe analysis: **Table A-6**
- Sediment grab chemistry (metals): **Table A-7**
- Sediment core chemistry (metals): **Table A-8**
- Sediment grab chemistry (hydrocarbons and PAHs): **Table A-9**

The tables document the results of the field and laboratory duplicate samples analyses and the QA swipe data for assessing cross-contamination of the field equipment (metals only). Below are the main points from the 2018 QA review of the sediment chemistry results.

ALS QC Reports

A summary of the various QC reports issued in 2018 is presented in **Table A-1** along with the results from the water chemistry analysis. These reports are combined for Meadowbank Lakes, Baker Lake, and the Whale Tail Pit Lakes. Four analytical reports were issued for the 2018 sediment sampling program, one each for the grab and core chemistry results from Meadowbank and Baker Lake, and the Whale Tail Pit sampling programs.

- Sample Integrity – Sediment samples are collected in 125 mL glass jars. There were broken jars in the sediment grab samples submitted – samples from all programs were shipped at the same time. Though some samples were lost as a result, the remaining samples were not compromised. Hold-times for analysis were met for all analytes except for EPH and PAHs in grab samples and moisture in grab and core samples.
- Detection Limits – Detection limits were met for all metals analyzed in 2018. There were a few instances where DLs were raised for TOC in the grab sample submissions for all programs. The target DL for TOC is 0.05%, but in a few cases the DL was raised to 0.075%. These instances of elevated DLs occurred in samples with low TOC content in the 0.5 to 2 % range. The elevated DLs lower the confidence of the results, but do not affect the overall interpretation of the results.
- ALS documented that some Meadowbank grab samples submitted for particle size analysis had less than the recommended mass of 100 g of sediment. The lab noted higher uncertainty for these results.

- Hydrocarbon and PAH analysis for some samples from the Meadowbank project lakes had elevated DLs. For acenaphthene, acenaphthylene, and dibenz(a,h)anthracene, the elevated DLs exceeded the CCME interim sediment quality guidelines (ISQGs) used for screening (see **Table A-9**). The lab noted that high moisture content in the sediment was responsible for the elevated DLs for these parameters. Historically, hydrocarbons and PAHs are almost always below the DL. The handful of cases with elevated DLs in 2018 relative to the CCME ISQGs do not change the overall conclusion that hydrocarbons and PAHs in the sediment occur at concentrations at or below the analytical detection limit and well below concentrations shown to cause adverse effects to aquatic life. Issues with moisture content and elevated DLs will be discussed with the lab prior to the 2018 field season.

Filter Swipes

Filter swipes were taken on various pieces of the sampling gear to quantify potential metals cross-contamination for grab and core samples. Ashless filters were swiped on the various sampling gear including the stainless steel spoons and bowls, the core ring, plastic spatulas used for core slicing, and the Petite Ponar and analyzed for metals (µg/filter). There were a number of metal parameters that were detected on the blank filter swipe that confounded the interpretation of the swipe results. Whatman™ glass microfiber filters (47 mm) were used as swipe material in 2017. The filters are made entirely of borosilicate glass and are touted as “the industry standard for high purity filtration”. Copper, iron, magnesium, sodium, and zinc on the filter paper were detected on the blank filter paper as well as the equipment swipes of the core sampling equipment and grab sampling equipment (**Table A-6**). A new filter swipe product was used for 2018 and these blank results are an improvement from the results in 2017. New products or changes to the filter swipe program will be considered for the 2019 sediment sampling program.

Several analytes were detected on both core and grab sample equipment swipes. These included aluminum, barium, chromium, manganese, nickel, phosphorus, strontium, tin, and titanium. The majority were less than 10 times the MDL. There were three concentrations that were greater than 10 times the MDL – two chromium and one manganese. All three were for grab sample equipment swipes. When comparing the amount of each metal on the filters to the concentration in the sediment core samples, the potential percent contribution from the swipe was less than 0.01% for both metals. In all three cases the concentrations corresponded to well below 0.01% of the concentrations present in the sediment grabs. Despite the confounding effects of metals in the blank swipes, the QA results from 2018 show the potential for cross-contamination to effect the sediment chemistry results is negligible.

Field Duplicates

Seven grab sample field duplicates and three core sample duplicates were collected in 2018 between all sediment sampling programs (**Table A-7** [grabs] and **Table A-8** [cores]). Of the 840 analytical measurements on the core and grab samples and field duplicates in 2018, only six instances were recorded where the RPD was greater than 50%. The thallium RPD for Wally Lake was only just over 50% and was not greater than 10-times the MDL. Of the remaining five cases, two were for grab samples and both were RPDs that were greater than 10-times the MDL; however, both of these were for particle size classes that were minimally present. For particle size comparisons we would expect the greatest apparent variability (highest RPD) between the least represented particle size classes – where a difference of only 1 or 2 % can return a large RPD value. There were no metal RPDs over 50% in the grab samples and only three for the core samples. All three were greater than 10-times the MDL; however, core sample duplicate collection requires that two separate cores are collected at the same location. The RPDs over 50% for core samples represents approximately 2% of the RPDs calculated for 2018. Given the inherent challenges with collecting the same sediment horizon from two discrete samples, and despite the likelihood that sediments will be highly heterogeneous within a relatively small footprint, the RPD results for core sample field duplicates are very good and indicate a high level or replicability.

There were no field duplicate DQO exceedances for the hydrocarbon and PAH analyses in 2018 (**Table A-9**).

Laboratory Duplicates

The analytical laboratory (for 2018 ALS Analytics completed the sediment chemistry analysis) runs duplicate samples to confirm that sediments were well homogenized in the field and that the laboratory processing and analytical methods were consistent between sub-samples. In 2018 no RPD results for laboratory duplicates were outside the laboratories DQOs.

Sediment Chemistry Summary

The QA/QC for sediment chemistry in 2018 highlights the strengths of the field sampling techniques and laboratory analysis procedures. A small number of containers were broken during transport which will be discussed by the field crew prior to the start of the August sediment sampling. The RPD results between field samples and duplicates show very good replication with only six RPD results out of 840 exceeding 50%. There were no laboratory duplicate flags in 2018. The filter swipe results for 2018 are an improvement on 2017 and the potential for cross-contamination between samples and sample replicates is considered very low.

A.2.1.4. Phytoplankton

The phytoplankton QA/QC assessment for 2018 is combined for the Meadowbank and Baker Lake study areas and the Whale Tail Pit study area. Three field duplicate samples were collected for each sampling event with the exception of September, when only one was collected. The field duplicates and laboratory QC duplicates were analyzed for the RPD in total density and total biomass between the original sample and the duplicate. RPD values were also calculated for the major taxa groups, but these results are not relied on for QC purposes because of the tendency for small differences in abundance/biomass between the original and the duplicate to cause large differences in the RPD. Thus, we evaluate the quality of these data based on total density and total biomass both for field and laboratory duplicates.

Results of the RPD analysis for all these parameters are presented in **Table A-10** (field) and **Table A-11** (laboratory) and are discussed below:

Field Duplicates

There were two DQO exceedances for total biomass (RPD = -64.5% in May field duplicate at INUG; RPD = 52% in May A20 field duplicate); both of these occurred under ice cover when total phytoplankton biomass was low. The effects of natural spatial heterogeneity are exacerbated when biomass is low. Total density did not exceed the RPD DQO in 2018. Although not specified as required components in this program's DQOs, total richness, and Simpson's diversity endpoints were all below the 50% RPD DQO for all field duplicate samples in 2017.

- Laboratory Duplicates – Duplicate re-counts were conducted on over 10% of the 2018 samples. No DQO exceedances were observed for the total density and total biomass endpoints in laboratory duplicates.
- Overall – While there were some DQO excursions in the field duplicate samples, the majority of those occurred during ice cover when phytoplankton communities have low biomass and densities. Phytoplankton metrics are known to be variable and interpretation of trends should not focus too much on individual values. Overall, the 2018 results met the data quality needs of the project.

Phytoplankton QA/QC Summary

The phytoplankton QA/QC analysis assessed both field collection and laboratory analysis and does not suggest data unreliability for 2018. There were some DQO excursions for field sampling but only when collection occurred through ice when phytoplankton levels are low and likely spatially heterogeneous.

A.2.1.5. Benthic Invertebrates

Laboratory replicate counts were performed on 10% of all benthic samples. Replicate samples were chosen at random and processed at different times from the original analysis to reduce bias. Percent recovery was above 92% in all re-sorted samples, with an average percent recovery of approximately 95.7% (**Table A-12**). These results suggest that the majority of individual organisms are recovered by the taxonomist during enumeration. As in previous years, the reference collection of benthic taxa for this project has been maintained.

Benthos Summary

There were no QA/QC concerns for benthic invertebrates in 2018 for any of the CREMP study areas.

TABLES

Table A-1. Laboratory QA/QC summary for the water and sediment quality program, 2018.

Event	Lab ID	Parameters Measured	Date sampled	Date received	Sample Integrity Observations	Temperature (°C)	Hold-time Exceedances	Data Qualifiers			Laboratory QC Summary									
											Detection Limits		Laboratory Duplicates		Method Blanks		Matrix Spike		LCS / CRM	
								Sample ID	Parameters	Qualifier	Parameters	Qualifier	Parameters	Qualifier	Parameters	Qualifier	Parameters	Qualifier	Parameters	Qualifier
May	L2098886	All parameters (except Wally Lake Samples)	13-May-18	23-May	Samples listed on COC but not received (SP110 T metals and D metals) Extra samples/bottles received but not listed on COC (SP-111, DI-1, WAL-79, WAL-80, TB)	NR	TDS, TSS, Turbidity, pH, Alkalinity, Diss O-PO4, Nitrate, Nitrite, TDP	Travel Blank SP-111 TPS-60 & SP-111 TPS-59 & TPE-111 TPE-110 & DI-1	Al, U & Zr Hg L, Ba, Cr & Zn Mn & Cd P & Mg	DLB DLM DTC DTMF RRV	Total - Al, U, Zr	DLB	None	-	Total - Al, U & Zr	MB-LOR & B	Diss - Ca, Mg, Sr	MS-B	Diss - Ba, Mn, V	MES
	L2099599	All parameters (except chloro-a for TE-94 and TE-95)	May 18-21	4-Jun	Containers broken in transit (T-Hg for PDL-63) Samples listed on COC but not received (No Chloro-a for TE-94 and TE-95)	18	TDS, TSS, Turbidity, pH, Diss O-PO4, Nitrate, Nitrite, TDP	TE-94	Al	DLB	None	-	None	-	Total - K Diss - Al	MB-LOR & B	Total - Mg	MS-B	None	-
	L2107814	Water - All analytes	May 30 - June 2	7-Jun	Discrepency between CoC and samples received	12, 14	TDS, TSS, Turbidity, pH, Alkalinity, Diss O-PO4, Nitrate, Nitrite, TDP	MAY-DI-1	Diss: Ba, Na, Sn Tot: Sn	RRV DTMF	TDS Diss: Al	DLB	None	-	Tot: S Diss: Al	MB-LOR	None	-	Diss: S	MES
	L1925440	All parameters	27-May-18	14-Jun	None	18	Turbidity, pH, Diss O-PO4, Nitrate, Nitrite, TDP				None	-	None	-	Total - Al & S	B	DOC	MS-B	None	
	L2103642	All parameters	27-May-18	31-May	None	18	Turbidity, pH, Diss O-PO4, Nitrate, Nitrite, TDP	None	-	-	None	-	None	-	Tot Al & Sr Diss OC; Tot OC, Ba, Ca, Mg, Sr & P	B MS-B	None	-	None	-
	L2093715	All parameters (except chloro-a)	9-May-18	14-May	None	18.4	Turbidity, pH, Diss O-PO4, Nitrate, Nitrite, TDP	None	-	-	None	-	None	-	Diss OC; Tot OC, Ba, Ca, Mg, Mn, K, Na & Sr	MS-B	None	-	None	-
July	L2129144	Water - All analytes except chl-a	8-Jul	13-Jul	Discrepency between CoC and samples received	22	Turbidity, pH, Diss O-PO4, Nitrate, Nitrite, TDP	JULY EB-1	Tot: As, Sb, Ba, Ca, Pb, Mg, Mn Diss: Ba, Pb, Zn	RRV	Tot: Ti	DLM	None	-	Tot: Tl	MB-LOR	Diss: Sr	MS-B	None	-
								JULY DUP-1	Diss: Pb	DTMF										
	L2129199	All parameters (except chloro-a)	July 7 & July 9	13-Jul	None	22	Turbidity, pH, Diss O-PO4, Nitrate, Nitrite, TDP	WAL-81	Total Pb	DTMF	Total - Zr	DLB	None	-	Total - Cr, V, Zr	MB-LOR	None		Total - S	MES
	L2132149	All parameters (except chloro-a)	15-Jul-18	19-Jul	None	20	Turbidity, pH, Diss O-PO4, Nitrate, Nitrite, TDP	TPN-113	DOC & TOC	HTP	None	-	None	-	Cl, Nitrate, SO4 Total - Al, Mn	MB-LOR & B	None	-	None	-
	L2136262	All parameters	July 9, 15, 19, 20	26-Jul	None	20 / 22.2	TDS, Turbidity, pH, Diss O-PO4, Nitrate, Nitrite, TDP	None	-	-	None	-	None	-	None	-	None	-	None	-
	L2133417	Water - All analytes	16-Jul	20-Jul	Discrepency between CoC and samples received	18	Turbidity, pH, Diss O-PO4, Nitrate, Nitrite, TDP	MAM-29 MAM-30 A20-23	Diss: Pb	DTMF	TDS Tot: Al, Mo, Ni	DLB	None	-	Tot: Al, Ba, Cd, Ca, Pb, Mg, Mg, Mo, Ni, Na, Sr, Sn	MB-LOR	Tot: Ca, Mg, Sr	MS-B	None	-
	L2136260	Water - All analytes	July 20 - 21	26-Jul	Discrepency between CoC and samples received	20, 22.2	Turbidity, pH, Cl, Diss O-PO4, Nitrate, Nitrite, TDP	None	-	-	Tot: Ti	DLM	None	-	None	-	None	-	None	-
	L2141222	All parameters	29-Jul-18	3-Aug	Discrepancy between COC and label	21	Turbidity, pH, Diss O-PO4, Nitrate, Nitrite, TDP	BAP-56 BAP-55	Diss S Diss Metals	DTMF DLA	TDS Hardness	DL	None	-	Diss - Th	B	Tot & Diss - Mg, Na, Sr	MS-B	Diss - S	MES

Table A-1. Laboratory QA/QC summary for the water and sediment quality program, 2018.

Event	Lab ID	Parameters Measured	Date sampled	Date received	Sample Integrity Observations	Temperature (°C)	Hold-time Exceedances	Data Qualifiers			Laboratory QC Summary									
											Detection Limits		Laboratory Duplicates		Method Blanks		Matrix Spike		LCS / CRM	
								Sample ID	Parameters	Qualifier	Parameters	Qualifier	Parameters	Qualifier	Parameters	Qualifier	Parameters	Qualifier	Parameters	Qualifier
August	L2149758	All parameters (except chloro-a)	Aug 13 & Aug 14	20-Aug	Discrepancy between COC and label	20	Turbidity, pH, Diss O-PO4, Nitrate, Nitrite, TDP	None	-	-	None	-	None	-	Diss - Mg	B	Diss OC, Ba, Ca, Mg, & Sr Tot Ca, Mg, & Sr	MS-B	Diss - S	MES
	L2154274	All parameters	Aug 13 & Aug 14 Aug 20 & Aug 21	28-Aug	Container broken in transit (BBD-58 may have been compromised)	22	Turbidity, pH, Diss O-PO4, Nitrate, Nitrite, TDP	None	-	-	None	-	None	-	None	-	Diss OC; Tot Ba, Ca, Cu, Mg, Mn, K, Na, Sr, & S	MS-B	None	-
	L2156055	Sediment grabs	Aug 10, 13, 11 , 20, 21 & 22	30-Aug	Some jars broke during transport; no effect on analyses	17.9	Moisture, EPH, PAHs	COMPs	MOG, EPHs, PAHs	DLHM	None	-	None	-	Benzo (g,h,i) perylene & Indeno(1,2,3-c,d) pyrene	MB-LOR	PAHs	MS-B	None	-
	L2155899	Sediment cores	Aug 10 & 11	30-Aug	None	17.9	Moisture	None	-	-	None	-	Cu, Fe, Ni, Sr & W	DUP-H	None	-	None	-	None	-
	L2152738	Water - All analytes except chl-a	Aug 14 - 19	24-Aug	Discrepency between CoC and samples received	15, 16, 17	TDS, TSS, Turbidity, pH, Alkalinity, Diss O-PO4, Nitrate, Nitrite, TDP	LK8-01	Diss: Cr	DTC	TDS Tot: Mo	DLB	None	-	Tot: Ag	MB-LOR	Tot: Sr Diss: Sr	MS-B	None	-
								WTP DI-1	Ammonia (as N)	RRV										
	L2154273	Water - Chl-a	Aug 14 - 17	28-Aug	None	22	None	None	-	-	None	-	n/a	-	None	-	n/a	-	None	-
	L2155885	Sediment grabs	Aug 13 - 19	30-Aug	Some jars broke during transport; no effect on analyses	17.9	Moisture, EPH, PAHs	COMPs	MOG, EPHs, PAHs	DLHM	TOC	>DL	None	-	None	-	None	-	Benzo(k) and (b&j) fluoranthene	LCS-ND
	L2155903	Sediment cores	Aug 14 - 18	30-Aug	Discrepency between CoC and samples received	17.9	Moisture	None	-	-	None	-	None	-	None	-	None	-	None	-
	L2154274	All parameters	Aug 13 & Aug 14 Aug 20 & Aug 21	28-Aug	Container broken in transit (BBD-58 may have been compromised)	22	Turbidity, pH, Diss O-PO4, Nitrate, Nitrite, TDP	None	-	-	None	-	None	-	None	-	Diss OC; Tot Ba, Ca, Cu, Mg, Mn, K, Na, Sr, & S	MS-B	None	-
September	L2161885	All parameters (except chloro-a)	Sept 02 & Sept 03	11-Sep	Discrepancy between COC and label; Sample labels incomplete	16	Turbidity, pH, Diss O-PO4, Nitrate, Nitrite, TDP	WAL-85 EB-1, DI-1	Diss Mn Diss Cd, Tot Pb, Tot Ba, Tot N	DTMF RRV	None	-	None	-	None	-	Diss OC & Mg; Tot OC, Ba, Ca, Cu, Pb, Mg, Na, Sr, & P	MS-B	None	-
	L2163886	All parameters	Sept 02 & Sept 03 (Chloro) Sept 08 21-May-18 (Te-Chloro)	13-Sep	Sample labels incomplete	17	Turbidity, pH, Diss O-PO4, Nitrate, Nitrite, TDP	BBD-60	SiO2	DLM	None	-	None	-	Tot Ag	MB-LOR	Diss Ba, Ca, Mg, Na, Sr & S; Tot Ba, Ca, Mg, Mn, Na, Sr, S & P	MS-B	None	-
	L2173524	Water - All analytes except chl-a	Sep 22 - 23	1-Oct	None	14	Cond, TDS, TSS, Turbidity, pH, Alkalinity, Ammonia, Br, Cl, Diss O-PO4, F, Nitrate, Nitrite, Si, SO4, TKN, TDP, TP, Cyanides, DOC, TOC, Hg	None	-	-	None	-	None	-	Diss: Phosphorus	B	None	-	None	-
	L2187379	Water - Chl-a	Sep 22 - 23	25-Oct	None	8	Chl-a	None	-	-	None	-	n/a	-	None	-	n/a	-	None	-

Table A-1. Laboratory QA/QC summary for the water and sediment quality program, 2018.

Event	Lab ID	Parameters Measured	Date sampled	Date received	Sample Integrity Observations	Temperature (°C)	Hold-time Exceedances	Data Qualifiers			Laboratory QC Summary									
											Detection Limits		Laboratory Duplicates		Method Blanks		Matrix Spike		LCS / CRM	
								Sample ID	Parameters	Qualifier	Parameters	Qualifier	Parameters	Qualifier	Parameters	Qualifier	Parameters	Qualifier	Parameters	Qualifier
November	L2194150	All parameters (except chloro-a)	Oct 30 to Nov 3	8-Nov	Container broken in transit (CREMP NOV DI-1 D-Hg vial)	13,13,12	Turbidity, pH, Diss O-PO4, Nitrate, Nitrite, TDP	None	-	-	None	-	None	-	None	-	Diss OC, Ca, Mg, Na, & Sr; Tot OC	MS-B	None	-
	L2194149	Water - All analytes except chl-a	Oct 31 - Nov 3	8-Nov	Discrepency between CoC and samples received	11	TDS, TSS, Turbidity, pH, Diss O-PO4, Nitrate, Nitrite, TDP	NOV EB-1	Tot: Al, Fe Diss: Zn	RRV	TDS	>DL	None	-	Tot: Ca	B	None	-	Tot: W Diss: S	MES
								MAM-35	Nitrite	RRV										
								MAM-35	Tot: Ti	DLM										
								NEM-36	Diss: Cr	DTC										
								DUP-1 and DUP-2	SiO2	RRV										
	L2205460	Water - Chl-a	Oct 31 - Nov 16	4-Dec	None	11	Chl-a	None	-	-	None	-	None	-	None	-	None	-	None	-
	L2195956	PDL (All analytes except chl-a)	5-Nov	5-Nov	None	12	Turbidity, pH, Diss O-PO4, Nitrate, Nitrite, TDP	None	-	-	None	-	None	-	None	-	F, N, & SiO2	MS-B	None	-
	L2203338	INUG (All analytes) All stations chl-a	Oct 31, Nov 3, Nov 5 & Nov 25	29-Nov	None	7	Turbidity, pH, Diss O-PO4, Nitrate, Nitrite, TDP	None	-	-	None	-	None	-	None	-	Diss Ba, Ca, Mg, Mn, K ,Si, Na, Sr, S, & U; Tot Ca, Mg, Na, Sr & S	MS-B	None	-
	L2200253	Water - All analytes except chl-a	16-Nov	22-Nov	Diss Hg vial LK5-05 broken during transport	5	Turbidity, pH, Diss O-PO4, Nitrate, Nitrite, TDP	LK5-05	Diss: Fe	DTC	None	-	None	-	None	-	None	-	None	-
	L2205457	Water - All analytes	Nov 25 - 27	4-Dec	Discrepency between CoC and samples received	11	Turbidity, pH, Diss O-PO4, Nitrate, Nitrite, TDP	DS1-27, A76-29, A76-30	Tot Cr	DLB	None	-	None	-	Tot: Cr	MB-LOR	Diss OC, Ca, Mg, Na & Sr; Tot OC; SiO2	MS-B		

Notes:
Conventionals = analytes that are not preserved
Diss O-PO4 = dissolved orthophosphate
LCS / CRM = laboratory control sample / certified reference material
TDS = total dissolved solids
TDP = total dissolved phosphorus
TSS = total suspended solids

Data and Laboratory QC qualifiers:
B = Method Blank exceeds ALS DQO. All associated sample results are at least 5 times greater than blank levels and are considered reliable.
DLA = Detection Limit adjusted for required dilution.
DLB = Detection Limit Raised. Analyte detected at comparable level in Method Blank.
DLDS = Detection Limit Raised: Dilution required due to high Dissolved Solids / Electrical Conductivity.
DLHM = Detection Limit Adjusted: Sample has high moisture content.
DTMF = Dissolved concentration exceeds total for field-filtered samples. Metallic contaminants may have been introduced to dissovled sample during field filtration.

Data and Laboratory QC qualifiers (continued):
DUP-H = Duplicate results outside ALS DQO, due to sample heterogeneity.
HTP = Sample preparation or preservation hold time was exceeded.
MB-LOR = Method Blank exceeds ALS DQO. Limits of Reporting have been adjusted for samples with positive hits below 5x blank level.
MES = Data Quality Objective was marginally exceeded (by < 10% absolute) for < 10% of analytes in a Multi-Element Scan / Multi-Parameter Scan (considered acceptable as per OMOE & CCME).
MS-B = Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
n/a = laboratory QC program not included as part of the analyses.

Table A-2. Laboratory detection limits and blanks (travel, de-ionized, and equipment) for the Meadowbank and Baker Lakes study area, 2018.

Month	May				July				August			
Collected by	Agnico				Agnico				Azimuth			
Analyte	DL	Travel Blank	DI Blank	Equip. Blank	DL	Travel Blank	DI Blank	Equip. Blank	DL	Travel Blank	DI Blank	Equip. Blank
Physical Tests												
Conductivity (µS/cm)	2	-	*<2.0*	*<2.0*	2	*<2.0*	*<2.0*	*<2.0*	2	*<2.0*	*<2.0*	*<2.0*
Hardness (mg/L)	0.5	-	*<0.5*	*<0.5*	0.5	*<0.5*	*<0.5*	*<0.5*	0.5	*<0.5*	*<0.5*	*<0.5*
pH (Laboratory)	0.1	-	5.36	5.37	0.1	5.43	5.47	5.91	0.1	5.43	5.39	5.36
Total Suspended Solids (mg/L)	1	-	*<1.0*	*<1.0*	1	*<1.0*	*<1.0*	*<1.0*	1	*<1.0*	*<1.0*	*<1.0*
Total Dissolved Solids (mg/L)	3	-	*<3.0*	*<3.0*	3	*<3.0*	*<3.0*	*<3.0*	3	*<3.0*	*<3.0*	*<3.0*
Turbidity (NTU)	0.1	-	*<0.1*	*<0.1*	0.1	*<0.1*	*<0.1*	*<0.1*	0.1	*<0.1*	*<0.1*	*<0.1*
Anions and Nutrients (mg/L)												
Alkalinity, Bicarbonate	1	-	*<1.0*	*<1.0*	1	*<1.0*	*<1.0*	*<1.0*	1	*<1.0*	*<1.0*	*<1.0*
Alkalinity, Carbonate	1	-	*<1.0*	*<1.0*	1	*<1.0*	*<1.0*	*<1.0*	1	*<1.0*	*<1.0*	*<1.0*
Alkalinity, Hydroxide	1	-	*<1.0*	*<1.0*	1	*<1.0*	*<1.0*	*<1.0*	1	*<1.0*	*<1.0*	*<1.0*
Alkalinity, Total	1	-	*<1.0*	*<1.0*	1	*<1.0*	*<1.0*	*<1.0*	1	*<1.0*	*<1.0*	*<1.0*
Ammonia, Total (as N)	0.005	-	*<0.005*	*<0.005*	0.005	*<0.005*	**0.011**	*<0.005*	0.005	*<0.005*	*<0.005*	*<0.005*
Bromide (Br)	0.05	-	*<0.05*	*<0.05*	0.05	*<0.05*	*<0.05*	*<0.05*	0.05	*<0.05*	*<0.05*	*<0.05*
Chloride (Cl)	0.1	-	*<0.1*	*<0.1*	0.1	*<0.1*	*<0.1*	*<0.1*	0.1	*<0.1*	*<0.1*	*<0.1*
Fluoride (F)	0.02	-	*<0.02*	*<0.02*	0.02	*<0.02*	*<0.02*	*<0.02*	0.02	*<0.02*	*<0.02*	*<0.02*
Nitrate (as N)	0.005	-	*<0.005*	*<0.005*	0.005	*<0.005*	*<0.005*	*<0.005*	0.005	*<0.005*	*<0.005*	*<0.005*
Nitrite (as N)	0.001	-	*<0.001*	*<0.001*	0.001	*<0.001*	*<0.001*	*<0.001*	0.001	*<0.001*	*<0.001*	*<0.001*
Total Kjeldahl Nitrogen	0.05	-	*<0.05*	*<0.05*	0.05	*<0.05*	*<0.05*	*<0.05*	0.05	*<0.05*	*<0.05*	*<0.05*
Orthophosphate-Dissolved (as P)	0.001	-	**0.0012**	*<0.001*	0.001	*<0.001*	*<0.001*	*<0.001*	0.001	*<0.001*	*<0.001*	*<0.001*
Phosphorus (P)-Total Dissolved	0.002	-	*<0.002*	*<0.002*	0.002	*<0.002*	*<0.002*	*<0.002*	0.002	*<0.002*	*<0.002*	*<0.002*
Phosphorus (P)-Total	0.002	-	*<0.002*	*<0.002*	0.002	*<0.002*	*<0.002*	*<0.002*	0.002	*<0.002*	*<0.002*	*<0.002*
Silicate (as SiO_2)	0.5	-	*<0.5*	*<0.5*	0.5	*<0.5*	*<0.5*	*<0.5*	0.5	*<0.5*	*<0.5*	*<0.5*
Sulfate (SO_4)	0.3	-	*<0.3*	*<0.3*	0.3	*<0.3*	*<0.3*	*<0.3*	0.3	*<0.3*	*<0.3*	*<0.3*
Cyanides (mg/L)												
Total Cyanide	0.001	*<0.001*	-	*<0.001*	0.001	*<0.001*	*<0.001*	*<0.001*	0.001	*<0.001*	*<0.001*	*<0.001*
Free Cyanide	0.001	*<0.001*	-	*<0.001*	0.001	*<0.001*	*<0.001*	*<0.001*	0.001	*<0.001*	*<0.001*	*<0.001*
Organic / Inorganic Carbon (mg/L)												
Dissolved Organic Carbon	0.5	-	-	*<0.5*	0.5	*<0.5*	*<0.5*	*<0.5*	0.5	-	*<0.5*	*<0.5*
Total Organic Carbon	0.5	-	**0.55**	*<0.5*	0.5	*<0.5*	*<0.5*	*<0.5*	0.5	*<0.5*	*<0.5*	*<0.5*
Plant Pigments (µg/L)												
Chlorophyll-a	0.01	-	-	-	0.01	-	-	-	0.01	-	-	-
Total Metals (mg/L)												
Aluminum	0.003	*<0.0060*	*<0.003*	**0.0044**	0.003	*<0.003*	*<0.003*	*<0.003*	0.003	*<0.003*	*<0.003*	*<0.003*
Antimony	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	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	0.0001	**0.00027**	*<0.0001*	**0.00024**	0.0001	*<0.0001*	*<0.0001*	*<0.0001*	0.0001	*<0.0001*	*<0.0001*	*<0.0001*
Beryllium	0.0001	*<0.0001*	*<0.0001*	*<0.0001*	0.0001	*<0.0001*	*<0.0001*	*<0.0001*	0.0001	*<0.0001*	*<0.0001*	*<0.0001*
Bismuth	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	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	0.000005	**0.0000085**	*<0.000005*	*<0.000005*	0.000005	*<0.000005*	*<0.000005*	*<0.000005*	0.000005	*<0.000005*	*<0.000005*	*<0.000005*
Calcium	0.05	1.02	*<0.05*	*<0.05*	0.05	*<0.05*	*<0.05*	*<0.05*	0.05	*<0.05*	*<0.05*	*<0.05*
Chromium	0.0001	**0.00011**	*<0.0001*	*<0.0001*	0.0001	*<0.0001*	*<0.0001*	*<0.0001*	0.0001	*<0.0001*	*<0.0001*	*<0.0001*
Cobalt	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	0.0005	**0.0022**	*<0.0005*	*<0.0005*	0.0005	*<0.0005*	*<0.0005*	*<0.0005*	0.0005	*<0.0005*	*<0.0005*	*<0.0005*
Iron	0.01	**0.011**	*<0.01*	*<0.01*	0.01	*<0.01*	*<0.01*	*<0.01*	0.01	*<0.01*	*<0.01*	*<0.01*
Lead	0.00005	**0.00017**	*<0.00005*	**0.000074**	0.00005	*<0.00005*	*<0.00005*	*<0.00005*	0.00005	*<0.00005*	*<0.00005*	*<0.00005*
Lithium	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	0.005	**0.022**	**0.0054**	**0.0272**	0.005	*<0.005*	*<0.005*	**0.0142**	0.005	*<0.005*	*<0.005*	*<0.005*
Manganese	0.0001	0.0012	*<0.0001*	**0.00016**	0.0001	*<0.0001*	*<0.0001*	*<0.0001*	0.0001	*<0.0001*	*<0.0001*	*<0.0001*
Mercury	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	0.00005	*<0.00005*	*<0.00005*	*<0.00005*	0.00005	*<0.00005*	*<0.00005*	*<0.00005*	0.00005	*<0.00005*	*<0.00005*	*<0.00005*
Nickel	0.0005	*<0.0005*	*<0.0005*	*<0.0005*	0.0005	*<0.0005*	*<0.0005*	*<0.0005*	0.0005	*<0.0005*	*<0.0005*	*<0.0005*
Phosphorus	0.05	*<0.05*	*<0.05*	*<0.05*	0.05	*<0.05*	*<0.05*	*<0.05*	0.05	*<0.05*	*<0.05*	*<0.05*
Potassium	0.05	*<0.05*	*<0.05*	*<0.05*	0.05	*<0.05*	*<0.05*	*<0.05*	0.05	*<0.05*	*<0.05*	*<0.05*
Selenium	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	0.1	*<0.1*	*<0.1*	*<0.1*	0.1	*<0.1*	*<0.1*	*<0.1*	0.1	*<0.1*	*<0.1*	*<0.1*
Silver	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	0.05	**0.089**	*<0.05*	*<0.05*	0.05	*<0.05*	*<0.05*	**0.177**	0.05	*<0.05*	*<0.05*	*<0.05*
Strontium	0.0002	**0.00076**	*<0.0002*	*<0.0002*	0.0002	*<0.0002*	*<0.0002*	*<0.0002*	0.0002	*<0.0002*	*<0.0002*	*<0.0002*
Sulfur	0.5	*<0.5*	*<0.5*	*<0.5*	0.5	*<0.5*	*<0.5*	*<0.5*	0.5	*<0.5*	*<0.5*	*<0.5*
Thallium	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	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	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	0.00001	*<0.00002*	*<0.00001*	*<0.00001*	0.00001	*<0.00001*	*<0.00001*	*<0.00001*	0.00001	*<0.00001*	*<0.00001*	*<0.00001*
Vanadium	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	0.003	**0.0032**	*<0.003*	*<0.003*	0.003	*<0.003*	*<0.003*	**0.0052**	0.003	*<0.003*	*<0.003*	*<0.003*
Dissolved Metals (mg/L)												
Aluminum	0.001	-	*<0.001*	*<0.001*	0.001	-	*<0.001*	*<0.001*	0.001	-	*<0.001*	*<0.001*
Antimony	0.0001	-	*<0.0001*	*<0.0001*	0.0001	-	*<0.0001*	*<0.0001*	0.0001	-	*<0.0001*	*<0.0001*
Arsenic	0.0001	-	*<0.0001*	*<0.0001*	0.0001	-	*<0.0001*	*<0.0001*	0.0001	-	*<0.0001*	*<0.0001*
Barium	0.0001	-	*<0.0001*	*<0.0001*	0.0001	-	*<0.0001*	*<0.0001*	0.0001	-	*<0.0001*	*<0.0001*
Beryllium	0.0001	-	*<0.0001*	*<0.0001*	0.0001	-	*<0.0001*	*<0.0001*	0.0001	-	*<0.0001*	*<0.0001*
Bismuth	0.00005	-	*<0.00005*	*<0.00005*	0.00005	-	*<0.00005*	*<0.00005*	0.00005	-	*<0.00005*	*<0.00005*
Boron	0.01	-	*<0.01*	*<0.01*	0.01	-	*<0.01*	*<0.01*	0.01	-	*<0.01*	*<0.01*
Cadmium	0.000005	-	*<0.000005*	*<0.000005*	0.000005	-	*<0.000005*	*<0.000005*	0.000005	-	*<0.000005*	*<0.000005*
Calcium	0.05	-	*<0.05*	*<0.05*	0.05	-	*<0.05*	*<0.05*	0.05	-	*<0.05*	*<0.05*
Chromium	0.0001	-	*<0.0001*	*<0.0001*	0.0001	-	*<0.0001*	*<0.0001*	0.0001	-	*<0.0001*	*<0.0001*
Cobalt	0.0001	-	*<0.0001*	*<0.0001*	0.0001	-	*<0.0001*	*<0.0001*	0.0001	-	*<0.0001*	*<0.0001*
Copper	0.0002	-	*<0.0002*	*<0.0002*	0.0002	-	*<0.0002*	*<0.0002*	0.0002	-	*<0.0002*	*<0.0002*
Iron	0.01	-	*<0.01*	*<0.01*	0.01	-	*<0.01*	*<0.01*	0.01	-	*<0.01*	*<0.01*
Lead	0.00005	-	*<0.00005*	*<0.00005*	0.00005	-	*<0.00005*	*<0.00005*	0.00005	-	*<0.00005*	*<0.00005*
Lithium	0.001	-	*<0.001*	*<0.001*	0.001	-	*<0.001*	*<0.001*	0.001	-	*<0.001*	*<0.001*
Magnesium	0.005	-	*<0.005*	*<0.005*	0.005	-	*<0.005*	**0.0147**	0.005	-	*<0.005*	*<0.005*
Manganese	0.0001	-	*<0.0001*	*<0.0001*	0.0001	-	*<0.0001*	*<0.0001*	0.0001	-	*<0.0001*	*<0.0001*
Mercury	0.000005	-	*<0.000005*	*<0.000005*	0.000005	-	*<0.000005*	*<0.000005*	0.000005	-	*<0.000005*	*<0.000005*
Molybdenum	0.00005	-	*<0.00005*	*<0.00005*	0.00005	-	*<0.00005*	*<0.00005*	0.00005	-	*<0.00005*	*<0.00005*
Nickel	0.0005	-	*<0.0005*	*<0.0005*	0.0005	-	*<0.0005*	*<0.0005*	0.0005	-	*<0.0005*	*<0.0005*
Phosphorus	0.05	-	*<0.05*	*<0.05*	0.05	-	*<0.05*	*<0.05*	0.05	-	*<0.05*	*<0.05*
Potassium	0.05	-	*<0.05*	*<0.05*	0.05	-	*<0.05*	*<0.05*	0.05	-	*<0.05*	*<0.05*
Selenium	0.00005	-	*<0.00005*	*<0.00005*	0.00005	-	*<0.00005*	*<0.00005*	0.00005	-	*<0.00005*	*<0.00005*
Silicon	0.05	-	*<0.05*	*<0.05*	0.05	-	*<0.05*	*<0.05*	0.05	-	*<0.05*	*<0.05*
Silver	0.00001	-	*<0.00001*	*<0.00001*	0.00001	-	*<0.00001*	*<0.00001*	0.00001	-	*<0.00001*	*<0.00001*
Sodium	0.05	-	*<0.05*	*<0.05*	0.05	-	*<0.05*	**0.168**	0.05	-	*<0.05*	*<0.05*
Strontium	0.0002	-	*<0.0002*	*<0.0002*	0.0002	-	*<0.0002*	*<0.0002*	0.0002	-	*<0.0002*	*<0.0002*
Sulfur	0.5	-	*<0.5*	*<0.5*	0.5	-	*<0.5*	*<0.5*	0.5	-	*<0.5*	*<0.5*
Thallium	0.00001	-	*<0.00001*	*<0.00001*	0.00001	-	*<0.00001*	*<0.00001*	0.00001	-	*<0.00001*	*<0.00001*
Tin	0.0001	-	*<0.0001*	*<0.0001*	0.0001	-	*<0.0001*	*<0.0001*	0.0001	-	*<0.0001*	*<0.0001*
Titanium	0.0003	-	*<0.0003*	*<0.0003*	0.0003	-	*<0.0003*	*<0.0003*	0.0003	-	*<0.0003*	*<0.0003*
Uranium	0.00001	-	*<0.00001*	*<0.00001*	0.00001	-	*<0.00001*	*<0.00001*	0.00001	-	*<0.00001*	*<0.00001*
Vanadium	0.0005	-	*<0.0005*	*<0.0005*	0.0005	-	*<0.0005*	*<0.0005*	0.0005	-	*<0.0005*	*<0.0005*
Zinc	0.001	-	*<0.001*	*<0.001*	0.001	-	*<0.001*	**0.0051**	0.001	-	*<0.001*	**0.0010**
Zirconium	0.00006	-	*<0.00006*	*<0.00006*	0.00006	-	*<0.00006*	*<0.00006*	0.00006	-	*<0.00006*	*<0.00006*

Notes:

Bolded Equipment or Travel Blank values concentrations exceeds laboratory DLs but < 10x DL.

Shaded Equipment or Travel Blank values concentrations is > 10x DL.

Italicized numbers are below detection limits.

"-" analyte not measured

Table A-2. Laboratory detection limits and blanks (travel, de-ionized, and equipment) for the Meadowbank and Baker Lakes study area, 2018.

Month	September				November			
Collected by	Agnico				Agnico			
Analyte	DL	Travel Blank	DI Blank	Equip. Blank	DL	Travel Blank	DI Blank	Equip. Blank
Physical Tests								
Conductivity (µS/cm)	2	*<2.0*	*<2.0*	*<2.0*	2	-	*<2.0*	*<2.0*
Hardness (mg/L)	0.5	*<0.5*	*<0.5*	*<0.5*	0.5	-	*<0.5*	*<0.5*
pH (Laboratory)	0.1	5.41	5.45	5.48	0.1	-	5.41	5.37
Total Suspended Solids (mg/L)	1	*<1.0*	*<1.0*	*<1.0*	1	-	*<1.0*	*<1.0*
Total Dissolved Solids (mg/L)	3	*<3.0*	*<3.0*	*<3.0*	3	-	*<3.0*	*<3.0*
Turbidity (NTU)	0.1	*<0.1*	*<0.1*	*<0.1*	0.1	-	*<0.1*	*<0.1*
Anions and Nutrients (mg/L)								
Alkalinity, Bicarbonate	1	*<1.0*	*<1.0*	*<1.0*	1	-	*<1.0*	*<1.0*
Alkalinity, Carbonate	1	*<1.0*	*<1.0*	*<1.0*	1	-	*<1.0*	*<1.0*
Alkalinity, Hydroxide	1	*<1.0*	*<1.0*	*<1.0*	1	-	*<1.0*	*<1.0*
Alkalinity, Total	1	*<1.0*	*<1.0*	*<1.0*	1	-	*<1.0*	*<1.0*
Ammonia, Total (as N)	0.005	*<0.005*	**0.012**	**0.0083**	0.005	-	*<0.005*	*<0.005*
Bromide (Br)	0.05	*<0.05*	*<0.05*	*<0.05*	0.05	-	*<0.05*	*<0.05*
Chloride (Cl)	0.1	*<0.1*	*<0.1*	*<0.1*	0.1	-	*<0.1*	*<0.1*
Fluoride (F)	0.02	*<0.02*	*<0.02*	*<0.02*	0.02	-	*<0.02*	*<0.02*
Nitrate (as N)	0.005	*<0.005*	*<0.005*	*<0.005*	0.005	-	*<0.005*	*<0.005*
Nitrite (as N)	0.001	*<0.001*	*<0.001*	*<0.001*	0.001	-	*<0.001*	*<0.001*
Total Kjeldahl Nitrogen	0.05	*<0.05*	*<0.05*	*<0.05*	0.05	-	*<0.05*	*<0.05*
Orthophosphate-Dissolved (as P)	0.001	*<0.001*	*<0.001*	*<0.001*	0.001	-	*<0.001*	*<0.001*
Phosphorus (P)-Total Dissolved	0.002	*<0.002*	*<0.002*	*<0.002*	0.002	-	*<0.002*	*<0.002*
Phosphorus (P)-Total	0.002	*<0.002*	*<0.002*	*<0.002*	0.002	-	**0.0032**	*<0.002*
Silicate (as SiO_2)	0.5	*<0.5*	*<0.5*	*<0.5*	0.5	-	*<0.5*	*<0.5*
Sulfate (SO_4)	0.3	*<0.3*	*<0.3*	*<0.3*	0.3	-	*<0.3*	*<0.3*
Cyanides (mg/L)								
Total Cyanide	0.001	*<0.001*	*<0.001*	*<0.001*	0.001	-	*<0.001*	*<0.001*
Free Cyanide	0.001	*<0.001*	*<0.001*	*<0.001*	0.001	-	*<0.001*	*<0.001*
Organic / Inorganic Carbon (mg/L)								
Dissolved Organic Carbon	0.5	*<0.5*	*<0.5*	*<0.5*	0.5	-	**1.8**	*<0.5*
Total Organic Carbon	0.5	*<0.5*	*<0.5*	*<0.5*	0.5	-	**1.9**	*<0.5*
Plant Pigments (µg/L)								
Chlorophyll-a	0.01	-	-	-	0.01	-	-	-
Total Metals (mg/L)								
Aluminum	0.003	*<0.003*	*<0.003*	*<0.003*	0.003	-	*<0.003*	*<0.003*
Antimony	0.0001	*<0.0001*	*<0.0001*	*<0.0001*	0.0001	-	*<0.0001*	*<0.0001*
Arsenic	0.0001	*<0.0001*	*<0.0001*	*<0.0001*	0.0001	-	*<0.0001*	*<0.0001*
Barium	0.0001	*<0.0001*	*<0.0001*	**0.00017**	0.0001	-	**0.00018**	*<0.0001*
Beryllium	0.0001	*<0.0001*	*<0.0001*	*<0.0001*	0.0001	-	*<0.0001*	*<0.0001*
Bismuth	0.00005	*<0.00005*	*<0.00005*	*<0.00005*	0.00005	-	*<0.00005*	*<0.00005*
Boron	0.01	*<0.01*	*<0.01*	*<0.01*	0.01	-	*<0.01*	*<0.01*
Cadmium	0.000005	*<0.000005*	*<0.000005*	*<0.000005*	0.000005	-	*<0.000005*	*<0.000005*
Calcium	0.05	*<0.05*	*<0.05*	*<0.05*	0.05	-	*<0.05*	*<0.05*
Chromium	0.0001	*<0.0001*	*<0.0001*	*<0.0001*	0.0001	-	*<0.0001*	*<0.0001*
Cobalt	0.0001	*<0.0001*	*<0.0001*	*<0.0001*	0.0001	-	*<0.0001*	*<0.0001*
Copper	0.0005	*<0.0005*	*<0.0005*	*<0.0005*	0.0005	-	*<0.0005*	*<0.0005*
Iron	0.01	*<0.01*	*<0.01*	*<0.01*	0.01	-	*<0.01*	*<0.01*
Lead	0.00005	*<0.00005*	*<0.00005*	**0.00011**	0.00005	-	*<0.00005*	*<0.00005*
Lithium	0.001	*<0.001*	*<0.001*	*<0.001*	0.001	-	*<0.001*	*<0.001*
Magnesium	0.005	*<0.005*	*<0.005*	*<0.005*	0.005	-	*<0.005*	*<0.005*
Manganese	0.0001	*<0.0001*	*<0.0001*	*<0.0001*	0.0001	-	*<0.0001*	*<0.0001*
Mercury	0.000005	*<0.000005*	*<0.000005*	*<0.000005*	0.000005	-	*<0.000005*	*<0.000005*
Molybdenum	0.00005	*<0.00005*	*<0.00005*	*<0.00005*	0.00005	-	*<0.00005*	*<0.00005*
Nickel	0.0005	*<0.0005*	*<0.0005*	*<0.0005*	0.0005	-	*<0.0005*	*<0.0005*
Phosphorus	0.05	*<0.05*	*<0.05*	*<0.05*	0.05	-	*<0.05*	*<0.05*
Potassium	0.05	*<0.05*	*<0.05*	*<0.05*	0.05	-	*<0.05*	*<0.05*
Selenium	0.00005	*<0.00005*	*<0.00005*	*<0.00005*	0.00005	-	*<0.00005*	*<0.00005*
Silicon	0.1	*<0.1*	*<0.1*	*<0.1*	0.1	-	*<0.1*	*<0.1*
Silver	0.00001	*<0.00001*	*<0.00001*	*<0.00001*	0.00001	-	*<0.00001*	*<0.00001*
Sodium	0.05	*<0.05*	*<0.05*	*<0.05*	0.05	-	*<0.05*	*<0.05*
Strontium	0.0002	*<0.0002*	*<0.0002*	*<0.0002*	0.0002	-	*<0.0002*	*<0.0002*
Sulfur	0.5	*<0.5*	*<0.5*	*<0.5*	0.5	-	*<0.5*	*<0.5*
Thallium	0.00001	*<0.00001*	*<0.00001*	*<0.00001*	0.00001	-	*<0.00001*	*<0.00001*
Tin	0.0001	*<0.0001*	*<0.0001*	*<0.0001*	0.0001	-	*<0.0001*	*<0.0001*
Titanium	0.0003	*<0.0003*	*<0.0003*	*<0.0003*	0.0003	-	*<0.0003*	*<0.0003*
Uranium	0.00001	*<0.00001*	*<0.00001*	*<0.00001*	0.00001	-	*<0.00001*	*<0.00001*
Vanadium	0.0005	*<0.0005*	*<0.0005*	*<0.0005*	0.0005	-	*<0.0005*	*<0.0005*
Zinc	0.003	*<0.003*	*<0.003*	*<0.003*	0.003	-	*<0.003*	*<0.003*
Dissolved Metals (mg/L)								
Aluminum	0.001	-	*<0.001*	*<0.001*	0.001	-	*<0.001*	*<0.001*
Antimony	0.0001	-	*<0.0001*	*<0.0001*	0.0001	-	*<0.0001*	*<0.0001*
Arsenic	0.0001	-	*<0.0001*	*<0.0001*	0.0001	-	*<0.0001*	*<0.0001*
Barium	0.0001	-	*<0.0001*	*<0.0001*	0.0001	-	*<0.0001*	*<0.0001*
Beryllium	0.0001	-	*<0.0001*	*<0.0001*	0.0001	-	*<0.0001*	*<0.0001*
Bismuth	0.00005	-	*<0.00005*	*<0.00005*	0.00005	-	*<0.00005*	*<0.00005*
Boron	0.01	-	*<0.01*	*<0.01*	0.01	-	*<0.01*	*<0.01*
Cadmium	0.000005	-	**0.00003**	*<0.000005*	0.000005	-	*<0.000005*	*<0.000005*
Calcium	0.05	-	*<0.05*	*<0.05*	0.05	-	*<0.05*	*<0.05*
Chromium	0.0001	-	*<0.0001*	*<0.0001*	0.0001	-	*<0.0001*	*<0.0001*
Cobalt	0.0001	-	*<0.0001*	*<0.0001*	0.0001	-	*<0.0001*	*<0.0001*
Copper	0.0002	-	*<0.0002*	*<0.0002*	0.0002	-	*<0.0002*	*<0.0002*
Iron	0.01	-	*<0.01*	*<0.01*	0.01	-	*<0.01*	*<0.01*
Lead	0.00005	-	*<0.00005*	*<0.00005*	0.00005	-	*<0.00005*	*<0.00005*
Lithium	0.001	-	*<0.001*	*<0.001*	0.001	-	*<0.001*	*<0.001*
Magnesium	0.005	-	*<0.005*	*<0.005*	0.005	-	*<0.005*	*<0.005*
Manganese	0.0001	-	*<0.0001*	*<0.0001*	0.0001	-	*<0.0001*	*<0.0001*
Mercury	0.000005	-	*<0.000005*	*<0.000005*	0.000005	-	*<0.000005*	*<0.000005*
Molybdenum	0.00005	-	*<0.00005*	*<0.00005*	0.00005	-	*<0.00005*	*<0.00005*
Nickel	0.0005	-	*<0.0005*	*<0.0005*	0.0005	-	*<0.0005*	*<0.0005*
Phosphorus	0.05	-	*<0.05*	*<0.05*	0.05	-	*<0.05*	*<0.05*
Potassium	0.05	-	*<0.05*	*<0.05*	0.05	-	*<0.05*	*<0.05*
Selenium	0.00005	-	*<0.00005*	*<0.00005*	0.00005	-	*<0.00005*	*<0.00005*
Silicon	0.05	-	*<0.05*	*<0.05*	0.05	-	*<0.05*	*<0.05*
Silver	0.00001	-	*<0.00001*	*<0.00001*	0.00001	-	*<0.00001*	*<0.00001*
Sodium	0.05	-	*<0.05*	*<0.05*	0.05	-	*<0.05*	*<0.05*
Strontium	0.0002	-	*<0.0002*	*<0.0002*	0.0002	-	*<0.0002*	*<0.0002*
Sulfur	0.5	-	*<0.5*	*<0.5*	0.5	-	*<0.5*	*<0.5*
Thallium	0.00001	-	*<0.00001*	*<0.00001*	0.00001	-	*<0.00001*	*<0.00001*
Tin	0.0001	-	*<0.0001*	*<0.0001*	0.0001	-	*<0.0001*	*<0.0001*
Titanium	0.0003	-	*<0.0003*	*<0.0003*	0.0003	-	*<0.0003*	*<0.0003*
Uranium	0.00001	-	*<0.00001*	*<0.00001*	0.00001	-	*<0.00001*	*<0.00001*
Vanadium	0.0005	-	*<0.0005*	*<0.0005*	0.0005	-	*<0.0005*	*<0.0005*
Zinc	0.001	-	*<0.001*	**0.001**	0.001	-	*<0.001*	*<0.001*
Zirconium	0.00006	-	*<0.00006*	*<0.00006*	0.00006	-	*<0.00006*	*<0.00006*

Notes:

Bolded Equipment or Travel Blank values concentrations exceeds laboratory DLs but < 10x DL.

Shaded Equipment or Travel Blank values concentrations is > 10x DL.

Italicized numbers are below detection limits.

"-" analyte not measured

Table A-3. Laboratory detection limits and blanks (travel, deionized water, and equipment) for the Whale Tail Pit Lakes, 2018.

Month	July				August				September				November			
Collected by	Agnico				Azimuth				Agnico				Agnico			
Analyte	DL	Travel Blank	DI Blank	Equip. Blank	DL	Travel Blank	DI Blank	Equip. Blank	DL	Travel Blank	DI Blank	Equip. Blank	DL	Travel Blank	DI Blank	Equip. Blank
Physical Tests																
Conductivity (µS/cm)	2	*<2.0*	*<2.0*	*<2.0*	2	*<2.0*	*<2.0*	*<2.0*	2	*<2.0*	*<2.0*	*<2.0*	2	-	*<2.0*	*<2.0*
Hardness (mg/L)	0.5	*<0.5*	*<0.5*	*<0.5*	0.5	*<0.5*	*<0.5*	*<0.5*	0.5	*<0.5*	*<0.5*	*<0.5*	0.5	-	*<0.5*	*<0.5*
pH (Laboratory)	0.1	5.43	5.44	5.52	0.1	5.43	5.44	5.50	0.1	5.41	5.6	5.68	0.1	-	5.45	5.45
Total Suspended Solids (mg/L)	1	*<1.0*	*<1.0*	*<1.0*	1	*<1.0*	*<1.0*	*<1.0*	1	*<1.0*	*<1.0*	*<1.0*	1	-	*<1.0*	*<1.0*
Total Dissolved Solids (mg/L)	3	*<3.0*	*<3.0*	*<3.0*	3	*<3.0*	*<3.0*	*<3.0*	3	*<3.0*	*<3.0*	*<3.0*	3	-	*<3.0*	*<3.0*
Turbidity (NTU)	0.1	*<0.1*	*<0.1*	**0.19**	0.1	*<0.1*	*<0.1*	*<0.1*	0.1	*<0.1*	*<0.1*	**0.27**	0.1	-	*<0.1*	*<0.1*
Anions and Nutrients (mg/L)																
Alkalinity, Bicarbonate (as $CaCO_3$)	1	*<1.0*	*<1.0*	*<1.0*	1	*<1.0*	*<1.0*	*<1.0*	1	*<1.0*	*<1.0*	*<1.0*	1	-	*<1.0*	*<1.0*
Alkalinity, Carbonate (as $CaCO_3$)	1	*<1.0*	*<1.0*	*<1.0*	1	*<1.0*	*<1.0*	*<1.0*	1	*<1.0*	*<1.0*	*<1.0*	1	-	*<1.0*	*<1.0*
Alkalinity, Hydroxide (as $CaCO_3$)	1	*<1.0*	*<1.0*	*<1.0*	1	*<1.0*	*<1.0*	*<1.0*	1	*<1.0*	*<1.0*	*<1.0*	1	-	*<1.0*	*<1.0*
Alkalinity, Total (as $CaCO_3$)	1	*<1.0*	*<1.0*	*<1.0*	1	*<1.0*	*<1.0*	*<1.0*	1	*<1.0*	*<1.0*	*<1.0*	1	-	*<1.0*	*<1.0*
Ammonia, Total (as N)	0.005	*<0.005*	*<0.005*	*<0.005*	0.005	*<0.005*	**0.011**	*<0.005*	0.005	*<0.005*	**0.037**	*<0.005*	0.005	-	*<0.005*	*<0.005*
Bromide (Br)	0.05	*<0.05*	*<0.05*	*<0.05*	0.05	*<0.05*	*<0.05*	*<0.05*	0.05	*<0.05*	*<0.05*	*<0.05*	0.05	-	*<0.05*	*<0.05*
Chloride (Cl)	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*
Fluoride (F)	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*
Nitrate (as N)	0.005	*<0.005*	*<0.005*	*<0.005*	0.005	*<0.005*	*<0.005*	*<0.005*	0.005	*<0.005*	*<0.005*	*<0.005*	0.005	-	*<0.005*	*<0.005*
Nitrite (as N)	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*
Total Kjeldahl Nitrogen	0.05	*<0.05*	*<0.05*	*<0.05*	0.05	*<0.05*	*<0.05*	*<0.05*	0.05	*<0.05*	*<0.05*	*<0.05*	0.05	-	*<0.05*	*<0.05*
Orthophosphate-Dissolved (as P)	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*
Phosphorus (P)-Total Dissolved	0.002	*<0.002*	*<0.002*	*<0.002*	0.002	*<0.002*	*<0.002*	*<0.002*	0.002	*<0.002*	*<0.002*	*<0.002*	0.002	-	*<0.002*	*<0.002*
Phosphorus (P)-Total	0.002	*<0.002*	*<0.002*	*<0.002*	0.002	*<0.002*	*<0.002*	*<0.002*	0.002	*<0.002*	*<0.002*	*<0.002*	0.002	-	*<0.002*	*<0.002*
Silicate (as SiO_2)	0.5	*<0.5*	*<0.5*	*<0.5*	0.5	*<0.5*	*<0.5*	*<0.5*	0.5	*<0.5*	*<0.5*	*<0.5*	0.5	-	*<0.5*	*<0.5*
Sulfate (SO_4)	0.3	*<0.3*	*<0.3*	*<0.3*	0.3	*<0.3*	*<0.3*	*<0.3*	0.3	*<0.3*	*<0.3*	*<0.3*	0.3	-	*<0.3*	*<0.3*
Cyanides (mg/L)																
Total Cyanide	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*
Free Cyanide	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*
Organic / Inorganic Carbon (mg/L)																
Dissolved Organic Carbon	0.5	*<0.5*	*<0.5*	*<0.5*	0.5	-	*<0.5*	*<0.5*	0.5	*<0.5*	*<0.5*	**0.50**	0.5	-	*<0.5*	*<0.5*
Total Organic Carbon	0.5	*<0.5*	**0.57**	*<0.5*	0.5	*<0.5*	*<0.5*	*<0.5*	0.5	*<0.5*	*<0.5*	*<0.5*	0.5	-	*<0.5*	*<0.5*
Plant Pigments (µg/L)																
Chlorophyll-a	0.01	-	-	-	0.01	-	-	-	0.01	-	-	-	0.01	-	-	-
Total Metals (mg/L)																
Aluminum	0.003	*<0.003*	*<0.003*	**0.0046**	0.003	*<0.003*	*<0.003*	*<0.003*	0.003	*<0.003*	*<0.003*	*<0.003*	0.003	-	*<0.003*	**0.005**
Antimony	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*
Arsenic	0.0001	*<0.0001*	*<0.0001*	*<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	0.0001	*<0.0001*	*<0.0001*	**0.00018**	0.0001	*<0.0001*	*<0.0001*	*<0.0001*	0.0001	*<0.0001*	*<0.0001*	*<0.0001*	0.0001	-	*<0.0001*	*<0.0001*
Beryllium	0.0001	*<0.0001*	*<0.0001*	*<0.0001*	0.0001	*<0.0001*	*<0.0001*	*<0.0001*	0.0001	*<0.0001*	*<0.0001*	*<0.0001*	0.0001	-	*<0.0001*	*<0.0001*
Bismuth	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	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	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	0.05	*<0.05*	*<0.05*	**0.055**	0.05	*<0.05*	*<0.05*	*<0.05*	0.05	*<0.05*	*<0.05*	*<0.05*	0.05	-	*<0.05*	*<0.05*
Cesium	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*
Chromium	0.0001	*<0.0001*	*<0.0001*	*<0.0001*	0.0001	*<0.0001*	*<0.0001*	*<0.0001*	0.0001	*<0.0001*	*<0.0001*	*<0.0001*	0.0001	-	*<0.0001*	
Cobalt	0.0001	*<0.0001*	*<0.0001*	*<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	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*
Iron	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	0.00005	*<0.00005*	*<0.00005*	0.00244	0.00005	*<0.00005*	*<0.00005*	*<0.00005*	0.00005	*<0.00005*	**0.000082**	*<0.00005*	0.00005	-	*<0.00005*	**0.000071**
Lithium	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	0.005	*<0.005*	*<0.005*	0.0697	0.005	*<0.005*	*<0.005*	*<0.005*	0.005	*<0.005*	*<0.005*	*<0.005*	0.005	-	*<0.005*	*<0.005*
Manganese	0.0001	*<0.0001*	*<0.0001*	**0.00019**	0.0001	*<0.0001*	*<0.0001*	*<0.0001*	0.0001	*<0.0001*	*<0.0001*	*<0.0001*	0.0001	-	*<0.0001*	
Mercury	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	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*
Nickel	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*
Phosphorus	0.05	*<0.05*	*<0.05*	*<0.05*	0.05	*<0.05*	*<0.05*	*<0.05*	0.05	*<0.05*	*<0.05*	*<0.05*	0.05	-	*<0.05*	*<0.05*
Potassium	0.05	*<0.05*	*<0.05*	*<0.05*	0.05	*<0.05*	*<0.05*	*<0.05*	0.05	*<0.05*	*<0.05*	*<0.05*	0.05	-	*<0.05*	*<0.05*
Rubidium	0.0002	*<0.0002*	*<0.0002*	*<0.0002*	0.0002	*<0.0002*	*<0.0002*	*<0.0002*	0.0002	*<0.0002*	*<0.0002*	*<0.0002*	0.0002	-	*<0.0002*	*<0.0002*
Selenium	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	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*
Silver	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	0.05	*<0.05*	*<0.05*	*<0.05*	0.05	*<0.05*	*<0.05*	*<0.05*	0.05	*<0.05*	*<0.05*	*<0.05*	0.05	-	*<0.05*	*<0.05*
Strontium	0.0002	*<0.0002*	*<0.0002*	*<0.0002*	0.0002	*<0.0002*	*<0.0002*	*<0.0002*	0.0002	*<0.0002*	*<0.0002*	*<0.0002*	0.0002	-	*<0.0002*	*<0.0002*
Sulfur	0.5	*<0.5*	*<0.5*	*<0.5*	0.5	*<0.5*	*<0.5*	*<0.5*	0.5	*<0.5*	*<0.5*	*<0.5*	0.5	-	*<0.5*	*<0.5*
Tellurium	0.0002	*<0.0002*	*<0.0002*	*<0.0002*	0.0002	*<0.0002*	*<0.0002*	*<0.0002*	0.0002	*<0.0002*	*<0.0002*	*<0.0002*	0.0002	-	*<0.0002*	*<0.0002*
Thallium	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*
Thorium	0.0001	*<0.0001*	*<0.0001*	*<0.0001*	0.0001	*<0.0001*	*<0.0001*	*<0.0001*	0.0001	*<0.0001*	*<0.0001*	*<0.0001*	0.0001	-	*<0.0001*	*<0.0001*
Tin	0.0001	*<0.0001*	*<0.0001*	*<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	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*
Tungsten	0.0001	*<0.0001*	*<0.0001*	*<0.0001*	0.0001	*<0.0001*	*<0.0001*	*<0.0001*	0.0001	*<0.0001*	*<0.0001*	*<0.0001*	0.0001	-	*<0.0001*	*<0.0001*
Uranium	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*
Vanadium	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	0.003	*<0.003*	*<0.003*	**0.0045**	0.003	*<0.003*	*<0.003*	*<0.003*	0.003	*<0.003*	*<0.003*	*<0.003*	0.003	-	*<0.003*	*<0.003*
Zirconium	0.00006	*<0.000060*	*<0.000060*	*<0.000060*	0.00006	*<0.000060*	*<0.000060*	*<0.000060*	0.00006	*<0.000060*	*<0.000060*	*<0.000060*	0.00006	-	*<0.000060*	*<0.000060*
Dissolved Metals (mg/L)																
Aluminum	0.001	-	*<0.001*	*<0.001*	0.001	-	*<0.001*	*<0.001*	0.001	-	*<0.001*	*<0.001*	0.001	-	*<0.001*	*<0.001*
Antimony	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	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	0.0001	-	*<0.0001*	**0.0003**	0.0001	-	*<0.0001*	*<0.0001*	0.0001	-	*<0.0001*	*<0.0001*	0.0001	-	*<0.0001*	*<0.0001*
Beryllium	0.0001	-	*<0.0001*	*<0.0001*	0.0001	-	*<0.0001*	*<0.0001*	0.0001	-	*<0.0001*	*<0.0001*	0.0001	-	*<0.0001*	*<0.0001*
Bismuth	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	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	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	0.05	-	*<0.05*	*<0.05*	0.05	-	*<0.05*	*<0.05*	0.05	-	*<0.05*	*<0.05*	0.05	-	*<0.05*	*<0.05*
Cesium	0.00001	-	*<0.00001*	*<0.00001*	0.00001	-	*<0.00001*	*<0.00001*	0.00001	-	*<0.00001*	*<0.00001*	0.00001	-	*<0.00001*	*<0.00001*
Chromium	0.0001	-	*<0.0001*	*<0.0001*	0.0001	-	*<0.0001*	*<0.0001*	0.0001	-	0.00134	*<0.0001*	0.0001	-	*<0.0001*	*<0.0001*
Cobalt	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	0.0002	-	*<0.0002*	*<0.0002*	0.0002	-	*<0.0002*	*<0.0002*	0.0002	-	*<0.0002*	*<0.0002*	0.0002	-	*<0.0002*	*<0.0002*
Iron	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	0.00005	-	*<0.00005*	**0.000075**	0.00005	-	*<0.00005*	*<0.00005*	0.00005	-		*<0.00005*	0.00005	-	*<0.00005*	*<0.00005*
Lithium	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	0.005	-	*<0.005*	*<0.005*	0.005	-	*<0.005*	*<0.005*	0.005	-	*<0.005*	*<0.005*	0.005	-	*<0.005*	*<0.005*
Manganese	0.0001	-	*<0.0001*	*<0.0001*	0.0001	-	*<0.0001*	*<0.0001*	0.0001	-	*<0.0001*	*<0.0001*	0.0001	-	*<0.0001*	*<0.0001*
Mercury	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	0.00005	-	*<0.00005*	*<0.00005*	0.00005	-	*<0.00005*	*<0.00005*	0.00005	-	*<0.00005*	*<0.00005*	0.00005	-	*<0.00005*	*<0.00005*
Nickel	0.0005	-	*<0.0005*	*<0.0005*	0.0005	-	*<0.0005*	*<0.0005*	0.0005	-	*<0.0005*	*<0.0005*	0.0005	-	*<0.0005*	*<0.0005*
Phosphorus	0.05	-	*<0.05*	*<0.05*	0.05	-	*<0.05*	*<0.05*	0.05	-	*<0.05*	*<0.05*	0.05	-	*<0.05*	*<0.05*
Potassium	0.05	-	*<0.05*	*<0.05*	0.05	-	*<0.05*	*<0.05*	0.05	-	*<0.05*	*<0.05*	0.05	-	*<0.05*	*<0.05*
Rubidium	0.0002	-	*<0.0002*	*<0.0002*	0.0002	-	*<0.0002*	*<0.0002*	0.0002	-	*<0.0002*	*<0.0002*	0.0002	-	*<0.0002*	*<0.0002*
Selenium	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	0.05	-	*<0.05*	*<0.05*	0.05	-	*<0.05*	*<0.05*	0.05	-	*<0.05*	*<0.05*	0.05	-	*<0.05*	*<0.05*
Silver	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	0.05	-	*<0.05*	*<0.05*	0.05	-	*<0.05*	*<0.05*	0.05	-	*<0.05*	*<0.05*	0.05	-	*<0.05*	*<0.05*
Strontium	0.0002	-	*<0.0002*	*<0.0002*	0.0002	-	*<0.0002*	*<0.0002*	0.0002	-	*<0.0002*	*<0.0002*	0.0002	-	*<0.0002*	*<0.0002*
Sulfur	0.5	-	*<0.5*	*<0.5*	0.5	-	*<0.5*	*<0.5*	0.5	-	*<0.5*	*<0.5*	0.5	-	*<0.5*	*<0.5*
Tellurium	0.0002	-	*<0.0002*	*<0.0002*	0.0002	-	*<0.0002*	*<0.0002*	0.0002	-	*<0.0002*	*<0.0002*	0.0002	-	*<0.0002*	*<0.0002*
Thallium	0.00001	-	*<0.00001*	*<0.00001*	0.00001	-	*<0.00001*	*<0.00001*	0.00001	-	*<0.00001*	*<0.00001*	0.00001	-	*<0.00001*	*<0.00001*
Thorium	0.0001	-	*<0.0001*	*<0.0001*	0.0001	-	*<0.0001*	*<0.0001*	0.0001	-	*<0.0001*	*<0.0001*	0.0001	-	*<0.0001*	*<0.0001*
Tin	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	0.0003	-	*<0.0003*	*<0.0003*	0.0003	-	*<0.0003*	*<0.0003*	0.0003	-	*<0.0003*	*<0.0003*	0.0003	-	*<0.0003*	*<0.0003*
Tungsten	0.0001	-	*<0.0001*	*<0.0001*	0.0001	-	*<0.0001*	*<0.0001*	0.0001	-	*<0.0001*	*<0.0001*	0.0001	-	*<0.0001*	*<0.0001*
Uranium	0.00001	-	*<0.00001*	*<0.00001*	0.00001	-	*<0.00001*	*<0.00001*	0.00001	-	*<0.00001*	*<0.00001*	0.00001	-	*<0.00001*	*<0.00001*
Vanadium	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	0.001	-	*<0.001*	**0.0028**	0.001	-	*<0.001*	*<0.001*	0.001	-	**0.0017**	*<0.001*	0.001	-	*<0.001*	**0.0015**
Zirconium	0.00006	-	*<0.000060*	*<0.000060*	0.00006	-	*<0.000060*	*<0.000060*	0.00006	-	*<0.000060*	*<0.000060*	0.00006	-	*<0.000060*	*<0.000060*
Speciated Metals (µg/L)																
Arsenate (As V)	-	-	-	-	0.02	-	*<0.02*	*<0.02*	-	-	-	-	0.02	-	*<0.02*	-
Arsenite (As III)	-	-	-	-	0.02	-	*<0.02*	*<0.02*	-	-	-	-	0.02	-	*<0.02*	-
Dimethylarsinic Acid (DMA)	-	-	-	-	0.02	-	*<0.02*	*<0.02*	-	-	-	-	0.02	-	*<0.02*	-
Monomethylarsonic Acid (MMA)	-	-	-	-	0.02	-	*<0.02*	*<0.02*	-	-	-	-	0.02	-	*<0.02*	-
Arsenobetaine (AsB)	-	-	-	-	0.05	-	*<0.05*	*<0.05*	-	-	-	-	0.05	-	*<0.05*	-

Notes:

Bolded Equipment or Travel Blank values concentrations exceeds laboratory DLs but < 10x DL.

Shaded Equipment or Travel Blank values concentrations is > 10x DL.

Italicized numbers are below detection limits.

Table A-4. Detected analytes in EB samples for both the Meadowbank Lakes and Baker Lake, and the Whale Tail Pit Lakes 2018 sample submissions.

Fraction	Parameter	Months								
		MBK	MBK	WTP	MBK	WTP	MBK	WTP	MBK	WTP
		May	Jul		Aug		Sept		Nov	
Unfiltered	Turbidity			○						
	Ammonia						○			
	Aluminum	○		○						○
	Antimony			○						
	Barium	○		○			○			
	Calcium			○						
	Chromium									
	Copper									
	Iron									
	Lead	○		●			○			○
	Magnesium	○		●						
	Manganese	○	○	○						
	Nickel									
Unfiltered	Sodium		○							
	Strontium									
	Zinc		○	○						
Filtered	Aluminum									
	Arsenic									
	Barium			○						
	Calcium									
	Copper									
	Lead			○						
	Manganese		○							
	Sodium		○							
	Strontium									
	Zinc		○	○	○		○			○
	DOC									

Notes:

○ < 10-times the MDL

● >10-times the MDL

Table A-5. Field QA/QC summary for water quality, all CREMP study areas, 2018.

Month		May			May			May		
	May MDLs	Second Portage Lake			Inuggugayualik Lake			Lake A20		
Analyte		SP-111	MAY DUP-1	RPD	INUG-98	MAY DUP-2	RPD	A20-21	DUP-1	RPD
Physical Tests										
Conductivity (µS/cm)	2	49.5	49.4	0.2	20.0	20.1	-0.5	20.7	20.6	0.5
Hardness (mg/L)	0.5	20.40	19.60	4.0	7.29	7.34	-0.7	6.97	6.81	2.3
pH (Laboratory)	0.1	7.43	7.45	-0.3	7.09	7.11	-0.3	6.96	6.89	1.0
Total Suspended Solids (mg/L)	1	*<1.0*	*<1.0*		*<1.0*	*<1.0*		*<1.0*	*<1.0*	
Total Dissolved Solids (mg/L)	3	30.5	30.8	-1.0	11.0	11.1	-0.9	15.9	15.0	5.8
Turbidity (NTU)	0.1	0.13	0.13	0.0	0.16	0.15	6.5	0.16	0.13	20.7
Anions and Nutrients (mg/L)										
Alkalinity, Bicarbonate	1	15	15	-0.7	7	7	1.4	7	7	-2.7
Alkalinity, Carbonate	1	*<1.0*	*<1.0*		*<1.0*	*<1.0*		*<1.0*	*<1.0*	
Alkalinity, Hydroxide	1	*<1.0*	*<1.0*		*<1.0*	*<1.0*		*<1.0*	*<1.0*	
Alkalinity, Total	1	15	15	-0.7	7	7	1.4	7	7	-2.7
Ammonia, Total (as N)	0.005	0.0170	0.0160	6.1	0.0196	0.0166	16.6	*<0.005*	*<0.005*	
Bromide (Br)	0.05	*<0.050*	*<0.05*		*<0.05*	*<0.05*		*<0.05*	*<0.05*	
Chloride (Cl)	0.1	1.13	1.13	0.0	0.97	0.97	0.0	0.90	0.91	-1.1
Fluoride (F)	0.02	0.083	0.084	-1.2	0.074	0.075	-1.3	0.038	0.039	-2.6
Nitrate (as N)	0.005	0.0110	0.0114	-3.6	*<0.005*	*<0.005*		*<0.005*	*<0.005*	
Nitrite (as N)	0.001	*<0.0010*	*<0.001*		*<0.001*	*<0.001*		*<0.001*	*<0.001*	
Total Kjeldahl Nitrogen	0.05	0.1	0.14	-10.9	0.13	0.12	7.8	0.11	0.10	10.8
Orthophosphate-Dissolved (as P)	0.001	0.0016	0.0011	37.0	*<0.001*	*<0.001*		*<0.001*	*<0.001*	
Phosphorus (P)-Total Dissolved	0.002	*<0.0020*	*<0.002*		*<0.002*	0.0025		*<0.002*	*<0.002*	
Phosphorus (P)-Total	0.002	0.0031	0.0024	25.5	0.0043	0.0031	32.4	*<0.002*	*<0.002*	
Silicate (as SiO_2)	0.5	0.51	0.51	0.0	*<0.5*	*<0.5*		1.33	1.36	-2.2
Sulfate (SO_4)	0.3	6.59	6.61	-0.3	1.19	1.19	0.0	1.38	1.39	-0.7
Cyanides (mg/L)										
Total Cyanide	0.001	*<0.001*	*<0.001*		*<0.001*	*<0.001*		*<0.001*	*<0.001*	
Free Cyanide	0.001	*<0.001*	*<0.001*		*<0.001*	*<0.001*		*<0.001*	*<0.001*	
Organic / Inorganic Carbon (mg/L)										
Dissolved Organic Carbon	0.5	2.04	1.91	6.6	2.22	2.18	1.8	2.23	1.99	11.4
Total Organic Carbon	0.5	2.02	1.88	7.2	2.15	2.16	-0.5	2.20	2.02	8.5
Plant Pigments (µg/L)										
Chlorophyll-a	0.01	0.66	0.666	-0.9	0.651	0.513	23.7	0.428	0.389	9.5
Total Metals (mg/L)										
Aluminum	0.003	*<0.0030*	0.0177		*<0.0030*	*<0.0030*		*<0.003*	0.0036	
Antimony	0.0001	*<0.00010*	*<0.0001*		*<0.0001*	*<0.0001*		*<0.0001*	*<0.0001*	
Arsenic	0.0001	0.00026	0.00030	-14.3	0.00015	0.00012	22.2	0.00014	0.00015	-6.9
Barium	0.0001	0.00358	0.00354	1.1	0.00363	0.00216	50.8	0.00499	0.00486	2.6
Beryllium	0.0001	*<0.00010*	*<0.0001*		*<0.00002*	*<0.00002*		*<0.0001*	*<0.0001*	
Bismuth	0.00005	*<0.000050*	*<0.00005*		*<0.00005*	*<0.00005*		*<0.00005*	*<0.00005*	
Boron	0.01	*<0.010*	*<0.01*		*<0.01*	*<0.01*		*<0.01*	*<0.01*	
Cadmium	0.000005	*<0.0000050*	*<0.000005*		*<0.000005*	*<0.000005*		*<0.000005*	*<0.000005*	
Calcium	0.05	5.09	5.36	-5.2	1.38	1.36	1.5	1.86	1.85	0.5
Cesium		*<0.000010*	-		-	-		*<0.00001*	*<0.00001*	
Chromium	0.0001	*<0.00010*	*<0.0001*		*<0.0001*	0.00015		*<0.0001*	0.00015	
Cobalt	0.0001	*<0.00010*	*<0.0001*		*<0.0001*	*<0.0001*		*<0.0001*	*<0.0001*	
Copper	0.0005	0.00066	0.00076	-14.1	*<0.0005*	*<0.0005*		*<0.0005*	*<0.0005*	
Iron	0.01	*<0.010*	*<0.01*		*<0.01*	*<0.01*		*<0.01*	*<0.01*	
Lead	0.00005	*<0.000050*	*<0.00005*		*<0.00005*	*<0.00005*		0.000113	*<0.00005*	
Lithium	0.001	*<0.0010*	*<0.001*		*<0.001*	*<0.001*		*<0.001*	*<0.001*	
Magnesium	0.005	1.61	1.57	2.5	0.88	0.90	-2.2	0.66	0.67	-0.5
Manganese	0.0001	0.00066	0.00068	-3.0	0.00064	0.00060	6.5	0.00051	0.00052	-1.9
Mercury	0.000005	*<0.00025*	*<0.000005*		*<0.000005*	*<0.000005*		*<0.000005*	*<0.000005*	
Molybdenum	0.00005	0.000208	0.000212	-1.9	*<0.00005*	*<0.00005*		*<0.00005*	*<0.00005*	
Nickel	0.0005	*<0.00050*	*<0.0005*		*<0.0005*	*<0.0005*		*<0.0005*	*<0.0005*	
Phosphorus	0.05	*<0.050*	*<0.05*		*<0.05*	*<0.05*		*<0.05*	*<0.05*	
Potassium	0.05	0.70	0.70	0.4	0.43	0.43	0.0	0.53	0.53	-1.1
Rubidium		0.00						0.00	0.00	
Selenium	0.00005	*<0.000050*	*<0.00005*		*<0.00005*	*<0.00005*		*<0.00005*	*<0.00005*	
Silicon	0.1	0.230	0.230	0.0	0.170	0.150	12.5	0.670	0.660	1.5
Silver	0.00001	*<0.000010*	*<0.00001*		*<0.00001*	*<0.00001*		*<0.00001*	*<0.00001*	
Sodium	0.05	1.23	1.25	-1.6	0.70	0.69	1.2	0.86	0.87	-1.0
Strontium	0.0002	0.0233	0.0240	-3.0	0.0079	0.0080	-1.5	0.0097	0.0099	-1.4
Sulfur	0.5	2.15	2.25	-4.5	*<0.5*	*<0.5*		1.09	1.05	3.7
Tellurium		*<0.00020*						*<0.0002*	*<0.0002*	
Thallium	0.00001	*<0.000010*	*<0.00001*		*<0.00001*	*<0.00001*		*<0.00001*	*<0.00001*	
Thorium		*<0.00010*						*<0.0001*	*<0.0001*	
Tin	0.0001	*<0.00010*	*<0.0001*		*<0.0001*	*<0.0001*		*<0.0001*	*<0.0001*	
Titanium	0.0003	*<0.00030*	*<0.00030*		*<0.0003*	*<0.00030*		*<0.0003*	*<0.0003*	
Tungsten		*<0.00010*						*<0.0001*	*<0.0001*	
Uranium	0.00001	0.000037	0.000040	-7.8	0.000045	0.000043	4.5	0.000031	0.000032	-3.2
Vanadium	0.0005	*<0.00050*	*<0.0005*		*<0.0005*	*<0.0005*		*<0.0005*	*<0.0005*	
Zinc	0.003	*<0.0030*	*<0.0030*		*<0.0030*	*<0.0030*		*<0.003*	*<0.003*	
Zirconium	0.00006	*<0.000060*	*<0.00006*		*<0.0003*	*<0.00030*		*<0.000060*	*<0.000060*	
Dissolved Metals (mg/L)										
Aluminum	0.001	0.0025	0.0013	**63.2**	0.0014	0.0019	-30.3	0.0024	*<0.002*	
Antimony	0.0001	*<0.00010*	*<0.0001*		*<0.0001*	*<0.0001*		*<0.0001*	*<0.0001*	
Arsenic	0.0001	0.00028	0.00027	3.6	0.00010	0.00012	-18.2	*<0.0001*	0.00011	
Barium	0.0001	0.00385	0.00376	2.4	0.00226	0.00219	3.1	0.00424	0.00421	0.7
Beryllium	0.0001	*<0.00010*	*<0.0001*		*<0.00002*	*<0.00002*		*<0.0001*	*<0.0001*	
Bismuth	0.00005	*<0.000050*	*<0.00005*		*<0.00005*	*<0.00005*		*<0.00005*	*<0.00005*	
Boron	0.01	*<0.010*	*<0.01*		*<0.01*	*<0.01*		*<0.01*	*<0.01*	
Cadmium	0.000005	*<0.0000050*	*<0.000005*		*<0.000005*	*<0.000005*		*<0.000005*	*<0.000005*	
Calcium	0.05	5.45	5.15	5.7	1.42	1.47	-3.5	1.81	1.76	2.8
Cesium		0.00			-			*<0.00001*	*<0.00001*	
Chromium	0.0001	*<0.00010*	*<0.0001*		*<0.0001*	*<0.0001*		*<0.0001*	*<0.0001*	
Cobalt	0.0001	*<0.00010*	*<0.0001*		*<0.0001*	*<0.0001*		*<0.0001*	*<0.0001*	
Copper	0.0002	0.00057	0.00051	11.1	0.00032	0.00035	-9.0	0.00029	0.00021	32.0
Iron	0.01	*<0.010*	*<0.01*		*<0.01*	*<0.01*		*<0.01*	*<0.01*	
Lead	0.00005	*<0.000050*	*<0.00005*		*<0.00005*	*<0.00005*		*<0.00005*	*<0.00005*	
Lithium	0.001	*<0.0010*	*<0.001*		*<0.001*	*<0.001*		*<0.001*	*<0.001*	
Magnesium	0.005	1.65	1.63	1.2	0.91	0.89	2.2	0.60	0.59	1.7
Manganese	0.0001	0.00022	0.00014	44.4	0.00013	0.00015	-14.3	0.00039	0.00035	10.8
Mercury	0.000005	*<0.00025*	*<0.000005*		*<0.000005*	*<0.000005*		*<0.000005*	*<0.000005*	
Molybdenum	0.00005	0.000222	0.000221	0.5	*<0.00005*	*<0.00005*		*<0.00005*	*<0.00005*	
Nickel	0.0005	*<0.00050*	*<0.0005*		*<0.0005*	*<0.0005*		*<0.0005*	*<0.0005*	
Phosphorus	0.05	*<0.050*	*<0.05*		*<0.05*	*<0.05*		*<0.05*	*<0.05*	
Potassium	0.05	0.75	0.74	1.3	0.49	0.49	0.0	0.48	0.48	1.0
Selenium	0.00005	*<0.000050*	*<0.00005*		*<0.00005*	*<0.00005*		*<0.00005*	*<0.00005*	
Silicon	0.05	0.208	0.199	4.4	0.125	0.134	-6.9	0.587	0.579	1.4
Silver	0.00001	*<0.000010*	*<0.00001*		*<0.00001*	*<0.00001*		*<0.00001*	*<0.00001*	
Sodium	0.05	1.21	1.20	0.8	0.73	0.71	3.3	0.78	0.76	2.1
Strontium	0.0002	0.0241	0.02390	0.8	0.0081	0.00829	-1.9	0.0096	0.00915	4.4
Sulfur	0.5	2.30	2.16	6.3	0.51	*<0.5*		*<0.5*	0.82	
Thallium	0.00001	*<0.000010*	*<0.00001*		*<0.00001*	*<0.00001*		*<0.00001*	*<0.00001*	
Tin	0.0001	*<0.00010*	*<0.0001*		*<0.0001*	*<0.0001*		*<0.0001*	*<0.0001*	
Titanium	0.0003	*<0.00030*	*<0.00030*		*<0.0003*	*<0.00030*		*<0.0003*	*<0.0003*	
Uranium	0.00001	0.000044	0.000043	2.3	0.000040	0.000040	0.0	0.000027	0.000024	11.8
Vanadium	0.0005	*<0.00050*	*<0.0005*		*<0.0005*	*<0.0005*		*<0.0005*	*<0.0005*	
Zinc	0.001	0.012	0.0025	131.0	*<0.001*	*<0.001*		*<0.001*	*<0.001*	
Speciated Metals (µg/L)										
Arsenate (As V)								0.0	-	
Arsenite (As III)								0.0	-	
Dimethylarsinic Acid (DMA)								<0.02	-	
Monomethylarsonic Acid (MMA)								<0.02	-	
Arsenobetaine (AsB)								<0.05	-	

Notes:

RPD = Relative Percent Difference (%) = ((original - duplicate) / (original + duplicate)/2) x 100.

RPDs are calculated when both samples are above detection.

The data quality objective (DQO) for field duplicates is an RPD < 50%.

Bolded RPDs RPD values exceed 50% but < 10 x MDL.

Shaded RPD RPD values exceed 50% and > 10 x MDL.

- = no measurement

Italicized numbers are below detection limits.

Table A-5. Field QA/QC summary for water quality, all CREMP study areas, 2018.

Month		July								
	July MDLs	Third Portage Lake - East Basin			Pipedream Lake			Whale Tail - South Basin		
Analyte		TPE-112	JUL DUP-1	RPD	PDL-66	JUL DUP-2	RPD	WTS-29	DUP-1	RPD
Physical Tests										
Conductivity (µS/cm)	2	30.7	30.7	0.0	22.3	22.1	0.9	39.4	35.3	11.0
Hardness (mg/L)	0.5	9.95	10.1	-1.5	8.8	8.9	-1.1	12.8	12.1	5.6
pH (Laboratory)	0.1	7.12	7.15	-0.4	7.14	7.18	-0.6	6.87	6.87	0.0
Total Suspended Solids (mg/L)	1	*<1.0*	*<1.0*		*<1.0*	*<1.0*		1.3	1.3	0.0
Total Dissolved Solids (mg/L)	3	21.4	20.7	3.3	15.5	15.5	0.0	38.0	25.8	38.2
Turbidity (NTU)	0.1	0.29	0.29	0.0	0.18	0.21	-15.4	0.61	0.54	12.2
Anions and Nutrients (mg/L)										
Alkalinity, Bicarbonate	1	8	8	0.0	9.5	9.3	2.1	4.6	4.1	11.5
Alkalinity, Carbonate	1	*<1.0*	*<1.0*		*<1.0*	*<1.0*		*<1.0*	*<1.0*	
Alkalinity, Hydroxide	1	*<1.0*	*<1.0*		*<1.0*	*<1.0*		*<1.0*	*<1.0*	
Alkalinity, Total	1	8	8	0.0	9.5	9.3	2.1	4.6	4.1	11.5
Ammonia, Total (as N)	0.005	*<0.005*	*<0.005*		*<0.005*	*<0.005*		*<0.005*	*<0.005*	
Bromide (Br)	0.05	*<0.05*	*<0.05*		*<0.05*	*<0.05*		0.1	0.1	-11.3
Chloride (Cl)	0.1	0.72	0.72	0.0	0.61	0.62	-1.6	6.68	6.75	-1.0
Fluoride (F)	0.02	0.073	0.073	0.0	0.038	0.038	0.0	0.028	0.029	-3.5
Nitrate (as N)	0.005	0.0115	0.0119	-3.4	*<0.005*	*<0.005*		*<0.005*	*<0.005*	
Nitrite (as N)	0.001	*<0.001*	*<0.001*		*<0.001*	*<0.001*		*<0.001*	*<0.001*	
Total Kjeldahl Nitrogen	0.05	0.091	0.1	-9.4	0.10	0.09	5.2	0.12	0.13	-7.1
Orthophosphate-Dissolved (as P)	0.001	*<0.001*	0.001		*<0.001*	*<0.001*		0.0	*<0.001*	
Phosphorus (P)-Total Dissolved	0.002	*<0.002*	*<0.002*		*<0.002*	*<0.002*		*<0.002*	*<0.002*	
Phosphorus (P)-Total	0.002	0.0027	*<0.002*		0.0	*<0.002*		0.0	0.0	32.7
Silicate (as SiO_2)	0.5	*<0.5*	*<0.5*		*<0.5*	*<0.5*		0.5	0.5	-1.9
Sulfate (SO_4)	0.3	4.61	4.63	-0.4	1.66	1.66	0.0	1.50	1.51	-0.7
Cyanides (mg/L)										
Total Cyanide	0.001	*<0.001*	*<0.001*		*<0.001*	*<0.001*		*<0.001*	*<0.001*	
Free Cyanide	0.001	*<0.001*	*<0.001*		*<0.001*	*<0.001*		*<0.001*	*<0.001*	
Organic / Inorganic Carbon (mg/L)										
Dissolved Organic Carbon	0.5	1.52	1.46	4.0	1.60	1.56	2.5	2.27	2.10	7.8
Total Organic Carbon	0.5	1.38	1.47	-6.3	1.71	1.70	0.6	2.29	2.41	-5.1
Plant Pigments (µg/L)										
Chlorophyll-a	0.01	0.231	1.12	-131.6	0.491	0.337	37.2	1.320	0.250	136.3
Total Metals (mg/L)										
Aluminum	0.003	0.0084	0.0092	-9.1	0.0050	0.0045	10.5	0.0164	0.0155	5.6
Antimony	0.0001	*<0.0001*	*<0.0001*		*<0.0001*	*<0.0001*		*<0.0001*	*<0.0001*	
Arsenic	0.0001	0.00035	0.00037	-5.6	0.00022	0.00018	20.0	0.00019	0.00020	-5.1
Barium	0.0001	0.00337	0.00329	2.4	0.00204	0.00202	1.0	0.00848	0.00879	-3.6
Beryllium	0.0001	*<0.0001*	*<0.0001*		*<0.00002*	*<0.00002*		*<0.0001*	*<0.0001*	
Bismuth	0.00005	*<0.00005*	*<0.00005*		*<0.00005*	*<0.00005*		*<0.00005*	*<0.00005*	
Boron	0.01	*<0.01*	*<0.01*		*<0.01*	*<0.01*		*<0.01*	*<0.01*	
Cadmium	0.000005	*<0.000005*	*<0.000005*		*<0.000005*	*<0.000005*		*<0.000005*	*<0.000005*	
Calcium	0.05	2.71	2.69	0.7	2.21	2.20	0.5	3.62	3.76	-3.8
Cesium	0.00001	0.000018	0.000018		-	-		*<0.00001*	*<0.00001*	
Chromium	0.0001	0.00012	0.00013	-8.0	*<0.0001*	*<0.0001*		0.0	0.0	18.2
Cobalt	0.0001	*<0.0001*	*<0.0001*		*<0.0001*	*<0.0001*		*<0.0001*	*<0.0001*	
Copper	0.0005	*<0.0005*	*<0.0005*		*<0.0005*	*<0.0005*		*<0.0005*	*<0.0005*	
Iron	0.01	0.02	0.02	0.0	*<0.01*	*<0.01*		0.0	0.0	26.1
Lead	0.00005	*<0.00005*	*<0.00005*		*<0.00005*	*<0.00005*		*<0.00005*	*<0.00005*	
Lithium	0.001	*<0.001*	*<0.001*		*<0.001*	*<0.001*		0.0	0.0	0.0
Magnesium	0.005	1.01	1.04	-2.9	0.81	0.81	0.0	0.99	1.04	-4.5
Manganese	0.0001	0.00399	0.00432	-7.9	0.00235	0.00229	2.6	0.01040	0.01020	1.9
Mercury	0.000005	*<0.000005*	*<0.000005*		*<0.000005*	*<0.000005*		*<0.000005*	*<0.000005*	
Molybdenum	0.00005	0.000135	0.000165	-20.0	*<0.00005*	*<0.00005*		*<0.00005*	*<0.00005*	
Nickel	0.0005	0.0007	0.00081	-14.6	0.0	0.0	0.0	0.0	0.0	-4.1
Phosphorus	0.05	*<0.05*	*<0.05*		*<0.05*	*<0.05*		*<0.05*	*<0.05*	
Potassium	0.05	0.515	0.508	1.4	0.34	0.34	0.0	0.54	0.59	-7.3
Rubidium	0.0002	0.00072	0.00083					0.00	0.00	
Selenium	0.00005	*<0.00005*	*<0.00005*		*<0.00005*	*<0.00005*		*<0.00005*	*<0.00005*	
Silicon	0.1	0.15	0.15	0.0	0.180	0.180	0.0	0.300	0.320	-6.5
Silver	0.00001	*<0.00001*	*<0.00001*		*<0.00001*	*<0.00001*		*<0.00001*	*<0.00001*	
Sodium	0.05	1.06	1.07	-0.9	0.51	0.51	-0.8	0.68	0.71	-4.8
Strontium	0.0002	0.0117	0.0115	1.7	0.0091	0.0091	0.0	0.0317	0.0332	-4.6
Sulfur	0.5	1.71	1.57	8.5	*<0.5*	*<0.5*		0.66	*<0.5*	
Tellurium	0.0002	*<0.0002*	*<0.0002*		-			*<0.0002*	*<0.0002*	
Thallium	0.00001	*<0.00001*	*<0.00001*		*<0.00001*	*<0.00001*		*<0.00001*	*<0.00001*	
Thorium	0.0001	*<0.0001*	*<0.0001*		-			*<0.0001*	*<0.0001*	
Tin	0.0001	*<0.0001*	*<0.0001*		*<0.0001*	*<0.0001*		*<0.0001*	*<0.0001*	
Titanium	0.0003	*<0.00030*	*<0.00030*		*<0.0003*	*<0.00030*		0.0	*<0.00090*	
Tungsten	0.0001	*<0.0001*	*<0.0001*		-			*<0.0001*	*<0.0001*	
Uranium	0.00001	0.000043	0.000044	-2.3	0.000022	0.000022	0.0	0.000031	0.000025	21.4
Vanadium	0.0005	*<0.0005*	*<0.0005*		*<0.0005*	*<0.0005*		*<0.0005*	*<0.0005*	
Zinc	0.003	*<0.0030*	*<0.0030*		*<0.0030*	*<0.0030*		*<0.003*	*<0.003*	
Zirconium		*<0.00006*	*<0.00006*		*<0.0003*	*<0.00030*		*<0.000060*	*<0.000060*	
Dissolved Metals (mg/L)										
Aluminum	0.001	0.0021	0.0023	-9.1	0.0023	0.0016	35.9	0.0042	0.0057	-30.3
Antimony	0.0001	*<0.0001*	*<0.0001*		*<0.0001*	*<0.0001*		*<0.0001*	*<0.0001*	
Arsenic	0.0001	0.0003	0.00028	6.9	0.00014	0.00016	-13.3	0.00017	0.00018	-5.7
Barium	0.0001	0.00289	0.00283	2.1	0.00201	0.00195	3.0	0.00790	0.00756	4.4
Beryllium	0.0001	*<0.0001*	*<0.0001*		*<0.00002*	*<0.00002*		*<0.0001*	*<0.0001*	
Bismuth	0.00005	*<0.00005*	*<0.00005*		*<0.00005*	*<0.00005*		*<0.00005*	*<0.00005*	
Boron	0.01	*<0.01*	*<0.01*		*<0.01*	*<0.01*		*<0.01*	*<0.01*	
Cadmium	0.000005	*<0.000005*	*<0.000005*		*<0.000005*	*<0.000005*		*<0.000005*	*<0.000005*	
Calcium	0.05	2.53	2.52	0.4	2.23	2.26	-1.3	3.63	3.43	5.7
Cesium	0.00001	0.000017	0.000017		-			*<0.00001*	*<0.00001*	
Chromium	0.0001	*<0.0001*	*<0.0001*		*<0.0001*	*<0.0001*		*<0.0001*	*<0.0001*	
Cobalt	0.0001	*<0.0001*	*<0.0001*		*<0.0001*	*<0.0001*		*<0.0001*	*<0.0001*	
Copper	0.0002	0.00028	0.0003	-6.9	0.00039	0.00039	0.0	0.00028	0.00031	-10.2
Iron	0.01	*<0.01*	*<0.01*		*<0.01*	*<0.01*		*<0.01*	*<0.01*	
Lead	0.00005	*<0.00005*	*<0.00005*		*<0.00005*	*<0.00005*		*<0.00005*	0.0	
Lithium	0.001	*<0.001*	*<0.001*		*<0.001*	*<0.001*		0.0	0.0	0.0
Magnesium	0.005	0.883	0.919	-4.0	0.79	0.79	0.0	0.91	0.87	4.4
Manganese	0.0001	0.00396	0.00279	34.7	0.00145	0.00134	7.9	0.00846	0.00806	4.8
Mercury	0.000005	*<0.000005*	*<0.000005*		*<0.000005*	*<0.000005*		*<0.000005*	*<0.000005*	
Molybdenum	0.00005	0.000127	0.000137	-7.6	*<0.00005*	*<0.00005*		*<0.00005*	*<0.00005*	
Nickel	0.0005	0.00056	0.00061	-8.5	0.0	0.0	0.0	0.0	0.0	4.5
Phosphorus	0.05	*<0.05*	*<0.05*		*<0.05*	*<0.05*		*<0.05*	*<0.05*	
Potassium	0.05	0.5	0.506	-1.2	0.37	0.37	0.0	0.55	0.52	5.8
Selenium	0.00005	*<0.00005*	*<0.00005*		*<0.00005*	*<0.00005*		*<0.00005*	*<0.00005*	
Silicon	0.05	0.095	0.099	-4.1	0.1	0.135	6.5	0.3	0.236	7.0
Silver	0.00001	*<0.00001*	*<0.00001*		*<0.00001*	*<0.00001*		*<0.00001*	*<0.00001*	
Sodium	0.05	0.972	1.01	-3.8	0.54	0.52	4.5	0.65	0.62	5.1
Strontium	0.0002	0.012	0.0118	1.7	0.00940	0.00932	0.9	0.03140	0.03000	4.6
Sulfur	0.5	1.72	1.83	-6.2	0.96	0.84	13.3	*<0.5*	*<0.5*	
Thallium	0.00001	*<0.00001*	*<0.00001*		*<0.00001*	*<0.00001*		*<0.00001*	*<0.00001*	
Tin	0.0001	*<0.0001*	*<0.0001*		*<0.0001*	*<0.0001*		*<0.0001*	*<0.0001*	
Titanium	0.0003	*<0.00030*	*<0.00030*		*<0.0003*	*<0.00030*		*<0.0003*	*<0.0003*	
Uranium	0.00001	0.000042	0.000042	0.0	0.000020	0.000021	-4.9	0.000025	0.000025	0.0
Vanadium	0.0005	*<0.0005*	*<0.0005*		*<0.0005*	*<0.0005*		*<0.0005*	*<0.0005*	
Zinc	0.001	*<0.001*	*<0.001*		*<0.001*	*<0.001*		*<0.001*	*<0.001*	
Speciated Metals (µg/L)										
Arsenate (As V)								-	-	
Arsenite (As III)								-	-	
Dimethylarsinic Acid (DMA)								-	-	
Monomethylarsonic Acid (MMA)								-	-	
Arsenobetaine (AsB)								-	-	

Notes:

RPD = Relative Percent Difference (%) = ((original - duplicate) / (original + duplicate)/2) x 100.

RPDs are calculated when both samples are above detection.

The data quality objective (DQO) for field duplicates is an RPD < 50%.

Bolded RPDs	RPD values exceed 50% but < 10 x MDL.
Shaded RPD	RPD values exceed 50% and > 10 x MDL.

- = no measurement

Italicized numbers are below detection limits.

Table A-5. Field QA/QC summary for water quality, all CREMP study areas, 2018.

Month		August								
	Aug MDLs	Third Portage Lake - East Basin			Wally Lake			Lake DS1		
Analyte		TPE-114	AUG DUP-1	RPD	WAL-83	AUG DUP-2	RPD	DS1-23	DUP-2	RPD
Physical Tests										
Conductivity (µS/cm)	2	29.6	29.7	-0.3	41.3	40.3	2.5	16.1	16.1	0.0
Hardness (mg/L)	0.5	10.70	11.00	-2.8	18.00	17.3	4.0	5.91	5.7	
pH (Laboratory)	0.1	7.25	7.26	-0.1	7.37	7.47	-1.3	6.92	6.94	-0.3
Total Suspended Solids (mg/L)	1	*<1.0*	*<1.0*		*<1.0*	*<1.0*		*<1.0*	*<1.0*	
Total Dissolved Solids (mg/L)	3	18.8	19.6	-4.2	26.7	26.6	0.4	14.2	13.3	6.5
Turbidity (NTU)	0.1	0.30	0.30	0.0	0.25	0.27	-7.7	0.42	0.37	13
Anions and Nutrients (mg/L)										
Alkalinity, Bicarbonate	1	8	8	-2.4	14	14	1.4	5	5	2.1
Alkalinity, Carbonate	1	*<1.0*	*<1.0*		*<1.0*	*<1.0*		*<1.0*	*<1.0*	
Alkalinity, Hydroxide	1	*<1.0*	*<1.0*		*<1.0*	*<1.0*		*<1.0*	*<1.0*	
Alkalinity, Total	1	8	8	-2.4	14	14	1.4	5	5	2.1
Ammonia, Total (as N)	0.005	0.0241	*<0.005*		0.0301	0.0056	**137.3**	0.0081	*<0.005*	
Bromide (Br)	0.05	*<0.05*	*<0.05*		*<0.05*	*<0.05*		*<0.05*	*<0.05*	
Chloride (Cl)	0.1	0.75	0.75	0.0	0.79	0.79	0.0	1.31	1.32	-1
Fluoride (F)	0.02	0.078	0.077	1.3	0.051	0.051	0.0	0.049	0.049	0.0
Nitrate (as N)	0.005	*<0.005*	*<0.005*		*<0.005*	*<0.005*		*<0.005*	*<0.005*	
Nitrite (as N)	0.001	*<0.001*	*<0.001*		*<0.001*	*<0.001*		*<0.001*	*<0.001*	
Total Kjeldahl Nitrogen	0.05	0.10	0.10	-5.0	0.16	0.13	17.2	0.13	0.12	
Orthophosphate-Dissolved (as P)	0.001	0.0011	0.002	**-58.1**	0.0011	0.0011	0.0	0.0014	0.0012	15.4
Phosphorus (P)-Total Dissolved	0.002	*<0.002*	*<0.002*		0.002	0.0021	-4.9	*<0.002*	*<0.002*	
Phosphorus (P)-Total	0.002	*<0.002*	*<0.002*		*<0.002*	0.0028		0.0063	0.0026	**83.1**
Silicate (as SiO_2)	0.5	*<0.5*	*<0.5*		*<0.5*	*<0.5*		*<0.5*	*<0.5*	
Sulfate (SO_4)	0.3	4.77	4.77	0.0	4.64	4.66	-0.4	1.14	1.14	0.0
Cyanides (mg/L)										
Total Cyanide	0.001	*<0.001*	*<0.001*		*<0.001*	*<0.001*		*<0.001*	*<0.001*	
Free Cyanide	0.001	*<0.001*	*<0.001*		*<0.001*	*<0.001*		*<0.001*	*<0.001*	
Organic / Inorganic Carbon (mg/L)										
Dissolved Organic Carbon	1	1.41	1.29	8.9	1.98	2.05	-3.5	1.63	1.70	-4.2
Total Organic Carbon	1	1.27	1.50	-16.6	1.95	2.07	-6.0	1.51	2.12	-33.6
Plant Pigments (µg/L)										
Chlorophyll-a	0.01	0.321	0.285	11.9	0.457	0.430	6.1	0.641	0.660	-2.9
Total Metals (mg/L)										
Aluminum	0.003	0.0094	0.0064	38.0	0.0039	0.0045	-14.3	0.011	0.0087	23
Antimony	0.0001	*<0.0001*	*<0.0001*		*<0.0001*	*<0.0001*		*<0.0001*	*<0.0001*	
Arsenic	0.0001	0.00040	0.00040	0.0	0.00031	0.00028	10.2	0.00012	0.00011	9
Barium	0.0001	0.00264	0.00265	-0.4	0.00216	0.00213	1.4	0.00337	0.00353	-4.6
Beryllium	0.0001	*<0.0001*	*<0.0001*		*<0.0001*	*<0.0001*		*<0.0001*	*<0.0001*	
Bismuth	0.00005	*<0.00005*	*<0.00005*		*<0.00005*	*<0.00005*		*<0.00005*	*<0.00005*	
Boron	0.01	*<0.01*	*<0.01*		*<0.01*	*<0.01*		*<0.01*	*<0.01*	
Cadmium	0.000005	*<0.000005*	*<0.000005*		*<0.000005*	*<0.000005*		*<0.000005*	*<0.000005*	
Calcium	0.05	2.46	2.46	0.0	4.40	4.33	1.6	1.49	1.53	-2.6
Cesium		0.00	0.000018		*<0.00001*	*<0.00001*		*<0.00001*	*<0.00001*	
Chromium	0.0001	*<0.0001*	*<0.0001*		*<0.0001*	*<0.0001*		*<0.0001*	*<0.0001*	
Cobalt	0.0001	*<0.0001*	*<0.0001*		*<0.0001*	*<0.0001*		*<0.0001*	*<0.0001*	
Copper	0.0005	*<0.0005*	*<0.0005*		0.00087	0.00085	2.3	*<0.0005*	*<0.0005*	
Iron	0.01	0.014	0.014	0.0	0.014	0.015	-6.9	0.028	0.032	-13.3
Lead	0.00005	*<0.00005*	*<0.00005*		*<0.00005*	*<0.00005*		*<0.00005*	*<0.00005*	
Lithium	0.001	*<0.001*	*<0.001*		*<0.001*	*<0.001*		*<0.001*	*<0.001*	
Magnesium	0.005	0.92	0.92	0.0	1.32	1.28	3.1	0.54	0.53	0.9
Manganese	0.0001	0.00172	0.00173	-0.6	0.00201	0.00196	2.5	0.00183	0.00179	2.2
Mercury	0.000005	*<0.000005*	*<0.000005*		*<0.000005*	*<0.000005*		*<0.000005*	*<0.000005*	
Molybdenum	0.00005	0.000142	0.000141	0.7	0.000232	0.000236	-1.7	*<0.0003*	*<0.0002*	
Nickel	0.0005	*<0.0005*	*<0.0005*		*<0.0005*	*<0.0005*		*<0.0005*	*<0.0005*	
Phosphorus	0.05	*<0.05*	*<0.05*		*<0.05*	*<0.05*		*<0.05*	*<0.05*	
Potassium	0.05	0.47	0.46	1.5	0.47	0.45	3.7	0.33	0.33	2
Rubidium		0.00	0.00		0.00	0.00		0.00	0.00	4
Selenium	0.00005	*<0.00005*	*<0.00005*		*<0.00005*	*<0.00005*		*<0.00005*	*<0.00005*	
Silicon	0.1	0.100	0.100	0.0	0.260	0.260	0.0	0.300	0.320	-6.5
Silver	0.00001	*<0.00001*	*<0.00001*		*<0.00001*	*<0.00001*		*<0.00001*	*<0.00001*	
Sodium	0.05	0.94	0.94	0.1	0.60	0.58	2.6	0.64	0.64	1.1
Strontium	0.0002	0.0105	0.0107	-1.9	0.0225	0.0224	0.4	0.0073	0.0073	-0.3
Sulfur	0.5	1.49	1.37	8.4	1.39	1.34	3.7	0.73	0.70	4.2
Tellurium		*<0.0002*	*<0.0002*		*<0.0002*	*<0.0002*		*<0.0002*	*<0.0002*	
Thallium	0.00001	*<0.00001*	*<0.00001*		*<0.00001*	*<0.00001*		*<0.00001*	*<0.00001*	
Thorium		*<0.0001*	*<0.0001*		*<0.0001*	*<0.0001*		*<0.0001*	*<0.0001*	
Tin	0.0001	*<0.0001*	*<0.0001*		*<0.0001*	*<0.0001*		*<0.0001*	*<0.0001*	
Titanium	0.0003	*<0.0003*	*<0.00030*		*<0.0003*	*<0.00030*		*<0.0003*	*<0.0003*	
Tungsten		*<0.0001*	*<0.0001*		*<0.0001*	*<0.0001*		*<0.0001*	*<0.0001*	
Uranium	0.00001	0.000042	0.000045	-6.9	0.000050	0.000056	-11.3	0.000031	0.000031	0
Vanadium	0.0005	*<0.0005*	*<0.0005*		*<0.0005*	*<0.0005*		*<0.0005*	*<0.0005*	
Zinc	0.003	*<0.0030*	*<0.0030*		*<0.0030*	*<0.0030*		*<0.003*	*<0.003*	
Zirconium	0.00006	*<0.00006*	*<0.00006*		*<0.00006*	*<0.00006*		*<0.000060*	*<0.000060*	
Dissolved Metals (mg/L)										
Aluminum	0.001	0.0029	0.0022	27.5	0.0023	0.0020	14.0	0.0042	0.0042	0
Antimony	0.0001	*<0.0001*	*<0.0001*		*<0.0001*	*<0.0001*		*<0.0001*	*<0.0001*	
Arsenic	0.0001	0.00034	0.00036	-5.7	0.00026	0.00028	-7.4	*<0.0001*	*<0.0001*	
Barium	0.0001	0.00268	0.00288	-7.2	0.00233	0.00221	5.3	0.00338	0.00331	2.1
Beryllium	0.0001	*<0.0001*	*<0.0001*		*<0.0001*	*<0.0001*		*<0.0001*	*<0.0001*	
Bismuth	0.00005	*<0.00005*	*<0.00005*		*<0.00005*	*<0.00005*		*<0.00005*	*<0.00005*	
Boron	0.01	*<0.01*	*<0.01*		*<0.01*	*<0.01*		*<0.01*	*<0.01*	
Cadmium	0.000005	*<0.000005*	*<0.000005*		*<0.000005*	*<0.000005*		*<0.000005*	*<0.000005*	
Calcium	0.05	2.67	2.76	-3.3	4.88	4.74	2.9	1.47	1.42	3.5
Cesium		0.00	0.00		*<0.00001*	*<0.00001*		*<0.00001*	*<0.00001*	
Chromium	0.0001	*<0.0001*	0.00015		*<0.0001*	*<0.0001*		*<0.0001*	*<0.0001*	
Cobalt	0.0001	*<0.0001*	*<0.0001*		*<0.0001*	*<0.0001*		*<0.0001*	*<0.0001*	
Copper	0.0002	0.00032	0.00033	-3.1	0.00080	0.00074	7.8	0.00024	0.00025	-4
Iron	0.01	*<0.01*	*<0.01*		*<0.01*	*<0.01*		*<0.01*	*<0.01*	
Lead	0.00005	*<0.00005*	*<0.00005*		*<0.00005*	*<0.00005*		*<0.00005*	*<0.00005*	
Lithium	0.001	*<0.001*	*<0.001*		*<0.001*	*<0.001*		*<0.001*	*<0.001*	
Magnesium	0.005	0.98	1.00	-1.7	1.42	1.32	7.3	0.55	0.52	4.3
Manganese	0.0001	0.00091	0.00099	-8.4	0.00033	0.00030	9.5	0.00031	0.00032	-3
Mercury	0.000005	*<0.000005*	*<0.000005*		*<0.000005*	*<0.000005*		*<0.000005*	*<0.000005*	
Molybdenum	0.00005	0.000150	0.000144	4.1	0.000239	0.000256	-6.9	*<0.00005*	*<0.00005*	
Nickel	0.0005	*<0.0005*	*<0.0005*		*<0.0005*	*<0.0005*		*<0.0005*	*<0.0005*	
Phosphorus	0.05	*<0.05*	*<0.05*		*<0.05*	*<0.05*		*<0.05*	*<0.05*	
Potassium	0.05	0.49	0.52	-4.4	0.53	0.47	10.8	0.35	0.34	3.8
Selenium	0.00005	*<0.00005*	*<0.00005*		*<0.00005*	*<0.00005*		*<0.00005*	*<0.00005*	
Silicon	0.05	0.065	0.074	-12.9	0.250	0.253	-1.2	0.241	0.211	13.3
Silver	0.00001	*<0.00001*	*<0.00001*		*<0.00001*	*<0.00001*		*<0.00001*	*<0.00001*	
Sodium	0.05	1.05	1.08	-2.8	0.69	0.64	7.2	0.65	0.64	1.4
Strontium	0.0002	0.0119	0.01210	-1.7	0.0236	0.02390	-1.3	0.0071	0.00702	1.3
Sulfur	0.5	1.55	1.27	19.9	1.57	1.38	12.9	0.65	0.72	-10.2
Thallium	0.00001	*<0.00001*	*<0.00001*		*<0.00001*	*<0.00001*		*<0.00001*	*<0.00001*	
Tin	0.0001	*<0.0001*	*<0.0001*		*<0.0001*	*<0.0001*		*<0.0001*	*<0.0001*	
Titanium	0.0003	*<0.0003*	*<0.00030*		*<0.0003*	*<0.00030*		*<0.0003*	*<0.0003*	
Uranium	0.00001	0.000037	0.000040	-7.8	0.000055	0.000052	5.6	0.000028	0.000026	7
Vanadium	0.0005	*<0.0005*	*<0.0005*		*<0.0005*	*<0.0005*		*<0.0005*	*<0.0005*	
Zinc	0.001	*<0.001*	*<0.001*		*<0.001*	*<0.001*		*<0.001*	*<0.001*	
Speciated Metals (µg/L)										
Arsenate (As V)								*<0.02*	*<0.02*	
Arsenite (As III)								0.034	0.033	3.0
Dimethylarsinic Acid (DMA)								*<0.02*	*<0.02*	
Monomethylarsonic Acid (MMA)								*<0.02*	*<0.02*	
Arsenobetaine (AsB)								*<0.05*	*<0.05*	

Notes:

RPD = Relative Percent Difference (%) = ((original - duplicate) / (original + duplicate)/2) x 100.

RPDs are calculated when both samples are above detection.

The data quality objective (DQO) for field duplicates is an RPD < 50%.

Bolded RPDs	RPD values exceed 50% but < 10 x MDL.
Shaded RPD	RPD values exceed 50% and > 10 x MDL.

- = no measurement

Italicized numbers are below detection limits.

Table A-5. Field QA/QC summary for water quality, all CREMP study areas, 2018.

Month		September					
	Sept MDLs	Third Portage Lake - North Basin			Baker Lake - Akilahaarjuk Point		
Analyte		TPN-116	SEPT DUP-1	RPD	BAP-59	SEPT DUP-2	RPD
Physical Tests							
Conductivity (µS/cm)	2	26.2	26.7	-1.9	300.0	300.0	0.0
Hardness (mg/L)	0.5	8.80	8.93	-1.5	35.20	35.10	0.3
pH (Laboratory)	0.1	7.06	7.05	0.1	7.27	7.26	0.1
Total Suspended Solids (mg/L)	1	*<1.0*	*<1.0*		1.1	*<1.0*	
Total Dissolved Solids (mg/L)	3	18.0	17.6	2.2	173.0	173.0	0.0
Turbidity (NTU)	0.1	0.17	0.21	-21.1	0.20	0.20	0.0
Anions and Nutrients (mg/L)							
Alkalinity, Bicarbonate	1	7	6	3.1	10	10	-1.0
Alkalinity, Carbonate	1	*<1.0*	*<1.0*		*<1.0*	*<1.0*	
Alkalinity, Hydroxide	1	*<1.0*	*<1.0*		*<1.0*	*<1.0*	
Alkalinity, Total	1	7	6	3.1	10	10	-1.0
Ammonia, Total (as N)	0.005	0.0115	0.0117	-1.7	0.0151	0.0114	27.9
Bromide (Br)	0.05	*<0.05*	*<0.05*		0.256	0.253	1.2
Chloride (Cl)	0.1	0.78	0.78	0.0	73.20	73.10	0.1
Fluoride (F)	0.02	0.066	0.065	1.5	0.068	0.068	0.0
Nitrate (as N)	0.005	0.0137	0.0132	3.7	0.0285	0.0288	-1.0
Nitrite (as N)	0.001	*<0.001*	*<0.001*		*<0.001*	*<0.001*	
Total Kjeldahl Nitrogen	0.05	0.10	0.08	18.0	0.16	0.15	5.1
Orthophosphate-Dissolved (as P)	0.001	*<0.001*	*<0.001*		0.0014	0.0012	15.4
Phosphorus (P)-Total Dissolved	0.002	*<0.002*	*<0.002*		*<0.002*	0.0023	
Phosphorus (P)-Total	0.002	*<0.002*	*<0.002*		0.0046	0.003	42.1
Silicate (as SiO_2)	0.5	*<0.5*	*<0.5*		*<0.5*	*<0.5*	
Sulfate (SO_4)	0.3	4.70	4.67	0.6	10.80	10.70	0.9
Cyanides (mg/L)							
Total Cyanide	0.001	*<0.001*	*<0.001*		*<0.001*	*<0.001*	
Free Cyanide	0.001	*<0.001*	*<0.001*		*<0.001*	*<0.001*	
Organic / Inorganic Carbon (mg/L)							
Dissolved Organic Carbon	0.5	1.31	1.42	-8.1	3.36	3.46	-2.9
Total Organic Carbon	0.5	1.34	1.35	-0.7	3.46	3.56	-2.8
Plant Pigments (µg/L)							
Chlorophyll-a	0.01	0.338	0.364	-7.4	1.07	0.571	60.8
Total Metals (mg/L)							
Aluminum	0.003	0.0044	0.0036	20.0	0.0068	0.0083	-19.9
Antimony	0.0001	*<0.0001*	*<0.0001*		*<0.0001*	*<0.0001*	
Arsenic	0.0001	0.00017	0.00016	6.1	0.00018	0.00019	-5.4
Barium	0.0001	0.00272	0.00270	0.7	0.01780	0.01810	-1.7
Beryllium	0.0001	*<0.0001*	*<0.0001*		*<0.0001*	*<0.0001*	
Bismuth	0.00005	*<0.00005*	*<0.00005*		*<0.00005*	*<0.00005*	
Boron	0.01	*<0.01*	*<0.01*		0.019	0.019	0.0
Cadmium	0.000005	*<0.000005*	*<0.000005*		*<0.000005*	*<0.000005*	
Calcium	0.05	2.11	2.17	-2.8	4.00	4.08	-2.0
Cesium		*<0.00001*	*<0.00001*		*<0.00001*	*<0.00001*	
Chromium	0.0001	*<0.0001*	*<0.0001*		*<0.0001*	0.00011	
Cobalt	0.0001	*<0.0001*	*<0.0001*		*<0.0001*	*<0.0001*	
Copper	0.0005	0.0005	*<0.0005*		*<0.0005*	*<0.0005*	
Iron	0.01	0.013	0.012	8.0	0.013	*<0.01*	
Lead	0.00005	*<0.00005*	*<0.00005*		*<0.00005*	*<0.00005*	
Lithium	0.001	*<0.001*	*<0.001*		0.00140	0.00150	-6.9
Magnesium	0.005	0.86	0.87	-2.1	5.91	5.96	-0.8
Manganese	0.0001	0.00168	0.00156	7.4	0.00150	0.00143	4.8
Mercury	0.000005	*<0.000005*	*<0.000005*		*<0.000005*	*<0.000005*	
Molybdenum	0.00005	0.000156	0.000142	9.4	0.000100	0.000090	10.5
Nickel	0.0005	0.00063	0.0006	4.9	*<0.0005*	*<0.0005*	
Phosphorus	0.05	*<0.05*	*<0.05*		*<0.05*	*<0.05*	
Potassium	0.05	0.46	0.47	-3.2	1.84	1.87	-1.6
Rubidium		0.00	0.00		0.00	0.00	
Selenium	0.00005	*<0.00005*	*<0.00005*		*<0.00005*	*<0.00005*	
Silicon	0.1	*<0.1*	*<0.1*		0.180	0.190	-5.4
Silver	0.00001	*<0.00001*	*<0.00001*		*<0.00001*	*<0.00001*	
Sodium	0.05	1.03	1.06	-2.9	40.20	41.10	-2.2
Strontium	0.0002	0.0101	0.0100	1.2	0.0467	0.0467	0.0
Sulfur	0.5	1.65	1.66	-0.6	3.78	3.56	6.0
Tellurium		*<0.0002*	*<0.0002*		*<0.0002*	*<0.0002*	
Thallium	0.00001	*<0.00001*	*<0.00001*		*<0.00001*	*<0.00001*	
Thorium		*<0.0001*	*<0.0001*		*<0.0001*	*<0.0001*	
Tin	0.0001	*<0.0001*	*<0.0001*		*<0.0001*	*<0.0001*	
Titanium	0.0003	*<0.0003*	*<0.00030*		*<0.0003*	*<0.00030*	
Tungsten		*<0.0001*	*<0.0001*		*<0.0001*	*<0.0001*	
Uranium	0.00001	0.000033	0.000035	-5.9	0.000055	0.000053	3.7
Vanadium	0.0005	*<0.0005*	*<0.0005*		*<0.0005*	*<0.0005*	
Zinc	0.003	*<0.0030*	*<0.0030*		*<0.003*	*<0.0030*	
Zirconium	0.00006	*<0.00006*	*<0.00006*		*<0.00006*	*<0.00006*	
Dissolved Metals (mg/L)							
Aluminum	0.001	0.0010	0.0027	**-91.9**	0.0062	0.0032	**63.8**
Antimony	0.0001	*<0.0001*	*<0.0001*		*<0.0001*	*<0.0001*	
Arsenic	0.0001	0.00015	0.00016	-6.5	0.00011	0.00011	0.0
Barium	0.0001	0.00279	0.00289	-3.5	0.01780	0.01780	0.0
Beryllium	0.0001	*<0.0001*	*<0.0001*		*<0.0001*	*<0.0001*	
Bismuth	0.00005	*<0.00005*	*<0.00005*		*<0.00005*	*<0.00005*	
Boron	0.01	*<0.01*	*<0.01*		0.018	0.018	0.0
Cadmium	0.000005	*<0.000005*	0.0000058		*<0.000005*	*<0.000005*	
Calcium	0.05	2.11	2.14	-1.4	4.03	4.05	-0.5
Cesium		*<0.00001*	*<0.00001*		*<0.00001*	*<0.00001*	
Chromium	0.0001	*<0.0001*	*<0.0001*		*<0.0001*	*<0.0001*	
Cobalt	0.0001	*<0.0001*	*<0.0001*		*<0.0001*	*<0.0001*	
Copper	0.0002	0.00050	0.00053	-5.8	0.00029	0.00029	0.0
Iron	0.01	*<0.01*	*<0.01*		*<0.01*	*<0.01*	
Lead	0.00005	*<0.00005*	*<0.00005*		*<0.00005*	*<0.00005*	
Lithium	0.001	*<0.001*	*<0.001*		0.00130	0.00130	0.0
Magnesium	0.005	0.86	0.87	-1.7	6.09	6.06	0.5
Manganese	0.0001	0.00053	0.00060	-12.4	0.00023	0.00013	**55.6**
Mercury	0.000005	*<0.000005*	*<0.000005*		*<0.000005*	*<0.000005*	
Molybdenum	0.00005	0.000129	0.000132	-2.3	0.000087	0.000101	-14.9
Nickel	0.0005	*<0.0005*	*<0.0005*		*<0.0005*	*<0.0005*	
Phosphorus	0.05	*<0.05*	*<0.05*		*<0.05*	*<0.05*	
Potassium	0.05	0.46	0.47	-2.8	1.90	1.92	-1.0
Selenium	0.00005	*<0.00005*	*<0.00005*		*<0.00005*	*<0.00005*	
Silicon	0.05	*<0.05*	0.051		0.155	0.149	3.9
Silver	0.00001	*<0.00001*	*<0.00001*		*<0.00001*	*<0.00001*	
Sodium	0.05	1.08	1.09	-0.9	40.70	41.80	-2.7
Strontium	0.0002	0.0098	0.00974	0.6	0.0453	0.04460	1.6
Sulfur	0.5	1.76	1.75	0.6	4.04	3.92	3.0
Thallium	0.00001	*<0.00001*	*<0.00001*		*<0.00001*	*<0.00001*	
Tin	0.0001	*<0.0001*	*<0.0001*		*<0.0001*	*<0.0001*	
Titanium	0.0003	*<0.0003*	*<0.00030*		*<0.0003*	*<0.00030*	
Uranium	0.00001	0.000027	0.000030	-10.5	0.000051	0.000046	10.3
Vanadium	0.0005	*<0.0005*	*<0.0005*		*<0.0005*	*<0.0005*	
Zinc	0.001	*<0.001*	0.0018		0.0013	*<0.001*	
Speciated Metals (µg/L)							
Arsenate (As V)							
Arsenite (As III)							
Dimethylarsinic Acid (DMA)							
Monomethylarsonic Acid (MMA)							
Arsenobetaine (AsB)							

Notes:

RPD = Relative Percent Difference (%) = ((original - duplicate) / (original + duplicate)/2) x 100.

RPDs are calculated when both samples are above detection.

The data quality objective (DQO) for field duplicates is an RPD < 50%.

Bolded RPDs	RPD values exceed 50% but < 10 x MDL.
Shaded RPD	RPD values exceed 50% and > 10 x MDL.

- = no measurement

Italicized numbers are below detection limits.

Table A-5. Field QA/QC summary for water quality, all CREMP study areas, 2018.

Month		November								
	Nov MDLs	Wally Lake			Whale Tail - South Basin			Lake A20		
Analyte		WAL-88	NOV DUP-1	RPD	WTS-36	DUP-1	RPD	A20-30	DUP-2	RPD
Physical Tests										
Conductivity (µS/cm)	2	42.1	42.2	-0.2	40.7	39.0	4.3	13.9	13.8	0.7
Hardness (mg/L)	0.5	18.20	18.90	-3.8	13.20	14.10	-6.6	5.12	5.11	0.2
pH (Laboratory)	0.1	7.40	7.40	0.0	6.95	6.94	0.1	6.86	6.86	0.0
Total Suspended Solids (mg/L)	1	*<1.0*	*<1.0*		*<1.0*	*<1.0*		*<1.0*	*<1.0*	
Total Dissolved Solids (mg/L)	3	26.0	26.6	-2.3	31.5	28.6	9.7	14.8	11.7	23.4
Turbidity (NTU)	0.1	0.17	0.18	-5.7	0.19	0.20	-5.1	0.15	0.19	-23.5
Anions and Nutrients (mg/L)										
Alkalinity, Bicarbonate	1	14	15	-3.4	6	6	6.9	5	5	4.3
Alkalinity, Carbonate	1	*<1.0*	*<1.0*		*<1.0*	*<1.0*		*<1.0*	*<1.0*	
Alkalinity, Hydroxide	1	*<1.0*	*<1.0*		*<1.0*	*<1.0*		*<1.0*	*<1.0*	
Alkalinity, Total	1	14	15	-3.4	6	6	6.9	5	5	4.3
Ammonia, Total (as N)	0.005	0.0230	*<0.005*		*<0.0050*	*<0.005*		*<0.0050*	*<0.005*	
Bromide (Br)	0.05	*<0.050*	*<0.05*		0.079	0.078	1.3	*<0.050*	*<0.05*	
Chloride (Cl)	0.1	0.80	0.81	-1.2	6.72	6.49	3.5	0.66	0.66	0.0
Fluoride (F)	0.02	0.052	0.052	0.0	0.034	0.033	3.0	0.029	0.029	0.0
Nitrate (as N)	0.005	*<0.0050*	*<0.005*		*<0.0050*	*<0.005*		*<0.0050*	*<0.005*	
Nitrite (as N)	0.001	*<0.0010*	*<0.001*		*<0.0010*	*<0.001*		*<0.0010*	*<0.001*	
Total Kjeldahl Nitrogen	0.05	0.14	0.12	14.3	0.10	0.10	-7.1	0.08	0.06	20.0
Orthophosphate-Dissolved (as P)	0.001	*<0.0010*	*<0.001*		*<0.0010*	*<0.001*		*<0.0010*	*<0.001*	
Phosphorus (P)-Total Dissolved	0.002	0.0023	0.0021	9.1	*<0.0020*	*<0.002*		*<0.0020*	*<0.002*	
Phosphorus (P)-Total	0.002	0.0028	0.0031	-10.2	0.0043	*<0.002*		0.0038	0.003	23.5
Silicate (as SiO_2)	0.5	0.54	0.52	3.8	0.53	*<0.5*		0.83	0.7	17.0
Sulfate (SO_4)	0.3	4.75	4.75	0.0	1.94	1.86	4.2	1.04	1.04	0.0
Cyanides (mg/L)										
Total Cyanide	0.001	*<0.001*	*<0.001*		*<0.0010*	*<0.001*		*<0.0010*	*<0.001*	
Free Cyanide	0.001	*<0.001*	*<0.001*		*<0.0010*	*<0.001*		*<0.0010*	*<0.001*	
Organic / Inorganic Carbon (mg/L)										
Dissolved Organic Carbon	0.5	1.71	2.17	-23.7	1.81	2.00	-10.0	1.39	1.53	-9.6
Total Organic Carbon	0.5	1.89	2.17	-13.8	1.98	2.07	-4.4	1.76	1.56	12.0
Plant Pigments (µg/L)										
Chlorophyll-a	0.01	1.27	1.31	-3.1	0.859	0.99	-14.2	0.415	0.504	-19.4
Total Metals (mg/L)										
Aluminum	0.003	*<0.0030*	0.0034		0.0076	0.0063	18.7	0.0034	0.0039	-13.7
Antimony	0.0001	*<0.00010*	*<0.0001*		*<0.00010*	*<0.0001*		*<0.00010*	*<0.0001*	
Arsenic	0.0001	0.00027	0.00026	3.8	0.00024	0.00023	4.3	*<0.00010*	*<0.0001*	
Barium	0.0001	0.00209	0.00209	0.0	0.00795	0.00760	4.5	0.00294	0.00328	-10.9
Beryllium	0.0001	*<0.00010*	*<0.0001*		*<0.00010*	*<0.0001*		*<0.00010*	*<0.0001*	
Bismuth	0.00005	*<0.000050*	*<0.00005*		*<0.000050*	*<0.00005*		*<0.000050*	*<0.00005*	
Boron	0.01	*<0.010*	*<0.01*		*<0.010*	*<0.01*		*<0.010*	*<0.01*	
Cadmium	0.000005	*<0.0000050*	*<0.000005*		*<0.0000050*	*<0.000005*		*<0.0000050*	*<0.000005*	
Calcium	0.05	4.89	4.92	-0.6	4.15	3.96	4.7	1.31	1.34	-2.3
Cesium	0.00001	*<0.000010*	*<0.00001*		*<0.000010*	*<0.00001*		*<0.000010*	*<0.00001*	
Chromium	0.0001	*<0.00010*	*<0.0001*		0.00012	*<0.0001*		0.0002	*<0.0001*	
Cobalt	0.0001	*<0.00010*	*<0.0001*		*<0.00010*	*<0.0001*		*<0.00010*	*<0.0001*	
Copper	0.0005	0.00081	0.00081	0.0	*<0.00050*	*<0.0005*		*<0.00050*	*<0.0005*	
Iron	0.01	*<0.010*	*<0.01*		*<0.010*	*<0.01*		0.012	*<0.01*	
Lead	0.00005	*<0.000050*	*<0.00005*		*<0.000050*	*<0.00005*		*<0.000050*	*<0.00005*	
Lithium	0.001	*<0.0010*	*<0.001*		0.00140	0.00130	7.4	*<0.0010*	*<0.001*	
Magnesium	0.005	1.48	1.46	1.4	1.11	1.08	2.7	0.44	0.49	-10.8
Manganese	0.0001	0.00184	0.00181	1.6	0.00065	0.00065	0.0	0.00071	0.00073	-2.8
Mercury	0.000005	*<0.0000050*	*<0.000005*		*<0.0000050*	*<0.000005*		*<0.0000050*	*<0.000005*	
Molybdenum	0.00005	0.000237	0.000243	-2.5	0.000058	0.000051	12.8	*<0.000050*	*<0.00005*	
Nickel	0.0005	*<0.00050*	*<0.0005*		0.00056	0.00051	9.3	*<0.00050*	*<0.0005*	
Phosphorus	0.05	*<0.050*	*<0.05*		*<0.050*	*<0.05*		*<0.050*	*<0.05*	
Potassium	0.05	0.54	0.53	1.3	0.81	0.75	7.5	0.34	0.36	-5.1
Rubidium	0.0002	0.00	0.00		0.00	0.00		0.00	0.00	
Selenium	0.00005	*<0.000050*	*<0.00005*		*<0.000050*	*<0.00005*		*<0.000050*	*<0.00005*	
Silicon	0.1	0.290	0.290	0.0	0.290	0.260	10.9	0.410	0.440	-7.1
Silver	0.00001	*<0.000010*	*<0.00001*		*<0.000010*	*<0.00001*		*<0.000010*	*<0.00001*	
Sodium	0.05	0.70	0.69	0.3	0.85	0.81	5.5	0.59	0.62	-4.3
Strontium	0.0002	0.0255	0.0255	0.0	0.0334	0.0322	3.7	0.0067	0.0072	-7.4
Sulfur	0.5	1.86	1.88	-1.1	0.73	0.65	11.6	*<0.50*	*<0.5*	
Tellurium	0.0002	*<0.00020*	*<0.0002*		*<0.00020*	*<0.0002*		*<0.00020*	*<0.0002*	
Thallium	0.00001	*<0.000010*	*<0.00001*		*<0.000010*	*<0.00001*		*<0.000010*	*<0.00001*	
Thorium	0.0001	*<0.00010*	*<0.0001*		*<0.00010*	*<0.0001*		*<0.00010*	*<0.0001*	
Tin	0.0001	*<0.00010*	*<0.0001*		*<0.00010*	*<0.0001*		*<0.00010*	*<0.0001*	
Titanium	0.0003	*<0.00030*	*<0.00030*		*<0.00030*	*<0.0003*		*<0.00030*	*<0.0003*	
Tungsten	0.0001	*<0.00010*	*<0.0001*		*<0.00010*	*<0.0001*		*<0.00010*	*<0.0001*	
Uranium	0.00001	0.000048	0.000045	6.5	0.000034	0.000032	6.1	0.000023	0.000023	0.0
Vanadium	0.0005	*<0.00050*	*<0.0005*		*<0.00050*	*<0.0005*		*<0.00050*	*<0.0005*	
Zinc	0.003	*<0.0030*	*<0.0030*		*<0.0030*	*<0.003*		*<0.0030*	*<0.003*	
Zirconium	0	*<0.000060*	*<0.00006*		*<0.000060*	*<0.000060*		*<0.000060*	*<0.000060*	
Dissolved Metals (mg/L)										
Aluminum	0.001	0.0016	0.0012	28.6	0.0029	0.0041	-34.3	0.0015	0.0011	30.8
Antimony	0.0001	*<0.00010*	*<0.0001*		*<0.00010*	*<0.0001*		*<0.00010*	*<0.0001*	
Arsenic	0.0001	0.00021	0.00020	4.9	0.00020	0.00022	-9.5	*<0.00010*	*<0.0001*	
Barium	0.0001	0.00214	0.00233	-8.5	0.00757	0.00763	-0.8	0.00303	0.00300	1.0
Beryllium	0.0001	*<0.00010*	*<0.0001*		*<0.00010*	*<0.0001*		*<0.00010*	*<0.0001*	
Bismuth	0.00005	*<0.000050*	*<0.00005*		*<0.000050*	*<0.00005*		*<0.000050*	*<0.00005*	
Boron	0.01	*<0.010*	*<0.01*		*<0.010*	*<0.01*		*<0.010*	*<0.01*	
Cadmium	0.000005	*<0.0000050*	*<0.000005*		*<0.0000050*	0.0000068		*<0.0000050*	*<0.000005*	
Calcium	0.05	4.91	5.13	-4.4	3.55	3.85	-8.1	1.30	1.30	0.0
Cesium	0.00001	*<0.000010*	*<0.00001*		*<0.000010*	*<0.00001*		*<0.000010*	*<0.00001*	
Chromium	0.0001	*<0.00010*	*<0.0001*		*<0.00010*	0.0001		*<0.00010*	*<0.0001*	
Cobalt	0.0001	*<0.00010*	*<0.0001*		*<0.00010*	*<0.0001*		*<0.00010*	*<0.0001*	
Copper	0.0002	0.00072	0.00077	-6.7	0.00039	0.00045	-14.3	0.00021	*<0.0002*	
Iron	0.01	*<0.010*	*<0.01*		*<0.010*	*<0.01*		*<0.010*	*<0.01*	
Lead	0.00005	*<0.000050*	*<0.00005*		*<0.000050*	*<0.00005*		*<0.000050*	*<0.00005*	
Lithium	0.001	*<0.0010*	*<0.001*		0.00100	0.00110	-9.5	*<0.0010*	*<0.001*	
Magnesium	0.005	1.45	1.48	-2.0	1.05	1.08	-2.8	0.46	0.45	1.1
Manganese	0.0001	0.00011	0.00012	-8.7	0.00013	0.00022	**-51.4**	0.00015	0.00017	-12.5
Mercury	0.000005	*<0.0000050*	*<0.000005*		*<0.0000050*	*<0.000005*		*<0.0000050*	*<0.000005*	
Molybdenum	0.00005	0.000249	0.000224	10.6	*<0.000050*	0.000058		*<0.000050*	*<0.00005*	
Nickel	0.0005	*<0.00050*	*<0.0005*		*<0.00050*	0.0005		*<0.00050*	*<0.0005*	
Phosphorus	0.05	*<0.050*	*<0.05*		*<0.050*	*<0.05*		*<0.050*	*<0.05*	
Potassium	0.05	0.52	0.55	-6.0	0.73	0.78	-5.7	0.35	0.34	2.3
Selenium	0.00005	*<0.000050*	*<0.00005*		*<0.000050*	*<0.00005*		*<0.000050*	*<0.00005*	
Silicon	0.05	0.271	0.248	8.9	0.226	0.243	-7.2	0.402	0.402	0.0
Silver	0.00001	*<0.000010*	*<0.00001*		*<0.000010*	*<0.00001*		*<0.000010*	*<0.00001*	
Sodium	0.05	0.69	0.73	-4.9	0.79	0.81	-3.5	0.59	0.59	-0.2
Strontium	0.0002	0.0251	0.02380	5.3	0.0318	0.03220	-1.2	0.0068	0.00698	-2.5
Sulfur	0.5	1.67	1.87	-11.3	0.69	0.62	10.7	*<0.50*	*<0.5*	
Thallium	0.00001	*<0.000010*	*<0.00001*		*<0.000010*	*<0.00001*		*<0.000010*	*<0.00001*	
Tin	0.0001	*<0.00010*	*<0.0001*		*<0.00010*	*<0.0001*		*<0.00010*	*<0.0001*	
Titanium	0.0003	*<0.00030*	*<0.00030*		*<0.00030*	*<0.0003*		*<0.00030*	*<0.0003*	
Uranium	0.00001	0.000042	0.000052	-21.3	0.000030	0.000031	-3.3	0.000021	0.000019	10.0
Vanadium	0.0005	*<0.00050*	*<0.0005*		*<0.00050*	*<0.0005*		*<0.00050*	*<0.0005*	
Zinc	0.001	*<0.0010*	*<0.001*		*<0.0010*	0.0015		*<0.0010*	*<0.001*	
Speciated Metals (µg/L)										
Arsenate (As V)					*<0.020*	*<0.02*		-	-	
Arsenite (As III)					0.063	0.067	-6.2	-	-	
Dimethylarsinic Acid (DMA)					*<0.020*	*<0.02*		-	-	
Monomethylarsonic Acid (MMA)					*<0.020*	*<0.02*		-	-	
Arsenobetaine (AsB)					*<0.050*	*<0.05*		-	-	

Notes:

RPD = Relative Percent Difference (%) = ((original - duplicate) / (original + duplicate)/2) x 100.

RPDs are calculated when both samples are above detection.

The data quality objective (DQO) for field duplicates is an RPD < 50%.

Bolded RPDs	RPD values exceed 50% but < 10 x MDL.
Shaded RPD	RPD values exceed 50% and > 10 x MDL.

- = no measurement

Italicized numbers are below detection limits.

Table A-6. Swipe chemistry data for sediment grab and core analyses, 2018.

		Equipment Swipes						
		SWIPE-QA	SWIPE-SC-1	SWIPE-SC-2	SWIPE-SC-3	SWIPE-1	SWIPE-2	SWIPE-3
	Swipe DLs (µg)	FILTER	FILTER	FILTER	FILTER	FILTER	FILTER	FILTER
Analyte		22-Aug-18	17-Aug-18	10-Aug-18	18-Aug-18	11-Aug-18	20-Aug-18	20-Aug-18
Total Metals (mg/kg dw)								
Aluminum	20	*<20*	**55**	*<20*	-	**23**	*<20*	**41**
Antimony	20	*<20*	*<20*	*<20*	-	*<20*	*<20*	*<20*
Arsenic	20	*<20*	*<20*	*<20*	-	*<20*	*<20*	*<20*
Barium	1	*<1.0*	**1.2**	*<1.0*	-	*<1.0*	*<1.0*	**2.5**
Beryllium	0.5	*<0.50*	*<0.50*	*<0.50*	-	*<0.50*	*<0.50*	*<0.50*
Bismuth	20	*<20*	*<20*	*<20*	-	*<20*	*<20*	*<20*
Cadmium	1	*<1.0*	*<1.0*	*<1.0*	-	*<1.0*	*<1.0*	*<1.0*
Calcium	200	*<200*	*<200*	*<200*	-	*<200*	*<200*	*<200*
Chromium	2	*<2.0*	*<2.0*	*<2.0*	-	22.7	**11**	30.8
Cobalt	1	*<1.0*	*<1.0*	*<1.0*	-	*<1.0*	*<1.0*	*<1.0*
Copper	1	**1.1**	**1.7**	*<1.0*	-	**2.2**	**1.2**	**1.2**
Iron	3	**10.4**	124	**27.5**	-	146	80.6	203
Lead	4	*<4.0*	*<4.0*	*<4.0*	-	*<4.0*	*<4.0*	*<4.0*
Lithium	1	*<1.0*	*<1.0*	*<1.0*	-	*<1.0*	*<1.0*	*<1.0*
Magnesium	100	**130**	**190**	**150**	-	**120**	**150**	**120**
Manganese	0.5	*<0.50*	**1.97**	**0.71**	-	**3.66**	**2.69**	5.23
Mercury	0.01	-	-		*<0.010*	-	-	-
Molybdenum	3	*<3.0*	*<3.0*	*<3.0*	-	*<3.0*	*<3.0*	*<3.0*
Nickel	5	*<5.0*	*<5.0*	*<5.0*	-	**5.1**	**5.7**	**11.7**
Phosphorus	30	*<30*	*<30*	**32**	-	*<30*	*<30*	*<30*
Potassium	200	*<200*	*<200*	*<200*	-	*<200*	*<200*	*<200*
Selenium	20	*<20*	*<20*	*<20*	-	*<20*	*<20*	*<20*
Silver	1	*<1.0*	*<1.0*	*<1.0*	-	*<1.0*	*<1.0*	*<1.0*
Sodium	400	**580**	**820**	**980**	-	**580**	**640**	**440**
Strontium	0.5	*<0.50*	**0.76**	**0.62**	-	*<0.50*	**0.53**	*<0.50*
Thallium	20	*<20*	*<20*	*<20*	-	*<20*	*<20*	*<20*
Tin	3	*<3.0*	*<3.0*	**4.5**	-	**11.4**	**11.8**	**8.9**
Titanium	1	*<1.0*	**2.2**	*<1.0*	-	*<1.0*	*<1.0*	**1.5**
Vanadium	3	*<3.0*	*<3.0*	*<3.0*	-	*<3.0*	*<3.0*	*<3.0*

Notes:

Bold Filter Swipe	value is > DL, but < 10x DL.
Shaded Filter Swipe	value > 10x DL.

Table A-7 QA/QC data for analysis of sediment grab samples, 2018.

		Field Duplicates (Grabs)																	
		Third Portage Lake - East			Second Portage Lake			Inuggugayualik Lake			Baker Lake - Barge Dock			Baker Lake - East Shore			Whale Tail - South Basin			Whale Tail - North Basin		
	DLs	TPE Rep 2	DUP-1	RPD[3]	SP Rep 1	DUP-2	RPD[3]	INUG Rep 5	DUP-3	RPD[3]	BAP Rep 2	DUP-4	RPD[3]	BES Rep 1	DUP-5	RPD[3]	WTS-3	DUP-1	RPD[3]	WTN-2	DUP-3	RPD[3]
Analyte	(mg/kg)	10-Aug-18		(%)	13-Aug-18		(%)	12-Aug-18		(%)	20-Aug-18		(%)	20-Aug-18		(%)	13-Aug-18		(%)	18-Aug-18		(%)
Physical & Organic Parameters																					
Moisture (%)	*0.25*	85.2	85.8	-0.7	84.9	84.7	0.2	82.5	83.2	-0.8	32.7	32.7	0.0	34.5	37.2	-7.5	80.8	79.5	1.6	87.1	87.0	0.1
pH	*0.10*	6.68	6.67	0	5.94	5.86	1.4	4.97	5.18	-4.1	6.48	6.18	4.7	7.59	7.38	2.8	5.18	5.21	-0.6	5.07	5.04	0.6
TOC (% dw)	*0.10*	3.44	3.29	4.5	3.87	3.65	5.9	3.45	3.43	0.6	0.39	0.30	24.9	0.33	0.39	-15.5	4.36	4.26	2.3	-	-	
Particle Size																						
% Gravel (>2mm)	*0.10*	*<1.0*	*<1.0*		*<1.0*	*<1.0*		*<1.0*	*<1.0*		*<1.0*	*<1.0*		*<1.0*	*<1.0*		<1.0	<1.0		-	-	
% Sand (2.00 - 0.063) mm)	*0.10*	1.10	2.90	-90	1.90	1.80	5.4	1.80	2.40	-28.6	75.30	77.10	-2.4	73.00	72.20	1.1	2.90	3.40	-15.9	-	-	
% Silt (0.063mm - 4µm)	*0.10*	70.2	65.1	7.5	80.9	71.9	11.8	74.3	73.1	1.6	22.4	20.5	8.9	23.6	24.7	-4.6	91.6	84.0	8.7	-	-	
% Clay (<4µm)	*0.10*	28.8	32.0	-10.5	17.2	26.3	-41.8	23.9	24.5	-2.5	2.3	2.4	-4.3	3.5	3.0	15.4	5.5	12.6	-78.5	-	-	
Total Metals (mg/kg dw)																						
Aluminum	*50*	23800	22800	4.3	26200	25000	4.7	24100	20800	14.7	4570	4590	-0.4	6510	5550	15.9	23400	22300	4.8	19100	17500	8.7
Antimony	*0.10*	0.23	0.23	0.0	0.28	0.25	11.3	0.17	0.16	6.1	0.18	0.13	32.3	0.12	0.12	0.0	0.30	0.27	10.5	0.27	0.24	11.8
Arsenic	*0.100*	18.6	18.0	3.3	35.6	34.3	3.7	131.0	126.0	3.9	6.9	6.6	3.6	3.1	3.4	-9.8	28.3	26.6	6.2	620.0	599.0	3.4
Barium	*0.50*	138	126	9.1	134	123	8.6	133	117	12.8	396	436	-9.6	160	132	19.2	165	152	8.2	156	141	10.1
Beryllium	*0.10*	1.72	1.76	-2.3	2.00	2.00	0.0	1.50	1.38	8.3	0.29	0.32	-9.8	0.35	0.32	9.0	1.96	1.80	8.5	1.49	1.39	6.9
Bismuth	*0.20*	2.34	2.26	3.5	2.39	2.28	4.7	1.20	1.15	4.3	*<0.20*	*<0.20*		*<0.20*	*<0.20*		0.72	0.66	8.7	0.52	0.47	10.1
Boron	*5.0*	9.10	8.50	6.8	9.50	9.40	1.1	9.20	8.70	5.6	6.20	6.40	-3.2	7.10	6.20	13.5	7.20	6.40	11.8	7.60	5.90	25.2
Cadmium	*0.020*	0.466	0.438	6.2	0.320	0.310	3.2	0.185	0.166	10.8	0.032	0.025	24.6	0.038	0.031	20.3	0.498	0.493	1.0	0.371	0.329	12.0
Calcium	*50*	2030	2010	1.0	2270	2180	4.0	1900	1740	8.8	2180	2150	1.4	2260	2100	7.3	3000	2710	10.2	1910	1630	15.8
Chromium	*0.50*	123.0	114.0	7.6	81.6	77.6	5.0	112.0	99.6	11.7	15.3	15.0	2.0	17.7	16.6	6.4	88.1	82.3	6.8	116.0	109.0	6.2
Cobalt	*0.10*	16.9	16.0	5.5	18.0	17.2	4.5	13.0	12.0	8.0	3.7	3.5	5.8	4.4	4.2	4.2	24.5	22.0	10.8	17.9	17.2	4.0
Copper	*0.50*	50.5	47.4	6.3	75.8	73.6	2.9	46.0	43.3	6.0	4.3	4.0	7.2	4.3	4.5	-3.2	56.4	53.8	4.7	45.4	42.6	6.4
Iron	*50*	43400	40900	5.9	71600	68100	5.0	113000	108000	4.5	14100	13700	2.9	12900	12400	4.0	39600	35500	10.9	115000	111000	3.5
Lead	*0.50*	20.6	20.4	1.0	22.6	21.5	5.0	12.8	12.5	2.4	4.3	4.4	-3.0	4.4	4.5	-2.2	15.8	14.5	8.6	12.4	11.4	8.4
Lithium	*2.0*	44.2	44.7	-1.1	44.8	44.3	1.1	27.5	25.8	6.4	6.4	7.0	-9.0	9.0	8.8	2.2	21.7	20.4	6.2	15.6	14.5	7.3
Magnesium	*20*	9850	9270	6.1	9480	8970	5.5	9970	8840	12.0	2710	2590	4.5	4010	3490	13.9	9530	8640	9.8	7770	7170	8.0
Manganese	*1.0*	3290	3120	5.3	1930	1830	5.3	828	768	7.5	185	181	2.2	611	562	8.4	482	460	4.7	2200	1990	10.0
Mercury	*0.0050*	0.0190	0.0199	-4.6	0.0294	0.0347	-16.5	0.0283	0.0276	2.5	0.0050	0.0051	-2.0	0.0074	0.0067	9.9	0.0381	0.0340	11.4	0.0634	0.0574	9.9
Molybdenum	*0.10*	4.09	4.05	1.0	7.12	6.70	6.1	11.50	10.90	5.4	0.59	0.47	22.6	0.48	0.57	-17.1	8.56	7.75	9.9	5.65	5.46	3.4
Nickel	*0.50*	131.0	123.0	6.3	69.9	67.8	3.1	74.3	68.7	7.8	8.9	8.5	4.5	10.3	9.9	4.0	115.0	106.0	8.1	96.3	92.0	4.6
Phosphorus	*50*	433	393	9.7	639	649	-1.6	2510	2240	11.4	719	690	4.1	618	630	-1.9	593	539	9.5	2640	2440	7.9
Potassium	*100*	4430	4000	10.2	4780	4390	8.5	3660	3340	9.1	1220	1100	10.3	1270	1240	2.4	3100	2930	5.6	2410	1980	19.6
Selenium	*0.20*	0.69	0.66	4.4	0.72	0.74	-2.7	0.71	0.64	10.4	*<0.20*	*<0.20*		*<0.20*	*<0.20*		0.90	0.77	15.6	0.81	0.71	13.2
Silver	*0.10*	*<0.10*	*<0.10*		0.17	0.17	0.0	0.18	0.18	0.0	*<0.10*	*<0.10*		*<0.10*	*<0.10*		0.34	0.33	3.0	0.33	0.30	9.5
Sodium	*50*	198	175	12.3	247	206	18.1	172	171	0.6	118	90	26.9	106	107	-0.9	189	170	10.6	170	144	16.6
Strontium	*0.50*	19.0	17.6	7.7	21.6	19.9	8.2	27.7	23.7	15.6	42.8	43.4	-1.4	40.6	36.3	11.2	29.8	25.8	14.4	23.2	19.1	19.4
Sulfur	*1000*	1900.0	1800.0	5.4	1600.0	1500.0	6.5	1000.0	1100.0	-9.5	*<1000*	*<1000*		*<1000*	*<1000*		2000.0	1700.0	16.2	1300.0	1200.0	8.0
Thallium	*0.050*	0.512	0.488	4.8	0.436	0.409	6.4	0.216	0.216	0.0	0.055	0.053	3.7	0.058	0.062	-6.7	0.354	0.334	5.8	0.237	0.209	12.6
Tin	*2.0*	2.1	*<2.0*		*<2.0*	*<2.0*		*<2.0*	*<2.0*		*<2.0*	*<2.0*		*<2.0*	*<2.0*		<2.0	<2.0		<2.0	<2.0	
Titanium	*1.0*	869	821	5.7	925	846	8.9	659	604	8.7	309	328	-6.0	372	331	11.7	734	650	12.1	491	352	33.0
Tungsten	*0.50*	1	1	-11.9	1	1	13.5	1	1	-3.2	*<0.50*	*<0.50*		*<0.50*	*<0.50*		0.52	<0.50		0.52	<0.50	
Uranium	*0.050*	16.2	15.7	3.1	20.3	19.3	5.1	16.2	15.3	5.7	1.2	1.4	-14.1	1.1	1.1	0.0	21.6	19.8	8.7	10.6	9.8	8.4
Vanadium	*0.20*	39.5	37.8	4.4	40.3	38.3	5.1	36.2	34.0	6.3	20.2	19.9	1.5	18.9	18.4	2.7	33.8	31.4	7.4	29.5	26.3	11.5
Zinc	*2.0*	116.0	109.0	6.2	124.0	119.0	4.1	94.4	87.6	7.5	19.6	18.8	4.2	23.6	22.6	4.3	155.0	141.0	9.5	102.0	94.6	7.5
Zirconium	*1.0*	2.9	2.7	7.1	3.1	3.0	3.3	3.4	2.8	19.4	4.5	4.5	0.0	2.8	2.5	11.3	7.1	6.5	8.8	1.9	2.4	-23.3

Notes:

The DQO for field duplicates is an RPD of < 50%.

RPD (%) = ((original - duplicate) / (original + duplicate)/2) x 100.

RPDs have not been calculated for cases where one of the samples is below detection and the other is not and in cases where both are below detection. RPD has been left blank.

Bold RPDs values exceed the DQO, but concentrations are < 10x DL.

Shaded RPDs values exceed the DQO, and concentrations are > 10x DL.

Field Dup' grab samples are homogenization duplicates - the original and duplicate samples were split from the same homogenized bowl of sediment.

Italicized numbers are below detection limits.

Table A-8. QA/QC data for analysis of sediment core samples, 2018.

		Field Duplicates (Cores)								
		Wally Lake			Third Portage Lake - East			Whale Tail - South Basin		
Analyte	DLs (mg/kg)	WAL SC-8	DUP-SC-1	RPD[3]	TPE SC-4	DUP-SC-2	RPD[3]	SC-03 (5-6)	DUP-SC-1	RPD[3]
		11-Aug-18		(%)	10-Aug-18		(%)	18-Aug-18		(%)
Physical & Organic Parameters										
Moisture (%)	*0.25*	94.9	93.2	2	89.8	89.8	0.0	80.9	83.1	-2.7
pH	*0.10*	6.43	5.88	8.9	5.97	6.21	-3.9	5.51	5.28	4.3
TOC (% dw)	*0.10*	-	-		-	-		-	-	
Particle Size										
% Gravel (>2mm)	*0.10*	-	-		-	-		-	-	
% Sand (2.00 - 0.063 mm)	*0.10*	-	-		-	-		-	-	
% Silt (0.063mm - 4µm)	*0.10*	-	-		-	-		-	-	
% Clay (<4µm)	*0.10*	-	-		-	-		-	-	
Total Metals (mg/kg dw)										
Aluminum	*50*	15500	24500	-45.0	25100	25400	-1.2	22800	21400	6.3
Antimony	*0.10*	0.50	0.63	-23.0	0.28	0.36	-25.0	0.21	0.24	-13.3
Arsenic	*0.100*	27.5	32.8	-17.6	19.8	28.4	-35.7	63.2	47.9	27.5
Barium	*0.50*	92	151	-48.8	134	124	7.8	153	139	9.6
Beryllium	*0.10*	1.17	1.82	-43.5	1.89	1.53	21.1	1.87	1.62	14.3
Bismuth	*0.20*	1.44	2.26	-44.32	2.51	2.04	20.7	0.68	0.65	4.5
Boron	*5.0*	13.00	13.50	-3.77	9.80	9.00	8.5	7.60	8.70	-13.5
Cadmium	*0.020*	0.474	0.712	-40	0.485	0.547	-12.0	0.295	0.871	-98.8
Calcium	*50*	5670	4310	27.3	2400	2850	-17	1990	1960	2
Chromium	*0.50*	49.0	62.8	-24.7	111.0	251.0	-77.3	82.9	80.5	2.9
Cobalt	*0.10*	9.4	11.9	-24.0	16.3	20.6	-23.3	11.6	11.8	-1.7
Copper	*0.50*	110.0	134.0	-19.7	55.3	49.2	11.7	54.5	53.1	2.6
Iron	*50*	27000	31300	-15	46700	51800	-10.4	55600	53400	4.0
Lead	*0.50*	29.8	37.1	-21.8	22.1	21.5	2.8	15.1	13.9	8.3
Lithium	*2.0*	26.1	43.0	-49	47.4	40.9	15	17.1	18.1	-6
Magnesium	*20*	6540	9180	-33.6	9700	13800	-34.9	7490	7420	0.9
Manganese	*1.0*	324	393	-19	2630	2820	-7.0	572	446	24.8
Mercury	*0.0050*	0.0859	0.0709	19	0.0214	0.0258	-18.6	0.0445	0.0438	1.6
Molybdenum	*0.10*	7.81	11.10	-34.8	4.38	4.33	1.1	5.92	4.70	23.0
Nickel	*0.50*	49.8	60.4	-19.2	113.0	164.0	-36.8	75.3	65.9	13.3
Phosphorus	*50*	940	645	37.2	419	515	-21	1400	1230	13
Potassium	*100*	2990	4230	-34	4540	4220	7	2850	2720	5
Selenium	*0.20*	0.78	0.88	-12.05	0.83	0.76	8.8	0.85	0.86	-1.2
Silver	*0.10*	0.52	0.56	-7.41	*<0.10*	0.18		0.33	0.31	6.25
Sodium	*50*	218	204	7	230	219	5	161	178	-10
Strontium	*0.50*	33.3	30.7	8.1	20.9	21.4	-2	25.4	22.5	12
Sulfur	*1000*	3800.0	2700.0	33.8	2000.0	2200.0	-10	<1000	1100.0	
Thallium	*0.050*	0.260	0.439	**-51**	0.480	0.436	9.6	0.241	0.236	2.1
Tin	*2.0*	6.7	6.5	3.0	3.3	3.6	-8.7	<2.0	<2.0	
Titanium	*1.0*	465	773	-50	897	782	14	633	592	7
Tungsten	*0.50*	1	1		1	1		<0.50	<0.50	
Uranium	*0.050*	12.9	21.5	-50.0	17.2	13.7	22.7	15.5	14.1	9.5
Vanadium	*0.20*	23.9	34.8	-37	42.9	47.8	-10.8	31.4	27.3	14.0
Zinc	*2.0*	101.0	178.0	-55	117.0	111.0	5.3	117.0	101.0	14.7
Zirconium	*1.0*	4.7	6.4	-31	2.8	2.7	3.6	3.3	2.2	40.0

Notes:

The DQO for field duplicates is an RPD of < 50%.

RPD (%) = ((original - duplicate) / (original + duplicate)/2) x 100.

RPDs have not been calculated for cases where one of the samples is below detection and the other is not and in cases where both are below detection. RPD has been l

Bold RPDs values exceed the DQO, but concentrations are < 10x DL.

Shaded RPDs values exceed the DQO, and concentrations are > 10x DL.

Field Dup' grab samples are homogenization duplicates - the original and duplicate samples were split from the same homogenized bowl of sediment.

Italicized numbers are below detection limits.

Table A-9. QA/QC results for sediment grab sample hydrocarbon and PAH analyses, 2018.

Analyte	DQOs[1]	DLs (mg/kg)	Field Duplicates: Baker Lake - Baker Proposed Jetty BPJ	COMP-DUP-2	RPD (%)	Whale Tail - South Basin WTS-COMP	COMP-DUP-1	RPD[2] (%)	Lake DS1 DS1-COMP	COMP-DUP-2	RPD (%)
						13-Aug-18			19-Aug-18		
Physical Parameters											
Moisture (%)		*0.25*	45.6	44.2	3.1	84.2	84.4	-0.2	69.4	68.8	0.9
Aggregate Organics (mg/kg)											
Mineral Oil and Grease		*500*	750.0	*<500*		2760	3820	-32.2	*<700*	1360	
Hydrocarbons (mg/kg)											
EPH10-19	40	*280*	*<200*	*<200*		*<640*	*<640*		*<320*	*<300*	
EPH19-32	40	*280*	*<200*	*<200*		*<640*	*<640*		*<320*	*<300*	
LEPH		*280*	*<200*	*<200*		*<640*	*<640*		*<320*	*<300*	
HEPH		*280*	*<200*	*<200*		*<640*	*<640*		*<320*	*<300*	
2-Bromobenzotrifluoride (%)			90.7	94.0		95.3	109.9		96.5	110.4	
Polycyclic Aromatic Hydrocarbons (mg/kg)											
Acenaphthene	50	*0.0050*	*<0.0050*	*<0.0050*		*<0.020*	*<0.0050*		*<0.0050*	*<0.0050*	
Acenaphthylene	50	*0.0050*	*<0.0050*	*<0.0050*		*<0.020*	*<0.0050*		*<0.0050*	*<0.0050*	
Anthracene	50	*0.0040*	*<0.0040*	*<0.0040*		*<0.020*	*<0.0040*		*<0.0040*	*<0.0040*	
Benz(a)anthracene	50	*0.010*	*<0.010*	*<0.010*		*<0.020*	*<0.010*		*<0.010*	*<0.010*	
Benzo(a)pyrene	50	*0.010*	*<0.010*	*<0.010*		*<0.020*	*<0.010*		*<0.010*	*<0.010*	
Benzo(b&j)fluoranthene	50	*0.010*	*<0.010*	*<0.010*		*<0.020*	*<0.010*		*<0.010*	*<0.010*	
Benzo(b+j+k)fluoranthene	50	*0.015*	*<0.015*	*<0.015*		*<0.028*	*<0.015*		*<0.015*	*<0.015*	
Benzo(g,h,i)perylene	50	*0.010*	*<0.010*	*<0.010*		*<0.020*	*<0.010*		*<0.010*	0	
Benzo(k)fluoranthene	50	*0.010*	*<0.010*	*<0.010*		*<0.020*	*<0.010*		*<0.010*	*<0.010*	
Chrysene	50	*0.010*	*<0.010*	*<0.010*		*<0.020*	*<0.010*		*<0.010*	*<0.010*	
Dibenz(a,h)anthracene	50	*0.0050*	*<0.0050*	*<0.0050*		*<0.020*	*<0.0050*		*<0.0050*	*<0.0050*	
Fluoranthene	50	*0.010*	*<0.010*	*<0.010*		*<0.020*	*<0.010*		*<0.010*	*<0.010*	
Fluorene	50	*0.010*	*<0.010*	*<0.010*		*<0.020*	*<0.010*		*<0.010*	*<0.010*	
Indeno(1,2,3-c,d)pyrene	50	*0.010*	*<0.010*	*<0.010*		*<0.020*	*<0.010*		*<0.010*	0.0	
1-Methylnaphthalene		*0.050*	*<0.050*	*<0.050*		*<0.050*	*<0.050*		*<0.050*	*<0.050*	
2-Methylnaphthalene	50	*0.010*	*<0.010*	*<0.010*		*<0.020*	*<0.010*		*<0.010*	*<0.010*	
Naphthalene	50	*0.010*	*<0.010*	*<0.010*		*<0.020*	*<0.010*		*<0.010*	*<0.010*	
Phenanthrene	50	*0.010*	*<0.010*	*<0.010*		*<0.020*	*<0.010*		*<0.010*	*<0.010*	
Pyrene	50	*0.010*	*<0.010*	*<0.010*		*<0.020*	*<0.010*		*<0.010*	*<0.010*	
Quinoline		*0.050*	*<0.050*	*<0.050*		*<0.050*	*<0.050*		*<0.050*	*<0.050*	
Acenaphthene d10	50		83.5	90.7	-8.3	90.1	95.9	-6.2	91.6	96.7	-5.4
Chrysene d12	50		84.5	100.2	-17.0	106.5	100.2	6.1	96.3	111.4	-14.5
Naphthalene d8	50		71.7	91.6	-24.4	85.1	91.2	-6.9	83.3	90.0	-7.7
Phenanthrene d10	50		94.3	109.7	-15.1	100.8	103.3	-2.4	86.1	103.5	-18.4
B(a)P Total Potency Equivalent	50	*0.020*	*<0.020*	*<0.020*		*<0.024*	*<0.020*		*<0.020*	*<0.020*	
IACR (CCME)	50	*0.15*	*<0.15*	*<0.15*		*<0.24*	*<0.15*		*<0.15*	*<0.15*	

Notes:

The DQO for field duplicates is an RPD of < 50%.

RPD = Relative Percent Difference (%) = ((original - duplicate) / (original + duplicate)/2) x 100.

RPDs are not calculated for cases where one of the samples is below detection and the other is not and in cases where both are below detection. RPD has been left blank.

Bold RPDs values exceed the DQO, but concentrations are < 10x DL.

Shaded RPDs values exceed the DQO, and concentrations are > 10x DL.

COMP-DUP samples are homogenization duplicates - the original and duplicate samples were split from the same homogenized bowl of sediment.

Table A-10. Field QA/QC data for phytoplankton, Meadowbank study lakes and Baker Lake, 2018.

Area-Replicate	Field QA	Phytoplankton Biomass (mg/m^3)							Taxa Richness
		Cyanophyte	Chlorophyte	Chrysophyte	Diatom	Cryptophyte	Dinoflagellate	**TOTAL**	
May	SP-111	0	2.8	34	1.5	3.4	2.8	45	21
	May DUP - 1	0	3.2	26	1.9	2.7	10	44	21
	RPD (%)		-15	28	-23	22	-114	2.2	0
	INUG-98	0	1.7	6.7	2.8	2.4	0	13	14
	May DUP - 2	0	2.6	9.2	2.5	1	11	26	17
	RPD (%)	NA	-42	-32.5	11	117	NA	**-64.5**	-19.4
	A20-21	0	1.7	15	4.1	0	12	32	15
	DUP - 1	0	2.6	8.6	1.8	0	5.7	19	15
	RPD (%)		-41	53.1	79	-108	70	**52**	0.0
July	TPE-112	0	4.0	65	23	1	14	107	30
	July DUP-1	0	3.2	69	28	0	22	122	24
	RPD (%)		20	-5	-20	67	-43	-13	22
	PDL-66	0	1	53	22	1.2	34	111	30
	July DUP-2	0	2.1	45	20	2.9	29	99	29
	RPD (%)		-77	16	6	-83	18	11	3.4
	WTS-29	0	2.8	330	17	18	43	410	32
	DUP-1	0	2.2	330	14	16	27	389	31
	RPD (%)		22	0	21	10	45	5.2	3.2
August	TPE-114	0.21	12	81	31	5.5	17	146	29
	Aug DUP-1	1	21	60	36	3.1	15	135	30
	RPD (%)	-109	-56	30	-13	54	12	8.0	-3.4
	WAL-83	9.1	26	54	31	5.0	7.0	132	38
	Aug DUP-2	0	19	49	27	3.7	14	112	30
	RPD (%)	182	31	10	16	30	-66	16	24
	DS1-23	0.00	7.9	64	5.5	11	15	104	35
	DUP-2	0	7.7	73	3.4	9.2	14	108	30
	RPD (%)		2	-13	48	16	5	-4.3	15
September	TPN-116	0.1	23	58	20	5.6	8.1	115	36
	Sept DUP-1	1	28	89	29	8.6	6.7	161	32
	RPD (%)	-146	-19	-41	-34.9	-42	19	-33.3	12
November	WAL-88	0	6.6	93	44	6.7	2.4	153	28
	Nov DUP-1	0	5.8	108	37	11	5.2	167	30
	RPD (%)		13	-15	19	-51	-75	-8.9	-6.9
	WTS-36	0.0	4.8	78	18	9.3	3.0	114	23
	DUP-1	0.0	4.1	77	21	11	7.6	121	25
	RPD (%)		16	2	-12	-21	-87	-5.9	-8.3
	A20-30	0.0	1.9	46	52	1.5	0	102	20
	DUP-2	0.0	1.7	36	40	1.1	2.7	82	20
	RPD (%)		13	24	25	30	-173	21	0.0

Notes:
RPD = Relative Percent Difference (%) = ((original - duplicate) / ((original + duplicate)/2)) x 100.
Bolded RPD values exceed 50%.
RPDs have not been calculated for cases where one or both of the samples is "0".

Table A-10. Field QA/QC data for phytoplankton, Meadowbank study lakes and Baker Lake, 2018.

Area-Replicate	Field QA	Phytoplankton Density (cells/L)						
		Cyanophyte	Chlorophyte	Chrysophyte	Diatom	Cryptophyte	Dinoflagellate	**TOTAL**
May	SP-111	0	244,681	432,724	54,892	18,431	700	751,427
	May DUP - 1	0	305,065	316,203	23,577	17,931	900	663,675
	RPD (%)		-22	31.1	80	3	-25	12
	INUG-98	200	340,626	110,229	32,515	14,484	0	498,054
	May DUP - 2	0	379,733	106,783	35,561	3,646	400	526,123
	RPD (%)	NA	-11	3	-9	119.6	NA	-5.5
	A20-21	0	308,511	132,406	163,921	100	2,300	607,237
	DUP - 1	0	457,447	181,851	92,299	3,746	1,300	736,643
	RPD (%)	-	-39	-31	56	-189.6	55.6	-19.3
July	TPE-112	0	137,296	983,024	529,912	800	2,400	1,653,432
	July DUP-1	0	122,128	887,632	619,120	400	4,600	1,633,880
	RPD (%)		12	10	-16	67	-63	1.2
	PDL-66	0	58,272	602,872	332,480	1,000	4,200	998,824
	July DUP-2	0	137,896	635,792	319,912	8,984	3,800	1,106,384
	RPD (%)		-81	-5	4	-160	10	-10.2
	WTS-29	0	208,336	1,124,432	292,160	96,792	5,800	1,727,520
	DUP-1	0	165,232	1,359,888	247,056	82,024	2,800	1,857,000
	RPD (%)		23	-19	17	17	70	-7.2
August	TPE-114	600	503,680	647,160	1,094,368	16,968	1,600	2,264,376
	Aug DUP-1	14,568	546,984	510,264	1,259,800	2,600	2,200	2,336,416
	RPD (%)	-184	-8	23.7	-14	147	-32	-3.1
	WAL-83	179,600	1,049,864	705,032	441,640	23,152	600	2,399,888
	Aug DUP-2	28,736	864,480	661,528	434,056	9,384	1,200	1,999,384
	RPD (%)	145	19	6	1.7	85	-67	18.2
	DS1-23	0	253,040	886,432	140,096	46,304	2,800	1,328,672
	DUP-2	0	474,744	779,072	68,656	45,304	2,600	1,370,376
	RPD (%)		-61	13	68.4	2	7	-3.1
September	TPN-116	400	1,035,496	740,352	349,432	16,368	1,000	2,143,048
	Sept DUP-1	14,368	891,416	941,104	563,952	31,336	1,200	2,443,376
	RPD (%)	-189	15	-24	-47	-63	-18	-13.1
November	WAL-88	0	375,768	938,920	752,968	37,520	600	2,105,776
	Nov DUP-1	0	310,712	1,023,728	607,688	101,376	800	2,044,304
	RPD (%)		19	-9	21	-92	-29	3.0
	WTS-36	0	603,456	670,560	645,592	25,352	800	1,945,760
	DUP-1	0	424,056	759,152	719,832	40,720	1,400	1,945,160
	RPD (%)		35	-12	-11	-47	-55	0.0
	A20-30	0	340,626	401,063	675,075	10,738	100	1,427,602
	DUP-2	0	393,717	327,341	634,714	3,946	300	1,360,018
	RPD (%)		-14	20	6	93	-100	4.8

Notes:
RPD = Relative Percent Difference (%) = ((original - duplicate) / (original + duplicate)/2) x 100.
Bolded RPD values exceed 50%.
RPDs have not been calculated for cases where one or both of the samples is "0".

Table A-11. Laboratory QA/QC data for phytoplankton, all CREMP study areas, 2018.

Area-Replicate	Field QA	Phytoplankton Biomass (mg/m^3)							Taxa
		Cyanophyte	Chlorophyte	Chrysophyte	Diatom	Cryptophyte	Dinoflagellate	TOTAL	Richness
May	SP-111	0	2.8	34.42	1.5	3.4	2.8	44.84	21
	Lab Dup	0	3.7	35.71	1.4	2.5	2.8	45.98	20
	RPD (%)		-28	-4	7	32	0	-2.5	4.9
	PDL-63	0.00	2.3	11.11	0.16	2.4	1.3	17.32	13
	Lab Dup	0	2.1	10.53	0.16	1.9	2.6	17.26	13
	RPD (%)		13	5	0	22	-64	0	0
	A76-21	0.00	1.4	29.41	3.0	3.8	21.26	58.91	21
	Lab Dup	0	1.1	35.28	3.3	3.8	27.07	70.59	20
	RPD (%)		23	-18	-9	0	-24	-18	4.9
July	TPN-112	0	3.5	55.13	6.7	1.9	10.12	77.30	25
	Lab Dup	0	5.7	51.01	5.5	2.1	10.26	74.67	24
	RPD (%)		-49	8	19	-12	-1	3.5	4.1
	PDL-65	0.00	2.1	61.54	25.31	0.24	27.17	116.33	26
	Lab Dup	0.00	1.4	58.85	34.22	0.24	32.62	127.34	27
	RPD (%)		38	4	-30	0	-18	-9.0	-3.8
	WTS-29	0.00	2.8	329.64	16.74	17.70	43.30	410.14	32
	Lab Dup	0.00	2.4	303.20	19.50	24.96	34.48	384.51	36
	RPD (%)		15	8	-15	-34	23	6.5	-12
August	TPN-114	0	13.47	51.06	23.48	3.5	9.3	100.81	26
	Lab Dup	0	17.38	47.93	22.46	4.7	11.65	104.13	29
	RPD (%)		-25	6	4	-29	-22	-3.2	-11
	BPJ-58	0.00	6.0	33.54	20.53	7.8	10.99	78.91	33
	Lab Dup	0	5.9	30.87	34.93	5.2	18.66	95.52	33
	RPD (%)		3	8	-52	41	-52	-19	0
	MAM-31	0	6.2	59.17	15.29	7.3	20.30	108.28	24
	Lab Dup	0	7.8	59.88	24.14	3.6	20.88	116.33	25
	RPD (%)		-24	-1	-45	69	-3	-7.2	-4.1
	DS1-24	0.00	8.3	79.28	5.0	4.7	19.98	117.27	28
	Lab Dup	0	12.26	68.53	2.5	5.0	27.87	116.13	26
	RPD (%)		-38	15	68	-7	-33	1	7.4
September	BPJ-59	0.00	5.3	60.98	23.99	9.8	12.16	112.30	35
	Lab Dup	0	5.2	51.46	26.37	14.36	15.10	112.53	33
	RPD (%)		2	17	-9	-37	-22	0	5.9
	NEM-33	0.03	9.7	59.84	20.44	1.8	1.9	93.66	29
	Lab Dup	0.00	10.78	59.02	16.80	3.9	1.9	92.33	29
	RPD (%)	NA	-10	1	20	-75	0	1.4	0
	DS1-25	0.00	5.3	115.18	10.81	15.53	10.43	157.28	37
	Lab Dup	0.00	4.4	102.06	8.9	19.80	15.89	151.09	35
	RPD (%)		19	12	19	-24	-42	4.0	5.6
November	PDL-71	1.0	7.4	95.95	8.9	9.1	2.7	125.05	29
	Lab Dup	0.86	6.4	106.89	6.2	4.0	16.14	140.45	30
	RPD (%)	19	15	-11	36	78	-143	-12	-3.4
	NEM-36	0.00	4.0	14.05	25.33	0.61	1.3	45.22	21
	Lab Dup	0.00	3.6	13.00	27.82	3.2	2.0	49.66	20
	RPD (%)		9	8	-9	-135	-46	-9.3	4.9

Notes:

RPD = Relative Percent Difference (%) = ((original - duplicate) / ((original + duplicate))/2) x 100.

Bolded RPD values exceed 25%.

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

Table A-11. Laboratory QA/QC data for phytoplankton, all CREMP study areas, 2018.

Area-Replicate	Field QA	Phytoplankton Density (cells/L)						
		Cyanophyte	Chlorophyte	Chrysophyte	Diatom	Cryptophyte	Dinoflagellate	**TOTAL**
May	SP-111	0	244,681	432,724	54,892	18,431	700	751,427
	Lab Dup	0	191,489	422,086	44,653	14,584	700	673,513
	RPD (%)		24	2.5	21	23	0	11
	PDL-63	0	521,677	188,143	100	1,500	400	711,820
	Lab Dup	0	464,839	159,575	100	1,200	600	626,314
	RPD (%)		12	16.4	0	22	-40	13
	A76-21	0	315,603	280,396	103,391	6,246	3,100	708,736
	Lab Dup	0	209,220	294,380	90,006	6,146	3,100	602,853
	RPD (%)		41	-4.9	14	2	0	16
July	TPN-112	0	114,944	741,552	98,592	1,600	1,600	958,288
	Lab Dup	0	158,048	770,088	118,344	1,800	1,600	1,049,880
	RPD (%)		-32	-3.8	-18	-12	0	-9.1
	PDL-65	0	86,408	773,688	450,624	200	4,800	1,315,720
	Lab Dup	0	109,560	746,552	375,984	200	3,800	1,236,096
	RPD (%)		-24	3.6	18	0	23	6.2
	WTS-29	0	208,336	1,124,432	292,160	96,792	5,800	1,727,520
	Lab Dup	0	208,736	1,029,440	377,768	154,664	4,600	1,775,208
	RPD (%)		0	8.8	-26	-46	23	-2.7
August	TPN-114	0	481,728	453,592	448,808	9,184	1,200	1,394,512
	Lab Dup	0	632,592	432,240	405,104	10,184	1,200	1,481,320
	RPD (%)		-27	4.8	10	-10	0	-6.0
	BPJ-58	0	424,656	374,168	210,784	16,168	2,200	1,027,976
	Lab Dup	0	359,200	431,840	139,928	37,320	1,800	970,088
	RPD (%)		17	-14.3	40	-79	20	5.8
	MAM-31	0	646,960	525,632	317,496	30,936	1,600	1,522,624
	Lab Dup	0	797,824	561,952	612,640	15,568	1,400	1,989,384
	RPD (%)		-21	-6.7	-63	66	13	-27
	DS1-24	0	281,176	834,944	96,392	3,400	4,200	1,220,112
	Lab Dup	0	324,680	792,640	52,088	3,400	5,200	1,178,008
	RPD (%)		-14	5.2	60	0	-21	3.5
September	BPJ-59	0	294,944	948,688	214,400	51,688	1,400	1,511,120
	Lab Dup	0	230,288	855,296	223,968	74,040	1,600	1,385,192
	RPD (%)		25	10.4	-4	-36	-13	8.7
	NEM-33	200	835,144	453,392	409,104	7,784	200	1,705,824
	Lab Dup	0	755,520	425,456	429,856	15,768	200	1,626,800
	RPD (%)	NA	10	6.4	-5	-68	0	4.7
	DS1-25	0	145,280	1,005,176	131,728	102,976	1,800	1,386,960
	Lab Dup	0	144,680	932,736	93,008	125,128	2,600	1,298,152
	RPD (%)		0	7.5	34	-19	-36	6.6
November	PDL-71	10,184	978,424	691,680	145,880	51,888	800	1,878,856
	Lab Dup	9,384	827,960	777,288	73,840	22,952	3,000	1,714,424
	RPD (%)	8	17	-11.7	66	77	-116	9.2
	NEM-36	0	298,172	196,436	578,022	3,646	100	1,076,376
	Lab Dup	0	347,518	224,404	627,468	21,577	300	1,221,266
	RPD (%)		-15	-13.3	-8	-142	-100	-13

Notes:

RPD = Relative Percent Difference (%) = ((original - duplicate) / (original + duplicate)/2) x 100.

Bolded RPD values exceed 25%.

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

Table A-12. Percent recovery of benthic invertebrate samples, all CREMP sample areas, 2018.

Area-Replicate	Number of Organisms Recovered	Number of Organisms in Re-sort	Percent Recovery
BAP-2	176	190	92.6%
BES-1	171	176	97%
INUG-3	67	68	98.5%
SP-3	87	92	95%
TPE-1	210	220	95.5%
A76-2	125	126	99.2%
DS1-4	136	137	99%
WTS-4	489	529	92.4%
		Average % Recovery	95.7%

Notes:

All samples were sorted in their entirety.

Pupae were not counted toward total number of taxa unless they were the sole representative of their taxa group.

Immatures were not counted toward total number of taxa unless they were the sole representative of their taxa group.

APPENDIX B
WATER CHEMISTRY DATA AND SUPPLEMENTAL PLOTS

APPENDIX B1
WATER CHEMISTRY – MEADOWBANK STUDY AREA LAKES

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Table B1-1. Water quality results from the 2018 CREMP, Meadowbank study area lakes.

Lake					Third Portage Lake East Basin									
(Station)					(TPE)									
Area-Replicate ID					TPE-110	TPE111	TPE-112	TPE-113	TPE-114	TPE-115	TPE-116	TPE-117	TPE-118	TPE-119
Date					13-May-18	13-May-18	15-Jul-18	15-Jul-18	13-Aug-18	13-Aug-18	3-Sep-18	3-Sep-18	30-Oct-18	30-Oct-18
Time	CCME (2012)	Trigger[2]			10:15	10:45	14:00	14:40	16:37	16:06	15:20	15:00	14:47	14:12
ALS Sample ID	Guideline[1]	Meadowbank	Wally Lake	Threshold[2]	L2098886-5	L2098886-6	L2132149-3	L2132149-4	L2149758-6	L2149758-7	L2161885-6	L2161885-7	L2194150-5	L2194150-6
Field Measurements (Surface)														
Temperature (°C)														
Specific Conductivity (µS/cm)														
Dissolved Oxygen (mg/L)														
pH	6.5 - 9.0	6.30 - 8.25	6.54 - 8.34	6.5 - 9.0										
Physical Tests (mg/L)														
Conductivity (µS/cm)		23.5	36.6		**40.2**	**40.1**	**30.7**	**30.6**	**29.6**	**29**	**29.4**	**29.6**	**30.3**	**30.1**
Hardness		8.5	16.7		**14**	**14.1**	**10.0**	**10.0**	**10.7**	**10.7**	**10.5**	**10.5**	**11**	**10.8**
pH (Laboratory)	6.5 - 9.0	6.50 - 7.94	6.92 - 8.17	6.5 - 9.0	7.3	7.3	7.1	7.2	7.3	7.2	7.2	7.2	7.2	7.2
Total Suspended Solids		3.0	3.0	5.0	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*
Total Dissolved Solids		18.0	25.3		**25**	**23.1**	**21.4**	**21.3**	**18.8**	**19.7**	**19.6**	**19.7**	17.8	**19.6**
Turbidity (NTU)					0.12	0.12	0.29	0.27	0.30	0.26	0.24	0.19	0.15	0.13
Anions and Nutrients (mg/L)														
Alkalinity - Bicarbonate		8.6	17.8		**10.4**	**10.3**	8.0	8.1	8.1	8.0	8.2	**8.6**	8.4	8.4
Alkalinity - Carbonate		4	4		*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*
Alkalinity - Hydroxide					*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*
Alkalinity - Total		8.5	17.8		**10.4**	**10.3**	8.0	8.1	8.1	8.0	8.2	**8.6**	8.4	8.4
Ammonia (as N)[3]	***equation***	0.065	0.067	0.126	0.023	0.018	*<0.005*	*<0.005*	0.024	0.012	0.010	0.014	0.0054	*<0.005*
Bromide					*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*
Chloride	120	60.28	60.2	120	0.98	0.99	0.72	0.72	0.75	0.75	0.77	0.77	0.74	0.75
Fluoride	0.120				0.088	0.089	0.073	0.072	0.078	0.076	0.075	0.074	0.077	0.076
Nitrate (as N)	3.0	1.50	1.50	3.0	0.014	0.012	0.012	0.011	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Nitrite (as N)	0.060	0.031	0.031	0.060	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*
Total Kjeldahl Nitrogen		0.170	0.163		**0.35**	0.11	0.091	0.093	0.097	0.094	0.080	0.091	0.073	0.076
Ortho Phosphate (as P)		0.002	0.002		0.0016	0.0015	*<0.001*	0.0011	0.0011	0.0013	0.0013	*<0.001*	*<0.001*	*<0.001*
Phosphorus (P)-Total Diss.					0.0021	0.0022	*<0.002*	*<0.002*	*<0.002*	0.0021	*<0.002*	*<0.002*	*<0.002*	*<0.002*
Phosphorus (P)-Total	0.0040	0.0060	0.0067		~~0.32~~	0.0054	0.0027	0.0025	*<0.002*	*<0.002*	*<0.002*	*<0.002*	0.0021	0.0028
Silicate (as SiO_2)		1.0	1.08		*<0.5*	*<0.5*	*<0.5*	*<0.5*	*<0.5*	*<0.5*	*<0.5*	*<0.5*	*<0.5*	*<0.5*
Sulphate (SO_4)		64.7	65.2	128	6.3	6.3	4.6	4.6	4.8	4.7	4.8	4.8	4.7	4.7
Cyanides (mg/L)														
Total Cyanide					*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*
Free Cyanide	0.005				*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*
Organic / Inorganic Carbon (mg/L)														
Dissolved Organic Carbon		2.60	3.21		1.7	1.7	1.5	1.3	1.4	1.3	1.5	1.5	1.5	1.4
Total Organic Carbon		2.79	4.11		2.2	2.4	1.4	1.5	1.3	1.2	1.5	1.6	1.4	1.4
Plant Pigments (µg/L)														
Chlorophyll-*a*					0.28	0.096	0.23	0.29	0.32	0.29	0.31	0.33	0.55	0.41
Total Metals (mg/L)														
Aluminum[3]	***equation***	0.054	0.053	0.100	0.0054	*<0.0030*	0.0084	0.0098	0.0094	0.0062	0.0058	0.0049	0.0047	0.0038
Antimony		0.0101	0.0100	0.020	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*
Arsenic	0.0050	0.00255	0.0026	0.005	0.00040	0.00037	0.00035	0.00037	0.00040	0.00033	0.00038	0.00037	0.00037	0.00032
Barium		0.50	0.50	1	0.0037	0.0038	0.0034	0.0033	0.0026	0.0026	0.0028	0.0026	0.0027	0.0027
Beryllium		0.0027	0.0027	0.0053	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*
Bismuth					*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*
Boron	1.5	0.76	0.76	1.5	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*
Cadmium[3]	***equation***	0.000025	0.000025	0.000040	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*
Calcium		2.15	4.88		**3.5**	**3.4**	**2.7**	**2.5**	**2.5**	**2.4**	**2.6**	**2.6**	**2.8**	**2.7**
Chromium[4]	0.001	0.00056	0.00055	0.001	0.00011	*<0.0001*	0.00012	0.00015	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*
Cobalt					*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*
Copper[3]	***equation***	0.00124	0.00149	0.002	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*
Iron	0.3	0.155	0.157	0.3	*<0.01*	*<0.01*	0.020	0.019	0.014	0.013	0.011	*<0.01*	*<0.01*	*<0.01*
Lead[3]	***equation***	0.000525	0.000525	0.001	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*
Lithium		0.048	0.048	0.096	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*
Magnesium		0.83	1.36		**1.2**	**1.3**	**1.0**	**1.0**	**0.92**	**0.90**	**1.0**	**0.99**	**1.1**	**1.1**
Manganese[3]		0.3157	0.3300	***equation***	0.0005	0.00047	0.0040	0.0041	0.0017	0.0016	0.0011	0.0011	0.00072	0.00067
Mercury	0.000026	0.000018	0.000018	0.000026	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*
Molybdenum	0.073	0.0365	0.0370	0.073	0.00020	0.00016	0.00014	0.00014	0.00014	0.00014	0.00015	0.00013	0.00015	0.00015
Nickel[3]	***equation***	0.0127	0.0130	0.025	*<0.0005*	*<0.0005*	0.00070	0.00075	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*
Phosphorus					*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*
Potassium		0.50	0.59		**0.65**	**0.67**	**0.52**	0.50	0.47	0.45	**0.51**	**0.50**	**0.55**	**0.55**
Selenium	0.001	0.00055	0.00055	0.001	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*
Silicon					0.11	0.11	0.15	0.14	0.10	*<0.1*	0.10	*<0.1*	*<0.1*	*<0.1*
Silver	0.0001				*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*
Sodium		0.975	0.72		**1.4**	**1.4**	**1.1**	**1.1**	0.94	0.95	**1.1**	**1.0**	**1.2**	**1.2**
Strontium		0.0279	0.0330	0.049	0.015	0.015	0.012	0.011	0.011	0.010	0.011	0.011	0.013	0.013
Sulfur					2.0	1.9	1.7	1.6	1.5	1.5	1.7	1.9	1.8	1.7
Thallium	0.0008	0.00041	0.00041	0.0008	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*
Tin		0.0002	0.0002		*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*
Titanium		1.00	1.00	2	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*
Uranium	0.015	0.0075	0.0075	0.015	0.00004	0.00003	0.00004	0.00004	0.00004	0.00004	0.00004	0.00004	0.00004	0.00004
Vanadium		0.0035	0.0035	0.006	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*
Zinc[3]	0.030	0.0063	0.0106	***equation***	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*
Dissolved Metals (mg/L)														
Aluminum[3]		0.0263	0.0260	0.05	0.0061	0.0021	0.0021	0.0046	0.0029	0.0037	0.0018	0.0013	0.0019	0.0015
Antimony		0.0101	0.0100	0.020	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*
Arsenic		0.0026	0.0026	0.005	0.00042	0.00037	0.00030	0.00029	0.00034	0.00029	0.00030	0.00028	0.00030	0.00027
Barium		0.5010	0.5000	1.0	0.0040	0.0041	0.0029	0.0034	0.0027	0.0027	0.0029	0.0026	0.0028	0.0029
Beryllium		0.0027	0.0027	0.0053	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*
Bismuth					*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*
Boron		0.76	0.76	1.5	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*
Cadmium		0.000025	0.000025	0.00004	*<0.000005*	0.00002	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*
Calcium					3.4	3.5	2.5	2.5	2.7	2.7	2.6	2.6	2.7	2.6
Chromium		0.00055	0.00055	0.001	0.00011	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*
Cobalt					*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*
Copper		0.00119	0.00148	0.002	0.00041	0.00060	0.00028	0.00032	0.00032	0.00033	0.00046	0.00045	0.00034	0.00035
Iron		0.155	0.155	0.3	0.013	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*
Lead		0.000525	0.000525	0.001	0.00007	0.00005	*<0.00005*	0.00009	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*
Lithium		0.048	0.048	0.096	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*
Magnesium					1.3	1.3	0.88	0.91	0.98	0.97	0.99	0.98	1.0	1.0
Manganese[3]		0.315	0.330	***equation***	0.00039	0.00027	0.0040	0.0029	0.00091	0.00092	0.00058	0.00055	0.00024	0.00028
Mercury		0.000018	0.000018	0.000026	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*
Molybdenum		0.037	0.037	0.073	0.00017	0.00018	0.00013	0.00013	0.00015	0.00014	0.00016	0.00014	0.00015	0.00014
Nickel		0.013	0.013	0.025	*<0.0005*	0.00061	0.00056	0.00061	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*
Phosphorus					*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*
Potassium					0.73	0.78	0.50	0.52	0.49	0.52	0.50	0.49	0.53	0.53
Selenium		0.00055	0.00055	0.001	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*
Silicon					0.086	0.090	0.095	0.10	0.065	0.074	0.066	0.062	0.052	0.051
Silver					*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*
Sodium					1.5	1.5	0.97	1.0	1.1	1.1	1.1	1.1	1.1	1.1
Strontium		0.028	0.033	0.049	0.015	0.015	0.012	0.011	0.012	0.012	0.012	0.011	0.012	0.012
Sulfur					2.0	2.1	1.7	1.7	1.6	1.4	1.8	1.8	1.7	1.4
Thallium		0.00041	0.00041	0.0008	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*
Tin		0.0002	0.0002		*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*
Titanium		1.01	1.00	2	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*
Uranium		0.0075	0.0075	0.015	0.00004	0.00004	0.00004	0.00004	0.00004	0.00004	0.00003	0.00003	0.00003	0.00003
Vanadium		0.0035	0.0035	0.006	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*
Zinc		0.0053	0.0096	***equation***	*<0.001*	0.0022	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*

Notes:

1. CCME (Canadian Council of Ministers of the Environment) Canadian Water Quality Guidelines for the Protection of Aquatic Life, 1999, updated up to 2015.

2. Trigger and threshold values were developed in *CREMP Design Document 2012* (Azimuth, 2012d). A number of thresholds were derived from methods (or sources) other than CCME guidelines. Refer to the *CREMP: 2015 Plan Update* (Azimuth, 2015a) for more details.

3. "***equation***" means that CCME guidelines (or thresholds) are calculated based on an equation which is either pH or hardness dependent. The ammonia and aluminum (t & d) guidelines vary with pH; the cadmium, copper, lead, manganese, nickel and zinc guidelines vary with hardness.

4. Chromium CCME guideline is for Cr VI.

123 Bolded concentrations exceed the trigger value.

123 Bolded and shaded concentrations also exceed the threshold value.

Italicized numbers are below detection limits.

underline = results were given a cautionary flag in the QC assessment (refer to **Section 3.1.2** for details)

~~strikethrough~~ = results flagged as unreliable in the QC assessment

Table B1-1. Water quality results from the 2018 CREMP, Meadowbank study area lakes.

Lake					Third Portage Lake North Basin									
(Station)					(TPN)									
Area-Replicate ID					TPN-110	TPN-111	TPN-112	TPN-113	TPN-114	TPN-115	TPN-116	TPN-117	TPN-118	TPN-119
Date					18-May-18	18-May-18	15-Jul-18	15-Jul-18	13-Aug-18	13-Aug-18	3-Sep-18	3-Sep-18	3-Nov-18	3-Nov-18
Time	CCME (2012)	Trigger[2]			0:00	0:00	11:30	10:45	17:41	17:13	13:45	14:20	10:30	11:15
ALS Sample ID	Guideline[1]	Meadowbank	Wally Lake	Threshold[2]	L2099599-1	L2099599-2	L2132149-1	L2132149-2	L2149758-9	L2149758-10	L2161885-8	L2161885-9	L2194150-3	L2194150-4
Field Measurements (Surface)														
Temperature (°C)														
Specific Conductivity (µS/cm)														
Dissolved Oxygen (mg/L)														
pH	6.5 - 9.0	6.30 - 8.25	6.54 - 8.34	6.5 - 9.0										
Physical Tests (mg/L)														
Conductivity (µS/cm)		23.5	36.6		**36.1**	**35.6**	**27.5**	**27.7**	**26.6**	**26.3**	**26.2**	**26.6**	**26.5**	**26.7**
Hardness		8.5	16.7		**11.4**	**11.9**	8.5	**8.7**	**9.0**	7.9	**8.8**	**8.9**	**9.5**	**9.3**
pH (Laboratory)	6.5 - 9.0	6.50 - 7.94	6.92 - 8.17	6.5 - 9.0	7.2	7.2	7.0	7.0	7.2	7.2	7.1	7.1	7.1	7.1
Total Suspended Solids		3.0	3.0	5.0	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*
Total Dissolved Solids		18.0	25.3		**20.6**	**23.1**	**20.5**	**20.6**	18	16.7	18	17.8	17	16.9
Turbidity (NTU)					0.13	0.11	0.20	0.20	0.22	0.22	0.17	0.17	0.13	0.12
Anions and Nutrients (mg/L)														
Alkalinity - Bicarbonate		8.6	17.8		8.2	8.3	6.4	6.3	6.7	6.6	6.6	6.8	6.6	6.7
Alkalinity - Carbonate		4	4		*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*
Alkalinity - Hydroxide					*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*
Alkalinity - Total		8.5	17.8		8.2	8.3	6.4	6.3	6.7	6.6	6.6	6.8	6.6	6.7
Ammonia (as N)[3]	***equation***	0.065	0.067	0.126	0.015	0.019	*<0.005*	*<0.005*	0.015	0.011	0.012	0.010	0.026	0.012
Bromide					*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*
Chloride	120	60.28	60.2	120	1.0	1.0	0.74	0.75	0.76	0.76	0.78	0.78	0.75	0.75
Fluoride	0.120				0.080	0.080	0.063	0.064	0.068	0.068	0.066	0.065	0.068	0.067
Nitrate (as N)	3.0	1.50	1.50	3.0	0.035	0.036	0.036	0.028	0.019	0.020	0.014	0.014	0.012	0.012
Nitrite (as N)	0.060	0.031	0.031	0.060	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*
Total Kjeldahl Nitrogen		0.170	0.163		0.12	0.12	0.096	0.099	0.11	0.099	0.097	0.11	0.11	0.078
Ortho Phosphate (as P)		0.002	0.002		*<0.001*	0.0014	*<0.001*	0.0011	0.0011	*<0.001*	*<0.001*	0.0013	*<0.001*	*<0.001*
Phosphorus (P)-Total Diss.					*<0.002*	0.0020	*<0.002*	*<0.002*	*<0.002*	*<0.002*	*<0.002*	*<0.002*	*<0.002*	*<0.002*
Phosphorus (P)-Total	0.0040	0.0060	0.0067		0.0030	0.0034	0.0027	0.0022	*<0.002*	*<0.002*	*<0.002*	0.0046	*<0.002*	**0.0078**
Silicate (as SiO_2)		1.0	1.08		*<0.5*	*<0.5*	*<0.5*	*<0.5*	**1.0**	0.81	*<0.5*	*<0.5*	*<0.5*	*<0.5*
Sulphate (SO_4)		64.7	65.2	128	6.2	6.2	4.6	4.7	4.7	4.7	4.7	4.7	4.5	4.5
Cyanides (mg/L)														
Total Cyanide					*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*
Free Cyanide	0.005				*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*
Organic / Inorganic Carbon (mg/L)														
Dissolved Organic Carbon		2.60	3.21		1.6	1.7	1.4	1.3	1.3	1.7	1.3	1.3	1.5	1.4
Total Organic Carbon		2.79	4.11		1.5	**4.2**	1.4	1.3	1.4	1.3	1.3	1.5	1.5	1.4
Plant Pigments (µg/L)														
Chlorophyll-*a*					0.71	0.51	0.22	0.38	0.26	0.33	0.34	0.40	0.62	0.55
Total Metals (mg/L)														
Aluminum[3]	***equation***	0.054	0.053	0.100	*<0.0030*	*<0.0030*	0.0056	0.034	0.0045	0.0049	0.0044	0.0040	0.0033	0.0033
Antimony		0.0101	0.0100	0.020	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*
Arsenic	0.0050	0.00255	0.0026	0.005	0.00020	0.00022	0.00018	0.00018	0.00015	0.00015	0.00017	0.00016	0.00020	0.00017
Barium		0.50	0.50	1	0.0037	0.0038	0.0031	0.0032	0.0027	0.0027	0.0027	0.0027	0.0028	0.0028
Beryllium		0.0027	0.0027	0.0053	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*
Bismuth					*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*
Boron	1.5	0.76	0.76	1.5	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*
Cadmium[3]	***equation***	0.000025	0.000025	0.000040	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*
Calcium		2.15	4.88		**2.8**	**2.8**	**2.2**	**2.3**	2.1	2.0	2.1	**2.2**	**2.3**	**2.3**
Chromium[4]	0.001	0.00056	0.00055	0.001	0.00020	*<0.0001*	0.00010	0.00011	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*
Cobalt					*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*
Copper[3]	***equation***	0.00124	0.00149	0.002	*<0.0005*	*<0.0005*	0.00053	0.00061	*<0.0005*	*<0.0005*	0.00050	*<0.0005*	*<0.0005*	*<0.0005*
Iron	0.3	0.155	0.157	0.3	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	0.013	*<0.01*	0.035	*<0.01*
Lead[3]	***equation***	0.000525	0.000525	0.001	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*
Lithium		0.048	0.048	0.096	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*
Magnesium		0.83	1.36		**1.1**	**1.1**	**0.90**	**0.89**	0.80	0.80	**0.86**	**0.87**	**0.94**	**0.94**
Manganese[3]		0.3157	0.3300	***equation***	0.00035	0.00031	0.0030	0.0022	0.0017	0.0017	0.0017	0.0015	0.0012	0.0010
Mercury	0.000026	0.000018	0.000018	0.000026	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*
Molybdenum	0.073	0.0365	0.0370	0.073	0.00018	0.00018	0.00014	0.00016	0.00014	0.00012	0.00016	0.00013	0.00015	0.00014
Nickel[3]	***equation***	0.0127	0.0130	0.025	*<0.0005*	*<0.0005*	0.00059	0.00069	*<0.0005*	*<0.0005*	0.00063	*<0.0005*	*<0.0005*	*<0.0005*
Phosphorus					*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*
Potassium		0.50	0.59		**0.61**	**0.60**	0.47	0.47	0.43	0.43	0.46	0.47	**0.52**	**0.52**
Selenium	0.001	0.00055	0.00055	0.001	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*
Silicon					*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*
Silver	0.0001				*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*
Sodium		0.975	0.72		**1.4**	**1.4**	**1.1**	**1.1**	0.96	0.96	**1.0**	**1.1**	**1.2**	**1.2**
Strontium		0.0279	0.0330	0.049	0.014	0.013	0.0099	0.010	0.0093	0.0093	0.010	0.010	0.011	0.011
Sulfur					1.9	1.6	1.4	1.3	1.4	1.5	1.7	1.7	1.7	1.8
Thallium	0.0008	0.00041	0.00041	0.0008	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*
Tin		0.0002	0.0002		*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*
Titanium		1.00	1.00	2	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*
Uranium	0.015	0.0075	0.0075	0.015	0.00004	0.00004	0.00004	0.00003	0.00003	0.00003	0.00003	0.00003	0.00003	0.00003
Vanadium		0.0035	0.0035	0.006	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*
Zinc[3]	0.030	0.0063	0.0106	***equation***	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*
Dissolved Metals (mg/L)														
Aluminum[3]		0.0263	0.0260	0.05	*<0.001*	0.0012	0.0025	0.0017	0.0016	0.0020	0.0010	0.0016	0.0018	0.0015
Antimony		0.0101	0.0100	0.020	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*
Arsenic		0.0026	0.0026	0.005	0.00017	0.00019	0.00013	0.00013	0.00013	0.00012	0.00015	0.00016	0.00014	0.00013
Barium		0.5010	0.5000	1.0	0.0037	0.0039	0.0028	0.0030	0.0027	0.0025	0.0028	0.0027	0.0030	0.0031
Beryllium		0.0027	0.0027	0.0053	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*
Bismuth					*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*
Boron		0.76	0.76	1.5	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*
Cadmium		0.000025	0.000025	0.00004	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*
Calcium					2.8	2.9	2.1	2.2	2.2	1.8	2.1	2.1	2.3	2.2
Chromium	0.00055	0.00055	0.001		*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*
Cobalt					*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*
Copper	0.00119	0.00148	0.002		0.00041	0.00034	0.00027	0.00025	0.00029	0.00032	0.00050	0.00059	0.00032	0.00030
Iron	0.155	0.155	0.3		*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*
Lead	0.000525	0.000525	0.001		*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	0.00012	*<0.00005*	*<0.00005*
Lithium	0.048	0.048	0.096		*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*
Magnesium					1.1	1.2	0.80	0.80	0.84	0.80	0.86	0.86	0.93	0.91
Manganese[3]	0.315	0.330	***equation***		0.00019	*<0.0001*	0.0020	0.0015	0.00082	0.00066	0.00053	0.00060	0.00025	0.00024
Mercury	0.000018	0.000018	0.000026		*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*
Molybdenum	0.037	0.037	0.073		0.00018	0.00020	0.00012	0.00013	0.00013	0.00012	0.00013	0.00013	0.00014	0.00014
Nickel	0.013	0.013	0.025		*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	0.00087	*<0.0005*	*<0.0005*
Phosphorus					*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*
Potassium					0.63	0.65	0.50	0.50	0.46	0.43	0.46	0.47	0.51	0.49
Selenium	0.00055	0.00055	0.001		*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*
Silicon					*<0.05*	*<0.05*	0.063	0.060	0.052	0.052	*<0.05*	*<0.05*	*<0.05*	*<0.05*
Silver					*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*
Sodium					1.4	1.5	1.1	1.1	1.1	1.00	1.1	1.1	1.2	1.1
Strontium	0.028	0.033	0.049		0.013	0.013	0.010	0.011	0.011	0.0096	0.0098	0.0097	0.011	0.011
Sulfur					2.1	2.1	1.7	1.7	1.4	1.4	1.8	1.8	1.6	1.6
Thallium	0.00041	0.00041	0.0008		*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*
Tin	0.0002	0.0002			*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*
Titanium	1.01	1.00	2		*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*
Uranium	0.0075	0.0075	0.015		0.00003	0.00003	0.00003	0.00003	0.00003	0.00003	0.00003	0.00003	0.00003	0.00003
Vanadium	0.0035	0.0035	0.006		*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*
Zinc[3]	0.0053	0.0096	***equation***		*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	0.0019	*<0.001*

Notes:

1. CCME (Canadian Council of Ministers of the Environment) Canadian Water Quality Guidelines for the Protection of Aquatic Life, 1999, updated up to 2015.

2. Trigger and threshold values were developed in *CREMP Design Document 2012* (Azimuth, 2012d). A number of thresholds were derived from methods (or sources) other than CCME guidelines. Refer to the *CREMP: 2015 Plan Update* (Azimuth, 2015a) for more details.

3. "***equation***" means that CCME guidelines (or thresholds) are calculated based on an equation which is either pH or hardness dependent. The ammonia and aluminum (t & d) guidelines vary with pH; the cadmium, copper, lead, manganese, nickel and zinc guidelines vary with hardness.

4. Chromium CCME guideline is for Cr VI.

123 Bolded concentrations exceed the trigger value.

123 Bolded and shaded concentrations also exceed the threshold value.

Italicized numbers are below detection limits.

underline = results were given a cautionary flag in the QC assessment (refer to **Section 3.1.2** for details)

~~strikethrough~~ = results flagged as unreliable in the QC assessment

Table B1-1. Water quality results from the 2018 CREMP, Meadowbank study area lakes.

Lake					Second Portage Lake									
(Station)					(SP)									
Area-Replicate ID					SP-110	SP-111	SP-112	SP-113	SP-114	SP-115	SP-116	SP-117	SP-118	SP-119
Date					13-May-18	13-May-18	9-Jul-18	9-Jul-18	13-Aug-18	13-Aug-18	2-Sep-18	2-Sep-18	3-Nov-18	3-Nov-18
Time	CCME (2012)	Trigger[2]			0:00	14:45	14:35	14:00	10:41	11:10	14:55	15:30	14:27	15:02
ALS Sample ID	Guideline[1]	Meadowbank	Wally Lake	Threshold[2]	L2098886-1	L2098886-7	L2129199-6	L2129199-5	L2149758-3	L2149758-4	L2161885-1	L2161885-2	L2194150-1	L2194150-2
Field Measurements (Surface)														
Temperature (°C)														
Specific Conductivity (µS/cm)														
Dissolved Oxygen (mg/L)														
pH	6.5 - 9.0	6.30 - 8.25	6.54 - 8.34	6.5 - 9.0										
Physical Tests (mg/L)														
Conductivity (µS/cm)		23.5	36.6		**50.9**	**49.5**	**40.2**	**40**	**40.9**	**40.4**	**41.3**	**41.1**	**39.9**	**40.8**
Hardness		8.5	16.7		**19.6**	**20.4**	**16**	**15.8**	**17.1**	**16.4**	**16**	**15.8**	**15.9**	**16.8**
pH (Laboratory)	6.5 - 9.0	6.50 - 7.94	6.92 - 8.17	6.5 - 9.0	7.5	7.4	7.4	7.4	7.4	7.4	7.3	7.3	7.3	7.3
Total Suspended Solids		3.0	3.0	5.0	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*
Total Dissolved Solids		18.0	25.3		**30.9**	**30.5**	15	16	**26.5**	**26**	**26.5**	**24.8**	**24.3**	**24.4**
Turbidity (NTU)					0.13	0.13	0.44	0.45	0.27	0.25	0.20	0.26	0.14	0.13
Anions and Nutrients (mg/L)														
Alkalinity - Bicarbonate		8.6	17.8		**15.1**	**14.7**	**11.8**	**11.7**	**12.1**	**12.3**	**11.8**	**11.6**	**11.1**	**12.4**
Alkalinity - Carbonate		4	4		*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*
Alkalinity - Hydroxide					*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*
Alkalinity - Total		8.5	17.8		**15.1**	**14.7**	**11.8**	**11.7**	**12.1**	**12.3**	**11.8**	**11.6**	**11.1**	**12.4**
Ammonia (as N)[3]	***equation***	0.065	0.067	0.126	0.020	0.017	*<0.005*	*<0.005*	0.016	0.016	0.020	0.017	*<0.005*	*<0.005*
Bromide					*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*
Chloride	120	60.28	60.2	120	1.2	1.1	0.95	0.96	0.95	0.95	0.97	0.97	0.91	0.92
Fluoride	0.120				0.084	0.083	0.071	0.071	0.071	0.071	0.072	0.073	0.072	0.072
Nitrate (as N)	3.0	1.50	1.50	3.0	0.013	0.011	0.0098	0.0092	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Nitrite (as N)	0.060	0.031	0.031	0.060	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*
Total Kjeldahl Nitrogen		0.170	0.163		0.12	0.12	0.12	0.11	0.13	0.12	0.12	0.11	0.092	0.096
Ortho Phosphate (as P)		0.002	0.002		0.0014	0.0016	0.0013	0.0013	0.0014	0.0012	0.0012	0.0013	*<0.001*	*<0.001*
Phosphorus (P)-Total Diss.					*<0.002*	*<0.002*	0.0020	*<0.002*	0.0023	*<0.002*	*<0.002*	*<0.002*	*<0.002*	*<0.002*
Phosphorus (P)-Total	0.0040	0.0060	0.0067		0.0026	0.0031	0.0036	0.0026	*<0.002*	0.0021	*<0.002*	*<0.002*	0.0030	0.0022
Silicate (as SiO_2)		1.0	1.08		0.52	0.51	*<0.5*	0.50	*<0.5*	*<0.5*	*<0.5*	*<0.5*	*<0.5*	*<0.5*
Sulphate (SO_4)		64.7	65.2	128	6.8	6.6	5.5	5.5	5.6	5.6	5.7	5.7	5.4	5.5
Cyanides (mg/L)														
Total Cyanide					*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*
Free Cyanide	0.005				*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*
Organic / Inorganic Carbon (mg/L)														
Dissolved Organic Carbon		2.60	3.21		2.1	2.0	1.9	2.0	1.6	1.6	1.6	1.8	1.8	1.6
Total Organic Carbon		2.79	4.11		2.1	2.0	2.0	1.9	1.6	1.7	1.7	1.8	1.7	1.6
Plant Pigments (µg/L)														
Chlorophyll-*a*					0.17	0.66	0.42	0.33	0.36	0.38	0.33	0.42	0.93	0.91
Total Metals (mg/L)														
Aluminum[3]	***equation***	0.054	0.053	0.100	0.012	*<0.0030*	0.013	0.015	0.0056	0.0063	0.0052	0.0051	0.0034	0.0033
Antimony		0.0101	0.0100	0.020	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*
Arsenic	0.0050	0.00255	0.0026	0.005	0.00028	0.00026	0.00027	0.00029	0.00023	0.00023	0.00026	0.00025	0.00025	0.00024
Barium		0.50	0.50	1	0.0039	0.0036	0.0030	0.0032	0.0026	0.0026	0.0025	0.0025	0.0026	0.0027
Beryllium		0.0027	0.0027	0.0053	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*
Bismuth					*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*
Boron	1.5	0.76	0.76	1.5	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*
Cadmium[3]	***equation***	0.000025	0.000025	0.000040	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*
Calcium		2.15	4.88		**5.6**	**5.1**	**4.3**	**4.3**	**3.9**	**4.0**	**4.3**	**4.2**	**4.3**	**4.5**
Chromium[4]	0.001	0.00056	0.00055	0.001	*<0.0001*	*<0.0001*	0.00014	0.00015	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	0.00011	*<0.0001*
Cobalt					*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*
Copper[3]	***equation***	0.00124	0.00149	0.002	0.00067	0.00066	0.00067	0.00082	0.00063	0.00060	0.00059	0.00058	0.00075	0.00058
Iron	0.3	0.155	0.157	0.3	*<0.01*	*<0.01*	0.028	0.029	0.017	0.018	0.015	0.015	*<0.01*	*<0.01*
Lead[3]	***equation***	0.000525	0.000525	0.001	*<0.00005*	*<0.00005*	0.00006	0.00017	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*
Lithium		0.048	0.048	0.096	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*
Magnesium		0.83	1.36		**1.6**	**1.6**	**1.4**	**1.3**	**1.3**	**1.3**	**1.3**	**1.3**	**1.4**	**1.4**
Manganese[3]		0.3157	0.3300	***equation***	0.00054	0.00066	0.0045	0.0044	0.0019	0.0019	0.0014	0.0013	0.00088	0.00088
Mercury	0.000026	0.000018	0.000018	0.000026	*<0.000005*	~~*<0.00025*~~	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*
Molybdenum	0.073	0.0365	0.0370	0.073	0.00022	0.00021	0.00017	0.00018	0.00020	0.00020	0.00020	0.00019	0.00020	0.00022
Nickel[3]	***equation***	0.0127	0.0130	0.025	*<0.0005*	*<0.0005*	0.00053	0.00056	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*
Phosphorus					*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*
Potassium		0.50	0.59		**0.70**	**0.70**	**0.53**	**0.55**	0.49	0.49	**0.54**	**0.53**	**0.58**	**0.59**
Selenium	0.001	0.00055	0.00055	0.001	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*
Silicon					0.24	0.23	0.27	0.27	0.19	0.18	0.19	0.19	0.17	0.17
Silver	0.0001				*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*
Sodium		0.975	0.72		**1.2**	**1.2**	0.85	**1.00**	0.78	0.80	0.90	0.84	0.96	0.97
Strontium		0.0279	0.0330	0.049	0.024	0.023	0.020	0.020	0.019	0.019	0.021	0.022	0.021	0.023
Sulfur					2.2	2.2	2.0	2.1	1.7	1.8	2.0	2.2	2.1	2.1
Thallium	0.0008	0.00041	0.00041	0.0008	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*
Tin		0.0002	0.0002		*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*
Titanium		1.00	1.00	2	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*
Uranium	0.015	0.0075	0.0075	0.015	0.00004	0.00004	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00004	0.00004
Vanadium		0.0035	0.0035	0.006	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*
Zinc[3]	0.030	0.0063	0.0106	***equation***	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	**0.0079**	*<0.0030*
Dissolved Metals (mg/L)														
Aluminum[3]		0.0263	0.0260	0.05	0.0013	0.0025	0.0031	0.0022	0.0027	0.0027	0.0022	0.0016	0.0011	0.0015
Antimony		0.0101	0.0100	0.020	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*
Arsenic		0.0026	0.0026	0.005	0.00026	0.00028	0.00020	0.00019	0.00022	0.00022	0.00022	0.00021	0.00019	0.00020
Barium		0.5010	0.5000	1.0	0.0037	0.0039	0.0032	0.0030	0.0026	0.0026	0.0025	0.0025	0.0027	0.0027
Beryllium		0.0027	0.0027	0.0053	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*
Bismuth					*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*
Boron		0.76	0.76	1.5	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*
Cadmium		0.000025	0.000025	0.00004	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	0.00001	*<0.000005*	*<0.000005*	*<0.000005*
Calcium		5.1	5.5		4.2	4.2	4.6	4.4	4.2	4.2	4.1	4.4		
Chromium	0.00055	0.00055	0.001		*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*
Cobalt					*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*
Copper	0.00119	0.00148	0.002		0.00067	0.00057	0.00063	0.00061	0.00059	0.00055	0.00072	0.00067	0.00052	0.00052
Iron	0.155	0.155	0.3		*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*
Lead	0.000525	0.000525	0.001		*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*
Lithium	0.048	0.048	0.096		*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*
Magnesium					1.7	1.7	1.3	1.3	1.4	1.3	1.3	1.3	1.4	1.4
Manganese[3]	0.315	0.330	***equation***		*<0.0001*	0.00022	0.0029	0.0028	0.00054	0.00056	0.00057	0.00034	0.00013	0.00015
Mercury	0.000018	0.000018	0.000026		*<0.000005*	~~*<0.00025*~~	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*
Molybdenum	0.037	0.037	0.073		0.00020	0.00022	0.00018	0.00018	0.00019	0.00020	0.00020	0.00019	0.00019	0.00020
Nickel	0.013	0.013	0.025		*<0.0005*	*<0.0005*	0.00051	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*
Phosphorus					*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*
Potassium					0.73	0.75	0.54	0.53	0.55	0.53	0.53	0.52	0.57	0.57
Selenium	0.00055	0.00055	0.001		*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*
Silicon					0.20	0.21	0.22	0.22	0.19	0.16	0.15	0.15	0.14	0.14
Silver					*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*
Sodium					1.2	1.2	0.83	0.82	0.91	0.90	0.91	0.89	0.95	0.95
Strontium	0.028	0.033	0.049		0.024	0.024	0.020	0.020	0.020	0.020	0.019	0.019	0.021	0.023
Sulfur					2.3	2.3	1.6	1.6	1.8	1.8	2.1	2.1	1.8	1.8
Thallium	0.00041	0.00041	0.0008		*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*
Tin	0.0002	0.0002			*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*
Titanium	1.01	1.00	2		*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*
Uranium	0.0075	0.0075	0.015		0.00004	0.00004	0.00005	0.00005	0.00004	0.00005	0.00004	0.00004	0.00004	0.00004
Vanadium	0.0035	0.0035	0.006		*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*
Zinc[3]	0.0053	0.0096	***equation***		*<0.001*	**0.012**	*<0.001*	*<0.001*	*<0.001*	*<0.001*	0.0010	*<0.001*	*<0.001*	*<0.001*

Notes:

1. CCME (Canadian Council of Ministers of the Environment) Canadian Water Quality Guidelines for the Protection of Aquatic Life, 1999, updated up to 2015.
2. Trigger and threshold values were developed in *CREMP Design Document 2012* (Azimuth, 2012d). A number of thresholds were derived from methods (or sources) other than CCME guidelines. Refer to the *CREMP: 2015 Plan Update* (Azimuth, 2015a) for more details.
3. "***equation***" means that CCME guidelines (or thresholds) are calculated based on an equation which is either pH or hardness dependent. The ammonia and aluminum (t & d) guidelines vary with pH; the cadmium, copper, lead, manganese, nickel and zinc guidelines vary with hardness.
4. Chromium CCME guideline is for Cr VI.

123 Bolded concentrations exceed the trigger value.

123 Bolded and shaded concentrations also exceed the threshold value.

Italicized numbers are below detection limits.

underline = results were given a cautionary flag in the QC assessment (refer to **Section 3.1.2** for details)

~~strikethrough~~ = results flagged as unreliable in the QC assessment

Table B1-1. Water quality results from the 2018 CREMP, Meadowbank study area lakes.

Lake (Station)					Wally Lake (WAL)									
Area-Replicate ID					WAL-79	WAL-80	WAL-81	WAL-82	WAL-83	WAL-84	WAL-85	WAL-86	WAL-87	WAL-88
Date					9-May-18	9-May-18	9-Jul-18	9-Jul-18	13-Aug-18	13-Aug-18	2-Sep-18	2-Sep-18	31-Oct-18	31-Oct-18
Time	**CCME (2012)**	**Trigger[2]**			14:45	14:00	11:50	11:15	9:02	9:38	13:30	14:05	10:53	10:20
ALS Sample ID	**Guideline[1]**	**Meadowbank**	**Wally Lake**	**Threshold[2]**	L2093715-4	L2093715-3	L2129199-4	L2129199-3	L2149758-2	L2149758-1	L2161885-3	L2161885-4	L2194150-7	L2194150-8
Field Measurements (Surface)														
Temperature (°C)														
Specific Conductivity (µS/cm)														
Dissolved Oxygen (mg/L)														
pH	6.5 - 9.0	6.30 - 8.25	6.54 - 8.34	6.5 - 9.0										
Physical Tests (mg/L)														
Conductivity (µS/cm)		23.5	36.6		**73.1**	**67.6**	**41.5**	36.4	**41.3**	**42**	**40.4**	**40.4**	**42.7**	**42.1**
Hardness		8.5	16.7		**32**	**29.8**	**17.6**	15.5	**18**	**17.3**	**17.1**	**17**	**18.6**	**18.2**
pH (Laboratory)	6.5 - 9.0	6.50 - 7.94	6.92 - 8.17	6.5 - 9.0	7.5	7.5	7.4	7.3	7.4	7.4	7.4	7.4	7.4	7.4
Total Suspended Solids		3.0	3.0	5.0	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*
Total Dissolved Solids		18.0	25.3		**51**	**45**	18	17.1	**26.7**	**29.1**	**27.1**	**27.2**	24.3	**26**
Turbidity (NTU)					0.13	0.13	0.36	0.35	0.25	0.24	0.22	0.23	0.17	0.17
Anions and Nutrients (mg/L)														
Alkalinity - Bicarbonate		8.6	17.8		**25.3**	**23.8**	13.8	12	14.2	14.2	14.2	14	14.2	14.3
Alkalinity - Carbonate		4	4		*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*
Alkalinity - Hydroxide					*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*
Alkalinity - Total		8.5	17.8		**25.3**	**23.8**	13.8	12	14.2	14.2	14.2	14	14.2	14.3
Ammonia (as N)[3]	***equation***	0.065	0.067	0.126	0.043	0.032	*<0.005*	*<0.005*	0.030	0.028	0.019	0.014	*<0.005*	0.023
Bromide					*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*
Chloride	120	60.28	60.2	120	1.5	1.4	0.71	0.76	0.79	0.80	0.84	0.82	0.80	0.80
Fluoride	0.120				0.068	0.064	0.040	0.048	0.051	0.050	0.049	0.050	0.052	0.052
Nitrate (as N)	3.0	1.50	1.50	3.0	0.10	0.085	0.0065	0.0080	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Nitrite (as N)	0.060	0.031	0.031	0.060	*<0.001*	0.0010	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*
Total Kjeldahl Nitrogen		0.170	0.163		**0.17**	0.16	0.13	0.14	0.16	0.15	0.12	0.12	0.11	0.14
Ortho Phosphate (as P)		0.002	0.002		*<0.001*	0.0011	0.0014	0.0015	0.0011	0.0011	0.0012	0.0013	*<0.001*	*<0.001*
Phosphorus (P)-Total Diss.					0.0021	*<0.002*	*<0.002*	*<0.002*	0.0020	*<0.002*	*<0.002*	*<0.002*	0.0024	0.0023
Phosphorus (P)-Total	0.0040	0.0060	0.0067		0.0021	0.0027	0.0040	0.0052	*<0.002*	*<0.002*	*<0.002*	0.0027	0.0030	0.0028
Silicate (as SiO_2)		1.0	1.08		0.85	0.99	0.70	0.59	*<0.5*	*<0.5*	0.56	0.57	0.56	0.54
Sulphate (SO_4)		64.7	65.2	128	9.0	8.3	4.6	4.3	4.6	4.6	4.7	4.7	4.8	4.8
Cyanides (mg/L)														
Total Cyanide					*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*
Free Cyanide	0.005				*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*
Organic / Inorganic Carbon (mg/L)														
Dissolved Organic Carbon		2.60	3.21		2.8	2.7	2.2	2.1	2.0	2.0	2.1	2.2	2.0	1.7
Total Organic Carbon		2.79	4.11		2.9	2.7	2.4	2.1	2.0	2.4	2.1	2.0	1.8	1.9
Plant Pigments (µg/L)														
Chlorophyll-*a*					0.44	0.29	0.76	0.52	0.46	0.53	0.50	0.41	1.4	1.3
Total Metals (mg/L)														
Aluminum[3]	***equation***	0.054	0.053	0.100	*<0.0030*	*<0.0030*	0.0079	0.0073	0.0039	0.0053	0.0051	*<0.0030*	0.0036	*<0.0030*
Antimony		0.0101	0.0100	0.020	0.00010	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*
Arsenic	0.0050	0.00255	0.0026	0.005	0.00036	0.00032	0.00034	0.00026	0.00031	0.00031	0.00033	0.00027	0.00028	0.00027
Barium		0.50	0.50	1	0.0052	0.0048	0.0026	0.0026	0.0022	0.0022	0.0022	0.0020	0.0021	0.0021
Beryllium		0.0027	0.0027	0.0053	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*
Bismuth					*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*
Boron	1.5	0.76	0.76	1.5	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*
Cadmium[3]	***equation***	0.000025	0.000025	0.000040	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*
Calcium		2.15	4.88		**7.6**	**7.1**	**5.0**	4.2	4.4	4.4	4.7	4.6	**5.1**	**4.9**
Chromium[4]	0.001	0.00056	0.00055	0.001	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*
Cobalt					*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*
Copper[3]	***equation***	0.00124	0.00149	0.002	**0.0055**	0.0012	0.00089	0.00072	0.00087	0.00089	0.00087	0.00084	0.00083	0.00081
Iron	0.3	0.155	0.157	0.3	*<0.01*	*<0.01*	0.020	0.026	0.014	0.016	0.013	*<0.01*	*<0.01*	*<0.01*
Lead[3]	***equation***	0.000525	0.000525	0.001	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*
Lithium		0.048	0.048	0.096	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*
Magnesium		0.83	1.36		**2.5**	**2.3**	**1.4**	1.3	1.3	1.3	**1.4**	1.3	**1.5**	**1.5**
Manganese[3]		0.3157	0.3300	***equation***	0.0017	0.0014	0.0027	0.0047	0.0020	0.0020	0.0019	0.00035	0.0016	0.0018
Mercury	0.000026	0.000018	0.000018	0.000026	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*
Molybdenum	0.073	0.0365	0.0370	0.073	0.00060	0.00049	0.00020	0.00018	0.00023	0.00026	0.00026	0.00026	0.00024	0.00024
Nickel[3]	***equation***	0.0127	0.0130	0.025	0.00067	0.00058	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*
Phosphorus					*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*
Potassium		0.50	0.59		**0.96**	**0.88**	0.45	0.48	0.47	0.46	0.50	0.48	0.55	0.54
Selenium	0.001	0.00055	0.00055	0.001	*<0.00005*	0.00005	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*
Silicon					0.47	0.48	0.37	0.31	0.26	0.26	0.29	0.28	0.31	0.29
Silver	0.0001				*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*
Sodium		0.975	0.72		**1.2**	**1.1**	0.58	0.609	0.60	0.60	0.63	0.59	0.70	0.70
Strontium		0.0279	0.0330	0.049	**0.044**	**0.041**	0.026	0.021	0.023	0.022	0.026	0.026	0.027	0.026
Sulfur					3.1	2.6	1.8	1.6	1.4	1.4	1.9	1.9	2.0	1.9
Thallium	0.0008	0.00041	0.00041	0.0008	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*
Tin		0.0002	0.0002		*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*
Titanium		1.00	1.00	2	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*
Uranium	0.015	0.0075	0.0075	0.015	0.00009	0.00008	0.00006	0.00005	0.00005	0.00005	0.00006	0.00005	0.00005	0.00005
Vanadium		0.0035	0.0035	0.006	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*
Zinc[3]	0.030	0.0063	0.0106	***equation***	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*
Dissolved Metals (mg/L)														
Aluminum[3]		0.0263	0.0260	0.05	0.0012	0.0017	0.0031	0.0028	0.0023	0.0029	0.0012	0.0025	0.0016	0.0016
Antimony		0.0101	0.0100	0.020	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*
Arsenic		0.0026	0.0026	0.005	0.00032	0.00029	0.00025	0.00016	0.00026	0.00026	0.00025	0.00026	0.00024	0.00021
Barium		0.5010	0.5000	1.0	0.0050	0.0047	0.0025	0.0025	0.0023	0.0023	0.0020	0.0021	0.0022	0.0021
Beryllium		0.0027	0.0027	0.0053	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*
Bismuth					*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*
Boron		0.76	0.76	1.5	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*
Cadmium		0.000025	0.000025	0.00004	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*
Calcium					8.6	8.1	4.9	4.2	4.9	4.6	4.6	4.6	5.0	4.9
Chromium	0.00055	0.00055	0.001		*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*
Cobalt					*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*
Copper	0.00119	0.00148	0.002		0.0011	0.0010	0.00087	0.00072	0.00080	0.00077	0.00088	0.00092	0.00076	0.00072
Iron	0.155	0.155	0.3		*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	0.012	*<0.01*	*<0.01*
Lead	0.000525	0.000525	0.001		*<0.00005*	*<0.00005*	**0.00075**	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	0.00006	*<0.00005*
Lithium	0.048	0.048	0.096		*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*
Magnesium					2.6	2.3	1.3	1.2	1.4	1.4	1.4	1.4	1.5	1.5
Manganese[3]	0.315	0.330	***equation***		*<0.0005*	*<0.00040*	0.0017	0.0034	0.00033	0.00029	0.00024	0.0016	0.00013	0.00011
Mercury	0.000018	0.000018	0.000026		*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*
Molybdenum	0.037	0.037	0.073		0.00059	0.00059	0.00018	0.00019	0.00024	0.00023	0.00025	0.00025	0.00025	0.00025
Nickel	0.013	0.013	0.025		0.00052	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*
Phosphorus					*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*
Potassium					0.99	0.91	0.44	0.48	0.53	0.51	0.49	0.49	0.53	0.52
Selenium	0.00055	0.00055	0.001		*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*
Silicon					0.39	0.42	0.31	0.28	0.25	0.24	0.24	0.25	0.28	0.27
Silver					*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*
Sodium					1.2	1.1	0.56	0.60	0.69	0.68	0.66	0.65	0.70	0.69
Strontium	0.028	0.033	0.049		**0.044**	**0.041**	0.025	0.021	0.024	0.024	0.024	0.023	0.026	0.025
Sulfur					2.8	2.5	1.2	1.2	1.6	1.6	1.9	1.9	1.6	1.7
Thallium	0.00041	0.00041	0.0008		*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*
Tin	0.0002	0.0002			*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*
Titanium	1.01	1.00	2		*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*
Uranium	0.0075	0.0075	0.015		0.00008	0.00007	0.00006	0.00005	0.00006	0.00005	0.00005	0.00005	0.00005	0.00004
Vanadium	0.0035	0.0035	0.006		*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*
Zinc[3]	0.0053	0.0096	***equation***		*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*

Notes:

1. CCME (Canadian Council of Ministers of the Environment) Canadian Water Quality Guidelines for the Protection of Aquatic Life, 1999, updated up to 2015.

2. Trigger and threshold values were developed in *CREMP Design Document 2012* (Azimuth, 2012d). A number of thresholds were derived from methods (or sources) other than CCME guidelines. Refer to the *CREMP: 2015 Plan Update* (Azimuth, 2015a) for more details.

3. "***equation***" means that CCME guidelines (or thresholds) are calculated based on an equation which is either pH or hardness dependent. The ammonia and aluminum (t & d) guidelines vary with pH; the cadmium, copper, lead, manganese, nickel and zinc guidelines vary with hardness.

4. Chromium CCME guideline is for Cr VI.

123 Bolded concentrations exceed the trigger value.

123 Bolded and shaded concentrations also exceed the threshold value.

Italicized numbers are below detection limits.

underline = results were given a cautionary flag in the QC assessment (refer to **Section 3.1.2** for details)

~~strikethrough~~ = results flagged as unreliable in the QC assessment

Table B1-1. Water quality results from the 2018 CREMP, Meadowbank study area lakes.

Lake					Tehek Lake		Tehek Lake Far-field		Third Portage Lake South	
(Station)					(TE)		(TEFF)		Basin (TPS)	
Area-Replicate ID					TE-94	TE-95	TEFF-47	TEFF-48	TPS-59	TPS-60
Date					21-May-18	21-May-18	27-May-18	27-May-18	13-May-18	13-May-18
Time	CCME (2012)	Trigger[2]			0:00	0:00	9:30	10:30	0:00	0:00
ALS Sample ID	Guideline[1]	Meadowbank	Wally Lake	Threshold[2]	L2099599-5	L2099599-6	L2103642-4	L2103642-5	L2098886-3	L2098886-4
Field Measurements (Surface)										
Temperature (°C)										
Specific Conductivity (µS/cm)										
Dissolved Oxygen (mg/L)										
pH	6.5 - 9.0	6.30 - 8.25	6.54 - 8.34	6.5 - 9.0						
Physical Tests (mg/L)										
Conductivity (µS/cm)		23.5	36.6		**34**	**35.1**	**24.6**	**24.4**	**36.5**	**28.7**
Hardness		8.5	16.7		**12.6**	**13.5**	**9.0**	8.4	**13.4**	**9.5**
pH (Laboratory)	6.5 - 9.0	6.50 - 7.94	6.92 - 8.17	6.5 - 9.0	7.3	7.3	7.1	7.1	7.2	7.1
Total Suspended Solids		3.0	3.0	5.0	*<1.0*	*<1.0*	*<1.0*	1.0	*<1.0*	*<1.0*
Total Dissolved Solids		18.0	25.3		17.2	**23.8**	13	14.9	**19.7**	16.5
Turbidity (NTU)					0.12	0.12	0.13	0.13	0.12	0.11
Anions and Nutrients (mg/L)										
Alkalinity - Bicarbonate		8.6	17.8		**9.9**	**10.3**	6.9	6.9	8.5	6.6
Alkalinity - Carbonate		4	4		*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*
Alkalinity - Hydroxide					*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*
Alkalinity - Total		8.5	17.8		**9.9**	**10.3**	6.9	6.9	8.5	6.6
Ammonia (as N)[3]	***equation***	0.065	0.067	0.126	0.013	0.0093	0.0084	0.0087	0.022	0.016
Bromide					*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*
Chloride	120	60.28	60.2	120	1.1	1.1	0.87	0.90	1.0	0.79
Fluoride	0.120				0.088	0.089	0.075	0.076	0.084	0.067
Nitrate (as N)	3.0	1.50	1.50	3.0	*<0.005*	0.0058	*<0.005*	*<0.005*	0.034	0.026
Nitrite (as N)	0.060	0.031	0.031	0.060	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*
Total Kjeldahl Nitrogen		0.170	0.163		0.13	0.12	0.086	0.080	0.10	0.095
Ortho Phosphate (as P)		0.002	0.002		*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	0.0013
Phosphorus (P)-Total Diss.					*<0.002*	*<0.002*	0.0023	0.0020	*<0.002*	*<0.002*
Phosphorus (P)-Total	0.0040	0.0060	0.0067		0.0045	0.0027	0.0021	0.0021	0.0032	0.0020
Silicate (as SiO_2)		1.0	1.08		0.53	0.54	*<0.5*	*<0.5*	*<0.5*	*<0.5*
Sulphate (SO_4)		64.7	65.2	128	4.4	4.5	3.2	3.2	6.4	5.0
Cyanides (mg/L)										
Total Cyanide					*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*
Free Cyanide	0.005				*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*
Organic / Inorganic Carbon (mg/L)										
Dissolved Organic Carbon		2.60	3.21		2.0	2.2	1.6	1.8	1.9	1.6
Total Organic Carbon		2.79	4.11		2.0	2.1	1.8	1.9	1.7	1.7
Plant Pigments (µg/L)										
Chlorophyll-*a*					0.18	0.25	0.44	0.48	0.45	0.24
Total Metals (mg/L)										
Aluminum[3]	***equation***	0.054	0.053	0.100	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*
Antimony		0.0101	0.0100	0.020	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*
Arsenic	0.0050	0.00255	0.0026	0.005	0.00016	0.00016	0.00012	0.00026	0.00019	0.00014
Barium		0.50	0.50	1	0.0037	0.0037	0.0032	0.0033	0.0039	0.0030
Beryllium		0.0027	0.0027	0.0053	*<0.0001*	*<0.0001*	*<0.00002*	*<0.00002*	*<0.0001*	*<0.0001*
Bismuth					*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*
Boron	1.5	0.76	0.76	1.5	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*
Cadmium[3]	***equation***	0.000025	0.000025	0.000040	*<0.000005*	*<0.000005*	*<0.000005*	0.00001	*<0.000005*	*<0.000005*
Calcium		2.15	4.88		**2.9**	**3.0**	1.9	1.9	**2.8**	**2.4**
Chromium[4]	0.001	0.00056	0.00055	0.001	*<0.0001*	*<0.0001*	*<0.0001*	0.00010	*<0.0001*	*<0.0001*
Cobalt					*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*
Copper[3]	***equation***	0.00124	0.00149	0.002	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*
Iron	0.3	0.155	0.157	0.3	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*
Lead[3]	***equation***	0.000525	0.000525	0.001	*<0.00005*	*<0.00005*	*<0.00005*	0.000067	*<0.00005*	*<0.00005*
Lithium		0.048	0.048	0.096	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*
Magnesium		0.83	1.36		**1.1**	**1.1**	**0.84**	**0.85**	**1.1**	**0.93**
Manganese[3]		0.3157	0.3300	***equation***	0.00044	0.00046	0.00045	0.00044	0.00034	0.00032
Mercury	0.000026	0.000018	0.000018	0.000026	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*
Molybdenum	0.073	0.0365	0.0370	0.073	0.00009	0.00010	0.00005	0.00007	0.00017	0.00014
Nickel[3]	***equation***	0.0127	0.0130	0.025	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*
Phosphorus					*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*
Potassium		0.50	0.59		**0.64**	**0.65**	**0.52**	**0.53**	**0.64**	**0.51**
Selenium	0.001	0.00055	0.00055	0.001	*<0.00005*	*<0.00005*	*<0.00005*	0.00012	*<0.00005*	*<0.00005*
Silicon					0.23	0.23	0.17	0.17	*<0.1*	*<0.1*
Silver	0.0001				*<0.00001*	*<0.00001*	*<0.00001*	0.00001	*<0.00001*	*<0.00001*
Sodium		0.975	0.72		**1.0**	**1.1**	0.83	0.85	**1.4**	**1.2**
Strontium		0.0279	0.0330	0.049	0.015	0.016	0.011	0.011	0.014	0.011
Sulfur					1.2	1.2	*<0.5*	*<0.5*	2.0	1.5
Thallium	0.0008	0.00041	0.00041	0.0008	*<0.00001*	*<0.00001*	*<0.00001*	0.00014	*<0.00001*	*<0.00001*
Tin		0.0002	0.0002		*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*
Titanium		1.00	1.00	2	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*
Uranium	0.015	0.0075	0.0075	0.015	0.00005	0.00005	0.00004	0.00004	0.00003	0.00003
Vanadium		0.0035	0.0035	0.006	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*
Zinc[3]	0.030	0.0063	0.0106	***equation***	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*
Dissolved Metals (mg/L)										
Aluminum[3]		0.0263	0.0260	0.05	*<0.0090*	0.0017	0.0022	0.0013	0.0019	0.017
Antimony		0.0101	0.0100	0.020	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*
Arsenic		0.0026	0.0026	0.005	0.00012	0.00011	0.00014	0.00012	0.00019	0.00015
Barium		0.5010	0.5000	1.0	0.0039	0.0039	0.0035	0.0033	0.0039	0.0054
Beryllium		0.0027	0.0027	0.0053	*<0.0001*	*<0.0001*	*<0.00002*	*<0.00002*	*<0.0001*	*<0.0001*
Bismuth					*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*
Boron		0.76	0.76	1.5	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*
Cadmium		0.000025	0.000025	0.00004	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	0.00001
Calcium					3.1	3.3	2.1	2.0	3.4	2.3
Chromium		0.00055	0.00055	0.001	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	**0.0011**
Cobalt					*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*
Copper		0.00119	0.00148	0.002	0.00050	0.00053	0.00036	0.00031	**0.0013**	0.0011
Iron		0.155	0.155	0.3	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	0.023
Lead		0.000525	0.000525	0.001	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	0.00006	0.00008
Lithium		0.048	0.048	0.096	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*
Magnesium					1.2	1.3	0.91	0.84	1.2	0.92
Manganese[3]		0.315	0.330	***equation***	0.00019	0.00021	0.00027	0.00019	0.00058	0.00032
Mercury		0.000018	0.000018	0.000026	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*
Molybdenum		0.037	0.037	0.073	0.00008	0.00008	*<0.00005*	*<0.00005*	0.00019	0.00021
Nickel		0.013	0.013	0.025	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	0.00054
Phosphorus					*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*
Potassium					0.67	0.74	0.60	0.56	0.71	0.56
Selenium		0.00055	0.00055	0.001	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*
Silicon					0.20	0.21	0.15	0.13	*<0.05*	*<0.05*
Silver					*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*
Sodium					1.0	1.2	0.92	0.87	1.5	1.2
Strontium		0.028	0.033	0.049	0.016	0.017	0.012	0.011	0.014	0.011
Sulfur					0.99	0.90	1.1	0.97	2.2	1.7
Thallium		0.00041	0.00041	0.0008	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*
Tin		0.0002	0.0002		*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*
Titanium		1.01	1.00	2	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	0.00070
Uranium		0.0075	0.0075	0.015	0.00005	0.00005	0.00004	0.00004	0.00004	0.00003
Vanadium		0.0035	0.0035	0.006	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*
Zinc[3]		0.0053	0.0096	***equation***	*<0.001*	*<0.001*	*<0.001*	*<0.001*	0.0018	0.0022

Notes:

1. CCME (Canadian Council of Ministers of the Environment) Canadian Water Quality Guidelines for the Protection of Aquatic Life, 1999, updated up to 2015.

2. Trigger and threshold values were developed in *CREMP Design Document 2012* (Azimuth, 2012d). A number of thresholds were derived from methods (or sources) other than CCME guidelines. Refer to the *CREMP: 2015 Plan Update* (Azimuth, 2015a) for more details.

3. "***equation***" means that CCME guidelines (or thresholds) are calculated based on an equation which is either pH or hardness dependent. The ammonia and aluminum (t & d) guidelines vary with pH; the cadmium, copper, lead, manganese, nickel and zinc guidelines vary with hardness.

4. Chromium CCME guideline is for Cr VI.

123 Bolded concentrations exceed the trigger value.

123 Bolded and shaded concentrations also exceed the threshold value.

Italicized numbers are below detection limits.

underline = results were given a cautionary flag in the QC assessment (refer to **Section 3.1.2** for details)

~~strikethrough~~ = results flagged as unreliable in the QC assessment

Table B1-1. Water quality results from the 2018 CREMP, Meadowbank study area lakes.

Lake					Inuggugayualik Lake									
(Station)					(INUG)									
Area-Replicate ID					INUG-98	INUG-99	INUG-100	INUG-101	INUG-102	INUG-103	INUG-104	INUG-105	INUG-106	INUG-107
Date					27-May-18	27-May-18	19-Jul-18	19-Jul-18	14-Aug-18	14-Aug-18	1-Sep-18	1-Sep-18	25-Nov-18	25-Nov-18
Time	CCME (2012)	Trigger[2]			13:30	14:30	9:48	10:30	0:00	9:51	13:00	12:25	11:41	11:03
ALS Sample ID	Guideline[1]	Meadowbank	Wally Lake	Threshold[2]	L2103642-1	L2103642-2	L2136262-1	L2136262-2	L2149758-11	L2149758-12	L2162149-8	L2162149-7	L2203338-1	L2203338-2
Field Measurements (Surface)														
Temperature (°C)														
Specific Conductivity (µS/cm)														
Dissolved Oxygen (mg/L)														
pH	6.5 - 9.0	6.30 - 8.25	6.54 - 8.34	6.5 - 9.0										
Physical Tests (mg/L)														
Conductivity (µS/cm)		23.5	36.6		20	20.1	15.3	15	15.4	15.5	17	16.9	15.8	15.3
Hardness		8.5	16.7		7.3	7.3	6.0	5.8	5.3	5.4	5.7	5.8	6.2	5.8
pH (Laboratory)	6.5 - 9.0	6.50 - 7.94	6.92 - 8.17	6.5 - 9.0	7.1	7.1	7.0	7.0	7.1	7.1	7.0	7.0	6.9	6.9
Total Suspended Solids		3.0	3.0	5.0	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	1.0	*<1.0*	*<1.0*
Total Dissolved Solids		18.0	25.3		11	9.3	15.4	10.7	12.2	10.8	13	13	9.5	9.3
Turbidity (NTU)					0.16	0.13	0.35	0.31	0.29	0.31	0.21	0.23	0.19	0.16
Anions and Nutrients (mg/L)														
Alkalinity - Bicarbonate		8.6	17.8		7.0	6.9	5.1	5.4	5.6	5.5	5.3	5.5	5.4	5.2
Alkalinity - Carbonate		4	4		*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*
Alkalinity - Hydroxide					*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*
Alkalinity - Total		8.5	17.8		7.0	6.9	5.1	5.4	5.6	5.5	5.3	5.5	5.4	5.2
Ammonia (as N)[3]	***equation***	0.065	0.067	0.126	0.020	0.019	*<0.005*	*<0.005*	0.011	0.030	0.016	0.0088	0.0066	0.0058
Bromide					*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*
Chloride	120	60.28	60.2	120	0.97	0.97	0.75	0.73	0.81	0.81	0.86	0.86	0.89	0.87
Fluoride	0.120				0.074	0.076	0.062	0.060	0.065	0.063	0.063	0.063	0.067	0.067
Nitrate (as N)	3.0	1.50	1.50	3.0	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Nitrite (as N)	0.060	0.031	0.031	0.060	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*
Total Kjeldahl Nitrogen		0.170	0.163		0.13	0.12	0.12	0.14	0.12	0.12	0.13	0.12	0.098	0.098
Ortho Phosphate (as P)		0.002	0.002		*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	0.0012	*<0.001*	0.0012	**0.0022**	**0.0021**
Phosphorus (P)-Total Diss.					*<0.002*	*<0.002*	*<0.002*	0.0020	*<0.002*	0.0021	*<0.002*	*<0.002*	0.0025	0.0025
Phosphorus (P)-Total	0.0040	0.0060	0.0067		0.0043	0.0043	0.0021	*<0.002*	0.0024	0.0021	*<0.002*	*<0.002*	*<0.002*	*<0.002*
Silicate (as SiO_2)		1.0	1.08		*<0.5*	*<0.5*	*<0.5*	*<0.5*	*<0.5*	*<0.5*	*<0.5*	*<0.5*	*<0.5*	*<0.5*
Sulphate (SO_4)		64.7	65.2	128	1.2	1.2	0.89	0.85	0.95	0.95	0.97	0.98	1.0	0.97
Cyanides (mg/L)														
Total Cyanide					*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*
Free Cyanide	0.005				*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*
Organic / Inorganic Carbon (mg/L)														
Dissolved Organic Carbon		2.60	3.21		2.2	2.2	1.9	1.9	1.7	1.7	2.2	2.2	1.6	1.6
Total Organic Carbon		2.79	4.11		2.2	2.4	2.1	2.1	1.8	1.8	2.2	2.2	1.7	1.6
Plant Pigments (µg/L)														
Chlorophyll-*a*					0.65	0.40	0.38	0.36	0.23	0.25	0.23	0.23	0.66	0.72
Total Metals (mg/L)														
Aluminum[3]	***equation***	0.054	0.053	0.100	*<0.0030*	*<0.0030*	0.010	0.011	0.0081	0.0092	0.0057	0.0046	0.0036	0.0032
Antimony		0.0101	0.0100	0.020	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*
Arsenic	0.0050	0.00255	0.0026	0.005	0.00015	*<0.0001*	0.00012	0.00012	*<0.0001*	*<0.0001*	0.00014	0.00014	*<0.0001*	*<0.0001*
Barium		0.50	0.50	1	0.0036	0.0021	0.0020	0.0021	0.0025	0.0017	0.0016	0.0015	0.0020	0.0016
Beryllium		0.0027	0.0027	0.0053	*<0.00002*	*<0.00002*	*<0.00002*	*<0.00002*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*
Bismuth					*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*
Boron	1.5	0.76	0.76	1.5	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*
Cadmium[3]	***equation***	0.000025	0.000025	0.000040	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*
Calcium		2.15	4.88		1.4	1.4	1.1	1.1	1.1	1.1	1.1	1.2	1.4	1.3
Chromium[4]	0.001	0.00056	0.00055	0.001	*<0.0001*	*<0.0001*	0.00011	0.00012	0.00012	0.00012	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*
Cobalt					*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*
Copper[3]	***equation***	0.00124	0.00149	0.002	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*
Iron	0.3	0.155	0.157	0.3	*<0.01*	*<0.01*	0.021	0.021	0.015	0.016	*<0.01*	*<0.01*	*<0.01*	*<0.01*
Lead[3]	***equation***	0.000525	0.000525	0.001	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*
Lithium		0.048	0.048	0.096	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*
Magnesium		0.83	1.36		**0.88**	**0.84**	0.71	0.75	0.67	0.66	0.71	0.70	0.80	0.79
Manganese[3]		0.3157	0.3300	***equation***	0.00064	0.00061	0.0094	0.0095	0.0027	0.0028	0.0018	0.0017	0.00086	0.00085
Mercury	0.000026	0.000018	0.000018	0.000026	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*
Molybdenum	0.073	0.0365	0.0370	0.073	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	0.00007	*<0.00005*
Nickel[3]	***equation***	0.0127	0.0130	0.025	*<0.0005*	*<0.0005*	*<0.0005*	0.00053	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*
Phosphorus					*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*
Potassium		0.50	0.59		0.43	0.41	0.36	0.40	0.35	0.34	0.37	0.37	0.45	0.45
Selenium	0.001	0.00055	0.00055	0.001	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*
Silicon					0.17	0.15	0.20	0.19	0.15	0.16	0.15	0.15	0.15	0.14
Silver	0.0001				*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*
Sodium		0.975	0.72		0.70	0.66	0.58	0.61	0.51	0.51	0.56	0.56	0.67	0.67
Strontium		0.0279	0.0330	0.049	0.0079	0.0076	0.0067	0.0065	0.0061	0.0060	0.0064	0.0065	0.0081	0.0070
Sulfur					*<0.5*	*<0.5*	*<0.5*	*<0.5*	*<0.5*	*<0.5*	*<0.5*	*<0.5*	*<0.5*	*<0.5*
Thallium	0.0008	0.00041	0.00041	0.0008	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*
Tin		0.0002	0.0002		*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*
Titanium		1.00	1.00	2	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*
Uranium	0.015	0.0075	0.0075	0.015	0.00005	0.00004	0.00005	0.00005	0.00004	0.00004	0.00003	0.00003	0.00005	0.00003
Vanadium		0.0035	0.0035	0.006	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*
Zinc[3]	0.030	0.0063	0.0106	***equation***	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*
Dissolved Metals (mg/L)														
Aluminum[3]		0.0263	0.0260	0.05	0.0014	0.0016	0.0028	0.0035	0.0022	0.0028	0.0012	0.0014	0.0016	0.0017
Antimony		0.0101	0.0100	0.020	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*
Arsenic		0.0026	0.0026	0.005	0.00010	0.00011	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*
Barium		0.5010	0.5000	1.0	0.0023	0.0022	0.0020	0.0020	0.0017	0.0017	0.0015	0.0015	0.0016	0.0016
Beryllium		0.0027	0.0027	0.0053	*<0.00002*	*<0.00002*	*<0.00002*	*<0.00002*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*
Bismuth					*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*
Boron		0.76	0.76	1.5	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*
Cadmium		0.000025	0.000025	0.00004	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*
Calcium					1.4	1.4	1.2	1.2	0.99	1.00	1.1	1.1	1.3	1.2
Chromium		0.00055	0.00055	0.001	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*
Cobalt					*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*
Copper		0.00119	0.00148	0.002	0.00032	0.00035	0.00036	0.00034	0.00028	0.00029	0.00046	0.00033	0.00029	0.00070
Iron		0.155	0.155	0.3	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	0.020	*<0.01*	*<0.01*	*<0.01*
Lead		0.000525	0.000525	0.001	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*
Lithium		0.048	0.048	0.096	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*
Magnesium					0.91	0.90	0.72	0.70	0.69	0.71	0.71	0.71	0.75	0.71
Manganese[3]		0.315	0.330	***equation***	0.00013	0.00015	0.0063	0.0063	0.00033	0.00037	0.00049	0.00032	*<0.0001*	*<0.0001*
Mercury		0.000018	0.000018	0.000026	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*
Molybdenum		0.037	0.037	0.073	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*
Nickel		0.013	0.013	0.025	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*
Phosphorus					*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*
Potassium					0.49	0.49	0.40	0.40	0.36	0.38	0.39	0.38	0.39	0.37
Selenium		0.00055	0.00055	0.001	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*
Silicon					0.13	0.11	0.15	0.16	0.13	0.12	0.11	0.11	0.10	0.10
Silver					*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*
Sodium					0.73	0.72	0.67	0.64	0.57	0.60	0.58	0.59	0.62	0.59
Strontium		0.028	0.033	0.049	0.0081	0.0082	0.0070	0.0068	0.0065	0.0062	0.0064	0.0064	0.0063	0.0060
Sulfur					0.51	*<0.5*	0.83	0.74	*<0.5*	*<0.5*	*<0.5*	*<0.5*	*<0.5*	*<0.5*
Thallium		0.00041	0.00041	0.0008	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*
Tin		0.0002	0.0002		*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*
Titanium		1.01	1.00	2	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*
Uranium		0.0075	0.0075	0.015	0.00004	0.00004	0.00004	0.00005	0.00004	0.00004	0.00003	0.00003	0.00003	0.00003
Vanadium		0.0035	0.0035	0.006	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*
Zinc[3]		0.0053	0.0096	***equation***	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	0.0014	*<0.001*	*<0.001*	*<0.001*

Notes:

1. CCME (Canadian Council of Ministers of the Environment) Canadian Water Quality Guidelines for the Protection of Aquatic Life, 1999, updated up to 2015.

2. Trigger and threshold values were developed in *CREMP Design Document 2012* (Azimuth, 2012d). A number of thresholds were derived from methods (or sources) other than CCME guidelines. Refer to the *CREMP: 2015 Plan Update* (Azimuth, 2015a) for more details.

3. "***equation***" means that CCME guidelines (or thresholds) are calculated based on an equation which is either pH or hardness dependent. The ammonia and aluminum (t & d) guidelines vary with pH; the cadmium, copper, lead, manganese, nickel and zinc guidelines vary with hardness.

4. Chromium CCME guideline is for Cr VI.

123 Bolded concentrations exceed the trigger value.

123 Bolded and shaded concentrations also exceed the threshold value.

Italicized numbers are below detection limits.

underline = results were given a cautionary flag in the QC assessment (refer to **Section 3.1.2** for details)

~~strikethrough~~ = results flagged as unreliable in the QC assessment

Table B1-1. Water quality results from the 2018 CREMP, Meadowbank study area lakes.

Lake					Pipedream Lake									
(Station)					(PDL)									
Area-Replicate ID					PDL-63	PDL-64	PDL-65	PDL-66	PDL-67	PDL-68	PDL-69	PDL-70	PDL-71	PDL-72
Date					20-May-18	20-May-18	20-Jul-18	20-Jul-18	14-Aug-18	14-Aug-18	1-Sep-18	1-Sep-18	5-Nov-18	5-Nov-18
Time	CCME (2012)	Trigger[2]			0:00	0:00	11:00	10:00	14:30	15:00	9:49	10:24	15:53	16:10
ALS Sample ID	Guideline[1]	Meadowbank	Wally Lake	Threshold[2]	L2099599-3	L2099599-4	L2136262-3	L2136262-4	L2149758-13	L2149758-14	L2162149-5	L2162149-6	L2195956-1	L2195956-2
Field Measurements (Surface)														
Temperature (°C)														
Specific Conductivity (µS/cm)														
Dissolved Oxygen (mg/L)														
pH	6.5 - 9.0	6.30 - 8.25	6.54 - 8.34	6.5 - 9.0										
Physical Tests (mg/L)														
Conductivity (µS/cm)		23.5	36.6		**28.7**	**28.4**	22.2	22.3	21.7	21.4	23.4	23.2	21.9	22.1
Hardness		8.5	16.7		**11.6**	**11.5**	**9.1**	**8.8**	8.5	8.4	**8.8**	**8.9**	**9.3**	**9.5**
pH (Laboratory)	6.5 - 9.0	6.50 - 7.94	6.92 - 8.17	6.5 - 9.0	7.3	7.3	7.2	7.1	7.3	7.3	7.2	7.2	7.1	7.1
Total Suspended Solids		3.0	3.0	5.0	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	1.3	*<1.0*	*<1.0*	*<1.0*
Total Dissolved Solids		18.0	25.3		16.3	**20.1**	15.6	15.5	14.6	14	15	15.9	16.2	15.5
Turbidity (NTU)					0.11	0.12	0.21	0.18	0.23	0.22	0.19	0.16	0.12	0.12
Anions and Nutrients (mg/L)														
Alkalinity - Bicarbonate		8.6	17.8		**10.3**	**10.5**	8.4	**9.5**	7.9	7.9	8.0	8.0	7.7	8.0
Alkalinity - Carbonate		4	4		*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*
Alkalinity - Hydroxide					*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*
Alkalinity - Total		8.5	17.8		**10.3**	**10.5**	8.4	**9.5**	7.9	7.9	8.0	8.0	7.7	8.0
Ammonia (as N)[3]	***equation***	0.065	0.067	0.126	0.013	0.011	*<0.005*	*<0.005*	0.016	0.0072	0.012	0.0056	*<0.005*	*<0.005*
Bromide					*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*
Chloride	120	60.28	60.2	120	0.83	0.81	0.62	0.61	0.65	0.64	0.67	0.67	0.67	0.67
Fluoride	0.120				0.047	0.045	0.038	0.038	0.038	0.038	0.038	0.038	0.043	0.043
Nitrate (as N)	3.0	1.50	1.50	3.0	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Nitrite (as N)	0.060	0.031	0.031	0.060	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*
Total Kjeldahl Nitrogen		0.170	0.163		0.11	0.11	0.082	0.098	0.11	0.086	0.11	0.10	0.080	0.079
Ortho Phosphate (as P)		0.002	0.002		*<0.001*	*<0.001*	*<0.001*	*<0.001*	0.0012	0.0011	*<0.001*	*<0.001*	*<0.001*	*<0.001*
Phosphorus (P)-Total Diss.					*<0.002*	*<0.002*	*<0.002*	*<0.002*	*<0.002*	*<0.002*	*<0.002*	*<0.002*	*<0.002*	*<0.002*
Phosphorus (P)-Total	0.0040	0.0060	0.0067		**0.0068**	0.0030	*<0.002*	**0.013**	*<0.002*	*<0.002*	*<0.002*	*<0.002*	*<0.002*	*<0.002*
Silicate (as SiO_2)		1.0	1.08		*<0.5*	*<0.5*	*<0.5*	*<0.5*	*<0.5*	*<0.5*	*<0.5*	*<0.5*	*<0.5*	*<0.5*
Sulphate (SO_4)		64.7	65.2	128	2.2	2.2	1.7	1.7	1.8	1.7	1.8	1.8	1.8	1.8
Cyanides (mg/L)														
Total Cyanide					*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*
Free Cyanide	0.005				*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*
Organic / Inorganic Carbon (mg/L)														
Dissolved Organic Carbon		2.60	3.21		2.0	2.0	1.8	1.6	1.4	1.4	1.8	1.7	1.6	1.5
Total Organic Carbon		2.79	4.11		1.9	**4.0**	1.9	1.7	1.6	1.5	1.8	2.0	1.6	1.6
Plant Pigments (µg/L)														
Chlorophyll-*a*					0.23	0.32	0.38	0.49	0.22	0.28	0.32	0.29	0.66	0.49
Total Metals (mg/L)														
Aluminum[3]	***equation***	0.054	0.053	0.100	*<0.0030*	*<0.0030*	0.0049	0.0050	0.0060	0.0043	0.0040	0.0034	0.0049	*<0.0030*
Antimony		0.0101	0.0100	0.020	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*
Arsenic	0.0050	0.00255	0.0026	0.005	0.00020	0.00020	0.00018	0.00022	0.00015	0.00014	0.00020	0.00021	0.00016	0.00018
Barium		0.50	0.50	1	0.0025	0.0026	0.0022	0.0020	0.0018	0.0017	0.0019	0.0018	0.0020	0.0020
Beryllium		0.0027	0.0027	0.0053	*<0.0001*	*<0.0001*	*<0.00002*	*<0.00002*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*
Bismuth					*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*
Boron	1.5	0.76	0.76	1.5	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*
Cadmium[3]	***equation***	0.000025	0.000025	0.000040	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*
Calcium		2.15	4.88		**2.9**	**2.9**	2.1	**2.2**	2.1	2.1	**2.3**	**2.3**	**2.3**	**2.2**
Chromium[4]	0.001	0.00056	0.00055	0.001	*<0.0001*	*<0.0001*	0.00011	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*
Cobalt					*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*
Copper[3]	***equation***	0.00124	0.00149	0.002	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	0.00057	0.00056	*<0.0005*	*<0.0005*
Iron	0.3	0.155	0.157	0.3	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	0.031	*<0.01*	*<0.01*	*<0.01*
Lead[3]	***equation***	0.000525	0.000525	0.001	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*
Lithium		0.048	0.048	0.096	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*
Magnesium		0.83	1.36		**1.0**	**1.0**	0.82	0.81	0.73	0.73	0.77	0.79	**0.88**	**0.87**
Manganese[3]		0.3157	0.3300	***equation***	0.00039	0.00047	0.0023	0.0024	0.0014	0.0016	0.0017	0.0013	0.0010	0.0011
Mercury	0.000026	0.000018	0.000018	0.000026	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*
Molybdenum	0.073	0.0365	0.0370	0.073	0.00005	0.00006	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	0.00005	0.00005	0.00005
Nickel[3]	***equation***	0.0127	0.0130	0.025	0.00052	0.00057	0.00065	0.00063	*<0.0005*	*<0.0005*	0.00051	0.00053	0.00053	0.00055
Phosphorus					*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*
Potassium		0.50	0.59		0.42	0.41	0.34	0.34	0.30	0.30	0.34	0.34	0.36	0.35
Selenium	0.001	0.00055	0.00055	0.001	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*
Silicon					0.17	0.17	0.18	0.18	0.15	0.14	0.14	0.15	0.15	0.15
Silver	0.0001				*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*
Sodium		0.975	0.72		0.65	0.65	0.52	0.51	0.44	0.43	0.49	0.51	0.53	0.52
Strontium		0.0279	0.0330	0.049	0.012	0.012	0.0094	0.0091	0.0084	0.0084	0.0093	0.0094	0.0096	0.0096
Sulfur					0.51	0.52	*<0.5*	*<0.5*	0.65	0.61	0.51	0.58	0.64	0.58
Thallium	0.0008	0.00041	0.00041	0.0008	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*
Tin		0.0002	0.0002		*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*
Titanium		1.00	1.00	2	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*
Uranium	0.015	0.0075	0.0075	0.015	0.00003	0.00003	0.00002	0.00002	0.00002	0.00002	0.00002	0.00002	0.00002	0.00002
Vanadium		0.0035	0.0035	0.006	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*
Zinc[3]	0.030	0.0063	0.0106	***equation***	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*
Dissolved Metals (mg/L)														
Aluminum[3]		0.0263	0.0260	0.05	0.0011	0.0022	0.0012	0.0023	0.0016	0.0016	0.0010	0.0011	0.0011	0.0014
Antimony		0.0101	0.0100	0.020	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*
Arsenic		0.0026	0.0026	0.005	0.00016	0.00020	0.00015	0.00014	0.00013	0.00013	0.00013	0.00015	0.00013	0.00013
Barium		0.5010	0.5000	1.0	0.0025	0.0027	0.0022	0.0020	0.0018	0.0020	0.0019	0.0018	0.0020	0.0020
Beryllium		0.0027	0.0027	0.0053	*<0.0001*	*<0.0001*	*<0.00002*	*<0.00002*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*
Bismuth					*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*
Boron		0.76	0.76	1.5	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*
Cadmium		0.000025	0.000025	0.00004	0.00001	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*
Calcium					3.0	2.9	2.3	2.2	2.1	2.0	2.2	2.3	2.4	2.4
Chromium		0.00055	0.00055	0.001	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*
Cobalt					*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*
Copper		0.00119	0.00148	0.002	0.00053	0.00067	0.00040	0.00039	0.00037	0.00038	0.00045	0.00042	0.00036	0.00042
Iron		0.155	0.155	0.3	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	0.014	*<0.01*	*<0.01*	*<0.01*
Lead		0.000525	0.000525	0.001	*<0.00005*	0.00006	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	0.00009	*<0.00005*
Lithium		0.048	0.048	0.096	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*
Magnesium					1.0	1.0	0.81	0.79	0.77	0.81	0.79	0.79	0.84	0.85
Manganese[3]		0.315	0.330	***equation***	0.00023	0.00015	0.0014	0.0015	0.00053	0.00052	0.00031	0.00029	0.00011	0.00011
Mercury		0.000018	0.000018	0.000026	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*
Molybdenum		0.037	0.037	0.073	0.00007	0.00015	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	0.00006
Nickel		0.013	0.013	0.025	*<0.0005*	0.00084	0.00067	0.00061	*<0.0005*	0.00054	*<0.0005*	*<0.0005*	*<0.0005*	0.00058
Phosphorus					*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*
Potassium					0.46	0.45	0.38	0.37	0.33	0.35	0.34	0.34	0.37	0.38
Selenium		0.00055	0.00055	0.001	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*
Silicon					0.14	0.14	0.13	0.14	0.11	0.11	0.12	0.12	0.12	0.11
Silver					*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*
Sodium					0.65	0.65	0.54	0.54	0.46	0.53	0.50	0.50	0.53	0.54
Strontium		0.028	0.033	0.049	0.012	0.012	0.0094	0.0094	0.0085	0.0092	0.0092	0.0092	0.0100	0.010
Sulfur					0.80	0.69	0.94	0.96	0.67	*<0.5*	0.58	0.55	0.65	0.60
Thallium		0.00041	0.00041	0.0008	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*
Tin		0.0002	0.0002		*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*
Titanium		1.01	1.00	2	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*
Uranium		0.0075	0.0075	0.015	0.00002	0.00002	0.00002	0.00002	0.00002	0.00002	0.00002	0.00002	0.00002	0.00002
Vanadium		0.0035	0.0035	0.006	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*
Zinc		0.0053	0.0096	***equation***	0.0013	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	0.0013	*<0.001*	*<0.001*

Notes:

1. CCME (Canadian Council of Ministers of the Environment) Canadian Water Quality Guidelines for the Protection of Aquatic Life, 1999, updated up to 2015.

2. Trigger and threshold values were developed in *CREMP Design Document 2012* (Azimuth, 2012d). A number of thresholds were derived from methods (or sources) other than CCME guidelines. Refer to the *CREMP: 2015 Plan Update* (Azimuth, 2015a) for more details.

3. "***equation***" means that CCME guidelines (or thresholds) are calculated based on an equation which is either pH or hardness dependent. The ammonia and aluminum (t & d) guidelines vary with pH; the cadmium, copper, lead, manganese, nickel and zinc guidelines vary with hardness.

4. Chromium CCME guideline is for Cr VI.

123 Bolded concentrations exceed the trigger value.

123 Bolded and shaded concentrations also exceed the threshold value.

Italicized numbers are below detection limits.

underline = results were given a cautionary flag in the QC assessment (refer to **Section 3.1.2** for details)

~~strikethrough~~ = results flagged as unreliable in the QC assessment

Table B1-2. Water quality results from Third Portage Lake in 2018 compared against predicted concentrations in the FEIS.

Lake and Station		Simulated Maximum Whole Lake Concentration (mg/L) Third Portage Lake[2]				Third Portage Lake East Basin (TPE)									
Area-Replicate ID	CCME (2012)	Upper Mixing Estimate (169 Mm^3)		Mid-range Mixing Estimate (92 Mm^3)		TPE-110	TPE111	TPE-112	TPE-113	TPE-114	TPE-115	TPE-116	TPE-117	TPE-118	TPE-119
Depth (m)	Guideline[1]	Without Dike Leaching	With Dike Leaching	Without Dike Leaching	With Dike Leaching	3	3	3	3	3	3	3	3	3	3
Date						13-May-18	13-May-18	15-Jul-18	15-Jul-18	13-Aug-18	13-Aug-18	3-Sep-18	3-Sep-18	30-Oct-18	30-Oct-18
Physical Tests (mg/L)															
Hardness		5.7	6.0	6.0	6.4	***14***	***14.1***	***9.95***	***10***	***10.7***	***10.7***	***10.5***	***10.5***	***11***	***10.8***
Anions and Nutrients (mg/L)															
Alkalinity - Total		4.13	4.14	4.23	4.24	***10.4***	***10.3***	***8***	***8.1***	***8.1***	***8***	***8.2***	***8.6***	***8.4***	***8.4***
Ammonia (as N)[3]	***equation***	0.0333	0.0333	0.0497	0.0497	0.0228	0.0181	*<0.005*	*<0.005*	0.0241	0.0123	0.0104	0.0139	0.0054	*<0.005*
Chloride	120	0.8	0.8	1.0	1.1	0.98	0.99	0.72	0.72	0.75	0.75	0.77	0.77	0.74	0.75
Fluoride	0.120	0.07	0.08	0.07	0.09	**0.088**	**0.089**	**0.073**	**0.072**	**0.078**	**0.076**	**0.075**	**0.074**	**0.077**	**0.076**
Nitrate (as N)	3.0	0.0351	0.0363	0.0569	0.0588	***0.088***	***0.089***	0.012	0.011	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Ortho Phosphate (as P)		0.0022	0.0022	0.0024	0.0024	***0.349***	***0.108***	*<0.001*	0.0011	0.0011	0.0013	0.0013	*<0.001*	*<0.001*	*<0.001*
Phosphorus (P)-Total	0.0040	0.0027	0.0029	0.0032	0.0035	0.0021	0.0022	0.0027	0.0025	*<0.002*	*<0.002*	*<0.002*	*<0.002*	0.0021	0.0028
Sulphate (SO_4)		1.7	1.7	2.0	2.0	*<0.5*	*<0.5*	***4.61***	***4.61***	***4.77***	***4.74***	***4.77***	***4.77***	***4.65***	***4.68***
Cyanides (mg/L)															
Total Cyanide		0	0	0	0	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*
Total Metals (mg/L)															
Aluminum[3]	***equation***	0.007	0.009	0.007	0.01	0.0054	*<0.0030*	**0.0084**	**0.0098**	**0.0094**	0.0062	0.0058	0.0049	0.0047	0.0038
Antimony		0.00056	0.00057	0.0006	0.00062	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*
Arsenic	0.0050	0.00062	0.00062	0.00072	0.00072	0.0004	0.00037	0.00035	0.00037	0.0004	0.00033	0.00038	0.00037	0.00037	0.00032
Barium		0.02	0.022	0.02	0.023	0.00369	0.00383	0.00337	0.00329	0.00264	0.00258	0.00275	0.00259	0.00273	0.00272
Beryllium		0.001	0.001	0.001	0.001	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*
Bismuth		0.102	0.102	0.104	0.104	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*
Boron	1.5	0.00001	0.00001	0.00001	0.00001	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*
Cadmium[3]	***equation***	<0.000051	<0.000051	<0.000052	<0.000052	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*
Calcium		1.3	1.4	1.5	1.5	***3.49***	***3.42***	***2.71***	***2.53***	***2.46***	***2.39***	***2.64***	***2.58***	***2.75***	***2.73***
Chromium[4]	0.001	0.001	0.001	0.001	0.001	0.00011	*<0.0001*	0.00012	0.00015	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*
Cobalt		0.004	0.0013	0.0004	0.0017	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*
Copper[3]	***equation***	0.0012	0.0012	0.0013	0.0013	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*
Iron	0.3	0.03	0.03	0.03	0.03	*<0.01*	*<0.01*	0.02	0.019	0.014	0.013	0.011	*<0.01*	*<0.01*	*<0.01*
Lead[3]	***equation***	0.0006	0.0006	0.0006	0.0007	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*
Lithium		0.005	0.005	0.005	0.005	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*
Magnesium		0.6	0.6	0.6	0.7	***1.23***	***1.29***	***1.01***	***1.03***	***0.923***	***0.901***	***1.02***	***0.985***	***1.08***	***1.06***
Manganese[3]		0.009	0.052	0.015	0.072	0.0005	0.00047	0.00399	0.00409	0.00172	0.00157	0.00114	0.00108	0.00072	0.00067
Mercury	0.000026	0.00005	0.00005	0.00005	0.00005	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*
Molybdenum	0.073	0.001	0.001	0.001	0.001	0.000204	0.00016	0.000135	0.000141	0.000142	0.00014	0.000145	0.000131	0.000153	0.000149
Nickel[3]	***equation***	0.0016	0.0016	0.002	0.0021	*<0.0005*	*<0.0005*	0.0007	0.00075	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*
Potassium		2	2.1	2	2.1	0.649	0.665	0.515	0.496	0.465	0.447	0.513	0.503	0.552	0.547
Selenium	0.001	0.001	0.001	0.001	0.001	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*
Silicon		0.01	0.08	0.02	0.12	**0.11**	**0.11**	***0.15***	***0.14***	**0.1**	*<0.1*	**0.1**	*<0.1*	*<0.1*	*<0.1*
Silver	0.0001	0.00002	0.00002	0.00002	0.00002	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*
Sodium		2	2	2	2.1	1.42	1.44	1.06	1.05	0.941	0.946	1.08	1.01	1.2	1.19
Strontium		0.002	0.005	0.004	0.007	***0.0152***	***0.0146***	***0.0117***	***0.0111***	***0.0105***	***0.0103***	***0.0113***	***0.011***	***0.0128***	***0.0127***
Thallium	0.0008	0.0002	0.0002	0.0002	0.0002	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*
Uranium	0.015	0.0002	0.0002	0.0002	0.0003	0.000038	0.000033	0.000043	0.000041	0.000042	0.00004	0.000043	0.000041	0.00004	0.000038
Vanadium		0.03	0.03	0.03	0.03	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*
Zinc[3]	0.030	0.011	0.011	0.015	0.015	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*

Notes:

1 . CCME (Canadian Council of Ministers of the Environment) Canadian Water Quality Guidelines for the Protection of Aquatic Life, 1999, updated up to 2016.

2. Whole lake data are given for a range of mixing conditions, representing mid-range and upper mixing estimate for the north basin discharge location. The model includes treated water releases from the project (Years 1 to 4), and long-term substance loading due to leaching from the Bay-Goose dike (Cumberland, 2005).

3. "***equation***" means that CCME guidelines (or thresholds) are calculated based on an equation which is either pH or hardness dependent. The ammonia and aluminum (t & d) guidelines vary with pH; the cadmium, copper, lead, manganese, nickel and zinc guidelines vary with hardness.

4. Chromium CCME guideline is for Cr VI.

Formatting for indicating the parameters that exceed the model predictions in the FEIS:

Mid-range Mixing Estimate (92 Mm^3):

- ***Bold italicized*** = concentrations exceed the prediction "With Dike Leaching."
- **Bold** = concentrations exceed the prediction "Without Dike Leaching."

Upper-range Mixing Estimate (169 Mm^3):

- Bordered cells = concentrations exceed the prediction "With Dike Leaching."
- Shaded cells = concentrations exceed the prediction "Without Dike Leaching."

Italicized numbers are below detection limits.

Table B1-2. Water quality results from Third Portage Lake in 2018 compared against predicted concentrations in the FEIS.

Lake and Station		Simulated Maximum Whole Lake Concentration (mg/L) Third Portage Lake[2]				Third Portage Lake East Basin (TPE)										Third Portage Lake South Basin (TPS)	
		Upper Mixing		Mid-range Mixing													
Area-Replicate ID	CCME (2012)	Estimate (169 Mm^3)		Estimate (92 Mm^3)		TPN-110	TPN-111	TPN-112	TPN-113	TPN-114	TPN-115	TPN-116	TPN-117	TPN-118	TPN-119	TPS-59	TPS-60
Depth (m)	Guideline[1]	Without Dike Leaching	With Dike Leaching	Without Dike Leaching	With Dike Leaching	3	3	3	3	3	3	3	3	3	3	3	3
Date						18-May-18	18-May-18	15-Jul-18	15-Jul-18	13-Aug-18	13-Aug-18	3-Sep-18	3-Sep-18	3-Nov-18	3-Nov-18	13-May-18	13-May-18
Physical Tests (mg/L)																	
Hardness		5.7	6.0	6.0	6.4	***11.4***	***11.9***	***8.47***	***8.74***	***9***	***7.85***	***8.8***	***8.89***	***9.45***	***9.31***	***13.4***	***9.49***
Anions and Nutrients (mg/L)																n 0	n 0
Alkalinity - Total		4.13	4.14	4.23	4.24	***8.2***	***8.3***	***6.4***	***6.3***	***6.7***	***6.6***	***6.6***	***6.8***	***6.6***	***6.7***	***8.5***	***6.6***
Ammonia (as N)[3]	***equation***	0.0333	0.0333	0.0497	0.0497	0.0146	0.0186	*<0.005*	*<0.005*	0.0151	0.0113	0.0115	0.0104	0.0259	0.0116	0.0215	0.0164
Chloride	120	0.8	0.8	1.0	1.1	**1.01**	1	0.74	0.75	0.76	0.76	0.78	0.78	0.75	0.75	**1.02**	0.79
Fluoride	0.120	0.07	0.08	0.07	0.09	0.0348	0.0363	0.063	0.064	0.068	0.068	0.066	0.065	0.068	0.067	**0.084**	0.067
Nitrate (as N)	3.0	0.0351	0.0363	0.0569	0.0588	*<0.001*	*<0.001*	0.036	0.028	0.019	0.020	0.0137	0.0138	0.0115	0.0115	0.034	0.0261
Ortho Phosphate (as P)		0.0022	0.0022	0.0024	0.0024	*<0.002*	0.002	*<0.001*	0.0011	0.0011	*<0.001*	*<0.001*	0.0013	*<0.001*	*<0.001*	*<0.001*	0.0013
Phosphorus (P)-Total	0.0040	0.0027	0.0029	0.0032	0.0035	*<0.5*	*<0.5*	0.0027	0.0022	*<0.002*	*<0.002*	*<0.002*	***0.0046***	*<0.002*	***0.0078***	0.0032	0.002
Sulphate (SO_4)		1.7	1.7	2.0	2.0	***6.22***	***6.18***	***4.58***	***4.66***	***4.68***	***4.68***	***4.7***	***4.67***	***4.5***	***4.51***	***6.37***	***5***
Cyanides (mg/L)																n 0	n 0
Total Cyanide		0	0	0	0	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*
Total Metals (mg/L)																n 0	n 0
Aluminum[3]	***equation***	0.007	0.009	0.007	0.01	*<0.0030*	*<0.0030*	0.0056	***0.0338***	0.0045	0.0049	0.0044	0.004	0.0033	0.0033	*<0.0030*	*<0.0030*
Antimony		0.00056	0.00057	0.0006	0.00062	*<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	0.0050	0.00062	0.00062	0.00072	0.00072	0.0002	0.00022	0.00018	0.00018	0.00015	0.00015	0.00017	0.00016	0.0002	0.00017	0.00019	0.00014
Barium		0.02	0.022	0.02	0.023	0.00366	0.00376	0.00307	0.00321	0.00268	0.00267	0.00272	0.00269	0.00276	0.0028	0.00385	0.00296
Beryllium		0.001	0.001	0.001	0.001	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*
Bismuth		0.102	0.102	0.104	0.104	*<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	1.5	0.00001	0.00001	0.00001	0.00001	*<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[3]	***equation***	<0.000051	<0.000051	<0.000052	<0.000052	*<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		1.3	1.4	1.5	1.5	***2.82***	***2.78***	***2.17***	***2.27***	***2.05***	***2.02***	***2.11***	***2.16***	***2.31***	***2.27***	***2.83***	***2.4***
Chromium[4]	0.001	0.001	0.001	0.001	0.001	0.0002	*<0.0001*	0.0001	0.00011	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*
Cobalt		0.004	0.0013	0.0004	0.0017	*<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[3]	***equation***	0.0012	0.0012	0.0013	0.0013	*<0.0005*	*<0.0005*	0.00053	0.00061	*<0.0005*	*<0.0005*	0.0005	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*
Iron	0.3	0.03	0.03	0.03	0.03	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	0.013	*<0.01*	***0.035***	*<0.01*	*<0.01*	*<0.01*
Lead[3]	***equation***	0.0006	0.0006	0.0006	0.0007	*<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		0.005	0.005	0.005	0.005	*<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		0.6	0.6	0.6	0.7	***1.11***	***1.09***	***0.901***	***0.887***	***0.799***	***0.803***	***0.856***	***0.869***	***0.938***	***0.942***	***1.11***	***0.932***
Manganese[3]		0.009	0.052	0.015	0.072	0.00035	0.00031	0.00295	0.00219	0.00172	0.00171	0.00168	0.00147	0.00121	0.00101	0.00034	0.00032
Mercury	0.000026	0.00005	0.00005	0.00005	0.00005	*<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	0.073	0.001	0.001	0.001	0.001	0.000183	0.00018	0.000135	0.000158	0.000135	0.00012	0.000156	0.000129	0.000145	0.000139	0.000173	0.000143
Nickel[3]	***equation***	0.0016	0.0016	0.002	0.0021	*<0.0005*	*<0.0005*	0.00059	0.00069	*<0.0005*	*<0.0005*	0.00063	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*
Potassium		2	2.1	2	2.1	0.61	0.598	0.474	0.474	0.425	0.43	0.459	0.471	0.521	0.523	0.637	0.513
Selenium	0.001	0.001	0.001	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*
Silicon		0.01	0.08	0.02	0.12	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*
Silver	0.0001	0.00002	0.00002	0.00002	0.00002	*<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		2	2	2	2.1	1.4	1.39	1.08	1.06	0.964	0.962	1.03	1.07	1.18	1.17	1.43	1.21
Strontium		0.002	0.005	0.004	0.007	***0.0136***	***0.0133***	***0.00985***	***0.0101***	***0.00933***	***0.00934***	***0.0101***	***0.0101***	***0.0113***	***0.0112***	***0.0139***	***0.0108***
Thallium	0.0008	0.0002	0.0002	0.0002	0.0002	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*
Uranium	0.015	0.0002	0.0002	0.0002	0.0003	0.000039	0.00004	0.000035	0.000026	0.000029	0.000033	0.000033	0.000033	0.000033	0.000033	0.000033	0.000026
Vanadium		0.03	0.03	0.03	0.03	*<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[3]	0.030	0.011	0.011	0.015	0.015	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*

Notes:

1 . CCME (Canadian Council of Ministers of the Environment) Canadian Water Quality Guidelines for the Protection of Aquatic Life, 1999, updated up to 2016.

2. Whole lake data are given for a range of mixing conditions, representing mid-range and upper mixing estimate for the north basin discharge location. The model includes treated water releases from the project (Years 1 to 4), and long-term substance loading due to leaching from the Bay-Goose dike (Cumberland, 2005).

3. "***equation***" means that CCME guidelines (or thresholds) are calculated based on an equation which is either pH or hardness dependent. The ammonia and aluminum (t & d) guidelines vary with pH; the cadmium, copper, lead, manganese, nickel and zinc guidelines vary with hardness.

4. Chromium CCME guideline is for Cr VI.

Formatting for indicating the parameters that exceed the model predictions in the FEIS:

Mid-range Mixing Estimate (92 Mm^3):

- ***Bold italicized*** = concentrations exceed the prediction "With Dike Leaching."
- **Bold** = concentrations exceed the prediction "Without Dike Leaching."

Upper-range Mixing Estimate (169 Mm^3):

- Bordered cells = concentrations exceed the prediction "With Dike Leaching."
- Shaded cells = concentrations exceed the prediction "Without Dike Leaching."

Italicized numbers are below detection limits.

Table B1-3. Water quality results from Second Portage Lake in 2018 compared against predicted concentrations in the FEIS.

Lake and Station		Simulated Maximum Whole Lake Concentration (mg/L) Second Portage Lake[2]				Second Portage Lake (SP)									
		Upper Mixing		Mid-range Mixing											
Area-Replicate ID	CCME (2012)	Estimate (169 Mm^3)		Estimate (92 Mm^3)		SP-110	SP-111	SP-112	SP-113	SP-114	SP-115	SP-116	SP-117	SP-118	SP-119
Depth (m)	Guideline[1]	Without Dike Leaching	With Dike Leaching	Without Dike Leaching	With Dike Leaching	3	3	3	3	3	3	3	3	3	3
Date						13-May-18	13-May-18	9-Jul-18	9-Jul-18	13-Aug-18	13-Aug-18	2-Sep-18	2-Sep-18	3-Nov-18	3-Nov-18
Physical Tests (mg/L)															
Hardness		8.9	8.9	8.9	8.9	***19.6***	***20.4***	***16***	***15.8***	***17.1***	***16.4***	***16***	***15.8***	***15.9***	***16.8***
Anions and Nutrients (mg/L)															
Alkalinity - Total		7.0	7.0	7.0	7.0	***15.1***	***14.7***	***11.8***	***11.7***	***12.1***	***12.3***	***11.8***	***11.6***	***11.1***	***12.4***
Ammonia (as N)[3]	***equation***	0.025	0.025	0.031	0.031	0.0199	0.017	*<0.005*	*<0.005*	0.0164	0.0156	0.0202	0.0166	*<0.005*	*<0.005*
Chloride	120	0.7	0.7	0.8	0.8	***1.15***	***1.13***	***0.95***	***0.96***	***0.95***	***0.95***	***0.97***	***0.97***	***0.91***	***0.92***
Fluoride	0.120	0.07	0.071	0.07	0.071	***0.084***	***0.083***	**0.071**	**0.071**	**0.071**	**0.071**	***0.072***	***0.073***	***0.072***	***0.072***
Nitrate (as N)	3.0	0.017	0.017	0.025	0.025	0.0131	0.011	0.0098	0.0092	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Ortho Phosphate (as P)		0.003	0.003	0.003	0.003	0.0014	0.0016	0.0013	0.0013	0.0014	0.0012	0.0012	0.0013	*<0.001*	*<0.001*
Phosphorus (P)-Total	0.0040	0.003	0.003	0.0031	0.0031	0.0026	0.0031	***0.0036***	0.0026	*<0.002*	0.0021	*<0.002*	*<0.002*	0.003	0.0022
Sulphate (SO_4)		2.8	2.8	2.8	2.8	***6.8***	***6.59***	***5.48***	***5.5***	***5.58***	***5.58***	***5.7***	***5.71***	***5.43***	***5.48***
Cyanides (mg/L)															
Total Cyanide		0	0	0	0	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*
Total Metals (mg/L)															
Aluminum[3]	***equation***	0.007	0.007	0.007	0.007	***0.0117***	*<0.0030*	***0.0126***	***0.0147***	0.0056	0.0063	0.0052	0.0051	0.0034	0.0033
Antimony		0.0005	0.0005	0.0005	0.0005	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*
Arsenic	0.0050	0.0005	0.0005	0.0006	0.0006	0.00028	0.00026	0.00027	0.00029	0.00023	0.00023	0.00026	0.00025	0.00025	0.00024
Barium		0.02	0.02	0.02	0.02	0.00393	0.00358	0.00299	0.00324	0.0026	0.00261	0.00252	0.00246	0.00262	0.00266
Beryllium		0.001	0.001	0.001	0.001	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*
Bismuth		0.1	0.1	0.1	0.1	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*
Boron	1.5	0.00001	0.00001	0.00001	0.00001	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*
Cadmium[3]	***equation***	<0.000050	<0.000050	<0.000051	<0.000051	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*
Calcium		2.3	2.3	2.3	2.3	***5.57***	***5.09***	***4.28***	***4.31***	***3.92***	***3.97***	***4.26***	***4.16***	***4.28***	***4.47***
Chromium[4]	0.001	0.001	0.001	0.001	0.001	*<0.0001*	*<0.0001*	0.00014	0.00015	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	0.00011	*<0.0001*
Cobalt		0.0003	0.0004	0.0003	0.0004	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*
Copper[3]	***equation***	0.0011	0.0011	0.0011	0.0011	0.00067	0.00066	0.00067	0.00082	0.00063	0.0006	0.00059	0.00058	0.00075	0.00058
Iron	0.3	0.03	0.03	0.03	0.03	*<0.01*	*<0.01*	0.028	0.029	0.017	0.018	0.015	0.015	*<0.01*	*<0.01*
Lead[3]	***equation***	0.0009	0.0009	0.0009	0.0009	*<0.00005*	*<0.00005*	0.000063	0.000167	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*
Lithium		0.005	0.005	0.005	0.005	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*
Magnesium		0.8	0.8	0.8	0.8	***1.61***	***1.61***	***1.35***	***1.33***	***1.27***	***1.28***	***1.33***	***1.31***	***1.41***	***1.44***
Manganese[3]		0.0044	0.0067	0.0066	0.0089	0.00054	0.00066	0.0045	0.00442	0.00191	0.00191	0.00139	0.00127	0.00088	0.00088
Mercury	0.000026	0.00005	0.00005	0.00005	0.00005	*<0.000005*	*<0.00025*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*
Molybdenum	0.073	0.001	0.001	0.001	0.001	0.000221	0.000208	0.000173	0.000183	0.000197	0.000196	0.000199	0.00019	0.000198	0.000215
Nickel[3]	***equation***	0.001	0.001	0.001	0.001	*<0.0005*	*<0.0005*	0.00053	0.00056	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*
Potassium		2	2	2	2	0.701	0.704	0.528	0.546	0.494	0.492	0.538	0.533	0.579	0.593
Selenium	0.001	0.001	0.001	0.001	0.001	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*
Silicon		0.01	0.01	0.01	0.01	***0.24***	***0.23***	***0.27***	***0.27***	***0.19***	***0.18***	***0.19***	***0.19***	***0.17***	***0.17***
Silver	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		2	2	2	2	1.22	1.23	0.852	0.999	0.781	0.796	0.901	0.838	0.963	0.969
Strontium		0.8	0.8	0.8	0.8	0.0235	0.0233	0.0202	0.0201	0.0186	0.0189	0.0208	0.0215	0.0213	0.0226
Thallium	0.0008	0.0002	0.0002	0.0002	0.0002	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*
Uranium	0.015	0.0002	0.0002	0.0002	0.0002	0.000038	0.000037	0.000052	0.00005	0.000045	0.000046	0.000045	0.000046	0.000042	0.000044
Vanadium		0.03	0.03	0.03	0.03	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*
Zinc[3]	0.030	0.007	0.007	0.009	0.009	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	0.0079	*<0.0030*

Notes:

1. CCME (Canadian Council of Ministers of the Environment) Canadian Water Quality Guidelines for the Protection of Aquatic Life, 1999, updated up to 2016.

2. The Second Portage Lake water quality model includes substance loading from the Third Portage and East dikes and inflow from Third Portage and Wally lakes. Changes in water quality in Second Portage Lake were modelled for two different mixing scenarios of water releases into Third Portage Lake (Cumberland, 2005).

3. "***equation***" means that CCME guidelines (or thresholds) are calculated based on an equation which is either pH or hardness dependent. The ammonia and aluminum (t & d) guidelines vary with pH; the cadmium, copper, lead, manganese, nickel and zinc guidelines vary with hardness.

4. Chromium CCME guideline is for Cr VI.

Formatting for indicating the parameters that exceed the model predictions in the FEIS:

Mid-range Mixing Estimate (92 Mm^3):

- ***Bold italicized*** = concentrations exceed the prediction "With Dike Leaching."
- **Bold** = concentrations exceed the prediction "Without Dike Leaching."

Upper-range Mixing Estimate (169 Mm^3):

- Bordered cells = concentrations exceed the prediction "With Dike Leaching."
- Shaded cells = concentrations exceed the prediction "Without Dike Leaching."

Italicized numbers are below detection limits.

Table B1-4. Water quality results from Wally Lake in 2018 compared against predicted concentrations in the FEIS.

Lake and Station		Simulated Maximum Whole Lake Concentration (mg/L)		Wally Lake (WAL)									
Area-Replicate ID	CCME (2012)	Wally Lake[2]		WAL-79	WAL-80	WAL-81	WAL-82	WAL-83	WAL-84	WAL-85	WAL-86	WAL-87	WAL-88
Depth (m)	Guideline[1]	Without Dike	With Dike	3	3	3	3	3	3	3	3	3	3
Date		Leaching	Leaching	9-May-18	9-May-18	9-Jul-18	9-Jul-18	13-Aug-18	13-Aug-18	2-Sep-18	2-Sep-18	31-Oct-18	31-Oct-18
Physical Tests (mg/L)													
Hardness		17.2	17.2	***32***	***29.8***	***17.6***	15.5	***18***	***17.3***	17.1	17	***18.6***	***18.2***
Anions and Nutrients (mg/L)													
Alkalinity - Total		13.24	13.34	***25.3***	***23.8***	***13.8***	12	***14.2***	***14.2***	***14.2***	***14***	***14.2***	***14.3***
Ammonia (as N)[3]	***equation***	0.089	0.089	0.0426	0.0318	*<0.005*	*<0.005*	0.0301	0.0279	0.0185	0.0144	*<0.005*	0.023
Chloride	120	0.7	0.7	***1.46***	***1.35***	***0.71***	***0.76***	***0.79***	***0.8***	***0.84***	***0.82***	***0.8***	***0.8***
Fluoride	0.120	0.05	0.05	***0.068***	***0.064***	0.04	0.048	***0.051***	0.05	0.049	0.05	***0.052***	***0.052***
Nitrate (as N)	3.0	0.102	0.102	0.101	0.0854	0.0065	0.008	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*
Ortho Phosphate (as P)		0.003	0.003	*<0.001*	0.0011	0.0014	0.0015	0.0011	0.0011	0.0012	0.0013	*<0.001*	*<0.001*
Phosphorus (P)-Total	0.0040	0.0039	0.004	0.0021	0.0027	**0.004**	***0.0052***	*<0.002*	*<0.002*	*<0.002*	0.0027	0.003	0.0028
Sulphate (SO_4)		5.3	5.3	***8.98***	***8.25***	4.64	4.25	4.64	4.64	4.7	4.72	4.8	4.75
Cyanides (mg/L)													
Total Cyanide		0	0	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*
Total Metals (mg/L)													
Aluminum[3]	***equation***	0.012	0.013	*<0.0030*	*<0.0030*	0.0079	0.0073	0.0039	0.0053	0.0051	*<0.0030*	0.0036	*<0.0030*
Antimony		0.0009	0.0009	0.0001	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*
Arsenic	0.0050	0.005	0.006	0.00036	0.00032	0.00034	0.00026	0.00031	0.00031	0.00033	0.00027	0.00028	0.00027
Barium		0.02	0.02	0.00518	0.00479	0.00259	0.00255	0.00216	0.00216	0.0022	0.00197	0.00211	0.00209
Beryllium		0.001	0.001	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*
Bismuth		0.1	0.1	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*
Boron	1.5	0.00001	0.00001	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*
Cadmium[3]	***equation***	0.00018	0.00019	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*
Calcium		4.7	4.7	***7.63***	***7.13***	***5.01***	4.19	4.4	4.39	***4.72***	4.55	***5.12***	***4.89***
Chromium[4]	0.001	0.001	0.001	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*
Cobalt		0.0003	0.0003	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*
Copper[3]	***equation***	0.002	0.002	***0.00548***	0.0012	0.00089	0.00072	0.00087	0.00089	0.00087	0.00084	0.00083	0.00081
Iron	0.3	0.03	0.03	*<0.01*	*<0.01*	0.02	0.026	0.014	0.016	0.013	*<0.01*	*<0.01*	*<0.01*
Lead[3]	***equation***	0.0007	0.0007	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*
Lithium		0.005	0.005	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*
Magnesium		1.3	1.3	***2.5***	***2.34***	***1.42***	1.25	***1.32***	***1.33***	***1.39***	***1.33***	***1.5***	***1.48***
Manganese[3]		0.002	0.002	0.00166	0.00141	***0.00274***	***0.0047***	***0.00201***	0.002	0.00185	0.00035	0.00157	0.00184
Mercury	0.000026	0.0001	0.0001	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*
Molybdenum	0.073	0.002	0.002	0.0006	0.00049	0.000196	0.00018	0.000232	0.000257	0.000261	0.000258	0.000244	0.000237
Nickel[3]	***equation***	0.001	0.001	0.00067	0.00058	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*
Potassium		2	2	0.956	0.877	0.447	0.478	0.466	0.459	0.502	0.48	0.545	0.535
Selenium	0.001	0.001	0.001	*<0.00005*	0.000054	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*
Silicon		0.04	0.04	***0.47***	***0.48***	***0.37***	***0.31***	***0.26***	***0.26***	***0.29***	***0.28***	***0.31***	***0.29***
Silver	0.0001	0.00002	0.00002	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*
Sodium		2	2	1.24	1.13	0.58	0.609	0.595	0.598	0.634	0.593	0.699	0.695
Thallium	0.0008	0.0002	0.0002	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*
Uranium	0.015	0.0007	0.0007	0.000091	0.000076	0.000056	0.000046	0.00005	0.000053	0.000057	0.000054	0.000049	0.000048
Vanadium		0.03	0.03	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*
Zinc[3]	0.030	0.013	0.013	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*

Notes:

1. CCME (Canadian Council of Ministers of the Environment) Canadian Water Quality Guidelines for the Protection of Aquatic Life, 1999, updated up to 2016.
2. Preliminary modelling of whole lake water quality in the receiving environment water bodies incorporates long-term loadings from the Vault dike and effluent releases from the Vault Attenuation pond (Cumberland, 2005).
3. "***equation***" means that CCME guidelines (or thresholds) are calculated based on an equation which is either pH or hardness dependent. Ammonia and aluminum (t & d) guidelines vary with pH; cadmium, copper, lead, manganese, nickel and zinc guidelines vary with hardness.
4. Chromium CCME guideline is for Cr VI.

Formatting for indicating the parameters that exceed the model predictions in the FEIS:

- ***Bold italicized*** = concentrations exceed the prediction "With Dike Leaching."
- **Bold** = concentrations exceed the prediction "Without Dike Leaching."

Italicized numbers are below detection limits.

Figure B1-1. Carbonate alkalinity (mg/L) in water from Meadowbank study area lakes since 2006.

Note: The red dashed line is the trigger value (separate trigger for WAL).

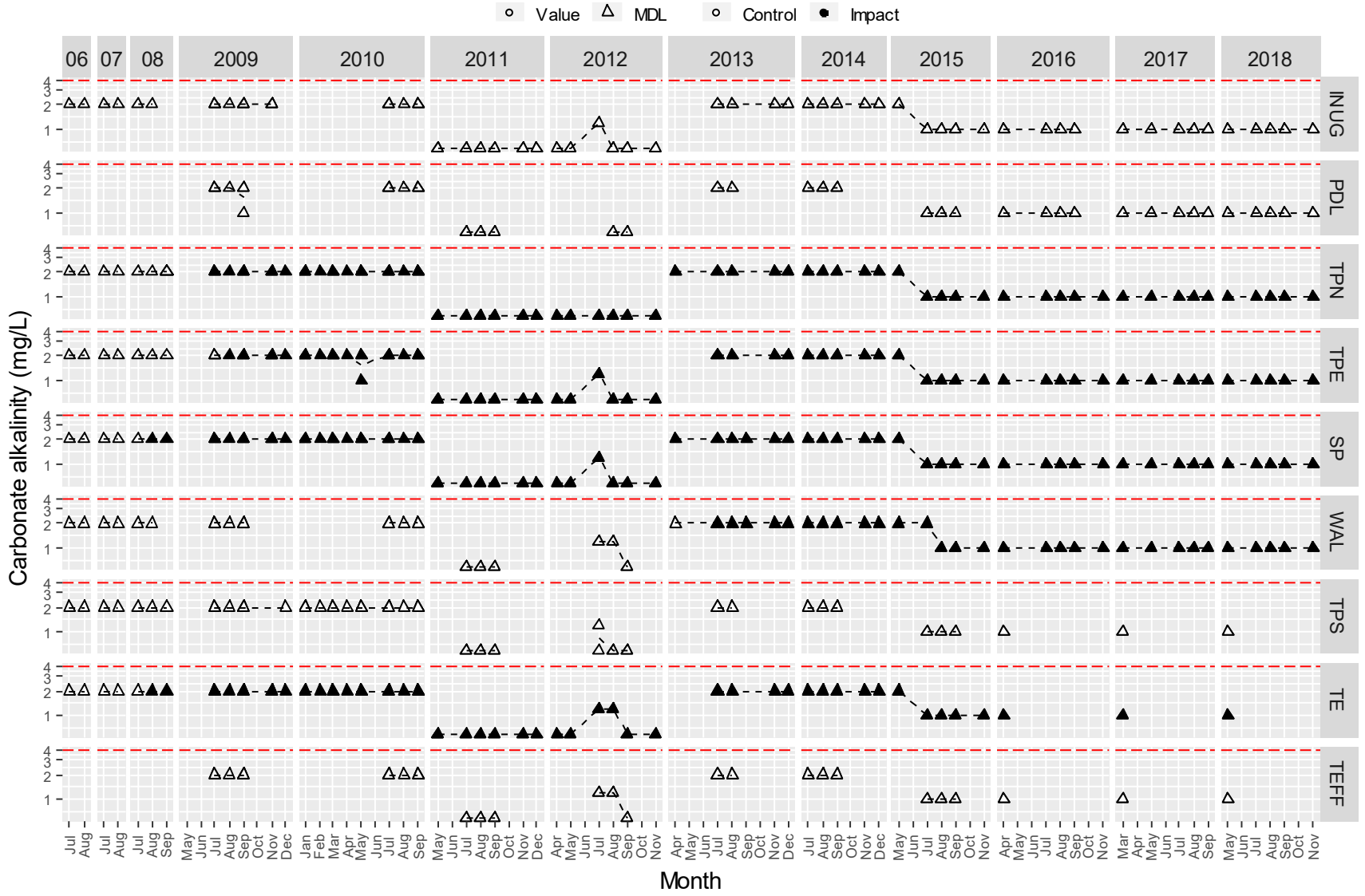


Figure B1-2. Nitrite-N (mg/L) in water from Meadowbank study area lakes since 2006.

Note: The red dashed line is the trigger value (separate trigger for WAL).

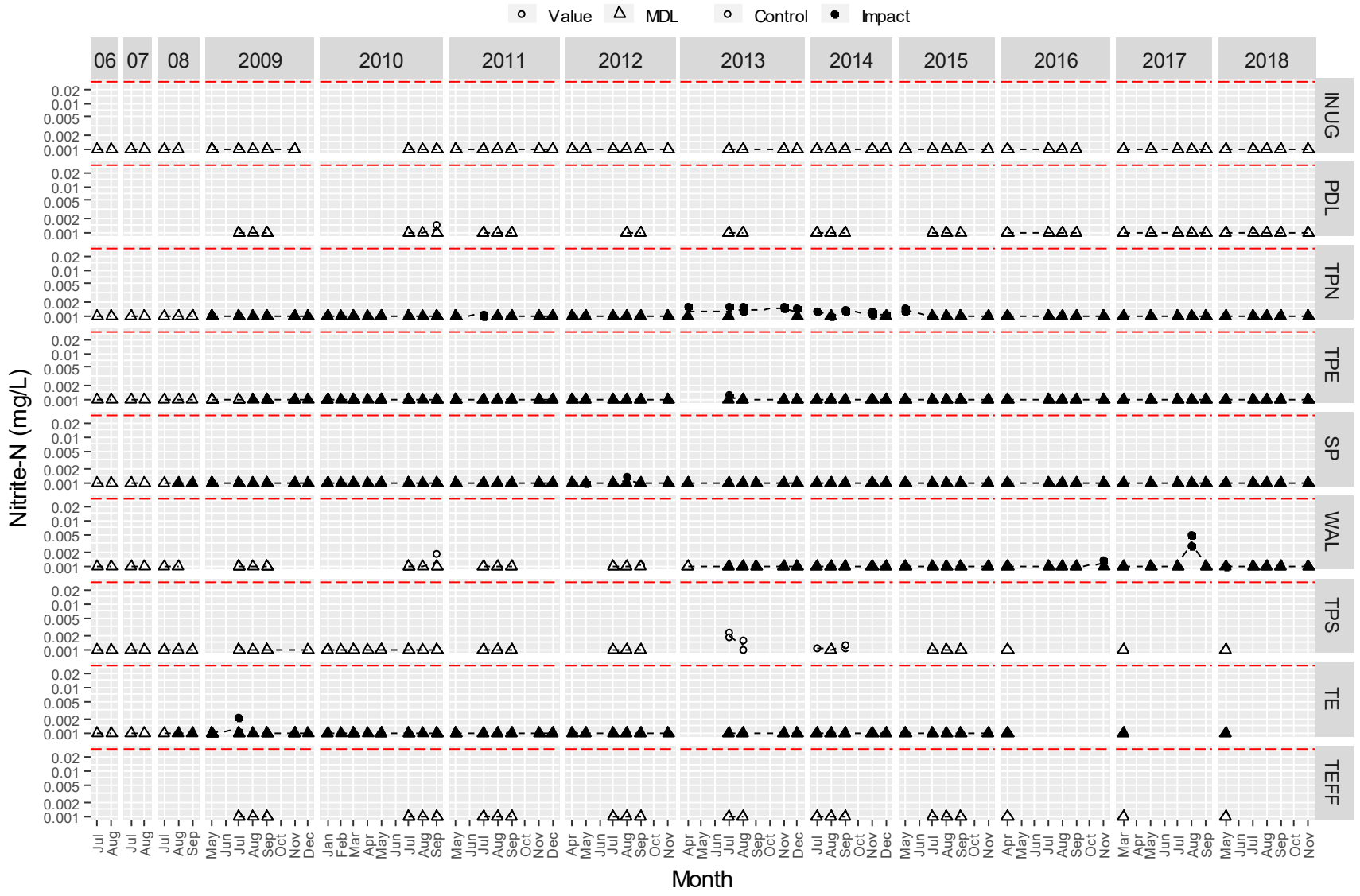


Figure B1-3. Orthophosphate (mg/L) in water from Meadowbank study area lakes since 2006.

Note: The red dashed line is the trigger value (separate trigger for WAL).

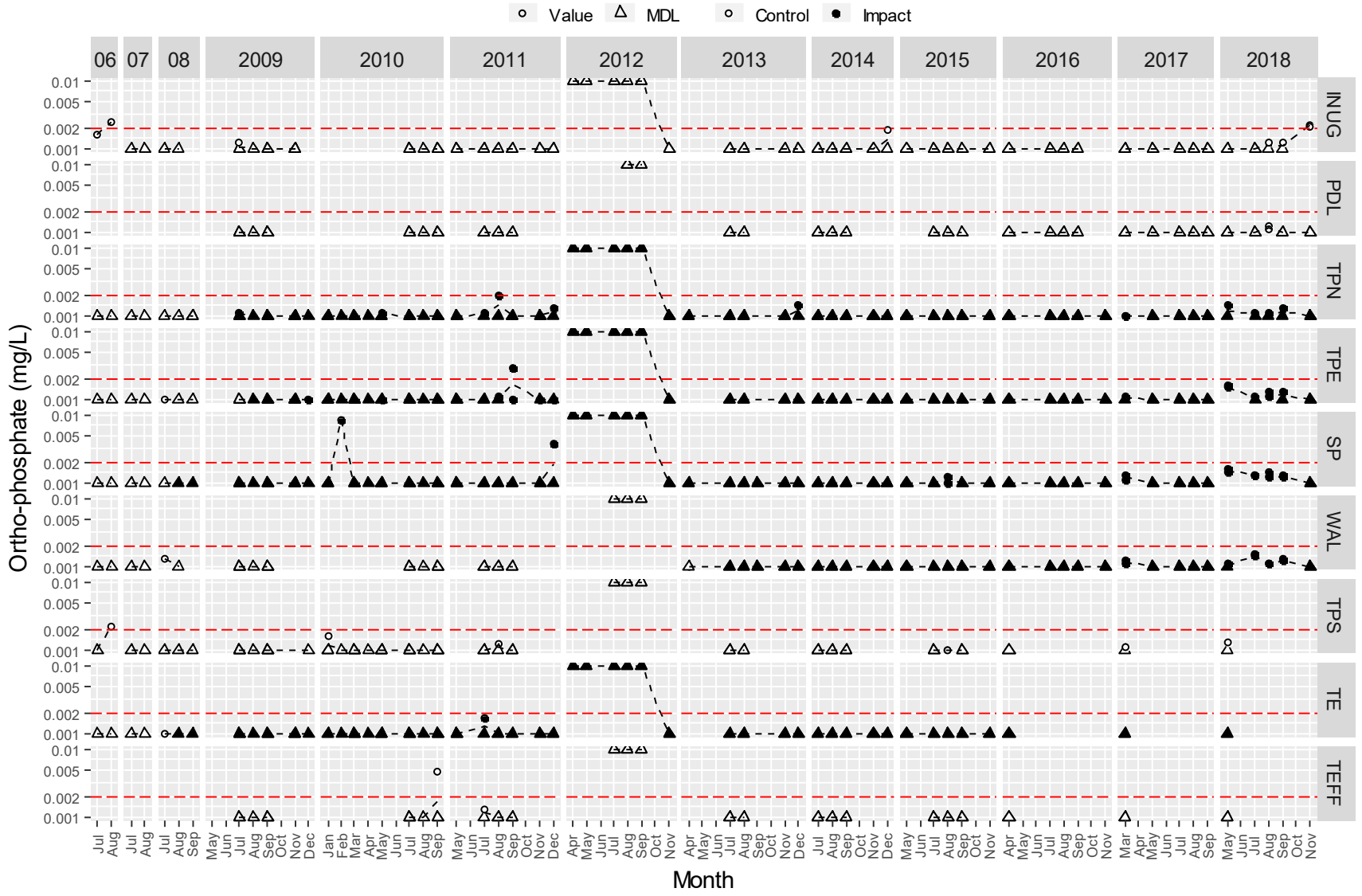


Figure B1-4. Total cyanide (mg/L) in water from Meadowbank study area lakes since 2014.

Note: No trigger for total cyanide. Detection limit lowered from 0.005 mg/L in 2014 to 0.001 mg/L in 2015.

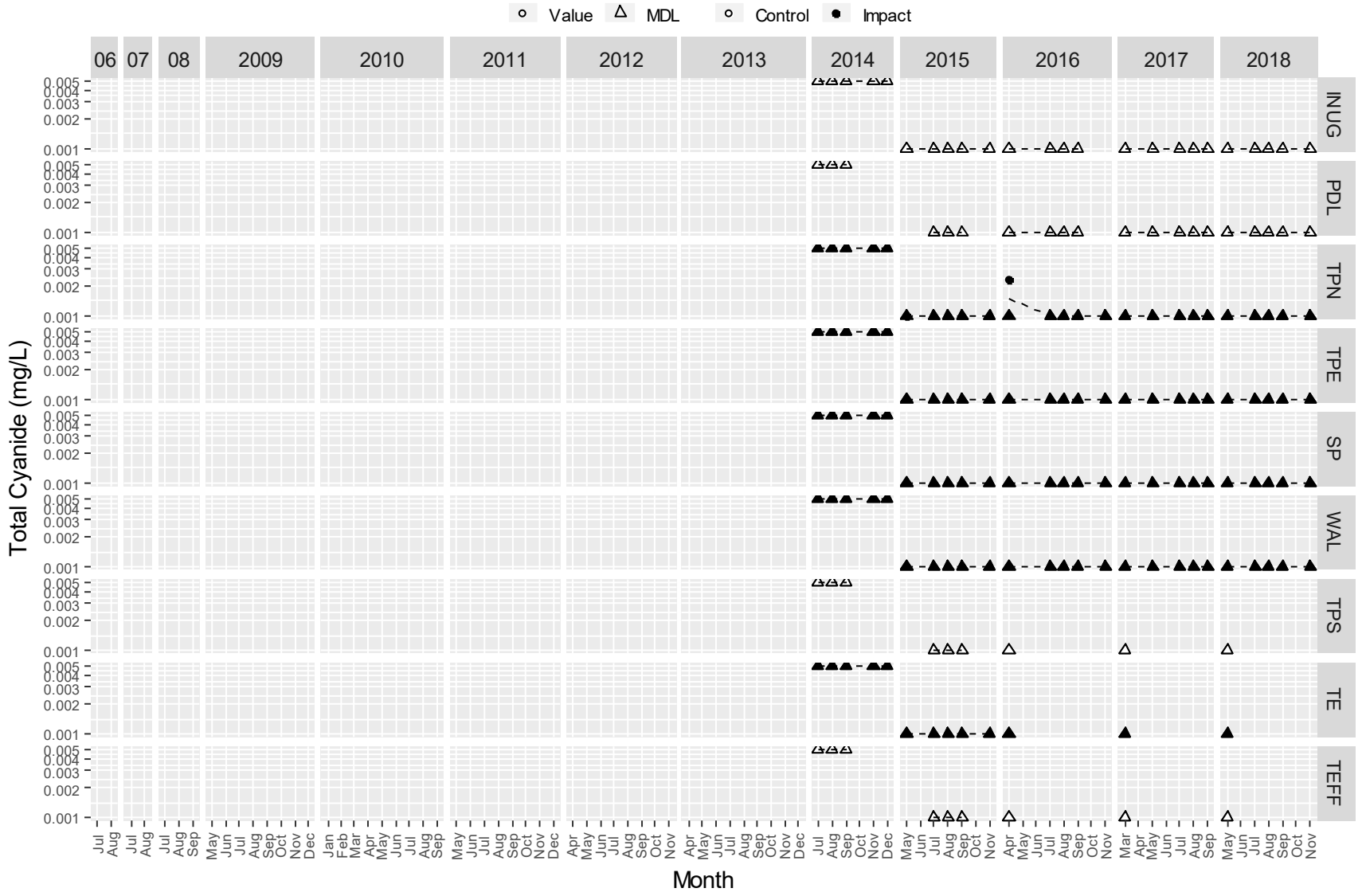


Figure B1-5. Free cyanide (mg/L) in water from Meadowbank study area lakes since 2014.

Note: No trigger for free cyanide. Detection limit lowered from 0.005 mg/L in 2014 to 0.001 mg/L in 2015.

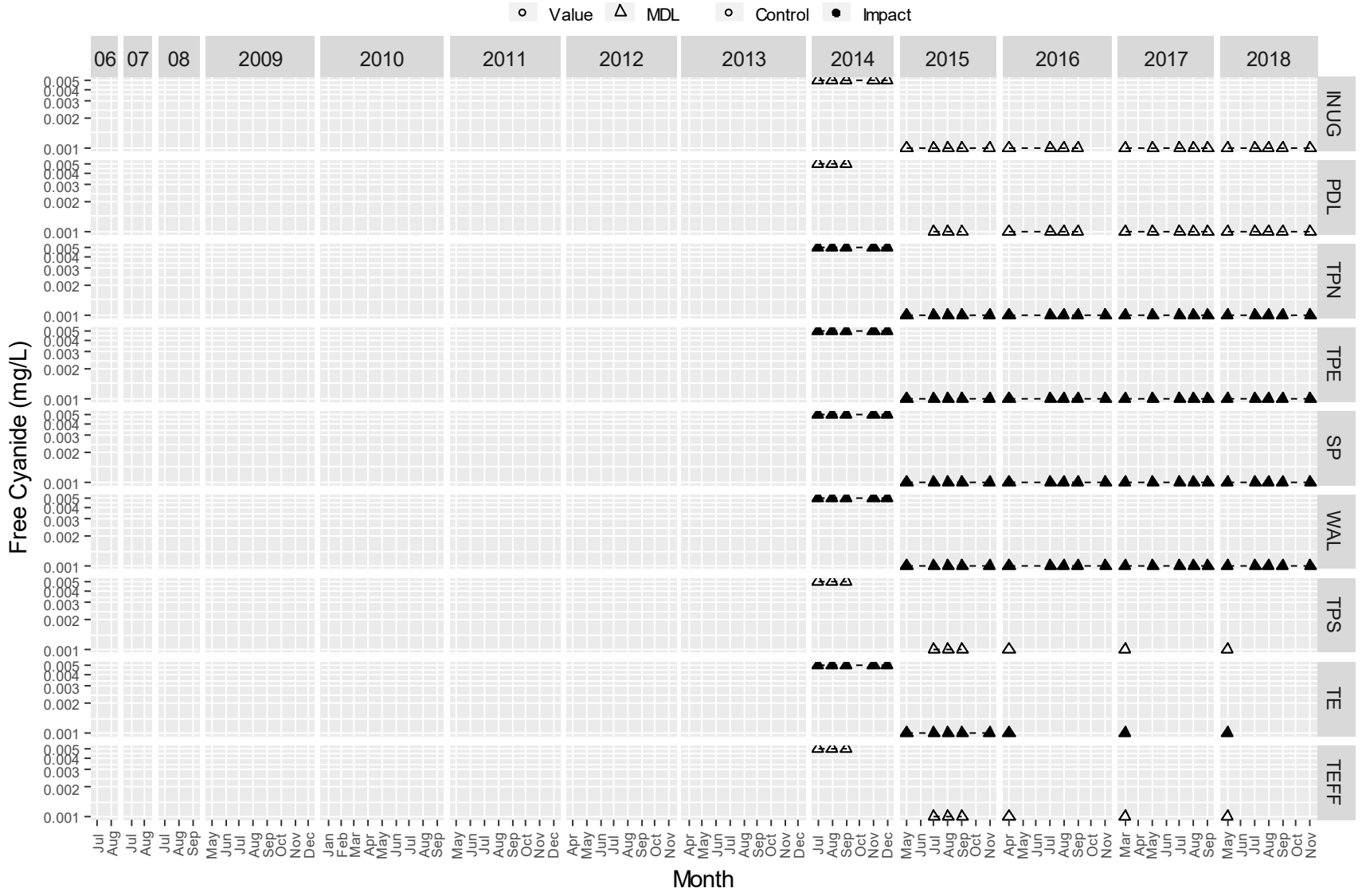


Figure B1-6. Total antimony (mg/L) in water from Meadowbank study area lakes since 2006.

Note: The red dashed line is the trigger value (separate trigger for WAL).

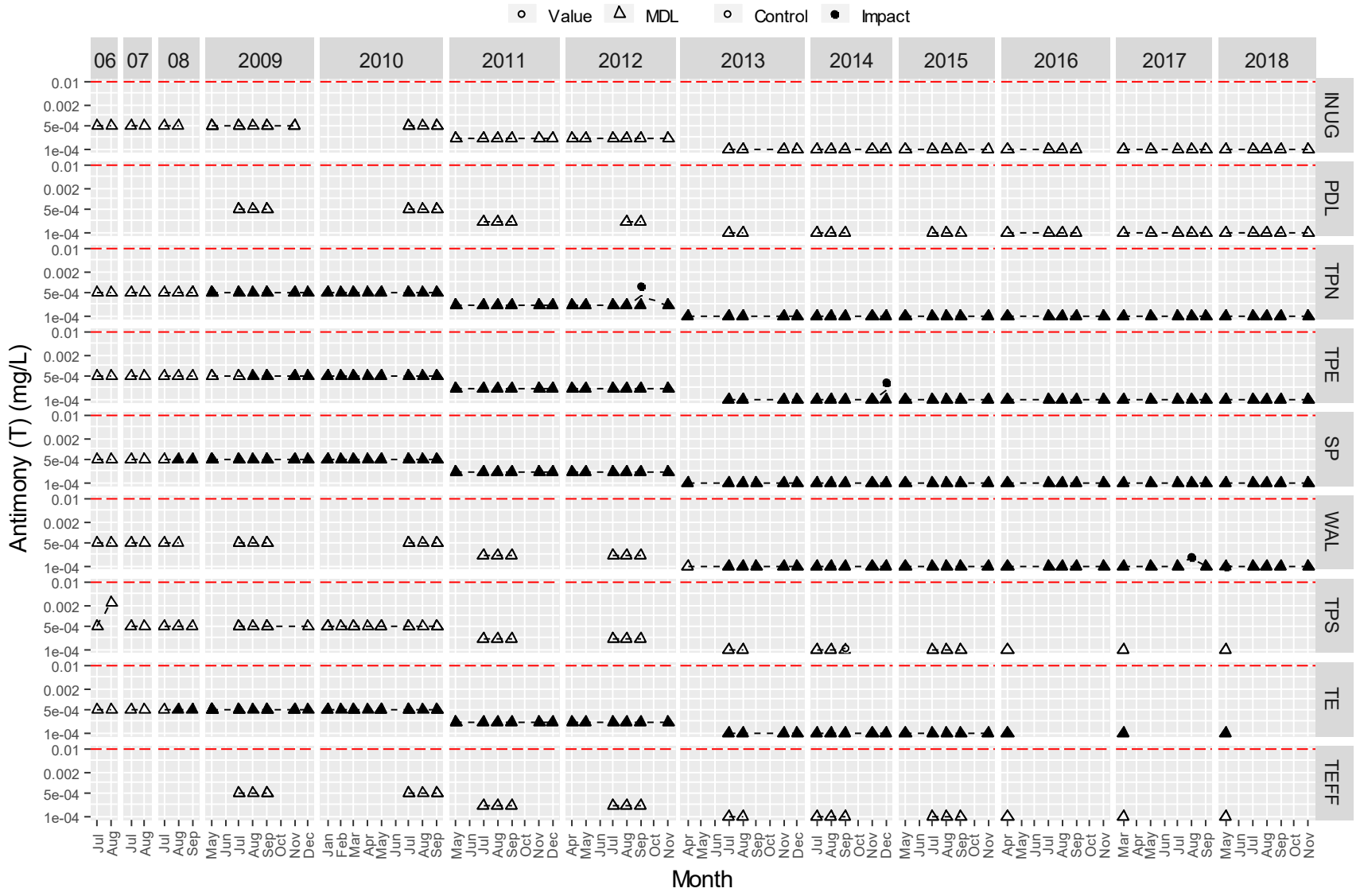


Figure B1-7. Total beryllium (mg/L) in water from Meadowbank study area lakes since 2006.

Note: The red dashed line is the trigger value (separate trigger for WAL).

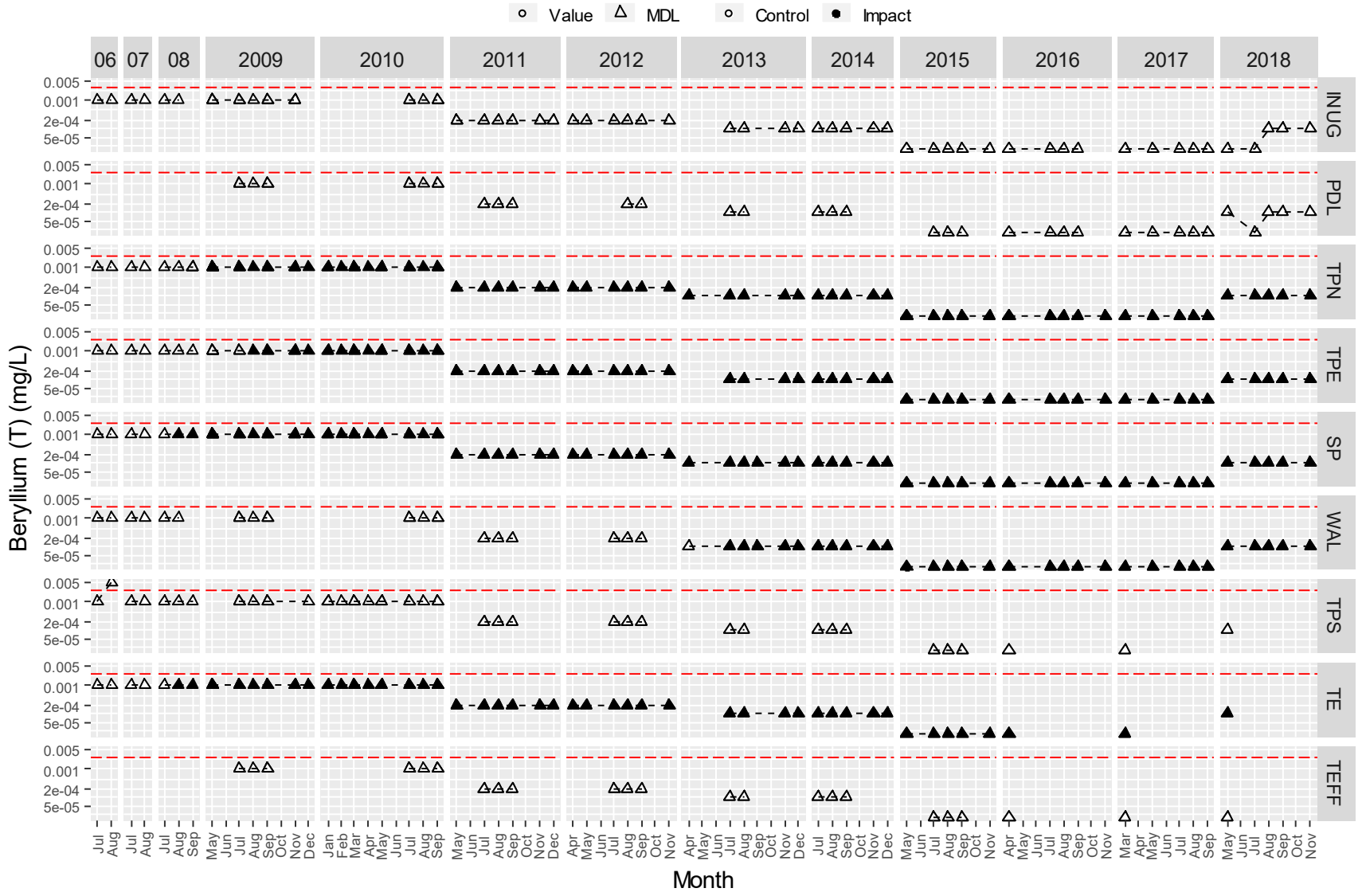


Figure B1-8. Total boron (mg/L) in water from Meadowbank study area lakes since 2006.

Note: The red dashed line is the trigger value (separate trigger for WAL).

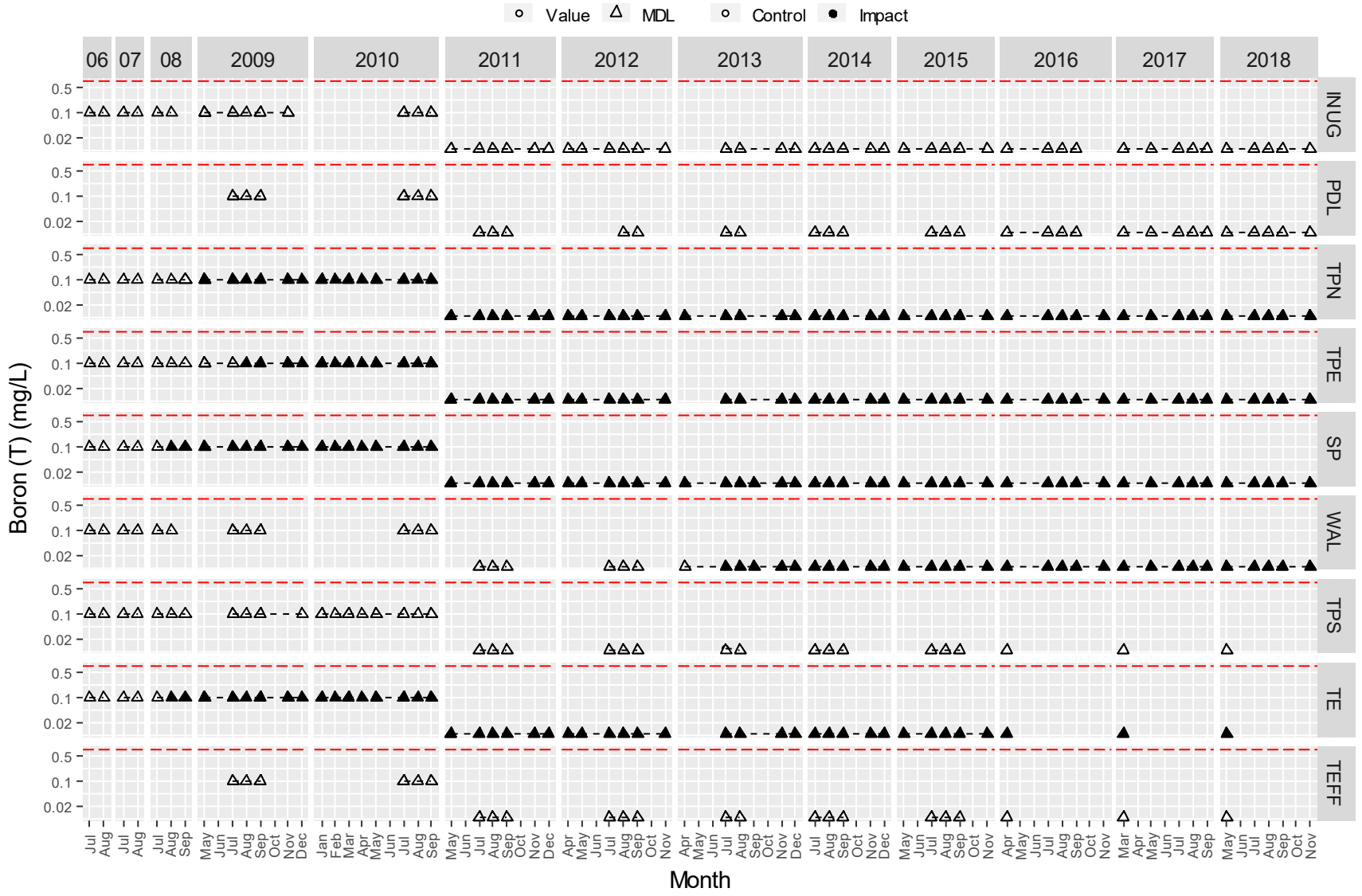


Figure B1-9. Total cadmium (mg/L) in water from Meadowbank study area lakes since 2006.

Note: The red dashed line is the trigger value (separate trigger for WAL).

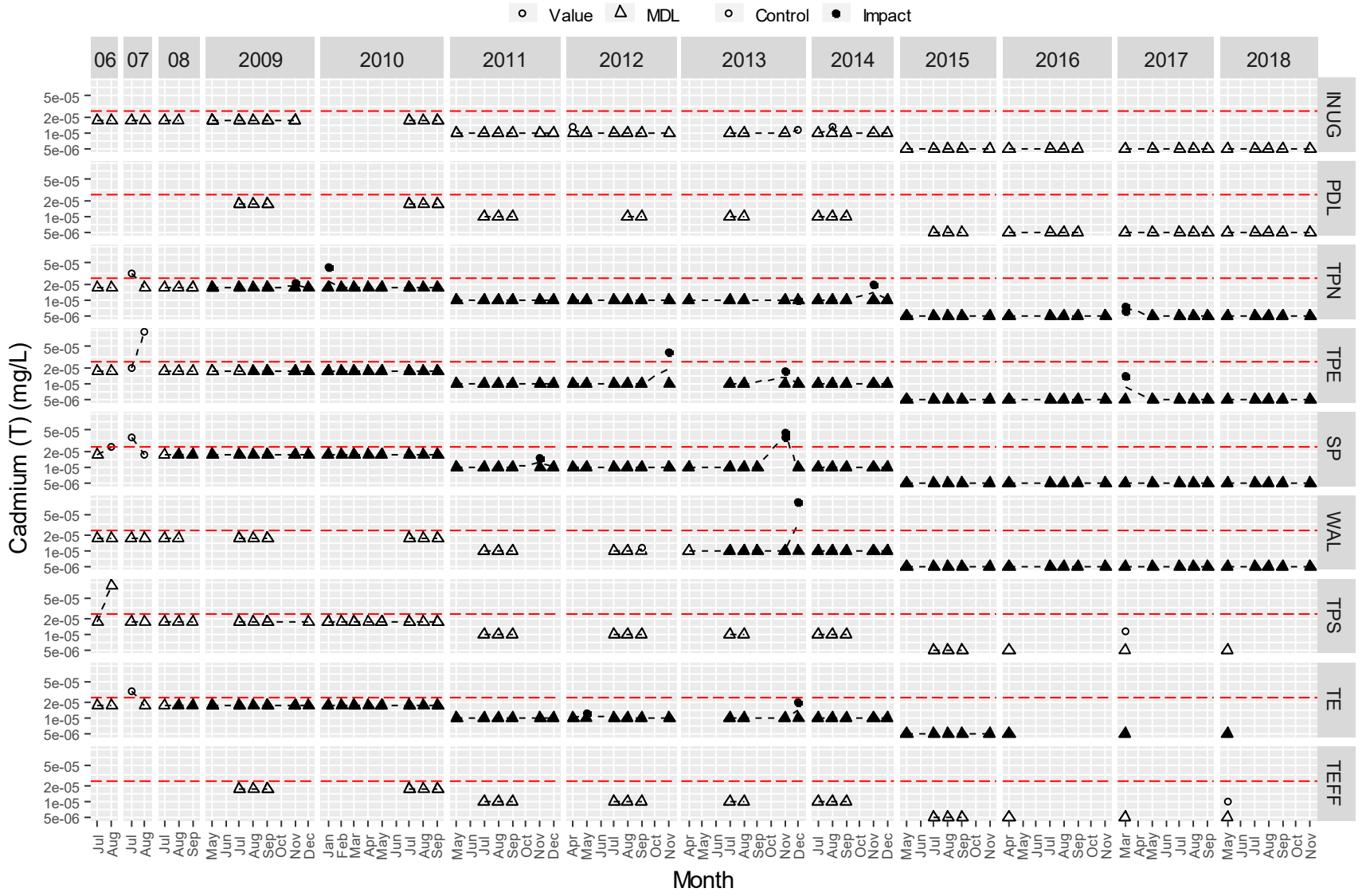


Figure B1-10. Total lead (mg/L) in water from Meadowbank study area lakes since 2006.

Note: The red dashed line is the trigger value (separate trigger for WAL).

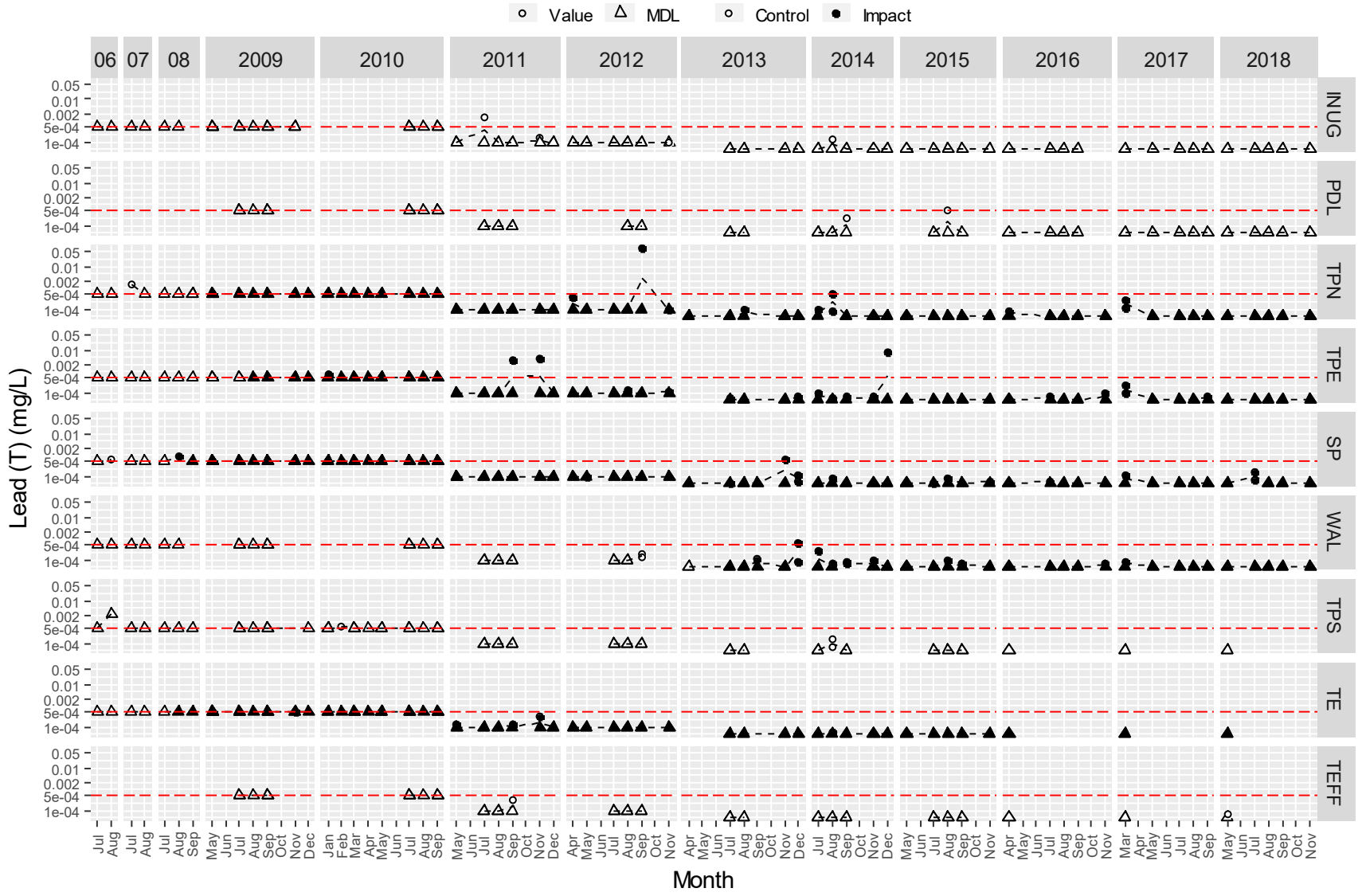


Figure B1-11. Total lithium (mg/L) in water from Meadowbank study area lakes since 2006.

Note: The red dashed line is the trigger value (separate trigger for WAL).

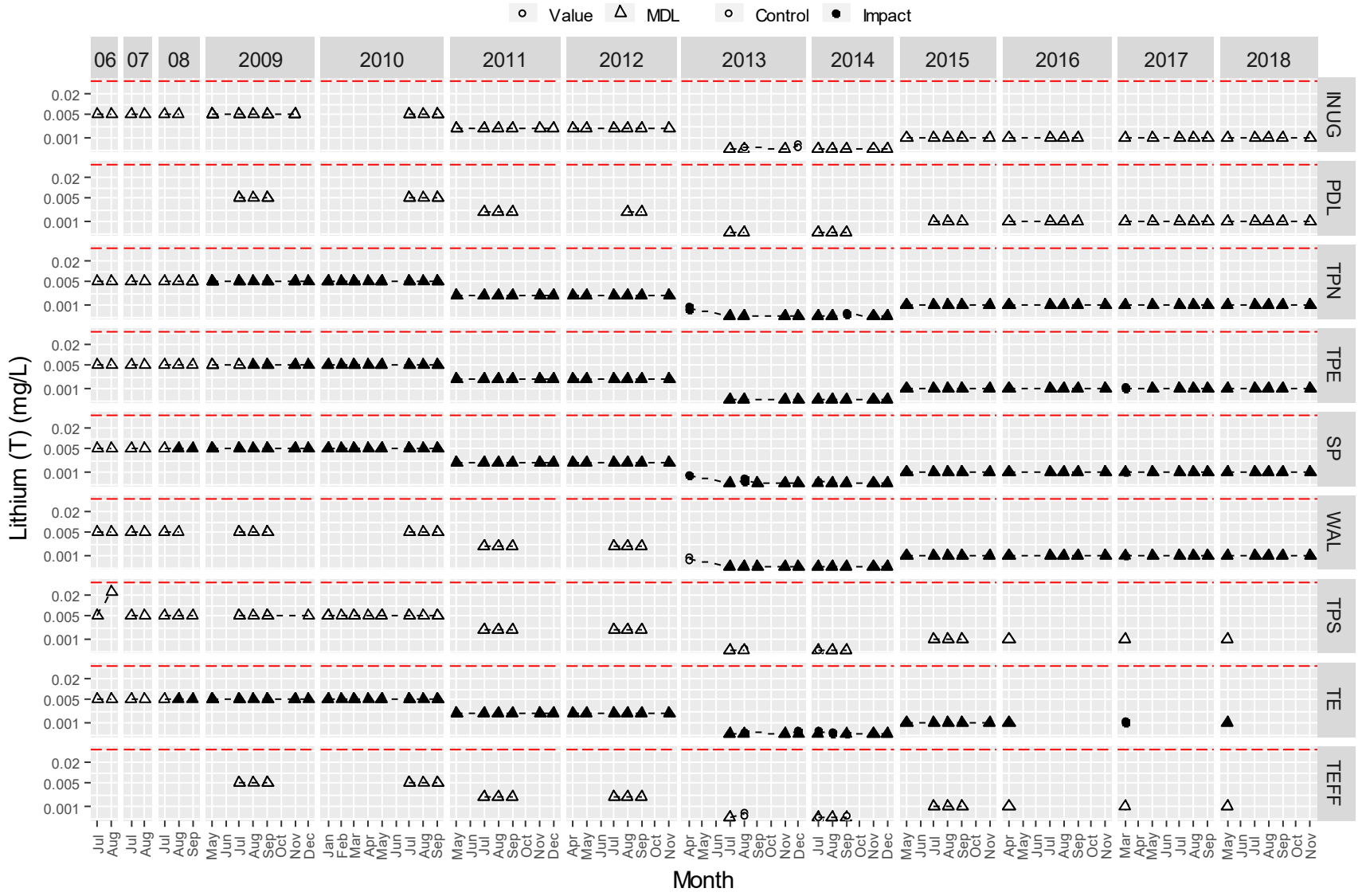


Figure B1-12. Total mercury (mg/L) in water from Meadowbank study area lakes since 2006.

Note: The red dashed line is the trigger value (separate trigger for WAL).

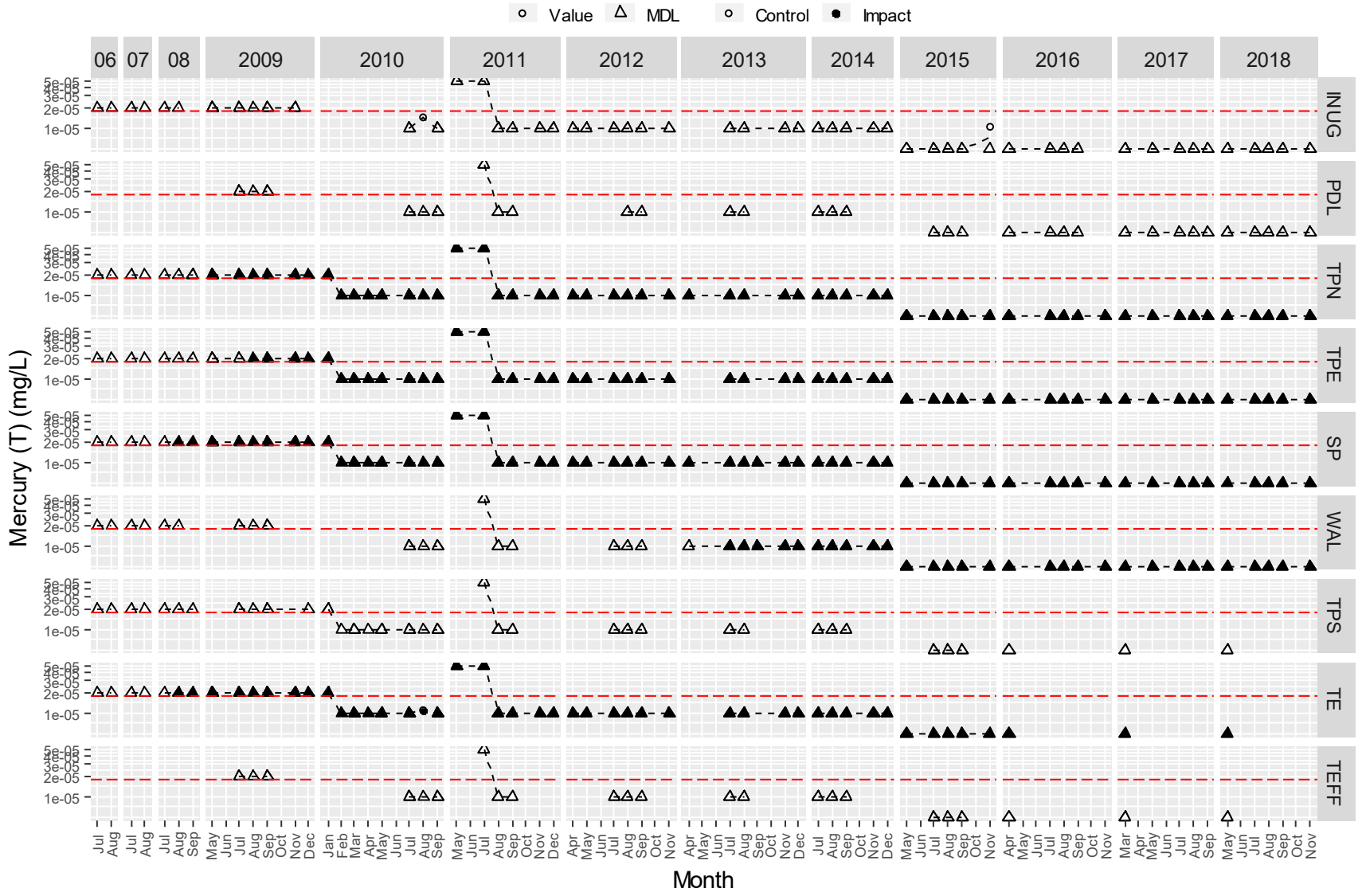


Figure B1-13. Total selenium (mg/L) in water from Meadowbank study area lakes since 2006.

Note: The red dashed line is the trigger value (separate trigger for WAL).

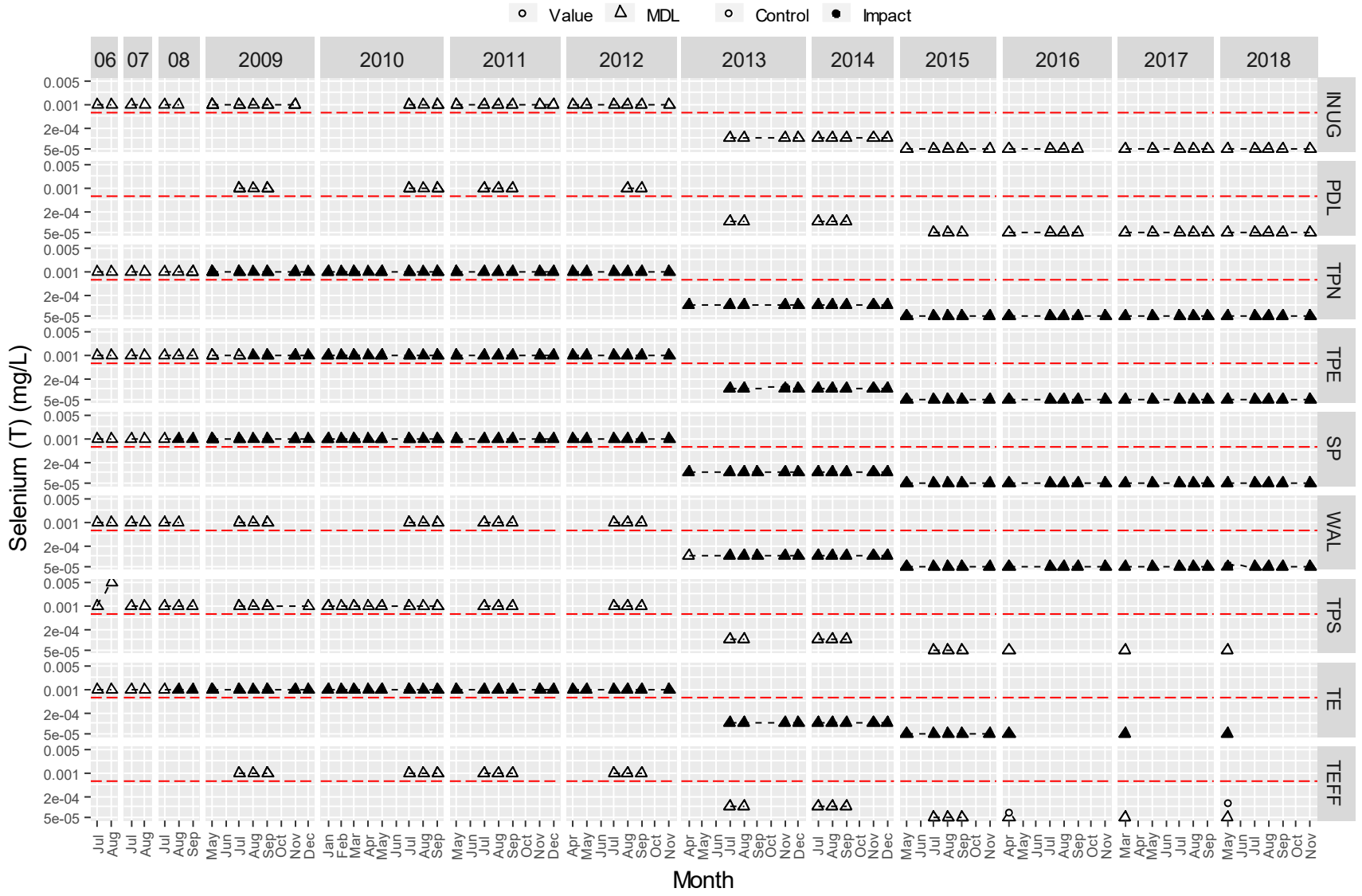


Figure B1-14. Total thallium (mg/L) in water from Meadowbank study area lakes since 2006.

Note: The red dashed line is the trigger value (separate trigger for WAL).

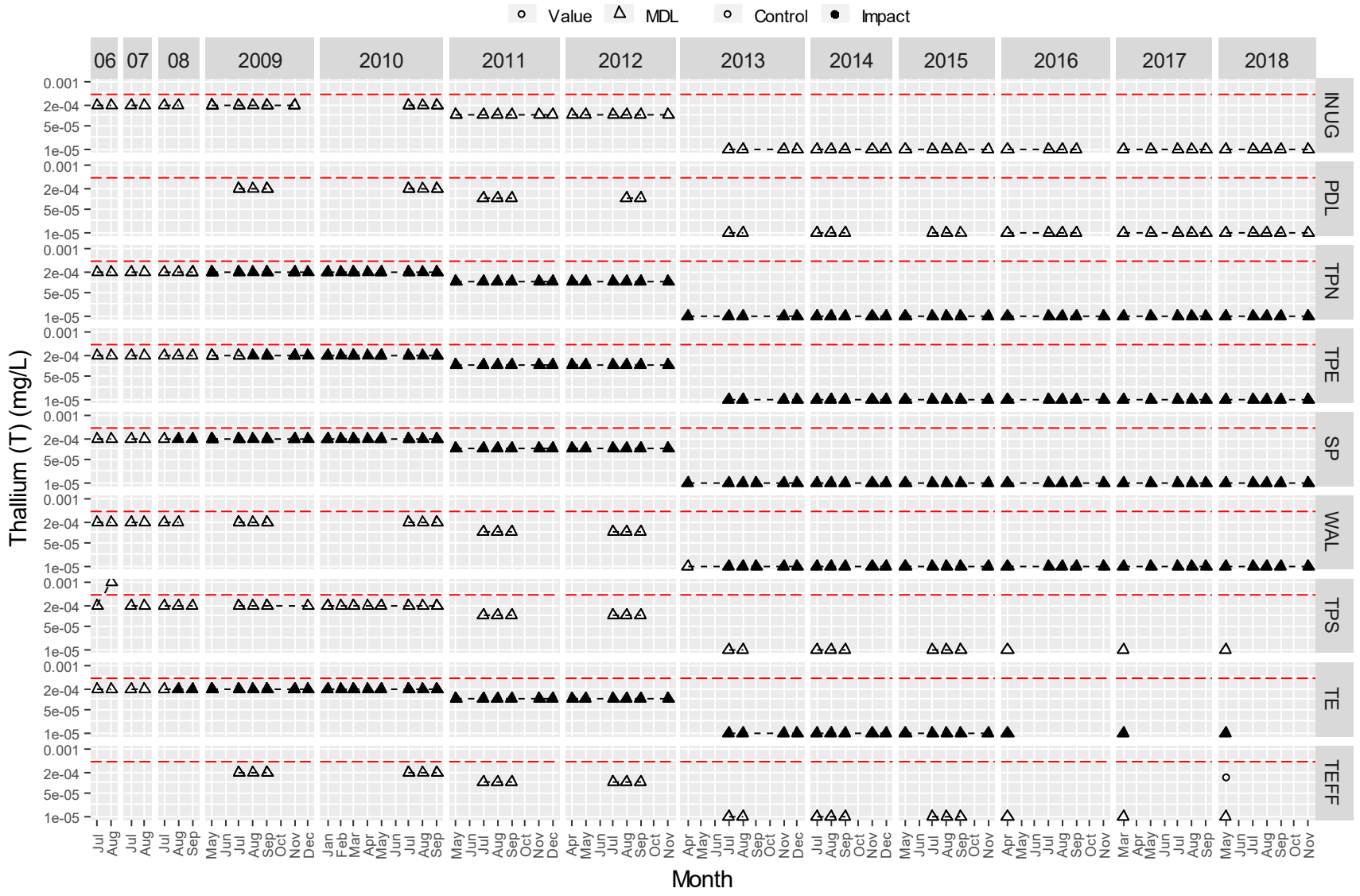


Figure B1-15. Total tin (mg/L) in water from Meadowbank study area lakes since 2006.

Note: The red dashed line is the trigger value (separate trigger for WAL).

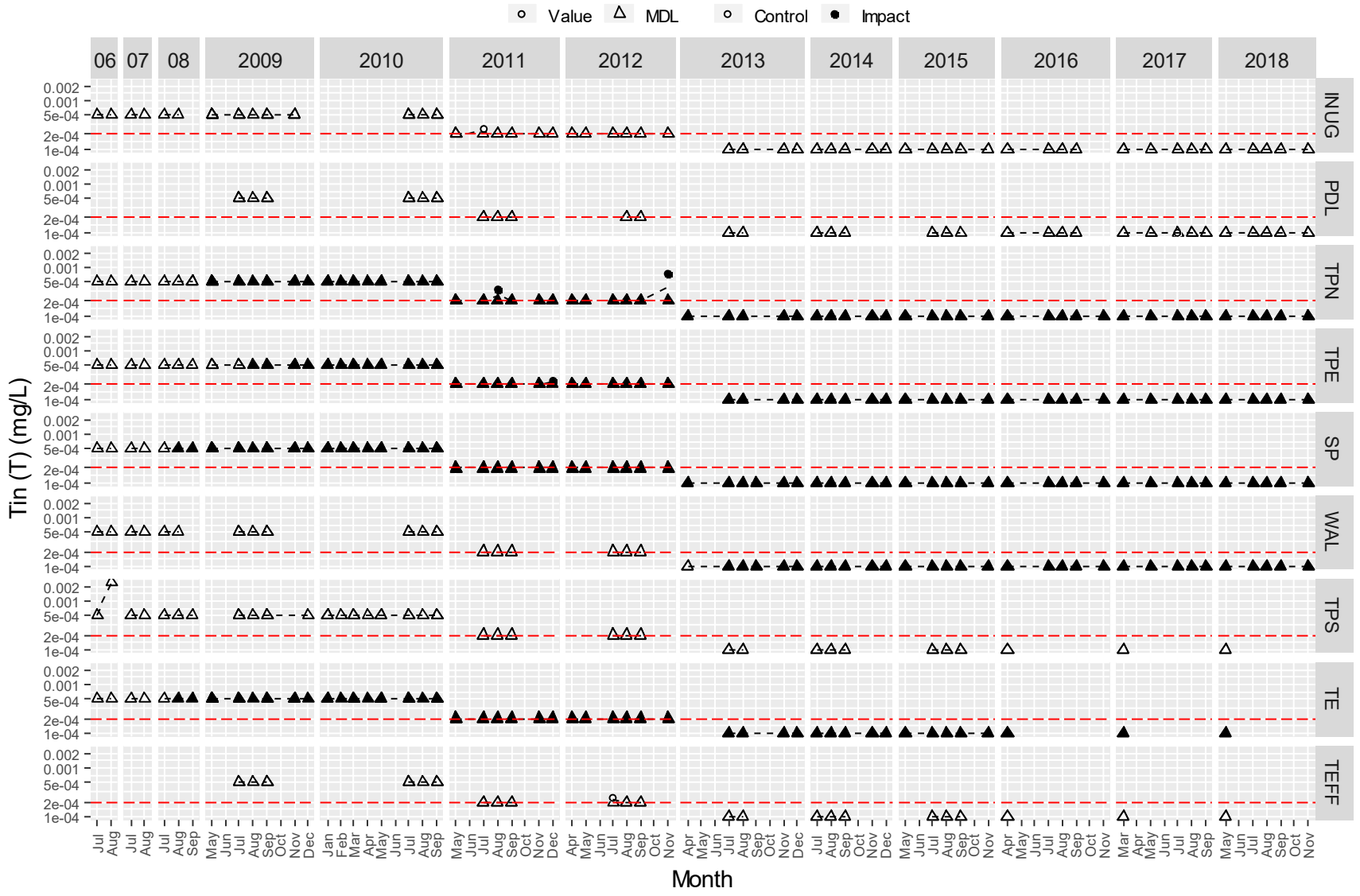


Figure B1-16. Total titanium (mg/L) in water from Meadowbank study area lakes since 2006.

Note: The red dashed line is the trigger value (separate trigger for WAL).

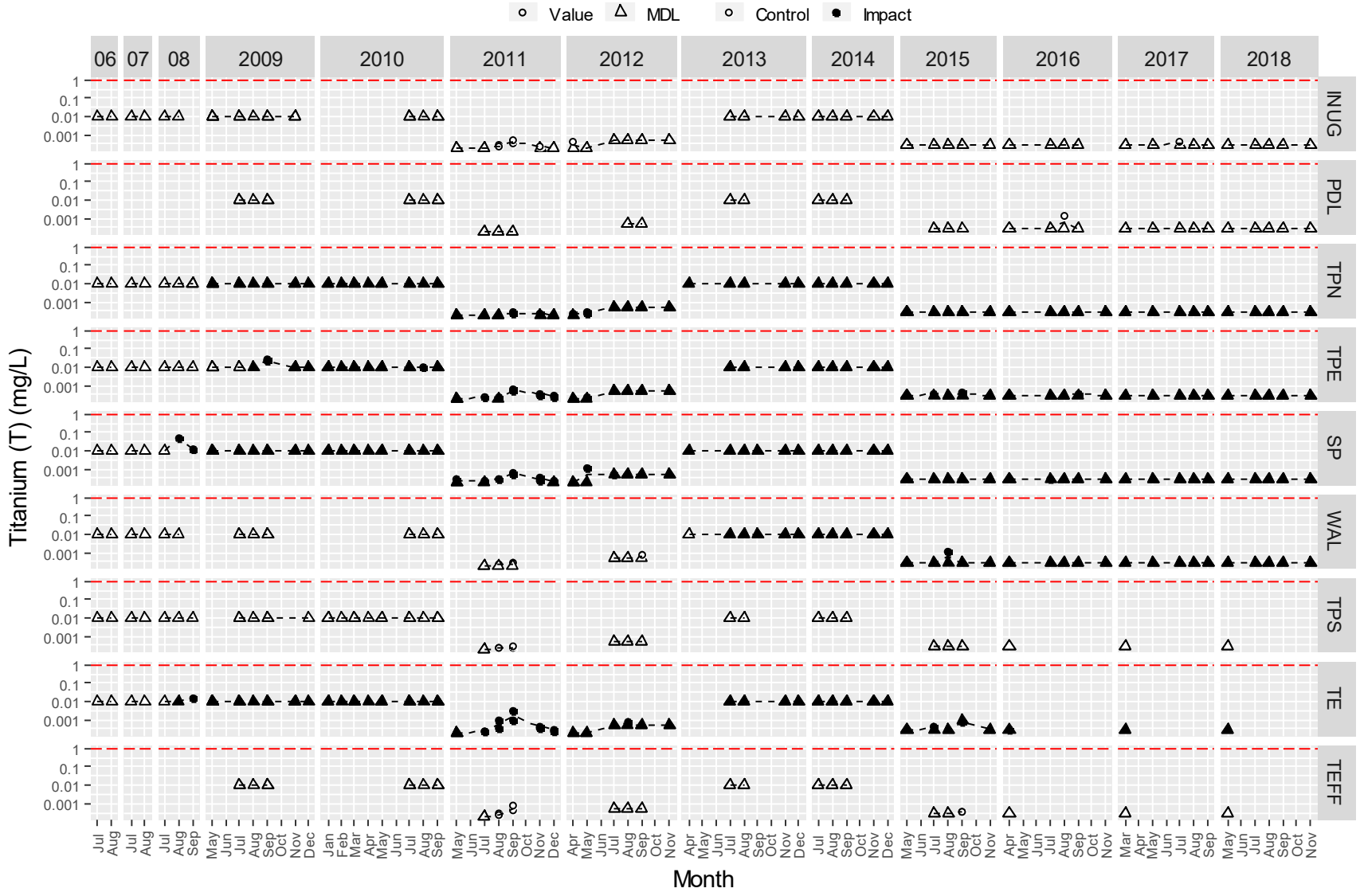


Figure B1-17. Total vanadium (mg/L) in water from Meadowbank study area lakes since 2006.

Note: The red dashed line is the trigger value (separate trigger for WAL).

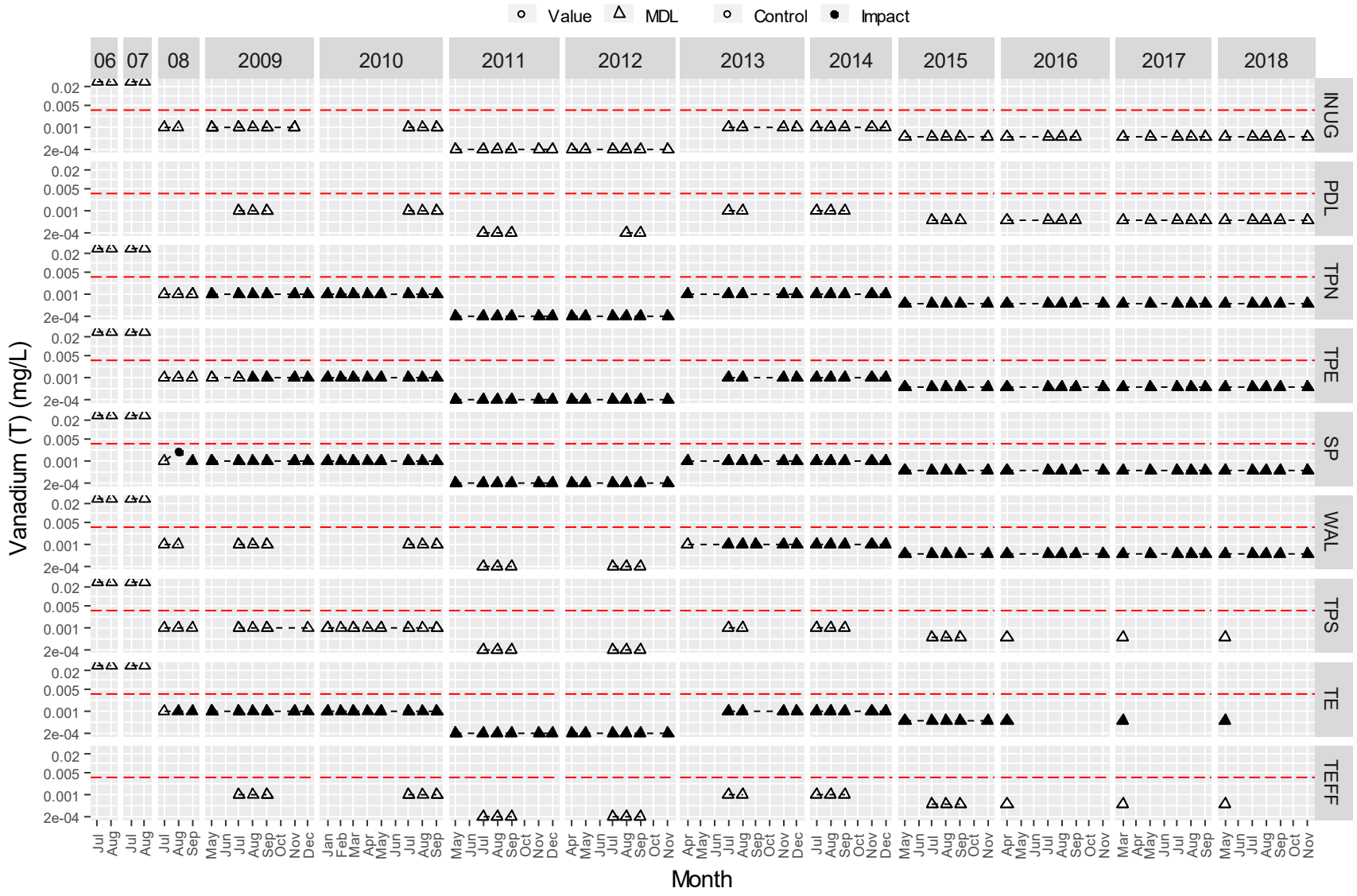


Figure B1-18. Total zinc (mg/L) in water from Meadowbank study area lakes since 2006.

Note: The red dashed line is the trigger value (separate trigger for WAL).

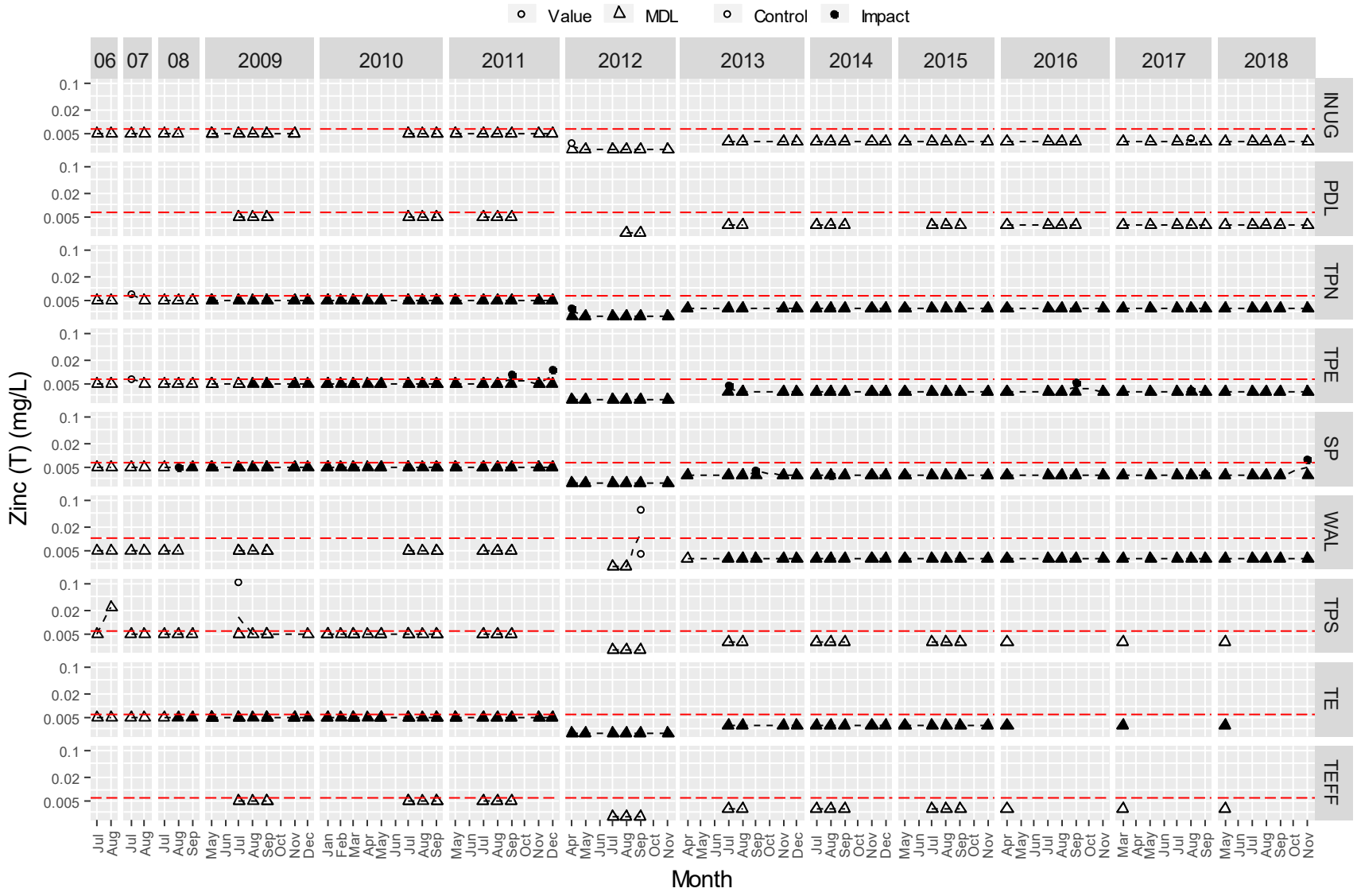


Figure B1-19. Dissolved antimony (mg/L) in water from Meadowbank study area lakes since 2006.

Note: The red dashed line is the trigger value (separate trigger for WAL).

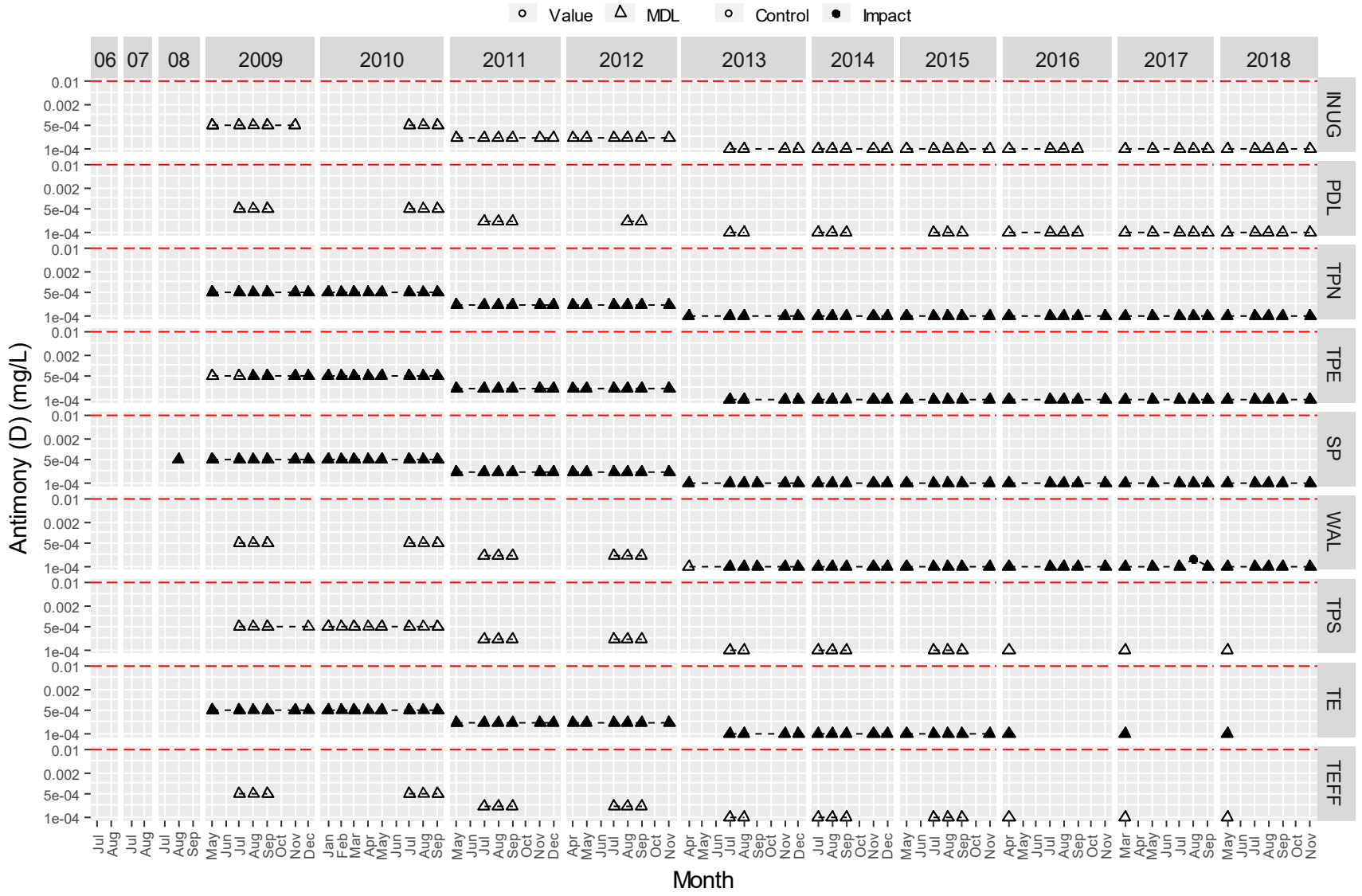


Figure B1-20. Dissolved beryllium (mg/L) in water from Meadowbank study area lakes since 2006.

Note: The red dashed line is the trigger value (separate trigger for WAL).

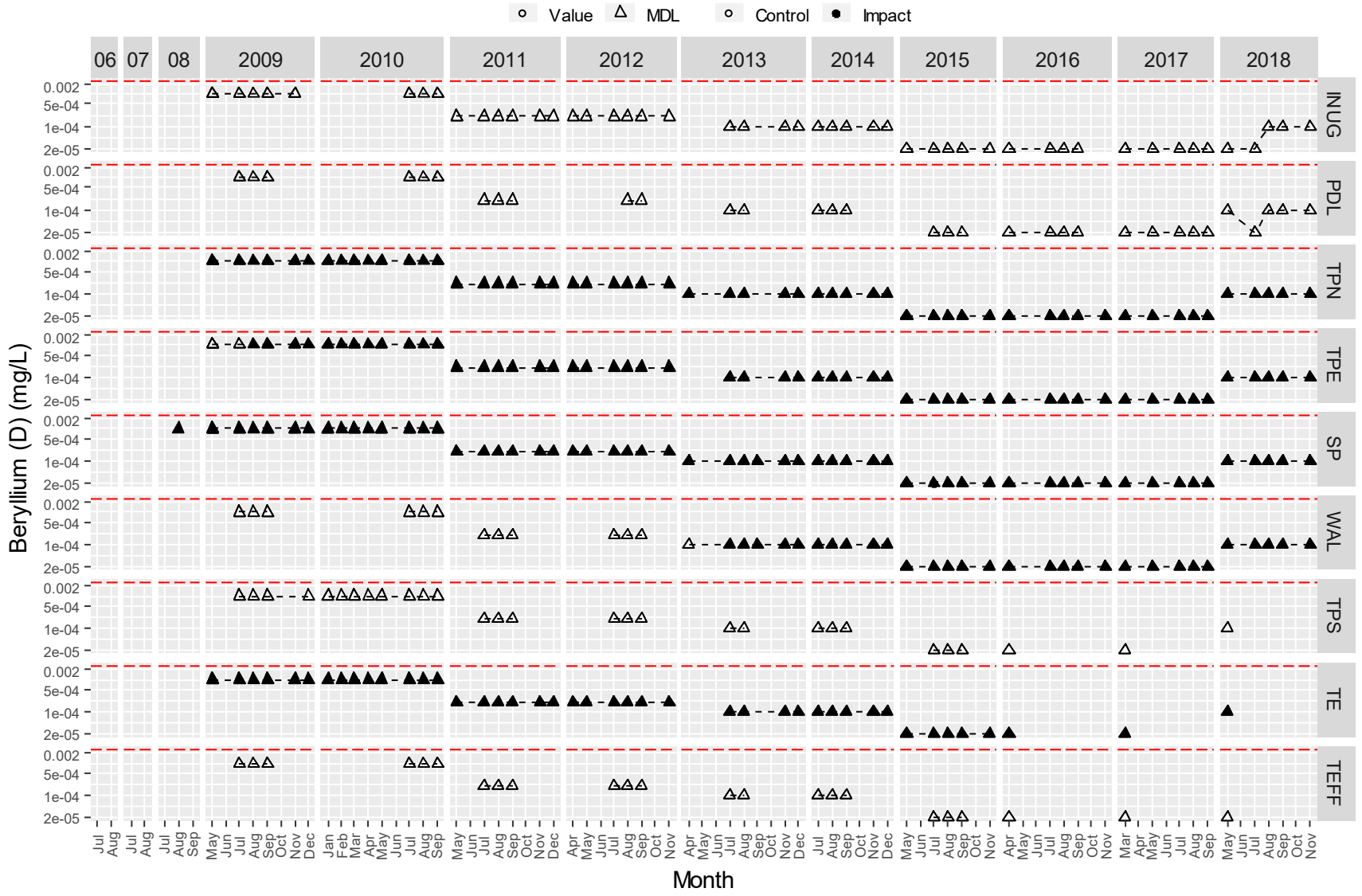


Figure B1-21. Dissolved boron (mg/L) in water from Meadowbank study area lakes since 2006.

Note: The red dashed line is the trigger value (separate trigger for WAL).

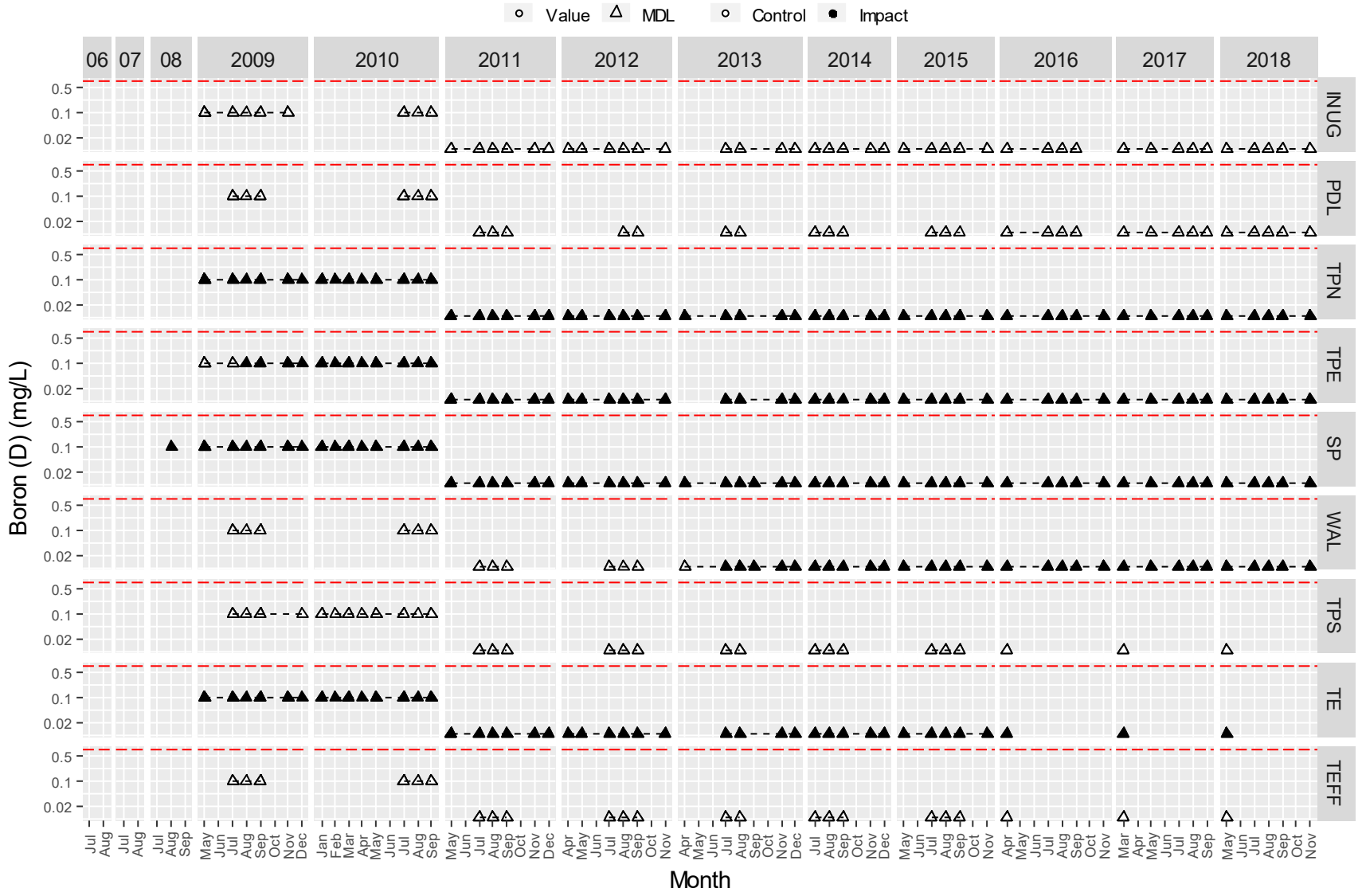


Figure B1-22. Dissolved cadmium (mg/L) in water from Meadowbank study area lakes since 2006.

Note: The red dashed line is the trigger value (separate trigger for WAL).

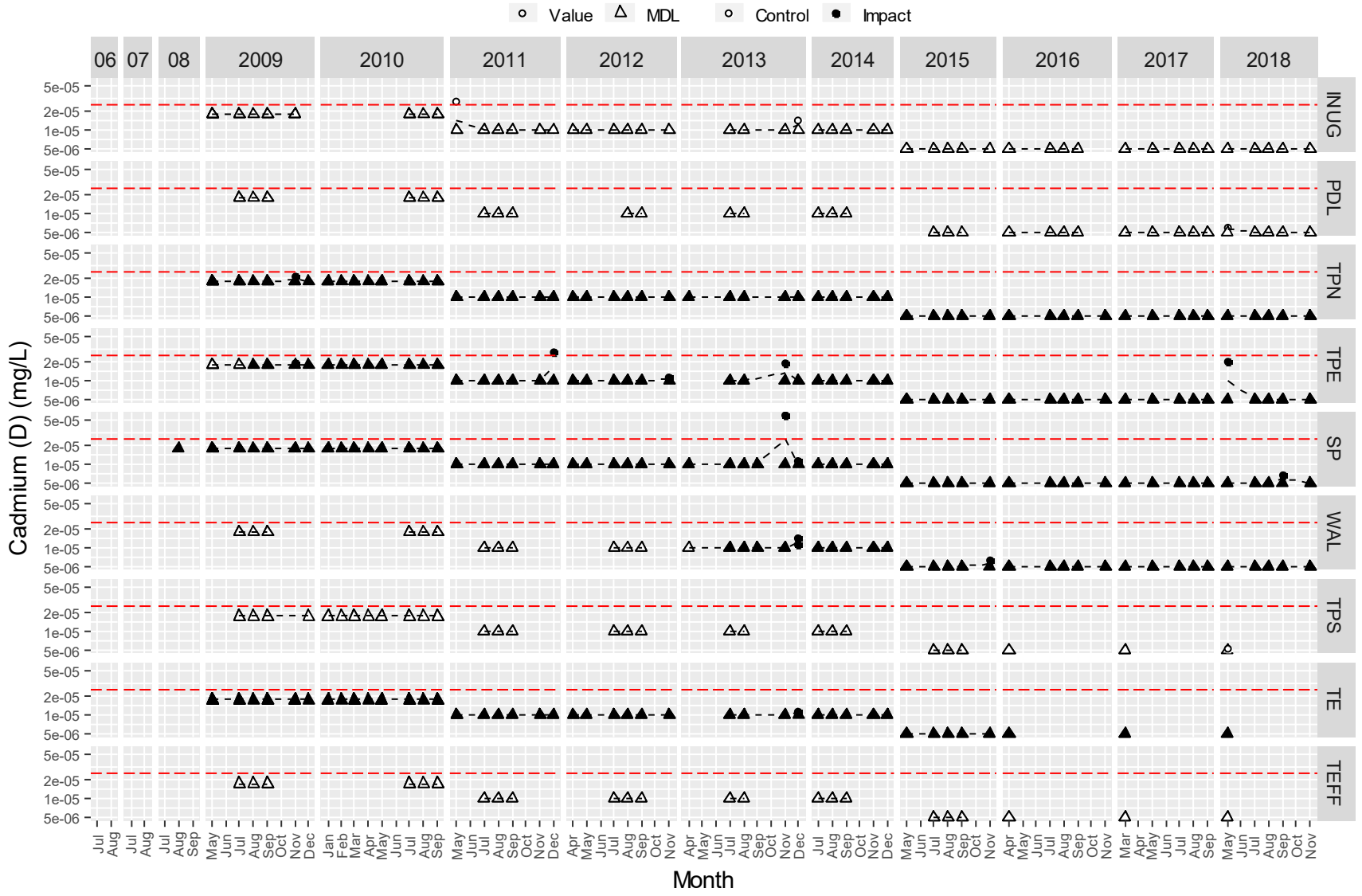


Figure B1-23. Dissolved chromium (mg/L) in water from Meadowbank study area lakes since 2006.

Note: The red dashed line is the trigger value (separate trigger for WAL).

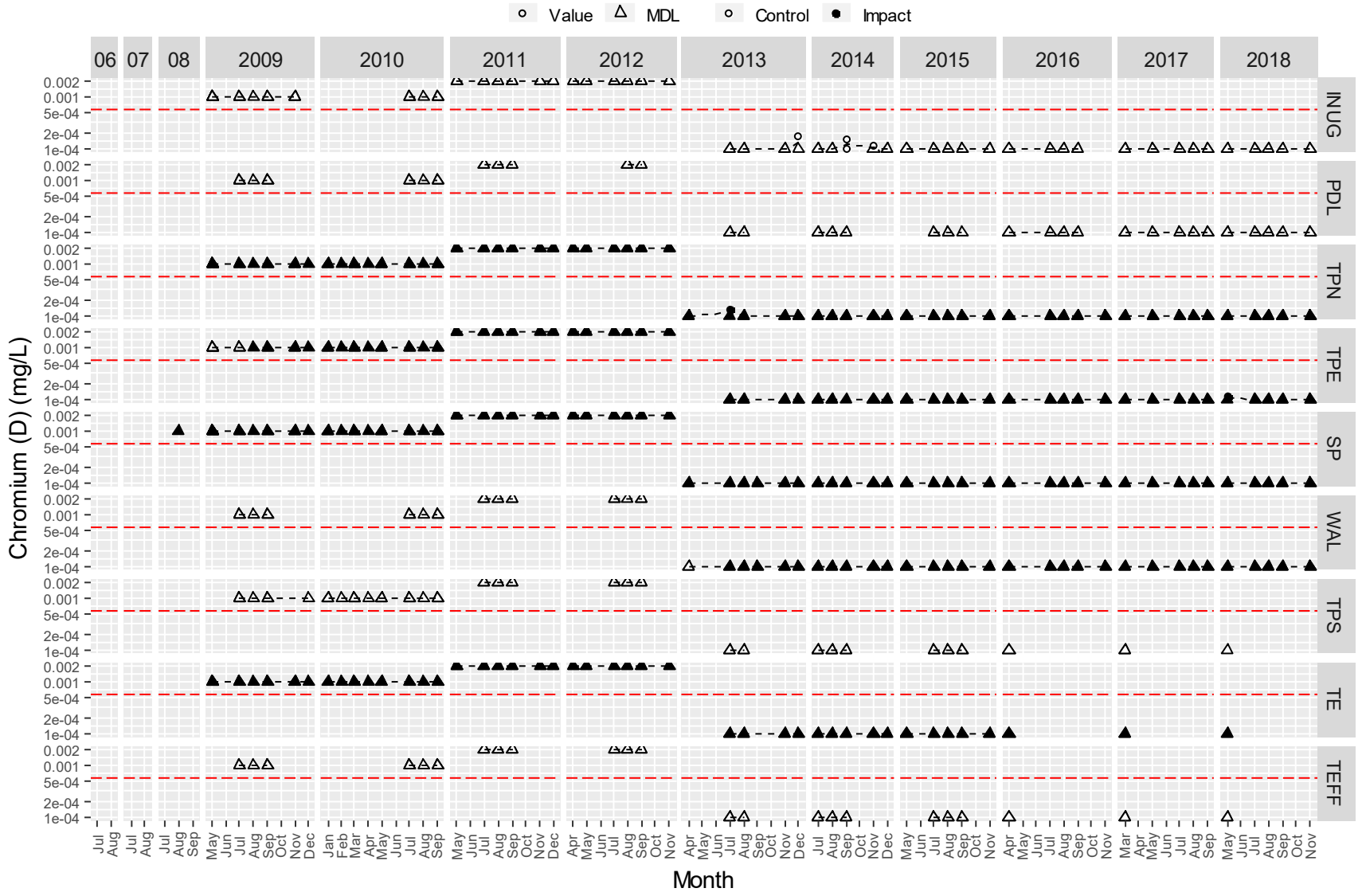


Figure B1-24. Dissolved iron (mg/L) in water from Meadowbank study area lakes since 2006.

Note: The red dashed line is the trigger value (separate trigger for WAL).

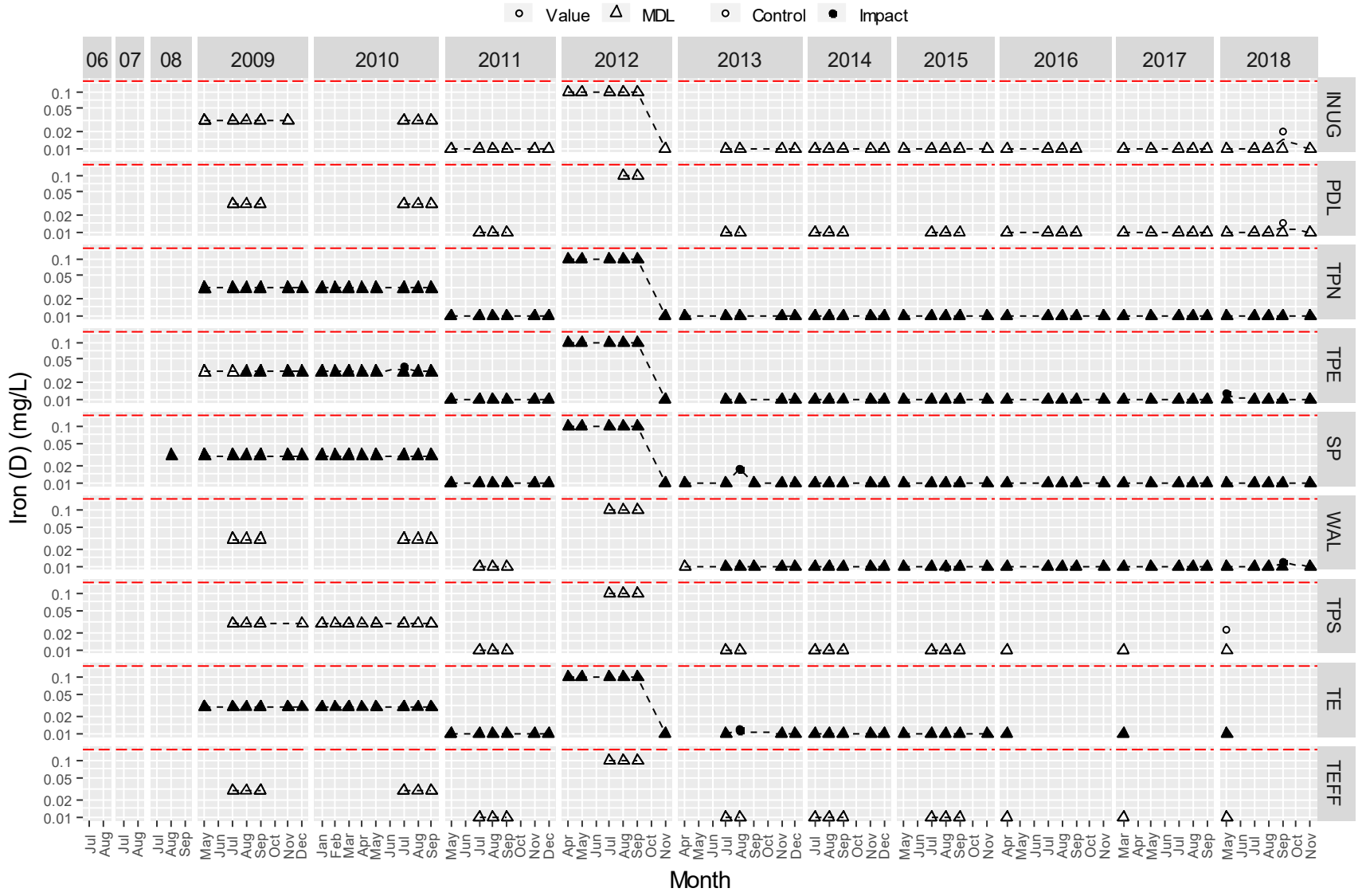


Figure B1-25. Dissolved lead (mg/L) in water from Meadowbank study area lakes since 2006.

Note: The red dashed line is the trigger value (separate trigger for WAL).

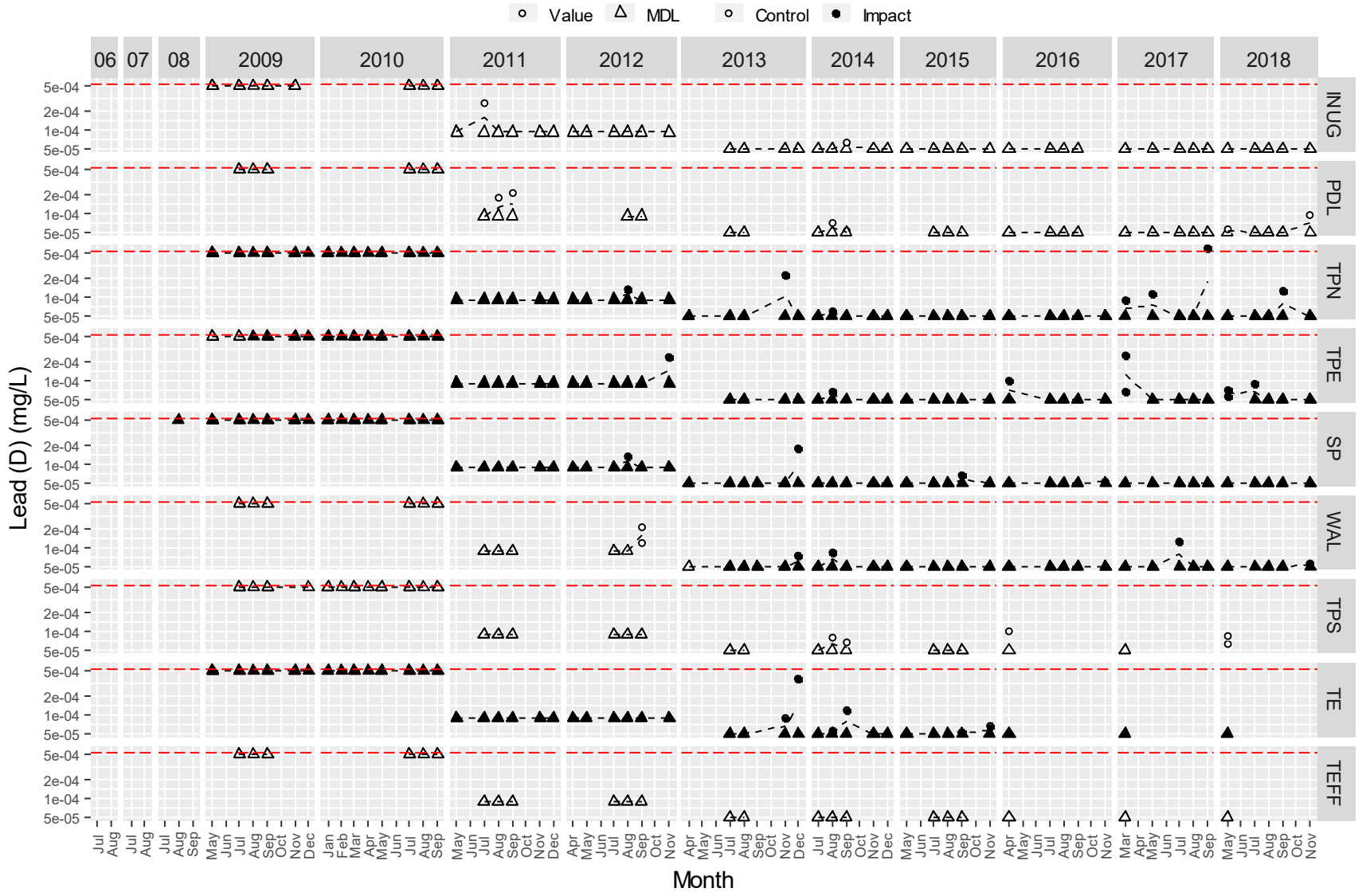


Figure B1-26. Dissolved lithium (mg/L) in water from Meadowbank study area lakes since 2006.

Note: The red dashed line is the trigger value (separate trigger for WAL).

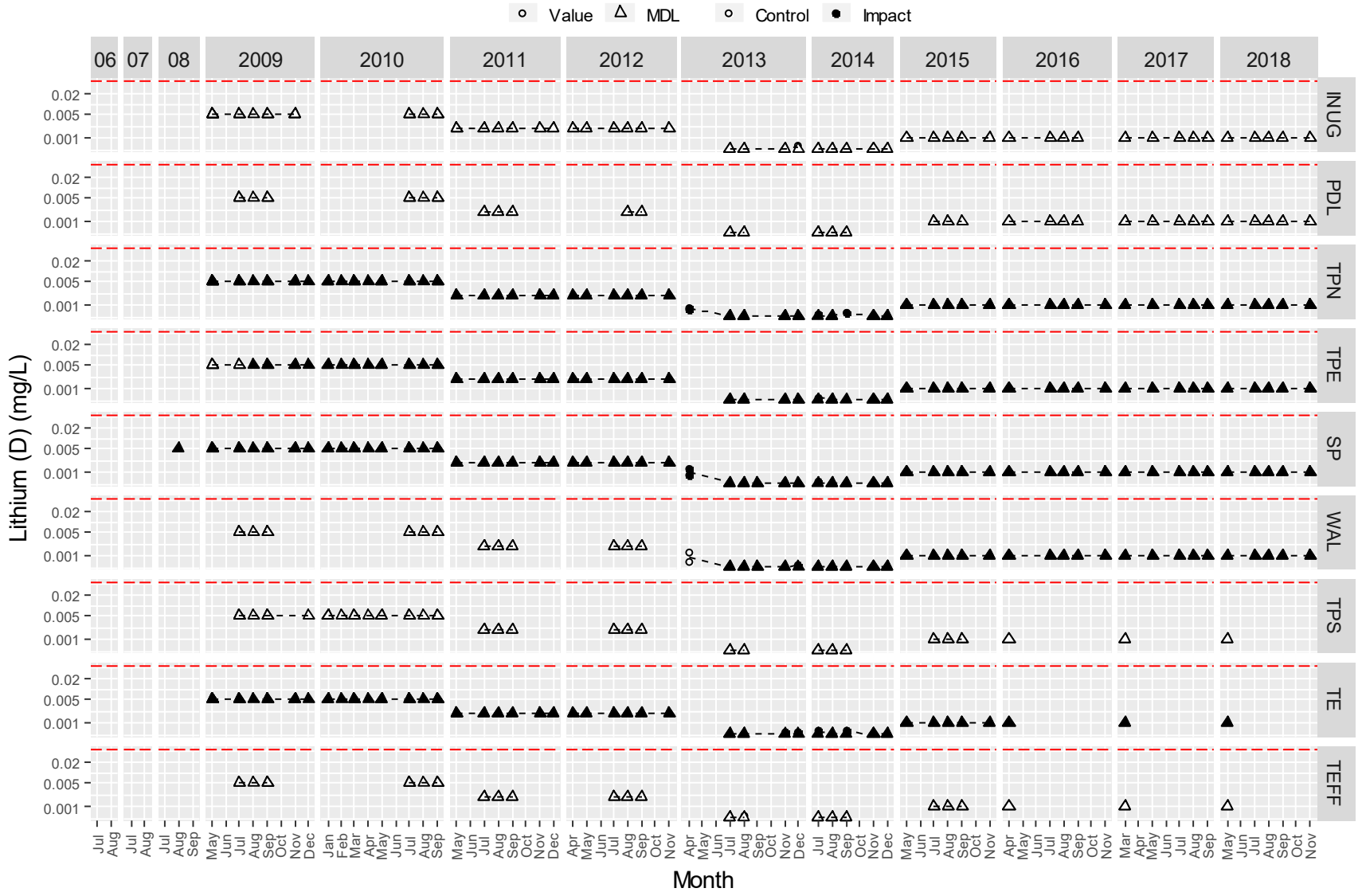


Figure B1-27. Dissolved mercury (mg/L) in water from Meadowbank study area lakes since 2006.

Note: The red dashed line is the trigger value (separate trigger for WAL).



Figure B1-28. Dissolved nickel (mg/L) in water from Meadowbank study area lakes since 2006.

Note: The red dashed line is the trigger value (separate trigger for WAL).

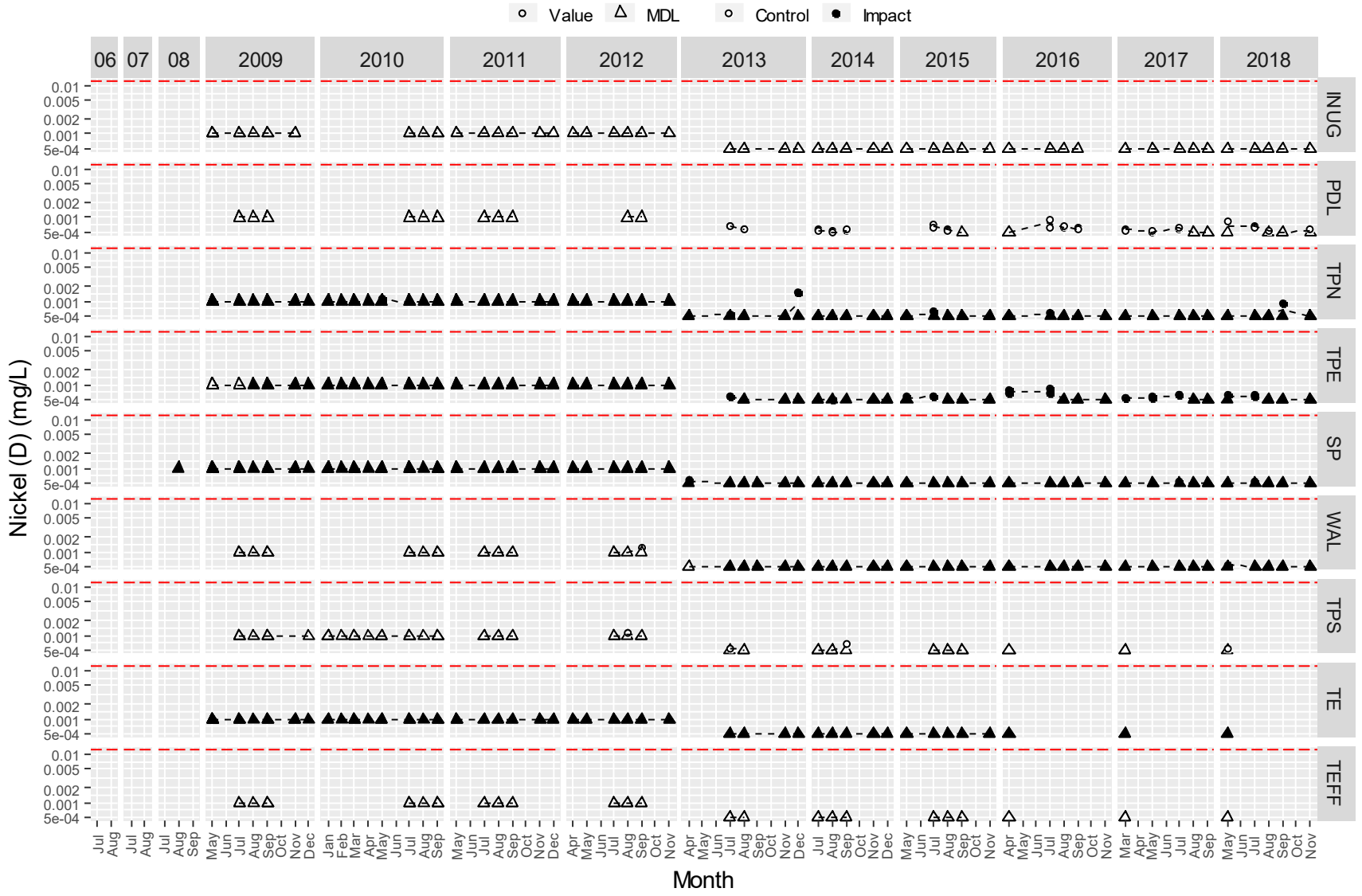


Figure B1-29. Dissolved selenium (mg/L) in water from Meadowbank study area lakes since 2006.

Note: The red dashed line is the trigger value (separate trigger for WAL).

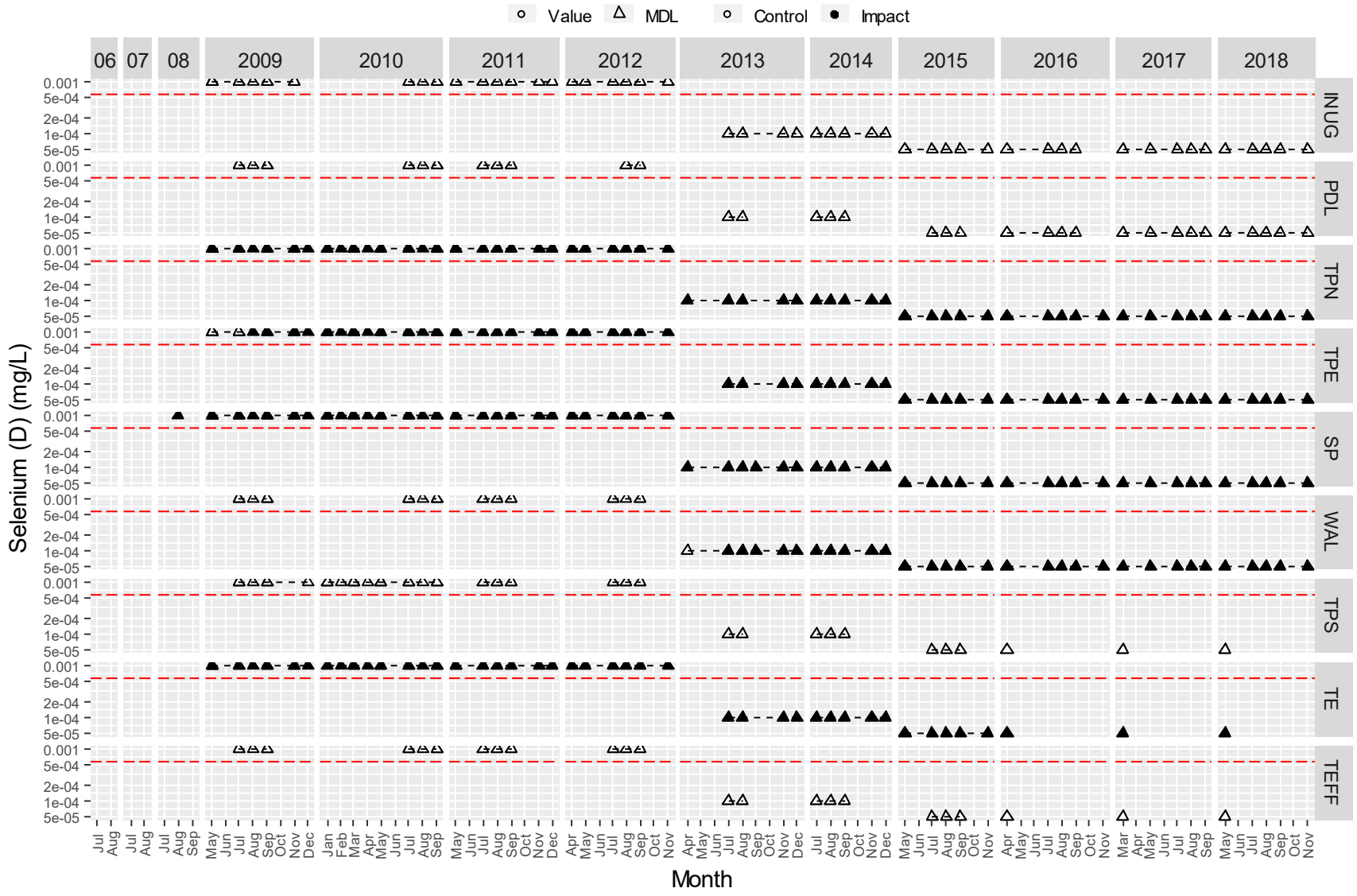


Figure B1-30. Dissolved thallium (mg/L) in water from Meadowbank study area lakes since 2006.

Note: The red dashed line is the trigger value (separate trigger for WAL).

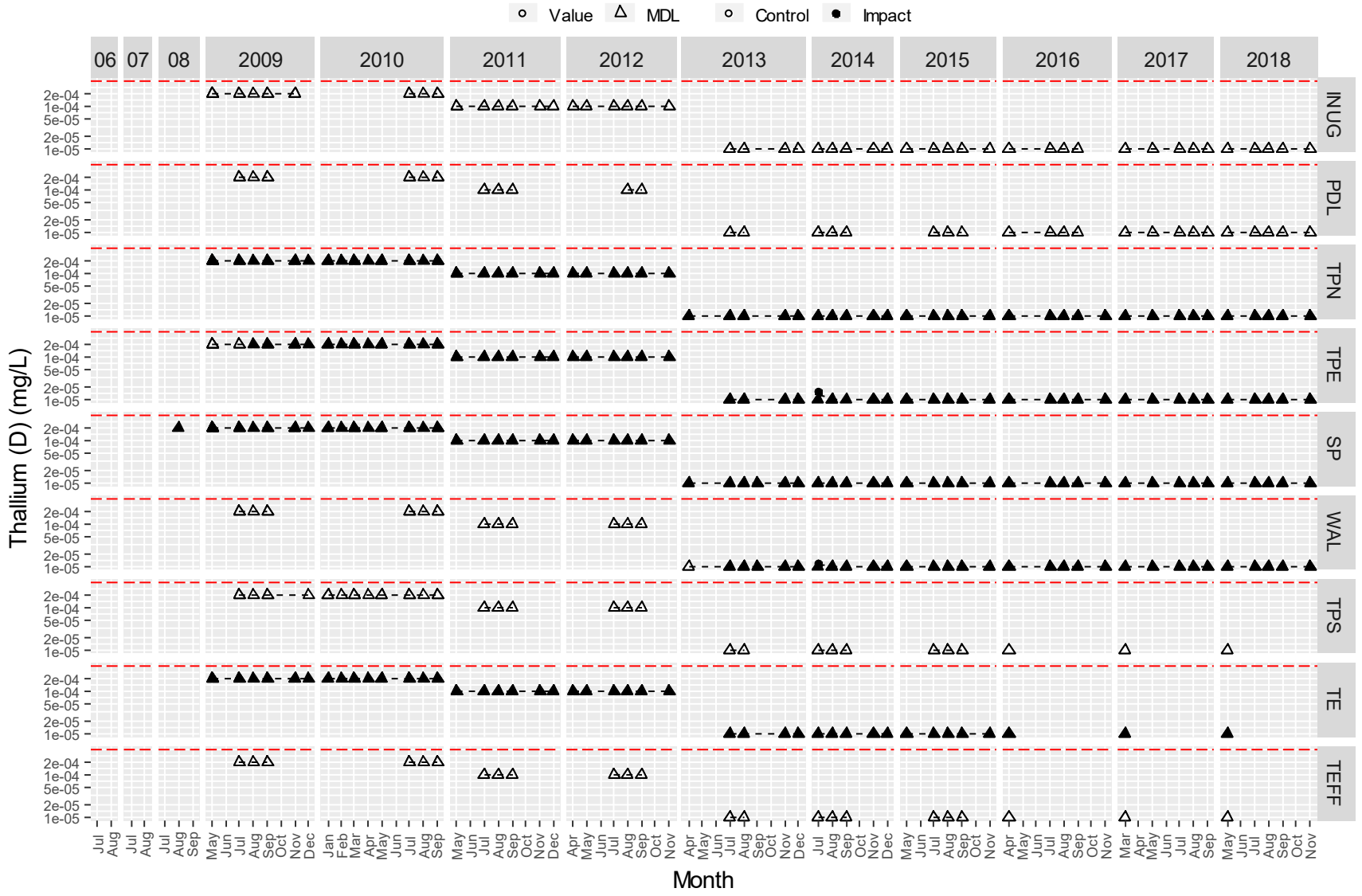


Figure B1-31. Dissolved tin (mg/L) in water from Meadowbank study area lakes since 2006.

Note: The red dashed line is the trigger value (separate trigger for WAL).

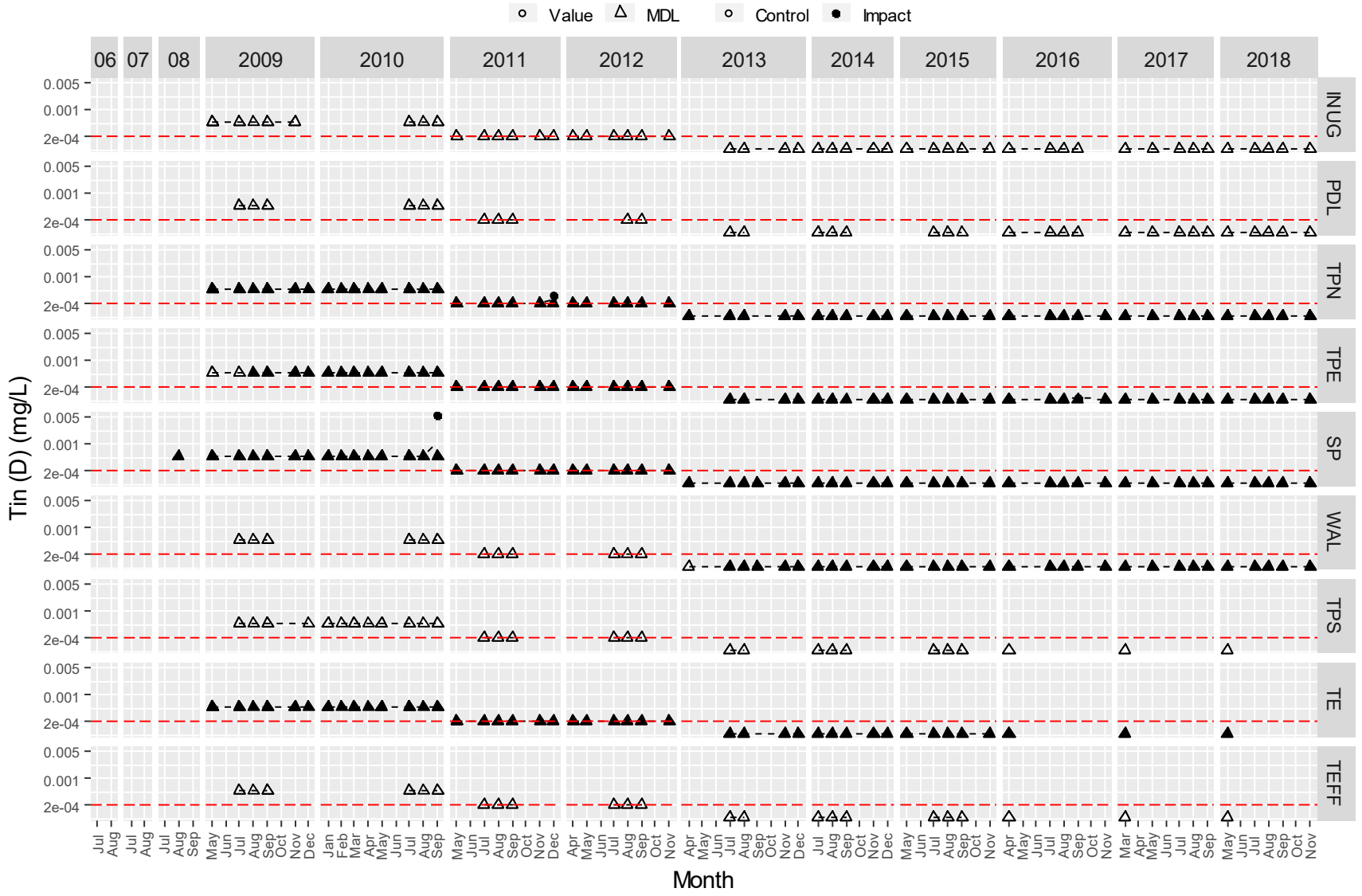


Figure B1-32. Dissolved titanium (mg/L) in water from Meadowbank study area lakes since 2006.

Note: The red dashed line is the trigger value (separate trigger for WAL).

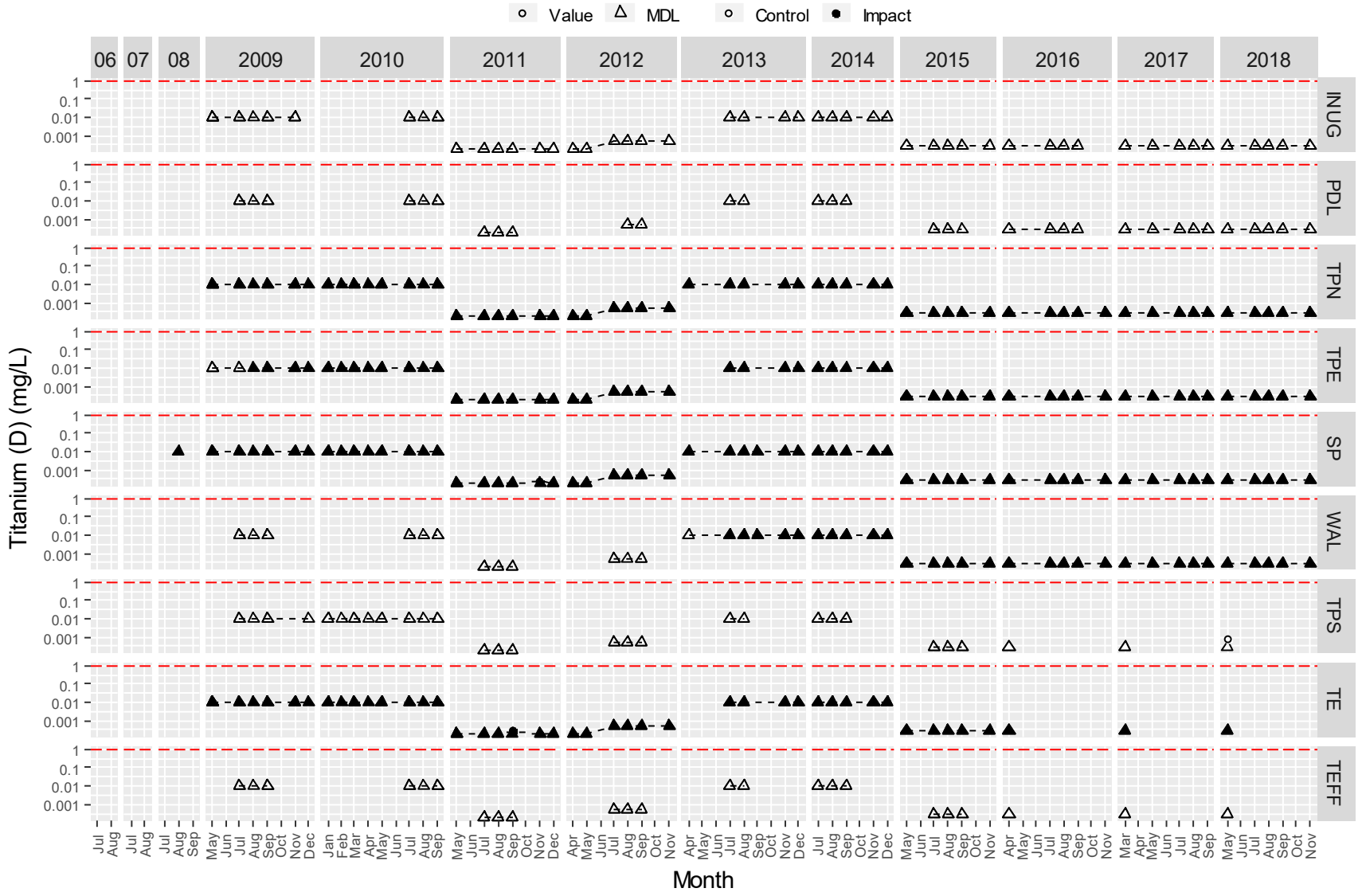


Figure B1-33. Dissolved vanadium (mg/L) in water from Meadowbank study area lakes since 2006.

Note: The red dashed line is the trigger value (separate trigger for WAL).

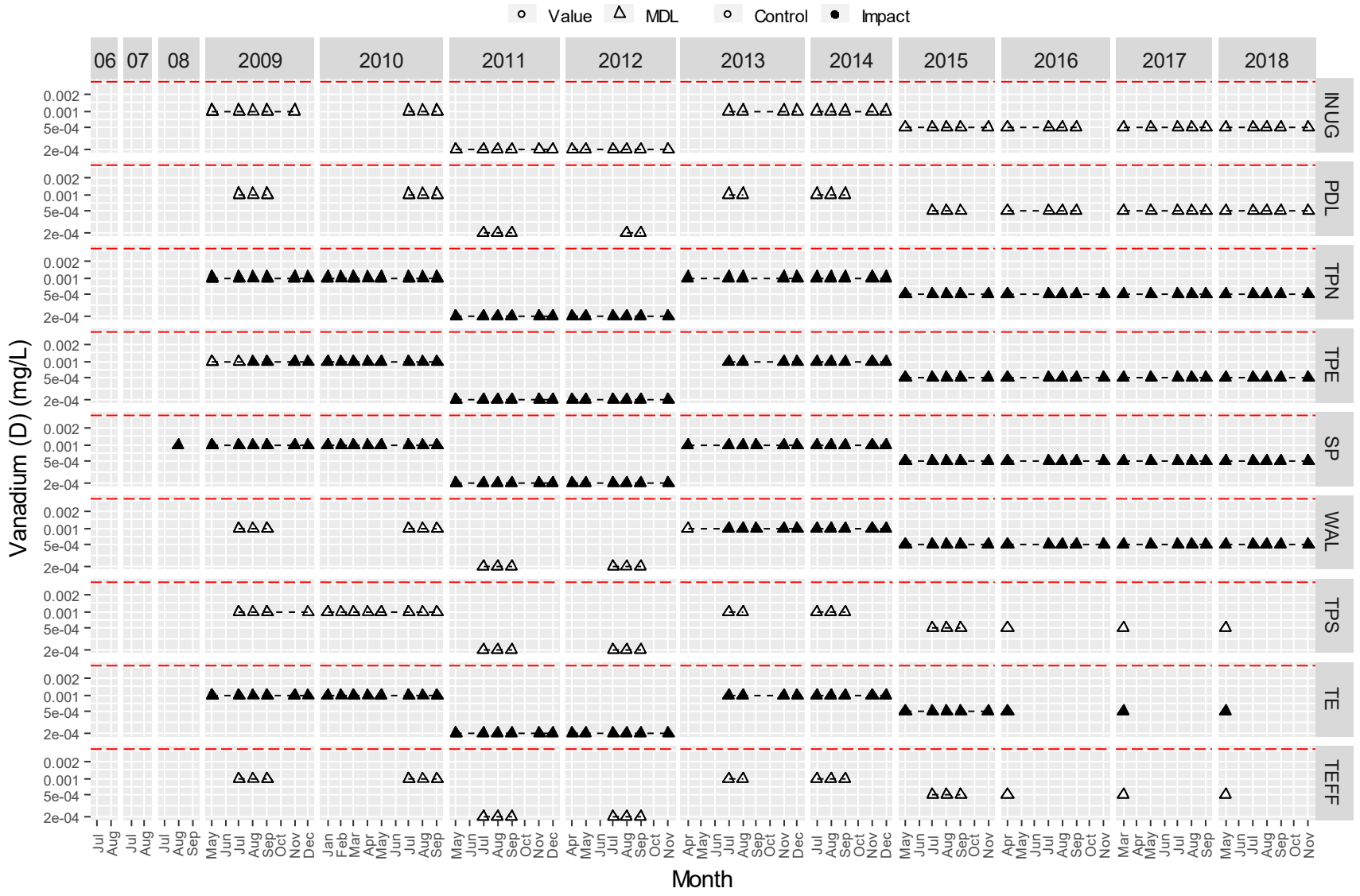
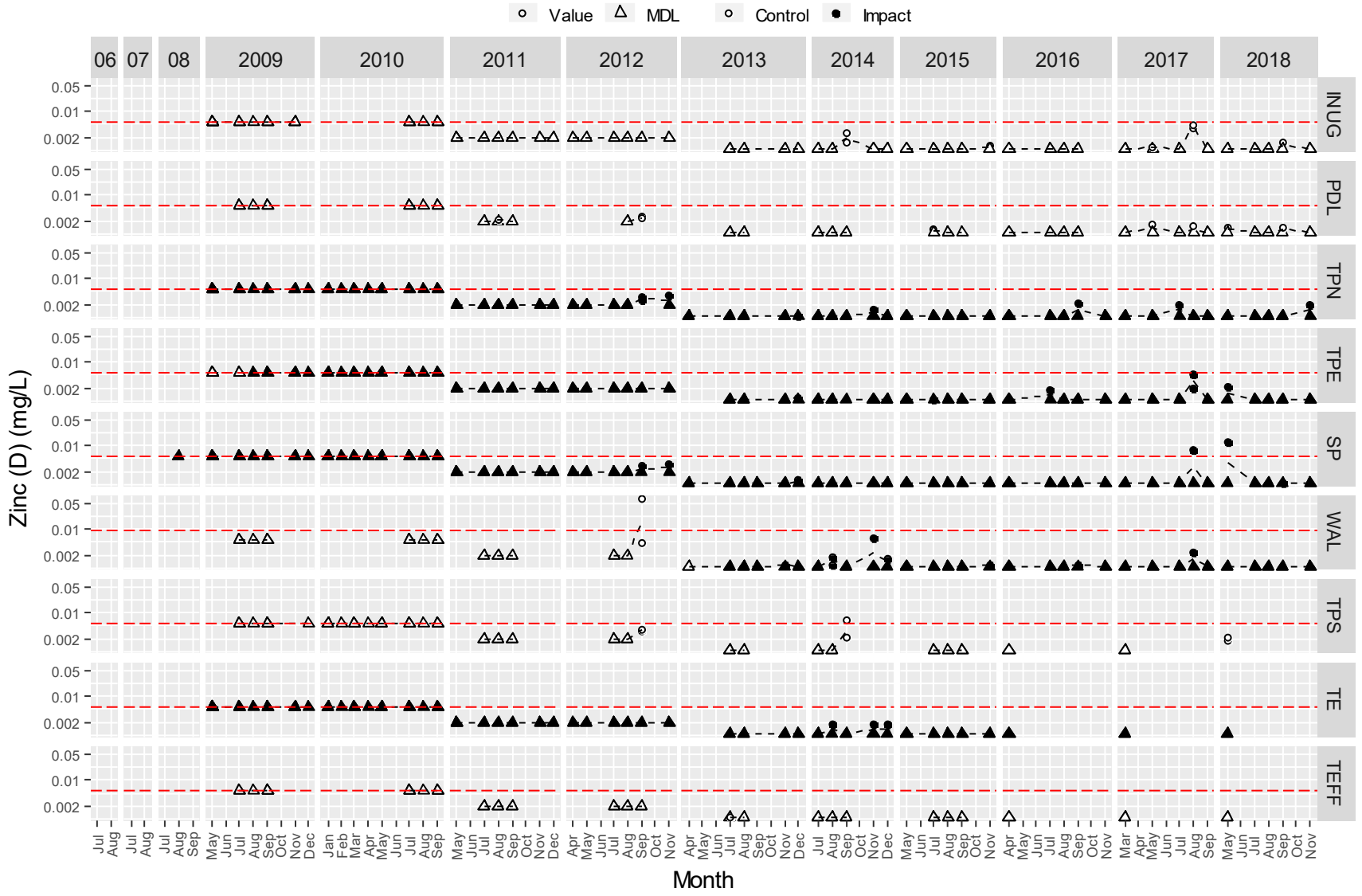


Figure B1-34. Dissolved zinc (mg/L) in water from Meadowbank study area lakes since 2006.

Note: The red dashed line is the trigger value (separate trigger for WAL).



APPENDIX B2
WATER CHEMISTRY – WHALE TAIL STUDY AREA LAKES

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Table B2-1. Water chemistry data for Whale Tail study area lakes, 2018.

Lake					Whale Tail Lake									
(Station)	Aquatic Life	Human Health	Trigger[3]	Threshold[3]	(WTS)									
Area-Replicate ID	Guidelines	Guidelines			WTS-27	WTS-28	WTS-29	WTS-30	WTS-31	WTS-32	WTS-33	WTS-34	WTS-35	WTS-36
Date					1-Jun-18	30-May-18	8-Jul-18	8-Jul-18	16-Aug-18	16-Aug-18	1-Sep-18	1-Sep-18	31-Oct-18	1-Nov-18
Time					16:00	16:00	14:30	15:00	8:45	8:00	14:53	15:15	15:07	10:50
ALS Sample ID					L2107814-2	L2107814-1	L2129144-1	L2129144-2	L2152738-1	L2152738-2	L2162149-3	L2162149-4	L2194149-3	L2194149-4
Field Measurements (3 m)														
Temperature (°C)					1.2	1.3	7.7	7.7	10.1	10.1	8.2	8.5	1.3	1.3
Specific Conductivity (µS/cm)					48.8	48.8	36.2	35.3	38.2	38.7	37.9	38.1	40.0	41.1
Dissolved Oxygen (mg/L)					17.3	16.4	12.0	11.9	10.4	10.4	11.5	11.4	15.8	15.4
pH	6.5 - 9.0		6.5 - 7.94	6.5 - 9.0	6.8	6.3	6.7	6.6	7.0	7.1	6.4	6.4	6.6	6.7
Physical Tests (mg/L)														
Conductivity (µS/cm)			23.51		54	56	39.4	36.7	40.0	40.1	40.4	40.5	37.4	40.7
Hardness			8.4895		18.3	18.4	12.8	12.1	13.3	13.5	13.4	13.5	13.4	13.2
pH (Laboratory)	6.5 - 9.0		6.50 - 7.94	6.5 - 9.0	6.9	6.9	6.9	6.9	7.0	7.0	7.0	7.0	6.9	7.0
Total Suspended Solids			3	5	*<1.0*	*<1.0*	1.3	1.1	2.1	1.7	*<1.0*	1.4	*<1.0*	*<1.0*
Total Dissolved Solids			18		44.0	41.0	38.0	29.1	28.4	26.7	27.4	28.4	27.7	31.5
Turbidity (NTU)					0.22	0.25	0.61	0.52	2.9	2.5	0.70	0.66	0.23	0.19
Anions and Nutrients (mg/L)														
Alkalinity - Bicarbonate			8.561475		6.7	6.7	4.6	4.4	5.5	5.3	5.5	5.5	5.4	6.0
Alkalinity - Carbonate			4		*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*
Alkalinity - Hydroxide					*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*
Alkalinity - Total			8.545		6.7	6.7	4.6	4.4	5.5	5.3	5.5	5.5	5.4	6.0
Ammonia (as N)[4]	***equation***		0.065343	0.126	0.016	0.019	*<0.0050*	*<0.0050*	0.012	*<0.0050*	*<0.0050*	*<0.0050*	*<0.0050*	*<0.0050*
Bromide					0.11	0.12	0.075	0.077	0.078	0.077	0.083	0.080	0.072	0.079
Chloride	120	250	60.275	120	9.7	9.8	6.7	6.6	6.7	6.8	6.9	6.9	6.1	6.7
Fluoride	0.12	1.5			0.038	0.036	0.028	0.030	0.028	0.028	0.029	0.029	0.031	0.034
Nitrate (as N)	3	10	1.5025	3	0.0075	0.017	*<0.0050*	*<0.0050*	*<0.0050*	*<0.0050*	*<0.0050*	*<0.0050*	*<0.0050*	*<0.0050*
Nitrite (as N)	0.06	1	0.031	0.06	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*
Total Kjeldahl Nitrogen			0.17025		0.15	0.14	0.12	0.12	0.13	0.11	0.098	0.12	0.10	0.095
Ortho Phosphate (as P)			0.002		*<0.0010*	*<0.0010*	0.0010	0.0011	0.0014	0.0010	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*
Phosphorus (P)-Total Diss.					*<0.0020*	*<0.0020*	*<0.0020*	0.0022	0.0027	*<0.0020*	*<0.0020*	*<0.0020*	*<0.0020*	*<0.0020*
Phosphorus (P)-Total	0.004		0.006022	0.004	0.0022	0.0024	0.0089	0.0052	0.0054	0.0048	*<0.0020*	0.0029	0.0028	0.0043
Silicate (as SiO_2)			1		0.76	0.81	0.53	0.56	*<0.50*	*<0.50*	*<0.50*	*<0.50*	*<0.50*	0.53
Sulphate (SO_4)		500	64.71	128	2.4	2.4	1.5	1.5	1.6	1.6	1.7	1.7	1.8	1.9
Cyanides														
Total Cyanide					*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*
Free Cyanide	0.005				*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*
Organic / Inorganic Carbon (mg/L)														
Dissolved Organic Carbon			2.6		2.5	2.5	2.3	2.3	1.8	1.8	2.1	2.0	1.9	1.8
Total Organic Carbon			2.785		2.7	2.4	2.3	2.3	1.7	1.7	2.0	2.1	1.9	2.0
Plant Pigments (µg/L)														
Chlorophyll-*a*					1.6	0.14	1.3	0.97	0.63	0.54	0.39	0.29	0.91	0.86
Total Metals (mg/L)														
Aluminum[4]	***equation***		0.0535	0.1	0.0037	0.0040	0.016	0.017	0.080	0.081	0.020	0.027	0.0077	0.0076
Antimony		0.006	0.01005	0.02	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Arsenic	0.005	0.01	0.00255	0.005	0.00026	0.00026	0.00019	0.00019	0.00040	0.00043	0.00032	0.00037	0.00020	0.00024
Barium		1	0.501035	1	0.011	0.011	0.0085	0.0083	0.0087	0.0088	0.0080	0.0081	0.0071	0.0080
Beryllium			0.0027	0.0053	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Bismuth					*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*
Boron	1.5	5	0.755	1.5	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*
Cadmium[4]	***equation***	0.005	0.000025	0.00004	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*
Calcium			2.1485		5.4	5.6	3.6	3.6	3.8	3.8	3.8	3.9	3.7	4.2
Cesium					*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	0.00002	0.00002	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*
Chromium[5]	0.001	0.05	0.000555	0.001	*<0.00010*	*<0.00010*	0.00018	0.00021	0.00058	0.00057	0.00023	0.00026	*<0.00010*	0.00012
Cobalt					*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Copper[3]	***equation***	1	0.001235	0.002	*<0.00050*	0.00081	*<0.00050*	*<0.00050*	0.00062	0.00058	0.00060	0.00061	*<0.00050*	*<0.00050*
Iron	0.3	0.3	0.155	0.3	*<0.010*	*<0.010*	0.039	0.040	0.12	0.12	0.040	0.047	0.012	*<0.010*
Lead[3]	***equation***	0.01	0.000525	0.001	*<0.000050*	0.00016	*<0.000050*	*<0.000050*	0.00016	0.00017	0.00007	0.00006	0.00007	*<0.000050*
Lithium			0.04821	0.096	0.0016	0.0016	0.0013	0.0012	0.0014	0.0014	0.0012	0.0012	0.0012	0.0014
Magnesium			0.8285		1.5	1.5	0.99	0.99	0.97	0.97	0.98	1.00	1.0	1.1
Manganese[4]		0.05	0.315675	***equation***	0.0010	0.0012	0.010	0.010	0.0038	0.0039	0.0021	0.0022	0.00091	0.00065
Mercury	0.000026	0.001	0.000018	0.000026	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*
Molybdenum	0.073		0.036525	0.073	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.00050*	0.00009	0.00005	0.00006	*<0.000050*	0.00006
Nickel[4]	***equation***		0.012729	0.025	0.00093	0.0010	0.00096	0.00099	0.00076	0.00080	0.00062	0.00057	0.00051	0.00056
Phosphorus					*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*
Potassium			0.5		0.80	0.79	0.54	0.55	0.71	0.71	0.70	0.72	0.73	0.81
Rubidium					0.0011	0.0011	0.00092	0.00082	0.0014	0.0015	0.0013	0.0014	0.0012	0.0014
Selenium	0.001	0.01	0.00055	0.001	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*
Silicon					0.42	0.43	0.30	0.30	0.40	0.40	0.23	0.26	0.26	0.29
Silver	0.00025				*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*
Sodium		200	0.9751		1.0	1.00	0.68	0.67	0.67	0.67	0.70	0.70	0.77	0.85
Strontium			0.02789	0.049	0.045	0.046	0.032	0.032	0.033	0.032	0.035	0.035	0.031	0.033
Sulfur					1.5	1.4	0.66	0.61	0.84	0.75	*<0.50*	*<0.50*	0.68	0.73
Tellurium					*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*
Thallium	0.0008		0.000405	0.0008	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*
Thorium					*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Tin			0.0002		*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Titanium			1.00008	2	*<0.00030*	*<0.00030*	0.00052	*<0.00060*	0.0026	0.0029	0.00090	0.0011	*<0.00030*	*<0.00030*
Tungsten					*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Uranium	0.015	0.02	0.00752	0.015	0.00003	0.00003	0.00003	0.00003	0.00006	0.00007	0.00004	0.00004	0.00003	0.00003
Vanadium			0.0035	0.006	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*
Zinc[4]	0.03	0.5	0.006252	***equation***	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*
Zirconium					*<0.000060*	*<0.000060*	*<0.000060*	*<0.000060*	0.00013	0.00013	*<0.000060*	*<0.000060*	*<0.000060*	*<0.000060*
Dissolved Metals (mg/L)														
Aluminum[4]			0.026266	0.05	0.0025	0.0023	0.0042	0.0049	0.0083	0.0089	0.0028	0.0036	0.0028	0.0029
Antimony			0.01005	0.02	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Arsenic			0.00255	0.005	0.00017	0.00019	0.00017	0.00012	0.00027	0.00030	0.00025	0.00026	0.00019	0.00020
Barium			0.500985	1	0.0092	0.0097	0.0079	0.0074	0.0083	0.0084	0.0079	0.0078	0.0075	0.0076
Beryllium			0.0027	0.0053	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Bismuth					*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*
Boron			0.755	1.5	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*
Cadmium			0.000025	0.00004	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*
Calcium					5.1	5.1	3.6	3.4	3.7	3.8	3.8	3.7	3.6	3.6
Cesium					*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*
Chromium			0.00055	0.001	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Cobalt					*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Copper			0.00119	0.002	0.00041	0.00067	0.00028	0.00039	0.00035	0.00043	0.00043	0.00043	0.00035	0.00039
Iron			0.155	0.3	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*
Lead			0.000525	0.001	0.00007	0.00012	*<0.000050*	*<0.000050*	*<0.000050*	0.00009	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*
Lithium			0.04825	0.096	0.0013	0.0013	0.0011	*<0.0010*	0.0012	0.0012	0.0012	0.0012	0.0010	0.0010
Magnesium			1.4		1.4	1.4	0.91	0.86	0.97	0.98	0.97	1.0	1.0	1.1
Manganese[4]		0.315233	***equation***		0.00051	0.00056	0.0085	0.0078	0.0013	0.0013	0.00081	0.0010	*<0.00010*	0.00013
Mercury		0.000018	0.000026		*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*
Molybdenum		0.036551	0.073		*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	0.00009	0.00008	*<0.000050*	0.00005	*<0.000050*	*<0.000050*
Nickel		0.01275	0.025		0.00078	0.00084	0.00090	0.00083	0.00057	0.00059	*<0.00050*	0.00051	*<0.00050*	*<0.00050*
Phosphorus					*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*
Potassium					0.71	0.71	0.55	0.52	0.74	0.75	0.69	0.71	0.72	0.73
Rubidium					0.00091	0.00099	0.00076	0.00087	0.0013	0.0012	0.0013	0.0014	0.0012	0.0013
Selenium		0.00055	0.001		*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*
Silicon					0.34	0.37	0.25	0.25	0.23	0.22	0.18	0.20	0.22	0.23
Silver					*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*
Sodium					0.89	0.90	0.65	0.61	0.68	0.70	0.70	0.71	0.75	0.79
Strontium		0.027953	0.049		0.042	0.043	0.031	0.030	0.032	0.032	0.031	0.032	0.031	0.032
Sulfur					0.79	0.78	*<0.50*	*<0.50*	0.86	0.92	*<0.50*	0.57	0.60	0.69
Tellurium					*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*
Thallium		0.000405	0.0008		*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*
Thorium					*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Tin		0.0002			*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Titanium		1.005	2		*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*
Tungsten					*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Uranium		0.007517	0.015		0.00003	0.00003	0.00003	0.00003	0.00004	0.00004	0.00003	0.00003	0.00003	0.00003
Vanadium		0.0035	0.006		*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*
Zinc[4]		0.005252	***equation***		*<0.0010*	*<0.0010*	*<0.0010*	0.0016	*<0.0010*	0.0015	*<0.0010*	0.0014	*<0.0010*	*<0.0010*
Zirconium					*<0.000060*	*<0.000060*	*<0.000060*	*<0.000060*	*<0.000060*	*<0.000060*	*<0.000060*	*<0.000060*	*<0.000060*	*<0.000060*

Notes:

1. CCME (Canadian Council of Ministers of the Environment) Canadian Water Quality Guidelines for the Protection of Aquatic Life, 1999, updated up to 2018.

2. Guidelines for Canadian Drinking Water Quality (Federal-Provincial-Territorial Committee on Health and the Environment). Standards for the following parameters are aesthetic and meant to protect against taste and odour: chloride, sulphate, copper, iron, manganese, sodium, zinc.

3. Trigger and threshold values are presented in "CREMP 2015 Plan Update" (Azimuth 2015a).

A number of thresholds were derived from methods (or sources) other than CCME guidelines - see Azimuth (2015a) for details.

4. "***equation***" means that CCME guidelines (or thresholds) are calculated based on an equation which is either pH or hardness dependent. The ammonia and aluminum (t & d) guidelines vary with pH; the cadmium, copper, lead, manganese, nickel and zinc guidelines vary with hardness.

5. Chromium CCME guideline is for Cr VI.

Shaded concentrations exceed the CCME aquatic life guidelines.

Bordered concentrations exceed the GCDWQ.

Italicized numbers are below detection limits.

"-" not analyzed/not sampled

n/a = issues with the water quality probe. No data collected.

underline = results were given a cautionary flag in the QC assessment (refer to **Appendix A1-1** for details).

strikethrough = results flagged as unreliable in the QC assessment (refer to **Appendix A1-1** for details).

Table B2-1. Water chemistry data for Whale Tail study area lakes, 2018.

Lake					Mammoth Lake									
(Station)					(MAM)									
Area-Replicate ID	Aquatic Life Guidelines	Human Health Guidelines	Trigger[3]	Threshold[3]	MAM-27	MAM-28	MAM-29	MAM-30	MAM-31	MAM-32	MAM-33	MAM-34	MAM-35	MAM-36
Date					1-Jun-18	1-Jun-18	16-Jul-18	16-Jul-18	16-Aug-18	16-Aug-18	1-Sep-18	1-Sep-18	1-Nov-18	1-Nov-18
Time					11:15	12:15	14:30	15:30	14:36	13:39	11:29	11:00	14:05	13:05
ALS Sample ID					L2107814-9	L2107814-10	L2133417-1	L2133417-2	L2152738-3	L2152738-4	L2162149-2	L2162149-1	L2194149-5	L2194149-6
Field Measurements (3 m)														
Temperature (°C)					1.8	1.5	13.3	12.9	9.9	10.0	8.2	8.1	1.3	1.6
Specific Conductivity (µS/cm)					64	59	53	52	62	57	64	59	126	132
Dissolved Oxygen (mg/L)					16.5	17.9	10.7	10.7	10.3	10.6	11.6	11.6	16.0	16.0
pH	6.5 - 9.0		6.5 - 7.94	6.5 - 9.0	6.5	6.5	6.4	6.7	7.0	7.0	6.4	6.3	6.4	6.6
Physical Tests (mg/L)														
Conductivity (µS/cm)			23.51		70	63	54	53	65	55	68	62	102	72
Hardness			8.4895		24.8	21.4	18.7	18.4	22.1	19.5	22.9	21.0	38.9	26.1
pH (Laboratory)	6.5 - 9.0		6.50 - 7.94	6.5 - 9.0	7.0	7.0	6.9	6.9	7.0	6.9	7.0	7.0	7.0	6.9
Total Suspended Solids			3	5	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	1.1	*<1.0*	*<1.0*
Total Dissolved Solids			18		54	44.0	47.5	44.8	47.0	51	51	47.0	89	58
Turbidity (NTU)					0.21	0.17	0.48	0.78	0.28	0.30	0.31	0.18	1.0	0.20
Anions and Nutrients (mg/L)														
Alkalinity - Bicarbonate			8.561475		9.3	7.9	4.7	5.1	5.3	4.7	5.2	4.8	7.1	5.3
Alkalinity - Carbonate			4		*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*
Alkalinity - Hydroxide					*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*
Alkalinity - Total			8.545		9.3	7.9	4.7	5.1	5.3	4.7	5.2	4.8	7.1	5.3
Ammonia (as N)[4]	***equation***		0.065343	0.126	*<0.0050*	*<0.0050*	*<0.0050*	*<0.0050*	0.0065	0.022	*<0.0050*	0.011	0.016	*<0.0050*
Bromide					0.13	0.12	0.13	0.13	0.16	0.14	0.17	0.15	0.28	0.18
Chloride	120	250	60.275	120	11.3	10.4	10.5	10.3	12.9	11.5	13.6	12.2	21.5	14.4
Fluoride	0.12	1.5			0.038	0.036	0.023	0.022	0.027	0.026	0.027	0.026	0.032	0.029
Nitrate (as N)	3	10	1.5025	3	*<0.0050*	0.0053	*<0.0050*	*<0.0050*	*<0.0050*	*<0.0050*	*<0.0050*	*<0.0050*	0.11	*<0.0050*
Nitrite (as N)	0.06	1	0.031	0.06	*<0.0010*	0.0013	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	0.0023	*<0.0010*
Total Kjeldahl Nitrogen			0.17025		0.13	0.19	0.10	0.095	0.098	0.12	0.083	0.085	0.13	0.086
Ortho Phosphate (as P)			0.002		*<0.0010*	*<0.0010*	0.0018	*<0.0010*	0.0011	0.0012	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*
Phosphorus (P)-Total Diss.					*<0.0020*	*<0.0020*	*<0.0020*	*<0.0020*	*<0.0020*	*<0.0020*	*<0.0020*	*<0.0020*	*<0.0020*	0.0022
Phosphorus (P)-Total	0.004		0.006022	0.004	0.0029	0.0024	0.0022	0.0028	0.0022	*<0.0020*	*<0.0020*	*<0.0020*	0.0036	0.0030
Silicate (as SiO_2)			1		1.3	1.1	0.54	0.56	0.52	*<0.50*	0.64	0.63	0.78	0.64
Sulphate (SO_4)		500	64.71	128	5.0	4.3	2.8	2.8	3.1	3.1	3.3	3.3	4.3	3.9
Cyanides														
Total Cyanide					*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*
Free Cyanide	0.005				*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*
Organic / Inorganic Carbon (mg/L)														
Dissolved Organic Carbon			2.6		2.2	2.1	1.7	1.6	1.6	1.5	1.7	1.6	1.6	1.8
Total Organic Carbon			2.785		2.2	2.1	1.7	1.7	1.4	1.3	1.7	1.7	1.6	1.7
Plant Pigments (µg/L)														
Chlorophyll-*a*					1.0	1.2	0.32	0.38	0.28	0.41	0.28	0.25	0.73	0.58
Total Metals (mg/L)														
Aluminum[4]	***equation***		0.0535	0.1	*<0.0030*	*<0.0030*	*<0.012*	*<0.0090*	0.0064	0.0043	0.0076	0.0034	0.049	0.0082
Antimony		0.006	0.01005	0.02	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Arsenic	0.005	0.01	0.00255	0.005	0.00043	0.00042	0.00035	0.00034	0.00040	0.00034	0.00039	0.00037	0.00047	0.00030
Barium		1	0.501035	1	0.014	0.012	0.012	0.011	0.011	0.010	0.011	0.010	0.019	0.012
Beryllium			0.0027	0.0053	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Bismuth					*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*
Boron	1.5	5	0.755	1.5	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*
Cadmium[4]	***equation***	0.005	0.000025	0.00004	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*
Calcium			2.1485		7.0	6.2	5.6	5.6	6.8	5.4	7.1	6.4	12.5	8.2
Cesium					*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	0.00001	*<0.000010*
Chromium[5]	0.001	0.05	0.000555	0.001	*<0.00010*	*<0.00010*	0.00011	0.00012	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	0.00023	*<0.00010*
Cobalt					*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Copper[3]	***equation***	1	0.001235	0.002	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	0.00051	*<0.00050*	*<0.00050*	*<0.00050*
Iron	0.3	0.3	0.155	0.3	*<0.010*	*<0.010*	0.021	0.023	0.017	0.012	0.023	*<0.010*	0.054	0.010
Lead[3]	***equation***	0.01	0.000525	0.001	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	0.00006	*<0.000050*
Lithium			0.04821	0.096	0.0017	0.0017	0.0023	0.0023	0.0027	0.0021	0.0025	0.0022	0.0048	0.0029
Magnesium			0.8285		2.0	1.8	1.2	1.1	1.3	1.2	1.4	1.3	2.1	1.6
Manganese[4]		0.05	0.315675	***equation***	0.0012	0.00067	0.0055	0.0061	0.0019	0.0019	0.0015	0.0013	0.0019	0.00093
Mercury	0.000026	0.001	0.000018	0.000026	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*
Molybdenum	0.073		0.036525	0.073	*<0.000050*	*<0.000050*	*<0.00010*	*<0.00010*	*<0.00040*	*<0.00040*	*<0.000050*	*<0.000050*	0.00027	*<0.000050*
Nickel[4]	***equation***		0.012729	0.025	0.0014	0.0010	*<0.0015*	0.0012	0.00069	0.00069	0.00071	0.00065	0.0012	0.00082
Phosphorus					*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*
Potassium			0.5		1.2	1.1	0.75	0.73	0.82	0.79	0.87	0.82	1.5	1.0
Rubidium					0.0017	0.0017	0.0010	0.0010	0.0012	0.0012	0.0013	0.0012	0.0022	0.0015
Selenium	0.001	0.01	0.00055	0.001	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*
Silicon					0.61	0.58	0.30	0.31	0.34	0.33	0.29	0.50	0.35	
Silver	0.00025				*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000030*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*
Sodium		200	0.9751		1.1	1.0	0.68	0.66	0.70	0.67	0.77	0.72	1.1	0.88
Strontium			0.02789	0.049	0.050	0.046	0.049	0.048	0.063	0.048	0.070	0.058	0.12	0.073
Sulfur					2.1	1.8	1.2	1.1	1.3	1.4	1.0	1.1	1.5	1.4
Tellurium					*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*
Thallium	0.0008		0.000405	0.0008	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*
Thorium					*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Tin			0.0002		*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Titanium			1.00008	2	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.0012*	*<0.00030*
Tungsten					*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Uranium	0.015	0.02	0.00752	0.015	0.00002	0.00002	0.00002	0.00002	0.00001	0.00001	0.00002	0.00001	0.00004	0.00002
Vanadium			0.0035	0.006	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*
Zinc[4]	0.03	0.5	0.006252	***equation***	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*
Zirconium					*<0.000060*	*<0.000060*	*<0.000060*	*<0.000060*	*<0.000060*	*<0.000060*	*<0.000060*	*<0.000060*	0.00008	*<0.000060*
Dissolved Metals (mg/L)														
Aluminum[4]			0.026266	0.05	*<0.0040*	*<0.0020*	0.0032	0.0032	0.0020	0.0029	0.0021	*<0.0010*	0.023	0.0043
Antimony			0.01005	0.02	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Arsenic			0.00255	0.005	0.00036	0.00035	0.00029	0.00030	0.00034	0.00030	0.00032	0.00030	0.00038	0.00028
Barium			0.500985	1	0.015	0.010	0.010	0.010	0.011	0.010	0.011	0.010	0.021	0.013
Beryllium			0.0027	0.0053	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Bismuth					*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*
Boron			0.755	1.5	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*
Cadmium			0.000025	0.00004	0.00001	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*
Calcium					6.9	6.0	5.6	5.5	6.7	5.8	6.9	6.3	12.2	7.8
Cesium					*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*
Chromium			0.00055	0.001	0.00017	*<0.00010*	*<0.00010*	0.00010	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Cobalt					*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Copper			0.00119	0.002	0.0010	0.00036	0.00031	0.00035	0.00030	0.00031	0.00038	0.00038	0.00037	0.00033
Iron			0.155	0.3	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*
Lead			0.000525	0.001	0.00007	*<0.000050*	0.00049	0.0019	*<0.000050*	*<0.000050*	0.00030	*<0.000050*	*<0.000050*	*<0.000050*
Lithium			0.04825	0.096	0.0016	0.0015	0.0021	0.0020	0.0026	0.0021	0.0025	0.0022	0.0047	0.0026
Magnesium					1.8	1.6	1.2	1.2	1.3	1.2	1.4	1.3	2.1	1.6
Manganese[4]			0.315233	***equation***	0.0010	0.00050	0.0041	0.0046	0.00089	0.00070	0.00074	0.00062	0.00065	0.00043
Mercury			0.000018	0.000026	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*
Molybdenum			0.036551	0.073	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	0.00006	0.00005	*<0.000050*	*<0.000050*	0.00031	*<0.000050*
Nickel			0.01275	0.025	0.0019	0.00080	0.0011	0.0012	0.00072	0.00067	0.00070	0.00060	0.0010	0.00073
Phosphorus					*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*
Potassium					1.1	0.98	0.75	0.76	0.86	0.82	0.87	0.81	1.6	1.0
Rubidium					0.0015	0.0013	0.0010	0.0012	0.0012	0.0012	0.0013	0.0012	0.0024	0.0015
Selenium			0.00055	0.001	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*
Silicon					0.53	0.48	0.27	0.26	0.27	0.27	0.27	0.26	0.42	0.32
Silver					*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*
Sodium					1.0	0.89	0.64	0.66	0.71	0.67	0.76	0.72	1.3	0.86
Strontium			0.027953	0.049	0.050	0.043	0.048	0.047	0.062	0.050	0.064	0.054	0.13	0.071
Sulfur					1.9	1.8	1.1	1.0	1.1	1.3	0.87	0.84	1.5	1.4
Tellurium					*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*
Thallium			0.000405	0.0008	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*
Thorium					*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Tin			0.0002		*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Titanium			1.005	2	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*
Tungsten					*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Uranium			0.007517	0.015	0.00002	0.00001	0.00002	0.00002	0.00001	0.00001	0.00001	0.00001	0.00003	0.00001
Vanadium			0.0035	0.006	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*
Zinc[4]			0.005252	***equation***	0.0039	*<0.0010*	*<0.0010*	0.0053	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*
Zirconium					*<0.000060*	*<0.000060*	0.00012	*<0.000060*	*<0.000060*	*<0.000060*	*<0.000060*	*<0.000060*	*<0.000060*	*<0.000060*

Notes:

1. CCME (Canadian Council of Ministers of the Environment) Canadian Water Quality Guidelines for the Protection of Aquatic Life, 1999, updated up to 2018.

2. Guidelines for Canadian Drinking Water Quality (Federal-Provincial-Territorial Committee on Health and the Environment). Standards for the following parameters are aesthetic and meant to protect against taste and odour: chloride, sulphate, copper, iron, manganese, sodium, zinc.

3. Trigger and threshold values are presented in "CREMP 2015 Plan Update" (Azimuth 2015a).
A number of thresholds were derived from methods (or sources) other than CCME guidelines - see Azimuth (2015a) for details.

4. "***equation***" means that CCME guidelines (or thresholds) are calculated based on an equation which is either pH or hardness dependent. The ammonia and aluminum (t & d) guidelines vary with pH; the cadmium, copper, lead, manganese, nickel and zinc guidelines vary with hardness.

5. Chromium CCME guideline is for Cr VI.

Shaded concentrations exceed the CCME aquatic life guidelines.

Bordered concentrations exceed the GCDWQ.

Italicized numbers are below detection limits.

"-" not analyzed/not sampled

n/a = issues with the water quality probe. No data collected.

underline = results were given a cautionary flag in the QC assessment (refer to **Appendix A1-1** for details).

strikethrough = results flagged as unreliable in the QC assessment (refer to **Appendix A1-1** for details).

Table B2-1. Water chemistry data for Whale Tail study area lakes, 2018.

Lake					Lake A20									
(Station)	Aquatic Life	Human Health	Trigger[3]	Threshold[3]	(A20)									
Area-Replicate ID	Guidelines	Guidelines			A20-21	A20-22	A20-22	A20-23	A20-25	A20-26	A20-27	A20-28	A20-29	A20-30
Date					2-Jun-18	2-Jun-18	16-Jul-18	16-Jul-18	17-Aug-18	17-Aug-18	22-Sep-18	22-Sep-18	1-Nov-18	1-Nov-18
Time					14:00	8:50	11:45	12:15	13:50	14:27	11:55	12:50	11:50	12:16
ALS Sample ID					L2107814-8	L2107814-7	L2133417-5	L2133417-6	L2152738-7	L2152738-8	L2173524-3	L2173524-4	L2194149-1	L2194149-2
Field Measurements (3 m)														
Temperature (°C)					1.0	2.1	11.4	12.9	9.8	10.1	0.21	2.0	1.5	1.5
Specific Conductivity (µS/cm)					19.3	27.0	12.8	12.6	13.4	13.1	15.4	15.0	15.5	15.4
Dissolved Oxygen (mg/L)					18.8	17.5	10.9	10.7	10.6	10.6	14.2	13.3	14.6	15.8
pH	6.5 - 9.0		6.5 - 7.94	6.5 - 9.0	6.5	6.2	6.3	6.3	7.0	6.9	6.5	6.7	7.3	6.6
Physical Tests (mg/L)														
Conductivity (µS/cm)			23.51		20.7	29.6	13.0	13.1	12.9	12.5	14.3	13.8	14.1	13.9
Hardness			8.4895		7.0	10.2	4.5	4.4	4.7	4.6	5.1	5.0	5.0	5.1
pH (Laboratory)	6.5 - 9.0		6.50 - 7.94	6.5 - 9.0	7.0	7.1	6.7	6.9	6.9	6.9	6.9	6.9	6.9	6.9
Total Suspended Solids			3	5	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*
Total Dissolved Solids			18		15.9	22.4	8.8	13.0	12.1	13.2	14.1	14.4	14.7	14.8
Turbidity (NTU)					0.16	0.20	0.36	0.37	0.25	0.35	0.21	0.25	0.15	0.15
Anions and Nutrients (mg/L)														
Alkalinity - Bicarbonate			8.561475		7.2	10.2	4.9	5.1	4.9	4.4	5.1	4.7	4.7	4.8
Alkalinity - Carbonate			4		*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*
Alkalinity - Hydroxide					*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*
Alkalinity - Total			8.545		7.2	10.2	4.9	5.1	4.9	4.4	5.1	4.7	4.7	4.8
Ammonia (as N)[4]	***equation***		0.065343	0.126	*<0.0050*	0.0096	*<0.0050*	*<0.0050*	*<0.0050*	0.014	0.016	0.0080	*<0.0050*	*<0.0050*
Bromide					*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*
Chloride	120	250	60.275	120	0.90	1.3	0.59	0.58	0.65	0.63	0.66	0.65	0.67	0.66
Fluoride	0.12	1.5			0.038	0.045	0.024	0.023	0.027	0.027	0.028	0.028	0.028	0.029
Nitrate (as N)	3	10	1.5025	3	*<0.0050*	0.0068	*<0.0050*	*<0.0050*	*<0.0050*	*<0.0050*	*<0.0050*	*<0.0050*	*<0.0050*	*<0.0050*
Nitrite (as N)	0.06	1	0.031	0.06	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*
Total Kjeldahl Nitrogen			0.17025		0.11	0.14	0.085	0.086	0.079	0.11	0.11	0.15	0.070	0.077
Ortho Phosphate (as P)			0.002		*<0.0010*	*<0.0010*	*<0.0010*	0.0011	0.0011	0.0013	0.0011	0.0014	*<0.0010*	*<0.0010*
Phosphorus (P)-Total Diss.					*<0.0020*	*<0.0020*	*<0.0020*	*<0.0020*	*<0.0020*	*<0.0020*	0.0027	0.0023	*<0.0020*	*<0.0020*
Phosphorus (P)-Total	0.004		0.006022	0.004	*<0.0020*	*<0.0020*	0.0022	0.0026	*<0.0020*	*<0.0020*	0.0030	0.0055	0.0020	0.0038
Silicate (as SiO_2)			1		1.3	2.1	0.82	0.78	0.79	0.74	0.85	0.78	0.79	0.83
Sulphate (SO_4)		500	64.71	128	1.4	1.9	0.86	0.86	0.99	0.93	1.1	1.0	1.1	1.0
Cyanides														
Total Cyanide					*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*
Free Cyanide	0.005				*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*
Organic / Inorganic Carbon (mg/L)														
Dissolved Organic Carbon			2.6		2.2	2.7	1.5	1.4	1.3	1.3	1.6	1.8	1.5	1.4
Total Organic Carbon			2.785		2.2	2.4	1.6	1.8	1.3	1.4	2.1	1.6	1.4	1.8
Plant Pigments (µg/L)														
Chlorophyll-*a*					0.43	0.72	0.24	0.30	0.25	0.28	0.33	0.36	0.44	0.42
Total Metals (mg/L)														
Aluminum[4]	***equation***		0.0535	0.1	*<0.0030*	*<0.0030*	*<0.0090*	0.010	0.0061	0.0059	0.0047	0.0039	0.0034	
Antimony		0.006	0.01005	0.02	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Arsenic	0.005	0.01	0.00255	0.005	0.00014	0.00016	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	0.00011	*<0.00010*	*<0.00010*
Barium		1	0.501035	1	0.0050	0.0090	0.0035	0.0033	0.0029	0.0027	0.0029	0.0030	0.0030	0.0029
Beryllium			0.0027	0.0053	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Bismuth					*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*
Boron	1.5	5	0.755	1.5	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*
Cadmium[4]	***equation***	0.005	0.000025	0.00004	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*
Calcium			2.1485		1.9	2.7	1.1	1.2	1.2	1.2	1.3	1.3	1.3	1.3
Cesium					*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*
Chromium[5]	0.001	0.05	0.000555	0.001	*<0.00010*	0.00014	*<0.00010*	0.00017	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	0.00020
Cobalt					*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Copper[3]	***equation***	1	0.001235	0.002	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*
Iron	0.3	0.3	0.155	0.3	*<0.010*	*<0.010*	0.018	0.025	0.021	0.014	0.013	0.014	*<0.010*	0.012
Lead[3]	***equation***	0.01	0.000525	0.001	0.00011	*<0.000050*	*<0.000050*	0.00016	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*
Lithium			0.04821	0.096	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*
Magnesium			0.8285		0.66	0.93	0.38	0.41	0.40	0.38	0.45	0.43	0.45	0.44
Manganese[4]		0.05	0.315675	***equation***	0.00051	0.0012	0.0025	0.0024	0.0010	0.0013	0.00068	0.0010	0.00071	0.00071
Mercury	0.000026	0.001	0.000018	0.000026	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*
Molybdenum	0.073		0.036525	0.073	*<0.000050*	*<0.000050*	*<0.00010*	*<0.000050*	*<0.00040*	*<0.00040*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*
Nickel[4]	***equation***		0.012729	0.025	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*
Phosphorus					*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*
Potassium			0.5		0.53	0.72	0.31	0.31	0.33	0.30	0.34	0.33	0.35	0.34
Rubidium					0.00070	0.00093	0.00037	0.00040	0.00037	0.00036	0.00041	0.00036	0.00038	0.00041
Selenium	0.001	0.01	0.00055	0.001	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*
Silicon					0.67	0.97	0.42	0.42	0.45	0.43	0.44	0.44	0.41	0.41
Silver	0.00025				*<0.000010*	*<0.000010*	0.00002	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*
Sodium		200	0.9751		0.86	1.2	0.54	0.52	0.53	0.50	0.62	0.61	0.61	0.59
Strontium			0.02789	0.049	0.0097	0.014	0.0061	0.0059	0.0064	0.0065	0.0069	0.0068	0.0068	0.0067
Sulfur					1.1	1.3	0.62	*<0.50*	0.76	0.61	*<0.50*	*<0.50*	*<0.50*	*<0.50*
Tellurium					*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*
Thallium	0.0008		0.000405	0.0008	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*
Thorium					*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Tin			0.0002		*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Titanium			1.00008	2	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*
Tungsten					*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Uranium	0.015	0.02	0.00752	0.015	0.00003	0.00004	0.00003	0.00003	0.00002	0.00003	0.00002	0.00002	0.00002	0.00002
Vanadium			0.0035	0.006	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*
Zinc[4]	0.03	0.5	0.006252	***equation***	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*
Zirconium					*<0.000060*	*<0.000060*	*<0.000060*	*<0.000060*	*<0.000060*	*<0.000060*	*<0.000060*	*<0.000060*	*<0.000060*	*<0.000060*
Dissolved Metals (mg/L)														
Aluminum[4]			0.026266	0.05	0.0024	0.0016	0.0032	0.0029	0.0027	0.0034	0.0029	0.0025	0.0019	0.0015
Antimony			0.01005	0.02	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Arsenic			0.00255	0.005	*<0.00010*	0.00011	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Barium			0.500985	1	0.0042	0.0071	0.0030	0.0030	0.0028	0.0030	0.0030	0.0031	0.0029	0.0030
Beryllium			0.0027	0.0053	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Bismuth					*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*
Boron			0.755	1.5	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*
Cadmium			0.000025	0.00004	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*
Calcium					1.8	2.7	1.2	1.1	1.2	1.2	1.3	1.3	1.3	1.3
Cesium					*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*
Chromium			0.00055	0.001	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	0.00011	0.00013	*<0.00010*
Cobalt					*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Copper			0.00119	0.002	0.00029	0.00037	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	0.00021	0.00021	0.00020	0.00021
Iron			0.155	0.3	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*
Lead			0.000525	0.001	*<0.000050*	*<0.000050*	0.00006	0.00056	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*
Lithium			0.04825	0.096	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*
Magnesium					0.60	0.88	0.38	0.38	0.41	0.40	0.45	0.45	0.44	0.46
Manganese[4]			0.315233	***equation***	0.00039	0.00084	0.0017	0.0015	0.00066	0.00086	0.00041	0.00053	0.00020	0.00015
Mercury			0.000018	0.000026	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*
Molybdenum			0.036551	0.073	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	0.00008	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*
Nickel			0.01275	0.025	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*
Phosphorus					*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*
Potassium					0.48	0.69	0.32	0.32	0.33	0.33	0.32	0.33	0.34	0.35
Rubidium					0.00060	0.00080	0.00037	0.00038	0.00042	0.00038	0.00042	0.00044	0.00035	0.00046
Selenium			0.00055	0.001	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*
Silicon					0.59	0.89	0.38	0.35	0.39	0.37	0.38	0.37	0.40	0.40
Silver					*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*
Sodium					0.78	1.1	0.51	0.51	0.53	0.52	0.59	0.61	0.58	0.59
Strontium			0.027953	0.049	0.0096	0.014	0.0061	0.0059	0.0063	0.0061	0.0067	0.0065	0.0067	0.0068
Sulfur					*<0.50*	*<0.50*	*<0.50*	*<0.50*	0.55	0.60	*<0.50*	*<0.50*	*<0.50*	*<0.50*
Tellurium					*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*
Thallium			0.000405	0.0008	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*
Thorium					*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Tin			0.0002		*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Titanium			1.005	2	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*
Tungsten					*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Uranium			0.007517	0.015	0.00003	0.00003	0.00003	0.00003	0.00002	0.00002	0.00002	0.00002	0.00002	0.00002
Vanadium			0.0035	0.006	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*
Zinc[4]			0.005252	***equation***	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*
Zirconium					*<0.000060*	*<0.000060*	*<0.000060*	*<0.000060*	*<0.000060*	*<0.000060*	*<0.000060*	*<0.000060*	*<0.000060*	*<0.000060*

Notes:

1. CCME (Canadian Council of Ministers of the Environment) Canadian Water Quality Guidelines for the Protection of Aquatic Life, 1999, updated up to 2018.

2. Guidelines for Canadian Drinking Water Quality (Federal-Provincial-Territorial Committee on Health and the Environment). Standards for the following parameters are aesthetic and meant to protect against taste and odour: chloride, sulphate, copper, iron, manganese, sodium, zinc.

3. Trigger and threshold values are presented in "CREMP 2015 Plan Update" (Azimuth 2015a).
A number of thresholds were derived from methods (or sources) other than CCME guidelines - see Azimuth (2015a) for details.

4. "***equation***" means that CCME guidelines (or thresholds) are calculated based on an equation which is either pH or hardness dependent. The ammonia and aluminum (t & d) guidelines vary with pH; the cadmium, copper, lead, manganese, nickel and zinc guidelines vary with hardness.

5. Chromium CCME guideline is for Cr VI.

Shaded concentrations exceed the CCME aquatic life guidelines.

Bordered concentrations exceed the GCDWQ.

Italicized numbers are below detection limits.

"-" not analyzed/not sampled

n/a = issues with the water quality probe. No data collected.

underline = results were given a cautionary flag in the QC assessment (refer to **Appendix A1-1** for details).

strikethrough = results flagged as unreliable in the QC assessment (refer to **Appendix A1-1** for details).

Table B2-1. Water chemistry data for Whale Tail study area lakes, 2018.

Lake					Lake A76									
(Station)	Aquatic Life	Human Health	Trigger[3]	Threshold[3]	(A76)									
Area-Replicate ID	Guidelines	Guidelines			A76-21	A76-22	A76-23	A76-24	A76-25	A76-26	A76-27	A76-28	A76-29	A76-30
Date					2-Jun-18	2-Jun-18	21-Jul-18	21-Jul-18	18-Aug-18	18-Aug-18	9-Sep-18	9-Sep-18	25-Nov-18	25-Nov-18
Time					16:00	16:55	11:15	12:00	12:52	12:06	13:27	12:20	11:20	10:50
ALS Sample ID					L2107814-6	L2107814-5	L2136260-3	L2136260-4	L2152738-9	L2152738-10	L2164419-13	L2164419-14	L2205457-3	L2205457-4
Field Measurements (3 m)														
Temperature (°C)					1.3	1.1	13.6	13.4	10.6	10.9	6.7	6.7	1.7	1.6
Specific Conductivity (µS/cm)					48.0	46.3	33.2	33.2	36.0	36.4	37.9	38.2	51	51
Dissolved Oxygen (mg/L)					18.6	17.6	10.5	10.5	10.5	10.5	10.9	10.9	15.8	16.5
pH	6.5 - 9.0		6.5 - 7.94	6.5 - 9.0	6.5	6.5	6.7	6.8	7.1	7.1	6.4	6.6	6.6	6.7
Physical Tests (mg/L)														
Conductivity (µS/cm)			23.51		51	48.7	35.4	35.8	34.3	35.3	38.0	38.4	44.4	44.0
Hardness			8.4895		17.9	17.0	12.3	12.2	13.2	13.7	13.8	13.7	16.1	17.6
pH (Laboratory)	6.5 - 9.0		6.50 - 7.94	6.5 - 9.0	7.0	7.1	7.1	7.1	7.0	7.0	7.0	7.0	7.0	7.0
Total Suspended Solids			3	5	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*
Total Dissolved Solids			18		38.0	42.0	25.7	24.8	26.7	25.7	26.7	25.5	21.2	25.0
Turbidity (NTU)					0.17	0.21	0.24	0.26	0.20	*<0.10*	0.19	0.21	0.15	0.13
Anions and Nutrients (mg/L)														
Alkalinity - Bicarbonate			8.561475		9.5	8.5	6.8	7.2	6.1	6.0	6.5	6.5	7.1	6.9
Alkalinity - Carbonate			4		*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*
Alkalinity - Hydroxide					*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*
Alkalinity - Total			8.545		9.5	8.5	6.8	7.2	6.1	6.0	6.5	6.5	7.1	6.9
Ammonia (as N)[4]	***equation***		0.065343	0.126	0.0073	0.014	*<0.0050*	0.0059	*<0.0050*	*<0.0050*	0.022	0.012	*<0.0050*	*<0.0050*
Bromide					0.069	0.063	*<0.050*	*<0.050*	0.053	0.056	0.056	0.056	0.064	0.059
Chloride	120	250	60.275	120	6.3	6.2	4.2	4.2	4.8	4.9	4.9	5.0	6.3	6.1
Fluoride	0.12	1.5			0.037	0.036	0.026	0.026	0.027	0.027	0.026	0.026	0.030	0.029
Nitrate (as N)	3	10	1.5025	3	*<0.0050*	0.0070	*<0.0050*	*<0.0050*	*<0.0050*	*<0.0050*	*<0.0050*	*<0.0050*	*<0.0050*	*<0.0050*
Nitrite (as N)	0.06	1	0.031	0.06	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*
Total Kjeldahl Nitrogen			0.17025		0.097	0.11	0.083	0.086	0.086	0.074	0.11	0.13	0.12	0.081
Ortho Phosphate (as P)			0.002		*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	0.0013	0.0012	0.0015	0.0013	*<0.0010*	0.0011
Phosphorus (P)-Total Diss.					*<0.0020*	*<0.0020*	*<0.0020*	*<0.0020*	*<0.0020*	*<0.0020*	0.0021	0.0023	*<0.0020*	*<0.0020*
Phosphorus (P)-Total	0.004		0.006022	0.004	0.0020	0.0022	0.0055	*<0.0020*	*<0.0020*	*<0.0020*	*<0.0020*	*<0.0020*	*<0.0020*	0.0026
Silicate (as SiO_2)			1		1.4	1.4	0.92	0.97	0.89	0.85	0.94	0.94	1.0	1.1
Sulphate (SO_4)		500	64.71	128	4.3	4.1	2.9	2.9	3.3	3.3	3.4	3.4	4.1	4.0
Cyanides														
Total Cyanide					*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*
Free Cyanide	0.005				*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*
Organic / Inorganic Carbon (mg/L)														
Dissolved Organic Carbon			2.6		1.8	1.9	1.5	1.7	1.4	1.4	1.6	1.6	1.5	1.7
Total Organic Carbon			2.785		1.9	1.7	1.6	2.0	1.4	1.4	1.7	1.7	1.6	1.8
Plant Pigments (µg/L)														
Chlorophyll-*a*					1.5	0.56	-	-	0.20	0.22	0.31	0.23	0.93	1.1
Total Metals (mg/L)														
Aluminum[4]	***equation***		0.0535	0.1	*<0.0030*	*<0.0030*	0.0045	0.0050	0.0057	0.0032	0.0036	*<0.0060*	0.0042	*<0.0030*
Antimony		0.006	0.01005	0.02	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Arsenic	0.005	0.01	0.00255	0.005	0.00029	0.00028	0.00025	0.00024	0.00021	0.00021	0.00021	0.00022	0.00023	0.00021
Barium		1	0.501035	1	0.011	0.0098	0.0073	0.0073	0.0066	0.0069	0.0066	0.0068	0.0084	0.0082
Beryllium			0.0027	0.0053	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Bismuth					*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*
Boron	1.5	5	0.755	1.5	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*
Cadmium[4]	***equation***	0.005	0.000025	0.00004	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	0.00001
Calcium			2.1485		4.8	4.5	3.3	3.3	3.7	3.7	3.9	3.8	4.3	4.4
Cesium					*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*
Chromium[5]	0.001	0.05	0.000555	0.001	0.00011	*<0.00010*	0.00013	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00050*	*<0.0010*
Cobalt					*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Copper[3]	***equation***	1	0.001235	0.002	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*
Iron	0.3	0.3	0.155	0.3	*<0.010*	*<0.010*	0.015	0.016	0.015	0.011	0.013	0.012	0.010	*<0.010*
Lead[3]	***equation***	0.01	0.000525	0.001	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*
Lithium			0.04821	0.096	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*
Magnesium			0.8285		1.7	1.5	1.1	1.1	1.1	1.1	1.1	1.1	1.3	1.4
Manganese[4]		0.05	0.315675	***equation***	0.00050	0.00041	0.0034	0.0033	0.0014	0.0013	0.0011	0.0011	0.00074	0.00068
Mercury	0.000026	0.001	0.000018	0.000026	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*
Molybdenum	0.073		0.036525	0.073	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.00020*	*<0.00020*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*
Nickel[4]	***equation***		0.012729	0.025	0.00075	0.00070	0.00070	0.00069	0.00050	*<0.00050*	*<0.00050*	*<0.00050*	0.00085	0.0011
Phosphorus					*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*
Potassium			0.5		1.1	0.97	0.66	0.66	0.68	0.70	0.68	0.70	0.77	0.78
Rubidium					0.0016	0.0014	0.00096	0.00092	0.00091	0.00097	0.0010	0.0011	0.0011	0.0012
Selenium	0.001	0.01	0.00055	0.001	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*
Silicon					0.70	0.65	0.47	0.45	0.52	0.49	0.49	0.48	0.55	0.56
Silver	0.00025				*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*
Sodium		200	0.9751		1.00	0.91	0.66	0.64	0.62	0.64	0.68	0.68	0.76	0.73
Strontium			0.02789	0.049	0.024	0.023	0.017	0.017	0.019	0.019	0.020	0.020	0.024	0.024
Sulfur					2.1	2.0	0.98	1.1	1.2	1.2	*<0.50*	*<0.50*	1.5	1.4
Tellurium					*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*
Thallium	0.0008		0.000405	0.0008	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*
Thorium					*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Tin			0.0002		*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Titanium			1.00008	2	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*
Tungsten					*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Uranium	0.015	0.02	0.00752	0.015	0.00002	0.00001	0.00002	0.00002	0.00002	0.00001	0.00002	0.00002	0.00001	0.00001
Vanadium			0.0035	0.006	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*
Zinc[4]	0.03	0.5	0.006252	***equation***	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	0.0076	*<0.0030*
Zirconium					*<0.000060*	*<0.000060*	*<0.000060*	*<0.000060*	*<0.000060*	*<0.000060*	*<0.000060*	*<0.000060*	*<0.000060*	*<0.000060*
Dissolved Metals (mg/L)														
Aluminum[4]			0.026266	0.05	*<0.0010*	0.0016	0.0018	0.0018	0.0012	0.0014	0.0012	0.0011	0.0034	0.0019
Antimony			0.01005	0.02	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Arsenic			0.00255	0.005	0.00021	0.00011	0.00017	0.00016	0.00018	0.00018	0.00022	0.00020	0.00020	0.00018
Barium			0.500985	1	0.0092	0.0071	0.0072	0.0072	0.0067	0.0071	0.0067	0.0066	0.0084	0.0091
Beryllium			0.0027	0.0053	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Bismuth					*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*
Boron			0.755	1.5	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*
Cadmium			0.000025	0.00004	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*
Calcium					4.7	2.7	3.2	3.2	3.5	3.6	3.7	3.6	4.3	4.7
Cesium					*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*
Chromium			0.00055	0.001	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Cobalt					*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Copper			0.00119	0.002	0.00034	0.00037	0.00029	0.00028	0.00027	0.00029	0.00027	0.00030	0.00032	0.00034
Iron			0.155	0.3	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*
Lead			0.000525	0.001	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*
Lithium			0.04825	0.096	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*
Magnesium					1.5	0.88	1.0	1.0	1.1	1.1	1.2	1.1	1.3	1.4
Manganese[4]			0.315233	***equation***	0.00024	0.00084	0.0023	0.0022	0.00028	0.00032	0.00059	0.00060	0.00026	0.00020
Mercury			0.000018	0.000026	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*
Molybdenum			0.036551	0.073	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	0.00006	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*
Nickel			0.01275	0.025	0.00068	*<0.00050*	0.00066	0.00065	*<0.00050*	0.00050	*<0.00050*	*<0.00050*	0.00056	0.00059
Phosphorus					*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*
Potassium					1.00	0.69	0.67	0.65	0.72	0.75	0.70	0.69	0.79	0.85
Rubidium					0.0013	0.00080	0.00092	0.00085	0.0011	0.0010	0.00099	0.00096	0.0012	0.0012
Selenium			0.00055	0.001	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*
Silicon					0.62	0.89	0.40	0.40	0.44	0.46	0.45	0.43	0.54	0.54
Silver					*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*
Sodium					0.90	1.1	0.62	0.60	0.63	0.65	0.64	0.65	0.75	0.81
Strontium			0.027953	0.049	0.024	0.014	0.017	0.017	0.019	0.019	0.019	0.019	0.025	0.026
Sulfur					1.1	*<0.50*	1.4	1.4	1.1	1.1	0.88	1.0	1.3	1.1
Tellurium					*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*
Thallium			0.000405	0.0008	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*
Thorium					*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Tin			0.0002		*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Titanium			1.005	2	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*
Tungsten					*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Uranium			0.007517	0.015	0.00001	0.00003	0.00002	0.00002	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001
Vanadium			0.0035	0.006	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*
Zinc[4]			0.005252	***equation***	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	0.0093	*<0.0010*
Zirconium					*<0.000060*	*<0.000060*	*<0.000060*	*<0.000060*	*<0.000060*	*<0.000060*	*<0.000060*	*<0.000060*	*<0.000060*	*<0.000060*

Notes:

1. CCME (Canadian Council of Ministers of the Environment) Canadian Water Quality Guidelines for the Protection of Aquatic Life, 1999, updated up to 2018.

2. Guidelines for Canadian Drinking Water Quality (Federal-Provincial-Territorial Committee on Health and the Environment). Standards for the following parameters are aesthetic and meant to protect against taste and odour: chloride, sulphate, copper, iron, manganese, sodium, zinc.

3. Trigger and threshold values are presented in "CREMP 2015 Plan Update" (Azimuth 2015a).
A number of thresholds were derived from methods (or sources) other than CCME guidelines - see Azimuth (2015a) for details.

4. "***equation***" means that CCME guidelines (or thresholds) are calculated based on an equation which is either pH or hardness dependent. The ammonia and aluminum (t & d) guidelines vary with pH; the cadmium, copper, lead, manganese, nickel and zinc guidelines vary with hardness.

5. Chromium CCME guideline is for Cr VI.

Shaded concentrations exceed the CCME aquatic life guidelines.

Bordered concentrations exceed the GCDWQ.

Italicized numbers are below detection limits.

"-" not analyzed/not sampled

n/a = issues with the water quality probe. No data collected.

underline = results were given a cautionary flag in the QC assessment (refer to **Appendix A1-1** for details).

strikethrough = results flagged as unreliable in the QC assessment (refer to **Appendix A1-1** for details).

Table B2-1. Water chemistry data for Whale Tail study area lakes, 2018.

Lake					Lake DS1									
(Station)	Aquatic Life	Human Health	Trigger[3]	Threshold[3]	(DS1)									
Area-Replicate ID	Guidelines	Guidelines			DS1-19	DS1-20	DS1-21	DS1-22	DS1-23	DS1-24	DS1-25	DS1-26	DS1-27	DS1-28
Date					3-Jun-18	3-Jun-18	20-Jul-18	20-Jul-18	19-Aug-18	19-Aug-18	10-Sep-18	10-Sep-18	26-Nov-18	26-Nov-18
Time					11:20	10:00	16:10	17:30	12:45	13:15	11:47	12:56	13:00	12:00
ALS Sample ID					L2107814-3	L2107814-4	L2136260-1	L2136260-2	L2152738-11	L2152738-12	L2164419-15	L2164419-16	L2205457-1	L2205457-2
Field Measurements (3 m)														
Temperature (°C)					2.0	1.0	14.5	15.3	-	-	6.8	4.6	1.2	1.6
Specific Conductivity (µS/cm)					23.9	38.1	14.2	18.1	17.1	21.6	19.7	25.3	26.4	35.8
Dissolved Oxygen (mg/L)					16.0	17.2	10.4	10.2	11.0	10.5	10.8	11.4	15.8	16.7
pH	6.5 - 9.0		6.5 - 7.94	6.5 - 9.0	6.8	6.3	6.4	6.6	7.2	7.2	6.1	6.1	6.3	6.4
Physical Tests (mg/L)														
Conductivity (µS/cm)			23.51		26.2	38.4	15.8	19.4	16.1	20.3	19.7	25.9	23.6	31.8
Hardness			8.4895		10.2	12.5	5.2	6.6	5.9	7.1	6.8	8.6	8.5	11.5
pH (Laboratory)	6.5 - 9.0		6.50 - 7.94	6.5 - 9.0	7.0	7.0	6.9	7.0	6.9	6.9	6.9	7.0	6.9	7.0
Total Suspended Solids			3	5	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	1.1	1.7	*<1.0*	*<1.0*
Total Dissolved Solids			18		19.8	27.2	11.5	10.0	14.2	17.0	14.6	17.5	17.3	18.5
Turbidity (NTU)					0.31	0.38	0.50	0.47	0.42	0.33	0.31	0.96	0.20	0.26
Anions and Nutrients (mg/L)														
Alkalinity - Bicarbonate			8.561475		7.8	9.7	4.6	5.5	4.8	5.0	5.4	5.9	6.0	7.4
Alkalinity - Carbonate			4		*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*
Alkalinity - Hydroxide					*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*
Alkalinity - Total			8.545		7.8	9.7	4.6	5.5	4.8	5.0	5.4	5.9	6.0	7.4
Ammonia (as N)[4]	***equation***		0.065343	0.126	*<0.0050*	*<0.0050*	*<0.0050*	*<0.0050*	0.0081	*<0.0050*	0.011	0.015	0.010	*<0.0050*
Bromide					*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*
Chloride	120	250	60.275	120	1.8	3.4	1.1	1.7	1.3	2.1	1.7	2.5	2.3	3.2
Fluoride	0.12	1.5			0.055	0.061	0.049	0.034	0.049	0.036	0.046	0.031	0.048	0.035
Nitrate (as N)	3	10	1.5025	3	0.013	0.048	*<0.0050*	*<0.0050*	*<0.0050*	*<0.0050*	*<0.0050*	*<0.0050*	*<0.0050*	0.0079
Nitrite (as N)	0.06	1	0.031	0.06	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*
Total Kjeldahl Nitrogen			0.17025		0.12	0.12	0.10	0.10	0.13	0.11	0.14	0.16	0.095	0.14
Ortho Phosphate (as P)			0.002		*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	0.0014	0.0015	0.0017	0.0015	0.0013	*<0.0010*
Phosphorus (P)-Total Diss.					*<0.0020*	*<0.0020*	*<0.0020*	*<0.0020*	*<0.0020*	*<0.0020*	0.0030	0.0037	*<0.0020*	*<0.0020*
Phosphorus (P)-Total	0.004		0.006022	0.004	*<0.0020*	*<0.0020*	0.0033	0.0029	0.0063	0.0028	0.0031	0.0033	0.0036	0.0043
Silicate (as SiO_2)			1		0.56	1.3	*<0.50*	0.74	*<0.50*	0.70	0.58	1.4	0.78	1.5
Sulphate (SO_4)		500	64.71	128	1.6	2.6	0.99	1.3	1.1	1.6	1.3	2.2	2.0	2.8
Cyanides														
Total Cyanide					*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*
Free Cyanide	0.005				*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*
Organic / Inorganic Carbon (mg/L)														
Dissolved Organic Carbon			2.6		2.7	2.5	2.1	2.1	1.6	1.4	2.3	3.3	2.2	2.3
Total Organic Carbon			2.785		2.3	2.5	2.2	2.0	1.5	2.9	2.3	3.2	2.3	2.3
Plant Pigments (µg/L)														
Chlorophyll-*a*					1.1	1.6	-	-	0.64	0.55	0.78	0.35	0.97	0.93
Total Metals (mg/L)														
Aluminum[4]	***equation***		0.0535	0.1	0.0041	0.0037	0.027	0.013	0.011	0.0081	*<0.0090*	0.050	0.0061	0.0091
Antimony		0.006	0.01005	0.02	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Arsenic	0.005	0.01	0.00255	0.005	0.00018	0.00017	0.00015	0.00015	0.00012	0.00010	0.00015	0.00012	0.00015	0.00011
Barium		1	0.501035	1	0.0053	0.0078	0.0042	0.0037	0.0034	0.0035	0.0037	0.0046	0.0052	0.0056
Beryllium			0.0027	0.0053	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Bismuth					*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*
Boron	1.5	5	0.755	1.5	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*
Cadmium[4]	***equation***	0.005	0.000025	0.00004	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*
Calcium			2.1485		2.3	3.3	1.3	1.7	1.5	1.9	1.8	2.3	2.2	3.0
Cesium					*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*
Chromium[5]	0.001	0.05	0.000555	0.001	0.00026	*<0.00010*	0.00028	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	0.00020	*<0.00050*	0.00050
Cobalt					*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Copper[3]	***equation***	1	0.001235	0.002	0.00077	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*
Iron	0.3	0.3	0.155	0.3	0.012	0.014	0.057	0.057	0.028	0.036	0.025	0.070	0.015	0.020
Lead[3]	***equation***	0.01	0.000525	0.001	*<0.000050*	*<0.000050*	0.00007	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*
Lithium			0.04821	0.096	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*
Magnesium			0.8285		0.97	1.2	0.51	0.55	0.54	0.60	0.63	0.76	0.85	0.94
Manganese[4]		0.05	0.315675	***equation***	0.0024	0.0018	0.0030	0.0025	0.0018	0.0015	0.0019	0.0019	0.0013	0.0010
Mercury	0.000026	0.001	0.000018	0.000026	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*
Molybdenum	0.073		0.036525	0.073	0.00006	0.00006	*<0.000050*	*<0.000050*	*<0.00030*	*<0.00020*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*
Nickel[4]	***equation***		0.012729	0.025	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	0.00057	0.00053
Phosphorus					*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*
Potassium			0.5		0.45	0.75	0.32	0.38	0.33	0.42	0.34	0.47	0.45	0.59
Rubidium					0.00067	0.0010	0.00057	0.00059	0.00050	0.00058	0.00059	0.00065	0.00060	0.00069
Selenium	0.001	0.01	0.00055	0.001	*<0.000050*	0.00006	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*
Silicon					0.31	0.66	0.28	0.40	0.30	0.45	0.30	0.77	0.51	0.76
Silver	0.00025				*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*
Sodium		200	0.9751		0.94	1.6	0.65	0.75	0.64	0.78	0.90	1.1	0.96	1.2
Strontium			0.02789	0.049	0.0095	0.016	0.0075	0.0087	0.0073	0.0089	0.0085	0.011	0.011	0.014
Sulfur					1.2	1.5	*<0.50*	*<0.50*	0.73	0.79	*<0.50*	*<0.50*	0.74	1.2
Tellurium					*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*
Thallium	0.0008		0.000405	0.0008	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*
Thorium					*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Tin			0.0002		*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Titanium			1.00008	2	*<0.00030*	*<0.00030*	*<0.00090*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	0.00093	*<0.00030*	*<0.00030*
Tungsten					*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Uranium	0.015	0.02	0.00752	0.015	0.00004	0.00003	0.00004	0.00003	0.00003	0.00002	0.00003	0.00005	0.00003	0.00003
Vanadium			0.0035	0.006	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*
Zinc[4]	0.03	0.5	0.006252	***equation***	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*
Zirconium					*<0.000060*	*<0.000060*	*<0.000060*	*<0.000060*	*<0.000060*	*<0.000060*	*<0.000060*	*<0.00024*	*<0.000060*	*<0.000060*
Dissolved Metals (mg/L)														
Aluminum[4]			0.026266	0.05	0.0029	0.0023	0.0058	0.0040	0.0042	0.0036	0.0044	0.014	0.0057	0.0052
Antimony			0.01005	0.02	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Arsenic			0.00255	0.005	0.00014	0.00011	*<0.00010*	0.00010	*<0.00010*	*<0.00010*	0.00014	0.00014	0.00011	*<0.00010*
Barium			0.500985	1	0.0042	0.0065	0.0039	0.0036	0.0034	0.0033	0.0036	0.0040	0.0049	0.0058
Beryllium			0.0027	0.0053	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Bismuth					*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*
Boron			0.755	1.5	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*
Cadmium			0.000025	0.00004	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*
Calcium					2.6	3.2	1.3	1.7	1.5	1.9	1.7	2.2	2.2	3.1
Cesium					*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*
Chromium			0.00055	0.001	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	0.00011	0.00012	*<0.00010*
Cobalt					*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Copper			0.00119	0.002	0.00044	0.00039	0.00023	0.00027	0.00024	0.00022	0.00030	0.00041	0.00032	0.00036
Iron			0.155	0.3	*<0.010*	*<0.010*	0.013	0.028	*<0.010*	0.013	*<0.010*	0.028	*<0.010*	*<0.010*
Lead			0.000525	0.001	*<0.000050*	*<0.000050*	0.00009	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*
Lithium			0.04825	0.096	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*
Magnesium			0.90		1.1	0.46	0.55	0.55	0.60	0.64	0.75	0.76	0.94	
Manganese[4]			0.315233	***equation***	0.0016	0.0016	0.0014	0.0021	0.00031	0.00066	0.00027	0.0013	0.00033	0.00041
Mercury			0.000018	0.000026	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*
Molybdenum			0.036551	0.073	0.00008	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	0.00005	*<0.000050*	*<0.000050*	*<0.000050*	0.00005
Nickel			0.01275	0.025	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*
Phosphorus					*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*
Potassium					0.42	0.70	0.34	0.42	0.35	0.42	0.36	0.45	0.42	0.59
Rubidium					0.00065	0.00086	0.00044	0.00058	0.00053	0.00059	0.00054	0.00065	0.00061	0.00074
Selenium			0.00055	0.001	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*
Silicon					0.25	0.60	0.21	0.33	0.24	0.37	0.27	0.65	0.37	0.76
Silver					*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*
Sodium					0.89	1.4	0.63	0.75	0.65	0.76	0.79	1.0	0.85	1.2
Strontium			0.027953	0.049	0.0093	0.015	0.0070	0.0084	0.0071	0.0088	0.0081	0.010	0.011	0.014
Sulfur					*<0.50*	0.70	0.70	0.80	0.65	0.72	*<0.50*	0.70	0.73	0.85
Tellurium					*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*
Thallium			0.000405	0.0008	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*
Thorium					*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Tin			0.0002		*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Titanium			1.005	2	*<0.00030*	*<0.00030*	*<0.00030*	0.00032	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*
Tungsten					*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Uranium			0.007517	0.015	0.00004	0.00003	0.00003	0.00003	0.00003	0.00002	0.00003	0.00004	0.00003	0.00003
Vanadium			0.0035	0.006	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*
Zinc[4]			0.005252	***equation***	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*
Zirconium					*<0.000060*	*<0.000060*	*<0.000060*	*<0.000060*	*<0.000060*	*<0.000060*	*<0.000060*	0.00011	*<0.000060*	*<0.000060*

Notes:

1. CCME (Canadian Council of Ministers of the Environment) Canadian Water Quality Guidelines for the Protection of Aquatic Life, 1999, updated up to 2018.

2. Guidelines for Canadian Drinking Water Quality (Federal-Provincial-Territorial Committee on Health and the Environment). Standards for the following parameters are aesthetic and meant to protect against taste and odour: chloride, sulphate, copper, iron, manganese, sodium, zinc.

3. Trigger and threshold values are presented in "CREMP 2015 Plan Update" (Azimuth 2015a).
A number of thresholds were derived from methods (or sources) other than CCME guidelines - see Azimuth (2015a) for details.

4. "***equation***" means that CCME guidelines (or thresholds) are calculated based on an equation which is either pH or hardness dependent. The ammonia and aluminum (t & d) guidelines vary with pH; the cadmium, copper, lead, manganese, nickel and zinc guidelines vary with hardness.

5. Chromium CCME guideline is for Cr VI.

Shaded concentrations exceed the CCME aquatic life guidelines.

Bordered concentrations exceed the GCDWQ.

Italicized numbers are below detection limits.

"-" not analyzed/not sampled

n/a = issues with the water quality probe. No data collected.

underline = results were given a cautionary flag in the QC assessment (refer to **Appendix A1-1** for details).

strikethrough = results flagged as unreliable in the QC assessment (refer to **Appendix A1-1** for details).

Table B2-1. Water chemistry data for Whale Tail study area lakes, 2018.

Lake					Nemo Lake									
(Station)					(NEM)									
Area-Replicate ID	Aquatic Life Guidelines	Human Health Guidelines	Trigger[3]	Threshold[3]	NEM-27	NEM-28	NEM-29	NEM-30	NEM-31	NEM-32	NEM-33	NEM-34	NEM-35	NEM-36
Date					1-Jun-18	1-Jun-18	16-Jul-18	16-Jul-18	17-Aug-18	17-Aug-18	1-Sep-18	1-Sep-18	3-Nov-18	3-Nov-18
Time					16:40	15:55	9:45	10:15	10:50	11:37	14:00	14:45	10:15	9:45
ALS Sample ID					L2107814-12	L2107814-11	L2133417-3	L2133417-4	L2152738-5	L2152738-6	L2162149-11	L2162149-12	L2194149-7	L2194149-8
Field Measurements (3 m)														
Temperature (°C)					1.6	1.6	10.9	10.1	10.4	10.4	8.7	8.7	1.2	1.3
Specific Conductivity (µS/cm)					35.3	32.2	25.1	25.0	25.1	25.1	25.7	25.8	29.4	29.6
Dissolved Oxygen (mg/L)					17.9	18.6	11.2	11.5	10.5	10.5	11.4	11.4	16.2	14.3
pH	6.5 - 9.0		6.5 - 7.94	6.5 - 9.0	6.9	7.1	6.9	6.7	7.1	7.3	6.7	6.6	6.6	7.1
Physical Tests (mg/L)														
Conductivity (µS/cm)			23.51		35.5	36.3	25.6	25.8	24.3	24.5	27.2	27.2	27.0	26.8
Hardness			8.4895		13.2	13.0	9.8	9.7	9.7	9.9	9.9	10.1	10.4	10.7
pH (Laboratory)	6.5 - 9.0		6.50 - 7.94	6.5 - 9.0	7.2	7.1	7.1	7.0	7.1	7.2	7.2	7.1	7.1	7.1
Total Suspended Solids			3	5	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*
Total Dissolved Solids			18		24.9	24.3	19.4	19.1	19.0	18.5	15.5	15.7	19.3	16.3
Turbidity (NTU)					0.12	0.12	0.27	0.28	0.28	0.23	0.20	0.24	0.12	0.12
Anions and Nutrients (mg/L)														
Alkalinity - Bicarbonate			8.561475		10.5	10.6	7.9	7.9	7.3	7.5	7.6	7.7	8.0	7.9
Alkalinity - Carbonate			4		*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*
Alkalinity - Hydroxide					*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*
Alkalinity - Total			8.545		10.5	10.6	7.9	7.9	7.3	7.5	7.6	7.7	8.0	7.9
Ammonia (as N)[4]	***equation***		0.065343	0.126	0.0086	*<0.0050*	*<0.0050*	*<0.0050*	*<0.0050*	0.0064	*<0.0050*	0.018	*<0.0050*	*<0.0050*
Bromide					*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*
Chloride	120	250	60.275	120	1.0	1.1	0.81	0.78	0.81	0.82	0.84	0.84	0.91	0.91
Fluoride	0.12	1.5			0.033	0.033	0.023	0.022	0.025	0.025	0.025	0.025	0.026	0.026
Nitrate (as N)	3	10	1.5025	3	*<0.0050*	*<0.0050*	*<0.0050*	*<0.0050*	*<0.0050*	*<0.0050*	*<0.0050*	*<0.0050*	*<0.0050*	*<0.0050*
Nitrite (as N)	0.06	1	0.031	0.06	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*
Total Kjeldahl Nitrogen			0.17025		0.11	0.13	0.092	0.092	0.11	0.11	0.087	0.15	0.080	0.090
Ortho Phosphate (as P)			0.002		*<0.0010*	*<0.0010*	*<0.0010*	0.0014	0.0013	0.0011	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*
Phosphorus (P)-Total Diss.					*<0.0020*	*<0.0020*	*<0.0020*	*<0.0020*	*<0.0020*	*<0.0020*	*<0.0020*	*<0.0020*	0.0029	0.0020
Phosphorus (P)-Total	0.004		0.006022	0.004	*<0.0020*	*<0.0020*	0.0034	0.0029	*<0.0020*	*<0.0020*	*<0.0020*	*<0.0020*	0.0029	0.0045
Silicate (as SiO_2)			1		0.50	*<0.50*	*<0.50*	*<0.50*	*<0.50*	*<0.50*	*<0.50*	*<0.50*	*<0.50*	*<0.50*
Sulphate (SO_4)		500	64.71	128	4.6	4.7	3.3	3.2	3.3	3.3	3.4	3.4	3.5	3.5
Cyanides														
Total Cyanide					*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*
Free Cyanide	0.005				*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*
Organic / Inorganic Carbon (mg/L)														
Dissolved Organic Carbon			2.6		1.9	2.0	1.4	1.5	1.4	1.3	1.6	1.7	1.5	1.4
Total Organic Carbon			2.785		1.9	2.3	1.5	1.5	1.3	1.3	1.8	1.7	1.7	1.4
Plant Pigments (µg/L)														
Chlorophyll-*a*					0.52	0.26	0.31	0.27	0.10	0.38	0.30	0.31	0.49	0.58
Total Metals (mg/L)														
Aluminum[4]	***equation***		0.0535	0.1	*<0.0030*	*<0.0030*	*<0.0060*	*<0.0060*	0.0033	0.0036	0.0036	*<0.0030*	*<0.0030*	*<0.0030*
Antimony		0.006	0.01005	0.02	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Arsenic	0.005	0.01	0.00255	0.005	0.00041	0.00042	0.00027	0.00029	0.00029	0.00031	0.00034	0.00033	0.00031	0.00030
Barium		1	0.501035	1	0.0059	0.0060	0.0046	0.0045	0.0039	0.0040	0.0040	0.0040	0.0041	0.0041
Beryllium			0.0027	0.0053	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Bismuth					*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*
Boron	1.5	5	0.755	1.5	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*
Cadmium[4]	***equation***	0.005	0.000025	0.00004	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*
Calcium			2.1485		3.1	3.1	2.2	2.2	2.2	2.3	2.3	2.3	2.5	2.5
Cesium					*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*
Chromium[5]	0.001	0.05	0.000555	0.001	0.00018	0.00013	0.00018	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	0.00011
Cobalt					*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Copper[3]	***equation***	1	0.001235	0.002	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*
Iron	0.3	0.3	0.155	0.3	*<0.010*	*<0.010*	0.022	0.020	0.011	0.011	*<0.010*	*<0.010*	*<0.010*	*<0.010*
Lead[3]	***equation***	0.01	0.000525	0.001	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*
Lithium			0.04821	0.096	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*
Magnesium			0.8285		1.5	1.6	1.00	0.97	1.00	1.00	1.1	1.1	1.1	1.1
Manganese[4]		0.05	0.315675	***equation***	0.00060	0.00068	0.0076	0.0086	0.0035	0.0035	0.0027	0.0027	0.0015	0.0016
Mercury	0.000026	0.001	0.000018	0.000026	0.00001	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*
Molybdenum	0.073		0.036525	0.073	0.00006	0.00006	*<0.00010*	*<0.00010*	*<0.00030*	*<0.00030*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*
Nickel[4]	***equation***		0.012729	0.025	0.00067	0.00067	*<0.0010*	*<0.0010*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	0.00057
Phosphorus					*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*
Potassium			0.5		0.93	0.88	0.57	0.55	0.56	0.57	0.58	0.58	0.63	0.58
Rubidium					0.00098	0.0011	0.00062	0.00064	0.00076	0.00064	0.00071	0.00073	0.00077	0.00076
Selenium	0.001	0.01	0.00055	0.001	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*
Silicon					0.28	0.27	0.21	0.20	0.22	0.23	0.21	0.21	0.23	0.22
Silver	0.00025				*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*
Sodium		200	0.9751		0.73	0.74	0.51	0.50	0.47	0.48	0.50	0.50	0.55	0.50
Strontium			0.02789	0.049	0.014	0.014	0.0099	0.0099	0.0098	0.0099	0.010	0.010	0.012	0.011
Sulfur					2.3	2.3	1.4	1.2	1.4	1.5	1.1	1.0	1.2	1.1
Tellurium					*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*
Thallium	0.0008		0.000405	0.0008	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*
Thorium					*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Tin			0.0002		*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Titanium			1.00008	2	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*
Tungsten					*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Uranium	0.015	0.02	0.00752	0.015	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*
Vanadium			0.0035	0.006	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*
Zinc[4]	0.03	0.5	0.006252	***equation***	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*
Zirconium					*<0.000060*	*<0.000060*	*<0.000060*	*<0.000060*	*<0.000060*	*<0.000060*	*<0.000060*	*<0.000060*	*<0.000060*	*<0.000060*
Dissolved Metals (mg/L)														
Aluminum[4]			0.026266	0.05	*<0.0020*	*<0.0010*	0.0011	0.0015	0.0021	0.0021	*<0.0010*	0.0012	0.0011	0.0014
Antimony			0.01005	0.02	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Arsenic			0.00255	0.005	0.00032	0.00032	0.00023	0.00024	0.00025	0.00029	0.00026	0.00028	0.00026	0.00028
Barium			0.500985	1	0.0054	0.0051	0.0041	0.0043	0.0039	0.0039	0.0041	0.0039	0.0040	0.0042
Beryllium			0.0027	0.0053	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Bismuth					*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*
Boron			0.755	1.5	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*
Cadmium			0.000025	0.00004	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*
Calcium					3.0	3.0	2.3	2.2	2.2	2.3	2.2	2.3	2.3	2.4
Cesium					*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*
Chromium			0.00055	0.001	0.00011	0.00012	*<0.00010*	*<0.00010*	*<0.00010*	0.00019	*<0.00010*	*<0.00010*	*<0.00010*	0.00044
Cobalt					*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Copper			0.00119	0.002	*<0.00020*	*<0.00020*	*<0.00020*	0.00021	0.00021	*<0.00020*	0.00023	0.00026	*<0.00020*	*<0.00020*
Iron			0.155	0.3	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*
Lead			0.000525	0.001	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	0.00036	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*
Lithium			0.04825	0.096	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*
Magnesium					1.4	1.4	1.0	1.0	1.0	1.0	1.0	1.1	1.1	1.1
Manganese[4]			0.315233	***equation***	*<0.00010*	0.00025	0.0045	0.0052	0.00043	0.00052	0.00038	0.00044	0.00016	0.00017
Mercury			0.000018	0.000026	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*
Molybdenum			0.036551	0.073	0.00005	*<0.000050*	*<0.000050*	*<0.000050*	0.00006	0.00007	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*
Nickel			0.01275	0.025	0.00053	*<0.00050*	0.00064	0.00066	*<0.00050*	0.00059	*<0.00050*	0.00050	*<0.00050*	*<0.00050*
Phosphorus					*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*
Potassium					0.77	0.78	0.60	0.58	0.60	0.59	0.58	0.59	0.61	0.62
Rubidium					0.00085	0.00088	0.00073	0.00068	0.00069	0.00070	0.00074	0.00072	0.00074	0.00072
Selenium			0.00055	0.001	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*
Silicon					0.23	0.22	0.16	0.18	0.18	0.18	0.18	0.19	0.18	0.20
Silver					*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*
Sodium					0.64	0.64	0.49	0.48	0.48	0.49	0.50	0.52	0.52	0.53
Strontium			0.027953	0.049	0.013	0.013	0.0099	0.0098	0.0098	0.0099	0.0099	0.010	0.011	0.011
Sulfur					1.9	1.7	1.2	1.1	1.4	1.4	0.99	1.4	1.2	1.1
Tellurium					*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*
Thallium			0.000405	0.0008	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*
Thorium					*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Tin			0.0002		*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	0.00042	*<0.00010*	*<0.00010*
Titanium			1.005	2	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*
Tungsten					*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Uranium			0.007517	0.015	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*
Vanadium			0.0035	0.006	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*
Zinc[4]			0.005252	***equation***	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	0.0014	*<0.0010*	0.0058	*<0.0010*	*<0.0010*
Zirconium					*<0.000060*	*<0.000060*	*<0.000060*	*<0.000060*	*<0.000060*	*<0.000060*	*<0.000060*	*<0.000060*	*<0.000060*	*<0.000060*

Notes:

1. CCME (Canadian Council of Ministers of the Environment) Canadian Water Quality Guidelines for the Protection of Aquatic Life, 1999, updated up to 2018.

2. Guidelines for Canadian Drinking Water Quality (Federal-Provincial-Territorial Committee on Health and the Environment). Standards for the following parameters are aesthetic and meant to protect against taste and odour: chloride, sulphate, copper, iron, manganese, sodium, zinc.

3. Trigger and threshold values are presented in "CREMP 2015 Plan Update" (Azimuth 2015a).

A number of thresholds were derived from methods (or sources) other than CCME guidelines - see Azimuth (2015a) for details.

4. "***equation***" means that CCME guidelines (or thresholds) are calculated based on an equation which is either pH or hardness dependent. The ammonia and aluminum (t & d) guidelines vary with pH; the cadmium, copper, lead, manganese, nickel and zinc guidelines vary with hardness.

5. Chromium CCME guideline is for Cr VI.

Shaded concentrations exceed the CCME aquatic life guidelines.

Bordered concentrations exceed the GCDWQ.

Italicized numbers are below detection limits.

"-" not analyzed/not sampled

n/a = issues with the water quality probe. No data collected.

underline = results were given a cautionary flag in the QC assessment (refer to **Appendix A1-1** for details).

strikethrough = results flagged as unreliable in the QC assessment (refer to **Appendix A1-1** for details).

Figure B2-1. Calcium (mg/L) in water from Whale Tail Pit study area lakes since 2014.

Note: The red dashed line is the Meadowbank trigger value.

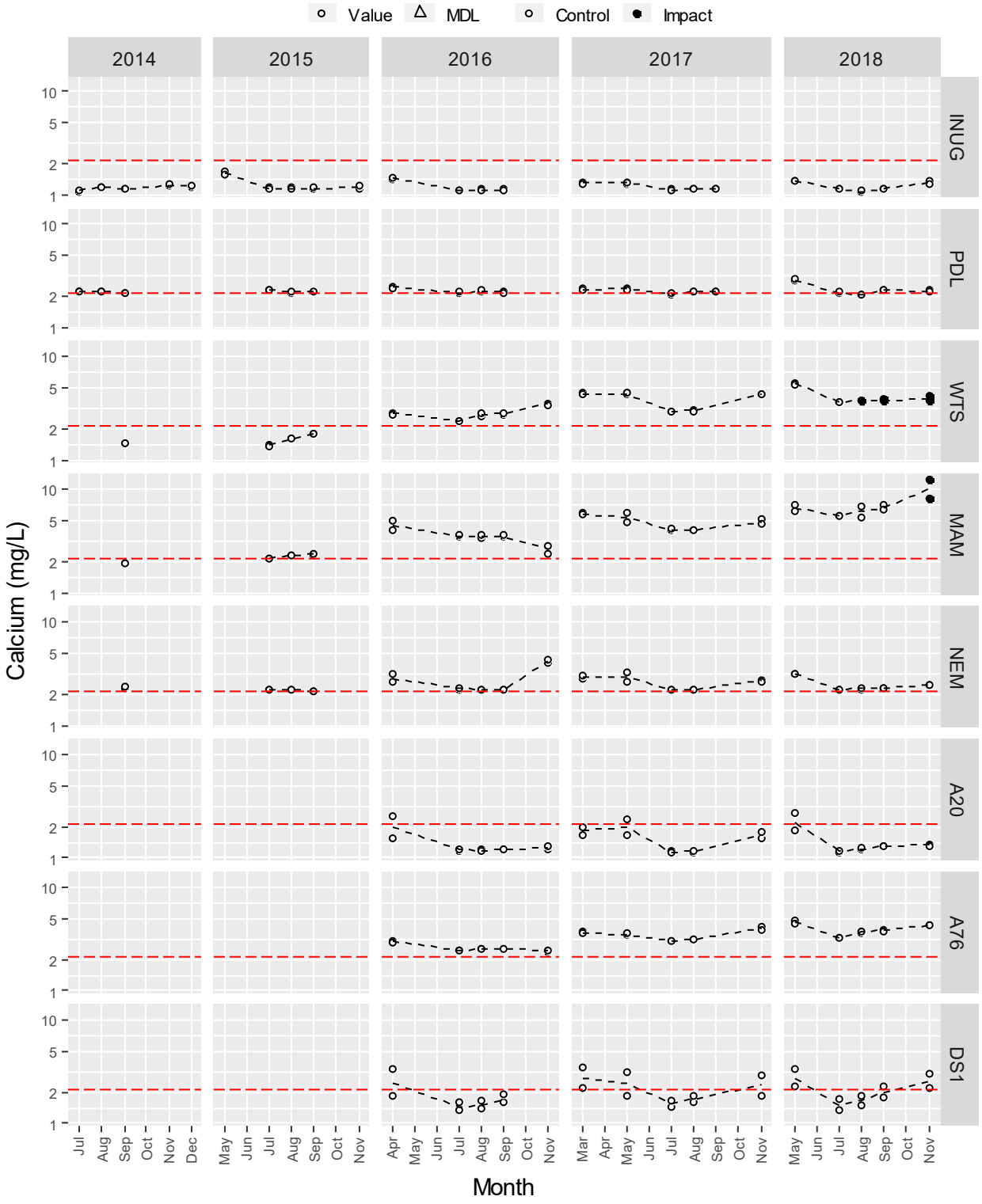


Figure B2-2. Magnesium (mg/L) in water from Whale Tail Pit study area lakes since 2014.

Note: The red dashed line is the Meadowbank trigger value.

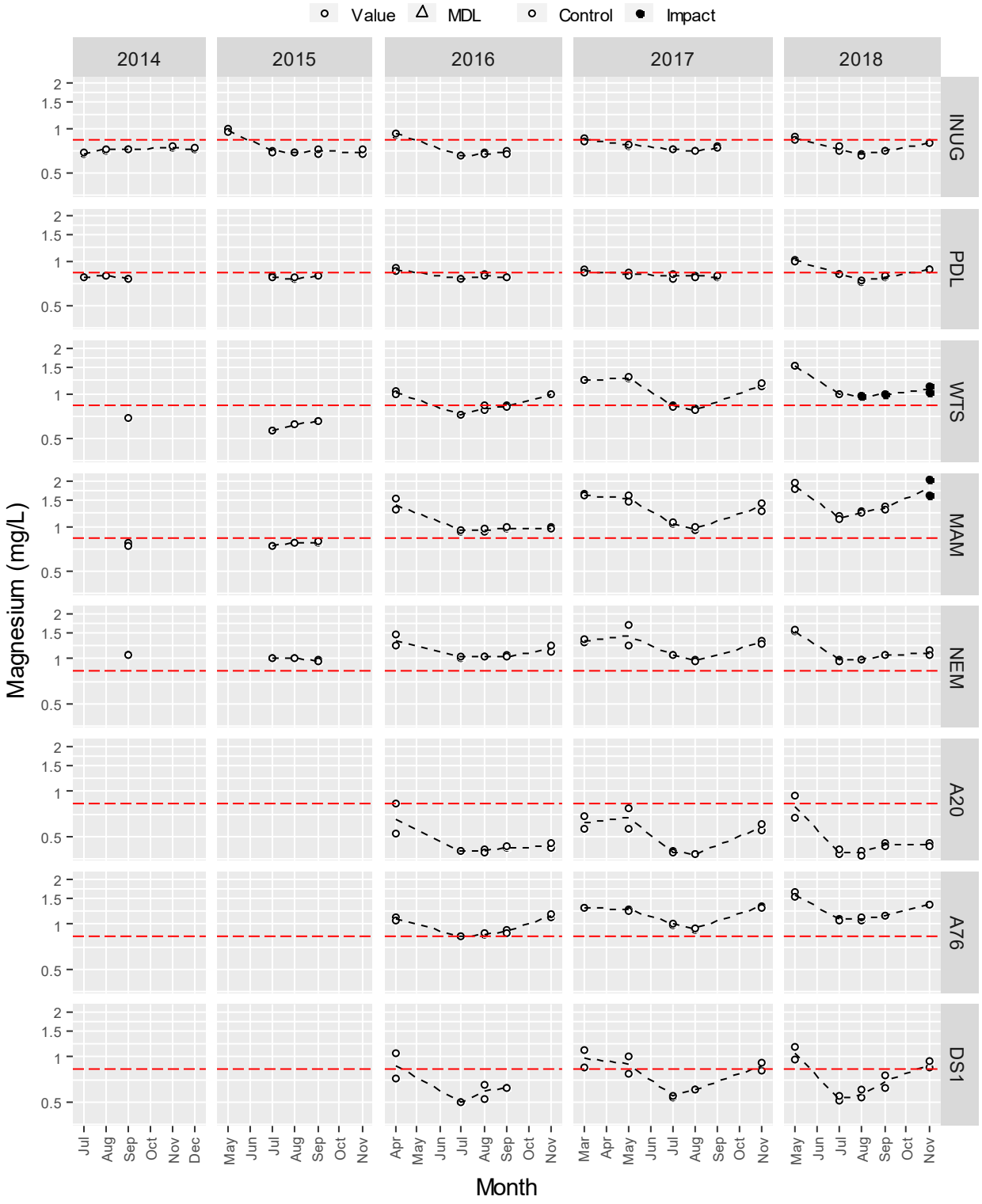


Figure B2-3. Potassium (mg/L) in water from Whale Tail Pit study area lakes since 2014.

Note: The red dashed line is the Meadowbank trigger value.

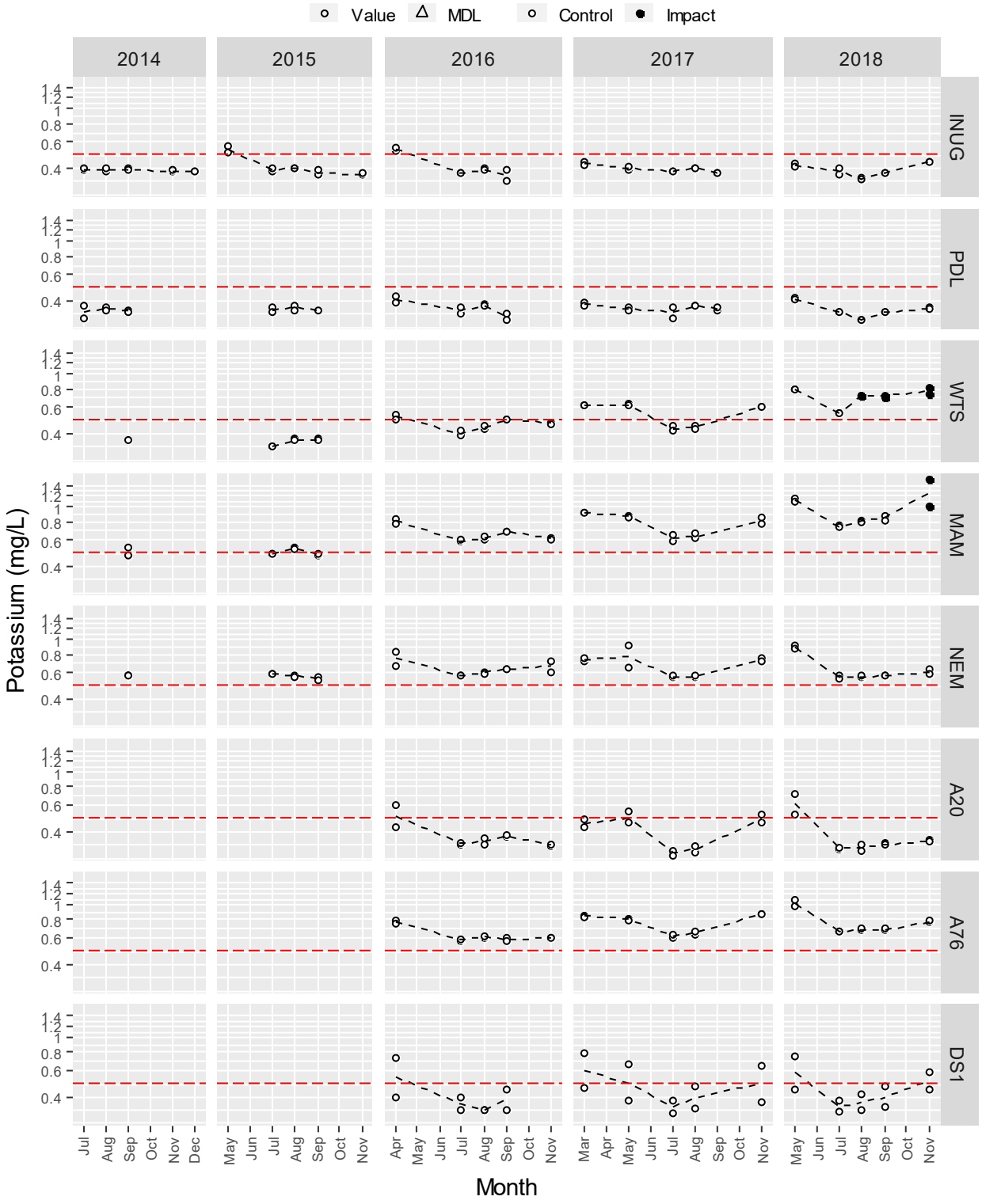


Figure B2-4. Sodium (mg/L) in water from Whale Tail Pit study area lakes since 2014.

Note: The red dashed line is the Meadowbank trigger value.

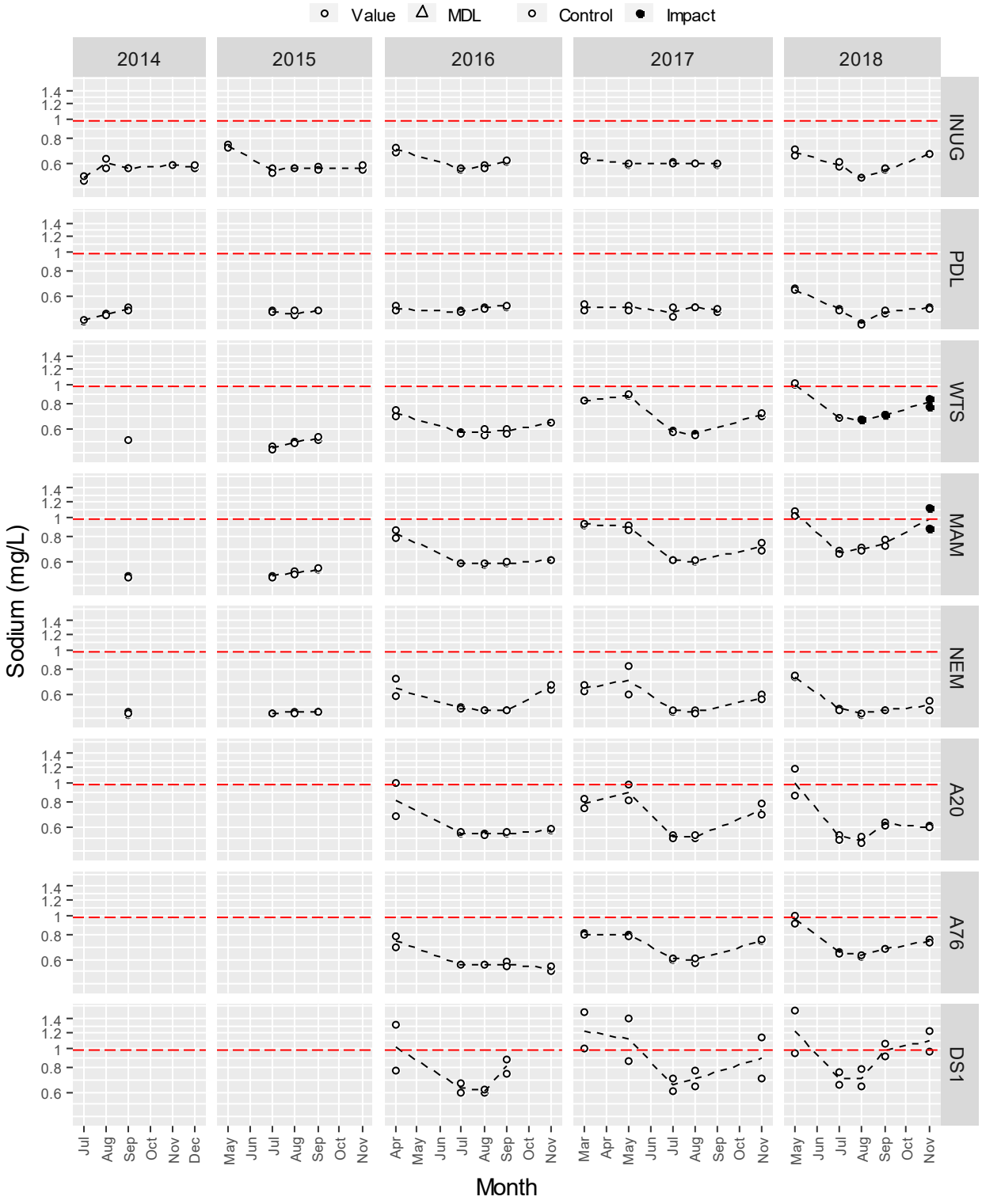


Figure B2-5. Carbonate alkalinity (mg/L) in water from Whale Tail Pit study area lakes since 2014.

Note: The red dashed line is the Meadowbank trigger value.

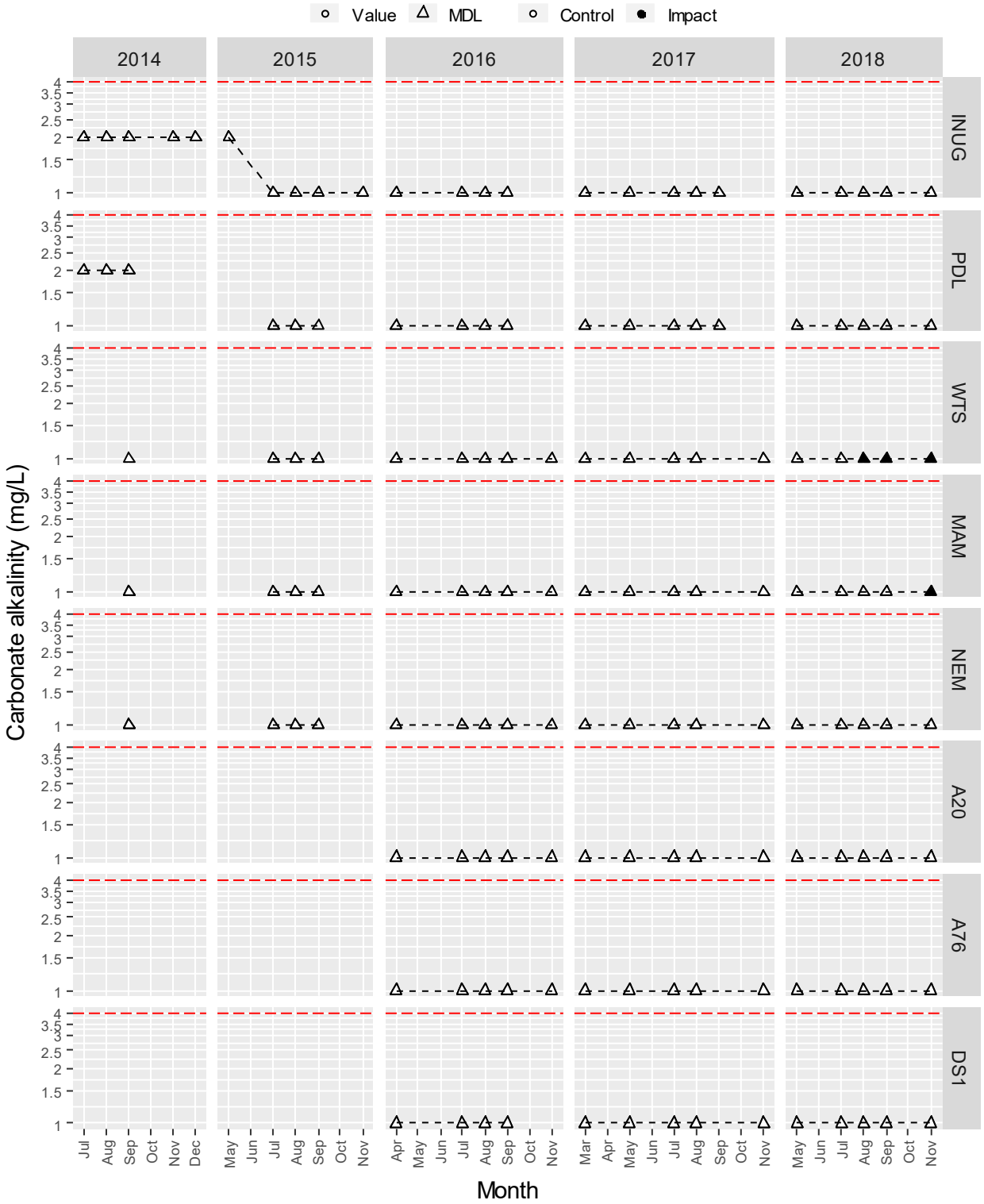


Figure B2-6. Orthophosphate (mg/L) in water from Whale Tail Pit study area lakes since 2014.

Note: The red dashed line is the Meadowbank trigger value.

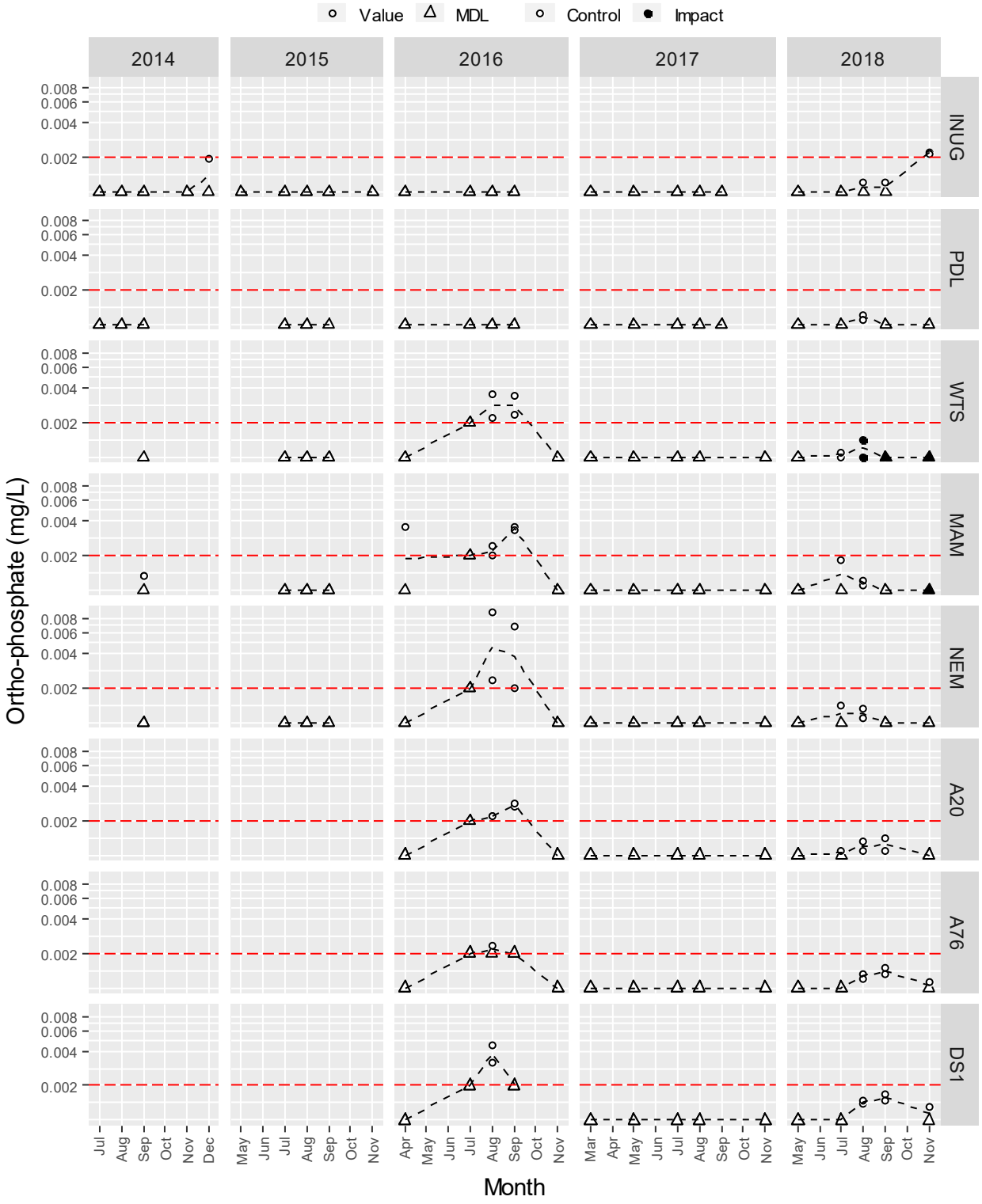


Figure B2-7. Total cyanide (mg/L) in water from Whale Tail Pit study area lakes since 2014.

Note: No trigger for total cyanide. Detection limit lowered from 0.005 mg/L in 2014 to 0.001 mg/L in 2015.

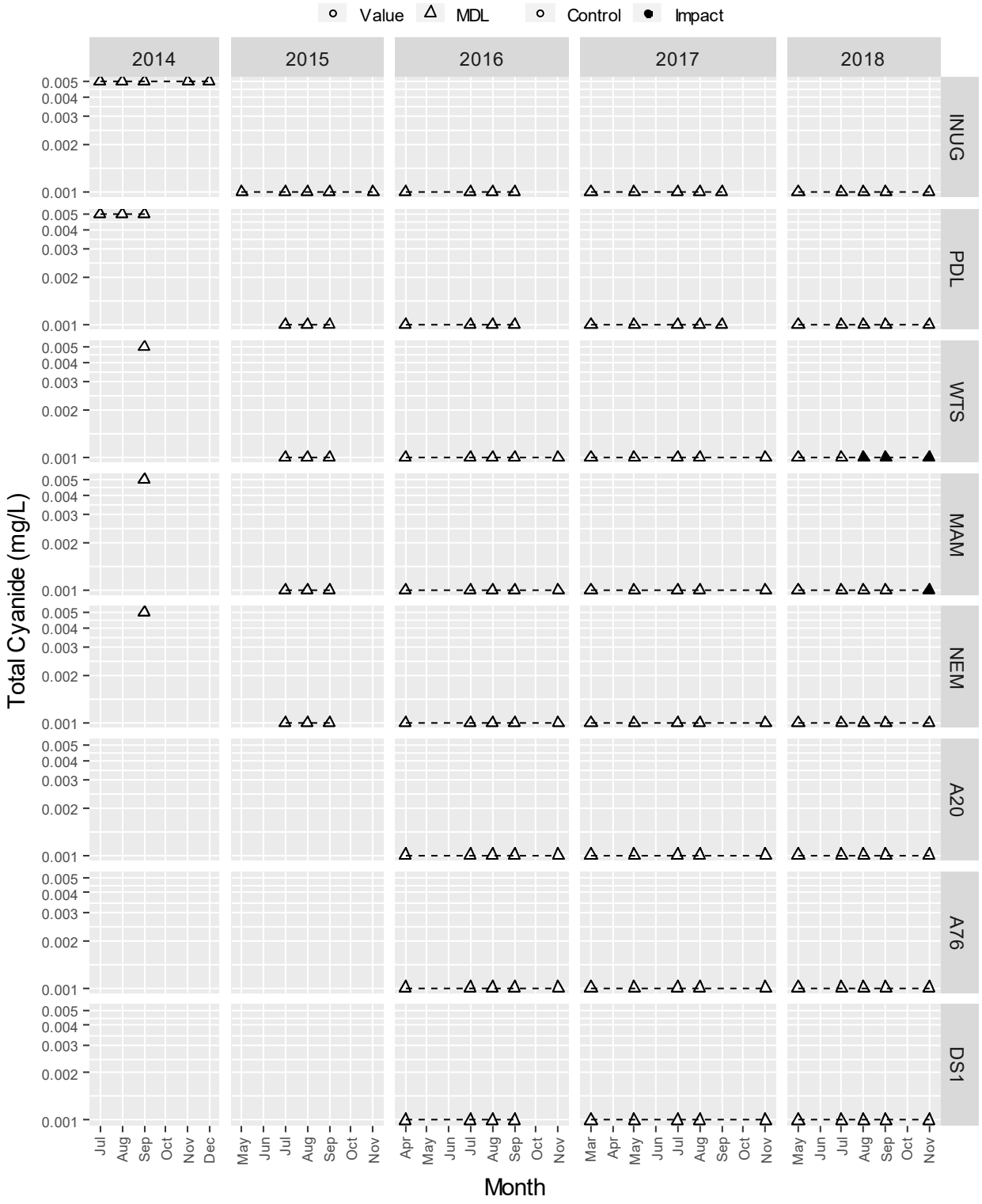


Figure B2-8. Free cyanide (mg/L) in water from Whale Tail Pit study area lakes since 2014.

Note: No trigger for free cyanide. Detection limit lowered from 0.005 mg/L in 2014 to 0.001 mg/L in 2015.

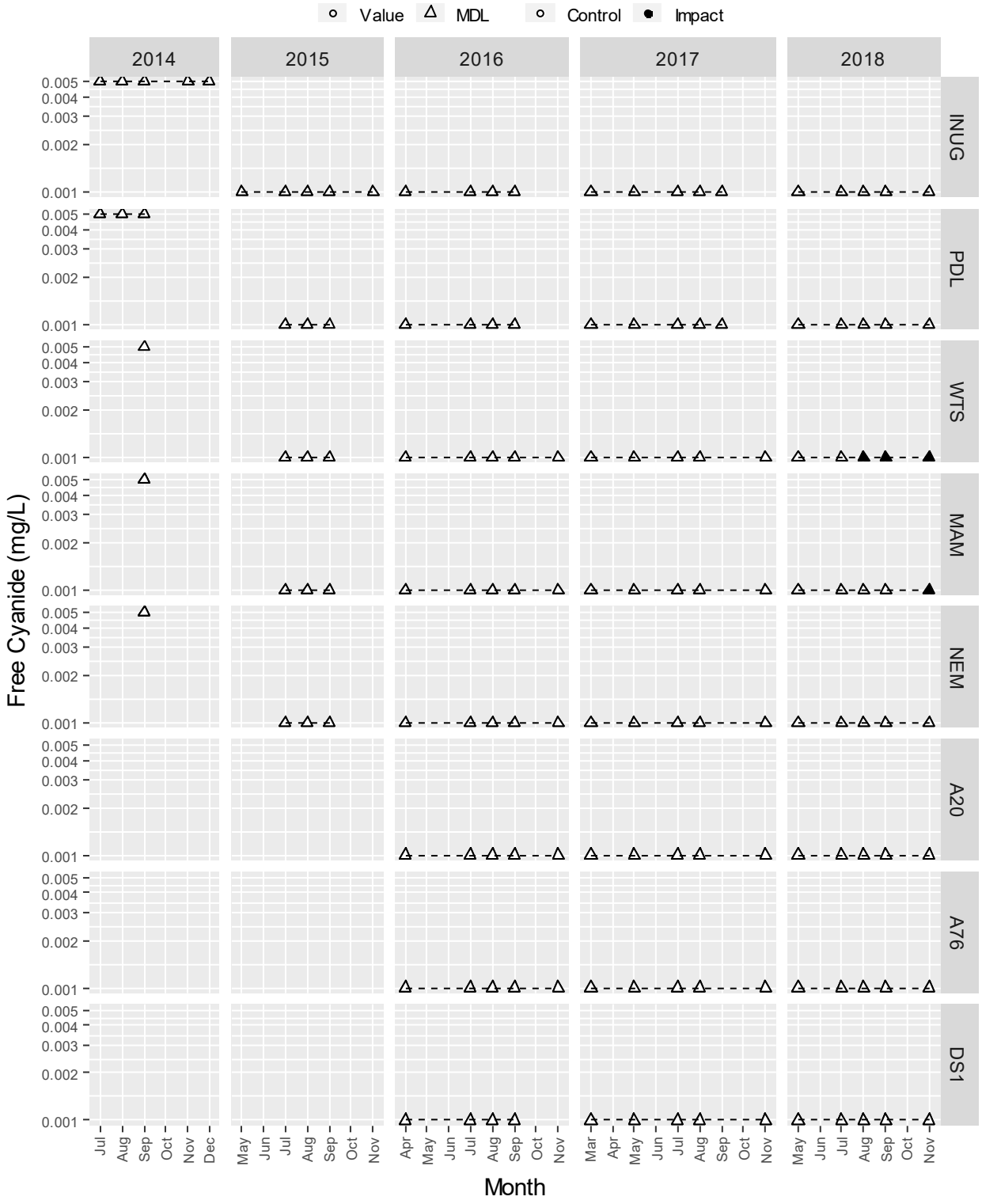


Figure B2-9. Total antimony (mg/L) in water from Whale Tail Pit study area lakes since 2014.

Note: The red dashed line is the Meadowbank trigger value.

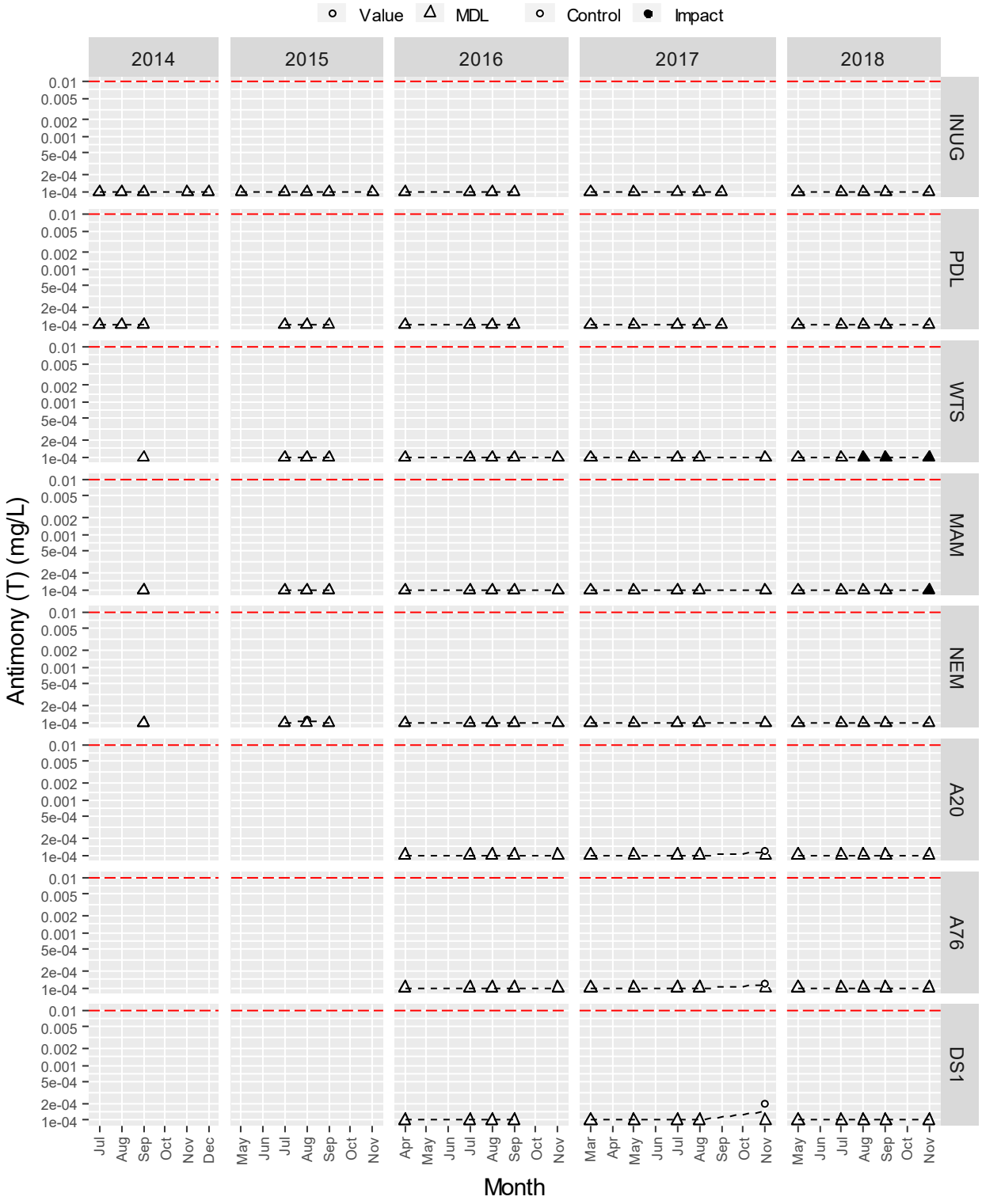


Figure B2-10. Total barium (mg/L) in water from Whale Tail Pit study area lakes since 2014.

Note: The red dashed line is the Meadowbank trigger value.

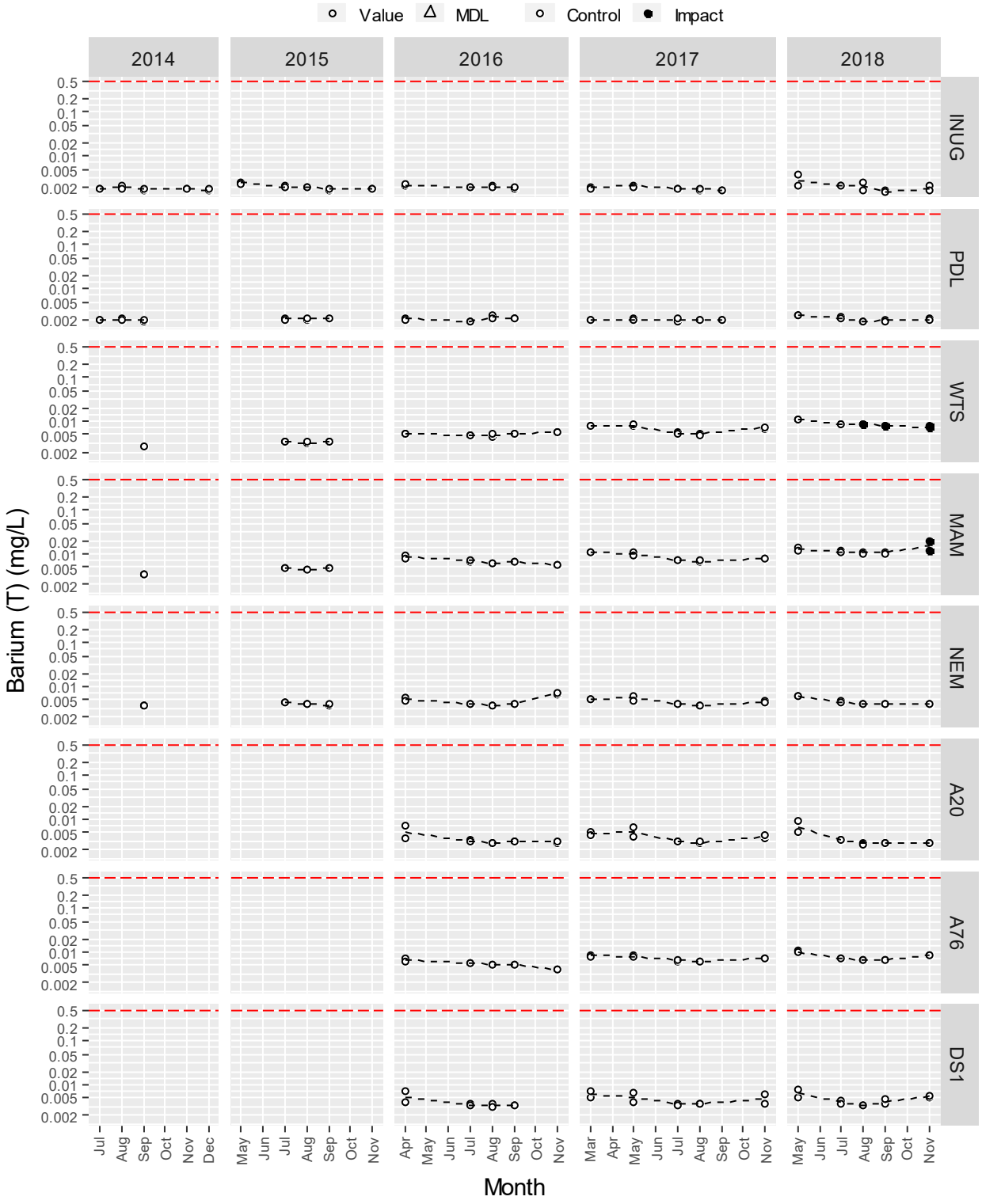


Figure B2-11. Total beryllium (mg/L) in water from Whale Tail Pit study area lakes since 2014.

Note: The red dashed line is the Meadowbank trigger value.



Figure B2-12. Total boron (mg/L) in water from Whale Tail Pit study area lakes since 2014.

Note: The red dashed line is the Meadowbank trigger value.

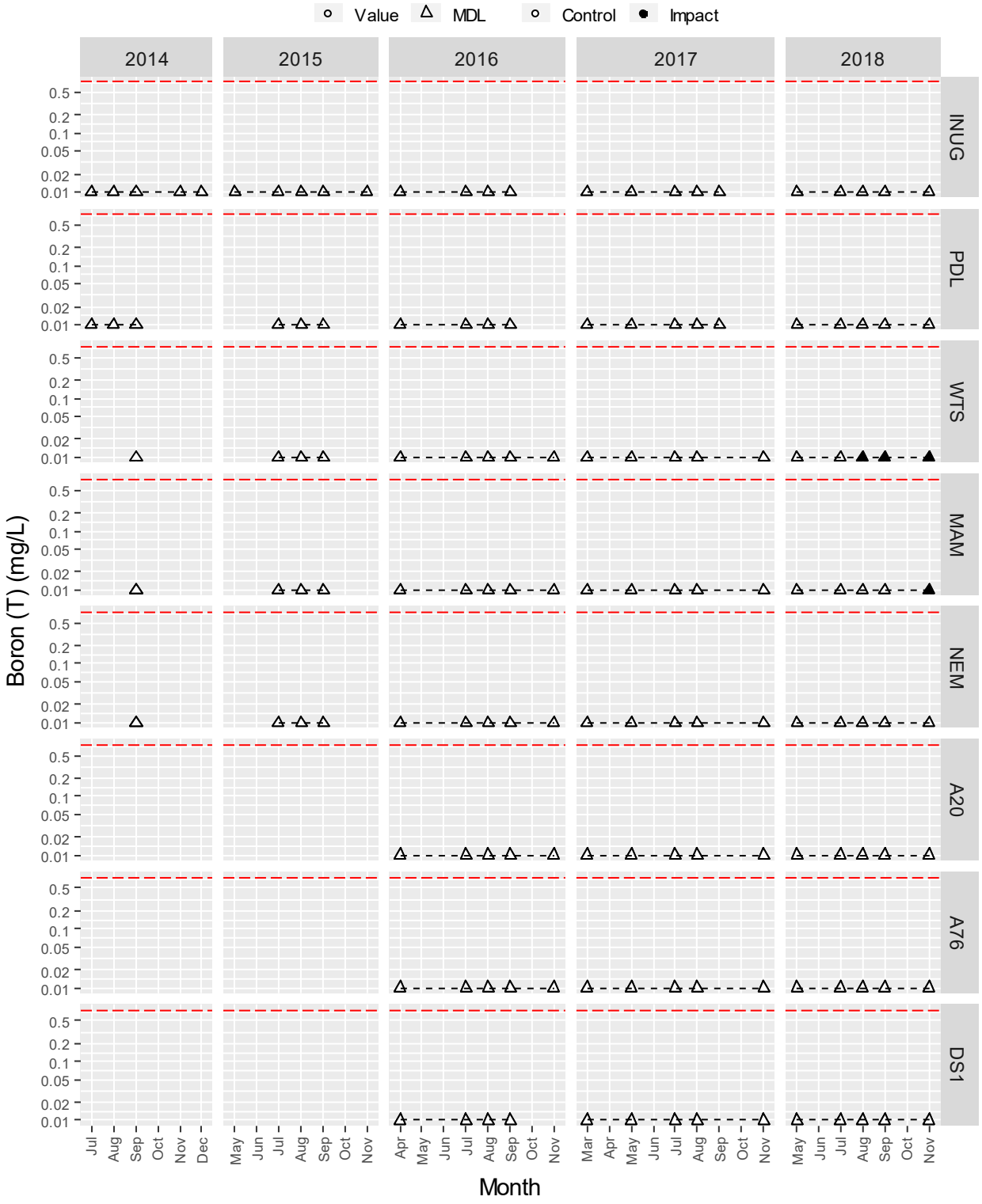


Figure B2-13. Total cadmium (mg/L) in water from Whale Tail Pit study area lakes since 2014.

Note: The red dashed line is the Meadowbank trigger value.

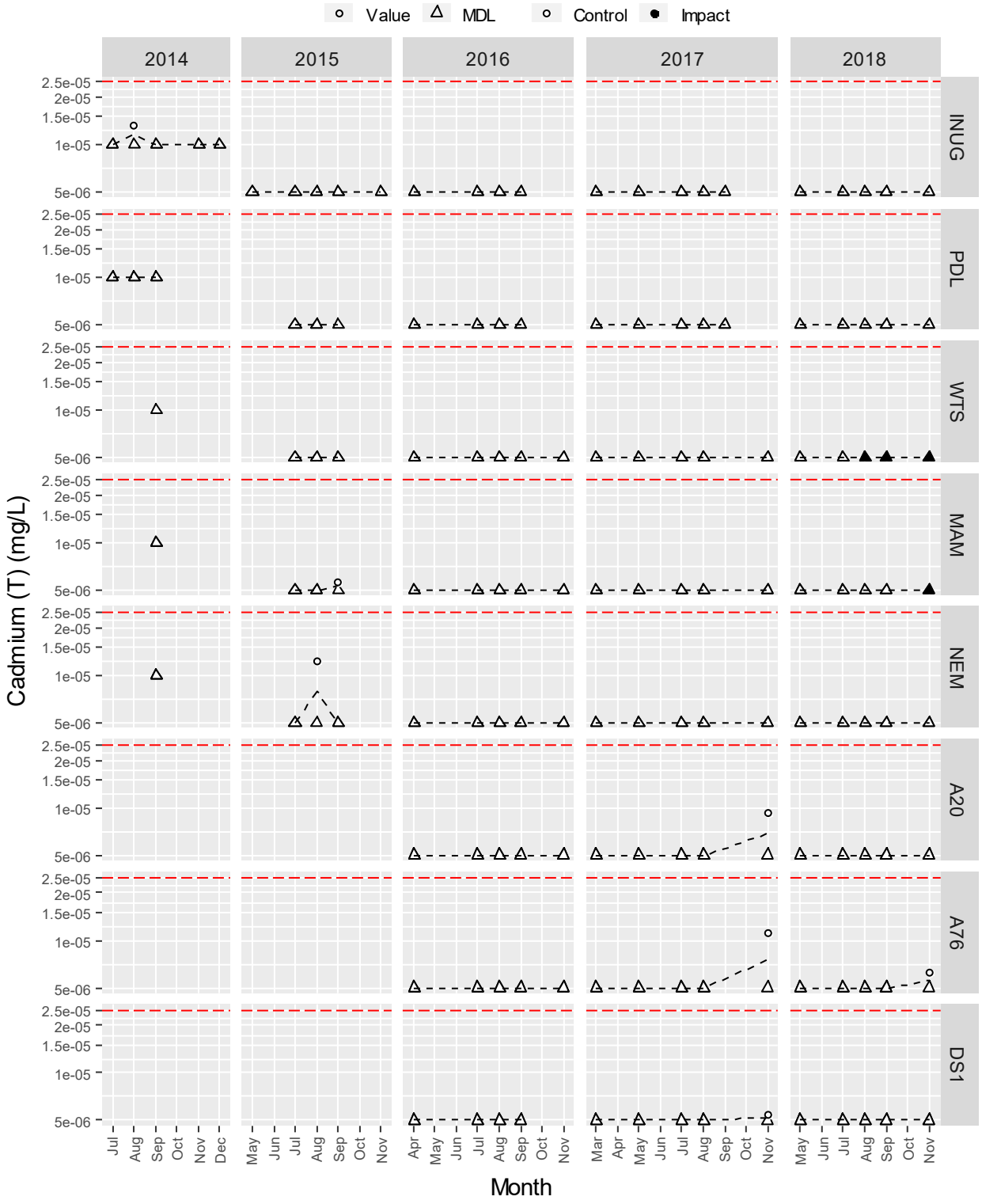


Figure B2-14. Total lithium (mg/L) in water from Whale Tail Pit study area lakes since 2014.

Note: The red dashed line is the Meadowbank trigger value.

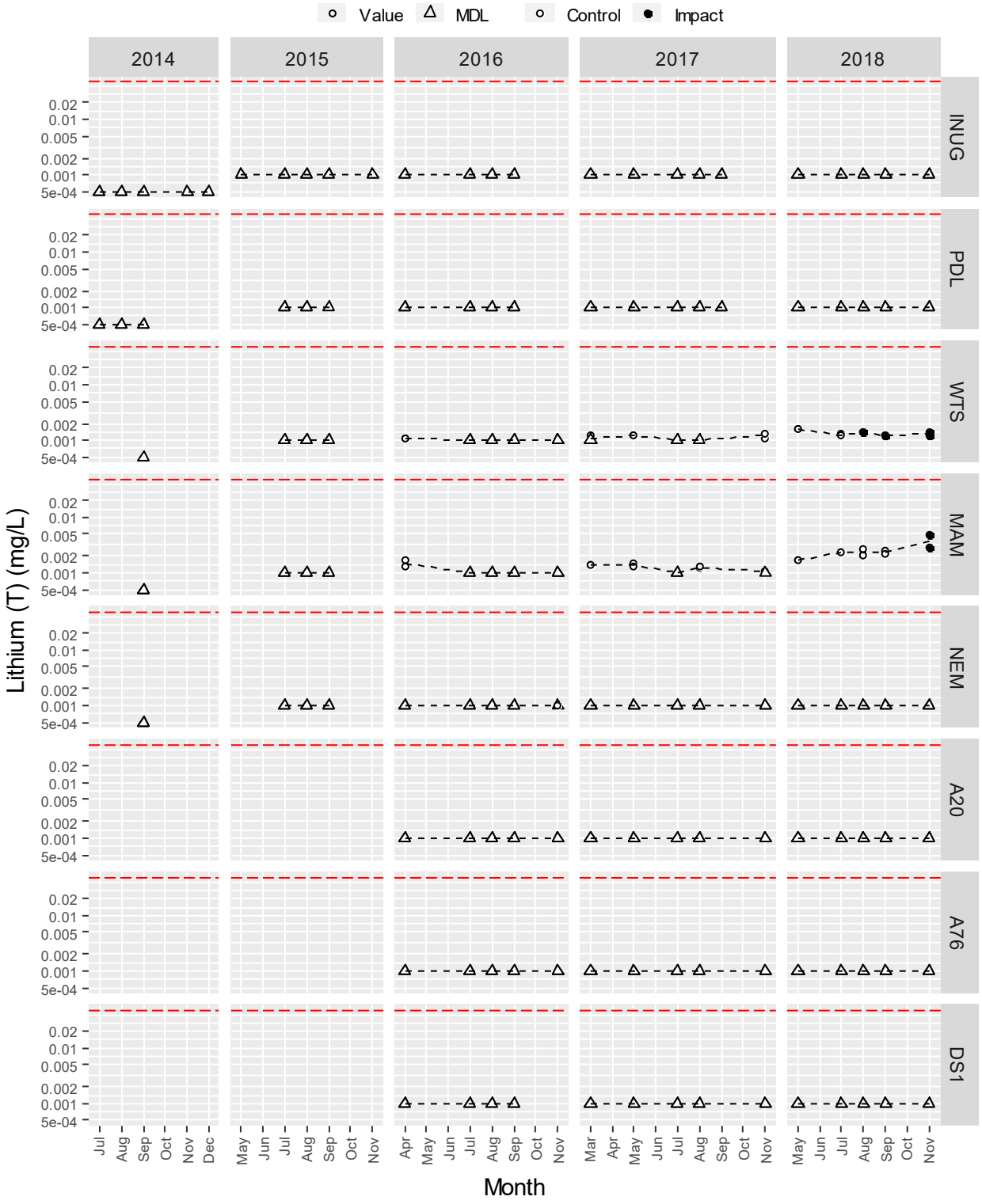


Figure B2-15. Total manganese (mg/L) in water from Whale Tail Pit study area lakes since 2014.

Note: The red dashed line is the Meadowbank trigger value.

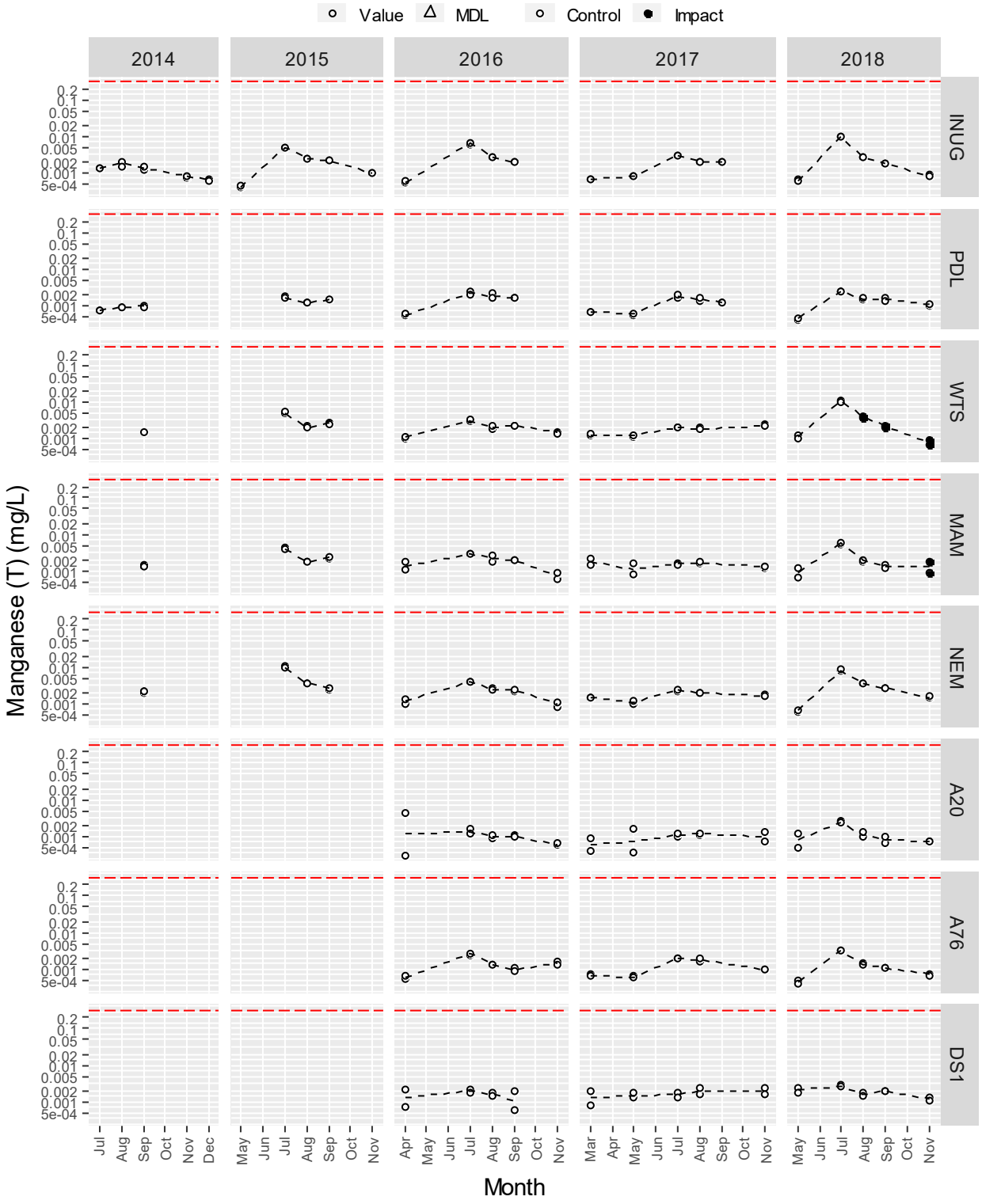


Figure B2-16. Total mercury (mg/L) in water from Whale Tail Pit study area lakes since 2014.

Note: The red dashed line is the Meadowbank trigger value.

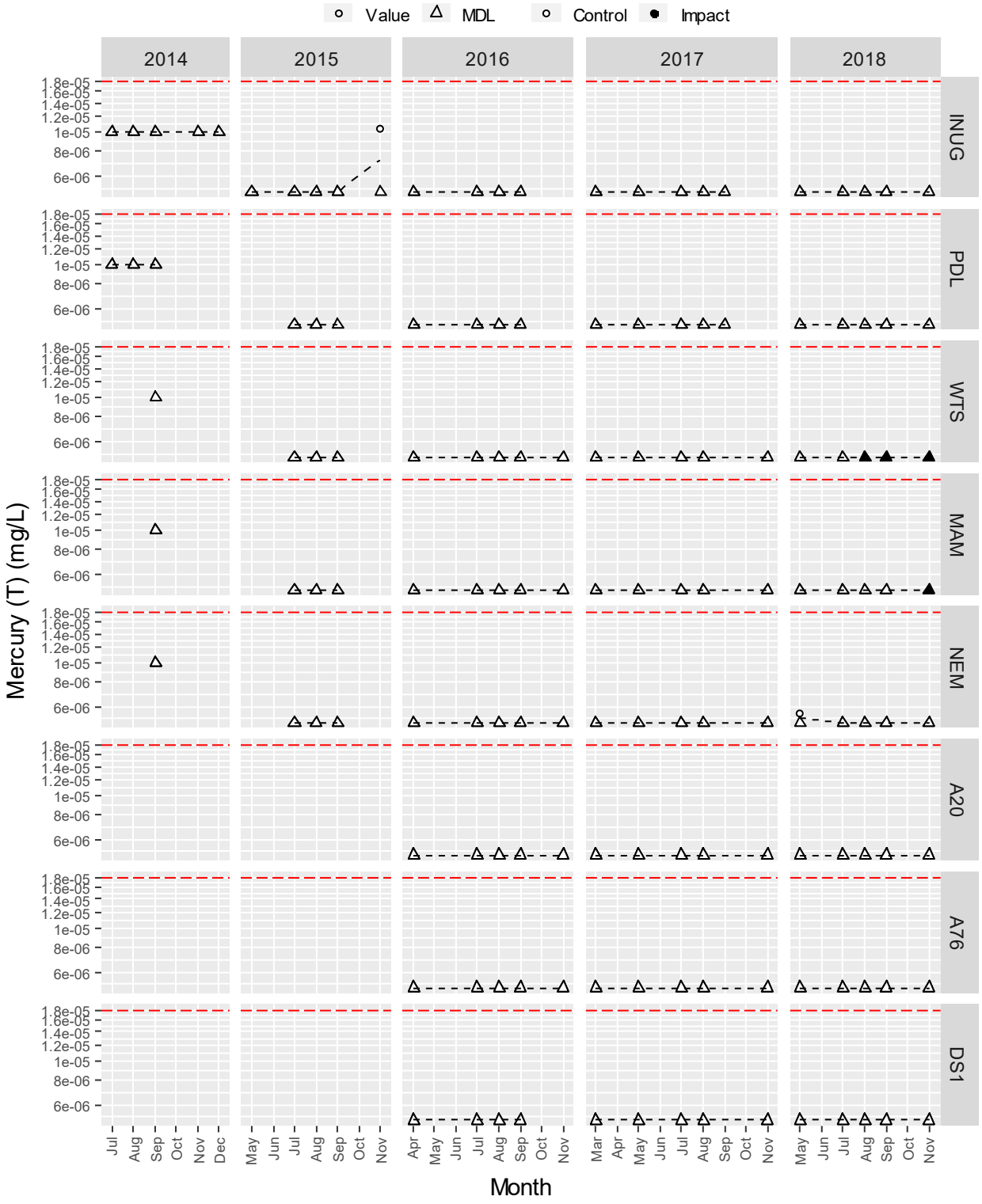


Figure B2-17. Total selenium (mg/L) in water from Whale Tail Pit study area lakes since 2014.

Note: The red dashed line is the Meadowbank trigger value.

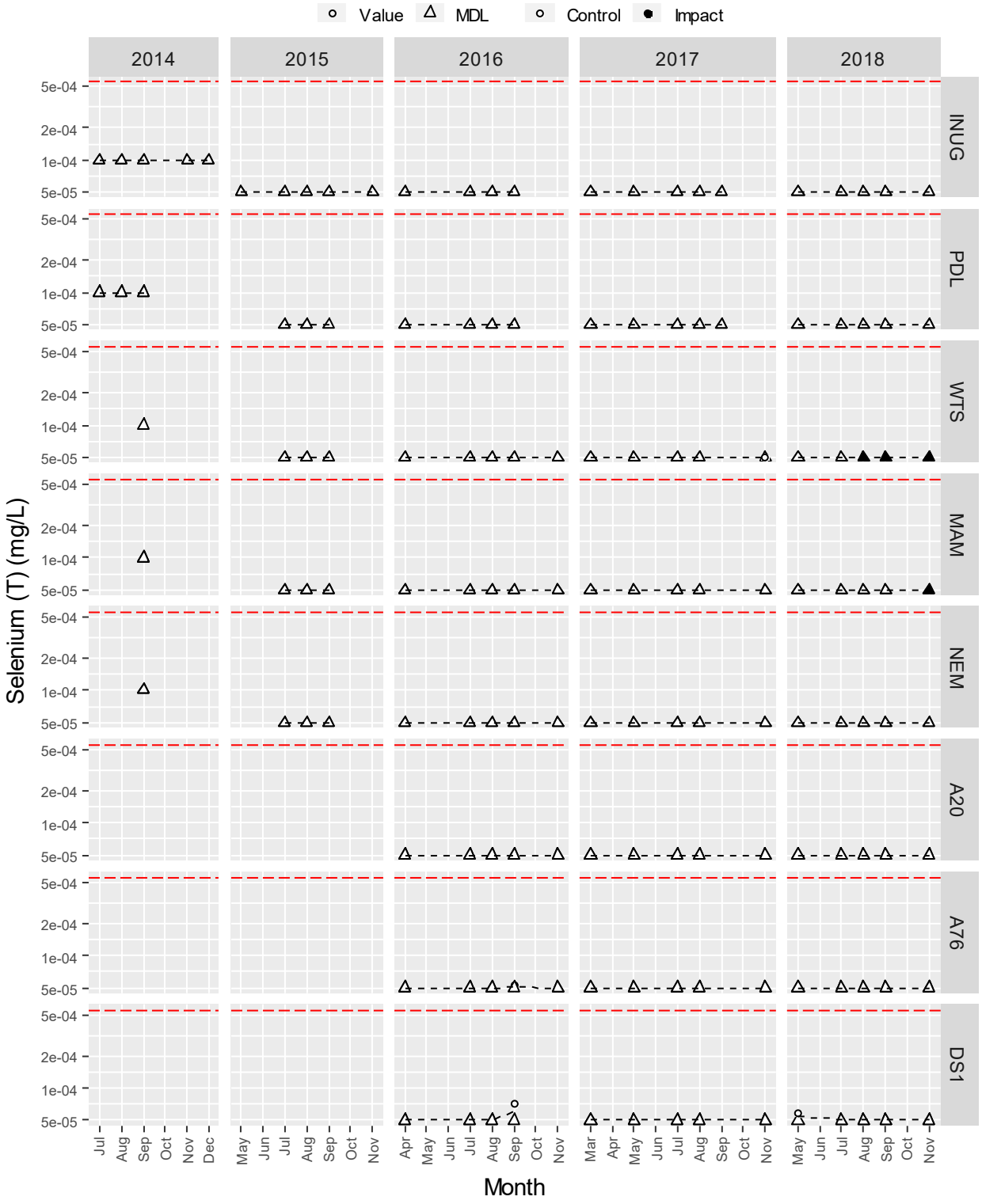


Figure B2-18. Total strontium (mg/L) in water from Whale Tail Pit study area lakes since 2014.

Note: The red dashed line is the Meadowbank trigger value.

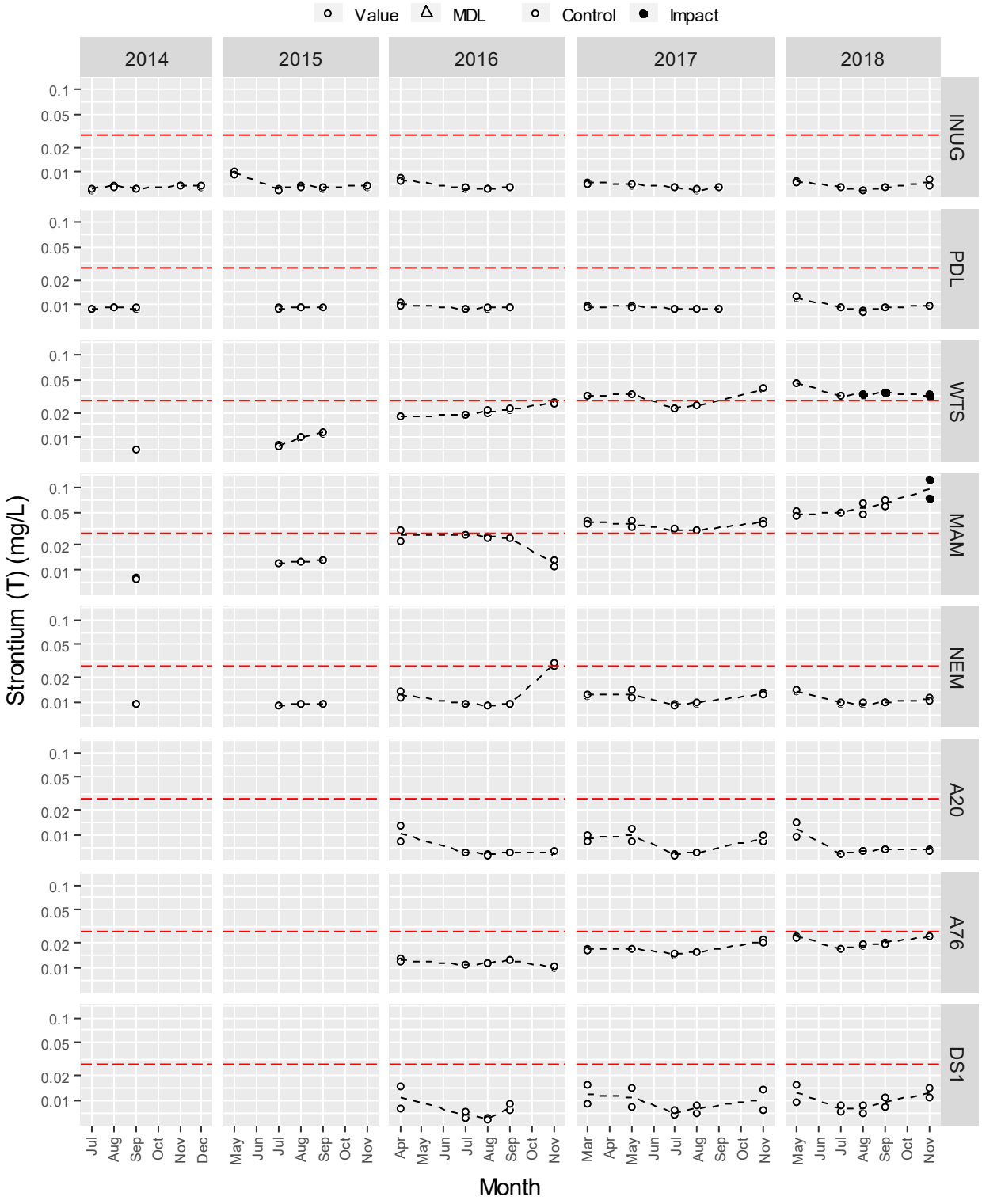


Figure B2-19. Total thallium (mg/L) in water from Whale Tail Pit study area lakes since 2014.

Note: The red dashed line is the Meadowbank trigger value.

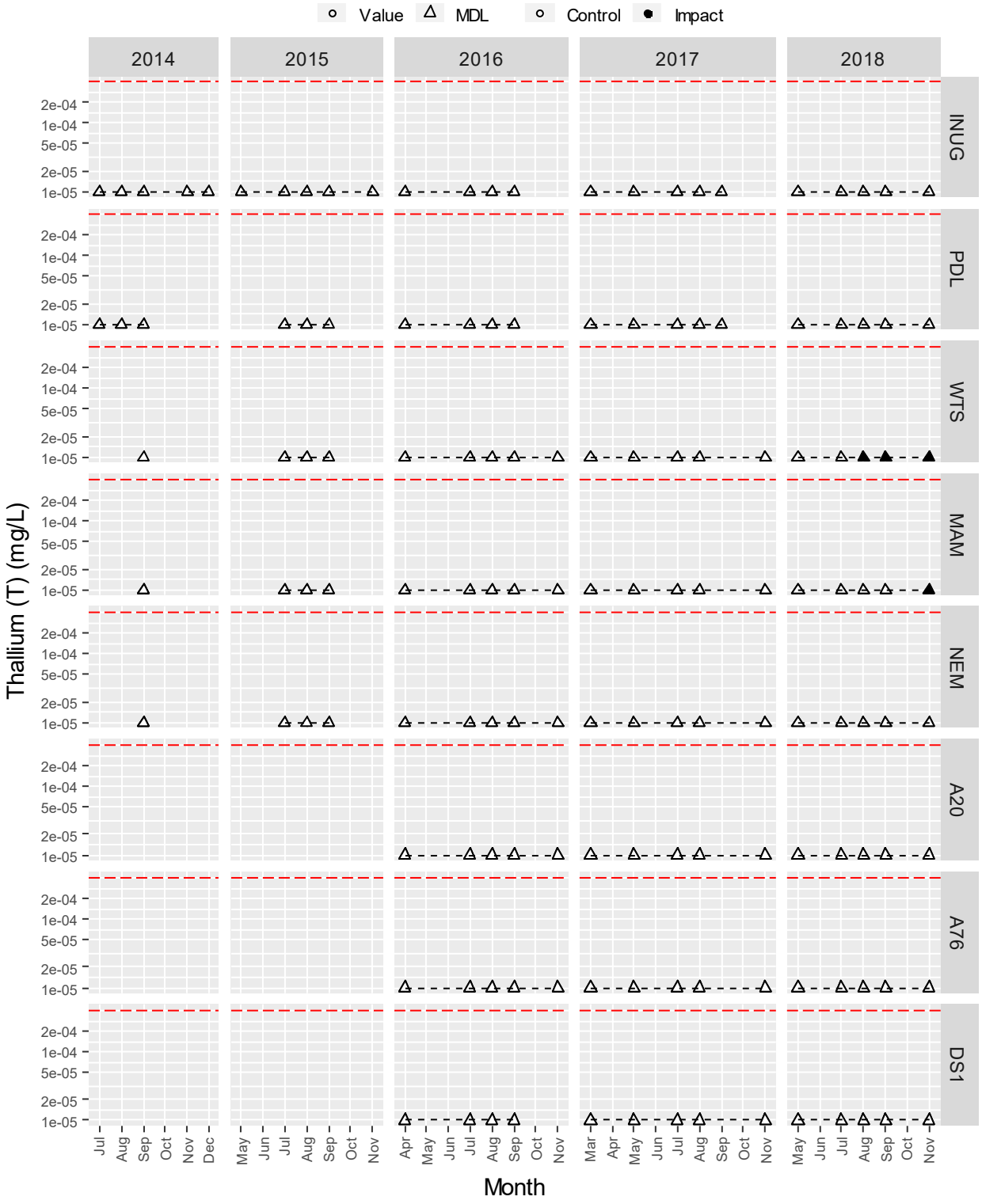


Figure B2-20. Total tin (mg/L) in water from Whale Tail Pit study area lakes since 2014.

Note: The red dashed line is the Meadowbank trigger value.

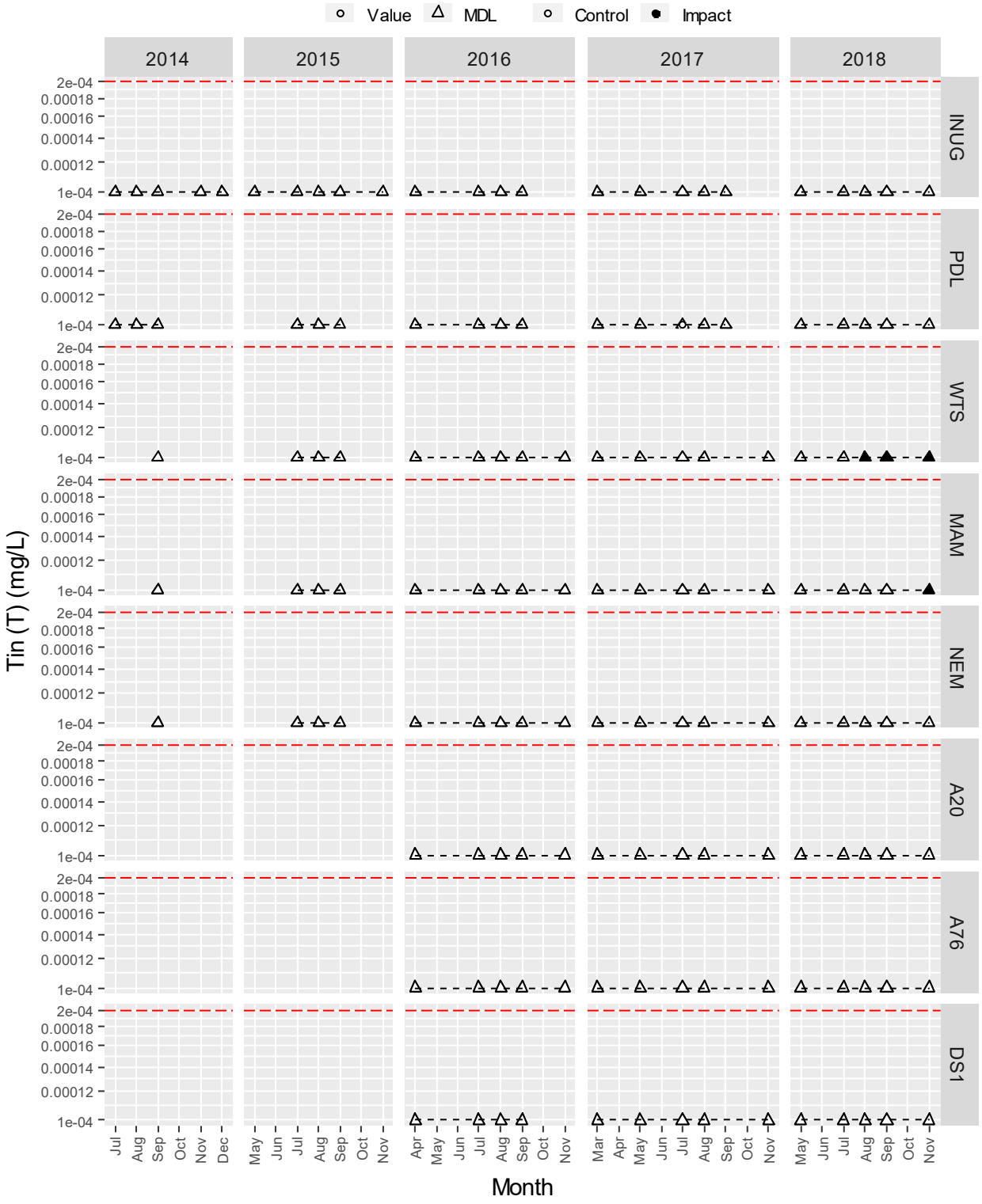


Figure B2-21. Total titanium (mg/L) in water from Whale Tail Pit study area lakes since 2014.

Note: The red dashed line is the Meadowbank trigger value.

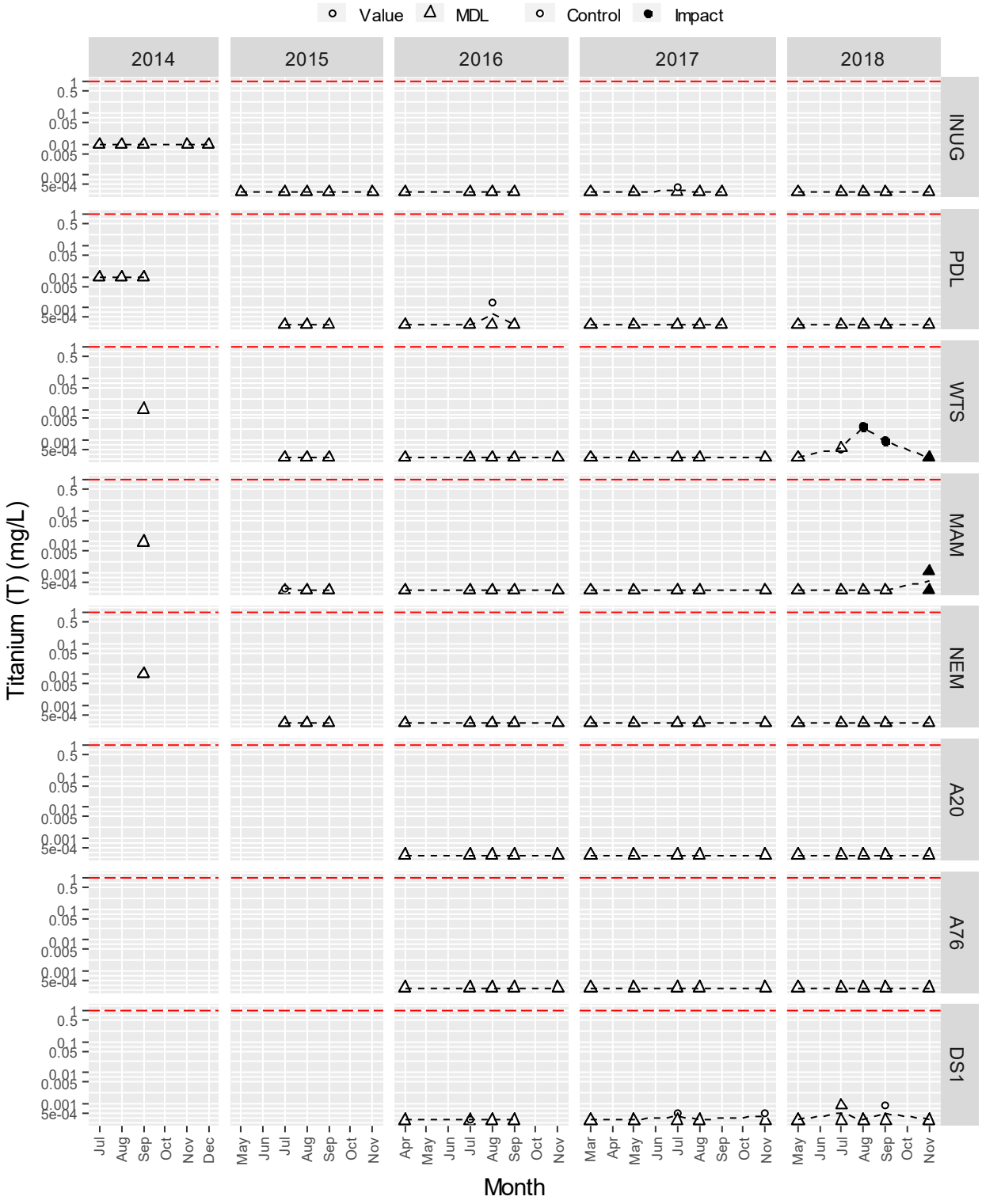


Figure B2-22. Total uranium (mg/L) in water from Whale Tail Pit study area lakes since 2014.

Note: The red dashed line is the Meadowbank trigger value.

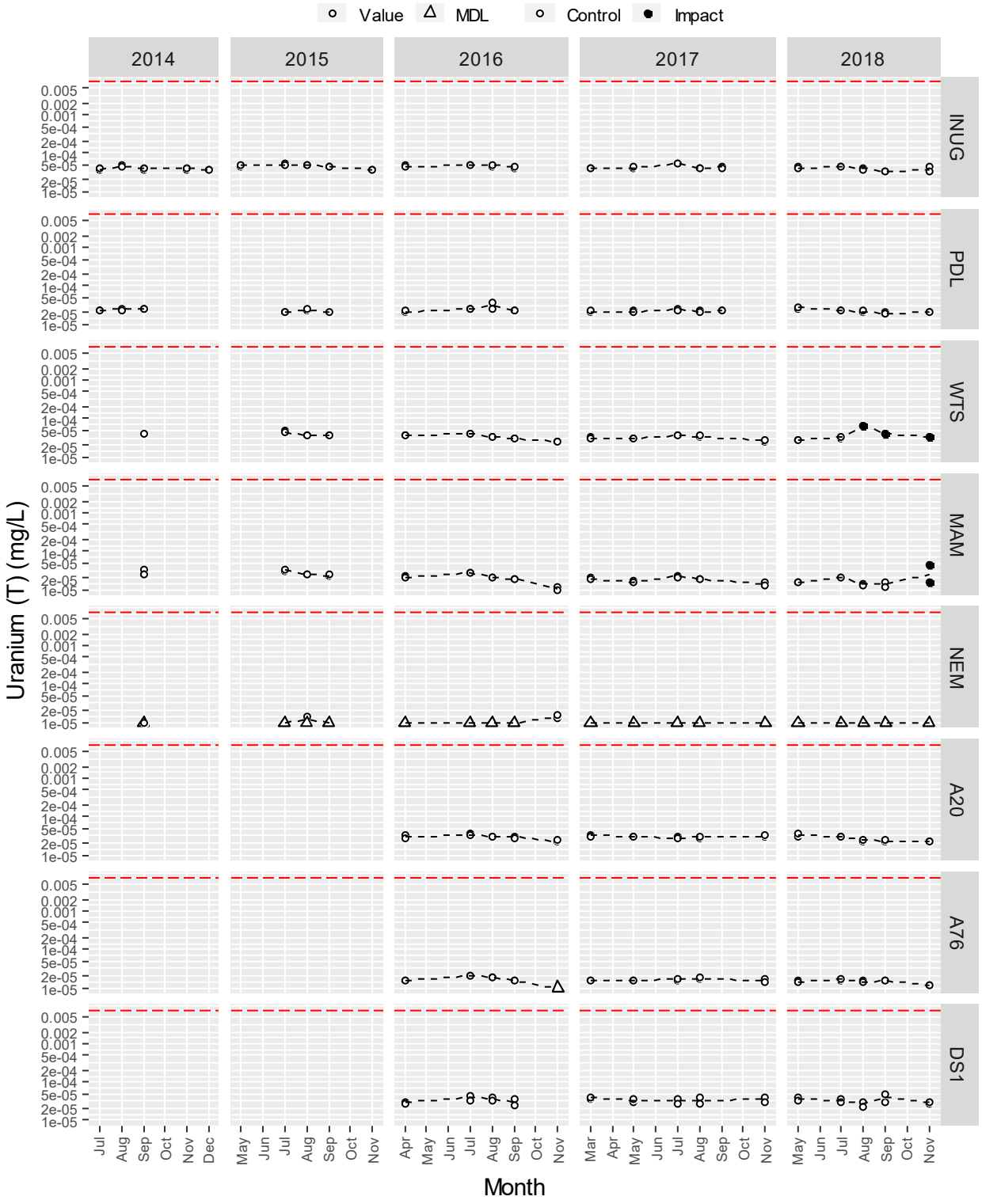


Figure B2-23. Total vanadium (mg/L) in water from Whale Tail Pit study area lakes since 2014.

Note: The red dashed line is the Meadowbank trigger value.

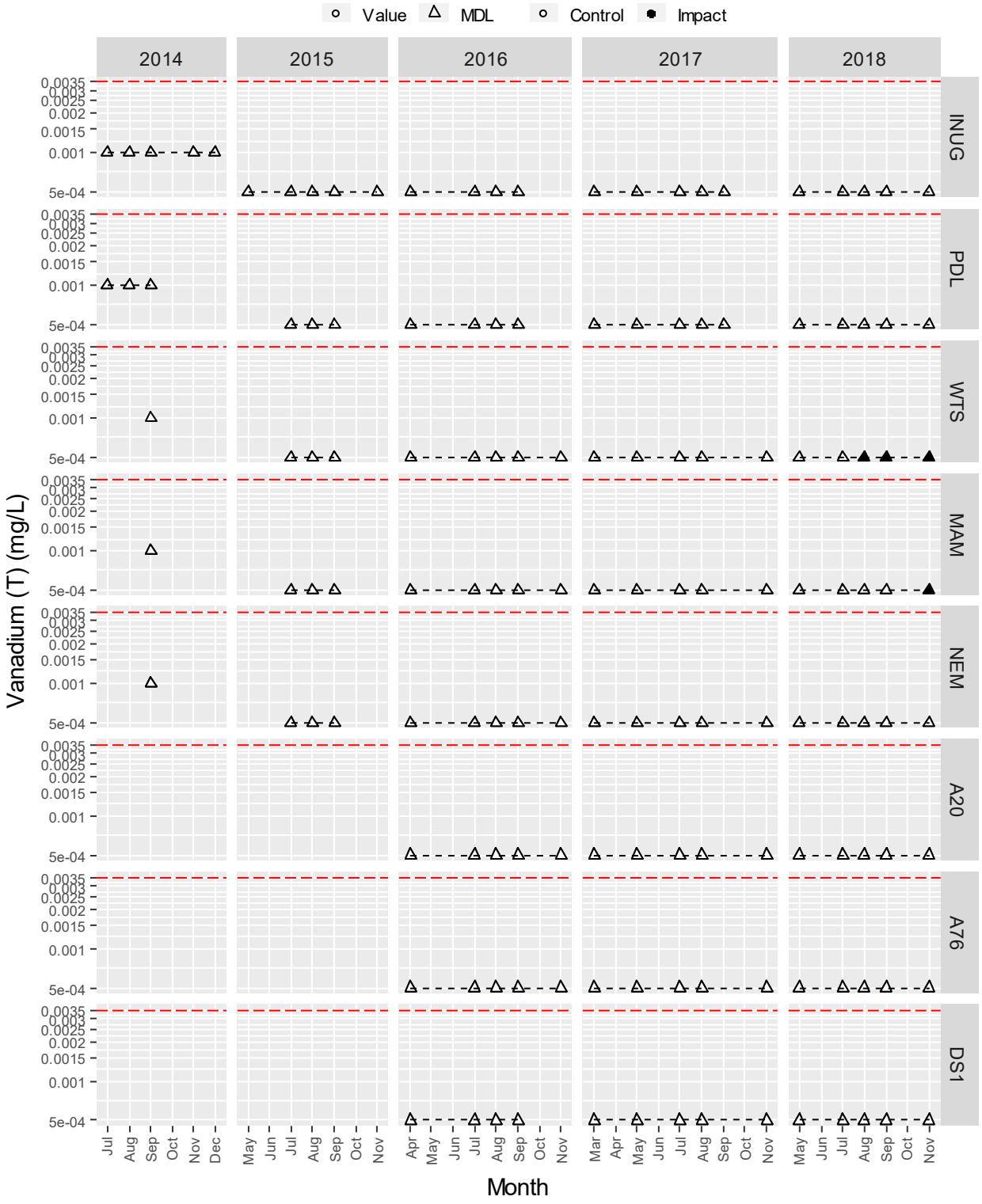


Figure B2-24. Total zinc (mg/L) in water from Whale Tail Pit study area lakes since 2014.

Note: The red dashed line is the Meadowbank trigger value.

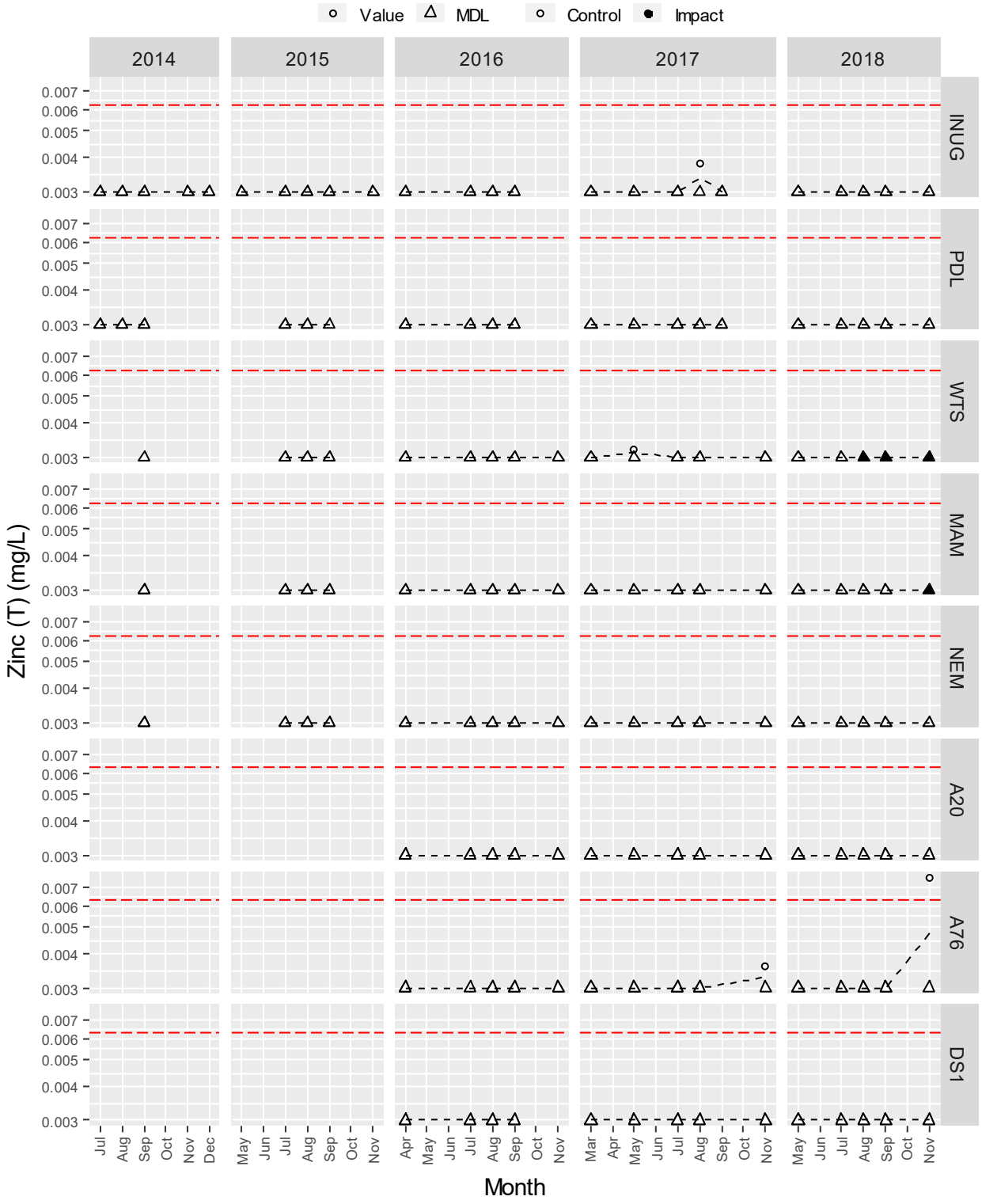


Figure B2-25. Dissolved antimony (mg/L) in water from Whale Tail Pit study area lakes since 2014.

Note: The red dashed line is the Meadowbank trigger value.

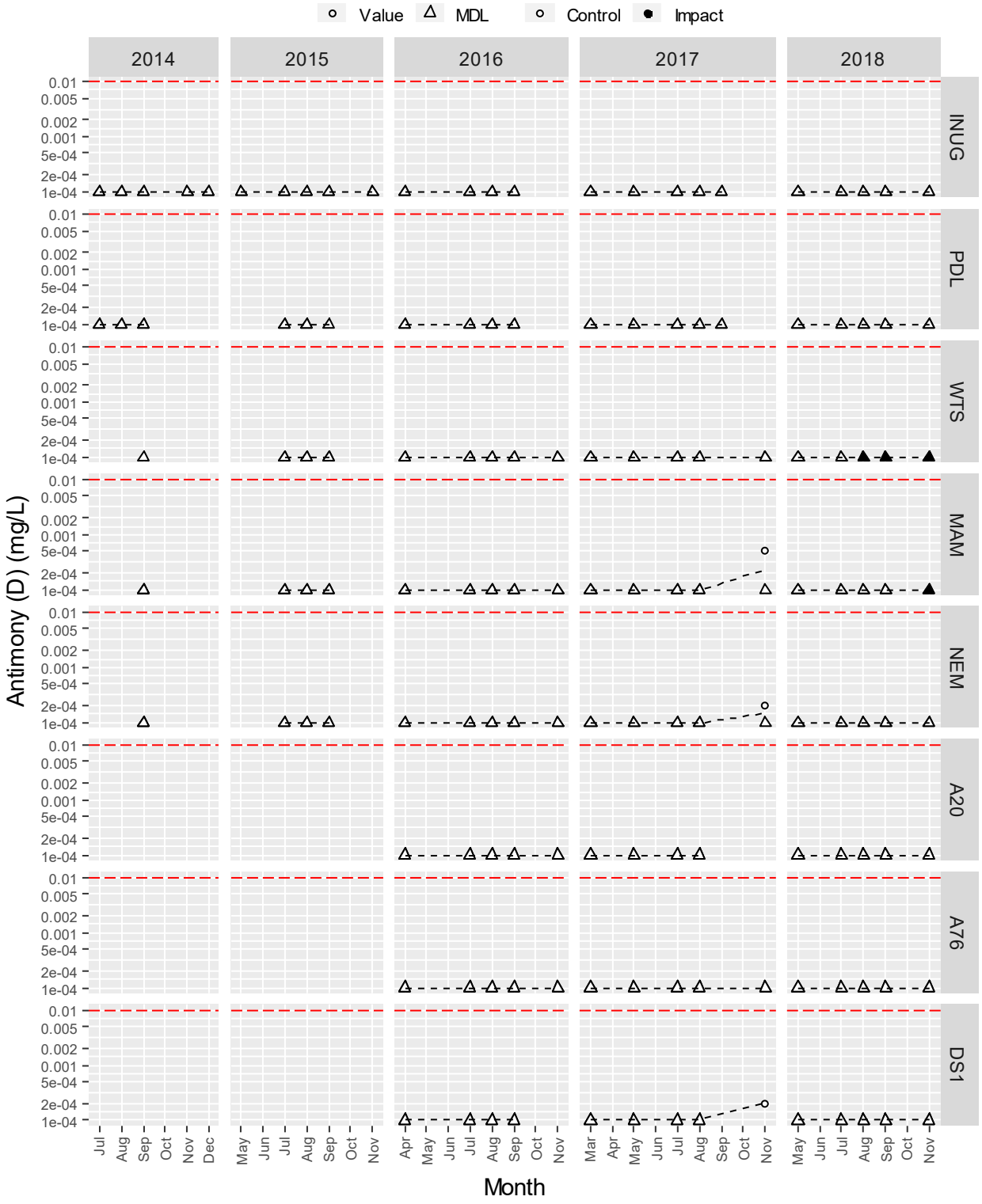


Figure B2-26. Dissolved barium (mg/L) in water from Whale Tail Pit study area lakes since 2014.

Note: The red dashed line is the Meadowbank trigger value.

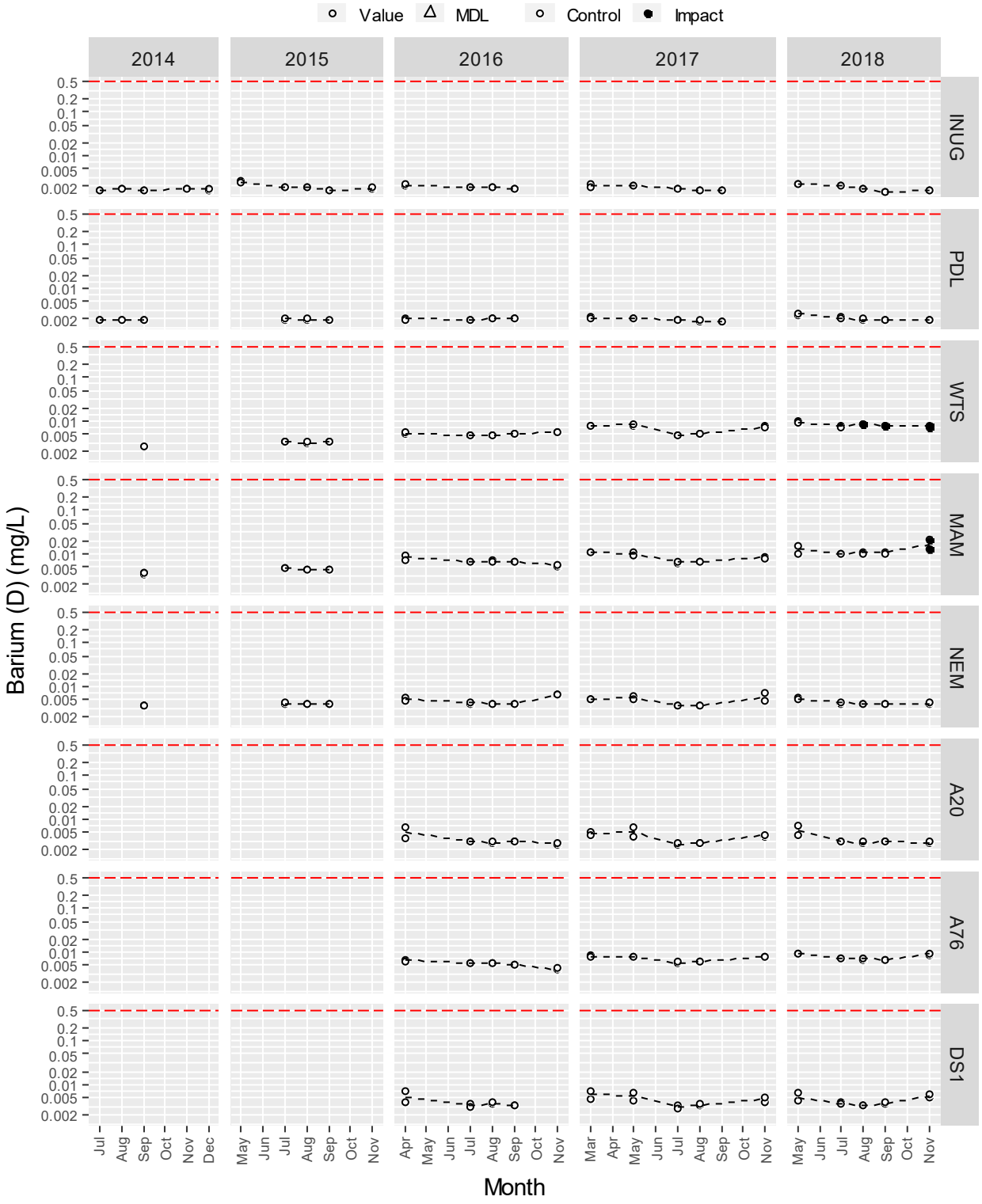


Figure B2-27. Dissolved beryllium (mg/L) in water from Whale Tail Pit study area lakes since 2014.

Note: The red dashed line is the Meadowbank trigger value.



Figure B2-28. Dissolved boron (mg/L) in water from Whale Tail Pit study area lakes since 2014.

Note: The red dashed line is the Meadowbank trigger value.

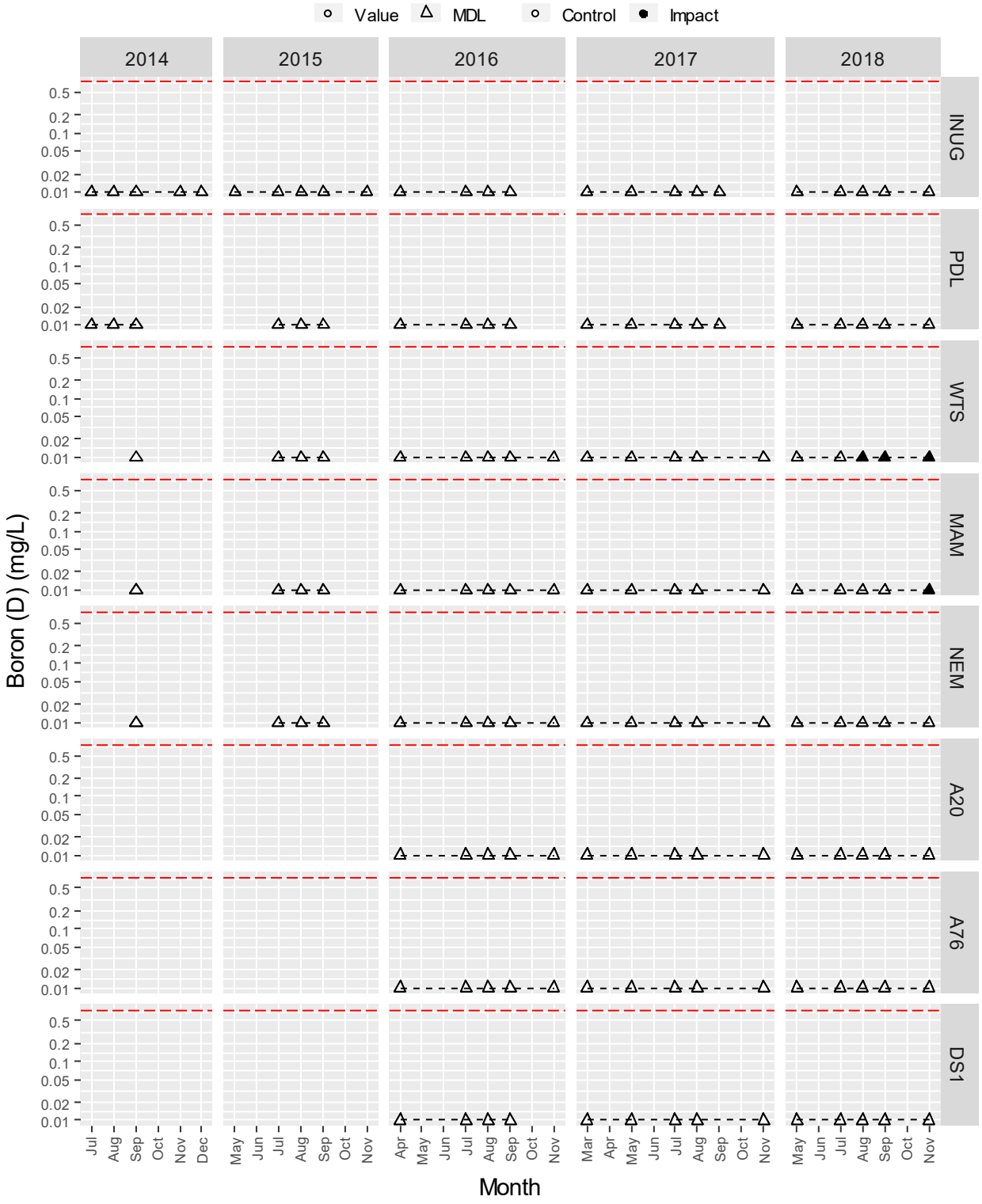


Figure B2-29. Dissolved cadmium (mg/L) in water from Whale Tail Pit study area lakes since 2014.

Note: The red dashed line is the Meadowbank trigger value.

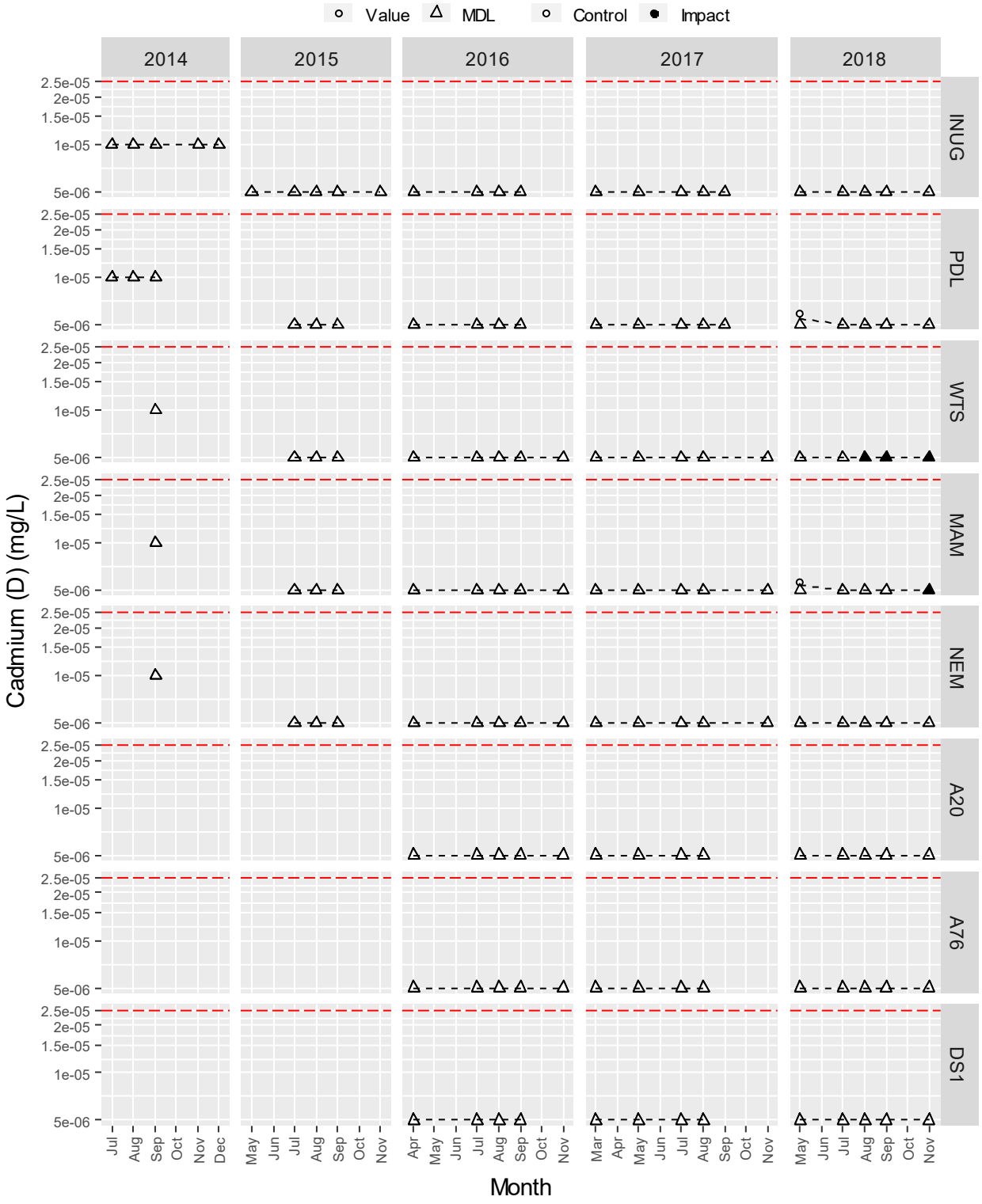


Figure B2-30. Dissolved lithium (mg/L) in water from Whale Tail Pit study area lakes since 2014.

Note: The red dashed line is the Meadowbank trigger value.

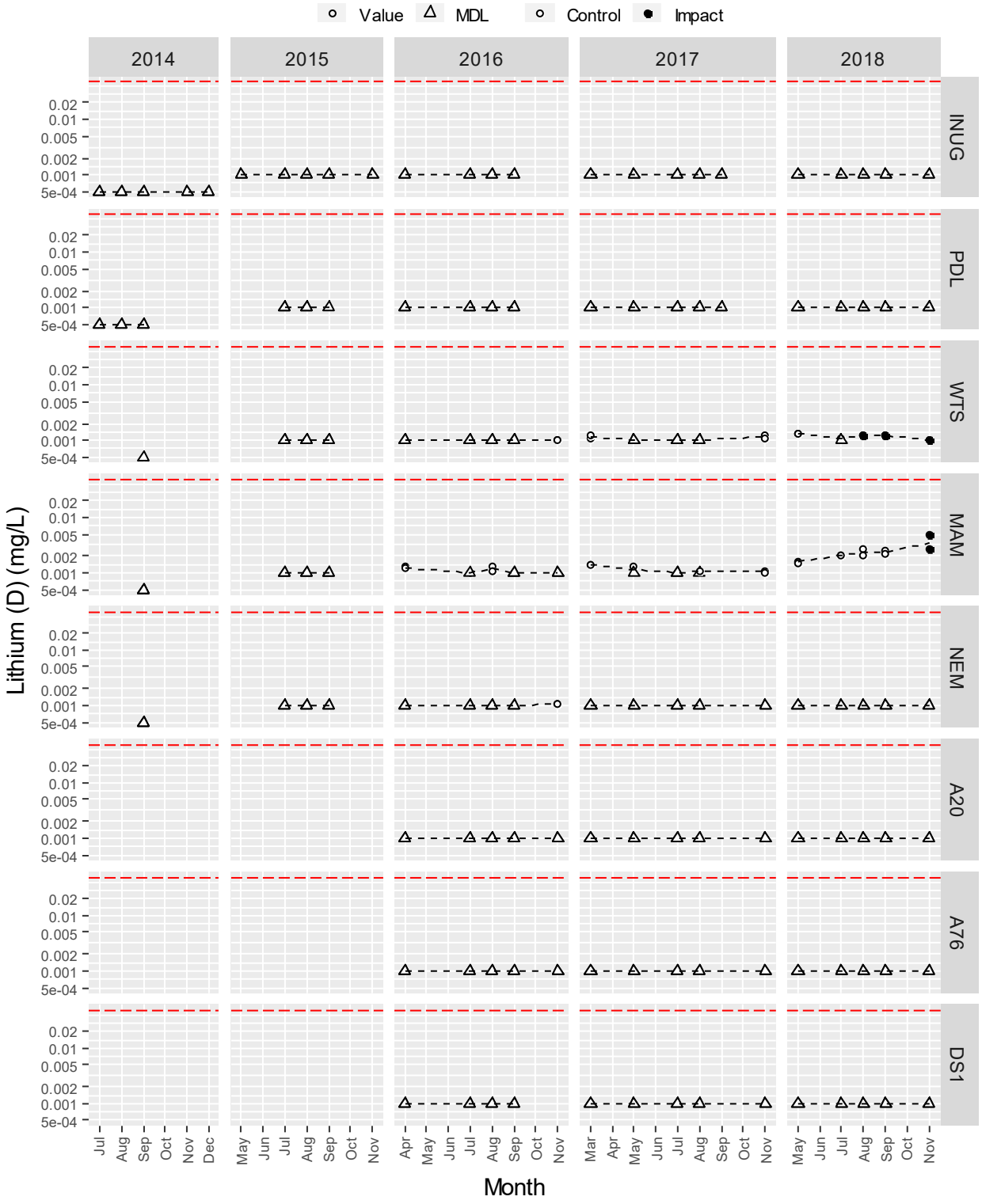


Figure B2-31. Dissolved manganese (mg/L) in water from Whale Tail Pit study area lakes since 2014.

Note: The red dashed line is the Meadowbank trigger value.

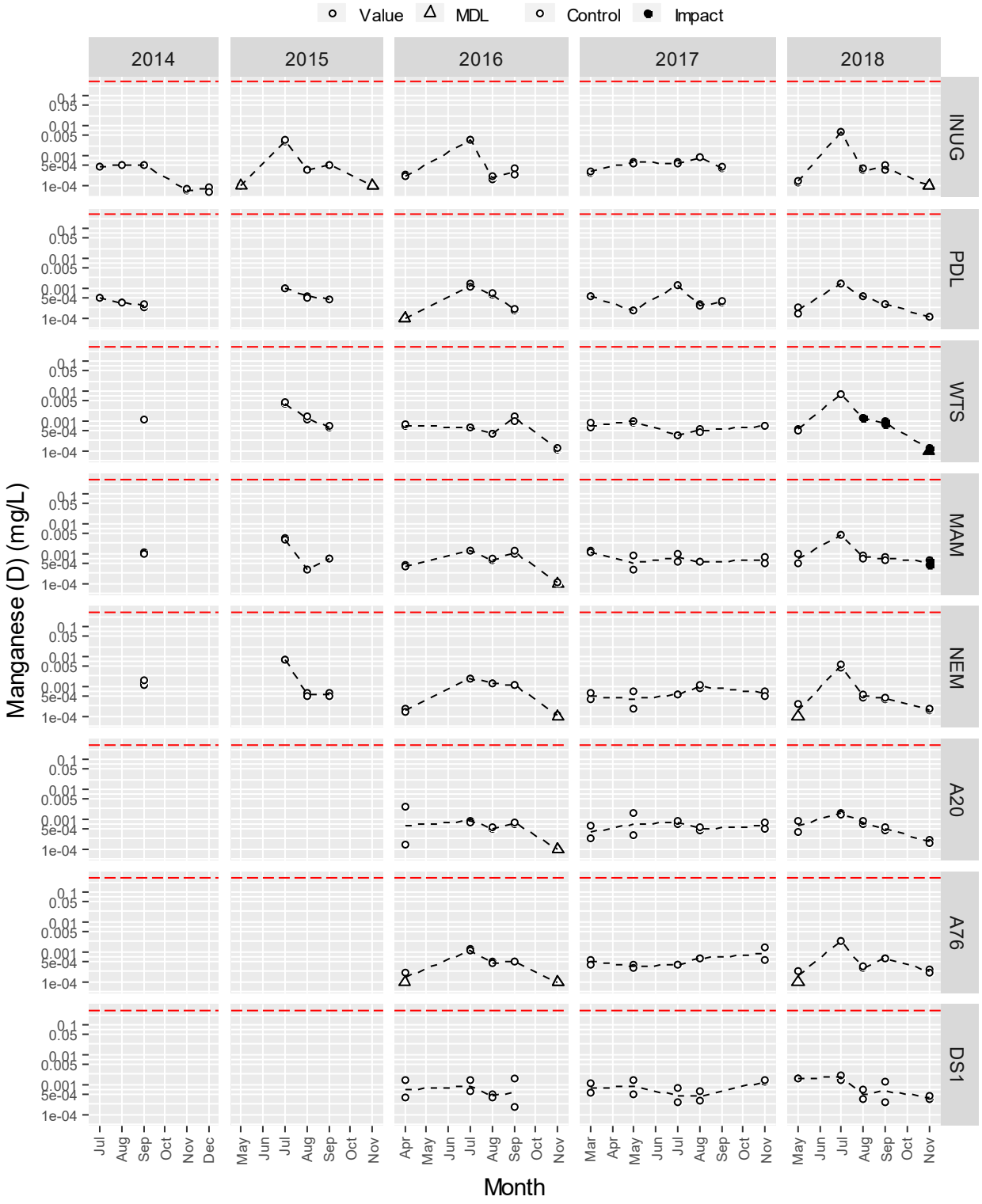


Figure B2-32. Dissolved mercury (mg/L) in water from Whale Tail Pit study area lakes since 2014.

Note: The red dashed line is the Meadowbank trigger value.

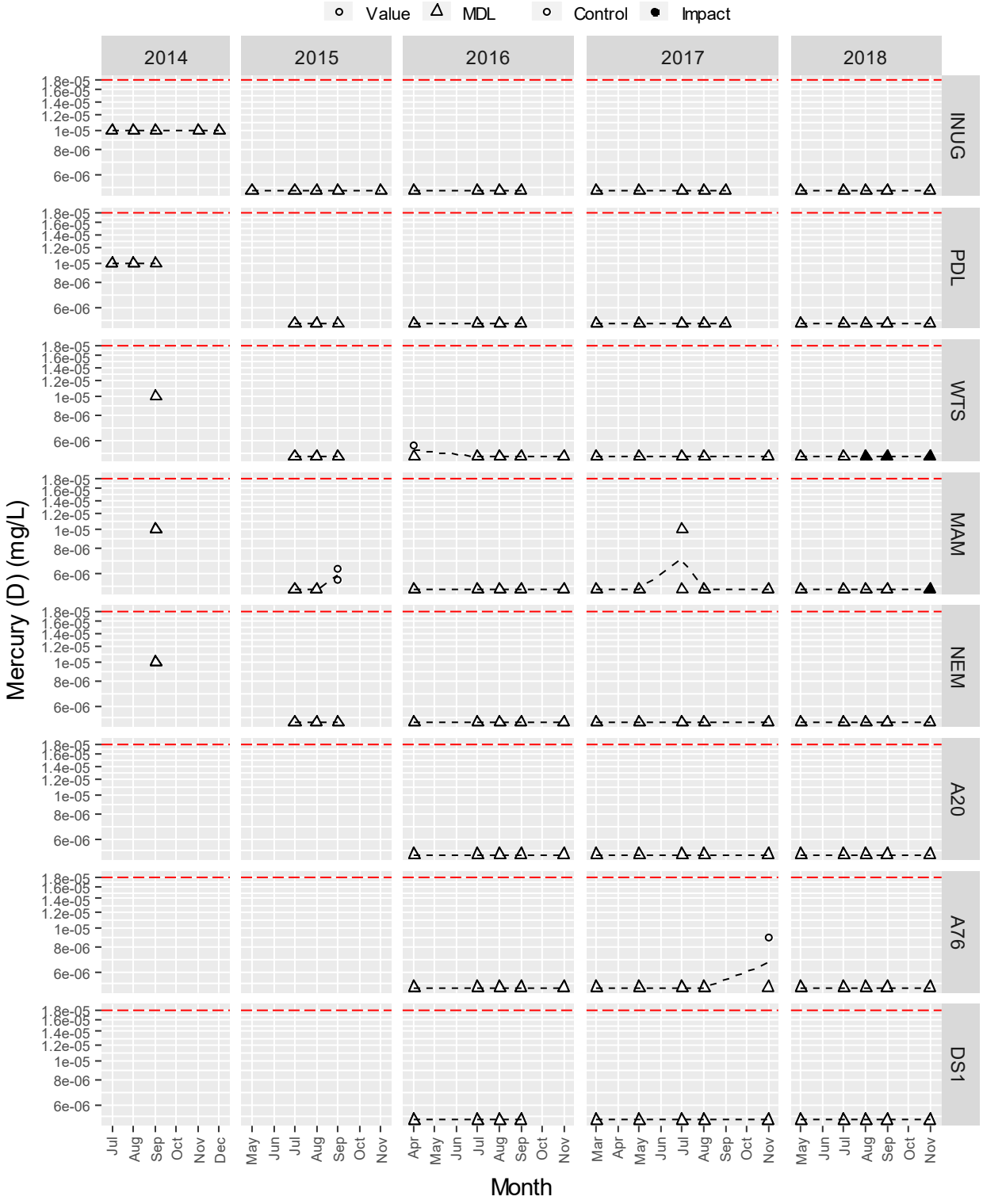


Figure B2-33. Dissolved selenium (mg/L) in water from Whale Tail Pit study area lakes since 2014.

Note: The red dashed line is the Meadowbank trigger value.

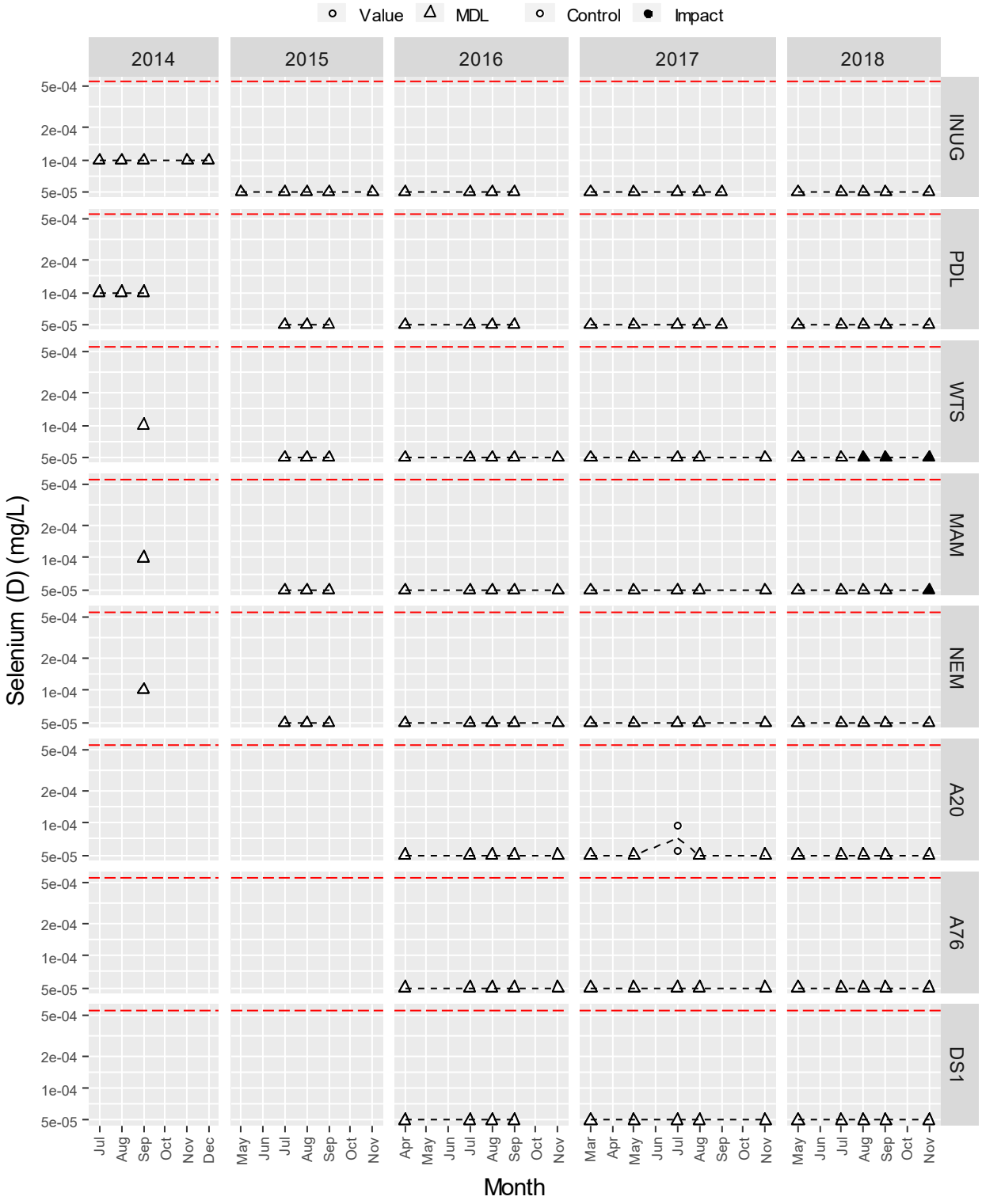


Figure B2-34. Dissolved strontium (mg/L) in water from Whale Tail Pit study area lakes since 2014.

Note: The red dashed line is the Meadowbank trigger value.

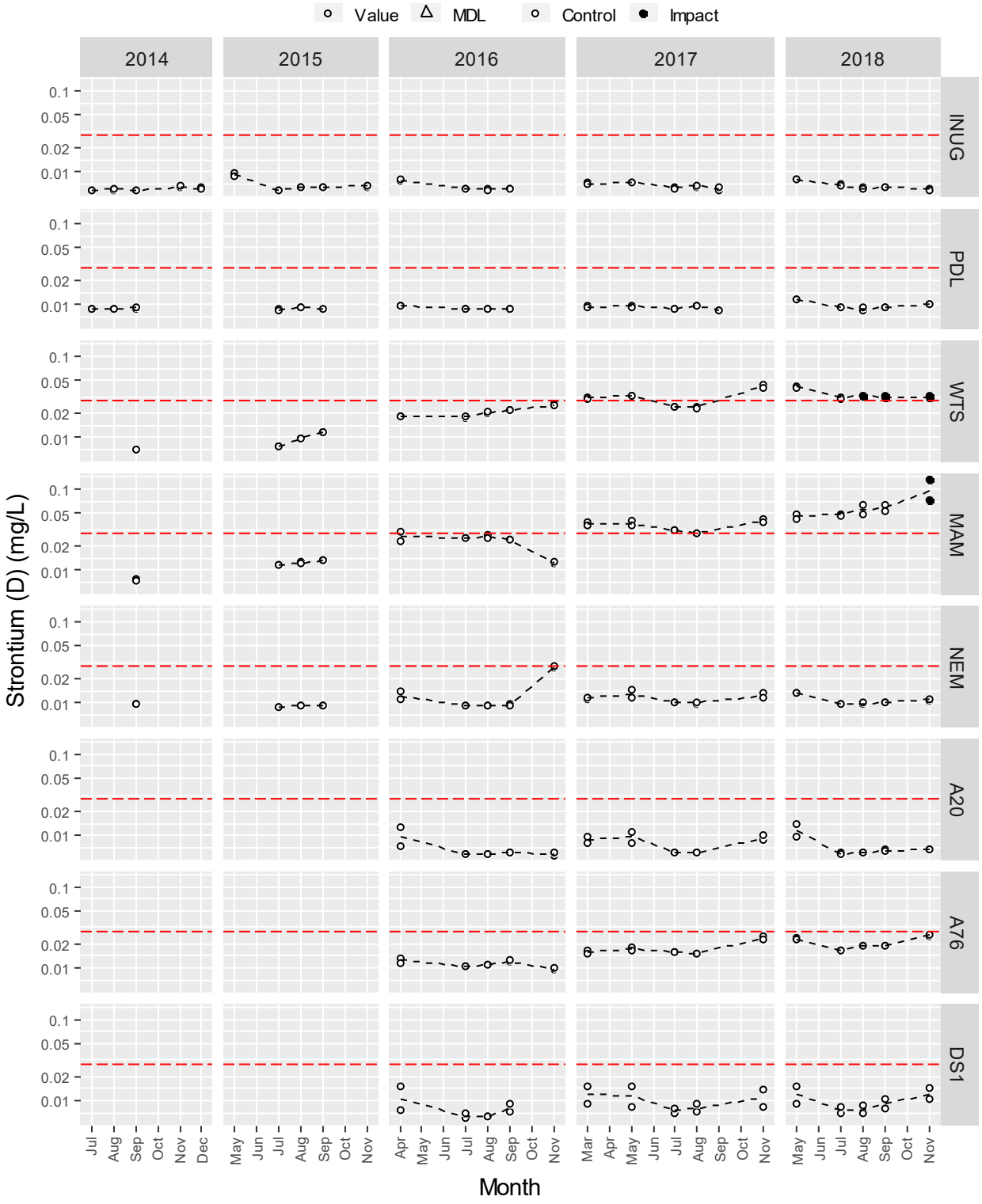


Figure B2-35. Dissolved thallium (mg/L) in water from Whale Tail Pit study area lakes since 2014.

Note: The red dashed line is the Meadowbank trigger value.

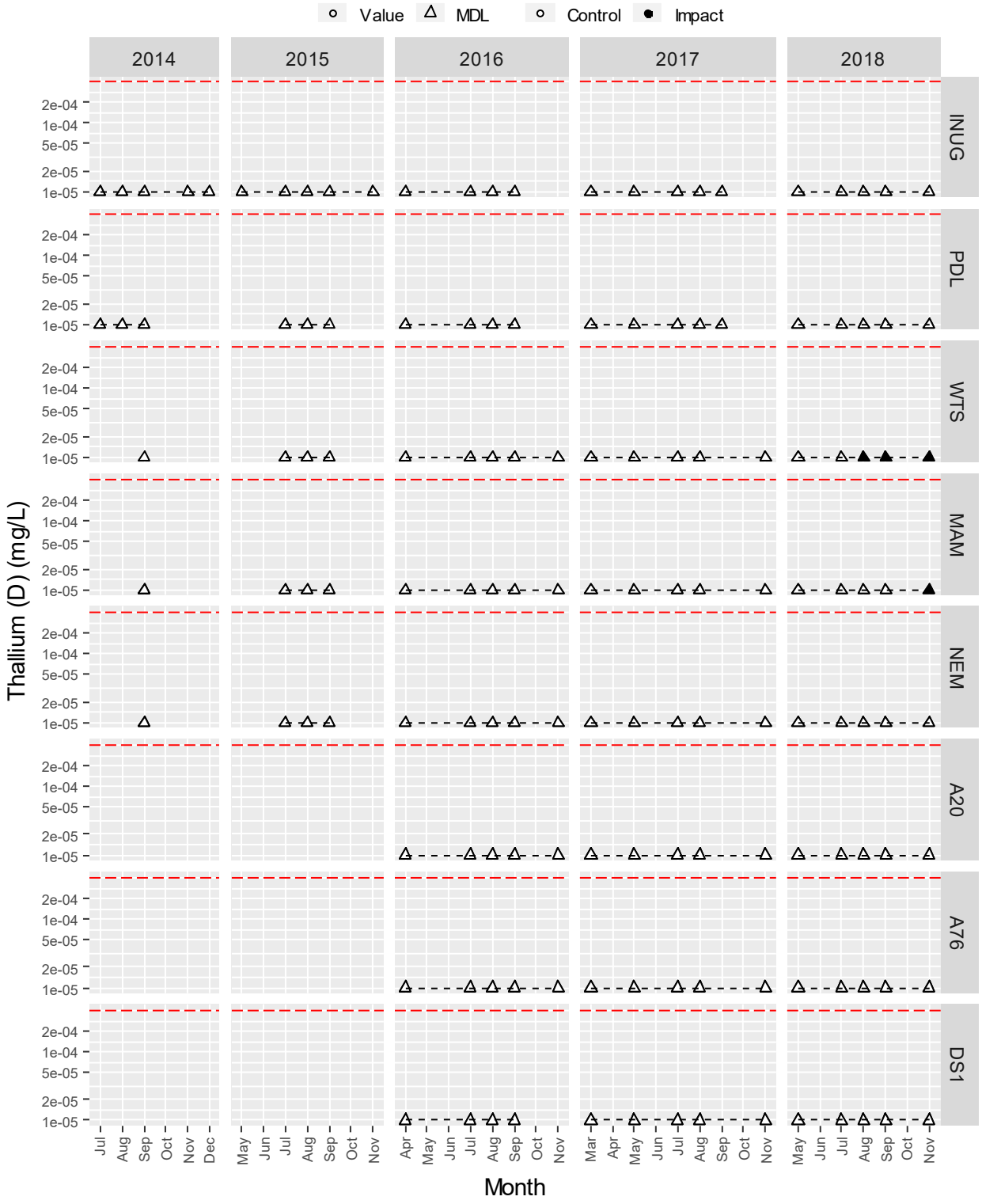


Figure B2-36. Dissolved tin (mg/L) in water from Whale Tail Pit study area lakes since 2014.

Note: The red dashed line is the Meadowbank trigger value.

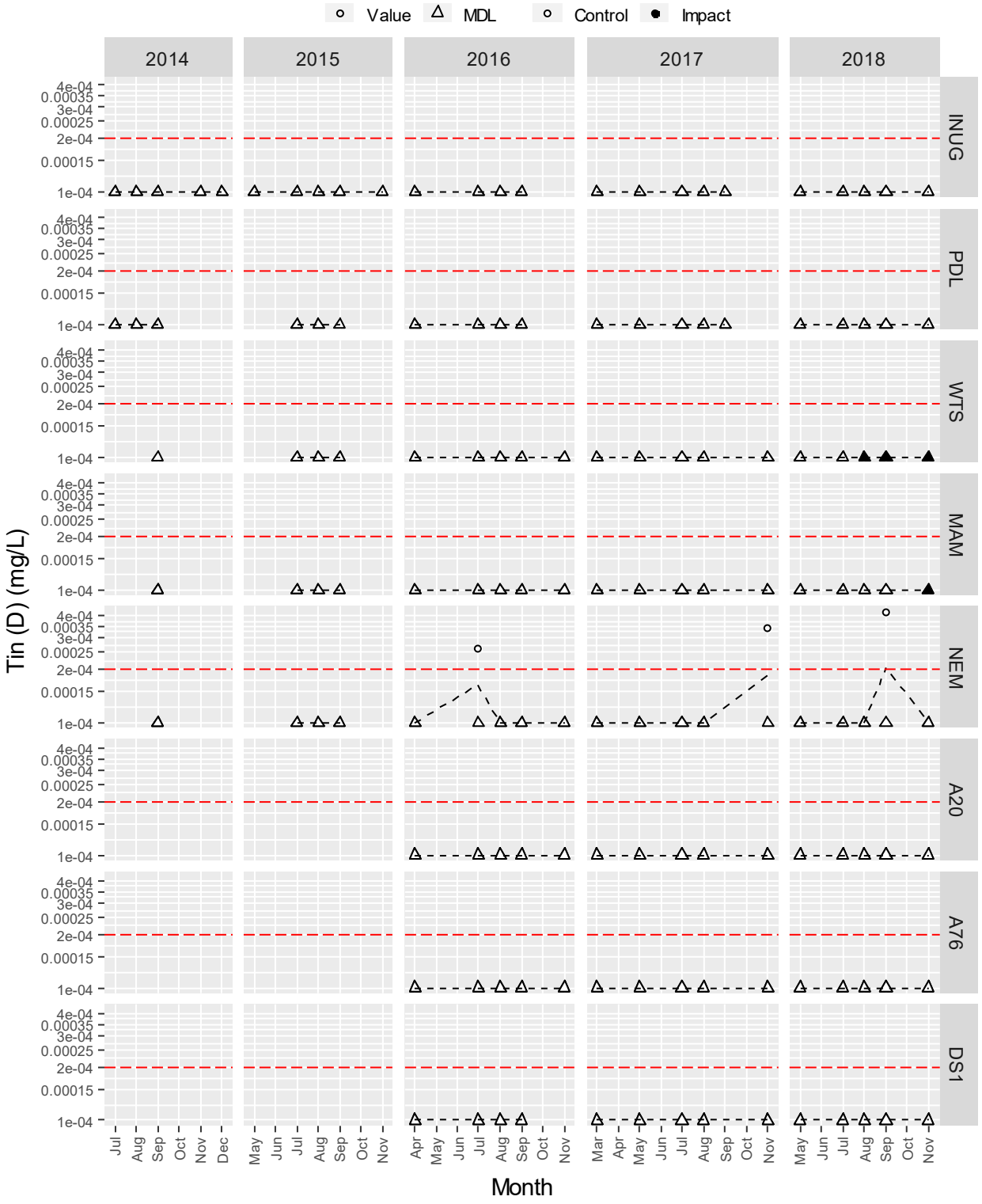


Figure B2-37. Dissolved titanium (mg/L) in water from Whale Tail Pit study area lakes since 2014.

Note: The red dashed line is the Meadowbank trigger value.

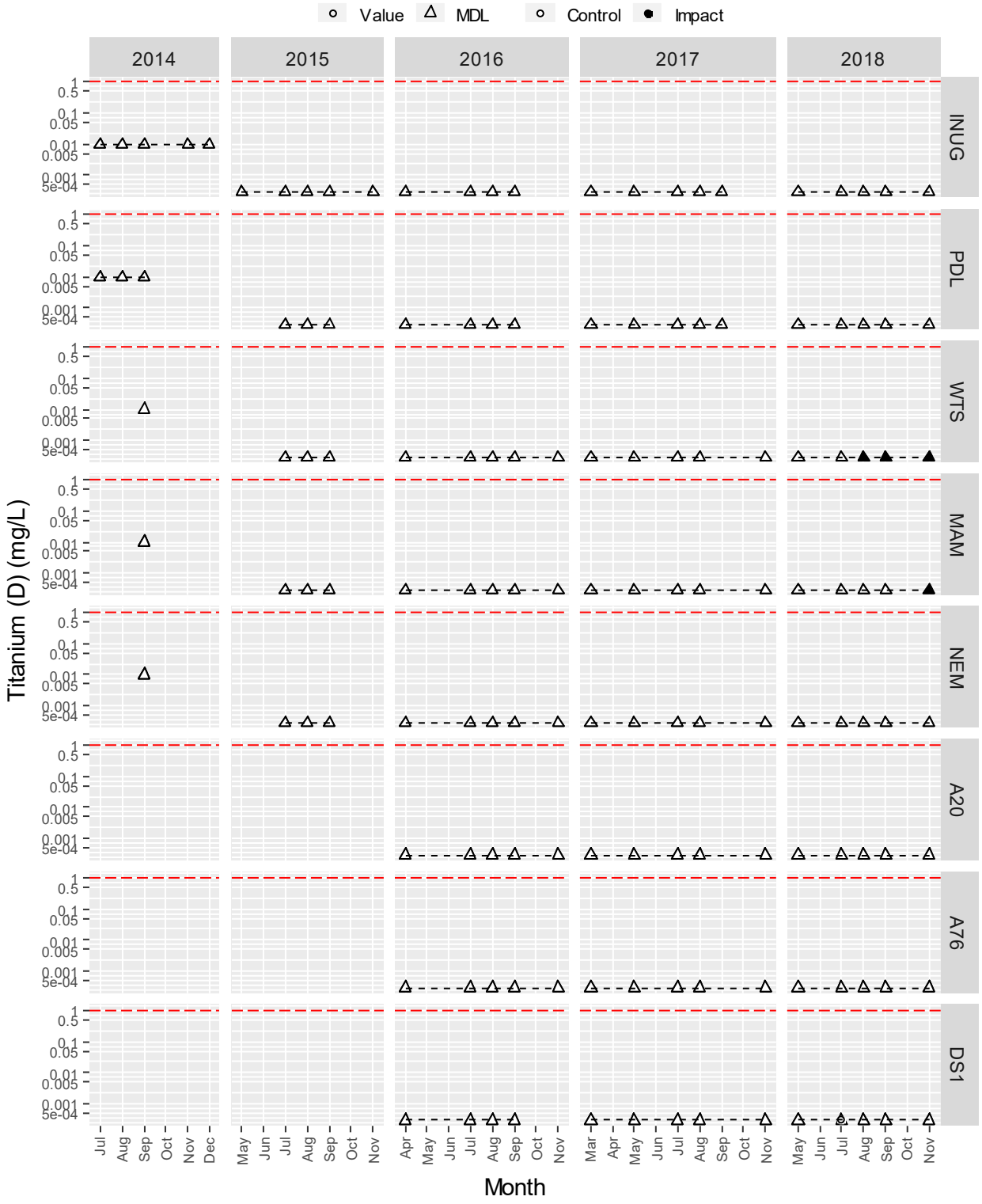


Figure B2-38. Dissolved uranium (mg/L) in water from Whale Tail Pit study area lakes since 2014.

Note: The red dashed line is the Meadowbank trigger value.

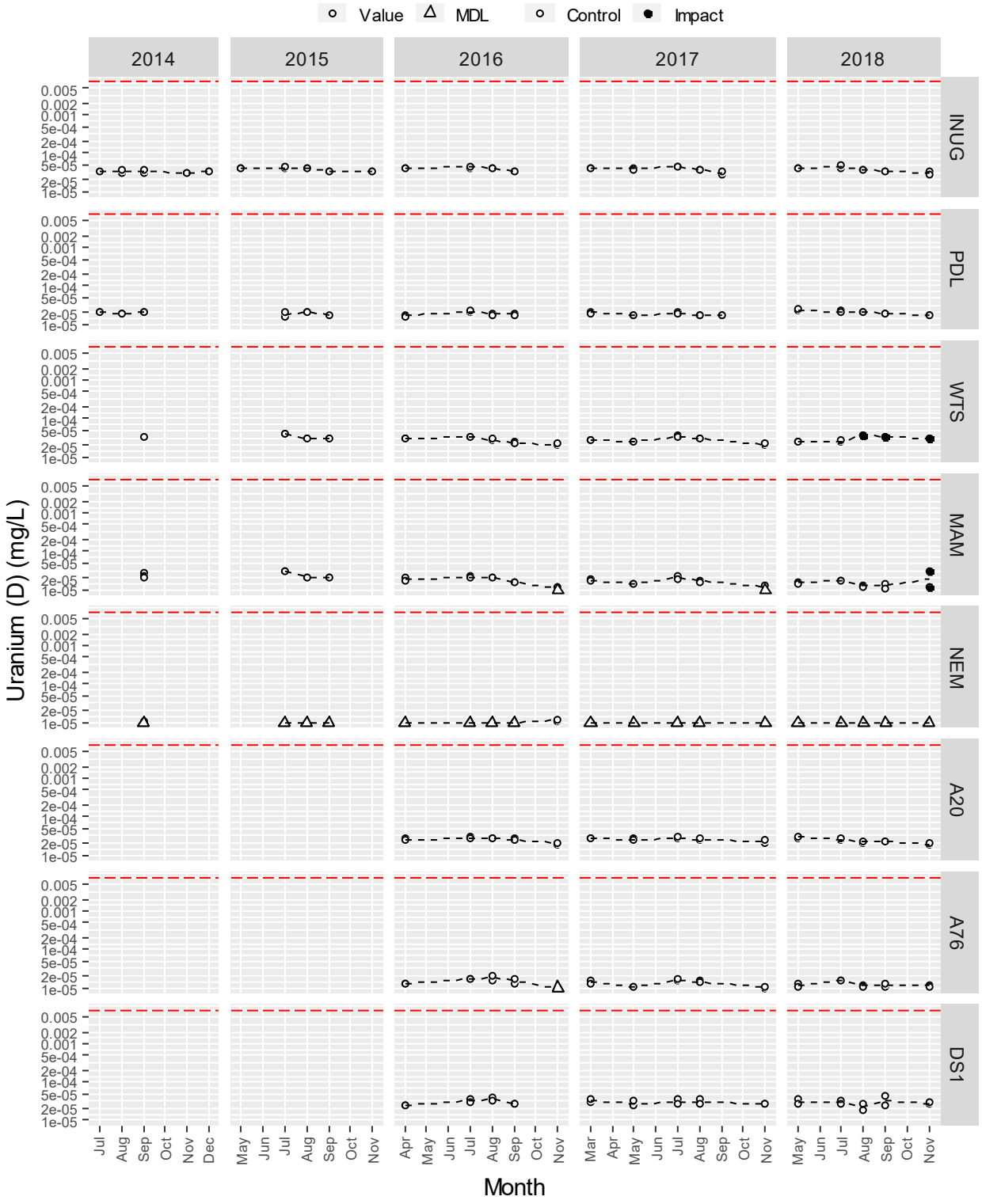


Figure B2-39. Dissolved vanadium (mg/L) in water from Whale Tail Pit study area lakes since 2014.

Note: The red dashed line is the Meadowbank trigger value.

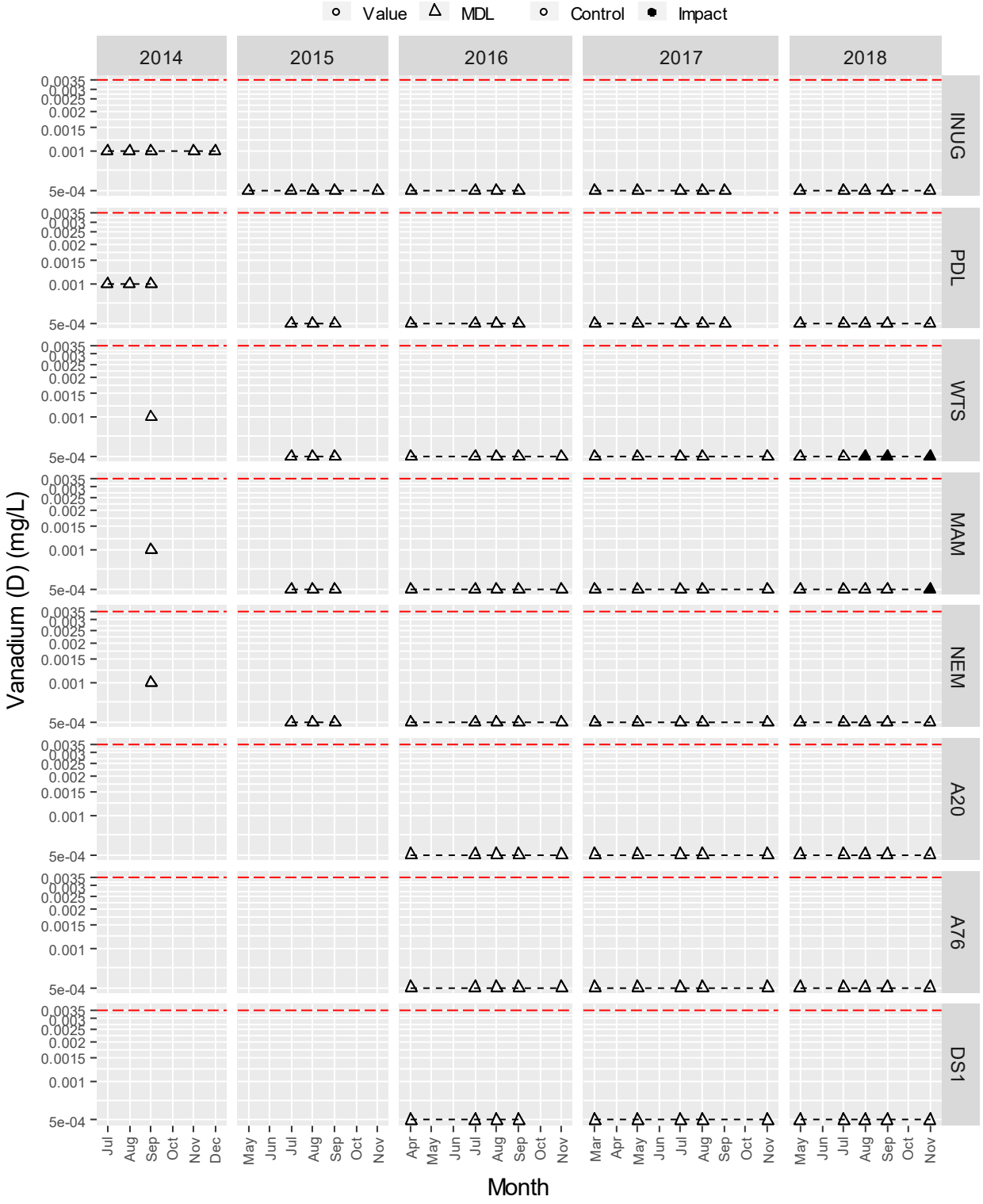
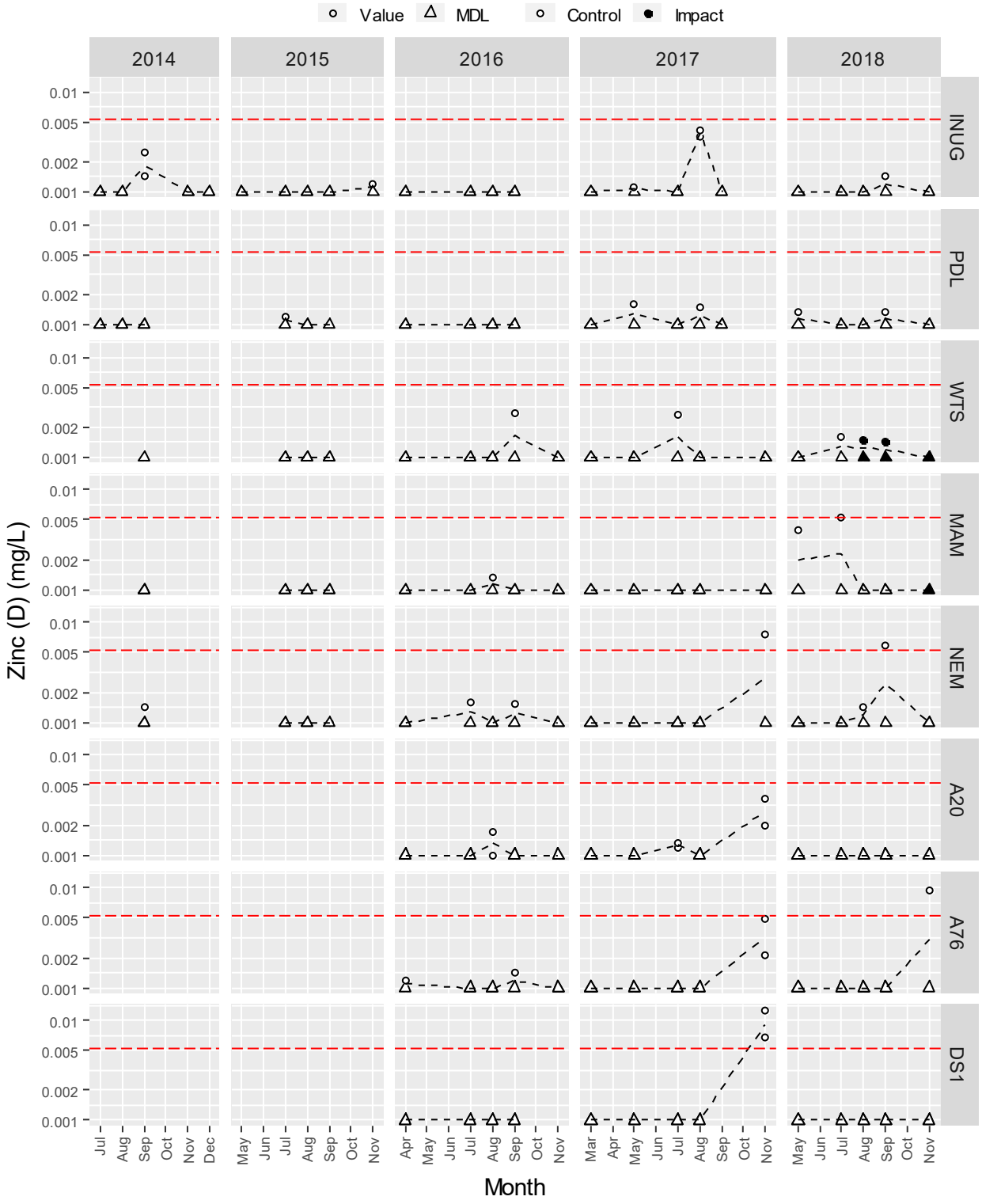


Figure B2-40. Dissolved zinc (mg/L) in water from Whale Tail Pit study area lakes since 2014.

Note: The red dashed line is the Meadowbank trigger value.



APPENDIX B3
WATER CHEMISTRY – BAKER LAKE

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Table B3–1. Water quality results from the 2018 CREMP, Baker Lake.

Lake				Baker Lake											
(Station)				Akilahaarjuk Point (BAP)						Barge Dock (BBD)					
Area-Replicate ID				BAP-55	BAP-56	BAP-57	BAP-58	BAP-59	BAP-60	BBD-55	BBD-56	BBD-57	BBD-58	BBD-59	BBD-60
Date				29-Jul-18	29-Jul-18	20-Aug-18	20-Aug-18	8-Sep-18	8-Sep-18	29-Jul-18	29-Jul-18	21-Aug-18	21-Aug-18	8-Sep-18	8-Sep-18
Time		Trigger[2]		13:15	13:40	13:15	13:45	8:04	8:50	14:50	14:03	11:15	11:45	11:38	12:00
ALS Sample ID	CCME Guideline[1]	Baker Lake	Threshold[2]	L2141222-5	L2141222-6	L2154274-8	L2154274-9	L2163886-5	L2163886-6	L2141222-1	L2141222-2	L2154274-6	L2154274-7	L2163886-1	L2163886-2
Physical Tests (mg/L)															
Conductivity (µS/cm)		494.5		39	41	382	352	300	298	162	271	319	322	357	359
Hardness		41.2		11	11	39	37	35	34	23	33	33	34	39	41
pH (Laboratory)	6.5 - 9.0	6.86 - 8.11	6.5 - 9.0	7.1	7.2	7.2	7.2	7.3	7.3	7.1	7.1	7.2	7.2	7.3	7.2
Total Suspended Solids		3.0	5.0	*<1.0*	*<1.0*	*<1.0*	*<1.0*	1.1	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	1.1
Total Dissolved Solids		208		22	25	**209**	192	173	148	108	163	185	178	187	193
Turbidity (NTU)				0.46	0.40	0.22	0.22	0.20	0.19	0.35	0.34	0.30	0.26	0.21	0.23
Anions and Nutrients (mg/L)															
Alkalinity - Bicarbonate		10.6		8.3	8.6	9.9	9.8	9.8	9.8	8.8	9.1	10	9.9	9.8	9.7
Alkalinity - Carbonate		4		*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*
Alkalinity - Hydroxide				*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*
Alkalinity - Total		10.6		8.3	8.6	9.9	9.8	9.8	9.8	8.8	9.1	10	9.9	9.8	9.7
Ammonia (as N)[3]	***equation***	0.067	0.126	*<0.005*	*<0.005*	0.0098	0.033	0.015	0.010	0.0092	0.0094	0.022	0.041	0.027	0.032
Bromide				*<0.05*	*<0.05*	0.35	0.31	0.26	0.25	0.15	0.27	0.29	0.29	0.31	0.31
Chloride	120	95.7	120	5.3	6.0	**97**	90	73	72	40	70	81	82	89	89
Fluoride	0.120			0.060	0.058	0.070	0.069	0.068	0.067	0.063	0.065	0.067	0.066	0.068	0.069
Nitrate (as N)	3.0	1.51	3	0.013	0.013	0.042	0.041	0.029	0.029	0.033	0.049	0.038	0.038	0.041	0.040
Nitrite (as N)	0.060	0.031	0.060	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*
Total Kjeldahl Nitrogen		0.214		*<0.05*	0.15	0.17	0.19	0.16	0.16	**0.23**	0.15	0.17	0.21	0.16	0.18
Ortho Phosphate (as P)		0.002		*<0.001*	0.0015	*<0.001*	*<0.001*	0.0014	0.0014	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*
Phosphorus (P)-Total Diss.				0.0021	0.0021	*<0.002*	*<0.002*	*<0.002*	0.0023	0.0022	0.0021	*<0.002*	0.0023	0.0024	0.0027
Phosphorus (P)-Total	0.0040	0.0096	0.004	**0.0041**	**0.0057**	*<0.002*	0.0023	**0.0046**	**0.0046**	**0.0066**	**0.0052**	0.0030	0.0038	**0.0044**	**0.0042**
Silicate (as SiO_2)		1.0		*<0.5*	*<0.5*	*<0.5*	*<0.5*	*<0.5*	*<0.5*	*<0.5*	*<0.5*	*<0.5*	*<0.5*	*<0.5*	*<2.5*
Sulphate (SO_4)		65.92	128	1.3	1.4	15	13	11	11	6.2	11	12	12	13	13
Cyanides (mg/L)															
Total Cyanide				*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*
Free Cyanide	0.005			*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*
Organic / Inorganic Carbon (mg/L)															
Dissolved Organic Carbon		4.05		3.7	3.4	3.1	3.1	3.4	3.8	3.5	3.5	3.1	3.1	3.3	3.3
Total Organic Carbon		4.25		3.2	3.3	3.3	3.3	3.5	3.5	3.5	3.5	3.1	3.3	3.4	3.5
Plant Pigments (µg/L)															
Chlorophyll-*a*				1.5	1.5	0.40	0.61	1.1	1.1	0.73	0.38	0.44	0.46	0.50	0.55
Total Metals (mg/L)															
Aluminum[3]	***equation***	0.056	0.100	0.015	0.014	0.0080	0.0083	0.0068	0.0070	0.013	0.012	0.0092	0.011	0.0076	0.0074
Antimony		0.0101	0.020	*<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	0.0050	0.00257	0.005	0.00012	0.00011	0.00014	0.00014	0.00018	0.00019	0.00013	0.00014	0.00015	0.00018	0.00018	
Barium		0.51	1	0.017	0.016	0.017	0.016	0.018	0.018	0.017	0.018	0.017	0.017	0.018	0.019
Beryllium		0.0027	0.0053	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*
Bismuth				*<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	1.5	0.76	1.5	*<0.01*	*<0.01*	0.024	0.021	0.019	0.019	0.011	0.018	0.019	0.020	0.022	0.022
Cadmium[3]	***equation***	0.000025	0.000040	*<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		4.50		2.4	2.4	4.5	4.2	4.0	4.0	3.1	3.8	4.1	4.1	4.4	4.3
Cesium				*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*
Chromium[4]	0.001	0.00056	0.001	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	0.00011	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*
Cobalt				*<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[3]	***equation***	0.00125	0.002	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*
Iron	0.3	0.160	0.3	0.019	0.017	0.010	0.010	0.013	0.010	0.020	0.018	0.014	0.015	0.011	0.011
Lead[3]	***equation***	0.000525	0.001	0.00015	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*
Lithium		0.048	0.096	*<0.001*	*<0.001*	0.0016	0.0015	0.0014	0.0014	0.0011	0.0014	0.0015	0.0015	0.0015	0.0016
Magnesium		7.44		1.3	1.3	7.2	6.5	5.9	6.0	3.6	5.5	6.2	6.1	6.9	7.1
Manganese[3]		0.3400	***equation***	0.0033	0.0031	0.0016	0.0016	0.0015	0.0015	0.0055	0.0069	0.0026	0.0028	0.0020	0.0019
Mercury	0.000026	0.000018	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	0.073	0.0365	0.073	*<0.00005*	*<0.00005*	0.00012	0.00010	0.00010	0.00009	0.00007	0.00008	0.00010	0.00010	0.00011	0.00011
Nickel[3]	***equation***	0.0128	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*
Phosphorus				*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*
Potassium		2.43		0.50	0.50	2.1	2.0	1.8	1.9	1.2	1.8	1.8	1.9	2.1	2.2
Rubidium				0.00081	0.00081	0.0014	0.0014	0.0013	0.0012	0.0011	0.0012	0.0013	0.0012	0.0014	0.0014
Selenium	0.001	0.00055	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				0.19	0.20	0.21	0.19	0.18	0.18	0.24	0.28	0.20	0.21	0.20	0.20
Silver	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		54.0		3.0	3.2	49	45	40	40	22	38	40	41	49	50
Strontium		0.049	0.049	0.018	0.018	**0.058**	**0.050**	0.047	0.047	0.031	0.043	0.047	0.049	**0.053**	**0.053**
Sulfur				0.58	0.63	5.1	4.6	3.8	3.6	2.3	3.7	4.0	4.1	4.4	4.6
Tellurium				*<0.0002*	*<0.0002*	*<0.0002*	*<0.0002*	*<0.0002*	*<0.0002*	*<0.0002*	*<0.0002*	*<0.0002*	*<0.0002*	*<0.0002*	*<0.0002*
Thallium	0.0008	0.00041	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*
Thorium				*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*
Tin		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*
Titanium		1.00	2	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*
Tungsten				*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*
Uranium	0.015	0.0075	0.015	0.00004	0.00004	0.00006	0.00006	0.00006	0.00005	0.00005	0.00005	0.00006	0.00006	0.00005	0.00006
Vanadium		0.0035	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[3]	0.030	0.0132	***equation***	*<0.003*	*<0.003*	*<0.003*	*<0.003*	*<0.003*	*<0.003*	*<0.003*	*<0.003*	*<0.003*	*<0.003*	*<0.003*	*<0.003*
Zirconium				0.00007	0.00006	*<0.00006*	*<0.00006*	*<0.00006*	0.00006	0.00006	*<0.00006*	*<0.00006*	*<0.00006*	0.00006	*<0.00006*
Dissolved Metals (mg/L)															
Aluminum[3]		0.0274	0.05	*<0.01*	0.0047	0.0051	0.0044	0.0062	0.0038	0.0058	0.0055	0.0040	0.0045	0.0034	0.0042
Antimony		0.0101	0.020	*<0.001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*
Arsenic		0.0026	0.005	*<0.001*	0.00012	0.00013	0.00013	0.00011	0.00012	0.00011	0.00012	0.00011	0.00011	0.00013	0.00011
Barium		0.5089	1	0.015	0.016	0.016	0.017	0.018	0.018	0.018	0.019	0.017	0.018	0.018	0.018
Beryllium		0.0027	0.0053	*<0.001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*
Bismuth				*<0.0005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*
Boron		0.76	1.5	*<0.1*	*<0.01*	0.022	0.020	0.018	0.018	0.011	0.018	0.019	0.018	0.021	0.021
Cadmium		0.000025	0.00004	*<0.00005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*
Calcium				2.5	2.3	4.3	4.2	4.0	4.0	3.3	3.9	4.0	3.9	4.3	4.4
Cesium				*<0.0001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*
Chromium		0.00055	0.001	*<0.001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*
Cobalt				*<0.001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*
Copper		0.00116	0.002	*<0.0002*	0.00030	0.00043	0.00030	0.00029	0.00030	0.00038	0.00026	0.00030	0.00029	0.00037	0.00028
Iron		0.155	0.3	*<0.1*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	0.010	*<0.01*
Lead		0.000525	0.001	*<0.0005*	*<0.00005*	0.00009	*<0.00005*	*<0.00005*	*<0.00005*	0.00005	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*
Lithium		0.048	0.096	*<0.01*	*<0.001*	0.0015	0.0014	0.0013	0.0013	0.0012	0.0014	0.0014	0.0014	0.0014	0.0015
Magnesium				1.2	1.2	6.9	6.5	6.1	5.9	3.6	5.6	5.7	6.0	6.8	7.2
Manganese[3]		0.339	***equation***	0.0010	0.0010	0.00056	0.00028	0.00023	0.00016	0.0038	0.0048	0.0010	0.0010	0.00060	0.00066
Mercury		0.000018	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		0.037	0.073	*<0.0005*	*<0.0005*	0.00010	0.00011	0.00009	0.00009	0.00010	0.00009	0.00008	0.00009	0.00012	0.00010
Nickel		0.013	0.025	*<0.005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*
Phosphorus				*<0.5*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*
Potassium				*<0.5*	0.46	2.1	2.0	1.9	1.9	1.2	1.9	1.8	1.8	2.2	2.2
Rubidium				*<0.002*	0.00081	0.0014	0.0013	0.0013	0.0013	0.0011	0.0013	0.0013	0.0012	0.0013	0.0014
Selenium		0.00055	0.001	*<0.0005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*
Silicon				*<0.5*	0.14	0.15	0.15	0.16	0.15	0.19	0.21	0.18	0.17	0.16	0.17
Silver				*<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				2.7	3.1	47	45	41	41	22	40	40	40	48	49
Strontium		0.049	0.049	0.018	0.016	**0.053**	**0.053**	0.045	0.046	0.032	0.044	0.047	0.049	**0.050**	**0.050**
Sulfur				*<0.5*	1.8	4.7	4.3	4.0	3.9	1.6	3.0	3.9	4.0	4.5	4.6
Tellurium				*<0.002*	*<0.0002*	*<0.0002*	*<0.0002*	*<0.0002*	*<0.0002*	*<0.0002*	*<0.0002*	*<0.0002*	*<0.0002*	*<0.0002*	*<0.0002*
Thallium		0.00041	0.0008	*<0.0001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*
Thorium				*<0.001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*
Tin		0.0002		*<0.001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*
Titanium		1.01	2	*<0.003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*
Tungsten				*<0.001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*
Uranium		0.0075	0.015	*<0.0001*	0.00004	0.00005	0.00006	0.00005	0.00005	0.00005	0.00005	0.00006	0.00006	0.00005	0.00005
Vanadium		0.0035	0.006	*<0.005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*
Zinc[3]		0.0122	***equation***	*<0.01*	*<0.001*	0.0017	*<0.001*	0.0013	*<0.001*	*<0.001*	0.0012	*<0.001*	*<0.001*	*<0.001*	*<0.001*
Zirconium				*<0.00060*	*<0.00006*	0.00006	*<0.00006*	*<0.00006*	*<0.00006*	*<0.00006*	*<0.00006*	*<0.00006*	*<0.00006*	*<0.00006*	*<0.00006*

Notes:

1. CCME (Canadian Council of Ministers of the Environment) Canadian Water Quality Guidelines for the Protection of Aquatic Life, 1999, updated up to 2015.

2. Trigger and threshold values were developed in *CREMP Design Document 2012* (Azimuth, 2012d).

A number of thresholds were derived from methods (or sources) other than CCME guidelines. Refer to the *CREMP: 2015 Plan Update* (Azimuth, 2015a) for more details.

3. "***equation***" means that CCME guidelines (or thresholds) are calculated based on an equation which is either pH or hardness dependent. The ammonia and aluminum (t & d) guidelines vary with pH; the cadmium, copper, lead, manganese, nickel and zinc guidelines vary with hardness.

4. Chromium CCME guideline is for Cr VI.

123	Bolded concentrations exceed the trigger value.
123	Bolded and shaded concentrations also exceed the threshold value.

Italicized numbers are below detection limits.

underline = results were given a cautionary flag in the QC assessment (refer to **Section 3.3 Main Report** for details)

~~strikethrough~~ = results flagged as unreliable in the QC assessment

Table B3–1. Water quality results from the 2018 CREMP, Baker Lake.

Lake				Baker Lake					
(Station)				Proposed Jetty (BPJ)					
Area-Replicate ID				BPJ-55	BPJ-56	BPJ-57	BPJ-58	BPJ-59	BPJ-60
Date				29-Jul-18	29-Jul-18	21-Aug-18	21-Aug-18	8-Sep-18	8-Sep-18
Time		Trigger[2]		15:55	15:30	10:15	10:40	9:50	11:07
ALS Sample ID	CCME Guideline[1]	Baker Lake	Threshold[2]	L2141222-3	L2141222-4	L2154274-4	L2154274-5	L2163886-3	L2163886-4
Physical Tests (mg/L)									
Conductivity (µS/cm)		494.5		104	76	334	334	318	319
Hardness		41.2		16	14	36	36	36	36
pH (Laboratory)	6.5 - 9.0	6.86 - 8.11	6.5 - 9.0	7.1	7.1	7.2	7.2	7.3	7.3
Total Suspended Solids		3.0	5.0	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*
Total Dissolved Solids		208		59	44	188	186	177	179
Turbidity (NTU)				0.40	0.40	0.27	0.30	0.23	0.20
Anions and Nutrients (mg/L)									
Alkalinity - Bicarbonate		10.6		8.5	8.8	9.6	9.8	9.8	9.7
Alkalinity - Carbonate		4		*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*
Alkalinity - Hydroxide				*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*
Alkalinity - Total		10.6		8.5	8.8	9.6	9.8	9.8	9.7
Ammonia (as N)[3]	***equation***	0.067	0.126	0.0072	0.0059	0.0070	0.033	0.012	0.013
Bromide				0.087	0.057	0.31	0.30	0.27	0.27
Chloride	120	95.7	120	23	15	87	86	77	78
Fluoride	0.120			0.060	0.060	0.067	0.068	0.067	0.068
Nitrate (as N)	3.0	1.51	3	0.024	0.019	0.040	0.039	0.032	0.032
Nitrite (as N)	0.060	0.031	0.060	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*
Total Kjeldahl Nitrogen		0.214		0.15	0.19	0.15	0.18	0.16	0.16
Ortho Phosphate (as P)		0.002		*<0.001*	*<0.001*	*<0.001*	*<0.001*	0.0011	0.0015
Phosphorus (P)-Total Diss.				*<0.002*	*<0.002*	*<0.002*	0.0021	*<0.002*	*<0.002*
Phosphorus (P)-Total	0.0040	0.0096	0.004	**0.0057**	**0.0045**	0.0031	0.0031	**0.0047**	**0.0088**
Silicate (as SiO_2)		1.0		*<0.5*	*<0.5*	*<0.5*	*<0.5*	*<0.5*	*<0.5*
Sulphate (SO_4)		65.92	128	3.8	2.7	13	13	11	11
Cyanides (mg/L)									
Total Cyanide				*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*
Free Cyanide	0.005			*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*
Organic / Inorganic Carbon (mg/L)									
Dissolved Organic Carbon		4.05		3.5	3.3	3.0	2.9	3.4	3.5
Total Organic Carbon		4.25		3.4	3.3	3.1	3.2	3.6	3.8
Plant Pigments (µg/L)									
Chlorophyll-*a*				0.99	0.87	0.38	0.39	0.94	0.91
Total Metals (mg/L)									
Aluminum[3]	***equation***	0.056	0.100	0.015	0.013	0.0089	0.0089	0.0062	0.0055
Antimony		0.0101	0.020	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*
Arsenic	0.0050	0.00257	0.005	0.00012	0.00010	0.00013	0.00015	0.00016	0.00018
Barium		0.51	1	0.016	0.017	0.019	0.017	0.017	0.018
Beryllium		0.0027	0.0053	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*
Bismuth				*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*
Boron	1.5	0.76	1.5	*<0.01*	*<0.01*	0.021	0.020	0.019	0.020
Cadmium[3]	***equation***	0.000025	0.000040	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*
Calcium		4.50		2.7	2.6	4.1	4.1	4.0	4.1
Cesium				*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*
Chromium[4]	0.001	0.00056	0.001	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*
Cobalt				*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*
Copper[3]	***equation***	0.00125	0.002	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*
Iron	0.3	0.160	0.3	0.018	0.018	0.012	0.013	*<0.01*	*<0.01*
Lead[3]	***equation***	0.000525	0.001	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*
Lithium		0.048	0.096	*<0.001*	*<0.001*	0.0015	0.0015	0.0014	0.0015
Magnesium		7.44		2.4	1.9	6.4	6.4	6.1	6.2
Manganese[3]		0.3400	***equation***	0.0034	0.0036	0.0019	0.0020	0.00085	0.00099
Mercury	0.000026	0.000018	0.000026	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*
Molybdenum	0.073	0.0365	0.073	0.00006	0.00005	0.00012	0.00010	0.00009	0.00009
Nickel[3]	***equation***	0.0128	0.025	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*
Phosphorus				*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*
Potassium		2.43		0.84	0.68	1.9	1.9	1.9	1.9
Rubidium				0.00089	0.00082	0.0013	0.0014	0.0013	0.0013
Selenium	0.001	0.00055	0.001	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*
Silicon				0.23	0.21	0.21	0.20	0.18	0.18
Silver	0.0001			*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*
Sodium		54.0		13	8.1	43	43	42	42
Strontium		0.049	0.049	0.024	0.021	**0.052**	0.049	0.048	**0.049**
Sulfur				1.4	1.1	4.4	4.4	3.9	3.9
Tellurium				*<0.0002*	*<0.0002*	*<0.0002*	*<0.0002*	*<0.0002*	*<0.0002*
Thallium	0.0008	0.00041	0.0008	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*
Thorium				*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*
Tin		0.0002		*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*
Titanium		1.00	2	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*
Tungsten				*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*
Uranium	0.015	0.0075	0.015	0.00005	0.00004	0.00006	0.00006	0.00005	0.00005
Vanadium		0.0035	0.006	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*
Zinc[3]	0.030	0.0132	***equation***	*<0.003*	*<0.003*	*<0.003*	*<0.003*	*<0.003*	*<0.003*
Zirconium				0.00006	0.00006	*<0.00006*	*<0.00006*	0.00007	0.00006
Dissolved Metals (mg/L)									
Aluminum[3]		0.0274	0.05	0.0043	0.0052	0.0036	0.0040	0.0035	0.0037
Antimony		0.0101	0.020	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*
Arsenic		0.0026	0.005	*<0.0001*	0.00011	0.00011	0.00011	0.00011	0.00013
Barium		0.5089	1	0.017	0.017	0.017	0.017	0.018	0.018
Beryllium		0.0027	0.0053	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*
Bismuth				*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*
Boron		0.76	1.5	*<0.01*	*<0.01*	0.020	0.020	0.019	0.019
Cadmium		0.000025	0.00004	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*
Calcium				2.7	2.7	4.0	4.0	4.1	4.1
Cesium				*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*
Chromium		0.00055	0.001	*<0.0001*	*<0.0001*	*<0.0001*	0.00014	*<0.0001*	*<0.0001*
Cobalt				*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*
Copper		0.00116	0.002	0.00026	0.00027	0.00029	0.00030	0.00028	0.00028
Iron		0.155	0.3	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*
Lead		0.000525	0.001	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*
Lithium		0.048	0.096	*<0.001*	*<0.001*	0.0014	0.0014	0.0014	0.0014
Magnesium				2.2	1.9	6.3	6.2	6.2	6.3
Manganese[3]		0.339	***equation***	0.0013	0.0015	0.00044	0.00047	0.00021	0.00023
Mercury		0.000018	0.000026	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*
Molybdenum		0.037	0.073	0.00006	0.00010	0.00010	0.00010	0.00009	0.00009
Nickel		0.013	0.025	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*
Phosphorus				*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*
Potassium				0.82	0.72	1.9	1.9	2.0	2.0
Rubidium				0.00086	0.00089	0.0013	0.0013	0.0013	0.0012
Selenium		0.00055	0.001	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*
Silicon				0.14	0.14	0.16	0.16	0.16	0.16
Silver				*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*
Sodium				12	8.8	42	42	44	44
Strontium		0.049	0.049	0.023	0.021	0.049	**0.050**	0.048	0.047
Sulfur				0.74	*<0.5*	4.2	4.2	4.2	4.1
Tellurium				*<0.0002*	*<0.0002*	*<0.0002*	*<0.0002*	*<0.0002*	*<0.0002*
Thallium		0.00041	0.0008	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*
Thorium				*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*
Tin		0.0002		*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*
Titanium		1.01	2	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*
Tungsten				*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*
Uranium		0.0075	0.015	0.00004	0.00004	0.00005	0.00006	0.00005	0.00005
Vanadium		0.0035	0.006	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*
Zinc[3]		0.0122	***equation***	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*
Zirconium				*<0.00006*	*<0.00006*	*<0.00006*	*<0.00006*	*<0.00006*	*<0.00006*

Notes:

1. CCME (Canadian Council of Ministers of the Environment) Canadian Water Quality Guidelines for the Protection of Aquatic Life, 1999, updated up to 2015.

2. Trigger and threshold values were developed in *CREMP Design Document 2012* (Azimuth, 2012d).

A number of thresholds were derived from methods (or sources) other than CCME guidelines. Refer to the *CREMP: 2015 Plan Update* (Azimuth, 2015a) for more details.

3. "***equation***" means that CCME guidelines (or thresholds) are calculated based on an equation which is either pH or hardness dependent. The ammonia and aluminum (t & d) guidelines vary with pH; the cadmium, copper, lead, manganese, nickel and zinc guidelines vary with hardness.

4. Chromium CCME guideline is for Cr VI.

123 Bolded concentrations exceed the trigger value.

123 Bolded and shaded concentrations also exceed the threshold v

Italicized numbers are below detection limits.

underline = results were given a cautionary flag in the QC assessment (refer to **Section 3.3 Main Repor**

~~strikethrough~~ = results flagged as unreliable in the QC assessment

Figure B3-1. Carbonate alkalinity (mg/L) in water from Baker Lake since 2008.

Note: The red dashed line is the trigger value.

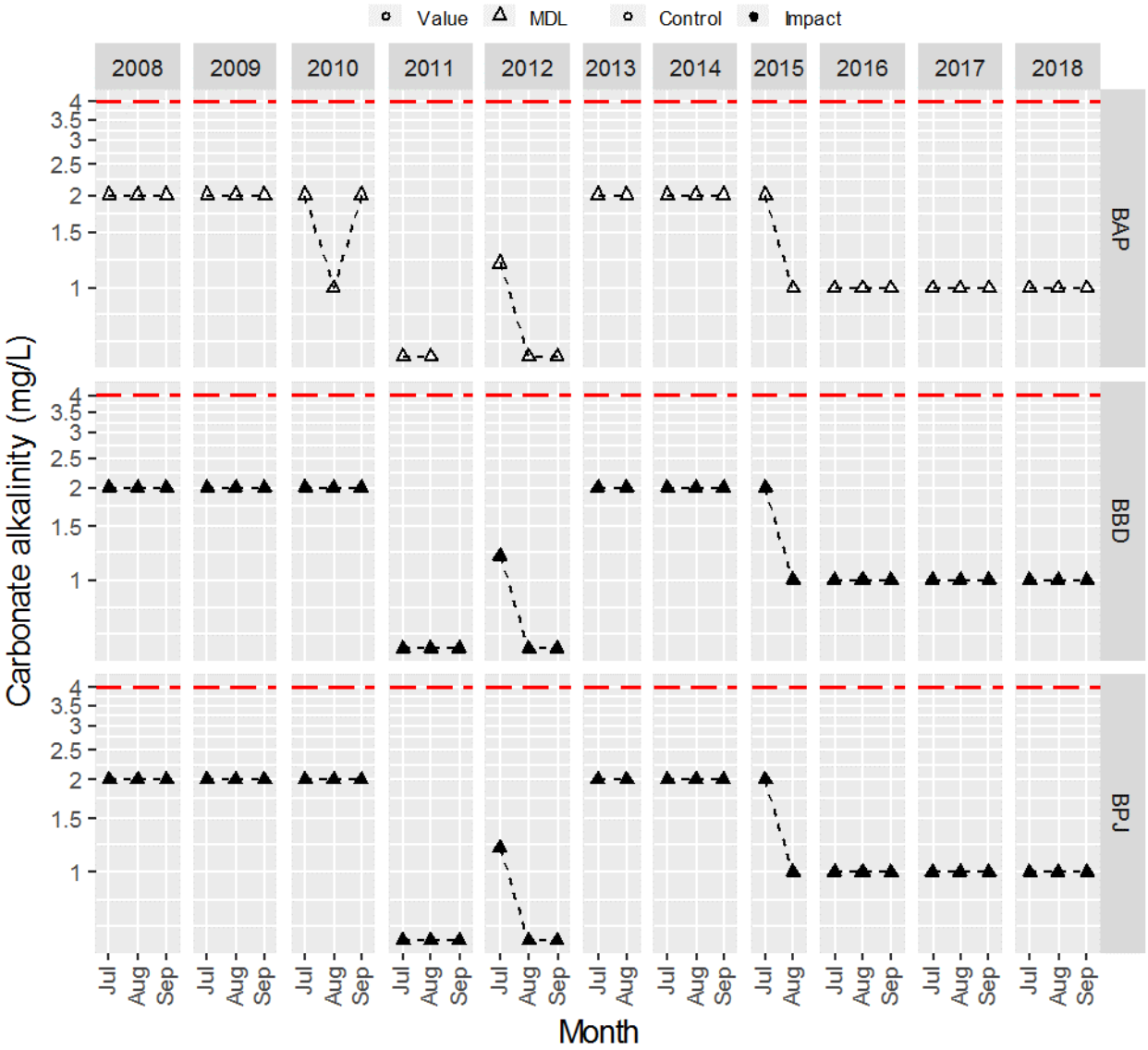


Figure B3-2. Nitrite-N (mg/L) in water from Baker Lake since 2008.

Note: The red dashed line is the trigger value.

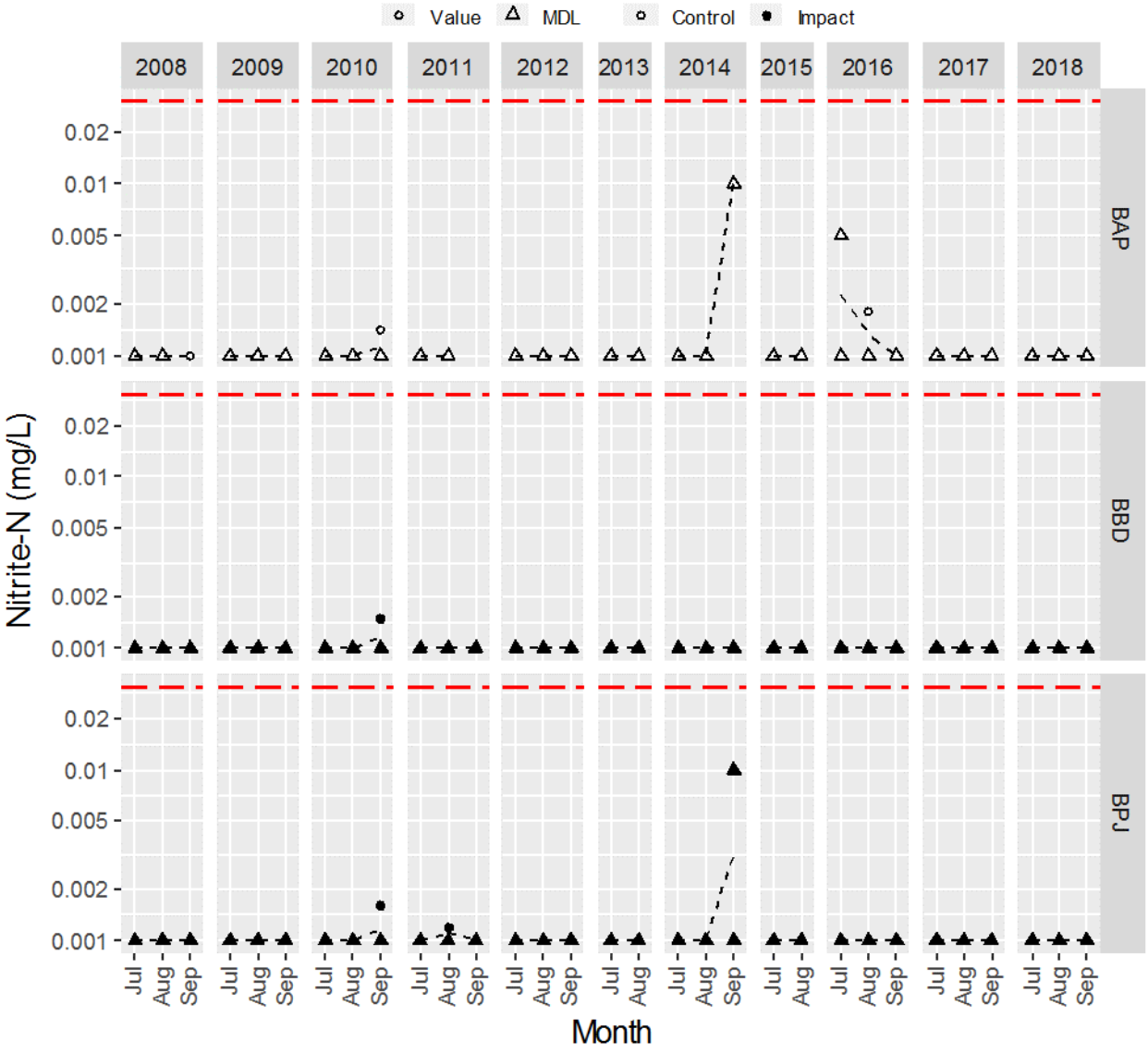


Figure B3-3. Total cyanide (mg/L) in water from Baker Lake since 2008.

Note: No trigger for total cyanide. Detection limit lowered from 0.005 mg/L in 2014 to 0.001 mg/L in 2015.

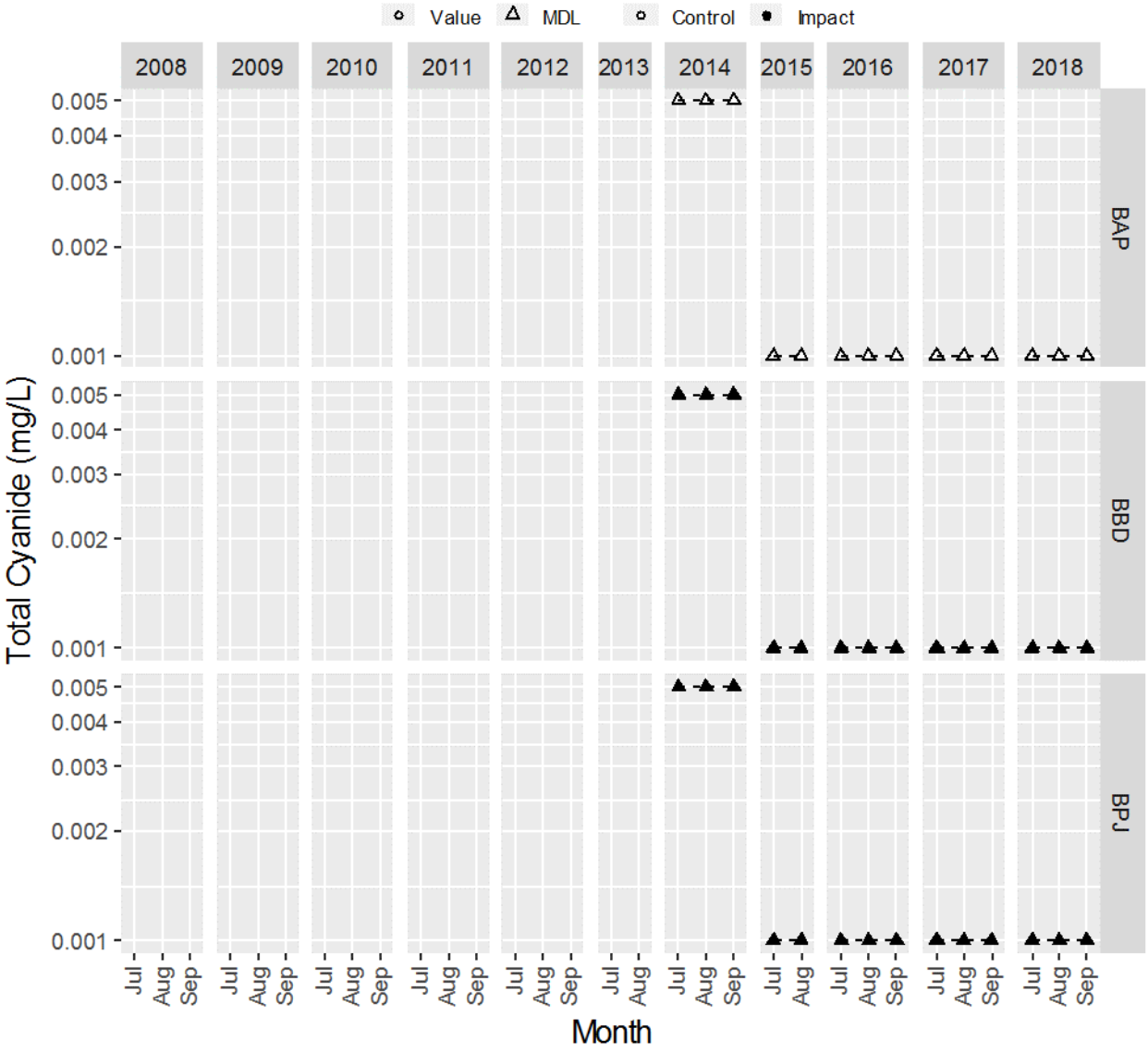


Figure B3-4. Free cyanide (mg/L) in water from Baker Lake since 2008.

Note: No trigger for free cyanide. Detection limit lowered from 0.005 mg/L in 2014 to 0.001 mg/L in 2015.

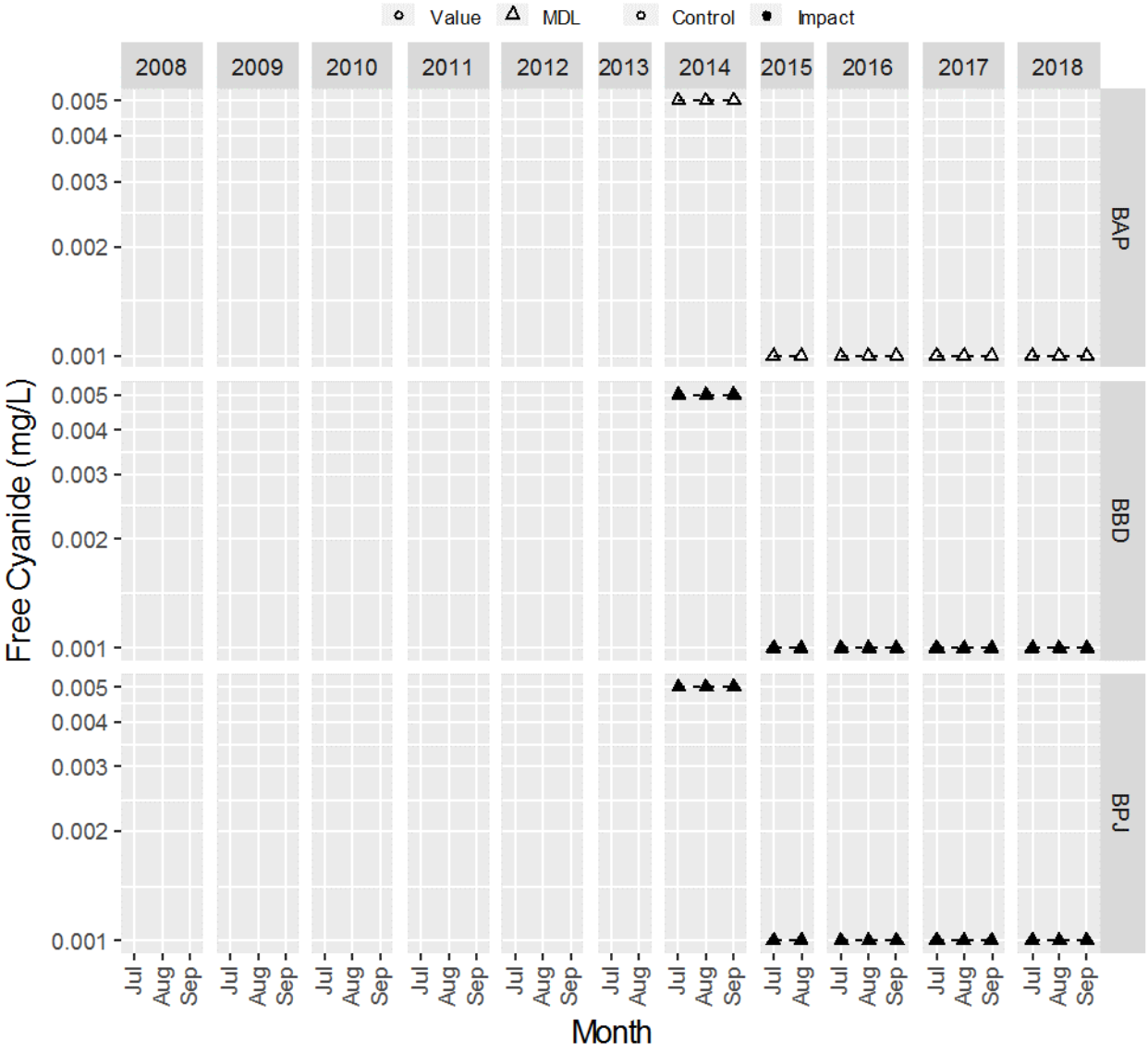


Figure B3-5. Total antimony (mg/L) in water from Baker Lake since 2008.

Note: The red dashed line is the trigger value.

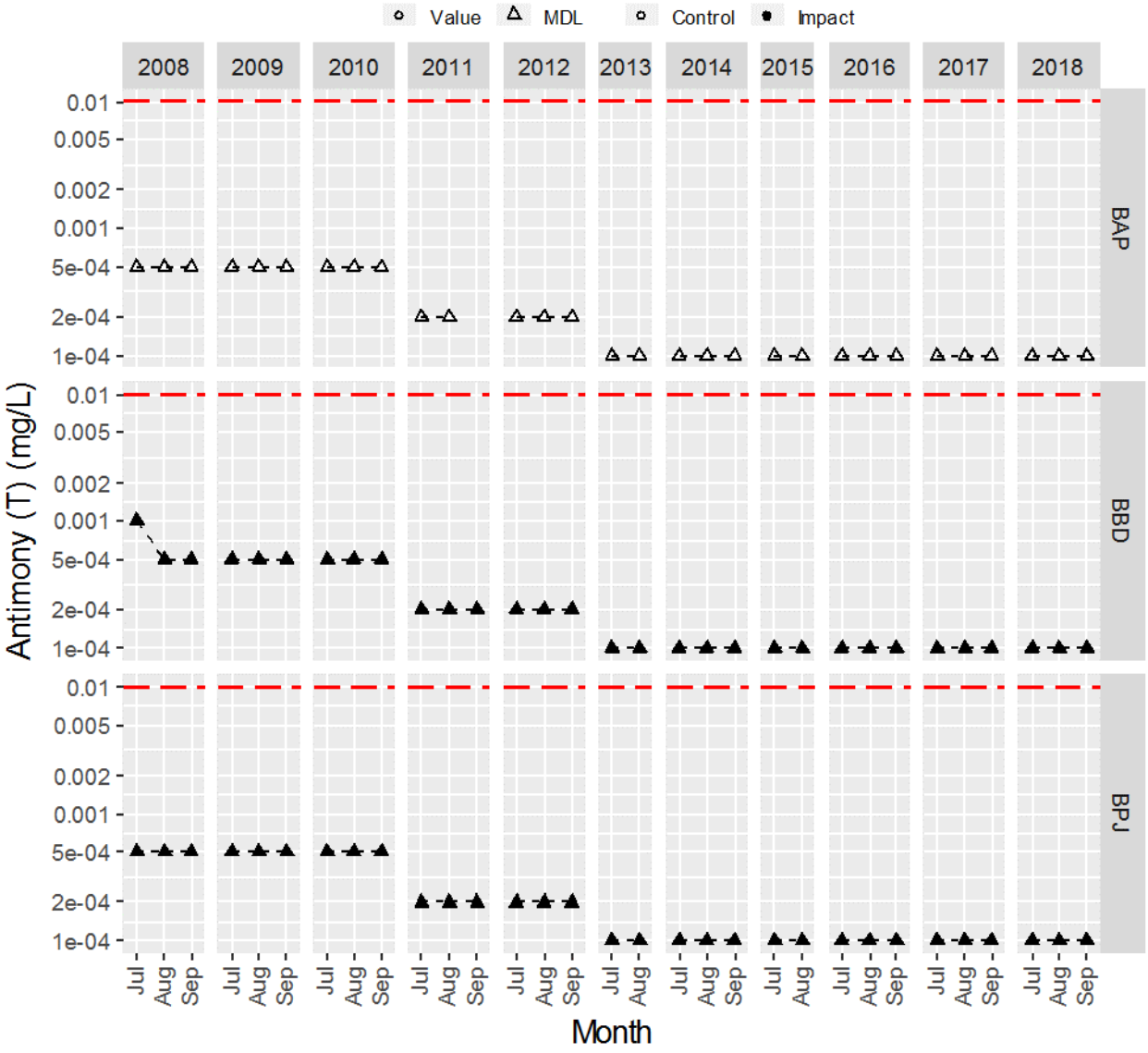


Figure B3-6. Total beryllium (mg/L) in water from Baker Lake since 2008.

Note: The red dashed line is the trigger value.

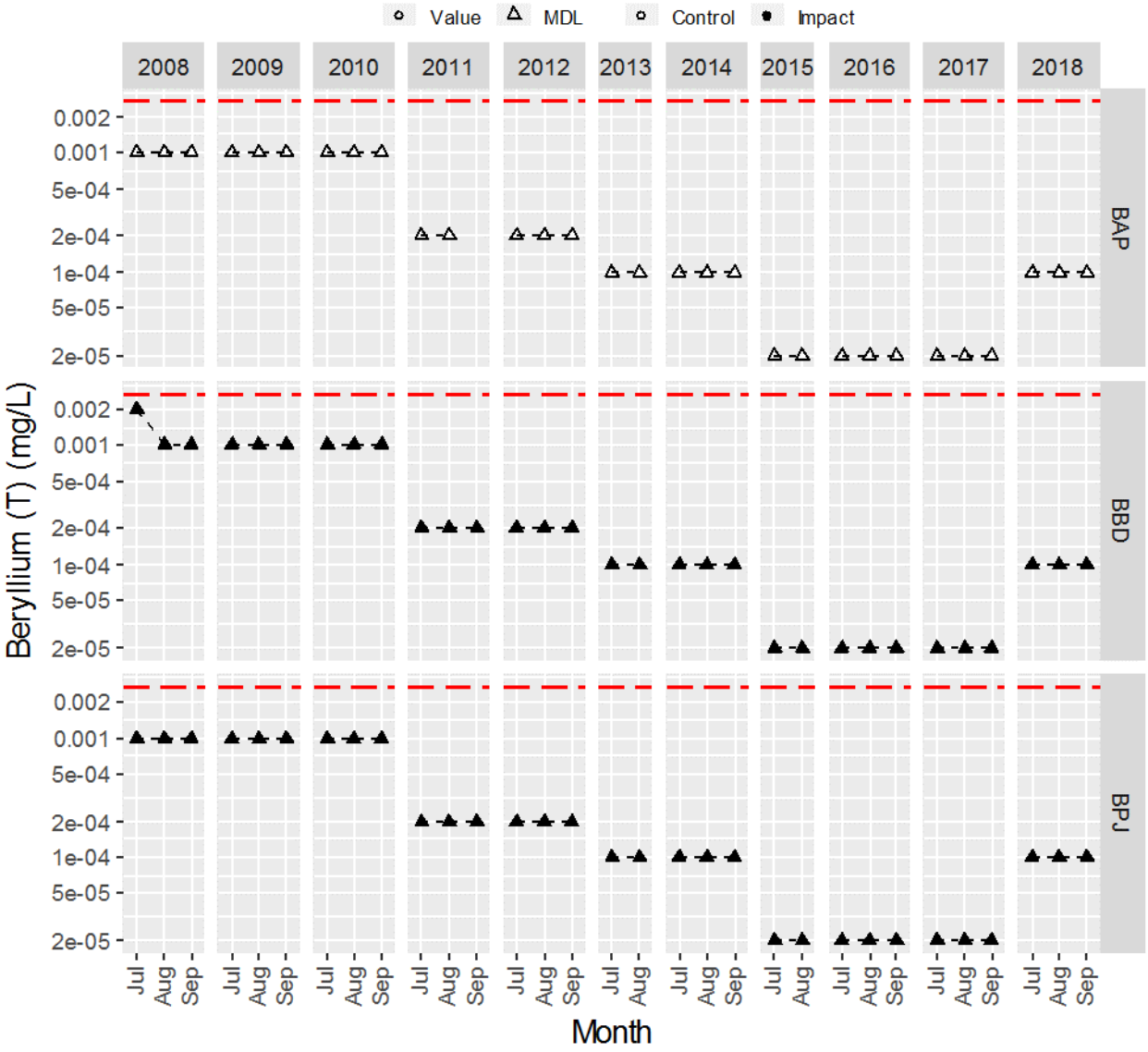


Figure B3-7. Total cadmium (mg/L) in water from Baker Lake since 2008.

Note: The red dashed line is the trigger value.

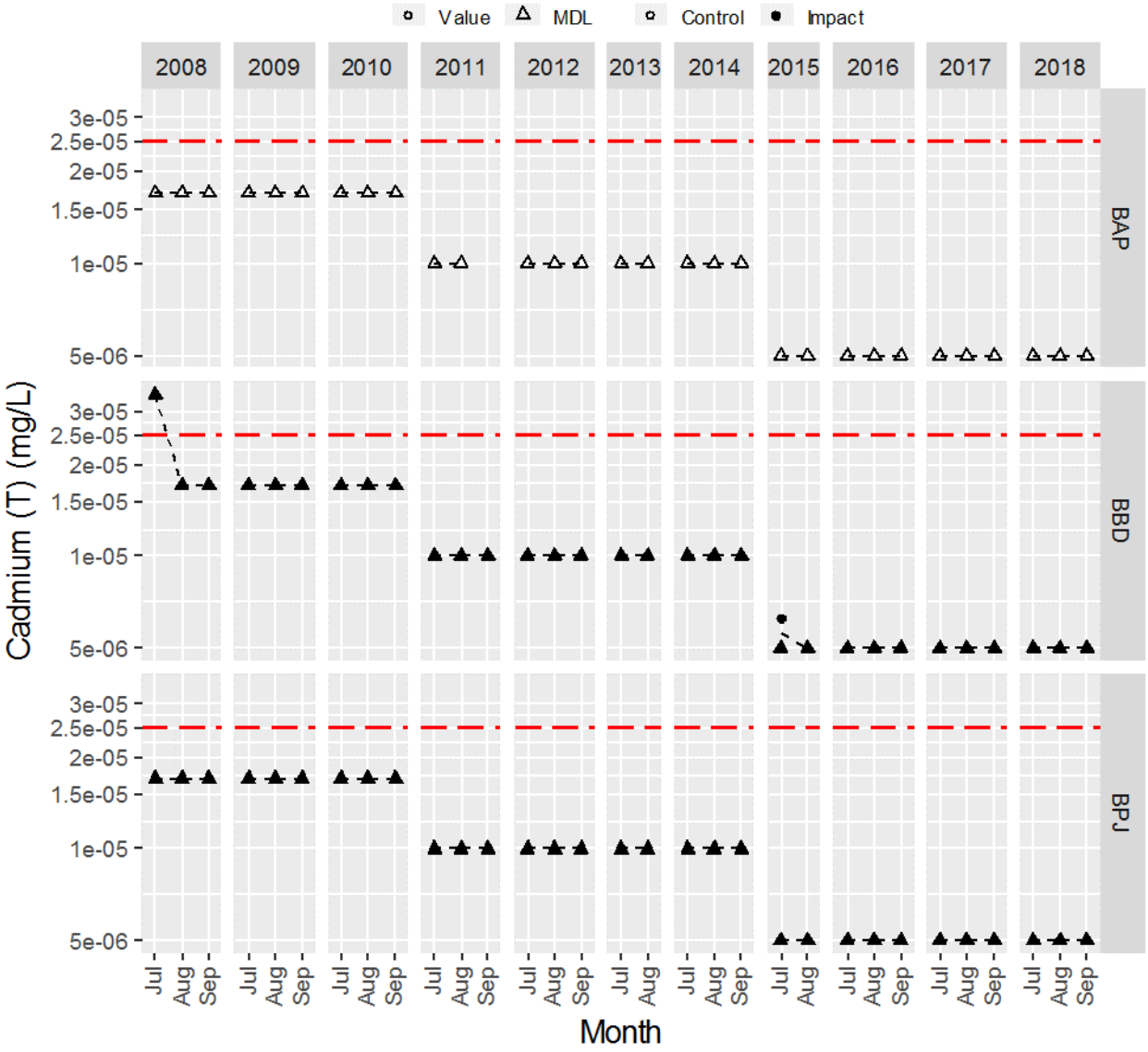


Figure B3-8. Total lead (mg/L) in water from Baker Lake since 2008.

Note: The red dashed line is the trigger value.

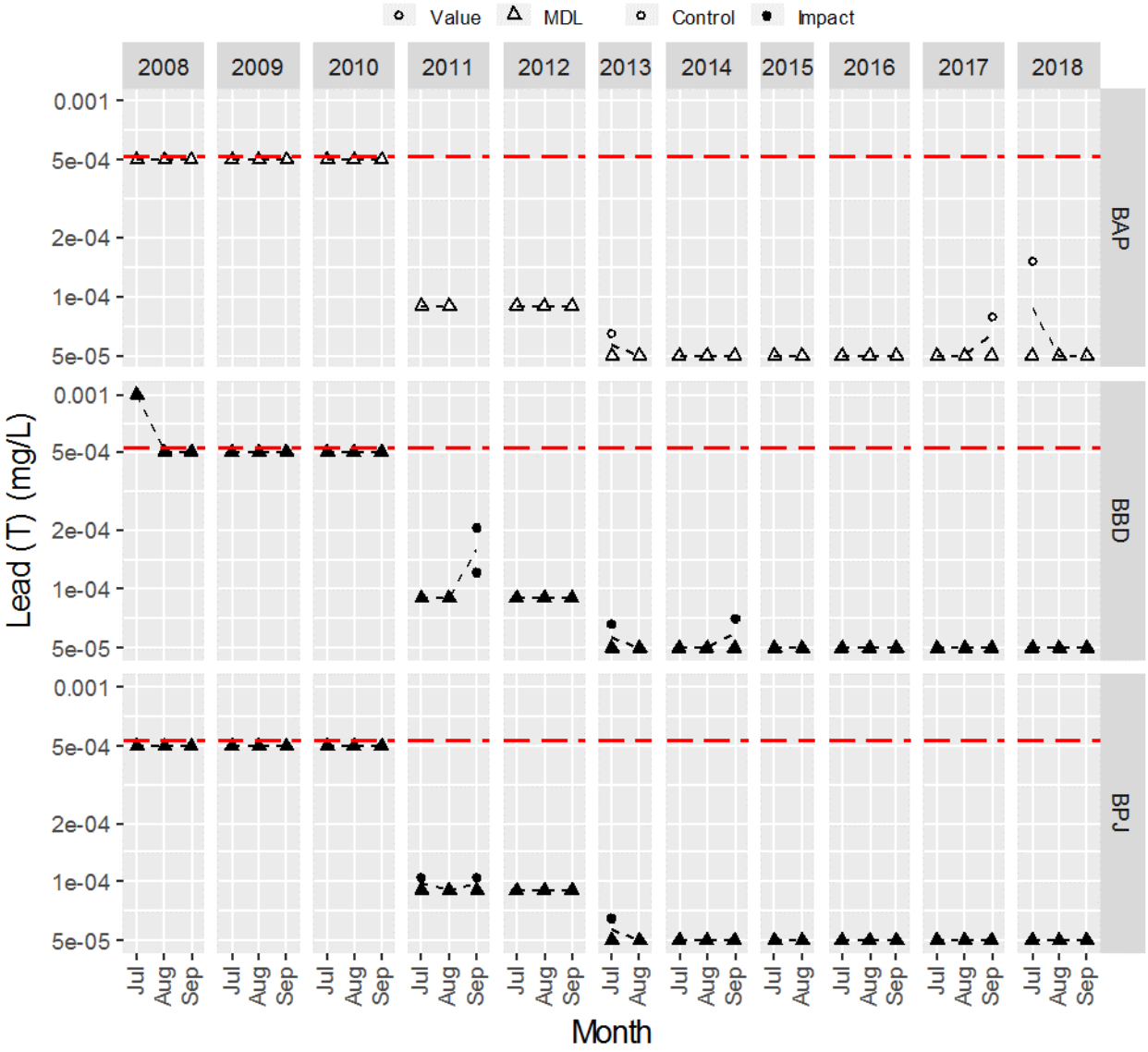


Figure B3-9. Total mercury (mg/L) in water from Baker Lake since 2008.

Note: The red dashed line is the trigger value.

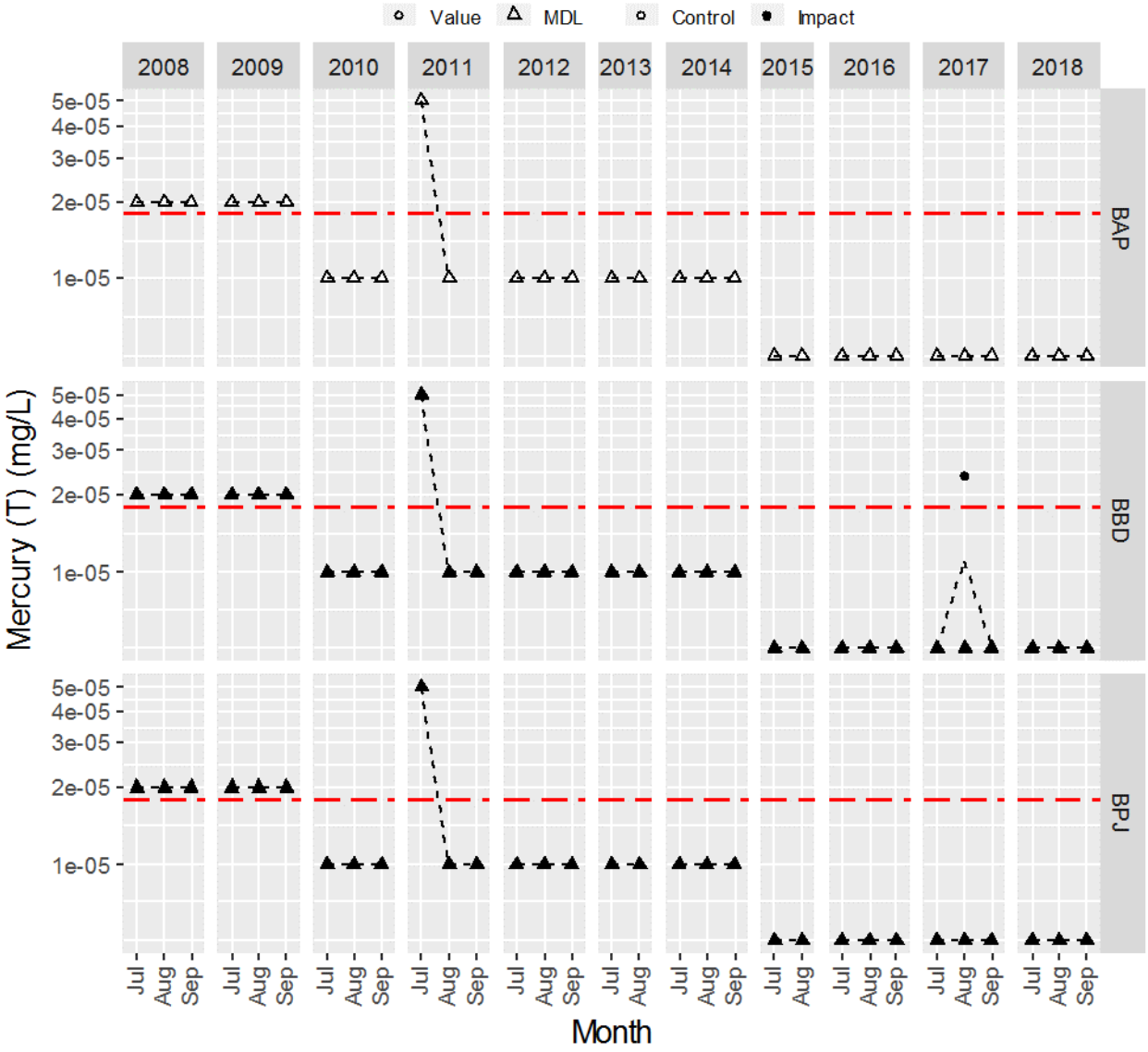


Figure B3-10. Total selenium (mg/L) in water from Baker Lake since 2008.

Note: The red dashed line is the trigger value.

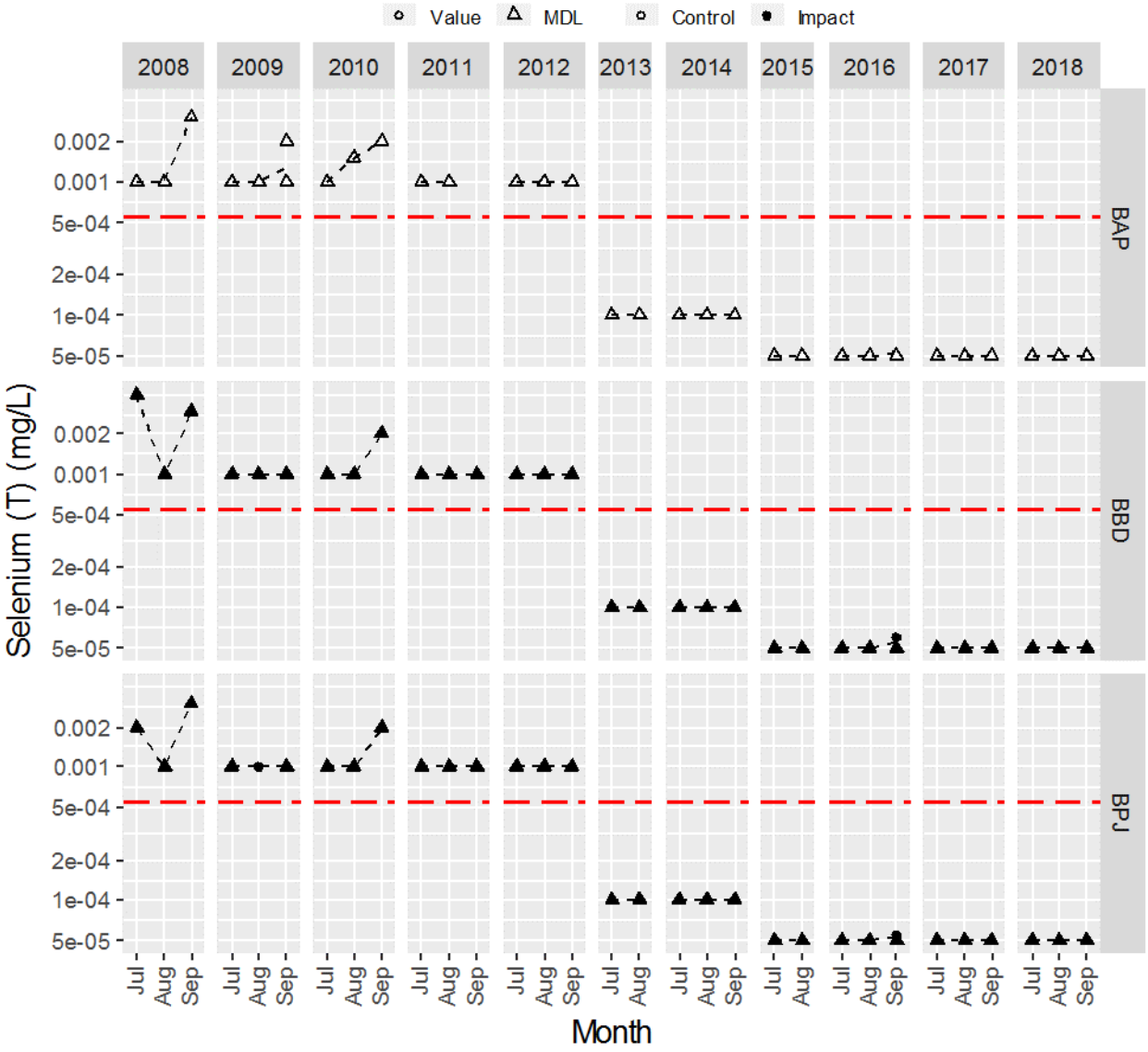


Figure B3-11. Total thallium (mg/L) in water from Baker Lake since 2008.

Note: The red dashed line is the trigger value.

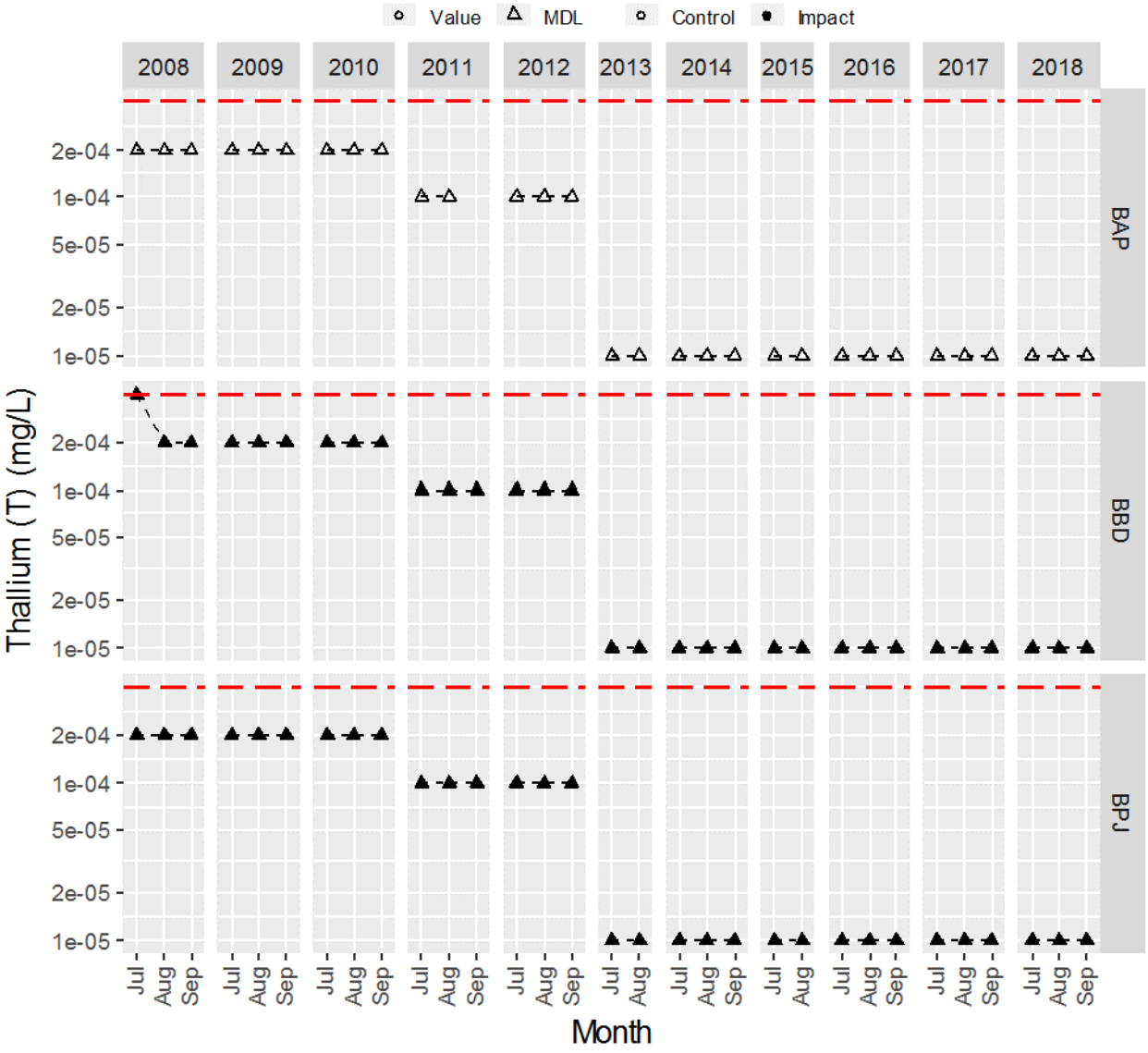


Figure B3-12. Total tin (mg/L) in water from Baker Lake since 2008.

Note: The red dashed line is the trigger value.

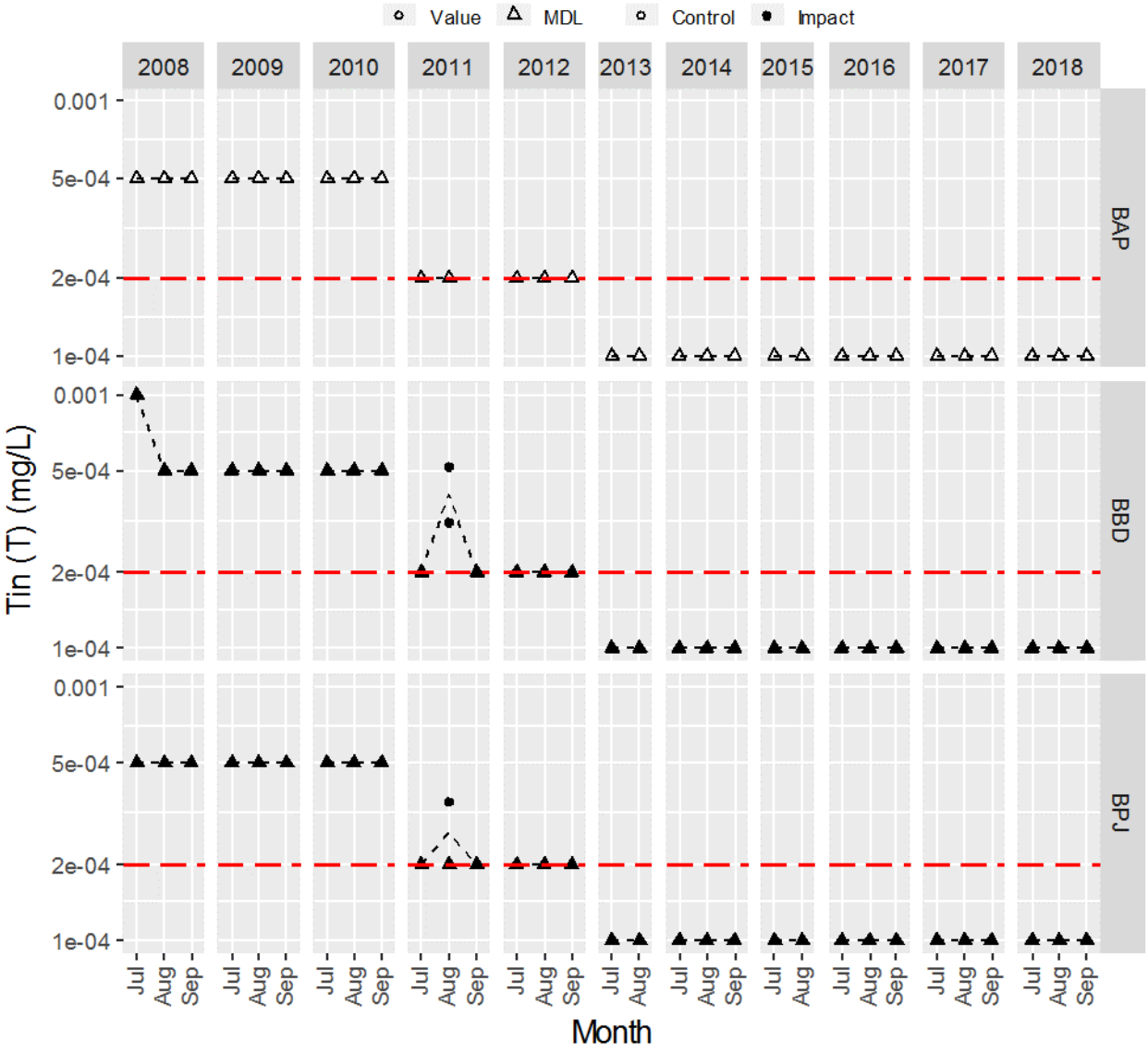


Figure B3-13. Total vanadium (mg/L) in water from Baker Lake since 2008.

Note: The red dashed line is the trigger value.

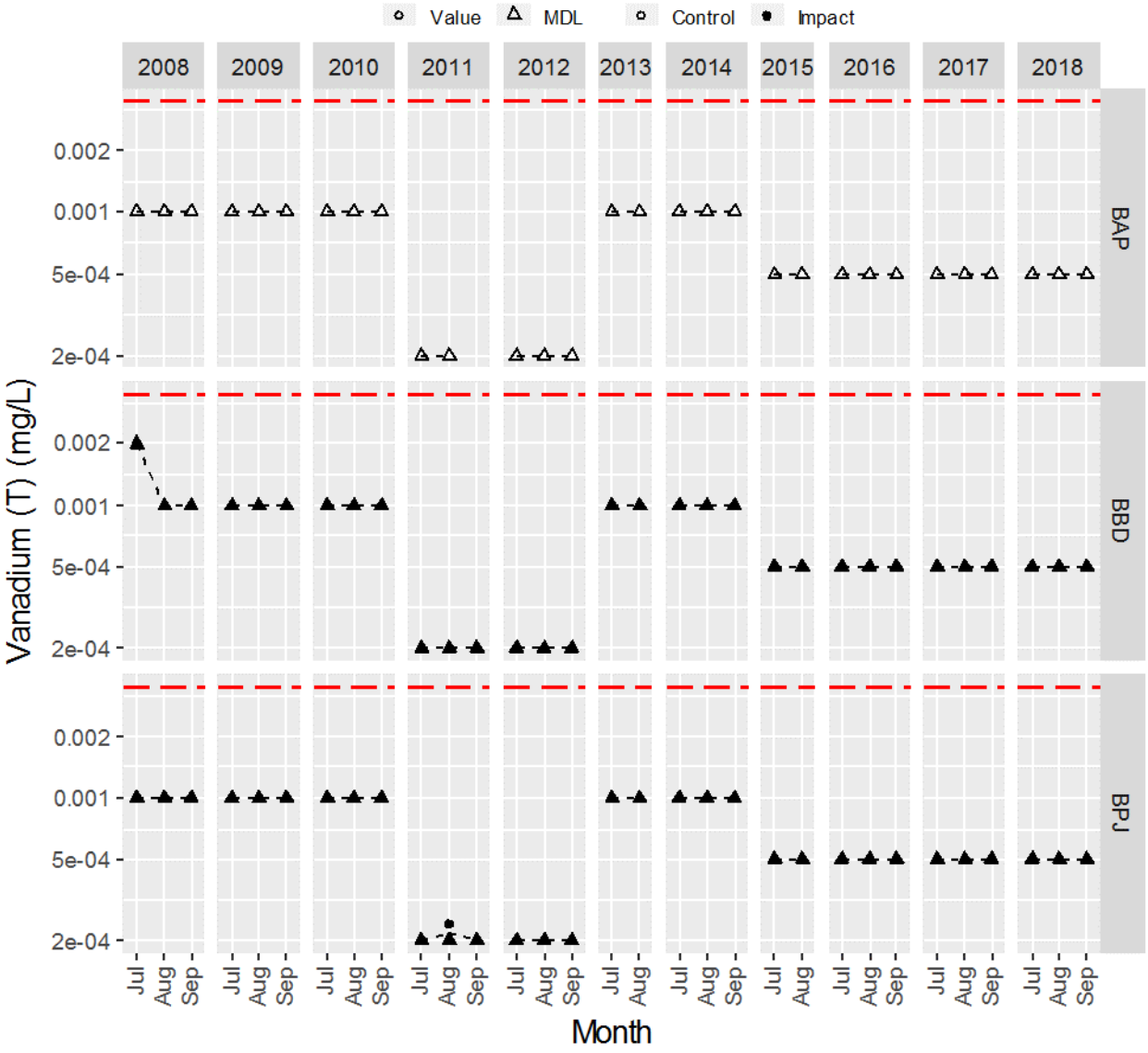


Figure B3-14. Total zinc (mg/L) in water from Baker Lake since 2008.

Note: The red dashed line is the trigger value.

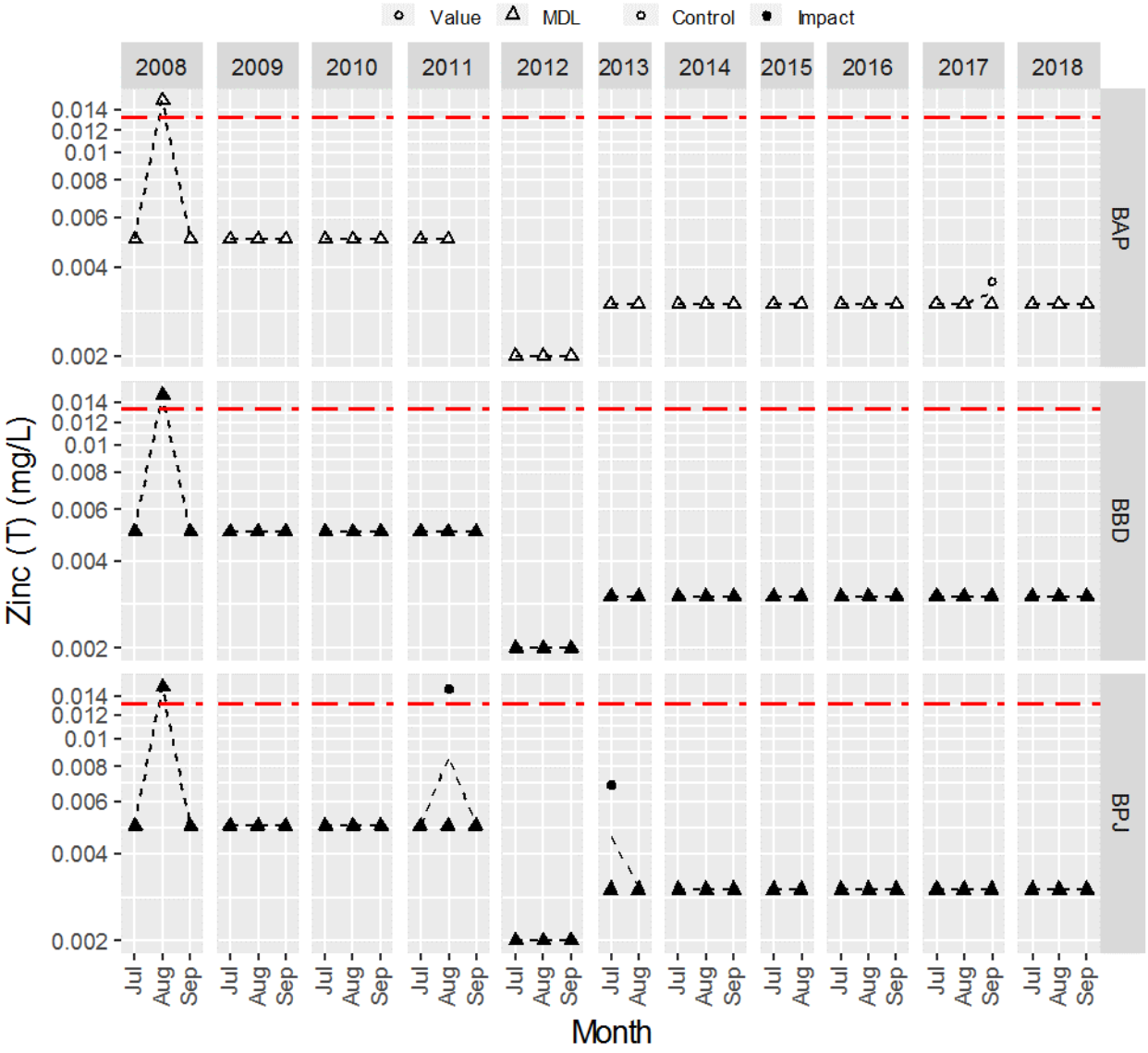


Figure B3-15. Dissolved antimony (mg/L) in water from Baker Lake since 2008.

Note: The red dashed line is the trigger value.

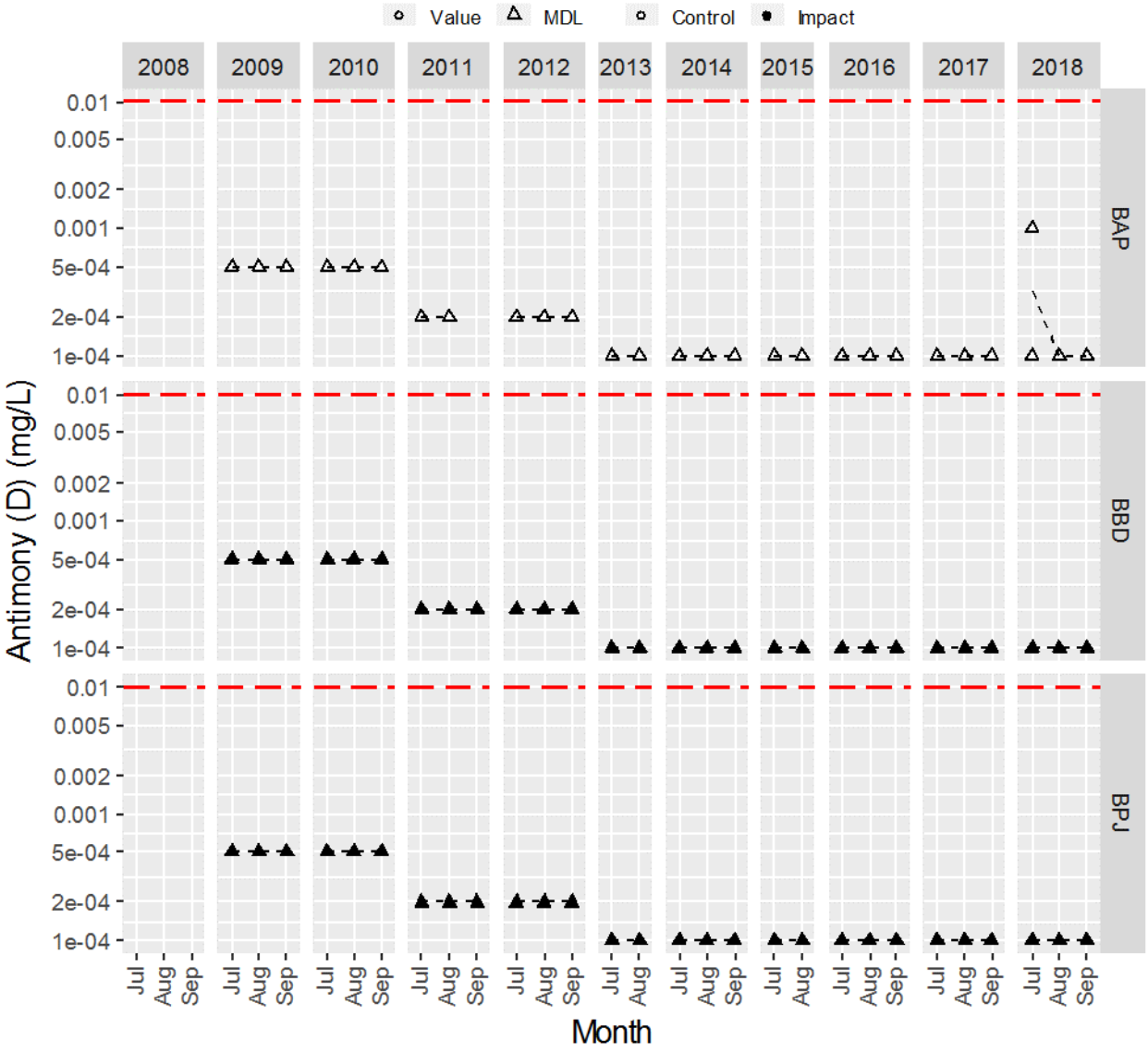


Figure B3-16. Dissolved beryllium (mg/L) in water from Baker Lake since 2008.

Note: The red dashed line is the trigger value.

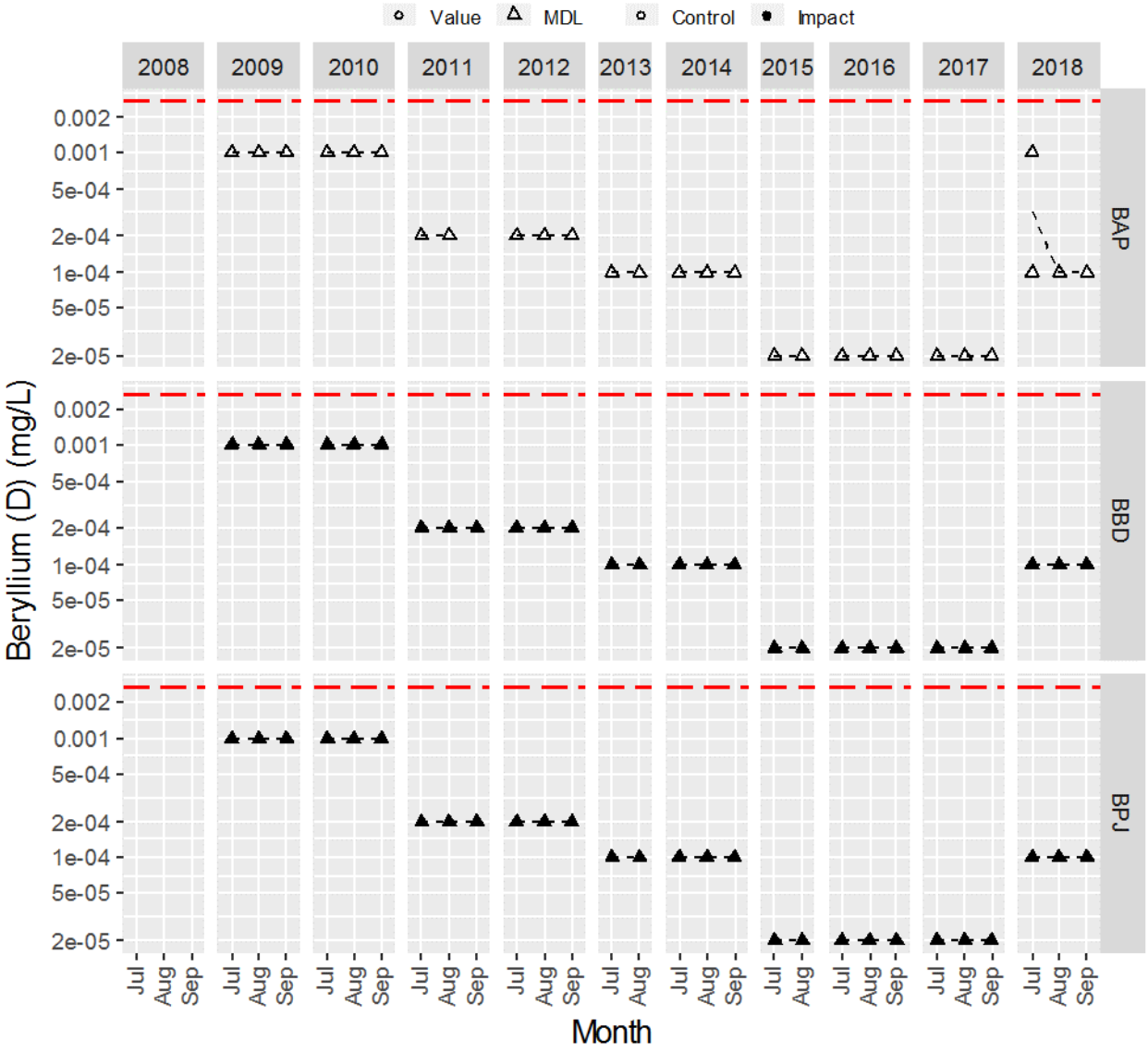


Figure B3-17. Dissolved cadmium (mg/L) in water from Baker Lake since 2008.

Note: The red dashed line is the trigger value.

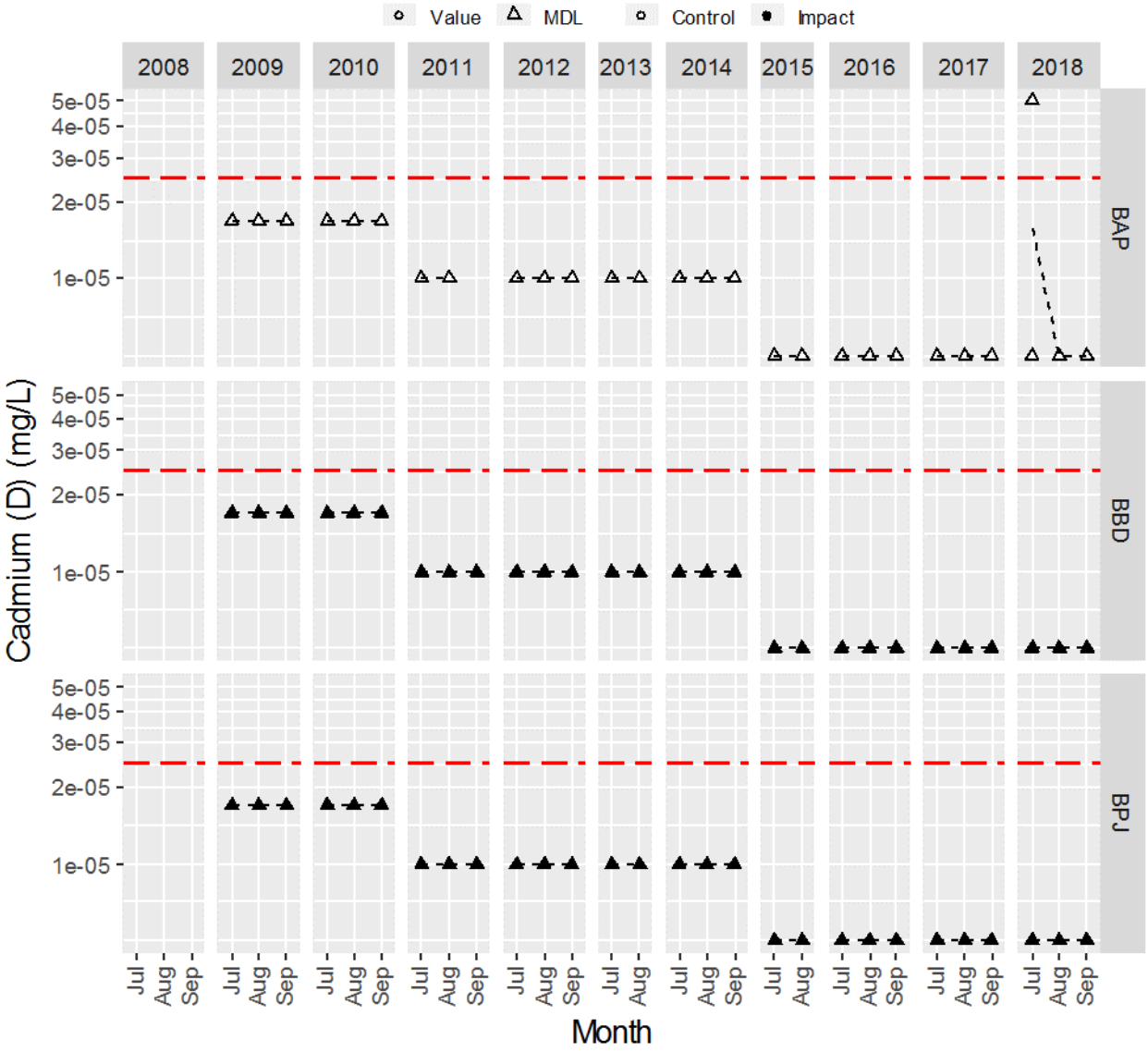


Figure B3-18. Dissolved chromium (mg/L) in water from Baker Lake since 2008.

Note: The red dashed line is the trigger value.

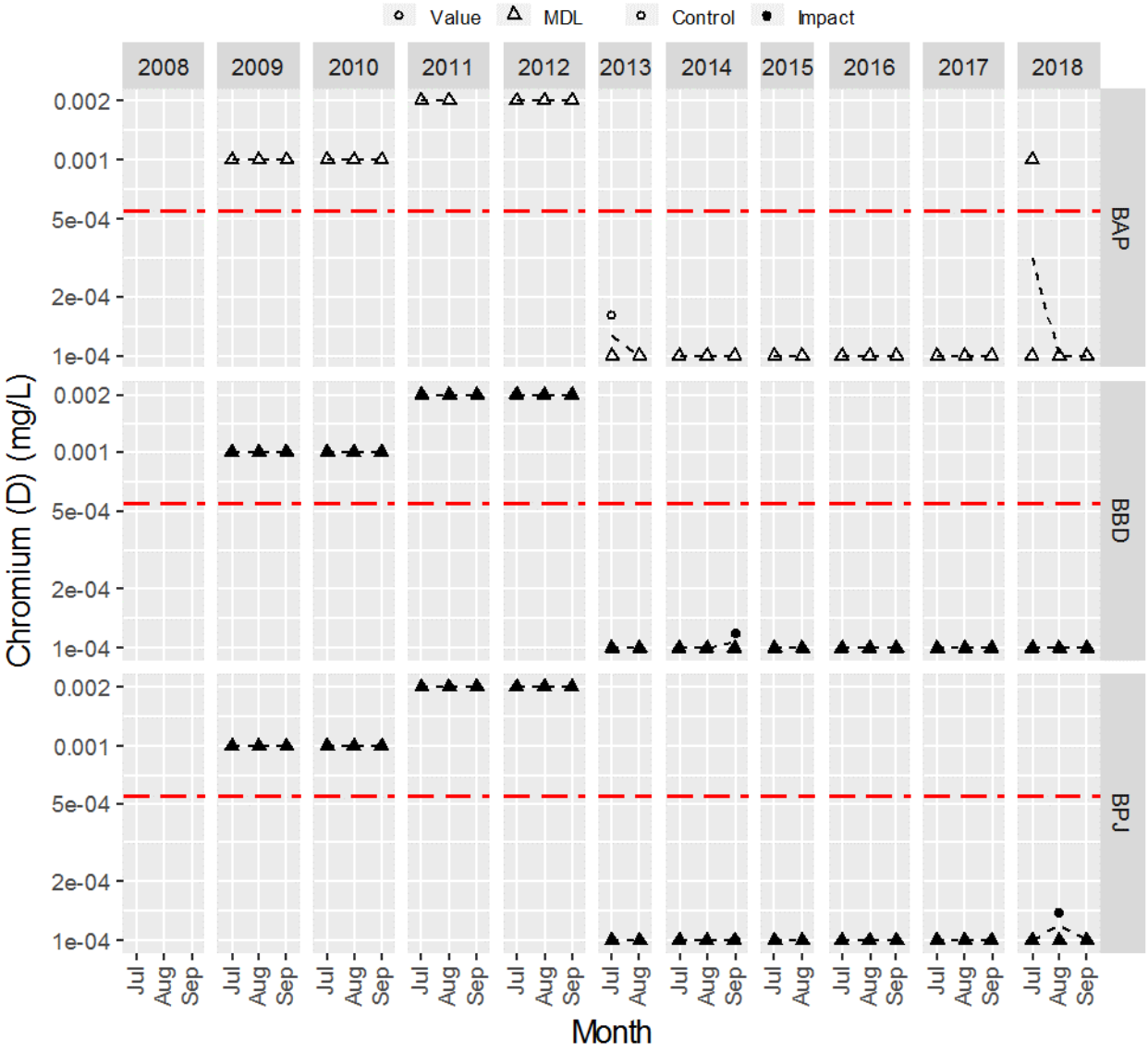


Figure B3-19. Dissolved lead (mg/L) in water from Baker Lake since 2008.

Note: The red dashed line is the trigger value.

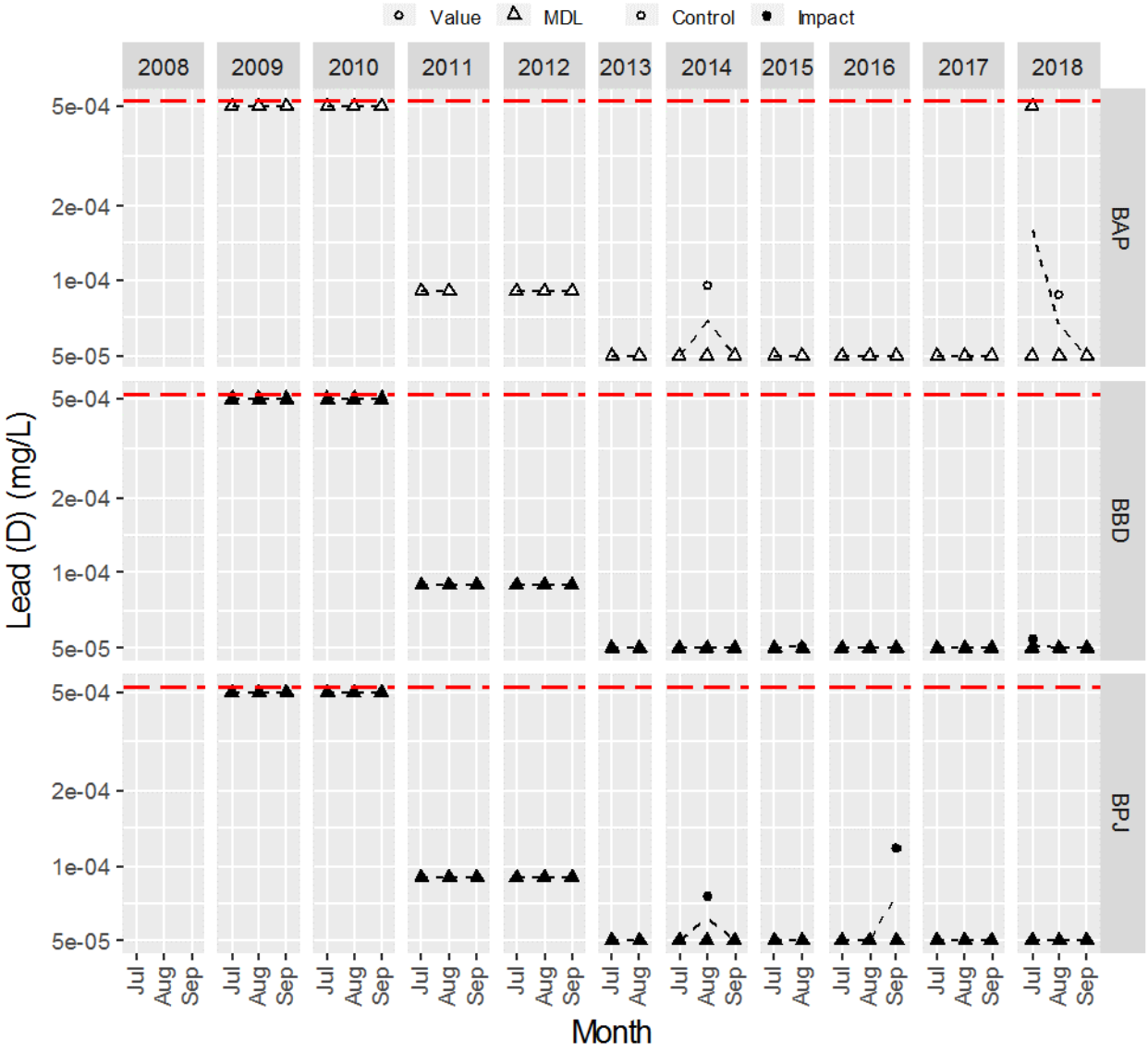


Figure B3-20. Dissolved mercury (mg/L) in water from Baker Lake since 2008.

Note: The red dashed line is the trigger value.

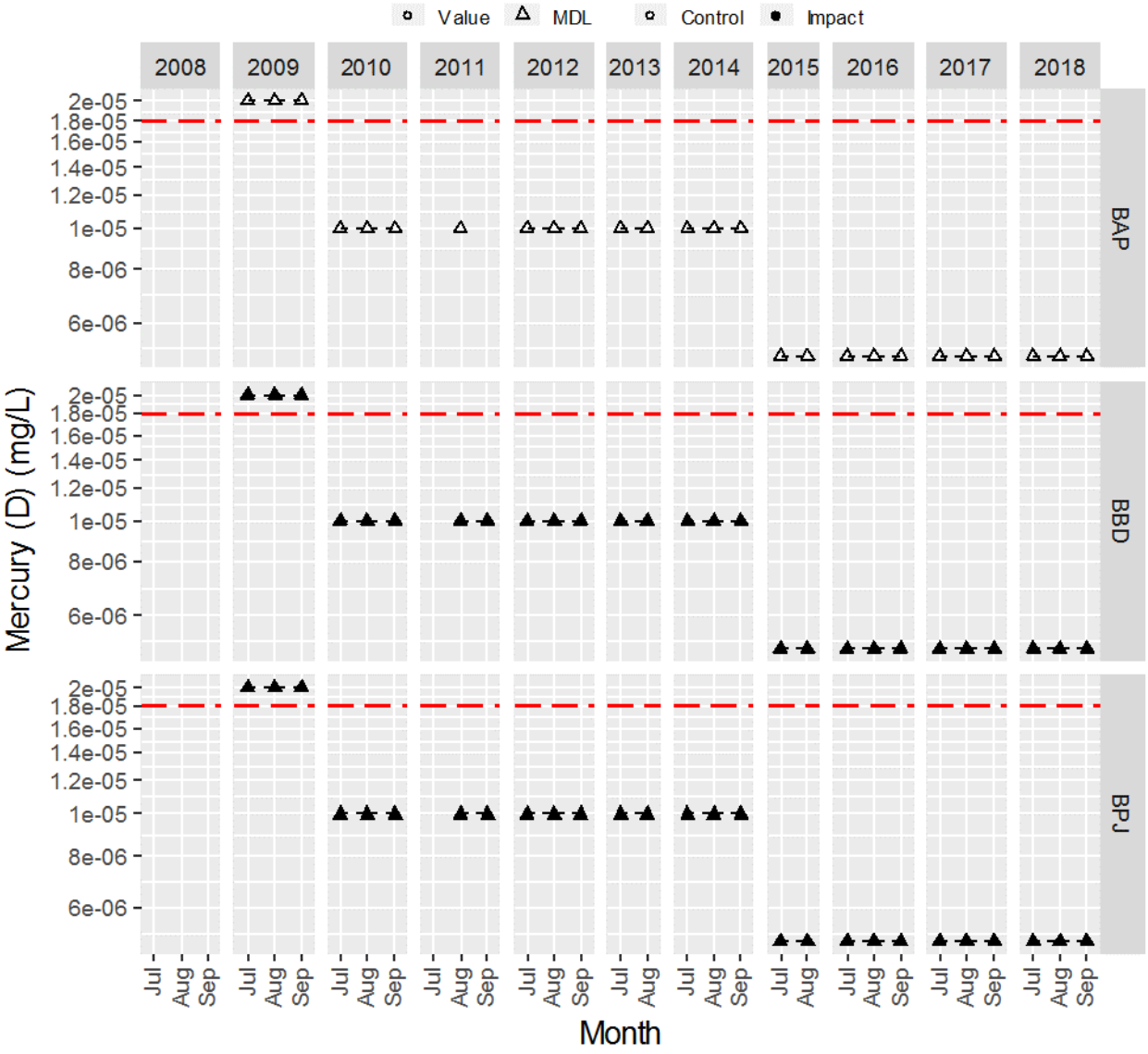


Figure B3-21. Dissolved nickel (mg/L) in water from Baker Lake since 2008.

Note: The red dashed line is the trigger value.

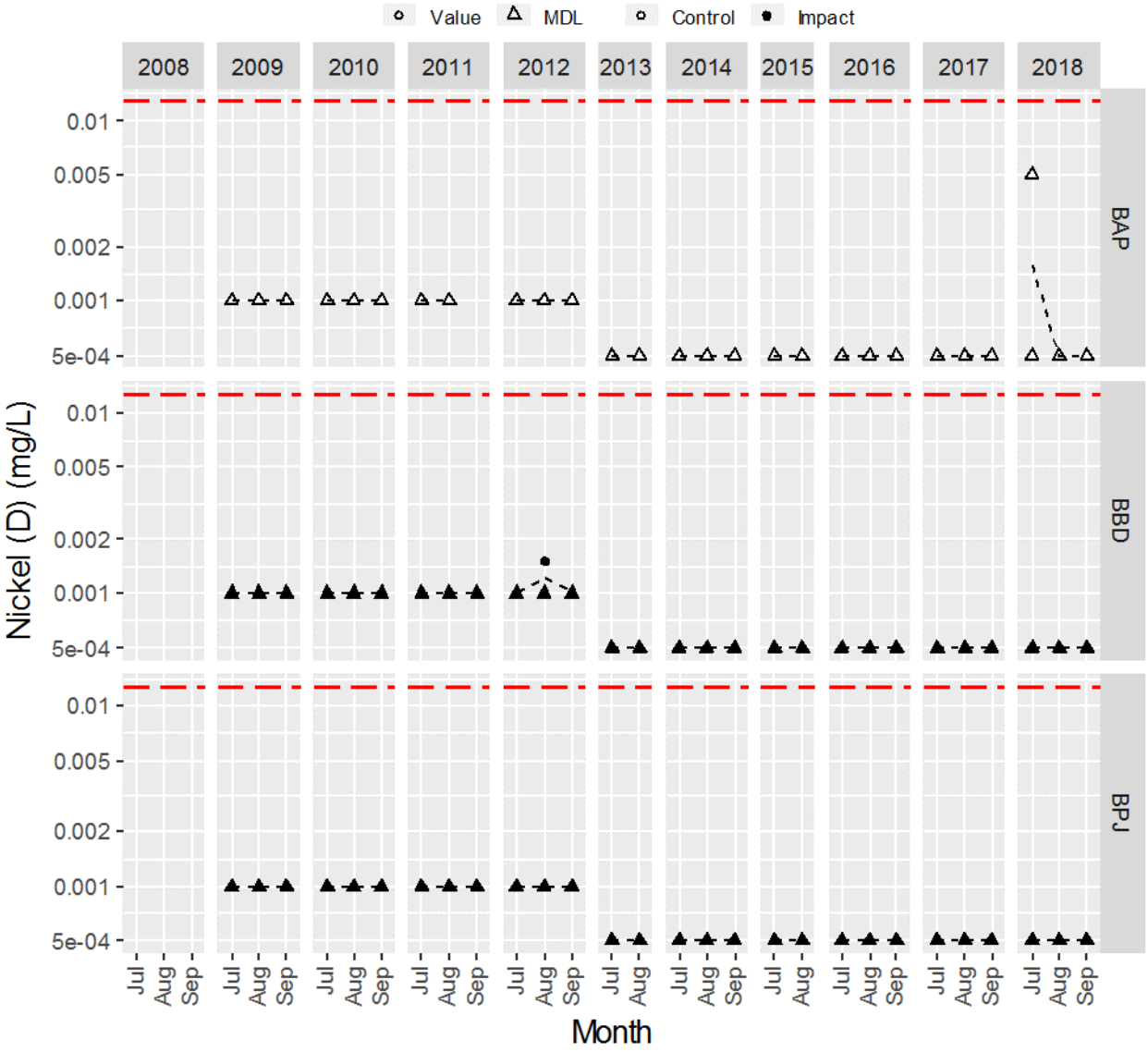


Figure B3-22. Dissolved selenium (mg/L) in water from Baker Lake since 2008.

Note: The red dashed line is the trigger value.

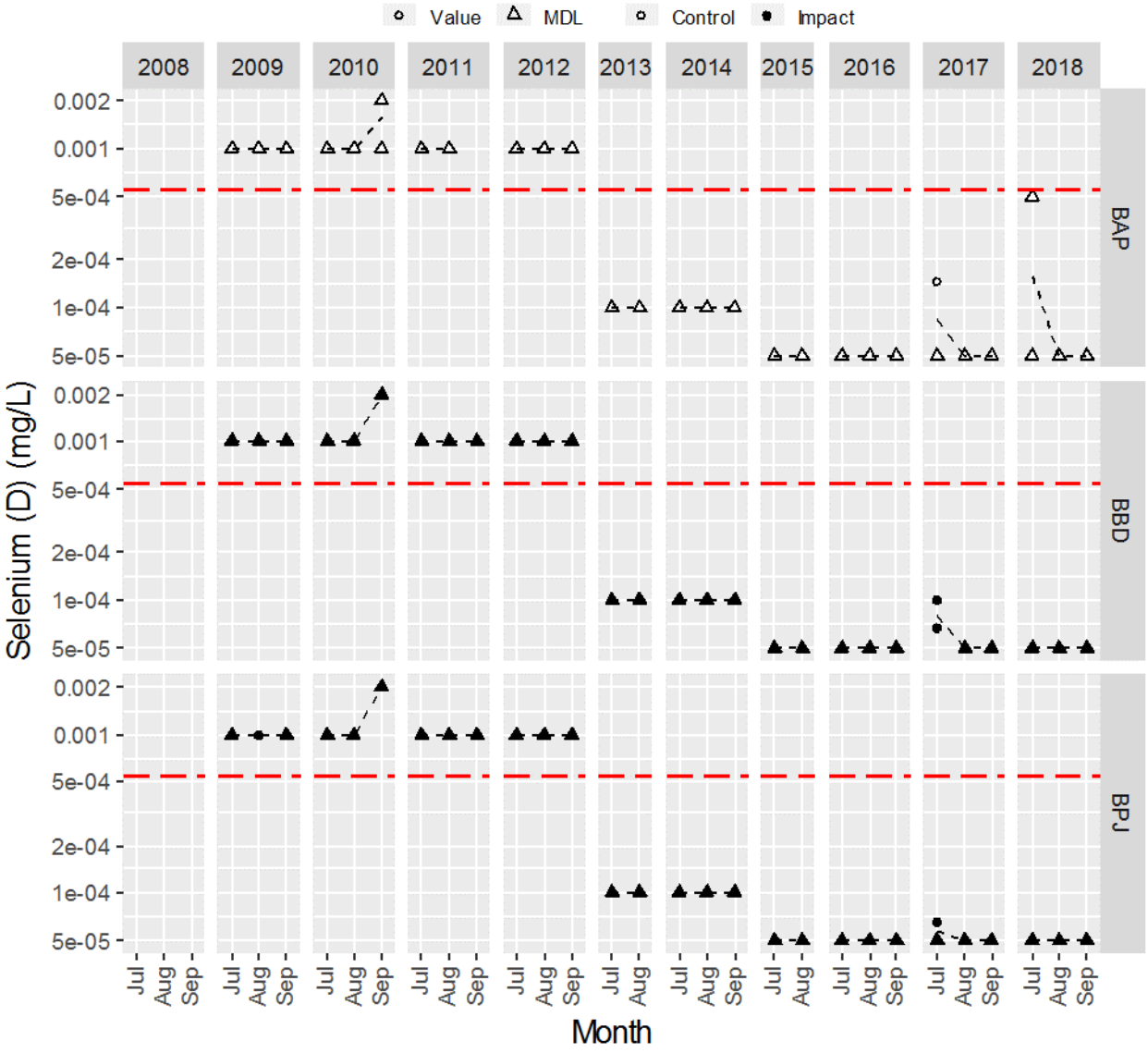


Figure B3-23. Dissolved thallium (mg/L) in water from Baker Lake since 2008.

Note: The red dashed line is the trigger value.

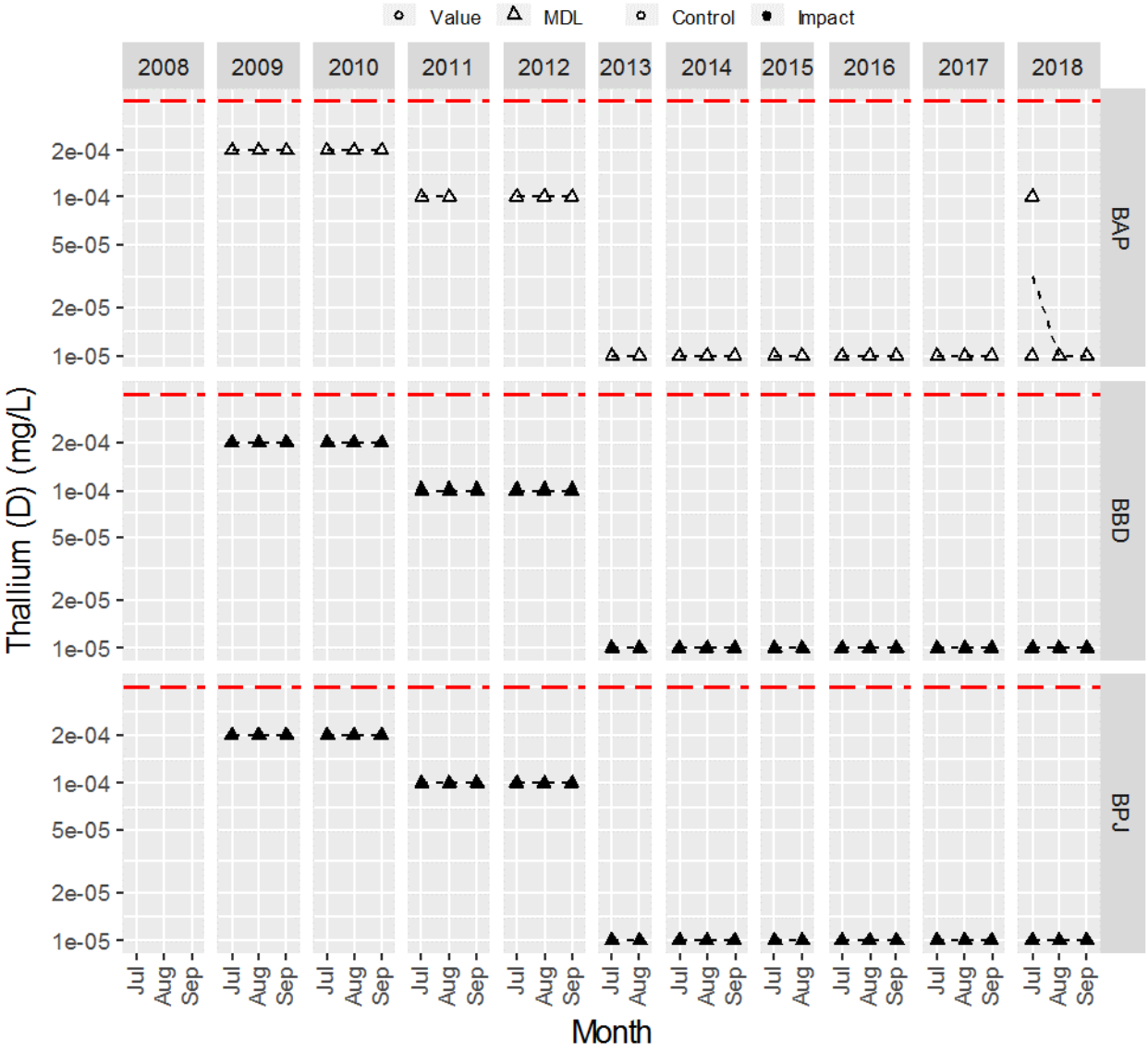


Figure B3-24. Dissolved tin (mg/L) in water from Baker Lake since 2008.

Note: The red dashed line is the trigger value.

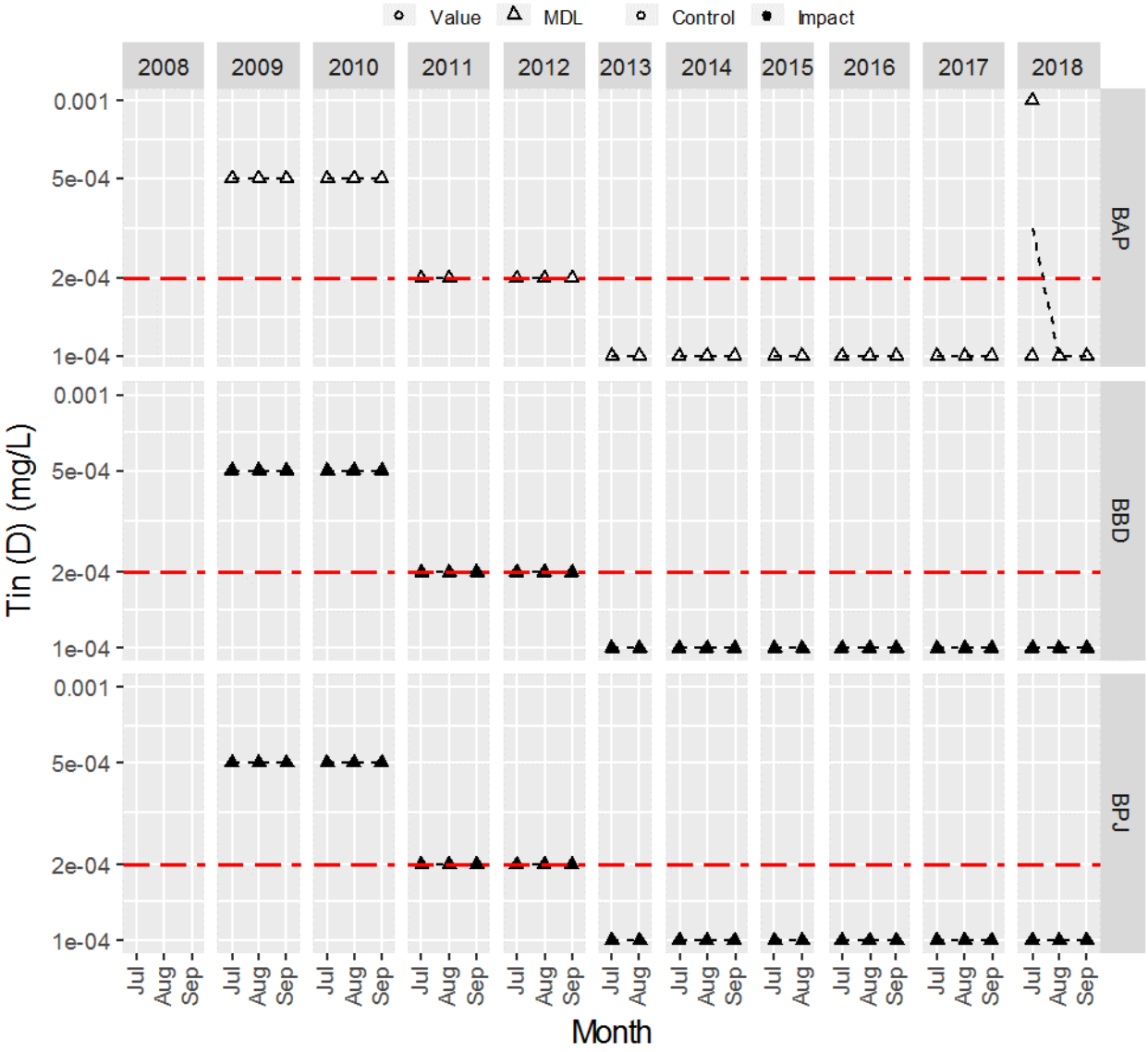


Figure B3-25. Dissolved titanium (mg/L) in water from Baker Lake since 2008.

Note: The red dashed line is the trigger value.

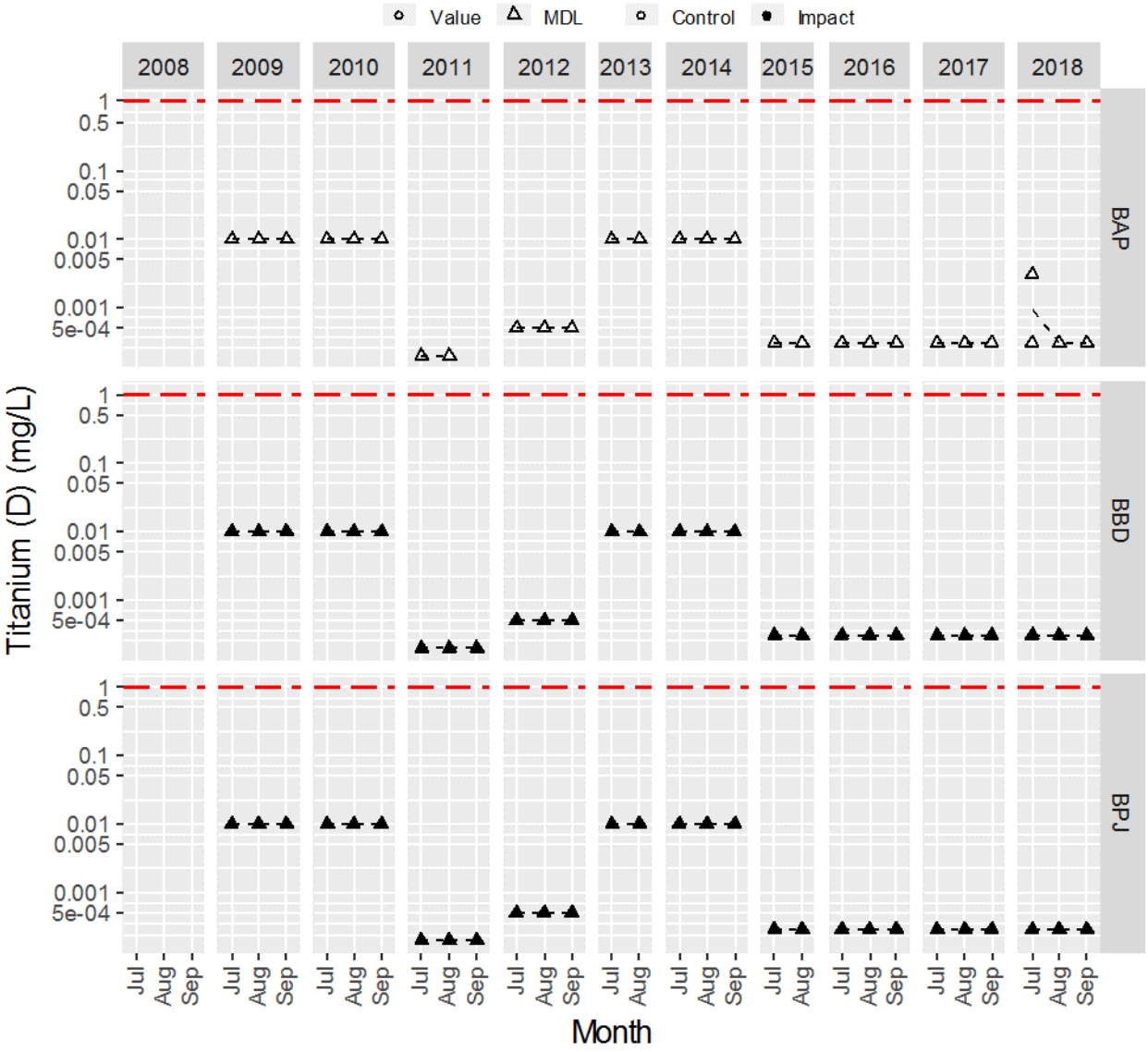
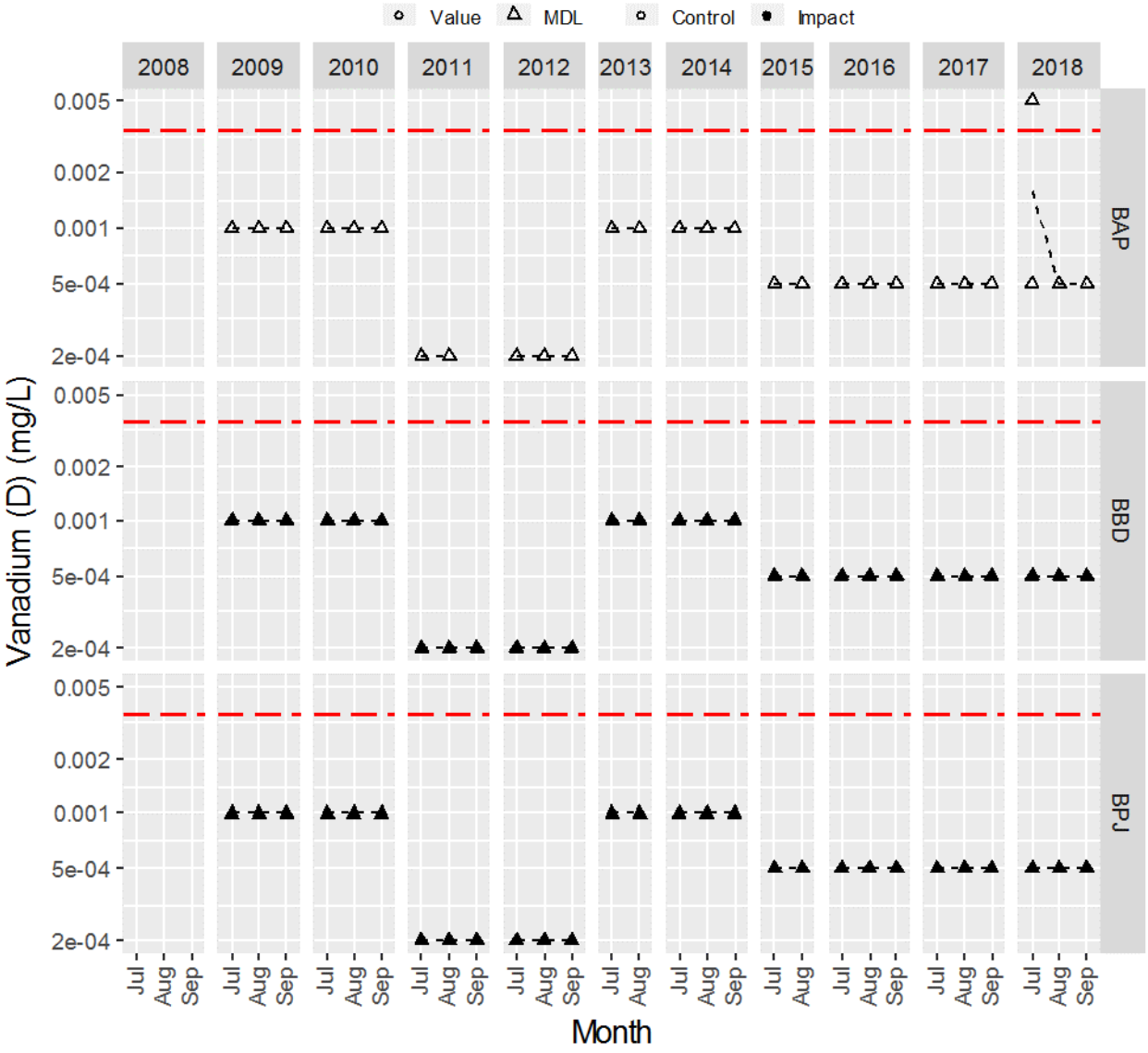


Figure B3-26. Dissolved vanadium (mg/L) in water from Baker Lake since 2008.

Note: The red dashed line is the trigger value.



APPENDIX C
SEDIMENT CHEMISTRY DATA

APPENDIX C1
SEDIMENT CHEMISTRY – MEADOWBANK STUDY AREA LAKES

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Table C1-1. Sediment core chemistry, Meadowbank study lakes, 2018.

Lake & Basin	Screening Criteria				Third Portage Lake - East Basin									
					TPE									
Area-Replicate ID	**CCME[1]**	**Trigger Values[2]**		**Threshold Values[3]**	**SC-1**	**SC-2**	**SC-3**	**SC-4**	**SC-5**	**SC-6**	**SC-7**	**SC-8**	**SC-9**	**SC-10**
Date					10-Aug-18	10-Aug-18	10-Aug-18	10-Aug-18	10-Aug-18	10-Aug-18	10-Aug-18	10-Aug-18	10-Aug-18	10-Aug-18
ALS Sample ID	**ISQG**	**MBK**	**WAL**		L2155899-1	L2155899-2	L2155899-3	L2155899-4	L2155899-5	L2155899-6	L2155899-7	L2155899-8	L2155899-9	L2155899-10
Physical & Organic Parameters														
Moisture (%)					88	87.5	88.8	89.8	88	89.3	88.0	87.0	87.4	86.2
pH					6.25	5.61	6.15	5.97	6.06	6.11	5.77	5.94	6.12	6.06
TOC (% dw)														
Total Metals (mg/kg dw)														
Aluminum					24400	26000	26200	25100	25500	24900	25700	26200	23700	25100
Antimony					0.27	0.24	0.29	0.28	0.26	0.29	0.26	0.27	0.29	0.29
Arsenic*	5.9	120.9	44.5		19.9	19.7	24.9	19.8	20.9	22.1	18.3	22.2	24.2	27.6
Barium					109	126	135	134	128	123	119	113	101	102
Beryllium					1.72	1.93	1.87	1.89	1.85	1.72	1.78	1.78	1.64	1.62
Bismuth					2.3	2.68	2.5	2.51	2.48	2.27	2.54	2.38	2.13	2.1
Boron					7.8	8.3	9.1	9.8	8.9	8.8	8.7	9.4	8.9	8.7
Cadmium*	0.6	1.10	0.66		0.205	0.295	0.342	0.485	0.308	0.381	0.195	0.158	0.205	0.197
Calcium					2530	1890	2450	2400	2330	2660	2160	2350	2470	2590
Chromium*	37.3	135.0	61.2		**148**	100	**148**	111	120	**172**	126	**148**	**196**	**230**
Cobalt					17.1	20.9	19.5	16.3	18.2	18.60	16.7	16.4	17.2	17.7
Copper*	35.7	83.4	257.1		50.4	53.2	57.4	55.3	54.2	52.3	55.3	56.4	54.5	54.2
Iron					45100	50100	54300	46700	50100	47800	46500	47800	47300	51000
Lead †	35	25.3	36.5	35	21.3	21.9	21.6	22.1	21.8	22.1	22.9	22.4	22	21.8
Lithium					43.6	48.2	46.6	47.4	46.1	43.6	45.8	48.5	47	46
Magnesium					10500	9620	10900	9700	9910	11200	10100	10900	11600	12800
Manganese					1710	1980	3760	2630	3040	2320	2140	1220	1260	1150
Mercury	0.17	0.102	0.120	0.17	0.0211	0.0167	0.02	0.0214	0.0197	0.0223	0.0203	0.0231	0.0245	0.0242
Molybdenum					3.93	4.55	4.85	4.38	4.34	4.16	4.48	4.12	4.16	4.2
Nickel					84.1	89.2	117	113	89.7	125	76.2	76.4	96.1	108
Phosphorus					426	411	454	419	436	456	426	469	473	481
Potassium					4130	4750	4550	4540	4680	4260	4610	4650	4070	4070
Selenium					0.76	0.56	0.76	0.83	0.84	0.85	0.57	0.65	0.57	0.62
Silver					0.12	*<0.10*	0.1	*<0.10*	*<0.10*	0.12	0.1	0.12	0.24	0.2
Sodium					198	250	222	230	224	216	222	223	211	207
Strontium					19.6	18.9	21.1	20.9	20.1	21.8	20.2	20.2	20	20.0
Thallium					0.384	0.479	0.455	0.48	0.439	0.435	0.406	0.389	0.354	0.349
Tin					4	2.7	3.2	3.3	2.7	5.9	4.1	2.8	6	5
Titanium					811	955	899	897	883	846	922	913	831	832
Uranium					15.2	18.4	18.8	17.2	17.1	15.6	18.4	17.5	15.6	15.3
Vanadium					42.3	43.6	46.3	42.9	42.7	44.7	44	45.6	45.1	48
Zinc †	123	114.2	142.1	123	103	114	**118**	**117**	112	111	112	109	104	107

Notes:

1. CCME (Canadian Council of Ministers of the Environment) Canadian Sediment Quality Guidelines for the Protection of Aquatic Life, 1999, updated in 2002. ISQG = Interim freshwater Sediment Quality Guideline.

2. Trigger values developed in the *CREMP Design Document 2012* (Azimuth, 2012d) were updated in 2017. Trigger values were developed for Wally Lake (WAL) separate from the other Meadowbank project lakes.

3. Thresholds are set equal to CCME ISQG guidelines, where available.

"*" CCME guideline not used as threshold value because threshold value would be lower than trigger value.

"†" CCME guideline not used as threshold value at Wally Lake.

123 Bolded concentrations exceed the trigger value.

123 Bolded and shaded concentrations also exceed the threshold value.

Italicized numbers are below detection limits.

Table C1-1. Sediment core chemistry, Meadowbank study lakes, 2018.

Lake & Basin	Screening Criteria				Wally Lake									
					WAL									
Area-Replicate ID	**CCME[1]**	**Trigger Values[2]**		**Threshold Values[3]**	**SC-1**	**SC-2**	**SC-3**	**SC-4**	**SC-5**	**SC-6**	**SC-7**	**SC-8**	**SC-9**	**SC-10**
Date					11-Aug-18	11-Aug-18	11-Aug-18	11-Aug-18	11-Aug-18	11-Aug-18	11-Aug-18	11-Aug-18	11-Aug-18	11-Aug-18
ALS Sample ID	**ISQG**	**MBK**	**WAL**		L2155899-11	L2155899-12	L2155899-13	L2155899-14	L2155899-15	L2155899-16	L2155899-17	L2155899-18	L2155899-19	L2155899-20
Physical & Organic Parameters														
Moisture (%)					90	94.2	93.9	93.7	94.4	93.4	92.4	94.9	93.9	93
pH					5.48	5.75	5.96	6.18	5.96	6.64	6.56	6.43	6.54	6.66
TOC (% dw)														
Total Metals (mg/kg dw)														
Aluminum					18700	18500	18500	20300	17300	20000	20400	15500	20000	21200
Antimony					0.58	0.49	0.47	0.57	0.55	0.54	0.54	0.5	0.56	0.49
Arsenic*	5.9	120.9	44.5		**57.2**	**56.8**	**46.1**	**54.9**	41.3	41.7	20.1	27.5	**75.2**	**45.3**
Barium					94.9	93.3	92	115	89.7	113	129	91.8	113	126
Beryllium					1.48	1.48	1.46	1.64	1.37	1.54	1.56	1.17	1.63	1.69
Bismuth					1.86	1.89	1.76	2.06	1.69	2.06	1.94	1.44	1.92	2.07
Boron					13.7	12.2	13.8	14.6	15.2	13.3	12.5	13	13.4	12.6
Cadmium*	0.6	1.10	0.66		0.464	0.443	0.434	0.516	0.477	0.56	0.639	0.474	0.419	0.508
Calcium					4500	4340	4300	4800	4750	4760	4640	5670	4960	5140
Chromium*	37.3	135.0	61.2		57.6	55.5	55.2	58	52.7	59	60	49	56.9	58.6
Cobalt					10.2	10.1	9.44	10.1	9.04	10.10	10	9.35	10.2	9.67
Copper*	35.7	83.4	257.1		138	135	132	160	130	158	147	110	139	149
Iron					40200	40500	32100	43000	31600	37100	26200	27000	50600	42200
Lead †	35	25.3	36.5	35	33.7	33	32.4	**36.7**	31.9	35.7	36	29.8	35.3	35.2
Lithium					30.6	29.9	30.2	32.3	28.6	31.1	36.5	26.1	30.9	35.8
Magnesium					7100	6930	6980	7250	6610	7130	7690	6540	7250	7660
Manganese					311	342	280	324	271	377	315	324	537	488
Mercury	0.17	0.102	0.120	0.17	0.091	0.0762	0.0877	0.0892	0.0966	0.0799	0.0674	0.0859	0.1	0.0847
Molybdenum					12.1	11.4	10.7	13.2	9.91	11.5	5.98	7.81	14.8	11.1
Nickel					58	53.6	55	58.8	54.5	56.8	57.1	49.8	51.7	55.6
Phosphorus					812	763	769	771	745	696	577	940	978	802
Potassium					3170	3130	3220	3470	3030	3490	3650	2990	3280	3490
Selenium					0.87	0.81	0.82	1	0.82	0.98	0.85	0.78	0.9	0.86
Silver					0.6	0.61	0.62	0.73	0.59	0.75	0.74	0.52	0.58	0.58
Sodium					201	217	229	233	214	245	241	218	206	217
Strontium					29.9	28.4	29	32.2	30.5	31.8	30.8	33.3	33.3	33.6
Thallium					0.319	0.314	0.314	0.338	0.299	0.33	0.336	0.26	0.3	0.317
Tin					5.4	5.6	5.8	7.8	7.1	7.9	6.4	6.7	6.5	8.1
Titanium					567	547	545	563	499	561	633	465	520	577
Uranium					16.5	16.4	15.7	18.3	15.1	18.1	16.9	12.9	16.5	16.2
Vanadium					30.4	29.4	29.4	31.8	27.4	31.2	30.8	23.9	30	32.1
Zinc †	123	114.2	142.1	123	128	124	122	136	115	126	122	101	125	120

Notes:

1. CCME (Canadian Council of Ministers of the Environment) Canadian Sediment Quality Guidelines for the Protection of Aquatic Life, 1999, updated in 2002. ISQG = Interim freshwater Sediment Quality Guideline.

2. Trigger values developed in the *CREMP Design Document 2012* (Azimuth, 2012d) were updated in 2017. Trigger values were developed for Wally Lake (WAL) separate from the other Meadowbank project lakes.

3. Thresholds are set equal to CCME ISQG guidelines, where available.

"*" CCME guideline not used as threshold value because threshold value would be lower than trigger value.

"†" CCME guideline not used as threshold value at Wally Lake.

123 Bolded concentrations exceed the trigger value.

123 Bolded and shaded concentrations also exceed the threshold value.

Italicized numbers are below detection limits.

Table C1-2. Sediment grab chemistry, Meadowbank study lakes, 2018.

Lake & Basin		Screening Criteria			Third Portage Lake										Second Portage Lake				
					East Basin					North Basin									
Area-Replicate ID	CCME[1]	Trigger Values[2]		Threshold Values[3]	TPE-1	TPE-2	TPE-3	TPE-4	TPE-5	TPN-1	TPN-2	TPN-3	TPN-4	TPN-5	SP-1	SP-2	SP-3	SP-4	SP-5
Date					10-Aug-18	10-Aug-18	10-Aug-18	10-Aug-18	10-Aug-18	10-Aug-18	10-Aug-18	10-Aug-18	10-Aug-18	10-Aug-18	13-Aug-18	13-Aug-18	13-Aug-18	13-Aug-18	13-Aug-18
ALS Sample ID	ISQG	MBK	WAL		L2156055-7	L2156055-8	L2156055-9	L2156055-10	L2156055-11	L2156055-13	L2156055-14	L2156055-15	L2156055-16	L2156055-17	L2156055-1	L2156055-2	L2156055-3	L2156055-4	L2156055-5
Physical & Organic Parameters																			
Moisture (%)					83.7	85.2	85.4	83.4	78.9	79.2	82.9	78.9	68.4	55.7	84.9	84.0	85.2	85.1	67.7
pH					6.51	6.68	6.3	6.07	5.91	5.91	5.65	5.79	5.85	5.87	5.94	5.52	5.87	6.01	5.96
TOC (% dw)					2.79	3.44	3.38	2.82	2.48	2.53	3.39	2.52	1.29	0.852	3.87	3.49	3.73	3.87	1.29
Particle Size																			
% Gravel (>2mm)					*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	1.2	1.1	*<1.0*	*<1.0*	*<1.0*	*<1.0*	2.3
% Sand (2.00mm - 0.063mm)					2.4	1.1	1.9	4.8	12.1	23.4	21.2	14.9	39.4	41.0	1.9	1.6	1.5	2	19.8
% Silt (0.063mm - 4µm)					71.5	70.2	63.7	69.2	65.7	63.5	65.8	61.9	47.6	37.5	80.9	74.2	79.8	81.6	52.2
% Clay (<4µm)					26.1	28.8	34.5	26	22.2	13.1	13.1	23.3	11.8	20.4	17.2	24.2	18.8	16.5	25.7
Total Metals (mg/kg dw)																			
Aluminum					24700	23800	24500	26100	27300	17100	17700	19800	20400	19300	26200	24500	25900	24500	26200
Antimony					0.22	0.23	0.24	0.23	0.22	0.16	0.24	0.2	0.16	0.13	0.28	0.26	0.27	0.27	0.15
Arsenic *	5.9	120.9	44.5		18	18.6	19.2	22.1	21.5	8.79	12.1	14.1	11.1	9.71	35.6	59.0	32.9	48.6	19.4
Barium					131	138	121	121	125	74	74.8	85.9	78.8	89.5	134	119	126	124	144
Beryllium					1.86	1.72	1.74	1.91	1.9	1.05	1.15	1.18	1.08	1.13	2	2.23	2.11	2.1	1.66
Bismuth					2.54	2.34	2.37	2.62	2.53	1.13	1.2	1.32	1.11	1.19	2.39	2.31	2.38	2.39	1.85
Boron					9.4	9.1	9.1	9.7	9.8	6.9	7.6	8.1	6.9	6.8	9.5	9.30	8.9	9.2	7.2
Cadmium *	0.6	1.10	0.66		0.18	0.466	0.244	0.182	0.135	0.072	0.204	0.105	0.052	0.071	0.32	0.254	0.286	0.257	0.398
Calcium					2060	2030	2050	1970	1990	1730	1670	1660	1370	1380	2270	2070	2300	2240	2360
Chromium *	37.3	135.0	61.2		109	123	133	133	129	114	113	124	131	108	81.6	77.4	87.3	81.5	69
Cobalt					15.4	16.9	16.3	18.2	16.6	8.70	10.3	11.4	10.3	10.2	18	15.6	17.8	16.7	17.9
Copper *	35.7	83.4	257.1		49.5	50.5	49.8	55.8	57.5	45.2	53.9	49.2	42.6	43.4	75.8	73.4	75.1	74.4	48.9
Iron					47900	43400	44000	48700	49300	22700	25100	28800	29700	29000	71600	91800	71900	82600	47100
Lead †	35	25.3	36.5	35	21.1	20.6	20.6	22.3	22.1	14.3	15.6	17.7	13.3	14.2	22.6	21	22.1	21.9	21.1
Lithium					46.4	44.2	44.2	48.5	54.1	28.5	29.6	33.2	34.6	37.5	44.8	42.1	44.3	41.3	59.7
Magnesium					9880	9850	10400	10800	11500	8320	8230	9090	9440	9160	9480	8740	9680	9010	10300
Manganese					3040	3290	1990	1630	1610	233	244	370	435	387	1930	1160	1520	1820	3700
Mercury	0.17	0.102	0.120	0.17	0.0182	0.019	0.0192	0.0189	0.0153	0.014	0.0162	0.0154	0.009	0.0072	0.0294	0.0283	0.0301	0.031	0.0141
Molybdenum					4.33	4.09	3.84	4.92	4.66	1.35	3	2.7	2.19	1.35	7.12	10.1	8.16	10	5.3
Nickel					68.8	131	86.3	74.5	69.7	56.1	61.6	60.7	57.4	56.6	69.9	57.5	70	64.4	83.6
Phosphorus					387	433	445	436	401	562	582	422	333	352	639	975	620	720	290
Potassium					4670	4430	4510	4940	5180	2720	2950	3320	3100	3410	4780	4450	4670	4510	5230
Selenium					0.61	0.69	0.65	0.49	0.37	0.37	0.53	0.34	*<0.20*	*<0.20*	0.72	0.76	0.68	0.75	*<0.20*
Silver					*<0.10*	*<0.10*	*<0.10*	*<0.10*	*<0.10*	0.15	0.13	*<0.10*	*<0.10*	*<0.10*	0.17	0.15	0.12	0.13	*<0.10*
Sodium					202	198	189	207	187	163	138	151	129	143	247	208	219	219	285
Strontium					18.8	19.0	19	18.9	19.5	16	16	17	15.5	15.4	21.6	20	20.7	20.6	23.9
Thallium					0.438	0.512	0.419	0.427	0.428	0.207	0.228	0.241	0.2	0.242	0.436	0.398	0.407	0.381	0.51
Tin					2	2.1	*<2.0*	2	2.3	*<2.0*	*<2.0*	*<2.0*	*<2.0*	*<2.0*	*<2.0*	*<2.0*	*<2.0*	*<2.0*	*<2.0*
Titanium					973	869	900	1040	1140	575	657	672	692	754	925	843	871	849	1430
Uranium					17.2	16.2	16.3	18.9	20.2	13.3	15.6	15.9	13.7	14	20.3	21	20.8	20.7	15.7
Vanadium					41.8	39.5	40.9	45.6	47.3	32.3	33.5	36.1	35.5	35.3	40.3	38.9	41.4	39	44.7
Zinc †	123	114.2	142.1	123	111	**116**	109	113	**117**	73.2	82.2	88.4	76.2	81.6	**124**	**122**	**128**	**123**	**118**

Notes:

1. CCME (Canadian Council of Ministers of the Environment) Canadian Sediment Quality Guidelines for the Protection of Aquatic Life, 1999, updated in 2002. ISQG = Interim freshwater Sediment Quality Guideline.
2. Trigger values developed in the *CREMP Design Document 2012* (Azimuth, 2012d) were updated in 2017. Trigger values were developed for Wally Lake (WAL) separate from the other Meadowbank project lakes.
3. Thresholds are set equal to CCME ISQG guidelines, where available.

"*" CCME guideline not used as threshold value because threshold value would be lower than trigger value.

"†" CCME guideline not used as threshold value at Wally Lake.

123 Bolded concentrations exceed the trigger value.

123 Bolded and shaded concentrations also exceed the threshold value.

Italicized numbers are below detection limits.

Table C1-2. Sediment grab chemistry, Meadowbank study lakes, 2018.

Lake & Basin		Screening Criteria			Wally Lake					Inuggugayualik Lake					Pipedream Lake			
Area-Replicate ID	CCME[1]	Trigger Values[2]		Threshold Values[3]	WAL-1	WAL-2	WAL-3	WAL-4	WAL-5	INUG-1	INUG-2	INUG-3	INUG-4	INUG-5	PDL-1	PDL-2	PDL-3	PDL-4
Date					11-Aug-18	11-Aug-18	11-Aug-18	11-Aug-18	11-Aug-18	13-Aug-18	13-Aug-18	13-Aug-18	13-Aug-18	13-Aug-18	13-Aug-18	13-Aug-18	13-Aug-18	13-Aug-18
ALS Sample ID	ISQG	MBK	WAL		L2156055-19	L2156055-20	L2156055-21	L2156055-22	L2156055-23	L2156055-25	L2156055-26	L2156055-27	L2156055-28	L2156055-29	L2156055-31	L2156055-32	L2156055-33	L2156055-34
Physical & Organic Parameters																		
Moisture (%)					90.9	92.1	90	91.7	90.5	85.6	83.6	82.9	82.4	82.5	69.8	75.8	76.6	83.4
pH					6.31	6.43	6.58	6.64	6.3	5.04	5.05	5.45	5.59	4.97	5.61	5.93	5.94	5.3
TOC (% dw)					10.3	10.5	8.62	10.3	10.5	4.08	3.58	3.29	3.08	3.45	1.76	2.31	2.26	3.74
Particle Size																		
% Gravel (>2mm)					*<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*
% Sand (2.00mm - 0.063mm)					1.5	1.20	1.2	1.3	1.2	2.3	2.8	3.1	3.8	1.8	10.7	10.8	8.1	8.3
% Silt (0.063mm - 4µm)					83.7	80.5	84.7	81.6	86.8	79.6	72.6	74.2	69.7	74.3	70.8	71.9	73.1	74.8
% Clay (<4µm)					14.8	18.30	14.2	17.1	12.1	18.1	24.6	22.8	26.6	23.9	18.4	17.4	18.8	16.9
Total Metals (mg/kg dw)																		
Aluminum					18500	18000	21900	19100	18200	23400	26500	25700	27400	24100	24300	21900	22200	20500
Antimony					0.47	0.45	0.44	0.5	0.45	0.21	0.17	0.17	0.16	0.17	0.2	0.19	0.23	0.24
Arsenic *	5.9	120.9	44.5		30.2	34.9	**47.2**	31.5	35.5	69.9	16.6	10.1	9	**131**	26.2	13	46	12.2
Barium					104	98.1	131	112	105	139	140	143	148	133	98.8	96.8	87.7	86.8
Beryllium					1.46	1.42	1.78	1.5	1.44	1.55	1.7	1.68	1.72	1.5	1.17	1.05	1.09	1.01
Bismuth					1.83	1.76	2.34	1.9	1.86	1.23	1.35	1.39	1.33	1.2	1	0.99	0.97	0.76
Boron					12.1	13	11.8	13.8	11.3	8	9.8	8.4	9.6	9.2	7.5	7.2	6.8	6.70
Cadmium *	0.6	1.10	0.66		0.513	0.419	0.55	0.457	0.43	0.345	0.274	0.278	0.19	0.185	0.149	0.117	0.19	0.292
Calcium					4100	4260	4220	4440	4120	1700	2060	1960	2260	1900	2000	2220	1940	2170
Chromium *	37.3	135.0	61.2		55.8	53.3	**63.6**	56.1	54	116	126	129	128	112	**155**	**143**	**152**	**136**
Cobalt					9.3	8.59	10	9.02	9.29	14.6	11.9	12.8	11.6	13	16.9	12.1	16.9	10.8
Copper *	35.7	83.4	257.1		130	130	167	136	130	50.1	51.9	51.1	49.9	46.0	48.6	44.6	49.7	44.8
Iron					27200	29000	42400	28300	31700	79000	39400	34100	31700	113000	42100	31300	44000	27100
Lead †	35	25.3	36.5	35	34	31.5	**37.9**	33.4	31.8	13.9	14.6	15.1	14.4	12.8	14.5	14.1	14.5	13.1
Lithium					32.4	30.6	35.8	33.4	30.3	29.2	32.4	33.2	34	27.5	32.9	30.3	30	27.7
Magnesium					7470	6940	7990	7360	6990	10100	10700	10900	11400	9970	12000	11200	11700	10700
Manganese					300	283	377	298	331	959	607	530	499	828	435	339	1070	306
Mercury	0.17	0.102	0.120	0.17	0.0771	0.0854	0.0777	0.0778	0.0809	0.0329	0.0264	0.025	0.0229	0.0283	0.0099	0.0113	0.0138	0.0159
Molybdenum					7.72	8.88	11.5	8.19	9.47	4.64	3.4	2.91	2.7	11.5	3.11	2.2	3.33	2.08
Nickel					52	49.5	59.5	51.6	50.8	104	89.3	95.2	86.9	74.3	96.5	81.5	96	82.4
Phosphorus					738	733	815	687	780	1880	1180	999	1020	2510	532	593	707	462
Potassium					3400	3250	3840	3530	3280	3450	3980	3840	4050	3660	3110	2930	2820	2550
Selenium					0.75	0.78	1.05	0.74	0.75	0.74	0.55	0.58	0.58	0.71	0.24	0.29	0.24	0.44
Silver					0.61	0.62	0.7	0.67	0.59	0.22	0.2	0.2	0.18	0.18	*<0.10*	0.12	*<0.10*	0.22
Sodium					201	197	208	209	181	170	179	179	197	172	114	112	111	99
Strontium					28.7	27.7	29.8	30.8	27.8	22.9	27.4	27.2	30.2	27.7	23.8	25.8	21.5	19.9
Thallium					0.321	0.306	0.359	0.331	0.312	0.244	0.251	0.26	0.241	0.216	0.191	0.184	0.198	0.174
Tin					*<2.0*	2.1	*<2.0*	*<2.0*	*<2.0*	*<2.0*	*<2.0*	*<2.0*	*<2.0*	*<2.0*	*<2.0*	*<2.0*	*<2.0*	*<2.0*
Titanium					561	539	637	620	537	563	747	708	772	659	646	614	532	508
Uranium					15	14.9	19.1	16	15	17.4	18.5	19	18.9	16.2	9.42	8.79	9.47	7.8
Vanadium					27.7	27.7	33.9	29.1	28.2	35.8	40.6	40	41	36.2	40.1	37.3	37.3	32.6
Zinc †	123	114.2	142.1	123	123	117	134	119	118	107	98	104	100	94.4	99.2	85.6	89.9	87.9

Notes:

1. CCME (Canadian Council of Ministers of the Environment) Canadian Sediment Quality Guidelines for the Protection of Aquatic Life, 1999, updated in 2002. ISQG = Interim freshwater Sediment Quality Guideline.
2. Trigger values developed in the *CREMP Design Document 2012* (Azimuth, 2012d) were updated in 2017. Trigger values were developed for Wally Lake (WAL) separate from the other Meadowbank project lakes.
3. Thresholds are set equal to CCME ISQG guidelines, where available.

"*" CCME guideline not used as threshold value because threshold value would be lower than trigger value.

"†" CCME guideline not used as threshold value at Wally Lake.

123 Bolded concentrations exceed the trigger value.

123 Bolded and shaded concentrations also exceed the threshold value.

Italicized numbers are below detection limits.

Table C1-3. Hydrocarbon and PAH results for composite sediment grabs at Meadowbank study lakes, 2018.

Lake	CCME (2002)	Third Portage Lake		Second Portage	Wally	Inuggugayualik	Pipedream
Area ID	Guidelines[1]	TPE	TPN	SP	WAL	INUG	PDL
Date							
ALS Sample ID	ISQG						
Physical Parameters							
Moisture (%)		84.0		81.8	91.6	83.9	75.3
Aggregate Organics (mg/kg)							
Mineral Oil and Grease		2150		620	9630	*<1500*	1350
Hydrocarbons (mg/kg)		*<600*		*<600*	*<1200*	*<620*	*<400*
EPH10-19		*<600*		*<600*	*<1200*	*<620*	*<400*
EPH19-32		*<600*		*<600*	*<1200*	*<620*	*<400*
LEPH		*<600*		*<600*	*<1200*	*<620*	*<400*
HEPH		96.1		93.5	99.9	169.3	191.8
Polycyclic Aromatic Hydrocarbons (mg/kg)							
Acenaphthene	0.00671	*<0.010*		*<0.0050*	*<0.015*	*<0.010*	*<0.0050*
Acenaphthylene	0.00587	*<0.010*		*<0.0050*	*<0.015*	*<0.010*	*<0.0050*
Anthracene	0.0469	*<0.0080*		*<0.0040*	*<0.012*	*<0.0080*	*<0.0040*
Benzo(a)anthracene	0.0317	*<0.020*		*<0.010*	*<0.030*	*<0.020*	*<0.010*
Benzo(a)pyrene	0.0319	*<0.020*		*<0.010*	*<0.030*	*<0.030*	*<0.010*
Benzo(b)fluoranthene		*<0.020*		*<0.010*	*<0.030*	*<0.030*	*<0.020*
Benzo(b+j+k)fluoranthene		*<0.028*		*<0.015*	*<0.042*	*<0.028*	*<0.015*
Benzo(g,h,i)perylene		*<0.020*		*<0.010*	*<0.030*	*<0.030*	*<0.020*
Benzo(k)fluoranthene		*<0.020*		*<0.010*	*<0.030*	*<0.020*	*<0.010*
Chrysene	0.0571	*<0.020*		*<0.010*	*<0.030*	*<0.020*	*<0.010*
Dibenz(a,h)anthracene	0.00622	*<0.010*		*<0.0050*	*<0.015*	*<0.010*	*<0.0050*
Fluoranthene	0.111	*<0.020*		*<0.010*	*<0.030*	*<0.020*	*<0.010*
Fluorene	0.0212	*<0.020*		*<0.010*	*<0.030*	*<0.020*	*<0.010*
Indeno(1,2,3-c,d)pyrene		*<0.020*		*<0.010*	*<0.030*	*<0.030*	*<0.020*
1-Methylnaphthalene		*<0.10*		*<0.050*	*<0.15*	*<0.10*	*<0.050*
2-Methylnaphthalene	0.0202	*<0.020*		*<0.010*	*<0.030*	*<0.020*	*<0.010*
Naphthalene	0.0346	*<0.020*		*<0.010*	*<0.030*	*<0.020*	*<0.010*
Phenanthrene	0.0419	*<0.020*		*<0.010*	*<0.030*	*<0.020*	*<0.010*
Pyrene	0.053	*<0.020*		*<0.010*	*<0.030*	*<0.020*	*<0.010*
Quinoline		*<0.10*		*<0.050*	*<0.15*	*<0.10*	*<0.050*
d10-Acenaphthene (%)		91.5		88.8	93.3	83.7	87.4
d12-Chrysene (%)		107.8		98.4	110.2	97.3	104.8
d8-Naphthalene (%)		87.0		89.3	88.8	81.0	85.4
d10-Phenanthrene (%)		103.0		107.3	106.0	90.0	097.1
B(a)P Total Potency Equivalent		*<0.020*		*<0.020*	*<0.029*	0.034	*<0.020*
IACR (CCME)		*<0.21*		*<0.15*	*<0.32*	0.34	*<0.15*

Notes:

1. CCME (Canadian Council of Ministers of the Environment) Canadian Sediment Quality Guidelines for the Protection of Aquatic Life, 1999, updated in 2002.

ISQG = Interim freshwater Sediment Quality Guideline

Bolded concentrations exceed the ISQG guideline.

Italicized numbers are below detection limits.

APPENDIX C2
SEDIMENT CHEMISTRY – WHALE TAIL STUDY AREA LAKES

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Table C2-1. Sediment grab chemistry, Whale Tail Pit study lakes, 2018. 2
Table C2-2. Hydrocarbon and PAH results for composite sediment grabs, Whale Tail Pit study lakes, 2018. 4

Table C2-1. Sediment grab chemistry, Whale Tail Pit study lakes, 2018.

Lake & Basin	Screening Criteria				Whale Tail Lake - North Basin					Whale Tail Lake - South Basin					Mammoth Lake					Lake A20				
Area-Replicate ID	CCME[1]		Meadowbank[2]		WTN-1	WTN-2	WTN-3	WTN-4	WTN-5	WTS-1	WTS-2	WTS-3	WTS-4	WTS-5	MAM-1	MAM-2	MAM-3	MAM-4	MAM-5	A20-1	A20-2	A20-3	A20-4	A20-5
Date	ISQG	PEL	Trigger	Threshold	18-Aug-18	18-Aug-18	18-Aug-18	18-Aug-18	18-Aug-18	13-Aug-18	13-Aug-18	13-Aug-18	13-Aug-18	13-Aug-18	16-Aug-18	16-Aug-18	16-Aug-18	16-Aug-18	16-Aug-18	18-Aug-18	18-Aug-18	18-Aug-18	18-Aug-18	18-Aug-18
Physical & Organic Parameters																								
Moisture (%)					86.1	87.1	85.1	87.8	87.5	82.4	82.8	80.8	88.9	83.5	78.4	89.9	90.2	89.7	90.4	87	86.7	85.4	90.1	86.5
pH					4.96	5.07	5.36	5.05	5.13	5.93	5.79	5.18	5.67	5.3	5.6	5.5	5.55	5.48	5.62	5.84	5.78	6.12	5.51	5.04
TOC (% dw)					-	-	-	-	-	4.03	3.72	4.36	7.53	4.23	3.84	11.1	9.48	10.3	9.6	4.67	4.54	4.06	7.17	4.22
Particle Size																								
% Gravel (>2mm)					-	-	-	-	-	*<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*
% Sand (2.00mm - 0.063mm)					-	-	-	-	-	5	4.4	2.9	1.9	3.5	4.5	*<1.0*	*<1.0*	*<1.0*	1.1	*<1.0*	*<1.0*	1.8	*<1.0*	1.3
% Silt (0.063mm - 4µm)					-	-	-	-	-	79.8	84.3	91.6	79.7	86.2	88.8	88.9	83.3	80.7	84.5	77.1	76.9	62.7	71	77.9
% Clay (<4µm)					-	-	-	-	-	15.2	11.4	5.5	18.4	10.4	6.8	10.3	16.3	18.7	14.4	22.2	22.2	35.5	28.2	20.9
Total Metals (mg/kg dw)																								
Aluminum					19100	19100	20900	19600	19600	20000	18500	23400	17500	19500	20300	20300	23900	22200	23300	25200	24300	27900	18900	19700
Antimony					0.25	0.27	0.22	0.27	0.28	0.21	0.21	0.3	0.17	0.19	0.39	0.28	0.38	0.33	0.37	0.19	0.2	0.23	0.14	0.17
Arsenic*	5.9	17	120.9		**668**	**620**	**76.1**	**705**	**366**	**67.3**	**77**	**28.3**	**10.7**	**155**	**48.1**	**74.5**	**63.2**	**63.3**	**66.3**	**37.4**	**51.6**	**35.8**	**7.9**	**158**
Barium					137	156	99.7	151	146	114	107	165	118	104	131	137	159	142	159	153	154	171	151	190
Beryllium					1.53	1.49	1.55	1.49	1.62	1.64	1.44	1.96	1.3	1.68	0.96	1.41	1.74	1.54	1.68	2.24	2.2	2.66	1.68	1.99
Bismuth					0.51	0.52	0.57	0.53	0.52	0.56	0.56	0.72	0.48	0.59	0.51	0.46	0.55	0.52	0.53	1.08	1.14	1.32	0.7	0.91
Boron					7.2	7.6	6.4	8	7.3	7	6.5	7.2	8.4	6.4	6.1	20.3	18.8	19	19.6	8	8.40	8.6	8.3	7.4
Cadmium*	0.6	3.5	1.10		0.314	0.371	0.196	0.417	0.393	0.305	0.285	0.498	0.332	0.218	**0.719**	0.316	0.512	0.415	0.412	0.192	0.144	0.14	0.229	0.271
Calcium					1770	1910	2000	1980	1930	2040	1890	3000	2940	1940	3790	3260	3280	3670	3360	2020	1830	2060	2700	1730
Chromium*	37.3	90	135.0		**112**	**116**	**132**	**119**	**123**	**72.9**	**71**	**88.1**	**68.6**	**74.7**	**125**	**167**	**193**	**172**	**189**	**61**	**57.3**	**68.1**	**46.7**	**49.1**
Cobalt					14.3	17.9	11.1	19.3	20.7	20.6	30.7	24.5	7.89	13.7	15.20	12.1	13.8	13.6	12.8	19.8	20.2	21.4	7.22	20.4
Copper*	35.7	197	83.4		**45.8**	**45.4**	**46**	**46.5**	**49.7**	**42.5**	**40.4**	**56.4**	**36.8**	**44.1**	**46.9**	**61.2**	**74.5**	**67.3**	**74.8**	**44.9**	**44.9**	**60.8**	32.6	**40.5**
Iron					137000	115000	42000	111000	106000	57300	75600	39600	21700	87700	29600	33900	35000	32900	35000	83200	90600	73000	23500	150000
Lead	35	91.3	25.3	35	11.7	12.4	13.3	12.4	12.4	13	12.5	15.8	12.1	13.1	14.2	17.3	20.5	18.6	18.6	18.8	19.8	23.7	14.6	17.6
Lithium					15.3	15.6	18.1	16.2	15.6	15.8	15	21.7	15.7	15.2	20.3	19.4	23.2	20.5	21.8	22.3	21.5	26.6	18.4	16.5
Magnesium					7310	7770	8450	7790	7820	6990	6620	9530	6770	6640	10600	9830	11200	10100	10700	8230	7380	8610	6320	5850
Manganese					1250	2200	446	1490	1250	1690	2000	482	282	1010	381	353	364	364	339	1740	1970	2490	267	1980
Mercury	0.17	0.486	0.102	0.17	0.053	0.063	0.043	0.061	0.052	0.052	0.056	0.038	0.070	0.057	0.019	0.103	0.087	0.103	0.086	0.046	0.043	0.041	0.0507	0.042
Molybdenum					5.56	5.65	2.78	6.37	4.64	4.27	3.8	8.56	1.95	5.15	3.56	3.23	4.01	3.62	4.13	5.27	6.79	6	2.28	7.19
Nickel					85	96.3	66.8	98.2	112	71.1	74.2	115	58.7	55.4	117	106	132	117	122	40	37.1	43.2	31.3	40.6
Phosphorus					3310	2640	1400	2500	2140	1320	971	593	730	2110	684	826	766	769	732	941	1080	912	490	2850
Potassium					2160	2410	2350	2410	2260	2390	2280	3100	2110	2400	2930	3010	3270	3190	3250	3810	3890	4250	2980	3020
Selenium					0.83	0.81	0.66	0.83	0.85	0.55	0.71	0.9	0.51	0.74	0.63	0.63	0.76	0.66	0.74	0.78	0.63	0.46	0.49	0.75
Silver					0.3	0.33	0.27	0.34	0.3	0.23	0.23	0.34	0.34	0.26	0.21	0.42	0.48	0.49	0.5	0.2	0.14	*<0.10*	0.3	0.21
Sodium					150	170	151	181	153	144	138	189	152	140	122	166	174	179	183	232	224	185	228	194
Strontium					21.1	23.2	22.8	23.8	22.2	23.4	22.0	29.8	26.5	22.1	35.5	29.6	27.4	28.6	27.8	21.9	20.8	23.4	22.8	18.9
Sulfur					1200	1300	*<1000*	1300	1300	1400	1300	2000	2200	1400	5100	2700	2600	2600	2600	1700	1700	1900	2200	1600
Thallium					0.212	0.237	0.185	0.254	0.249	0.235	0.243	0.354	0.159	0.177	0.338	0.253	0.332	0.306	0.299	0.322	0.335	0.388	0.233	0.319
Tin					*<2.0*	*<2.0*	*<2.0*	*<2.0*	*<2.0*	*<2.0*	*<2.0*	*<2.0*	*<2.0*	*<2.0*	*<2.0*	*<2.0*	*<2.0*	*<2.0*	*<2.0*	*<2.0*	*<2.0*	*<2.0*	*<2.0*	*<2.0*
Titanium					458	491	534	519	482	514	469	734	338	437	845	544	641	581	606	573	599	672	470	491
Tungsten					*<0.50*	0.52	*<0.50*	*<0.50*	*<0.50*	*<0.50*	*<0.50*	0.52	*<0.50*	*<0.50*	*<0.50*	0.94	0.63	0.64	0.59	0.62	0.58	0.65	0.53	0.61
Uranium					11.1	10.6	12.0	11.2	12	11.5	10.9	21.6	9.81	11.9	22.2	11.6	14.2	12.8	13.9	13.8	14.8	22.4	12.7	13.5
Vanadium					28.5	29.5	32.5	30.1	30.3	27.2	26.2	33.8	22.7	26.8	34.4	37.8	43.4	39.8	42.9	34.1	34	39.9	26	28.8
Zinc*	123	315	114.2		99.4	102	91.1	106	113	97.3	88.3	**155**	92.8	94.2	107	115	**148**	**127**	**134**	103	99.7	117	83	95.8

Notes:

1. CCME (Canadian Council of Ministers of the Environment) Canadian Sediment Quality Guidelines for the Protection of Aquatic Life, 1999, updated in 2002.
   ISQG = interim sediment quality guideline
   PEL = probable effect level
2. Trigger and threshold values shown here for context only; they were developed for Meadowbank in the CREMP Design Document 2012 (Azimuth, 2012d).
Thresholds are set equal to CCME ISQG guidelines, where available.

* CCME guideline not used as threshold value because threshold value would be lower than trigger value.

123 Bolded concentrations exceed the ISQG.

123 Bolded and shaded concentrations also exceed the PEL.

Italicized numbers are below detection limits.

Table C2-1. Sediment grab chemistry, Whale Tail Pit study lakes, 2018.

Lake & Basin	Screening Criteria				Lake A76					Lake DS1					Nemo Lake				
Area-Replicate ID	CCME[1]		Meadowbank[2]		A76-1	A76-2	A76-3	A76-4	A76-5	DS1-1	DS1-2	DS1-3	DS1-4	DS1-5	NEM-1	NEM-2	NEM-3	NEM-4	NEM-5
Date	ISQG	PEL	Trigger	Threshold	18-Aug-18	18-Aug-18	18-Aug-18	18-Aug-18	18-Aug-18	19-Aug-18	19-Aug-18	19-Aug-18	19-Aug-18	19-Aug-18	17-Aug-18	17-Aug-18	17-Aug-18	17-Aug-18	17-Aug-18
Physical & Organic Parameters																			
Moisture (%)					89.8	89.3	90.2	86.7	89.5	71.5	66.8	70.8	66.4	68.6	89.2	83.3	83.1	88.9	90.9
pH					5.81	5.63	5.93	5.31	5.57	6.92	6.46	6.83	6.68	6.64	6.3	6.27	6.37	6.35	6.08
TOC (% dw)					6.36	6.47	7.28	5.25	6.34	1.56	1.45	1.7	1.36	1.37	6.74	4.17	3.24	6.93	8.58
Particle Size																			
% Gravel (>2mm)					*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	2.1	*<1.0*	*<1.0*
% Sand (2.00mm - 0.063mm)					*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	1	20.9	49.10	48.4	21.2	16.4
% Silt (0.063mm - 4µm)					80.5	77.1	79.4	78.3	80.1	81.1	80.8	82.9	81.3	82.4	72.7	46.8	46	71.2	75.9
% Clay (<4µm)					19.1	22.3	19.9	21.1	19.4	18.5	18.9	16.4	18.2	16.6	6.5	3.40	3.5	7.5	7.8
Total Metals (mg/kg dw)																			
Aluminum					24800	24700	24900	22500	26200	16800	15900	16200	17800	16800	11000	9720	9080	11400	10500
Antimony					0.41	0.38	0.41	0.38	0.45	0.29	0.27	0.27	0.27	0.27	0.42	0.32	0.28	0.46	0.44
Arsenic*	5.9	17	120.9		**59.9**	**125**	**40.2**	**370**	**159**	**20.4**	**13**	**43.7**	**16.7**	**22.4**	**22.7**	**26.7**	**13.4**	**25.7**	**30.9**
Barium					215	217	220	158	214	122	87.2	118	104	107	84.5	85.8	56.4	86	74.5
Beryllium					1.72	1.75	1.6	1.65	1.93	1.05	0.99	1.02	1.03	0.98	0.72	0.57	0.5	0.77	0.68
Bismuth					0.81	0.84	0.76	0.76	0.89	0.69	0.68	0.68	0.71	0.67	0.25	0.2	*<0.20*	0.25	0.24
Boron					8.7	9.10	11.6	7.6	8.7	19.4	13.9	14.5	14.8	15.1	8.3	7	6	9.7	10.3
Cadmium*	0.6	3.5	1.10		0.32	0.3	0.408	0.148	0.238	0.222	0.176	0.179	0.185	0.155	0.276	0.21	0.184	0.316	0.282
Calcium					2840	2820	3190	2110	2580	2310	2290	2170	2430	2440	2630	1940	1880	2640	2690
Chromium*	37.3	90	135.0		**133**	**134**	**135**	**121**	**142**	**75**	**76.5**	**75.7**	**84.7**	**79.2**	**113**	**104**	**84.2**	**113**	**110**
Cobalt					11.7	15.1	10.9	18.7	16.1	15.8	15.1	16	16	15.2	7.15	6.95	5.81	7.74	7.23
Copper*	35.7	197	83.4		**93.7**	**96.8**	**97.4**	**85.2**	**109**	15.6	14.6	14.9	15.7	14.9	**45.3**	33.6	28.5	**46.7**	**44.2**
Iron					45500	64300	38100	115000	76500	41600	37800	46700	41800	39000	19300	18200	15400	19700	19500
Lead	35	91.3	25.3	35	23.7	23.9	22.1	21.6	25.2	16.7	16.6	16.6	17	16.1	8.16	6.0	6.03	8.41	8.53
Lithium					22.4	23.2	24.1	19.1	23.1	23.8	23	22.7	24.3	23.2	12.7	11.5	11	12.9	11.6
Magnesium					8990	9010	9270	8150	9180	10200	9940	10100	11100	10400	6560	6380	5550	6700	6340
Manganese					361	968	306	1040	824	10900	1880	9800	2960	10700	207	253	172	243	197
Mercury	0.17	0.486	0.102	0.17	0.047	0.051	0.047	0.039	0.051	0.0561	0.05	0.0569	0.0507	0.05	0.0192	0.0121	0.0119	0.0179	0.0245
Molybdenum					5.19	5.16	4.52	6.13	6.36	3.22	1.85	3.99	1.96	2.49	2.7	4.68	1.47	2.87	2.9
Nickel					114	117	120	95.8	118	49.2	47.1	46.8	50.5	48.4	83.5	76.1	63.6	89.4	79.4
Phosphorus					813	950	670	1630	1150	861	727	920	808	818	478	418	311	512	558
Potassium					3790	3820	3840	3530	3980	2530	2260	2320	2590	2450	1280	1070	980	1280	1230
Selenium					0.89	1.04	0.98	0.97	1.23	0.29	0.25	0.31	0.2	0.26	0.56	0.42	0.3	0.64	0.56
Silver					0.53	0.56	0.65	0.27	0.48	0.13	0.14	0.13	0.14	0.13	0.17	0.15	0.11	0.18	0.18
Sodium					204	196	195	161	192	142	126	117	138	123	79	63	66	86	82
Strontium					23.2	23.3	24.5	19.4	22.5	29.4	26.7	27.3	29.4	29.1	20.9	17.8	19.3	21.8	20.8
Sulfur					2300	2200	2200	1800	2300	*<1000*	*<1000*	*<1000*	*<1000*	*<1000*	1900	1200	1100	1900	2500
Thallium					0.36	0.367	0.327	0.325	0.378	0.203	0.189	0.185	0.193	0.177	0.096	0.087	0.068	0.111	0.095
Tin					*<2.0*	*<2.0*	*<2.0*	*<2.0*	*<2.0*	*<2.0*	*<2.0*	*<2.0*	*<2.0*	*<2.0*	*<2.0*	*<2.0*	*<2.0*	*<2.0*	*<2.0*
Titanium					607	602	639	595	639	546	504	488	569	530	212	218	236	240	213
Tungsten					0.75	0.69	0.71	0.68	0.77	0.55	*<0.50*	0.57	0.54	*<0.50*	*<0.50*	*<0.50*	*<0.50*	*<0.50*	*<0.50*
Uranium					16.4	16.3	16.5	15.6	18.7	4.12	3.98	3.85	4.03	3.9	4.91	3.8	3.3	5.14	4.61
Vanadium					44.8	44.7	44.2	41.3	48.9	36.1	34.8	35.7	38.5	36.1	23.4	20.5	18.1	23.6	22.5
Zinc*	123	315	114.2		**130**	**127**	**124**	**125**	**145**	78.3	75	76.9	80.8	75.1	61.9	53.1	46.5	66.7	63.8

Notes:

1. CCME (Canadian Council of Ministers of the Environment) Canadian Sediment Quality Guidelines for the Protection of Aquatic Life, 1999, updated in 2002.
   ISQG = interim sediment quality guideline
   PEL = probable effect level
2. Trigger and threshold values shown here for context only; they were developed for Meadowbank in the CREMP Design Document 2012 (Azimuth, 2012d).
Thresholds are set equal to CCME ISQG guidelines, where available.

* CCME guideline not used as threshold value because threshold value would be lower than trigger value.

123 Bolded concentrations exceed the ISQG.

123 Bolded and shaded concentrations also exceed the PEL.

Italicized numbers are below detection limits.

Table C2-2. Hydrocarbon and PAH results for composite sediment grabs, Whale Tail Pit study lakes, 2018.

Lake	Lowest DL	CCME Guidelines[1]		Whale Tail	Mammoth	Lake A20	Lake A76	Lake DS1	Nemo
Area ID		ISQG	PEL	WTS	MAM	A20	A76	DS1	NEM
Date				13-Aug-18	16-Aug-18	18-Aug-18	18-Aug-18	19-Aug-18	17-Aug-18
Physical Parameters									
Moisture (%)				84.2	87.1	87.4	89.1	69.4	87.1
Aggregate Organics (mg/kg)									
Mineral Oil and Grease	500			2760	2230	*<1900*	2720	*<700*	2320
Hydrocarbons (mg/kg)									
EPH10-19	200			*<640*	*<740*	*<800*	*<920*	*<320*	*<740*
EPH19-32	200			*<640*	*<740*	*<800*	*<920*	*<320*	*<740*
LEPH	200			*<640*	*<740*	*<800*	*<920*	*<320*	*<740*
HEPH	200			*<640*	*<740*	*<800*	*<920*	*<320*	*<740*
2-Bromobenzotrifluoride (%)				95.3	98.3	102.3	100.4	96.5	99.4
Polycyclic Aromatic Hydrocarbons (mg/kg)									
Acenaphthene	0.005	0.00671	0.0889	*<0.020*	*<0.010*	*<0.010*	*<0.015*	*<0.0050*	*<0.010*
Acenaphthylene	0.005	0.00587	0.128	*<0.020*	*<0.010*	*<0.010*	*<0.015*	*<0.0050*	*<0.010*
Anthracene	0.004	0.0469	0.245	*<0.020*	*<0.0080*	*<0.0080*	*<0.012*	*<0.0040*	*<0.0080*
Benz(a)anthracene	0.01	0.0317	0.385	*<0.020*	*<0.020*	*<0.020*	*<0.030*	*<0.010*	*<0.020*
Benzo(a)pyrene	0.01	0.0319	0.782	*<0.020*	*<0.020*	*<0.020*	*<0.030*	*<0.010*	*<0.020*
Benzo(b&j)fluoranthene	0.01			*<0.020*	*<0.020*	*<0.020*	*<0.030*	*<0.010*	*<0.020*
Benzo(b+j+k)fluoranthene	0.015			*<0.028*	*<0.028*	*<0.028*	*<0.042*	*<0.015*	*<0.028*
Benzo(g,h,i)perylene	0.01			*<0.020*	*<0.020*	*<0.020*	*<0.030*	*<0.010*	*<0.020*
Benzo(k)fluoranthene	0.01			*<0.020*	*<0.020*	*<0.020*	*<0.030*	*<0.010*	*<0.020*
Chrysene	0.01	0.0571	0.862	*<0.020*	*<0.020*	*<0.020*	*<0.030*	*<0.010*	*<0.020*
Dibenz(a,h)anthracene	0.005	0.00622	0.135	*<0.020*	*<0.010*	*<0.010*	*<0.015*	*<0.0050*	*<0.010*
Fluoranthene	0.01	0.111	2.355	*<0.020*	*<0.020*	*<0.020*	*<0.030*	*<0.010*	*<0.020*
Fluorene	0.01	0.0212	0.144	*<0.020*	*<0.020*	*<0.020*	*<0.030*	*<0.010*	*<0.020*
Indeno(1,2,3-c,d)pyrene	0.01			*<0.020*	*<0.020*	*<0.020*	*<0.030*	*<0.010*	*<0.020*
1-Methylnaphthalene	0.05			*<0.050*	*<0.10*	*<0.10*	*<0.15*	*<0.050*	*<0.10*
2-Methylnaphthalene	0.01	0.0202	0.201	*<0.020*	*<0.020*	*<0.020*	*<0.030*	*<0.010*	*<0.020*
Naphthalene	0.01	0.0346	0.391	*<0.020*	*<0.020*	*<0.020*	*<0.030*	*<0.010*	*<0.020*
Phenanthrene	0.01	0.0419	0.515	*<0.020*	*<0.020*	*<0.020*	*<0.030*	*<0.010*	*<0.020*
Pyrene	0.01	0.053	0.875	*<0.020*	*<0.020*	*<0.020*	*<0.030*	*<0.010*	*<0.020*
Quinoline	0.05			*<0.050*	*<0.10*	*<0.10*	*<0.15*	*<0.050*	*<0.10*
Acenaphthene d10				90.1	93.3	94.8	94.7	91.6	94.5
Chrysene d12				106.5	110.7	111.4	110.2	96.3	110.6
Naphthalene d8				85.1	89.1	91.7	88.7	83.3	89.7
Phenanthrene d10				100.8	105.2	105.3	104.3	86.1	106.9
B(a)P Total Potency Equivalent	0.02			*<0.024*	*<0.020*	*<0.020*	*<0.029*	*<0.020*	*<0.020*
IACR (CCME)	0.15			*<0.24*	*<0.21*	*<0.21*	*<0.32*	*<0.15*	*<0.21*

Notes:

1. CCME (Canadian Council of Ministers of the Environment) Canadian Sediment Quality Guidelines for the Protection of Aquatic Life, 1999, updated in 2002.
   ISQG = interim sediment quality guideline
   PEL = probable effect level

Bolded concentrations exceed the ISQG guideline.

Italicized numbers are below detection limits.

APPENDIX C3
SEDIMENT CHEMISTRY – BAKER LAKE

LIST OF TABLES – APPENDIX C3

Table C3-1. Sediment grab chemistry, Baker Lake, 2018. 2
Table C3-2. Hydrocarbon and PAH results from composite sediment grabs at Baker Lake, 2018. 3

Table C3-1. Sediment grab chemistry, Baker Lake, 2018.

Lake & Basin	Screening Criteria			Baker Lake																
				Barge Dock					Proposed Jetty					Akilahaarjuk Point					East Shore				
Area-Replicate ID	CCME[1]	Baker Laker[2]		BBD-1	BBD-2	BBD-3	BBD-4	BBD-5	BPJ-1	BPJ-2	BPJ-3	BPJ-4	BPJ-5	BAP-1	BAP-2	BAP-3	BAP-4	BAP-5	BES-1	BES-2	BES-3	BES-4	BES-5
Date	ISQG	Trigger	Threshold	21-Aug-18	21-Aug-18	21-Aug-18	21-Aug-18	21-Aug-18	21-Aug-18	21-Aug-18	21-Aug-18	21-Aug-18	21-Aug-18	20-Aug-18	20-Aug-18	20-Aug-18	20-Aug-18	20-Aug-18	20-Aug-18	20-Aug-18	20-Aug-18	20-Aug-18	20-Aug-18
ALS Sample ID				L2156055-55	L2156055-56	L2156055-57	L2156055-58	L2156055-59	L2156055-49	L2156055-50	L2156055-51	L2156055-52	L2156055-53	L2156055-37	L2156055-38	L2156055-39	L2156055-40	L2156055-41	L2156055-43	L2156055-44	L2156055-45	L2156055-46	L2156055-47
Physical & Organic Parameters																						
Moisture (%)				41.5	27.4	37.2	16	38.1	50.3	50.6	49.8	38.2	41.7	31.8	32.7	32.8	38.9	41.6	34.5	39.3	42	37.9	38.5
pH				6.17	7.19	6.77	6.52	5.59	7.24	6.84	6.69	6.65	7.42	6.7	6.48	5.76	6.06	6.07	7.59	6.79	6.85	6.75	6.72
TOC (% dw)				0.585	0.18	0.441	0.202	0.553	0.666	0.655	0.702	0.365	0.502	0.283	0.389	0.33	0.532	0.428	0.33	0.377	0.439	0.492	0.43
Particle Size																						
% Gravel (>2mm)				*<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*	*<1.0*	*<1.0*	*<1.0*
% Sand (2.00mm - 0.063mm)				31	86.7	25.3	82.5	41.3	32.2	33.5	20.7	57.7	54.1	84.2	75.3	76.6	68.3	69	73	68.6	60.8	60.9	58.7
% Silt (0.063mm - 4µm)				62.6	10.6	63.3	15.1	52.7	57.5	55.7	67.1	36.7	38.7	14.2	22.4	21	27.8	26.9	23.6	26.9	34.2	33.2	35.1
% Clay (<4µm)				6.5	1.7	10.7	2	6	10.3	10.8	12.2	5.4	7.3	1.6	2.3	2.4	4	4.10	3.50	4.5	4.4	5.9	5.7
Total Metals (mg/kg dw)																						
Aluminum				8320	4170	8010	4360	6720	9040	8830	11000	6630	7420	4370	4570	4590	5500	5950	6510	6890	7630	7280	7010
Antimony				0.11	*<0.10*	0.11	*<0.10*	0.1	0.14	0.13	0.2	0.11	0.1	0.13	0.18	0.13	0.15	0.15	0.12	0.13	0.13	0.16	0.14
Arsenic*	5.9	7.6		7.29	3.8	5.87	3.48	**7.82**	6.9	**9.59**	**23.4**	6.19	6.39	4.61	6.85	3	3.35	3.02	3.09	3.4	3.78	3.69	3.64
Barium				104	42.9	74.1	41.9	88.9	116	114	122	98.1	104	376	396	272	280	359	160	146	138	116	119
Beryllium				0.35	0.18	0.41	0.2	0.33	0.42	0.41	0.52	0.29	0.34	0.32	0.29	0.31	0.37	0.38	0.35	0.38	0.39	0.39	0.37
Bismuth				*<0.20*	*<0.20*	*<0.20*	*<0.20*	*<0.20*	0.21	0.2	0.25	*<0.20*	*<0.20*	*<0.20*	*<0.20*	*<0.20*	*<0.20*	*<0.20*	*<0.20*	0.27	*<0.20*	*<0.20*	*<0.20*
Boron				6.5	*<5.0*	7.5	*<5.0*	6.2	6.9	7.5	9.8	5.9	6.8	6.3	6.2	6	7.6	7.9	7.1	7.8	8.1	7.7	7
Cadmium	0.6	0.32	0.6	0.061	*<0.020*	0.048	0.025	0.044	0.082	0.07	0.067	0.05	0.047	*<0.020*	0.032	0.024	0.038	0.032	0.038	0.041	0.043	0.045	0.037
Calcium				2730	1170	2650	1320	2330	2550	2630	3010	2070	2130	1870	2180	1970	1920	2100	2260	2330	2450	2350	2460
Chromium	37.3	26.8	37.3	17.6	8.6	18.2	9.03	15	20.8	20.7	24.4	16.6	16.6	14.6	15.3	14.9	16.6	17.5	17.7	18.5	20.4	19.8	19.1
Cobalt				5.42	3.20	5.96	3.18	4.49	6.83	6.77	7.71	5.01	5.18	3.28	3.73	3.74	4.22	4.19	4.38	4.63	5.05	5.05	4.78
Copper	35.7	20.3	35.7	8.49	2.82	8.23	4.34	7.01	9.08	8.59	10.5	5.82	6.59	3.50	4.29	4.39	6	5.75	4.31	4.67	5.48	5.22	5.19
Iron				15000	9330	14900	9390	13800	17800	18900	24900	14700	15300	11400	14100	12600	12900	13800	12900	13200	14000	13900	13600
Lead	35	19.5	35	7.93	3.04	8.1	3.9	7.17	9	8.47	10.6	6.17	6.6	3.43	4.29	4.16	5.01	5.01	4.44	4.84	5.43	5.61	5.55
Lithium				9.8	6.5	11.1	7.1	10.1	11.6	10.8	13.3	8	9.30	6.60	6.40	7.5	8.40	8.80	9	9.5	9.9	10	9.1
Magnesium				4570	3040	4230	2770	3840	5300	4880	5940	3730	4240	2850	2710	3130	3590	3640	4010	4210	4520	4310	4070
Manganese				280	259	410	171	188	1680	1640	1280	2690	1100	163	185	122	110	126	611	723	843	730	854
Mercury	0.17	0.088	0.17	0.0082	*<0.0050*	0.0074	*<0.0050*	0.008	0.0128	0.0102	0.01	0.0073	0.0074	*<0.0050*	0.005	0.0052	*<0.0050*	0.0055	0.0074	0.0072	0.0095	0.0096	0.0095
Molybdenum				0.73	0.46	1.05	0.31	1.04	1.38	1.38	1.93	1.21	1.04	0.36	0.59	0.39	0.47	0.41	0.48	0.63	0.7	0.63	0.86
Nickel				11.1	6.37	11.20	6.2	9.59	13.6	12.8	14.5	9.9	10.6	8.28	8.86	8.6	10.1	10.4	10.3	11	11.9	11.9	10.7
Phosphorus				836	401	799	403	824	871	836	1280	606	655	579	719	653	602	626	618	671	671	684	716
Potassium				1290	620	1610	680	1250	1460	1480	1940	1080	1260	990	1220	1040	1260	1410	1270	1350	1430	1370	1270
Selenium				*<0.20*	*<0.20*	*<0.20*	*<0.20*	*<0.20*	*<0.20*	*<0.20*	*<0.20*	*<0.20*	*<0.20*	*<0.20*	*<0.20*	*<0.20*	*<0.20*	*<0.20*	*<0.20*	*<0.20*	*<0.20*	*<0.20*	*<0.20*
Silver				*<0.10*	*<0.10*	*<0.10*	*<0.10*	*<0.10*	*<0.10*	*<0.10*	*<0.10*	*<0.10*	*<0.10*	*<0.10*	*<0.10*	*<0.10*	*<0.10*	*<0.10*	*<0.10*	*<0.10*	*<0.10*	*<0.10*	*<0.10*
Sodium				154	53	161	58	131	164	167	217	113	134	73	118	86	116	136	106	121	132	123	133
Strontium				44	27.4	45	27.8	53.2	43.4	48.9	58.8	44.2	45.9	44	42.8	38.8	43.7	48.2	40.6	42.5	45.7	43.9	41.9
Sulfur				*<1000*	*<1000*	*<1000*	*<1000*	*<1000*	*<1000*	*<1000*	*<1000*	*<1000*	*<1000*	*<1000*	*<1000*	*<1000*	*<1000*	*<1000*	*<1000*	*<1000*	*<1000*	*<1000*	*<1000*
Thallium				0.060	*<0.050*	0.071	*<0.050*	0.061	0.072	0.074	0.088	*<0.050*	0.057	*<0.050*	0.055	0.054	0.065	0.065	0.058	0.063	0.064	0.063	0.059
Tin				*<2.0*	*<2.0*	*<2.0*	*<2.0*	*<2.0*	*<2.0*	*<2.0*	*<2.0*	*<2.0*	*<2.0*	*<2.0*	*<2.0*	*<2.0*	*<2.0*	*<2.0*	*<2.0*	*<2.0*	*<2.0*	*<2.0*	*<2.0*
Titanium				444	209	406	206	370	346	407	476	359	406	276	309	279	311	357	372	383	387	375	374
Uranium				1.54	0.67	2.09	0.736	1.38	1.96	1.78	2.45	1.21	1.41	0.94	1.19	1.21	1.46	1.45	1.12	1.21	1.3	1.33	1.39
Vanadium				19.8	11.5	22.3	11.6	18.3	23.5	23.8	29.2	18.7	20.6	15.7	20.2	18.4	20.2	21.1	18.9	19.2	20.6	20.2	19.9
Zinc	123	73.1	123	33.2	18.3	32.1	19.7	29.3	41.7	38.3	49.6	27.3	31.3	16.8	19.6	20.8	23.6	24.3	23.6	25.8	27.7	27.6	26.7

Notes:

1. CCME (Canadian Council of Ministers of the Environment) Canadian Sediment Quality Guidelines for the Protection of Aquatic Life, 1999, updated in 2002. ISQG = Interim freshwater Sediment Quality Guideline.
2. Trigger values developed in the *CREMP Design Document 2012* (Azimuth, 2012d) were updated in 2017.
3. Thresholds are set equal to CCME ISQG guidelines, where available.

"*" CCME guideline not used as threshold value because threshold value would be lower than trigger value.

123 Bolded concentrations exceed the trigger value.

123 Bolded and shaded concentrations also exceed the threshold value.

Italicized numbers are below detection limits.

Table C3-2. Hydrocarbon and PAH results from composite sediment grabs at Baker Lake, 2018.

Lake	CCME (2002) Guidelines[1]	Baker Lake			
Area ID		BBD	BPJ	BAP	BES
Date	ISQG	21-Aug-18	21-Aug-18	20-Aug-18	20-Aug-18
Physical Parameters					
Moisture (%)		32.0	47.0	39.6	37.7
Aggregate Organics (mg/kg)					
Mineral Oil and Grease		*<500*	750	*<500*	*<500*
Hydrocarbons (mg/kg)					
EPH10-19		*<200*	*<200*	*<200*	*<200*
EPH19-32		*<200*	*<200*	*<200*	*<200*
LEPH		*<200*	*<200*	*<200*	*<200*
HEPH		*<200*	*<200*	*<200*	*<200*
Polycyclic Aromatic Hydrocarbons (mg/kg)					
Acenaphthene	0.00671	*<0.0050*	*<0.0050*	*<0.0050*	*<0.0050*
Acenaphthylene	0.00587	*<0.0050*	*<0.0050*	*<0.0050*	*<0.0050*
Anthracene	0.0469	*<0.0040*	*<0.0040*	*<0.0040*	*<0.0040*
Benzo(a)anthracene	0.0317	*<0.010*	*<0.010*	*<0.010*	*<0.010*
Benzo(a)pyrene	0.0319	*<0.010*	*<0.010*	*<0.010*	*<0.010*
Benzo(b)fluoranthene		*<0.010*	*<0.010*	*<0.010*	*<0.010*
Benzo(b+j+k)fluoranthene		*<0.015*	*<0.015*	*<0.015*	*<0.015*
Benzo(g,h,i)perylene		*<0.010*	*<0.010*	*<0.010*	*<0.010*
Benzo(k)fluoranthene		*<0.010*	*<0.010*	*<0.010*	*<0.010*
Chrysene	0.0571	*<0.010*	*<0.010*	*<0.010*	*<0.010*
Dibenz(a,h)anthracene	0.00622	*<0.0050*	*<0.0050*	*<0.0050*	*<0.0050*
Fluoranthene	0.111	*<0.010*	*<0.010*	*<0.010*	*<0.010*
Fluorene	0.0212	*<0.010*	*<0.010*	*<0.010*	*<0.010*
Indeno(1,2,3-c,d)pyrene		*<0.010*	*<0.010*	*<0.010*	*<0.010*
1-Methylnaphthalene		*<0.050*	*<0.050*	*<0.050*	*<0.050*
2-Methylnaphthalene	0.0202	*<0.010*	*<0.010*	*<0.010*	*<0.010*
Naphthalene	0.0346	*<0.010*	*<0.010*	*<0.010*	*<0.010*
Phenanthrene	0.0419	*<0.010*	*<0.010*	*<0.010*	*<0.010*
Pyrene	0.053	*<0.010*	*<0.010*	*<0.010*	*<0.010*
Quinoline		*<0.050*	*<0.050*	*<0.050*	*<0.050*
d10-Acenaphthene (%)		91.7	83.5	92.5	79
d12-Chrysene (%)		94.5	84.5	93.6	103
d8-Naphthalene (%)		78.6	71.7	85.4	90
d10-Phenanthrene (%)		89.5	94.3	120	92.3
B(a)P Total Potency Equivalent		*<0.020*	*<0.020*	*<0.020*	*<0.020*
IACR (CCME)		*<0.15*	*<0.15*	*<0.15*	*<0.15*

Notes:

1. CCME (Canadian Council of Ministers of the Environment) Canadian Sediment Quality Guidelines for the Protection of Aquatic Life, 1999, updated in 2002.

ISQG = Interim freshwater Sediment Quality Guideline

Bolded concentrations exceed the ISQG guideline.

Italicized numbers are below detection limits.

APPENDIX D
PHYTOPLANKTON TAXONOMY DATA AND SUPPLEMENTAL PLOTS

APPENDIX D1
PHYTO DATA – MEADOWBANK STUDY AREA LAKES

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Table D1-1. Phytoplankton density (cells/L), biomass (mg/m3), and diversity by major taxa group, Meadowbank study lakes, 2018.

Area-Replicate	Date	Phytoplankton Biomass (mg/m^3)							Taxa Richness	Simpson's Diversity
		Cyanophyte	Chlorophyte	Chrysophyte	Diatom	Cryptophyte	Dinoflagellate	TOTAL		
Inuggugayualik Lake										
INUG-98	27-May-18	0.0	1.7	6.7	2.8	2.4	0.00	13	14	0.52
INUG-99	27-May-18	0	1.7	11	3.7	0.9	0.5	18	12	0.53
INUG-100	19-Jul-18	0	0.5	181	30	2.6	16	230	25	0.86
INUG-101	19-Jul-18	0	2.4	109	25	1.1	14	152	29	0.88
INUG-102	14-Aug-18	1.5	13	103	11	2.8	12	143	35	0.84
INUG-103	14-Aug-18	0.5	13	131	11	1.5	9.2	167	33	0.85
INUG-104	2-Sep-18	2.2	15	111	14	3.3	25	171	36	0.78
INUG-105	2-Sep-18	2.2	12	87	13	1.9	12	129	32	0.74
INUG-106	25-Nov-18	0.3	6.3	18	7.5	5.0	2.5	40	23	0.81
INUG-107	25-Nov-18	0.4	6.6	17	8.7	4.9	4.5	42	25	0.79
Percent Density or Biomass		***0.65***	***6.6***	***70***	***12***	***2.4***	***8.7***			
Pipedream Lake										
PDL-63	20-May-18	0	2.3	11	0.2	2.4	1.3	17	13	0.42
PDL-64	20-May-18	0	2.0	12	0.7	3.5	7.2	25	15	0.45
PDL-65	20-Jul-18	0	2.1	62	25	0.2	27	116	26	0.90
PDL-66	20-Jul-18	0	0.9	53	22	1.2	34	111	30	0.89
PDL-67	14-Aug-18	0.7	8.0	73	27	0.5	9.5	119	31	0.89
PDL-68	14-Aug-18	0.5	7.0	89	22	2.1	18	138	34	0.89
PDL-69	2-Sep-18	1.5	13	90	22	3.1	10	139	33	0.71
PDL-70	2-Sep-18	1.0	14	65	24	2.0	15	121	34	0.72
PDL-71	5-Nov-18	1.0	7.4	96	8.9	9.1	2.7	125	29	0.79
PDL-72	5-Nov-18	1.1	5.9	84	13	4.3	1.3	110	28	0.76
Percent Density or Biomass		***0.57***	***6.1***	***62***	***16***	***2.8***	***12***			
Third Portage Lake - East Basin										
TPE-110	16-May-18	0	2.5	12	0.1	3.0	3.7	21	15	0.71
TPE-111	16-May-18	0	3.7	12	0.7	1.2	4.0	22	13	0.70
TPE-112	15-Jul-18	0	4.0	65	23	0.9	14	107	30	0.85
TPE-113	15-Jul-18	0	2.2	71	19	0.5	6.7	99	28	0.88
TPE-114	13-Aug-18	0.2	12	81	31	5.5	17	146	29	0.76
TPE-115	13-Aug-18	0.2	12	68	38	3.4	14	136	29	0.72
TPE-116	3-Sep-18	0.2	21	61	37	5.7	3.4	128	31	0.80
TPE-117	3-Sep-18	0.0	22	68	33	12	8.1	144	31	0.81
TPE-118	31-Oct-18	0.2	8.6	50	39	5.5	0.00	104	29	0.68
TPE-119	31-Oct-18	0.0	9.9	41	31	7.2	6.5	96	29	0.69
Percent Density or Biomass		***<0.1***	***13***	***47***	***30***	***6.4***	***3.8***			

Table D1-1. Phytoplankton density (cells/L), biomass (mg/m3), and diversity by major taxa group, Meadowbank study lakes, 2018.

Area-Replicate	Date	Phytoplankton Density (cells/L)						
		Cyanophyte	Chlorophyte	Chrysophyte	Diatom	Cryptophyte	Dinoflagellate	**TOTAL**
Inuggugayualik Lake								
INUG-98	27-May-18	200	340,626	110,229	32,515	14,484	0	498,054
INUG-99	27-May-18	0	411,348	177,405	46,499	3,846	100	639,198
INUG-100	19-Jul-18	0	7,384	760,552	356,616	2,200	9,184	1,135,936
INUG-101	19-Jul-18	0	29,136	507,696	361,000	800	2,000	900,632
INUG-102	14-Aug-18	67,856	1,178,576	736,568	233,288	14,968	7,984	2,239,240
INUG-103	14-Aug-18	1,800	1,149,840	788,256	210,936	7,584	800	2,159,216
INUG-104	2-Sep-18	9,400	1,475,120	935,120	296,144	28,936	1,600	2,746,320
INUG-105	2-Sep-18	8,200	1,386,912	691,464	267,008	7,784	800	2,362,168
INUG-106	25-Nov-18	1,300	448,309	465,539	276,996	35,761	600	1,228,505
INUG-107	25-Nov-18	1,900	462,993	472,331	288,034	32,615	300	1,258,173
Percent Density or Biomass		***0.60***	***45***	***37***	***16***	***0.98***	***0.15***	
Pipedream Lake								
PDL-63	20-May-18	0	521,677	188,143	100	1,500	400	711,820
PDL-64	20-May-18	0	482,270	170,413	10,738	18,531	900	682,851
PDL-65	20-Jul-18	0	86,408	773,688	450,624	200	4,800	1,315,720
PDL-66	20-Jul-18	0	58,272	602,872	332,480	1,000	4,200	998,824
PDL-67	14-Aug-18	2,000	704,832	778,472	377,584	400	1,000	1,864,288
PDL-68	14-Aug-18	1,800	332,064	757,120	404,920	8,184	1,800	1,505,888
PDL-69	2-Sep-18	4,400	1,661,704	713,616	342,648	15,168	800	2,738,336
PDL-70	2-Sep-18	5,200	1,519,424	490,512	322,296	1,200	1,400	2,340,032
PDL-71	5-Nov-18	10,184	978,424	691,680	145,880	51,888	800	1,878,856
PDL-72	5-Nov-18	4,800	769,488	432,256	288,160	29,136	400	1,524,240
Percent Density or Biomass		***0.18***	***44***	***37***	***18***	***0.38***	***0.13***	
Third Portage Lake - East Basin								
TPE-110	16-May-18	0	251,773	273,050	4,346	15,084	900	545,153
TPE-111	16-May-18	0	276,596	202,128	28,469	4,146	500	511,838
TPE-112	15-Jul-18	0	137,296	983,024	529,912	800	2,400	1,653,432
TPE-113	15-Jul-18	0	122,528	1,053,664	371,264	400	1,200	1,549,056
TPE-114	13-Aug-18	600	503,680	647,160	1,094,368	16,968	1,600	2,264,376
TPE-115	13-Aug-18	400	496,096	596,272	1,244,632	8,984	1,400	2,347,784
TPE-116	3-Sep-18	1,000	1,093,168	690,264	1,158,824	22,952	600	2,966,808
TPE-117	3-Sep-18	200	898,800	718,800	1,043,880	32,936	1,000	2,695,616
TPE-118	31-Oct-18	800	554,368	496,496	1,439,000	23,152	0	2,513,816
TPE-119	31-Oct-18	200	489,312	410,288	1,229,464	44,104	600	2,173,968
Percent Density or Biomass		***<0.1***	***25***	***32***	***42***	***0.88***	***<0.1***	

Table D1-1. Phytoplankton density (cells/L), biomass (mg/m3), and diversity by major taxa group, Meadowbank study lakes, 2018.

Area-Replicate	Date	Phytoplankton Biomass (mg/m^3)							Taxa Richness	Simpson's Diversity
		Cyanophyte	Chlorophyte	Chrysophyte	Diatom	Cryptophyte	Dinoflagellate	TOTAL		
Third Portage Lake - North Basin										
TPN-110	18-May-18	0	2.5	28	0.3	1.8	17	50	19	0.53
TPN-111	18-May-18	0	3.0	21	0.1	4.4	6.6	35	19	0.41
TPN-112	15-Jul-18	0	3.5	55	6.7	1.9	10	77	25	0.85
TPN-113	15-Jul-18	0	7.6	52	10	1.1	15	87	25	0.85
TPN-114	13-Aug-18	0	13	51	23	3.5	9.3	101	26	0.89
TPN-115	13-Aug-18	0	20	52	25	5.2	13	116	31	0.90
TPN-116	3-Sep-18	0.1	23	58	20	5.6	8.1	115	36	0.87
TPN-117	3-Sep-18	0	44	47	30	4.1	17	142	37	0.86
TPN-118	3-Nov-18	0	6.2	29	23	1.0	3.4	63	27	0.84
TPN-119	3-Nov-18	0	7.2	28	36	2.1	0.8	74	23	0.87
Percent Density or Biomass		***<0.1***	***20***	***41***	***28***	***3.3***	***7.4***			
Third Portage Lake - South Basin										
TPS-59	13-May-18	0	3.0	15	0.2	1.9	1.9	22	20	0.69
TPS-60	13-May-18	0	1.3	11	0.5	3.6	0.00	16	17	0.66
Percent Density or Biomass		***<0.1***	***11***	***67***	***2.1***	***14***	***5.1***			
Second Portage Lake										
SP-110	13-May-18	0	2.2	28	1.2	3.7	4.8	40	21	0.74
SP-111	13-May-18	0	2.8	34	1.5	3.4	2.8	45	21	0.79
SP-112	9-Jul-18	0	1.1	99	11	6.5	16	133	27	0.85
SP-113	9-Jul-18	0.00	2.1	122	10	0.7	5.6	141	24	0.88
SP-114	13-Aug-18	0.1	8.7	51	27	3.1	7.7	97	26	0.83
SP-115	13-Aug-18	0.4	7.5	63	24	3.5	14	112	30	0.86
SP-116	2-Sep-18	0.1	12	72	45	7.7	8.1	145	32	0.83
SP-117	2-Sep-18	0.00	12	80	50	2.9	3.7	149	32	0.87
SP-118	3-Nov-18	0	7.2	53	16	5.2	7.6	90	28	0.73
SP-119	3-Nov-18	0	13	39	45	4.0	17	118	27	0.68
Percent Density or Biomass		***<0.1***	***8.9***	***49***	***31***	***4.0***	***7.3***			
Tehek Lake										
TE-94	21-May-18	0.00	1.7	17	1.8	2.0	5.0	27	14	0.53
TE-95	21-May-18	0	1.8	14	1.2	1.3	3.3	21	15	0.59
Percent Density or Biomass		***<0.1***	***7.3***	***62***	***6.2***	***6.9***	***17***			

Table D1-1. Phytoplankton density (cells/L), biomass (mg/m3), and diversity by major taxa group, Meadowbank study lakes, 2018.

Area-Replicate	Date	Phytoplankton Density (cells/L)						
		Cyanophyte	Chlorophyte	Chrysophyte	Diatom	Cryptophyte	Dinoflagellate	**TOTAL**
Third Portage Lake - North Basin								
TPN-110	18-May-18	0	574,468	260,565	14,184	4,646	2,100	855,964
TPN-111	18-May-18	0	602,837	168,567	3,546	6,746	1,300	782,996
TPN-112	15-Jul-18	0	114,944	741,552	98,592	1,600	1,600	958,288
TPN-113	15-Jul-18	0	158,048	763,304	177,016	800	2,200	1,101,368
TPN-114	13-Aug-18	0	481,728	453,592	448,808	9,184	1,200	1,394,512
TPN-115	13-Aug-18	0	704,832	396,320	391,536	4,000	1,800	1,498,488
TPN-116	3-Sep-18	400	1,035,496	740,352	349,432	16,368	1,000	2,143,048
TPN-117	3-Sep-18	0	1,027,912	603,856	551,584	8,784	2,000	2,194,136
TPN-118	3-Nov-18	0	460,576	323,680	292,360	600	400	1,077,616
TPN-119	3-Nov-18	0	374,168	366,984	416,088	14,568	200	1,172,008
Percent Density or Biomass		***<0.1***	***42***	***37***	***21***	***0.51***	***0.10***	
Third Portage Lake - South Basin								
TPS-59	13-May-18	0	273,050	223,804	3,646	4,646	400	505,546
TPS-60	13-May-18	0	212,766	166,967	14,784	15,484	0	410,002
Percent Density or Biomass		***<0.1***	***53***	***43***	***2.0***	***2.2***	***<0.1***	
Second Portage Lake								
SP-110	13-May-18	0	223,504	358,456	15,284	21,877	400	619,521
SP-111	13-May-18	0	244,681	432,724	54,892	18,431	700	751,427
SP-112	9-Jul-18	0	64,656	782,072	372,584	24,152	2,600	1,246,064
SP-113	9-Jul-18	0	93,592	806,824	325,280	400	800	1,226,896
SP-114	13-Aug-18	400	582,304	582,504	621,624	2,600	800	1,790,232
SP-115	13-Aug-18	1,200	711,216	698,048	441,824	9,184	1,000	1,862,472
SP-116	2-Sep-18	400	948,888	769,888	613,656	17,568	1,200	2,351,600
SP-117	2-Sep-18	0	813,592	920,552	531,448	8,384	600	2,274,576
SP-118	3-Nov-18	0	998,976	620,824	229,304	23,352	1,000	1,873,456
SP-119	3-Nov-18	0	1,223,080	512,664	189,416	8,984	1,200	1,935,344
Percent Density or Biomass		***<0.1***	***37***	***41***	***21***	***0.85***	***<0.1***	
Tehek Lake								
TE-94	21-May-18	0	407,802	173,959	32,015	14,284	400	628,460
TE-95	21-May-18	0	340,426	180,951	31,915	4,246	400	557,938
Percent Density or Biomass		***<0.1***	***63***	***30***	***5.4***	***1.6***	***<0.1***	

Table D1-1. Phytoplankton density (cells/L), biomass (mg/m3), and diversity by major taxa group, Meadowbank study lakes, 2018.

Area-Replicate	Date	Phytoplankton Biomass (mg/m^3)							Taxa Richness	Simpson's Diversity
		Cyanophyte	Chlorophyte	Chrysophyte	Diatom	Cryptophyte	Dinoflagellate	**TOTAL**		
Tehek Lake - Far-field										
TEFF-47	27-May-18	0	1.6	7.0	1.4	6.4	11	27	20	0.62
TEFF-48	27-May-18	0	1.4	13	1.9	2.3	11	30	21	0.71
Percent Density or Biomass		***<0.1***	***5.3***	***36***	***5.8***	***15***	***38***			
Wally Lake										
WAL-79	9-May-18	0	1.0	7.9	2.6	12	5.9	30	22	0.80
WAL-80	9-May-18	0	1.1	2.6	3.4	8.2	3.2	18	15	0.73
WAL-81	9-Jul-18	0	1.9	163	15	22	13	215	31	0.87
WAL-82	9-Jul-18	0	1.3	212	14	20	11	259	28	0.86
WAL-83	13-Aug-18	9.1	26	54	31	5.0	7.0	132	38	0.89
WAL-84	13-Aug-18	3.9	22	78	33	3.1	3.8	143	37	0.88
WAL-85	2-Sep-18	0.5	9.5	84	38	12	1.7	146	34	0.83
WAL-86	2-Sep-18	0.9	14	81	42	13	8.2	159	33	0.84
WAL-87	31-Oct-18	0	6.1	96	21	9.0	1.6	134	27	0.85
WAL-88	31-Oct-18	0	6.6	93	44	6.7	2.4	153	28	0.84
Percent Density or Biomass		***1.0***	***6.1***	***60***	***25***	***6.9***	***2.3***			
All 2018 Locations Relative Density or Biomass (%)		***0.40***	***7.7***	***57***	***18***	***4.2***	***8.6***			

Table D1-1. Phytoplankton density (cells/L), biomass (mg/m3), and diversity by major taxa group, Meadowbank study lakes, 2018.

Area-Replicate	Date	Phytoplankton Density (cells/L)						
		Cyanophyte	Chlorophyte	Chrysophyte	Diatom	Cryptophyte	Dinoflagellate	**TOTAL**
Tehek Lake - Far-field								
TEFF-47	27-May-18	0	259,265	88,853	39,007	39,407	1,300	427,832
TEFF-48	27-May-18	0	216,412	195,236	46,299	11,138	1,700	470,785
Percent Density or Biomass		***<0.1***	***53***	***32***	***9.5***	***5.6***	***0.33***	
Wally Lake								
WAL-79	9-May-18	0	103,037	223,504	86,906	35,369	600	449,416
WAL-80	9-May-18	0	177,305	67,576	86,306	38,161	400	369,748
WAL-81	9-Jul-18	0	50,688	1,182,408	317,160	99,592	2,200	1,652,048
WAL-82	9-Jul-18	0	21,952	1,759,512	385,416	126,128	1,600	2,294,608
WAL-83	13-Aug-18	179,600	1,049,864	705,032	441,640	23,152	600	2,399,888
WAL-84	13-Aug-18	36,120	1,215,496	935,320	414,504	15,168	400	2,617,008
WAL-85	2-Sep-18	600	863,680	889,432	827,176	59,472	400	2,640,760
WAL-86	2-Sep-18	1,200	1,020,928	896,216	784,320	73,040	1,000	2,776,704
WAL-87	31-Oct-18	0	503,280	993,008	634,808	38,520	400	2,170,016
WAL-88	31-Oct-18	0	375,768	938,920	752,968	37,520	600	2,105,776
Percent Density or Biomass		***1.1***	***28***	***44***	***24***	***2.8***	***<0.1***	
All 2018 Locations Relative Density or Biomass (%)		***0.32***	***34***	***36***	***23***	***1.1***	***<0.1***	

Figure D1-1. Cyanophyte biomass (mg/m^3) from Meadowbank study lakes since 2006.

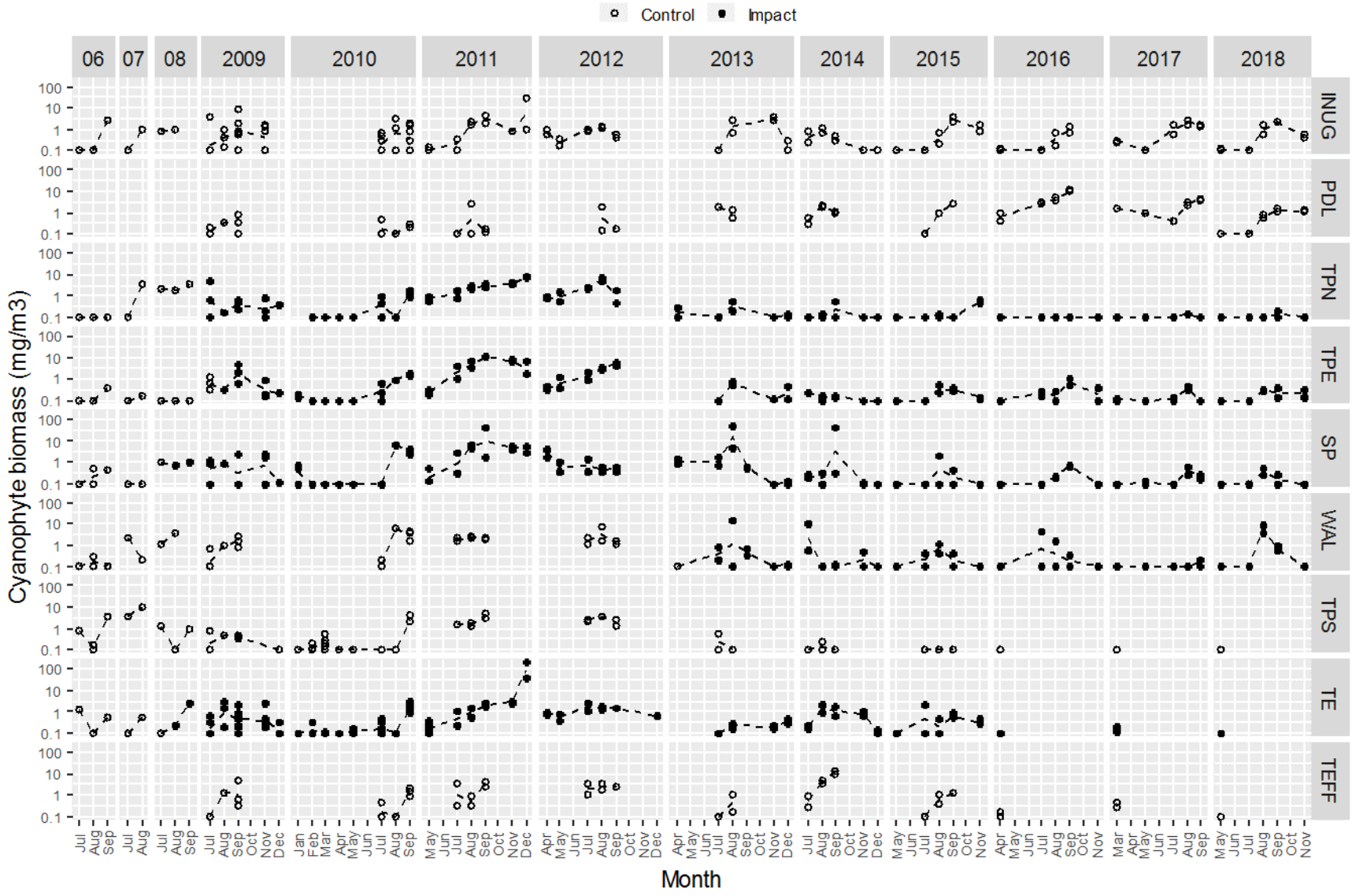


Figure D1-2. Chlorophyte biomass (mg/m^3) from Meadowbank study lakes since 2006.

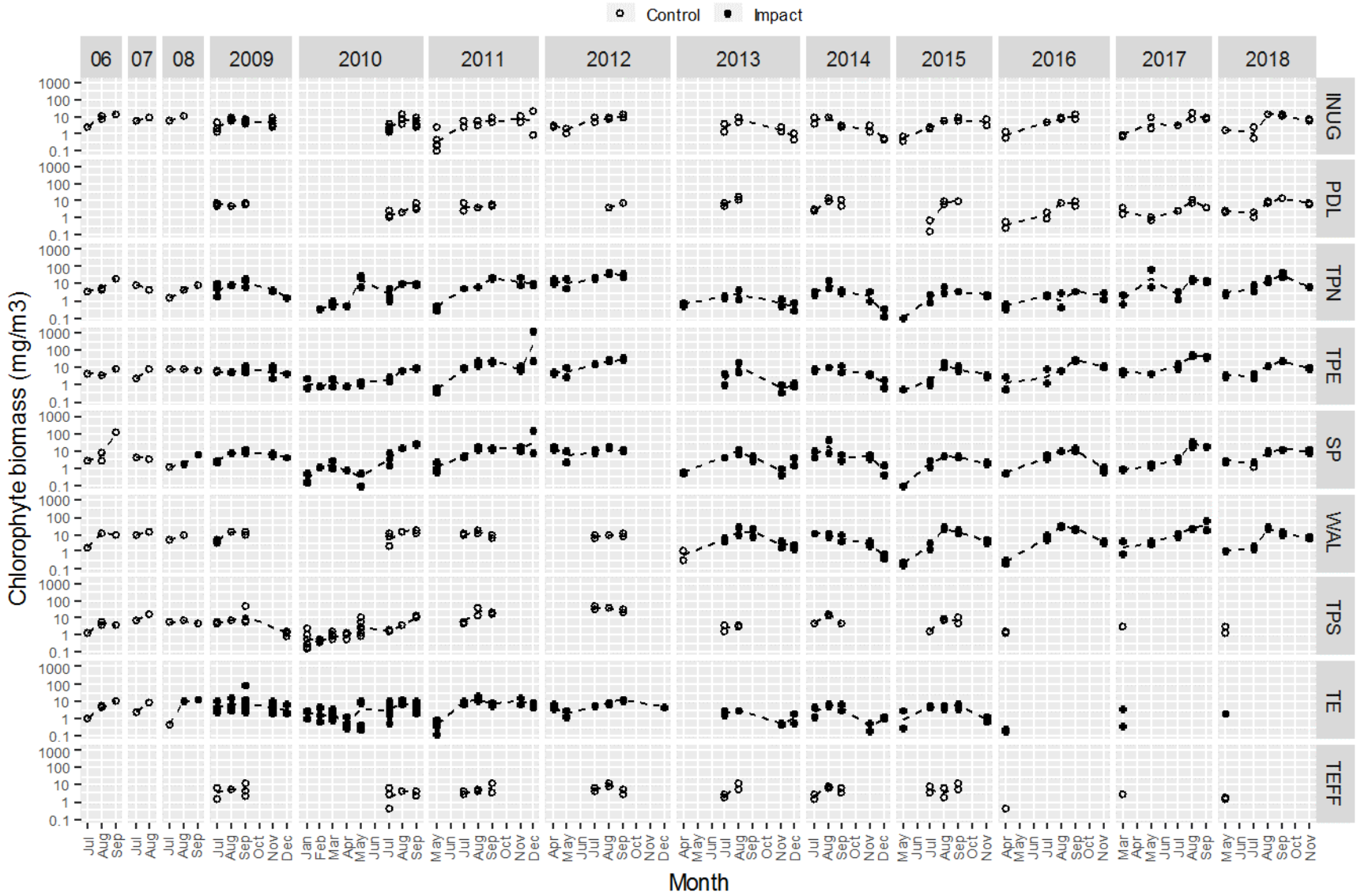


Figure D1-3. Chrysophyte biomass (mg/m^3) from Meadowbank study lakes since 2006.

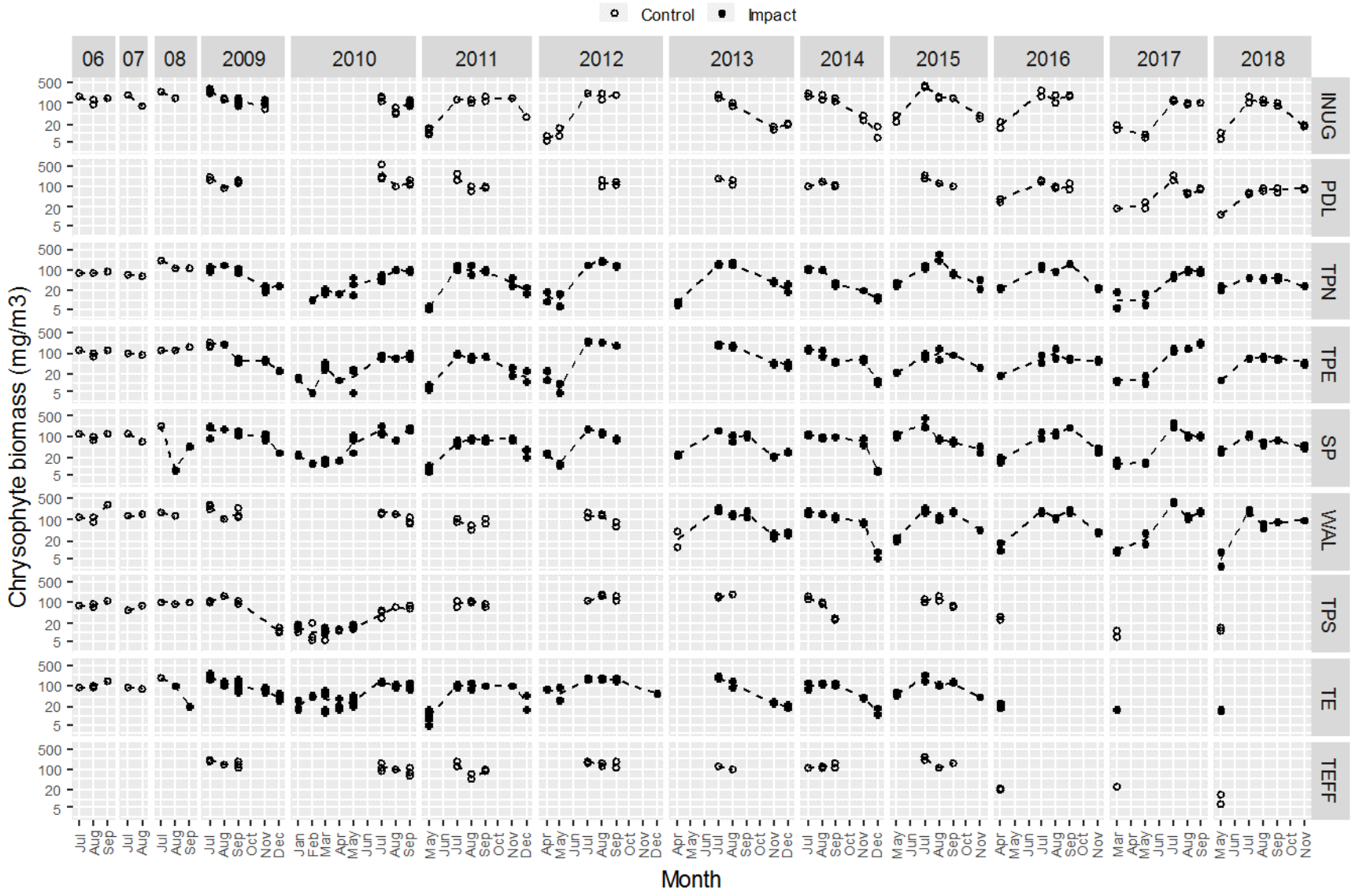


Figure D1-4. Diatom biomass (mg/m^3) from Meadowbank study lakes since 2006.

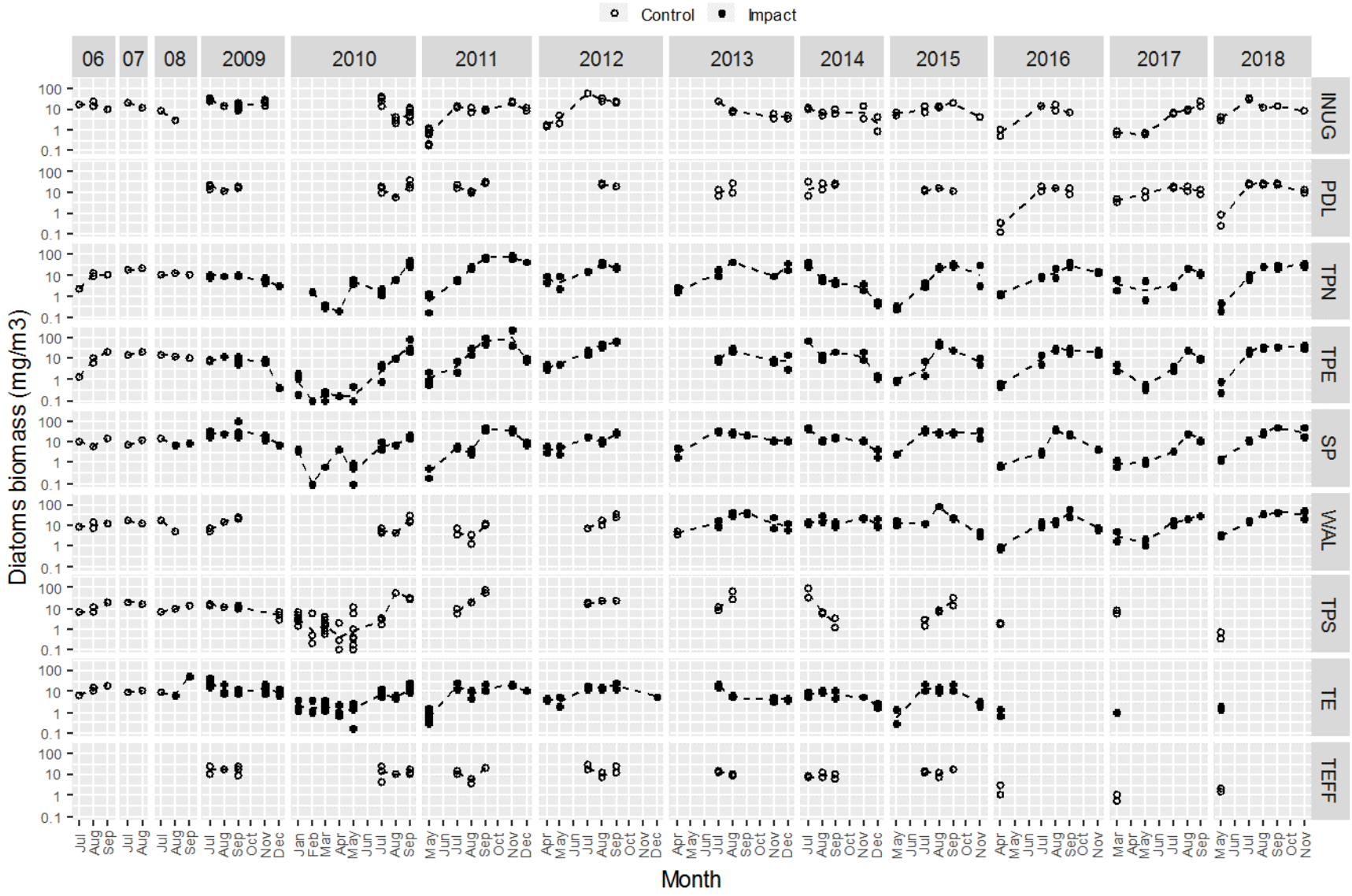


Figure D1-5. Cryptophyte biomass (mg/m^3) from Meadowbank study lakes since 2006.

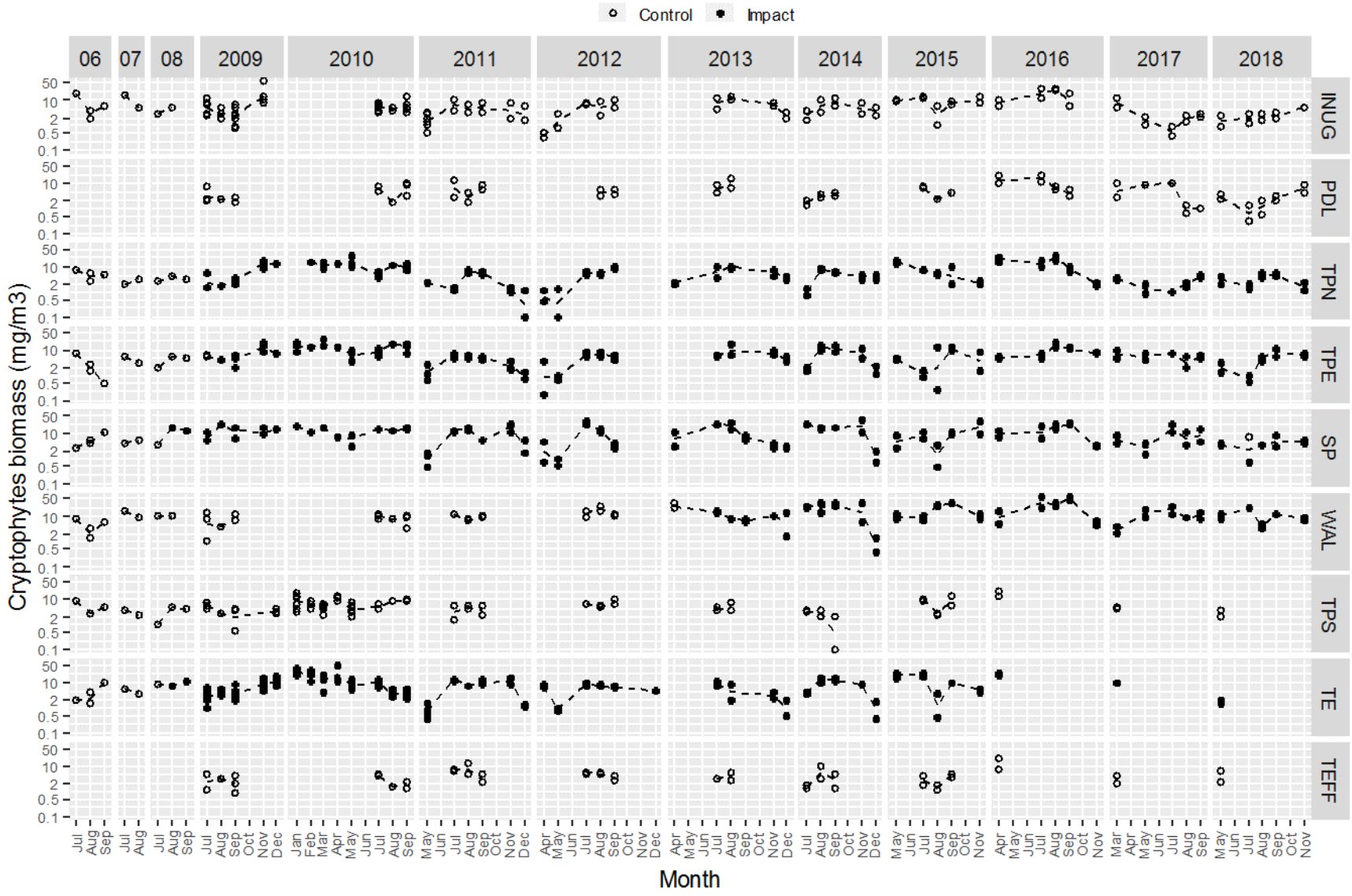


Figure D1-6. Dinoflagellate biomass (mg/m^3) from Meadowbank study lakes since 2006.

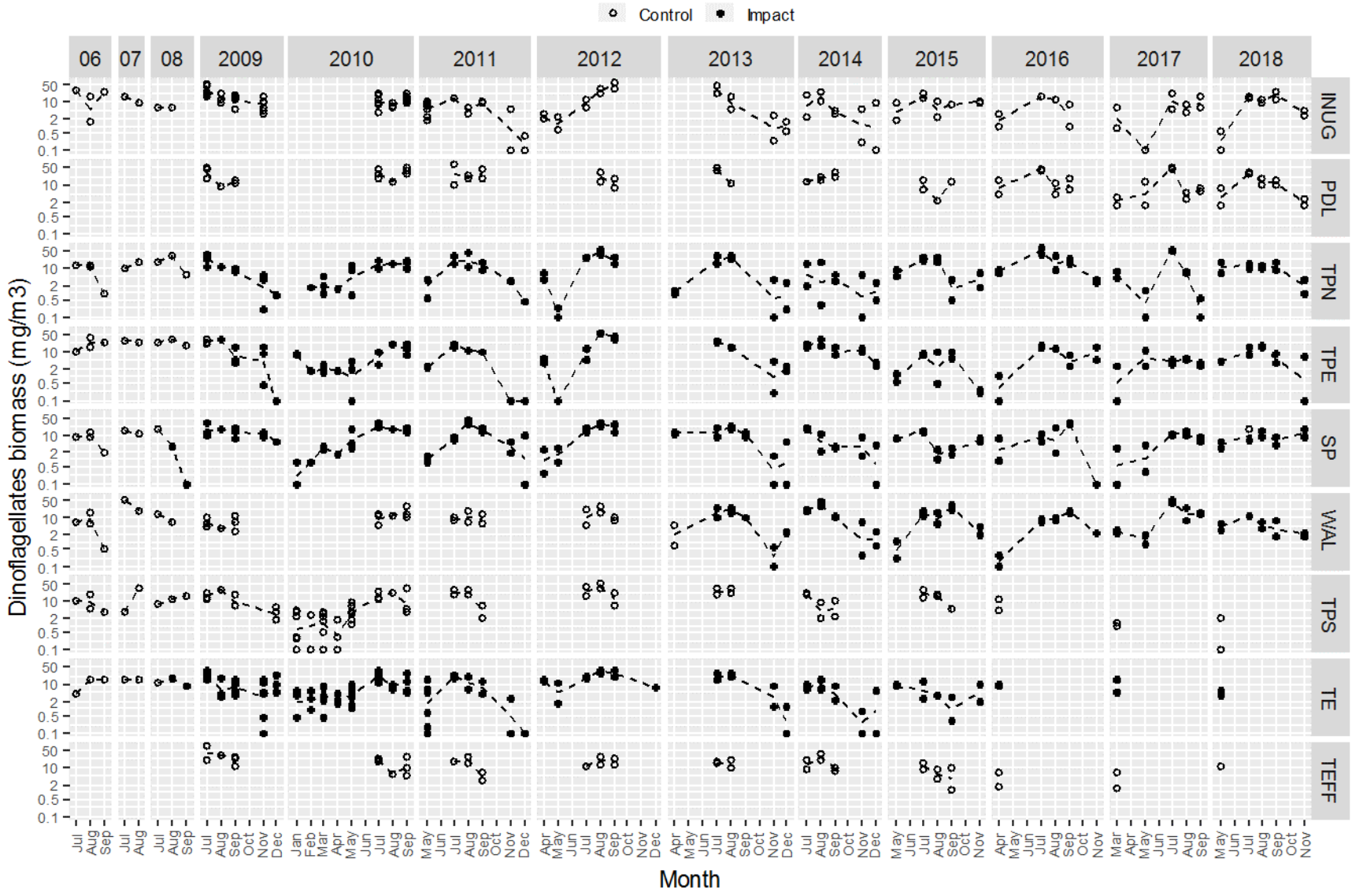


Figure D1-7. Phytoplankton density (cells/L) by major taxa group from Meadowbank study lakes since 2006.

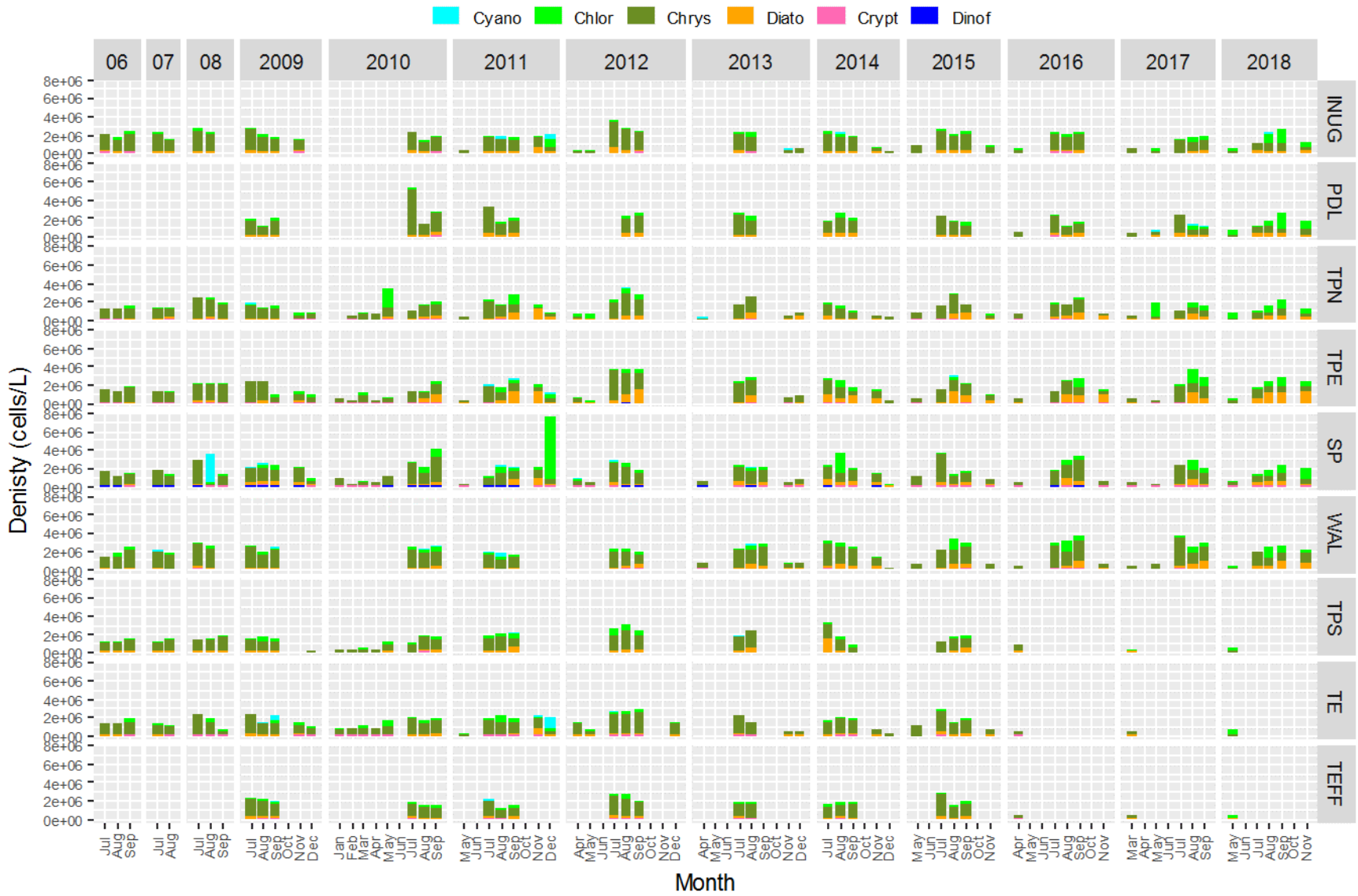


Figure D1-8. Relative phytoplankton density by major taxa group from Meadowbank study lakes since 2006.

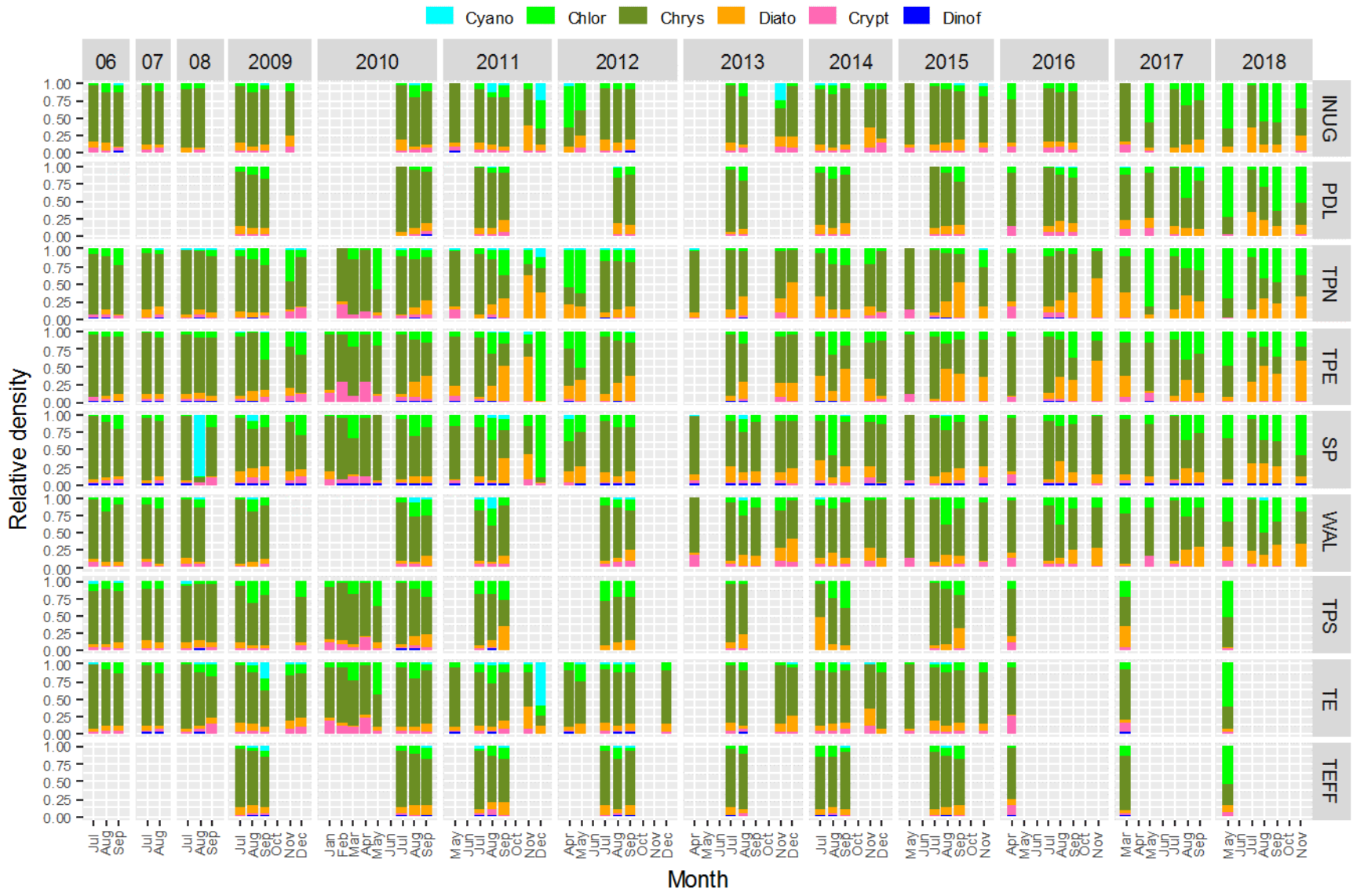


Figure D1-9. Cyanophyte density (cells/L) by major taxa group from Meadowbank study lakes since 2006.

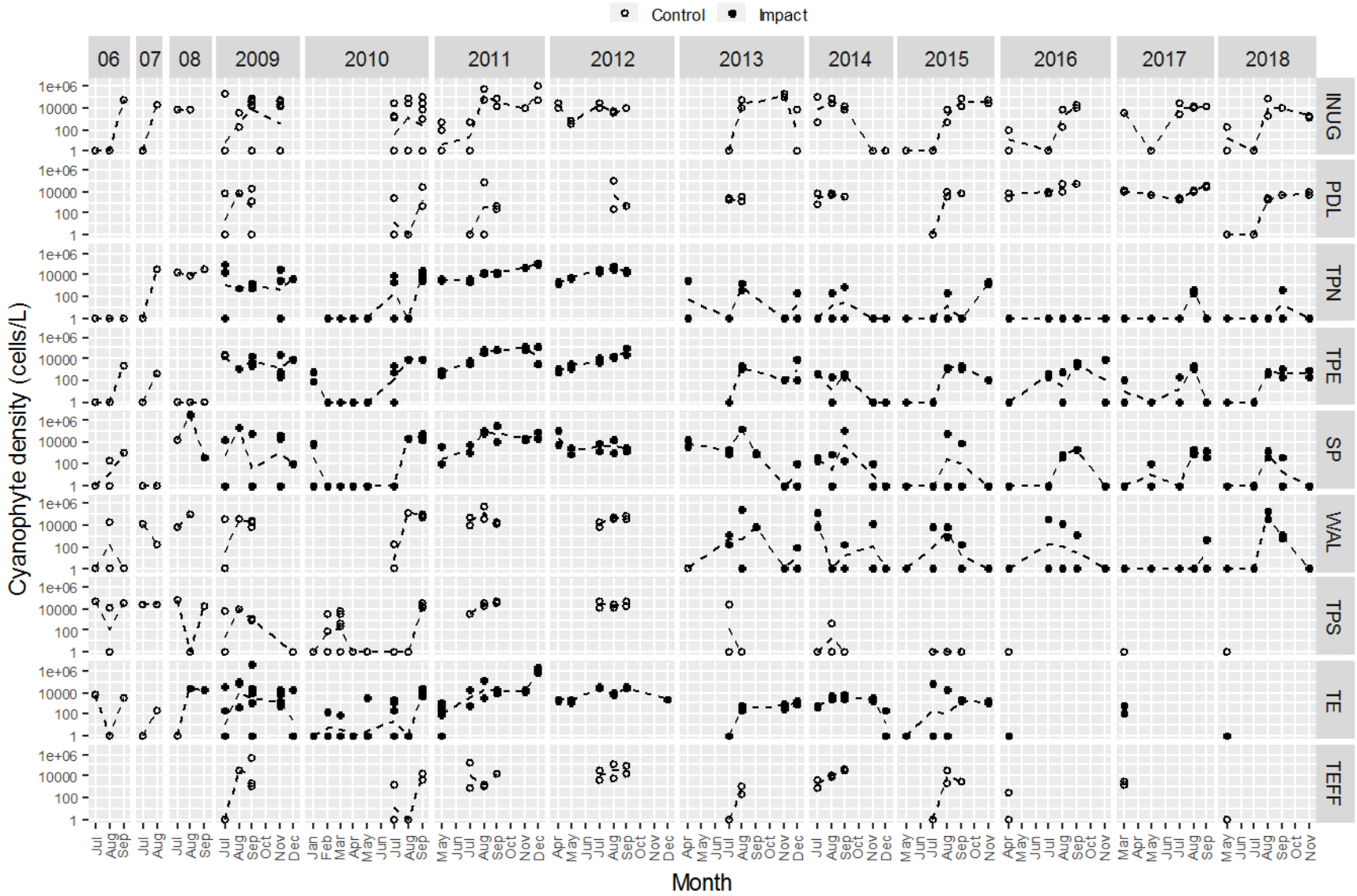


Figure D1-10. Chlorophyte density (cells/L) by major taxa group from Meadowbank study lakes since 2006.

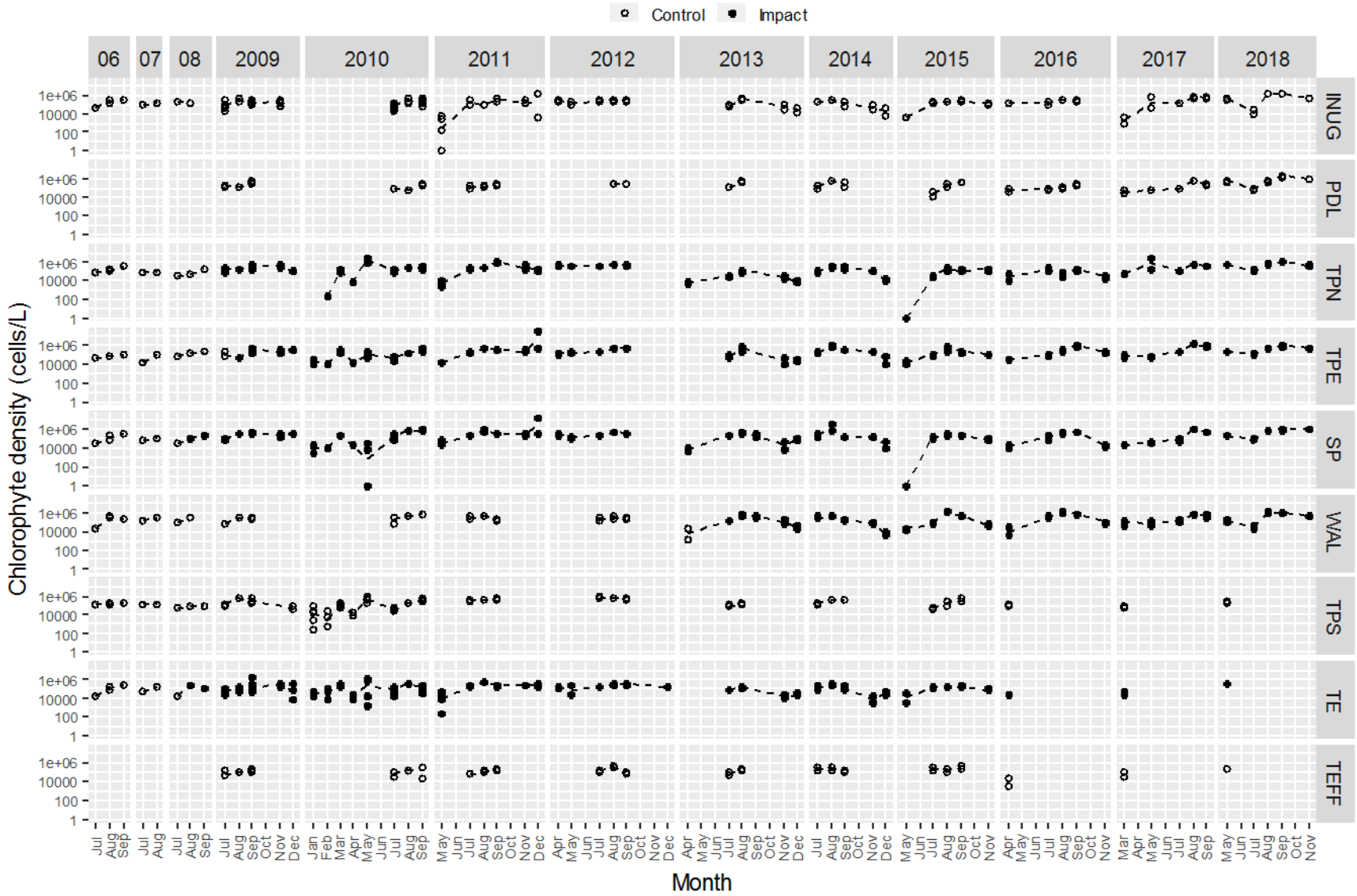


Figure D1-11. Chrysophyte density (cells/L) by major taxa group from Meadowbank study lakes since 2006.

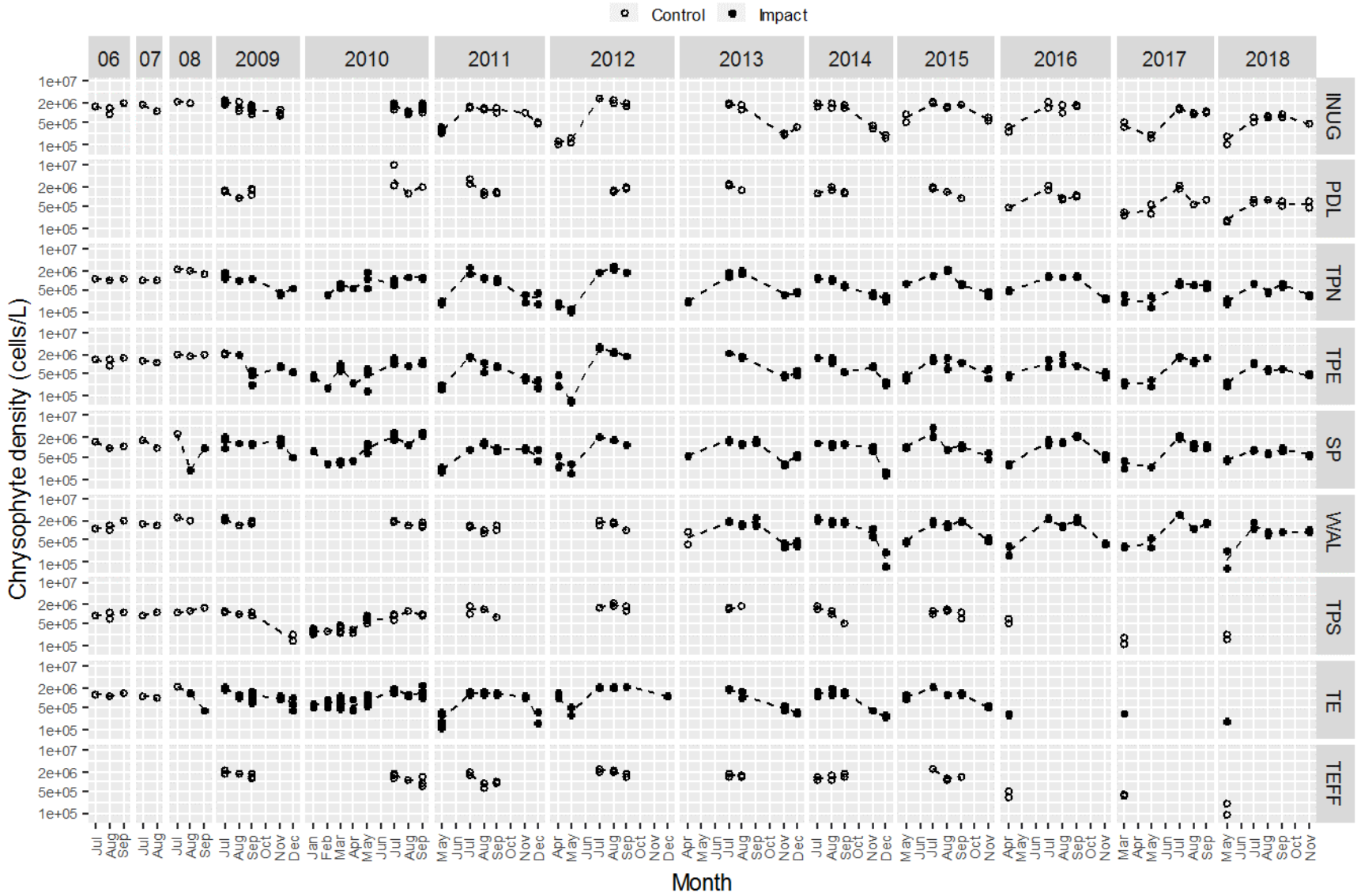


Figure D1-12. Diatom density (cells/L) by major taxa group from Meadowbank study lakes since 2006.

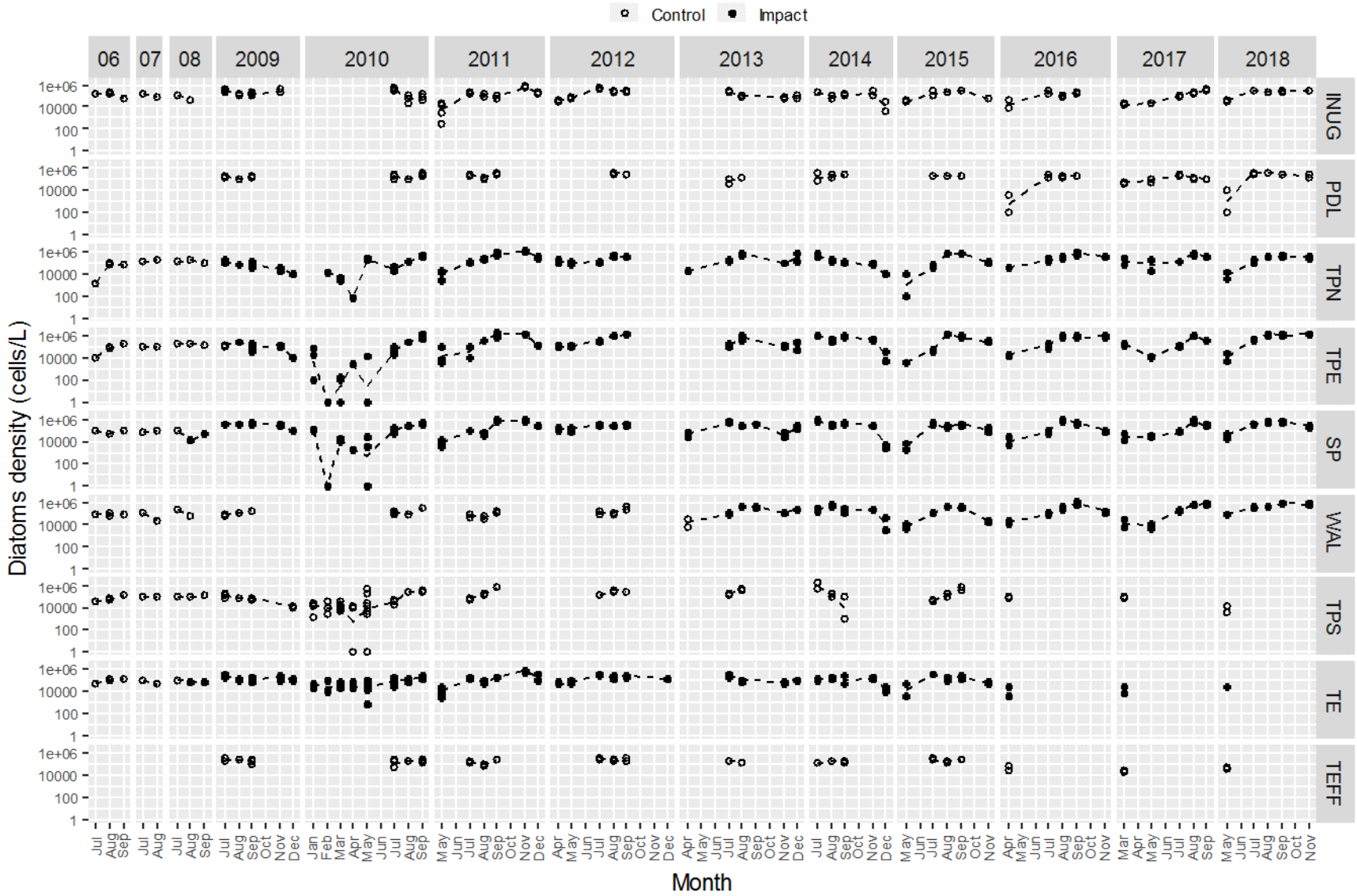


Figure D1-13. Cryptophytes density (cells/L) by major taxa group from Meadowbank study lakes since 2006.

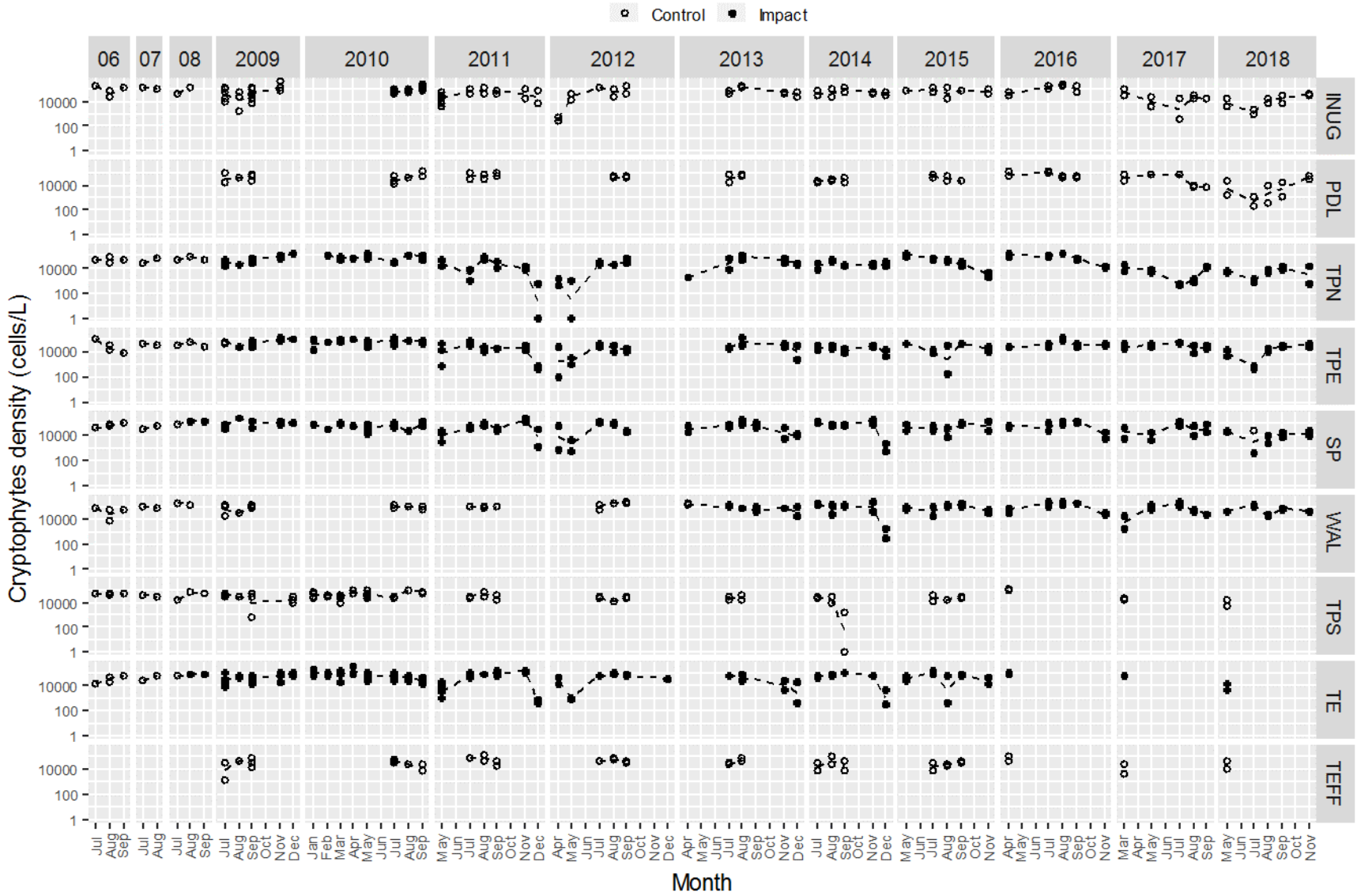


Figure D1-14. Dinoflagellates density (cells/L) by major taxa group from Meadowbank study lakes since 2006.

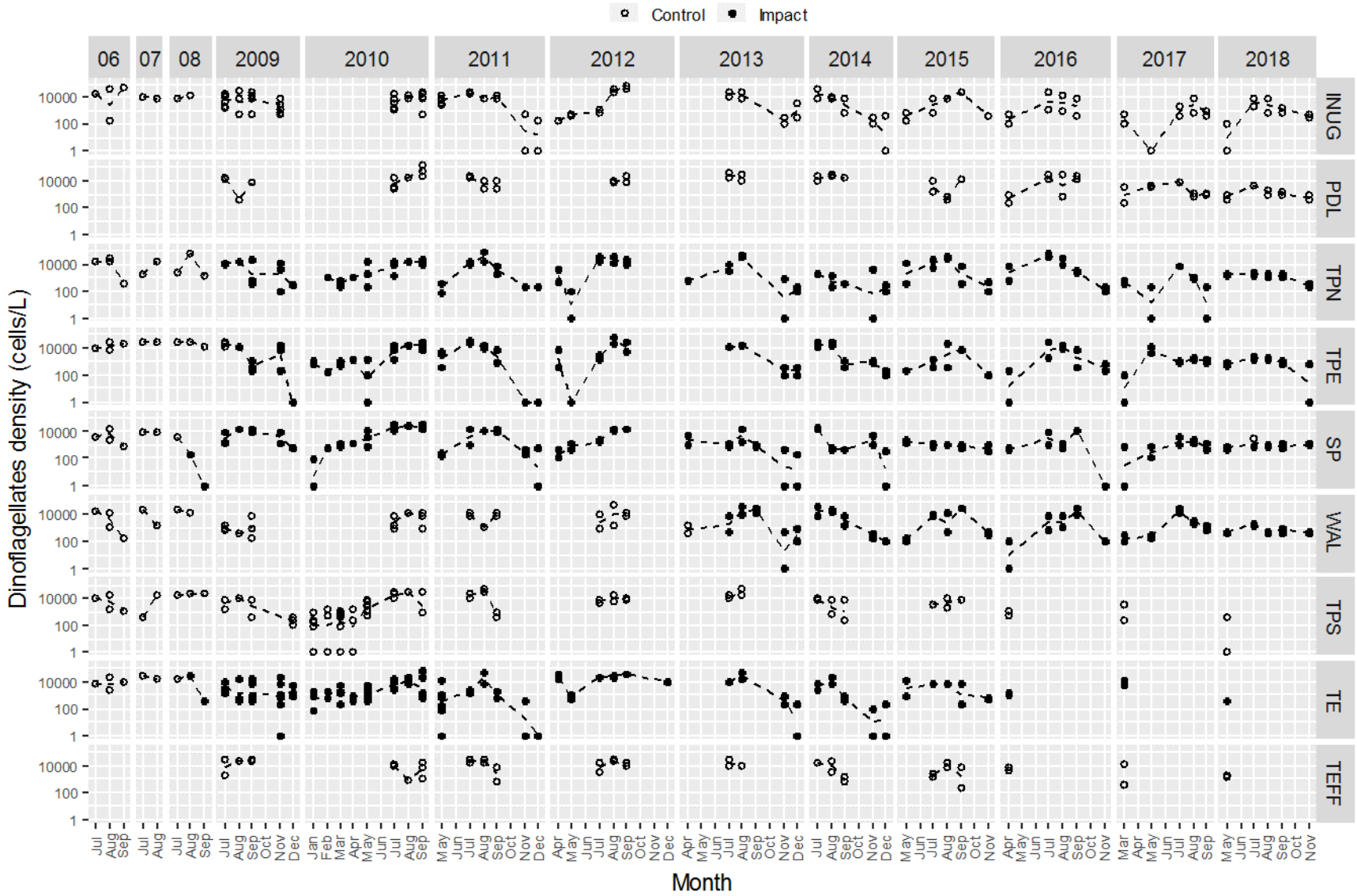
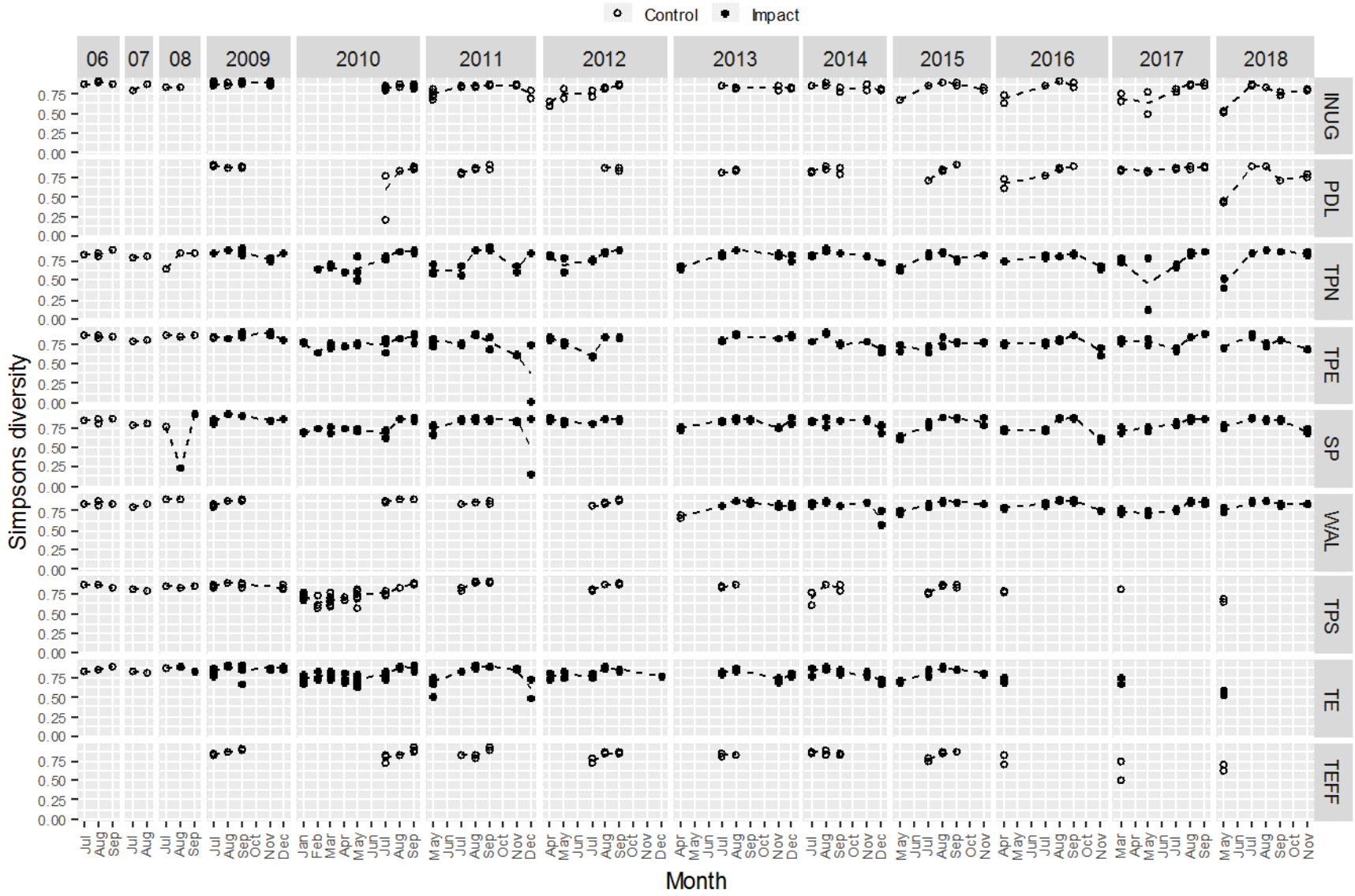


Figure D1-15. Simpsons' Diversity for the phytoplankton community from Meadowbank study lakes since 2006.



APPENDIX D2
PHYTO DATA – WHALE TAIL STUDY AREA LAKES

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Table D2-1. Phytoplankton density (cells/L), biomass (mg/m3), and diversity by major taxa group, Whale Tail Pit study lakes, 2018.

Area-Replicate	Date	Phytoplankton Biomass (mg/m^3)							Taxa Richness	Simpson's Diversity
		Cyanophyte	Chlorophyte	Chrysophyte	Diatom	Cryptophyte	Dinoflagellate	TOTAL		
Mammoth Lake										
MAM-27	30-May-18	0	0.8	82	4.2	37	126	251	21	0.83
MAM-28	30-May-18	0	1.7	48	4.7	43	138	235	25	0.84
MAM-29	16-Jul-18	0.3	3.1	316	9.1	4.6	12	345	27	0.87
MAM-30	16-Jul-18	0.3	3.3	330	6.1	6.4	9.2	355	27	0.86
MAM-31	16-Aug-18	0.00	6.2	59	15	7.3	20	108	24	0.82
MAM-32	16-Aug-18	0.1	5.9	71	34	4.8	16	133	29	0.80
MAM-33	1-Sep-18	0.2	15	72	27	5.9	3.7	124	27	0.79
MAM-34	1-Sep-18	0.1	12	69	30	1.7	3.7	116	27	0.78
MAM-35	1-Nov-18	0.00	1.8	11	17	5.2	5.1	40	19	0.62
MAM-36	1-Nov-18	0.00	0.6	20	19	9.7	6.3	55	19	0.64
Percent Density or Biomass		***<0.1***	***2.8***	***61***	***9.4***	***7.2***	***19***			
Nemo Lake										
NEM-27	1-Jun-18	0	1.2	7.0	2.1	2.2	9.4	22	13	0.63
NEM-28	1-Jun-18	0	0.5	5.9	2.4	2.0	14	25	12	0.72
NEM-29	16-Jul-18	0	1.7	84	43	0.2	21	150	26	0.83
NEM-30	16-Jul-18	0	3.6	81	40	1.6	8.1	135	32	0.84
NEM-31	17-Aug-18	0.00	17	57	16	1.2	22	113	29	0.85
NEM-32	17-Aug-18	0.00	15	48	22	2.6	18	107	27	0.86
NEM-33	3-Sep-18	0.0	9.7	60	20	1.8	1.9	94	29	0.80
NEM-34	3-Sep-18	0.00	11	53	18	2.4	7.2	93	32	0.88
NEM-35	3-Nov-18	0.00	2.5	11	25	5.4	1.3	45	21	0.62
NEM-36	3-Nov-18	0.00	4.0	14	25	0.6	1.3	45	21	0.68
Percent Density or Biomass		***<0.1***	***8.1***	***51***	***26***	***2.4***	***12***			
Whale Tail South										
WTS-27	30-May-18	0	0.2	41	0.5	5.3	0.4	47	11	0.82
WTS-28	30-May-18	0	0.3	36	0.5	6.4	1.7	45	12	0.82
WTS-29	8-Jul-18	0	2.8	330	17	18	43	410	32	0.93
WTS-30	8-Jul-18	0.1	2.6	316	12	12	38	381	33	0.92
WTS-31	16-Aug-18	14	12	31	57	5.0	21	140	27	0.82
WTS-32	16-Aug-18	13	16	36	47	2.5	25	140	29	0.83
WTS-33	1-Sep-18	13	19	79	40	2.7	38	192	31	0.81
WTS-34	1-Sep-18	15	19	68	37	3.6	60	202	29	0.79
WTS-35	31-Oct-18	0	5.5	33	37	2.7	3.0	81	26	0.60
WTS-36	1-Nov-18	0	4.8	78	18	9.3	3.0	114	23	0.80
Percent Density or Biomass		***3.1***	***8.3***	***44***	***22***	***3.1***	***18***			

Table D2-1. Phytoplankton density (cells/L), biomass (mg/m3), and diversity by major taxa group, Whale Tail Pit study lakes, 2018.

Area-Replicate	Date	Phytoplankton Density (cells/L)						
		Cyanophyte	Chlorophyte	Chrysophyte	Diatom	Cryptophyte	Dinoflagellate	**TOTAL**
Mammoth Lake								
MAM-27	30-May-18	0	86,208	900,800	145,896	133,144	14,000	1,280,048
MAM-28	30-May-18	0	201,152	731,784	143,312	111,808	14,600	1,202,656
MAM-29	16-Jul-18	800	87,008	2,142,128	162,064	16,368	1,200	2,409,568
MAM-30	16-Jul-18	800	136,896	1,796,912	73,456	36,720	2,000	2,046,784
MAM-31	16-Aug-18	0	646,960	525,632	317,496	30,936	1,600	1,522,624
MAM-32	16-Aug-18	200	468,160	661,328	777,672	16,568	1,200	1,925,128
MAM-33	1-Sep-18	800	1,322,056	994,992	973,640	10,184	400	3,302,072
MAM-34	1-Sep-18	400	1,358,776	975,032	930,736	7,784	400	3,273,128
MAM-35	1-Nov-18	0	184,497	132,006	532,069	3,100	1,000	852,672
MAM-36	1-Nov-18	0	134,752	140,198	526,623	18,884	700	821,157
Percent Density or Biomass		***<0.1***	***25***	***48***	***25***	***2.1***	***0.20***	
Nemo Lake								
NEM-27	1-Jun-18	0	202,228	95,745	78,314	1,900	1,100	379,287
NEM-28	1-Jun-18	0	109,929	85,106	92,299	1,700	1,300	290,334
NEM-29	16-Jul-18	0	110,160	730,784	729,448	200	2,000	1,572,592
NEM-30	16-Jul-18	0	152,664	737,568	706,896	7,584	1,200	1,605,912
NEM-31	17-Aug-18	0	863,480	476,144	363,600	1,000	1,600	1,705,824
NEM-32	17-Aug-18	0	791,640	418,672	464,176	14,768	1,800	1,691,056
NEM-33	3-Sep-18	200	835,144	453,392	409,104	7,784	200	1,705,824
NEM-34	3-Sep-18	0	403,304	496,296	331,296	8,184	1,000	1,240,080
NEM-35	3-Nov-18	0	241,435	171,713	721,112	35,961	200	1,170,421
NEM-36	3-Nov-18	0	298,172	196,436	578,022	3,646	100	1,076,376
Percent Density or Biomass		***<0.1***	***34***	***34***	***31***	***0.42***	***0.10***	
Whale Tail South								
WTS-27	30-May-18	0	49,645	190,490	21,277	22,877	100	284,389
WTS-28	30-May-18	0	74,468	144,437	21,277	33,115	400	273,697
WTS-29	8-Jul-18	0	208,336	1,124,432	292,160	96,792	5,800	1,727,520
WTS-30	8-Jul-18	200	136,496	1,165,336	203,952	61,072	4,600	1,571,656
WTS-31	16-Aug-18	40,400	1,120,904	425,056	863,680	16,168	1,400	2,467,608
WTS-32	16-Aug-18	38,000	1,171,592	489,712	963,256	1,800	2,200	2,666,560
WTS-33	1-Sep-18	35,800	1,523,208	988,208	1,241,448	8,384	3,800	3,800,848
WTS-34	1-Sep-18	38,800	1,423,232	958,472	1,376,144	2,200	5,600	3,804,448
WTS-35	31-Oct-18	0	345,832	364,000	1,335,888	8,184	800	2,054,704
WTS-36	1-Nov-18	0	603,456	670,560	645,592	25,352	800	1,945,760
Percent Density or Biomass		***0.74***	***32***	***32***	***34***	***1.3***	***0.12***	

Table D2-1. Phytoplankton density (cells/L), biomass (mg/m3), and diversity by major taxa group, Whale Tail Pit study lakes, 2018.

Area-Replicate	Date	Phytoplankton Biomass (mg/m^3)							Taxa Richness	Simpson's Diversity
		Cyanophyte	Chlorophyte	Chrysophyte	Diatom	Cryptophyte	Dinoflagellate	TOTAL		
Lake A-20										
A20-21	2-Jun-18	0	1.7	15	4.1	0.1	12	32	15	0.68
A20-22	2-Jun-18	0	1.5	26	3.5	1.1	13	44	22	0.75
A20-23	16-Jul-18	0	1.8	86	5.3	1.6	17	111	27	0.87
A20-24	16-Jul-18	0	1.4	51	6.0	5.1	12	75	24	0.84
A20-25	17-Aug-18	0.5	6.9	74	22	7.2	9.2	120	28	0.79
A20-26	17-Aug-18	3.1	5.0	54	27	2.8	18	110	26	0.75
A20-27	22-Sep-18	0.1	4.3	59	47	3.6	23	136	31	0.80
A20-28	22-Sep-18	0.2	3.3	33	56	2.9	7.0	103	27	0.80
A20-29	1-Nov-18	0	2.6	35	48	2.5	1.2	90	23	0.75
A20-30	1-Nov-18	0	1.9	46	52	1.5	0.2	102	20	0.77
Percent Density or Biomass		***0.42***	***2.8***	***40***	***47***	***2.4***	***7.2***			
Lake A-76										
A76-21	2-Jun-18	0	1.4	29	3.0	3.8	21	59	21	0.73
A76-22	2-Jun-18	0	2.3	30	3.2	2.5	16	55	18	0.79
A76-23	21-Jul-18	0	3.6	108	27	3.1	13	155	29	0.91
A76-24	21-Jul-18	0.00	1.8	108	18	1.7	13	142	29	0.90
A76-25	18-Aug-18	0	18	51	51	4.7	11	135	28	0.82
A76-26	18-Aug-18	0	9.4	47	33	7.7	12	109	29	0.82
A76-27	9-Sep-18	0	7.6	80	25	5.9	9.1	128	30	0.75
A76-28	9-Sep-18	0.00	9.6	50	23	1.0	5.3	89	29	0.79
A76-29	25-Nov-18	0	6.0	23	12	5.5	5.1	52	23	0.81
A76-30	25-Nov-18	0	4.1	22	16	1.5	1.2	44	21	0.78
Percent Density or Biomass		***<0.1***	***8.7***	***56***	***24***	***4.4***	***6.6***			
Lake DS-1										
DS1-19	3-Jun-18	0	0.4	173	1.0	11	29	214	17	0.46
DS1-20	3-Jun-18	0	0.00	185	1.2	12	22	221	18	0.39
DS1-21	20-Jul-18	0	7.3	144	20	10	35	217	40	0.91
DS1-22	20-Jul-18	0	10	132	14	13	24	194	36	0.89
DS1-23	19-Aug-18	0	7.9	64	5.5	11	15	104	35	0.86
DS1-24	19-Aug-18	0	8.3	79	5.0	4.7	20	117	28	0.83
DS1-25	10-Sep-18	0	5.3	115	11	16	10	157	37	0.83
DS1-26	10-Sep-18	0	2.0	117	11	10	16	156	35	0.74
DS1-27	26-Nov-18	0	3.2	64	7.4	3.4	10	88	21	0.79
DS1-28	26-Nov-18	0	2.0	51	5.2	7.8	0.9	67	25	0.83
Percent Density or Biomass		***<0.1***	***2.7***	***74***	***7.4***	***7.9***	***7.9***			
All 2018 Locations Relative Density or Biomass (%)		***0.77***	***4.3***	***60***	***14***	***4.6***	***14***			

Table D2-1. Phytoplankton density (cells/L), biomass (mg/m3), and diversity by major taxa group, Whale Tail Pit study lakes, 2018.

Area-Replicate	Date	Phytoplankton Density (cells/L)						
		Cyanophyte	Chlorophyte	Chrysophyte	Diatom	Cryptophyte	Dinoflagellate	**TOTAL**
Lake A-20								
A20-21	2-Jun-18	0	308,511	132,406	163,921	100	2,300	607,237
A20-22	2-Jun-18	0	255,319	241,835	115,475	4,046	1,800	618,475
A20-23	16-Jul-18	0	137,296	1,038,696	125,728	7,584	1,200	1,310,504
A20-24	16-Jul-18	0	64,856	842,128	125,928	16,768	1,200	1,050,880
A20-25	17-Aug-18	7,184	684,080	763,304	337,664	31,136	1,000	1,824,368
A20-26	17-Aug-18	57,672	669,112	540,000	253,656	8,784	1,400	1,530,624
A20-27	22-Sep-18	200	611,640	640,976	417,104	22,752	1,000	1,693,672
A20-28	22-Sep-18	400	332,064	339,648	512,496	15,368	800	1,200,776
A20-29	1-Nov-18	0	479,124	328,141	648,952	4,746	300	1,461,263
A20-30	1-Nov-18	0	340,626	401,063	675,075	10,738	100	1,427,602
Percent Density or Biomass		***0.51***	***31***	***41***	***27***	***0.96***	***<0.1***	
Lake A-76								
A76-21	2-Jun-18	0	315,603	280,396	103,391	6,246	3,100	708,736
A76-22	2-Jun-18	0	244,681	251,727	94,053	2,000	2,400	594,860
A76-23	21-Jul-18	0	130,112	901,800	317,912	8,584	1,400	1,359,808
A76-24	21-Jul-18	0	180,200	879,648	262,024	7,584	1,400	1,330,856
A76-25	18-Aug-18	0	834,744	619,224	958,272	16,568	800	2,429,608
A76-26	18-Aug-18	0	783,856	641,376	791,840	37,920	1,000	2,255,992
A76-27	9-Sep-18	0	496,096	648,160	879,248	17,168	14,868	2,055,540
A76-28	9-Sep-18	0	511,464	427,656	656,544	600	7,584	1,603,848
A76-29	25-Nov-18	0	450,455	409,102	412,748	42,653	300	1,315,257
A76-30	25-Nov-18	0	503,546	434,124	416,594	7,492	300	1,362,056
Percent Density or Biomass		***<0.1***	***30***	***37***	***33***	***0.98***	***0.22***	
Lake DS-1								
DS1-19	3-Jun-18	0	7,184	2,806,408	28,936	21,168	4,000	2,867,696
DS1-20	3-Jun-18	0	0	2,970,256	36,120	14,784	2,800	3,024,160
DS1-21	20-Jul-18	0	447,208	1,461,352	329,280	54,088	6,000	2,297,928
DS1-22	20-Jul-18	0	274,592	1,466,736	212,536	64,472	24,352	2,042,888
DS1-23	19-Aug-18	0	253,040	886,432	140,096	46,304	2,800	1,328,672
DS1-24	19-Aug-18	0	281,176	834,944	96,392	3,400	4,200	1,220,112
DS1-25	10-Sep-18	0	145,280	1,005,176	131,728	102,976	1,800	1,386,960
DS1-26	10-Sep-18	0	107,960	1,110,136	223,120	59,872	15,368	1,516,456
DS1-27	26-Nov-18	0	535,461	617,475	141,598	11,838	1,100	1,307,473
DS1-28	26-Nov-18	0	351,064	705,928	130,114	57,138	100	1,244,343
Percent Density or Biomass		***<0.1***	***13***	***76***	***8.1***	***2.4***	***0.34***	
All 2018 Locations Relative Density or Biomass (%)		***2856***	***324028***	***558334***	***301284***	***17862***	***2290***	

Figure D2-1. Cyanophyte biomass (mg/m^3) from Whale Tail Pit lakes since 2015.

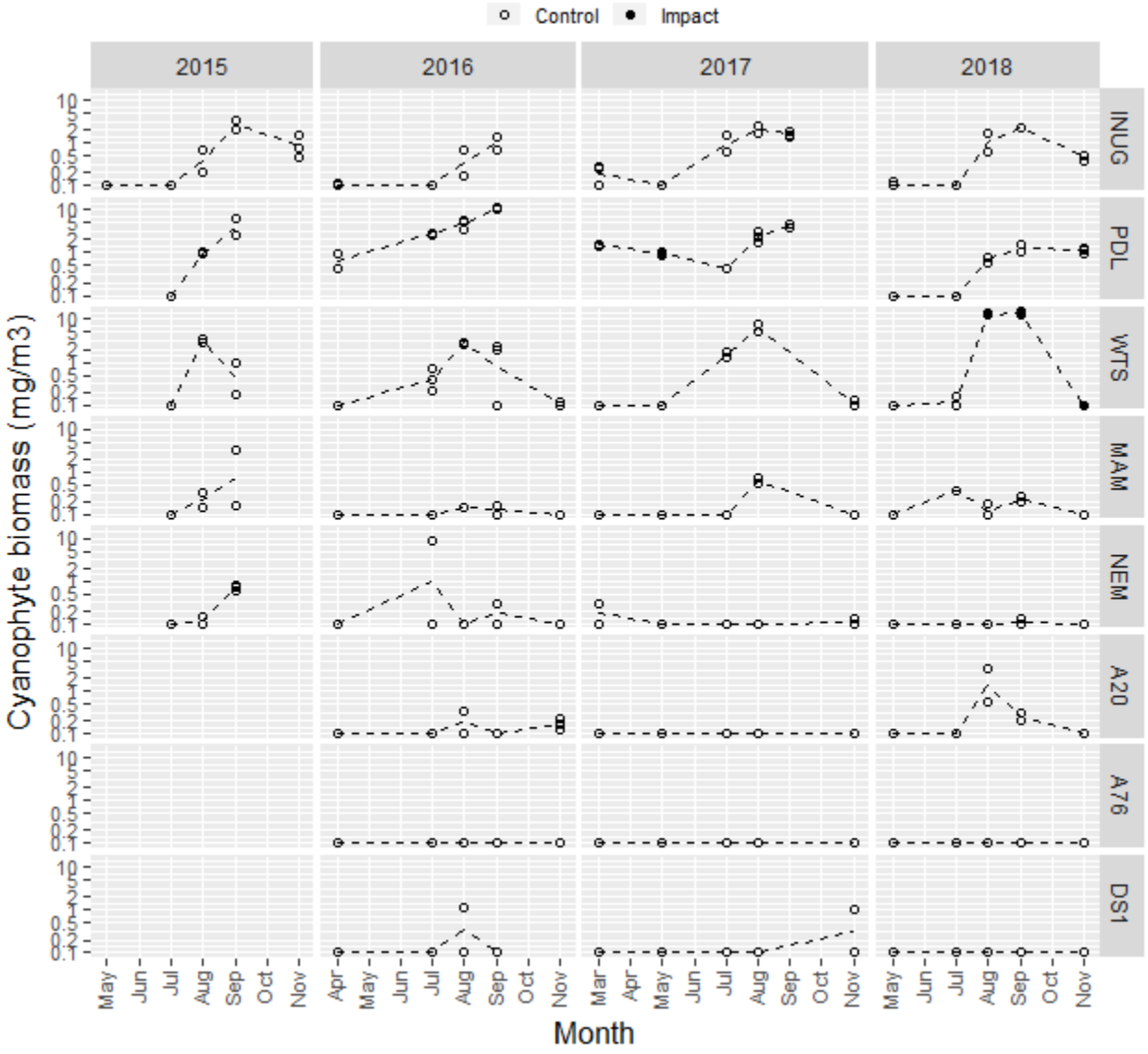


Figure D2-2. Chlorophyte biomass (mg/m^3) from Whale Tail Pit lakes since 2015.

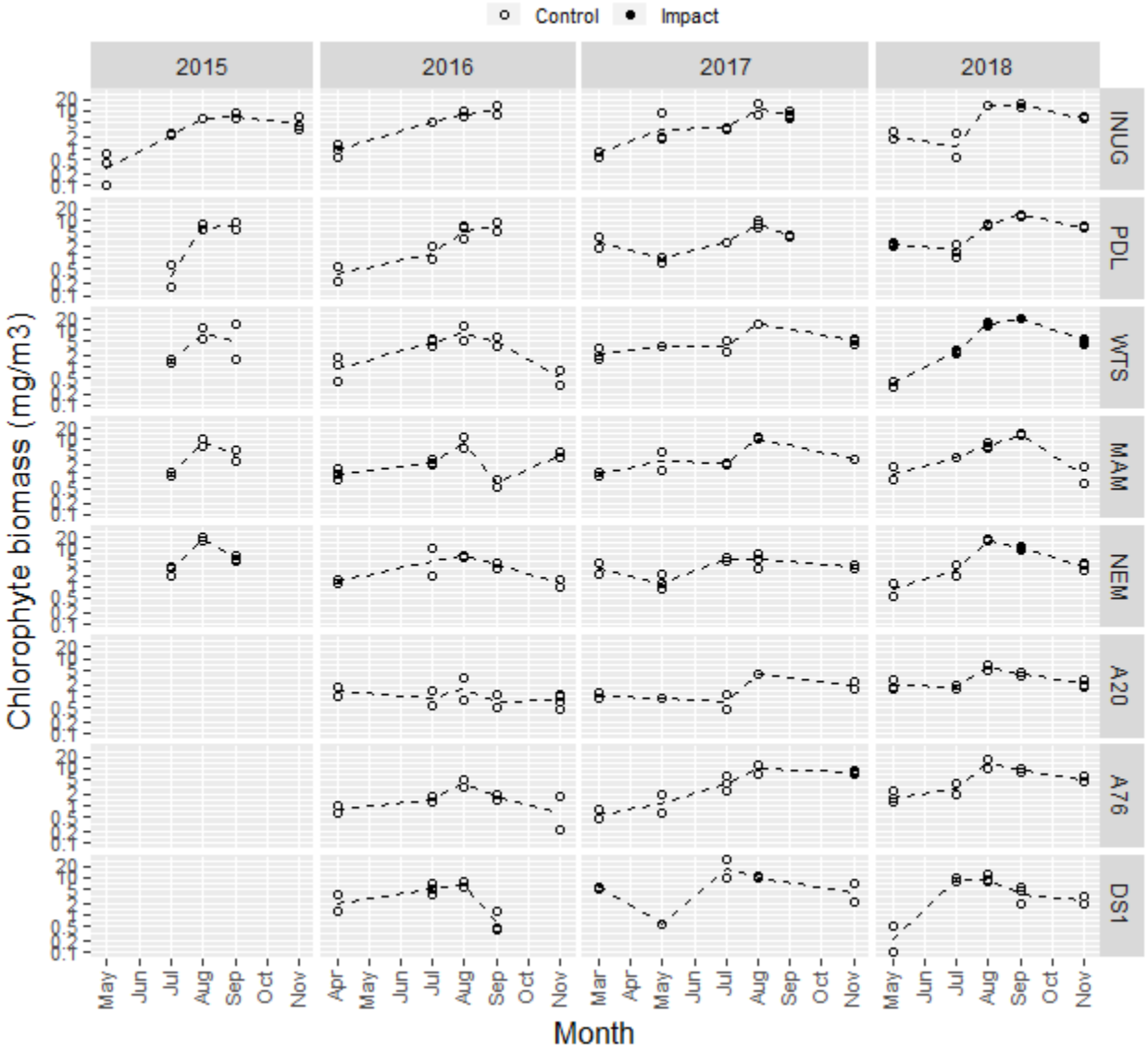


Figure D2-3. Chrysophyte biomass (mg/m^3) from Whale Tail Pit lakes since 2015.

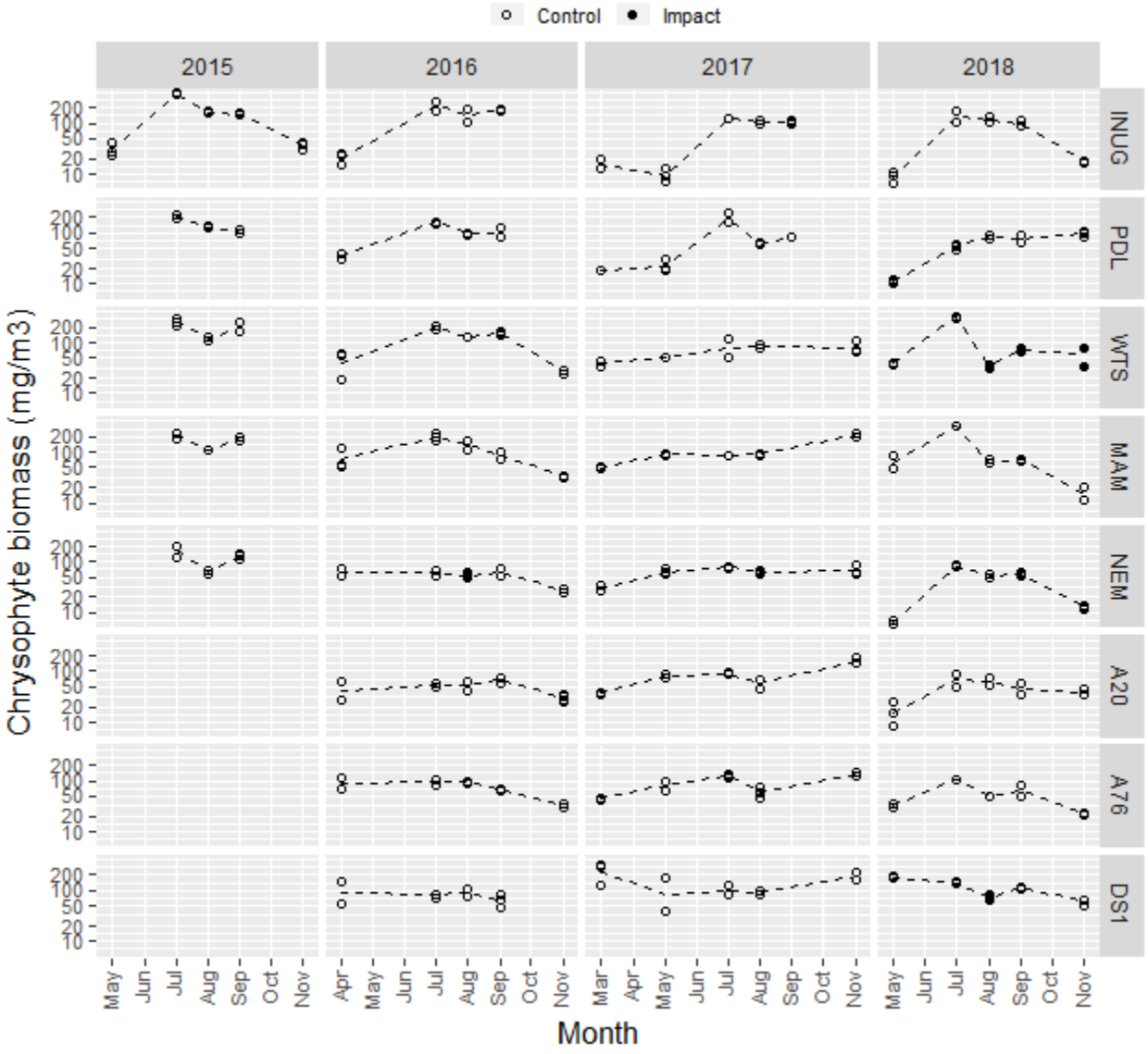


Figure D2-4. Diatom biomass (mg/m^3) from Whale Tail Pit lakes since 2015.

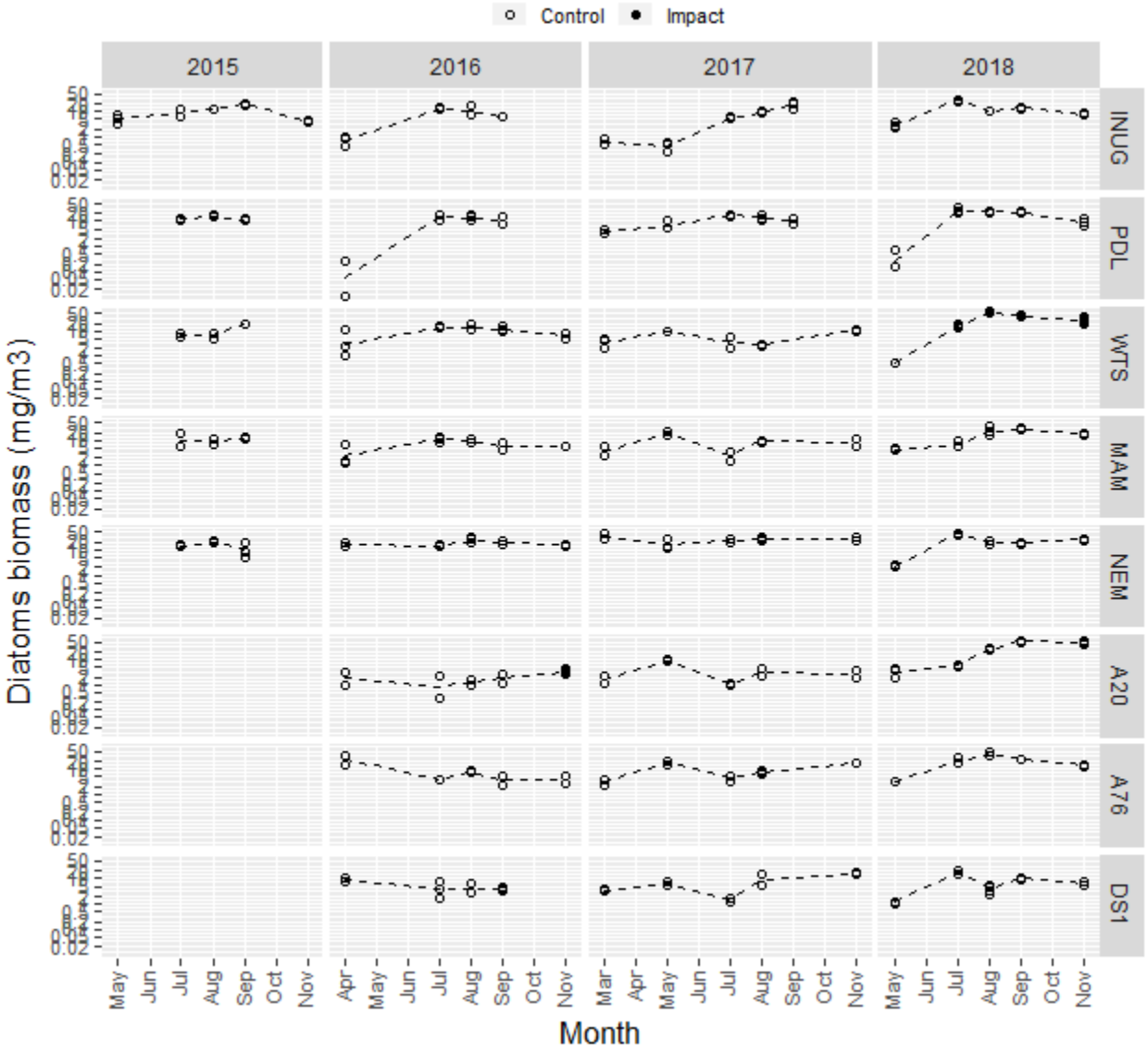


Figure D2-5. Cryptophyte biomass (mg/m^3) from Whale Tail Pit lakes since 2015.

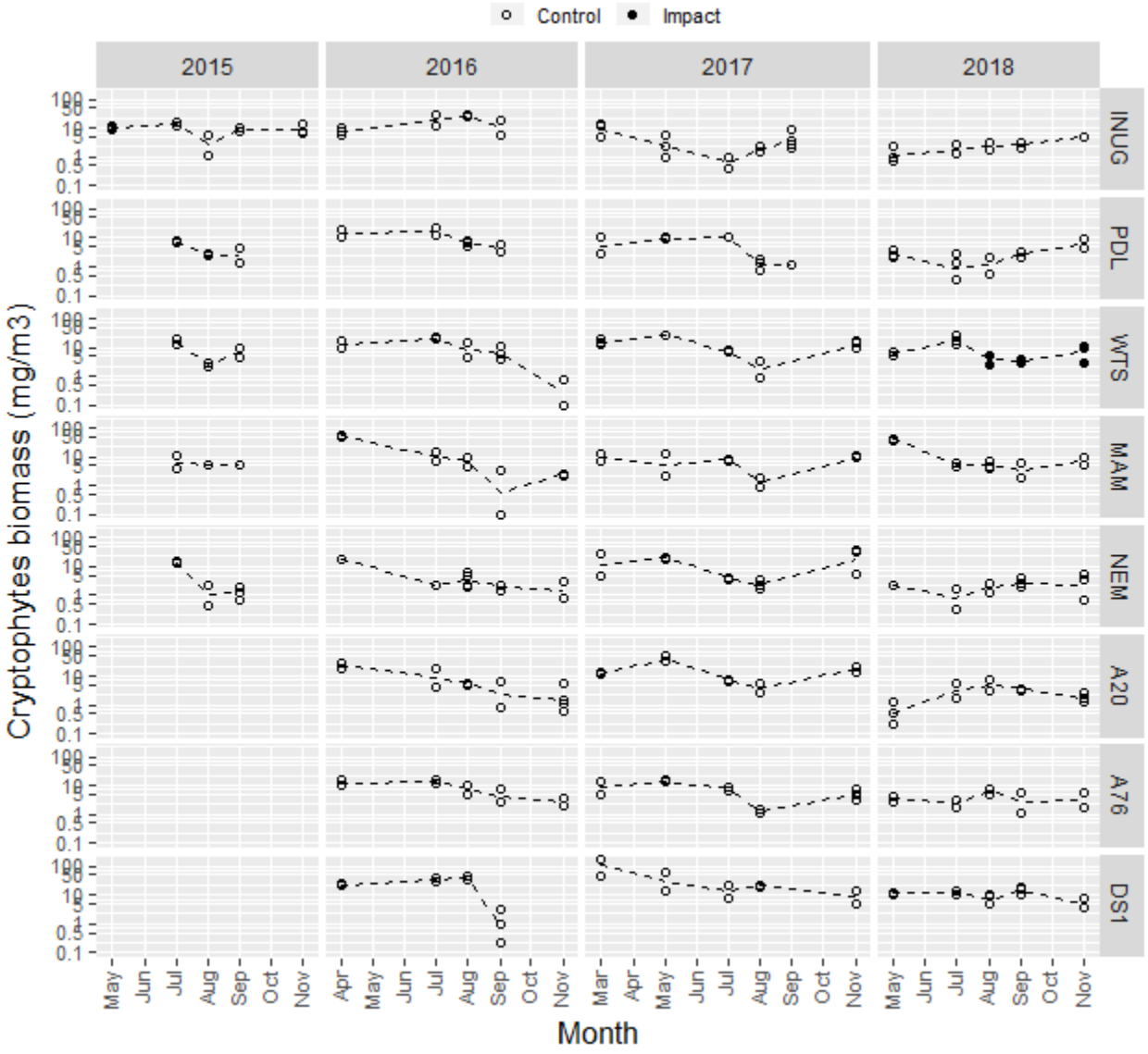


Figure D2-6. Dinoflagellate biomass (mg/m^3) from Whale Tail Pit lakes since 2015.



Figure D2-7. Phytoplankton density (cells/L) by major taxa group from Whale Tail Pit lakes since 2015.

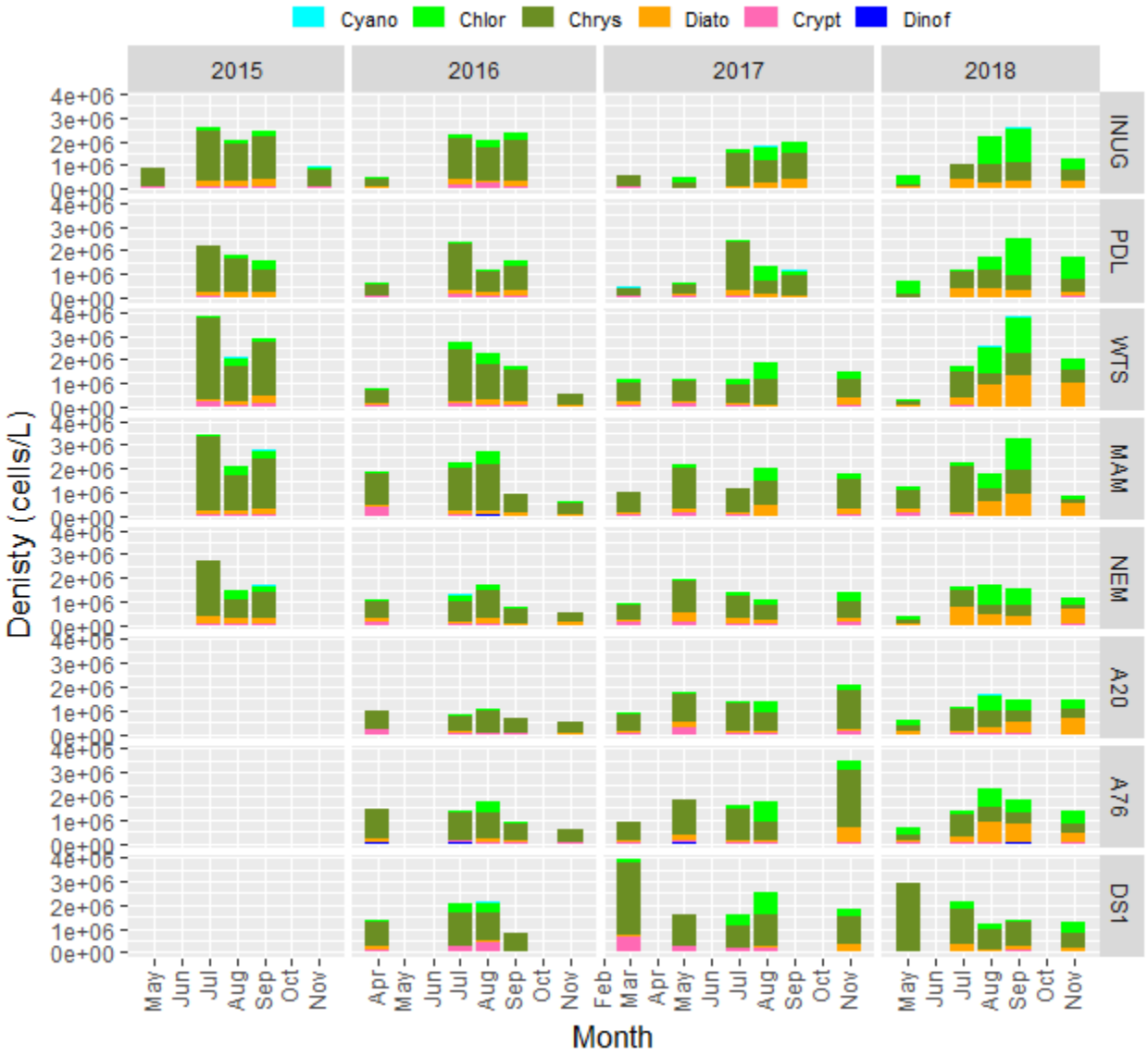


Figure D2-8. Relative phytoplankton density from Whale Tail Pit lakes since 2015.

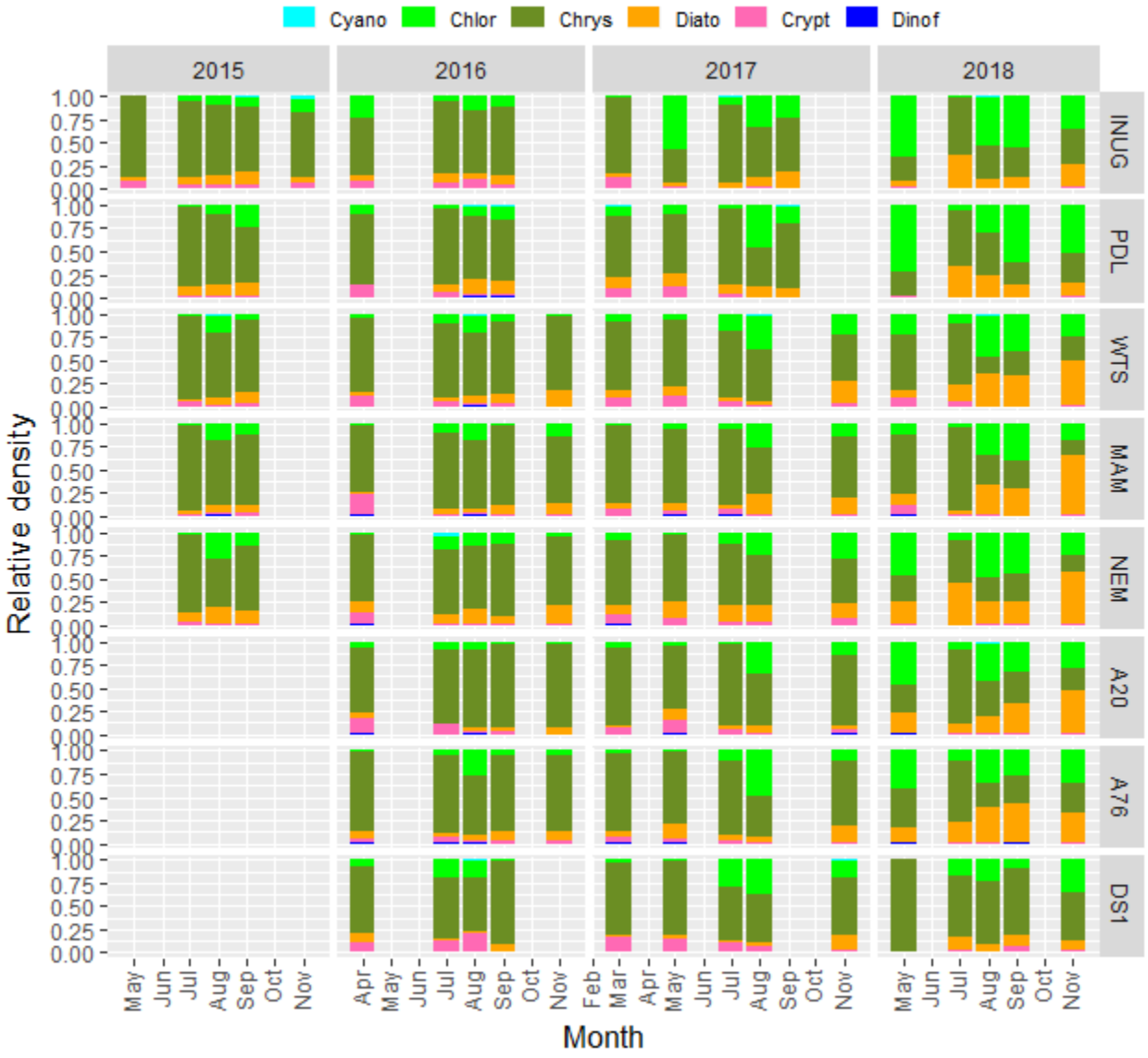


Figure D2-9. Cyanophyte density (cells/L) from Whale Tail Pit lakes since 2015.

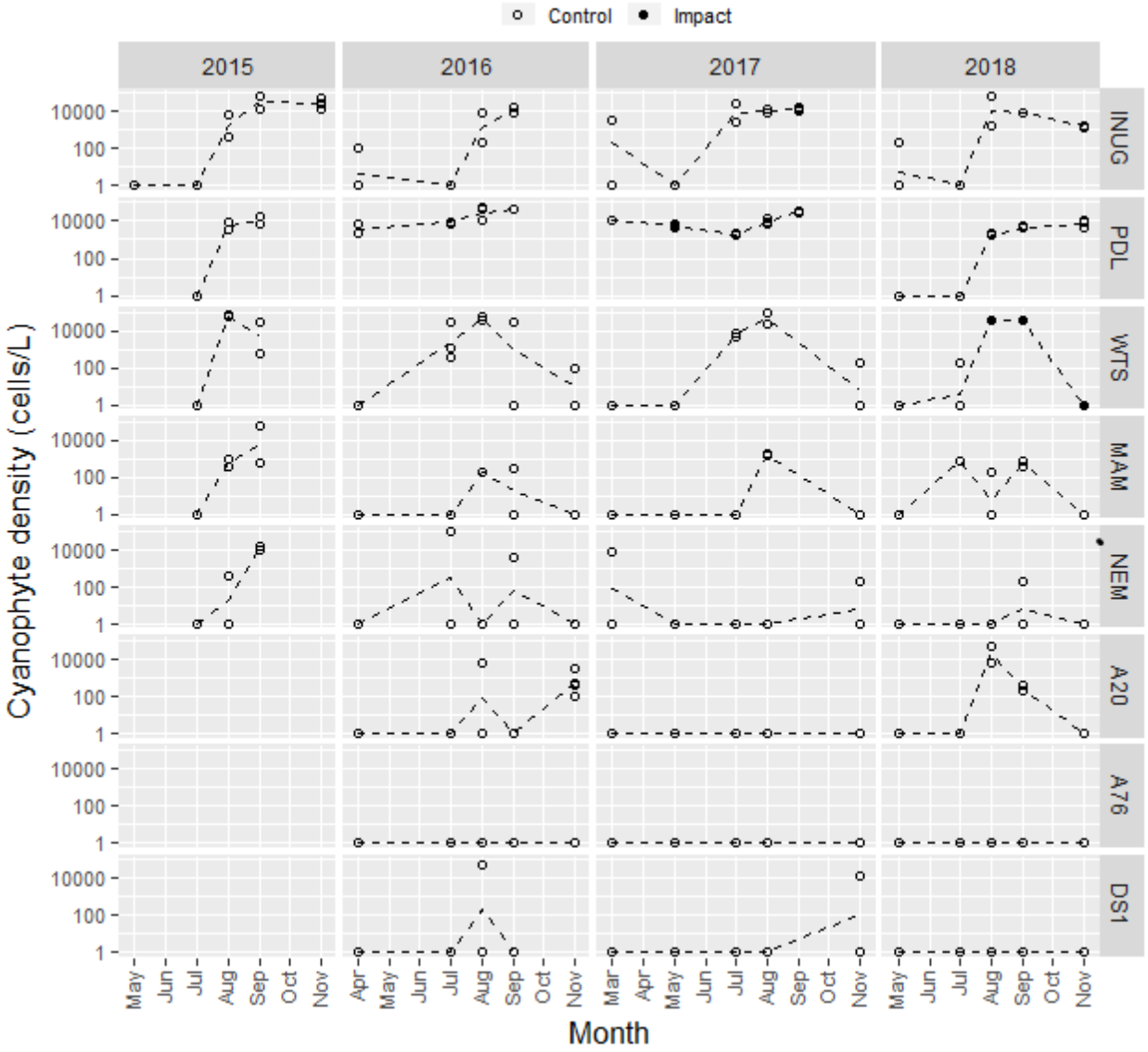


Figure D2-10. Chlorphyte density (cells/L) from Whale Tail Pit lakes since 2015.

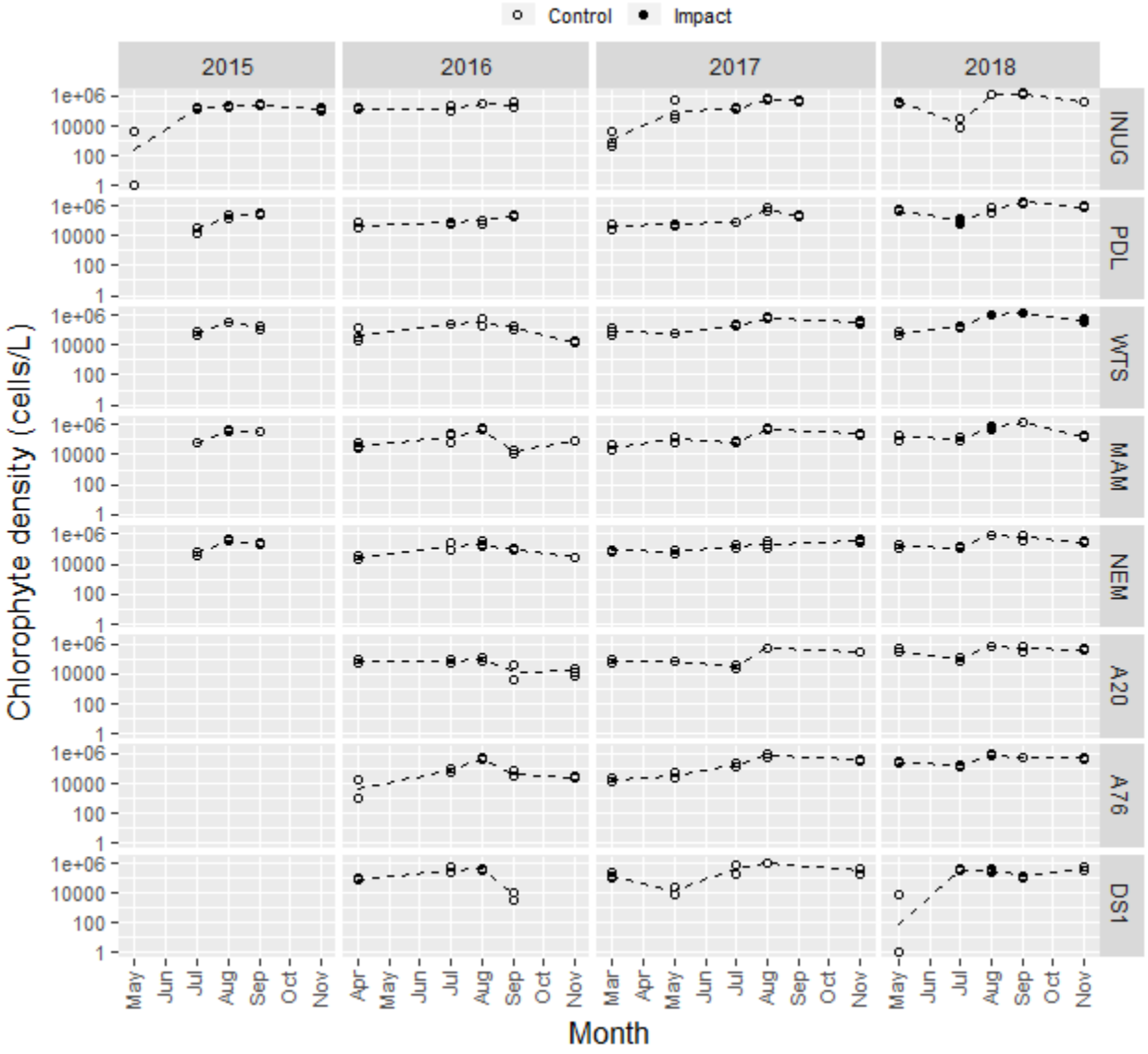


Figure D2-11. Chrysophyte density (cells/L) from Whale Tail Pit lakes since 2015.

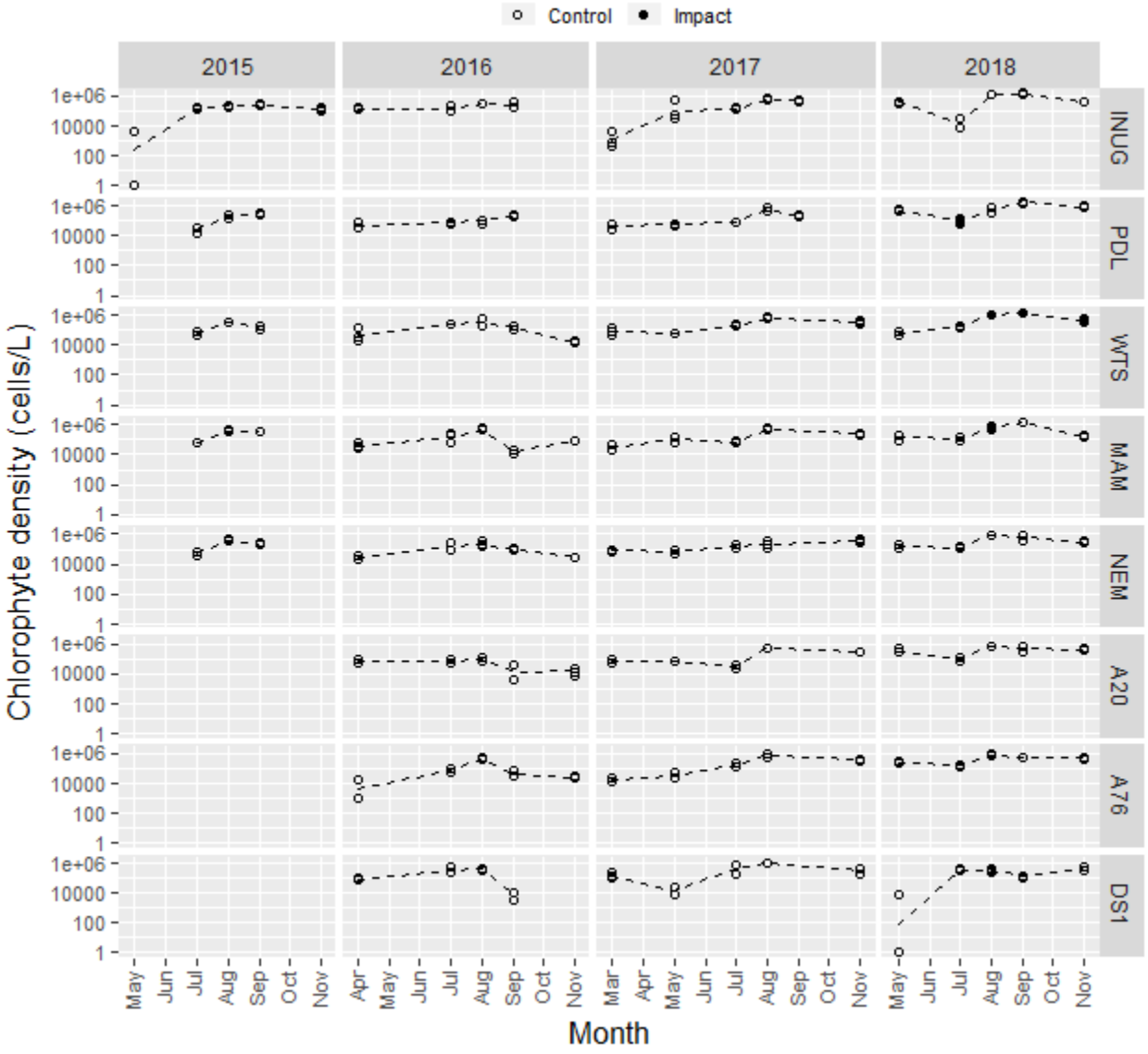


Figure D2-12. Diatom density (cells/L) from Whale Tail Pit lakes since 2015.

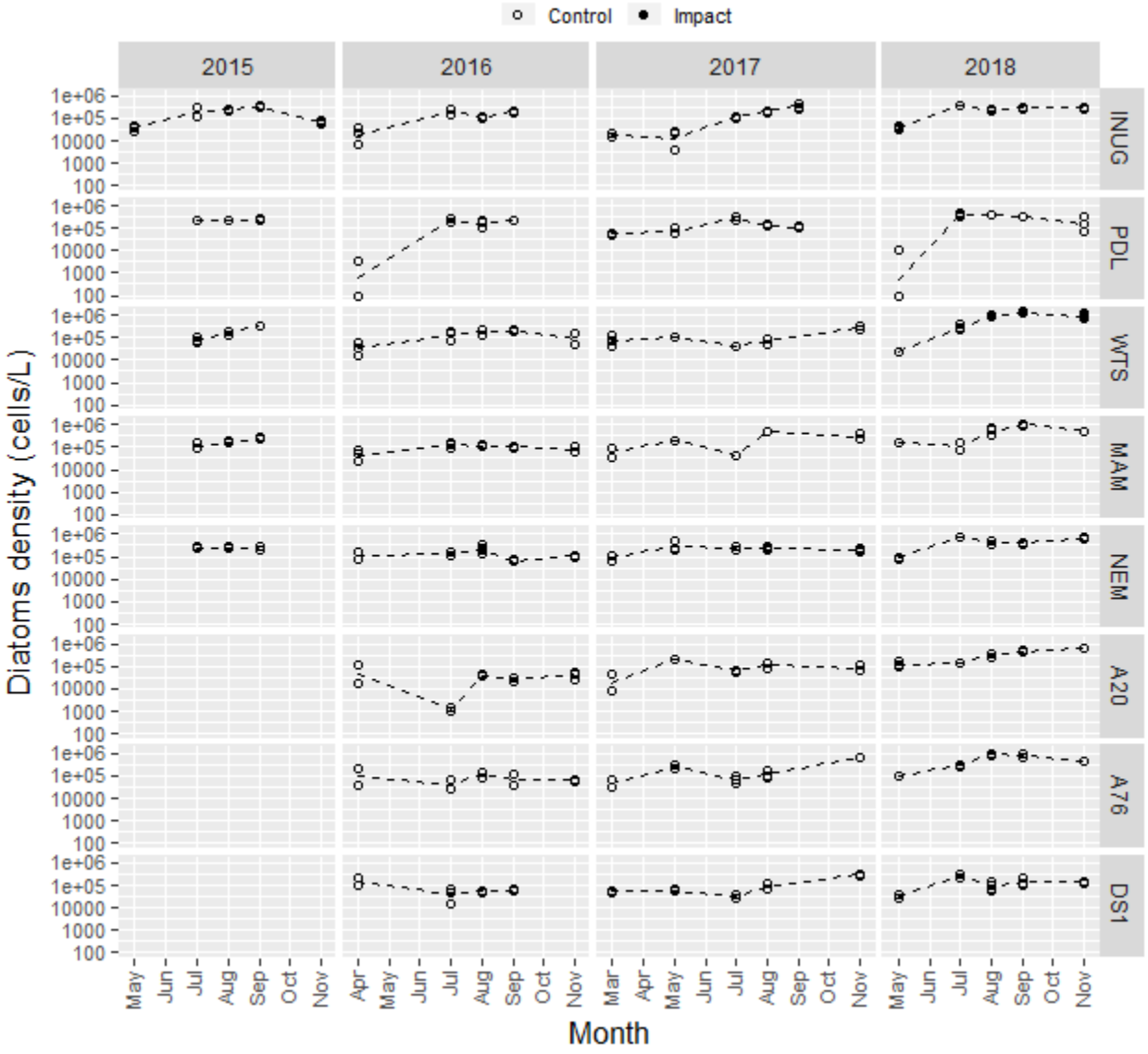


Figure D2-13. Cryptophytes density (cells/L) from Whale Tail Pit lakes since 2015.

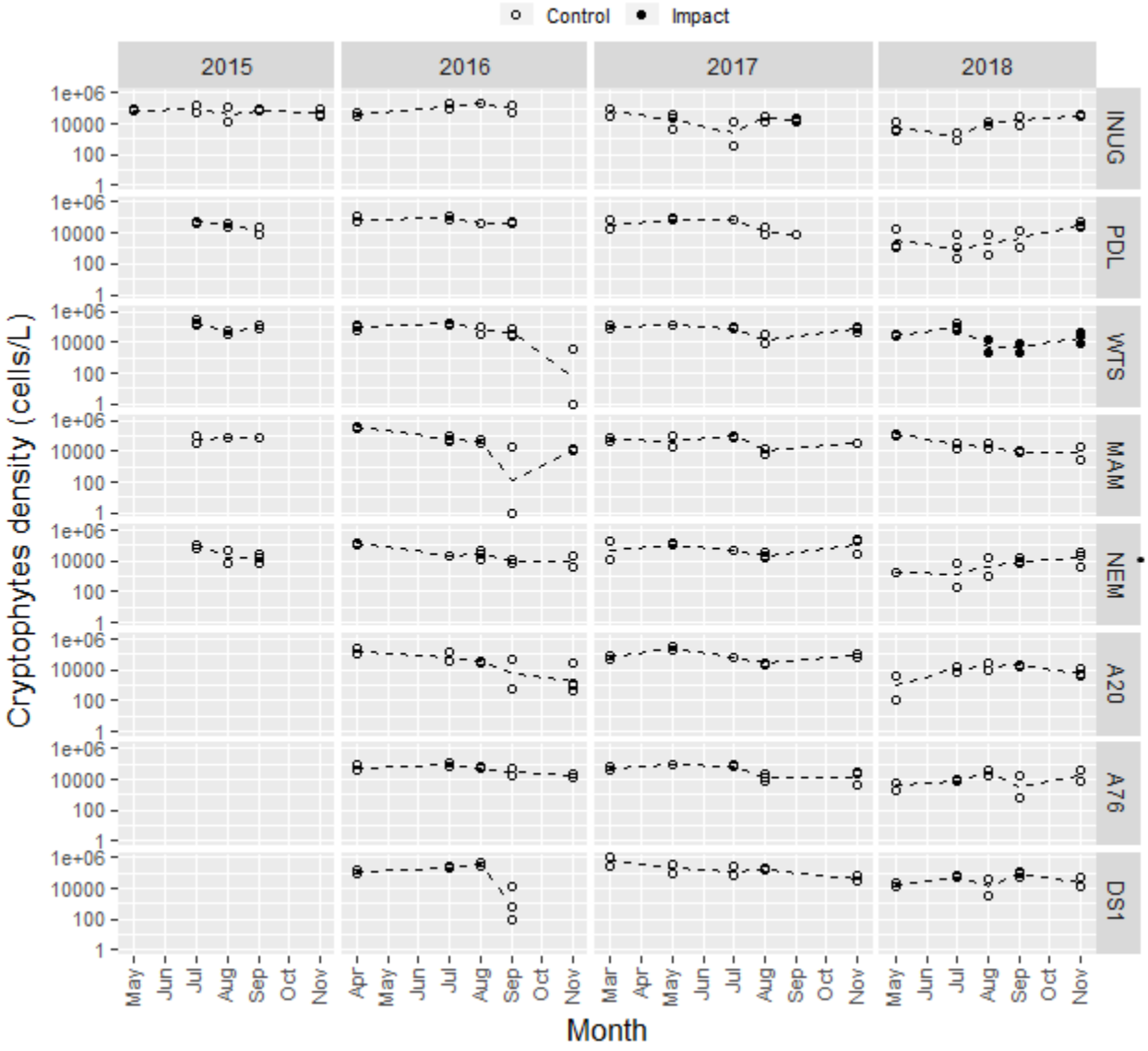


Figure D2-14. Dinoflagellate density (cells/L) from Whale Tail Pit lakes since 2015.

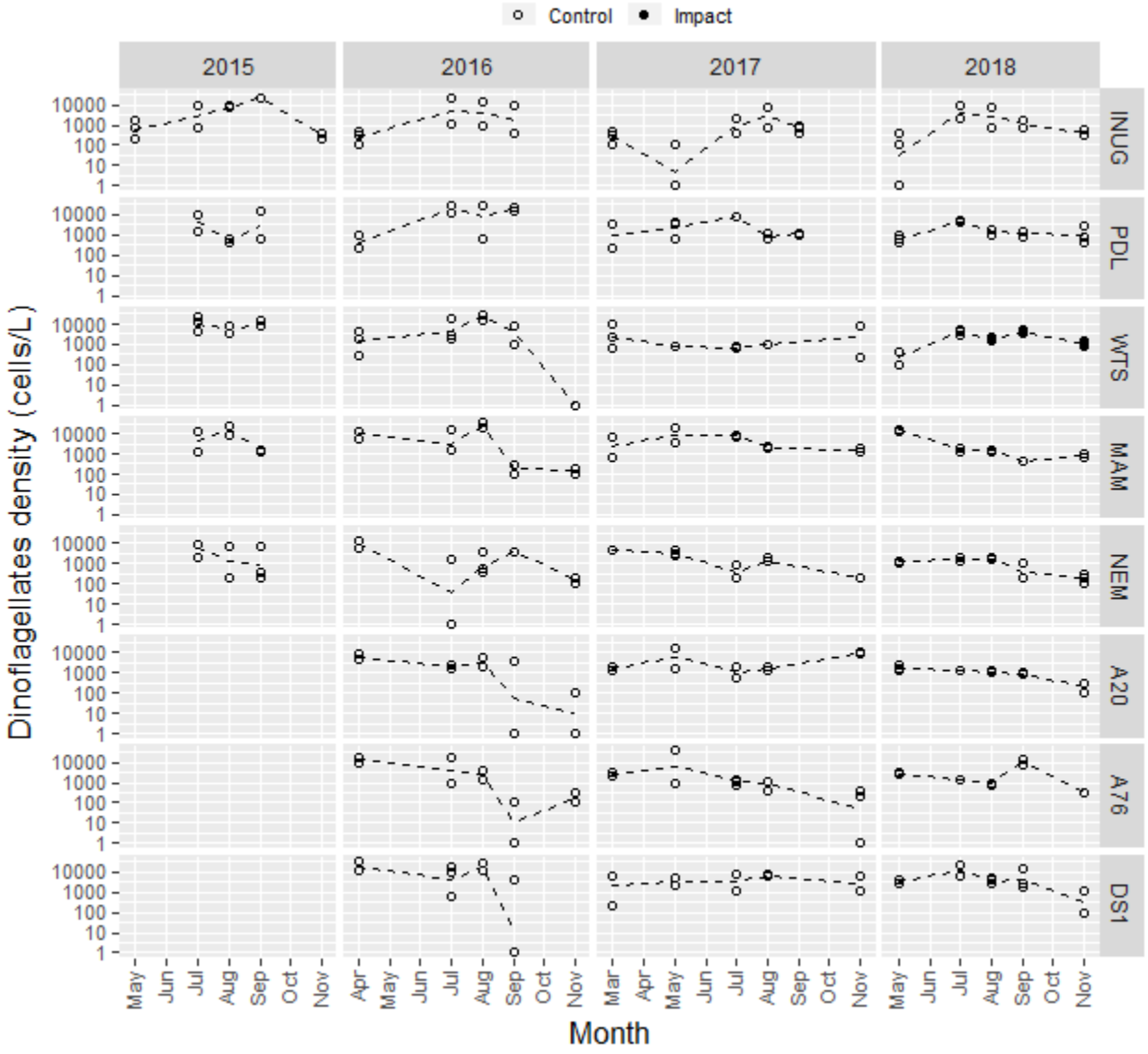
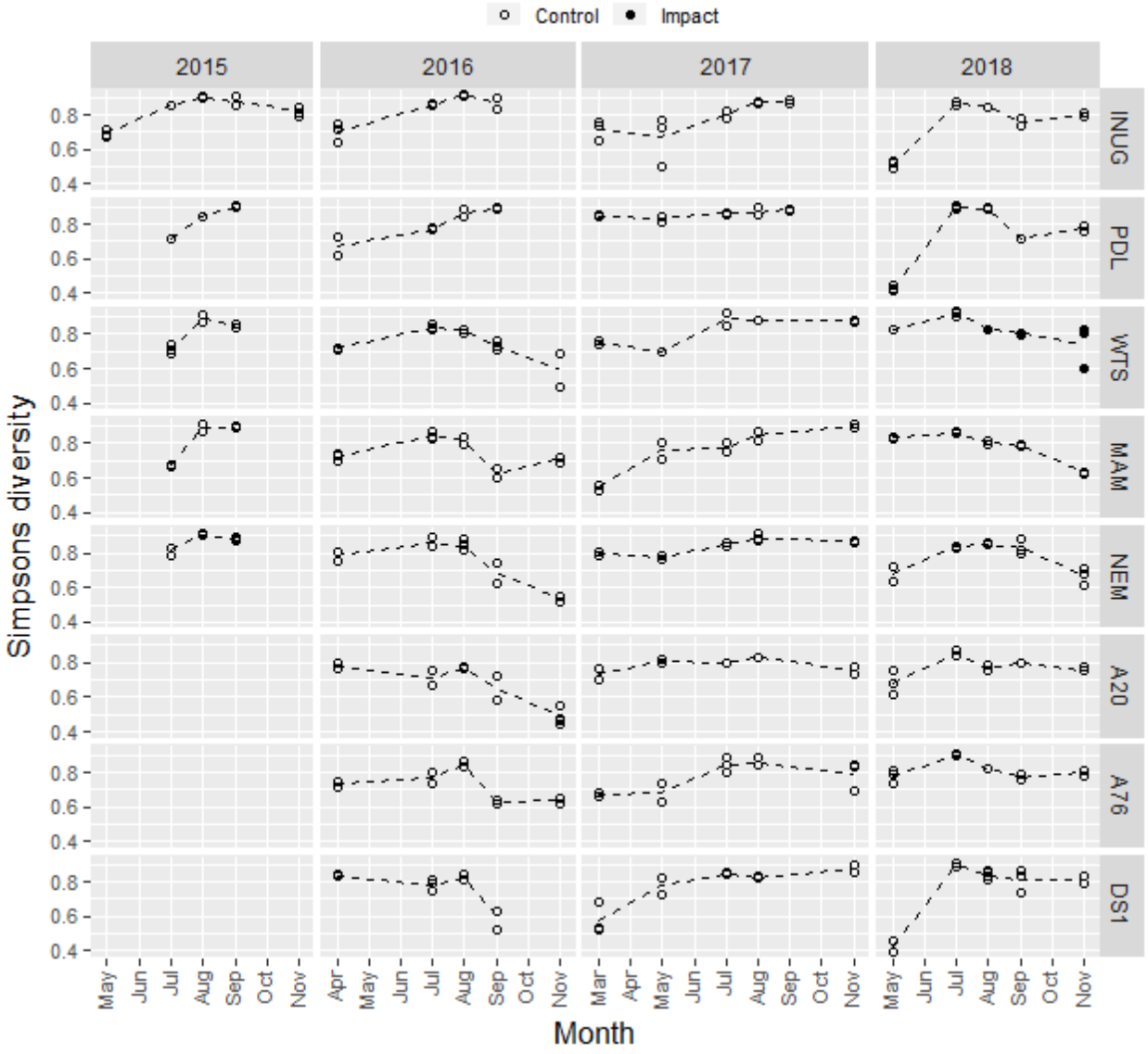


Figure D2-15. Simpsons' Diversity for the phytoplankton community from Whale Tail Pit lakes since 2015.



APPENDIX D3
PHYTO DATA – BAKER LAKE

LIST OF TABLES – APPENDIX D3

Table D3-1. Phytoplankton density (cells/L), biomass (mg/m3), and diversity by major taxa group, Baker Lake, 2018. 1

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Table D3-1. Phytoplankton density (cells/L), biomass (mg/m3), and diversity by major taxa group, Baker Lake, 2018.

Area-Replicate	Date	Phytoplankton Biomass (mg/m^3)								Taxa Richness	Simpson's Diversity
		Cyanophyte	Chlorophyte	Euglenophyte	Chrysophyte	Diatom	Cryptophyte	Dinoflagellate	TOTAL		
Baker Akilahaarjuk Point											
BAP-55	29-Jul-18	0	10.8	0	93	52.36	15	21.29	192	33	0.88
BAP-56	29-Jul-18	0	0.5	0	66	35.55	9	30.26	142	32	0.87
BAP-57	21-Aug-18	0	7.5	0	38	16.06	6	20.74	88	27	0.59
BAP-58	21-Aug-18	0	5.2	0	31	24.11	12	24.53	97	29	0.65
BAP-59	8-Sep-18	0	6.1	0	83	31.16	30	7.13	157	35	0.91
BAP-60	8-Sep-18	0	5.1	0	63	23.89	18	5.08	116	32	0.89
Percent Density or Biomass		***<0.1***	***4.4***	***<0.1***	***47***	***23***	***11***	***14***			
Baker Barge Dock											
BBD-55	29-Jul-18	0	10.4	0	43	18.65	8.8	16.96	98	30	0.86
BBD-56	29-Jul-18	0	3.2	0	46	12.77	10	37.64	109	32	0.84
BBD-57	21-Aug-18	0	9.2	0	36	22.99	7	14.41	89	31	0.68
BBD-58	21-Aug-18	0	6.7	0.0	52	29.13	7	14.05	109	30	0.72
BBD-59	8-Sep-18	0	2.9	0	30	16.12	8	7.54	65	27	0.84
BBD-60	8-Sep-18	0	7	0	29	14.98	2	2.83	56	29	0.82
Percent Density or Biomass		***<0.1***	***7.5***	***<0.1***	***45***	***22***	***8.1***	***18***			
Baker Proposed Jetty											
BPJ-55	29-Jul-18	0	3.3	0	33	21.95	26	14.91	100	28	0.89
BPJ-56	29-Jul-18	1	0.5	0	57	14.00	21	12.69	105	30	0.90
BPJ-57	21-Aug-18	0	2.3	0	40	15.85	14	8.70	80	28	0.89
BPJ-58	21-Aug-18	0	6.0	0	34	20.53	8	10.99	79	33	0.87
BPJ-59	8-Sep-18	0	5.3	0	61	23.99	10	12.16	112	35	0.86
BPJ-60	8-Sep-18	0	3.8	0	50	6.10	27	9.43	97	30	0.87
Percent Density or Biomass		***0.10***	***3.7***	***<0.1***	***48***	***18***	***18***	***12***			
All 2018 Locations Relative Density or Biomass (%)		***<0.1***	***5.1***	***<0.1***	***47***	***21***	***13***	***14***			

Table D3-1. Phytoplankton density (cells/L), biomass (mg/m3), and diversity by major taxa group, Baker Lake, 2018.

Area-Replicate	Date	Phytoplankton Density (cells/L)							
		Cyanophyte	Chlorophyte	Euglenophyte	Chrysophyte	Diatom	Cryptophyte	Dinoflagellate	**TOTAL**
Baker Akilahaarjuk Point									
BAP-55	29-Jul-18	0	179,600	0	1,237,248	346,248	70,856	2,400	1,836,352
BAP-56	29-Jul-18	0	50,288	0	1,029,112	201,168	26,352	5,800	1,312,720
BAP-57	21-Aug-18	0	1,250,016	0	481,328	136,128	29,736	1,800	1,899,008
BAP-58	21-Aug-18	0	1,041,680	0	452,992	191,600	73,240	2,200	1,761,712
BAP-59	8-Sep-18	0	237,272	0	1,042,880	444,672	161,248	1,200	1,887,272
BAP-60	8-Sep-18	0	323,280	0	941,904	307,160	101,976	1,200	1,675,520
Percent Density or Biomass		***<0.1***	***30***	***<0.1***	***50***	***16***	***4.5***	***0.14***	
Baker Barge Dock									
BBD-55	29-Jul-18	0	36,120	0	496,896	286,992	38,720	3,200	861,928
BBD-56	29-Jul-18	200	86,408	0	611,440	186,400	52,088	4,800	941,336
BBD-57	21-Aug-18	0	1,163,808	0	503,480	211,752	24,352	2,200	1,905,592
BBD-58	21-Aug-18	0	955,872	0	525,032	234,104	18,368	1,800	1,735,176
BBD-59	8-Sep-18	0	359,600	0	345,632	207,384	24,352	1,600	938,568
BBD-60	8-Sep-18	0	416,872	0	438,624	185,216	1,400	200	1,042,312
Percent Density or Biomass		***<0.1***	***41***	***<0.1***	***39***	***18***	***2.1***	***0.19***	
Baker Proposed Jetty									
BPJ-55	29-Jul-18	0	57,472	0	518,648	223,720	84,440	1,800	886,080
BPJ-56	29-Jul-18	7,184	28,736	0	626,808	164,048	67,872	1,600	896,248
BPJ-57	21-Aug-18	0	208,336	0	560,752	224,336	80,024	1,200	1,074,648
BPJ-58	21-Aug-18	0	424,656	0	374,168	210,784	16,168	2,200	1,027,976
BPJ-59	8-Sep-18	0	294,944	0	948,688	214,400	51,688	1,400	1,511,120
BPJ-60	8-Sep-18	200	150,864	0	713,016	104,576	160,048	1,000	1,129,704
Percent Density or Biomass		***0.11***	***18***	***<0.1***	***57***	***17***	***7.1***	***0.14***	
All 2018 Locations Relative Density or Biomass (%)		***<0.1***	***30***	***<0.1***	***49***	***17***	***4.5***	***0.15***	

Figure D3-1. Cyanophyte biomass (mg/m^3) from Baker Lake since 2008.

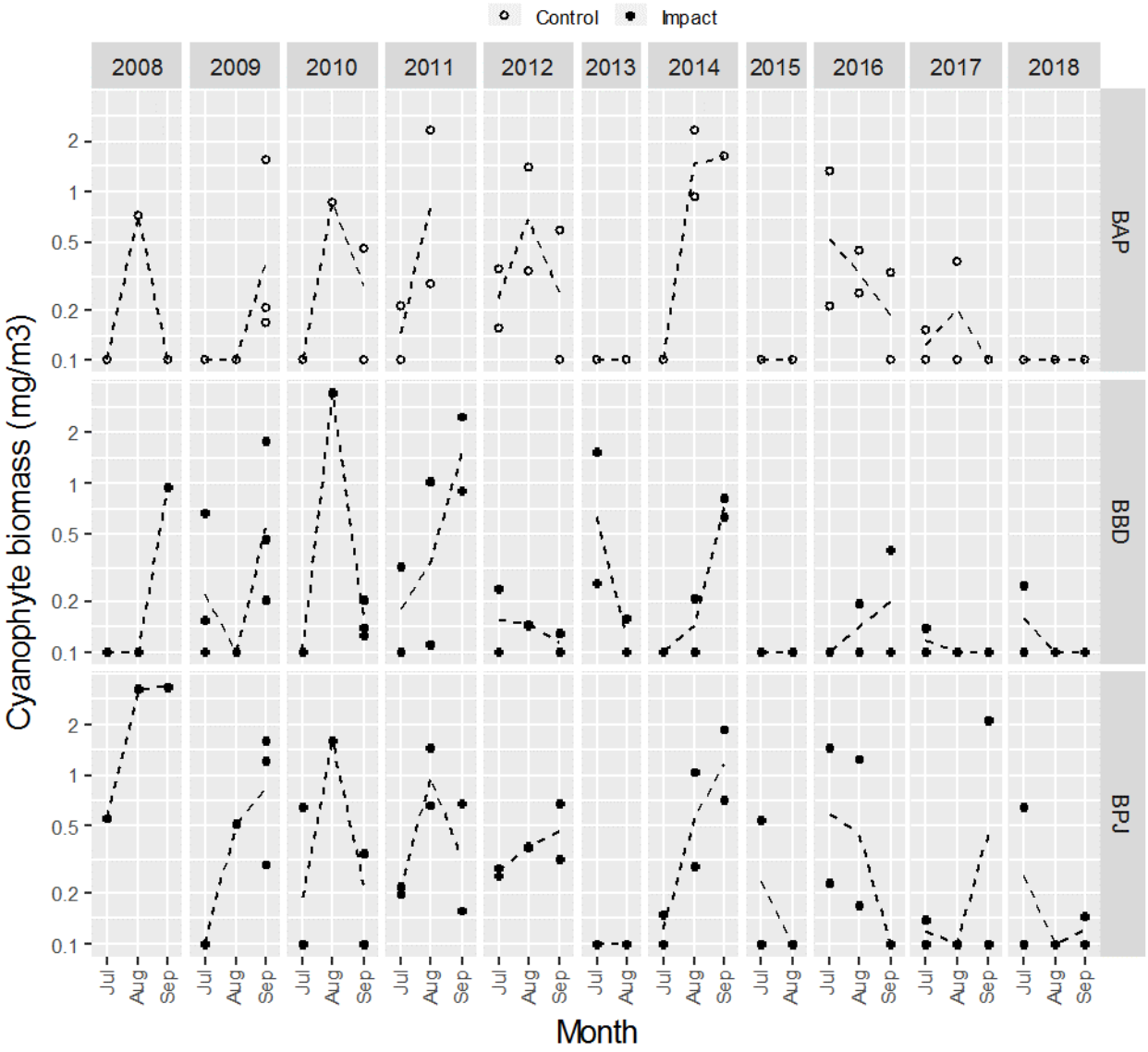


Figure D3-2. Chlorophyte biomass (mg/m^3) from Baker Lake since 2008.

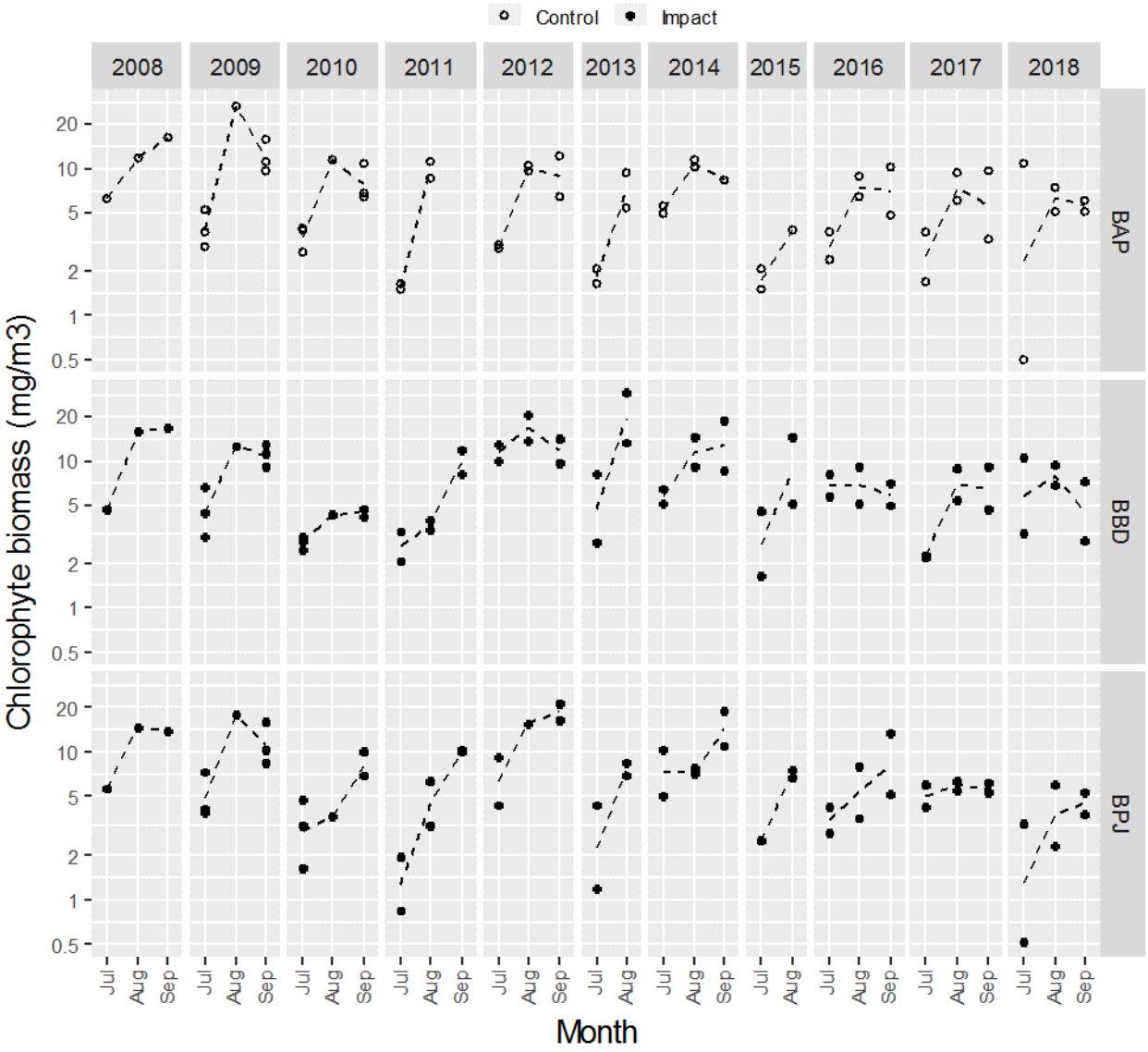


Figure D3-3. Chrysophyte biomass (mg/m^3) from Baker Lake since 2008.

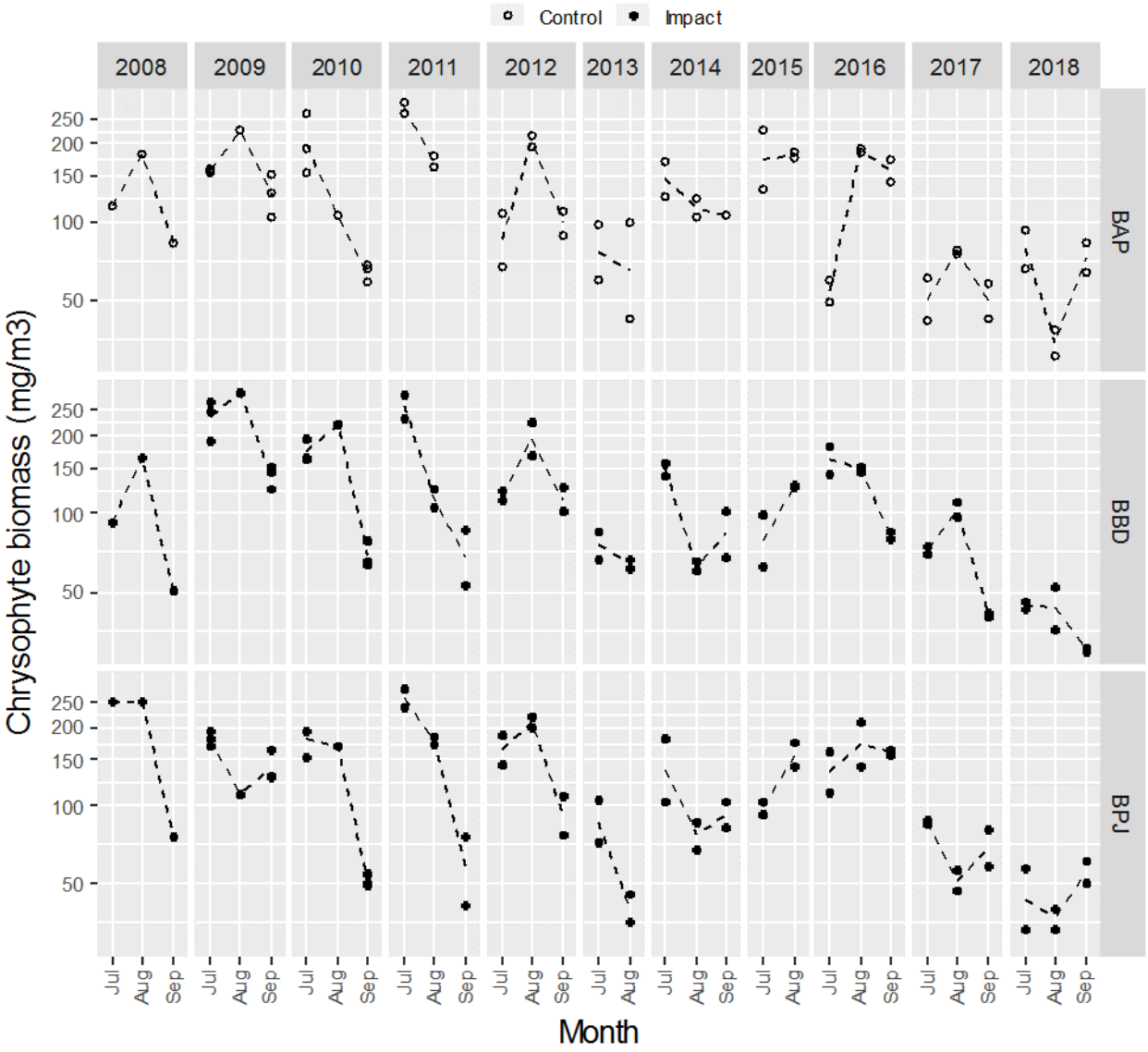


Figure D3-4. Diatom biomass (mg/m^3) from Baker Lake since 2008.

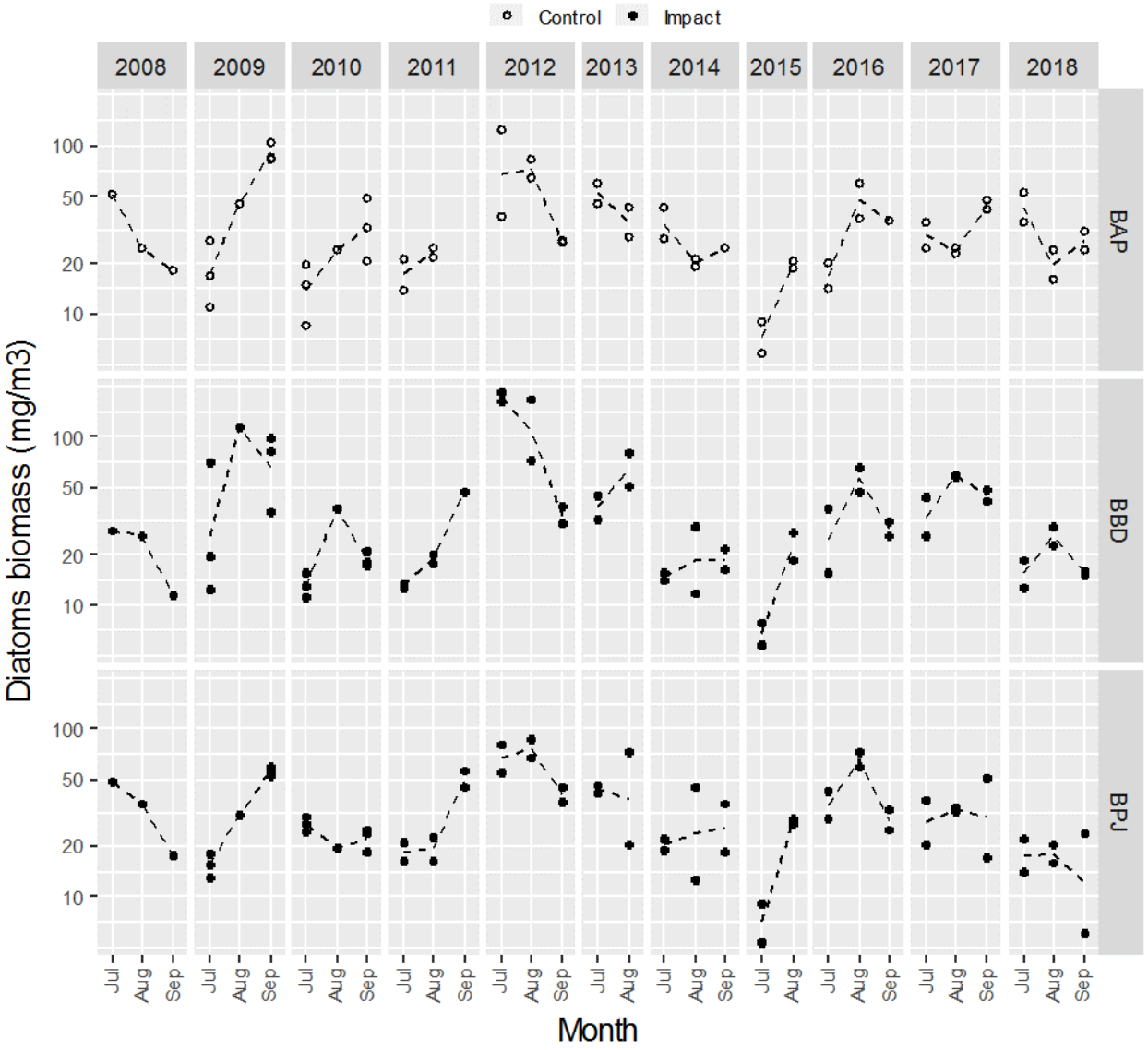


Figure D3-5. Cyrptophyte biomass (mg/m^3) from Baker Lake since 2008.

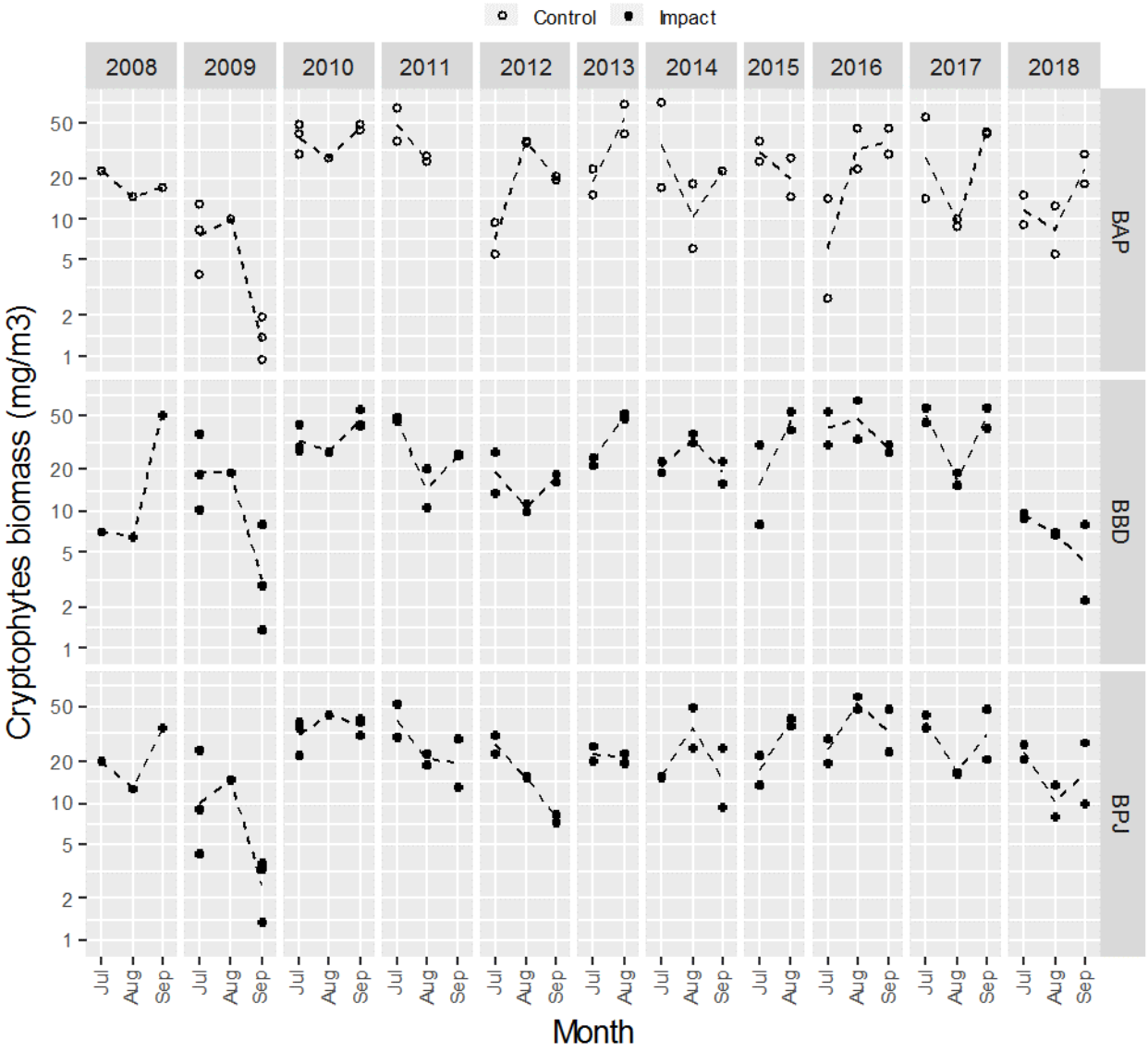


Figure D3-6. Dinoflagellate biomass (mg/m^3) from Baker Lake since 2008.

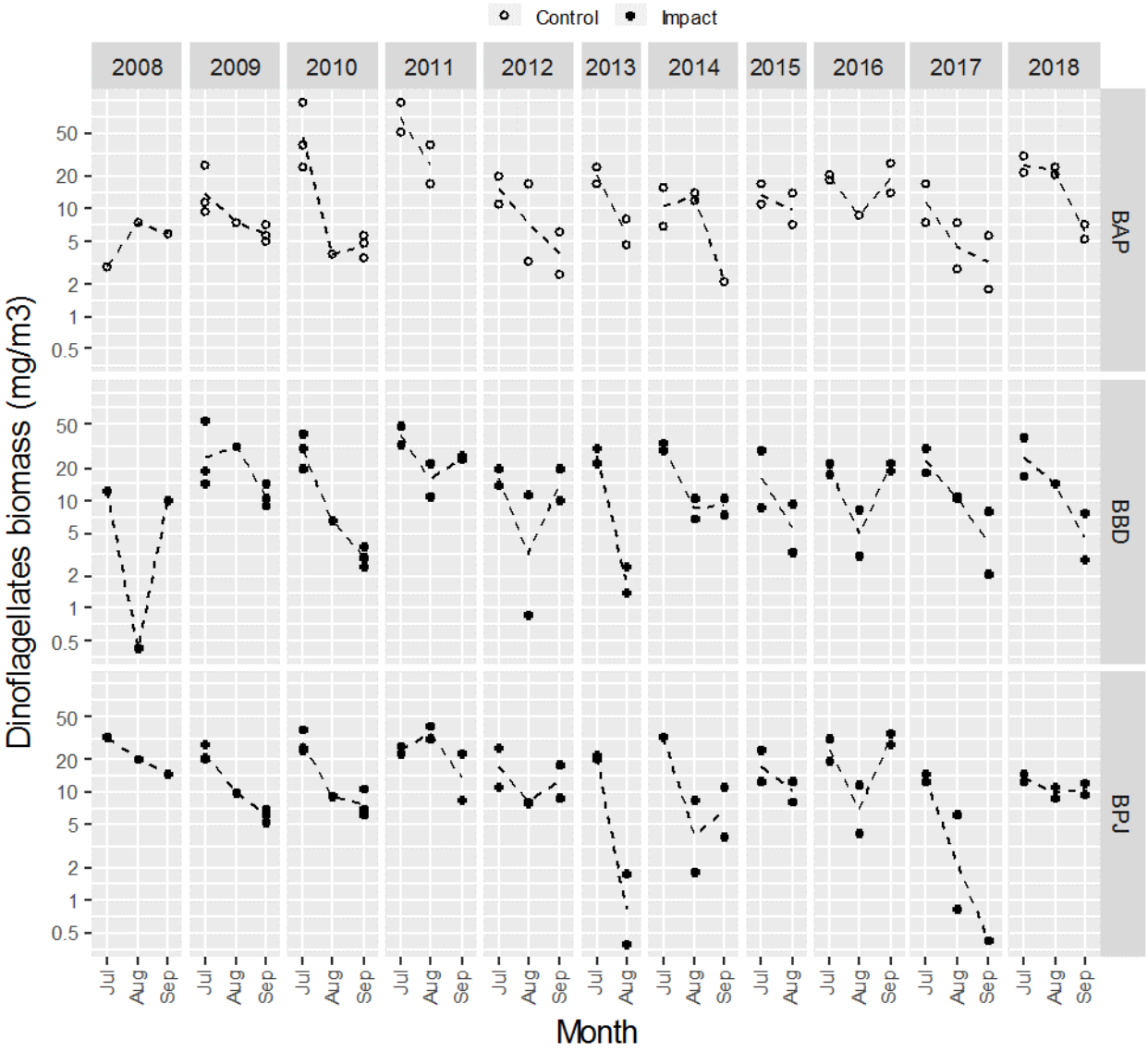


Figure D3-7. Phytoplankton density (cells/L) by major taxa group from Baker Lake since 2008.

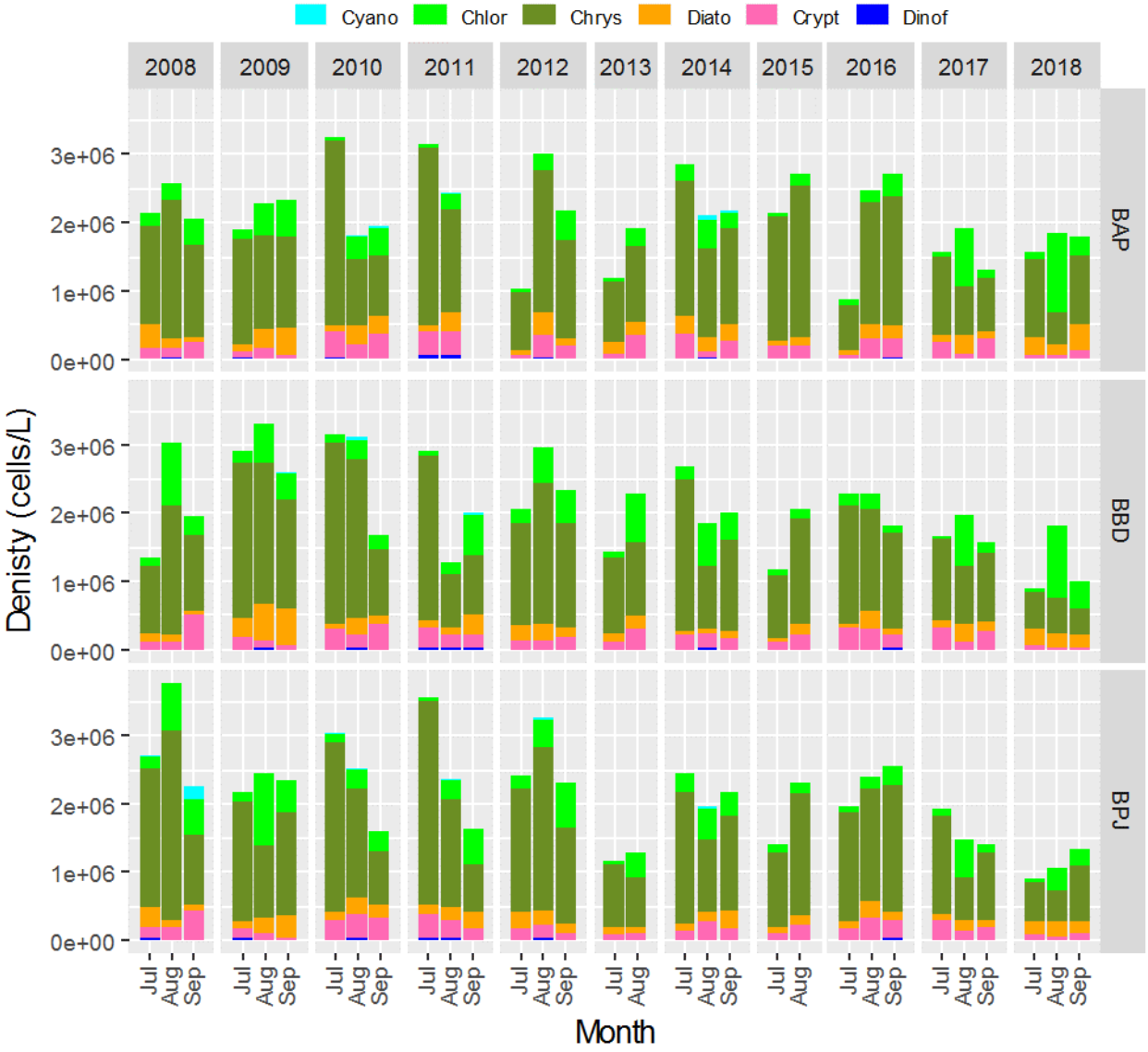


Figure D3-8. Relative phytoplankton density from Baker Lake since 2008.

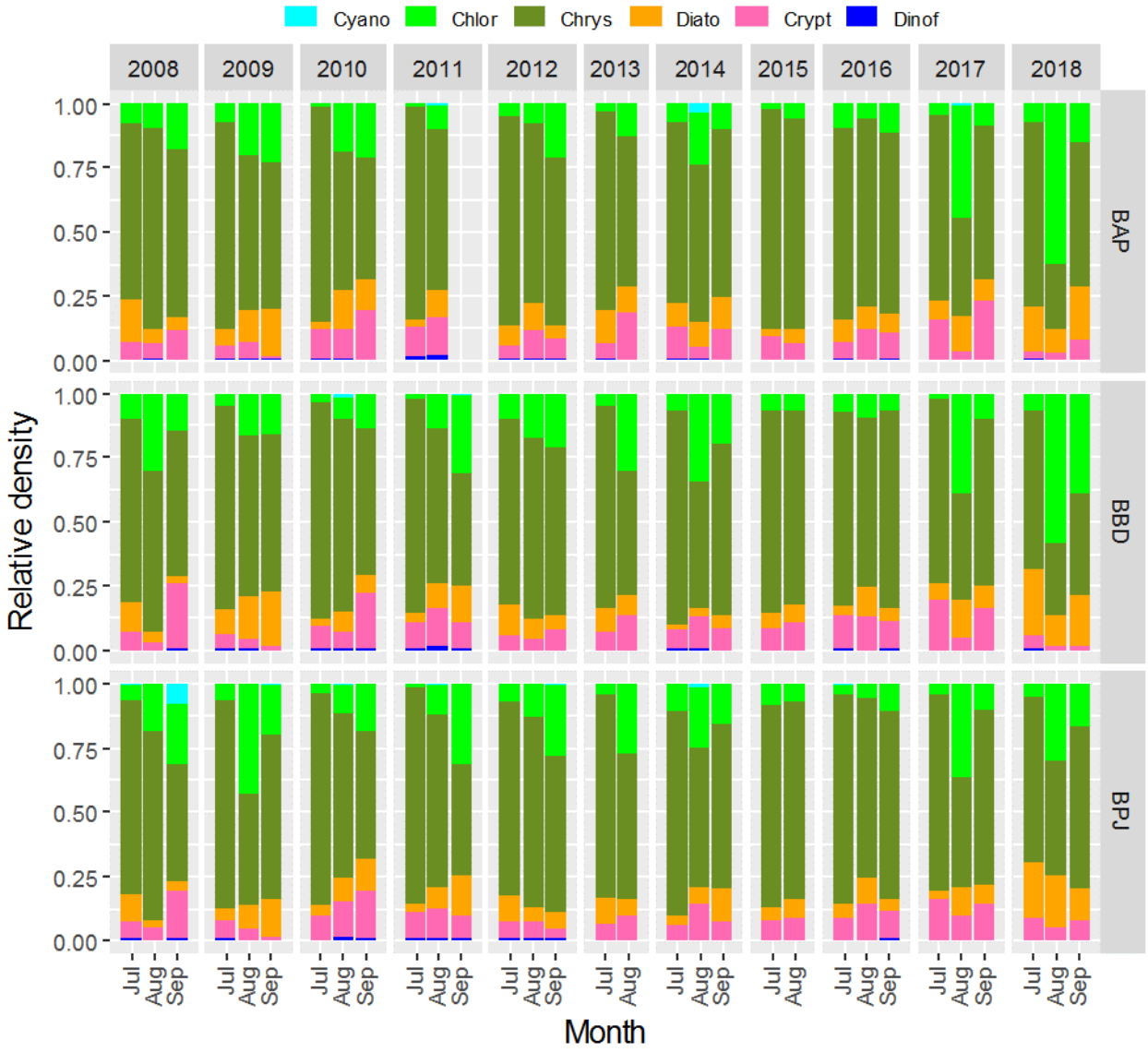


Figure D3-9. Cyanophyte density (cells/L) from Baker Lake since 2008.

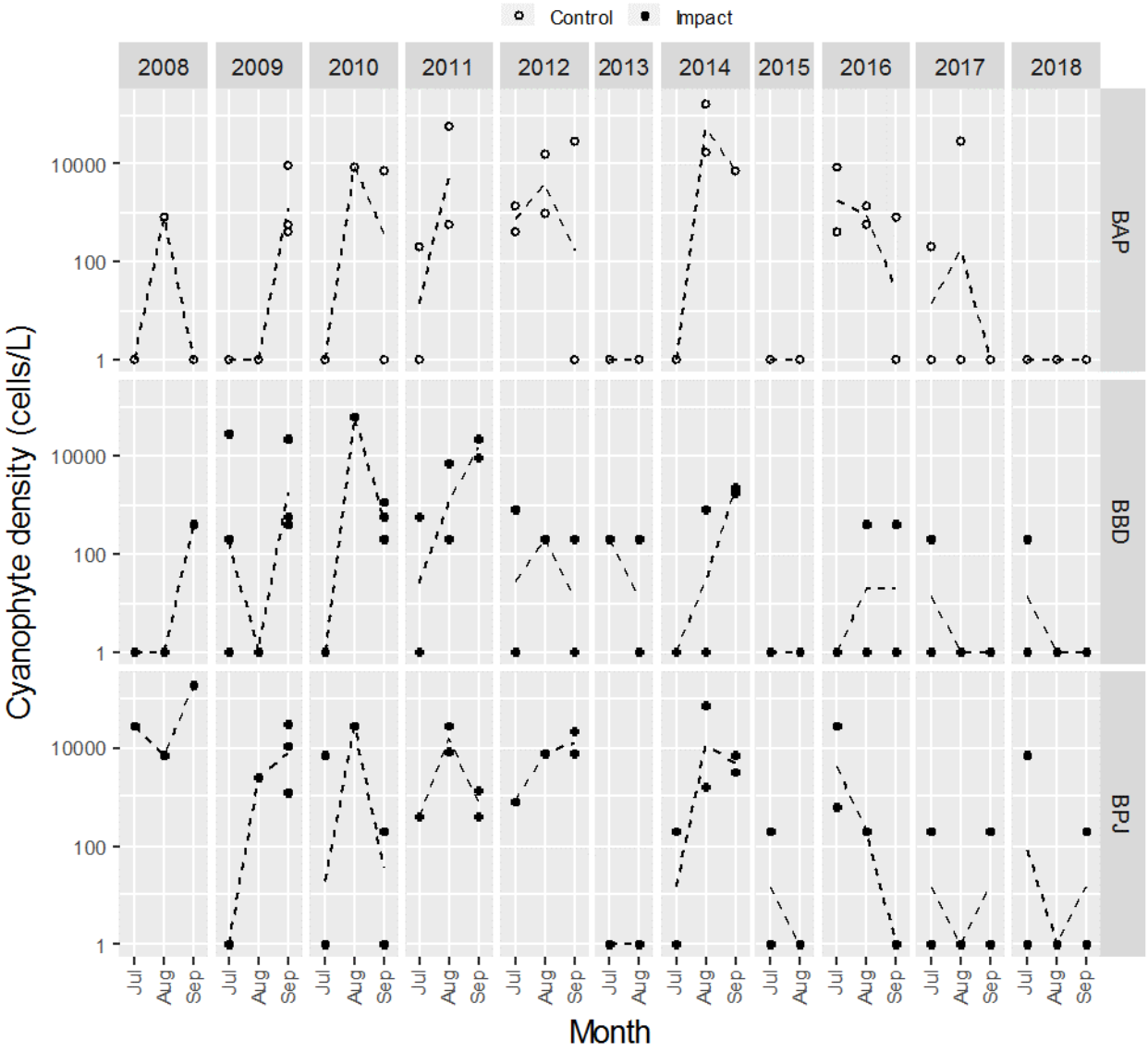


Figure D3-10. Chlorphyte density (cells/L) from Baker Lake since 2008.

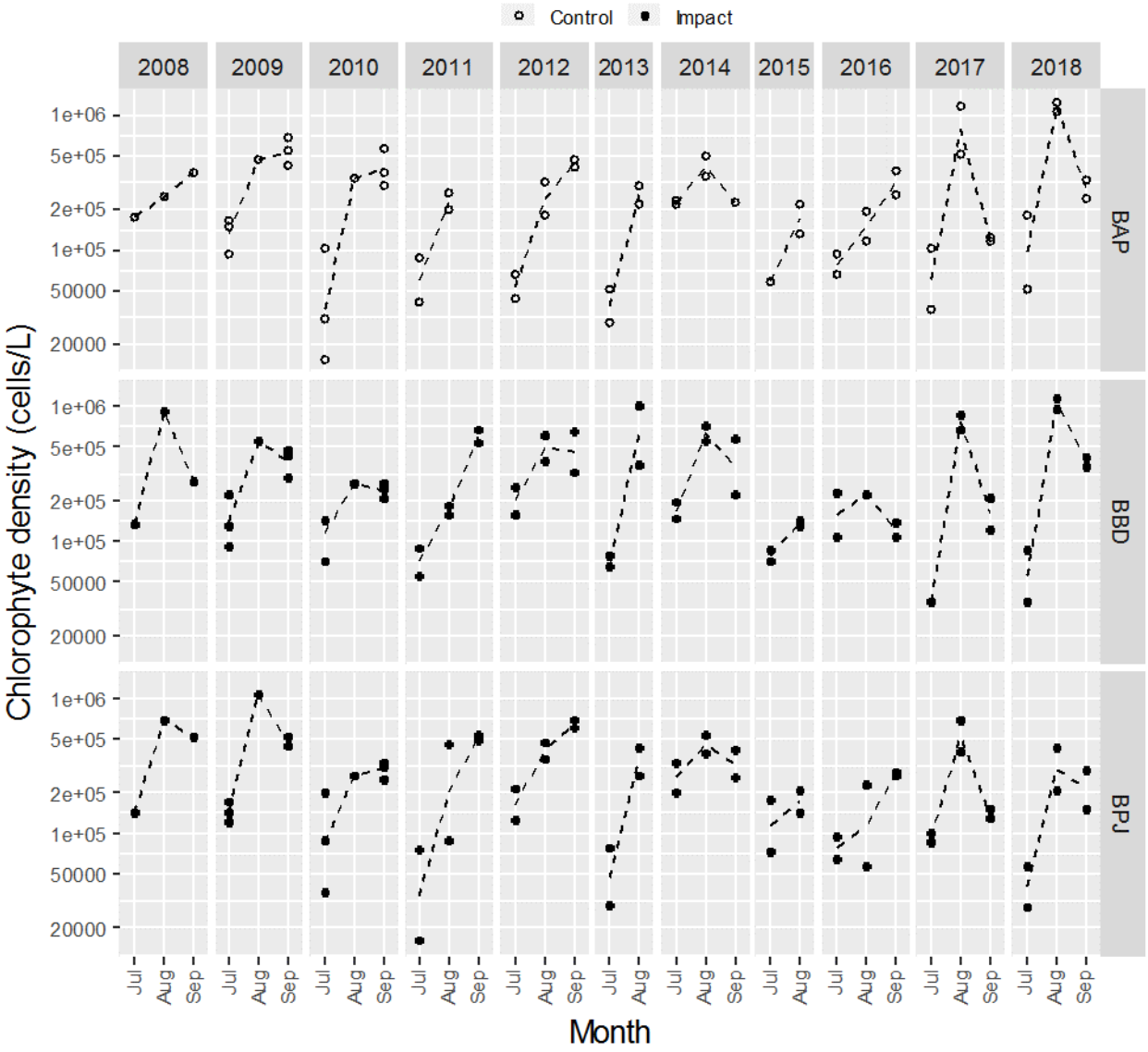


Figure D3-11. Chrysophyte density (cells/L) from Baker Lake since 2008.

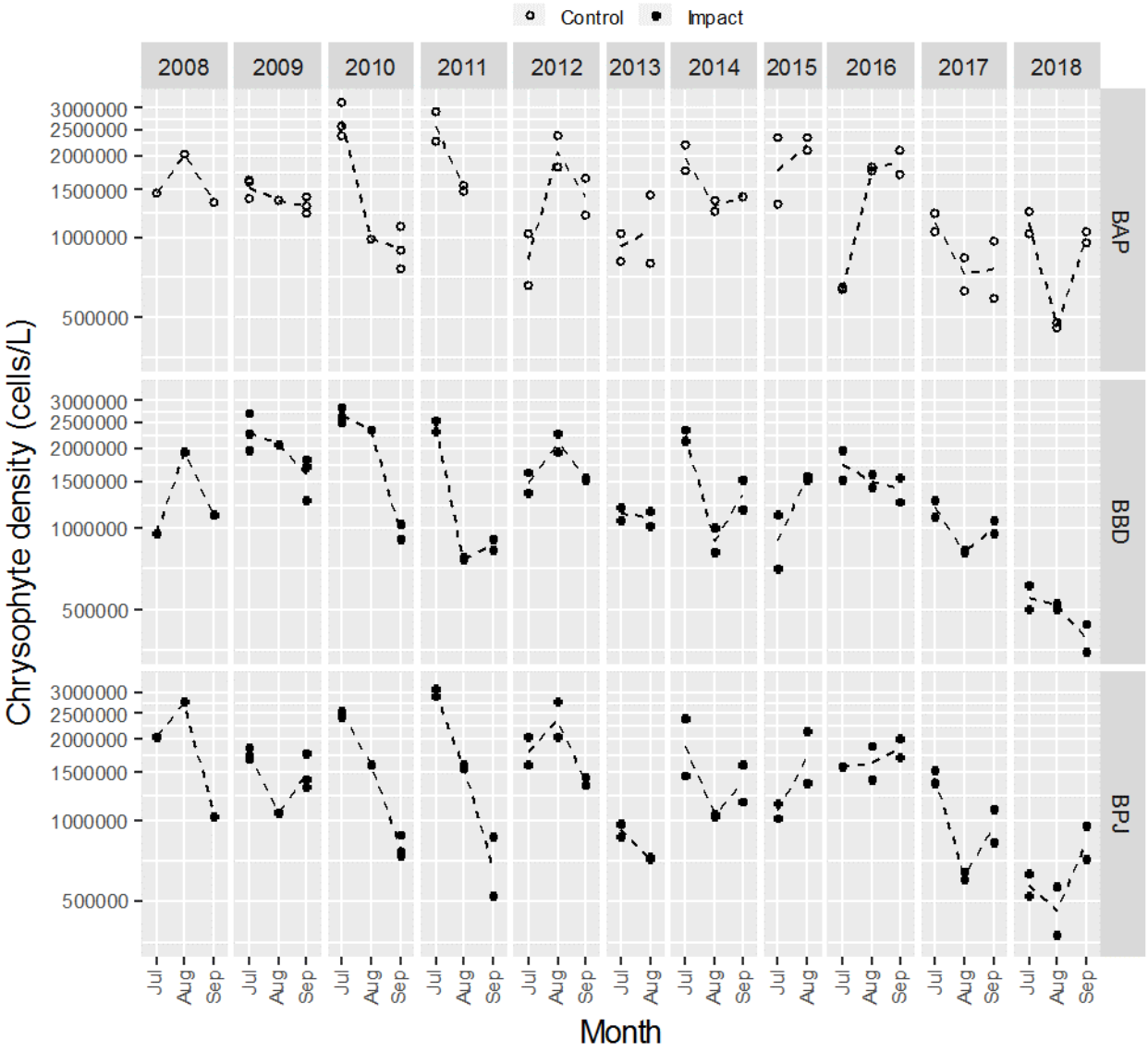


Figure D3-12. Diatom density (cells/L) from Baker Lake since 2008.

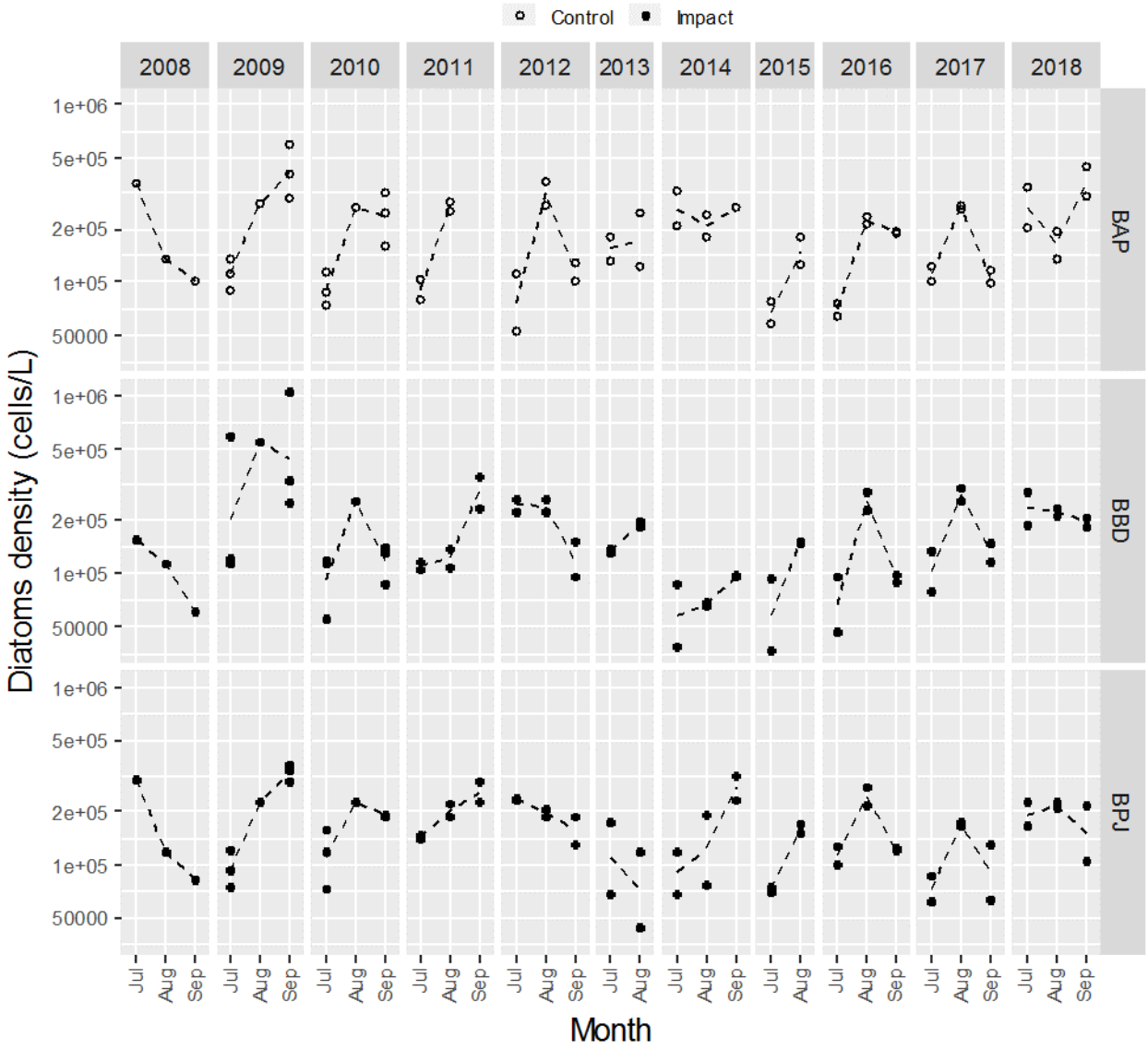


Figure D3-13. Cryptophytes density (cells/L) from Baker Lake since 2008.

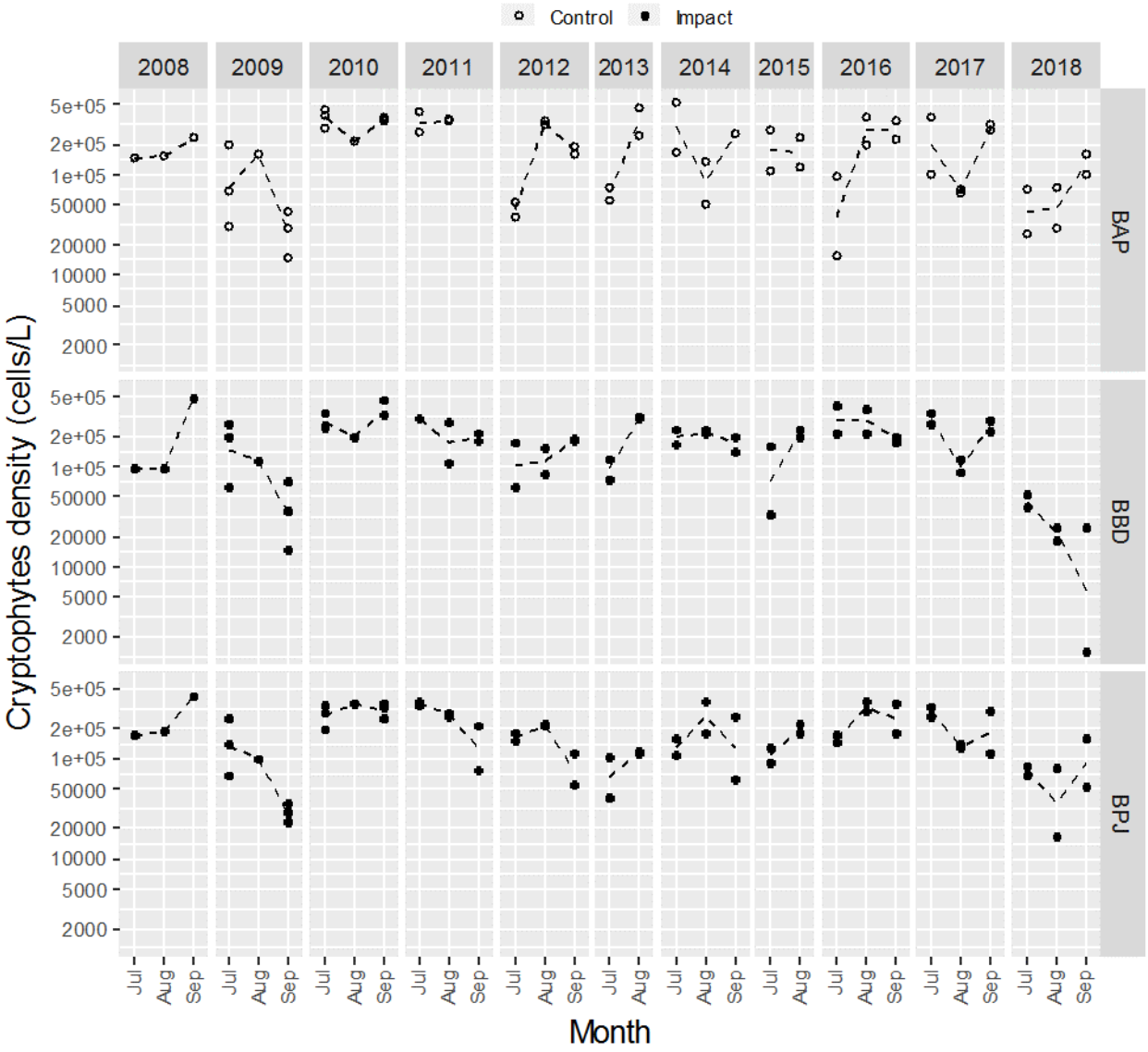


Figure D3-14. Dinoflagellate density (cells/L) from Baker Lake since 2008.

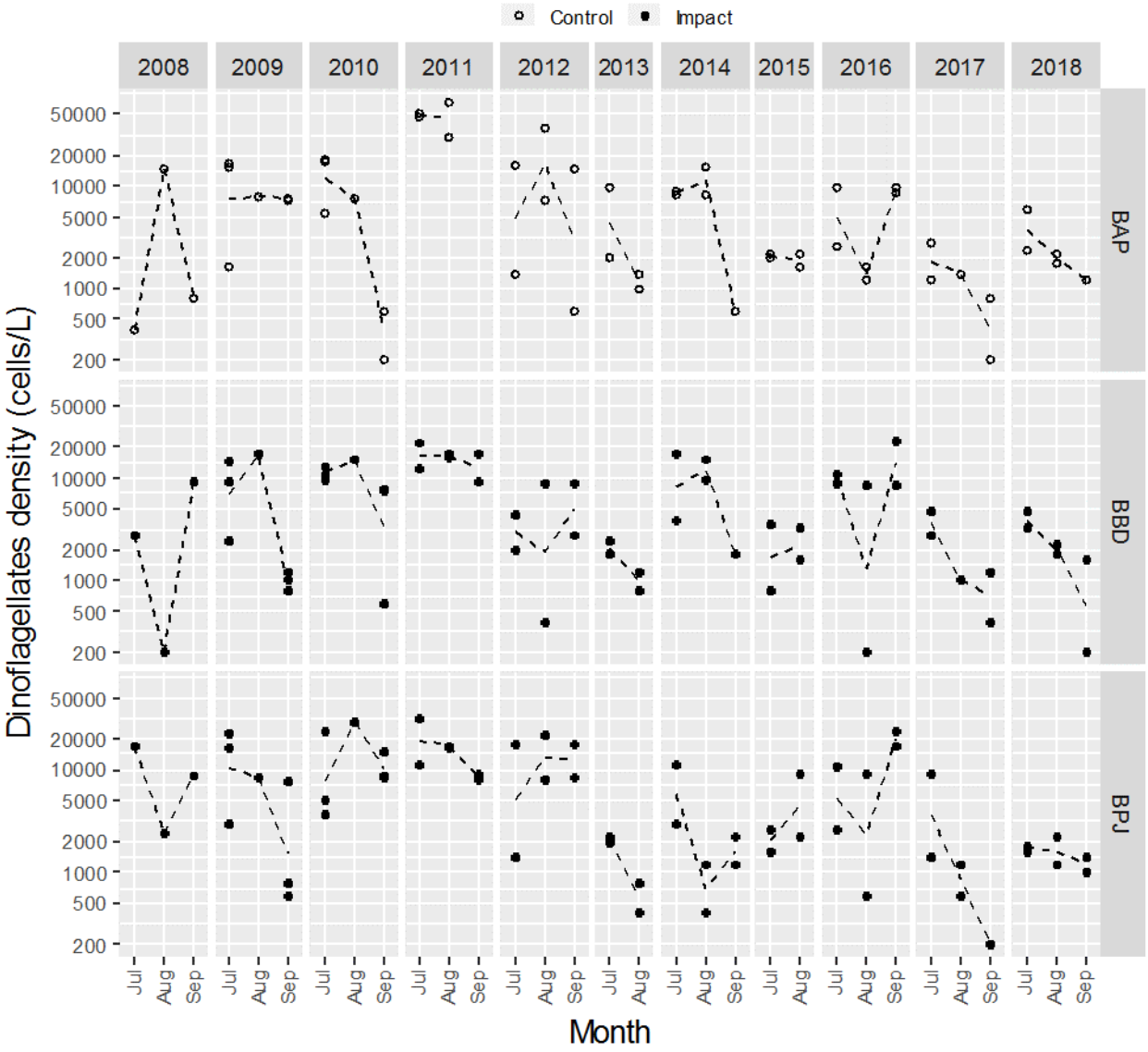
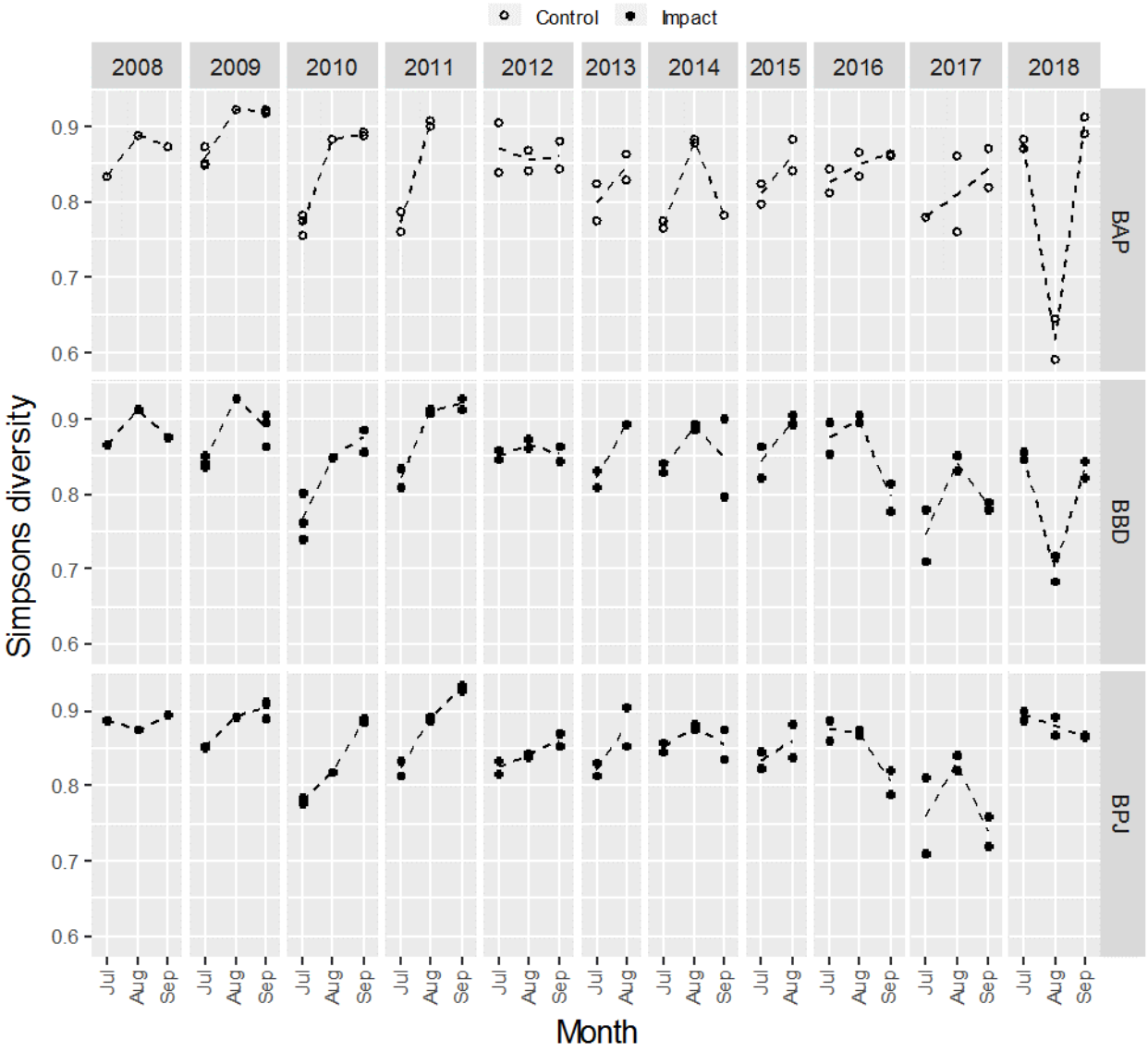


Figure D3-15. Simpsons' Diversity for the phytoplankton community from Baker Lake since 2008.



APPENDIX E
BENTHOS TAXONOMY DATA AND SUPPLEMENTAL PLOTS

APPENDIX E1
BENTHOS DATA – MEADOWBANK STUDY AREA LAKES

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Table E1-1. Benthic invertebrate abundance (#/m2) and richness (# taxa) by major taxa group, Meadowbank study area lakes.

Area-Replicate	Date	Depth (m)	Abundance (#/m^2)					Richness (# taxa)					Simpson's Diversity	Bray-Curtis Index
			Oligochaetes	Insects	Molluscs	Other Taxa[1]	TOTAL	Oligochaetes	Insects	Molluscs	Other Taxa[1]	TOTAL		
Inuggugayualik Lake														
INUG-1	14-Aug-18	8.7	22	761	1,717	130	2,630	1	9	3	3	16	0.79	0.44
INUG-2	14-Aug-18	7.5	65	826	348	87	1,326	2	6	3	3	14	0.92	0.23
INUG-3	14-Aug-18	7.7	43	978	370	0	1,391	2	10	3	0	15	0.86	0.21
INUG-4	14-Aug-18	7.2	43	739	543	43	1,370	1	7	3	2	13	0.87	0.12
INUG-5	14-Aug-18	8.8	22	739	326	43	1,130	1	8	3	1	13	0.87	0.20
	Area Mean		***39***	***809***	***661***	***61***	***1,570***	***1***	***8***	***3***	***2***	***14***	***0.86***	***0.24***
Pipedream Lake														
PDL-1	14-Aug-18	6.5	65	348	130	43	587	1	3	1	2	7	0.86	0.18
PDL-2	14-Aug-18	6.5	43	326	522	0	891	1	4	1	0	6	0.62	0.26
PDL-3	14-Aug-18	7.7	0	500	261	0	761	0	2	1	0	3	0.68	0.11
PDL-4	14-Aug-18	6.8	109	565	174	0	848	2	5	2	0	9	0.88	0.31
PDL-5	14-Aug-18	7.6	22	500	326	0	848	1	4	1	0	6	0.72	0.11
	Area Mean		***48***	***448***	***283***	***9***	***787***	***1***	***4***	***1***	***0***	***6***	***0.75***	***0.19***
Second Portage Lake														
SP-1	13-Aug-18	8.9	0	348	848	65	1,261	0	3	1	2	6	0.52	0.41
SP-2	13-Aug-18	7.2	87	913	478	217	1,696	2	6	1	6	15	0.86	0.37
SP-3	13-Aug-18	7.7	43	652	674	87	1,457	1	8	1	2	12	0.76	0.32
SP-4	13-Aug-18	7.1	43	457	565	0	1,065	1	9	1	0	11	0.71	0.31
SP-5	13-Aug-18	7.2	0	543	500	65	1,109	0	7	1	3	11	0.76	0.29
	Area Mean		***35***	***583***	***613***	***87***	***1,317***	***1***	***7***	***1***	***3***	***11***	***0.72***	***0.34***
Third Portage Lake - East Basin														
TPE-1	10-Aug-18	7.6	43	1,826	413	152	2,435	2	10	1	2	15	0.88	0.42
TPE-2	10-Aug-18	8.2	130	1,239	522	87	1,978	1	8	1	2	12	0.86	0.43
TPE-3	10-Aug-18	7.6	152	2,870	587	65	3,674	1	9	1	2	13	0.86	0.61
TPE-4	10-Aug-18	9.5	22	1,457	804	22	2,304	1	8	1	1	11	0.77	0.45
TPE-5	10-Aug-18	6.8	22	1,696	587	22	2,326	1	11	1	1	14	0.79	0.54
	Area Mean		***74***	***1,817***	***583***	***70***	***2,543***	***1***	***9***	***1***	***2***	***13***	***0.83***	***0.49***
Third Portage Lake - North Basin														
TPN-1	10-Aug-18	7.5	109	1,457	696	0	2,261	3	9	1	0	13	0.85	0.38
TPN-2	10-Aug-18	8.0	0	1,239	348	43	1,630	0	13	2	1	16	0.90	0.29
TPN-3	10-Aug-18	7.8	0	1,522	500	22	2,043	0	9	1	1	11	0.85	0.34
TPN-4	10-Aug-18	8.4	0	2,022	413	0	2,435	0	11	1	0	12	0.88	0.40
TPN-5	10-Aug-18	8.6	0	1,630	326	22	1,978	0	9	1	1	11	0.89	0.32
	Area Mean		***22***	***1,574***	***457***	***17***	***2,070***	***1***	***10***	***1***	***1***	***13***	***0.87***	***0.35***
Wally Lake														
WAL-1	11-Aug-18	9.0	152	14,000	1,348	43	15,543	1	10	2	1	14	0.80	0.88
WAL-2	11-Aug-18	8.7	65	12,696	1,391	174	14,326	2	8	2	3	15	0.72	0.87
WAL-3	11-Aug-18	7.7	43	5,522	739	43	6,348	1	12	2	2	17	0.81	0.75
WAL-4	11-Aug-18	8.6	109	17,739	1,000	130	18,978	2	9	2	4	17	0.73	0.89
WAL-5	11-Aug-18	9.5	*0*	*8,022*	*1,217*	*174*	*9,413*	*0*	*7*	*2*	*3*	*12*	*0.81*	*0.83*
	Area Mean		***74***	***11,596***	***1,139***	***113***	***12,922***	***1***	***9***	***2***	***3***	***15***	***0.77***	***0.84***

Notes:

1. "Other taxa" includes flatworms (Turbellaria) and arthropods (Acalyptonotidae, Hygrobatidae, Lebertiidae, Oxidae, Pionidae, Harpacticoida, and O. Notostraca).

Table E1-2. Raw benthic invertebrate data from the Meadowbank Study Lakes 2018.

Program	Meadowbank									
Lake	Inuggugayualik Lake					Pipedream Lake				
Station	INUG					PDL				
Control/Impact?	Control					Control				
Replicate	1	2	3	4	5	1	2	3	4	5
Date	13-Aug-18	13-Aug-18	13-Aug-18	13-Aug-18	13-Aug-18	13-Aug-18	13-Aug-18	13-Aug-18	13-Aug-18	13-Aug-18
DepthOfSample (m)	8.7	7.5	7.7	7.2	8.8	6.5	6.5	7.7	6.8	7.6
ROUNDWORMS										
P. Nemata	-	3	2	4	2	-	2	3	2	4
FLATWORMS										
P. Platyhelminthes										
Cl. Turbellaria										
indeterminate	1	1	-	1	-	-	-	-	-	-
ANNELIDS										
P. Annelida										
WORMS										
Cl. Oligochaeta										
F. Enchytraeidae	-	-	-	-	-	-	-	-	-	-
F. Naididae										
S.F. Naidinae										
Nais	-	-	-	-	-	-	-	-	-	-
S.F. Tubificinae										
Limnodrilus hoffmeisteri	-	-	-	-	-	-	-	-	-	-
Tasserkidrilus americanus	-	-	-	-	-	1	-	-	1	-
immatures with hair chaetae	-	-	-	-	-	2	-	-	3	-
immatures without hair chaetae	-	-	-	-	-	-	-	-	-	-
S.F. Rhyacodrilinae										
Rhyacodrilus coccineus	-	1	1	-	1	-	-	-	-	-
Rhyacodrilus montana	-	-	-	-	-	-	-	-	-	-
F. Lumbriculidae										
Lumbriculus	1	2	1	2	-	-	2	-	1	1
ARTHROPODS										
P. Arthropoda										
MITES										
Cl. Arachnida										
O. Acarina										
immature	-	-	-	-	-	-	-	-	-	-
F. Acalyptonotidae										
Acalyptonotus	-	-	-	-	-	-	-	-	-	-
F. Hygrobatidae										
Hygrobates	-	-	-	-	-	-	-	-	-	-
F. Lebertiidae										
Lebertia	1	2	-	1	-	1	-	-	-	-
F. Oxidae										
Oxus	4	1	-	-	2	-	-	-	-	-
F. Pionidae										
indeterminate	-	-	-	-	-	-	-	-	-	-
HARPACTICOIDS										
O. Harpacticoida	-	-	-	-	-	-	-	-	-	-
SEED SHRIMPS										
Cl. Ostracoda	1	4	2	-	-	5	9	3	4	2
TADPOLE SHRIMP										
O. Notostraca										
Lepidurus arcticus	-	-	-	-	-	1	-	-	-	-
INSECTS										
Cl. Insecta										
CADDISFLIES										
O. Trichoptera										
F. Apataniidae										
Apatania	-	-	-	-	-	-	-	-	-	-
F. Limnephilidae										
Grensia praeterita	-	-	-	-	-	-	-	-	1	-
TRUE FLIES										
O. Diptera										
MIDGES										
F. Chironomidae										
chironomid pupae	**12**	**8**	**2**	**4**	**8**	**3**	-	-	**1**	-
S.F. Chironominae										
Chironomus	-	-	-	-	-	-	-	-	-	-
Cladotanytarsus	-	-	-	-	-	-	-	-	-	-
Constempellina	-	-	-	-	-	-	-	-	-	-
Corynocera ambigua	2	-	1	-	-	-	-	-	-	-
?Corynocera oliveri	-	-	-	-	1	-	-	-	-	-
Dicrotendipes	-	-	1	-	-	-	-	-	-	-
Micropsectra	2	7	9	5	5	-	-	-	-	-
Microtendipes	2	-	2	-	-	-	-	-	-	-
Parachironomus	-	-	-	-	-	-	-	-	-	-
Paracladopelma	-	-	-	-	-	-	-	-	-	-
Paratanytarsus	2	3	-	-	7	-	-	-	3	-
Polypedilum	-	-	-	-	-	-	-	-	-	-
Sergentia	-	-	-	-	-	-	-	-	-	-
Stempellinella	-	-	1	1	-	-	-	-	-	-
Stictochironomus	10	7	19	16	-	7	6	10	4	12
Tanytarsus	1	-	4	2	1	-	-	-	10	-
S.F. Diamesinae										
Protanypus	-	-	-	-	-	1	-	-	-	1
Potthastia	-	-	-	-	-	-	-	-	-	-
Pseudodiamesa	-	-	-	-	-	-	-	-	-	-
S.F. Orthocladiinae										
Abiskomyia	-	-	-	-	-	-	-	-	-	-
Cricotopus	-	-	-	-	-	-	-	-	-	-
Cricotopus/Orthocladius	-	-	-	-	-	-	-	-	-	-
Heterotrissocladius	1	5	2	-	-	-	-	-	-	-
Hydrobaenus	-	-	-	-	-	-	-	-	-	-
Mesocricotopus	-	-	-	-	1	-	-	-	-	-
Paracladius	-	-	-	-	1	-	-	-	-	-
Parakiefferiella	-	-	-	-	-	-	-	-	-	-
Psectrocladius	-	-	-	-	-	-	1	-	-	1
Zalutschia	-	-	-	1	-	-	-	-	-	-
Orthocladiinae *Genus "Greenland"*	-	-	-	-	-	-	-	-	-	-
S.F. Prodiamesinae										
Monodiamesa	2	5	2	1	1	-	1	-	-	-
S.F. Tanypodinae										
Ablabesmyia	-	-	-	-	-	-	-	-	-	-
Procladius	1	3	2	4	9	5	7	13	7	9
Thienemannimyia complex	-	-	-	-	-	-	-	-	-	-
F. Empididae										
Neoplasta/ Chelifera/Metachela	-	-	-	-	-	-	-	-	-	-
Wiedemannia	-	-	-	-	-	-	-	-	-	-
pupae	-	-	-	-	-	-	-	-	-	-

Table E1-2. Raw benthic invertebrate data from the Meadowbank Study Lakes 2018.

Program	Meadowbank									
Lake	Inuggugayualik Lake					Pipedream Lake				
Station	INUG					PDL				
Control/Impact?	Control					Control				
Replicate	1	2	3	4	5	1	2	3	4	5
Date	13-Aug-18	13-Aug-18	13-Aug-18	13-Aug-18	13-Aug-18	13-Aug-18	13-Aug-18	13-Aug-18	13-Aug-18	13-Aug-18
DepthOfSample (m)	8.7	7.5	7.7	7.2	8.8	6.5	6.5	7.7	6.8	7.6
MOLLUSCS										
P. Mollusca										
SNAILS										
Cl. Gastropoda										
F. Valvatidae										
Valvata	-	-	-	-	-	-	-	-	-	-
CLAMS										
Cl. Bivalvia										
F. Sphaeriidae										
Pisidium (Cyclocalyx)/Neopisidium	44	9	11	12	13	6	24	12	4	15
Pisidium (Cyclocalyx)	30	5	2	7	1	-	-	-	4	-
Sphaerium nitidum	5	2	4	6	1	-	-	-	-	-
R (Richness) - totals [2,3]										
Total	16	14	15	13	13	7	6	3	9	6
Oligochaete	1	2	2	1	1	1	1	0	2	1
Insect	9	6	10	7	8	3	4	2	5	4
Mollusc	3	3	3	3	3	1	1	1	2	1
Other[4]	3	3	0	2	1	2	0	0	0	0
Abundance (raw) - totals [5,6]										
Total	121	61	64	63	52	27	41	35	39	39
Oligochaete	1	3	2	2	1	3	2	0	5	1
Insect	35	38	45	34	34	16	15	23	26	23
Mollusc	79	16	17	25	15	6	24	12	8	15
Other[4]	6	4	0	2	2	2	0	0	0	0
Abundance - totals (#/m^2) [5]										
Total	2,630	1,326	1,391	1,370	1,130	587	891	761	848	848
Oligochaete	22	65	43	43	22	65	43	0	109	22
Insect	761	826	978	739	739	348	326	500	565	500
Mollusc	1,717	348	370	543	326	130	522	261	174	326
Other[4]	130	87	0	43	43	43	0	0	0	0

Notes:

1. Benthic invertebrate count data shown in this table are from composite of two grabs sieved to 500 µm.
2. Richness totals exclude P. Nemata, Cl. Ostracoda, indeterminates (O. Acarina, F. Lumbriculidae), immatures (S.F. Tubificinae, O. Acarina), and pupae.
3. Pupae and immatures (bolded values) are excluded from the richness totals if other life stages are present in the replicate sample.
4. Other Taxa include: Cl. Turbellaria, F. Acalyptonotidae, F. Hygrobatidae, F. Lebertiidae, F. Oxidae, F. Pionidae, O. Harpacticoida, O. Notostraca, and F. Gammaracanthidae.
5. Abundance totals exclude P. Nemata and Cl. Ostracoda.
6. Raw abundance from two grabs (grab area = 0.023 m^2).

Table E1-2. Raw benthic invertebrate data from the Meadowbank Study Lakes 2018.

Program	Meadowbank									
Lake	Second Portage Lake					Third Portage Lake - East Basin				
Station	SP					TPE				
Control/Impact?	Impact					Impact				
Replicate	1	2	3	4	5	1	2	3	4	5
Date	13-Aug-18	13-Aug-18	13-Aug-18	13-Aug-18	13-Aug-18	10-Aug-18	10-Aug-18	10-Aug-18	10-Aug-18	10-Aug-18
DepthOfSample (m)	8.9	7.2	7.7	7.1	7.2	7.6	8.2	7.6	9.5	6.8
ROUNDWORMS										
P. Nemata	1	4	5	3	5	6	3	7	4	5
FLATWORMS										
P. Platyhelminthes										
Cl. Turbellaria										
indeterminate	-	1	-	-	-	-	-	2	1	-
ANNELIDS										
P. Annelida										
WORMS										
Cl. Oligochaeta										
F. Enchytraeidae	-	-	-	-	-	-	-	-	-	-
F. Naididae										
S.F. Naidinae										
Nais	-	-	-	-	-	-	-	-	-	-
S.F. Tubificinae										
Limnodrilus hoffmeisteri	-	-	-	-	-	-	-	-	-	-
Tasserkidrilus americanus	-	-	-	-	-	-	-	-	-	-
immatures with hair chaetae	-	-	2	-	-	-	-	-	-	-
immatures without hair chaetae	-	-	-	-	-	-	-	-	-	-
S.F. Rhyacodrilinae										
Rhyacodrilus coccineus	-	2	-	-	-	1	6	7	-	1
Rhyacodrilus montana	-	-	-	-	-	-	-	-	-	-
F. Lumbriculidae										
Lumbriculus	-	2	-	2	-	1	-	-	1	-
ARTHROPODS										
P. Arthropoda										
MITES										
Cl. Arachnida										
O. Acarina										
immature	-	-	-	-	-	**1**	-	-	-	-
F. Acalyptonotidae										
Acalyptonotus	-	1	2	-	1	5	3	-	-	-
F. Hygrobatidae										
Hygrobates	-	1	-	-	-	-	-	-	-	-
F. Lebertiidae										
Lebertia	1	1	-	-	1	-	1	1	-	-
F. Oxidae										
Oxus	2	5	2	-	1	1	-	-	-	1
F. Pionidae										
indeterminate	-	1	-	-	-	-	-	-	-	-
HARPACTICOIDS										
O. Harpacticoida	-	-	-	-	-	-	-	-	-	-
SEED SHRIMPS										
Cl. Ostracoda	14	8	20	4	3	102	25	64	51	52
TADPOLE SHRIMP										
O. Notostraca										
Lepidurus arcticus	-	-	-	-	-	-	-	-	-	-
INSECTS										
Cl. Insecta										
CADDISFLIES										
O. Trichoptera										
F. Apataniidae										
Apatania	-	-	-	-	-	-	-	-	-	-
F. Limnephilidae										
Grensia praeterita	-	-	-	-	-	-	-	-	-	-
TRUE FLIES										
O. Diptera										
MIDGES										
F. Chironomidae										
chironomid pupae	-	**13**	**5**	**4**	**8**	**16**	**5**	**19**	**4**	**8**
S.F. Chironominae										
Chironomus	-	-	-	-	-	-	-	-	-	-
Cladotanytarsus	-	-	-	1	-	-	-	-	-	-
Constempellina	-	-	-	-	-	-	-	-	-	-
Corynocera ambigua	-	-	-	-	-	-	-	-	-	-
?Corynocera oliveri	-	1	-	-	-	-	-	-	-	-
Dicrotendipes	-	-	-	-	-	-	-	-	-	-
Micropsectra	-	9	2	2	1	3	2	27	-	3
Microtendipes	-	-	-	-	-	-	-	-	-	-
Parachironomus	-	-	-	-	-	-	-	-	-	-
Paracladopelma	-	-	-	-	-	-	-	-	-	-
Paratanytarsus	-	-	1	2	2	19	17	40	21	38
Polypedilum	-	-	-	-	-	-	-	-	-	-
Sergentia	-	-	-	-	-	-	-	-	-	-
Stempellinella	-	-	-	-	-	-	-	-	-	-
Stictochironomus	4	2	5	2	4	7	4	3	9	1
Tanytarsus	-	-	-	-	-	2	-	-	-	1
S.F. Diamesinae										
Protanypus	-	-	-	1	1	-	-	-	-	-
Potthastia	-	-	-	-	-	-	-	-	-	-
Pseudodiamesa	-	-	-	-	-	-	-	-	-	-
S.F. Orthocladiinae										
Abiskomyia	-	-	-	-	-	-	2	-	-	1
Cricotopus	-	-	-	-	-	-	-	-	-	-
Cricotopus/Orthocladius	-	-	-	-	-	-	-	-	-	-
Heterotrissocladius	-	1	2	-	-	8	7	14	1	6
Hydrobaenus	-	-	1	-	-	-	-	-	-	-
Mesocricotopus	-	-	-	-	-	-	-	-	-	-
Paracladius	-	-	-	1	-	1	-	1	1	-
Parakiefferiella	-	-	-	-	-	-	-	-	-	-
Psectrocladius	-	-	1	-	-	4	1	1	1	3
Zalutschia	-	-	-	-	-	-	-	-	-	-
Orthocladiinae *Genus "Greenland"*	-	-	-	-	-	-	-	-	-	-
S.F. Prodiamesinae										
Monodiamesa	3	8	5	2	2	1	3	2	1	-
S.F. Tanypodinae										
Ablabesmyia	-	-	-	-	1	-	-	-	-	1
Procladius	9	8	8	5	6	22	16	22	27	14
Thienemannimyia complex	-	-	-	1	-	1	-	3	2	1
F. Empididae										
Neoplasta/ Chelifera/Metachela	-	-	-	-	-	-	-	-	-	1
Wiedemannia	-	-	-	-	-	-	-	-	-	-
pupae	-	-	-	-	-	-	-	-	-	-

Table E1-2. Raw benthic invertebrate data from the Meadowbank Study Lakes 2018.

Program	Meadowbank									
Lake	Second Portage Lake					Third Portage Lake - East Basin				
Station	SP					TPE				
Control/Impact?	Impact					Impact				
Replicate	1	2	3	4	5	1	2	3	4	5
Date	13-Aug-18	13-Aug-18	13-Aug-18	13-Aug-18	13-Aug-18	10-Aug-18	10-Aug-18	10-Aug-18	10-Aug-18	10-Aug-18
DepthOfSample (m)	8.9	7.2	7.7	7.1	7.2	7.6	8.2	7.6	9.5	6.8
MOLLUSCS										
P. Mollusca										
SNAILS										
Cl. Gastropoda										
F. Valvatidae										
Valvata	-	-	-	-	-	-	-	-	-	-
CLAMS										
Cl. Bivalvia										
F. Sphaeriidae										
Pisidium (Cyclocalyx)/Neopisidium	39	22	31	26	23	19	24	27	37	27
Pisidium (Cyclocalyx)	-	-	-	-	-	-	-	-	-	-
Sphaerium nitidum	-	-	-	-	-	-	-	-	-	-
R (Richness) - totals [2,3]										
Total	6	15	12	11	11	15	12	13	11	14
Oligochaete	0	2	1	1	0	2	1	1	1	1
Insect	3	6	8	9	7	10	8	9	8	11
Mollusc	1	1	1	1	1	1	1	1	1	1
Other[4]	2	6	2	0	3	2	2	2	1	1
Abundance (raw) - totals [5,6]										
Total	58	78	67	49	51	112	91	169	106	107
Oligochaete	0	4	2	2	0	2	6	7	1	1
Insect	16	42	30	21	25	84	57	132	67	78
Mollusc	39	22	31	26	23	19	24	27	37	27
Other[4]	3	10	4	0	3	7	4	3	1	1
Abundance - totals (#/m^2) [5]										
Total	1,261	1,696	1,457	1,065	1,109	2,435	1,978	3,674	2,304	2,326
Oligochaete	0	87	43	43	0	43	130	152	22	22
Insect	348	913	652	457	543	1,826	1,239	2,870	1,457	1,696
Mollusc	848	478	674	565	500	413	522	587	804	587
Other[4]	65	217	87	0	65	152	87	65	22	22

Notes:

1. Benthic invertebrate count data shown in this table are from composite of two grabs sieved to 500 µm.
2. Richness totals exclude P. Nemata, Cl. Ostracoda, indeterminates (O. Acarina, F. Lumbriculidae), immatures (S.F. Tubificinae, O. Acarina), and pupae.
3. Pupae and immatures (bolded values) are excluded from the richness totals if other life stages are present in the replicate sample.
4. Other Taxa include: Cl. Turbellaria, F. Acalyptonotidae, F. Hygrobatidae, F. Lebertiidae, F. Oxidae, F. Pionidae, O. Harpacticoida, O. Notostraca, and F. Gammaracanthidae.
5. Abundance totals exclude P. Nemata and Cl. Ostracoda.
6. Raw abundance from two grabs (grab area = 0.023 m^2).

Table E1-2. Raw benthic invertebrate data from the Meadowbank Study Lakes 2018.

Program						Meadowbank				
Lake	Third Portage Lake - North Basin					Wally Lake				
Station	TPN					WAL				
Control/Impact?	Impact					Impact				
Replicate	1	2	3	4	5	1	2	3	4	5
Date	10-Aug-18	10-Aug-18	10-Aug-18	10-Aug-18	10-Aug-18	11-Aug-18	11-Aug-18	11-Aug-18	11-Aug-18	11-Aug-18
DepthOfSample (m)	7.5	8.0	7.8	8.4	8.6	9.0	8.7	7.7	8.6	9.5
ROUNDWORMS										
P. Nemata	2	4	2	5	-	-	1	1	1	1
FLATWORMS										
P. Platyhelminthes										
Cl. Turbellaria										
indeterminate	-	2	-	-	-	-	2	1	2	4
ANNELIDS										
P. Annelida										
WORMS										
Cl. Oligochaeta										
F. Enchytraeidae	-	-	-	-	-	-	-	-	-	-
F. Naididae										
S.F. Naidinae										
Nais	-	-	-	-	-	-	-	-	-	-
S.F. Tubificinae										
Limnodrilus hoffmeisteri	-	-	-	-	-	-	-	-	-	-
Tasserkidrilus americanus	-	-	-	-	-	-	-	-	-	-
immatures with hair chaetae	1	-	-	-	-	-	-	-	-	-
immatures without hair chaetae	-	-	-	-	-	-	-	-	-	-
S.F. Rhyacodrilinae										
Rhyacodrilus coccineus	1	-	-	-	-	-	1	-	1	-
Rhyacodrilus montana	-	-	-	-	-	-	-	-	-	-
F. Lumbriculidae										
Lumbriculus	3	-	-	-	-	7	2	2	4	-
ARTHROPODS										
P. Arthropoda										
MITES										
Cl. Arachnida										
O. Acarina										
immature	-	-	-	-	-	-	-	-	-	-
F. Acalyptonotidae										
Acalyptonotus	-	-	-	-	1	2	4	1	2	3
F. Hygrobatidae										
Hygrobates	-	-	1	-	-	-	-	-	-	-
F. Lebertiidae										
Lebertia	-	-	-	-	-	-	-	-	1	1
F. Oxidae										
Oxus	-	-	-	-	-	-	2	-	1	-
F. Pionidae										
indeterminate	-	-	-	-	-	-	-	-	-	-
HARPACTICOIDS										
O. Harpacticoida	-	-	-	-	-	-	-	-	-	-
SEED SHRIMPS										
Cl. Ostracoda	11	17	8	29	13	21	12	5	14	19
TADPOLE SHRIMP										
O. Notostraca										
Lepidurus arcticus	-	-	-	-	-	-	-	-	-	-
INSECTS										
Cl. Insecta										
CADDISFLIES										
O. Trichoptera										
F. Apataniidae										
Apatania	-	-	-	-	-	-	-	-	-	-
F. Limnephilidae										
Grensia praeterita	-	-	-	-	-	-	-	-	-	-
TRUE FLIES										
O. Diptera										
MIDGES										
F. Chironomidae										
chironomid pupae	**9**	**14**	**9**	**11**	**14**	**3**	**1**	**1**	**3**	**3**
S.F. Chironominae										
Chironomus	-	-	-	-	-	-	-	-	-	-
Cladotanytarsus	-	-	-	-	-	-	-	-	14	-
Constempellina	-	-	-	-	-	-	-	-	-	-
Corynocera ambigua	-	-	-	-	-	219	204	66	205	125
?Corynocera oliveri	-	-	-	-	-	170	275	96	375	107
Dicrotendipes	-	-	-	-	-	16	4	2	7	-
Micropsectra	11	5	7	14	13	-	-	-	-	-
Microtendipes	-	-	-	-	-	-	-	-	-	-
Parachironomus	-	-	-	-	-	-	-	-	-	-
Paracladopelma	1	-	-	-	-	-	-	-	-	-
Paratanytarsus	7	5	-	2	6	131	53	28	137	38
Polypedilum	-	-	-	-	-	-	-	-	-	-
Sergentia	-	-	-	-	-	-	-	-	-	-
Stempellinella	-	-	-	-	-	-	-	-	-	-
Stictochironomus	9	3	23	8	8	17	28	35	10	4
Tanytarsus	-	2	2	3	3	66	-	15	45	72
S.F. Diamesinae										
Protanypus	-	1	-	-	-	-	-	2	-	-
Potthastia	-	-	-	-	-	-	-	-	-	-
Pseudodiamesa	-	-	-	-	-	-	-	-	-	-
S.F. Orthocladiinae										
Abiskomyia	-	1	-	-	-	-	-	-	-	-
Cricotopus	-	-	-	-	-	-	-	-	-	-
Cricotopus/Orthocladius	-	-	-	-	-	-	-	-	-	-
Heterotrissocladius	13	7	12	25	16	-	-	-	-	-
Hydrobaenus	2	5	-	3	-	-	-	-	-	-
Mesocricotopus	-	-	-	-	1	-	-	-	-	-
Paracladius	-	1	2	-	-	-	-	-	-	-
Parakiefferiella	-	-	-	-	-	-	-	-	-	-
Psectrocladius	-	-	-	4	-	7	-	2	-	-
Zalutschia	-	2	2	2	-	-	-	-	-	-
Orthocladiinae *Genus "Greenland"*	-	-	-	-	-	-	-	-	-	-
S.F. Prodiamesinae										
Monodiamesa	2	1	2	2	3	2	-	1	3	1
S.F. Tanypodinae										
Ablabesmyia	-	-	-	-	-	1	5	1	-	-
Procladius	11	8	9	11	6	12	13	1	17	19
Thienemannimyia complex	2	2	2	8	5	-	1	4	-	-
F. Empididae										
Neoplasta/ Chelifera/Metachela	-	-	-	-	-	-	-	-	-	-
Wiedemannia	-	-	-	-	-	-	-	-	-	-
pupae	-	-	-	-	-	-	-	-	-	-

Table E1-2. Raw benthic invertebrate data from the Meadowbank Study Lakes 2018.

Program						Meadowbank				
Lake	Third Portage Lake - North Basin					Wally Lake				
Station	TPN					WAL				
Control/Impact?	Impact					Impact				
Replicate	1	2	3	4	5	1	2	3	4	5
Date	10-Aug-18	10-Aug-18	10-Aug-18	10-Aug-18	10-Aug-18	11-Aug-18	11-Aug-18	11-Aug-18	11-Aug-18	11-Aug-18
DepthOfSample (m)	7.5	8.0	7.8	8.4	8.6	9.0	8.7	7.7	8.6	9.5
MOLLUSCS										
P. Mollusca										
SNAILS										
Cl. Gastropoda										
F. Valvatidae										
Valvata	-	-	-	-	-	-	-	-	-	-
CLAMS										
Cl. Bivalvia										
F. Sphaeriidae										
Pisidium (Cyclocalyx)/Neopisidium	32	15	23	19	15	38	41	27	28	34
Pisidium (Cyclocalyx)	-	1	-	-	-	24	23	7	18	22
Sphaerium nitidum	-	-	-	-	-	-	-	-	-	-
R (Richness) - totals [2,3]										
Total	13	16	11	12	11	14	15	17	17	12
Oligochaete	3	0	0	0	0	1	2	1	2	0
Insect	9	13	9	11	9	10	8	12	9	7
Mollusc	1	2	1	1	1	2	2	2	2	2
Other[4]	0	1	1	0	1	1	3	2	4	3
Abundance (raw) - totals [5,6]										
Total	104	75	94	112	91	715	659	292	873	433
Oligochaete	5	0	0	0	0	7	3	2	5	0
Insect	67	57	70	93	75	644	584	254	816	369
Mollusc	32	16	23	19	15	62	64	34	46	56
Other[4]	0	2	1	0	1	2	8	2	6	8
Abundance - totals (#/m^2) [5]										
Total	2,261	1,630	2,043	2,435	1,978	15,543	14,326	6,348	18,978	9,413
Oligochaete	109	0	0	0	0	152	65	43	109	0
Insect	1,457	1,239	1,522	2,022	1,630	14,000	12,696	5,522	17,739	8,022
Mollusc	696	348	500	413	326	1,348	1,391	739	1,000	1,217
Other[4]	0	43	22	0	22	43	174	43	130	174

Notes:

1. Benthic invertebrate count data shown in this table are from composite of two grabs sieved to 500 µm.
2. Richness totals exclude P. Nemata, Cl. Ostracoda, indeterminates (O. Acarina, F. Lumbriculidae), immatures (S.F. Tubificinae, O. Acarina), and pupae.
3. Pupae and immatures (bolded values) are excluded from the richness totals if other life stages are present in the replicate sample.
4. Other Taxa include: Cl. Turbellaria, F. Acalyptonotidae, F. Hygrobatidae, F. Lebertiidae, F. Oxidae, F. Pionidae, O. Harpacticoida, O. Notostraca, and F. Gammaracanthidae.
5. Abundance totals exclude P. Nemata and Cl. Ostracoda.
6. Raw abundance from two grabs (grab area = 0.023 m^2).

Figure E1-1. Oligochaete abundance (#/m^2) from Meadowbank study lakes since 2006.

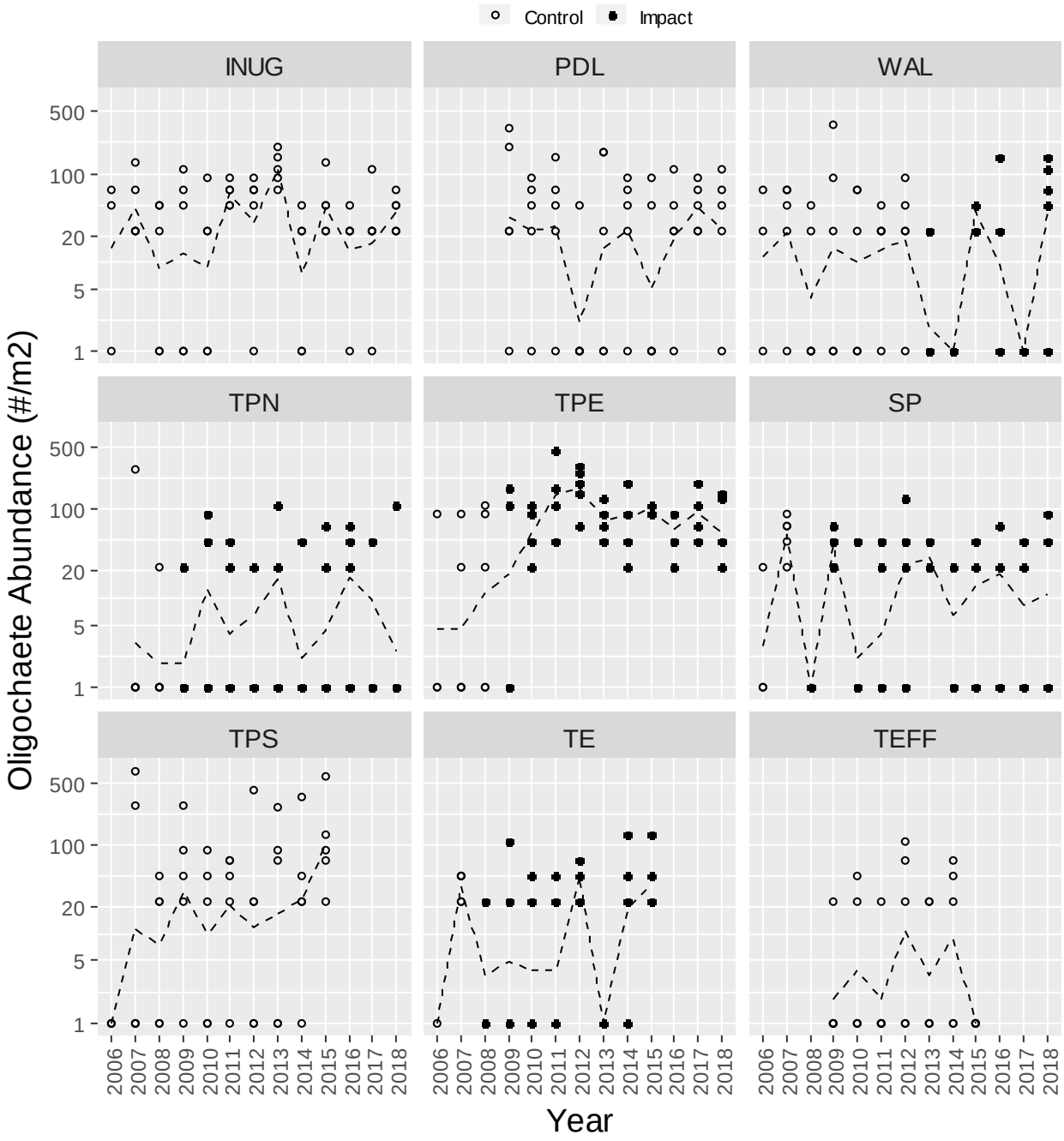


Figure E1-2. Insect abundance (#/m^2) from Meadowbank study lakes since 2006.

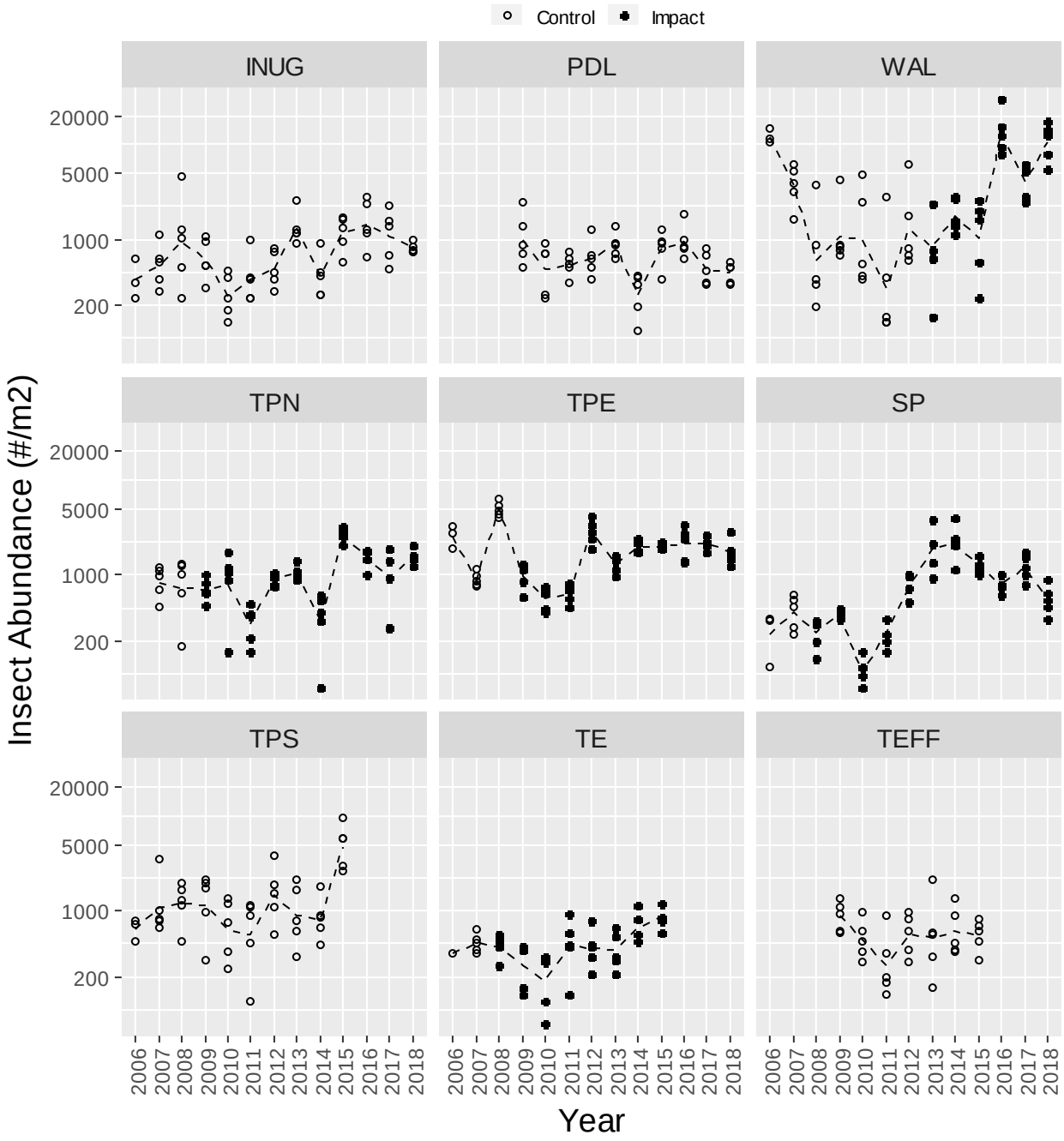


Figure E1-3. Mollusc abundance (#/m^2) from Meadowbank study lakes since 2006.

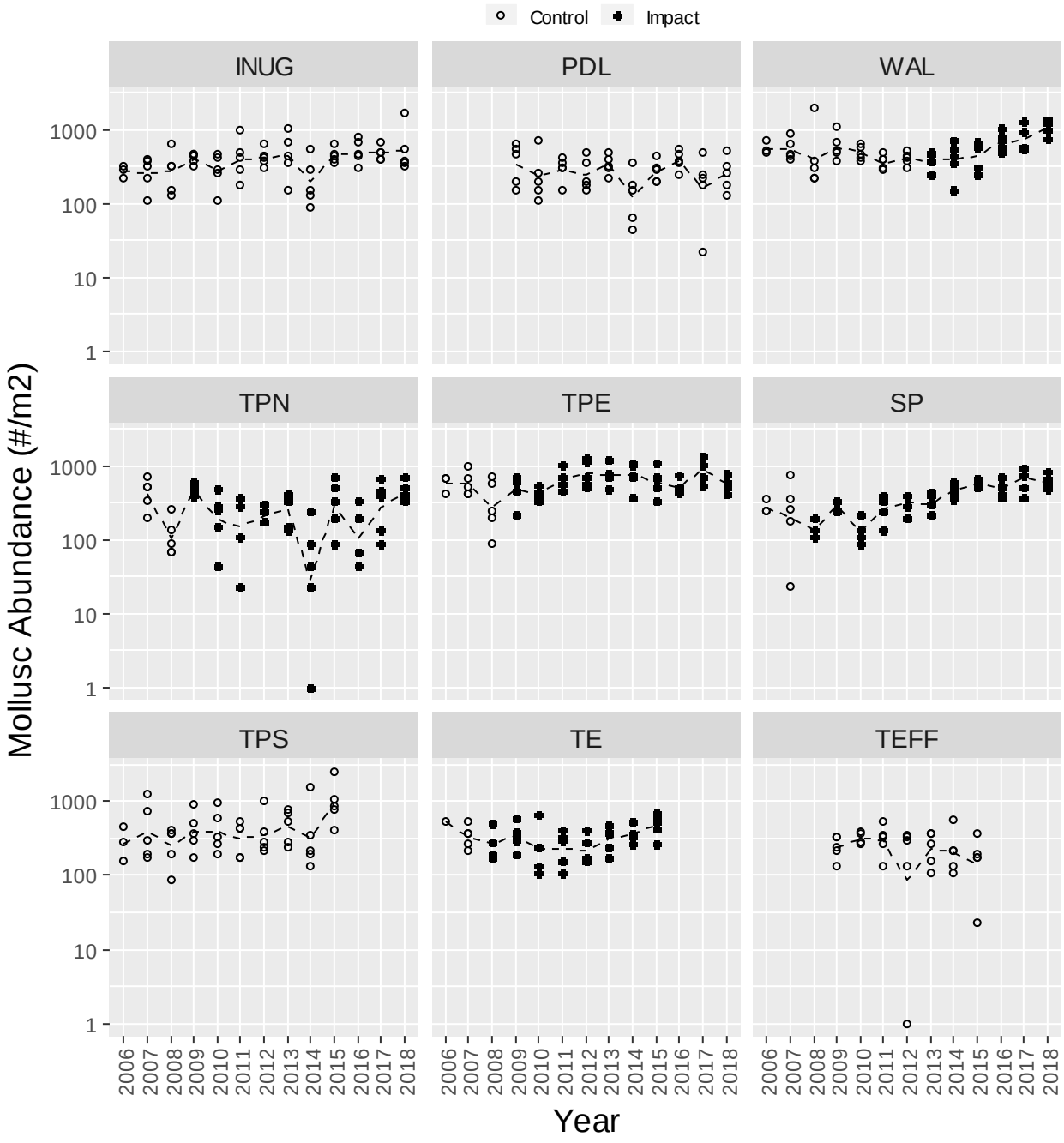


Figure E1-4. Other taxa abundance (#/m^2) from Meadowbank study lakes since 2006.

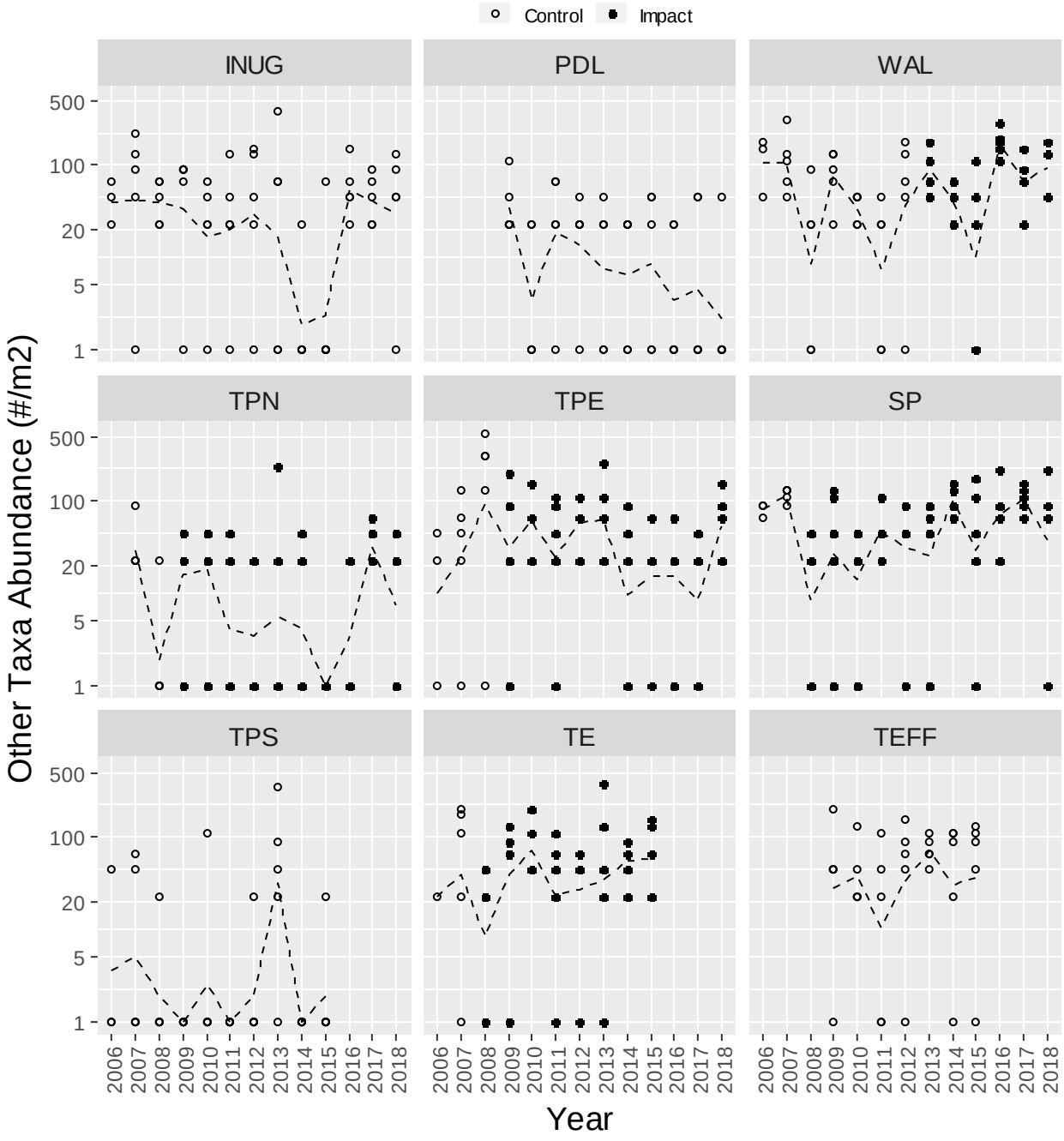


Figure E1-5. Oligochaete richness (# of taxa) from Meadowbank study lakes since 2006.

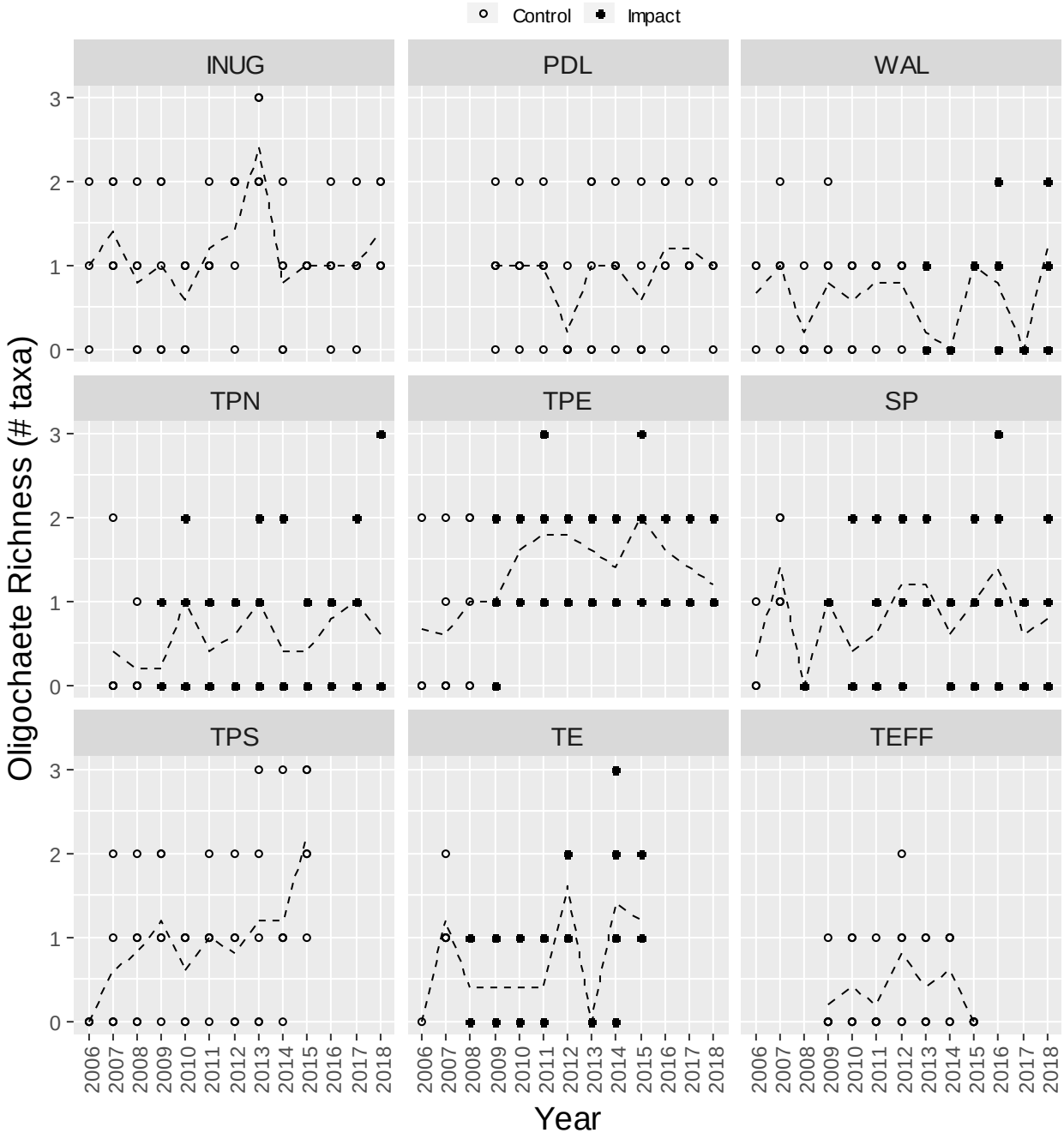


Figure E1-6. Insect richness (# of taxa)) from Meadowbank study lakes since 2006.

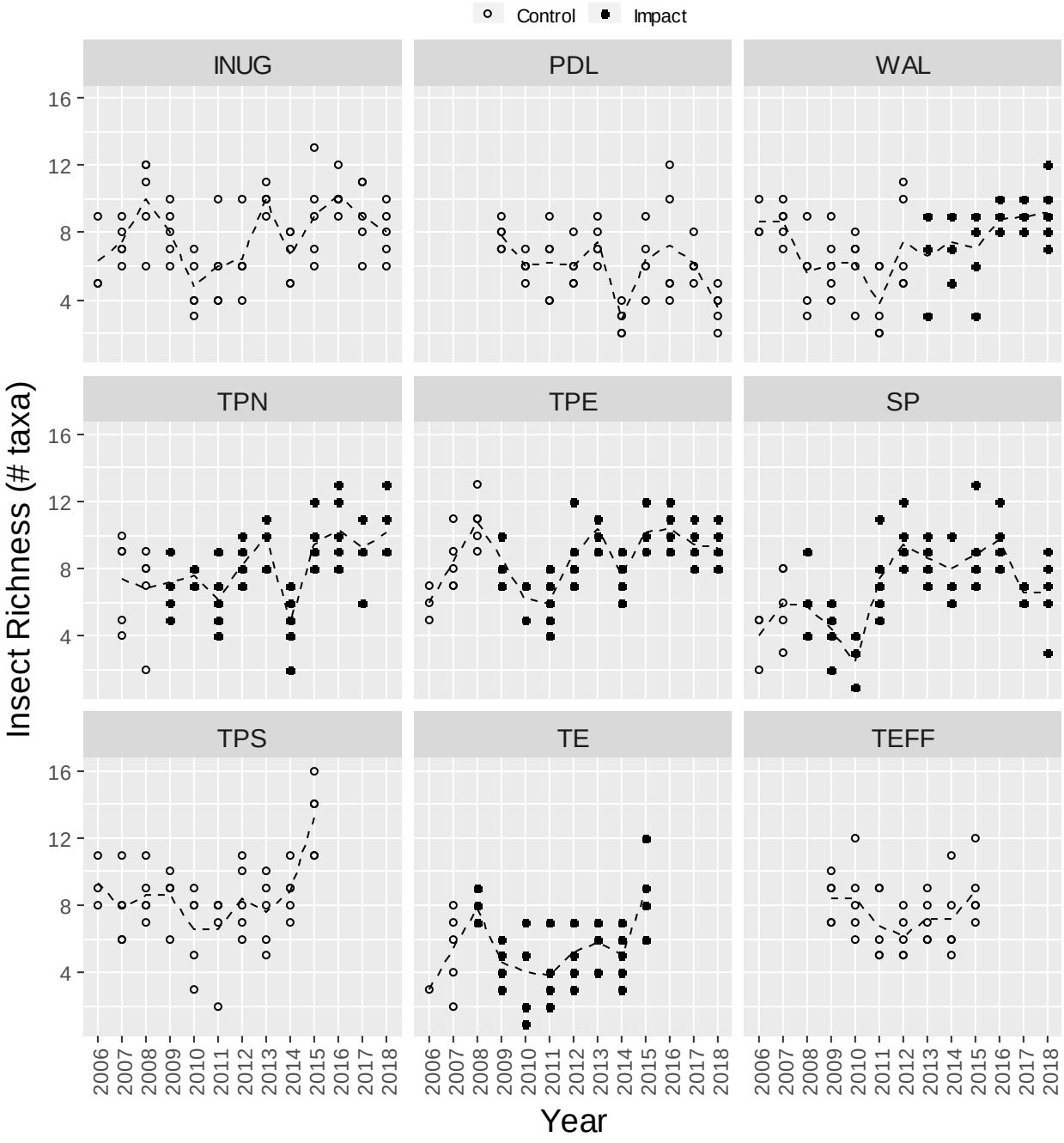


Figure E1-7. Mollusc richness (# of taxa) from Meadowbank study lakes since 2006.

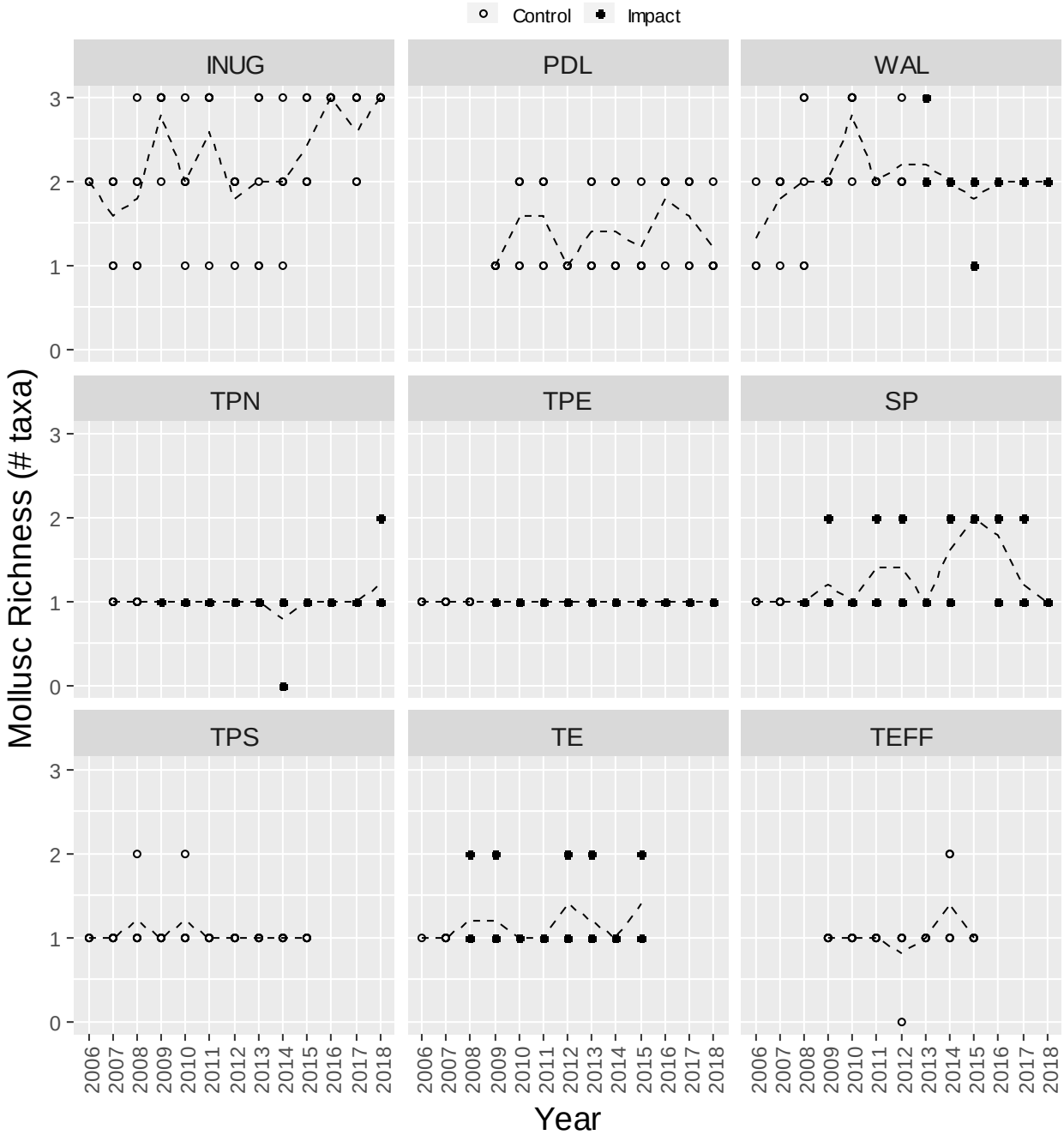


Figure E1-8. Other taxa richness (# of taxa) from Meadowbank study lakes since 2006.

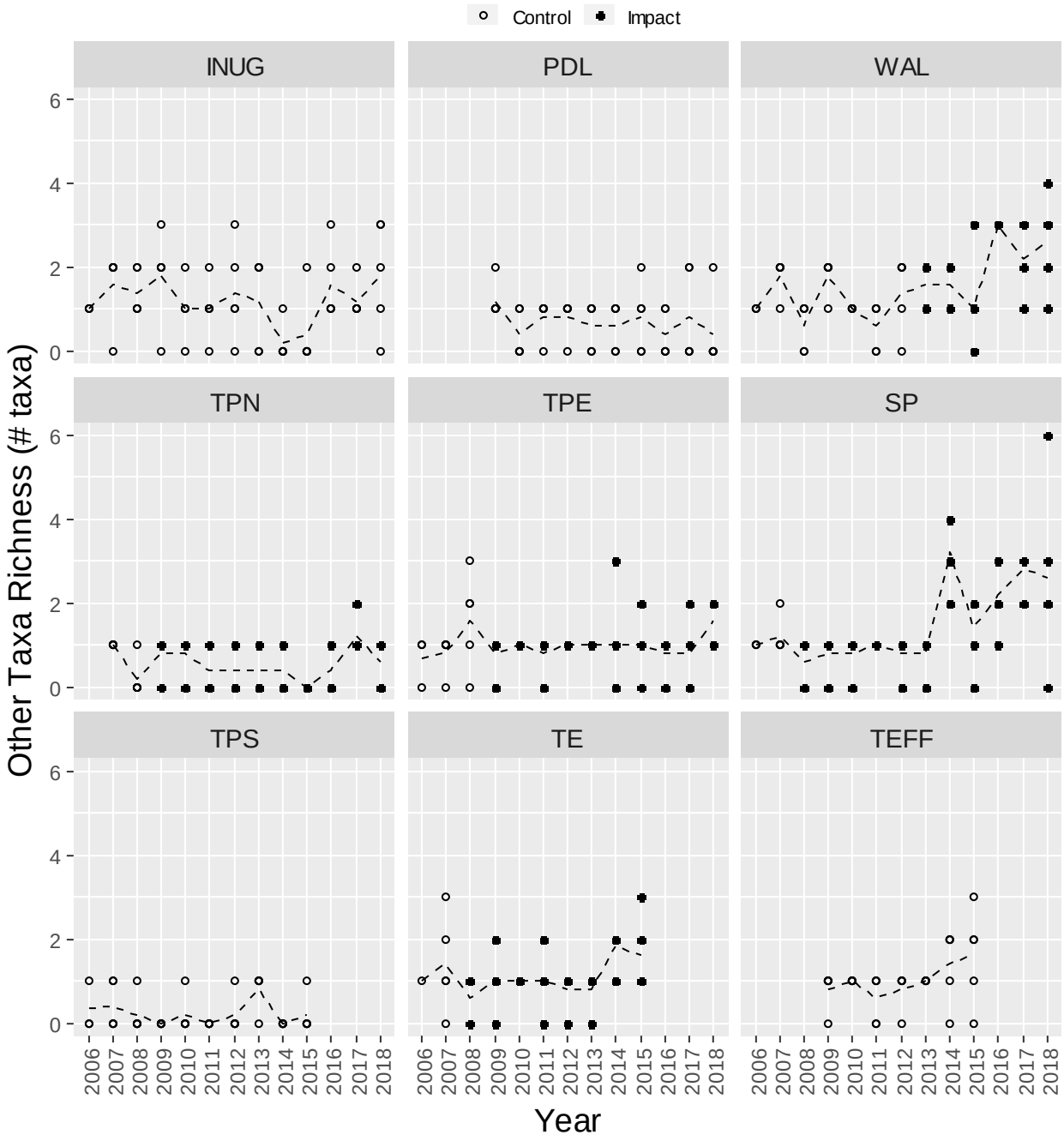


Figure E1-9. Simpsons' Diversity for the benthic invertebrate community at the Meadowbank study lakes since 2006.

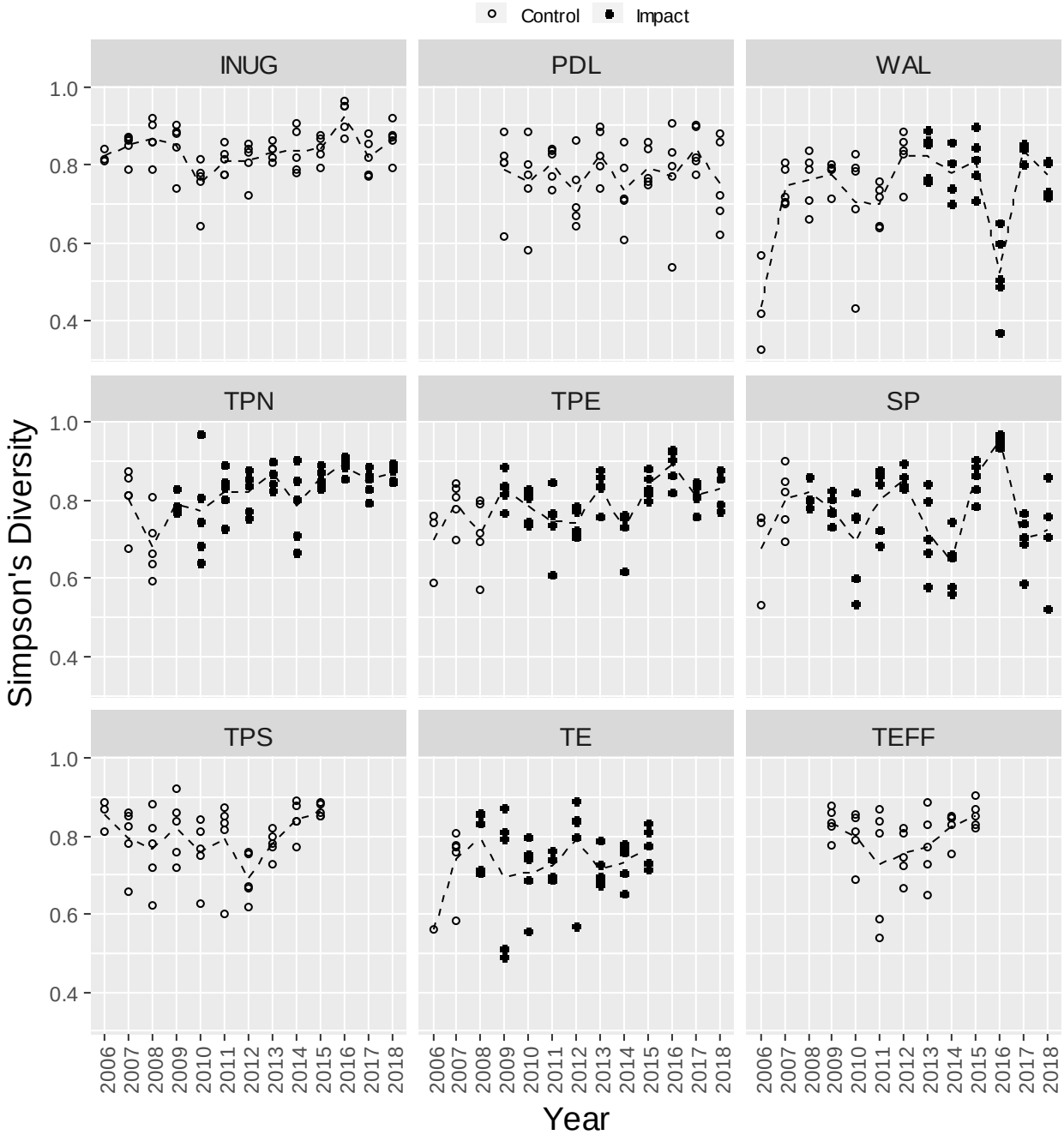
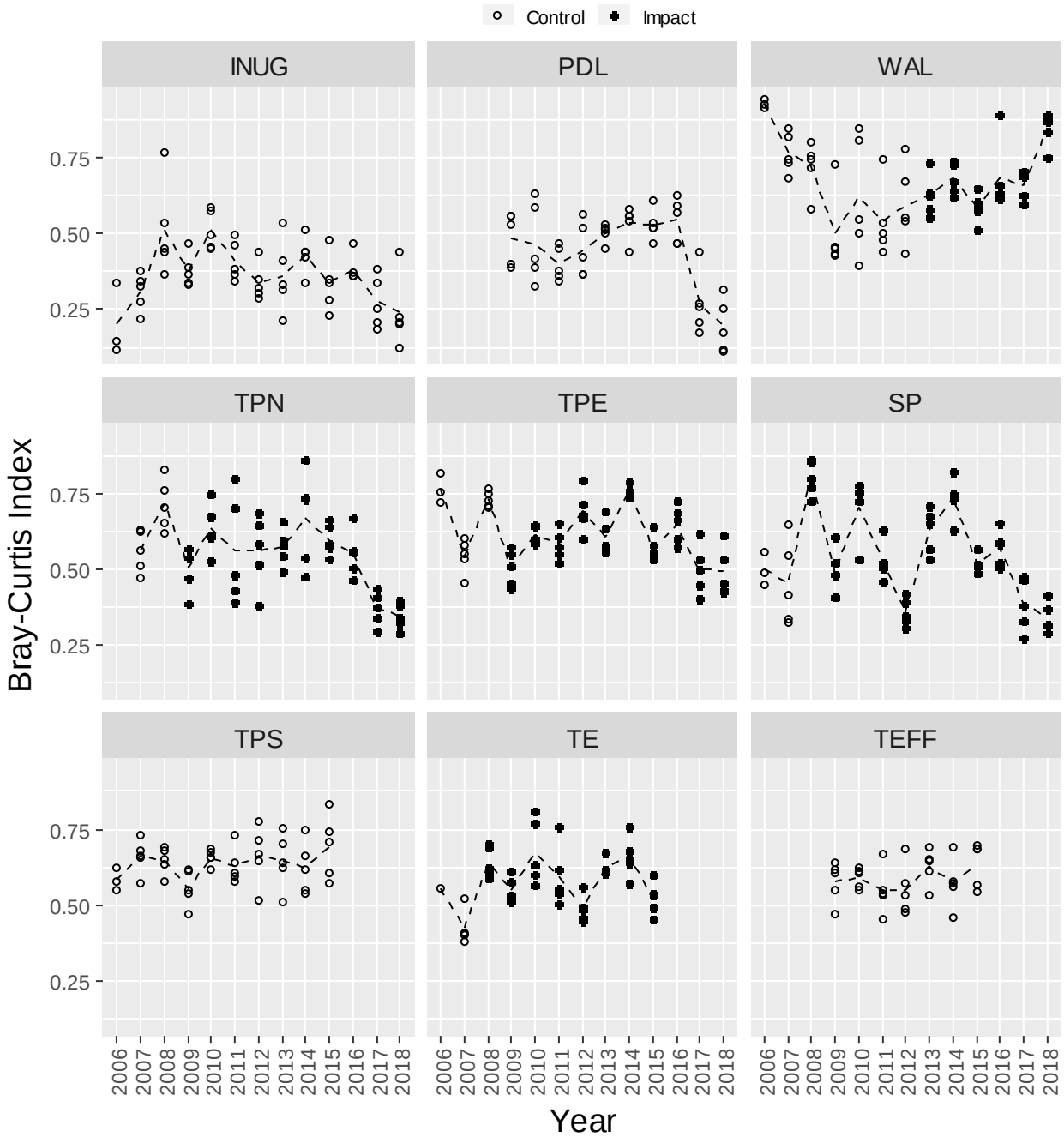


Figure E1-10. Bray-Curtis Index for the benthic invertebrate community at the Meadowbank study lakes since 2006.



APPENDIX E2
BENTHOS DATA – WHALE TAIL STUDY AREA LAKES

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Table E2-1. Benthic invertebrate abundance (#/m2) and richness (# taxa) by major taxa group, Whale Tail Pit study lakes.

Area-Replicate	Date	Depth (m)	Abundance (#/m^2)					Richness (# taxa)					Simpson's Diversity	Bray-Curtis Index
			Oligochaetes	Insects	Molluscs	Other Taxa[1]	TOTAL	Oligochaetes	Insects	Molluscs	Other Taxa[1]	TOTAL		
Whale Tail South Basin (WTS)														
WTS-1	13-Aug-18	7.2	43	1,891	804	22	2,761	2	13	3	1	19	0.89	0.38
WTS-2	13-Aug-18	8.3	0	2,152	391	130	2,674	0	14	2	2	18	0.90	0.46
WTS-3	13-Aug-18	7.8	43	6,500	565	109	7,217	2	13	3	2	20	0.89	0.67
WTS-4	13-Aug-18	7.9	87	9,478	1,152	261	10,978	2	11	2	3	18	0.83	0.82
WTS-5	13-Aug-18	7.2	22	1,065	565	109	1,761	1	8	2	2	13	0.85	0.35
	Area Mean		***39***	***4,217***	***696***	***126***	***5,078***	***1***	***12***	***2***	***2***	***18***	***0.87***	***0.54***
Mammoth Lake (MAM)														
MAM-1	16-Aug-18	8.0	43	696	674	87	1,500	2	8	3	3	16	0.89	0.29
MAM-2	16-Aug-18	7.9	130	2,783	978	87	3,978	2	8	3	4	17	0.71	0.62
MAM-3	16-Aug-18	8.1	87	4,022	609	261	4,978	1	6	2	2	11	0.80	0.72
MAM-4	16-Aug-18	8.6	261	4,783	1,217	261	6,522	2	5	3	3	13	0.85	0.75
MAM-5	16-Aug-18	8.4	43	1,783	543	130	2,500	2	8	3	3	16	0.79	0.53
	Area Mean		***113***	***2,813***	***804***	***165***	***3,896***	***2***	***7***	***3***	***3***	***15***	***0.81***	***0.58***
Lake A20														
A20-1	18-Aug-18	7.6	0	870	1,152	87	2,109	0	6	1	3	10	0.67	0.42
A20-2	18-Aug-18	8.0	87	1,022	1,413	130	2,652	1	11	2	4	18	0.70	0.45
A20-3	18-Aug-18	8.9	43	1,239	891	326	2,500	1	9	2	4	16	0.87	0.36
A20-4	18-Aug-18	8.2	174	4,348	522	174	5,217	2	8	3	2	15	0.83	0.68
A20-5	18-Aug-18	7.7	109	1,196	1,000	22	2,326	2	11	2	1	16	0.77	0.52
	Area Mean		***83***	***1,735***	***996***	***148***	***2,961***	***1***	***9***	***2***	***3***	***15***	***0.77***	***0.49***
Lake A76														
A76-1	18-Aug-18	8.2	0	3,630	696	87	4,413	0	8	2	2	12	0.79	0.66
A76-2	18-Aug-18	8.8	43	1,913	391	87	2,435	1	9	1	3	14	0.83	0.42
A76-3	18-Aug-18	8.9	304	5,435	1,348	348	7,435	3	7	3	5	18	0.88	0.71
A76-4	18-Aug-18	8.1	22	630	522	0	1,174	1	8	3	0	12	0.83	0.26
A76-5	18-Aug-18	7.9	43	2,391	370	217	3,022	2	9	1	4	16	0.69	0.60
	Area Mean		***83***	***2,800***	***665***	***148***	***3,696***	***1***	***8***	***2***	***3***	***14***	***0.80***	***0.53***
Lake DS1														
DS1-1	19-Aug-18	9.2	0	3,804	761	65	4,630	0	8	3	2	13	0.54	0.71
DS1-2	19-Aug-18	8.6	0	1,783	739	109	2,630	0	8	2	1	11	0.82	0.61
DS1-3	19-Aug-18	8.8	22	1,543	609	174	2,348	1	8	4	2	15	0.81	0.56
DS1-4	19-Aug-18	9.2	0	2,087	696	43	2,826	0	8	3	2	13	0.74	0.57
DS1-5	19-Aug-18	9.5	0	587	609	174	1,370	0	10	2	5	17	0.82	0.35
	Area Mean		***4***	***1,961***	***683***	***113***	***2,761***	***0***	***8***	***3***	***2***	***14***	***0.74***	***0.56***
Nemo Lake (NEM)														
NEM-1	17-Aug-18	6.9	22	2,435	239	0	2,696	1	8	2	0	11	0.80	0.47
NEM-2	17-Aug-18	8.4	22	1,609	217	22	1,870	1	6	2	1	10	0.79	0.45
NEM-3	17-Aug-18	6.2	0	2,696	174	87	2,957	0	7	1	2	10	0.71	0.59
NEM-4	17-Aug-18	7.8	22	1,848	522	22	2,413	1	5	2	1	9	0.79	0.52
NEM-5	17-Aug-18	8.2	*43*	*3,348*	*522*	*130*	*4,043*	*1*	*5*	*2*	*2*	*10*	*0.75*	*0.67*
	Area Mean		***22***	***2,387***	***335***	***52***	***2,796***	***1***	***6***	***2***	***1***	***10***	***0.77***	***0.54***

Notes:

1. "Other taxa" includes flatworms (Turbellaria) and arthropods (Acalyptonotidae, Hygrobatidae, Lebertiidae, Oxidae, Pionidae, Harpacticoida, and O. Notostraca).

Table E2-1. Raw benthic invertebrate data from the Whale Tail Pit study area 2018.

Program	Whale Tail Pit Expansion									
Lake	Lake A20					Lake A76				
Station	A20					A76				
Control/Impact?	Control					Control				
Replicate	1	2	3	4	5	1	2	3	4	5
Date	18-Aug-18	18-Aug-18	18-Aug-18	18-Aug-18	18-Aug-18	18-Aug-18	18-Aug-18	18-Aug-18	18-Aug-18	18-Aug-18
DepthOfSample (m)	7.6	8.0	8.9	8.2	7.7	8.2	8.8	8.9	8.1	7.9
ROUNDWORMS										
P. Nemata	6	5	6	12	8	1	8	6	2	3
FLATWORMS										
P. Platyhelminthes										
Cl. Turbellaria										
indeterminate	-	1	-	-	-	3	1	2	-	3
ANNELIDS										
P. Annelida										
WORMS										
Cl. Oligochaeta										
F. Enchytraeidae	-	-	-	-	-	-	-	-	-	-
F. Naididae										
S.F. Naidinae										
Nais	-	-	-	-	-	-	-	8	-	-
S.F. Tubificinae										
Limnodrilus hoffmeisteri	-	-	-	-	-	-	-	-	-	-
Tasserkidrilus americanus	-	-	-	-	-	-	-	-	-	-
immatures with hair chaetae	-	-	-	-	-	-	-	-	1	-
immatures without hair chaetae	-	-	-	-	-	-	-	-	-	-
S.F. Rhyacodrilinae										
Rhyacodrilus coccineus	-	4	-	2	3	-	-	4	-	1
Rhyacodrilus montana	-	-	-	-	-	-	-	-	-	-
F. Lumbriculidae										
Lumbriculus	-	-	2	6	2	-	2	2	-	1
ARTHROPODS										
P. Arthropoda										
MITES										
Cl. Arachnida										
O. Acarina										
immature	-	-	**1**	**4**	-	-	-	**2**	-	-
F. Acalyptonotidae										
Acalyptonotus	1	2	2	-	-	-	2	6	-	3
F. Hygrobatidae										
Hygrobates	-	-	8	-	1	-	-	-	-	-
F. Lebertiidae										
Lebertia	2	2	2	2	-	-	-	2	-	2
F. Oxidae										
Oxus	1	1	2	2	-	1	1	2	-	2
F. Pionidae										
indeterminate	-	-	-	-	-	-	-	-	-	-
HARPACTICOIDS										
O. Harpacticoida	-	-	-	-	-	-	-	2	-	-
SEED SHRIMPS										
Cl. Ostracoda	19	34	22	14	12	13	6	44	4	15
TADPOLE SHRIMP										
O. Notostraca										
Lepidurus arcticus	-	-	-	-	-	-	-	-	-	-
INSECTS										
Cl. Insecta										
CADDISFLIES										
O. Trichoptera										
F. Apataniidae										
Apatania	-	-	1	-	-	-	-	-	-	-
F. Limnephilidae										
Grensia praeterita	-	-	-	-	-	-	-	-	-	-
TRUE FLIES										
O. Diptera										
MIDGES										
F. Chironomidae										
chironomid pupae	**4**	**4**	**8**	**6**	**11**	**3**	**2**	-	**2**	**1**
S.F. Chironominae										
Chironomus	-	-	-	-	-	-	-	-	-	-
Cladotanytarsus	-	-	-	4	1	-	-	-	1	-
Constempellina	-	-	-	-	-	-	-	-	-	-
Corynocera ambigua	-	1	3	75	2	67	1	68	2	10
?Corynocera oliveri	-	-	-	-	-	-	-	-	-	-
Dicrotendipes	-	-	-	-	-	-	-	6	-	-
Micropsectra	-	1	-	25	3	59	38	64	6	75
Microtendipes	-	-	-	-	-	-	-	-	-	-
Parachironomus	-	-	-	-	-	-	-	-	-	-
Paracladopelma	-	-	-	-	-	-	-	-	-	-
Paratanytarsus	15	11	10	53	22	7	16	42	6	1
Polypedilum	-	-	-	-	-	-	-	-	-	-
Sergentia	-	-	-	-	-	-	-	-	-	-
Stempellinella	-	-	-	-	-	13	-	-	-	10
Stictochironomus	9	13	16	-	1	3	12	14	4	4
Tanytarsus	2	3	2	25	5	3	6	34	-	-
S.F. Diamesinae										
Protanypus	-	-	-	-	1	-	-	-	-	2
Potthastia	-	-	-	-	-	-	-	-	-	-
Pseudodiamesa	-	-	-	-	-	-	-	-	-	-
S.F. Orthocladiinae										
Abiskomyia	-	-	-	-	-	-	3	-	1	2
Cricotopus	-	-	-	-	-	-	-	-	-	-
Cricotopus/Orthocladius	-	-	-	-	-	-	-	-	-	-
Heterotrissocladius	-	1	-	4	-	-	-	-	-	-
Hydrobaenus	-	-	-	-	-	-	-	-	-	-
Mesocricotopus	-	-	-	-	-	-	-	-	-	-
Paracladius	-	-	-	-	-	-	-	-	-	-
Parakiefferiella	-	-	-	-	-	-	-	-	-	-
Psectrocladius	-	1	-	-	-	1	2	-	-	-
Zalutschia	-	-	-	-	-	-	-	-	-	-
Orthocladiinae *Genus "Greenland"*	-	1	-	-	-	-	-	-	-	-
S.F. Prodiamesinae										
Monodiamesa	-	2	5	4	1	-	3	-	2	2
S.F. Tanypodinae										
Ablabesmyia	1	-	1	-	-	-	-	-	-	-
Procladius	6	6	10	4	6	11	5	22	5	3
Thienemannimyia complex	3	3	1	-	1	-	-	-	-	-
F. Empididae										
Neoplasta/ Chelifera/Metachela	-	-	-	-	1	-	-	-	-	-
Wiedemannia	-	-	-	-	-	-	-	-	-	-
pupae	-	-	-	-	-	-	-	-	-	-

Table E2-1. Raw benthic invertebrate data from the Whale Tail Pit study area 2018.

Program	Whale Tail Pit Expansion									
Lake	Lake A20					Lake A76				
Station	A20					A76				
Control/Impact?	Control					Control				
Replicate	1	2	3	4	5	1	2	3	4	5
Date	18-Aug-18	18-Aug-18	18-Aug-18	18-Aug-18	18-Aug-18	18-Aug-18	18-Aug-18	18-Aug-18	18-Aug-18	18-Aug-18
DepthOfSample (m)	7.6	8.0	8.9	8.2	7.7	8.2	8.8	8.9	8.1	7.9
MOLLUSCS										
P. Mollusca										
SNAILS										
Cl. Gastropoda										
F. Valvatidae										
Valvata	-	-	-	-	-	-	-	-	-	-
CLAMS										
Cl. Bivalvia										
F. Sphaeriidae										
Pisidium (Cyclocalyx)/Neopisidium	53	64	33	8	45	24	18	22	20	17
Pisidium (Cyclocalyx)	-	-	-	6	-	8	-	10	2	-
Sphaerium nitidum	-	1	8	10	1	-	-	30	2	-
R (Richness) - totals [2,3]										
Total	10	18	16	15	16	12	14	18	12	16
Oligochaete	0	1	1	2	2	0	1	3	1	2
Insect	6	11	9	8	11	8	9	7	8	9
Mollusc	1	2	2	3	2	2	1	3	3	1
Other[4]	3	4	4	2	1	2	3	5	0	4
Abundance (raw) - totals [5,6]										
Total	97	122	115	240	107	203	112	342	54	139
Oligochaete	0	4	2	8	5	0	2	14	1	2
Insect	40	47	57	200	55	167	88	250	29	110
Mollusc	53	65	41	24	46	32	18	62	24	17
Other[4]	4	6	15	8	1	4	4	16	0	10
Abundance - totals (#/m^2) [5]										
Total	2,109	2,652	2,500	5,217	2,326	4,413	2,435	7,435	1,174	3,022
Oligochaete	0	87	43	174	109	0	43	304	22	43
Insect	870	1,022	1,239	4,348	1,196	3,630	1,913	5,435	630	2,391
Mollusc	1,152	1,413	891	522	1,000	696	391	1,348	522	370
Other[4]	87	130	326	174	22	87	87	348	0	217

Notes:

1. Benthic invertebrate count data shown in this table are from composite of two grabs sieved to 500 µm.
2. Richness totals exclude P. Nemata, Cl. Ostracoda, indeterminates (O. Acarina, F. Lumbriculidae), immatures (S.F. Tubificinae, O. Acarina), and pupae.
3. Pupae and immatures (bolded values) are excluded from the richness totals if other life stages are present in the replicate sample.
4. Other Taxa include: Cl. Turbellaria, F. Acalyptonotidae, F. Hygrobatidae, F. Lebertiidae, F. Oxidae, F. Pionidae, O. Harpacticoida, O. Notostraca, and F. Gammaracanthidae.
5. Abundance totals exclude P. Nemata and Cl. Ostracoda.
6. Raw abundance from two grabs (grab area = 0.023 m^2).

Table E2-1. Raw benthic invertebrate data from the Whale Tail Pit study area 2018.

Program						Whale Tail Pit Expansion				
Lake	Lake DS1					Mammoth Lake				
Station	DS1					MAM				
Control/Impact?	Control					Control				
Replicate	1	2	3	4	5	1	2	3	4	5
Date	19-Aug-18	19-Aug-18	19-Aug-18	19-Aug-18	19-Aug-18	16-Aug-18	16-Aug-18	16-Aug-18	16-Aug-18	16-Aug-18
DepthOfSample (m)	9.2	8.6	8.8	9.2	9.5	8	7.9	8.1	8.6	8.4
ROUNDWORMS										
P. Nemata	4	7	7	3	6	6	35	12	16	-
FLATWORMS										
P. Platyhelminthes										
Cl. Turbellaria										
indeterminate	-	-	-	-	2	1	1	8	-	3
ANNELIDS										
P. Annelida										
WORMS										
Cl. Oligochaeta										
F. Enchytraeidae	-	-	-	-	-	-	-	-	-	-
F. Naididae										
S.F. Naidinae										
Nais	-	-	-	-	-	-	-	-	-	-
S.F. Tubificinae										
Limnodrilus hoffmeisteri	-	-	-	-	-	-	-	-	-	-
Tasserkidrilus americanus	-	-	-	-	-	-	-	-	-	-
immatures with hair chaetae	-	-	-	-	-	-	-	-	-	-
immatures without hair chaetae	-	-	-	-	-	-	-	-	-	-
S.F. Rhyacodrilinae										
Rhyacodrilus coccineus	-	-	1	-	-	1	2	-	4	1
Rhyacodrilus montana	-	-	-	-	-	-	-	-	-	-
F. Lumbriculidae										
Lumbriculus	-	-	-	-	-	1	4	4	8	1
ARTHROPODS										
P. Arthropoda										
MITES										
Cl. Arachnida										
O. Acarina										
immature	-	-	-	-	-	-	-	-	-	-
F. Acalyptonotidae										
Acalyptonotus	-	-	-	-	1	-	-	-	-	-
F. Hygrobatidae										
Hygrobates	-	-	-	1	1	-	-	-	-	-
F. Lebertiidae										
Lebertia	1	5	5	1	3	2	1	-	4	1
F. Oxidae										
Oxus	2	-	3	-	1	1	1	4	4	2
F. Pionidae										
indeterminate	-	-	-	-	-	-	-	-	4	-
HARPACTICOIDS										
O. Harpacticoida	-	-	-	-	-	-	-	-	-	-
SEED SHRIMPS										
Cl. Ostracoda	6	1	7	4	5	16	6	28	28	16
TADPOLE SHRIMP										
O. Notostraca										
Lepidurus arcticus	-	-	-	-	-	-	1	-	-	-
INSECTS										
Cl. Insecta										
CADDISFLIES										
O. Trichoptera										
F. Apataniidae										
Apatania	-	1	3	-	2	-	-	-	-	-
F. Limnephilidae										
Grensia praeterita	-	-	-	-	-	-	-	-	-	-
TRUE FLIES										
O. Diptera										
MIDGES										
F. Chironomidae										
chironomid pupae	**2**	**2**	-	**2**	-	-	-	**4**	-	-
S.F. Chironominae										
Chironomus	-	-	-	-	-	-	-	-	-	-
Cladotanytarsus	-	-	-	-	-	1	-	-	-	-
Constempellina	-	-	-	-	-	-	-	-	-	-
Corynocera ambigua	-	-	-	-	-	9	11	44	72	11
?Corynocera oliveri	-	-	-	-	-	-	-	-	-	-
Dicrotendipes	6	-	-	4	2	1	-	-	-	-
Micropsectra	-	-	-	1	-	-	3	24	12	1
Microtendipes	-	-	-	-	-	-	-	-	-	-
Parachironomus	-	1	-	-	-	-	-	-	-	-
Paracladopelma	-	-	-	-	-	-	-	-	-	-
Paratanytarsus	141	33	34	60	-	4	5	24	40	6
Polypedilum	-	-	-	-	-	-	-	-	-	-
Sergentia	-	-	-	-	-	-	-	-	-	-
Stempellinella	-	-	-	-	-	-	-	-	-	-
Stictochironomus	2	-	2	4	3	3	2	-	-	3
Tanytarsus	-	-	-	-	-	1	92	84	68	47
S.F. Diamesinae										
Protanypus	-	-	-	-	-	-	-	-	-	-
Potthastia	-	-	-	-	-	-	-	-	-	-
Pseudodiamesa	-	-	-	-	-	-	-	-	-	-
S.F. Orthocladiinae										
Abiskomyia	-	-	-	1	-	-	-	-	-	-
Cricotopus	-	-	-	-	-	-	-	-	-	-
Cricotopus/Orthocladius	1	-	-	-	1	-	-	-	-	-
Heterotrissocladius	6	14	3	10	6	-	-	-	-	-
Hydrobaenus	-	-	-	-	-	-	-	-	-	-
Mesocricotopus	-	-	-	-	-	-	-	-	-	-
Paracladius	-	-	-	-	-	-	-	-	-	-
Parakiefferiella	-	-	-	-	-	-	-	-	-	-
Psectrocladius	-	-	-	-	2	-	3	-	-	-
Zalutschia	-	-	-	-	1	-	-	-	-	-
Orthocladiinae *Genus "Greenland"*	-	-	-	-	-	-	-	-	-	-
S.F. Prodiamesinae										
Monodiamesa	4	3	1	2	1	6	2	-	-	2
S.F. Tanypodinae										
Ablabesmyia	2	3	1	-	1	-	-	4	-	1
Procladius	11	24	26	12	8	7	10	1	28	11
Thienemannimyia complex	-	-	-	-	-	-	-	-	-	-
F. Empididae										
Neoplasta/ Chelifera/Metachela	-	1	1	-	-	-	-	-	-	-
Wiedemannia	-	-	-	-	-	-	-	-	-	-
pupae	-	-	-	-	-	-	-	-	-	-

Table E2-1. Raw benthic invertebrate data from the Whale Tail Pit study area 2018.

Program						Whale Tail Pit Expansion				
Lake	Lake DS1					Mammoth Lake				
Station	DS1					MAM				
Control/Impact?	Control					Control				
Replicate	1	2	3	4	5	1	2	3	4	5
Date	19-Aug-18	19-Aug-18	19-Aug-18	19-Aug-18	19-Aug-18	16-Aug-18	16-Aug-18	16-Aug-18	16-Aug-18	16-Aug-18
DepthOfSample (m)	9.2	8.6	8.8	9.2	9.5	8	7.9	8.1	8.6	8.4
MOLLUSCS										
P. Mollusca										
SNAILS										
Cl. Gastropoda										
F. Valvatidae										
Valvata	1	5	5	4	3	-	-	-	-	-
CLAMS										
Cl. Bivalvia										
F. Sphaeriidae										
Pisidium (Cyclocalyx)/Neopisidium	28	29	21	24	25	12	25	16	28	10
Pisidium (Cyclocalyx)	6	-	1	4	-	14	17	12	20	14
Sphaerium nitidum	-	-	1	-	-	5	3	-	8	1
R (Richness) - totals [2,3]										
Total	13	11	15	13	17	16	17	11	13	16
Oligochaete	0	0	1	0	0	2	2	1	2	2
Insect	8	8	8	8	10	8	8	6	5	8
Mollusc	3	2	4	3	2	3	3	2	3	3
Other[4]	2	1	2	2	5	3	4	2	3	3
Abundance (raw) - totals [5,6]										
Total	213	121	108	130	63	69	183	229	300	115
Oligochaete	0	0	1	0	0	2	6	4	12	2
Insect	175	82	71	96	27	32	128	185	220	82
Mollusc	35	34	28	32	28	31	45	28	56	25
Other[4]	3	5	8	2	8	4	4	12	12	6
Abundance - totals (#/m^2) [5]										
Total	4,630	2,630	2,348	2,826	1,370	1,500	3,978	4,978	6,522	2,500
Oligochaete	0	0	22	0	0	43	130	87	261	43
Insect	3,804	1,783	1,543	2,087	587	696	2,783	4,022	4,783	1,783
Mollusc	761	739	609	696	609	674	978	609	1,217	543
Other[4]	65	109	174	43	174	87	87	261	261	130

Notes:

1. Benthic invertebrate count data shown in this table are from composite of two grabs sieved to 500 µm.
2. Richness totals exclude P. Nemata, Cl. Ostracoda, indeterminates (O. Acarina, F. Lumbriculidae), immatures (S.F. Tubificinae, O. Acarina), and pupae.
3. Pupae and immatures (bolded values) are excluded from the richness totals if other life stages are present in the replicate sample.
4. Other Taxa include: Cl. Turbellaria, F. Acalyptonotidae, F. Hygrobatidae, F. Lebertiidae, F. Oxidae, F. Pionidae, O. Harpacticoida, O. Notostraca, and F. Gammaracanthidae.
5. Abundance totals exclude P. Nemata and Cl. Ostracoda.
6. Raw abundance from two grabs (grab area = 0.023 m^2).

Table E2-1. Raw benthic invertebrate data from the Whale Tail Pit study area 2018.

Program						Whale Tail Pit Expansion				
Lake	Nemo Lake					Whale Tail Lake - South Basin				
Station	NEM					WTS				
Control/Impact?	Control					Impact				
Replicate	1	2	3	4	5	1	2	3	4	5
Date	17-Aug-18	17-Aug-18	17-Aug-18	17-Aug-18	17-Aug-18	13-Aug-18	13-Aug-18	13-Aug-18	13-Aug-18	13-Aug-18
DepthOfSample (m)	6.9	8.4	6.2	7.8	8.2	7.2	8.3	7.8	7.9	7.2
ROUNDWORMS										
P. Nemata	-	1	2	-	-	2	4	3	3	3
FLATWORMS										
P. Platyhelminthes										
Cl. Turbellaria										
indeterminate	-	-	2	1	2	-	-	4	7	3
ANNELIDS										
P. Annelida										
WORMS										
Cl. Oligochaeta										
F. Enchytraeidae	-	-	-	-	-	-	-	-	-	-
F. Naididae										
S.F. Naidinae										
Nais	-	-	-	-	-	-	-	-	-	-
S.F. Tubificinae										
Limnodrilus hoffmeisteri	-	-	-	-	-	-	-	-	-	-
Tasserkidrilus americanus	-	-	-	-	-	-	-	-	-	-
immatures with hair chaetae	-	-	-	-	-	-	-	-	-	-
immatures without hair chaetae	-	-	-	-	-	-	-	-	-	-
S.F. Rhyacodrilinae										
Rhyacodrilus coccineus	-	-	-	-	-	1	-	1	3	1
Rhyacodrilus montana	-	-	-	-	-	-	-	-	-	-
F. Lumbriculidae										
Lumbriculus	1	1	-	1	2	1	-	1	1	-
ARTHROPODS										
P. Arthropoda										
MITES										
Cl. Arachnida										
O. Acarina										
immature	-	-	-	-	-	-	-	-	-	-
F. Acalyptonotidae										
Acalyptonotus	-	1	2	-	4	1	4	-	-	2
F. Hygrobatidae										
Hygrobates	-	-	-	-	-	-	-	-	2	-
F. Lebertiidae										
Lebertia	-	-	-	-	-	-	-	-	-	-
F. Oxidae										
Oxus	-	-	-	-	-	-	2	1	3	-
F. Pionidae										
indeterminate	-	-	-	-	-	-	-	-	-	-
HARPACTICOIDS										
O. Harpacticoida	-	-	-	-	-	-	-	-	-	-
SEED SHRIMPS										
Cl. Ostracoda	14	13	28	8	4	17	5	9	21	15
TADPOLE SHRIMP										
O. Notostraca										
Lepidurus arcticus	-	-	-	-	-	-	-	-	-	-
INSECTS										
Cl. Insecta										
CADDISFLIES										
O. Trichoptera										
F. Apataniidae										
Apatania	-	-	-	-	-	-	-	-	-	-
F. Limnephilidae										
Grensia praeterita	-	-	-	-	-	-	-	-	-	-
TRUE FLIES										
O. Diptera										
MIDGES										
F. Chironomidae										
chironomid pupae	**4**	**1**	-	**1**	-	**10**	**9**	**1**	**21**	**13**
S.F. Chironominae										
Chironomus	-	-	-	-	-	-	-	-	-	-
Cladotanytarsus	16	-	6	-	-	1	7	55	-	-
Constempellina	-	-	-	-	-	-	-	-	-	-
Corynocera ambigua	-	-	-	-	-	4	13	25	31	2
?Corynocera oliveri	-	-	-	-	-	2	-	49	137	-
Dicrotendipes	-	-	-	-	-	-	1	-	2	-
Micropsectra	6	3	8	-	36	3	26	16	37	10
Microtendipes	-	-	-	-	-	-	-	-	-	-
Parachironomus	-	-	-	-	-	-	-	-	-	-
Paracladopelma	-	-	-	-	-	-	-	-	-	-
Paratanytarsus	4	7	-	-	2	18	8	58	134	6
Polypedilum	-	-	-	-	-	-	-	-	-	-
Sergentia	-	-	-	-	-	-	-	-	6	-
Stempellinella	-	-	-	-	-	1	-	1	-	-
Stictochironomus	24	32	64	36	24	13	1	29	-	-
Tanytarsus	46	19	34	30	80	4	4	40	52	3
S.F. Diamesinae										
Protanypus	-	-	-	-	-	-	1	1	-	1
Potthastia	-	-	-	-	-	-	-	-	-	-
Pseudodiamesa	-	-	-	-	-	-	-	-	-	-
S.F. Orthocladiinae										
Abiskomyia	-	-	-	-	-	-	-	-	-	-
Cricotopus	-	-	-	-	-	-	-	-	-	-
Cricotopus/Orthocladius	-	-	-	-	-	-	1	-	-	-
Heterotrissocladius	-	-	-	-	-	-	1	-	4	-
Hydrobaenus	-	-	-	-	-	-	-	-	-	-
Mesocricotopus	-	-	-	-	-	-	-	-	-	-
Paracladius	-	-	-	-	-	-	-	-	-	-
Parakiefferiella	-	-	-	-	-	1	-	-	-	-
Psectrocladius	1	-	2	2	-	6	4	6	-	1
Zalutschia	-	-	-	-	-	-	-	-	-	-
Orthocladiinae *Genus "Greenland"*	-	-	-	-	-	-	-	-	-	-
S.F. Prodiamesinae										
Monodiamesa	-	-	-	-	-	2	4	2	1	3
S.F. Tanypodinae										
Ablabesmyia	-	-	-	-	-	1	1	1	1	-
Procladius	6	10	6	12	12	21	18	15	10	10
Thienemannimyia complex	5	2	4	4	-	-	-	-	-	-
F. Empididae										
Neoplasta/ Chelifera/Metachela	-	-	-	-	-	-	-	-	-	-
Wiedemannia	-	-	-	-	-	-	-	-	-	-
pupae	-	-	-	-	-	-	-	-	-	-

Table E2-1. Raw benthic invertebrate data from the Whale Tail Pit study area 2018.

Program						Whale Tail Pit Expansion				
Lake	Nemo Lake					Whale Tail Lake - South Basin				
Station	NEM					WTS				
Control/Impact?	Control					Impact				
Replicate	1	2	3	4	5	1	2	3	4	5
Date	17-Aug-18	17-Aug-18	17-Aug-18	17-Aug-18	17-Aug-18	13-Aug-18	13-Aug-18	13-Aug-18	13-Aug-18	13-Aug-18
DepthOfSample (m)	6.9	8.4	6.2	7.8	8.2	7.2	8.3	7.8	7.9	7.2
MOLLUSCS										
P. Mollusca										
SNAILS										
Cl. Gastropoda										
F. Valvatidae										
Valvata	-	-	-	-	-	-	-	-	-	-
CLAMS										
Cl. Bivalvia										
F. Sphaeriidae										
Pisidium (Cyclocalyx)/Neopisidium	4	8	8	9	6	27	15	9	20	25
Pisidium (Cyclocalyx)	7	2	-	15	18	5	3	13	33	1
Sphaerium nitidum	-	-	-	-	-	5	-	4	-	-
R (Richness) - totals [2,3]										
Total	11	10	10	9	10	19	18	20	18	13
Oligochaete	1	1	0	1	1	2	0	2	2	1
Insect	8	6	7	5	5	13	14	13	11	8
Mollusc	2	2	1	2	2	3	2	3	2	2
Other[4]	0	1	2	1	2	1	2	2	3	2
Abundance (raw) - totals [5,6]										
Total	124	86	136	111	186	127	123	332	505	81
Oligochaete	1	1	0	1	2	2	0	2	4	1
Insect	112	74	124	85	154	87	99	299	436	49
Mollusc	11	10	8	24	24	37	18	26	53	26
Other[4]	0	1	4	1	6	1	6	5	12	5
Abundance - totals (#/m^2) [5]										
Total	2,696	1,870	2,957	2,413	4,043	2,761	2,674	7,217	10,978	1,761
Oligochaete	22	22	0	22	43	43	0	43	87	22
Insect	2,435	1,609	2,696	1,848	3,348	1,891	2,152	6,500	9,478	1,065
Mollusc	239	217	174	522	522	804	391	565	1,152	565
Other[4]	0	22	87	22	130	22	130	109	261	109

Notes:

1. Benthic invertebrate count data shown in this table are from composite of two grabs sieved to 500 µm.
2. Richness totals exclude P. Nemata, Cl. Ostracoda, indeterminates (O. Acarina, F. Lumbriculidae), immatures (S.F. Tubificinae, O. Acarina), and pupae.
3. Pupae and immatures are only included in the richness totals if no other life stages are present in the replicate sample.
4. Other Taxa include: Cl. Turbellaria, F. Acalyptonotidae, F. Hygrobatidae, F. Lebertiidae, F. Oxidae, F. Pionidae, O. Harpacticoida, O. Notostraca, and F. Gammaracanthidae.
5. Abundance totals exclude P. Nemata and Cl. Ostracoda.
6. Raw abundance from two grabs (grab area = 0.023 m^2).

Figure E2-1. Oligochaete abundance (#/m^2) from the Whale Tail Pit study lakes since 2015.

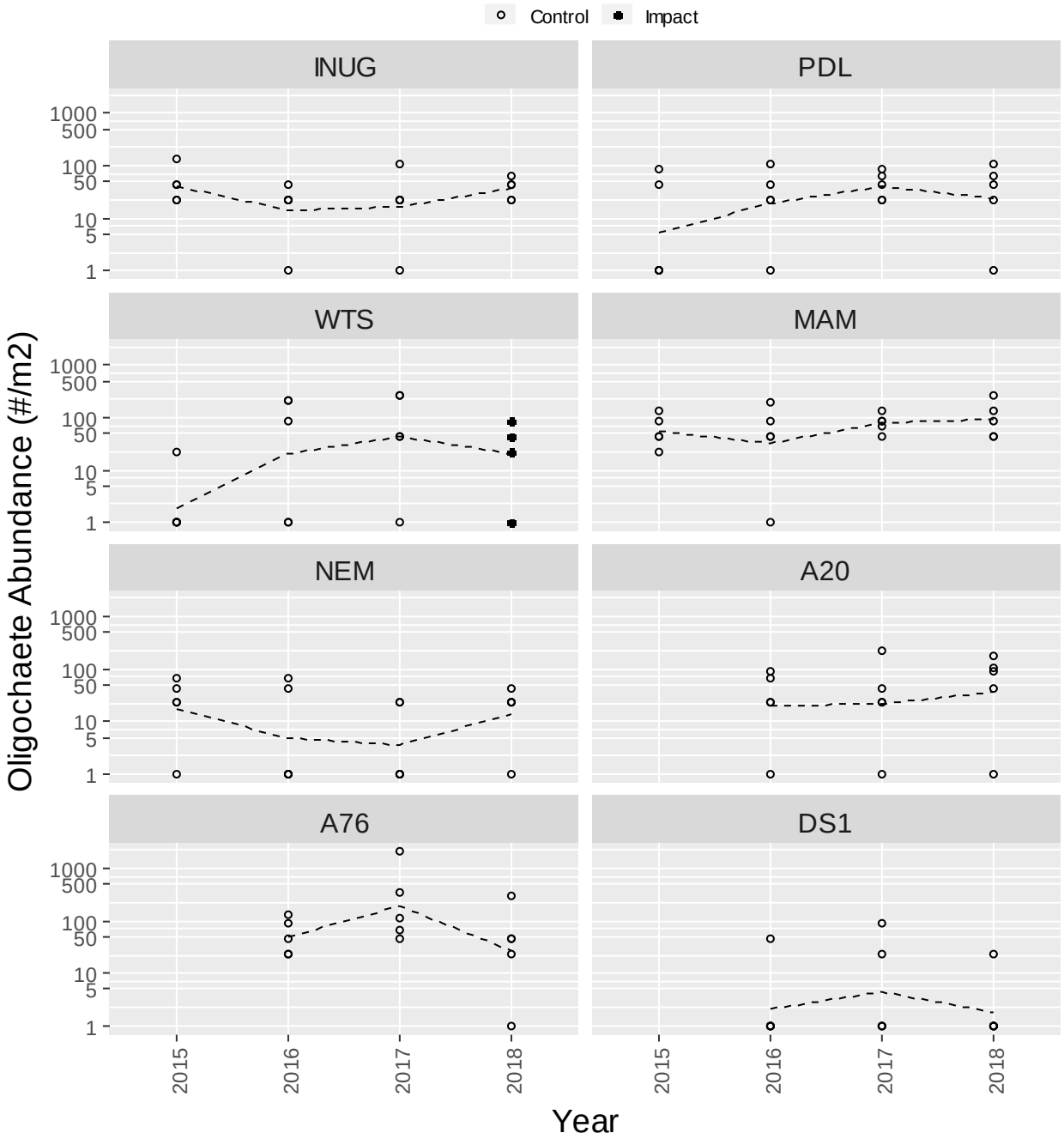


Figure E2-2. Insect abundance (#/m^2) from the Whale Tail Pit study lakes since 2015.

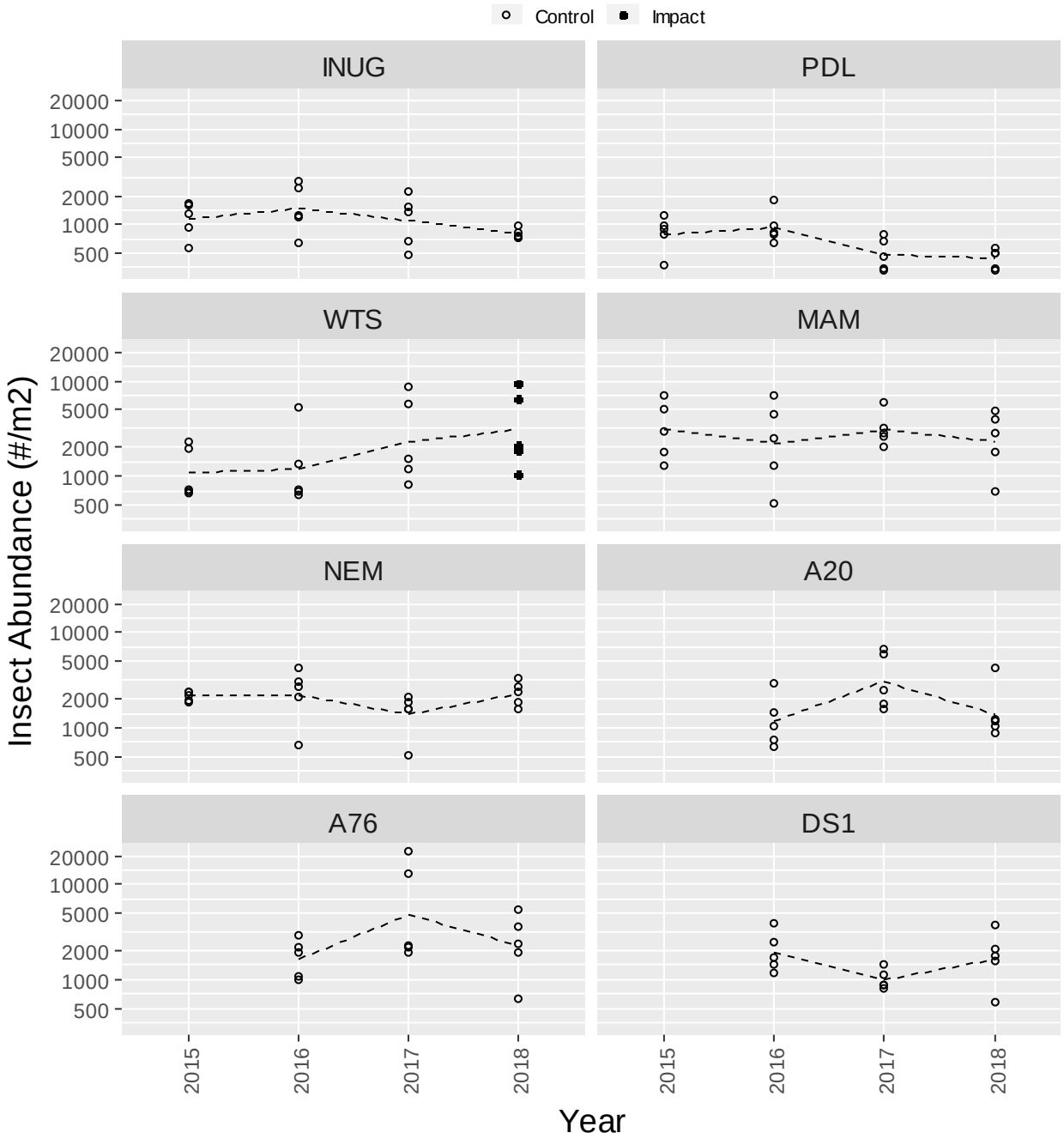


Figure E2-3. Mollusc abundance (#/m^2) from the Whale Tail Pit study lakes since 2015.

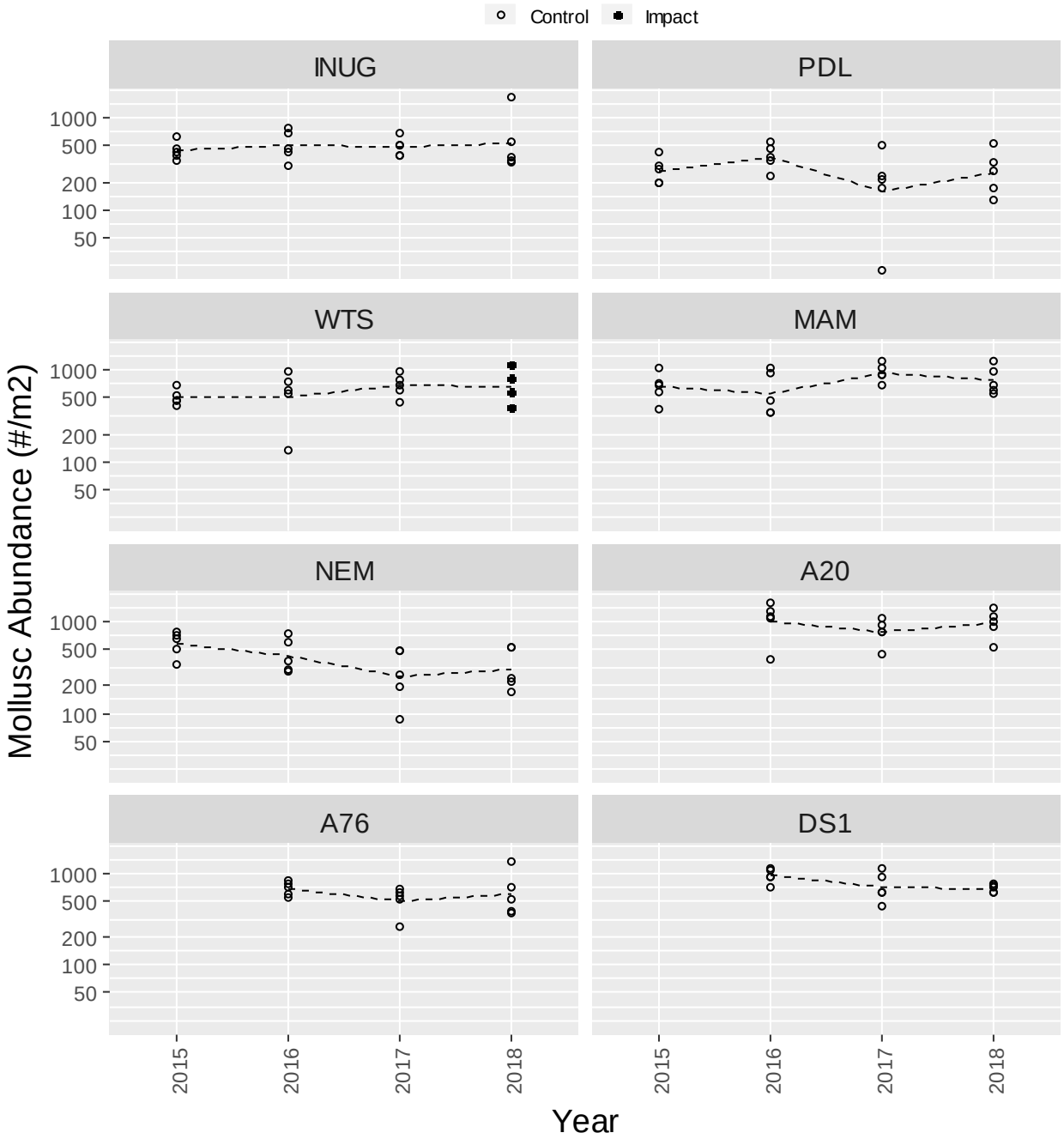


Figure E2-4. Other taxa abundance (#/m^2) from the Whale Tail Pit study lakes since 2015.

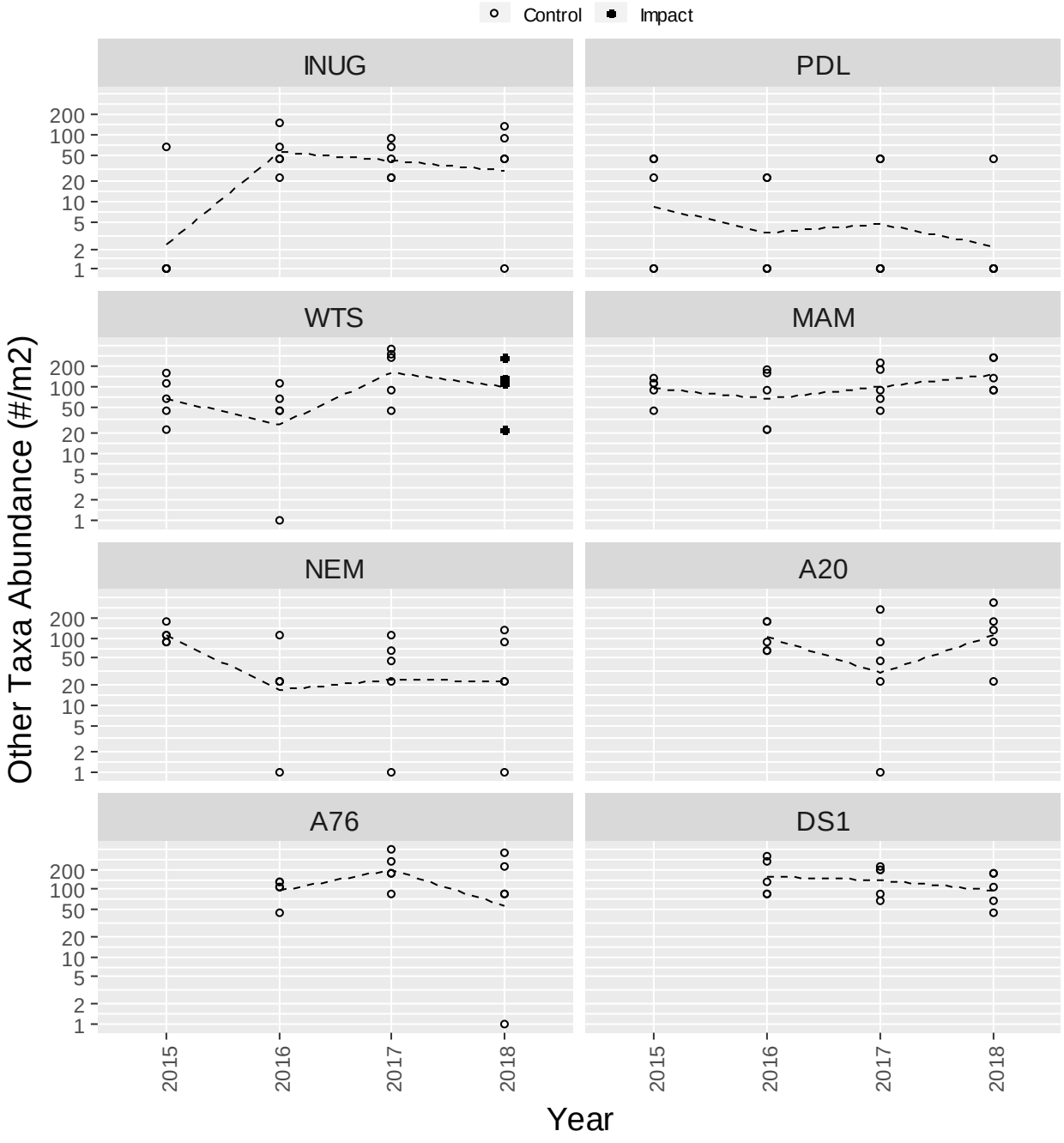


Figure E2-5. Oligochaete richness (# of taxa) from the Whale Tail Pit study lakes since 2015.

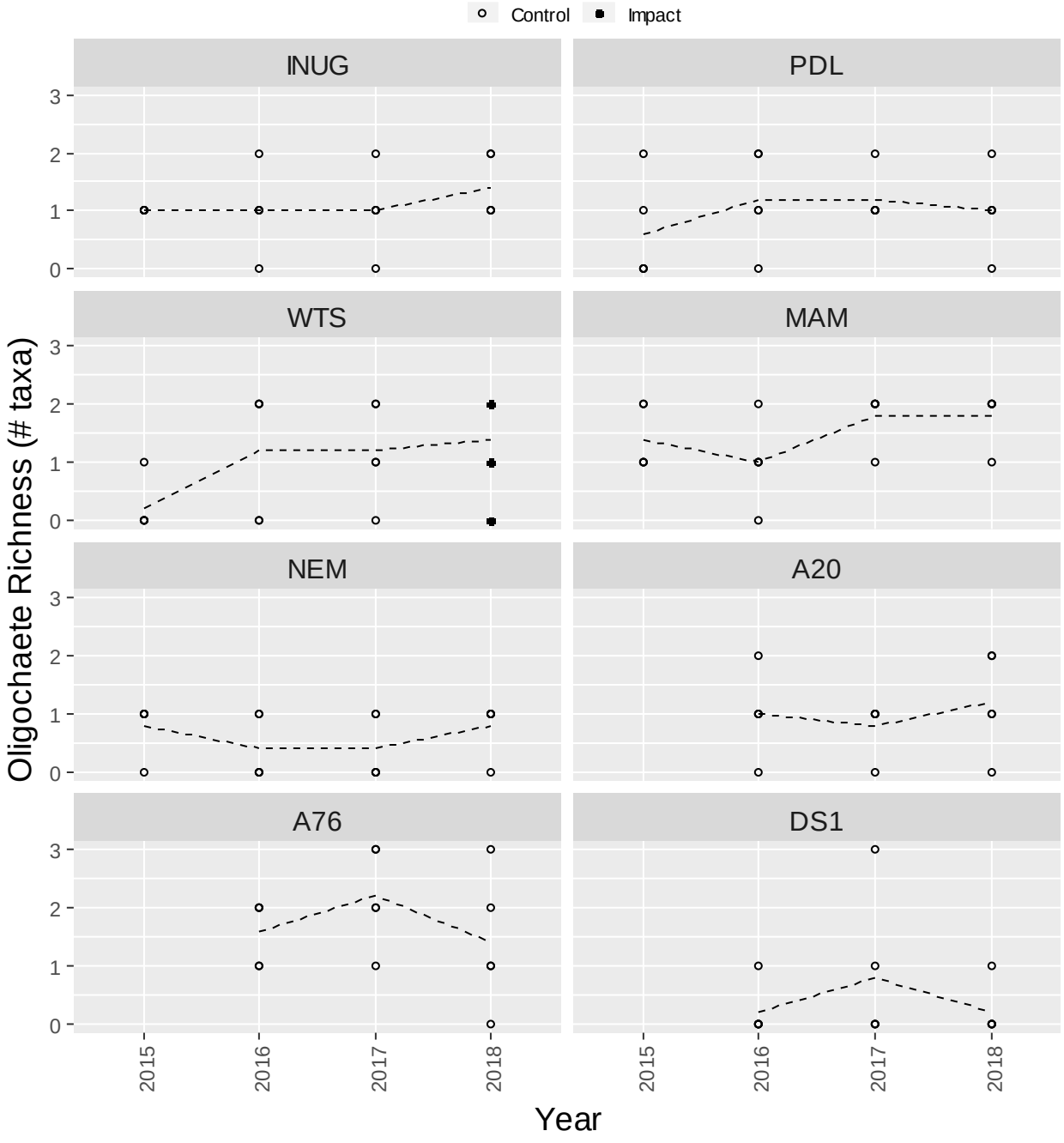


Figure E2-6. Insect richness (# of taxa) from the Whale Tail Pit study lakes since 2015.

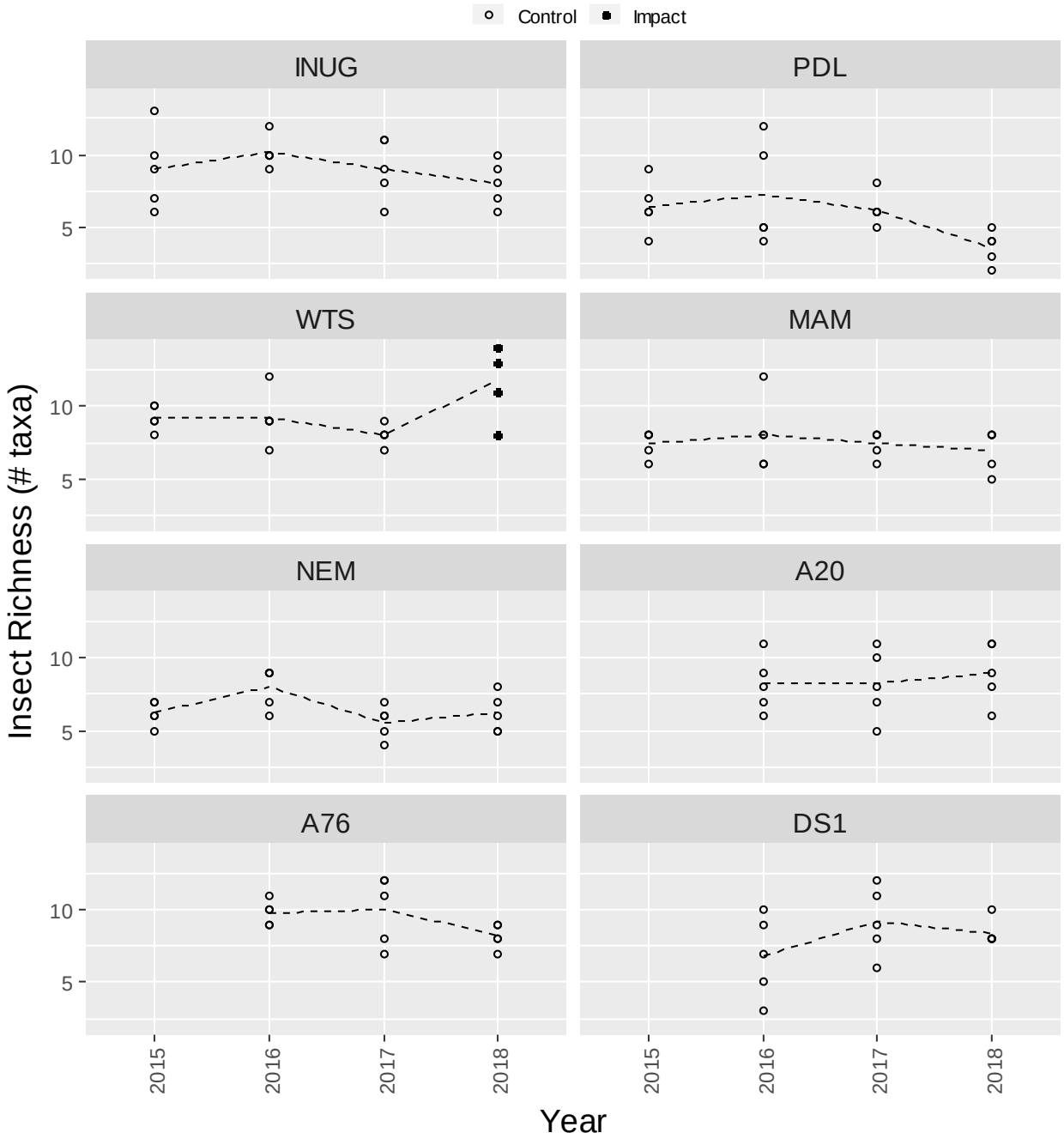


Figure E2-7. Mollusc richness (# of taxa) from the Whale Tail Pit study lakes since 2015.

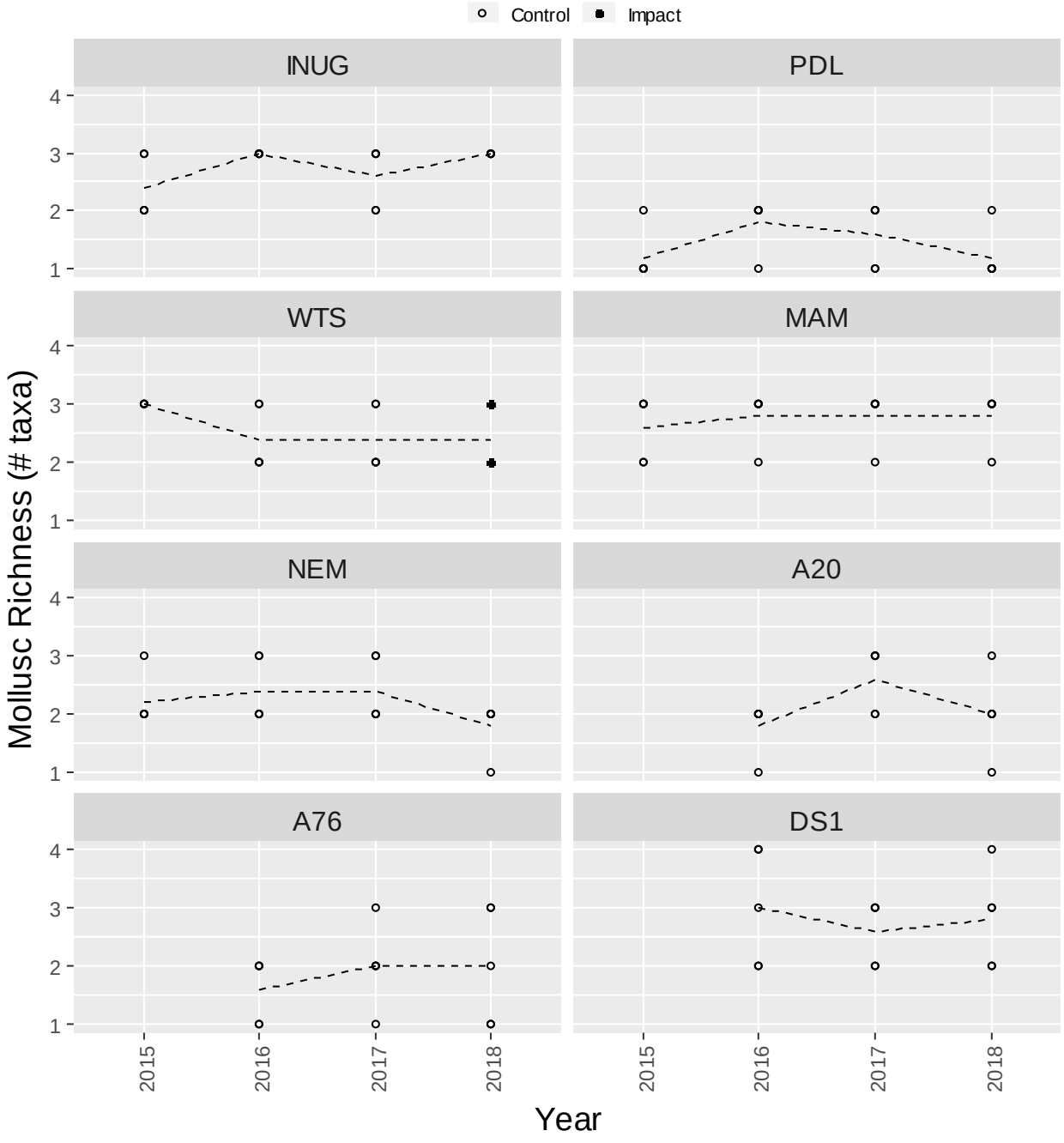


Figure E2-8. Other taxa richness (# of taxa) from the Whale Tail Pit study lakes since 2015.

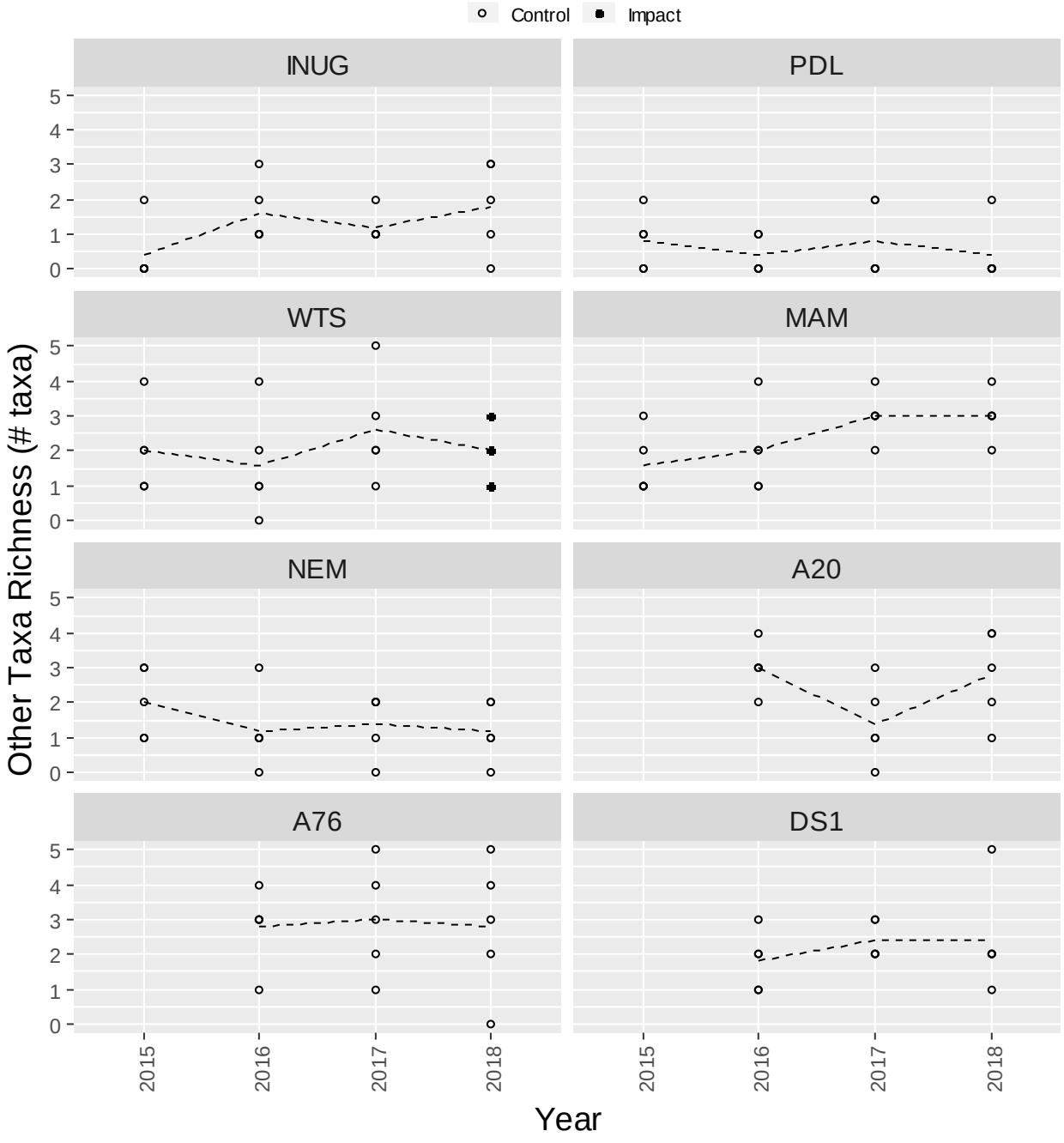


Figure E2-9. Simpsons' Diversity for the benthic invertebrate community at the Whale Tail Pit study lakes since 2015.

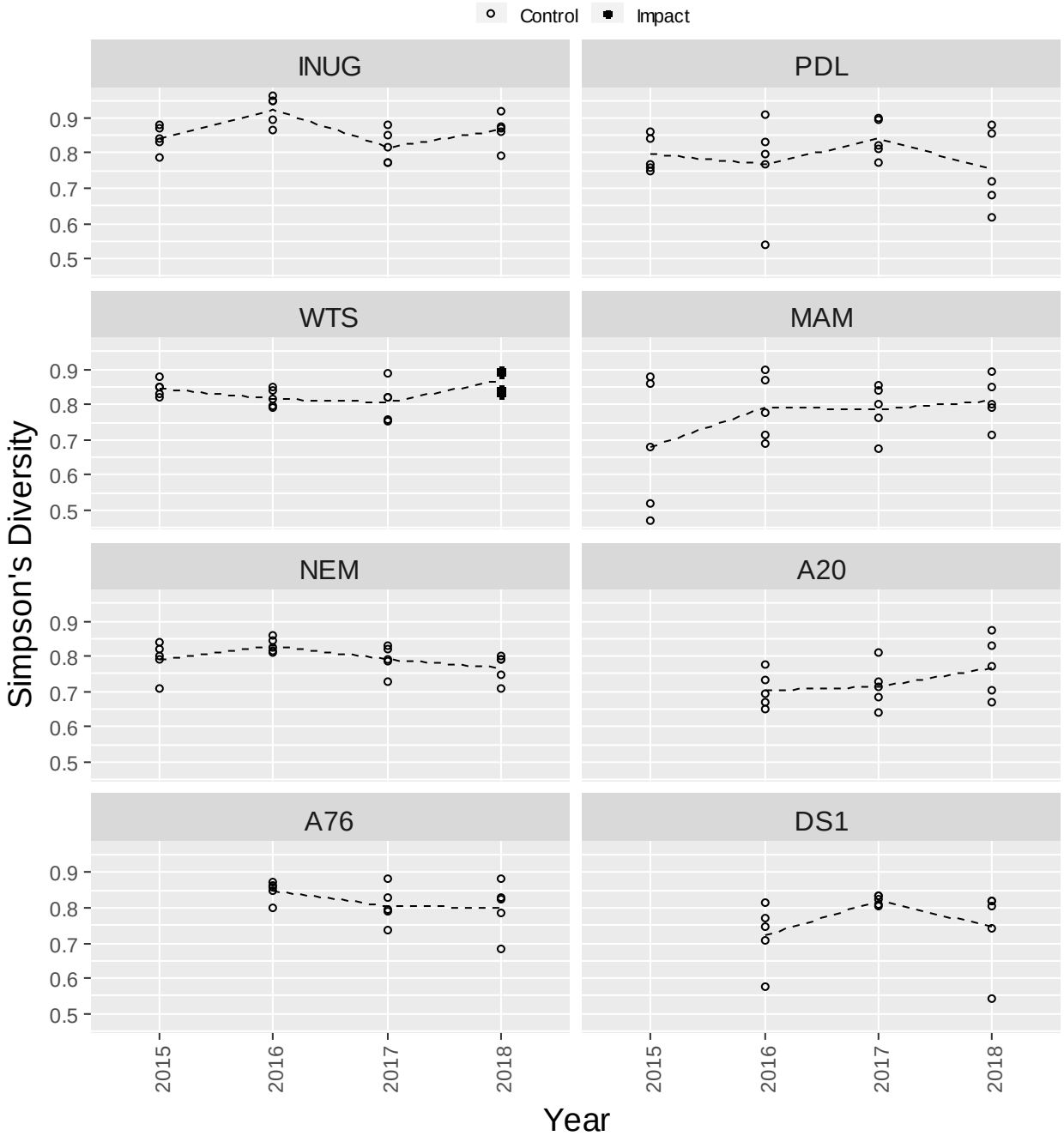
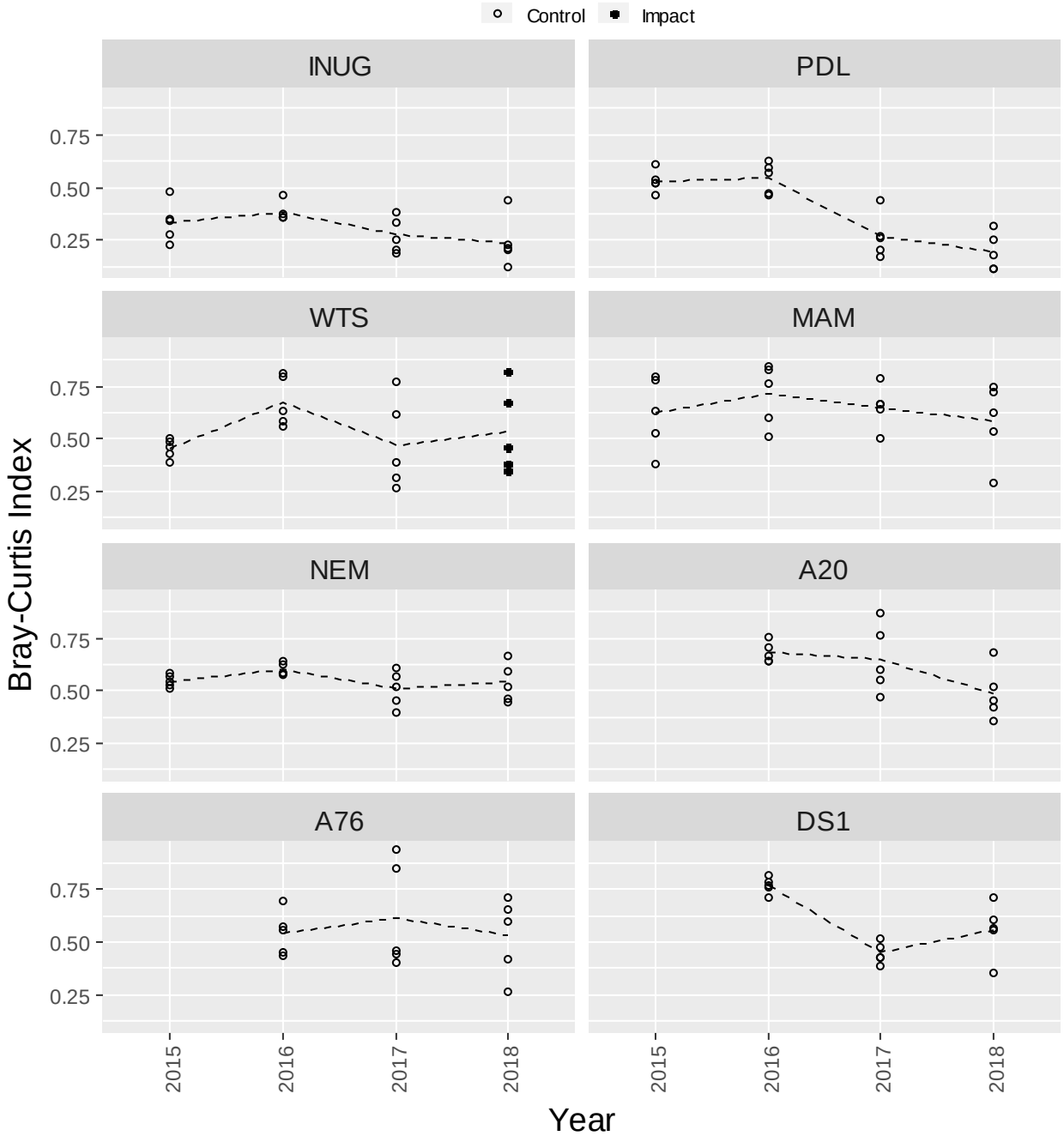


Figure E2-10. Bray-Curtis Index for the benthic invertebrate community at the Whale Tail Pit study lakes since 2015.



APPENDIX E3
BENTHOS DATA – BAKER LAKE

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Table E3-1. Benthic invertebrate abundance (#/m2) and richness (# taxa) by major taxa group, Baker Lake.

Area-Replicate	Date	Depth (m)	Abundance (#/m^2)					Richness (# taxa)					Simpson's Diversity	Bray-Curtis Index
			Oligochaetes	Insects	Molluscs	Other Taxa[1]	TOTAL	Oligochaetes	Insects	Molluscs	Other Taxa[1]	TOTAL		
Baker Akilahaarjuk Point														
BAP-1	20-Aug-18	8.3	283	2,826	500	130	3,739	3	15	1	2	21	0.88	0.17
BAP-2	20-Aug-18	7.7	587	2,587	783	65	4,022	3	13	2	2	20	0.89	0.23
BAP-3	20-Aug-18	7.8	978	4,522	935	65	6,500	3	19	1	2	25	0.90	0.31
BAP-4	20-Aug-18	7.3	4,152	4,261	43	43	8,500	5	17	2	1	25	0.89	0.40
BAP-5	20-Aug-18	9.0	1,239	2,696	413	22	4,370	3	12	2	1	18	0.91	0.26
Area Mean			***1,448***	***3,378***	***535***	***65***	***5,426***	***3***	***15***	***2***	***2***	***22***	***0.89***	***0.27***
Baker Barge Dock														
BBD-1	21-Aug-18	9	130	14,478	609	43	15,261	2	11	2	1	16	0.37	0.76
BBD-2	21-Aug-18	7.6	43	6,609	22	109	6,783	1	16	1	3	21	0.76	0.54
BBD-3	21-Aug-18	7.6	22	4,891	0	22	4,935	1	18	0	1	20	0.73	0.55
BBD-4	21-Aug-18	8.4	22	11,022	65	43	11,152	1	17	1	2	21	0.76	0.62
BBD-5	21-Aug-18	8.7	391	10,609	1,435	43	12,478	2	9	2	1	14	0.59	0.72
Area Mean			***122***	***9,522***	***426***	***52***	***10,122***	***1***	***14***	***1***	***2***	***18***	***0.64***	***0.64***
Baker East Shore														
BES-1	20-Aug-18	8.4	130	3,283	261	109	3,783	2	15	1	4	22	0.86	0.18
BES-2	20-Aug-18	8.1	87	3,522	370	109	4,087	1	17	1	2	21	0.90	0.18
BES-3	20-Aug-18	8.5	87	1,652	283	130	2,152	2	14	1	3	20	0.90	0.28
BES-4	20-Aug-18	8.1	43	1,413	435	0	1,891	2	13	1	0	16	0.87	0.25
BES-5	20-Aug-18	8.3	217	2,978	565	217	3,978	2	19	1	4	26	0.90	0.17
Area Mean			***113***	***2,570***	***383***	***113***	***3,178***	***2***	***16***	***1***	***3***	***21***	***0.89***	***0.21***
Baker Proposed Jetty														
BPJ-1	21-Aug-18	7.1	65	6,130	435	87	6,717	1	19	1	3	24	0.92	0.41
BPJ-2	21-Aug-18	6.9	152	5,174	565	174	6,065	1	17	1	4	23	0.91	0.31
BPJ-3	21-Aug-18	7.5	0	2,935	0	65	3,000	0	16	0	3	19	0.90	0.39
BPJ-4	21-Aug-18	8.0	22	1,935	22	22	2,000	1	13	1	1	16	0.90	0.44
BPJ-5	21-Aug-18	7.5	174	10,239	1,087	152	11,652	2	20	2	4	28	0.85	0.53
Area Mean			***83***	***5,283***	***422***	***100***	***5,887***	***1***	***17***	***1***	***3***	***22***	***0.89***	***0.42***

Notes:

1. "Other taxa" includes flatworms (Turbellaria) and arthropods (Acalyptonotidae, Hygrobatidae, Lebertiidae, Oxidae, Pionidae, Harpacticoida, and O. Notostraca).

Table E3-2. Raw benthic invertebrate data from Baker Lake 2018.

Program	Baker									
Lake	Baker Akilahaarjuk Point					Baker Barge Dock				
Station	BAP					BBD				
Control/Impact?	Control					Impact				
Replicate	1	2	3	4	5	1	2	3	4	5
Date	20-Aug-18	20-Aug-18	20-Aug-18	20-Aug-18	20-Aug-18	21-Aug-18	21-Aug-18	21-Aug-18	21-Aug-18	21-Aug-18
DepthOfSample (m)	8.3	7.7	7.8	7.3	9.0	9.0	7.6	7.6	8.4	8.7
ROUNDWORMS										
P. Nemata	3	5	1	15	2	-	2	3	2	6
FLATWORMS										
P. Platyhelminthes										
Cl. Turbellaria										
indeterminate	-	-	-	-	-	-	-	-	-	-
ANNELIDS										
P. Annelida										
WORMS										
Cl. Oligochaeta										
F. Enchytraeidae	2	-	-	17	-	-	2	1	-	-
F. Naididae										
S.F. Naidinae										
Nais	-	-	-	26	-	-	-	-	-	-
S.F. Tubificinae										
Limnodrilus hoffmeisteri	-	-	-	9	-	-	-	-	-	-
Tasserkidrilus americanus	1	-	-	26	8	-	-	-	-	-
immatures with hair chaetae	-	4	9	104	20	1	-	-	-	2
immatures without hair chaetae	-	2	9	-	6	-	-	-	-	-
S.F. Rhyacodrilinae										
Rhyacodrilus coccineus	-	3	9	9	3	-	-	-	-	-
Rhyacodrilus montana	10	18	18	-	20	5	-	-	1	16
F. Lumbriculidae										
Lumbriculus	-	-	-	-	-	-	-	-	-	-
ARTHROPODS										
P. Arthropoda										
MITES										
Cl. Arachnida										
O. Acarina										
immature	-	-	-	-	-	-	-	-	-	-
F. Acalyptonotidae										
Acalyptonotus	1	-	2	-	-	-	2	-	-	2
F. Hygrobatidae										
Hygrobates	-	-	-	2	-	-	-	-	1	-
F. Lebertiidae										
Lebertia	5	2	1	-	-	2	2	1	1	-
F. Oxidae										
Oxus	-	1	-	-	1	-	1	-	-	-
F. Pionidae										
indeterminate	-	-	-	-	-	-	-	-	-	-
HARPACTICOIDS										
O. Harpacticoida	-	-	-	-	-	-	-	-	-	-
SEED SHRIMPS										
Cl. Ostracoda	4	-	7	19	3	6	13	11	10	16
TADPOLE SHRIMP										
O. Notostraca										
Lepidurus arcticus	-	-	-	-	-	-	-	-	-	-
INSECTS										
Cl. Insecta										
CADDISFLIES										
O. Trichoptera										
F. Apataniidae										
Apatania	1	-	-	-	-	-	-	-	-	-
F. Limnephilidae										
Grensia praeterita	-	-	-	-	-	-	-	-	-	-
TRUE FLIES										
O. Diptera										
MIDGES										
F. Chironomidae										
chironomid pupae	**34**	**30**	**44**	**39**	**10**	**13**	**42**	**17**	**35**	**10**
S.F. Chironominae										
Chironomus	-	-	-	-	-	-	-	-	-	-
Cladotanytarsus	39	34	52	14	20	-	2	5	14	4
Constempellina	7	6	6	7	4	4	47	7	43	28
Corynocera ambigua	-	-	-	-	-	-	-	-	-	-
?Corynocera oliveri	-	-	-	-	-	-	-	-	-	-
Dicrotendipes	-	-	-	-	-	-	-	-	-	-
Micropsectra	-	-	1	12	9	8	-	-	28	10
Microtendipes	-	-	-	-	-	-	-	-	-	-
Parachironomus	-	-	-	-	-	-	-	2	-	-
Paracladopelma	-	3	-	-	-	-	2	-	5	-
Paratanytarsus	4	3	20	43	5	-	-	-	-	-
Polypedilum	1	-	3	-	-	-	2	-	-	-
Sergentia	-	-	-	-	-	-	-	-	-	-
Stempellinella	1	3	5	2	7	12	8	1	9	-
Stictochironomus	6	11	34	11	38	556	137	102	231	360
Tanytarsus	7	12	18	17	21	40	19	58	61	40
S.F. Diamesinae										
Protanypus	-	-	-	-	1	-	-	-	-	-
Potthastia	-	-	-	-	-	-	-	1	1	-
Pseudodiamesa	1	-	-	21	-	-	-	-	-	-
S.F. Orthocladiinae										
Abiskomyia	-	-	2	1	-	4	6	4	-	8
Cricotopus	-	-	-	1	-	-	-	1	1	-
Cricotopus/Orthocladius	-	-	1	3	-	-	-	1	-	-
Heterotrissocladius	13	4	5	-	4	12	4	4	17	16
Hydrobaenus	1	-	-	1	-	4	2	1	1	-
Mesocricotopus	6	2	3	-	-	-	-	-	-	-
Paracladius	6	2	2	-	-	-	-	-	4	-
Parakiefferiella	-	-	-	2	-	-	11	4	24	-
Psectrocladius	-	-	1	-	-	-	-	1	1	-
Zalutschia	-	-	-	-	-	-	-	-	-	-
Orthocladiinae *Genus "Greenland"*	-	-	-	-	-	-	-	-	-	-
S.F. Prodiamesinae										
Monodiamesa	-	6	4	-	1	6	14	5	18	4
S.F. Tanypodinae										
Ablabesmyia	-	-	1	-	-	-	-	-	5	-
Procladius	1	2	4	8	3	6	5	9	9	8
Thienemannimyia complex	-	-	-	2	-	-	1	1	-	-
F. Empididae										
Neoplasta/ Chelifera/Metachela	-	1	1	5	1	1	1	1	-	-
Wiedemannia	-	-	-	-	-	-	-	-	-	-
pupae	2	-	**1**	**7**	-	-	**1**	-	-	-

Table E3-2. Raw benthic invertebrate data from Baker Lake 2018.

Program	Baker									
Lake	Baker Akilahaarjuk Point					Baker Barge Dock				
Station	BAP					BBD				
Control/Impact?	Control					Impact				
Replicate	1	2	3	4	5	1	2	3	4	5
Date	20-Aug-18	20-Aug-18	20-Aug-18	20-Aug-18	20-Aug-18	21-Aug-18	21-Aug-18	21-Aug-18	21-Aug-18	21-Aug-18
DepthOfSample (m)	8.3	7.7	7.8	7.3	9.0	9.0	7.6	7.6	8.4	8.7
MOLLUSCS										
P. Mollusca										
SNAILS										
Cl. Gastropoda										
F. Valvatidae										
Valvata	-	-	-	-	-	-	-	-	-	-
CLAMS										
Cl. Bivalvia										
F. Sphaeriidae										
Pisidium (Cyclocalyx)/Neopisidium	23	35	43	1	16	27	1	-	3	50
Pisidium (Cyclocalyx)	-	1	-	1	3	1	-	-	-	16
Sphaerium nitidum	-	-	-	-	-	-	-	-	-	-
R (Richness) - totals [2,3]										
Total	21	20	25	25	18	16	21	20	21	14
Oligochaete	3	3	3	5	3	2	1	1	1	2
Insect	15	13	19	17	12	11	16	18	17	9
Mollusc	1	2	1	2	2	2	1	0	1	2
Other[4]	2	2	2	1	1	1	3	1	2	1
Abundance (raw) - totals [5,6]										
Total	172	185	299	391	201	702	312	227	513	574
Oligochaete	13	27	45	191	57	6	2	1	1	18
Insect	130	119	208	196	124	666	304	225	507	488
Mollusc	23	36	43	2	19	28	1	0	3	66
Other[4]	6	3	3	2	1	2	5	1	2	2
Abundance - totals (#/m^2) [5]										
Total	3,739	4,022	6,500	8,500	4,370	15,261	6,783	4,935	11,152	12,478
Oligochaete	283	587	978	4,152	1,239	130	43	22	22	391
Insect	2,826	2,587	4,522	4,261	2,696	14,478	6,609	4,891	11,022	10,609
Mollusc	500	783	935	43	413	609	22	0	65	1,435
Other[4]	130	65	65	43	22	43	109	22	43	43

Notes:

1. Benthic invertebrate count data shown in this table are from composite of two grabs sieved to 500 µm.
2. Richness totals exclude P. Nemata, Cl. Ostracoda, indeterminates (O. Acarina, F. Lumbriculidae), immatures (S.F. Tubificinae, O. Acarina), and pupae.
3. Pupae and immatures (bolded values) are excluded from the richness totals if other life stages are present in the replicate sample.
4. Other Taxa include: Cl. Turbellaria, F. Acalyptonotidae, F. Hygrobatidae, F. Lebertiidae, F. Oxidae, F. Pionidae, O. Harpacticoida, O. Notostraca, and F. Gammaracanthidae.
5. Abundance totals exclude P. Nemata and Cl. Ostracoda.
6. Raw abundance from two grabs (grab area = 0.023 m^2).

Table E3-2. Raw benthic invertebrate data from Baker Lake 2018.

Program										
Lake	Baker East Shore					Baker Proposed Jetty				
Station	BES					BPJ				
Control/Impact?	Control					Impact				
Replicate	1	2	3	4	5	1	2	3	4	5
Date	20-Aug-18	20-Aug-18	20-Aug-18	20-Aug-18	20-Aug-18	21-Aug-18	21-Aug-18	21-Aug-18	21-Aug-18	21-Aug-18
DepthOfSample (m)	8.4	8.1	8.5	8.1	8.3	7.1	6.9	7.5	8.0	7.5
ROUNDWORMS										
P. Nemata	2	5	4	1	3	5	14	11	8	7
FLATWORMS										
P. Platyhelminthes										
Cl. Turbellaria										
indeterminate	1	-	-	-	-	-	-	-	-	1
ANNELIDS										
P. Annelida										
WORMS										
Cl. Oligochaeta										
F. Enchytraeidae	5	4	1	1	9	-	-	-	-	-
F. Naididae										
S.F. Naidinae										
Nais	-	-	-	-	-	-	-	-	-	-
S.F. Tubificinae										
Limnodrilus hoffmeisteri	-	-	-	-	-	-	-	-	-	-
Tasserkidrilus americanus	-	-	-	-	-	-	-	-	-	-
immatures with hair chaetae	-	-	-	-	-	-	-	-	-	-
immatures without hair chaetae	-	-	-	-	-	-	-	-	-	-
S.F. Rhyacodrilinae										
Rhyacodrilus coccineus	-	-	-	-	-	-	-	-	-	1
Rhyacodrilus montana	1	-	3	1	1	3	7	-	1	7
F. Lumbriculidae										
Lumbriculus	-	-	-	-	-	-	-	-	-	-
ARTHROPODS										
P. Arthropoda										
MITES										
Cl. Arachnida										
O. Acarina										
immature	-	-	-	-	-	-	-	-	-	-
F. Acalyptonotidae										
Acalyptonotus	2	3	1	-	3	2	1	1	-	1
F. Hygrobatidae										
Hygrobates	-	-	3	-	1	1	2	1	-	2
F. Lebertiidae										
Lebertia	1	2	2	-	4	1	4	1	-	3
F. Oxidae										
Oxus	1	-	-	-	2	-	1	-	1	-
F. Pionidae										
indeterminate	-	-	-	-	-	-	-	-	-	-
HARPACTICOIDS										
O. Harpacticoida	-	-	-	-	-	-	-	-	-	-
SEED SHRIMPS										
Cl. Ostracoda	-	1	1	1	1	6	6	5	1	5
TADPOLE SHRIMP										
O. Notostraca										
Lepidurus arcticus	-	-	-	-	-	-	-	-	-	-
INSECTS										
Cl. Insecta										
CADDISFLIES										
O. Trichoptera										
F. Apataniidae										
Apatania	-	-	-	-	-	-	-	-	-	-
F. Limnephilidae										
Grensia praeterita	-	-	-	-	-	-	-	-	-	-
TRUE FLIES										
O. Diptera										
MIDGES										
F. Chironomidae										
chironomid pupae	**54**	**44**	**17**	**20**	**36**	**48**	**63**	**24**	**16**	**74**
S.F. Chironominae										
Chironomus	-	-	-	-	-	-	-	-	-	-
Cladotanytarsus	23	17	10	7	18	5	14	1	3	17
Constempellina	3	6	2	2	1	15	19	14	-	7
Corynocera ambigua	-	-	-	-	-	-	-	-	-	-
?Corynocera oliveri	-	-	-	-	-	-	-	-	-	-
Dicrotendipes	-	-	-	-	-	-	-	-	-	-
Micropsectra	-	2	-	-	-	-	4	3	5	10
Microtendipes	-	-	-	-	-	-	-	-	-	-
Parachironomus	-	-	-	-	-	-	-	-	-	-
Paracladopelma	2	-	2	1	1	-	-	-	1	-
Paratanytarsus	20	17	4	4	5	5	3	4	1	7
Polypedilum	1	-	-	-	1	2	-	-	-	2
Sergentia	-	-	-	-	-	-	-	-	-	-
Stempellinella	2	2	1	-	-	15	4	-	-	17
Stictochironomus	-	3	1	-	1	54	19	3	1	171
Tanytarsus	12	14	4	2	14	21	26	13	7	43
S.F. Diamesinae										
Protanypus	-	-	-	-	-	-	-	-	-	-
Potthastia	1	1	-	-	2	4	-	1	1	3
Pseudodiamesa	-	-	1	-	1	-	-	-	-	-
S.F. Orthocladiinae										
Abiskomyia	-	-	-	-	1	7	7	9	-	14
Cricotopus	1	2	-	1	-	-	-	-	-	-
Cricotopus/Orthocladius	-	-	-	-	1	2	-	1	-	-
Heterotrissocladius	9	17	20	11	21	5	8	5	5	10
Hydrobaenus	1	-	-	-	-	-	-	4	-	-
Mesocricotopus	7	7	-	3	5	11	7	1	6	10
Paracladius	5	10	4	-	3	20	16	23	6	2
Parakiefferiella	5	14	6	2	17	17	10	4	8	53
Psectrocladius	-	-	-	-	-	-	1	-	-	2
Zalutschia	-	-	-	-	-	-	-	-	-	-
Orthocladiinae *Genus "Greenland"*	-	-	-	-	-	-	-	-	-	-
S.F. Prodiamesinae										
Monodiamesa	5	2	1	5	4	22	9	8	18	10
S.F. Tanypodinae										
Ablabesmyia	-	-	-	-	-	-	-	-	-	-
Procladius	-	1	-	5	2	19	24	17	11	14
Thienemannimyia complex	-	2	2	1	1	4	-	-	-	2
F. Empididae										
Neoplasta/ Chelifera/Metachela	-	1	-	1	2	3	2	-	-	1
Wiedemannia	-	-	1	-	-	-	-	-	-	-
pupae	-	-	-	-	-	**3**	**2**	-	-	**2**

Table E3-2. Raw benthic invertebrate data from Baker Lake 2018.

Program										
	Baker									
Lake	Baker East Shore					Baker Proposed Jetty				
Station	BES					BPJ				
Control/Impact?	Control					Impact				
Replicate	1	2	3	4	5	1	2	3	4	5
Date	20-Aug-18	20-Aug-18	20-Aug-18	20-Aug-18	20-Aug-18	21-Aug-18	21-Aug-18	21-Aug-18	21-Aug-18	21-Aug-18
DepthOfSample (m)	8.4	8.1	8.5	8.1	8.3	7.1	6.9	7.5	8.0	7.5
MOLLUSCS										
P. Mollusca										
SNAILS										
Cl. Gastropoda										
F. Valvatidae										
Valvata	-	-	-	-	-	-	-	-	-	-
CLAMS										
Cl. Bivalvia										
F. Sphaeriidae										
Pisidium (Cyclocalyx)/Neopisidium	12	17	13	20	26	20	26	-	1	49
Pisidium (Cyclocalyx)	-	-	-	-	-	-	-	-	-	1
Sphaerium nitidum	-	-	-	-	-	-	-	-	-	-
R (Richness) - totals [2,3]										
Total	22	21	20	16	26	24	23	19	16	28
Oligochaete	2	1	2	2	2	1	1	0	1	2
Insect	15	17	14	13	19	19	17	16	13	20
Mollusc	1	1	1	1	1	1	1	0	1	2
Other[4]	4	2	3	0	4	3	4	3	1	4
Abundance (raw) - totals [5,6]										
Total	174	188	99	87	183	309	279	138	92	536
Oligochaete	6	4	4	2	10	3	7	0	1	8
Insect	151	162	76	65	137	282	238	135	89	471
Mollusc	12	17	13	20	26	20	26	0	1	50
Other[4]	5	5	6	0	10	4	8	3	1	7
Abundance - totals (#/m^2) [5]										
Total	3,783	4,087	2,152	1,891	3,978	6,717	6,065	3,000	2,000	11,652
Oligochaete	130	87	87	43	217	65	152	0	22	174
Insect	3,283	3,522	1,652	1,413	2,978	6,130	5,174	2,935	1,935	10,239
Mollusc	261	370	283	435	565	435	565	0	22	1,087
Other[4]	109	109	130	0	217	87	174	65	22	152

Notes:

1. Benthic invertebrate count data shown in this table are from composite of two grabs sieved to 500 µm.
2. Richness totals exclude P. Nemata, Cl. Ostracoda, indeterminates (O. Acarina, F. Lumbriculidae), immatures (S.F. Tubificinae, O. Acarina), and pupae.
3. Pupae and immatures (bolded values) are excluded from the richness totals if other life stages are present in the replicate sample.
4. Other Taxa include: Cl. Turbellaria, F. Acalyptonotidae, F. Hygrobatidae, F. Lebertiidae, F. Oxidae, F. Pionidae, O. Harpacticoida, O. Notostraca, and F. Gammaracanthidae.
5. Abundance totals exclude P. Nemata and Cl. Ostracoda.
6. Raw abundance from two grabs (grab area = 0.023 m^2).

Figure E3-1. Oligochaete abundance (#/m^2) from Baker Lake since 2008.

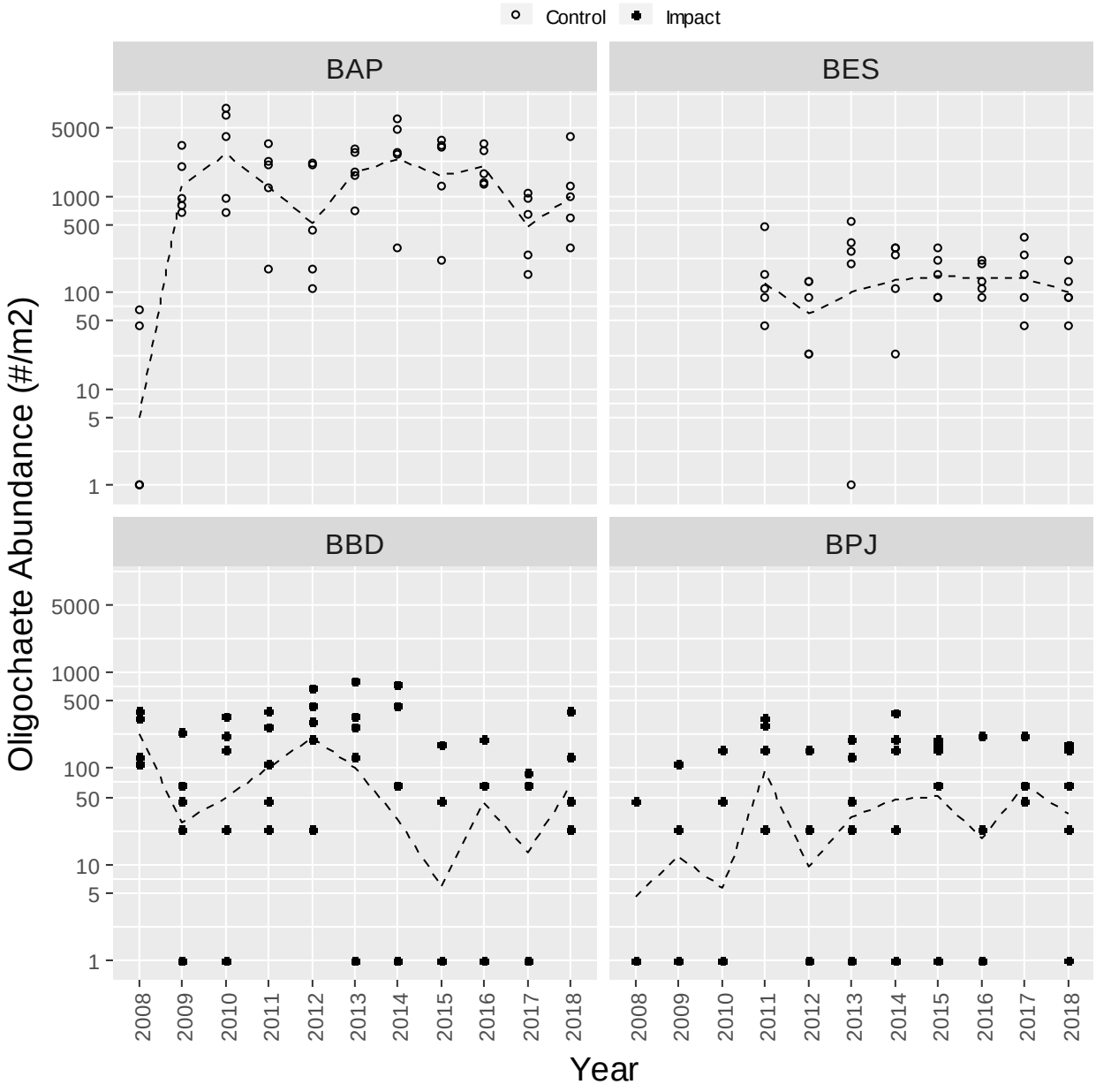


Figure E3-2. Insect abundance (#/m^2) from Baker Lake since 2008.

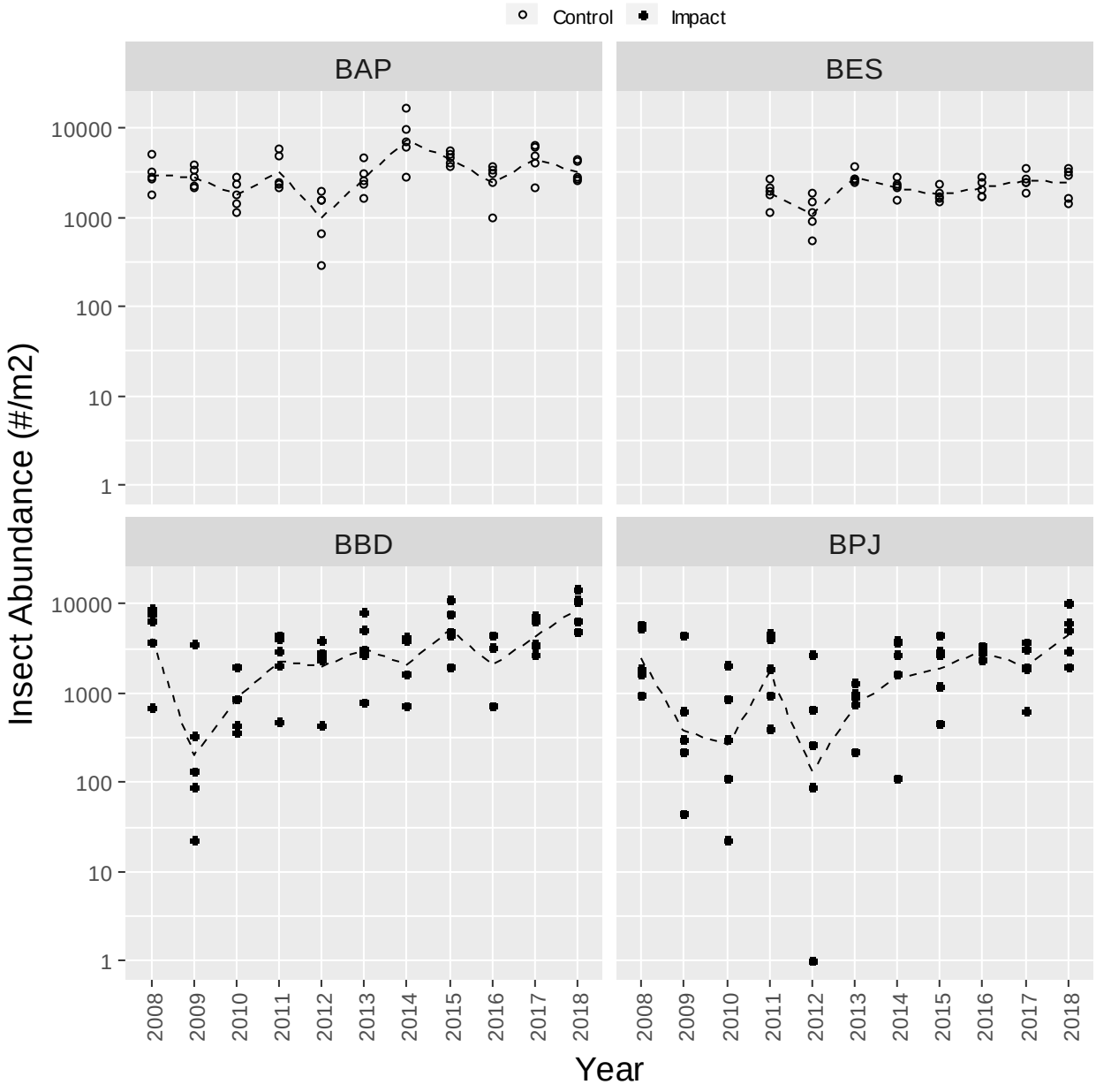


Figure E3-3. Mollusc abundance (#/m^2) from Baker Lake since 2008.

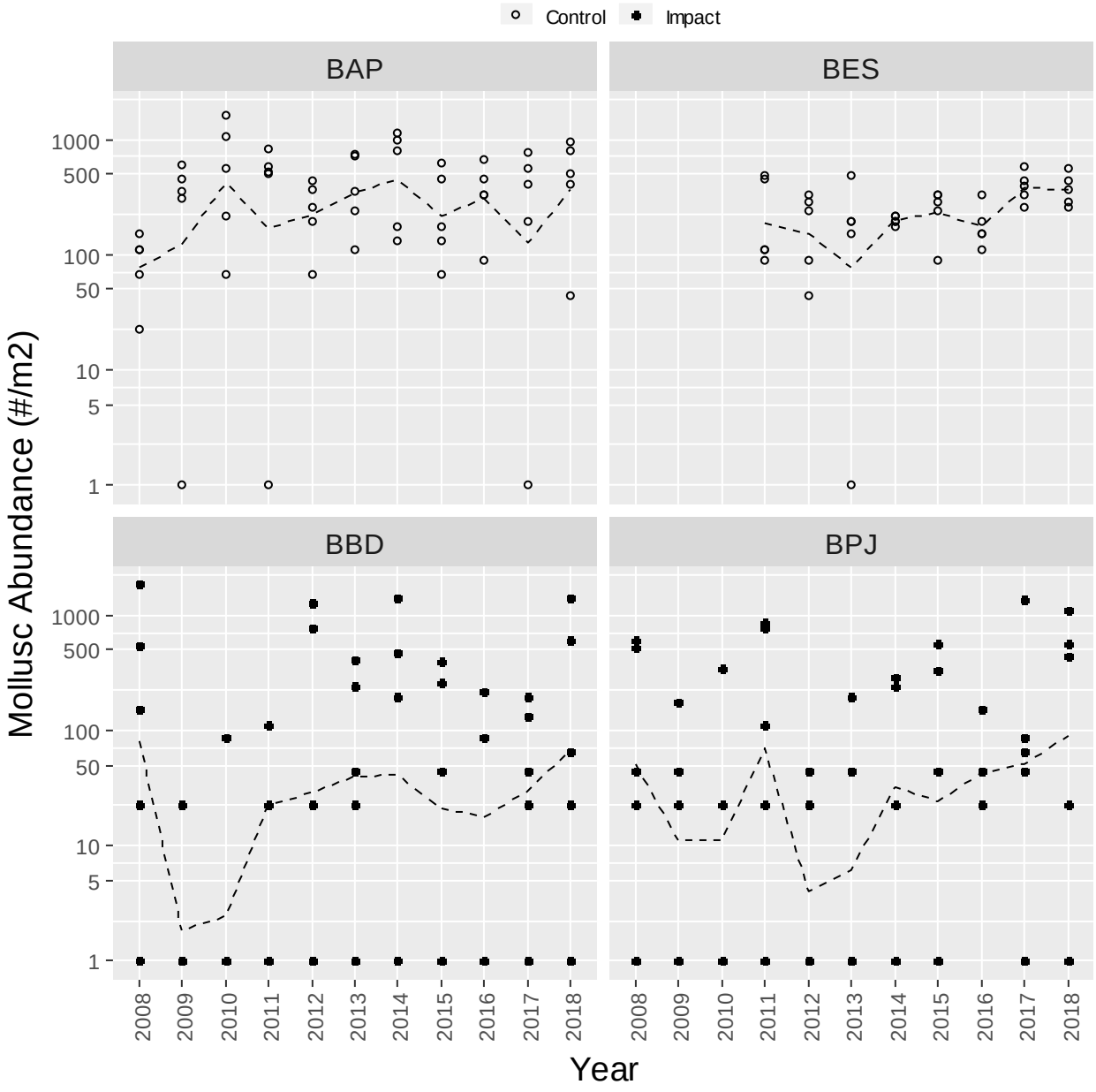


Figure E3-4. Other taxa abundance (#/m^2) from Baker Lake since 2008.

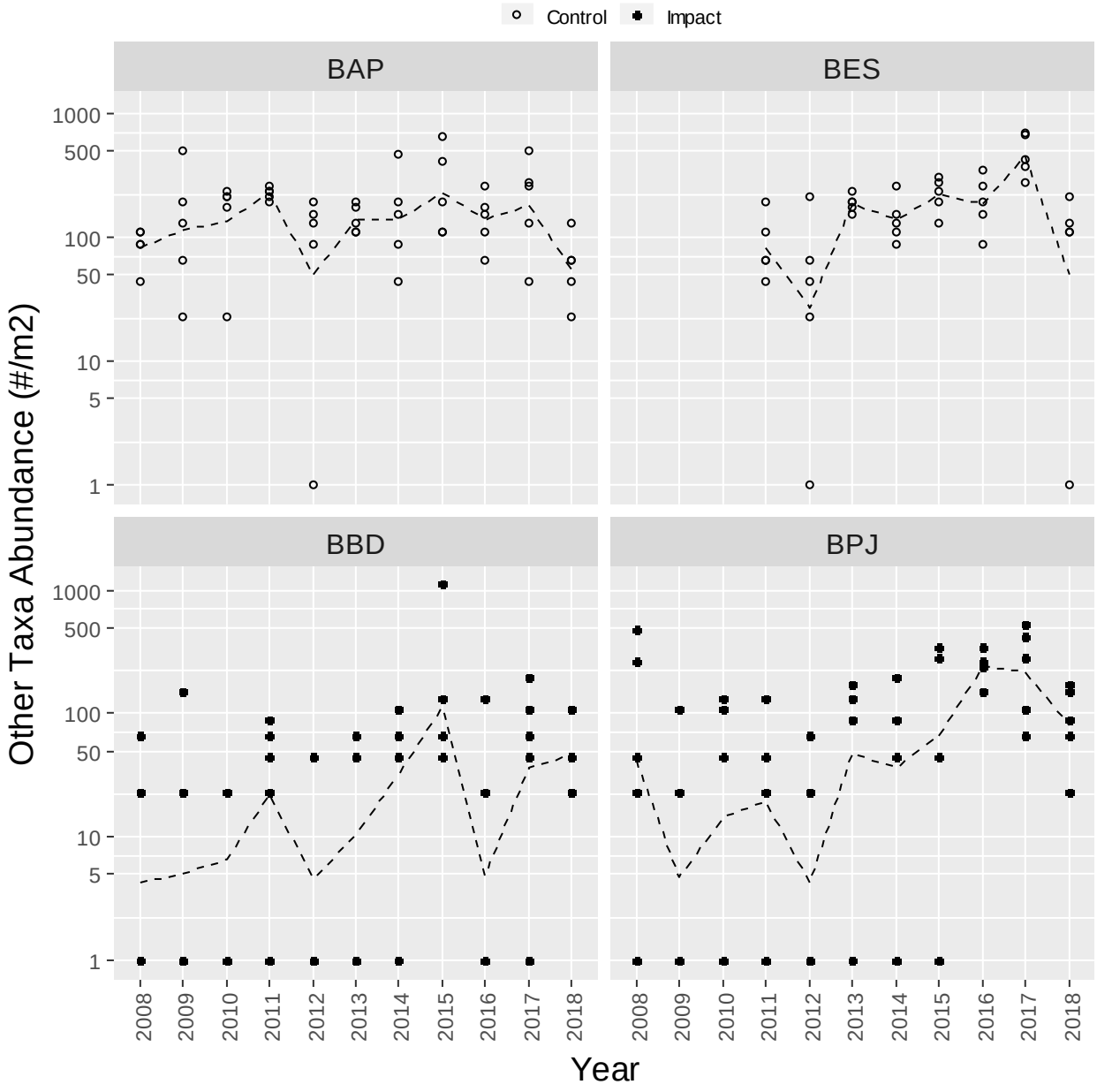


Figure E3-5. Oligochaete richness (# of taxa) from Baker Lake since 2008.

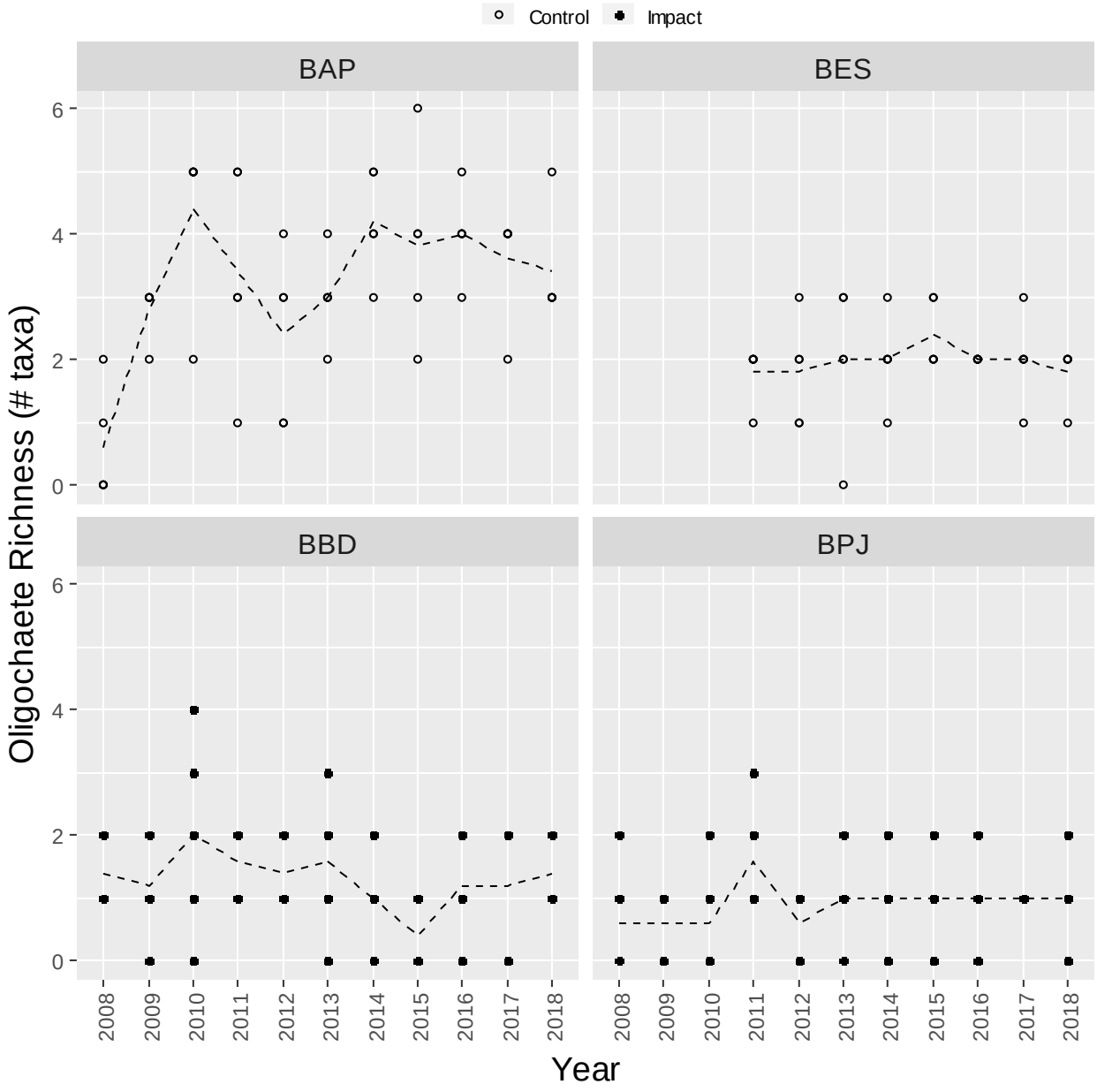


Figure E3-6. Insect richness (# of taxa) from Baker Lake since 2008.

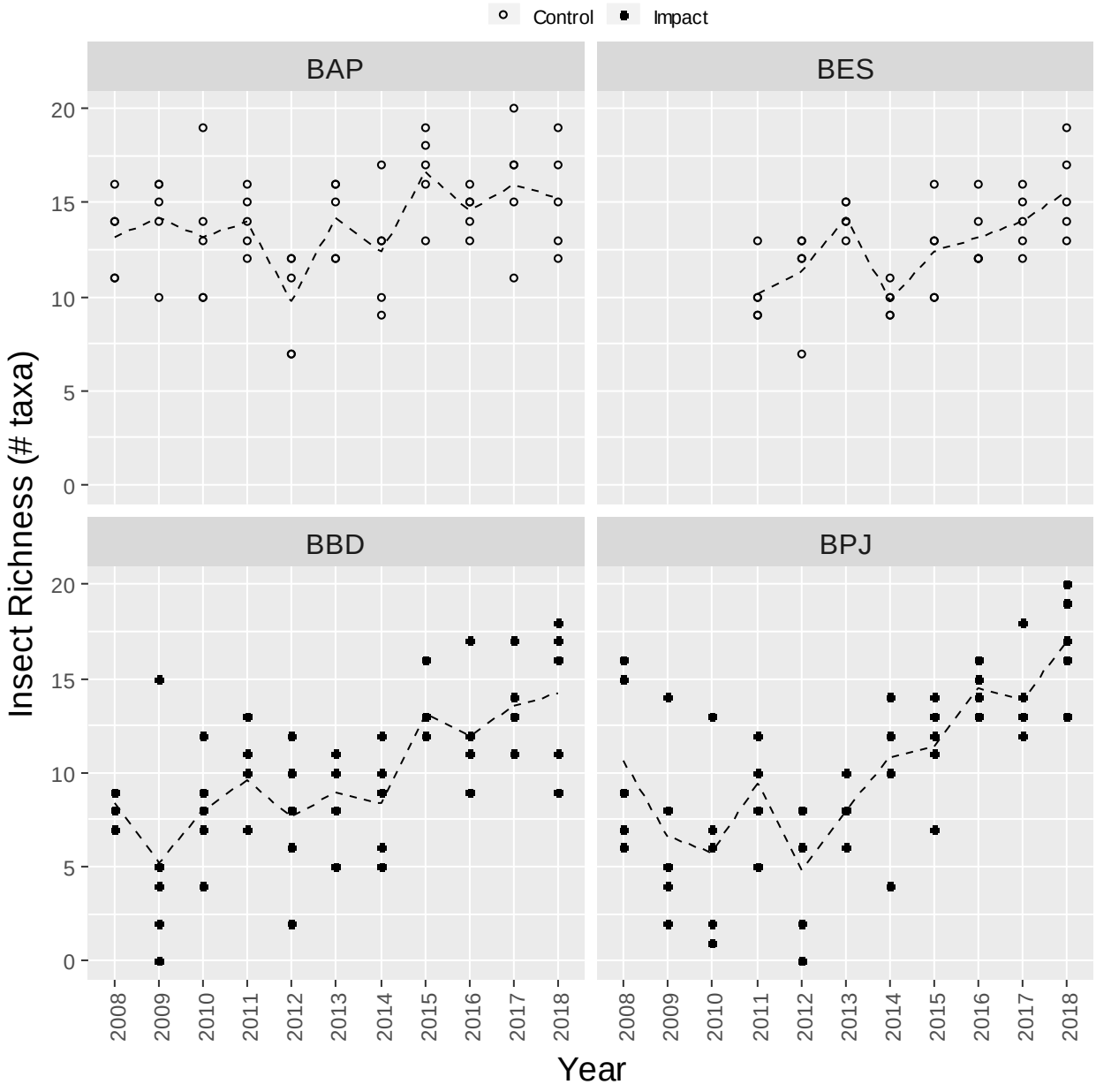


Figure E3-7. Mollusc richness (# of taxa) from Baker Lake since 2008.

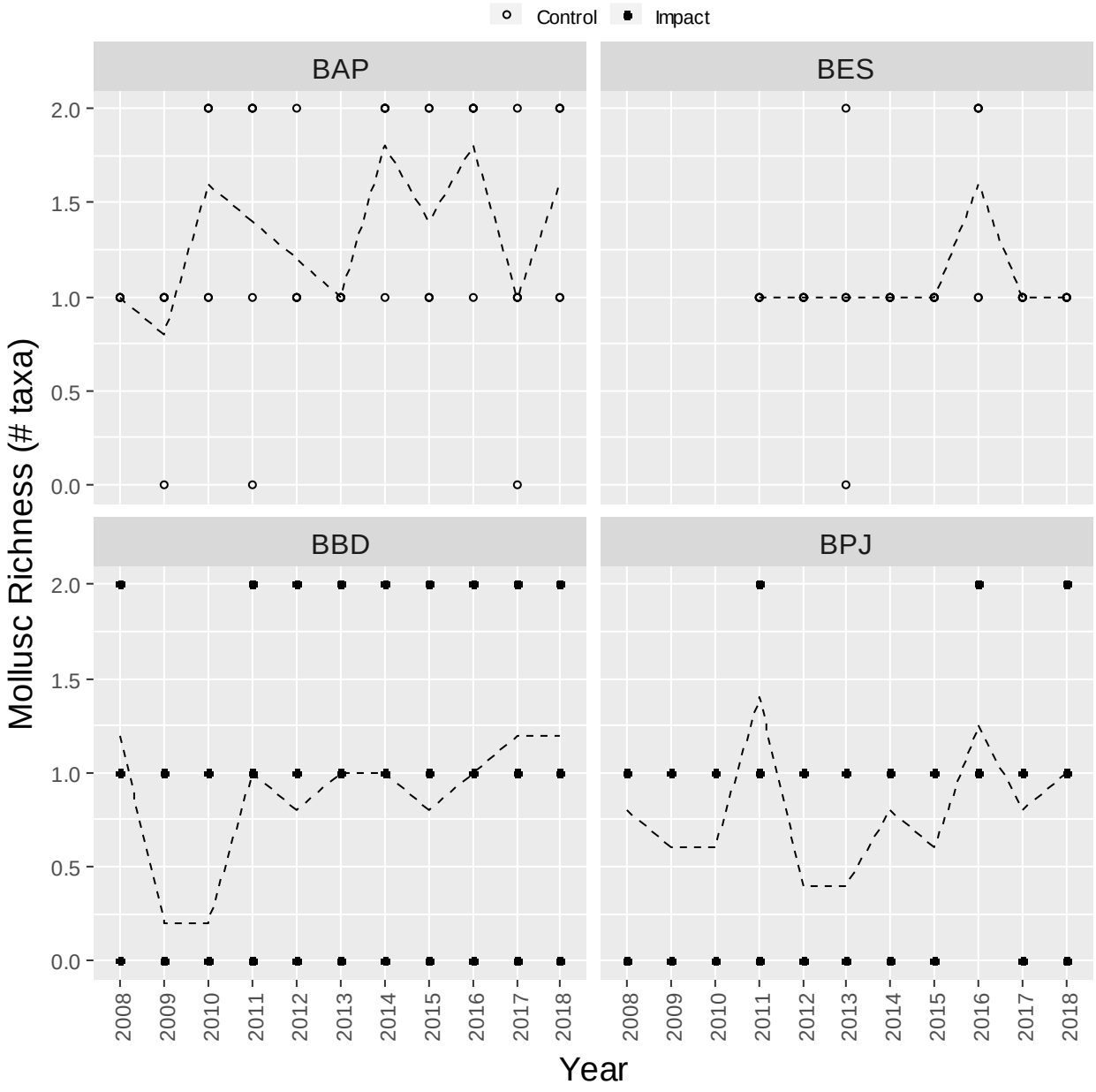


Figure E3-8. Other taxa richness (# of taxa) from Baker Lake since 2008.

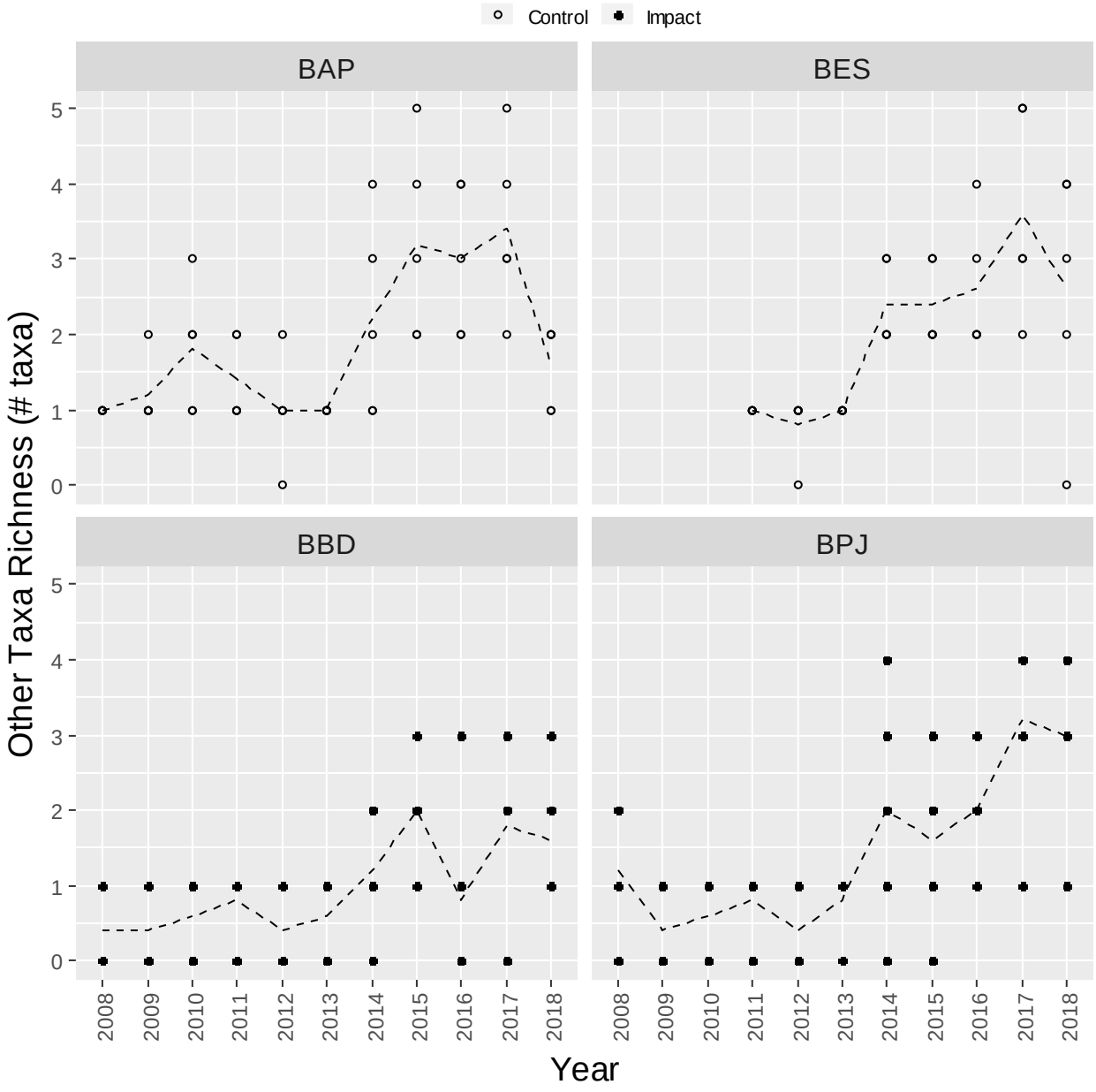


Figure E3-9. Simpsons' Diversity for the benthic invertebrate community at Baker Lake since 2008.

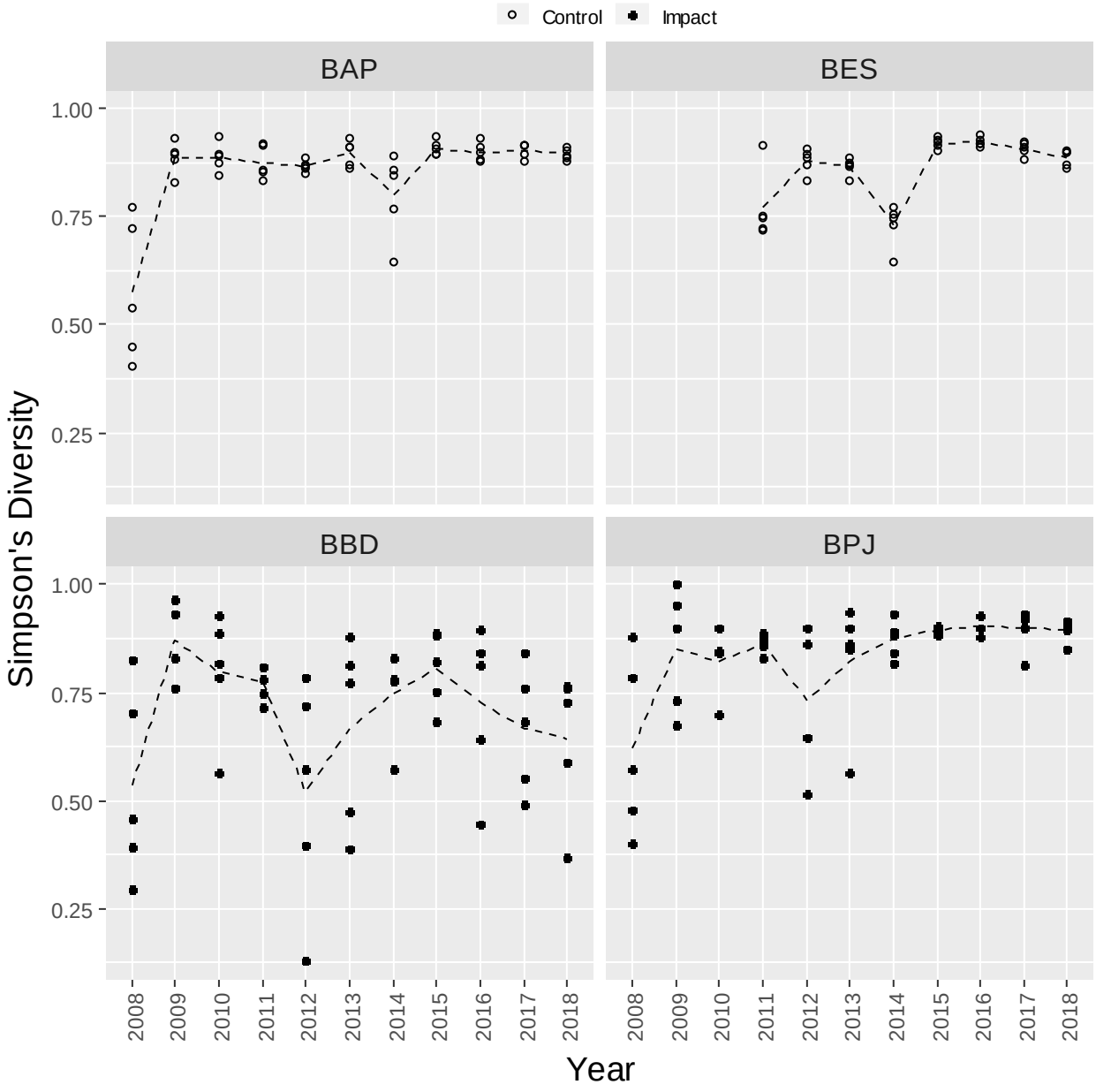
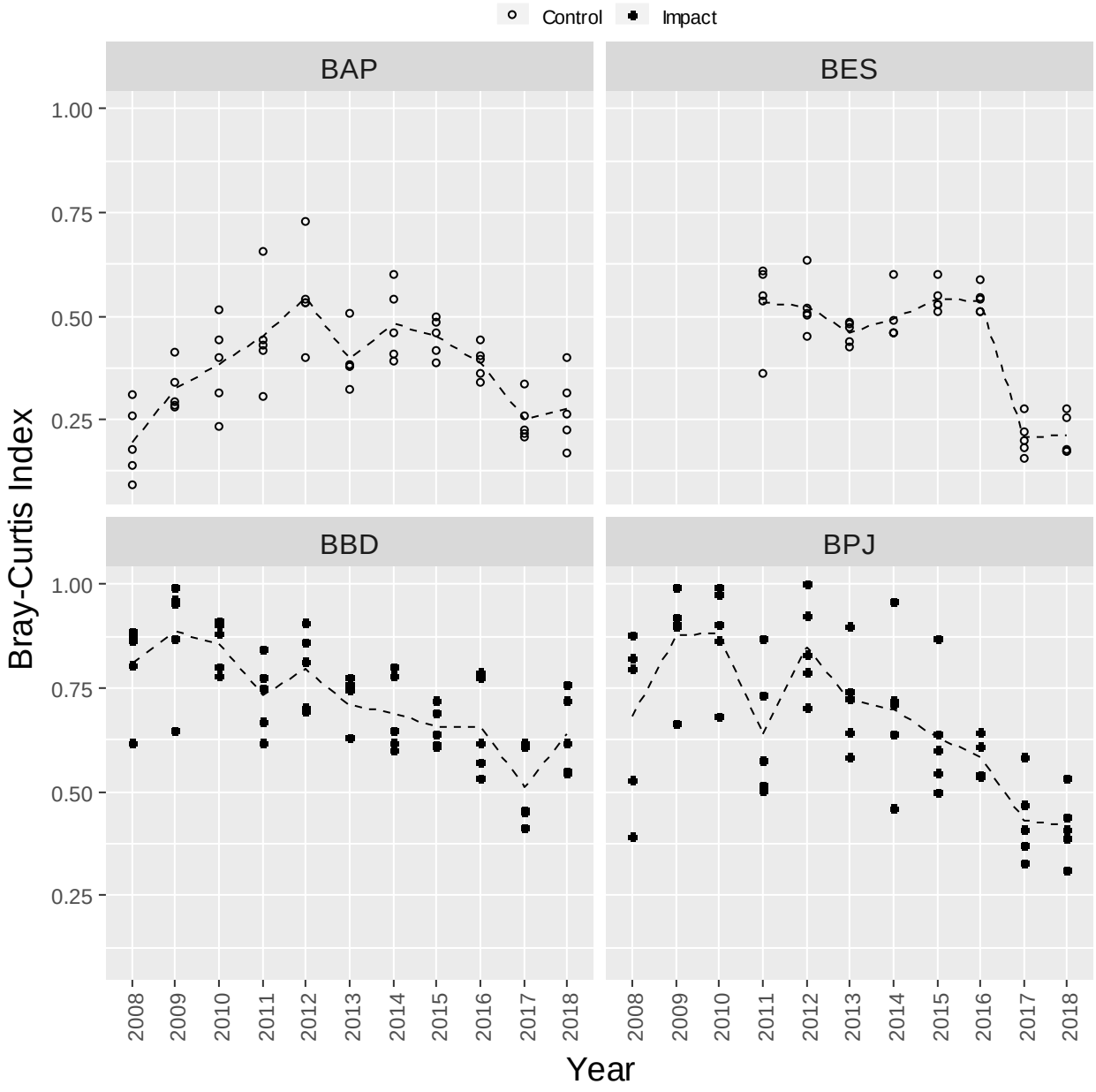


Figure E3-10. Bray-Curtis Index for the benthic invertebrate community at Baker Lake since 2008.



APPENDIX F
2018 WATER AND SEDIMENT CHEMISTRY LAB REPORTS

AZIMUTH CONSULTING GROUP INC.
ATTN: Eric Franz
218 - 2902 West Broadway
Vancouver BC V6K 2G8

Date Received: 14-MAY-18
Report Date: 22-MAY-18 18:58 (MT)
Version: FINAL

Client Phone: 604-730-1220

Certificate of Analysis

Lab Work Order #: L2093715

Project P.O. #: NOT SUBMITTED
Job Reference: MEADOWBANK CREMP-SURFACE WATER
C of C Numbers:
Legal Site Desc:

Comments: ADDITIONAL 22-MAY-18 18:31

Brent Mack, B.Sc.
Account Manager

[This report shall not be reproduced except in full without the written authority of the Laboratory.]

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2093715-1	L2093715-2	L2093715-3	L2093715-4	
Description	Surface Water	Surface Water	Surface Water	Surface Water	
Sampled Date	05-MAY-18	05-MAY-18	09-MAY-18	09-MAY-18	
Sampled Time	16:00	16:15	14:00	14:45	
Client ID	MAY CREMP EB-1	MAY CREMP DI-1	WAL-80	WAL-79	
Grouping	**Analyte**				
WATER					
Physical Tests	Conductivity (uS/cm)	<2.0	<2.0	67.6	73.1
	Hardness (as CaCO3) (mg/L)	<0.50	<0.50 HTC	29.8	32.0
	pH (pH)	5.37	5.32	7.46	7.51
	Total Suspended Solids (mg/L)	<1.0	<1.0	<1.0	<1.0
	Total Dissolved Solids (mg/L)	<3.0	<3.0	45	51
	Turbidity (NTU)	<0.10	<0.10	0.13	0.13
Anions and Nutrients	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	<1.0	<1.0	23.8	25.3
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0
	Alkalinity, Total (as CaCO3) (mg/L)	<1.0	<1.0	23.8	25.3
	Ammonia, Total (as N) (mg/L)	<0.0050	<0.0050	0.0318	0.0426
	Bromide (Br) (mg/L)	<0.050	<0.050	<0.050	<0.050
	Chloride (Cl) (mg/L)	<0.10	<0.10	1.35	1.46
	Fluoride (F) (mg/L)	<0.020	<0.020	0.064	0.068
	Nitrate (as N) (mg/L)	<0.0050	<0.0050	0.0854	0.101
	Nitrite (as N) (mg/L)	<0.0010	<0.0010	0.0010	<0.0010
	Total Kjeldahl Nitrogen (mg/L)	<0.050	<0.050	0.163	0.165
	Orthophosphate-Dissolved (as P) (mg/L)	<0.0010	<0.0010	0.0011	<0.0010
	Phosphorus (P)-Total Dissolved (mg/L)	<0.0020	<0.0020	<0.0020	0.0021
	Phosphorus (P)-Total (mg/L)	<0.0020	<0.0020	0.0027	0.0021
	Silicate (as SiO2) (mg/L)	<0.50	<0.50	0.99	0.85
	Sulfate (SO4) (mg/L)	<0.30	<0.30	8.25	8.98
Cyanides	Cyanide, Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010
	Cyanide, Free (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	<0.50		2.65	2.83
	Total Organic Carbon (mg/L)	<0.50	<0.50	2.68	2.87
Total Metals	Aluminum (Al)-Total (mg/L)	0.0044 RRV	<0.0030	<0.0030	<0.0030
	Antimony (Sb)-Total (mg/L)	<0.00010	<0.00010	<0.00010	0.00010
	Arsenic (As)-Total (mg/L)	<0.00010	<0.00010	0.00032	0.00036
	Barium (Ba)-Total (mg/L)	0.00024 RRV	<0.00010	0.00479	0.00518
	Beryllium (Be)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010
	Bismuth (Bi)-Total (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050
	Boron (B)-Total (mg/L)	<0.010	<0.010	<0.010	<0.010
	Cadmium (Cd)-Total (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050
	Calcium (Ca)-Total (mg/L)	<0.050	<0.050	7.13	7.63
	Cesium (Cs)-Total (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2093715-1	L2093715-2	L2093715-3	L2093715-4	
Description	Surface Water	Surface Water	Surface Water	Surface Water	
Sampled Date	05-MAY-18	05-MAY-18	09-MAY-18	09-MAY-18	
Sampled Time	16:00	16:15	14:00	14:45	
Client ID	MAY CREMP EB-1	MAY CREMP DI-1	WAL-80	WAL-79	
Grouping	**Analyte**				
WATER					
Total Metals	Chromium (Cr)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	
	Cobalt (Co)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	
	Copper (Cu)-Total (mg/L)	<0.00050	<0.00050	0.00120	0.00548	
	Iron (Fe)-Total (mg/L)	<0.010	<0.010	<0.010	<0.010	
	Lead (Pb)-Total (mg/L)	0.000074 RRV	<0.000050	<0.000050	<0.000050	
	Lithium (Li)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	
	Magnesium (Mg)-Total (mg/L)	0.0272 RRV	<0.0050	2.34	2.50	
	Manganese (Mn)-Total (mg/L)	0.00016 RRV	<0.00010	0.00141	0.00166	
	Mercury (Hg)-Total (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	
	Molybdenum (Mo)-Total (mg/L)	<0.000050	<0.000050	0.000490	0.000600	
	Nickel (Ni)-Total (mg/L)	<0.00050	<0.00050	0.00058	0.00067	
	Phosphorus (P)-Total (mg/L)	<0.050	<0.050	<0.050	<0.050	
	Potassium (K)-Total (mg/L)	<0.050	<0.050	0.877	0.956	
	Rubidium (Rb)-Total (mg/L)	<0.00020	<0.00020	0.00132	0.00145	
	Selenium (Se)-Total (mg/L)	<0.000050	<0.000050	0.000054	<0.000050	
	Silicon (Si)-Total (mg/L)	<0.10	<0.10	0.48	0.47	
	Silver (Ag)-Total (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	
	Sodium (Na)-Total (mg/L)	<0.050	<0.050	1.13	1.24	
	Strontium (Sr)-Total (mg/L)	<0.00020	<0.00020	0.0414	0.0436	
	Sulfur (S)-Total (mg/L)	<0.50	<0.50	2.64	3.14	
	Tellurium (Te)-Total (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020	
	Thallium (Tl)-Total (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	
	Thorium (Th)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	
	Tin (Sn)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	
	Titanium (Ti)-Total (mg/L)	<0.00030	<0.00030	<0.00030	<0.00030	
	Tungsten (W)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	
	Uranium (U)-Total (mg/L)	<0.000010	<0.000010	0.000076	0.000091	
	Vanadium (V)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	
	Zinc (Zn)-Total (mg/L)	<0.0030	<0.0030	<0.0030	<0.0030	
	Zirconium (Zr)-Total (mg/L)	<0.000060	<0.000060	<0.000060	<0.000060	
Dissolved Metals	Dissolved Mercury Filtration Location	FIELD		FIELD	FIELD	
	Dissolved Metals Filtration Location	FIELD		FIELD	FIELD	
	Aluminum (Al)-Dissolved (mg/L)	<0.0010		0.0017	0.0012	
	Antimony (Sb)-Dissolved (mg/L)	<0.00010		<0.00010	<0.00010	
	Arsenic (As)-Dissolved (mg/L)	<0.00010		0.00029	0.00032	
	Barium (Ba)-Dissolved (mg/L)	<0.00010		0.00473	0.00502	
	Beryllium (Be)-Dissolved (mg/L)	<0.00010		<0.00010	<0.00010	

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2093715-1	L2093715-2	L2093715-3	L2093715-4	
Description	Surface Water	Surface Water	Surface Water	Surface Water	
Sampled Date	05-MAY-18	05-MAY-18	09-MAY-18	09-MAY-18	
Sampled Time	16:00	16:15	14:00	14:45	
Client ID	MAY CREMP EB-1	MAY CREMP DI-1	WAL-80	WAL-79	
Grouping / **Analyte**					
WATER					
Dissolved Metals					
Bismuth (Bi)-Dissolved (mg/L)	<0.000050		<0.000050	<0.000050	
Boron (B)-Dissolved (mg/L)	<0.010		<0.010	<0.010	
Cadmium (Cd)-Dissolved (mg/L)	<0.0000050		<0.0000050	<0.0000050	
Calcium (Ca)-Dissolved (mg/L)	<0.050		8.06	8.62	
Cesium (Cs)-Dissolved (mg/L)	<0.000010		<0.000010	<0.000010	
Chromium (Cr)-Dissolved (mg/L)	<0.00010		<0.00010	<0.00010	
Cobalt (Co)-Dissolved (mg/L)	<0.00010		<0.00010	<0.00010	
Copper (Cu)-Dissolved (mg/L)	<0.00020		0.00102	0.00111	
Iron (Fe)-Dissolved (mg/L)	<0.010		<0.010	<0.010	
Lead (Pb)-Dissolved (mg/L)	<0.000050		<0.000050	<0.000050	
Lithium (Li)-Dissolved (mg/L)	<0.0010		<0.0010	<0.0010	
Magnesium (Mg)-Dissolved (mg/L)	<0.0050		2.34	2.55	
Manganese (Mn)-Dissolved (mg/L)	<0.00010		<0.00040 DLAI	<0.00050 DLAI	
Mercury (Hg)-Dissolved (mg/L)	<0.0000050		<0.0000050	<0.0000050	
Molybdenum (Mo)-Dissolved (mg/L)	<0.000050		0.000594	0.000590	
Nickel (Ni)-Dissolved (mg/L)	<0.00050		<0.00050	0.00052	
Phosphorus (P)-Dissolved (mg/L)	<0.050		<0.050	<0.050	
Potassium (K)-Dissolved (mg/L)	<0.050		0.907	0.988	
Rubidium (Rb)-Dissolved (mg/L)	<0.00020		0.00124	0.00143	
Selenium (Se)-Dissolved (mg/L)	<0.000050		<0.000050	<0.000050	
Silicon (Si)-Dissolved (mg/L)	<0.050		0.420	0.391	
Silver (Ag)-Dissolved (mg/L)	<0.000010		<0.000010	<0.000010	
Sodium (Na)-Dissolved (mg/L)	<0.050		1.09	1.18	
Strontium (Sr)-Dissolved (mg/L)	<0.00020		0.0407	0.0437	
Sulfur (S)-Dissolved (mg/L)	<0.50		2.54	2.82	
Tellurium (Te)-Dissolved (mg/L)	<0.00020		<0.00020	<0.00020	
Thallium (Tl)-Dissolved (mg/L)	<0.000010		<0.000010	<0.000010	
Thorium (Th)-Dissolved (mg/L)	<0.00010		<0.00010	<0.00010	
Tin (Sn)-Dissolved (mg/L)	<0.00010		<0.00010	<0.00010	
Titanium (Ti)-Dissolved (mg/L)	<0.00030		<0.00030	<0.00030	
Tungsten (W)-Dissolved (mg/L)	<0.00010		<0.00010	<0.00010	
Uranium (U)-Dissolved (mg/L)	<0.000010		0.000072	0.000081	
Vanadium (V)-Dissolved (mg/L)	<0.00050		<0.00050	<0.00050	
Zinc (Zn)-Dissolved (mg/L)	<0.0010		<0.0010	<0.0010	
Zirconium (Zr)-Dissolved (mg/L)	<0.000060		<0.000060	<0.000060	

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Duplicate	Silver (Ag)-Total	DUP-H	L2093715-1
Matrix Spike	Dissolved Organic Carbon	MS-B	L2093715-1
Matrix Spike	Total Organic Carbon	MS-B	L2093715-2, -3, -4
Matrix Spike	Total Organic Carbon	MS-B	L2093715-1
Matrix Spike	Total Organic Carbon	MS-B	L2093715-1
Matrix Spike	Total Organic Carbon	MS-B	L2093715-1
Matrix Spike	Barium (Ba)-Total	MS-B	L2093715-2, -3, -4
Matrix Spike	Calcium (Ca)-Total	MS-B	L2093715-2, -3, -4
Matrix Spike	Magnesium (Mg)-Total	MS-B	L2093715-2, -3, -4
Matrix Spike	Manganese (Mn)-Total	MS-B	L2093715-2, -3, -4
Matrix Spike	Potassium (K)-Total	MS-B	L2093715-2, -3, -4
Matrix Spike	Sodium (Na)-Total	MS-B	L2093715-2, -3, -4
Matrix Spike	Strontium (Sr)-Total	MS-B	L2093715-2, -3, -4

Qualifiers for Individual Parameters Listed:

Qualifier	Description
DLAI	Detection limit raised due to low level analytical interference or background.
DUP-H	Duplicate results outside ALS DQO, due to sample heterogeneity.
HTC	Hardness was calculated from Total Ca and/or Mg concentrations and may be biased high (dissolved Ca/Mg results unavailable).
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RRV	Reported Result Verified By Repeat Analysis

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ALK-TITR-VA	Water	Alkalinity Species by Titration	APHA 2320 Alkalinity

This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.

BR-L-IC-N-VA	Water	Bromide in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

CARBONS-DOC-VA	Water	Dissolved organic carbon by combustion	APHA 5310B TOTAL ORGANIC CARBON (TOC)

This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)". Dissolved carbon (DOC) fractions are determined by filtering the sample through a 0.45 micron membrane filter prior to analysis.

CARBONS-TOC-VA	Water	Total organic carbon by combustion	APHA 5310B TOTAL ORGANIC CARBON (TOC)

This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)".

CL-L-IC-N-VA	Water	Chloride in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

CN-FREE-L-CFA-VA	Water	Low Level Free Cyanide in water by CFA	ASTM 7237

This analysis is carried out using procedures adapted from ASTM Method 7237 "Free Cyanide with Flow Injection Analysis (FIA) Utilizing Gas Diffusion Separation and Amperometric Detection". Free cyanide is determined by in-line gas diffusion at pH 6 with final determination by colourimetric analysis.

CN-T-L-CFA-VA	Water	Low Level Total Cyanide in water by CFA	ISO 14403:2002

This analysis is carried out using procedures adapted from ISO Method 14403:2002 "Determination of Total Cyanide using Flow Analysis (FIA and CFA)". Total or strong acid dissociable (SAD) cyanide is determined by in-line UV digestion along with sample distillation and final determination by colourimetric analysis. Method Limitation: This method is susceptible to interference from thiocyanate (SCN). If SCN is present in the sample, there could be a positive interference with this method, but it would be less than 1% and could be as low as zero.

EC-PCT-VA	Water	Conductivity (Automated)	APHA 2510 Auto. Conduc.

This analysis is carried out using procedures adapted from APHA Method 2510 "Conductivity". Conductivity is determined using a conductivity electrode.

EC-SCREEN-VA	Water	Conductivity Screen (Internal Use Only)	APHA 2510

Qualitative analysis of conductivity where required during preparation of other tests - e.g. TDS, metals, etc.

F-IC-N-VA	Water	Fluoride in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

Reference Information

HARDNESS-CALC-VA	Water	Hardness	APHA 2340B

Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

HG-D-CVAA-VA	Water	Diss. Mercury in Water by CVAAS or CVAFS	APHA 3030B/EPA 1631E (mod)

Water samples are filtered (0.45 um), preserved with hydrochloric acid, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

HG-T-CVAA-VA	Water	Total Mercury in Water by CVAAS or CVAFS	EPA 1631E (mod)

Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

MET-D-CCMS-VA	Water	Dissolved Metals in Water by CRC ICPMS	APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

MET-T-CCMS-VA	Water	Total Metals in Water by CRC ICPMS	EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

NH3-F-VA	Water	Ammonia in Water by Fluorescence	J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

NO2-L-IC-N-VA	Water	Nitrite in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

NO3-L-IC-N-VA	Water	Nitrate in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

P-T-PRES-COL-VA	Water	Total P in Water by Colour	APHA 4500-P Phosphorus

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is determined colourimetrically after persulphate digestion of the sample.
Samples with very high dissolved solids (i.e. seawaters, brackish waters) may produce a negative bias by this method. Alternate methods are available for these types of samples.

Arsenic (5+), at elevated levels, is a positive interference on colourimetric phosphate analysis.

P-TD-COL-VA	Water	Total Dissolved P in Water by Colour	APHA 4500-P Phosphorous

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Dissolved Phosphorus is determined colourimetrically after persulphate digestion of a sample that has been lab or field filtered through a 0.45 micron membrane filter.
Samples with very high dissolved solids (i.e. seawaters, brackish waters) may produce a negative bias by this method. Alternate methods are available for these types of samples.

Arsenic (5+), at elevated levels, is a positive interference on colourimetric phosphate analysis.

PH-PCT-VA	Water	pH by Meter (Automated)	APHA 4500-H pH Value

This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode

It is recommended that this analysis be conducted in the field.

PO4-DO-COL-VA	Water	Diss. Orthophosphate in Water by Colour	APHA 4500-P Phosphorus

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.
Samples with very high dissolved solids (i.e. seawaters, brackish waters) may produce a negative bias by this method. Alternate methods are available for these types of samples.

Arsenic (5+), at elevated levels, is a positive interference on colourimetric phosphate analysis.

SILICATE-COL-VA	Water	Silicate by Colourimetric analysis	APHA 4500-SiO2 E.

This analysis is carried out using procedures adapted from APHA Method 4500-SiO2 E. "Silica". Silicate (molybdate-reactive silica) is determined by the molybdosilicate-heteropoly blue colourimetric method.

SO4-IC-N-VA	Water	Sulfate in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

Reference Information

TDS-LOW-VA	Water	Low Level TDS (3.0mg/L) by Gravimetric	APHA 2540C

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total dissolved solids (TDS) are determined by filtering a sample through a glass fibre filter, TDS is determined by evaporating the filtrate to dryness at 180 degrees celsius.

TKN-F-VA	Water	TKN in Water by Fluorescence	APHA 4500-NORG D.

This analysis is carried out using procedures adapted from APHA Method 4500-Norg D. "Block Digestion and Flow Injection Analysis". Total Kjeldahl Nitrogen is determined using block digestion followed by Flow-injection analysis with fluorescence detection.

TSS-LOW-VA	Water	Total Suspended Solids by Grav. (1 mg/L)	APHA 2540D

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total suspended solids (TSS) are determined by filtering a sample through a glass fibre filter, TSS is determined by drying the filter at 104 degrees celsius.
Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.

TURBIDITY-VA	Water	Turbidity by Meter	APHA 2130 Turbidity

This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

ALS Environmental

Chain of Custody / Analytical Request Form
Canada Toll Free: 1 800 668 9878
www.alsglobal.com

Report To		Report Format / Distribution		Service Requested (Rush for routine analysis subject to availability)
Company:	Azimuth Consulting Group	☑ Standard ☐ Other		◉ Regular (Standard Turnaround Times - Business Days)
Contact:	Eric Franz	☑ PDF ☑ Excel ☐ Digital ☐ Fax		○ Priority (2-4 Business Days) - 50% Surcharge - Contact ALS to Confirm TAT
Address:	218-2902 West Broadway	Email 1:	efranz@azimuthgroup.ca	○ Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT
	Vancouver, BC V6K2G8	Email 2:	marie-pier.marcil@agnicoeagle.com	○ Same Day or Weekend Emergency - Contact ALS to Confirm TAT
Phone:	604-730-1220 Fax:	Email 3:	robin.allard@agnicoeagle.com	
Invoice To	Same as Report ? ☑ Yes ☐ No	Client / Project Information		Analysis Request
Hardcopy of Invoice with Report?	☐ Yes ☑ No	Job #:	Meadowbank CREMP - Surfacewater	Please indicate below Filtered, Preserved or both (F, P, F/P)
Company:		PO / AFE:		
Contact:		SD:		
Address:				
Phone:		Quote #:	Q39503	
Lab Work Orde (lab use only)	L2093715-COFC	S ntact:	Brent Mack	Sampler: Eric Franz

Sample #	Sample Identification (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Conventionals** see notes	TSS-Low, TDS-Low	TOC, Ammonia, TKN, Total P	DOC	T-CN (Low), Free CN (Low)	Total mercury	Dissolved mercury	Total Metals	Dissolved metals	Chlorophyll-a			Number of Containers
							P	F/P	P	P	F/P	P	F/P	F			
	May CREMP EB-1	05-May-18	16:00	Surface Water	X	X	X	X	X	X	X	X	X				9
	May CREMP DI-1	05-May-18	16:15	Surface Water	X	X	X		X	X		X					6
	WAL-80	09-May-18	14:00	Surface Water	X	X	X	X	X	X	X	X	X				9
	WAL-79	09-May-18	14:45	Surface Water	X	X	X	X	X	X	X	X	X				9
	May Travel Blank	10-May-18	7:00	Surface Water													

Special Instructions / Regulations with water or land use (CCME-Freshwater Aquatic Life/BC CSR - Commercial/AB Tier 1 - Natural, etc) / Hazardous Details

**Conventionals includes: Alk Species, pH, EC, Turbidity, Conductivity, Anions (F, NO2, NO3, Br, SO4), low-level Chloride, Silicate, TD-P, and Ortho-PO4.

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.

Received May 14th 2018
8:40AM
15.4°C

AZIMUTH CONSULTING GROUP INC.
ATTN: Eric Franz
218 - 2902 West Broadway
Vancouver BC V6K 2G8

Date Received: 23-MAY-18
Report Date: 07-JUN-18 18:15 (MT)
Version: FINAL

Client Phone: 604-730-1220

Certificate of Analysis

Lab Work Order #: L2098886

Project P.O. #: NOT SUBMITTED
Job Reference: MEADOWBANK CREMP-SURFACEWATER
C of C Numbers:
Legal Site Desc:

Brent Mack, B.Sc.
Account Manager

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ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2098886-1	L2098886-2	L2098886-3	L2098886-4	L2098886-5
Description	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water
Sampled Date	13-MAY-18	13-MAY-18	13-MAY-18	13-MAY-18	13-MAY-18
Sampled Time					10:15
Client ID	SP-110	SP-110 DUP-1	TPS-59	TPS-60	TPE-110
Grouping **Analyte**					
FILTER					
Plant Pigments Chlorophyll a (ug/L)	0.173	0.666	0.451	0.241	0.282

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2098886-6	L2098886-7	L2098886-9	L2098886-10	
Description	Surface Water	Surface Water	Surface Water	Surface Water	
Sampled Date	13-MAY-18	13-MAY-18	09-MAY-18	09-MAY-18	
Sampled Time	10:45	14:45	15:00	14:10	
Client ID	TPE111	SP-111	WAL-79	WAL-80	
Grouping **Analyte**					
FILTER					
Plant Pigments Chlorophyll a (ug/L)	0.096	0.660	0.438	0.291	

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2098886-1	L2098886-2	L2098886-3	L2098886-4	L2098886-5
Description	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water
Sampled Date	13-MAY-18	13-MAY-18	13-MAY-18	13-MAY-18	13-MAY-18
Sampled Time					10:15
Client ID	SP-110	SP-110 DUP-1	TPS-59	TPS-60	TPE-110
Grouping / **Analyte**					
WATER					
Physical Tests Conductivity (uS/cm)	50.9	49.4	36.5	28.7	40.2
Hardness (as CaCO3) (mg/L)	19.6	19.6	13.4	9.49	14.0
pH (pH)	7.45	7.45	7.22	7.11	7.29
Total Suspended Solids (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
Total Dissolved Solids (mg/L)	30.9	30.8	19.7	16.5	25.0
Turbidity (NTU)	0.13	0.13	0.12	0.11	0.12
Anions and Nutrients Alkalinity, Bicarbonate (as CaCO3) (mg/L)	15.1	14.8	8.5	6.6	10.4
Alkalinity, Carbonate (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
Alkalinity, Total (as CaCO3) (mg/L)	15.1	14.8	8.5	6.6	10.4
Ammonia, Total (as N) (mg/L)	0.0199	0.0160	0.0215	0.0164	0.0228
Bromide (Br) (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050
Chloride (Cl) (mg/L)	1.15	1.13	1.02	0.79	0.98
Fluoride (F) (mg/L)	0.084	0.084	0.084	0.067	0.088
Nitrate (as N) (mg/L)	0.0131	0.0114	0.0340	0.0261	0.0139
Nitrite (as N) (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Total Kjeldahl Nitrogen (mg/L)	0.117	0.136	0.102	0.095	0.349
Orthophosphate-Dissolved (as P) (mg/L)	0.0014	0.0011	<0.0010	0.0013	0.0016
Phosphorus (P)-Total Dissolved (mg/L)	<0.0020	<0.0020	<0.0020	<0.0020	0.0021
Phosphorus (P)-Total (mg/L)	0.0026	0.0024	0.0032	0.0020	0.319 RRV
Silicate (as SiO2) (mg/L)	0.52	0.51	<0.50	<0.50	<0.50
Sulfate (SO4) (mg/L)	6.80	6.61	6.37	5.00	6.32
Cyanides Cyanide, Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Cyanide, Free (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Organic / Inorganic Carbon Dissolved Organic Carbon (mg/L)	2.14	1.91	1.86	1.56	1.67
Total Organic Carbon (mg/L)	2.09	1.88	1.74	1.66	2.21
Total Metals Aluminum (Al)-Total (mg/L)	0.0117	0.0177	<0.0030	<0.0030	0.0054
Antimony (Sb)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic (As)-Total (mg/L)	0.00028	0.00030	0.00019	0.00014	0.00040
Barium (Ba)-Total (mg/L)	0.00393	0.00354	0.00385	0.00296	0.00369
Beryllium (Be)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth (Bi)-Total (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron (B)-Total (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)-Total (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Calcium (Ca)-Total (mg/L)	5.57	5.36	2.83	2.40	3.49
Cesium (Cs)-Total (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	0.000014

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2098886-6	L2098886-7	L2098886-8	L2098886-11	
	Description	Surface Water	Surface Water	Surface Water	Surface Water	
	Sampled Date	13-MAY-18	13-MAY-18	13-MAY-18		
	Sampled Time	10:45	14:45			
	Client ID	TPE111	SP-111	CREMP-MAY DI 1	CREMP MAY-TRAVELLING BLANK	
Grouping	**Analyte**					
WATER						
Physical Tests	Conductivity (uS/cm)	40.1	49.5	<2.0		
	Hardness (as CaCO3) (mg/L)	14.1	20.4	<0.50		
	pH (pH)	7.30	7.43	5.36		
	Total Suspended Solids (mg/L)	<1.0	<1.0	<1.0		
	Total Dissolved Solids (mg/L)	23.1	30.5	<3.0		
	Turbidity (NTU)	0.12	0.13	<0.10		
Anions and Nutrients	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	10.3	14.7	<1.0		
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<1.0	<1.0	<1.0		
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0	<1.0	<1.0		
	Alkalinity, Total (as CaCO3) (mg/L)	10.3	14.7	<1.0		
	Ammonia, Total (as N) (mg/L)	0.0181	0.0170	<0.0050		
	Bromide (Br) (mg/L)	<0.050	<0.050	<0.050		
	Chloride (Cl) (mg/L)	0.99	1.13	<0.10		
	Fluoride (F) (mg/L)	0.089	0.083	<0.020		
	Nitrate (as N) (mg/L)	0.0120	0.0110	<0.0050		
	Nitrite (as N) (mg/L)	<0.0010	<0.0010	<0.0010		
	Total Kjeldahl Nitrogen (mg/L)	0.108	0.122	<0.050		
	Orthophosphate-Dissolved (as P) (mg/L)	0.0015	0.0016	0.0012		
	Phosphorus (P)-Total Dissolved (mg/L)	0.0022	<0.0020	<0.0020		
	Phosphorus (P)-Total (mg/L)	0.0054	0.0031	<0.0020		
	Silicate (as SiO2) (mg/L)	<0.50	0.51	<0.50		
	Sulfate (SO4) (mg/L)	6.33	6.59	<0.30		
Cyanides	Cyanide, Total (mg/L)	<0.0010	<0.0010		<0.0010	
	Cyanide, Free (mg/L)	<0.0010	<0.0010		<0.0010	
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	1.67	2.04			
	Total Organic Carbon (mg/L)	2.37	2.02	0.55		
Total Metals	Aluminum (Al)-Total (mg/L)	<0.0030	<0.0030	<0.0030	<0.0060 DLB	
	Antimony (Sb)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	
	Arsenic (As)-Total (mg/L)	0.00037	0.00026	<0.00010	<0.00010	
	Barium (Ba)-Total (mg/L)	0.00383	0.00358	<0.00010	0.00027	
	Beryllium (Be)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	
	Bismuth (Bi)-Total (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	
	Boron (B)-Total (mg/L)	<0.010	<0.010	<0.010	<0.010	
	Cadmium (Cd)-Total (mg/L)	<0.0000050	<0.0000050	<0.0000050	0.0000085	
	Calcium (Ca)-Total (mg/L)	3.42	5.09	<0.050	1.02	
	Cesium (Cs)-Total (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	L2098886-1 Surface Water 13-MAY-18 SP-110	L2098886-2 Surface Water 13-MAY-18 SP-110 DUP-1	L2098886-3 Surface Water 13-MAY-18 TPS-59	L2098886-4 Surface Water 13-MAY-18 TPS-60	L2098886-5 Surface Water 13-MAY-18 10:15 TPE-110
WATER						
Total Metals	Chromium (Cr)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	0.00011
	Cobalt (Co)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Copper (Cu)-Total (mg/L)	0.00067	0.00076	<0.00050	<0.00050	<0.00050
	Iron (Fe)-Total (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
	Lead (Pb)-Total (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Lithium (Li)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Magnesium (Mg)-Total (mg/L)	1.61	1.57	1.11	0.932	1.23
	Manganese (Mn)-Total (mg/L)	0.00054	0.00068	0.00034	0.00032	0.00050
	Mercury (Hg)-Total (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
	Molybdenum (Mo)-Total (mg/L)	0.000221	0.000212	0.000173	0.000143	0.000204
	Nickel (Ni)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Phosphorus (P)-Total (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050
	Potassium (K)-Total (mg/L)	0.701	0.701	0.637	0.513	0.649
	Rubidium (Rb)-Total (mg/L)	0.00105	0.00114	0.00093	0.00075	0.00099
	Selenium (Se)-Total (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Silicon (Si)-Total (mg/L)	0.24	0.23	<0.10	<0.10	0.11
	Silver (Ag)-Total (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Sodium (Na)-Total (mg/L)	1.22	1.25	1.43	1.21	1.42
	Strontium (Sr)-Total (mg/L)	0.0235	0.0240	0.0139	0.0108	0.0152
	Sulfur (S)-Total (mg/L)	2.17	2.25	1.95	1.51	1.95
	Tellurium (Te)-Total (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
	Thallium (Tl)-Total (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Thorium (Th)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Tin (Sn)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Titanium (Ti)-Total (mg/L)	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030
	Tungsten (W)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Uranium (U)-Total (mg/L)	0.000038	0.000040	0.000033	0.000026	0.000038
	Vanadium (V)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Zinc (Zn)-Total (mg/L)	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
	Zirconium (Zr)-Total (mg/L)	<0.000060	<0.000060	<0.000060	<0.000060	<0.000060
Dissolved Metals	Dissolved Mercury Filtration Location	FIELD	FIELD	FIELD	FIELD	FIELD
	Dissolved Metals Filtration Location	FIELD	FIELD	FIELD	FIELD	FIELD
	Aluminum (Al)-Dissolved (mg/L)	0.0013	0.0013	0.0019	0.0169 DTC	0.0061
	Antimony (Sb)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Arsenic (As)-Dissolved (mg/L)	0.00026	0.00027	0.00019	0.00015	0.00042
	Barium (Ba)-Dissolved (mg/L)	0.00369	0.00376	0.00389	0.00540 DTC	0.00404
	Beryllium (Be)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	L2098886-6 Surface Water 13-MAY-18 10:45 TPE111	L2098886-7 Surface Water 13-MAY-18 14:45 SP-111	L2098886-8 Surface Water 13-MAY-18 CREMP-MAY DI 1	L2098886-11 Surface Water CREMP MAY-TRAVELLING BLANK	
WATER						
Total Metals	Chromium (Cr)-Total (mg/L)	<0.00010	<0.00010	<0.00010	0.00011	
	Cobalt (Co)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	
	Copper (Cu)-Total (mg/L)	<0.00050	0.00066	<0.00050	0.00217	
	Iron (Fe)-Total (mg/L)	<0.010	<0.010	<0.010	0.011	
	Lead (Pb)-Total (mg/L)	<0.000050	<0.000050	<0.000050	0.000172	
	Lithium (Li)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	
	Magnesium (Mg)-Total (mg/L)	1.29	1.61	0.0054 RRV	0.0215	
	Manganese (Mn)-Total (mg/L)	0.00047	0.00066	<0.00010	0.00115	
	Mercury (Hg)-Total (mg/L)	<0.0000050	<0.00025 DLM	<0.0000050	<0.0000050	
	Molybdenum (Mo)-Total (mg/L)	0.000160	0.000208	<0.000050	<0.000050	
	Nickel (Ni)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	
	Phosphorus (P)-Total (mg/L)	<0.050	<0.050	<0.050	<0.050	
	Potassium (K)-Total (mg/L)	0.665	0.704	<0.050	<0.050	
	Rubidium (Rb)-Total (mg/L)	0.00100	0.00110	<0.00020	<0.00020	
	Selenium (Se)-Total (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	
	Silicon (Si)-Total (mg/L)	0.11	0.23	<0.10	<0.10	
	Silver (Ag)-Total (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	
	Sodium (Na)-Total (mg/L)	1.44	1.23	<0.050	0.089	
	Strontium (Sr)-Total (mg/L)	0.0146	0.0233	<0.00020	0.00076	
	Sulfur (S)-Total (mg/L)	1.92	2.15	<0.50	<0.50	
	Tellurium (Te)-Total (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020	
	Thallium (Tl)-Total (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	
	Thorium (Th)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	
	Tin (Sn)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	
	Titanium (Ti)-Total (mg/L)	<0.00030	<0.00030	<0.00030	<0.00030	
	Tungsten (W)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	
	Uranium (U)-Total (mg/L)	0.000033	0.000037	<0.000010	<0.000020 DLB	
	Vanadium (V)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	
	Zinc (Zn)-Total (mg/L)	<0.0030	<0.0030	<0.0030	0.0032	
	Zirconium (Zr)-Total (mg/L)	<0.000060	<0.000060	<0.000060	<0.00018 DLB	
Dissolved Metals	Dissolved Mercury Filtration Location	FIELD	FIELD	LAB		
	Dissolved Metals Filtration Location	FIELD	FIELD	LAB		
	Aluminum (Al)-Dissolved (mg/L)	0.0021	0.0025	<0.0010		
	Antimony (Sb)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010		
	Arsenic (As)-Dissolved (mg/L)	0.00037	0.00028	<0.00010		
	Barium (Ba)-Dissolved (mg/L)	0.00414	0.00385	<0.00010		
	Beryllium (Be)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010		

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2098886-1	L2098886-2	L2098886-3	L2098886-4	L2098886-5
Description	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water
Sampled Date	13-MAY-18	13-MAY-18	13-MAY-18	13-MAY-18	13-MAY-18
Sampled Time					10:15
Client ID	SP-110	SP-110 DUP-1	TPS-59	TPS-60	TPE-110
Grouping / **Analyte**					
WATER					
Dissolved Metals Bismuth (Bi)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron (B)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)-Dissolved (mg/L)	<0.0000050	<0.0000050	<0.0000050	0.0000051	<0.0000050
Calcium (Ca)-Dissolved (mg/L)	5.10	5.15	3.41	2.28	3.41
Cesium (Cs)-Dissolved (mg/L)	<0.000010	0.000010	<0.000010	<0.000010	0.000022
Chromium (Cr)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	0.00114 DTC	0.00011
Cobalt (Co)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper (Cu)-Dissolved (mg/L)	0.00067	0.00051	0.00126	0.00105	0.00041
Iron (Fe)-Dissolved (mg/L)	<0.010	<0.010	<0.010	0.023	0.013
Lead (Pb)-Dissolved (mg/L)	<0.000050	<0.000050	0.000061	0.000081	0.000069
Lithium (Li)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Magnesium (Mg)-Dissolved (mg/L)	1.68	1.63	1.19	0.921	1.32
Manganese (Mn)-Dissolved (mg/L)	<0.00010	0.00014	0.00058 DTMF	0.00032	0.00039
Mercury (Hg)-Dissolved (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Molybdenum (Mo)-Dissolved (mg/L)	0.000203	0.000221	0.000194	0.000213	0.000166
Nickel (Ni)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	0.00054	<0.00050
Phosphorus (P)-Dissolved (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050
Potassium (K)-Dissolved (mg/L)	0.733	0.737	0.709	0.559	0.731
Rubidium (Rb)-Dissolved (mg/L)	0.00109	0.00115	0.00097	0.00073	0.00107
Selenium (Se)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Silicon (Si)-Dissolved (mg/L)	0.195	0.199	<0.050	<0.050	0.086
Silver (Ag)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)-Dissolved (mg/L)	1.19	1.20	1.50	1.21	1.46
Strontium (Sr)-Dissolved (mg/L)	0.0240	0.0239	0.0140	0.0109	0.0153
Sulfur (S)-Dissolved (mg/L)	2.27	2.16	2.18	1.67	2.04
Tellurium (Te)-Dissolved (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Thallium (Tl)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Thorium (Th)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Tin (Sn)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)-Dissolved (mg/L)	<0.00030	<0.00030	<0.00030	0.00070	<0.00030
Tungsten (W)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Uranium (U)-Dissolved (mg/L)	0.000043	0.000043	0.000038	0.000034	0.000043
Vanadium (V)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc (Zn)-Dissolved (mg/L)	<0.0010	0.0025	0.0018	0.0022	<0.0010
Zirconium (Zr)-Dissolved (mg/L)	<0.000060	<0.000060	<0.000060	<0.000060	<0.000060

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2098886-6	L2098886-7	L2098886-8	L2098886-11	
Description	Surface Water	Surface Water	Surface Water	Surface Water	
Sampled Date	13-MAY-18	13-MAY-18	13-MAY-18		
Sampled Time	10:45	14:45			
Client ID	TPE111	SP-111	CREMP-MAY DI 1	CREMP MAY-TRAVELLING BLANK	
Grouping / **Analyte**					
WATER					
Dissolved Metals					
Bismuth (Bi)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050		
Boron (B)-Dissolved (mg/L)	<0.010	<0.010	<0.010		
Cadmium (Cd)-Dissolved (mg/L)	0.0000195 DTMF	<0.0000050	<0.0000050		
Calcium (Ca)-Dissolved (mg/L)	3.46	5.45	<0.050		
Cesium (Cs)-Dissolved (mg/L)	0.000017	0.000010	<0.000010		
Chromium (Cr)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010		
Cobalt (Co)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010		
Copper (Cu)-Dissolved (mg/L)	0.00060	0.00057	<0.00020		
Iron (Fe)-Dissolved (mg/L)	<0.010	<0.010	<0.010		
Lead (Pb)-Dissolved (mg/L)	0.000054	<0.000050	<0.000050		
Lithium (Li)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010		
Magnesium (Mg)-Dissolved (mg/L)	1.32	1.65	<0.0050		
Manganese (Mn)-Dissolved (mg/L)	0.00027	0.00022	<0.00010		
Mercury (Hg)-Dissolved (mg/L)	<0.0000050	<0.00025 DLM	<0.0000050		
Molybdenum (Mo)-Dissolved (mg/L)	0.000177	0.000222	<0.000050		
Nickel (Ni)-Dissolved (mg/L)	0.00061	<0.00050	<0.00050		
Phosphorus (P)-Dissolved (mg/L)	<0.050	<0.050	<0.050		
Potassium (K)-Dissolved (mg/L)	0.778	0.747	<0.050		
Rubidium (Rb)-Dissolved (mg/L)	0.00115	0.00109	<0.00020		
Selenium (Se)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050		
Silicon (Si)-Dissolved (mg/L)	0.090	0.208	<0.050		
Silver (Ag)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010		
Sodium (Na)-Dissolved (mg/L)	1.51	1.21	<0.050		
Strontium (Sr)-Dissolved (mg/L)	0.0153	0.0241	<0.00020		
Sulfur (S)-Dissolved (mg/L)	2.12	2.30	<0.50		
Tellurium (Te)-Dissolved (mg/L)	<0.00020	<0.00020	<0.00020		
Thallium (Tl)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010		
Thorium (Th)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010		
Tin (Sn)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010		
Titanium (Ti)-Dissolved (mg/L)	<0.00030	<0.00030	<0.00030		
Tungsten (W)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010		
Uranium (U)-Dissolved (mg/L)	0.000041	0.000044	<0.000010		
Vanadium (V)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050		
Zinc (Zn)-Dissolved (mg/L)	0.0022	0.0120 DTC	<0.0010		
Zirconium (Zr)-Dissolved (mg/L)	<0.000060	<0.000060	<0.000060		

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

Reference Information

Qualifiers for Individual Samples Listed:

Sample Numbe	Client Sample ID	Qualifier	Description
L2098886-11	CREMP MAY-TRAVELLING I	WSMT	Water sample(s) for total mercury analysis was not submitted in glass or PTFE container with HCl preservative. Results may be biased low.
L2098886-8	CREMP-MAY DI 1	WSMT	Water sample(s) for total mercury analysis was not submitted in glass or PTFE container with HCl preservative. Results may be biased low.

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Method Blank	Zirconium (Zr)-Total	B	L2098886-11
Method Blank	Aluminum (Al)-Total	MB-LOR	L2098886-11
Method Blank	Uranium (U)-Total	MB-LOR	L2098886-11
Laboratory Control Sample	Barium (Ba)-Dissolved	MES	L2098886-4, -7
Laboratory Control Sample	Manganese (Mn)-Dissolved	MES	L2098886-8
Laboratory Control Sample	Vanadium (V)-Dissolved	MES	L2098886-4, -7
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L2098886-4, -7
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L2098886-1, -2, -3, -4, -5, -6, -7
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L2098886-4, -7
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L2098886-1, -2, -3, -4, -5, -6, -7
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L2098886-4, -7
Matrix Spike	Manganese (Mn)-Dissolved	MS-B	L2098886-4, -7
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L2098886-4, -7
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L2098886-1, -2, -3, -4, -5, -6, -7
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L2098886-4, -7
Matrix Spike	Barium (Ba)-Total	MS-B	L2098886-11
Matrix Spike	Calcium (Ca)-Total	MS-B	L2098886-8
Matrix Spike	Calcium (Ca)-Total	MS-B	L2098886-11
Matrix Spike	Copper (Cu)-Total	MS-B	L2098886-11
Matrix Spike	Magnesium (Mg)-Total	MS-B	L2098886-8
Matrix Spike	Magnesium (Mg)-Total	MS-B	L2098886-11
Matrix Spike	Molybdenum (Mo)-Total	MS-B	L2098886-11
Matrix Spike	Potassium (K)-Total	MS-B	L2098886-11
Matrix Spike	Silicon (Si)-Total	MS-B	L2098886-11
Matrix Spike	Sodium (Na)-Total	MS-B	L2098886-8
Matrix Spike	Sodium (Na)-Total	MS-B	L2098886-11
Matrix Spike	Strontium (Sr)-Total	MS-B	L2098886-8
Matrix Spike	Strontium (Sr)-Total	MS-B	L2098886-11
Matrix Spike	Sulfur (S)-Total	MS-B	L2098886-11
Matrix Spike	Uranium (U)-Total	MS-B	L2098886-11
Matrix Spike	Phosphorus (P)-Total	MS-B	L2098886-1, -2, -3, -4, -5, -6, -7, -8
Matrix Spike	Silicate (as SiO2)	MS-B	L2098886-1, -2, -3, -4, -5, -6, -7, -8

Qualifiers for Individual Parameters Listed:

Qualifier	Description
B	Method Blank exceeds ALS DQO. Associated sample results which are < Limit of Reporting or > 5 times blank level are considered reliable.
DLB	Detection Limit Raised. Analyte detected at comparable level in Method Blank.
DLM	Detection Limit Adjusted due to sample matrix effects (e.g. chemical interference, colour, turbidity).
DTC	Dissolved concentration exceeds total. Results were confirmed by re-analysis.
DTMF	Dissolved concentration exceeds total for field-filtered metals sample. Metallic contaminants may have been introduced to dissolved sample during field filtration.
MB-LOR	Method Blank exceeds ALS DQO. Limits of Reporting have been adjusted for samples with positive hits below 5x blank level.
MES	Data Quality Objective was marginally exceeded (by < 10% absolute) for < 10% of analytes in a Multi-Element Scan / Multi-Parameter Scan (considered acceptable as per OMOE & CCME).
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RRV	Reported Result Verified By Repeat Analysis

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ALK-TITR-VA	Water	Alkalinity Species by Titration	APHA 2320 Alkalinity
This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.			
BR-L-IC-N-VA	Water	Bromide in Water by IC (Low Level)	EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			
CARBONS-DOC-VA	Water	Dissolved organic carbon by combustion	APHA 5310B
This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)". Dissolved carbon (DOC) fractions are determined by filtering the sample through a 0.45 micron membrane filter prior to analysis.			
CARBONS-TOC-VA	Water	Total organic carbon by combustion	APHA 5310B TOTAL ORGANIC CARBON (TOC)
This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)".			
CHLOROA-F-VA	Filter	Chlorophyll a by Fluorometer (Filter)	EPA 445.0
This analysis is done using procedures modified from EPA Method 445.0. Chlorophyll-a is determined by a routine acetone extraction followed with analysis by fluorometry using the non-acidification procedure. This method is not subject to interferences from chlorophyll b.			
CL-IC-N-VA	Water	Chloride in Water by IC	EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			
CL-L-IC-N-VA	Water	Chloride in Water by IC (Low Level)	EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			
CN-FREE-L-CFA-VA	Water	Low Level Free Cyanide in water by CFA	ASTM 7237
This analysis is carried out using procedures adapted from ASTM Method 7237 "Free Cyanide with Flow Injection Analysis (FIA) Utilizing Gas Diffusion Separation and Amperometric Detection". Free cyanide is determined by in-line gas diffusion at pH 6 with final determination by colourimetric analysis.			
CN-T-L-CFA-VA	Water	Low Level Total Cyanide in water by CFA	ISO 14403:2002
This analysis is carried out using procedures adapted from ISO Method 14403:2002 "Determination of Total Cyanide using Flow Analysis (FIA and CFA)". Total or strong acid dissociable (SAD) cyanide is determined by in-line UV digestion along with sample distillation and final determination by colourimetric analysis. Method Limitation: This method is susceptible to interference from thiocyanate (SCN). If SCN is present in the sample, there could be a positive interference with this method, but it would be less than 1% and could be as low as zero.			
EC-PCT-VA	Water	Conductivity (Automated)	APHA 2510 Auto. Conduc.
This analysis is carried out using procedures adapted from APHA Method 2510 "Conductivity". Conductivity is determined using a conductivity electrode.			
EC-SCREEN-VA	Water	Conductivity Screen (Internal Use Only)	APHA 2510
Qualitative analysis of conductivity where required during preparation of other tests - e.g. TDS, metals, etc.			
F-IC-N-VA	Water	Fluoride in Water by IC	EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			
HARDNESS-CALC-VA	Water	Hardness	APHA 2340B
Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.			
HG-D-CVAA-VA	Water	Diss. Mercury in Water by CVAAS or CVAFS	APHA 3030B/EPA 1631E (mod)
Water samples are filtered (0.45 um), preserved with hydrochloric acid, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.			
HG-T-CVAA-VA	Water	Total Mercury in Water by CVAAS or CVAFS	EPA 1631E (mod)
Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.			
MET-D-CCMS-VA	Water	Dissolved Metals in Water by CRC ICPMS	APHA 3030B/6020A (mod)
Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.			
Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.			
MET-T-CCMS-VA	Water	Total Metals in Water by CRC ICPMS	EPA 200.2/6020A (mod)
Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.			
Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.			
NH3-F-VA	Water	Ammonia in Water by Fluorescence	J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

Reference Information

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

NO2-L-IC-N-VA	Water	Nitrite in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

NO3-L-IC-N-VA	Water	Nitrate in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

P-T-PRES-COL-VA	Water	Total P in Water by Colour	APHA 4500-P Phosphorus

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is determined colourimetrically after persulphate digestion of the sample.
Samples with very high dissolved solids (i.e. seawaters, brackish waters) may produce a negative bias by this method. Alternate methods are available for these types of samples.

Arsenic (5+), at elevated levels, is a positive interference on colourimetric phosphate analysis.

P-TD-COL-VA	Water	Total Dissolved P in Water by Colour	APHA 4500-P Phosphorous

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Dissolved Phosphorus is determined colourimetrically after persulphate digestion of a sample that has been lab or field filtered through a 0.45 micron membrane filter.
Samples with very high dissolved solids (i.e. seawaters, brackish waters) may produce a negative bias by this method. Alternate methods are available for these types of samples.

Arsenic (5+), at elevated levels, is a positive interference on colourimetric phosphate analysis.

PH-PCT-VA	Water	pH by Meter (Automated)	APHA 4500-H pH Value

This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode

It is recommended that this analysis be conducted in the field.

PO4-DO-COL-VA	Water	Diss. Orthophosphate in Water by Colour	APHA 4500-P Phosphorus

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.
Samples with very high dissolved solids (i.e. seawaters, brackish waters) may produce a negative bias by this method. Alternate methods are available for these types of samples.

Arsenic (5+), at elevated levels, is a positive interference on colourimetric phosphate analysis.

SILICATE-COL-VA	Water	Silicate by Colourimetric analysis	APHA 4500-SiO2 E.

This analysis is carried out using procedures adapted from APHA Method 4500-SiO2 E. "Silica". Silicate (molybdate-reactive silica) is determined by the molybdosilicate-heteropoly blue colourimetric method.

SO4-IC-N-VA	Water	Sulfate in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

TDS-LOW-VA	Water	Low Level TDS (3.0mg/L) by Gravimetric	APHA 2540C

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total dissolved solids (TDS) are determined by filtering a sample through a glass fibre filter, TDS is determined by evaporating the filtrate to dryness at 180 degrees celsius.

TKN-F-VA	Water	TKN in Water by Fluorescence	APHA 4500-NORG D.

This analysis is carried out using procedures adapted from APHA Method 4500-Norg D. "Block Digestion and Flow Injection Analysis". Total Kjeldahl Nitrogen is determined using block digestion followed by Flow-injection analysis with fluorescence detection.

TSS-LOW-VA	Water	Total Suspended Solids by Grav. (1 mg/L)	APHA 2540D

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total suspended solids (TSS) are determined by filtering a sample through a glass fibre filter, TSS is determined by drying the filter at 104 degrees celsius.
Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.

TURBIDITY-VA	Water	Turbidity by Meter	APHA 2130 Turbidity

This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location

Reference Information

VA ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

ALS Environmental

Chain of Custody / Analytical Request Form
Canada Toll Free: 1 800 668 9878
www.alsglobal.com

COC # _____

Page 1 of 1

Report To				**Report Format / Distribution**			
Company:	Azimuth Consulting Group			☑ Standard	☐ Other		
Contact:	Eric Franz			☑ PDF	☑ Excel	☐ Digital	☐ Fax
Address:	218-2902 West Broadway			Email 1:	efranz@azimuthgroup.ca		
	Vancouver, BC V6K2G8			Email 2:	marie-pier.marcil@agnicoeagle.com		
Phone:	604-730-1220	Fax:		Email 3:	robin.allard@agnicoeagle.com		
Invoice To	Same as Report ?	☑ Yes	☐ No	**Client / Project Information**			
Hardcopy of Invoice with Report?		☐ Yes	☑ No	Job #:	Meadowbank CREMP - Surfacewater		
Company:				PO / AFE:			
Contact:				LSD:			
Address:							
Phone:		Fax:		Quote #:	Q39503		
Lab Work Order # (lab use only)				**ALS Contact:**	Brent Mack	**Sampler:**	Jamie K/Robin A

Service Requested (Rush for routine analysis subject to availability)

- ◉ Regular (Standard Turnaround Times - Business Days)
- ○ Priority (2-4 Business Days) - 50% Surcharge - Contact ALS to Confirm TAT
- ○ Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT
- ○ Same Day or Weekend Emergency - Contact ALS to Confirm TAT

Analysis Request

Please indicate below Filtered, Preserved or both (F, P, F/P)

Sample #	Sample Identification (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Conventionals** see notes	TSS-Low, TDS-Low	TOC, Ammonia, TKN, Total P	DOC	T-CN (Low), Free CN (Low)	Total mercury	Dissolved mercury	Total Metals	Dissolved metals	Chlorophyll-a			Number of Containers
							P	F/P	P	P	F/P	P	F/P	F			
	SP-110	13/05/2018		Surface Water	X	X								X			3
	SP-110 Dup-1	13/05/2018		Surface Water	X	X								X			3
	TPS-59	13/05/2018		Surface Water	X	X								X			3
	TPS-60	13/05/2018		Surface Water	X	X								X			3
	TPE-110	16/05/2018	10:15	Surface Water	X	X								X			3
	TPE111	16/05/2018	10:45	Surface Water	X	X								X			3

L2098886-COFC

Special Instructions / Regulations with water or land use (CCME-Freshwater Aquatic Life/BC CSR - Commercial/AB Tier 1 - Natural, etc) / Hazardous Details

**Conventionals includes: Alk Species, pH, EC, Turbidity, Conductivity, Anions (F, NO2, NO3, Br, SO4), low-level Chloride, Silicate, TD-P, and Ortho-PO4.

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.

By the use of this form the user acknowledges and agrees with the Terms and Conditions as provided on a separate Excel tab.

Also provided on another Excel tab are the ALS location addresses, phone numbers and sample container / preservation / holding time table for common analyses.

SHIPMENT RELEASE (client use)			SHIPMENT RECEPTION (lab use only)				SHIPMENT VERIFICATION (lab use only)			
Released by:	Date (dd-mmm-yy)	Time (hh-mm)	Received by:	Date:	Time:	Temperature:	Verified by:	Date:	Time:	Observations:
			JC	May 23	12:10					

AZIMUTH CONSULTING GROUP INC.
ATTN: Eric Franz
218 - 2902 West Broadway
Vancouver BC V6K 2G8

Date Received: 24-MAY-18
Report Date: 05-JUN-18 13:36 (MT)
Version: FINAL

Client Phone: 604-730-1220

Certificate of Analysis

Lab Work Order #: L2099599

Project P.O. #: NOT SUBMITTED
Job Reference: MEADOW CREMP-SURFACEWATER
C of C Numbers:
Legal Site Desc:

Brent Mack, B.Sc.
Account Manager

[This report shall not be reproduced except in full without the written authority of the Laboratory.]

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2099599-1	L2099599-2	L2099599-3	L2099599-4	
	Description	SURFACE WATE	SURFACE WATE	SURFACE WATE	SURFACE WATE	
	Sampled Date	18-MAY-18	18-MAY-18	20-MAY-18	20-MAY-18	
	Sampled Time					
	Client ID	TPN-110	TPN-111	PDL-63	PDL-64	
Grouping	**Analyte**					
FILTER						
Plant Pigments	Chlorophyll a (ug/L)	0.712	0.510	0.225	0.317	

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2099599-1	L2099599-2	L2099599-3	L2099599-4	L2099599-5
Description	SURFACE WATE	SURFACE WATE	SURFACE WATE	SURFACE WATE	SURFACE WATE
Sampled Date	18-MAY-18	18-MAY-18	20-MAY-18	20-MAY-18	21-MAY-18
Sampled Time					
Client ID	TPN-110	TPN-111	PDL-63	PDL-64	TE-94
Grouping / **Analyte**					
WATER					
Physical Tests Conductivity (uS/cm)	36.1	35.6	28.7	28.4	34.0
Hardness (as CaCO3) (mg/L)	11.4	11.9	11.6	11.5	12.6
pH (pH)	7.21	7.19	7.30	7.30	7.27
Total Suspended Solids (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
Total Dissolved Solids (mg/L)	20.6	23.1	16.3	20.1	17.2
Turbidity (NTU)	0.13	0.11	0.11	0.12	0.12
Anions and Nutrients Alkalinity, Bicarbonate (as CaCO3) (mg/L)	8.2	8.3	10.3	10.5	9.9
Alkalinity, Carbonate (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
Alkalinity, Total (as CaCO3) (mg/L)	8.2	8.3	10.3	10.5	9.9
Ammonia, Total (as N) (mg/L)	0.0146	0.0186	0.0128	0.0113	0.0129
Bromide (Br) (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050
Chloride (Cl) (mg/L)	1.01	1.00	0.83	0.81	1.09
Fluoride (F) (mg/L)	0.080	0.080	0.047	0.045	0.088
Nitrate (as N) (mg/L)	0.0348	0.0363	<0.0050	<0.0050	<0.0050
Nitrite (as N) (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Total Kjeldahl Nitrogen (mg/L)	0.116	0.117	0.108	0.110	0.130
Orthophosphate-Dissolved (as P) (mg/L)	<0.0010	0.0014	<0.0010	<0.0010	<0.0010
Phosphorus (P)-Total Dissolved (mg/L)	<0.0020	0.0020	<0.0020	<0.0020	<0.0020
Phosphorus (P)-Total (mg/L)	0.0030	0.0034	0.0068	0.0030	0.0045
Silicate (as SiO2) (mg/L)	<0.50	<0.50	<0.50	<0.50	0.53
Sulfate (SO4) (mg/L)	6.22	6.18	2.24	2.21	4.35
Cyanides Cyanide, Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Cyanide, Free (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Organic / Inorganic Carbon Dissolved Organic Carbon (mg/L)	1.55	1.67	1.99	1.97	2.01
Total Organic Carbon (mg/L)	1.54	4.16	1.90	4.03	1.97
Total Metals Aluminum (Al)-Total (mg/L)	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Antimony (Sb)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic (As)-Total (mg/L)	0.00020	0.00022	0.00020	0.00020	0.00016
Barium (Ba)-Total (mg/L)	0.00366	0.00376	0.00245	0.00255	0.00365
Beryllium (Be)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth (Bi)-Total (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron (B)-Total (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)-Total (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Calcium (Ca)-Total (mg/L)	2.82	2.78	2.87	2.91	2.88
Cesium (Cs)-Total (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2099599-6				
	Description	SURFACE WATE				
	Sampled Date	21-MAY-18				
	Sampled Time					
	Client ID	TE-95				
Grouping	**Analyte**					
WATER						
Physical Tests	Conductivity (uS/cm)	35.1				
	Hardness (as CaCO3) (mg/L)	13.5				
	pH (pH)	7.28				
	Total Suspended Solids (mg/L)	<1.0				
	Total Dissolved Solids (mg/L)	23.8				
	Turbidity (NTU)	0.12				
Anions and Nutrients	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	10.3				
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<1.0				
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0				
	Alkalinity, Total (as CaCO3) (mg/L)	10.3				
	Ammonia, Total (as N) (mg/L)	0.0093				
	Bromide (Br) (mg/L)	<0.050				
	Chloride (Cl) (mg/L)	1.12				
	Fluoride (F) (mg/L)	0.089				
	Nitrate (as N) (mg/L)	0.0058				
	Nitrite (as N) (mg/L)	<0.0010				
	Total Kjeldahl Nitrogen (mg/L)	0.120				
	Orthophosphate-Dissolved (as P) (mg/L)	<0.0010				
	Phosphorus (P)-Total Dissolved (mg/L)	<0.0020				
	Phosphorus (P)-Total (mg/L)	0.0027				
	Silicate (as SiO2) (mg/L)	0.54				
	Sulfate (SO4) (mg/L)	4.50				
Cyanides	Cyanide, Total (mg/L)	<0.0010				
	Cyanide, Free (mg/L)	<0.0010				
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	2.22				
	Total Organic Carbon (mg/L)	2.11				
Total Metals	Aluminum (Al)-Total (mg/L)	<0.0030				
	Antimony (Sb)-Total (mg/L)	<0.00010				
	Arsenic (As)-Total (mg/L)	0.00016				
	Barium (Ba)-Total (mg/L)	0.00365				
	Beryllium (Be)-Total (mg/L)	<0.00010				
	Bismuth (Bi)-Total (mg/L)	<0.000050				
	Boron (B)-Total (mg/L)	<0.010				
	Cadmium (Cd)-Total (mg/L)	<0.0000050				
	Calcium (Ca)-Total (mg/L)	3.00				
	Cesium (Cs)-Total (mg/L)	<0.000010				

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2099599-1	L2099599-2	L2099599-3	L2099599-4	L2099599-5
Description	SURFACE WATE	SURFACE WATE	SURFACE WATE	SURFACE WATE	SURFACE WATE
Sampled Date	18-MAY-18	18-MAY-18	20-MAY-18	20-MAY-18	21-MAY-18
Sampled Time					
Client ID	TPN-110	TPN-111	PDL-63	PDL-64	TE-94
Grouping / **Analyte**					
WATER					
Total Metals Chromium (Cr)-Total (mg/L)	0.00020	<0.00010	<0.00010	<0.00010	<0.00010
Cobalt (Co)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper (Cu)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Iron (Fe)-Total (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
Lead (Pb)-Total (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium (Li)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Magnesium (Mg)-Total (mg/L)	1.11	1.09	1.01	1.00	1.12
Manganese (Mn)-Total (mg/L)	0.00035	0.00031	0.00039	0.00047	0.00044
Mercury (Hg)-Total (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Molybdenum (Mo)-Total (mg/L)	0.000183	0.000180	0.000053	0.000057	0.000088
Nickel (Ni)-Total (mg/L)	<0.00050	<0.00050	0.00052	0.00057	<0.00050
Phosphorus (P)-Total (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050
Potassium (K)-Total (mg/L)	0.610	0.598	0.421	0.407	0.638
Rubidium (Rb)-Total (mg/L)	0.00090	0.00086	0.00057	0.00058	0.00125
Selenium (Se)-Total (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Silicon (Si)-Total (mg/L)	<0.10	<0.10	0.17	0.17	0.23
Silver (Ag)-Total (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)-Total (mg/L)	1.40	1.39	0.650	0.646	1.04
Strontium (Sr)-Total (mg/L)	0.0136	0.0133	0.0122	0.0124	0.0152
Sulfur (S)-Total (mg/L)	1.93	1.63	0.51	0.52	1.23
Tellurium (Te)-Total (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Thallium (Tl)-Total (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Thorium (Th)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Tin (Sn)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)-Total (mg/L)	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030
Tungsten (W)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Uranium (U)-Total (mg/L)	0.000039	0.000040	0.000026	0.000027	0.000049
Vanadium (V)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc (Zn)-Total (mg/L)	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Zirconium (Zr)-Total (mg/L)	<0.000060	<0.000060	<0.000060	<0.000060	<0.000060
Dissolved Metals Dissolved Mercury Filtration Location	FIELD	FIELD	FIELD	FIELD	FIELD
Dissolved Metals Filtration Location	FIELD	FIELD	FIELD	FIELD	FIELD
Aluminum (Al)-Dissolved (mg/L)	<0.0010	0.0012	0.0011	0.0022	<0.0090 DLB
Antimony (Sb)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic (As)-Dissolved (mg/L)	0.00017	0.00019	0.00016	0.00020	0.00012
Barium (Ba)-Dissolved (mg/L)	0.00369	0.00389	0.00251	0.00265	0.00387
Beryllium (Be)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2099599-6				
	Description	SURFACE WATE				
	Sampled Date	21-MAY-18				
	Sampled Time					
	Client ID	TE-95				
Grouping	**Analyte**					
WATER						
Total Metals	Chromium (Cr)-Total (mg/L)	<0.00010				
	Cobalt (Co)-Total (mg/L)	<0.00010				
	Copper (Cu)-Total (mg/L)	<0.00050				
	Iron (Fe)-Total (mg/L)	<0.010				
	Lead (Pb)-Total (mg/L)	<0.000050				
	Lithium (Li)-Total (mg/L)	<0.0010				
	Magnesium (Mg)-Total (mg/L)	1.14				
	Manganese (Mn)-Total (mg/L)	0.00046				
	Mercury (Hg)-Total (mg/L)	<0.0000050				
	Molybdenum (Mo)-Total (mg/L)	0.000095				
	Nickel (Ni)-Total (mg/L)	<0.00050				
	Phosphorus (P)-Total (mg/L)	<0.050				
	Potassium (K)-Total (mg/L)	0.653				
	Rubidium (Rb)-Total (mg/L)	0.00120				
	Selenium (Se)-Total (mg/L)	<0.000050				
	Silicon (Si)-Total (mg/L)	0.23				
	Silver (Ag)-Total (mg/L)	<0.000010				
	Sodium (Na)-Total (mg/L)	1.06				
	Strontium (Sr)-Total (mg/L)	0.0158				
	Sulfur (S)-Total (mg/L)	1.21				
	Tellurium (Te)-Total (mg/L)	<0.00020				
	Thallium (Tl)-Total (mg/L)	<0.000010				
	Thorium (Th)-Total (mg/L)	<0.00010				
	Tin (Sn)-Total (mg/L)	<0.00010				
	Titanium (Ti)-Total (mg/L)	<0.00030				
	Tungsten (W)-Total (mg/L)	<0.00010				
	Uranium (U)-Total (mg/L)	0.000052				
	Vanadium (V)-Total (mg/L)	<0.00050				
	Zinc (Zn)-Total (mg/L)	<0.0030				
	Zirconium (Zr)-Total (mg/L)	<0.000060				
Dissolved Metals	Dissolved Mercury Filtration Location	FIELD				
	Dissolved Metals Filtration Location	FIELD				
	Aluminum (Al)-Dissolved (mg/L)	0.0017				
	Antimony (Sb)-Dissolved (mg/L)	<0.00010				
	Arsenic (As)-Dissolved (mg/L)	0.00011				
	Barium (Ba)-Dissolved (mg/L)	0.00394				
	Beryllium (Be)-Dissolved (mg/L)	<0.00010				

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2099599-1	L2099599-2	L2099599-3	L2099599-4	L2099599-5
Description	SURFACE WATE	SURFACE WATE	SURFACE WATE	SURFACE WATE	SURFACE WATE
Sampled Date	18-MAY-18	18-MAY-18	20-MAY-18	20-MAY-18	21-MAY-18
Sampled Time					
Client ID	TPN-110	TPN-111	PDL-63	PDL-64	TE-94
Grouping / **Analyte**					
WATER					
Dissolved Metals Bismuth (Bi)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron (B)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)-Dissolved (mg/L)	<0.0000050	<0.0000050	0.0000058	<0.0000050	<0.0000050
Calcium (Ca)-Dissolved (mg/L)	2.76	2.87	2.99	2.91	3.11
Cesium (Cs)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Chromium (Cr)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Cobalt (Co)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper (Cu)-Dissolved (mg/L)	0.00041	0.00034	0.00053	0.00067	0.00050
Iron (Fe)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
Lead (Pb)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	0.000055	<0.000050
Lithium (Li)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Magnesium (Mg)-Dissolved (mg/L)	1.09	1.15	1.01	1.02	1.17
Manganese (Mn)-Dissolved (mg/L)	0.00019	<0.00010	0.00023	0.00015	0.00019
Mercury (Hg)-Dissolved (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Molybdenum (Mo)-Dissolved (mg/L)	0.000177	0.000203	0.000074	0.000148	0.000083
Nickel (Ni)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	0.00084	<0.00050
Phosphorus (P)-Dissolved (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050
Potassium (K)-Dissolved (mg/L)	0.630	0.649	0.455	0.450	0.666
Rubidium (Rb)-Dissolved (mg/L)	0.00093	0.00089	0.00057	0.00053	0.00115
Selenium (Se)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Silicon (Si)-Dissolved (mg/L)	<0.050	<0.050	0.142	0.137	0.197
Silver (Ag)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)-Dissolved (mg/L)	1.40	1.46	0.647	0.648	1.03
Strontium (Sr)-Dissolved (mg/L)	0.0130	0.0133	0.0119	0.0118	0.0156
Sulfur (S)-Dissolved (mg/L)	2.05	2.11	0.80	0.69	0.99
Tellurium (Te)-Dissolved (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Thallium (Tl)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Thorium (Th)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Tin (Sn)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)-Dissolved (mg/L)	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030
Tungsten (W)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Uranium (U)-Dissolved (mg/L)	0.000034	0.000034	0.000022	0.000024	0.000046
Vanadium (V)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc (Zn)-Dissolved (mg/L)	<0.0010	<0.0010	0.0013	<0.0010	<0.0010
Zirconium (Zr)-Dissolved (mg/L)	<0.000060	<0.000060	<0.000060	<0.000060	<0.000060

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2099599-6				
	Description	SURFACE WATE				
	Sampled Date	21-MAY-18				
	Sampled Time					
	Client ID	TE-95				
Grouping	**Analyte**					
WATER						
Dissolved Metals	Bismuth (Bi)-Dissolved (mg/L)	<0.000050				
	Boron (B)-Dissolved (mg/L)	<0.010				
	Cadmium (Cd)-Dissolved (mg/L)	<0.0000050				
	Calcium (Ca)-Dissolved (mg/L)	3.32				
	Cesium (Cs)-Dissolved (mg/L)	<0.000010				
	Chromium (Cr)-Dissolved (mg/L)	<0.00010				
	Cobalt (Co)-Dissolved (mg/L)	<0.00010				
	Copper (Cu)-Dissolved (mg/L)	0.00053				
	Iron (Fe)-Dissolved (mg/L)	<0.010				
	Lead (Pb)-Dissolved (mg/L)	<0.000050				
	Lithium (Li)-Dissolved (mg/L)	<0.0010				
	Magnesium (Mg)-Dissolved (mg/L)	1.25				
	Manganese (Mn)-Dissolved (mg/L)	0.00021				
	Mercury (Hg)-Dissolved (mg/L)	<0.0000050				
	Molybdenum (Mo)-Dissolved (mg/L)	0.000084				
	Nickel (Ni)-Dissolved (mg/L)	<0.00050				
	Phosphorus (P)-Dissolved (mg/L)	<0.050				
	Potassium (K)-Dissolved (mg/L)	0.742				
	Rubidium (Rb)-Dissolved (mg/L)	0.00134				
	Selenium (Se)-Dissolved (mg/L)	<0.000050				
	Silicon (Si)-Dissolved (mg/L)	0.208				
	Silver (Ag)-Dissolved (mg/L)	<0.000010				
	Sodium (Na)-Dissolved (mg/L)	1.18				
	Strontium (Sr)-Dissolved (mg/L)	0.0166				
	Sulfur (S)-Dissolved (mg/L)	0.90				
	Tellurium (Te)-Dissolved (mg/L)	<0.00020				
	Thallium (Tl)-Dissolved (mg/L)	<0.000010				
	Thorium (Th)-Dissolved (mg/L)	<0.00010				
	Tin (Sn)-Dissolved (mg/L)	<0.00010				
	Titanium (Ti)-Dissolved (mg/L)	<0.00030				
	Tungsten (W)-Dissolved (mg/L)	<0.00010				
	Uranium (U)-Dissolved (mg/L)	0.000046				
	Vanadium (V)-Dissolved (mg/L)	<0.00050				
	Zinc (Zn)-Dissolved (mg/L)	<0.0010				
	Zirconium (Zr)-Dissolved (mg/L)	<0.000060				

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

Reference Information

Qualifiers for Individual Samples Listed:

Sample Number	Client Sample ID	Qualifier	Description
L2099599-3	PDL-63	WSMT	Water sample(s) for total mercury analysis was not submitted in glass or PTFE container with HCl preservative. Results may be biased low.

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Method Blank	Potassium (K)-Total	B	L2099599-1, -2, -3, -4, -5, -6
Method Blank	Aluminum (Al)-Dissolved	MB-LOR	L2099599-5
Matrix Spike	Dissolved Organic Carbon	MS-B	L2099599-1, -2, -3, -4
Matrix Spike	Total Organic Carbon	MS-B	L2099599-1, -2, -3, -4
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L2099599-1, -2, -3, -4
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L2099599-4, -6
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L2099599-1, -2, -3, -4
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L2099599-4, -6
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L2099599-1, -2, -3, -4
Matrix Spike	Manganese (Mn)-Dissolved	MS-B	L2099599-1, -2, -3, -4
Matrix Spike	Manganese (Mn)-Dissolved	MS-B	L2099599-4, -6
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L2099599-1, -2, -3, -4
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L2099599-4, -6
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L2099599-1, -2, -3, -4
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L2099599-4, -6
Matrix Spike	Magnesium (Mg)-Total	MS-B	L2099599-1, -2, -3, -4, -5, -6

Qualifiers for Individual Parameters Listed:

Qualifier	Description
B	Method Blank exceeds ALS DQO. Associated sample results which are < Limit of Reporting or > 5 times blank level are considered reliable.
DLB	Detection Limit Raised. Analyte detected at comparable level in Method Blank.
MB-LOR	Method Blank exceeds ALS DQO. Limits of Reporting have been adjusted for samples with positive hits below 5x blank level.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ALK-TITR-VA	Water	Alkalinity Species by Titration	APHA 2320 Alkalinity

This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.

BR-L-IC-N-VA	Water	Bromide in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

CARBONS-DOC-VA	Water	Dissolved organic carbon by combustion	APHA 5310B

This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)". Dissolved carbon (DOC) fractions are determined by filtering the sample through a 0.45 micron membrane filter prior to analysis.

CARBONS-TOC-VA	Water	Total organic carbon by combustion	APHA 5310B TOTAL ORGANIC CARBON (TOC)

This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)".

CHLOROA-F-VA	Filter	Chlorophyll a by Fluorometer (Filter)	EPA 445.0

This analysis is done using procedures modified from EPA Method 445.0. Chlorophyll-a is determined by a routine acetone extraction followed with analysis by fluorometry using the non-acidification procedure. This method is not subject to interferences from chlorophyll b.

CL-L-IC-N-VA	Water	Chloride in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

CN-FREE-L-CFA-VA	Water	Low Level Free Cyanide in water by CFA	ASTM 7237

This analysis is carried out using procedures adapted from ASTM Method 7237 "Free Cyanide with Flow Injection Analysis (FIA) Utilizing Gas Diffusion Separation and Amperometric Detection". Free cyanide is determined by in-line gas diffusion at pH 6 with final determination by colourimetric analysis.

CN-T-L-CFA-VA	Water	Low Level Total Cyanide in water by CFA	ISO 14403:2002

Reference Information

This analysis is carried out using procedures adapted from ISO Method 14403:2002 "Determination of Total Cyanide using Flow Analysis (FIA and CFA)". Total or strong acid dissociable (SAD) cyanide is determined by in-line UV digestion along with sample distillation and final determination by colourimetric analysis. Method Limitation: This method is susceptible to interference from thiocyanate (SCN). If SCN is present in the sample, there could be a positive interference with this method, but it would be less than 1% and could be as low as zero.

EC-PCT-VA Water Conductivity (Automated) APHA 2510 Auto. Conduc.

This analysis is carried out using procedures adapted from APHA Method 2510 "Conductivity". Conductivity is determined using a conductivity electrode.

EC-SCREEN-VA Water Conductivity Screen (Internal Use Only) APHA 2510

Qualitative analysis of conductivity where required during preparation of other tests - e.g. TDS, metals, etc.

F-IC-N-VA Water Fluoride in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

HARDNESS-CALC-VA Water Hardness APHA 2340B

Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

HG-D-CVAA-VA Water Diss. Mercury in Water by CVAAS or CVAFS APHA 3030B/EPA 1631E (mod)

Water samples are filtered (0.45 um), preserved with hydrochloric acid, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

HG-T-CVAA-VA Water Total Mercury in Water by CVAAS or CVAFS EPA 1631E (mod)

Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

MET-D-CCMS-VA Water Dissolved Metals in Water by CRC ICPMS APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

MET-T-CCMS-VA Water Total Metals in Water by CRC ICPMS EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

NH3-F-VA Water Ammonia in Water by Fluorescence J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

NO2-L-IC-N-VA Water Nitrite in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

NO3-L-IC-N-VA Water Nitrate in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

P-T-PRES-COL-VA Water Total P in Water by Colour APHA 4500-P Phosphorus

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is determined colourimetrically after persulphate digestion of the sample.
Samples with very high dissolved solids (i.e. seawaters, brackish waters) may produce a negative bias by this method. Alternate methods are available for these types of samples.

Arsenic (5+), at elevated levels, is a positive interference on colourimetric phosphate analysis.

P-TD-COL-VA Water Total Dissolved P in Water by Colour APHA 4500-P Phosphorous

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Dissolved Phosphorus is determined colourimetrically after persulphate digestion of a sample that has been lab or field filtered through a 0.45 micron membrane filter.
Samples with very high dissolved solids (i.e. seawaters, brackish waters) may produce a negative bias by this method. Alternate methods are available for these types of samples.

Arsenic (5+), at elevated levels, is a positive interference on colourimetric phosphate analysis.

PH-PCT-VA Water pH by Meter (Automated) APHA 4500-H pH Value

This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode

Reference Information

It is recommended that this analysis be conducted in the field.

PO4-DO-COL-VA Water Diss. Orthophosphate in Water by Colour APHA 4500-P Phosphorus

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.
Samples with very high dissolved solids (i.e. seawaters, brackish waters) may produce a negative bias by this method. Alternate methods are available for these types of samples.

Arsenic (5+), at elevated levels, is a positive interference on colourimetric phosphate analysis.

SILICATE-COL-VA Water Silicate by Colourimetric analysis APHA 4500-SiO2 E.

This analysis is carried out using procedures adapted from APHA Method 4500-SiO2 E. "Silica". Silicate (molybdate-reactive silica) is determined by the molybdosilicate-heteropoly blue colourimetric method.

SO4-IC-N-VA Water Sulfate in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

TDS-LOW-VA Water Low Level TDS (3.0mg/L) by Gravimetric APHA 2540C

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total dissolved solids (TDS) are determined by filtering a sample through a glass fibre filter, TDS is determined by evaporating the filtrate to dryness at 180 degrees celsius.

TKN-F-VA Water TKN in Water by Fluorescence APHA 4500-NORG D.

This analysis is carried out using procedures adapted from APHA Method 4500-Norg D. "Block Digestion and Flow Injection Analysis". Total Kjeldahl Nitrogen is determined using block digestion followed by Flow-injection analysis with fluorescence detection.

TSS-LOW-VA Water Total Suspended Solids by Grav. (1 mg/L) APHA 2540D

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total suspended solids (TSS) are determined by filtering a sample through a glass fibre filter, TSS is determined by drying the filter at 104 degrees celsius.
Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.

TURBIDITY-VA Water Turbidity by Meter APHA 2130 Turbidity

This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

ALS Environmental

Chain of Custody / Analytical Request Form

Canada Toll Free: 1 800 668 9878

www.alsglobal.com

COC # _____

Page 1 of 1

Report To		**Report Format / Distribution**				**Service Requested** (Rush for routine analysis subject to availability)
Company:	Azimuth Consulting Group	☑ Standard	☐ Other			◉ Regular (Standard Turnaround Times - Business Days)
Contact:	Eric Franz	☑ PDF	☑ Excel	☐ Digital	☐ Fax	○ Priority (2-4 Business Days) - 50% Surcharge - Contact ALS to Confirm TAT
Address:	218-2902 West Broadway	Email 1:	efranz@azimuthgroup.ca			○ Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT
	Vancouver, BC V6K2G8	Email 2:	marie-pier.marcil@agnicoeagle.com			○ Same Day or Weekend Emergency - Contact ALS to Confirm TAT
Phone:	604-730-1220 Fax:	Email 3:	robin.allard@agnicoeagle.com			
Invoice To	Same as Report ? ☑ Yes ☐ No	**Client / Project Information**				**Analysis Request**
Hardcopy of Invoice with Report?	☐ Yes ☑ No	Job #:	Meadowbank CREMP - Surfacewater			Please indicate below Filtered, Preserved or both (F, P, F/P)
Company:		PO / AFE:				
Contact:		LSD:				
Address:						
Phone:	Fax:	Quote #:	Q39503			
Lab Work Order # (lab use only)		**ALS Contact:**	Brent Mack	**Sampler:**	Jamie K/Laurance A	

Sample #	Sample Identification (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Conventionals** see notes	TSS-Low, TDS-Low	TOC, Ammonia, TKN, Total P	DOC	T-CN (Low), Free CN (Low)	Total mercury	Dissolved mercury	Total Metals	Dissolved metals	Chlorophyll-a			Number of Containers
							P	F/P	P	P	F/P	P	F/P	F			
	TPN-110	18-May-18		Surface Water	X	X	X	X	X	X	X	X	X	X			10
	TPN-111	18-May-18		Surface Water	X	X	X	X	X	X	X	X	X	X			10
	PDL-63	20-May-18		Surface Water	X	X	X	X	X	X	X	X	X	X			10
	PDL-64	20-May-18		Surface Water	X	X	X	X	X	X	X	X	X	X			10
	TE-94	21-May-18		Surface Water	X	X	X	X	X	X	X	X	X	X			10
	TE-95	21-May-18		Surface Water	X	X	X	X	X	X	X	X	X	X			10



Special Instructions / Regulations with water or land use (CCME-Freshwater Aquatic Life/BC CSR - Commercial/AB Tier 1 - Natural, etc) / Hazardous Details

**Conventionals includes: Alk Species, pH, EC, Turbidity, Conductivity, Anions (F, NO2, NO3, Br, SO4), low-level Chloride, Silicate, TD-P, and Ortho-PO4.

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.

By the use of this form the user acknowledges and agrees with the Terms and Conditions as provided on a separate Excel tab.

Also provided on another Excel tab are the ALS location addresses, phone numbers and sample container / preservation / holding time table for common analyses.

SHIPMENT RELEASE (client use)			SHIPMENT RECEPTION (lab use only)				SHIPMENT VERIFICATION (lab use only)			
Released by:	Date (dd-mmm-yy)	Time (hh-mm)	Received by: JC	Date: 5/24/18	Time: 845 hm	Temperature: 18	Verified by:	Date: A	Time:	Observations:

AZIMUTH CONSULTING GROUP INC.
ATTN: Eric Franz
218 - 2902 West Broadway
Vancouver BC V6K 2G8

Date Received: 31-MAY-18
Report Date: 15-JUN-18 11:09 (MT)
Version: FINAL

Client Phone: 604-730-1220

Certificate of Analysis

Lab Work Order #: L2103642

Project P.O. #: NOT SUBMITTED
Job Reference: MEADOWBANK CREMP - SURFACEWATER
C of C Numbers:
Legal Site Desc:

Brent Mack, B.Sc.
Account Manager

[This report shall not be reproduced except in full without the written authority of the Laboratory.]

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2103642-1	L2103642-2	L2103642-3	L2103642-4	L2103642-5
Description	SURFACE WATE	SURFACE WATE	SURFACE WATE	SURFACE WATE	SURFACE WATE
Sampled Date	27-MAY-18	27-MAY-18	27-MAY-18	27-MAY-18	27-MAY-18
Sampled Time	13:30	14:30		09:30	10:30
Client ID	INUG-98	INUG-99	DUP-MAY-2	TEFF-47	TEFF-48
Grouping **Analyte**					
FILTER					
Plant Pigments Chlorophyll a (ug/L)	0.651	0.400	0.513	0.442	0.480

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	L2103642-1 SURFACE WATE 27-MAY-18 13:30 INUG-98	L2103642-2 SURFACE WATE 27-MAY-18 14:30 INUG-99	L2103642-3 SURFACE WATE 27-MAY-18 DUP-MAY-2	L2103642-4 SURFACE WATE 27-MAY-18 09:30 TEFF-47	L2103642-5 SURFACE WATE 27-MAY-18 10:30 TEFF-48
WATER						
Physical Tests	Conductivity (uS/cm)	20.0	20.1	20.1	24.6	24.4
	Hardness (as CaCO3) (mg/L)	7.29	7.26	7.34	8.98	8.40
	pH (pH)	7.09	7.12	7.11	7.12	7.14
	Total Suspended Solids (mg/L)	<1.0	<1.0	<1.0	<1.0	1.0
	Total Dissolved Solids (mg/L)	11.0	9.3	11.1	13.0	14.9
	Turbidity (NTU)	0.16	0.13	0.15	0.13	0.13
Anions and Nutrients	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	7.0	6.9	6.9	6.9	6.9
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
	Alkalinity, Total (as CaCO3) (mg/L)	7.0	6.9	6.9	6.9	6.9
	Ammonia, Total (as N) (mg/L)	0.0196	0.0192	0.0166	0.0084	0.0087
	Bromide (Br) (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050
	Chloride (Cl) (mg/L)	0.97	0.97	0.97	0.87	0.90
	Fluoride (F) (mg/L)	0.074	0.076	0.075	0.075	0.076
	Nitrate (as N) (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
	Nitrite (as N) (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Total Kjeldahl Nitrogen (mg/L)	0.134	0.120	0.124	0.086	0.080
	Orthophosphate-Dissolved (as P) (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Phosphorus (P)-Total Dissolved (mg/L)	<0.0020	<0.0020	0.0025	0.0023	0.0020
	Phosphorus (P)-Total (mg/L)	0.0043	0.0043	0.0031	0.0021	0.0021
	Silicate (as SiO2) (mg/L)	<0.50	<0.50	<0.50	<0.50	<0.50
	Sulfate (SO4) (mg/L)	1.19	1.18	1.19	3.20	3.22
Cyanides	Cyanide, Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Cyanide, Free (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	2.22	2.16	2.18	1.60	1.77
	Total Organic Carbon (mg/L)	2.15	2.36	2.16	1.79	1.91
Total Metals	Aluminum (Al)-Total (mg/L)	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
	Antimony (Sb)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Arsenic (As)-Total (mg/L)	0.00015	<0.00010	0.00012	0.00012	0.00026
	Barium (Ba)-Total (mg/L)	0.00363	0.00205	0.00216	0.00318	0.00326
	Beryllium (Be)-Total (mg/L)	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
	Bismuth (Bi)-Total (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Boron (B)-Total (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
	Cadmium (Cd)-Total (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000099
	Calcium (Ca)-Total (mg/L)	1.38	1.35	1.36	1.92	1.86
	Chromium (Cr)-Total (mg/L)	<0.00010	<0.00010	0.00015	<0.00010	0.00010

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2103642-1	L2103642-2	L2103642-3	L2103642-4	L2103642-5
	Description	SURFACE WATE	SURFACE WATE	SURFACE WATE	SURFACE WATE	SURFACE WATE
	Sampled Date	27-MAY-18	27-MAY-18	27-MAY-18	27-MAY-18	27-MAY-18
	Sampled Time	13:30	14:30		09:30	10:30
	Client ID	INUG-98	INUG-99	DUP-MAY-2	TEFF-47	TEFF-48
Grouping	**Analyte**					
WATER						
Total Metals	Cobalt (Co)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Copper (Cu)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Iron (Fe)-Total (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
	Lead (Pb)-Total (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	0.000067
	Lithium (Li)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Magnesium (Mg)-Total (mg/L)	0.88	0.84	0.90	0.84	0.85
	Manganese (Mn)-Total (mg/L)	0.00064	0.00061	0.00060	0.00045	0.00044
	Mercury (Hg)-Total (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
	Molybdenum (Mo)-Total (mg/L)	<0.000050	<0.000050	<0.000050	0.000053	0.000068
	Nickel (Ni)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Phosphorus (P)-Total (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050
	Potassium (K)-Total (mg/L)	0.43	0.41	0.43	0.52	0.53
	Selenium (Se)-Total (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	0.000124
	Silicon (Si)-Total (mg/L)	0.17	0.15	0.15	0.17	0.17
	Silver (Ag)-Total (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	0.000013
	Sodium (Na)-Total (mg/L)	0.699	0.657	0.691	0.825	0.846
	Strontium (Sr)-Total (mg/L)	0.00789	0.00755	0.00801	0.0108	0.0110
	Sulfur (S)-Total (mg/L)	<0.50	<0.50	<0.50	<0.50	<0.50
	Thallium (Tl)-Total (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	0.000138
	Tin (Sn)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Titanium (Ti)-Total (mg/L)	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030
	Uranium (U)-Total (mg/L)	0.000045	0.000040	0.000043	0.000041	0.000042
	Vanadium (V)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Zinc (Zn)-Total (mg/L)	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
	Zirconium (Zr)-Total (mg/L)	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030
Dissolved Metals	Dissolved Mercury Filtration Location	FIELD	FIELD	FIELD	FIELD	FIELD
	Dissolved Metals Filtration Location	FIELD	FIELD	FIELD	FIELD	FIELD
	Aluminum (Al)-Dissolved (mg/L)	0.0014	0.0016	0.0019	0.0022	0.0013
	Antimony (Sb)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Arsenic (As)-Dissolved (mg/L)	0.00010	0.00011	0.00012	0.00014	0.00012
	Barium (Ba)-Dissolved (mg/L)	0.00226	0.00224	0.00219	0.00351	0.00325
	Beryllium (Be)-Dissolved (mg/L)	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
	Bismuth (Bi)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Boron (B)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
	Cadmium (Cd)-Dissolved (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
	Calcium (Ca)-Dissolved (mg/L)	1.42	1.43	1.47	2.10	1.99
	Chromium (Cr)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2103642-1	L2103642-2	L2103642-3	L2103642-4	L2103642-5
	Description	SURFACE WATE	SURFACE WATE	SURFACE WATE	SURFACE WATE	SURFACE WATE
	Sampled Date	27-MAY-18	27-MAY-18	27-MAY-18	27-MAY-18	27-MAY-18
	Sampled Time	13:30	14:30		09:30	10:30
	Client ID	INUG-98	INUG-99	DUP-MAY-2	TEFF-47	TEFF-48
Grouping	**Analyte**					
WATER						
Dissolved Metals	Cobalt (Co)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Copper (Cu)-Dissolved (mg/L)	0.00032	0.00035	0.00035	0.00036	0.00031
	Iron (Fe)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
	Lead (Pb)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Lithium (Li)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Magnesium (Mg)-Dissolved (mg/L)	0.91	0.90	0.89	0.91	0.84
	Manganese (Mn)-Dissolved (mg/L)	0.00013	0.00015	0.00015	0.00027	0.00019
	Mercury (Hg)-Dissolved (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
	Molybdenum (Mo)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Nickel (Ni)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Phosphorus (P)-Dissolved (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050
	Potassium (K)-Dissolved (mg/L)	0.49	0.49	0.49	0.60	0.56
	Selenium (Se)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Silicon (Si)-Dissolved (mg/L)	0.125	0.114	0.134	0.151	0.130
	Silver (Ag)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Sodium (Na)-Dissolved (mg/L)	0.733	0.720	0.709	0.919	0.867
	Strontium (Sr)-Dissolved (mg/L)	0.00813	0.00821	0.00829	0.0116	0.0110
	Sulfur (S)-Dissolved (mg/L)	0.51	<0.50	<0.50	1.13	0.97
	Thallium (Tl)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Tin (Sn)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Titanium (Ti)-Dissolved (mg/L)	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030
	Uranium (U)-Dissolved (mg/L)	0.000040	0.000042	0.000040	0.000037	0.000037
	Vanadium (V)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Zinc (Zn)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Zirconium (Zr)-Dissolved (mg/L)	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030
Speciated Metals	Arsenate (As V) (ug/L)	<0.020	<0.020	<0.020		
	Arsenite (As III) (ug/L)	<0.020	<0.020	<0.020		
	Dimethylarsinic Acid (DMA, as As) (ug/L)	<0.020	<0.020	<0.020		
	Monomethylarsonic Acid (MMA, as As) (ug/L)	<0.020	<0.020	<0.020		
	Arsenobetaine (AsB, as As) (ug/L)	<0.050	<0.050	<0.050		

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Method Blank	Aluminum (Al)-Total	B	L2103642-1, -2, -3, -4, -5
Method Blank	Sulfur (S)-Total	B	L2103642-1, -2, -3, -4, -5
Matrix Spike	Dissolved Organic Carbon	MS-B	L2103642-2, -3, -4, -5
Matrix Spike	Dissolved Organic Carbon	MS-B	L2103642-1
Matrix Spike	Total Organic Carbon	MS-B	L2103642-1, -2, -3, -4, -5
Matrix Spike	Barium (Ba)-Total	MS-B	L2103642-1, -2, -3, -4, -5
Matrix Spike	Calcium (Ca)-Total	MS-B	L2103642-1, -2, -3, -4, -5
Matrix Spike	Magnesium (Mg)-Total	MS-B	L2103642-1, -2, -3, -4, -5
Matrix Spike	Strontium (Sr)-Total	MS-B	L2103642-1, -2, -3, -4, -5
Matrix Spike	Phosphorus (P)-Total	MS-B	L2103642-1, -2, -3, -4, -5

Qualifiers for Individual Parameters Listed:

Qualifier	Description
B	Method Blank exceeds ALS DQO. Associated sample results which are < Limit of Reporting or > 5 times blank level are considered reliable.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ALK-TITR-VA	Water	Alkalinity Species by Titration	APHA 2320 Alkalinity

This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.

AS-SPEC-HPLC/CCMS-VA	Water	Arsenic Species in Water by HPLC/CCMS	USGS WRIR 02-4144

Speciated Arsenic (As) Analysis is by reverse phase HPLC-ICPMS. Sample handling, preservation and holding times outlined in USGS Report 02-4144 and AWWA Preservation of Arsenic Species, 2006. Instrumental analysis based on Afton et al, Journal of Chromatography A, 1208 (2008) 156-163 and Agilent Technologies application notes. Filtration is conducted prior to preservation. Results for unfiltered, preserved samples may be elevated due to extraction of arsenic species from particulate matter in the samples.
Elevated iron (~100+ ppm) concentrations or sulfidic water can introduce biases to the reported results for some arsenic species.

BE-D-L-CCMS-VA	Water	Diss. Be (low) in Water by CRC ICPMS	APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

BE-T-L-CCMS-VA	Water	Total Be (Low) in Water by CRC ICPMS	EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

BR-L-IC-N-VA	Water	Bromide in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

CARBONS-DOC-VA	Water	Dissolved organic carbon by combustion	APHA 5310B

This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)". Dissolved carbon (DOC) fractions are determined by filtering the sample through a 0.45 micron membrane filter prior to analysis.

CARBONS-TOC-VA	Water	Total organic carbon by combustion	APHA 5310B TOTAL ORGANIC CARBON (TOC)

This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)".

CHLOROA-F-VA	Filter	Chlorophyll a by Fluorometer (Filter)	EPA 445.0

This analysis is done using procedures modified from EPA Method 445.0. Chlorophyll-a is determined by a routine acetone extraction followed with analysis by fluorometry using the non-acidification procedure. This method is not subject to interferences from chlorophyll b.

CL-L-IC-N-VA	Water	Chloride in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

CN-FREE-L-CFA-VA	Water	Low Level Free Cyanide in water by CFA	ASTM 7237

This analysis is carried out using procedures adapted from ASTM Method 7237 "Free Cyanide with Flow Injection Analysis (FIA) Utilizing Gas Diffusion Separation and Amperometric Detection". Free cyanide is determined by in-line gas diffusion at pH 6 with final determination by colourimetric analysis.

CN-T-L-CFA-VA	Water	Low Level Total Cyanide in water by CFA	ISO 14403:2002

This analysis is carried out using procedures adapted from ISO Method 14403:2002 "Determination of Total Cyanide using Flow Analysis (FIA and CFA)". Total or strong acid dissociable (SAD) cyanide is determined by in-line UV digestion along with sample distillation and final determination by colourimetric analysis. Method Limitation: This method is susceptible to interference from thiocyanate (SCN). If SCN is present in the sample, there

Reference Information

could be a positive interference with this method, but it would be less than 1% and could be as low as zero.

EC-PCT-VA Water Conductivity (Automated) APHA 2510 Auto. Conduc.

This analysis is carried out using procedures adapted from APHA Method 2510 "Conductivity". Conductivity is determined using a conductivity electrode.

EC-SCREEN-VA Water Conductivity Screen (Internal Use Only) APHA 2510

Qualitative analysis of conductivity where required during preparation of other tests - e.g. TDS, metals, etc.

F-IC-N-VA Water Fluoride in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

HARDNESS-CALC-VA Water Hardness APHA 2340B

Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

HG-D-CVAA-VA Water Diss. Mercury in Water by CVAAS or CVAFS APHA 3030B/EPA 1631E (mod)

Water samples are filtered (0.45 um), preserved with hydrochloric acid, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

HG-T-CVAA-VA Water Total Mercury in Water by CVAAS or CVAFS EPA 1631E (mod)

Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

MET-D-CCMS-VA Water Dissolved Metals in Water by CRC ICPMS APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

MET-T-CCMS-VA Water Total Metals in Water by CRC ICPMS EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

NH3-F-VA Water Ammonia in Water by Fluorescence J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

NO2-L-IC-N-VA Water Nitrite in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

NO3-L-IC-N-VA Water Nitrate in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

P-T-PRES-COL-VA Water Total P in Water by Colour APHA 4500-P Phosphorus

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is determined colourimetrically after persulphate digestion of the sample.
Samples with very high dissolved solids (i.e. seawaters, brackish waters) may produce a negative bias by this method. Alternate methods are available for these types of samples.

Arsenic (5+), at elevated levels, is a positive interference on colourimetric phosphate analysis.

P-TD-COL-VA Water Total Dissolved P in Water by Colour APHA 4500-P Phosphorous

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Dissolved Phosphorus is determined colourimetrically after persulphate digestion of a sample that has been lab or field filtered through a 0.45 micron membrane filter.
Samples with very high dissolved solids (i.e. seawaters, brackish waters) may produce a negative bias by this method. Alternate methods are available for these types of samples.

Arsenic (5+), at elevated levels, is a positive interference on colourimetric phosphate analysis.

PH-PCT-VA Water pH by Meter (Automated) APHA 4500-H pH Value

This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode

It is recommended that this analysis be conducted in the field.

PO4-DO-COL-VA Water Diss. Orthophosphate in Water by Colour APHA 4500-P Phosphorus

Reference Information

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.
Samples with very high dissolved solids (i.e. seawaters, brackish waters) may produce a negative bias by this method. Alternate methods are available for these types of samples.

Arsenic (5+), at elevated levels, is a positive interference on colourimetric phosphate analysis.

SILICATE-COL-VA	Water	Silicate by Colourimetric analysis	APHA 4500-SiO2 E.

This analysis is carried out using procedures adapted from APHA Method 4500-SiO2 E. "Silica". Silicate (molybdate-reactive silica) is determined by the molybdosilicate-heteropoly blue colourimetric method.

SO4-IC-N-VA	Water	Sulfate in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

TDS-LOW-VA	Water	Low Level TDS (3.0mg/L) by Gravimetric	APHA 2540C

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total dissolved solids (TDS) are determined by filtering a sample through a glass fibre filter, TDS is determined by evaporating the filtrate to dryness at 180 degrees celsius.

TKN-F-VA	Water	TKN in Water by Fluorescence	APHA 4500-NORG D.

This analysis is carried out using procedures adapted from APHA Method 4500-Norg D. "Block Digestion and Flow Injection Analysis". Total Kjeldahl Nitrogen is determined using block digestion followed by Flow-injection analysis with fluorescence detection.

TSS-LOW-VA	Water	Total Suspended Solids by Grav. (1 mg/L)	APHA 2540D

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total suspended solids (TSS) are determined by filtering a sample through a glass fibre filter, TSS is determined by drying the filter at 104 degrees celsius.
Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.

TURBIDITY-VA	Water	Turbidity by Meter	APHA 2130 Turbidity

This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

L2103642-COFC

COC # _____

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ALS Environmental

Report To				Report Format / Distribution				Service Requested (Rush for routine analysis subject to availability)
Company:	Azimuth Consulting Group			☑ Standard	☐ Other			◉ Regular (Standard Turnaround Times - Business Days)
Contact:	Eric Franz			☑ PDF	☑ Excel	☐ Digital	☐ Fax	○ Priority (2-4 Business Days) - 50% Surcharge - Contact ALS to Confirm TAT
Address:	218-2902 West Broadway			Email 1:	efranz@azimuthgroup.ca			○ Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT
	Vancouver, BC V6K2G8			Email 2:	marie-pier.marcil@agnicoeagle.com			○ Same Day or Weekend Emergency - Contact ALS to Confirm TAT
Phone:	604-730-1220	Fax:		Email 3:	robin.allard@agnicoeagle.com			
Invoice To	Same as Report ?	☑ Yes	☐ No	**Client / Project Information**				**Analysis Request**
Hardcopy of Invoice with Report?		☐ Yes	☑ No	Job #:	Meadowbank CREMP - Surfacewater			Please indicate below Filtered, Preserved or both (F, P, F/P)
Company:				PO / AFE:				
Contact:				LSD:				
Address:								
Phone:		Fax:		Quote #:	Q39503			

Lab Work Order # (lab use only)		**ALS Contact:**	Brent Mack	**Sampler:**	Jamie K/Laurance A

Sample #	Sample Identification (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Conventionals** see notes	TSS-Low, TDS-Low	TOC, Ammonia, TKN, Total P	DOC	T-CN (Low), Free CN (Low)	Total mercury	Dissolved mercury	Total Metals	Dissolved metals	Chlorophyll-a	Arsenic speciation		Number of Containers
							P	F/P	P	P	F/P	P	F/P	F			
	INUG-98	27-May-18	13:30	Surface Water	X	X	X	X	X	X	X	X	X	X	X		11
	INUG-99	27-May-18	14:30	Surface Water	X	X	X	X	X	X	X	X	X	X	X		11
	DUP-MAY-2	27-May-18		Surface Water	X	X	X	X	X	X	X	X	X	X	X		11
	TEFF-47	27-May-18	9:30	Surface Water	X	X	X	X	X	X	X	X	X	X			10
	TEFF-48	27-May-18	10:30	Surface Water	X	X	X	X	X	X	X	X	X	X			10

Special Instructions / Regulations with water or land use (CCME-Freshwater Aquatic Life/BC CSR - Commercial/AB Tier 1 - Natural, etc) / Hazardous Details

**Conventionals includes: Alk Species, pH, EC, Turbidity, Conductivity, Anions (F, NO2, NO3, Br, SO4), low-level Chloride, Silicate, TD-P, and Ortho-PO4.

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.

By the use of this form the user acknowledges and agrees with the Terms and Conditions as provided on a separate Excel tab.

Also provided on another Excel tab are the ALS location addresses, phone numbers and sample container / preservation / holding time table for common analyses.

SHIPMENT RELEASE (client use)			SHIPMENT RECEPTION (lab use only)				SHIPMENT VERIFICATION (lab use only)			
Released by:	Date (dd-mmm-yy)	Time (hh-mm)	Received by:	Date:	Time:	Temperature:	Verified by:	Date:	Time:	Observations: Yes / No ? If Yes add SIF
Fanny Laporte	28-May-18	9:00	JC	5/31/18	850AM	1.8 °C				

GENF 20.00 Front

AZIMUTH CONSULTING GROUP INC.
ATTN: Eric Franz
218 - 2902 West Broadway
Vancouver BC V6K 2G8

Date Received: 13-JUL-18
Report Date: 25-JUL-18 16:00 (MT)
Version: FINAL

Client Phone: 604-730-1220

Certificate of Analysis

Lab Work Order #: L2129199

Project P.O. #: NOT SUBMITTED
Job Reference: MEADOWBANK CREMP - SURFACEWATER
C of C Numbers:
Legal Site Desc:

Brent Mack, B.Sc.
Account Manager

[This report shall not be reproduced except in full without the written authority of the Laboratory.]

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2129199-1	L2129199-2	L2129199-3	L2129199-4	L2129199-5
	Description	Water	Water	Water	Water	Water
	Sampled Date	07-JUL-18	07-JUL-18	09-JUL-18	09-JUL-18	09-JUL-18
	Sampled Time	11:30	11:45	11:15	11:50	14:00
	Client ID	JULY CREMP DI-1	JULY CREMP EB-1	WAL-82	WAL-81	SP-113
Grouping	**Analyte**					
WATER						
Physical Tests	Conductivity (uS/cm)	<2.0	<2.0	36.4	41.5	40.0
	Hardness (as CaCO3) (mg/L)	<0.50	<0.50	15.5	17.6	15.8
	pH (pH)	5.47	5.91	7.34	7.43	7.37
	Total Suspended Solids (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
	Total Dissolved Solids (mg/L)	<3.0	<3.0	17.1	18.0	16.0
	Turbidity (NTU)	<0.10	<0.10	0.35	0.36	0.45
Anions and Nutrients	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	<1.0	<1.0	12.0	13.8	11.7
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
	Alkalinity, Total (as CaCO3) (mg/L)	<1.0	<1.0	12.0	13.8	11.7
	Ammonia, Total (as N) (mg/L)	0.0109	<0.0050	<0.0050	<0.0050	<0.0050
	Bromide (Br) (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050
	Chloride (Cl) (mg/L)	<0.10	<0.10	0.76	0.71	0.96
	Fluoride (F) (mg/L)	<0.020	<0.020	0.048	0.040	0.071
	Nitrate (as N) (mg/L)	<0.0050	<0.0050	0.0080	0.0065	0.0092
	Nitrite (as N) (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Total Kjeldahl Nitrogen (mg/L)	<0.050	<0.050	0.143	0.131	0.108
	Orthophosphate-Dissolved (as P) (mg/L)	<0.0010	<0.0010	0.0015	0.0014	0.0013
	Phosphorus (P)-Total Dissolved (mg/L)	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
	Phosphorus (P)-Total (mg/L)	<0.0020	<0.0020	0.0052	0.0040	0.0026
	Silicate (as SiO2) (mg/L)	<0.50	<0.50	0.59	0.70	0.50
	Sulfate (SO4) (mg/L)	<0.30	<0.30	4.25	4.64	5.50
Cyanides	Cyanide, Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Cyanide, Free (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	<0.50	<0.50	2.08	2.23	1.99
	Total Organic Carbon (mg/L)	<0.50	<0.50	2.12	2.42	1.91
Total Metals	Aluminum (Al)-Total (mg/L)	<0.0030	<0.0030	0.0073	0.0079	0.0147
	Antimony (Sb)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Arsenic (As)-Total (mg/L)	<0.00010	<0.00010	0.00026	0.00034	0.00029
	Barium (Ba)-Total (mg/L)	<0.00010	<0.00010	0.00255	0.00259	0.00324
	Beryllium (Be)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Bismuth (Bi)-Total (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Boron (B)-Total (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
	Cadmium (Cd)-Total (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
	Calcium (Ca)-Total (mg/L)	<0.050	<0.050	4.19	5.01	4.31
	Cesium (Cs)-Total (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2129199-6				
	Description	Water				
	Sampled Date	09-JUL-18				
	Sampled Time	14:35				
	Client ID	SP-112				
Grouping	**Analyte**					
WATER						
Physical Tests	Conductivity (uS/cm)	40.2				
	Hardness (as CaCO3) (mg/L)	16.0				
	pH (pH)	7.37				
	Total Suspended Solids (mg/L)	<1.0				
	Total Dissolved Solids (mg/L)	15.0				
	Turbidity (NTU)	0.44				
Anions and Nutrients	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	11.8				
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<1.0				
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0				
	Alkalinity, Total (as CaCO3) (mg/L)	11.8				
	Ammonia, Total (as N) (mg/L)	<0.0050				
	Bromide (Br) (mg/L)	<0.050				
	Chloride (Cl) (mg/L)	0.95				
	Fluoride (F) (mg/L)	0.071				
	Nitrate (as N) (mg/L)	0.0098				
	Nitrite (as N) (mg/L)	<0.0010				
	Total Kjeldahl Nitrogen (mg/L)	0.117				
	Orthophosphate-Dissolved (as P) (mg/L)	0.0013				
	Phosphorus (P)-Total Dissolved (mg/L)	0.0020				
	Phosphorus (P)-Total (mg/L)	0.0036				
	Silicate (as SiO2) (mg/L)	<0.50				
	Sulfate (SO4) (mg/L)	5.48				
Cyanides	Cyanide, Total (mg/L)	<0.0010				
	Cyanide, Free (mg/L)	<0.0010				
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	1.87				
	Total Organic Carbon (mg/L)	1.97				
Total Metals	Aluminum (Al)-Total (mg/L)	0.0126				
	Antimony (Sb)-Total (mg/L)	<0.00010				
	Arsenic (As)-Total (mg/L)	0.00027				
	Barium (Ba)-Total (mg/L)	0.00299				
	Beryllium (Be)-Total (mg/L)	<0.00010				
	Bismuth (Bi)-Total (mg/L)	<0.000050				
	Boron (B)-Total (mg/L)	<0.010				
	Cadmium (Cd)-Total (mg/L)	<0.0000050				
	Calcium (Ca)-Total (mg/L)	4.28				
	Cesium (Cs)-Total (mg/L)	<0.000010				

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2129199-1	L2129199-2	L2129199-3	L2129199-4	L2129199-5
	Description	Water	Water	Water	Water	Water
	Sampled Date	07-JUL-18	07-JUL-18	09-JUL-18	09-JUL-18	09-JUL-18
	Sampled Time	11:30	11:45	11:15	11:50	14:00
	Client ID	JULY CREMP DI-1	JULY CREMP EB-1	WAL-82	WAL-81	SP-113
Grouping	**Analyte**					
WATER						
Total Metals	Chromium (Cr)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	0.00015
	Cobalt (Co)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Copper (Cu)-Total (mg/L)	<0.00050	<0.00050	0.00072	0.00089	0.00082
	Iron (Fe)-Total (mg/L)	<0.010	<0.010	0.026	0.020	0.029
	Lead (Pb)-Total (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	0.000167
	Lithium (Li)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Magnesium (Mg)-Total (mg/L)	<0.0050	0.0142	1.25	1.42	1.33
	Manganese (Mn)-Total (mg/L)	<0.00010	<0.00010	0.00470	0.00274	0.00442
	Mercury (Hg)-Total (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
	Molybdenum (Mo)-Total (mg/L)	<0.000050	<0.000050	0.000180	0.000196	0.000183
	Nickel (Ni)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	0.00056
	Phosphorus (P)-Total (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050
	Potassium (K)-Total (mg/L)	<0.050	<0.050	0.478	0.447	0.546
	Rubidium (Rb)-Total (mg/L)	<0.00020	<0.00020	0.00068	0.00052	0.00079
	Selenium (Se)-Total (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Silicon (Si)-Total (mg/L)	<0.10	<0.10	0.31	0.37	0.27
	Silver (Ag)-Total (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Sodium (Na)-Total (mg/L)	<0.050	0.177	0.609	0.580	0.999
	Strontium (Sr)-Total (mg/L)	<0.00020	<0.00020	0.0210	0.0259	0.0201
	Sulfur (S)-Total (mg/L)	<0.50	<0.50	1.63	1.75	2.08
	Tellurium (Te)-Total (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
	Thallium (Tl)-Total (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Thorium (Th)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Tin (Sn)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Titanium (Ti)-Total (mg/L)	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030
	Tungsten (W)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Uranium (U)-Total (mg/L)	<0.000010	<0.000010	0.000046	0.000056	0.000050
	Vanadium (V)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Zinc (Zn)-Total (mg/L)	<0.0030	0.0052	<0.0030	<0.0030	<0.0030
	Zirconium (Zr)-Total (mg/L)	<0.000060	<0.000060	<0.000060	<0.000060	<0.00012 DLB
Dissolved Metals	Dissolved Mercury Filtration Location	FIELD	FIELD	FIELD	FIELD	FIELD
	Dissolved Metals Filtration Location	FIELD	FIELD	FIELD	FIELD	FIELD
	Aluminum (Al)-Dissolved (mg/L)	<0.0010	<0.0010	0.0028	0.0031	0.0022
	Antimony (Sb)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Arsenic (As)-Dissolved (mg/L)	<0.00010	<0.00010	0.00016	0.00025	0.00019
	Barium (Ba)-Dissolved (mg/L)	<0.00010	<0.00010	0.00254	0.00253	0.00299
	Beryllium (Be)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2129199-6				
	Description	Water				
	Sampled Date	09-JUL-18				
	Sampled Time	14:35				
	Client ID	SP-112				
Grouping	**Analyte**					
WATER						
Total Metals	Chromium (Cr)-Total (mg/L)	0.00014				
	Cobalt (Co)-Total (mg/L)	<0.00010				
	Copper (Cu)-Total (mg/L)	0.00067				
	Iron (Fe)-Total (mg/L)	0.028				
	Lead (Pb)-Total (mg/L)	0.000063				
	Lithium (Li)-Total (mg/L)	<0.0010				
	Magnesium (Mg)-Total (mg/L)	1.35				
	Manganese (Mn)-Total (mg/L)	0.00450				
	Mercury (Hg)-Total (mg/L)	<0.0000050				
	Molybdenum (Mo)-Total (mg/L)	0.000173				
	Nickel (Ni)-Total (mg/L)	0.00053				
	Phosphorus (P)-Total (mg/L)	<0.050				
	Potassium (K)-Total (mg/L)	0.528				
	Rubidium (Rb)-Total (mg/L)	0.00078				
	Selenium (Se)-Total (mg/L)	<0.000050				
	Silicon (Si)-Total (mg/L)	0.27				
	Silver (Ag)-Total (mg/L)	<0.000010				
	Sodium (Na)-Total (mg/L)	0.852				
	Strontium (Sr)-Total (mg/L)	0.0202				
	Sulfur (S)-Total (mg/L)	1.99				
	Tellurium (Te)-Total (mg/L)	<0.00020				
	Thallium (Tl)-Total (mg/L)	<0.000010				
	Thorium (Th)-Total (mg/L)	<0.00010				
	Tin (Sn)-Total (mg/L)	<0.00010				
	Titanium (Ti)-Total (mg/L)	<0.00030				
	Tungsten (W)-Total (mg/L)	<0.00010				
	Uranium (U)-Total (mg/L)	0.000052				
	Vanadium (V)-Total (mg/L)	<0.00050				
	Zinc (Zn)-Total (mg/L)	<0.0030				
	Zirconium (Zr)-Total (mg/L)	<0.000060				
Dissolved Metals	Dissolved Mercury Filtration Location	FIELD				
	Dissolved Metals Filtration Location	FIELD				
	Aluminum (Al)-Dissolved (mg/L)	0.0031				
	Antimony (Sb)-Dissolved (mg/L)	<0.00010				
	Arsenic (As)-Dissolved (mg/L)	0.00020				
	Barium (Ba)-Dissolved (mg/L)	0.00320				
	Beryllium (Be)-Dissolved (mg/L)	<0.00010				

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2129199-1	L2129199-2	L2129199-3	L2129199-4	L2129199-5
Description	Water	Water	Water	Water	Water
Sampled Date	07-JUL-18	07-JUL-18	09-JUL-18	09-JUL-18	09-JUL-18
Sampled Time	11:30	11:45	11:15	11:50	14:00
Client ID	JULY CREMP DI-1	JULY CREMP EB-1	WAL-82	WAL-81	SP-113
Grouping / **Analyte**					
WATER					
Dissolved Metals Bismuth (Bi)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron (B)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)-Dissolved (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Calcium (Ca)-Dissolved (mg/L)	<0.050	<0.050	4.16	4.85	4.18
Cesium (Cs)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Chromium (Cr)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Cobalt (Co)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper (Cu)-Dissolved (mg/L)	<0.00020	<0.00020	0.00072	0.00087	0.00061
Iron (Fe)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
Lead (Pb)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	0.000746 DTMF	<0.000050
Lithium (Li)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Magnesium (Mg)-Dissolved (mg/L)	<0.0050	0.0147 RRV	1.23	1.33	1.30
Manganese (Mn)-Dissolved (mg/L)	<0.00010	<0.00010	0.00337	0.00167	0.00284
Mercury (Hg)-Dissolved (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Molybdenum (Mo)-Dissolved (mg/L)	<0.000050	<0.000050	0.000193	0.000183	0.000177
Nickel (Ni)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Phosphorus (P)-Dissolved (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050
Potassium (K)-Dissolved (mg/L)	<0.050	<0.050	0.481	0.435	0.534
Rubidium (Rb)-Dissolved (mg/L)	<0.00020	<0.00020	0.00069	0.00054	0.00079
Selenium (Se)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Silicon (Si)-Dissolved (mg/L)	<0.050	<0.050	0.276	0.314	0.215
Silver (Ag)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)-Dissolved (mg/L)	<0.050	0.168 RRV	0.599	0.557	0.824
Strontium (Sr)-Dissolved (mg/L)	<0.00020	<0.00020	0.0210	0.0249	0.0198
Sulfur (S)-Dissolved (mg/L)	<0.50	<0.50	1.19	1.23	1.61
Tellurium (Te)-Dissolved (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Thallium (Tl)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Thorium (Th)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Tin (Sn)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)-Dissolved (mg/L)	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030
Tungsten (W)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Uranium (U)-Dissolved (mg/L)	<0.000010	<0.000010	0.000046	0.000058	0.000047
Vanadium (V)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc (Zn)-Dissolved (mg/L)	<0.0010	0.0051 RRV	<0.0010	<0.0010	<0.0010
Zirconium (Zr)-Dissolved (mg/L)	<0.000060	<0.000060	<0.000060	<0.000060	<0.000060

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2129199-6				
	Description	Water				
	Sampled Date	09-JUL-18				
	Sampled Time	14:35				
	Client ID	SP-112				
Grouping	**Analyte**					
WATER						
Dissolved Metals	Bismuth (Bi)-Dissolved (mg/L)	<0.000050				
	Boron (B)-Dissolved (mg/L)	<0.010				
	Cadmium (Cd)-Dissolved (mg/L)	<0.0000050				
	Calcium (Ca)-Dissolved (mg/L)	4.19				
	Cesium (Cs)-Dissolved (mg/L)	<0.000010				
	Chromium (Cr)-Dissolved (mg/L)	<0.00010				
	Cobalt (Co)-Dissolved (mg/L)	<0.00010				
	Copper (Cu)-Dissolved (mg/L)	0.00063				
	Iron (Fe)-Dissolved (mg/L)	<0.010				
	Lead (Pb)-Dissolved (mg/L)	<0.000050				
	Lithium (Li)-Dissolved (mg/L)	<0.0010				
	Magnesium (Mg)-Dissolved (mg/L)	1.34				
	Manganese (Mn)-Dissolved (mg/L)	0.00288				
	Mercury (Hg)-Dissolved (mg/L)	<0.0000050				
	Molybdenum (Mo)-Dissolved (mg/L)	0.000176				
	Nickel (Ni)-Dissolved (mg/L)	0.00051				
	Phosphorus (P)-Dissolved (mg/L)	<0.050				
	Potassium (K)-Dissolved (mg/L)	0.542				
	Rubidium (Rb)-Dissolved (mg/L)	0.00089				
	Selenium (Se)-Dissolved (mg/L)	<0.000050				
	Silicon (Si)-Dissolved (mg/L)	0.223				
	Silver (Ag)-Dissolved (mg/L)	<0.000010				
	Sodium (Na)-Dissolved (mg/L)	0.833				
	Strontium (Sr)-Dissolved (mg/L)	0.0198				
	Sulfur (S)-Dissolved (mg/L)	1.61				
	Tellurium (Te)-Dissolved (mg/L)	<0.00020				
	Thallium (Tl)-Dissolved (mg/L)	<0.000010				
	Thorium (Th)-Dissolved (mg/L)	<0.00010				
	Tin (Sn)-Dissolved (mg/L)	<0.00010				
	Titanium (Ti)-Dissolved (mg/L)	<0.00030				
	Tungsten (W)-Dissolved (mg/L)	<0.00010				
	Uranium (U)-Dissolved (mg/L)	0.000046				
	Vanadium (V)-Dissolved (mg/L)	<0.00050				
	Zinc (Zn)-Dissolved (mg/L)	<0.0010				
	Zirconium (Zr)-Dissolved (mg/L)	<0.000060				

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Method Blank	Chromium (Cr)-Total	MB-LOR	L2129199-1, -2
Method Blank	Vanadium (V)-Total	MB-LOR	L2129199-1, -2, -3, -4, -5, -6
Method Blank	Zirconium (Zr)-Total	MB-LOR	L2129199-1, -2, -3, -4, -5, -6
Laboratory Control Sample	Sulfur (S)-Total	MES	L2129199-1, -2
Matrix Spike	Dissolved Organic Carbon	MS-B	L2129199-1, -2, -3, -4, -5, -6
Matrix Spike	Dissolved Organic Carbon	MS-B	L2129199-1, -2, -3, -4, -5, -6
Matrix Spike	Total Organic Carbon	MS-B	L2129199-1, -2, -3, -4, -5, -6
Matrix Spike	Total Organic Carbon	MS-B	L2129199-1, -2, -3, -4, -5, -6
Matrix Spike	Antimony (Sb)-Dissolved	MS-B	L2129199-2
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L2129199-1, -2, -3, -4, -5, -6
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L2129199-1, -2, -3, -4, -5, -6
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L2129199-2
Matrix Spike	Copper (Cu)-Dissolved	MS-B	L2129199-1, -2, -3, -4, -5, -6
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L2129199-1, -2, -3, -4, -5, -6
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L2129199-2
Matrix Spike	Manganese (Mn)-Dissolved	MS-B	L2129199-1, -2, -3, -4, -5, -6
Matrix Spike	Molybdenum (Mo)-Dissolved	MS-B	L2129199-1, -2, -3, -4, -5, -6
Matrix Spike	Molybdenum (Mo)-Dissolved	MS-B	L2129199-2
Matrix Spike	Potassium (K)-Dissolved	MS-B	L2129199-1, -2, -3, -4, -5, -6
Matrix Spike	Silicon (Si)-Dissolved	MS-B	L2129199-1, -2, -3, -4, -5, -6
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L2129199-1, -2, -3, -4, -5, -6
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L2129199-2
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L2129199-1, -2, -3, -4, -5, -6
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L2129199-2
Matrix Spike	Sulfur (S)-Dissolved	MS-B	L2129199-1, -2, -3, -4, -5, -6
Matrix Spike	Sulfur (S)-Dissolved	MS-B	L2129199-2
Matrix Spike	Tungsten (W)-Dissolved	MS-B	L2129199-2
Matrix Spike	Uranium (U)-Dissolved	MS-B	L2129199-2
Matrix Spike	Aluminum (Al)-Total	MS-B	L2129199-1, -2, -3, -4, -5, -6
Matrix Spike	Aluminum (Al)-Total	MS-B	L2129199-1, -2
Matrix Spike	Barium (Ba)-Total	MS-B	L2129199-1, -2
Matrix Spike	Calcium (Ca)-Total	MS-B	L2129199-1, -2, -3, -4, -5, -6
Matrix Spike	Calcium (Ca)-Total	MS-B	L2129199-1, -2
Matrix Spike	Copper (Cu)-Total	MS-B	L2129199-1, -2, -3, -4, -5, -6
Matrix Spike	Iron (Fe)-Total	MS-B	L2129199-1, -2
Matrix Spike	Magnesium (Mg)-Total	MS-B	L2129199-1, -2, -3, -4, -5, -6
Matrix Spike	Magnesium (Mg)-Total	MS-B	L2129199-1, -2
Matrix Spike	Manganese (Mn)-Total	MS-B	L2129199-1, -2, -3, -4, -5, -6
Matrix Spike	Manganese (Mn)-Total	MS-B	L2129199-1, -2
Matrix Spike	Sodium (Na)-Total	MS-B	L2129199-1, -2
Matrix Spike	Strontium (Sr)-Total	MS-B	L2129199-1, -2, -3, -4, -5, -6
Matrix Spike	Strontium (Sr)-Total	MS-B	L2129199-1, -2

Qualifiers for Individual Parameters Listed:

Qualifier	Description
DLB	Detection Limit Raised. Analyte detected at comparable level in Method Blank.
DTMF	Dissolved concentration exceeds total for field-filtered metals sample. Metallic contaminants may have been introduced to dissolved sample during field filtration.
MB-LOR	Method Blank exceeds ALS DQO. Limits of Reporting have been adjusted for samples with positive hits below 5x blank level.
MES	Data Quality Objective was marginally exceeded (by < 10% absolute) for < 10% of analytes in a Multi-Element Scan / Multi-Parameter Scan (considered acceptable as per OMOE & CCME).
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RRV	Reported Result Verified By Repeat Analysis

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ALK-TITR-VA	Water	Alkalinity Species by Titration	APHA 2320 Alkalinity
This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.			
BR-L-IC-N-VA	Water	Bromide in Water by IC (Low Level)	EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			
CARBONS-DOC-VA	Water	Dissolved organic carbon by combustion	APHA 5310B
This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)". Dissolved carbon (DOC) fractions are determined by filtering the sample through a 0.45 micron membrane filter prior to analysis.			
CARBONS-TOC-VA	Water	Total organic carbon by combustion	APHA 5310B TOTAL ORGANIC CARBON (TOC)
This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)".			
CL-L-IC-N-VA	Water	Chloride in Water by IC (Low Level)	EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			
CN-FREE-L-CFA-VA	Water	Low Level Free Cyanide in water by CFA	ASTM 7237
This analysis is carried out using procedures adapted from ASTM Method 7237 "Free Cyanide with Flow Injection Analysis (FIA) Utilizing Gas Diffusion Separation and Amperometric Detection". Free cyanide is determined by in-line gas diffusion at pH 6 with final determination by colourimetric analysis.			
CN-T-L-CFA-VA	Water	Low Level Total Cyanide in water by CFA	ISO 14403:2002
This analysis is carried out using procedures adapted from ISO Method 14403:2002 "Determination of Total Cyanide using Flow Analysis (FIA and CFA)". Total or strong acid dissociable (SAD) cyanide is determined by in-line UV digestion along with sample distillation and final determination by colourimetric analysis. Method Limitation: This method is susceptible to interference from thiocyanate (SCN). If SCN is present in the sample, there could be a positive interference with this method, but it would be less than 1% and could be as low as zero.			
EC-PCT-VA	Water	Conductivity (Automated)	APHA 2510 Auto. Conduc.
This analysis is carried out using procedures adapted from APHA Method 2510 "Conductivity". Conductivity is determined using a conductivity electrode.			
EC-SCREEN-VA	Water	Conductivity Screen (Internal Use Only)	APHA 2510
Qualitative analysis of conductivity where required during preparation of other tests - e.g. TDS, metals, etc.			
F-IC-N-VA	Water	Fluoride in Water by IC	EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			
HARDNESS-CALC-VA	Water	Hardness	APHA 2340B
Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.			
HG-D-CVAA-VA	Water	Diss. Mercury in Water by CVAAS or CVAFS	APHA 3030B/EPA 1631E (mod)
Water samples are filtered (0.45 um), preserved with hydrochloric acid, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.			
HG-T-CVAA-VA	Water	Total Mercury in Water by CVAAS or CVAFS	EPA 1631E (mod)
Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.			
MET-D-CCMS-VA	Water	Dissolved Metals in Water by CRC ICPMS	APHA 3030B/6020A (mod)
Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS. Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.			
MET-T-CCMS-VA	Water	Total Metals in Water by CRC ICPMS	EPA 200.2/6020A (mod)
Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS. Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.			
NH3-F-VA	Water	Ammonia in Water by Fluorescence	J. ENVIRON. MONIT., 2005, 7, 37-42, RSC
This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.			

Reference Information

NO2-L-IC-N-VA	Water	Nitrite in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

NO3-L-IC-N-VA	Water	Nitrate in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

P-T-PRES-COL-VA	Water	Total P in Water by Colour	APHA 4500-P Phosphorus

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is determined colourimetrically after persulphate digestion of the sample.
Samples with very high dissolved solids (i.e. seawaters, brackish waters) may produce a negative bias by this method. Alternate methods are available for these types of samples.

Arsenic (5+), at elevated levels, is a positive interference on colourimetric phosphate analysis.

P-TD-COL-VA	Water	Total Dissolved P in Water by Colour	APHA 4500-P Phosphorous

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Dissolved Phosphorus is determined colourimetrically after persulphate digestion of a sample that has been lab or field filtered through a 0.45 micron membrane filter.
Samples with very high dissolved solids (i.e. seawaters, brackish waters) may produce a negative bias by this method. Alternate methods are available for these types of samples.

Arsenic (5+), at elevated levels, is a positive interference on colourimetric phosphate analysis.

PH-PCT-VA	Water	pH by Meter (Automated)	APHA 4500-H pH Value

This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode

It is recommended that this analysis be conducted in the field.

PO4-DO-COL-VA	Water	Diss. Orthophosphate in Water by Colour	APHA 4500-P Phosphorus

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.
Samples with very high dissolved solids (i.e. seawaters, brackish waters) may produce a negative bias by this method. Alternate methods are available for these types of samples.

Arsenic (5+), at elevated levels, is a positive interference on colourimetric phosphate analysis.

SILICATE-COL-VA	Water	Silicate by Colourimetric analysis	APHA 4500-SiO2 E.

This analysis is carried out using procedures adapted from APHA Method 4500-SiO2 E. "Silica". Silicate (molybdate-reactive silica) is determined by the molybdosilicate-heteropoly blue colourimetric method.

SO4-IC-N-VA	Water	Sulfate in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

TDS-LOW-VA	Water	Low Level TDS (3.0mg/L) by Gravimetric	APHA 2540C

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total dissolved solids (TDS) are determined by filtering a sample through a glass fibre filter, TDS is determined by evaporating the filtrate to dryness at 180 degrees celsius.

TKN-F-VA	Water	TKN in Water by Fluorescence	APHA 4500-NORG D.

This analysis is carried out using procedures adapted from APHA Method 4500-Norg D. "Block Digestion and Flow Injection Analysis". Total Kjeldahl Nitrogen is determined using block digestion followed by Flow-injection analysis with fluorescence detection.

TSS-LOW-VA	Water	Total Suspended Solids by Grav. (1 mg/L)	APHA 2540D

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total suspended solids (TSS) are determined by filtering a sample through a glass fibre filter, TSS is determined by drying the filter at 104 degrees celsius.
Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.

TURBIDITY-VA	Water	Turbidity by Meter	APHA 2130 Turbidity

This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

Reference Information

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

ALS Environmental

L2129199-COFC

COC # _____

Page 1 of 1

Report To			Report Format / Distribution				Service Requested (Rush for routine analysis subject to availability)
Company:	Azimuth Consulting Group		☑ Standard	☐ Other			◉ Regular (Standard Turnaround Times - Business Days)
Contact:	Eric Franz		☑ PDF	☑ Excel	☐ Digital	☐ Fax	○ Priority (2-4 Business Days) - 50% Surcharge - Contact ALS to Confirm TAT
Address:	218-2902 West Broadway		Email 1:	efranz@azimuthgroup.ca			○ Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT
	Vancouver, BC V6K2G8		Email 2:	marie-pier.marcil@agnicoeagle.com			○ Same Day or Weekend Emergency - Contact ALS to Confirm TAT
Phone:	604-730-1220	Fax:	Email 3:	robin.allard@agnicoeagle.com			
Invoice To	Same as Report ? ☑ Yes	☐ No	Client / Project Information				Analysis Request
Hardcopy of Invoice with Report?	☐ Yes	☑ No	Job #:	Meadowbank CREMP - Surfacewater			Please indicate below Filtered, Preserved or both (F, P, F/P)
Company:			PO / AFE:				
Contact:			LSD:				
Address:							
Phone:		Fax:	Quote #:	Q39503			
Lab Work Order # (lab use only)			ALS Contact:	Brent Mack	Sampler:	Tom Thomson	

Sample #	Sample Identification (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Conventionals** see notes	TSS-Low, TDS-Low	TOC, Ammonia, TKN, Total P	DOC	T-CN (Low), Free CN (Low)	Total mercury	Dissolved mercury	Total Metals	Dissolved metals	Chlorophyll-a			Number of Containers
							P	F/P	P	P	F/P	P	F/P	F			
					X	X	X	X	X	X	X	X	X				9
	JULY CREMP DI-1	07-Jul-18	11:30	Water	X	X	X	X	X	X	X	X	X				9
	JULY CREMP EB-1	07-Jul-18	11:45	Water	X	X	X	X	X	X	X	X	X				9
	WAL-82	09-Jul-18	11:15	Water	X	X	X	X	X	X	X	X	X				9
	WAL-81	09-Jul-18	11:50	Water	X	X	X	X	X	X	X	X	X				9
	SP-113	09-Jul-18	14:00	Water	X	X	X	X	X	X	X	X	X				9
	SP-112	09-Jul-18	14:35	Water	X	X	X	X	X	X	X	X	X				9

Special Instructions / Regulations with water or land use (CCME-Freshwater Aquatic Life/BC CSR - Commercial/AB Tier 1 - Natural, etc) / Hazardous Details

**Conventionals includes: Alk Species, pH, EC, Turbidity, Conductivity, Anions (F, NO2, NO3, Br, SO4), low-level Chloride, Silicate, TD-P, and Ortho-PO4.

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.

By the use of this form the user acknowledges and agrees with the Terms and Conditions as provided on a separate Excel tab.

RK, 13Jul18, 10:45 am, 22°C

AZIMUTH CONSULTING GROUP INC.
ATTN: Eric Franz
218 - 2902 West Broadway
Vancouver BC V6K 2G8

Date Received: 19-JUL-18
Report Date: 30-JUL-18 17:03 (MT)
Version: FINAL

Client Phone: 604-730-1220

Certificate of Analysis

Lab Work Order #: L2132149

Project P.O. #: NOT SUBMITTED
Job Reference: MEADOWBANK CREMP - SURFACEWATER
C of C Numbers:
Legal Site Desc:

Brent Mack, B.Sc.
Account Manager

[This report shall not be reproduced except in full without the written authority of the Laboratory.]

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	L2132149-1 Water 15-JUL-18 11:30 TPN-112	L2132149-2 Water 15-JUL-18 10:45 TPN-113	L2132149-3 Water 15-JUL-18 14:00 TPE-112	L2132149-4 Water 15-JUL-18 14:40 TPE-113	L2132149-5 Water 15-JUL-18 14:00 TPE-112 DUP 1
WATER						
Physical Tests	Conductivity (uS/cm)	27.5	27.7	30.7	30.6	30.7
	Hardness (as CaCO3) (mg/L)	8.47	8.74	9.95	10.0	10.1
	pH (pH)	7.01	6.98	7.12	7.15	7.15
	Total Suspended Solids (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
	Total Dissolved Solids (mg/L)	20.5	20.6	21.4	21.3	20.7
	Turbidity (NTU)	0.20	0.20	0.29	0.27	0.29
Anions and Nutrients	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	6.4	6.3	8.0	8.1	8.0
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
	Alkalinity, Total (as CaCO3) (mg/L)	6.4	6.3	8.0	8.1	8.0
	Ammonia, Total (as N) (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
	Bromide (Br) (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050
	Chloride (Cl) (mg/L)	0.74	0.75	0.72	0.72	0.72
	Fluoride (F) (mg/L)	0.063	0.064	0.073	0.072	0.073
	Nitrate (as N) (mg/L)	0.0355	0.0277	0.0115	0.0113	0.0119
	Nitrite (as N) (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Total Kjeldahl Nitrogen (mg/L)	0.096	0.099	0.091	0.093	0.100
	Orthophosphate-Dissolved (as P) (mg/L)	<0.0010	0.0011	<0.0010	0.0011	0.0010
	Phosphorus (P)-Total Dissolved (mg/L)	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
	Phosphorus (P)-Total (mg/L)	0.0027	0.0022	0.0027	0.0025	<0.0020
	Silicate (as SiO2) (mg/L)	<0.50	<0.50	<0.50	<0.50	<0.50
	Sulfate (SO4) (mg/L)	4.58	4.66	4.61	4.61	4.63
Cyanides	Cyanide, Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Cyanide, Free (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	1.43	1.31 HTP	1.52	1.33	1.46
	Total Organic Carbon (mg/L)	1.43	1.27 HTP	1.38	1.50	1.47
Total Metals	Aluminum (Al)-Total (mg/L)	0.0056	0.0338	0.0084	0.0098	0.0092
	Antimony (Sb)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Arsenic (As)-Total (mg/L)	0.00018	0.00018	0.00035	0.00037	0.00037
	Barium (Ba)-Total (mg/L)	0.00307	0.00321	0.00337	0.00329	0.00329
	Beryllium (Be)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Bismuth (Bi)-Total (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Boron (B)-Total (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
	Cadmium (Cd)-Total (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
	Calcium (Ca)-Total (mg/L)	2.17	2.27	2.71	2.53	2.69
	Cesium (Cs)-Total (mg/L)	<0.000010	<0.000010	0.000018	0.000017	0.000018

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2132149-1	L2132149-2	L2132149-3	L2132149-4	L2132149-5
Description	Water	Water	Water	Water	Water
Sampled Date	15-JUL-18	15-JUL-18	15-JUL-18	15-JUL-18	15-JUL-18
Sampled Time	11:30	10:45	14:00	14:40	14:00
Client ID	TPN-112	TPN-113	TPE-112	TPE-113	TPE-112 DUP 1
Grouping / **Analyte**					
WATER					
Total Metals Chromium (Cr)-Total (mg/L)	0.00010	0.00011	0.00012	0.00015	0.00013
Cobalt (Co)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper (Cu)-Total (mg/L)	0.00053	0.00061	<0.00050	<0.00050	<0.00050
Iron (Fe)-Total (mg/L)	<0.010	<0.010	0.020	0.019	0.020
Lead (Pb)-Total (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium (Li)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Magnesium (Mg)-Total (mg/L)	0.901	0.887	1.01	1.03	1.04
Manganese (Mn)-Total (mg/L)	0.00295	0.00219	0.00399	0.00409	0.00432
Mercury (Hg)-Total (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Molybdenum (Mo)-Total (mg/L)	0.000135	0.000158	0.000135	0.000141	0.000165
Nickel (Ni)-Total (mg/L)	0.00059	0.00069	0.00070	0.00075	0.00081
Phosphorus (P)-Total (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050
Potassium (K)-Total (mg/L)	0.474	0.474	0.515	0.496	0.508
Rubidium (Rb)-Total (mg/L)	0.00066	0.00064	0.00072	0.00078	0.00083
Selenium (Se)-Total (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Silicon (Si)-Total (mg/L)	<0.10	<0.10	0.15	0.14	0.15
Silver (Ag)-Total (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)-Total (mg/L)	1.08	1.06	1.06	1.05	1.07
Strontium (Sr)-Total (mg/L)	0.00985	0.0101	0.0117	0.0111	0.0115
Sulfur (S)-Total (mg/L)	1.42	1.30	1.71	1.55	1.57
Tellurium (Te)-Total (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Thallium (Tl)-Total (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Thorium (Th)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Tin (Sn)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)-Total (mg/L)	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030
Tungsten (W)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Uranium (U)-Total (mg/L)	0.000035	0.000026	0.000043	0.000041	0.000044
Vanadium (V)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc (Zn)-Total (mg/L)	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Zirconium (Zr)-Total (mg/L)	<0.000060	<0.000060	<0.000060	<0.000060	<0.000060
Dissolved Metals Dissolved Mercury Filtration Location	FIELD	FIELD	FIELD	FIELD	FIELD
Dissolved Metals Filtration Location	FIELD	FIELD	FIELD	FIELD	FIELD
Aluminum (Al)-Dissolved (mg/L)	0.0025	0.0017	0.0021	0.0046	0.0023
Antimony (Sb)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic (As)-Dissolved (mg/L)	0.00013	0.00013	0.00030	0.00029	0.00028
Barium (Ba)-Dissolved (mg/L)	0.00279	0.00304	0.00289	0.00337	0.00283
Beryllium (Be)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2132149-1	L2132149-2	L2132149-3	L2132149-4	L2132149-5
Description	Water	Water	Water	Water	Water
Sampled Date	15-JUL-18	15-JUL-18	15-JUL-18	15-JUL-18	15-JUL-18
Sampled Time	11:30	10:45	14:00	14:40	14:00
Client ID	TPN-112	TPN-113	TPE-112	TPE-113	TPE-112 DUP 1
Grouping **Analyte**					
WATER					
Dissolved Metals Bismuth (Bi)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron (B)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)-Dissolved (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Calcium (Ca)-Dissolved (mg/L)	2.08	2.18	2.53	2.50	2.52
Cesium (Cs)-Dissolved (mg/L)	<0.000010	<0.000010	0.000017	0.000015	0.000017
Chromium (Cr)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Cobalt (Co)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper (Cu)-Dissolved (mg/L)	0.00027	0.00025	0.00028	0.00032	0.00030
Iron (Fe)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
Lead (Pb)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	0.000089	<0.000050
Lithium (Li)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Magnesium (Mg)-Dissolved (mg/L)	0.795	0.802	0.883	0.913	0.919
Manganese (Mn)-Dissolved (mg/L)	0.00201	0.00152	0.00396	0.00293	0.00279
Mercury (Hg)-Dissolved (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Molybdenum (Mo)-Dissolved (mg/L)	0.000122	0.000126	0.000127	0.000129	0.000137
Nickel (Ni)-Dissolved (mg/L)	<0.00050	<0.00050	0.00056	0.00061	0.00061
Phosphorus (P)-Dissolved (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050
Potassium (K)-Dissolved (mg/L)	0.499	0.499	0.500	0.520	0.506
Rubidium (Rb)-Dissolved (mg/L)	0.00068	0.00067	0.00079	0.00083	0.00084
Selenium (Se)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Silicon (Si)-Dissolved (mg/L)	0.063	0.060	0.095	0.100	0.099
Silver (Ag)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)-Dissolved (mg/L)	1.08	1.06	0.972	1.02	1.01
Strontium (Sr)-Dissolved (mg/L)	0.0102	0.0106	0.0120	0.0113	0.0118
Sulfur (S)-Dissolved (mg/L)	1.70	1.73	1.72	1.68	1.83
Tellurium (Te)-Dissolved (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Thallium (Tl)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Thorium (Th)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Tin (Sn)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)-Dissolved (mg/L)	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030
Tungsten (W)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Uranium (U)-Dissolved (mg/L)	0.000034	0.000028	0.000042	0.000043	0.000042
Vanadium (V)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc (Zn)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Zirconium (Zr)-Dissolved (mg/L)	<0.000060	<0.000060	<0.000060	<0.000060	<0.000060

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Method Blank	Chloride (Cl)	B	L2132149-1, -2, -3, -4, -5
Method Blank	Nitrate (as N)	B	L2132149-1, -2, -3, -4, -5
Method Blank	Sulfate (SO4)	B	L2132149-1, -2, -3, -4, -5
Method Blank	Aluminum (Al)-Total	MB-LOR	L2132149-1, -2, -3, -4, -5
Method Blank	Manganese (Mn)-Total	MB-LOR	L2132149-1, -2, -3, -4, -5
Matrix Spike	Barium (Ba)-Total	MS-B	L2132149-1, -2, -3, -4, -5
Matrix Spike	Calcium (Ca)-Total	MS-B	L2132149-1, -2, -3, -4, -5
Matrix Spike	Magnesium (Mg)-Total	MS-B	L2132149-1, -2, -3, -4, -5
Matrix Spike	Manganese (Mn)-Total	MS-B	L2132149-1, -2, -3, -4, -5
Matrix Spike	Molybdenum (Mo)-Total	MS-B	L2132149-1, -2, -3, -4, -5
Matrix Spike	Potassium (K)-Total	MS-B	L2132149-1, -2, -3, -4, -5
Matrix Spike	Silicon (Si)-Total	MS-B	L2132149-1, -2, -3, -4, -5
Matrix Spike	Sodium (Na)-Total	MS-B	L2132149-1, -2, -3, -4, -5
Matrix Spike	Strontium (Sr)-Total	MS-B	L2132149-1, -2, -3, -4, -5
Matrix Spike	Sulfur (S)-Total	MS-B	L2132149-1, -2, -3, -4, -5
Matrix Spike	Nitrate (as N)	MS-B	L2132149-1, -2, -3, -4, -5
Matrix Spike	Silicate (as SiO2)	MS-B	L2132149-1, -2, -3, -4, -5

Qualifiers for Individual Parameters Listed:

Qualifier	Description
B	Method Blank exceeds ALS DQO. Associated sample results which are < Limit of Reporting or > 5 times blank level are considered reliable.
HTP	Sample preparation or preservation hold time was exceeded.
MB-LOR	Method Blank exceeds ALS DQO. Limits of Reporting have been adjusted for samples with positive hits below 5x blank level.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ALK-TITR-VA	Water	Alkalinity Species by Titration	APHA 2320 Alkalinity

This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.

BR-L-IC-N-VA	Water	Bromide in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

CARBONS-DOC-VA	Water	Dissolved organic carbon by combustion	APHA 5310B

This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)". Dissolved carbon (DOC) fractions are determined by filtering the sample through a 0.45 micron membrane filter prior to analysis.

CARBONS-TOC-VA	Water	Total organic carbon by combustion	APHA 5310B TOTAL ORGANIC CARBON (TOC)

This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)".

CL-L-IC-N-VA	Water	Chloride in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

CN-FREE-L-CFA-VA	Water	Low Level Free Cyanide in water by CFA	ASTM 7237

This analysis is carried out using procedures adapted from ASTM Method 7237 "Free Cyanide with Flow Injection Analysis (FIA) Utilizing Gas Diffusion Separation and Amperometric Detection". Free cyanide is determined by in-line gas diffusion at pH 6 with final determination by colourimetric analysis.

CN-T-L-CFA-VA	Water	Low Level Total Cyanide in water by CFA	ISO 14403:2002

This analysis is carried out using procedures adapted from ISO Method 14403:2002 "Determination of Total Cyanide using Flow Analysis (FIA and CFA)". Total or strong acid dissociable (SAD) cyanide is determined by in-line UV digestion along with sample distillation and final determination by colourimetric analysis. Method Limitation: This method is susceptible to interference from thiocyanate (SCN). If SCN is present in the sample, there could be a positive interference with this method, but it would be less than 1% and could be as low as zero.

EC-PCT-VA	Water	Conductivity (Automated)	APHA 2510 Auto. Conduc.

This analysis is carried out using procedures adapted from APHA Method 2510 "Conductivity". Conductivity is determined using a conductivity electrode.

EC-SCREEN-VA	Water	Conductivity Screen (Internal Use Only)	APHA 2510

Reference Information

Qualitative analysis of conductivity where required during preparation of other tests - e.g. TDS, metals, etc.

F-IC-N-VA Water Fluoride in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

HARDNESS-CALC-VA Water Hardness APHA 2340B

Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

HG-D-CVAA-VA Water Diss. Mercury in Water by CVAAS or CVAFS APHA 3030B/EPA 1631E (mod)

Water samples are filtered (0.45 um), preserved with hydrochloric acid, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

HG-T-CVAA-VA Water Total Mercury in Water by CVAAS or CVAFS EPA 1631E (mod)

Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

MET-D-CCMS-VA Water Dissolved Metals in Water by CRC ICPMS APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

MET-T-CCMS-VA Water Total Metals in Water by CRC ICPMS EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

NH3-F-VA Water Ammonia in Water by Fluorescence J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

NO2-L-IC-N-VA Water Nitrite in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

NO3-L-IC-N-VA Water Nitrate in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

P-T-PRES-COL-VA Water Total P in Water by Colour APHA 4500-P Phosphorus

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is determined colourimetrically after persulphate digestion of the sample.
Samples with very high dissolved solids (i.e. seawaters, brackish waters) may produce a negative bias by this method. Alternate methods are available for these types of samples.

Arsenic (5+), at elevated levels, is a positive interference on colourimetric phosphate analysis.

P-TD-COL-VA Water Total Dissolved P in Water by Colour APHA 4500-P Phosphorous

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Dissolved Phosphorus is determined colourimetrically after persulphate digestion of a sample that has been lab or field filtered through a 0.45 micron membrane filter.
Samples with very high dissolved solids (i.e. seawaters, brackish waters) may produce a negative bias by this method. Alternate methods are available for these types of samples.

Arsenic (5+), at elevated levels, is a positive interference on colourimetric phosphate analysis.

PH-PCT-VA Water pH by Meter (Automated) APHA 4500-H pH Value

This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode

It is recommended that this analysis be conducted in the field.

PO4-DO-COL-VA Water Diss. Orthophosphate in Water by Colour APHA 4500-P Phosphorus

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.
Samples with very high dissolved solids (i.e. seawaters, brackish waters) may produce a negative bias by this method. Alternate methods are available for these types of samples.

Arsenic (5+), at elevated levels, is a positive interference on colourimetric phosphate analysis.

SILICATE-COL-VA Water Silicate by Colourimetric analysis APHA 4500-SiO2 E.

Reference Information

This analysis is carried out using procedures adapted from APHA Method 4500-SiO2 E. "Silica". Silicate (molybdate-reactive silica) is determined by the molybdosilicate-heteropoly blue colourimetric method.

SO4-IC-N-VA Water Sulfate in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

TDS-LOW-VA Water Low Level TDS (3.0mg/L) by Gravimetric APHA 2540C

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total dissolved solids (TDS) are determined by filtering a sample through a glass fibre filter, TDS is determined by evaporating the filtrate to dryness at 180 degrees celsius.

TKN-F-VA Water TKN in Water by Fluorescence APHA 4500-NORG D.

This analysis is carried out using procedures adapted from APHA Method 4500-Norg D. "Block Digestion and Flow Injection Analysis". Total Kjeldahl Nitrogen is determined using block digestion followed by Flow-injection analysis with fluorescence detection.

TSS-LOW-VA Water Total Suspended Solids by Grav. (1 mg/L) APHA 2540D

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total suspended solids (TSS) are determined by filtering a sample through a glass fibre filter, TSS is determined by drying the filter at 104 degrees celsius.
Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.

TURBIDITY-VA Water Turbidity by Meter APHA 2130 Turbidity

This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

ALS Environ

L2132149-COFC

Chain of Custody / Analytical Request Form

Canada Toll Free: 1 800 668 9878

www.alsglobal.com

COC #

Report To		Report Format / Distribution		Service Requested (Rush for routine analysis subject to availability)
Company:	Azimuth Consulting Group	☑ Standard ☐ Other		◉ Regular (Standard Turnaround Times - Business Days)
Contact:	Eric Franz	☑ PDF ☑ Excel ☐ Digital ☐ Fax		○ Priority (2-4 Business Days) - 50% Surcharge - Contact ALS to Confirm TAT
Address:	218-2902 West Broadway	Email 1:	efranz@azimuthgroup.ca	○ Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT
	Vancouver, BC V6K2G8	Email 2:	marie-pier.marcil@agnicoeagle.com	○ Same Day or Weekend Emergency - Contact ALS to Confirm TAT
Phone:	604-730-1220 Fax:	Email 3:	robin.allard@agnicoeagle.com	
Invoice To	Same as Report ? ☑ Yes ☐ No	Client / Project Information		Analysis Request
Hardcopy of Invoice with Report?	☐ Yes ☑ No	Job #:	Meadowbank CREMP - Surfacewater	Please indicate below Filtered, Preserved or both (F, P, F/P)
Company:		PO / AFE:		
Contact:		LSD:		
Address:				
Phone:	Fax:	Quote #:	Q39503	
Lab Work Order # (lab use only)		ALS Contact:	Brent Mack	Sampler: Jamie K/Laurance A

Sample #	Sample Identification (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Conventionals** see notes	TSS-Low, TDS-Low	TOC, Ammonia, TKN, Total P	DOC	T-CN (Low), Free CN (Low)	Total mercury	Dissolved mercury	Total Metals	Dissolved metals	Chlorophyll-a			Number of Containers
							P	F/P	P	P	F/P	P	F/P	F			
[redacted]	TPN-112	15-Jul-18	11:30	Water	X	X	X	X	X	X	X	X	X	X			9
[redacted]	TPN-113	15-Jul-18	10:45	Water	X	X	X	X	X	X	X	X	X	X			9
[redacted]	TPE-xx	15-Jul-18	14:00	Water	X	X	X	X	X	X	X	X	X	X			9
[redacted]	TP-113	15-Jul-18	14:40	Water	X	X	X	X	X	X	X	X	X	X			9
[redacted]	TPE-112	15-Jul-18	14:00	Water	X	X	X	X	X	X	X	X	X	X			9

JUL 19 2018 20°C 845AM JC

L2132149-COFC

Report To	
Company:	Azimuth Consultin
Contact:	Erin Franz
Address:	218-2902 West Broadway
	Vancouver, BC V6K2
Phone:	604-730-1220
Invoice To	Same as Report ? Yes / No
Hardcopy of Invoice with Report?	Yes / No
Company:	
Contact:	
Address:	
Phone:	Fax:
Lab Work Order # (lab use only)	
ALS Contact:	Brent Mack
Sampler:	Jamie McLaurance A
Quote #:	Q39803
PO / AFE:	
LSD:	
Job #:	Meadowbank CREMP - Surface water
Project Information	
Email 1 or Fax	
Email 2	
Email 3	
Specify Regulation	
Select Matrix	
Select Report Format	
Merge QC/QC/Duplicate/Triplicate into one PDF?	
Select Report Format:	
Quality Control (QC) Report with Report	
Criteria on Report - provide details below if box checked	
Select Distribution:	
Email 1 or Fax	
Email 2	
Email 3	
Specify Regulation	
Select Matrix	

Page 1 of 1

Analysis Request

Please indicate below Filtered, Preserved or both (F, P, F/P)

| Sample | Sample Identification (This description will appear on the report) | Date (dd-mmm-yy) | Time (hh:mm) | Sample Type | Conventionals, see notes | TSS/Low, TDS/Low | COD | Ammonia, Total | TOC | Dissolved Metals | Total Metals | Dissolved Mercury | Mercury | Total Hg | Chlorophyll-a | | |

AZIMUTH CONSULTING GROUP INC.
ATTN: Eric Franz
218 - 2902 West Broadway
Vancouver BC V6K 2G8

Date Received: 26-JUL-18
Report Date: 08-AUG-18 16:09 (MT)
Version: FINAL

Client Phone: 604-730-1220

Certificate of Analysis

Lab Work Order #: L2136262

Project P.O. #: NOT SUBMITTED
Job Reference: MEADOWBANK CREMP - SURFACEWATER
C of C Numbers:
Legal Site Desc:

Brent Mack, B.Sc.
Account Manager

[This report shall not be reproduced except in full without the written authority of the Laboratory.]

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2136262-1	L2136262-2	L2136262-3	L2136262-4	L2136262-5
Description	water	water	water	water	water
Sampled Date	19-JUL-18	19-JUL-18	20-JUL-18	20-JUL-18	20-JUL-18
Sampled Time	09:48	10:30	11:00	10:00	
Client ID	INUG-100	INUG-101	PDL-65	PDL-66	DUP-JULY#2
Grouping **Analyte**					
FILTER					
Plant Pigments Chlorophyll a (ug/L)	0.375	0.360	0.382	0.736	0.505

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2136262-6	L2136262-7	L2136262-8	L2136262-9	L2136262-10
Description	water	water	water	water	water
Sampled Date	15-JUL-18	15-JUL-18	15-JUL-18	15-JUL-18	15-JUL-18
Sampled Time		14:00	14:40	11:30	10:45
Client ID	DUP-JULY#1	TPE-112	TPE-113	TPN-112	TPN-113
Grouping / Analyte					
FILTER					
Plant Pigments Chlorophyll a (ug/L)	1.12	0.231	0.294	0.218	0.379

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2136262-11	L2136262-12	L2136262-13	L2136262-14	
Description	water	water	water	water	
Sampled Date	09-JUL-18	09-JUL-18	09-JUL-18	09-JUL-18	
Sampled Time	11:00	11:15	14:35	14:00	
Client ID	WAL-81	WAL-82	SP-112	SP-113	
Grouping **Analyte**					
FILTER					
Plant Pigments Chlorophyll a (ug/L)	0.756	0.519	0.418	0.333	

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2136262-1	L2136262-2	L2136262-3	L2136262-4	L2136262-5
Description	water	water	water	water	water
Sampled Date	19-JUL-18	19-JUL-18	20-JUL-18	20-JUL-18	20-JUL-18
Sampled Time	09:48	10:30	11:00	10:00	
Client ID	INUG-100	INUG-101	PDL-65	PDL-66	DUP-JULY#2
Grouping / **Analyte**					
WATER					
Physical Tests Conductivity (uS/cm)	15.3	15.0	22.2	22.3	22.1
Hardness (as CaCO3) (mg/L)	5.99	5.78	9.11	8.81	8.91
pH (pH)	6.97	6.98	7.21	7.14	7.18
Total Suspended Solids (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
Total Dissolved Solids (mg/L)	15.4	10.7	15.6	15.5	15.5
Turbidity (NTU)	0.35	0.31	0.21	0.18	0.21
Anions and Nutrients Alkalinity, Bicarbonate (as CaCO3) (mg/L)	5.1	5.4	8.4	9.5	9.3
Alkalinity, Carbonate (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
Alkalinity, Total (as CaCO3) (mg/L)	5.1	5.4	8.4	9.5	9.3
Ammonia, Total (as N) (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Bromide (Br) (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050
Chloride (Cl) (mg/L)	0.75	0.73	0.62	0.61	0.62
Fluoride (F) (mg/L)	0.062	0.060	0.038	0.038	0.038
Nitrate (as N) (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Nitrite (as N) (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Total Kjeldahl Nitrogen (mg/L)	0.115	0.141	0.082	0.098	0.093
Orthophosphate-Dissolved (as P) (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Phosphorus (P)-Total Dissolved (mg/L)	<0.0020	0.0020	<0.0020	<0.0020	<0.0020
Phosphorus (P)-Total (mg/L)	0.0021	<0.0020	<0.0020	0.0132	<0.0020
Silicate (as SiO2) (mg/L)	<0.50	<0.50	<0.50	<0.50	<0.50
Sulfate (SO4) (mg/L)	0.89	0.85	1.66	1.66	1.66
Cyanides Cyanide, Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Cyanide, Free (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Organic / Inorganic Carbon Dissolved Organic Carbon (mg/L)	1.94	1.91	1.75	1.60	1.56
Total Organic Carbon (mg/L)	2.10	2.06	1.86	1.71	1.70
Total Metals Aluminum (Al)-Total (mg/L)	0.0103	0.0105	0.0049	0.0050	0.0045
Antimony (Sb)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic (As)-Total (mg/L)	0.00012	0.00012	0.00018	0.00022	0.00018
Barium (Ba)-Total (mg/L)	0.00203	0.00213	0.00219	0.00204	0.00202
Beryllium (Be)-Total (mg/L)	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
Bismuth (Bi)-Total (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron (B)-Total (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)-Total (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Calcium (Ca)-Total (mg/L)	1.12	1.13	2.13	2.21	2.20
Chromium (Cr)-Total (mg/L)	0.00011	0.00012	0.00011	<0.00010	<0.00010

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2136262-1	L2136262-2	L2136262-3	L2136262-4	L2136262-5
Description	water	water	water	water	water
Sampled Date	19-JUL-18	19-JUL-18	20-JUL-18	20-JUL-18	20-JUL-18
Sampled Time	09:48	10:30	11:00	10:00	
Client ID	INUG-100	INUG-101	PDL-65	PDL-66	DUP-JULY#2
Grouping / **Analyte**					
WATER					
Total Metals Cobalt (Co)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper (Cu)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Iron (Fe)-Total (mg/L)	0.021	0.021	<0.010	<0.010	<0.010
Lead (Pb)-Total (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium (Li)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Magnesium (Mg)-Total (mg/L)	0.71	0.75	0.82	0.81	0.81
Manganese (Mn)-Total (mg/L)	0.00941	0.00947	0.00234	0.00235	0.00229
Mercury (Hg)-Total (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Molybdenum (Mo)-Total (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Nickel (Ni)-Total (mg/L)	<0.00050	0.00053	0.00065	0.00063	0.00063
Phosphorus (P)-Total (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050
Potassium (K)-Total (mg/L)	0.36	0.40	0.34	0.34	0.34
Selenium (Se)-Total (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Silicon (Si)-Total (mg/L)	0.20	0.19	0.18	0.18	0.18
Silver (Ag)-Total (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)-Total (mg/L)	0.576	0.605	0.517	0.507	0.511
Strontium (Sr)-Total (mg/L)	0.00668	0.00650	0.00943	0.00912	0.00912
Sulfur (S)-Total (mg/L)	<0.50	<0.50	<0.50	<0.50	<0.50
Thallium (Tl)-Total (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin (Sn)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)-Total (mg/L)	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030
Uranium (U)-Total (mg/L)	0.000045	0.000045	0.000023	0.000022	0.000022
Vanadium (V)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc (Zn)-Total (mg/L)	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Zirconium (Zr)-Total (mg/L)	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030
Dissolved Metals Dissolved Mercury Filtration Location	FIELD	FIELD	FIELD	FIELD	FIELD
Dissolved Metals Filtration Location	FIELD	FIELD	FIELD	FIELD	FIELD
Aluminum (Al)-Dissolved (mg/L)	0.0028	0.0035	0.0012	0.0023	0.0016
Antimony (Sb)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic (As)-Dissolved (mg/L)	<0.00010	<0.00010	0.00015	0.00014	0.00016
Barium (Ba)-Dissolved (mg/L)	0.00202	0.00204	0.00216	0.00201	0.00195
Beryllium (Be)-Dissolved (mg/L)	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
Bismuth (Bi)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron (B)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)-Dissolved (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Calcium (Ca)-Dissolved (mg/L)	1.21	1.15	2.32	2.23	2.26
Chromium (Cr)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2136262-1	L2136262-2	L2136262-3	L2136262-4	L2136262-5
Description	water	water	water	water	water
Sampled Date	19-JUL-18	19-JUL-18	20-JUL-18	20-JUL-18	20-JUL-18
Sampled Time	09:48	10:30	11:00	10:00	
Client ID	INUG-100	INUG-101	PDL-65	PDL-66	DUP-JULY#2
Grouping / **Analyte**					
WATER					
Dissolved Metals Cobalt (Co)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper (Cu)-Dissolved (mg/L)	0.00036	0.00034	0.00040	0.00039	0.00039
Iron (Fe)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
Lead (Pb)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium (Li)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Magnesium (Mg)-Dissolved (mg/L)	0.72	0.70	0.81	0.79	0.79
Manganese (Mn)-Dissolved (mg/L)	0.00628	0.00625	0.00139	0.00145	0.00134
Mercury (Hg)-Dissolved (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Molybdenum (Mo)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Nickel (Ni)-Dissolved (mg/L)	<0.00050	<0.00050	0.00067	0.00061	0.00061
Phosphorus (P)-Dissolved (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050
Potassium (K)-Dissolved (mg/L)	0.40	0.40	0.38	0.37	0.37
Selenium (Se)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Silicon (Si)-Dissolved (mg/L)	0.152	0.157	0.131	0.144	0.135
Silver (Ag)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)-Dissolved (mg/L)	0.672	0.638	0.544	0.540	0.516
Strontium (Sr)-Dissolved (mg/L)	0.00701	0.00676	0.00942	0.00940	0.00932
Sulfur (S)-Dissolved (mg/L)	0.83	0.74	0.94	0.96	0.84
Thallium (Tl)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin (Sn)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)-Dissolved (mg/L)	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030
Uranium (U)-Dissolved (mg/L)	0.000040	0.000047	0.000022	0.000020	0.000021
Vanadium (V)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc (Zn)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Zirconium (Zr)-Dissolved (mg/L)	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Matrix Spike	Dissolved Organic Carbon	MS-B	L2136262-1, -2, -3, -4, -5
Matrix Spike	Total Organic Carbon	MS-B	L2136262-1, -2, -4, -5
Matrix Spike	Total Organic Carbon	MS-B	L2136262-3
Matrix Spike	Barium (Ba)-Total	MS-B	L2136262-1, -2, -3, -4, -5
Matrix Spike	Calcium (Ca)-Total	MS-B	L2136262-1, -2, -3, -4, -5
Matrix Spike	Magnesium (Mg)-Total	MS-B	L2136262-1, -2, -3, -4, -5
Matrix Spike	Manganese (Mn)-Total	MS-B	L2136262-1, -2, -3, -4, -5
Matrix Spike	Molybdenum (Mo)-Total	MS-B	L2136262-1, -2, -3, -4, -5
Matrix Spike	Potassium (K)-Total	MS-B	L2136262-1, -2, -3, -4, -5
Matrix Spike	Sodium (Na)-Total	MS-B	L2136262-1, -2, -3, -4, -5
Matrix Spike	Strontium (Sr)-Total	MS-B	L2136262-1, -2, -3, -4, -5
Matrix Spike	Sulfur (S)-Total	MS-B	L2136262-1, -2, -3, -4, -5
Matrix Spike	Phosphorus (P)-Total Dissolved	MS-B	L2136262-1, -2, -3, -4, -5

Qualifiers for Individual Parameters Listed:

Qualifier	Description
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ALK-TITR-VA	Water	Alkalinity Species by Titration	APHA 2320 Alkalinity

This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.

BE-D-L-CCMS-VA	Water	Diss. Be (low) in Water by CRC ICPMS	APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

BE-T-L-CCMS-VA	Water	Total Be (Low) in Water by CRC ICPMS	EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

BR-L-IC-N-VA	Water	Bromide in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

CARBONS-DOC-VA	Water	Dissolved organic carbon by combustion	APHA 5310B

This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)". Dissolved carbon (DOC) fractions are determined by filtering the sample through a 0.45 micron membrane filter prior to analysis.

CARBONS-TOC-VA	Water	Total organic carbon by combustion	APHA 5310B TOTAL ORGANIC CARBON (TOC)

This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)".

CHLOROA-F-VA	Filter	Chlorophyll a by Fluorometer (Filter)	EPA 445.0

This analysis is done using procedures modified from EPA Method 445.0. Chlorophyll-a is determined by a routine acetone extraction followed with analysis by fluorometry using the non-acidification procedure. This method is not subject to interferences from chlorophyll b.

CL-L-IC-N-VA	Water	Chloride in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

CN-FREE-L-CFA-VA	Water	Low Level Free Cyanide in water by CFA	ASTM 7237

This analysis is carried out using procedures adapted from ASTM Method 7237 "Free Cyanide with Flow Injection Analysis (FIA) Utilizing Gas Diffusion Separation and Amperometric Detection". Free cyanide is determined by in-line gas diffusion at pH 6 with final determination by colourimetric analysis.

CN-T-L-CFA-VA	Water	Low Level Total Cyanide in water by CFA	ISO 14403:2002

This analysis is carried out using procedures adapted from ISO Method 14403:2002 "Determination of Total Cyanide using Flow Analysis (FIA and CFA)". Total or strong acid dissociable (SAD) cyanide is determined by in-line UV digestion along with sample distillation and final determination by colourimetric analysis. Method Limitation: This method is susceptible to interference from thiocyanate (SCN). If SCN is present in the sample, there could be a positive interference with this method, but it would be less than 1% and could be as low as zero.

EC-PCT-VA	Water	Conductivity (Automated)	APHA 2510 Auto. Conduc.

This analysis is carried out using procedures adapted from APHA Method 2510 "Conductivity". Conductivity is determined using a conductivity electrode.

Reference Information

EC-SCREEN-VA	Water	Conductivity Screen (Internal Use Only)	APHA 2510

Qualitative analysis of conductivity where required during preparation of other tests - e.g. TDS, metals, etc.

F-IC-N-VA	Water	Fluoride in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

HARDNESS-CALC-VA	Water	Hardness	APHA 2340B

Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

HG-D-CVAA-VA	Water	Diss. Mercury in Water by CVAAS or CVAFS	APHA 3030B/EPA 1631E (mod)

Water samples are filtered (0.45 um), preserved with hydrochloric acid, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

HG-T-CVAA-VA	Water	Total Mercury in Water by CVAAS or CVAFS	EPA 1631E (mod)

Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

MET-D-CCMS-VA	Water	Dissolved Metals in Water by CRC ICPMS	APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

MET-T-CCMS-VA	Water	Total Metals in Water by CRC ICPMS	EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

NH3-F-VA	Water	Ammonia in Water by Fluorescence	J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

NO2-L-IC-N-VA	Water	Nitrite in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

NO3-L-IC-N-VA	Water	Nitrate in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

P-T-PRES-COL-VA	Water	Total P in Water by Colour	APHA 4500-P Phosphorus

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is determined colourimetrically after persulphate digestion of the sample.
Samples with very high dissolved solids (i.e. seawaters, brackish waters) may produce a negative bias by this method. Alternate methods are available for these types of samples.

Arsenic (5+), at elevated levels, is a positive interference on colourimetric phosphate analysis.

P-TD-COL-VA	Water	Total Dissolved P in Water by Colour	APHA 4500-P Phosphorous

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Dissolved Phosphorus is determined colourimetrically after persulphate digestion of a sample that has been lab or field filtered through a 0.45 micron membrane filter.
Samples with very high dissolved solids (i.e. seawaters, brackish waters) may produce a negative bias by this method. Alternate methods are available for these types of samples.

Arsenic (5+), at elevated levels, is a positive interference on colourimetric phosphate analysis.

PH-PCT-VA	Water	pH by Meter (Automated)	APHA 4500-H pH Value

This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode

It is recommended that this analysis be conducted in the field.

PO4-DO-COL-VA	Water	Diss. Orthophosphate in Water by Colour	APHA 4500-P Phosphorus

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.
Samples with very high dissolved solids (i.e. seawaters, brackish waters) may produce a negative bias by this method. Alternate methods are available for these types of samples.

Arsenic (5+), at elevated levels, is a positive interference on colourimetric phosphate analysis.

Reference Information

SILICATE-COL-VA	Water	Silicate by Colourimetric analysis	APHA 4500-SiO2 E.

This analysis is carried out using procedures adapted from APHA Method 4500-SiO2 E. "Silica". Silicate (molybdate-reactive silica) is determined by the molybdosilicate-heteropoly blue colourimetric method.

SO4-IC-N-VA	Water	Sulfate in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

TDS-LOW-VA	Water	Low Level TDS (3.0mg/L) by Gravimetric	APHA 2540C

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total dissolved solids (TDS) are determined by filtering a sample through a glass fibre filter, TDS is determined by evaporating the filtrate to dryness at 180 degrees celsius.

TKN-F-VA	Water	TKN in Water by Fluorescence	APHA 4500-NORG D.

This analysis is carried out using procedures adapted from APHA Method 4500-Norg D. "Block Digestion and Flow Injection Analysis". Total Kjeldahl Nitrogen is determined using block digestion followed by Flow-injection analysis with fluorescence detection.

TSS-LOW-VA	Water	Total Suspended Solids by Grav. (1 mg/L)	APHA 2540D

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total suspended solids (TSS) are determined by filtering a sample through a glass fibre filter, TSS is determined by drying the filter at 104 degrees celsius.
Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.

TURBIDITY-VA	Water	Turbidity by Meter	APHA 2130 Turbidity

This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

ALS Environmental

Chain of Custody

L2136262-COFC

COC # _____

Page 1 of 1

Report To		Report Format / Distribution		Requested (Rush for routine analysis subject to availability)
Company:	Azimuth Consulting Group	☑ Standard ☐ Other		◉ Regular (Standard Turnaround Times - Business Days)
Contact:	Eric Franz	☑ PDF ☑ Excel ☐ Digital ☐ Fax		○ Priority (2-4 Business Days) - 50% Surcharge - Contact ALS to Confirm TAT
Address:	218-2902 West Broadway	Email 1:	efranz@azimuthgroup.ca	○ Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT
	Vancouver, BC V6K2G8	Email 2:	marie-pier.marcil@agnicoeagle.com	○ Same Day or Weekend Emergency - Contact ALS to Confirm TAT
Phone:	604-730-1220 Fax:	Email 3:	robin.allard@agnicoeagle.com	
Invoice To	Same as Report ? ☑ Yes ☐ No	Client / Project Information		Analysis Request
Hardcopy of Invoice with Report?	☐ Yes ☑ No	Job #:	Meadowbank CREMP - Surfacewater	Please indicate below Filtered, Preserved or both (F, P, F/P)
Company:		PO / AFE:		
Contact:		LSD:		
Address:				
Phone:	Fax:	Quote #:	Q39503	
Lab Work Order # (lab use only)		ALS Contact:	Brent Mack	Sampler: Various tech

Sample #	Sample Identification (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Conventionals** see notes	TSS-Low, TDS-Low	TOC, Ammonia, TKN, Total P	DOC	T-CN (Low), Free CN (Low)	Total mercury	Dissolved mercury	Total Metals	Dissolved metals	Chlorophyll-a			Number of Containers
							P	F/P	P	P	F/P	P	F/P	F			
	INUG-100	19-Jul-18	9:48	Water	X	X	X	X	X	X	X	X	X	X			10
	INUG-101	19-Jul-18	10:30	Water	X	X	X	X	X	X	X	X	X	X			10
	PDL-65	20-Jul-18	11:00	Water	X	X	X	X	X	X	X	X	X	X			10
	PDL-66	20-Jul-18	10:00	Water	X	X	X	X	X	X	X	X	X	X			10
	DUP-JULY#2	20-Jul-18		Water	X	X	X	X	X	X	X	X	X	X			10
	DUP-JULY#1	15-Jul-18												X			1
	TPE-112	15-Jul-18	14:00											X			1
	TPE-113	15-Jul-18	14:40											X			1
	TPN-112	15-Jul-18	11:30											X			1
	TPN-113	15-Jul-18	10:45											X			1
	WAL-81	09-Jul-18	11:00											X			1
	WAL-82	09-Jul-18	11:15											X			1
	SP-112	09-Jul-18	14:35											X			1
	SP-113	09-Jul-18	14:00											X			1

Special Instructions / Regulations with water or land use (CCME-Freshwater Aquatic Life/BC CSR - Commercial/AB Tier 1 - Natural, etc) / Hazardous Details

**Conventionals includes: Alk Species, pH, EC, Turbidity, Conductivity, Anions (F, NO2, NO3, Br, SO4), low-level Chloride, Silicate, TD-P, and Ortho-PO4.

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.

By the use of this form the user acknowledges and agrees with the Terms and Conditions as provided on a separate Excel tab.

Also provided on another Excel tab are the ALS location addresses, phone numbers and sample container / preservation / holding time table for common analyses.

SHIPMENT RELEASE (client use)			SHIPMENT RECEPTION (lab use only)				SHIPMENT VERIFICATION (lab use only)			
Released by:	Date (dd-mmm-yy)	Time (hh-mm)	Received by:	Date:	Time:	Temperature:	Verified by:	Date:	Time:	Observations: Yes / No ? If Yes add SIF
Fanny Laporte	19-Jul-18	9:00	BP	July 26	09:10	20/22.2°C				

GENF 20.00 Front

AZIMUTH CONSULTING GROUP INC.
ATTN: Eric Franz
218 - 2902 West Broadway
Vancouver BC V6K 2G8

Date Received: 03-AUG-18
Report Date: 15-AUG-18 16:35 (MT)
Version: FINAL

Client Phone: 604-730-1220

Certificate of Analysis

Lab Work Order #: L2141222

Project P.O. #: NOT SUBMITTED
Job Reference: MEADOWBANK CREMP - SURFACEWATER
C of C Numbers:
Legal Site Desc:

Brent Mack, B.Sc.
Account Manager

[This report shall not be reproduced except in full without the written authority of the Laboratory.]

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	Sample ID Description Sampled Date Sampled Time Client ID	L2141222-1 WATER 29-JUL-18 14:50 BBD-55	L2141222-2 WATER 29-JUL-18 14:03 BBD-56	L2141222-3 WATER 29-JUL-18 15:55 BPJ-55	L2141222-4 WATER 29-JUL-18 15:30 BPJ-56	L2141222-5 WATER 29-JUL-18 13:15 BAP-55
FILTER							
Plant Pigments	Chlorophyll a (ug/L)		0.726	0.381	0.994	0.870	1.46

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2141222-6				
Description	WATER				
Sampled Date	29-JUL-18				
Sampled Time	13:40				
Client ID	BAP-56				
Grouping **Analyte**					
FILTER					
Plant Pigments Chlorophyll a (ug/L)	1.46				

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	L2141222-1 WATER 29-JUL-18 14:50 BBD-55	L2141222-2 WATER 29-JUL-18 14:03 BBD-56	L2141222-3 WATER 29-JUL-18 15:55 BPJ-55	L2141222-4 WATER 29-JUL-18 15:30 BPJ-56	L2141222-5 WATER 29-JUL-18 13:15 BAP-55
WATER						
Physical Tests	Conductivity (uS/cm)	162	271	104	75.9	39.1
	Hardness (as CaCO3) (mg/L)	22.9	32.9	15.9	14.4	10.9
	pH (pH)	7.06	7.10	7.06	7.08	7.09
	Total Suspended Solids (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
	Total Dissolved Solids (mg/L)	108	163	59	44	22.4
	Turbidity (NTU)	0.35	0.34	0.40	0.40	0.46
Anions and Nutrients	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	8.8	9.1	8.5	8.8	8.3
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
	Alkalinity, Total (as CaCO3) (mg/L)	8.8	9.1	8.5	8.8	8.3
	Ammonia, Total (as N) (mg/L)	0.0092	0.0094	0.0072	0.0059	<0.0050
	Bromide (Br) (mg/L)	0.147	0.268	0.087	0.057	<0.050
	Chloride (Cl) (mg/L)	39.7	70.4	22.9	15.2	5.30
	Fluoride (F) (mg/L)	0.063	0.065	0.060	0.060	0.060
	Nitrate (as N) (mg/L)	0.0329	0.0490	0.0243	0.0194	0.0129
	Nitrite (as N) (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Total Kjeldahl Nitrogen (mg/L)	0.225	0.153	0.151	0.185	<0.050
	Orthophosphate-Dissolved (as P) (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Phosphorus (P)-Total Dissolved (mg/L)	0.0022	0.0021	<0.0020	<0.0020	0.0021
	Phosphorus (P)-Total (mg/L)	0.0066	0.0052	0.0057	0.0045	0.0041
	Silicate (as SiO2) (mg/L)	<0.50	<0.50	<0.50	<0.50	<0.50
	Sulfate (SO4) (mg/L)	6.16	10.6	3.77	2.67	1.26
Cyanides	Cyanide, Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Cyanide, Free (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	3.48	3.51	3.45	3.27	3.65
	Total Organic Carbon (mg/L)	3.50	3.51	3.40	3.32	3.16
Total Metals	Aluminum (Al)-Total (mg/L)	0.0125	0.0118	0.0154	0.0131	0.0149
	Antimony (Sb)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Arsenic (As)-Total (mg/L)	0.00013	0.00013	0.00012	0.00010	0.00012
	Barium (Ba)-Total (mg/L)	0.0170	0.0178	0.0164	0.0166	0.0168
	Beryllium (Be)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Bismuth (Bi)-Total (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Boron (B)-Total (mg/L)	0.011	0.018	<0.010	<0.010	<0.010
	Cadmium (Cd)-Total (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
	Calcium (Ca)-Total (mg/L)	3.14	3.83	2.71	2.57	2.40
	Cesium (Cs)-Total (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2141222-6	L2141222-7			
	Description	WATER	WATER			
	Sampled Date	29-JUL-18	29-JUL-18			
	Sampled Time	13:40				
	Client ID	BAP-56	JULY-TB-1			
Grouping	**Analyte**					
WATER						
Physical Tests	Conductivity (uS/cm)	40.8	<2.0			
	Hardness (as CaCO3) (mg/L)	10.6	<0.50 HTC			
	pH (pH)	7.15	5.43			
	Total Suspended Solids (mg/L)	<1.0	<1.0			
	Total Dissolved Solids (mg/L)	24.6	<3.0			
	Turbidity (NTU)	0.40	<0.10			
Anions and Nutrients	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	8.6	<1.0			
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<1.0	<1.0			
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0	<1.0			
	Alkalinity, Total (as CaCO3) (mg/L)	8.6	<1.0			
	Ammonia, Total (as N) (mg/L)	<0.0050	<0.0050			
	Bromide (Br) (mg/L)	<0.050	<0.050			
	Chloride (Cl) (mg/L)	5.96	<0.10			
	Fluoride (F) (mg/L)	0.058	<0.020			
	Nitrate (as N) (mg/L)	0.0128	<0.0050			
	Nitrite (as N) (mg/L)	<0.0010	<0.0010			
	Total Kjeldahl Nitrogen (mg/L)	0.145	<0.050			
	Orthophosphate-Dissolved (as P) (mg/L)	0.0015	<0.0010			
	Phosphorus (P)-Total Dissolved (mg/L)	0.0021	<0.0020			
	Phosphorus (P)-Total (mg/L)	0.0057	<0.0020			
	Silicate (as SiO2) (mg/L)	<0.50	<0.50			
	Sulfate (SO4) (mg/L)	1.36	<0.30			
Cyanides	Cyanide, Total (mg/L)	<0.0010	<0.0010			
	Cyanide, Free (mg/L)	<0.0010	<0.0010			
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	3.35	<0.50			
	Total Organic Carbon (mg/L)	3.32	<0.50			
Total Metals	Aluminum (Al)-Total (mg/L)	0.0137	<0.0030			
	Antimony (Sb)-Total (mg/L)	<0.00010	<0.00010			
	Arsenic (As)-Total (mg/L)	0.00011	<0.00010			
	Barium (Ba)-Total (mg/L)	0.0159	<0.00010			
	Beryllium (Be)-Total (mg/L)	<0.00010	<0.00010			
	Bismuth (Bi)-Total (mg/L)	<0.000050	<0.000050			
	Boron (B)-Total (mg/L)	<0.010	<0.010			
	Cadmium (Cd)-Total (mg/L)	<0.0000050	<0.0000050			
	Calcium (Ca)-Total (mg/L)	2.36	<0.050			
	Cesium (Cs)-Total (mg/L)	<0.000010	<0.000010			

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	L2141222-1 WATER 29-JUL-18 14:50 BBD-55	L2141222-2 WATER 29-JUL-18 14:03 BBD-56	L2141222-3 WATER 29-JUL-18 15:55 BPJ-55	L2141222-4 WATER 29-JUL-18 15:30 BPJ-56	L2141222-5 WATER 29-JUL-18 13:15 BAP-55
WATER						
Total Metals	Chromium (Cr)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Cobalt (Co)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Copper (Cu)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Iron (Fe)-Total (mg/L)	0.020	0.018	0.018	0.018	0.019
	Lead (Pb)-Total (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	0.000152
	Lithium (Li)-Total (mg/L)	0.0011	0.0014	<0.0010	<0.0010	<0.0010
	Magnesium (Mg)-Total (mg/L)	3.56	5.54	2.36	1.86	1.25
	Manganese (Mn)-Total (mg/L)	0.00549	0.00688	0.00344	0.00361	0.00328
	Mercury (Hg)-Total (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
	Molybdenum (Mo)-Total (mg/L)	0.000068	0.000084	0.000059	0.000052	<0.000050
	Nickel (Ni)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Phosphorus (P)-Total (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050
	Potassium (K)-Total (mg/L)	1.20	1.79	0.840	0.681	0.495
	Rubidium (Rb)-Total (mg/L)	0.00106	0.00122	0.00089	0.00082	0.00081
	Selenium (Se)-Total (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Silicon (Si)-Total (mg/L)	0.24	0.28	0.23	0.21	0.19
	Silver (Ag)-Total (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Sodium (Na)-Total (mg/L)	21.9	38.1	12.5	8.13	2.97
	Strontium (Sr)-Total (mg/L)	0.0312	0.0433	0.0240	0.0211	0.0178
	Sulfur (S)-Total (mg/L)	2.27	3.65	1.43	1.05	0.58
	Tellurium (Te)-Total (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
	Thallium (Tl)-Total (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Thorium (Th)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Tin (Sn)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Titanium (Ti)-Total (mg/L)	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030
	Tungsten (W)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Uranium (U)-Total (mg/L)	0.000050	0.000054	0.000046	0.000043	0.000041
	Vanadium (V)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Zinc (Zn)-Total (mg/L)	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
	Zirconium (Zr)-Total (mg/L)	0.000062	<0.000060	0.000063	0.000063	0.000065
Dissolved Metals	Dissolved Mercury Filtration Location	FIELD	FIELD	FIELD	FIELD	FIELD
	Dissolved Metals Filtration Location	FIELD	FIELD	FIELD	FIELD	FIELD
	Aluminum (Al)-Dissolved (mg/L)	0.0058	0.0055	0.0043	0.0052	<0.010 DLA
	Antimony (Sb)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.0010 DLA
	Arsenic (As)-Dissolved (mg/L)	0.00011	0.00012	<0.00010	0.00011	<0.0010 DLA
	Barium (Ba)-Dissolved (mg/L)	0.0181	0.0194	0.0165	0.0172	0.0153
	Beryllium (Be)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.0010 DLA

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2141222-6	L2141222-7			
	Description	WATER	WATER			
	Sampled Date	29-JUL-18	29-JUL-18			
	Sampled Time	13:40				
	Client ID	BAP-56	JULY-TB-1			
Grouping	**Analyte**					
WATER						
Total Metals	Chromium (Cr)-Total (mg/L)	<0.00010	<0.00010			
	Cobalt (Co)-Total (mg/L)	<0.00010	<0.00010			
	Copper (Cu)-Total (mg/L)	<0.00050	<0.00050			
	Iron (Fe)-Total (mg/L)	0.017	<0.010			
	Lead (Pb)-Total (mg/L)	<0.000050	<0.000050			
	Lithium (Li)-Total (mg/L)	<0.0010	<0.0010			
	Magnesium (Mg)-Total (mg/L)	1.28	<0.0050			
	Manganese (Mn)-Total (mg/L)	0.00313	<0.00010			
	Mercury (Hg)-Total (mg/L)	<0.0000050	<0.0000050			
	Molybdenum (Mo)-Total (mg/L)	<0.000050	<0.000050			
	Nickel (Ni)-Total (mg/L)	<0.00050	<0.00050			
	Phosphorus (P)-Total (mg/L)	<0.050	<0.050			
	Potassium (K)-Total (mg/L)	0.502	<0.050			
	Rubidium (Rb)-Total (mg/L)	0.00081	<0.00020			
	Selenium (Se)-Total (mg/L)	<0.000050	<0.000050			
	Silicon (Si)-Total (mg/L)	0.20	<0.10			
	Silver (Ag)-Total (mg/L)	<0.000010	<0.000010			
	Sodium (Na)-Total (mg/L)	3.20	<0.050			
	Strontium (Sr)-Total (mg/L)	0.0179	<0.00020			
	Sulfur (S)-Total (mg/L)	0.63	<0.50			
	Tellurium (Te)-Total (mg/L)	<0.00020	<0.00020			
	Thallium (Tl)-Total (mg/L)	<0.000010	<0.000010			
	Thorium (Th)-Total (mg/L)	<0.00010	<0.00010			
	Tin (Sn)-Total (mg/L)	<0.00010	<0.00010			
	Titanium (Ti)-Total (mg/L)	<0.00030	<0.00030			
	Tungsten (W)-Total (mg/L)	<0.00010	<0.00010			
	Uranium (U)-Total (mg/L)	0.000043	<0.000010			
	Vanadium (V)-Total (mg/L)	<0.00050	<0.00050			
	Zinc (Zn)-Total (mg/L)	<0.0030	<0.0030			
	Zirconium (Zr)-Total (mg/L)	0.000063	<0.000060			
Dissolved Metals	Dissolved Mercury Filtration Location	FIELD				
	Dissolved Metals Filtration Location	FIELD				
	Aluminum (Al)-Dissolved (mg/L)	0.0047				
	Antimony (Sb)-Dissolved (mg/L)	<0.00010				
	Arsenic (As)-Dissolved (mg/L)	0.00012				
	Barium (Ba)-Dissolved (mg/L)	0.0155				
	Beryllium (Be)-Dissolved (mg/L)	<0.00010				

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2141222-1	L2141222-2	L2141222-3	L2141222-4	L2141222-5
Description	WATER	WATER	WATER	WATER	WATER
Sampled Date	29-JUL-18	29-JUL-18	29-JUL-18	29-JUL-18	29-JUL-18
Sampled Time	14:50	14:03	15:55	15:30	13:15
Client ID	BBD-55	BBD-56	BPJ-55	BPJ-56	BAP-55
Grouping / Analyte					
WATER					
Dissolved Metals					
Bismuth (Bi)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.00050 DLA
Boron (B)-Dissolved (mg/L)	0.011	0.018	<0.010	<0.010	<0.10 DLA
Cadmium (Cd)-Dissolved (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.000050 DLA
Calcium (Ca)-Dissolved (mg/L)	3.29	3.91	2.72	2.65	2.47
Cesium (Cs)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.00010 DLA
Chromium (Cr)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.0010 DLA
Cobalt (Co)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.0010 DLA
Copper (Cu)-Dissolved (mg/L)	0.00038	0.00026	0.00026	0.00027	<0.00020 DLA
Iron (Fe)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.10 DLA
Lead (Pb)-Dissolved (mg/L)	0.000054	<0.000050	<0.000050	<0.000050	<0.00050 DLA
Lithium (Li)-Dissolved (mg/L)	0.0012	0.0014	<0.0010	<0.0010	<0.010 DLA
Magnesium (Mg)-Dissolved (mg/L)	3.57	5.61	2.22	1.90	1.15
Manganese (Mn)-Dissolved (mg/L)	0.00377	0.00475	0.00127	0.00153	0.0010
Mercury (Hg)-Dissolved (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Molybdenum (Mo)-Dissolved (mg/L)	0.000102	0.000091	0.000064	0.000104	<0.00050 DLA
Nickel (Ni)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050 DLA
Phosphorus (P)-Dissolved (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.50 DLA
Potassium (K)-Dissolved (mg/L)	1.23	1.92	0.822	0.716	<0.50 DLA
Rubidium (Rb)-Dissolved (mg/L)	0.00106	0.00130	0.00086	0.00089	<0.0020 DLA
Selenium (Se)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.00050 DLA
Silicon (Si)-Dissolved (mg/L)	0.186	0.205	0.136	0.142	<0.50 DLA
Silver (Ag)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.00010 DLA
Sodium (Na)-Dissolved (mg/L)	22.2	39.6	12.0	8.78	2.73
Strontium (Sr)-Dissolved (mg/L)	0.0315	0.0436	0.0229	0.0210	0.0184
Sulfur (S)-Dissolved (mg/L)	1.64	3.03	0.74	<0.50	<0.50
Tellurium (Te)-Dissolved (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020	<0.0020 DLA
Thallium (Tl)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.00010 DLA
Thorium (Th)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.0010 DLA
Tin (Sn)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.0010 DLA
Titanium (Ti)-Dissolved (mg/L)	<0.00030	<0.00030	<0.00030	<0.00030	<0.0030 DLA
Tungsten (W)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.0010 DLA
Uranium (U)-Dissolved (mg/L)	0.000051	0.000052	0.000043	0.000043	<0.00010 DLA
Vanadium (V)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050 DLA
Zinc (Zn)-Dissolved (mg/L)	<0.0010	0.0012	<0.0010	<0.0010	<0.010 DLA
Zirconium (Zr)-Dissolved (mg/L)	<0.000060	<0.000060	<0.000060	<0.000060	<0.00060 DLA

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2141222-6	L2141222-7			
	Description	WATER	WATER			
	Sampled Date	29-JUL-18	29-JUL-18			
	Sampled Time	13:40				
	Client ID	BAP-56	JULY-TB-1			
Grouping	**Analyte**					
WATER						
Dissolved Metals	Bismuth (Bi)-Dissolved (mg/L)	<0.000050				
	Boron (B)-Dissolved (mg/L)	<0.010				
	Cadmium (Cd)-Dissolved (mg/L)	<0.0000050				
	Calcium (Ca)-Dissolved (mg/L)	2.32				
	Cesium (Cs)-Dissolved (mg/L)	<0.000010				
	Chromium (Cr)-Dissolved (mg/L)	<0.00010				
	Cobalt (Co)-Dissolved (mg/L)	<0.00010				
	Copper (Cu)-Dissolved (mg/L)	0.00030				
	Iron (Fe)-Dissolved (mg/L)	<0.010				
	Lead (Pb)-Dissolved (mg/L)	<0.000050				
	Lithium (Li)-Dissolved (mg/L)	<0.0010				
	Magnesium (Mg)-Dissolved (mg/L)	1.17				
	Manganese (Mn)-Dissolved (mg/L)	0.00103				
	Mercury (Hg)-Dissolved (mg/L)	<0.0000050				
	Molybdenum (Mo)-Dissolved (mg/L)	<0.000050				
	Nickel (Ni)-Dissolved (mg/L)	<0.00050				
	Phosphorus (P)-Dissolved (mg/L)	<0.050				
	Potassium (K)-Dissolved (mg/L)	0.459				
	Rubidium (Rb)-Dissolved (mg/L)	0.00081				
	Selenium (Se)-Dissolved (mg/L)	<0.000050				
	Silicon (Si)-Dissolved (mg/L)	0.139				
	Silver (Ag)-Dissolved (mg/L)	<0.000010				
	Sodium (Na)-Dissolved (mg/L)	3.05				
	Strontium (Sr)-Dissolved (mg/L)	0.0163				
	Sulfur (S)-Dissolved (mg/L)	1.84 DTMF				
	Tellurium (Te)-Dissolved (mg/L)	<0.00020				
	Thallium (Tl)-Dissolved (mg/L)	<0.000010				
	Thorium (Th)-Dissolved (mg/L)	<0.00010				
	Tin (Sn)-Dissolved (mg/L)	<0.00010				
	Titanium (Ti)-Dissolved (mg/L)	<0.00030				
	Tungsten (W)-Dissolved (mg/L)	<0.00010				
	Uranium (U)-Dissolved (mg/L)	0.000037				
	Vanadium (V)-Dissolved (mg/L)	<0.00050				
	Zinc (Zn)-Dissolved (mg/L)	<0.0010				
	Zirconium (Zr)-Dissolved (mg/L)	<0.000060				

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Method Blank	Thallium (Tl)-Dissolved	B	L2141222-5
Matrix Spike	Dissolved Organic Carbon	MS-B	L2141222-1, -2, -3, -4, -6, -7
Matrix Spike	Dissolved Organic Carbon	MS-B	L2141222-5
Matrix Spike	Total Organic Carbon	MS-B	L2141222-1, -2, -3, -4, -6, -7
Matrix Spike	Total Organic Carbon	MS-B	L2141222-5
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L2141222-5
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L2141222-5
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L2141222-1, -2, -3, -4, -5, -6
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L2141222-5
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L2141222-1, -2, -3, -4, -5, -6
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L2141222-5
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L2141222-1, -2, -3, -4, -5, -6
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L2141222-5
Matrix Spike	Magnesium (Mg)-Total	MS-B	L2141222-1, -2, -3, -4, -5, -6, -7
Matrix Spike	Sodium (Na)-Total	MS-B	L2141222-1, -2, -3, -4, -5, -6, -7
Matrix Spike	Strontium (Sr)-Total	MS-B	L2141222-1, -2, -3, -4, -5, -6, -7
Matrix Spike	Phosphorus (P)-Total	MS-B	L2141222-1, -2, -3

Qualifiers for Individual Parameters Listed:

Qualifier	Description
B	Method Blank exceeds ALS DQO. Associated sample results which are < Limit of Reporting or > 5 times blank level are considered reliable.
DLA	Detection Limit adjusted for required dilution
DTMF	Dissolved concentration exceeds total for field-filtered metals sample. Metallic contaminants may have been introduced to dissolved sample during field filtration.
HTC	Hardness was calculated from Total Ca and/or Mg concentrations and may be biased high (dissolved Ca/Mg results unavailable).
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ALK-TITR-VA	Water	Alkalinity Species by Titration	APHA 2320 Alkalinity

This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.

BR-L-IC-N-VA	Water	Bromide in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

CARBONS-DOC-VA	Water	Dissolved organic carbon by combustion	APHA 5310B

This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)". Dissolved carbon (DOC) fractions are determined by filtering the sample through a 0.45 micron membrane filter prior to analysis.

CARBONS-TOC-VA	Water	Total organic carbon by combustion	APHA 5310B TOTAL ORGANIC CARBON (TOC)

This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)".

CHLOROA-F-VA	Filter	Chlorophyll a by Fluorometer (Filter)	EPA 445.0

This analysis is done using procedures modified from EPA Method 445.0. Chlorophyll-a is determined by a routine acetone extraction followed with analysis by fluorometry using the non-acidification procedure. This method is not subject to interferences from chlorophyll b.

CL-L-IC-N-VA	Water	Chloride in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

CN-FREE-L-CFA-VA	Water	Low Level Free Cyanide in water by CFA	ASTM 7237

This analysis is carried out using procedures adapted from ASTM Method 7237 "Free Cyanide with Flow Injection Analysis (FIA) Utilizing Gas Diffusion Separation and Amperometric Detection". Free cyanide is determined by in-line gas diffusion at pH 6 with final determination by colourimetric analysis.

CN-T-L-CFA-VA	Water	Low Level Total Cyanide in water by CFA	ISO 14403:2002

This analysis is carried out using procedures adapted from ISO Method 14403:2002 "Determination of Total Cyanide using Flow Analysis (FIA and CFA)". Total or strong acid dissociable (SAD) cyanide is determined by in-line UV digestion along with sample distillation and final determination by colourimetric analysis. Method Limitation: This method is susceptible to interference from thiocyanate (SCN). If SCN is present in the sample, there could be a positive interference with this method, but it would be less than 1% and could be as low as zero.

Reference Information

EC-PCT-VA	Water	Conductivity (Automated)	APHA 2510 Auto. Conduc.

This analysis is carried out using procedures adapted from APHA Method 2510 "Conductivity". Conductivity is determined using a conductivity electrode.

EC-SCREEN-VA	Water	Conductivity Screen (Internal Use Only)	APHA 2510

Qualitative analysis of conductivity where required during preparation of other tests - e.g. TDS, metals, etc.

F-IC-N-VA	Water	Fluoride in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

HARDNESS-CALC-VA	Water	Hardness	APHA 2340B

Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

HG-D-CVAA-VA	Water	Diss. Mercury in Water by CVAAS or CVAFS	APHA 3030B/EPA 1631E (mod)

Water samples are filtered (0.45 um), preserved with hydrochloric acid, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

HG-T-CVAA-VA	Water	Total Mercury in Water by CVAAS or CVAFS	EPA 1631E (mod)

Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

MET-D-CCMS-VA	Water	Dissolved Metals in Water by CRC ICPMS	APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

MET-T-CCMS-VA	Water	Total Metals in Water by CRC ICPMS	EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

NH3-F-VA	Water	Ammonia in Water by Fluorescence	J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

NO2-L-IC-N-VA	Water	Nitrite in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

NO3-L-IC-N-VA	Water	Nitrate in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

P-T-PRES-COL-VA	Water	Total P in Water by Colour	APHA 4500-P Phosphorus

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is determined colourimetrically after persulphate digestion of the sample.
Samples with very high dissolved solids (i.e. seawaters, brackish waters) may produce a negative bias by this method. Alternate methods are available for these types of samples.

Arsenic (5+), at elevated levels, is a positive interference on colourimetric phosphate analysis.

P-TD-COL-VA	Water	Total Dissolved P in Water by Colour	APHA 4500-P Phosphorous

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Dissolved Phosphorus is determined colourimetrically after persulphate digestion of a sample that has been lab or field filtered through a 0.45 micron membrane filter.
Samples with very high dissolved solids (i.e. seawaters, brackish waters) may produce a negative bias by this method. Alternate methods are available for these types of samples.

Arsenic (5+), at elevated levels, is a positive interference on colourimetric phosphate analysis.

PH-PCT-VA	Water	pH by Meter (Automated)	APHA 4500-H pH Value

This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode

It is recommended that this analysis be conducted in the field.

PO4-DO-COL-VA	Water	Diss. Orthophosphate in Water by Colour	APHA 4500-P Phosphorus

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.

Reference Information

Samples with very high dissolved solids (i.e. seawaters, brackish waters) may produce a negative bias by this method. Alternate methods are available for these types of samples.

Arsenic (5+), at elevated levels, is a positive interference on colourimetric phosphate analysis.

SILICATE-COL-VA	Water	Silicate by Colourimetric analysis	APHA 4500-SiO2 E.

This analysis is carried out using procedures adapted from APHA Method 4500-SiO2 E. "Silica". Silicate (molybdate-reactive silica) is determined by the molybdosilicate-heteropoly blue colourimetric method.

SO4-IC-N-VA	Water	Sulfate in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

TDS-LOW-VA	Water	Low Level TDS (3.0mg/L) by Gravimetric	APHA 2540C

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total dissolved solids (TDS) are determined by filtering a sample through a glass fibre filter, TDS is determined by evaporating the filtrate to dryness at 180 degrees celsius.

TKN-F-VA	Water	TKN in Water by Fluorescence	APHA 4500-NORG D.

This analysis is carried out using procedures adapted from APHA Method 4500-Norg D. "Block Digestion and Flow Injection Analysis". Total Kjeldahl Nitrogen is determined using block digestion followed by Flow-injection analysis with fluorescence detection.

TSS-LOW-VA	Water	Total Suspended Solids by Grav. (1 mg/L)	APHA 2540D

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total suspended solids (TSS) are determined by filtering a sample through a glass fibre filter, TSS is determined by drying the filter at 104 degrees celsius.
Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.

TURBIDITY-VA	Water	Turbidity by Meter	APHA 2130 Turbidity

This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

ALS Environmental

Chain of Custody / Analytical Request Form

Canada Toll Free: 1 800 668 9878

www.alsglobal.com

COC # _____

Page 1 of 1

Report To		Report Format / Distribution		Service Requested (Rush for routine analysis subject to availability)
Company:	Azimuth Consulting Group	☑ Standard ☐ Other		◉ Regular (Standard Turnaround Times - Business Days)
Contact:	Eric Franz	☑ PDF ☑ Excel ☐ Digital ☐ Fax		○ Priority (2-4 Business Days) - 50% Surcharge - Contact ALS to Confirm TAT
Address:	218-2902 West Broadway	Email 1:	efranz@azimuthgroup.ca	○ Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT
	Vancouver, BC V6K2G8	Email 2:	marie-pier.marcil@agnicoeagle.com	○ Same Day or Weekend Emergency - Contact ALS to Confirm TAT
Phone:	604-730-1220 Fax:	Email 3:	robin.allard@agnicoeagle.com	
Invoice To	Same as Report ? ☑ Yes ☐ No	**Client / Project Information**		**Analysis Request**
Hardcopy of Invoice with Report?	☐ Yes ☑ No	Job #:	Meadowbank CREMP - Surfacewater	Please indicate below Filtered, Preserved or both (F, P, F/P)
Company:		PO / AFE:		
Contact:		LSD:		
Address:				
Phone:	Fax:	Quote #:	Q39503	
Lab Work Order # (lab use only)		**ALS Contact:**	Brent Mack	**Sampler:** Various tech

Sample #	Sample Identification (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Conventionals** see notes	TSS-Low, TDS-Low	TOC, Ammonia, TKN, Total P	DOC	T-CN (Low), Free CN (Low)	Total mercury	Dissolved mercury	Total Metals	Dissolved metals	Chlorophyll-a			Number of Containers
							P	F/P	P	P	F/P	P	F/P	F			
	BBD-55	29-Jul-18	14:50	Water	X	X	X	X	X	X	X	X	X	X			10
	BBD-56	29-Jul-18	14:03	Water	X	X	X	X	X	X	X	X	X	X			10
	BPJ-55	29-Jul-18	15:55	Water	X	X	X	X	X	X	X	X	X	X			10
	BPJ-56	29-Jul-18	15:30	Water	X	X	X	X	X	X	X	X	X	X			10
	BAP-55	29-Jul-18	13:15	Water	X	X	X	X	X	X	X	X	X	X			10
	BAP-56	29-Jul-18	13:40	Water	X	X	X	X	X	X	X	X	X	X			10
	JULY-TB -1	29-Jul-18		Water	X	X	X	X	X	X	X	X	X				9
	All the bottles we had prefiled seemed to be Filtered.																
	2 COOLERS																

L2141222-COFC

Special Instructions / Regulations with water or land use (CCME-Freshwater Aquatic Life/BC CSR - Commercial/AB Tier 1 - Natural, etc); Hazardous Details

**Conventionals includes: Alk Species, pH, EC, Turbidity, Conductivity, Anions (F, NO2, NO3, Br, SO4), low-level Chloride, Silicate, TD-P, and Ortho-PO4.

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.

By the use of this form the user acknowledges and agrees with the Terms and Conditions as provided on a separate Excel tab.

Also provided on another Excel tab are the ALS location addresses, phone numbers and sample container / preservation / holding time table for common analyses.

SHIPMENT RELEASE (client use)			SHIPMENT RECEPTION (lab use only)				SHIPMENT VERIFICATION (lab use only)			
Released by:	Date (dd-mmm-yy)	Time (hh-mm)	Received by:	Date:	Time:	Temperature:	Verified by:	Date:	Time:	Observations: Yes / No ? If Yes add SIF
Fanny Laporte	31-Jul-18	9:00	JC	Aug 3	10:50	2 °C				

AZIMUTH CONSULTING GROUP INC.
ATTN: Eric Franz
218 - 2902 West Broadway
Vancouver BC V6K 2G8

Date Received: 30-AUG-18
Report Date: 10-SEP-18 16:40 (MT)
Version: FINAL

Client Phone: 604-730-1220

Certificate of Analysis

Lab Work Order #: L2155899

Project P.O. #: NOT SUBMITTED
Job Reference: CREMP SEDIMENT CORES
C of C Numbers:
Legal Site Desc:

Brent Mack, B.Sc.
Account Manager

[This report shall not be reproduced except in full without the written authority of the Laboratory.]

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2155899-1	L2155899-2	L2155899-3	L2155899-4	L2155899-5
Description	Sediment	Sediment	Sediment	Sediment	Sediment
Sampled Date	10-AUG-18	10-AUG-18	10-AUG-18	10-AUG-18	10-AUG-18
Sampled Time					
Client ID	TPE-SC-1	TPE-SC-2	TPE-SC-3	TPE-SC-4	TPE-SC-5
Grouping / **Analyte**					
SOIL					
Physical Tests Moisture (%)	88.0	87.5	88.8	89.8	88.0
pH (1:2 soil:water) (pH)	6.25	5.61	6.15	5.97	6.06
Metals Aluminum (Al) (mg/kg)	24400	26000	26200	25100	25500
Antimony (Sb) (mg/kg)	0.27	0.24	0.29	0.28	0.26
Arsenic (As) (mg/kg)	19.9	19.7	24.9	19.8	20.9
Barium (Ba) (mg/kg)	109	126	135	134	128
Beryllium (Be) (mg/kg)	1.72	1.93	1.87	1.89	1.85
Bismuth (Bi) (mg/kg)	2.30	2.68	2.50	2.51	2.48
Boron (B) (mg/kg)	7.8	8.3	9.1	9.8	8.9
Cadmium (Cd) (mg/kg)	0.205	0.295	0.342	0.485	0.308
Calcium (Ca) (mg/kg)	2530	1890	2450	2400	2330
Chromium (Cr) (mg/kg)	148	100	148	111	120
Cobalt (Co) (mg/kg)	17.1	20.9	19.5	16.3	18.2
Copper (Cu) (mg/kg)	50.4	53.2	57.4	55.3	54.2
Iron (Fe) (mg/kg)	45100	50100	54300	46700	50100
Lead (Pb) (mg/kg)	21.3	21.9	21.6	22.1	21.8
Lithium (Li) (mg/kg)	43.6	48.2	46.6	47.4	46.1
Magnesium (Mg) (mg/kg)	10500	9620	10900	9700	9910
Manganese (Mn) (mg/kg)	1710	1980	3760	2630	3040
Mercury (Hg) (mg/kg)	0.0211	0.0167	0.0200	0.0214	0.0197
Molybdenum (Mo) (mg/kg)	3.93	4.55	4.85	4.38	4.34
Nickel (Ni) (mg/kg)	84.1	89.2	117	113	89.7
Phosphorus (P) (mg/kg)	426	411	454	419	436
Potassium (K) (mg/kg)	4130	4750	4550	4540	4680
Selenium (Se) (mg/kg)	0.76	0.56	0.76	0.83	0.84
Silver (Ag) (mg/kg)	0.12	<0.10	0.10	<0.10	<0.10
Sodium (Na) (mg/kg)	198	250	222	230	224
Strontium (Sr) (mg/kg)	19.6	18.9	21.1	20.9	20.1
Sulfur (S) (mg/kg)	2100	1700	2100	2000	2200
Thallium (Tl) (mg/kg)	0.384	0.479	0.455	0.480	0.439
Tin (Sn) (mg/kg)	4.0	2.7	3.2	3.3	2.7
Titanium (Ti) (mg/kg)	811	955	899	897	883
Tungsten (W) (mg/kg)	0.91	1.00	0.90	0.90	0.85
Uranium (U) (mg/kg)	15.2	18.4	18.8	17.2	17.1
Vanadium (V) (mg/kg)	42.3	43.6	46.3	42.9	42.7
Zinc (Zn) (mg/kg)	103	114	118	117	112
Zirconium (Zr) (mg/kg)	3.4	3.9	2.6	2.8	2.9

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2155899-6	L2155899-7	L2155899-8	L2155899-9	L2155899-10
Description	Sediment	Sediment	Sediment	Sediment	Sediment
Sampled Date	10-AUG-18	10-AUG-18	10-AUG-18	10-AUG-18	10-AUG-18
Sampled Time					
Client ID	TPE-SC-6	TPE-SC-7	TPE-SC-8	TPE-SC-9	TPE-SC-10
Grouping / **Analyte**					
SOIL					
Physical Tests Moisture (%)	89.3	88.0	87.0	87.4	86.2
pH (1:2 soil:water) (pH)	6.11	5.77	5.94	6.12	6.06
Metals Aluminum (Al) (mg/kg)	24900	25700	26200	23700	25100
Antimony (Sb) (mg/kg)	0.29	0.26	0.27	0.29	0.29
Arsenic (As) (mg/kg)	22.1	18.3	22.2	24.2	27.6
Barium (Ba) (mg/kg)	123	119	113	101	102
Beryllium (Be) (mg/kg)	1.72	1.78	1.78	1.64	1.62
Bismuth (Bi) (mg/kg)	2.27	2.54	2.38	2.13	2.10
Boron (B) (mg/kg)	8.8	8.7	9.4	8.9	8.7
Cadmium (Cd) (mg/kg)	0.381	0.195	0.158	0.205	0.197
Calcium (Ca) (mg/kg)	2660	2160	2350	2470	2590
Chromium (Cr) (mg/kg)	172	126	148	196	230
Cobalt (Co) (mg/kg)	18.6	16.7	16.4	17.2	17.7
Copper (Cu) (mg/kg)	52.3	55.3	56.4	54.5	54.2
Iron (Fe) (mg/kg)	47800	46500	47800	47300	51000
Lead (Pb) (mg/kg)	22.1	22.9	22.4	22.0	21.8
Lithium (Li) (mg/kg)	43.6	45.8	48.5	47.0	46.0
Magnesium (Mg) (mg/kg)	11200	10100	10900	11600	12800
Manganese (Mn) (mg/kg)	2320	2140	1220	1260	1150
Mercury (Hg) (mg/kg)	0.0223	0.0203	0.0231	0.0245	0.0242
Molybdenum (Mo) (mg/kg)	4.16	4.48	4.12	4.16	4.20
Nickel (Ni) (mg/kg)	125	76.2	76.4	96.1	108
Phosphorus (P) (mg/kg)	456	426	469	473	481
Potassium (K) (mg/kg)	4260	4610	4650	4070	4070
Selenium (Se) (mg/kg)	0.85	0.57	0.65	0.57	0.62
Silver (Ag) (mg/kg)	0.12	0.10	0.12	0.24	0.20
Sodium (Na) (mg/kg)	216	222	223	211	207
Strontium (Sr) (mg/kg)	21.8	20.2	20.2	20.0	20.0
Sulfur (S) (mg/kg)	2100	1700	1800	1800	1800
Thallium (Tl) (mg/kg)	0.435	0.406	0.389	0.354	0.349
Tin (Sn) (mg/kg)	5.9	4.1	2.8	6.0	5.0
Titanium (Ti) (mg/kg)	846	922	913	831	832
Tungsten (W) (mg/kg)	0.92	0.78	0.83	0.98	1.01
Uranium (U) (mg/kg)	15.6	18.4	17.5	15.6	15.3
Vanadium (V) (mg/kg)	44.7	44.0	45.6	45.1	48.0
Zinc (Zn) (mg/kg)	111	112	109	104	107
Zirconium (Zr) (mg/kg)	2.9	3.3	3.4	3.3	3.5

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2155899-11	L2155899-12	L2155899-13	L2155899-14	L2155899-15
Description	Sediment	Sediment	Sediment	Sediment	Sediment
Sampled Date	10-AUG-18	10-AUG-18	10-AUG-18	10-AUG-18	10-AUG-18
Sampled Time					
Client ID	WAL-SC-1	WAL-SC-2	WAL-SC-3	WAL-SC-4	WAL-SC-5
Grouping / **Analyte**					
SOIL					
Physical Tests Moisture (%)	90.0	94.2	93.9	93.7	94.4
pH (1:2 soil:water) (pH)	5.48	5.75	5.96	6.18	5.96
Metals Aluminum (Al) (mg/kg)	18700	18500	18500	20300	17300
Antimony (Sb) (mg/kg)	0.58	0.49	0.47	0.57	0.55
Arsenic (As) (mg/kg)	57.2	56.8	46.1	54.9	41.3
Barium (Ba) (mg/kg)	94.9	93.3	92.0	115	89.7
Beryllium (Be) (mg/kg)	1.48	1.48	1.46	1.64	1.37
Bismuth (Bi) (mg/kg)	1.86	1.89	1.76	2.06	1.69
Boron (B) (mg/kg)	13.7	12.2	13.8	14.6	15.2
Cadmium (Cd) (mg/kg)	0.464	0.443	0.434	0.516	0.477
Calcium (Ca) (mg/kg)	4500	4340	4300	4800	4750
Chromium (Cr) (mg/kg)	57.6	55.5	55.2	58.0	52.7
Cobalt (Co) (mg/kg)	10.2	10.1	9.44	10.1	9.04
Copper (Cu) (mg/kg)	138	135	132	160	130
Iron (Fe) (mg/kg)	40200	40500	32100	43000	31600
Lead (Pb) (mg/kg)	33.7	33.0	32.4	36.7	31.9
Lithium (Li) (mg/kg)	30.6	29.9	30.2	32.3	28.6
Magnesium (Mg) (mg/kg)	7100	6930	6980	7250	6610
Manganese (Mn) (mg/kg)	311	342	280	324	271
Mercury (Hg) (mg/kg)	0.0910	0.0762	0.0877	0.0892	0.0966
Molybdenum (Mo) (mg/kg)	12.1	11.4	10.7	13.2	9.91
Nickel (Ni) (mg/kg)	58.0	53.6	55.0	58.8	54.5
Phosphorus (P) (mg/kg)	812	763	769	771	745
Potassium (K) (mg/kg)	3170	3130	3220	3470	3030
Selenium (Se) (mg/kg)	0.87	0.81	0.82	1.00	0.82
Silver (Ag) (mg/kg)	0.60	0.61	0.62	0.73	0.59
Sodium (Na) (mg/kg)	201	217	229	233	214
Strontium (Sr) (mg/kg)	29.9	28.4	29.0	32.2	30.5
Sulfur (S) (mg/kg)	3500	2800	3500	3200	3900
Thallium (Tl) (mg/kg)	0.319	0.314	0.314	0.338	0.299
Tin (Sn) (mg/kg)	5.4	5.6	5.8	7.8	7.1
Titanium (Ti) (mg/kg)	567	547	545	563	499
Tungsten (W) (mg/kg)	1.34	1.31	1.32	1.31	1.32
Uranium (U) (mg/kg)	16.5	16.4	15.7	18.3	15.1
Vanadium (V) (mg/kg)	30.4	29.4	29.4	31.8	27.4
Zinc (Zn) (mg/kg)	128	124	122	136	115
Zirconium (Zr) (mg/kg)	4.4	4.1	4.6	4.1	4.3

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2155899-16	L2155899-17	L2155899-18	L2155899-19	L2155899-20
Description	Sediment	Sediment	Sediment	Sediment	Sediment
Sampled Date	10-AUG-18	10-AUG-18	10-AUG-18	10-AUG-18	10-AUG-18
Sampled Time					
Client ID	WAL-SC-6	WAL-SC-7	WAL-SC-8	WAL-SC-9	WAL-SC-10
Grouping / **Analyte**					
SOIL					
Physical Tests Moisture (%)	93.4	92.4	94.9	93.9	93.0
pH (1:2 soil:water) (pH)	6.64	6.56	6.43	6.54	6.66
Metals Aluminum (Al) (mg/kg)	20000	20400	15500	20000	21200
Antimony (Sb) (mg/kg)	0.54	0.54	0.50	0.56	0.49
Arsenic (As) (mg/kg)	41.7	20.1	27.5	75.2	45.3
Barium (Ba) (mg/kg)	113	129	91.8	113	126
Beryllium (Be) (mg/kg)	1.54	1.56	1.17	1.63	1.69
Bismuth (Bi) (mg/kg)	2.06	1.94	1.44	1.92	2.07
Boron (B) (mg/kg)	13.3	12.5	13.0	13.4	12.6
Cadmium (Cd) (mg/kg)	0.560	0.639	0.474	0.419	0.508
Calcium (Ca) (mg/kg)	4760	4640	5670	4960	5140
Chromium (Cr) (mg/kg)	59.0	60.0	49.0	56.9	58.6
Cobalt (Co) (mg/kg)	10.1	10.0	9.35	10.2	9.67
Copper (Cu) (mg/kg)	158	147	110	139	149
Iron (Fe) (mg/kg)	37100	26200	27000	50600	42200
Lead (Pb) (mg/kg)	35.7	36.0	29.8	35.3	35.2
Lithium (Li) (mg/kg)	31.1	36.5	26.1	30.9	35.8
Magnesium (Mg) (mg/kg)	7130	7690	6540	7250	7660
Manganese (Mn) (mg/kg)	377	315	324	537	488
Mercury (Hg) (mg/kg)	0.0799	0.0674	0.0859	0.100	0.0847
Molybdenum (Mo) (mg/kg)	11.5	5.98	7.81	14.8	11.1
Nickel (Ni) (mg/kg)	56.8	57.1	49.8	51.7	55.6
Phosphorus (P) (mg/kg)	696	577	940	978	802
Potassium (K) (mg/kg)	3490	3650	2990	3280	3490
Selenium (Se) (mg/kg)	0.98	0.85	0.78	0.90	0.86
Silver (Ag) (mg/kg)	0.75	0.74	0.52	0.58	0.58
Sodium (Na) (mg/kg)	245	241	218	206	217
Strontium (Sr) (mg/kg)	31.8	30.8	33.3	33.3	33.6
Sulfur (S) (mg/kg)	2900	2800	3800	2800	2400
Thallium (Tl) (mg/kg)	0.330	0.336	0.260	0.300	0.317
Tin (Sn) (mg/kg)	7.9	6.4	6.7	6.5	8.1
Titanium (Ti) (mg/kg)	561	633	465	520	577
Tungsten (W) (mg/kg)	1.43	1.49	1.32	1.33	1.31
Uranium (U) (mg/kg)	18.1	16.9	12.9	16.5	16.2
Vanadium (V) (mg/kg)	31.2	30.8	23.9	30.0	32.1
Zinc (Zn) (mg/kg)	126	122	101	125	120
Zirconium (Zr) (mg/kg)	3.9	4.9	4.7	3.9	3.5

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2155899-21	L2155899-22			
	Description	Sediment	Sediment			
	Sampled Date	10-AUG-18	10-AUG-18			
	Sampled Time					
	Client ID	CREMP DUP-SC-1	CREMP DUP-SC-2			
Grouping	**Analyte**					
SOIL						
Physical Tests	Moisture (%)	93.2	89.8			
	pH (1:2 soil:water) (pH)	5.88	6.21			
Metals	Aluminum (Al) (mg/kg)	24500	25400			
	Antimony (Sb) (mg/kg)	0.63	0.36			
	Arsenic (As) (mg/kg)	32.8	28.4			
	Barium (Ba) (mg/kg)	151	124			
	Beryllium (Be) (mg/kg)	1.82	1.53			
	Bismuth (Bi) (mg/kg)	2.26	2.04			
	Boron (B) (mg/kg)	13.5	9.0			
	Cadmium (Cd) (mg/kg)	0.712	0.547			
	Calcium (Ca) (mg/kg)	4310	2850			
	Chromium (Cr) (mg/kg)	62.8	251			
	Cobalt (Co) (mg/kg)	11.9	20.6			
	Copper (Cu) (mg/kg)	134	49.2			
	Iron (Fe) (mg/kg)	31300	51800			
	Lead (Pb) (mg/kg)	37.1	21.5			
	Lithium (Li) (mg/kg)	43.0	40.9			
	Magnesium (Mg) (mg/kg)	9180	13800			
	Manganese (Mn) (mg/kg)	393	2820			
	Mercury (Hg) (mg/kg)	0.0709	0.0258			
	Molybdenum (Mo) (mg/kg)	11.1	4.33			
	Nickel (Ni) (mg/kg)	60.4	164			
	Phosphorus (P) (mg/kg)	645	515			
	Potassium (K) (mg/kg)	4230	4220			
	Selenium (Se) (mg/kg)	0.88	0.76			
	Silver (Ag) (mg/kg)	0.56	0.18			
	Sodium (Na) (mg/kg)	204	219			
	Strontium (Sr) (mg/kg)	30.7	21.4			
	Sulfur (S) (mg/kg)	2700	2200			
	Thallium (Tl) (mg/kg)	0.439	0.436			
	Tin (Sn) (mg/kg)	6.5	3.6			
	Titanium (Ti) (mg/kg)	773	782			
	Tungsten (W) (mg/kg)	1.34	1.07			
	Uranium (U) (mg/kg)	21.5	13.7			
	Vanadium (V) (mg/kg)	34.8	47.8			
	Zinc (Zn) (mg/kg)	178	111			
	Zirconium (Zr) (mg/kg)	6.4	2.7			

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2155899-23				
	Description	Sediment				
	Sampled Date	10-AUG-18				
	Sampled Time					
	Client ID	CREMP SWIPE-SC-1				
Grouping	**Analyte**					
SWAB						
Metals	Aluminum (Al)-Total (ug)	<20				
	Antimony (Sb)-Total (ug)	<20				
	Arsenic (As)-Total (ug)	<20				
	Barium (Ba)-Total (ug)	<1.0				
	Beryllium (Be)-Total (ug)	<0.50				
	Bismuth (Bi)-Total (ug)	<20				
	Cadmium (Cd)-Total (ug)	<1.0				
	Calcium (Ca)-Total (ug)	<200				
	Chromium (Cr)-Total (ug)	<2.0				
	Cobalt (Co)-Total (ug)	<1.0				
	Copper (Cu)-Total (ug)	<1.0				
	Iron (Fe)-Total (ug)	27.5				
	Lead (Pb)-Total (ug)	<4.0				
	Lithium (Li)-Total (ug)	<1.0				
	Magnesium (Mg)-Total (ug)	150				
	Manganese (Mn)-Total (ug)	0.71				
	Molybdenum (Mo)-Total (ug)	<3.0				
	Nickel (Ni)-Total (ug)	<5.0				
	Phosphorus (P)-Total (ug)	32				
	Potassium (K)-Total (ug)	<200				
	Selenium (Se)-Total (ug)	<20				
	Silver (Ag)-Total (ug)	<1.0				
	Sodium (Na)-Total (ug)	980				
	Strontium (Sr)-Total (ug)	0.62				
	Thallium (Tl)-Total (ug)	<20				
	Tin (Sn)-Total (ug)	4.5				
	Titanium (Ti)-Total (ug)	<1.0				
	Vanadium (V)-Total (ug)	<3.0				
	Zinc (Zn)-Total (ug)	32.8				

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Duplicate	Copper (Cu)	DUP-H	L2155899-22
Duplicate	Iron (Fe)	DUP-H	L2155899-22
Duplicate	Nickel (Ni)	DUP-H	L2155899-22
Duplicate	Strontium (Sr)	DUP-H	L2155899-22
Duplicate	Tungsten (W)	DUP-H	L2155899-22

Qualifiers for Individual Parameters Listed:

Qualifier	Description
DUP-H	Duplicate results outside ALS DQO, due to sample heterogeneity.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
HG-200.2-CVAF-VA	Soil	Mercury in Soil by CVAAS	EPA 200.2/1631E (mod)

Soil samples are digested with hot nitric and hydrochloric acids, followed by CVAAS analysis. This method is fully compliant with the BC SALM strong acid leachable metals digestion method.

MET-200.2-CCMS-VA	Soil	Metals in Soil by CRC ICPMS	EPA 200.2/6020A (mod)

This method uses a heated strong acid digestion with HNO3 and HCl and is intended to liberate metals that may be environmentally available. Silicate minerals are not solubilized. Dependent on sample matrix, some metals may be only partially recovered, including Al, Ba, Be, Cr, Sr, Ti, Tl, V, W, and Zr. Volatile forms of sulfur (including sulfide) may not be captured, as they may be lost during sampling, storage, or digestion. Analysis is by Collision/Reaction Cell ICPMS.

MET-UG-ICP-VA	Swab	Metals in Swab by ICPOES	NIOSH 7303/EPA 6010B

This analysis is carried out using procedures adapted from Method 7303 in the NIOSH Manual of Analytcial Methods (NMAM). The procedure involves a hot block digestion of the swab material, using a combination of nitric acid and hydrochloric acid. Instrumental analysis of the swab extract is by inductively coupled plasma - optical emission spectrophotometry (EPA 6010B).

MOISTURE-VA	Soil	Moisture content	CWS for PHC in Soil - Tier 1

This analysis is carried out gravimetrically by drying the sample at 105 C for a minimum of six hours.

PH-1:2-VA	Soil	pH in Soil (1:2 Soil:Water Extraction)	BC WLAP METHOD: PH, ELECTROMETRIC, SOIL

This analysis is carried out in accordance with procedures described in the pH, Electrometric in Soil and Sediment method - Section B Physical/Inorganic and Misc. Constituents, BC Environmental Laboratory Manual 2007. The procedure involves mixing the dried (at <60°C) and sieved (No. 10 / 2mm) sample with deionized/distilled water at a 1:2 ratio of sediment to water. The pH of the solution is then measured using a standard pH probe.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

ALS Environmental

L2155899-COFC

COC # _____

Page 1 of 2

Report To		Report Format / Distribution	Service Requested (Rush for routine analysis subject to availability)
Company:	Azimuth Consulting Group	☐ Standard ☐ Other	◉ Regular (Standard Turnaround Times - Business Days)
Contact:	Eric Franz	☑ PDF ☑ Excel ☐ Digital ☐ Fax	○ Priority (2-4 Business Days) - 50% Surcharge - Contact ALS to Confirm TAT
Address:	218-2902 West Broadway	Email 1: efranz@azimuthgroup.ca	○ Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT
	Vancouver, BC V6K2G8	Email 2: gmann@azimuthgroup.ca	○ Same Day or Weekend Emergency - Contact ALS to Confirm TAT
Phone:	604-730-1220 Fax:	Email 3: robin.allard@agnicoeagle.com	
Invoice To	Same as Report ? ☑ Yes ☐ No	Client / Project Information	Analysis Request
Hardcopy of Invoice with Report?	☐ Yes ☑ No	Job #: CREMP Sediment Cores	Please indicate below Filtered, Preserved or both (F, P, F/P)
Company:		PO / AFE:	
Contact:		LSD:	
Address:			
Phone:	Fax:	Quote #: Q38011	

Lab Work Order # (lab use only)		ALS Contact:	Brent Mack	Sampler:	E. Franz M. Finley

Sample #	Sample Identification (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Total Metals, pH, Moisture	Number of Containers
	TPE-SC-1	10-Aug-18	-	Sediment	X	1
	TPE-SC-2	10-Aug-18	-	Sediment	X	1
	TPE-SC-3	10-Aug-18	-	Sediment	X	1
	TPE-SC-4	10-Aug-18	-	Sediment	X	1
	TPE-SC-5	10-Aug-18	-	Sediment	X	1
	TPE-SC-6	10-Aug-18	-	Sediment	X	1
	TPE-SC-7	10-Aug-18	-	Sediment	X	1
	TPE-SC-8	10-Aug-18	-	Sediment	X	1
	TPE-SC-9	10-Aug-18	-	Sediment	X	1
	TPE-SC-10	10-Aug-18	-	Sediment	X	1
	WAL-SC-1	11-Aug-18	-	Sediment	X	1
	WAL-SC-2	11-Aug-18	-	Sediment	X	1

Special Instructions / Regulations with water or land use (CCME-Freshwater Aquatic Life/BC CSR - Commercial/AB Tier 1 - Natural, etc) / Hazardous Details

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.

By the use of this form the user acknowledges and agrees with the Terms and Conditions as provided on a separate Excel tab.

Also provided on another Excel tab are the ALS location addresses, phone numbers and sample container / preservation / holding time table for common analyses.

SHIPMENT RELEASE (client use)			SHIPMENT RECEPTION (lab use only)				SHIPMENT VERIFICATION (lab use only)			
Released by:	Date (dd-mmm-yy)	Time (hh-mm)	Received by:	Date:	Time:	Temperature:	Verified by:	Date:	Time:	Observations: Yes / No ? If Yes add SIF
Eric Franz	23-Aug-18	9:00	PAUL	AUG 30	08:50	17.9 °C				

AV. OF 6 COOLERS

GENF 20.00 Front

ALS Environmental

L2155899-COFC

COC # _____

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Report To		Report Format / Distribution	Service Requested (Rush for routine analysis subject to availability)
Company:	Azimuth Consulting Group	☐ Standard ☐ Other	◉ Regular (Standard Turnaround Times - Business Days)
Contact:	Eric Franz	☑ PDF ☑ Excel ☐ Digital ☐ Fax	○ Priority (2-4 Business Days) - 50% Surcharge - Contact ALS to Confirm TAT
Address:	218-2902 West Broadway	Email 1: efranz@azimuthgroup.ca	○ Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT
	Vancouver, BC V6K2G8	Email 2: gmann@azimuthgroup.ca	○ Same Day or Weekend Emergency - Contact ALS to Confirm TAT
Phone:	604-730-1220 Fax:	Email 3: robin.allard@agnicoeagle.com	
Invoice To	Same as Report ? ☑ Yes ☐ No	Client / Project Information	Analysis Request
Hardcopy of Invoice with Report?	☐ Yes ☑ No	Job #: CREMP Sediment Cores	Please indicate below Filtered, Preserved or both (F, P, F/P)
Company:		PO / AFE:	
Contact:		LSD:	
Address:			
Phone:	Fax:	Quote #: Q38011	

Lab Work Order # (lab use only)		ALS Contact: Brent Mack	Sampler: E. Franz, M. Finley

Sample #	Sample Identification (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Total Metals, pH, Moisture												Number of Containers
	WAL-SC-3	11-Aug-18	-	Sediment	X												1
	WAL-SC-4	11-Aug-18	-	Sediment	X												1
	WAL-SC-5	11-Aug-18	-	Sediment	X												1
	WAL-SC-6	11-Aug-18	-	Sediment	X												1
	WAL-SC-7	11-Aug-18	-	Sediment	X												1
	WAL-SC-8	11-Aug-18	-	Sediment	X												1
	WAL-SC-9	11-Aug-18	-	Sediment	X												1
	WAL-SC-10	11-Aug-18	-	Sediment	X												1
	CREMP DUP-SC-1	-	-	Sediment	X												1
	CREMP DUP-SC-2	-	-	Sediment	X												1
	CREMP SWIPE-SC-1	10-Aug-18	-	Sediment	X												1

Special Instructions / Regulations with water or land use (CCME-Freshwater Aquatic Life/BC CSR - Commercial/AB Tier 1 - Natural, etc) / Hazardous Details

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.

By the use of this form the user acknowledges and agrees with the Terms and Conditions as provided on a separate Excel tab.

Also provided on another Excel tab are the ALS location addresses, phone numbers and sample container / preservation / holding time table for common analyses.

SHIPMENT RELEASE (client use)			SHIPMENT RECEPTION (lab use only)				SHIPMENT VERIFICATION (lab use only)			
Released by:	Date (dd-mmm-yy)	Time (hh-mm)	Received by:	Date:	Time:	Temperature:	Verified by:	Date:	Time:	Observations: Yes / No ? If Yes add SIF
			PAUL	AUG 30	08:50	17.9 °C				

AV. OF 6 COOLERS

GENF 20.00 Front

AZIMUTH CONSULTING GROUP INC.
ATTN: Eric Franz
218 - 2902 West Broadway
Vancouver BC V6K 2G8

Date Received: 30-AUG-18
Report Date: 27-SEP-18 18:44 (MT)
Version: FINAL REV. 2

Client Phone: 604-730-1220

Certificate of Analysis

Lab Work Order #: L2156055

Project P.O. #: NOT SUBMITTED
Job Reference: CREMP SEDIMENT GRABS
C of C Numbers:
Legal Site Desc:

Comments:

27-SEP-2018 This report replaces the previous version and contains increased detection limits for certain PAH compounds for certain samples.

Brent Mack, B.Sc.
Account Manager

[This report shall not be reproduced except in full without the written authority of the Laboratory.]

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2156055-1	L2156055-2	L2156055-3	L2156055-4	L2156055-5
Description	Sediment	Sediment	Sediment	Sediment	Sediment
Sampled Date	13-AUG-18	13-AUG-18	13-AUG-18	13-AUG-18	13-AUG-18
Sampled Time					
Client ID	SP-1	SP-2	SP-3	SP-4	SP-5
Grouping / **Analyte**					
SOIL					
Physical Tests Moisture (%)	84.9	84.0	85.2	85.1	67.7
pH (1:2 soil:water) (pH)	5.94	5.52	5.87	6.01	5.96
Particle Size % Gravel (>2mm) (%)	<1.0	<1.0	<1.0	<1.0	2.3
% Sand (2.0mm - 0.063mm) (%)	1.9	1.6	1.5	2.0	19.8
% Silt (0.063mm - 4um) (%)	80.9	74.2	79.8	81.6	52.2
% Clay (<4um) (%)	17.2	24.2	18.8	16.5	25.7
Texture	Silt loam	Silt loam	Silt loam	Silt	Silt loam
Organic / Inorganic Carbon Total Organic Carbon (%)	3.87	3.49	3.73	3.87	1.29
Metals Aluminum (Al) (mg/kg)	26200	24500	25900	24500	26200
Antimony (Sb) (mg/kg)	0.28	0.26	0.27	0.27	0.15
Arsenic (As) (mg/kg)	35.6	59.0	32.9	48.6	19.4
Barium (Ba) (mg/kg)	134	119	126	124	144
Beryllium (Be) (mg/kg)	2.00	2.23	2.11	2.10	1.66
Bismuth (Bi) (mg/kg)	2.39	2.31	2.38	2.39	1.85
Boron (B) (mg/kg)	9.5	9.3	8.9	9.2	7.2
Cadmium (Cd) (mg/kg)	0.320	0.254	0.286	0.257	0.398
Calcium (Ca) (mg/kg)	2270	2070	2300	2240	2360
Chromium (Cr) (mg/kg)	81.6	77.4	87.3	81.5	69.0
Cobalt (Co) (mg/kg)	18.0	15.6	17.8	16.7	17.9
Copper (Cu) (mg/kg)	75.8	73.4	75.1	74.4	48.9
Iron (Fe) (mg/kg)	71600	91800	71900	82600	47100
Lead (Pb) (mg/kg)	22.6	21.0	22.1	21.9	21.1
Lithium (Li) (mg/kg)	44.8	42.1	44.3	41.3	59.7
Magnesium (Mg) (mg/kg)	9480	8740	9680	9010	10300
Manganese (Mn) (mg/kg)	1930	1160	1520	1820	3700
Mercury (Hg) (mg/kg)	0.0294	0.0283	0.0301	0.0310	0.0141
Molybdenum (Mo) (mg/kg)	7.12	10.1	8.16	10.0	5.30
Nickel (Ni) (mg/kg)	69.9	57.5	70.0	64.4	83.6
Phosphorus (P) (mg/kg)	639	975	620	720	290
Potassium (K) (mg/kg)	4780	4450	4670	4510	5230
Selenium (Se) (mg/kg)	0.72	0.76	0.68	0.75	<0.20
Silver (Ag) (mg/kg)	0.17	0.15	0.12	0.13	<0.10
Sodium (Na) (mg/kg)	247	208	219	219	285
Strontium (Sr) (mg/kg)	21.6	20.0	20.7	20.6	23.9
Sulfur (S) (mg/kg)	1600	1200	1500	1300	<1000
Thallium (Tl) (mg/kg)	0.436	0.398	0.407	0.381	0.510

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2156055-7	L2156055-8	L2156055-9	L2156055-10	L2156055-11
Description	Sediment	Sediment	Sediment	Sediment	Sediment
Sampled Date	10-AUG-18	10-AUG-18	10-AUG-18	10-AUG-18	10-AUG-18
Sampled Time					
Client ID	TPE-1	TPE-2	TPE-3	TPE-4	TPE-5
Grouping / **Analyte**					
SOIL					
Physical Tests Moisture (%)	83.7	85.2	85.4	83.4	78.9
pH (1:2 soil:water) (pH)	6.51	6.68	6.30	6.07	5.91
Particle Size % Gravel (>2mm) (%)	<1.0	<1.0	<1.0	<1.0	<1.0
% Sand (2.0mm - 0.063mm) (%)	2.4	1.1	1.9	4.8	12.1
% Silt (0.063mm - 4um) (%)	71.5	70.2	63.7	69.2	65.7
% Clay (<4um) (%)	26.1	28.8	34.5	26.0	22.2
Texture	Silt loam	Silt loam	Silt loam	Silt loam	Silt loam
Organic / Inorganic Carbon Total Organic Carbon (%)	2.79	3.44	3.38	2.82	2.48
Metals Aluminum (Al) (mg/kg)	24700	23800	24500	26100	27300
Antimony (Sb) (mg/kg)	0.22	0.23	0.24	0.23	0.22
Arsenic (As) (mg/kg)	18.0	18.6	19.2	22.1	21.5
Barium (Ba) (mg/kg)	131	138	121	121	125
Beryllium (Be) (mg/kg)	1.86	1.72	1.74	1.91	1.90
Bismuth (Bi) (mg/kg)	2.54	2.34	2.37	2.62	2.53
Boron (B) (mg/kg)	9.4	9.1	9.1	9.7	9.8
Cadmium (Cd) (mg/kg)	0.180	0.466	0.244	0.182	0.135
Calcium (Ca) (mg/kg)	2060	2030	2050	1970	1990
Chromium (Cr) (mg/kg)	109	123	133	133	129
Cobalt (Co) (mg/kg)	15.4	16.9	16.3	18.2	16.6
Copper (Cu) (mg/kg)	49.5	50.5	49.8	55.8	57.5
Iron (Fe) (mg/kg)	47900	43400	44000	48700	49300
Lead (Pb) (mg/kg)	21.1	20.6	20.6	22.3	22.1
Lithium (Li) (mg/kg)	46.4	44.2	44.2	48.5	54.1
Magnesium (Mg) (mg/kg)	9880	9850	10400	10800	11500
Manganese (Mn) (mg/kg)	3040	3290	1990	1630	1610
Mercury (Hg) (mg/kg)	0.0182	0.0190	0.0192	0.0189	0.0153
Molybdenum (Mo) (mg/kg)	4.33	4.09	3.84	4.92	4.66
Nickel (Ni) (mg/kg)	68.8	131	86.3	74.5	69.7
Phosphorus (P) (mg/kg)	387	433	445	436	401
Potassium (K) (mg/kg)	4670	4430	4510	4940	5180
Selenium (Se) (mg/kg)	0.61	0.69	0.65	0.49	0.37
Silver (Ag) (mg/kg)	<0.10	<0.10	<0.10	<0.10	<0.10
Sodium (Na) (mg/kg)	202	198	189	207	187
Strontium (Sr) (mg/kg)	18.8	19.0	19.0	18.9	19.5
Sulfur (S) (mg/kg)	1600	1900	1700	1200	1200
Thallium (Tl) (mg/kg)	0.438	0.512	0.419	0.427	0.428

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2156055-12	L2156055-13	L2156055-14	L2156055-15	L2156055-16
Description	Sediment	Sediment	Sediment	Sediment	Sediment
Sampled Date	10-AUG-18	10-AUG-18	10-AUG-18	10-AUG-18	10-AUG-18
Sampled Time					
Client ID	TPE-COMP	TPN-1	TPN-2	TPN-3	TPN-4
Grouping / **Analyte**					
SOIL					
Physical Tests Moisture (%)	84.0	79.2	82.9	78.9	68.4
pH (1:2 soil:water) (pH)		5.91	5.65	5.79	5.85
Particle Size % Gravel (>2mm) (%)		<1.0	<1.0	<1.0	1.2
% Sand (2.0mm - 0.063mm) (%)		23.4	21.2	14.9	39.4
% Silt (0.063mm - 4um) (%)		63.5	65.8	61.9	47.6
% Clay (<4um) (%)		13.1	13.1	23.3	11.8
Texture		Silt loam	Silt loam	Silt loam	Silt loam
Organic / Inorganic Carbon Total Organic Carbon (%)		2.53	3.39	2.52	1.29
Metals Aluminum (Al) (mg/kg)		17100	17700	19800	20400
Antimony (Sb) (mg/kg)		0.16	0.24	0.20	0.16
Arsenic (As) (mg/kg)		8.79	12.1	14.1	11.1
Barium (Ba) (mg/kg)		74.0	74.8	85.9	78.8
Beryllium (Be) (mg/kg)		1.05	1.15	1.18	1.08
Bismuth (Bi) (mg/kg)		1.13	1.20	1.32	1.11
Boron (B) (mg/kg)		6.9	7.6	8.1	6.9
Cadmium (Cd) (mg/kg)		0.072	0.204	0.105	0.052
Calcium (Ca) (mg/kg)		1730	1670	1660	1370
Chromium (Cr) (mg/kg)		114	113	124	131
Cobalt (Co) (mg/kg)		8.70	10.3	11.4	10.3
Copper (Cu) (mg/kg)		45.2	53.9	49.2	42.6
Iron (Fe) (mg/kg)		22700	25100	28800	29700
Lead (Pb) (mg/kg)		14.3	15.6	17.7	13.3
Lithium (Li) (mg/kg)		28.5	29.6	33.2	34.6
Magnesium (Mg) (mg/kg)		8320	8230	9090	9440
Manganese (Mn) (mg/kg)		233	244	370	435
Mercury (Hg) (mg/kg)		0.0140	0.0162	0.0154	0.0090
Molybdenum (Mo) (mg/kg)		1.35	3.00	2.70	2.19
Nickel (Ni) (mg/kg)		56.1	61.6	60.7	57.4
Phosphorus (P) (mg/kg)		562	582	422	333
Potassium (K) (mg/kg)		2720	2950	3320	3100
Selenium (Se) (mg/kg)		0.37	0.53	0.34	<0.20
Silver (Ag) (mg/kg)		0.15	0.13	<0.10	<0.10
Sodium (Na) (mg/kg)		163	138	151	129
Strontium (Sr) (mg/kg)		16.0	16.0	17.0	15.5
Sulfur (S) (mg/kg)		<1000	<1000	<1000	<1000
Thallium (Tl) (mg/kg)		0.207	0.228	0.241	0.200

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2156055-17	L2156055-19	L2156055-20	L2156055-21	L2156055-22
Description	Sediment	Sediment	Sediment	Sediment	Sediment
Sampled Date	10-AUG-18	11-AUG-18	11-AUG-18	11-AUG-18	11-AUG-18
Sampled Time					
Client ID	TPN-5	WAL-1	WAL-2	WAL-3	WAL-4
Grouping / **Analyte**					
SOIL					
Physical Tests Moisture (%)	55.7	90.9	92.1	90.0	91.7
pH (1:2 soil:water) (pH)	5.87	6.31	6.43	6.58	6.64
Particle Size % Gravel (>2mm) (%)	1.1	<1.0	<1.0	<1.0	<1.0
% Sand (2.0mm - 0.063mm) (%)	41.0	1.5	1.2	1.2	1.3
% Silt (0.063mm - 4um) (%)	37.5	83.7	80.5	84.7	81.6
% Clay (<4um) (%)	20.4	14.8	18.3	14.2	17.1
Texture	Loam	Silt	Silt loam	Silt	Silt loam
Organic / Inorganic Carbon Total Organic Carbon (%)	0.852	10.3	10.5	8.62	10.3
Metals Aluminum (Al) (mg/kg)	19300	18500	18000	21900	19100
Antimony (Sb) (mg/kg)	0.13	0.47	0.45	0.44	0.50
Arsenic (As) (mg/kg)	9.71	30.2	34.9	47.2	31.5
Barium (Ba) (mg/kg)	89.5	104	98.1	131	112
Beryllium (Be) (mg/kg)	1.13	1.46	1.42	1.78	1.50
Bismuth (Bi) (mg/kg)	1.19	1.83	1.76	2.34	1.90
Boron (B) (mg/kg)	6.8	12.1	13.0	11.8	13.8
Cadmium (Cd) (mg/kg)	0.071	0.513	0.419	0.550	0.457
Calcium (Ca) (mg/kg)	1380	4100	4260	4220	4440
Chromium (Cr) (mg/kg)	108	55.8	53.3	63.6	56.1
Cobalt (Co) (mg/kg)	10.2	9.30	8.59	10.0	9.02
Copper (Cu) (mg/kg)	43.4	130	130	167	136
Iron (Fe) (mg/kg)	29000	27200	29000	42400	28300
Lead (Pb) (mg/kg)	14.2	34.0	31.5	37.9	33.4
Lithium (Li) (mg/kg)	37.5	32.4	30.6	35.8	33.4
Magnesium (Mg) (mg/kg)	9160	7470	6940	7990	7360
Manganese (Mn) (mg/kg)	387	300	283	377	298
Mercury (Hg) (mg/kg)	0.0072	0.0771	0.0854	0.0777	0.0778
Molybdenum (Mo) (mg/kg)	1.35	7.72	8.88	11.5	8.19
Nickel (Ni) (mg/kg)	56.6	52.0	49.5	59.5	51.6
Phosphorus (P) (mg/kg)	352	738	733	815	687
Potassium (K) (mg/kg)	3410	3400	3250	3840	3530
Selenium (Se) (mg/kg)	<0.20	0.75	0.78	1.05	0.74
Silver (Ag) (mg/kg)	<0.10	0.61	0.62	0.70	0.67
Sodium (Na) (mg/kg)	143	201	197	208	209
Strontium (Sr) (mg/kg)	15.4	28.7	27.7	29.8	30.8
Sulfur (S) (mg/kg)	<1000	3300	2700	2300	2900
Thallium (Tl) (mg/kg)	0.242	0.321	0.306	0.359	0.331

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2156055-23	L2156055-24	L2156055-25	L2156055-26	L2156055-27
Description	Sediment	Sediment	Sediment	Sediment	Sediment
Sampled Date	11-AUG-18	11-AUG-18	13-AUG-18	13-AUG-18	13-AUG-18
Sampled Time					
Client ID	WAL-5	WAL-COMP	INUG-1	INUG-2	INUG-3
Grouping / **Analyte**					
SOIL					
Physical Tests Moisture (%)	90.5	91.6	85.6	83.6	82.9
pH (1:2 soil:water) (pH)	6.30		5.04	5.05	5.45
Particle Size % Gravel (>2mm) (%)	<1.0		<1.0	<1.0	<1.0
% Sand (2.0mm - 0.063mm) (%)	1.2		2.3	2.8	3.1
% Silt (0.063mm - 4um) (%)	86.8		79.6	72.6	74.2
% Clay (<4um) (%)	12.1		18.1	24.6	22.8
Texture	Silt		Silt loam	Silt loam	Silt loam
Organic / Inorganic Carbon Total Organic Carbon (%)	10.5		4.08	3.58	3.29
Metals Aluminum (Al) (mg/kg)	18200		23400	26500	25700
Antimony (Sb) (mg/kg)	0.45		0.21	0.17	0.17
Arsenic (As) (mg/kg)	35.5		69.9	16.6	10.1
Barium (Ba) (mg/kg)	105		139	140	143
Beryllium (Be) (mg/kg)	1.44		1.55	1.70	1.68
Bismuth (Bi) (mg/kg)	1.86		1.23	1.35	1.39
Boron (B) (mg/kg)	11.3		8.0	9.8	8.4
Cadmium (Cd) (mg/kg)	0.430		0.345	0.274	0.278
Calcium (Ca) (mg/kg)	4120		1700	2060	1960
Chromium (Cr) (mg/kg)	54.0		116	126	129
Cobalt (Co) (mg/kg)	9.29		14.6	11.9	12.8
Copper (Cu) (mg/kg)	130		50.1	51.9	51.1
Iron (Fe) (mg/kg)	31700		79000	39400	34100
Lead (Pb) (mg/kg)	31.8		13.9	14.6	15.1
Lithium (Li) (mg/kg)	30.3		29.2	32.4	33.2
Magnesium (Mg) (mg/kg)	6990		10100	10700	10900
Manganese (Mn) (mg/kg)	331		959	607	530
Mercury (Hg) (mg/kg)	0.0809		0.0329	0.0264	0.0251
Molybdenum (Mo) (mg/kg)	9.47		4.64	3.40	2.91
Nickel (Ni) (mg/kg)	50.8		104	89.3	95.2
Phosphorus (P) (mg/kg)	780		1880	1180	999
Potassium (K) (mg/kg)	3280		3450	3980	3840
Selenium (Se) (mg/kg)	0.75		0.74	0.55	0.58
Silver (Ag) (mg/kg)	0.59		0.22	0.20	0.20
Sodium (Na) (mg/kg)	181		170	179	179
Strontium (Sr) (mg/kg)	27.8		22.9	27.4	27.2
Sulfur (S) (mg/kg)	3200		1200	<1000	<1000
Thallium (Tl) (mg/kg)	0.312		0.244	0.251	0.260

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2156055-28	L2156055-29	L2156055-30	L2156055-31	L2156055-32
Description	Sediment	Sediment	Sediment	Sediment	Sediment
Sampled Date	13-AUG-18	13-AUG-18	13-AUG-18	13-AUG-18	13-AUG-18
Sampled Time					
Client ID	INUG-4	INUG-5	INUG-COMP	PDL-1	PDL-2
Grouping / **Analyte**					
SOIL					
Physical Tests Moisture (%)	82.4	82.5	83.9	69.8	75.8
pH (1:2 soil:water) (pH)	5.59	4.97		5.61	5.93
Particle Size % Gravel (>2mm) (%)	<1.0	<1.0		<1.0	<1.0
% Sand (2.0mm - 0.063mm) (%)	3.8	1.8		10.7	10.8
% Silt (0.063mm - 4um) (%)	69.7	74.3		70.8	71.9
% Clay (<4um) (%)	26.6	23.9		18.4	17.4
Texture	Silt loam	Silt loam		Silt loam	Silt loam
Organic / Inorganic Carbon Total Organic Carbon (%)	3.08	3.45		1.76	2.31
Metals Aluminum (Al) (mg/kg)	27400	24100		24300	21900
Antimony (Sb) (mg/kg)	0.16	0.17		0.20	0.19
Arsenic (As) (mg/kg)	9.00	131		26.2	13.0
Barium (Ba) (mg/kg)	148	133		98.8	96.8
Beryllium (Be) (mg/kg)	1.72	1.50		1.17	1.05
Bismuth (Bi) (mg/kg)	1.33	1.20		1.00	0.99
Boron (B) (mg/kg)	9.6	9.2		7.5	7.2
Cadmium (Cd) (mg/kg)	0.190	0.185		0.149	0.117
Calcium (Ca) (mg/kg)	2260	1900		2000	2220
Chromium (Cr) (mg/kg)	128	112		155	143
Cobalt (Co) (mg/kg)	11.6	13.0		16.9	12.1
Copper (Cu) (mg/kg)	49.9	46.0		48.6	44.6
Iron (Fe) (mg/kg)	31700	113000		42100	31300
Lead (Pb) (mg/kg)	14.4	12.8		14.5	14.1
Lithium (Li) (mg/kg)	34.0	27.5		32.9	30.3
Magnesium (Mg) (mg/kg)	11400	9970		12000	11200
Manganese (Mn) (mg/kg)	499	828		435	339
Mercury (Hg) (mg/kg)	0.0229	0.0283		0.0099	0.0113
Molybdenum (Mo) (mg/kg)	2.70	11.5		3.11	2.20
Nickel (Ni) (mg/kg)	86.9	74.3		96.5	81.5
Phosphorus (P) (mg/kg)	1020	2510		532	593
Potassium (K) (mg/kg)	4050	3660		3110	2930
Selenium (Se) (mg/kg)	0.58	0.71		0.24	0.29
Silver (Ag) (mg/kg)	0.18	0.18		<0.10	0.12
Sodium (Na) (mg/kg)	197	172		114	112
Strontium (Sr) (mg/kg)	30.2	27.7		23.8	25.8
Sulfur (S) (mg/kg)	<1000	1000		<1000	<1000
Thallium (Tl) (mg/kg)	0.241	0.216		0.191	0.184

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2156055-33	L2156055-34	L2156055-36	L2156055-37	L2156055-38
Description	Sediment	Sediment	Sediment	Sediment	Sediment
Sampled Date	13-AUG-18	13-AUG-18	13-AUG-18	20-AUG-18	20-AUG-18
Sampled Time					
Client ID	PDL-3	PDL-4	PDL-COMP	BAP-1	BAP-2
Grouping / **Analyte**					
SOIL					
Physical Tests Moisture (%)	76.6	83.4	75.3	31.8	32.7
pH (1:2 soil:water) (pH)	5.94	5.30		6.70	6.48
Particle Size % Gravel (>2mm) (%)	<1.0	<1.0		<1.0	<1.0
% Sand (2.0mm - 0.063mm) (%)	8.1	8.3		84.2	75.3
% Silt (0.063mm - 4um) (%)	73.1	74.8		14.2	22.4
% Clay (<4um) (%)	18.8	16.9		1.6	2.3
Texture	Silt loam / Silt	Silt loam		Sand	Loamy sand
Organic / Inorganic Carbon Total Organic Carbon (%)	2.26	3.74		0.283	0.389
Metals Aluminum (Al) (mg/kg)	22200	20500		4370	4570
Antimony (Sb) (mg/kg)	0.23	0.24		0.13	0.18
Arsenic (As) (mg/kg)	46.0	12.2		4.61	6.85
Barium (Ba) (mg/kg)	87.7	86.8		376	396
Beryllium (Be) (mg/kg)	1.09	1.01		0.32	0.29
Bismuth (Bi) (mg/kg)	0.97	0.76		<0.20	<0.20
Boron (B) (mg/kg)	6.8	6.7		6.3	6.2
Cadmium (Cd) (mg/kg)	0.190	0.292		<0.020	0.032
Calcium (Ca) (mg/kg)	1940	2170		1870	2180
Chromium (Cr) (mg/kg)	152	136		14.6	15.3
Cobalt (Co) (mg/kg)	16.9	10.8		3.28	3.73
Copper (Cu) (mg/kg)	49.7	44.8		3.50	4.29
Iron (Fe) (mg/kg)	44000	27100		11400	14100
Lead (Pb) (mg/kg)	14.5	13.1		3.43	4.29
Lithium (Li) (mg/kg)	30.0	27.7		6.6	6.4
Magnesium (Mg) (mg/kg)	11700	10700		2850	2710
Manganese (Mn) (mg/kg)	1070	306		163	185
Mercury (Hg) (mg/kg)	0.0138	0.0159		<0.0050	0.0050
Molybdenum (Mo) (mg/kg)	3.33	2.08		0.36	0.59
Nickel (Ni) (mg/kg)	96.0	82.4		8.28	8.86
Phosphorus (P) (mg/kg)	707	462		579	719
Potassium (K) (mg/kg)	2820	2550		990	1220
Selenium (Se) (mg/kg)	0.24	0.44		<0.20	<0.20
Silver (Ag) (mg/kg)	<0.10	0.22		<0.10	<0.10
Sodium (Na) (mg/kg)	111	99		73	118
Strontium (Sr) (mg/kg)	21.5	19.9		44.0	42.8
Sulfur (S) (mg/kg)	<1000	<1000		<1000	<1000
Thallium (Tl) (mg/kg)	0.198	0.174		<0.050	0.055

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2156055-39	L2156055-40	L2156055-41	L2156055-42	L2156055-43
Description	Sediment	Sediment	Sediment	Sediment	Sediment
Sampled Date	20-AUG-18	20-AUG-18	20-AUG-18	20-AUG-18	20-AUG-18
Sampled Time					
Client ID	BAP-3	BAP-4	BAP-5	BAP-COMP	BES-1
Grouping / **Analyte**					
SOIL					
Physical Tests Moisture (%)	32.8	38.9	41.6	37.7	34.5
pH (1:2 soil:water) (pH)	5.76	6.06	6.07		7.59
Particle Size % Gravel (>2mm) (%)	<1.0	<1.0	<1.0		<1.0
% Sand (2.0mm - 0.063mm) (%)	76.6	68.3	69.0		73.0
% Silt (0.063mm - 4um) (%)	21.0	27.8	26.9		23.6
% Clay (<4um) (%)	2.4	4.0	4.1		3.5
Texture	Loamy sand	Sandy loam	Loamy sand		Loamy sand
Organic / Inorganic Carbon Total Organic Carbon (%)	0.330	0.532	0.428		0.334
Metals Aluminum (Al) (mg/kg)	4590	5500	5950		6510
Antimony (Sb) (mg/kg)	0.13	0.15	0.15		0.12
Arsenic (As) (mg/kg)	3.00	3.35	3.02		3.09
Barium (Ba) (mg/kg)	272	280	359		160
Beryllium (Be) (mg/kg)	0.31	0.37	0.38		0.35
Bismuth (Bi) (mg/kg)	<0.20	<0.20	<0.20		<0.20
Boron (B) (mg/kg)	6.0	7.6	7.9		7.1
Cadmium (Cd) (mg/kg)	0.024	0.038	0.032		0.038
Calcium (Ca) (mg/kg)	1970	1920	2100		2260
Chromium (Cr) (mg/kg)	14.9	16.6	17.5		17.7
Cobalt (Co) (mg/kg)	3.74	4.22	4.19		4.38
Copper (Cu) (mg/kg)	4.39	6.00	5.75		4.31
Iron (Fe) (mg/kg)	12600	12900	13800		12900
Lead (Pb) (mg/kg)	4.16	5.01	5.01		4.44
Lithium (Li) (mg/kg)	7.5	8.4	8.8		9.0
Magnesium (Mg) (mg/kg)	3130	3590	3640		4010
Manganese (Mn) (mg/kg)	122	110	126		611
Mercury (Hg) (mg/kg)	0.0052	<0.0050	0.0055		0.0074
Molybdenum (Mo) (mg/kg)	0.39	0.47	0.41		0.48
Nickel (Ni) (mg/kg)	8.60	10.1	10.4		10.3
Phosphorus (P) (mg/kg)	653	602	626		618
Potassium (K) (mg/kg)	1040	1260	1410		1270
Selenium (Se) (mg/kg)	<0.20	<0.20	<0.20		<0.20
Silver (Ag) (mg/kg)	<0.10	<0.10	<0.10		<0.10
Sodium (Na) (mg/kg)	86	116	136		106
Strontium (Sr) (mg/kg)	38.8	43.7	48.2		40.6
Sulfur (S) (mg/kg)	<1000	<1000	<1000		<1000
Thallium (Tl) (mg/kg)	0.054	0.065	0.065		0.058

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2156055-44	L2156055-45	L2156055-46	L2156055-47	L2156055-48
Description	Sediment	Sediment	Sediment	Sediment	Sediment
Sampled Date	20-AUG-18	20-AUG-18	20-AUG-18	20-AUG-18	20-AUG-18
Sampled Time					
Client ID	BES-2	BES-3	BES-4	BES-5	BES-COMP
Grouping / **Analyte**					
SOIL					
Physical Tests Moisture (%)	39.3	42.0	37.9	38.5	39.6
pH (1:2 soil:water) (pH)	6.79	6.85	6.75	6.72	
Particle Size % Gravel (>2mm) (%)	<1.0	<1.0	<1.0	<1.0	
% Sand (2.0mm - 0.063mm) (%)	68.6	60.8	60.9	58.7	
% Silt (0.063mm - 4um) (%)	26.9	34.2	33.2	35.1	
% Clay (<4um) (%)	4.5	4.4	5.9	5.7	
Texture	Loamy sand	Sandy loam	Sandy loam	Sandy loam	
Organic / Inorganic Carbon Total Organic Carbon (%)	0.377	0.439	0.492	0.430	
Metals Aluminum (Al) (mg/kg)	6890	7630	7280	7010	
Antimony (Sb) (mg/kg)	0.13	0.13	0.16	0.14	
Arsenic (As) (mg/kg)	3.40	3.78	3.69	3.64	
Barium (Ba) (mg/kg)	146	138	116	119	
Beryllium (Be) (mg/kg)	0.38	0.39	0.39	0.37	
Bismuth (Bi) (mg/kg)	0.27	<0.20	<0.20	<0.20	
Boron (B) (mg/kg)	7.8	8.1	7.7	7.0	
Cadmium (Cd) (mg/kg)	0.041	0.043	0.045	0.037	
Calcium (Ca) (mg/kg)	2330	2450	2350	2460	
Chromium (Cr) (mg/kg)	18.5	20.4	19.8	19.1	
Cobalt (Co) (mg/kg)	4.63	5.05	5.05	4.78	
Copper (Cu) (mg/kg)	4.67	5.48	5.22	5.19	
Iron (Fe) (mg/kg)	13200	14000	13900	13600	
Lead (Pb) (mg/kg)	4.84	5.43	5.61	5.55	
Lithium (Li) (mg/kg)	9.5	9.9	10.0	9.1	
Magnesium (Mg) (mg/kg)	4210	4520	4310	4070	
Manganese (Mn) (mg/kg)	723	843	730	854	
Mercury (Hg) (mg/kg)	0.0072	0.0095	0.0096	0.0095	
Molybdenum (Mo) (mg/kg)	0.63	0.70	0.63	0.86	
Nickel (Ni) (mg/kg)	11.0	11.9	11.9	10.7	
Phosphorus (P) (mg/kg)	671	671	684	716	
Potassium (K) (mg/kg)	1350	1430	1370	1270	
Selenium (Se) (mg/kg)	<0.20	<0.20	<0.20	<0.20	
Silver (Ag) (mg/kg)	<0.10	<0.10	<0.10	<0.10	
Sodium (Na) (mg/kg)	121	132	123	133	
Strontium (Sr) (mg/kg)	42.5	45.7	43.9	41.9	
Sulfur (S) (mg/kg)	<1000	<1000	<1000	<1000	
Thallium (Tl) (mg/kg)	0.063	0.064	0.063	0.059	

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	L2156055-49 Sediment 21-AUG-18 BPJ-1	L2156055-50 Sediment 21-AUG-18 BPJ-2	L2156055-51 Sediment 21-AUG-18 BPJ-3	L2156055-52 Sediment 21-AUG-18 BPJ-4	L2156055-53 Sediment 21-AUG-18 BPJ-5
Sample ID / Description / Sampled Date / Sampled Time / Client ID						
SOIL						
Physical Tests	Moisture (%)	50.3	50.6	49.8	38.2	41.7
	pH (1:2 soil:water) (pH)	7.24	6.84	6.69	6.65	7.42
Particle Size	% Gravel (>2mm) (%)	<1.0	<1.0	<1.0	<1.0	<1.0
	% Sand (2.0mm - 0.063mm) (%)	32.2	33.5	20.7	57.7	54.1
	% Silt (0.063mm - 4um) (%)	57.5	55.7	67.1	36.7	38.7
	% Clay (<4um) (%)	10.3	10.8	12.2	5.4	7.3
	Texture	Silt loam	Silt loam	Silt loam	Sandy loam	Sandy loam
Organic / Inorganic Carbon	Total Organic Carbon (%)	0.666	0.655	0.702	0.365	0.502
Metals	Aluminum (Al) (mg/kg)	9040	8830	11000	6630	7420
	Antimony (Sb) (mg/kg)	0.14	0.13	0.20	0.11	0.10
	Arsenic (As) (mg/kg)	6.87	9.59	23.4	6.19	6.39
	Barium (Ba) (mg/kg)	116	114	122	98.1	104
	Beryllium (Be) (mg/kg)	0.42	0.41	0.52	0.29	0.34
	Bismuth (Bi) (mg/kg)	0.21	0.20	0.25	<0.20	<0.20
	Boron (B) (mg/kg)	6.9	7.5	9.8	5.9	6.8
	Cadmium (Cd) (mg/kg)	0.082	0.070	0.067	0.050	0.047
	Calcium (Ca) (mg/kg)	2550	2630	3010	2070	2130
	Chromium (Cr) (mg/kg)	20.8	20.7	24.4	16.6	16.6
	Cobalt (Co) (mg/kg)	6.83	6.77	7.71	5.01	5.18
	Copper (Cu) (mg/kg)	9.08	8.59	10.5	5.82	6.59
	Iron (Fe) (mg/kg)	17800	18900	24900	14700	15300
	Lead (Pb) (mg/kg)	9.00	8.47	10.6	6.17	6.60
	Lithium (Li) (mg/kg)	11.6	10.8	13.3	8.0	9.3
	Magnesium (Mg) (mg/kg)	5300	4880	5940	3730	4240
	Manganese (Mn) (mg/kg)	1680	1640	1280	2690	1100
	Mercury (Hg) (mg/kg)	0.0128	0.0102	0.0100	0.0073	0.0074
	Molybdenum (Mo) (mg/kg)	1.38	1.38	1.93	1.21	1.04
	Nickel (Ni) (mg/kg)	13.6	12.8	14.5	9.88	10.6
	Phosphorus (P) (mg/kg)	871	836	1280	606	655
	Potassium (K) (mg/kg)	1460	1480	1940	1080	1260
	Selenium (Se) (mg/kg)	<0.20	<0.20	<0.20	<0.20	<0.20
	Silver (Ag) (mg/kg)	<0.10	<0.10	<0.10	<0.10	<0.10
	Sodium (Na) (mg/kg)	164	167	217	113	134
	Strontium (Sr) (mg/kg)	43.4	48.9	58.8	44.2	45.9
	Sulfur (S) (mg/kg)	<1000	<1000	<1000	<1000	<1000
	Thallium (Tl) (mg/kg)	0.072	0.074	0.088	<0.050	0.057

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	L2156055-54 Sediment 21-AUG-18 BPJ-COMP	L2156055-55 Sediment 21-AUG-18 BBD-1	L2156055-56 Sediment 21-AUG-18 BBD-2	L2156055-57 Sediment 21-AUG-18 BBD-3	L2156055-58 Sediment 21-AUG-18 BBD-4
SOIL						
Physical Tests	Moisture (%)	45.6	41.5	27.4	37.2	16.0
	pH (1:2 soil:water) (pH)		6.17	7.19	6.77	6.52
Particle Size	% Gravel (>2mm) (%)		<1.0	<1.0	<1.0	<1.0
	% Sand (2.0mm - 0.063mm) (%)		31.0	86.7	25.3	82.5
	% Silt (0.063mm - 4um) (%)		62.6	10.6	63.3	15.1
	% Clay (<4um) (%)		6.5	1.7	10.7	2.0
	Texture		Silt loam	Sand	Silt loam	Loamy sand
Organic / Inorganic Carbon	Total Organic Carbon (%)		0.585	0.180	0.441	0.202
Metals	Aluminum (Al) (mg/kg)		8320	4170	8010	4360
	Antimony (Sb) (mg/kg)		0.11	<0.10	0.11	<0.10
	Arsenic (As) (mg/kg)		7.29	3.80	5.87	3.48
	Barium (Ba) (mg/kg)		104	42.9	74.1	41.9
	Beryllium (Be) (mg/kg)		0.35	0.18	0.41	0.20
	Bismuth (Bi) (mg/kg)		<0.20	<0.20	<0.20	<0.20
	Boron (B) (mg/kg)		6.5	<5.0	7.5	<5.0
	Cadmium (Cd) (mg/kg)		0.061	<0.020	0.048	0.025
	Calcium (Ca) (mg/kg)		2730	1170	2650	1320
	Chromium (Cr) (mg/kg)		17.6	8.60	18.2	9.03
	Cobalt (Co) (mg/kg)		5.42	3.20	5.96	3.18
	Copper (Cu) (mg/kg)		8.49	2.82	8.23	4.34
	Iron (Fe) (mg/kg)		15000	9330	14900	9390
	Lead (Pb) (mg/kg)		7.93	3.04	8.10	3.90
	Lithium (Li) (mg/kg)		9.8	6.5	11.1	7.1
	Magnesium (Mg) (mg/kg)		4570	3040	4230	2770
	Manganese (Mn) (mg/kg)		280	259	410	171
	Mercury (Hg) (mg/kg)		0.0082	<0.0050	0.0074	<0.0050
	Molybdenum (Mo) (mg/kg)		0.73	0.46	1.05	0.31
	Nickel (Ni) (mg/kg)		11.1	6.37	11.2	6.20
	Phosphorus (P) (mg/kg)		836	401	799	403
	Potassium (K) (mg/kg)		1290	620	1610	680
	Selenium (Se) (mg/kg)		<0.20	<0.20	<0.20	<0.20
	Silver (Ag) (mg/kg)		<0.10	<0.10	<0.10	<0.10
	Sodium (Na) (mg/kg)		154	53	161	58
	Strontium (Sr) (mg/kg)		44.0	27.4	45.0	27.8
	Sulfur (S) (mg/kg)		<1000	<1000	<1000	<1000
	Thallium (Tl) (mg/kg)		0.060	<0.050	0.071	<0.050

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	L2156055-59 Sediment 21-AUG-18 BBD-5	L2156055-60 Sediment 21-AUG-18 BBD-COMP	L2156055-61 Sediment CREMP DUP-1	L2156055-62 Sediment CREMP DUP-2	L2156055-63 Sediment CREMP DUP-3
Sample ID						
Description						
Sampled Date						
Sampled Time						
Client ID						
SOIL						
Physical Tests	Moisture (%)	38.1	32.0	85.8	84.7	83.2
	pH (1:2 soil:water) (pH)	5.59		6.67	5.86	5.18
Particle Size	% Gravel (>2mm) (%)	<1.0		<1.0	<1.0	<1.0
	% Sand (2.0mm - 0.063mm) (%)	41.3		2.9	1.8	2.4
	% Silt (0.063mm - 4um) (%)	52.7		65.1	71.9	73.1
	% Clay (<4um) (%)	6.0		32.0	26.3	24.5
	Texture	Silt loam / Sandy loam		Silt loam	Silt loam	Silt loam
Organic / Inorganic Carbon	Total Organic Carbon (%)	0.553		3.29	3.65	3.43
Metals	Aluminum (Al) (mg/kg)	6720		22800	25000	20800
	Antimony (Sb) (mg/kg)	0.10		0.23	0.25	0.16
	Arsenic (As) (mg/kg)	7.82		18.0	34.3	126
	Barium (Ba) (mg/kg)	88.9		126	123	117
	Beryllium (Be) (mg/kg)	0.33		1.76	2.00	1.38
	Bismuth (Bi) (mg/kg)	<0.20		2.26	2.28	1.15
	Boron (B) (mg/kg)	6.2		8.5	9.4	8.7
	Cadmium (Cd) (mg/kg)	0.044		0.438	0.310	0.166
	Calcium (Ca) (mg/kg)	2330		2010	2180	1740
	Chromium (Cr) (mg/kg)	15.0		114	77.6	99.6
	Cobalt (Co) (mg/kg)	4.49		16.0	17.2	12.0
	Copper (Cu) (mg/kg)	7.01		47.4	73.6	43.3
	Iron (Fe) (mg/kg)	13800		40900	68100	108000
	Lead (Pb) (mg/kg)	7.17		20.4	21.5	12.5
	Lithium (Li) (mg/kg)	10.1		44.7	44.3	25.8
	Magnesium (Mg) (mg/kg)	3840		9270	8970	8840
	Manganese (Mn) (mg/kg)	188		3120	1830	768
	Mercury (Hg) (mg/kg)	0.0080		0.0199	0.0347	0.0276
	Molybdenum (Mo) (mg/kg)	1.04		4.05	6.70	10.9
	Nickel (Ni) (mg/kg)	9.59		123	67.8	68.7
	Phosphorus (P) (mg/kg)	824		393	649	2240
	Potassium (K) (mg/kg)	1250		4000	4390	3340
	Selenium (Se) (mg/kg)	<0.20		0.66	0.74	0.64
	Silver (Ag) (mg/kg)	<0.10		<0.10	0.17	0.18
	Sodium (Na) (mg/kg)	131		175	206	171
	Strontium (Sr) (mg/kg)	53.2		17.6	19.9	23.7
	Sulfur (S) (mg/kg)	<1000		1800	1500	1100
	Thallium (Tl) (mg/kg)	0.061		0.488	0.409	0.216

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2156055-64	L2156055-65	L2156055-66	L2156055-67	
Description	Sediment	Sediment	Sediment	Sediment	
Sampled Date					
Sampled Time					
Client ID	CREMP DUP-4	CREMP DUP-5	CREMP COMP DUP-1	CREMP COMP DUP-2	
Grouping / **Analyte**					
SOIL					
Physical Tests Moisture (%)	32.7	37.2	81.8	44.2	
pH (1:2 soil:water) (pH)	6.18	7.38			
Particle Size % Gravel (>2mm) (%)	<1.0	<1.0			
% Sand (2.0mm - 0.063mm) (%)	77.1	72.2			
% Silt (0.063mm - 4um) (%)	20.5	24.7			
% Clay (<4um) (%)	2.4	3.0			
Texture	Loamy sand	Loamy sand			
Organic / Inorganic Carbon Total Organic Carbon (%)	0.303	0.390			
Metals Aluminum (Al) (mg/kg)	4590	5550			
Antimony (Sb) (mg/kg)	0.13	0.12			
Arsenic (As) (mg/kg)	6.61	3.41			
Barium (Ba) (mg/kg)	436	132			
Beryllium (Be) (mg/kg)	0.32	0.32			
Bismuth (Bi) (mg/kg)	<0.20	<0.20			
Boron (B) (mg/kg)	6.4	6.2			
Cadmium (Cd) (mg/kg)	0.025	0.031			
Calcium (Ca) (mg/kg)	2150	2100			
Chromium (Cr) (mg/kg)	15.0	16.6			
Cobalt (Co) (mg/kg)	3.52	4.20			
Copper (Cu) (mg/kg)	3.99	4.45			
Iron (Fe) (mg/kg)	13700	12400			
Lead (Pb) (mg/kg)	4.42	4.54			
Lithium (Li) (mg/kg)	7.0	8.8			
Magnesium (Mg) (mg/kg)	2590	3490			
Manganese (Mn) (mg/kg)	181	562			
Mercury (Hg) (mg/kg)	0.0051	0.0067			
Molybdenum (Mo) (mg/kg)	0.47	0.57			
Nickel (Ni) (mg/kg)	8.47	9.90			
Phosphorus (P) (mg/kg)	690	630			
Potassium (K) (mg/kg)	1100	1240			
Selenium (Se) (mg/kg)	<0.20	<0.20			
Silver (Ag) (mg/kg)	<0.10	<0.10			
Sodium (Na) (mg/kg)	90	107			
Strontium (Sr) (mg/kg)	43.4	36.3			
Sulfur (S) (mg/kg)	<1000	<1000			
Thallium (Tl) (mg/kg)	0.053	0.062			

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2156055-1	L2156055-2	L2156055-3	L2156055-4	L2156055-5
	Description	Sediment	Sediment	Sediment	Sediment	Sediment
	Sampled Date	13-AUG-18	13-AUG-18	13-AUG-18	13-AUG-18	13-AUG-18
	Sampled Time					
	Client ID	SP-1	SP-2	SP-3	SP-4	SP-5
Grouping	**Analyte**					
SOIL						
Metals	Tin (Sn) (mg/kg)	<2.0	<2.0	<2.0	<2.0	<2.0
	Titanium (Ti) (mg/kg)	925	843	871	849	1430
	Tungsten (W) (mg/kg)	0.87	0.88	0.96	0.87	0.59
	Uranium (U) (mg/kg)	20.3	21.0	20.8	20.7	15.7
	Vanadium (V) (mg/kg)	40.3	38.9	41.4	39.0	44.7
	Zinc (Zn) (mg/kg)	124	122	128	123	118
	Zirconium (Zr) (mg/kg)	3.1	3.1	3.1	2.8	7.4
Aggregate Organics	Mineral Oil and Grease (mg/kg)					
Hydrocarbons	EPH10-19 (mg/kg)					
	EPH19-32 (mg/kg)					
	LEPH (mg/kg)					
	HEPH (mg/kg)					
	Surrogate: 2-Bromobenzotrifluoride (%)					
Polycyclic Aromatic Hydrocarbons	Acenaphthene (mg/kg)					
	Acenaphthylene (mg/kg)					
	Anthracene (mg/kg)					
	Benz(a)anthracene (mg/kg)					
	Benzo(a)pyrene (mg/kg)					
	Benzo(b&j)fluoranthene (mg/kg)					
	Benzo(b+j+k)fluoranthene (mg/kg)					
	Benzo(g,h,i)perylene (mg/kg)					
	Benzo(k)fluoranthene (mg/kg)					
	Chrysene (mg/kg)					
	Dibenz(a,h)anthracene (mg/kg)					
	Fluoranthene (mg/kg)					
	Fluorene (mg/kg)					
	Indeno(1,2,3-c,d)pyrene (mg/kg)					
	1-Methylnaphthalene (mg/kg)					
	2-Methylnaphthalene (mg/kg)					
	Naphthalene (mg/kg)					
	Phenanthrene (mg/kg)					
	Pyrene (mg/kg)					
	Quinoline (mg/kg)					
	Surrogate: Acenaphthene d10 (%)					
	Surrogate: Chrysene d12 (%)					

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	L2156055-7 Sediment 10-AUG-18 TPE-1	L2156055-8 Sediment 10-AUG-18 TPE-2	L2156055-9 Sediment 10-AUG-18 TPE-3	L2156055-10 Sediment 10-AUG-18 TPE-4	L2156055-11 Sediment 10-AUG-18 TPE-5
SOIL						
Metals	Tin (Sn) (mg/kg)	2.0	2.1	<2.0	2.0	2.3
	Titanium (Ti) (mg/kg)	973	869	900	1040	1140
	Tungsten (W) (mg/kg)	0.73	0.71	0.81	0.98	0.82
	Uranium (U) (mg/kg)	17.2	16.2	16.3	18.9	20.2
	Vanadium (V) (mg/kg)	41.8	39.5	40.9	45.6	47.3
	Zinc (Zn) (mg/kg)	111	116	109	113	117
	Zirconium (Zr) (mg/kg)	3.2	2.9	3.0	3.4	3.9
Aggregate Organics	Mineral Oil and Grease (mg/kg)					
Hydrocarbons	EPH10-19 (mg/kg)					
	EPH19-32 (mg/kg)					
	LEPH (mg/kg)					
	HEPH (mg/kg)					
	Surrogate: 2-Bromobenzotrifluoride (%)					
Polycyclic Aromatic Hydrocarbons	Acenaphthene (mg/kg)					
	Acenaphthylene (mg/kg)					
	Anthracene (mg/kg)					
	Benz(a)anthracene (mg/kg)					
	Benzo(a)pyrene (mg/kg)					
	Benzo(b&j)fluoranthene (mg/kg)					
	Benzo(b+j+k)fluoranthene (mg/kg)					
	Benzo(g,h,i)perylene (mg/kg)					
	Benzo(k)fluoranthene (mg/kg)					
	Chrysene (mg/kg)					
	Dibenz(a,h)anthracene (mg/kg)					
	Fluoranthene (mg/kg)					
	Fluorene (mg/kg)					
	Indeno(1,2,3-c,d)pyrene (mg/kg)					
	1-Methylnaphthalene (mg/kg)					
	2-Methylnaphthalene (mg/kg)					
	Naphthalene (mg/kg)					
	Phenanthrene (mg/kg)					
	Pyrene (mg/kg)					
	Quinoline (mg/kg)					
	Surrogate: Acenaphthene d10 (%)					
	Surrogate: Chrysene d12 (%)					

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	L2156055-12 Sediment 10-AUG-18 TPE-COMP	L2156055-13 Sediment 10-AUG-18 TPN-1	L2156055-14 Sediment 10-AUG-18 TPN-2	L2156055-15 Sediment 10-AUG-18 TPN-3	L2156055-16 Sediment 10-AUG-18 TPN-4
SOIL						
Metals	Tin (Sn) (mg/kg)		<2.0	<2.0	<2.0	<2.0
	Titanium (Ti) (mg/kg)		575	657	672	692
	Tungsten (W) (mg/kg)		0.79	0.70	0.62	0.60
	Uranium (U) (mg/kg)		13.3	15.6	15.9	13.7
	Vanadium (V) (mg/kg)		32.3	33.5	36.1	35.5
	Zinc (Zn) (mg/kg)		73.2	82.2	88.4	76.2
	Zirconium (Zr) (mg/kg)		2.0	3.7	2.1	2.4
Aggregate Organics	Mineral Oil and Grease (mg/kg)	2150				
Hydrocarbons	EPH10-19 (mg/kg)	<600 DLHM				
	EPH19-32 (mg/kg)	<600 DLHM				
	LEPH (mg/kg)	<600				
	HEPH (mg/kg)	<600				
	Surrogate: 2-Bromobenzotrifluoride (%)	96.1				
Polycyclic Aromatic Hydrocarbons	Acenaphthene (mg/kg)	<0.010 DLHM				
	Acenaphthylene (mg/kg)	<0.010 DLHM				
	Anthracene (mg/kg)	<0.0080 DLHM				
	Benz(a)anthracene (mg/kg)	<0.020 DLHM				
	Benzo(a)pyrene (mg/kg)	<0.020 DLHM				
	Benzo(b&j)fluoranthene (mg/kg)	<0.020 DLHM				
	Benzo(b+j+k)fluoranthene (mg/kg)	<0.028				
	Benzo(g,h,i)perylene (mg/kg)	<0.020 DLHM				
	Benzo(k)fluoranthene (mg/kg)	<0.020 DLHM				
	Chrysene (mg/kg)	<0.020 DLHM				
	Dibenz(a,h)anthracene (mg/kg)	<0.010 DLHM				
	Fluoranthene (mg/kg)	<0.020 DLHM				
	Fluorene (mg/kg)	<0.020 DLHM				
	Indeno(1,2,3-c,d)pyrene (mg/kg)	<0.020 DLHM				
	1-Methylnaphthalene (mg/kg)	<0.10 DLHM				
	2-Methylnaphthalene (mg/kg)	<0.020 DLHM				
	Naphthalene (mg/kg)	<0.020 DLHM				
	Phenanthrene (mg/kg)	<0.020 DLHM				
	Pyrene (mg/kg)	<0.020 DLHM				
	Quinoline (mg/kg)	<0.10 DLHM				
	Surrogate: Acenaphthene d10 (%)	91.5				
	Surrogate: Chrysene d12 (%)	107.8				

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	L2156055-17 Sediment 10-AUG-18 TPN-5	L2156055-19 Sediment 11-AUG-18 WAL-1	L2156055-20 Sediment 11-AUG-18 WAL-2	L2156055-21 Sediment 11-AUG-18 WAL-3	L2156055-22 Sediment 11-AUG-18 WAL-4
SOIL						
Metals	Tin (Sn) (mg/kg)	<2.0	<2.0	2.1	<2.0	<2.0
	Titanium (Ti) (mg/kg)	754	561	539	637	620
	Tungsten (W) (mg/kg)	0.74	1.33	1.35	1.56	1.39
	Uranium (U) (mg/kg)	14.0	15.0	14.9	19.1	16.0
	Vanadium (V) (mg/kg)	35.3	27.7	27.7	33.9	29.1
	Zinc (Zn) (mg/kg)	81.6	123	117	134	119
	Zirconium (Zr) (mg/kg)	3.4	5.5	4.7	4.3	4.2
Aggregate Organics	Mineral Oil and Grease (mg/kg)					
Hydrocarbons	EPH10-19 (mg/kg)					
	EPH19-32 (mg/kg)					
	LEPH (mg/kg)					
	HEPH (mg/kg)					
	Surrogate: 2-Bromobenzotrifluoride (%)					
Polycyclic Aromatic Hydrocarbons	Acenaphthene (mg/kg)					
	Acenaphthylene (mg/kg)					
	Anthracene (mg/kg)					
	Benz(a)anthracene (mg/kg)					
	Benzo(a)pyrene (mg/kg)					
	Benzo(b&j)fluoranthene (mg/kg)					
	Benzo(b+j+k)fluoranthene (mg/kg)					
	Benzo(g,h,i)perylene (mg/kg)					
	Benzo(k)fluoranthene (mg/kg)					
	Chrysene (mg/kg)					
	Dibenz(a,h)anthracene (mg/kg)					
	Fluoranthene (mg/kg)					
	Fluorene (mg/kg)					
	Indeno(1,2,3-c,d)pyrene (mg/kg)					
	1-Methylnaphthalene (mg/kg)					
	2-Methylnaphthalene (mg/kg)					
	Naphthalene (mg/kg)					
	Phenanthrene (mg/kg)					
	Pyrene (mg/kg)					
	Quinoline (mg/kg)					
	Surrogate: Acenaphthene d10 (%)					
	Surrogate: Chrysene d12 (%)					

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2156055-23	L2156055-24	L2156055-25	L2156055-26	L2156055-27
Description	Sediment	Sediment	Sediment	Sediment	Sediment
Sampled Date	11-AUG-18	11-AUG-18	13-AUG-18	13-AUG-18	13-AUG-18
Sampled Time					
Client ID	WAL-5	WAL-COMP	INUG-1	INUG-2	INUG-3
Grouping / **Analyte**					
SOIL					
Metals Tin (Sn) (mg/kg)	<2.0		<2.0	<2.0	<2.0
Titanium (Ti) (mg/kg)	537		563	747	708
Tungsten (W) (mg/kg)	1.28		0.63	0.67	0.70
Uranium (U) (mg/kg)	15.0		17.4	18.5	19.0
Vanadium (V) (mg/kg)	28.2		35.8	40.6	40.0
Zinc (Zn) (mg/kg)	118		107	98.0	104
Zirconium (Zr) (mg/kg)	3.7		4.9	4.1	4.8
Aggregate Organics Mineral Oil and Grease (mg/kg)		9630			
Hydrocarbons EPH10-19 (mg/kg)		<1200 DLHM			
EPH19-32 (mg/kg)		<1200 DLHM			
LEPH (mg/kg)		<1200			
HEPH (mg/kg)		<1200			
Surrogate: 2-Bromobenzotrifluoride (%)		99.9			
Polycyclic Aromatic Hydrocarbons Acenaphthene (mg/kg)		<0.015 DLHM			
Acenaphthylene (mg/kg)		<0.015 DLHM			
Anthracene (mg/kg)		<0.012 DLHM			
Benz(a)anthracene (mg/kg)		<0.030 DLHM			
Benzo(a)pyrene (mg/kg)		<0.030 DLHM			
Benzo(b&j)fluoranthene (mg/kg)		<0.030 DLHM			
Benzo(b+j+k)fluoranthene (mg/kg)		<0.042			
Benzo(g,h,i)perylene (mg/kg)		<0.030 DLHM			
Benzo(k)fluoranthene (mg/kg)		<0.030 DLHM			
Chrysene (mg/kg)		<0.030 DLHM			
Dibenz(a,h)anthracene (mg/kg)		<0.015 DLHM			
Fluoranthene (mg/kg)		<0.030 DLHM			
Fluorene (mg/kg)		<0.030 DLHM			
Indeno(1,2,3-c,d)pyrene (mg/kg)		<0.030 DLHM			
1-Methylnaphthalene (mg/kg)		<0.15 DLHM			
2-Methylnaphthalene (mg/kg)		<0.030 DLHM			
Naphthalene (mg/kg)		<0.030 DLHM			
Phenanthrene (mg/kg)		<0.030 DLHM			
Pyrene (mg/kg)		<0.030 DLHM			
Quinoline (mg/kg)		<0.15 DLHM			
Surrogate: Acenaphthene d10 (%)		93.3			
Surrogate: Chrysene d12 (%)		110.2			

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	L2156055-28 Sediment 13-AUG-18 INUG-4	L2156055-29 Sediment 13-AUG-18 INUG-5	L2156055-30 Sediment 13-AUG-18 INUG-COMP	L2156055-31 Sediment 13-AUG-18 PDL-1	L2156055-32 Sediment 13-AUG-18 PDL-2
SOIL						
Metals	Tin (Sn) (mg/kg)	<2.0	<2.0		<2.0	<2.0
	Titanium (Ti) (mg/kg)	772	659		646	614
	Tungsten (W) (mg/kg)	0.68	0.62		0.56	0.70
	Uranium (U) (mg/kg)	18.9	16.2		9.42	8.79
	Vanadium (V) (mg/kg)	41.0	36.2		40.1	37.3
	Zinc (Zn) (mg/kg)	100	94.4		99.2	85.6
	Zirconium (Zr) (mg/kg)	3.7	3.4		2.1	2.0
Aggregate Organics	Mineral Oil and Grease (mg/kg)			DLHM <1500		
Hydrocarbons	EPH10-19 (mg/kg)			DLHM <620		
	EPH19-32 (mg/kg)			DLHM <620		
	LEPH (mg/kg)			<620		
	HEPH (mg/kg)			<620		
	Surrogate: 2-Bromobenzotrifluoride (%)			SURR-ND 169.3		
Polycyclic Aromatic Hydrocarbons	Acenaphthene (mg/kg)			DLHM <0.010		
	Acenaphthylene (mg/kg)			DLHM <0.010		
	Anthracene (mg/kg)			DLHM <0.0080		
	Benz(a)anthracene (mg/kg)			DLHM <0.020		
	Benzo(a)pyrene (mg/kg)			DLB <0.030		
	Benzo(b&j)fluoranthene (mg/kg)			DLB <0.030		
	Benzo(b+j+k)fluoranthene (mg/kg)			<0.028		
	Benzo(g,h,i)perylene (mg/kg)			DLB <0.030		
	Benzo(k)fluoranthene (mg/kg)			DLHM <0.020		
	Chrysene (mg/kg)			DLHM <0.020		
	Dibenz(a,h)anthracene (mg/kg)			DLHM <0.010		
	Fluoranthene (mg/kg)			DLHM <0.020		
	Fluorene (mg/kg)			DLHM <0.020		
	Indeno(1,2,3-c,d)pyrene (mg/kg)			DLB <0.030		
	1-Methylnaphthalene (mg/kg)			DLHM <0.10		
	2-Methylnaphthalene (mg/kg)			DLHM <0.020		
	Naphthalene (mg/kg)			DLHM <0.020		
	Phenanthrene (mg/kg)			DLHM <0.020		
	Pyrene (mg/kg)			DLHM <0.020		
	Quinoline (mg/kg)			DLHM <0.10		
	Surrogate: Acenaphthene d10 (%)			83.7		
	Surrogate: Chrysene d12 (%)			97.3		

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2156055-33	L2156055-34	L2156055-36	L2156055-37	L2156055-38
Description	Sediment	Sediment	Sediment	Sediment	Sediment
Sampled Date	13-AUG-18	13-AUG-18	13-AUG-18	20-AUG-18	20-AUG-18
Sampled Time					
Client ID	PDL-3	PDL-4	PDL-COMP	BAP-1	BAP-2
Grouping / **Analyte**					
SOIL					
Metals Tin (Sn) (mg/kg)	<2.0	<2.0		<2.0	<2.0
Titanium (Ti) (mg/kg)	532	508		276	309
Tungsten (W) (mg/kg)	0.62	<0.50		<0.50	<0.50
Uranium (U) (mg/kg)	9.47	7.80		0.939	1.19
Vanadium (V) (mg/kg)	37.3	32.6		15.7	20.2
Zinc (Zn) (mg/kg)	89.9	87.9		16.8	19.6
Zirconium (Zr) (mg/kg)	1.5	2.7		5.0	4.5
Aggregate Organics Mineral Oil and Grease (mg/kg)			1350		
Hydrocarbons EPH10-19 (mg/kg)			<400 DLHM		
EPH19-32 (mg/kg)			<400 DLHM		
LEPH (mg/kg)			<400		
HEPH (mg/kg)			<400		
Surrogate: 2-Bromobenzotrifluoride (%)			191.8 SURR-ND		
Polycyclic Aromatic Hydrocarbons Acenaphthene (mg/kg)			<0.0050		
Acenaphthylene (mg/kg)			<0.0050		
Anthracene (mg/kg)			<0.0040		
Benz(a)anthracene (mg/kg)			<0.010		
Benzo(a)pyrene (mg/kg)			<0.010		
Benzo(b&j)fluoranthene (mg/kg)			<0.020 DLB		
Benzo(b+j+k)fluoranthene (mg/kg)			<0.015		
Benzo(g,h,i)perylene (mg/kg)			<0.020 DLB		
Benzo(k)fluoranthene (mg/kg)			<0.010		
Chrysene (mg/kg)			<0.010		
Dibenz(a,h)anthracene (mg/kg)			<0.0050		
Fluoranthene (mg/kg)			<0.010		
Fluorene (mg/kg)			<0.010		
Indeno(1,2,3-c,d)pyrene (mg/kg)			<0.020 DLB		
1-Methylnaphthalene (mg/kg)			<0.050		
2-Methylnaphthalene (mg/kg)			<0.010		
Naphthalene (mg/kg)			<0.010		
Phenanthrene (mg/kg)			<0.010		
Pyrene (mg/kg)			<0.010		
Quinoline (mg/kg)			<0.050		
Surrogate: Acenaphthene d10 (%)			87.4		
Surrogate: Chrysene d12 (%)			104.8		

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	L2156055-39 Sediment 20-AUG-18 BAP-3	L2156055-40 Sediment 20-AUG-18 BAP-4	L2156055-41 Sediment 20-AUG-18 BAP-5	L2156055-42 Sediment 20-AUG-18 BAP-COMP	L2156055-43 Sediment 20-AUG-18 BES-1
Sample ID						
Description						
Sampled Date						
Sampled Time						
Client ID						
SOIL						
Metals	Tin (Sn) (mg/kg)	<2.0	<2.0	<2.0		<2.0
	Titanium (Ti) (mg/kg)	279	311	357		372
	Tungsten (W) (mg/kg)	<0.50	<0.50	<0.50		<0.50
	Uranium (U) (mg/kg)	1.21	1.46	1.45		1.12
	Vanadium (V) (mg/kg)	18.4	20.2	21.1		18.9
	Zinc (Zn) (mg/kg)	20.8	23.6	24.3		23.6
	Zirconium (Zr) (mg/kg)	5.0	5.3	5.7		2.8
Aggregate Organics	Mineral Oil and Grease (mg/kg)				<500	
Hydrocarbons	EPH10-19 (mg/kg)				<200	
	EPH19-32 (mg/kg)				<200	
	LEPH (mg/kg)				<200	
	HEPH (mg/kg)				<200	
	Surrogate: 2-Bromobenzotrifluoride (%)				95.0	
Polycyclic Aromatic Hydrocarbons	Acenaphthene (mg/kg)				<0.0050	
	Acenaphthylene (mg/kg)				<0.0050	
	Anthracene (mg/kg)				<0.0040	
	Benz(a)anthracene (mg/kg)				<0.010	
	Benzo(a)pyrene (mg/kg)				<0.010	
	Benzo(b&j)fluoranthene (mg/kg)				<0.010	
	Benzo(b+j+k)fluoranthene (mg/kg)				<0.015	
	Benzo(g,h,i)perylene (mg/kg)				<0.010	
	Benzo(k)fluoranthene (mg/kg)				<0.010	
	Chrysene (mg/kg)				<0.010	
	Dibenz(a,h)anthracene (mg/kg)				<0.0050	
	Fluoranthene (mg/kg)				<0.010	
	Fluorene (mg/kg)				<0.010	
	Indeno(1,2,3-c,d)pyrene (mg/kg)				<0.010	
	1-Methylnaphthalene (mg/kg)				<0.050	
	2-Methylnaphthalene (mg/kg)				<0.010	
	Naphthalene (mg/kg)				<0.010	
	Phenanthrene (mg/kg)				<0.010	
	Pyrene (mg/kg)				<0.010	
	Quinoline (mg/kg)				<0.050	
	Surrogate: Acenaphthene d10 (%)				92.5	
	Surrogate: Chrysene d12 (%)				93.6	

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	L2156055-44 Sediment 20-AUG-18 BES-2	L2156055-45 Sediment 20-AUG-18 BES-3	L2156055-46 Sediment 20-AUG-18 BES-4	L2156055-47 Sediment 20-AUG-18 BES-5	L2156055-48 Sediment 20-AUG-18 BES-COMP
SOIL						
Metals	Tin (Sn) (mg/kg)	<2.0	<2.0	<2.0	<2.0	
	Titanium (Ti) (mg/kg)	383	387	375	374	
	Tungsten (W) (mg/kg)	<0.50	<0.50	<0.50	<0.50	
	Uranium (U) (mg/kg)	1.21	1.30	1.33	1.39	
	Vanadium (V) (mg/kg)	19.2	20.6	20.2	19.9	
	Zinc (Zn) (mg/kg)	25.8	27.7	27.6	26.7	
	Zirconium (Zr) (mg/kg)	2.7	2.4	2.3	2.4	
Aggregate Organics	Mineral Oil and Grease (mg/kg)					<500
Hydrocarbons	EPH10-19 (mg/kg)					<200
	EPH19-32 (mg/kg)					<200
	LEPH (mg/kg)					<200
	HEPH (mg/kg)					<200
	Surrogate: 2-Bromobenzotrifluoride (%)					88.3
Polycyclic Aromatic Hydrocarbons	Acenaphthene (mg/kg)					<0.0050
	Acenaphthylene (mg/kg)					<0.0050
	Anthracene (mg/kg)					<0.0040
	Benz(a)anthracene (mg/kg)					<0.010
	Benzo(a)pyrene (mg/kg)					<0.010
	Benzo(b&j)fluoranthene (mg/kg)					<0.010
	Benzo(b+j+k)fluoranthene (mg/kg)					<0.015
	Benzo(g,h,i)perylene (mg/kg)					<0.010
	Benzo(k)fluoranthene (mg/kg)					<0.010
	Chrysene (mg/kg)					<0.010
	Dibenz(a,h)anthracene (mg/kg)					<0.0050
	Fluoranthene (mg/kg)					<0.010
	Fluorene (mg/kg)					<0.010
	Indeno(1,2,3-c,d)pyrene (mg/kg)					<0.010
	1-Methylnaphthalene (mg/kg)					<0.050
	2-Methylnaphthalene (mg/kg)					<0.010
	Naphthalene (mg/kg)					<0.010
	Phenanthrene (mg/kg)					<0.010
	Pyrene (mg/kg)					<0.010
	Quinoline (mg/kg)					<0.050
	Surrogate: Acenaphthene d10 (%)					79.0
	Surrogate: Chrysene d12 (%)					103.0

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2156055-49	L2156055-50	L2156055-51	L2156055-52	L2156055-53
	Description	Sediment	Sediment	Sediment	Sediment	Sediment
	Sampled Date	21-AUG-18	21-AUG-18	21-AUG-18	21-AUG-18	21-AUG-18
	Sampled Time					
	Client ID	BPJ-1	BPJ-2	BPJ-3	BPJ-4	BPJ-5
Grouping	**Analyte**					
SOIL						
Metals	Tin (Sn) (mg/kg)	<2.0	<2.0	<2.0	<2.0	<2.0
	Titanium (Ti) (mg/kg)	346	407	476	359	406
	Tungsten (W) (mg/kg)	<0.50	<0.50	<0.50	<0.50	<0.50
	Uranium (U) (mg/kg)	1.96	1.78	2.45	1.21	1.41
	Vanadium (V) (mg/kg)	23.5	23.8	29.2	18.7	20.6
	Zinc (Zn) (mg/kg)	41.7	38.3	49.6	27.3	31.3
	Zirconium (Zr) (mg/kg)	3.0	3.1	5.5	3.0	4.8
Aggregate Organics	Mineral Oil and Grease (mg/kg)					
Hydrocarbons	EPH10-19 (mg/kg)					
	EPH19-32 (mg/kg)					
	LEPH (mg/kg)					
	HEPH (mg/kg)					
	Surrogate: 2-Bromobenzotrifluoride (%)					
Polycyclic Aromatic Hydrocarbons	Acenaphthene (mg/kg)					
	Acenaphthylene (mg/kg)					
	Anthracene (mg/kg)					
	Benz(a)anthracene (mg/kg)					
	Benzo(a)pyrene (mg/kg)					
	Benzo(b&j)fluoranthene (mg/kg)					
	Benzo(b+j+k)fluoranthene (mg/kg)					
	Benzo(g,h,i)perylene (mg/kg)					
	Benzo(k)fluoranthene (mg/kg)					
	Chrysene (mg/kg)					
	Dibenz(a,h)anthracene (mg/kg)					
	Fluoranthene (mg/kg)					
	Fluorene (mg/kg)					
	Indeno(1,2,3-c,d)pyrene (mg/kg)					
	1-Methylnaphthalene (mg/kg)					
	2-Methylnaphthalene (mg/kg)					
	Naphthalene (mg/kg)					
	Phenanthrene (mg/kg)					
	Pyrene (mg/kg)					
	Quinoline (mg/kg)					
	Surrogate: Acenaphthene d10 (%)					
	Surrogate: Chrysene d12 (%)					

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	L2156055-54 Sediment 21-AUG-18 BPJ-COMP	L2156055-55 Sediment 21-AUG-18 BBD-1	L2156055-56 Sediment 21-AUG-18 BBD-2	L2156055-57 Sediment 21-AUG-18 BBD-3	L2156055-58 Sediment 21-AUG-18 BBD-4
SOIL						
Metals	Tin (Sn) (mg/kg)		<2.0	<2.0	<2.0	<2.0
	Titanium (Ti) (mg/kg)		444	209	406	206
	Tungsten (W) (mg/kg)		<0.50	<0.50	<0.50	<0.50
	Uranium (U) (mg/kg)		1.54	0.670	2.09	0.736
	Vanadium (V) (mg/kg)		19.8	11.5	22.3	11.6
	Zinc (Zn) (mg/kg)		33.2	18.3	32.1	19.7
	Zirconium (Zr) (mg/kg)		4.7	3.0	5.8	3.1
Aggregate Organics	Mineral Oil and Grease (mg/kg)	750				
Hydrocarbons	EPH10-19 (mg/kg)	<200				
	EPH19-32 (mg/kg)	<200				
	LEPH (mg/kg)	<200				
	HEPH (mg/kg)	<200				
	Surrogate: 2-Bromobenzotrifluoride (%)	90.7				
Polycyclic Aromatic Hydrocarbons	Acenaphthene (mg/kg)	<0.0050				
	Acenaphthylene (mg/kg)	<0.0050				
	Anthracene (mg/kg)	<0.0040				
	Benz(a)anthracene (mg/kg)	<0.010				
	Benzo(a)pyrene (mg/kg)	<0.010				
	Benzo(b&j)fluoranthene (mg/kg)	<0.010				
	Benzo(b+j+k)fluoranthene (mg/kg)	<0.015				
	Benzo(g,h,i)perylene (mg/kg)	<0.010				
	Benzo(k)fluoranthene (mg/kg)	<0.010				
	Chrysene (mg/kg)	<0.010				
	Dibenz(a,h)anthracene (mg/kg)	<0.0050				
	Fluoranthene (mg/kg)	<0.010				
	Fluorene (mg/kg)	<0.010				
	Indeno(1,2,3-c,d)pyrene (mg/kg)	<0.010				
	1-Methylnaphthalene (mg/kg)	<0.050				
	2-Methylnaphthalene (mg/kg)	<0.010				
	Naphthalene (mg/kg)	<0.010				
	Phenanthrene (mg/kg)	<0.010				
	Pyrene (mg/kg)	<0.010				
	Quinoline (mg/kg)	<0.050				
	Surrogate: Acenaphthene d10 (%)	83.5				
	Surrogate: Chrysene d12 (%)	84.5				

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	L2156055-59 Sediment 21-AUG-18 BBD-5	L2156055-60 Sediment 21-AUG-18 BBD-COMP	L2156055-61 Sediment CREMP DUP-1	L2156055-62 Sediment CREMP DUP-2	L2156055-63 Sediment CREMP DUP-3
SOIL						
Metals	Tin (Sn) (mg/kg)	<2.0		<2.0	<2.0	<2.0
	Titanium (Ti) (mg/kg)	370		821	846	604
	Tungsten (W) (mg/kg)	<0.50		0.80	0.76	0.64
	Uranium (U) (mg/kg)	1.38		15.7	19.3	15.3
	Vanadium (V) (mg/kg)	18.3		37.8	38.3	34.0
	Zinc (Zn) (mg/kg)	29.3		109	119	87.6
	Zirconium (Zr) (mg/kg)	4.2		2.7	3.0	2.8
Aggregate Organics	Mineral Oil and Grease (mg/kg)		<500			
Hydrocarbons	EPH10-19 (mg/kg)		<200			
	EPH19-32 (mg/kg)		<200			
	LEPH (mg/kg)		<200			
	HEPH (mg/kg)		<200			
	Surrogate: 2-Bromobenzotrifluoride (%)		88.7			
Polycyclic Aromatic Hydrocarbons	Acenaphthene (mg/kg)		<0.0050			
	Acenaphthylene (mg/kg)		<0.0050			
	Anthracene (mg/kg)		<0.0040			
	Benz(a)anthracene (mg/kg)		<0.010			
	Benzo(a)pyrene (mg/kg)		<0.010			
	Benzo(b&j)fluoranthene (mg/kg)		<0.010			
	Benzo(b+j+k)fluoranthene (mg/kg)		<0.015			
	Benzo(g,h,i)perylene (mg/kg)		<0.010			
	Benzo(k)fluoranthene (mg/kg)		<0.010			
	Chrysene (mg/kg)		<0.010			
	Dibenz(a,h)anthracene (mg/kg)		<0.0050			
	Fluoranthene (mg/kg)		<0.010			
	Fluorene (mg/kg)		<0.010			
	Indeno(1,2,3-c,d)pyrene (mg/kg)		<0.010			
	1-Methylnaphthalene (mg/kg)		<0.050			
	2-Methylnaphthalene (mg/kg)		<0.010			
	Naphthalene (mg/kg)		<0.010			
	Phenanthrene (mg/kg)		<0.010			
	Pyrene (mg/kg)		<0.010			
	Quinoline (mg/kg)		<0.050			
	Surrogate: Acenaphthene d10 (%)		91.7			
	Surrogate: Chrysene d12 (%)		94.5			

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	L2156055-64 Sediment CREMP DUP-4	L2156055-65 Sediment CREMP DUP-5	L2156055-66 Sediment CREMP COMP DUP-1	L2156055-67 Sediment CREMP COMP DUP-2	
Sample ID		L2156055-64	L2156055-65	L2156055-66	L2156055-67	
Description		Sediment	Sediment	Sediment	Sediment	
Sampled Date						
Sampled Time						
Client ID		CREMP DUP-4	CREMP DUP-5	CREMP COMP DUP-1	CREMP COMP DUP-2	
SOIL						
Metals	Tin (Sn) (mg/kg)	<2.0	<2.0			
	Titanium (Ti) (mg/kg)	328	331			
	Tungsten (W) (mg/kg)	<0.50	<0.50			
	Uranium (U) (mg/kg)	1.37	1.12			
	Vanadium (V) (mg/kg)	19.9	18.4			
	Zinc (Zn) (mg/kg)	18.8	22.6			
	Zirconium (Zr) (mg/kg)	4.5	2.5			
Aggregate Organics	Mineral Oil and Grease (mg/kg)			620	<500	
Hydrocarbons	EPH10-19 (mg/kg)			<600 DLHM	<200	
	EPH19-32 (mg/kg)			<600 DLHM	<200	
	LEPH (mg/kg)			<600	<200	
	HEPH (mg/kg)			<600	<200	
	Surrogate: 2-Bromobenzotrifluoride (%)			93.5	94.0	
Polycyclic Aromatic Hydrocarbons	Acenaphthene (mg/kg)			<0.0050	<0.0050	
	Acenaphthylene (mg/kg)			<0.0050	<0.0050	
	Anthracene (mg/kg)			<0.0040	<0.0040	
	Benz(a)anthracene (mg/kg)			<0.010	<0.010	
	Benzo(a)pyrene (mg/kg)			<0.010	<0.010	
	Benzo(b&j)fluoranthene (mg/kg)			<0.010	<0.010	
	Benzo(b+j+k)fluoranthene (mg/kg)			<0.015	<0.015	
	Benzo(g,h,i)perylene (mg/kg)			<0.010	<0.010	
	Benzo(k)fluoranthene (mg/kg)			<0.010	<0.010	
	Chrysene (mg/kg)			<0.010	<0.010	
	Dibenz(a,h)anthracene (mg/kg)			<0.0050	<0.0050	
	Fluoranthene (mg/kg)			<0.010	<0.010	
	Fluorene (mg/kg)			<0.010	<0.010	
	Indeno(1,2,3-c,d)pyrene (mg/kg)			<0.010	<0.010	
	1-Methylnaphthalene (mg/kg)			<0.050	<0.050	
	2-Methylnaphthalene (mg/kg)			<0.010	<0.010	
	Naphthalene (mg/kg)			<0.010	<0.010	
	Phenanthrene (mg/kg)			<0.010	<0.010	
	Pyrene (mg/kg)			<0.010	<0.010	
	Quinoline (mg/kg)			<0.050	<0.050	
	Surrogate: Acenaphthene d10 (%)			88.8	90.7	
	Surrogate: Chrysene d12 (%)			98.4	100.2	

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2156055-1	L2156055-2	L2156055-3	L2156055-4	L2156055-5
	Description	Sediment	Sediment	Sediment	Sediment	Sediment
	Sampled Date	13-AUG-18	13-AUG-18	13-AUG-18	13-AUG-18	13-AUG-18
	Sampled Time					
	Client ID	SP-1	SP-2	SP-3	SP-4	SP-5
Grouping	**Analyte**					
SOIL						
Polycyclic Aromatic Hydrocarbons	Surrogate: Naphthalene d8 (%)					
	Surrogate: Phenanthrene d10 (%)					
	B(a)P Total Potency Equivalent (mg/kg)					
	IACR (CCME) (mg/kg)					

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2156055-7	L2156055-8	L2156055-9	L2156055-10	L2156055-11
	Description	Sediment	Sediment	Sediment	Sediment	Sediment
	Sampled Date	10-AUG-18	10-AUG-18	10-AUG-18	10-AUG-18	10-AUG-18
	Sampled Time					
	Client ID	TPE-1	TPE-2	TPE-3	TPE-4	TPE-5
Grouping	**Analyte**					
SOIL						
Polycyclic Aromatic Hydrocarbons	Surrogate: Naphthalene d8 (%)					
	Surrogate: Phenanthrene d10 (%)					
	B(a)P Total Potency Equivalent (mg/kg)					
	IACR (CCME) (mg/kg)					

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2156055-12	L2156055-13	L2156055-14	L2156055-15	L2156055-16
Description	Sediment	Sediment	Sediment	Sediment	Sediment
Sampled Date	10-AUG-18	10-AUG-18	10-AUG-18	10-AUG-18	10-AUG-18
Sampled Time					
Client ID	TPE-COMP	TPN-1	TPN-2	TPN-3	TPN-4
Grouping / **Analyte**					
SOIL					
Polycyclic Aromatic Hydrocarbons					
Surrogate: Naphthalene d8 (%)	87.0				
Surrogate: Phenanthrene d10 (%)	103.0				
B(a)P Total Potency Equivalent (mg/kg)	<0.020				
IACR (CCME) (mg/kg)	<0.21				

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2156055-17	L2156055-19	L2156055-20	L2156055-21	L2156055-22
	Description	Sediment	Sediment	Sediment	Sediment	Sediment
	Sampled Date	10-AUG-18	11-AUG-18	11-AUG-18	11-AUG-18	11-AUG-18
	Sampled Time					
	Client ID	TPN-5	WAL-1	WAL-2	WAL-3	WAL-4
Grouping	**Analyte**					
SOIL						
Polycyclic Aromatic Hydrocarbons	Surrogate: Naphthalene d8 (%)					
	Surrogate: Phenanthrene d10 (%)					
	B(a)P Total Potency Equivalent (mg/kg)					
	IACR (CCME) (mg/kg)					

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2156055-23	L2156055-24	L2156055-25	L2156055-26	L2156055-27
	Description	Sediment	Sediment	Sediment	Sediment	Sediment
	Sampled Date	11-AUG-18	11-AUG-18	13-AUG-18	13-AUG-18	13-AUG-18
	Sampled Time					
	Client ID	WAL-5	WAL-COMP	INUG-1	INUG-2	INUG-3
Grouping	**Analyte**					
SOIL						
Polycyclic Aromatic Hydrocarbons	Surrogate: Naphthalene d8 (%)		88.8			
	Surrogate: Phenanthrene d10 (%)		106.0			
	B(a)P Total Potency Equivalent (mg/kg)		<0.029			
	IACR (CCME) (mg/kg)		<0.32			

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	L2156055-28 Sediment 13-AUG-18 INUG-4	L2156055-29 Sediment 13-AUG-18 INUG-5	L2156055-30 Sediment 13-AUG-18 INUG-COMP	L2156055-31 Sediment 13-AUG-18 PDL-1	L2156055-32 Sediment 13-AUG-18 PDL-2
Sample ID / **Description** / **Sampled Date** / **Sampled Time** / **Client ID**						
SOIL						
Polycyclic Aromatic Hydrocarbons	Surrogate: Naphthalene d8 (%)			81.0		
	Surrogate: Phenanthrene d10 (%)			90.0		
	B(a)P Total Potency Equivalent (mg/kg)			0.034		
	IACR (CCME) (mg/kg)			0.34		

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2156055-33	L2156055-34	L2156055-36	L2156055-37	L2156055-38
Description	Sediment	Sediment	Sediment	Sediment	Sediment
Sampled Date	13-AUG-18	13-AUG-18	13-AUG-18	20-AUG-18	20-AUG-18
Sampled Time					
Client ID	PDL-3	PDL-4	PDL-COMP	BAP-1	BAP-2
Grouping / **Analyte**					
SOIL					
Polycyclic Aromatic Hydrocarbons					
Surrogate: Naphthalene d8 (%)			85.4		
Surrogate: Phenanthrene d10 (%)			97.1		
B(a)P Total Potency Equivalent (mg/kg)			<0.020		
IACR (CCME) (mg/kg)			<0.15		

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2156055-39	L2156055-40	L2156055-41	L2156055-42	L2156055-43
Description	Sediment	Sediment	Sediment	Sediment	Sediment
Sampled Date	20-AUG-18	20-AUG-18	20-AUG-18	20-AUG-18	20-AUG-18
Sampled Time					
Client ID	BAP-3	BAP-4	BAP-5	BAP-COMP	BES-1
Grouping / **Analyte**					
SOIL					
Polycyclic Aromatic Hydrocarbons					
Surrogate: Naphthalene d8 (%)				85.4	
Surrogate: Phenanthrene d10 (%)				120.0	
B(a)P Total Potency Equivalent (mg/kg)				<0.020	
IACR (CCME) (mg/kg)				<0.15	

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2156055-44	L2156055-45	L2156055-46	L2156055-47	L2156055-48
Description	Sediment	Sediment	Sediment	Sediment	Sediment
Sampled Date	20-AUG-18	20-AUG-18	20-AUG-18	20-AUG-18	20-AUG-18
Sampled Time					
Client ID	BES-2	BES-3	BES-4	BES-5	BES-COMP
Grouping / **Analyte**					
SOIL					
Polycyclic Aromatic Hydrocarbons					
Surrogate: Naphthalene d8 (%)					90.0
Surrogate: Phenanthrene d10 (%)					92.3
B(a)P Total Potency Equivalent (mg/kg)					<0.020
IACR (CCME) (mg/kg)					<0.15

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2156055-49	L2156055-50	L2156055-51	L2156055-52	L2156055-53
	Description	Sediment	Sediment	Sediment	Sediment	Sediment
	Sampled Date	21-AUG-18	21-AUG-18	21-AUG-18	21-AUG-18	21-AUG-18
	Sampled Time					
	Client ID	BPJ-1	BPJ-2	BPJ-3	BPJ-4	BPJ-5
Grouping	**Analyte**					
SOIL						
Polycyclic Aromatic Hydrocarbons	Surrogate: Naphthalene d8 (%)					
	Surrogate: Phenanthrene d10 (%)					
	B(a)P Total Potency Equivalent (mg/kg)					
	IACR (CCME) (mg/kg)					

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2156055-54	L2156055-55	L2156055-56	L2156055-57	L2156055-58
Description	Sediment	Sediment	Sediment	Sediment	Sediment
Sampled Date	21-AUG-18	21-AUG-18	21-AUG-18	21-AUG-18	21-AUG-18
Sampled Time					
Client ID	BPJ-COMP	BBD-1	BBD-2	BBD-3	BBD-4
Grouping / **Analyte**					
SOIL					
Polycyclic Aromatic Hydrocarbons					
Surrogate: Naphthalene d8 (%)	71.7				
Surrogate: Phenanthrene d10 (%)	94.3				
B(a)P Total Potency Equivalent (mg/kg)	<0.020				
IACR (CCME) (mg/kg)	<0.15				

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	L2156055-59 Sediment 21-AUG-18 BBD-5	L2156055-60 Sediment 21-AUG-18 BBD-COMP	L2156055-61 Sediment CREMP DUP-1	L2156055-62 Sediment CREMP DUP-2	L2156055-63 Sediment CREMP DUP-3
SOIL						
Polycyclic Aromatic Hydrocarbons	Surrogate: Naphthalene d8 (%)		78.6			
	Surrogate: Phenanthrene d10 (%)		89.5			
	B(a)P Total Potency Equivalent (mg/kg)		<0.020			
	IACR (CCME) (mg/kg)		<0.15			

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	Sample ID / Description / Sampled Date / Sampled Time / Client ID	L2156055-64 Sediment CREMP DUP-4	L2156055-65 Sediment CREMP DUP-5	L2156055-66 Sediment CREMP COMP DUP-1	L2156055-67 Sediment CREMP COMP DUP-2	
SOIL							
Polycyclic Aromatic Hydrocarbons	Surrogate: Naphthalene d8 (%)				89.3	91.6	
	Surrogate: Phenanthrene d10 (%)				107.3	109.7	
	B(a)P Total Potency Equivalent (mg/kg)				<0.020	<0.020	
	IACR (CCME) (mg/kg)				<0.15	<0.15	

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2156055-68	L2156055-69	L2156055-70	L2156055-71	
Description	Other	Other	Other	Other	
Sampled Date	11-AUG-18	20-AUG-18	20-AUG-18	22-AUG-18	
Sampled Time	12:00	12:00	12:00	12:00	
Client ID	CREMP SWIPE-1	CREMP SWIPE-2	CREMP SWIPE-3	CREMP SWIPE-4	
Grouping	**Analyte**				
SWAB					
Metals	Aluminum (Al)-Total (ug)	23	<20	41	<20	
	Antimony (Sb)-Total (ug)	<20	<20	<20	<20	
	Arsenic (As)-Total (ug)	<20	<20	<20	<20	
	Barium (Ba)-Total (ug)	<1.0	<1.0	2.5	<1.0	
	Beryllium (Be)-Total (ug)	<0.50	<0.50	<0.50	<0.50	
	Bismuth (Bi)-Total (ug)	<20	<20	<20	<20	
	Cadmium (Cd)-Total (ug)	<1.0	<1.0	<1.0	<1.0	
	Calcium (Ca)-Total (ug)	<200	<200	<200	<200	
	Chromium (Cr)-Total (ug)	22.7	11.0	30.8	<2.0	
	Cobalt (Co)-Total (ug)	<1.0	<1.0	<1.0	<1.0	
	Copper (Cu)-Total (ug)	2.2	1.2	1.2	1.1	
	Iron (Fe)-Total (ug)	146	80.6	203	10.4	
	Lead (Pb)-Total (ug)	<4.0	<4.0	<4.0	<4.0	
	Lithium (Li)-Total (ug)	<1.0	<1.0	<1.0	<1.0	
	Magnesium (Mg)-Total (ug)	120	150	120	130	
	Manganese (Mn)-Total (ug)	3.66	2.69	5.23	<0.50	
	Molybdenum (Mo)-Total (ug)	<3.0	<3.0	<3.0	<3.0	
	Nickel (Ni)-Total (ug)	5.1	5.7	11.7	<5.0	
	Phosphorus (P)-Total (ug)	<30	<30	<30	<30	
	Potassium (K)-Total (ug)	<200	<200	<200	<200	
	Selenium (Se)-Total (ug)	<20	<20	<20	<20	
	Silver (Ag)-Total (ug)	<1.0	<1.0	<1.0	<1.0	
	Sodium (Na)-Total (ug)	580	640	440	580	
	Strontium (Sr)-Total (ug)	<0.50	0.53	<0.50	<0.50	
	Thallium (Tl)-Total (ug)	<20	<20	<20	<20	
	Tin (Sn)-Total (ug)	11.4	11.8	8.9	<3.0	
	Titanium (Ti)-Total (ug)	<1.0	<1.0	1.5	<1.0	
	Vanadium (V)-Total (ug)	<3.0	<3.0	<3.0	<3.0	
	Zinc (Zn)-Total (ug)	45.0	29.3	24.5	40.1	

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

Reference Information

Qualifiers for Individual Samples Listed:

Sample Number	Client Sample ID	Qualifier	Description
L2156055-1	SP-1	PSAL	Limited sample was available for PSA (100g minimum is standard). Measurement Uncertainty for PSA results may be higher than usual.
L2156055-10	TPE-4	PSAL	Limited sample was available for PSA (100g minimum is standard). Measurement Uncertainty for PSA results may be higher than usual.
L2156055-11	TPE-5	PSAL	Limited sample was available for PSA (100g minimum is standard). Measurement Uncertainty for PSA results may be higher than usual.
L2156055-13	TPN-1	PSAL	Limited sample was available for PSA (100g minimum is standard). Measurement Uncertainty for PSA results may be higher than usual.
L2156055-14	TPN-2	PSAL	Limited sample was available for PSA (100g minimum is standard). Measurement Uncertainty for PSA results may be higher than usual.
L2156055-15	TPN-3	PSAL	Limited sample was available for PSA (100g minimum is standard). Measurement Uncertainty for PSA results may be higher than usual.
L2156055-16	TPN-4	PSAL	Limited sample was available for PSA (100g minimum is standard). Measurement Uncertainty for PSA results may be higher than usual.
L2156055-17	TPN-5	PSAL	Limited sample was available for PSA (100g minimum is standard). Measurement Uncertainty for PSA results may be higher than usual.
L2156055-19	WAL-1	PSAL	Limited sample was available for PSA (100g minimum is standard). Measurement Uncertainty for PSA results may be higher than usual.
L2156055-2	SP-2	PSAL	Limited sample was available for PSA (100g minimum is standard). Measurement Uncertainty for PSA results may be higher than usual.
L2156055-20	WAL-2	PSAL	Limited sample was available for PSA (100g minimum is standard). Measurement Uncertainty for PSA results may be higher than usual.
L2156055-21	WAL-3	PSAL	Limited sample was available for PSA (100g minimum is standard). Measurement Uncertainty for PSA results may be higher than usual.
L2156055-22	WAL-4	PSAL	Limited sample was available for PSA (100g minimum is standard). Measurement Uncertainty for PSA results may be higher than usual.
L2156055-23	WAL-5	PSAL	Limited sample was available for PSA (100g minimum is standard). Measurement Uncertainty for PSA results may be higher than usual.
L2156055-25	INUG-1	PSAL	Limited sample was available for PSA (100g minimum is standard). Measurement Uncertainty for PSA results may be higher than usual.
L2156055-26	INUG-2	PSAL	Limited sample was available for PSA (100g minimum is standard). Measurement Uncertainty for PSA results may be higher than usual.
L2156055-27	INUG-3	PSAL	Limited sample was available for PSA (100g minimum is standard). Measurement Uncertainty for PSA results may be higher than usual.
L2156055-28	INUG-4	PSAL	Limited sample was available for PSA (100g minimum is standard). Measurement Uncertainty for PSA results may be higher than usual.
L2156055-29	INUG-5	PSAL	Limited sample was available for PSA (100g minimum is standard). Measurement Uncertainty for PSA results may be higher than usual.
L2156055-3	SP-3	PSAL	Limited sample was available for PSA (100g minimum is standard). Measurement Uncertainty for PSA results may be higher than usual.
L2156055-31	PDL-1	PSAL	Limited sample was available for PSA (100g minimum is standard). Measurement Uncertainty for PSA results may be higher than usual.
L2156055-32	PDL-2	PSAL	Limited sample was available for PSA (100g minimum is standard). Measurement Uncertainty for PSA results may be higher than usual.
L2156055-33	PDL-3	PSAL	Limited sample was available for PSA (100g minimum is standard). Measurement Uncertainty for PSA results may be higher than usual.
L2156055-34	PDL-4	PSAL	Limited sample was available for PSA (100g minimum is standard). Measurement Uncertainty for PSA results may be higher than usual.
L2156055-4	SP-4	PSAL	Limited sample was available for PSA (100g minimum is standard). Measurement Uncertainty for PSA results may be higher than usual.
L2156055-49	BPJ-1	PSAL	Limited sample was available for PSA (100g minimum is standard). Measurement Uncertainty for PSA results may be higher than usual.
L2156055-5	SP-5	PSAL	Limited sample was available for PSA (100g minimum is standard). Measurement Uncertainty for PSA results may be higher than usual.
L2156055-50	BPJ-2	PSAL	Limited sample was available for PSA (100g minimum is standard). Measurement Uncertainty for PSA results may be higher than usual.
L2156055-61	CREMP DUP-1	PSAL	Limited sample was available for PSA (100g minimum is standard). Measurement Uncertainty for PSA results may be higher than usual.
L2156055-62	CREMP DUP-2	PSAL	Limited sample was available for PSA (100g minimum is standard). Measurement Uncertainty for PSA results may be higher than usual.
L2156055-63	CREMP DUP-3	PSAL	Limited sample was available for PSA (100g minimum is standard). Measurement Uncertainty for PSA results may be higher than usual.
L2156055-7	TPE-1	PSAL	Limited sample was available for PSA (100g minimum is standard). Measurement Uncertainty for PSA results may be higher than usual.
L2156055-8	TPE-2	PSAL	Limited sample was available for PSA (100g minimum is standard). Measurement Uncertainty for PSA results may be higher than usual.
L2156055-9	TPE-3	PSAL	Limited sample was available for PSA (100g minimum is standard). Measurement Uncertainty for PSA results may be higher than usual.

QC Samples with Qualifiers & Comments:

Reference Information

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Duplicate	Copper (Cu)	DUP-H	L2156055-38
Duplicate	Iron (Fe)	DUP-H	L2156055-38
Duplicate	Nickel (Ni)	DUP-H	L2156055-38
Duplicate	Strontium (Sr)	DUP-H	L2156055-38
Duplicate	Tungsten (W)	DUP-H	L2156055-38
Duplicate	Acenaphthylene	DUP-H	L2156055-54, -60, -66, -67
Duplicate	Anthracene	DUP-H	L2156055-54, -60, -66, -67
Duplicate	Benz(a)anthracene	DUP-H	L2156055-54, -60, -66, -67
Duplicate	Benzo(a)pyrene	DUP-H	L2156055-54, -60, -66, -67
Duplicate	Benzo(b&j)fluoranthene	DUP-H	L2156055-54, -60, -66, -67
Duplicate	Benzo(g,h,i)perylene	DUP-H	L2156055-54, -60, -66, -67
Duplicate	Benzo(k)fluoranthene	DUP-H	L2156055-54, -60, -66, -67
Duplicate	Chrysene	DUP-H	L2156055-54, -60, -66, -67
Duplicate	Dibenz(a,h)anthracene	DUP-H	L2156055-54, -60, -66, -67
Duplicate	Fluoranthene	DUP-H	L2156055-54, -60, -66, -67
Duplicate	Indeno(1,2,3-c,d)pyrene	DUP-H	L2156055-54, -60, -66, -67
Duplicate	Pyrene	DUP-H	L2156055-54, -60, -66, -67
Method Blank	Benzo(g,h,i)perylene	MB-LOR	L2156055-54, -60, -66, -67
Method Blank	Indeno(1,2,3-c,d)pyrene	MB-LOR	L2156055-54, -60, -66, -67
Certified Reference Material	Lead (Pb)	MES	L2156055-57, -58, -59, -61, -62, -63, -64, -65
Matrix Spike	1-Methylnaphthalene	MS-B	L2156055-42, -48
Matrix Spike	Acenaphthene	MS-B	L2156055-42, -48
Matrix Spike	Anthracene	MS-B	L2156055-42, -48
Matrix Spike	Benz(a)anthracene	MS-B	L2156055-42, -48
Matrix Spike	Benzo(a)pyrene	MS-B	L2156055-42, -48
Matrix Spike	Benzo(b&j)fluoranthene	MS-B	L2156055-42, -48
Matrix Spike	Benzo(g,h,i)perylene	MS-B	L2156055-42, -48
Matrix Spike	Benzo(k)fluoranthene	MS-B	L2156055-42, -48
Matrix Spike	Chrysene	MS-B	L2156055-42, -48
Matrix Spike	Dibenz(a,h)anthracene	MS-B	L2156055-42, -48
Matrix Spike	Fluoranthene	MS-B	L2156055-42, -48
Matrix Spike	Fluorene	MS-B	L2156055-42, -48
Matrix Spike	Indeno(1,2,3-c,d)pyrene	MS-B	L2156055-42, -48
Matrix Spike	Naphthalene	MS-B	L2156055-42, -48
Matrix Spike	Phenanthrene	MS-B	L2156055-42, -48
Matrix Spike	Pyrene	MS-B	L2156055-42, -48

Qualifiers for Individual Parameters Listed:

Qualifier	Description
DLB	Detection Limit Raised. Analyte detected at comparable level in Method Blank.
DLHM	Detection Limit Adjusted: Sample has High Moisture Content
DUP-H	Duplicate results outside ALS DQO, due to sample heterogeneity.
MB-LOR	Method Blank exceeds ALS DQO. Limits of Reporting have been adjusted for samples with positive hits below 5x blank level.
MES	Data Quality Objective was marginally exceeded (by < 10% absolute) for < 10% of analytes in a Multi-Element Scan / Multi-Parameter Scan (considered acceptable as per OMOE & CCME).
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
SURR-ND	Surrogate recovery marginally exceeded ALS DQO. Reported non-detect results for associated samples were deemed to be unaffected.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
C-TIC-PCT-SK	Soil	Total Inorganic Carbon in Soil	CSSS (2008) P216-217

Reference Information

A known quantity of acetic acid is consumed by reaction with carbonates in the soil. The pH of the resulting solution is measured and compared against a standard curve relating pH to weight of carbonate.

C-TOC-CALC-SK Soil Total Organic Carbon Calculation CSSS (2008) 21.2

Total Organic Carbon (TOC) is calculated by the difference between total carbon (TC) and total inorganic carbon. (TIC)

C-TOT-LECO-SK Soil Total Carbon by combustion method CSSS (2008) 21.2

The sample is ignited in a combustion analyzer where carbon in the reduced CO2 gas is determined using a thermal conductivity detector.

EPH-TUMB-FID-VA Soil EPH in Solids by Tumbler and GCFID BC MOE EPH GCFID

Analysis is in accordance with BC MOE Lab Manual method "Extractable Petroleum Hydrocarbons in Solids by GC/FID", v2.1, July 1999. Soil samples are extracted with a 1:1 mixture of hexane and acetone using a rotary extraction technique modified from EPA 3570 prior to gas chromatography with flame ionization detection (GC-FID). EPH results include Polycyclic Aromatic Hydrocarbons (PAH) and are therefore not equivalent to Light and Heavy Extractable Petroleum Hydrocarbons (LEPH/HEPH).

HG-200.2-CVAF-VA Soil Mercury in Soil by CVAAS EPA 200.2/1631E (mod)

Soil samples are digested with hot nitric and hydrochloric acids, followed by CVAAS analysis. This method is fully compliant with the BC SALM strong acid leachable metals digestion method.

IC-CACO3-CALC-SK Soil Inorganic Carbon as CaCO3 Equivalent Calculation

LEPH/HEPH-CALC-VA Soil LEPHs and HEPHs BC MOE LEPH/HEPH

LEPHs and HEPHs are measures of Light and Heavy Extractable Petroleum Hydrocarbons in soil. Results are calculated by subtraction of applicable PAH concentrations from EPH10-19 and EPH19-32, as per the BC Lab Manual LEPH/HEPH calculation procedure.
LEPHs = EPH10-19 minus Acenaphthene, Acridine, Anthracene, Fluorene, Naphthalene and Phenanthrene.
HEPHs = EPH19-32 minus Benz(a)anthracene, Benzo(a)pyrene, Fluoranthene, and Pyrene.

MET-200.2-CCMS-VA Soil Metals in Soil by CRC ICPMS EPA 200.2/6020A (mod)

This method uses a heated strong acid digestion with HNO3 and HCl and is intended to liberate metals that may be environmentally available. Silicate minerals are not solubilized. Dependent on sample matrix, some metals may be only partially recovered, including Al, Ba, Be, Cr, Sr, Ti, Tl, V, W, and Zr. Volatile forms of sulfur (including sulfide) may not be captured, as they may be lost during sampling, storage, or digestion. Analysis is by Collision/Reaction Cell ICPMS.

MET-UG-ICP-VA Swab Metals in Swab by ICPOES NIOSH 7303/EPA 6010B

This analysis is carried out using procedures adapted from Method 7303 in the NIOSH Manual of Analytcial Methods (NMAM). The procedure involves a hot block digestion of the swab material, using a combination of nitric acid and hydrochloric acid. Instrumental analysis of the swab extract is by inductively coupled plasma - optical emission spectrophotometry (EPA 6010B).

MOISTURE-VA Soil Moisture content CWS for PHC in Soil - Tier 1

This analysis is carried out gravimetrically by drying the sample at 105 C for a minimum of six hours.

OGG-TUMB-SG-VA Soil Mineral Oil & Grease in Soil CCME PETROLEUM HYDROCARBONS-GRAVIMETRIC

This analysis is carried out in accordance with the "Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil - Tier 1 Method, Canadian Council of Ministers of the Environment, December 2000." A subsample of the sediment/soil is extracted with 1:1 hexane:acetone using a rotary extraction apparatus. The extract undergoes a silica-gel clean-up to remove polar compounds, and is analyzed gravimetrically. Mineral Oil and Grease is equivalent to fraction F4G of the Canada-wide Standard for Petroleum Hydrocarbons.

Accuracy target values for Reference Materials used in this method are derived from averages of long-term method performance, as certified values do not exist for the reported parameters.

PAH-TMB-H/A-MS-VA Soil PAH - Rotary Extraction (Hexane/Acetone) EPA 3570/8270

This analysis is carried out using procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846, Methods 3570 & 8270, published by the United States Environmental Protection Agency (EPA). The procedure uses a mechanical shaking technique to extract a subsample of the sediment/soil with a 1:1 mixture of hexane and acetone. The extract is then solvent exchanged to toluene. The final extract is analysed by capillary column gas chromatography with mass spectrometric detection (GC/MS). Surrogate recoveries may not be reported in cases where interferences from the sample matrix prevent accurate quantitation. Because the two isomers cannot be readily chromatographically separated, benzo(j)fluoranthene is reported as part of the benzo(b)fluoranthene parameter.

Benzo(a)pyrene Total Potency Equivalents [B(a)P TPE] represents the sum of estimated cancer potency relative to B(a)P for all potentially carcinogenic unsubstituted PAHs, and is calculated as per the CCME PAH Soil Quality Guidelines reference document (2010).

PH-1:2-VA Soil pH in Soil (1:2 Soil:Water Extraction) BC WLAP METHOD: PH, ELECTROMETRIC, SOIL

This analysis is carried out in accordance with procedures described in the pH, Electrometric in Soil and Sediment method - Section B Physical/Inorganic and Misc. Constituents, BC Environmental Laboratory Manual 2007. The procedure involves mixing the dried (at <60°C) and sieved (No. 10 / 2mm) sample with deionized/distilled water at a 1:2 ratio of sediment to water. The pH of the solution is then measured using a standard pH probe.

PSA-PIPET+GRAVEL-SK Soil Particle size - Sieve and Pipette SSIR-51 METHOD 3.2.1

Particle size distribution is determined by a combination of techniques. Dry sieving is performed for coarse particles, wet sieving for sand particles and the pipette sedimentation method for clay particles.

Reference Information

Reference:

Burt, R. (2009). Soil Survey Field and Laboratory Methods Manual. Soil Survey Investigations Report No. 5. Method 3.2.1.2.2. United States Department of Agriculture Natural Resources Conservation Service.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
SK	ALS ENVIRONMENTAL - SASKATOON, SASKATCHEWAN, CANADA
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

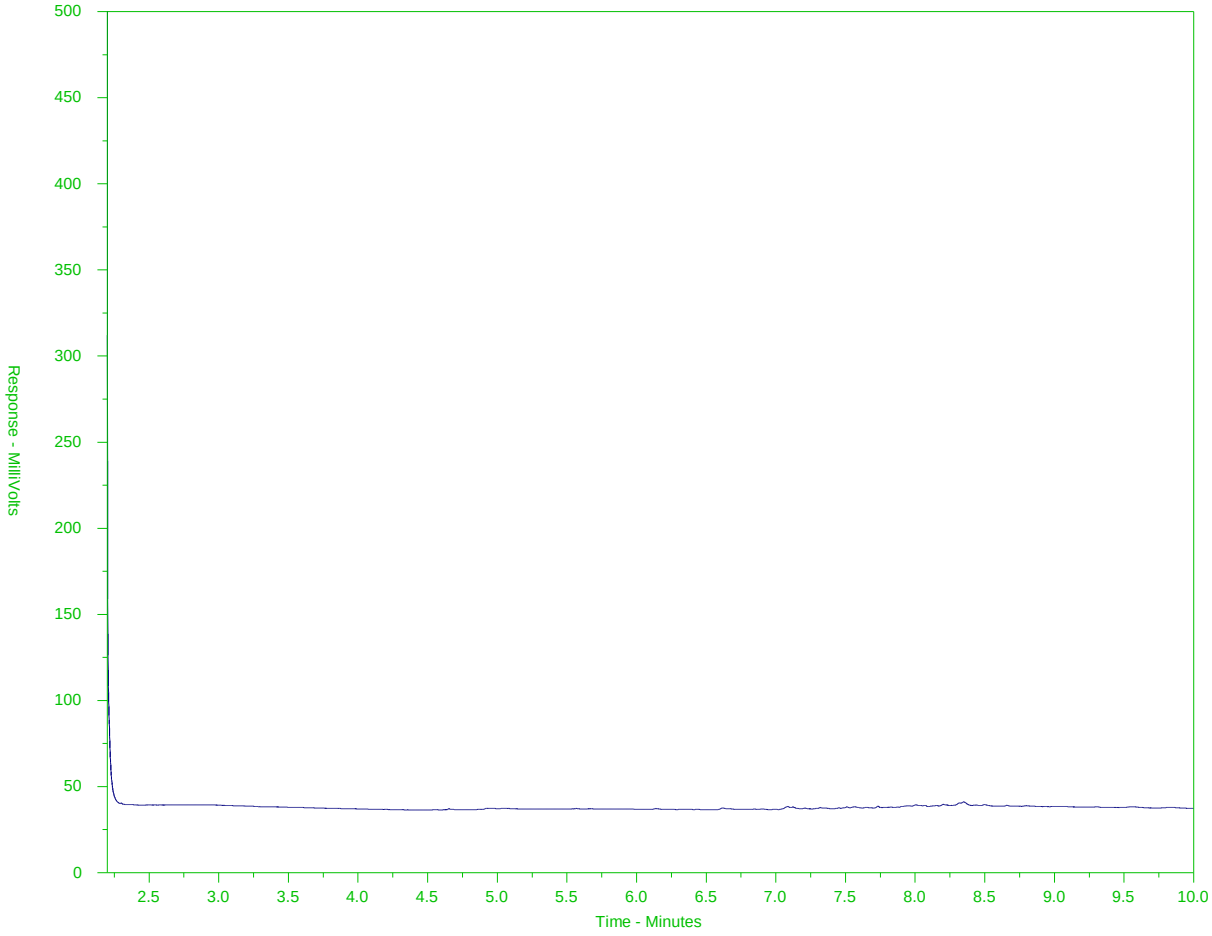
GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

BC EPH HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2156055-12
Client Sample ID: TPE-COMP



← EPH10-19 →		← EPH19-32 →
nC10	nC19	nC32
174°C	330°C	467°C
346°F	626°F	873°F
← Gasoline →	← Motor Oils/ Lube Oils/ Grease →	
← Diesel/ Jet Fuels →		

The BC EPH Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and three n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

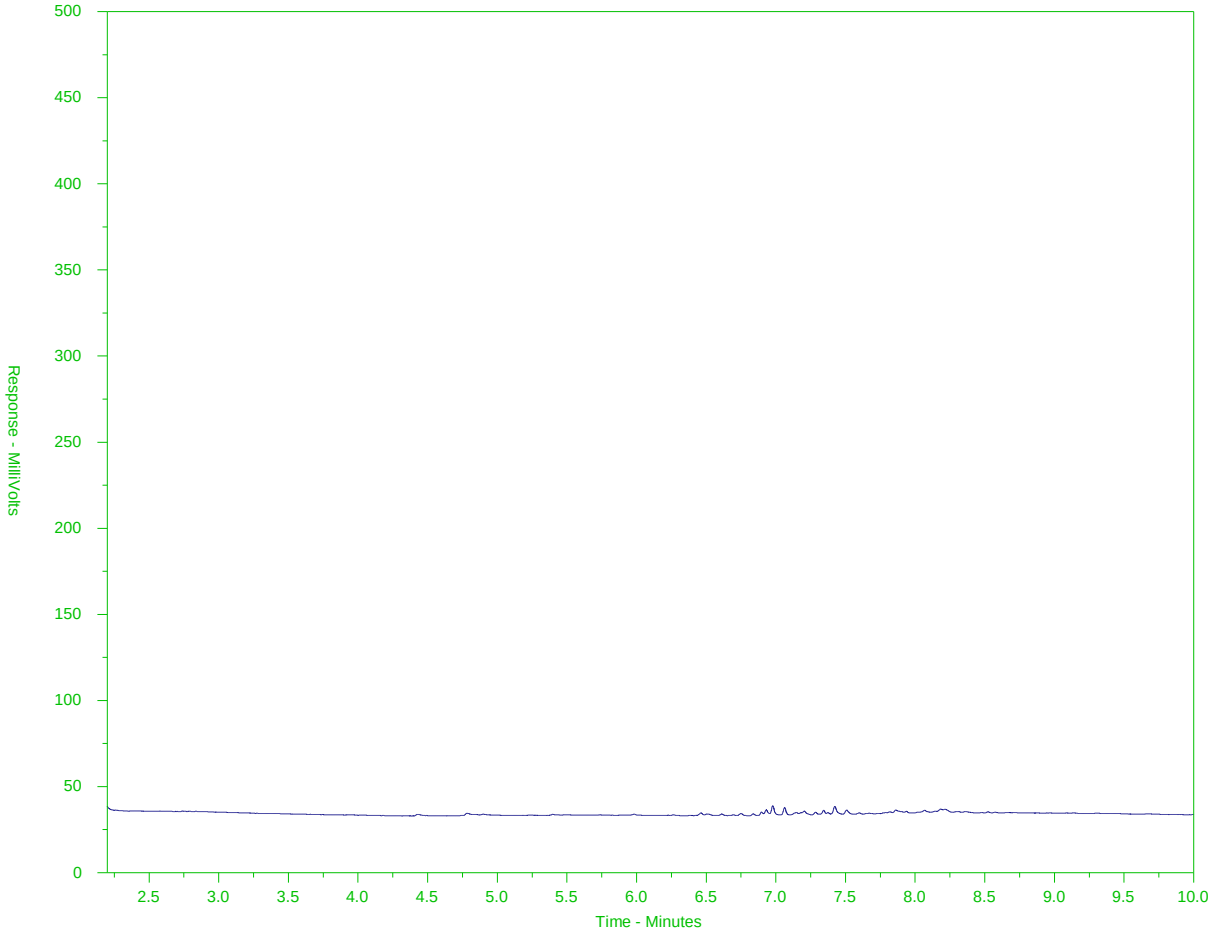
Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the scale at left.

A "-L-" in the sample ID denotes a low level sample. A "-S-" denotes a silica gel cleaned sample.

Note: This chromatogram was produced using GC conditions that are specific to the ALS Canada EPH method. Refer to the ALS Canada EPH Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR library can be found at www.alsglobal.com.

BC EPH HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2156055-24
Client Sample ID: WAL-COMP



← EPH10-19 →		← EPH19-32 →
nC10	nC19	nC32
174°C	330°C	467°C
346°F	626°F	873°F
← Gasoline →	← Motor Oils/ Lube Oils/ Grease →	
← Diesel/ Jet Fuels →		

The BC EPH Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and three n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

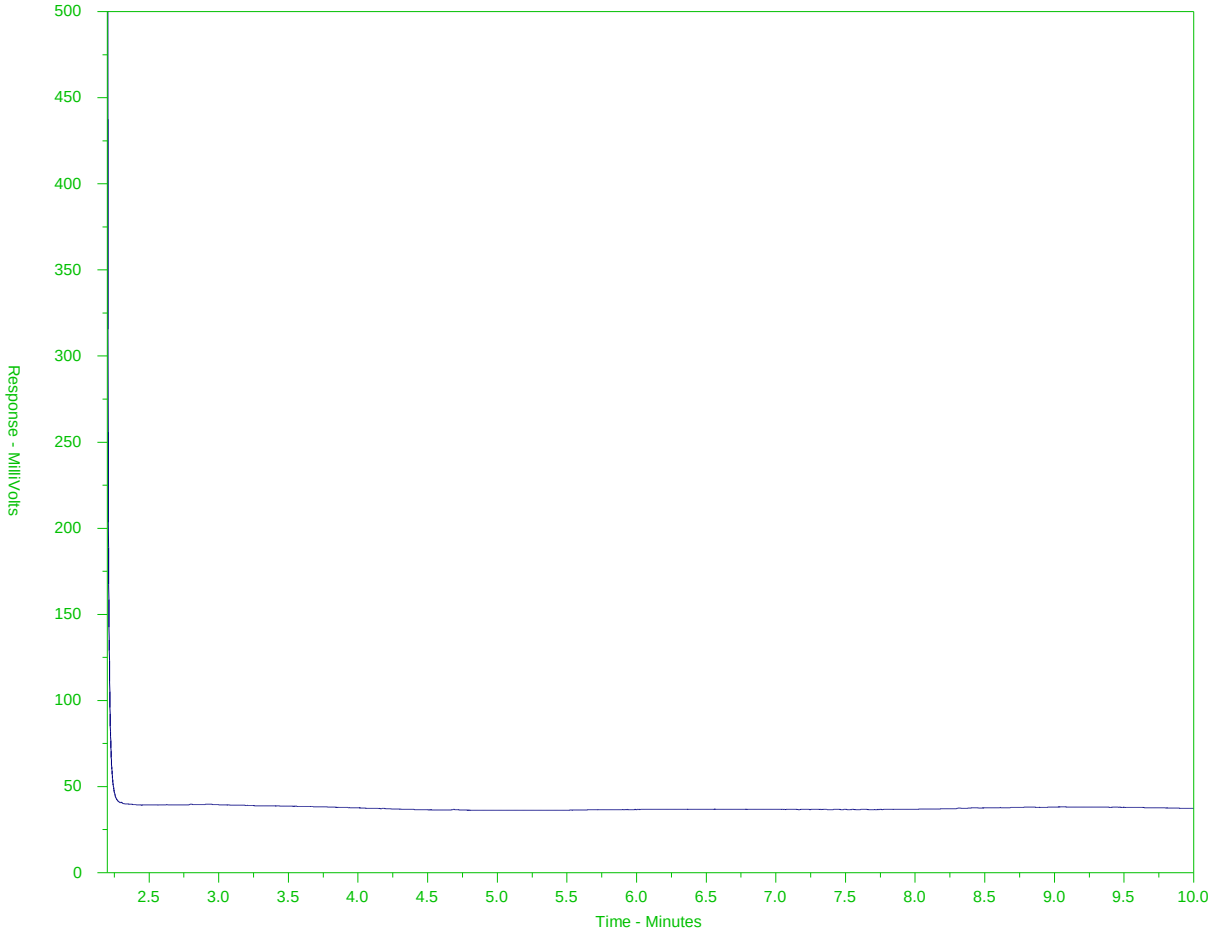
Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the scale at left.

A "-L-" in the sample ID denotes a low level sample. A "-S-" denotes a silica gel cleaned sample.

Note: This chromatogram was produced using GC conditions that are specific to the ALS Canada EPH method. Refer to the ALS Canada EPH Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR library can be found at www.alsglobal.com.

BC EPH HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2156055-30
Client Sample ID: INUG-COMP



← EPH10-19 →		← EPH19-32 →
nC10	nC19	nC32
174°C	330°C	467°C
346°F	626°F	873°F
← Gasoline →	← Motor Oils/ Lube Oils/ Grease →	
← Diesel/ Jet Fuels →		

The BC EPH Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and three n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

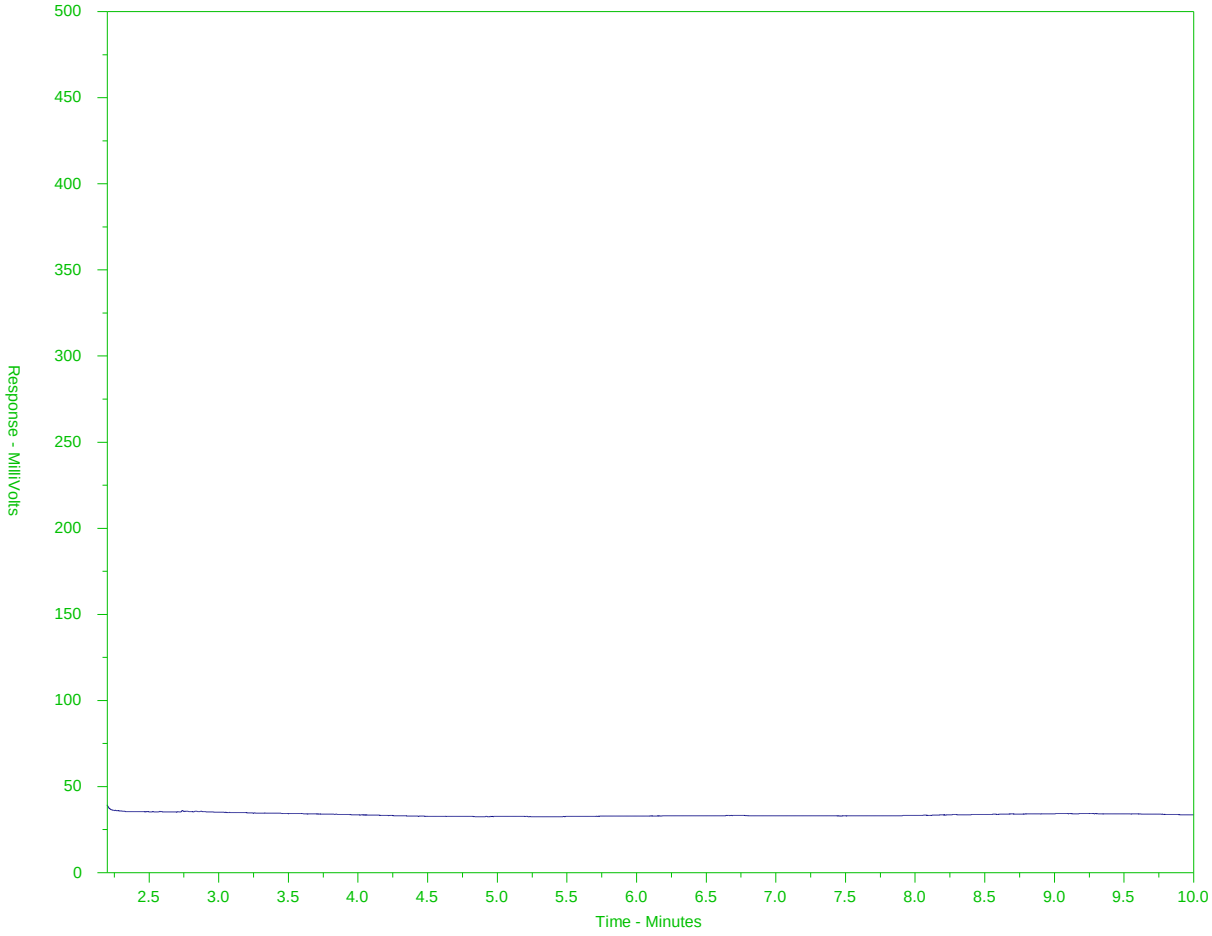
Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the scale at left.

A "-L-" in the sample ID denotes a low level sample. A "-S-" denotes a silica gel cleaned sample.

Note: This chromatogram was produced using GC conditions that are specific to the ALS Canada EPH method. Refer to the ALS Canada EPH Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR library can be found at www.alsglobal.com.

BC EPH HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2156055-36
Client Sample ID: PDL-COMP



← EPH10-19 →		← EPH19-32 →
nC10	nC19	nC32
174°C	330°C	467°C
346°F	626°F	873°F
← Gasoline →	← Motor Oils/ Lube Oils/ Grease →	
← Diesel/ Jet Fuels →		

The BC EPH Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and three n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

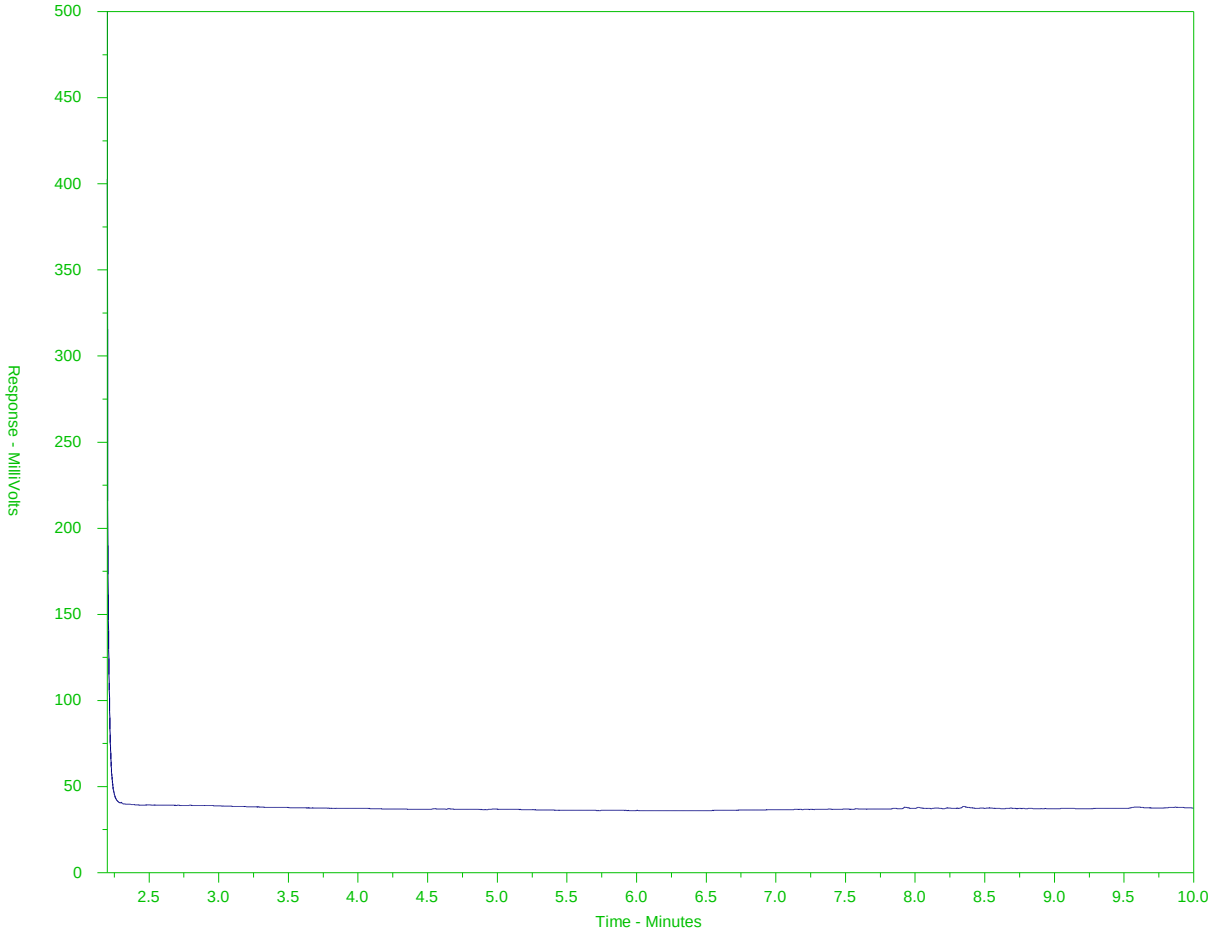
Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the scale at left.

A "-L-" in the sample ID denotes a low level sample. A "-S-" denotes a silica gel cleaned sample.

Note: This chromatogram was produced using GC conditions that are specific to the ALS Canada EPH method. Refer to the ALS Canada EPH Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR library can be found at www.alsglobal.com.

BC EPH HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2156055-42
Client Sample ID: BAP-COMP



← EPH10-19 →		← EPH19-32 →
nC10	nC19	nC32
174°C	330°C	467°C
346°F	626°F	873°F
← Gasoline →	← Motor Oils/ Lube Oils/ Grease →	
← Diesel/ Jet Fuels →		

The BC EPH Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and three n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

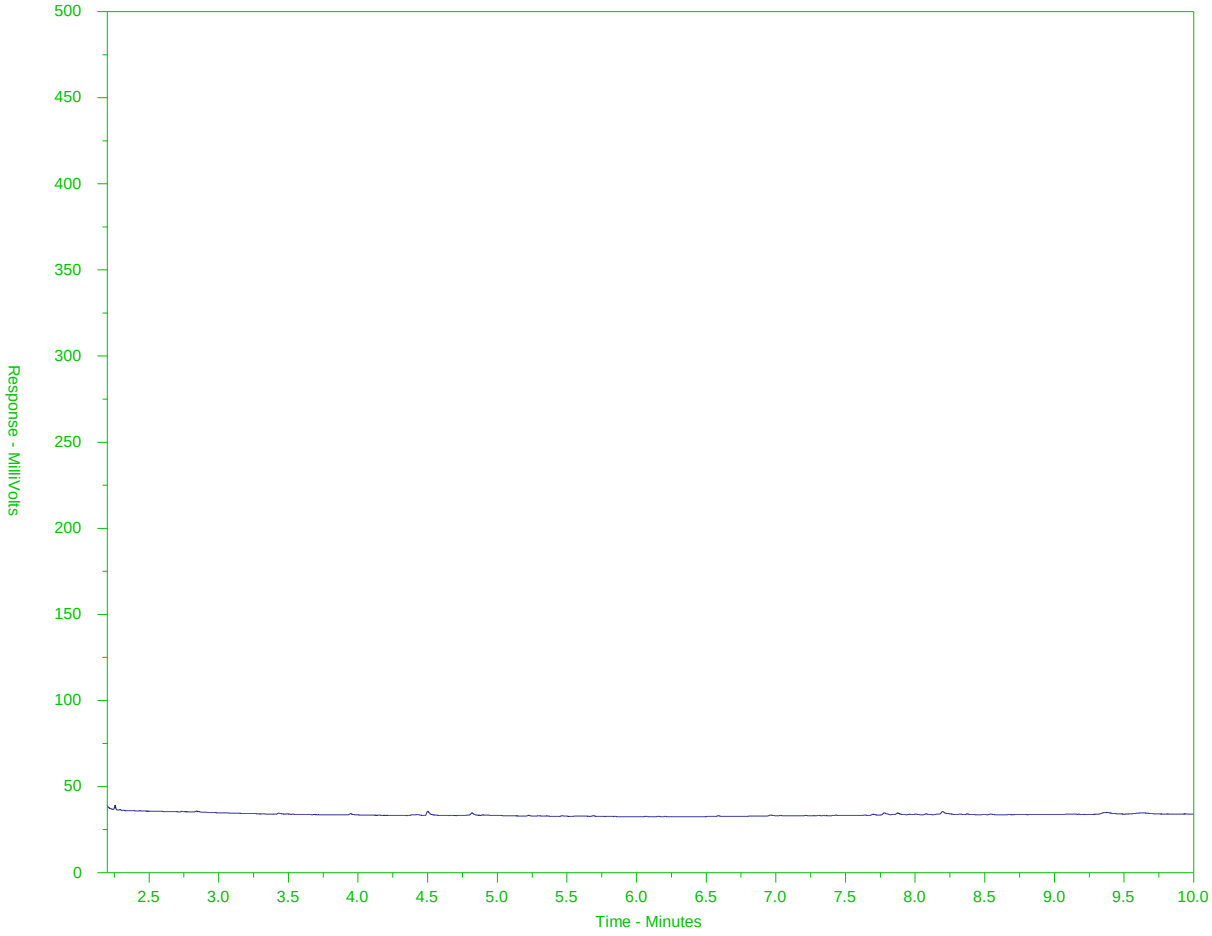
Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the scale at left.

A "-L-" in the sample ID denotes a low level sample. A "-S-" denotes a silica gel cleaned sample.

Note: This chromatogram was produced using GC conditions that are specific to the ALS Canada EPH method. Refer to the ALS Canada EPH Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR library can be found at www.alsglobal.com.

BC EPH HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: WG2866654-3#L2156055-42
Client Sample ID: BAP-COMP



← EPH10-19 →		← EPH19-32 →
nC10	nC19	nC32
174°C	330°C	467°C
346°F	626°F	873°F
← Gasoline →	← Motor Oils/ Lube Oils/ Grease →	
← Diesel/ Jet Fuels →		

The BC EPH Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and three n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

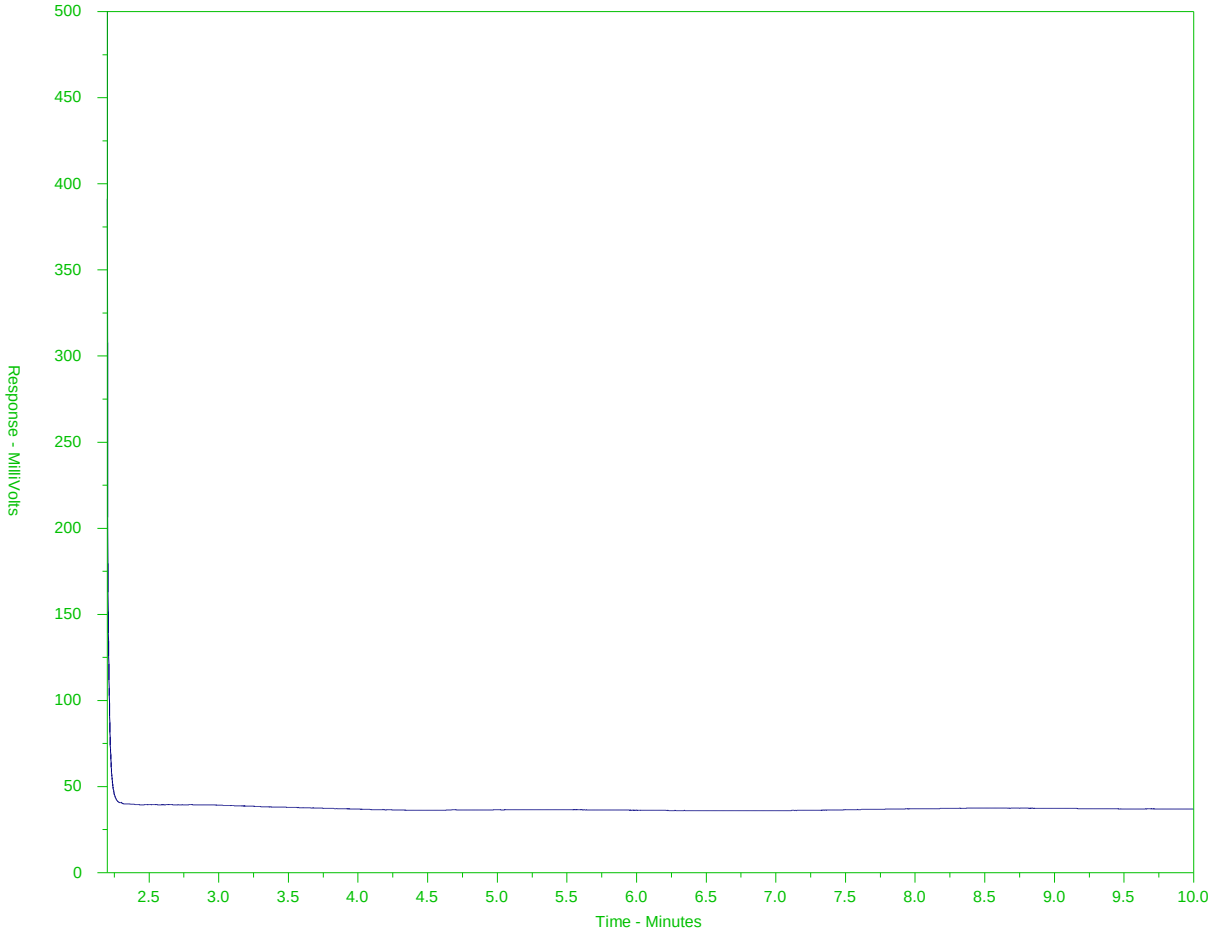
Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the scale at left.

A "-L-" in the sample ID denotes a low level sample. A "-S-" denotes a silica gel cleaned sample.

Note: This chromatogram was produced using GC conditions that are specific to the ALS Canada EPH method. Refer to the ALS Canada EPH Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR library can be found at www.alsglobal.com.

BC EPH HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2156055-48
Client Sample ID: BES-COMP



← EPH10-19 →		← EPH19-32 →
nC10	nC19	nC32
174°C	330°C	467°C
346°F	626°F	873°F
← Gasoline →	← Motor Oils/ Lube Oils/ Grease →	
← Diesel/ Jet Fuels →		

The BC EPH Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and three n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

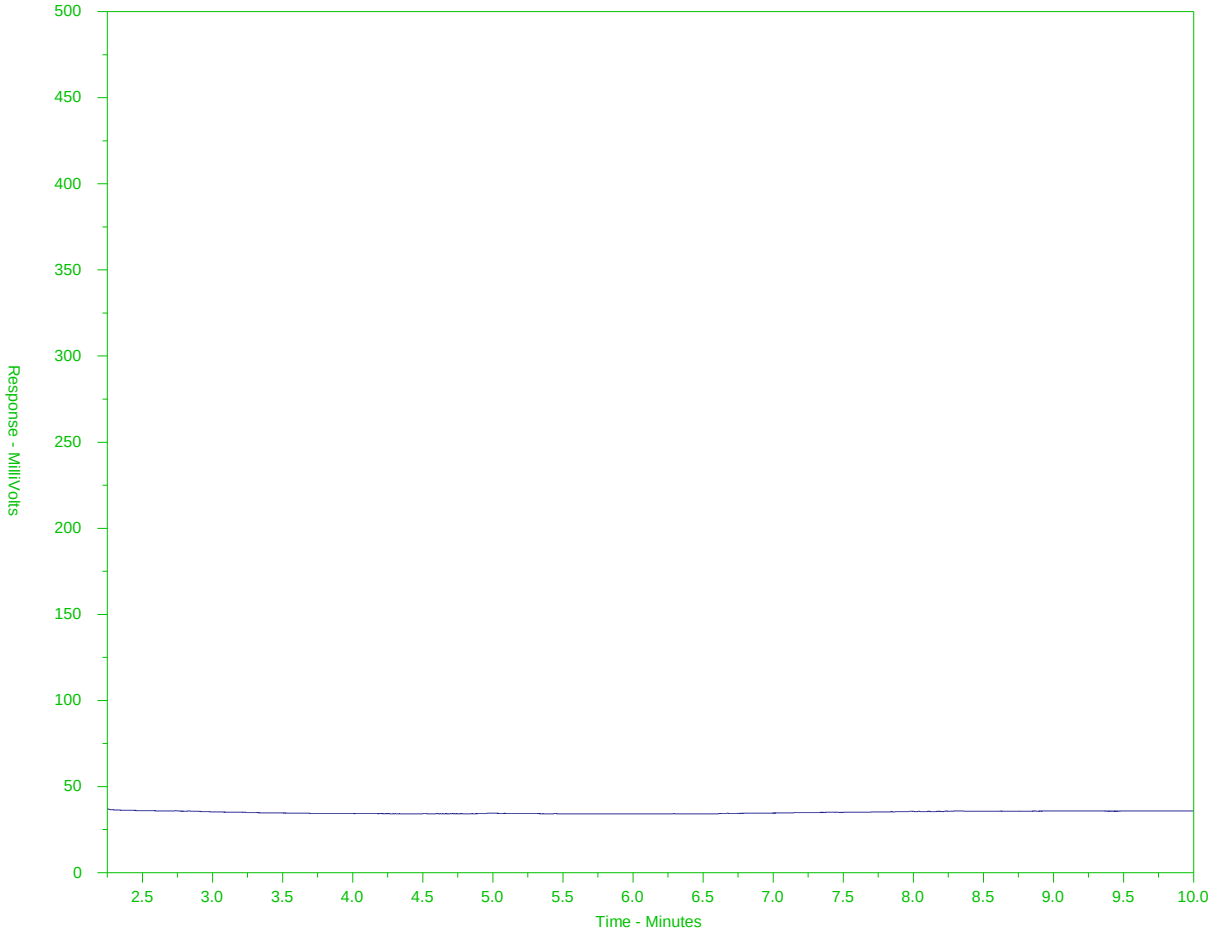
Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the scale at left.

A "-L-" in the sample ID denotes a low level sample. A "-S-" denotes a silica gel cleaned sample.

Note: This chromatogram was produced using GC conditions that are specific to the ALS Canada EPH method. Refer to the ALS Canada EPH Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR library can be found at www.alsglobal.com.

BC EPH HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2156055-54
Client Sample ID: BPJ-COMP



← EPH10-19 →		← EPH19-32 →
nC10	nC19	nC32
174°C	330°C	467°C
346°F	626°F	873°F
← Gasoline →	← Motor Oils/ Lube Oils/ Grease →	
← Diesel/ Jet Fuels →		

The BC EPH Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and three n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

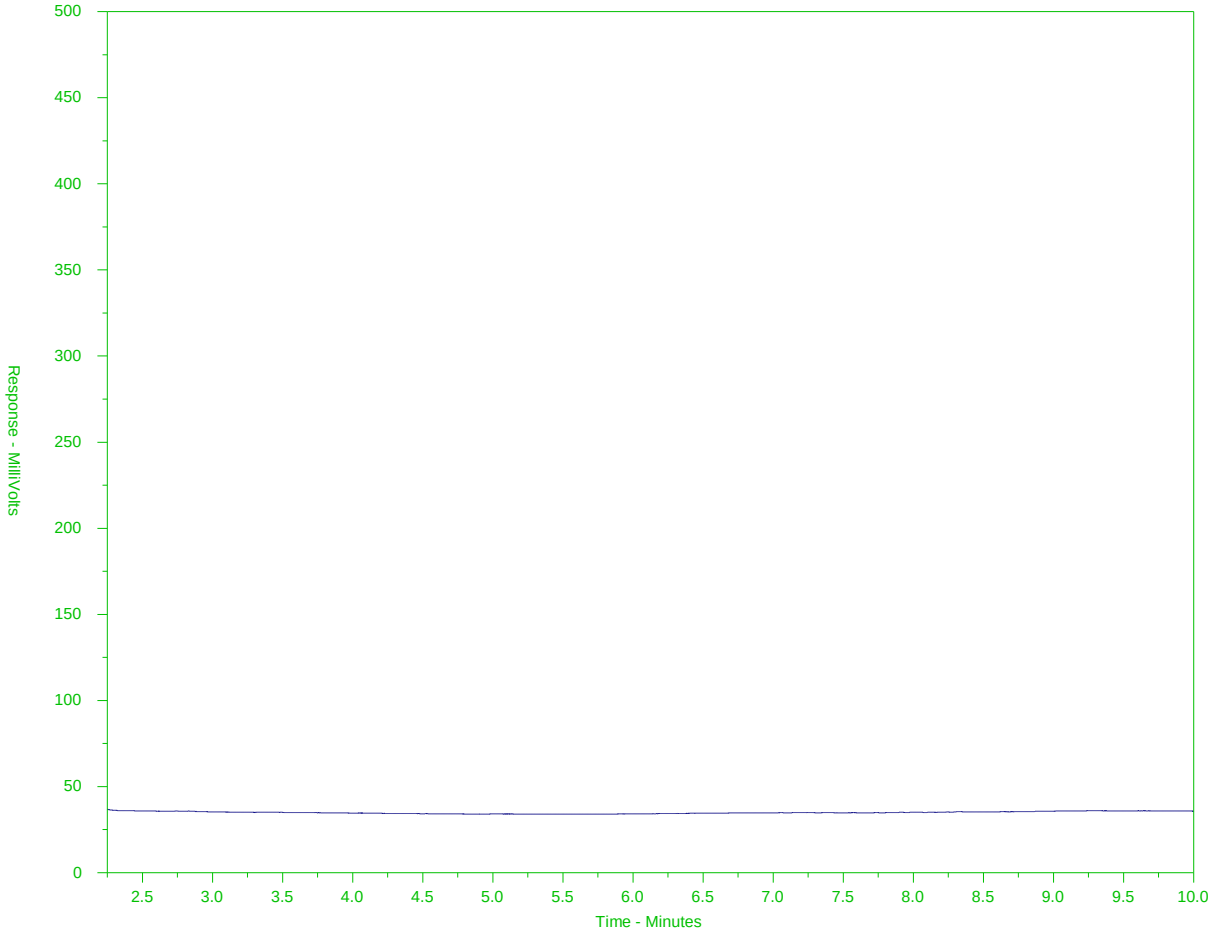
Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the scale at left.

A "-L-" in the sample ID denotes a low level sample. A "-S-" denotes a silica gel cleaned sample.

Note: This chromatogram was produced using GC conditions that are specific to the ALS Canada EPH method. Refer to the ALS Canada EPH Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR library can be found at www.alsglobal.com.

BC EPH HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2156055-60
Client Sample ID: BBD-COMP



← EPH10-19 →		← EPH19-32 →
nC10	nC19	nC32
174°C	330°C	467°C
346°F	626°F	873°F
← Gasoline →	← Motor Oils/ Lube Oils/ Grease →	
← Diesel/ Jet Fuels →		

The BC EPH Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and three n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

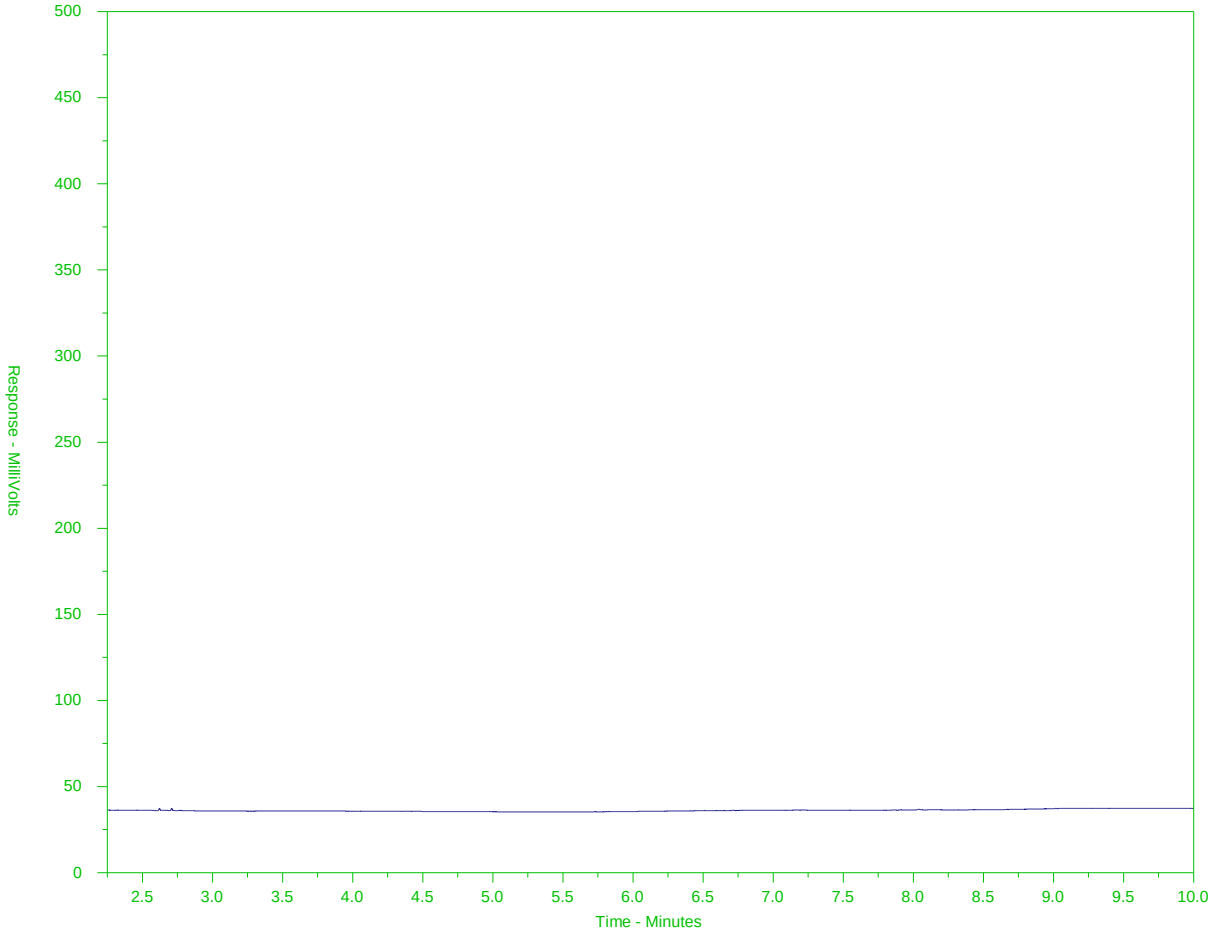
Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the scale at left.

A "-L-" in the sample ID denotes a low level sample. A "-S-" denotes a silica gel cleaned sample.

Note: This chromatogram was produced using GC conditions that are specific to the ALS Canada EPH method. Refer to the ALS Canada EPH Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR library can be found at www.alsglobal.com.

BC EPH HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2156055-66
Client Sample ID: CREMP COMP DUP-1



← EPH10-19 →		← EPH19-32 →
nC10	nC19	nC32
174°C	330°C	467°C
346°F	626°F	873°F
← Gasoline →	← Motor Oils/ Lube Oils/ Grease →	
← Diesel/ Jet Fuels →		

The BC EPH Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and three n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

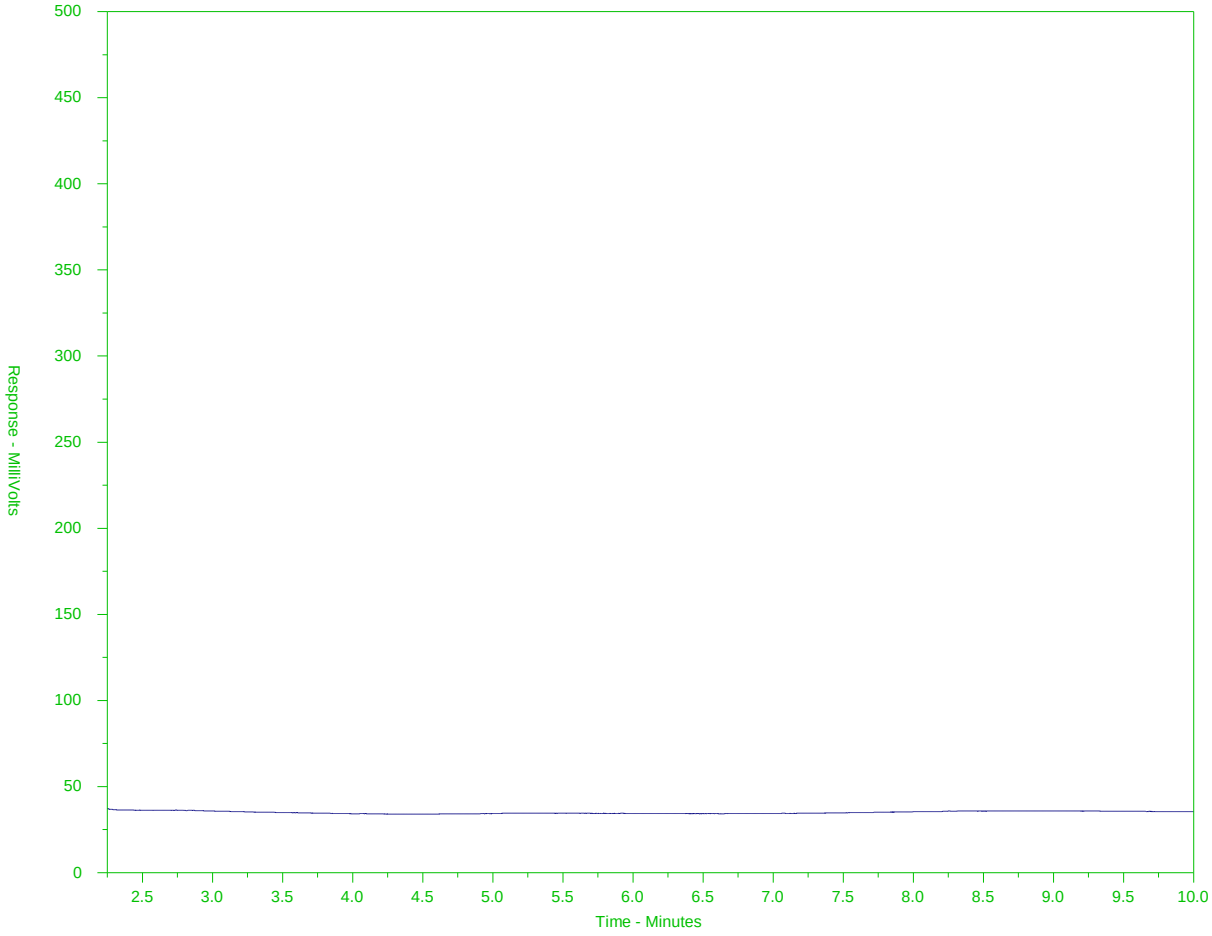
Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the scale at left.

A "-L-" in the sample ID denotes a low level sample. A "-S-" denotes a silica gel cleaned sample.

Note: This chromatogram was produced using GC conditions that are specific to the ALS Canada EPH method. Refer to the ALS Canada EPH Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR library can be found at www.alsglobal.com.

BC EPH HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2156055-67
Client Sample ID: CREMP COMP DUP-2



← EPH10-19 →		← EPH19-32 →
nC10	nC19	nC32
174°C	330°C	467°C
346°F	626°F	873°F
← Gasoline →	← Motor Oils/ Lube Oils/ Grease →	
← Diesel/ Jet Fuels →		

The BC EPH Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and three n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the scale at left.

A "-L-" in the sample ID denotes a low level sample. A "-S-" denotes a silica gel cleaned sample.

Note: This chromatogram was produced using GC conditions that are specific to the ALS Canada EPH method. Refer to the ALS Canada EPH Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR library can be found at www.alsglobal.com.

ALS Environmental

L2156055-COFC

COC # _____

Page 1 of 6

Report To		Report Format / Distribution		Service Requested (Rush for routine analysis subject to availability)
Company:	Azimuth Consulting Group	☐ Standard ☐ Other		◉ Regular (Standard Turnaround Times - Business Days)
Contact:	Eric Franz	☑ PDF ☑ Excel ☐ Digital ☐ Fax		○ Priority (2-4 Business Days) - 50% Surcharge - Contact ALS to Confirm TAT
Address:	218-2902 West Broadway	Email 1:	efranz@azimuthgroup.ca	○ Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT
	Vancouver, BC V6K2G8	Email 2:	mfinley@azimuthgroup.ca	○ Same Day or Weekend Emergency - Contact ALS to Confirm TAT
Phone:	604-730-1220 Fax:	Email 3:	robin.allard@agnicoeagle.com	
Invoice To	Same as Report ? ☑ Yes ☐ No	Client / Project Information		Analysis Request
Hardcopy of Invoice with Report?	☐ Yes ☑ No	Job #:	CREMP Sediment Grabs	Please indicate below Filtered, Preserved or both (F, P, F/P)
Company:		PO / AFE:		
Contact:		LSD:		
Address:				
Phone:	Fax:	Quote #:	Q38011	
Lab Work Order # (lab use only)		ALS Contact:	Brent Mack	Sampler: E. Franz, M. Finley

Sample #	Sample Identification (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Total Metals, pH, Moisture	TOC	Grain size	PAHs, LEPHs, HEPHs, MOG								Number of Containers
	SP-1	13-Aug-18	-	Sediment	X	X	X									3
	SP-2	13-Aug-18	-	Sediment	X	X	X									3
	SP-3	13-Aug-18	-	Sediment	X	X	X									3
	SP-4	13-Aug-18	-	Sediment	X	X	X									3
	SP-5	13-Aug-18	-	Sediment	X	X	X									3
	SP-COMP	13-Aug-18	-	Sediment				X								1
	TPE-1	10-Aug-18	-	Sediment	X	X	X									3
	TPE-2	10-Aug-18	-	Sediment	X	X	X									3
	TPE-3	10-Aug-18	-	Sediment	X	X	X									3
	TPE-4	10-Aug-18	-	Sediment	X	X	X									3
	TPE-5	10-Aug-18	-	Sediment	X	X	X									3
	TPE-COMP	10-Aug-18	-	Sediment				X								1

Special Instructions / Regulations with water or land use (CCME-Freshwater Aquatic Life/BC CSR - Commercial/AB Tier 1 - Natural, etc) / Hazardous Details

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Also provided on another Excel tab are the ALS location addresses, phone numbers and sample container / preservation / holding time table for common analyses.

SHIPMENT RELEASE (client use)			SHIPMENT RECEPTION (lab use only)				SHIPMENT VERIFICATION (lab use only)			
Released by:	Date (dd-mmm-yy)	Time (hh-mm)	Received by:	Date:	Time:	Temperature:	Verified by:	Date:	Time:	Observations: Ye If
Eric Franz	23-Aug-18		PAUL	AUG 30	08:50	17.9 °C				

AV. OF 6 COOLERS

GENF 20

ALS Environmental

L2156055-COFC

COC # _____

Report To		Report Format / Distribution		Service Requested (Rush for routine analysis subject to availability)
Company:	Azimuth Consulting Group	☐ Standard ☐ Other		◉ Regular (Standard Turnaround Times - Business Days)
Contact:	Eric Franz	☑ PDF ☑ Excel ☐ Digital ☐ Fax		○ Priority (2-4 Business Days) - 50% Surcharge - Contact ALS to Confirm TAT
Address:	218-2902 West Broadway	Email 1:	efranz@azimuthgroup.ca	○ Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT
	Vancouver, BC V6K2G8	Email 2:	mfinley@azimuthgroup.ca	○ Same Day or Weekend Emergency - Contact ALS to Confirm TAT
Phone:	604-730-1220 Fax:	Email 3:	robin.allard@agnicoeagle.com	
Invoice To	Same as Report ? ☑ Yes ☐ No	Client / Project Information		Analysis Request
Hardcopy of Invoice with Report?	☐ Yes ☑ No	Job #:	CREMP Sediment Grabs	Please Indicate below Filtered, Preserved or both (F, P, F/P)
Company:		PO / AFE:		
Contact:		LSD:		
Address:				
Phone:	Fax:	Quote #:	Q38011	
Lab Work Order # (lab use only)		ALS Contact:	Brent Mack	Sampler: E. Franz, M. Finley

Sample #	Sample Identification (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Total Metals, pH, Moisture	TOC	Grain size	PAHs, LEPHs, HEPHs, MOG								Number of Containers
	TPN-1	10-Aug-18	-	Sediment	X	X	X									3
	TPN-2	10-Aug-18	-	Sediment	X	X	X									3
	TPN-3	10-Aug-18	-	Sediment	X	X	X									3
	TPN-4	10-Aug-18	-	Sediment	X	X	X									3
	TPN-5	10-Aug-18	-	Sediment	X	X	X									3
	TPN-COMP	10-Aug-18	-	Sediment				X								1
	WAL-1	11-Aug-18	-	Sediment	X	X	X									3
	WAL-2	11-Aug-18	-	Sediment	X	X	X									3
	WAL-3	11-Aug-18	-	Sediment	X	X	X									3
	WAL-4	11-Aug-18	-	Sediment	X	X	X									3
	WAL-5	11-Aug-18	-	Sediment	X	X	X									3
	WAL-COMP	11-Aug-18	-	Sediment				X								1

Special Instructions / Regulations with water or land use (CCME-Freshwater Aquatic Life/BC CSR - Commercial/AB Tier 1 - Natural, etc) / Hazardous Details

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SHIPMENT RELEASE (client use)			SHIPMENT RECEPTION (lab use only)				SHIPMENT VERIFICATION (lab use only)			
Released by:	Date (dd-mmm-yy)	Time (hh-mm)	Received by:	Date:	Time:	Temperature:	Verified by:	Date:	Time:	Observations: Yes / No ? If Yes add SIF
			PAUL	AUG 30	08:50	17.9 °C				

AV. OF 6 COOLERS

ALS Environmental

L2156055-COFC

COC # _____

Report To		Report Format / Distribution		Service Requested (Rush for routine analysis subject to availability)
Company:	Azimuth Consulting Group	☐ Standard ☐ Other		◉ Regular (Standard Turnaround Times - Business Days)
Contact:	Eric Franz	☑ PDF ☑ Excel ☐ Digital ☐ Fax		○ Priority (2-4 Business Days) - 50% Surcharge - Contact ALS to Confirm TAT
Address:	218-2902 West Broadway	Email 1: efranz@azimuthgroup.ca		○ Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT
	Vancouver, BC V6K2G8	Email 2: mfinley@azimuthgroup.ca		○ Same Day or Weekend Emergency - Contact ALS to Confirm TAT
Phone:	604-730-1220 Fax:	Email 3: robin.allard@agnicoeagle.com		**Analysis Request**
Invoice To	Same as Report ? ☑ Yes ☐ No	**Client / Project Information**		Please indicate below Filtered, Preserved or both (F, P, F/P)
Hardcopy of Invoice with Report?	☐ Yes ☑ No	Job #: CREMP Sediment Grabs		
Company:		PO / AFE:		
Contact:		LSD:		
Address:				
Phone:	Fax:	Quote #: Q38011		
Lab Work Order # (lab use only)		**ALS Contact:** Brent Mack	**Sampler:** E. Franz M. Finley	

Sample #	Sample Identification (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Total Metals, pH, Moisture	TOC	Grain size									Number of Containers
	INUG-1	13-Aug-18	-	Sediment	X	X	X									3
	INUG-2	13-Aug-18	-	Sediment	X	X	X									3
	INUG-3	13-Aug-18	-	Sediment	X	X	X									3
	INUG-4	13-Aug-18	-	Sediment	X	X	X									3
	INUG-5	13-Aug-18	-	Sediment	X	X	X									3
	INUG-COMP	13-Aug-18	-	Sediment				X								1
	PDL-1	13-Aug-18	-	Sediment	X	X	X									3
	PDL-2	13-Aug-18	-	Sediment	X	X	X									3
	PDL-3	13-Aug-18	-	Sediment	X	X	X									3
	PDL-4	13-Aug-18	-	Sediment	X	X	X									3
	PDL-5	13-Aug-18	-	Sediment	X	X	X									3
	PDL-COMP	13-Aug-18	-	Sediment				X								1

Special Instructions / Regulations with water or land use (CCME-Freshwater Aquatic Life/BC CSR - Commercial/AB Tier 1 - Natural, etc) / Hazardous Details

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SHIPMENT RELEASE (client use)			SHIPMENT RECEPTION (lab use only)				SHIPMENT VERIFICATION (lab use only)			
Released by:	Date (dd-mmm-yy)	Time (hh-mm)	Received by:	Date:	Time:	Temperature:	Verified by:	Date:	Time:	Observations: Yes / No ? If Yes add SIF
			PAUL	AUG 30	08:50	17.9 °C				

AV. OF 6 COOLERS

ALS Environmental

L2156055-COFC

COC # _____

Report To		Report Format / Distribution	Service Requested (Rush for routine analysis subject to availability)
Company:	Azimuth Consulting Group	☐ Standard ☐ Other	◉ Regular (Standard Turnaround Times - Business Days)
Contact:	Eric Franz	☑ PDF ☑ Excel ☐ Digital ☐ Fax	○ Priority (2-4 Business Days) - 50% Surcharge - Contact ALS to Confirm TAT
Address:	218-2902 West Broadway	Email 1: efranz@azimuthgroup.ca	○ Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT
	Vancouver, BC V6K2G8	Email 2: mfinley@azimuthgroup.ca	○ Same Day or Weekend Emergency - Contact ALS to Confirm TAT
Phone:	604-730-1220 Fax:	Email 3: robin.allard@agnicoeagle.com	
Invoice To	Same as Report ? ☑ Yes ☐ No	Client / Project Information	Analysis Request
Hardcopy of Invoice with Report?	☐ Yes ☑ No	Job #: CREMP Sediment Grabs	Please indicate below Filtered, Preserved or both (F, P, F/P)
Company:		PO / AFE:	
Contact:		LSD:	
Address:			
Phone:	Fax:	Quote #: Q38011	
Lab Work Order # (lab use only)		ALS Contact: Brent Mack	Sampler: E. Franz, M. Finley

Sample #	Sample Identification (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Total Metals, pH, Moisture	TOC	Grain size	PAHs, LEPHs, HEPHs, MOG								Number of Containers
	BAP-1	20-Aug-18	-	Sediment	X	X	X									3
	BAP-2	20-Aug-18	-	Sediment	X	X	X									3
	BAP-3	20-Aug-18	-	Sediment	X	X	X									3
	BAP-4	20-Aug-18	-	Sediment	X	X	X									3
	BAP-5	20-Aug-18	-	Sediment	X	X	X									3
	BAP-COMP	20-Aug-18	-	Sediment				X								1
	BES-1	20-Aug-18	-	Sediment	X	X	X									3
	BES-2	20-Aug-18	-	Sediment	X	X	X									3
	BES-3	20-Aug-18	-	Sediment	X	X	X									3
	BES-4	20-Aug-18	-	Sediment	X	X	X									3
	BES-5	20-Aug-18	-	Sediment	X	X	X									3
	BES-COMP	20-Aug-18	-	Sediment				X								1

Special Instructions / Regulations with water or land use (CCME-Freshwater Aquatic Life/BC CSR - Commercial/AB Tier 1 - Natural, etc) / Hazardous Details

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SHIPMENT RELEASE (client use)			SHIPMENT RECEPTION (lab use only)				SHIPMENT VERIFICATION (lab use only)			
Released by:	Date (dd-mmm-yy)	Time (hh-mm)	Received by:	Date:	Time:	Temperature:	Verified by:	Date:	Time:	Observations: Yes / No ? If Yes add SIF
			PAUL	AUG 30	08:50	17.9 °C				

AV. OF 6 COOLERS

ALS Environmental

L2156055-COFC

COC # _____

Report To		Report Format / Distribution	Service Requested (Rush for routine analysis subject to availability)
Company:	Azimuth Consulting Group	☐ Standard ☐ Other	◉ Regular (Standard Turnaround Times - Business Days)
Contact:	Eric Franz	☑ PDF ☑ Excel ☐ Digital ☐ Fax	○ Priority (2-4 Business Days) - 50% Surcharge - Contact ALS to Confirm TAT
Address:	218-2902 West Broadway	Email 1: efranz@azimuthgroup.ca	○ Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT
	Vancouver, BC V6K2G8	Email 2: mfinley@azimuthgroup.ca	○ Same Day or Weekend Emergency - Contact ALS to Confirm TAT
Phone:	604-730-1220 Fax:	Email 3: robin.allard@agnicoeagle.com	
Invoice To	Same as Report ? ☑ Yes ☐ No	Client / Project Information	Analysis Request
Hardcopy of Invoice with Report?	☐ Yes ☑ No	Job #: CREMP Sediment Grabs	Please indicate below Filtered, Preserved or both (F, P, F/P)
Company:		PO / AFE:	
Contact:		LSD:	
Address:			
Phone:	Fax:	Quote #: Q38011	
Lab Work Order # (lab use only)		ALS Contact: Brent Mack	Sampler: E. Franz, M. Finley

Sample #	Sample Identification (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Total Metals, pH, Moisture	TOC	Grain size	PAHs, LEPHs, HEPHs, MOG	Number of Containers
	BPJ-1	21-Aug-18	-	Sediment	X	X	X		3
	BPJ-2	21-Aug-18	-	Sediment	X	X	X		3
	BPJ-3	21-Aug-18	-	Sediment	X	X	X		3
	BPJ-4	21-Aug-18	-	Sediment	X	X	X		3
	BPJ-5	21-Aug-18	-	Sediment	X	X	X		3
	BPJ-COMP	21-Aug-18	-	Sediment				X	1
	BBD-1	21-Aug-18	-	Sediment	X	X	X		3
	BBD-2	21-Aug-18	-	Sediment	X	X	X		3
	BBD-3	21-Aug-18	-	Sediment	X	X	X		3
	BBD-4	21-Aug-18	-	Sediment	X	X	X		3
	BBD-5	21-Aug-18	-	Sediment	X	X	X		3
	BBD-COMP	21-Aug-18	-	Sediment				X	1

Special Instructions / Regulations with water or land use (CCME-Freshwater Aquatic Life/BC CSR - Commercial/AB Tier 1 - Natural, etc) / Hazardous Details

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SHIPMENT RELEASE (client use)			SHIPMENT RECEPTION (lab use only)				SHIPMENT VERIFICATION (lab use only)			
Released by:	Date (dd-mmm-yy)	Time (hh-mm)	Received by:	Date:	Time:	Temperature:	Verified by:	Date:	Time:	Observations: Yes / No ? If Yes add SIF
			PAUL	AUG 30	08:50	17.9 °C				

AV. OF 6 COOLERS

ALS Environmental

L2156055-COFC

COC # _____

Report To		Report Format / Distribution		Service Requested (Rush for routine analysis subject to availability)
Company:	Azimuth Consulting Group	☐ Standard ☐ Other		◉ Regular (Standard Turnaround Times - Business Days)
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	Vancouver, BC V6K2G8	Email 2:	mfinley@azimuthgroup.ca	○ Same Day or Weekend Emergency - Contact ALS to Confirm TAT
Phone:	604-730-1220 Fax:	Email 3:	robin.allard@agnicoeagle.com	
Invoice To	Same as Report ? ☑ Yes ☐ No	**Client / Project Information**		**Analysis Request**
Hardcopy of Invoice with Report?	☐ Yes ☑ No	Job #:	CREMP Sediment Grabs	Please indicate below Filtered, Preserved or both (F, P, F/P)
Company:		PO / AFE:		
Contact:		LSD:		
Address:				
Phone:	Fax:	Quote #:	Q38011	
Lab Work Order # (lab use only)		**ALS Contact:**	Brent Mack	**Sampler:** E. Franz, M. Finley

Sample #	Sample Identification (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Total Metals, pH, Moisture	TOC	Grain size	PAHs, LEPHs, HEPHs, MOG									Number of Containers
	CREMP DUP-1	-	-	Sediment	X	X	X										3
	CREMP DUP-2	-	-	Sediment	X	X	X										3
	CREMP DUP-3	-		Sediment	X	X	X										3
	CREMP DUP-4	-	-	Sediment	X	X	X										3
	CREMP DUP-5	-	-	Sediment	X	X	X										3
	CREMP COMP DUP-1	-	-	Sediment				X									1
	CREMP COMP DUP-2	-	-	Sediment				X									1
	CREMP SWIPE-1	11-Aug-18	-	Other	X												1
	CREMP SWIPE-2	20-Aug-18	-	Other	X												1
	CREMP SWIPE-3	20-Aug-18	-	Other	X												1
	CREMP SWIPE-4	22-Aug-18	-	Other	X												1

Special Instructions / Regulations with water or land use (CCME-Freshwater Aquatic Life/BC CSR - Commercial/AB Tier 1 - Natural, etc) / Hazardous Details

CREMP SWIPE-1 @ WAL; CREMP SWIPE-2 @ BAP; CREMP SWIPE-3 @ BES; CREMP SWIPE-4 = BLANK

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.

By the use of this form the user acknowledges and agrees with the Terms and Conditions as provided on a separate Excel tab.

Also provided on another Excel tab are the ALS location addresses, phone numbers and sample container / preservation / holding time table for common analyses.

SHIPMENT RELEASE (client use)			SHIPMENT RECEPTION (lab use only)				SHIPMENT VERIFICATION (lab use only)			
Released by:	Date (dd-mmm-yy)	Time (hh-mm)	Received by:	Date:	Time:	Temperature:	Verified by:	Date:	Time:	Observations: Yes / No ? If Yes add SIF
			PAUL	AUG 30	08:50	17.9 °C				

AV. OF 6 COOLERS

AZIMUTH CONSULTING GROUP INC.
ATTN: Eric Franz
218 - 2902 West Broadway
Vancouver BC V6K 2G8

Date Received: 20-AUG-18
Report Date: 04-SEP-18 12:48 (MT)
Version: FINAL

Client Phone: 604-730-1220

Certificate of Analysis

Lab Work Order #: L2149758

Project P.O. #: NOT SUBMITTED
Job Reference: MEADOWBANK CREMP-SURFACEWATER
C of C Numbers:
Legal Site Desc:

Brent Mack, B.Sc.
Account Manager

[This report shall not be reproduced except in full without the written authority of the Laboratory.]

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2149758-1	L2149758-2	L2149758-3	L2149758-4	L2149758-5
	Description	Water	Water	Water	Water	Water
	Sampled Date	13-AUG-18	13-AUG-18	13-AUG-18	13-AUG-18	13-AUG-18
	Sampled Time	09:38	09:02	10:41	11:10	
	Client ID	WAL-84	WAL-83	SP-114	SP-115	AUG-DUP-2
Grouping	**Analyte**					
WATER						
Physical Tests	Conductivity (uS/cm)	42.0	41.3	40.9	40.4	40.3
	Hardness (as CaCO3) (mg/L)	17.3	18.0	17.1	16.4	17.3
	pH (pH)	7.39	7.37	7.37	7.43	7.47
	Total Suspended Solids (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
	Total Dissolved Solids (mg/L)	29.1	26.7	26.5	26.0	26.6
	Turbidity (NTU)	0.24	0.25	0.27	0.25	0.27
Anions and Nutrients	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	14.2	14.2	12.1	12.3	14.0
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
	Alkalinity, Total (as CaCO3) (mg/L)	14.2	14.2	12.1	12.3	14.0
	Ammonia, Total (as N) (mg/L)	0.0279	0.0301	0.0164	0.0156	0.0056
	Bromide (Br) (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050
	Chloride (Cl) (mg/L)	0.80	0.79	0.95	0.95	0.79
	Fluoride (F) (mg/L)	0.050	0.051	0.071	0.071	0.051
	Nitrate (as N) (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
	Nitrite (as N) (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Total Kjeldahl Nitrogen (mg/L)	0.146	0.158	0.127	0.119	0.133
	Orthophosphate-Dissolved (as P) (mg/L)	0.0011	0.0011	0.0014	0.0012	0.0011
	Phosphorus (P)-Total Dissolved (mg/L)	<0.0020	0.0020	0.0023	<0.0020	0.0021
	Phosphorus (P)-Total (mg/L)	<0.0020	<0.0020	<0.0020	0.0021	0.0028
	Silicate (as SiO2) (mg/L)	<0.50	<0.50	<0.50	<0.50	<0.50
	Sulfate (SO4) (mg/L)	4.64	4.64	5.58	5.58	4.66
Cyanides	Cyanide, Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Cyanide, Free (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	2.00	1.98	1.59	1.55	2.05
	Total Organic Carbon (mg/L)	2.44	1.95	1.62	1.74	2.07
Total Metals	Aluminum (Al)-Total (mg/L)	0.0053	0.0039	0.0056	0.0063	0.0045
	Antimony (Sb)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Arsenic (As)-Total (mg/L)	0.00031	0.00031	0.00023	0.00023	0.00028
	Barium (Ba)-Total (mg/L)	0.00216	0.00216	0.00260	0.00261	0.00213
	Beryllium (Be)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Bismuth (Bi)-Total (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Boron (B)-Total (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
	Cadmium (Cd)-Total (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
	Calcium (Ca)-Total (mg/L)	4.39	4.40	3.92	3.97	4.33
	Cesium (Cs)-Total (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2149758-6	L2149758-7	L2149758-8	L2149758-9	L2149758-10
Description	Water	Water	Water	Water	Water
Sampled Date	13-AUG-18	13-AUG-18	13-AUG-18	13-AUG-18	13-AUG-18
Sampled Time	16:37	16:06		17:41	17:13
Client ID	TPE-114	TPE-115	AUG-DUP-1	TPN-114	TPN-115
Grouping / **Analyte**					
WATER					
Physical Tests Conductivity (uS/cm)	29.6	29.0	29.7	26.6	26.3
Hardness (as CaCO3) (mg/L)	10.7	10.7	11.0	9.00	7.85
pH (pH)	7.25	7.24	7.26	7.16	7.15
Total Suspended Solids (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
Total Dissolved Solids (mg/L)	18.8	19.7	19.6	18.0	16.7
Turbidity (NTU)	0.30	0.26	0.30	0.22	0.22
Anions and Nutrients Alkalinity, Bicarbonate (as CaCO3) (mg/L)	8.1	8.0	8.3	6.7	6.6
Alkalinity, Carbonate (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
Alkalinity, Total (as CaCO3) (mg/L)	8.1	8.0	8.3	6.7	6.6
Ammonia, Total (as N) (mg/L)	0.0241	0.0123	<0.0050	0.0151	0.0113
Bromide (Br) (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050
Chloride (Cl) (mg/L)	0.75	0.75	0.75	0.76	0.76
Fluoride (F) (mg/L)	0.078	0.076	0.077	0.068	0.068
Nitrate (as N) (mg/L)	<0.0050	<0.0050	<0.0050	0.0185	0.0196
Nitrite (as N) (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Total Kjeldahl Nitrogen (mg/L)	0.097	0.094	0.102	0.106	0.099
Orthophosphate-Dissolved (as P) (mg/L)	0.0011	0.0013	0.0020	0.0011	<0.0010
Phosphorus (P)-Total Dissolved (mg/L)	<0.0020	0.0021	<0.0020	<0.0020	<0.0020
Phosphorus (P)-Total (mg/L)	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Silicate (as SiO2) (mg/L)	<0.50	<0.50	<0.50	1.03	0.81
Sulfate (SO4) (mg/L)	4.77	4.74	4.77	4.68	4.68
Cyanides Cyanide, Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Cyanide, Free (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Organic / Inorganic Carbon Dissolved Organic Carbon (mg/L)	1.41	1.27	1.29	1.33	1.69
Total Organic Carbon (mg/L)	1.27	1.19	1.50	1.40	1.34
Total Metals Aluminum (Al)-Total (mg/L)	0.0094	0.0062	0.0064	0.0045	0.0049
Antimony (Sb)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic (As)-Total (mg/L)	0.00040	0.00033	0.00040	0.00015	0.00015
Barium (Ba)-Total (mg/L)	0.00264	0.00258	0.00265	0.00268	0.00267
Beryllium (Be)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth (Bi)-Total (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron (B)-Total (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)-Total (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Calcium (Ca)-Total (mg/L)	2.46	2.39	2.46	2.05	2.02
Cesium (Cs)-Total (mg/L)	0.000018	0.000014	0.000018	<0.000010	<0.000010

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2149758-11	L2149758-12	L2149758-13	L2149758-14	
Description	Water	Water	Water	Water	
Sampled Date	14-AUG-18	14-AUG-18	14-AUG-18	14-AUG-18	
Sampled Time		09:51	14:30	15:00	
Client ID	INUG-102	INUG-103	PDL-67	PDL-68	
Grouping	**Analyte**				
WATER					
Physical Tests	Conductivity (uS/cm)	15.4	15.5	21.7	21.4
	Hardness (as CaCO3) (mg/L)	5.33	5.43	8.46	8.35
	pH (pH)	7.07	7.07	7.26	7.26
	Total Suspended Solids (mg/L)	<1.0	<1.0	<1.0	<1.0
	Total Dissolved Solids (mg/L)	12.2	10.8	14.6	14.0
	Turbidity (NTU)	0.29	0.31	0.23	0.22
Anions and Nutrients	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	5.6	5.5	7.9	7.9
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0
	Alkalinity, Total (as CaCO3) (mg/L)	5.6	5.5	7.9	7.9
	Ammonia, Total (as N) (mg/L)	0.0111	0.0297	0.0157	0.0072
	Bromide (Br) (mg/L)	<0.050	<0.050	<0.050	<0.050
	Chloride (Cl) (mg/L)	0.81	0.81	0.65	0.64
	Fluoride (F) (mg/L)	0.065	0.063	0.038	0.038
	Nitrate (as N) (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050
	Nitrite (as N) (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010
	Total Kjeldahl Nitrogen (mg/L)	0.119	0.121	0.112	0.086
	Orthophosphate-Dissolved (as P) (mg/L)	<0.0010	0.0012	0.0012	0.0011
	Phosphorus (P)-Total Dissolved (mg/L)	<0.0020	0.0021	<0.0020	<0.0020
	Phosphorus (P)-Total (mg/L)	0.0024	0.0021	<0.0020	<0.0020
	Silicate (as SiO2) (mg/L)	<0.50	<0.50	<0.50	<0.50
	Sulfate (SO4) (mg/L)	0.95	0.95	1.75	1.74
Cyanides	Cyanide, Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010
	Cyanide, Free (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	1.70	1.69	1.35	1.38
	Total Organic Carbon (mg/L)	1.77	1.78	1.60	1.47
Total Metals	Aluminum (Al)-Total (mg/L)	0.0081	0.0092	0.0060	0.0043
	Antimony (Sb)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010
	Arsenic (As)-Total (mg/L)	<0.00010	<0.00010	0.00015	0.00014
	Barium (Ba)-Total (mg/L)	0.00254	0.00167	0.00178	0.00170
	Beryllium (Be)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010
	Bismuth (Bi)-Total (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050
	Boron (B)-Total (mg/L)	<0.010	<0.010	<0.010	<0.010
	Cadmium (Cd)-Total (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050
	Calcium (Ca)-Total (mg/L)	1.07	1.08	2.09	2.07
	Cesium (Cs)-Total (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2149758-1	L2149758-2	L2149758-3	L2149758-4	L2149758-5
Description	Water	Water	Water	Water	Water
Sampled Date	13-AUG-18	13-AUG-18	13-AUG-18	13-AUG-18	13-AUG-18
Sampled Time	09:38	09:02	10:41	11:10	
Client ID	WAL-84	WAL-83	SP-114	SP-115	AUG-DUP-2
Grouping / **Analyte**					
WATER					
Total Metals Chromium (Cr)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Cobalt (Co)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper (Cu)-Total (mg/L)	0.00089	0.00087	0.00063	0.00060	0.00085
Iron (Fe)-Total (mg/L)	0.016	0.014	0.017	0.018	0.015
Lead (Pb)-Total (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium (Li)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Magnesium (Mg)-Total (mg/L)	1.33	1.32	1.27	1.28	1.28
Manganese (Mn)-Total (mg/L)	0.00200	0.00201	0.00191	0.00191	0.00196
Mercury (Hg)-Total (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Molybdenum (Mo)-Total (mg/L)	0.000257	0.000232	0.000197	0.000196	0.000236
Nickel (Ni)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Phosphorus (P)-Total (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050
Potassium (K)-Total (mg/L)	0.459	0.466	0.494	0.492	0.449
Rubidium (Rb)-Total (mg/L)	0.00072	0.00068	0.00080	0.00079	0.00069
Selenium (Se)-Total (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Silicon (Si)-Total (mg/L)	0.26	0.26	0.19	0.18	0.26
Silver (Ag)-Total (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)-Total (mg/L)	0.598	0.595	0.781	0.796	0.580
Strontium (Sr)-Total (mg/L)	0.0224	0.0225	0.0186	0.0189	0.0224
Sulfur (S)-Total (mg/L)	1.36	1.39	1.69	1.80	1.34
Tellurium (Te)-Total (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Thallium (Tl)-Total (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Thorium (Th)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Tin (Sn)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)-Total (mg/L)	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030
Tungsten (W)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Uranium (U)-Total (mg/L)	0.000053	0.000050	0.000045	0.000046	0.000056
Vanadium (V)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc (Zn)-Total (mg/L)	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Zirconium (Zr)-Total (mg/L)	<0.000060	<0.000060	<0.000060	<0.000060	<0.000060
Dissolved Metals Dissolved Mercury Filtration Location	FIELD	FIELD	FIELD	FIELD	FIELD
Dissolved Metals Filtration Location	FIELD	FIELD	FIELD	FIELD	FIELD
Aluminum (Al)-Dissolved (mg/L)	0.0029	0.0023	0.0027	0.0027	0.0020
Antimony (Sb)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic (As)-Dissolved (mg/L)	0.00026	0.00026	0.00022	0.00022	0.00028
Barium (Ba)-Dissolved (mg/L)	0.00225	0.00233	0.00264	0.00264	0.00221
Beryllium (Be)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2149758-6	L2149758-7	L2149758-8	L2149758-9	L2149758-10
Description	Water	Water	Water	Water	Water
Sampled Date	13-AUG-18	13-AUG-18	13-AUG-18	13-AUG-18	13-AUG-18
Sampled Time	16:37	16:06		17:41	17:13
Client ID	TPE-114	TPE-115	AUG-DUP-1	TPN-114	TPN-115
Grouping / **Analyte**					
WATER					
Total Metals Chromium (Cr)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Cobalt (Co)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper (Cu)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Iron (Fe)-Total (mg/L)	0.014	0.013	0.014	<0.010	<0.010
Lead (Pb)-Total (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium (Li)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Magnesium (Mg)-Total (mg/L)	0.923	0.901	0.923	0.799	0.803
Manganese (Mn)-Total (mg/L)	0.00172	0.00157	0.00173	0.00172	0.00171
Mercury (Hg)-Total (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Molybdenum (Mo)-Total (mg/L)	0.000142	0.000140	0.000141	0.000135	0.000120
Nickel (Ni)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Phosphorus (P)-Total (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050
Potassium (K)-Total (mg/L)	0.465	0.447	0.458	0.425	0.430
Rubidium (Rb)-Total (mg/L)	0.00076	0.00071	0.00078	0.00061	0.00065
Selenium (Se)-Total (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Silicon (Si)-Total (mg/L)	0.10	<0.10	0.10	<0.10	<0.10
Silver (Ag)-Total (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)-Total (mg/L)	0.941	0.946	0.940	0.964	0.962
Strontium (Sr)-Total (mg/L)	0.0105	0.0103	0.0107	0.00933	0.00934
Sulfur (S)-Total (mg/L)	1.49	1.46	1.37	1.36	1.53
Tellurium (Te)-Total (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Thallium (Tl)-Total (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Thorium (Th)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Tin (Sn)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)-Total (mg/L)	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030
Tungsten (W)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Uranium (U)-Total (mg/L)	0.000042	0.000040	0.000045	0.000029	0.000033
Vanadium (V)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc (Zn)-Total (mg/L)	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Zirconium (Zr)-Total (mg/L)	<0.000060	<0.000060	<0.000060	<0.000060	<0.000060
Dissolved Metals Dissolved Mercury Filtration Location	FIELD	FIELD	FIELD	FIELD	FIELD
Dissolved Metals Filtration Location	FIELD	FIELD	FIELD	FIELD	FIELD
Aluminum (Al)-Dissolved (mg/L)	0.0029	0.0037	0.0022	0.0016	0.0020
Antimony (Sb)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic (As)-Dissolved (mg/L)	0.00034	0.00029	0.00036	0.00013	0.00012
Barium (Ba)-Dissolved (mg/L)	0.00268	0.00272	0.00288	0.00268	0.00253
Beryllium (Be)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2149758-11	L2149758-12	L2149758-13	L2149758-14	
Description	Water	Water	Water	Water	
Sampled Date	14-AUG-18	14-AUG-18	14-AUG-18	14-AUG-18	
Sampled Time		09:51	14:30	15:00	
Client ID	INUG-102	INUG-103	PDL-67	PDL-68	
Grouping	**Analyte**				
WATER					
Total Metals	Chromium (Cr)-Total (mg/L)	0.00012	0.00012	<0.00010	<0.00010	
	Cobalt (Co)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	
	Copper (Cu)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	
	Iron (Fe)-Total (mg/L)	0.015	0.016	<0.010	<0.010	
	Lead (Pb)-Total (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	
	Lithium (Li)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	
	Magnesium (Mg)-Total (mg/L)	0.674	0.664	0.731	0.732	
	Manganese (Mn)-Total (mg/L)	0.00266	0.00277	0.00143	0.00159	
	Mercury (Hg)-Total (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	
	Molybdenum (Mo)-Total (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	
	Nickel (Ni)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	
	Phosphorus (P)-Total (mg/L)	<0.050	<0.050	<0.050	<0.050	
	Potassium (K)-Total (mg/L)	0.347	0.337	0.302	0.299	
	Rubidium (Rb)-Total (mg/L)	0.00055	0.00049	0.00044	0.00039	
	Selenium (Se)-Total (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	
	Silicon (Si)-Total (mg/L)	0.15	0.16	0.15	0.14	
	Silver (Ag)-Total (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	
	Sodium (Na)-Total (mg/L)	0.510	0.510	0.435	0.432	
	Strontium (Sr)-Total (mg/L)	0.00614	0.00597	0.00844	0.00835	
	Sulfur (S)-Total (mg/L)	<0.50	<0.50	0.65	0.61	
	Tellurium (Te)-Total (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020	
	Thallium (Tl)-Total (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	
	Thorium (Th)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	
	Tin (Sn)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	
	Titanium (Ti)-Total (mg/L)	<0.00030	<0.00030	<0.00030	<0.00030	
	Tungsten (W)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	
	Uranium (U)-Total (mg/L)	0.000041	0.000038	0.000021	0.000022	
	Vanadium (V)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	
	Zinc (Zn)-Total (mg/L)	<0.0030	<0.0030	<0.0030	<0.0030	
	Zirconium (Zr)-Total (mg/L)	<0.000060	<0.000060	<0.000060	<0.000060	
Dissolved Metals	Dissolved Mercury Filtration Location	FIELD	FIELD	FIELD	FIELD	
	Dissolved Metals Filtration Location	FIELD	FIELD	FIELD	FIELD	
	Aluminum (Al)-Dissolved (mg/L)	0.0022	0.0028	0.0016	0.0016	
	Antimony (Sb)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	
	Arsenic (As)-Dissolved (mg/L)	<0.00010	<0.00010	0.00013	0.00013	
	Barium (Ba)-Dissolved (mg/L)	0.00172	0.00171	0.00183	0.00199	
	Beryllium (Be)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2149758-1	L2149758-2	L2149758-3	L2149758-4	L2149758-5
Description	Water	Water	Water	Water	Water
Sampled Date	13-AUG-18	13-AUG-18	13-AUG-18	13-AUG-18	13-AUG-18
Sampled Time	09:38	09:02	10:41	11:10	
Client ID	WAL-84	WAL-83	SP-114	SP-115	AUG-DUP-2
Grouping / **Analyte**					
WATER					
Dissolved Metals Bismuth (Bi)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron (B)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)-Dissolved (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Calcium (Ca)-Dissolved (mg/L)	4.59	4.88	4.58	4.35	4.74
Cesium (Cs)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Chromium (Cr)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Cobalt (Co)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper (Cu)-Dissolved (mg/L)	0.00077	0.00080	0.00059	0.00055	0.00074
Iron (Fe)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
Lead (Pb)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium (Li)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Magnesium (Mg)-Dissolved (mg/L)	1.43	1.42	1.37	1.34	1.32
Manganese (Mn)-Dissolved (mg/L)	0.00029	0.00033	0.00054	0.00056	0.00030
Mercury (Hg)-Dissolved (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Molybdenum (Mo)-Dissolved (mg/L)	0.000230	0.000239	0.000194	0.000196	0.000256
Nickel (Ni)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Phosphorus (P)-Dissolved (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050
Potassium (K)-Dissolved (mg/L)	0.513	0.528	0.546	0.529	0.474
Rubidium (Rb)-Dissolved (mg/L)	0.00070	0.00071	0.00078	0.00087	0.00075
Selenium (Se)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Silicon (Si)-Dissolved (mg/L)	0.242	0.250	0.188	0.160	0.253
Silver (Ag)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)-Dissolved (mg/L)	0.680	0.689	0.912	0.900	0.641
Strontium (Sr)-Dissolved (mg/L)	0.0240	0.0236	0.0199	0.0198	0.0239
Sulfur (S)-Dissolved (mg/L)	1.62	1.57	1.79	1.81	1.38
Tellurium (Te)-Dissolved (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Thallium (Tl)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Thorium (Th)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Tin (Sn)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)-Dissolved (mg/L)	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030
Tungsten (W)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Uranium (U)-Dissolved (mg/L)	0.000053	0.000055	0.000044	0.000046	0.000052
Vanadium (V)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc (Zn)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Zirconium (Zr)-Dissolved (mg/L)	<0.000060	<0.000060	<0.000060	<0.000060	<0.000060
Speciated Metals Arsenate (As V) (ug/L)					
Arsenite (As III) (ug/L)					

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2149758-6	L2149758-7	L2149758-8	L2149758-9	L2149758-10
Description	Water	Water	Water	Water	Water
Sampled Date	13-AUG-18	13-AUG-18	13-AUG-18	13-AUG-18	13-AUG-18
Sampled Time	16:37	16:06		17:41	17:13
Client ID	TPE-114	TPE-115	AUG-DUP-1	TPN-114	TPN-115
Grouping / **Analyte**					
WATER					
Dissolved Metals Bismuth (Bi)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron (B)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)-Dissolved (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Calcium (Ca)-Dissolved (mg/L)	2.67	2.67	2.76	2.23	1.83
Cesium (Cs)-Dissolved (mg/L)	0.000022	0.000015	0.000018	<0.000010	<0.000010
Chromium (Cr)-Dissolved (mg/L)	<0.00010	<0.00010	0.00015	<0.00010	<0.00010
Cobalt (Co)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper (Cu)-Dissolved (mg/L)	0.00032	0.00033	0.00033	0.00029	0.00032
Iron (Fe)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
Lead (Pb)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium (Li)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Magnesium (Mg)-Dissolved (mg/L)	0.980	0.968	0.997	0.836	0.798
Manganese (Mn)-Dissolved (mg/L)	0.00091	0.00092	0.00099	0.00082	0.00066
Mercury (Hg)-Dissolved (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Molybdenum (Mo)-Dissolved (mg/L)	0.000150	0.000139	0.000144	0.000130	0.000116
Nickel (Ni)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Phosphorus (P)-Dissolved (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050
Potassium (K)-Dissolved (mg/L)	0.493	0.521	0.515	0.464	0.431
Rubidium (Rb)-Dissolved (mg/L)	0.00072	0.00087	0.00081	0.00074	0.00065
Selenium (Se)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Silicon (Si)-Dissolved (mg/L)	0.065	0.074	0.074	0.052	0.052
Silver (Ag)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)-Dissolved (mg/L)	1.05	1.12	1.08	1.06	0.996
Strontium (Sr)-Dissolved (mg/L)	0.0119	0.0120	0.0121	0.0107	0.00959
Sulfur (S)-Dissolved (mg/L)	1.55	1.43	1.27	1.35	1.44
Tellurium (Te)-Dissolved (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Thallium (Tl)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Thorium (Th)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Tin (Sn)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)-Dissolved (mg/L)	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030
Tungsten (W)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Uranium (U)-Dissolved (mg/L)	0.000037	0.000037	0.000040	0.000031	0.000027
Vanadium (V)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc (Zn)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Zirconium (Zr)-Dissolved (mg/L)	<0.000060	<0.000060	<0.000060	<0.000060	<0.000060
Speciated Metals Arsenate (As V) (ug/L)					
Arsenite (As III) (ug/L)					

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2149758-11	L2149758-12	L2149758-13	L2149758-14	
Description	Water	Water	Water	Water	
Sampled Date	14-AUG-18	14-AUG-18	14-AUG-18	14-AUG-18	
Sampled Time		09:51	14:30	15:00	
Client ID	INUG-102	INUG-103	PDL-67	PDL-68	
Grouping	**Analyte**				
WATER					
Dissolved Metals	Bismuth (Bi)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	
	Boron (B)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010	
	Cadmium (Cd)-Dissolved (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	
	Calcium (Ca)-Dissolved (mg/L)	0.989	0.998	2.12	2.00	
	Cesium (Cs)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	
	Chromium (Cr)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	
	Cobalt (Co)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	
	Copper (Cu)-Dissolved (mg/L)	0.00028	0.00029	0.00037	0.00038	
	Iron (Fe)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010	
	Lead (Pb)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	
	Lithium (Li)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	
	Magnesium (Mg)-Dissolved (mg/L)	0.693	0.712	0.766	0.814	
	Manganese (Mn)-Dissolved (mg/L)	0.00033	0.00037	0.00053	0.00052	
	Mercury (Hg)-Dissolved (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	
	Molybdenum (Mo)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	
	Nickel (Ni)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	0.00054	
	Phosphorus (P)-Dissolved (mg/L)	<0.050	<0.050	<0.050	<0.050	
	Potassium (K)-Dissolved (mg/L)	0.364	0.376	0.327	0.347	
	Rubidium (Rb)-Dissolved (mg/L)	0.00055	0.00054	0.00041	0.00039	
	Selenium (Se)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	
	Silicon (Si)-Dissolved (mg/L)	0.127	0.122	0.110	0.112	
	Silver (Ag)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	
	Sodium (Na)-Dissolved (mg/L)	0.574	0.600	0.458	0.531	
	Strontium (Sr)-Dissolved (mg/L)	0.00651	0.00624	0.00846	0.00915	
	Sulfur (S)-Dissolved (mg/L)	<0.50	<0.50	0.67	<0.50	
	Tellurium (Te)-Dissolved (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020	
	Thallium (Tl)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	
	Thorium (Th)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	
	Tin (Sn)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	
	Titanium (Ti)-Dissolved (mg/L)	<0.00030	<0.00030	<0.00030	<0.00030	
	Tungsten (W)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	
	Uranium (U)-Dissolved (mg/L)	0.000036	0.000037	0.000020	0.000021	
	Vanadium (V)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	
	Zinc (Zn)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	
	Zirconium (Zr)-Dissolved (mg/L)	<0.000060	<0.000060	<0.000060	<0.000060	
Speciated Metals	Arsenate (As V) (ug/L)	<0.020	<0.020	<0.020	<0.020	
	Arsenite (As III) (ug/L)	<0.020	<0.020	0.047	0.055	

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2149758-1	L2149758-2	L2149758-3	L2149758-4	L2149758-5
	Description	Water	Water	Water	Water	Water
	Sampled Date	13-AUG-18	13-AUG-18	13-AUG-18	13-AUG-18	13-AUG-18
	Sampled Time	09:38	09:02	10:41	11:10	
	Client ID	WAL-84	WAL-83	SP-114	SP-115	AUG-DUP-2
Grouping	**Analyte**					
WATER						
Speciated Metals	Dimethylarsinic Acid (DMA, as As) (ug/L)					
	Monomethylarsonic Acid (MMA, as As) (ug/L)					
	Arsenobetaine (AsB, as As) (ug/L)					

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2149758-6	L2149758-7	L2149758-8	L2149758-9	L2149758-10
	Description	Water	Water	Water	Water	Water
	Sampled Date	13-AUG-18	13-AUG-18	13-AUG-18	13-AUG-18	13-AUG-18
	Sampled Time	16:37	16:06		17:41	17:13
	Client ID	TPE-114	TPE-115	AUG-DUP-1	TPN-114	TPN-115
Grouping	**Analyte**					
WATER						
Speciated Metals	Dimethylarsinic Acid (DMA, as As) (ug/L)					
	Monomethylarsonic Acid (MMA, as As) (ug/L)					
	Arsenobetaine (AsB, as As) (ug/L)					

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2149758-11	L2149758-12	L2149758-13	L2149758-14	
Description	Water	Water	Water	Water	
Sampled Date	14-AUG-18	14-AUG-18	14-AUG-18	14-AUG-18	
Sampled Time		09:51	14:30	15:00	
Client ID	INUG-102	INUG-103	PDL-67	PDL-68	
Grouping / **Analyte**					
WATER					
Speciated Metals					
Dimethylarsinic Acid (DMA, as As) (ug/L)	<0.020	<0.020	<0.020	<0.020	
Monomethylarsonic Acid (MMA, as As) (ug/L)	<0.020	<0.020	<0.020	<0.020	
Arsenobetaine (AsB, as As) (ug/L)	<0.050	<0.050	<0.050	<0.050	

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Method Blank	Magnesium (Mg)-Dissolved	B	L2149758-1, -10, -11, -12, -14, -2, -3, -4, -5, -6, -7, -8, -9
Laboratory Control Sample	Sulfur (S)-Dissolved	MES	L2149758-1, -10, -11, -12, -14, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Dissolved Organic Carbon	MS-B	L2149758-1
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L2149758-13
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L2149758-1, -10, -11, -12, -14, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L2149758-13
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L2149758-1, -10, -11, -12, -14, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L2149758-13
Matrix Spike	Manganese (Mn)-Dissolved	MS-B	L2149758-13
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L2149758-1, -10, -11, -12, -14, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L2149758-13
Matrix Spike	Calcium (Ca)-Total	MS-B	L2149758-1, -10, -11, -12, -13, -14, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Magnesium (Mg)-Total	MS-B	L2149758-1, -10, -11, -12, -13, -14, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Strontium (Sr)-Total	MS-B	L2149758-1, -10, -11, -12, -13, -14, -2, -3, -4, -5, -6, -7, -8, -9

Qualifiers for Individual Parameters Listed:

Qualifier	Description
B	Method Blank exceeds ALS DQO. Associated sample results which are < Limit of Reporting or > 5 times blank level are considered reliable.
MES	Data Quality Objective was marginally exceeded (by < 10% absolute) for < 10% of analytes in a Multi-Element Scan / Multi-Parameter Scan (considered acceptable as per OMOE & CCME).
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ALK-TITR-VA	Water	Alkalinity Species by Titration	APHA 2320 Alkalinity

This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.

AS-SPEC-HPLC/CCMS-VA	Water	Arsenic Species in Water by HPLC/CCMS	USGS WRIR 02-4144

Speciated Arsenic (As) Analysis is by reverse phase HPLC-ICPMS. Sample handling, preservation and holding times outlined in USGS Report 02-4144 and AWWA Preservation of Arsenic Species, 2006. Instrumental analysis based on Afton et al, Journal of Chromatography A, 1208 (2008) 156-163 and Agilent Technologies application notes. Filtration is conducted prior to preservation. Results for unfiltered, preserved samples may be elevated due to extraction of arsenic species from particulate matter in the samples.
Elevated iron (~100+ ppm) concentrations or sulfidic water can introduce biases to the reported results for some arsenic species.

BR-L-IC-N-VA	Water	Bromide in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

CARBONS-DOC-VA	Water	Dissolved organic carbon by combustion	APHA 5310B

This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)". Dissolved carbon (DOC) fractions are determined by filtering the sample through a 0.45 micron membrane filter prior to analysis.

CARBONS-TOC-VA	Water	Total organic carbon by combustion	APHA 5310B TOTAL ORGANIC CARBON (TOC)

This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)".

CL-L-IC-N-VA	Water	Chloride in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

CN-FREE-L-CFA-VA	Water	Low Level Free Cyanide in water by CFA	ASTM 7237

This analysis is carried out using procedures adapted from ASTM Method 7237 "Free Cyanide with Flow Injection Analysis (FIA) Utilizing Gas Diffusion Separation and Amperometric Detection". Free cyanide is determined by in-line gas diffusion at pH 6 with final determination by colourimetric analysis.

CN-T-L-CFA-VA	Water	Low Level Total Cyanide in water by CFA	ISO 14403:2002

This analysis is carried out using procedures adapted from ISO Method 14403:2002 "Determination of Total Cyanide using Flow Analysis (FIA and CFA)". Total or strong acid dissociable (SAD) cyanide is determined by in-line UV digestion along with sample distillation and final determination by colourimetric analysis. Method Limitation: This method is susceptible to interference from thiocyanate (SCN). If SCN is present in the sample, there could be a positive interference with this method, but it would be less than 1% and could be as low as zero.

EC-PCT-VA	Water	Conductivity (Automated)	APHA 2510 Auto. Conduc.

Reference Information

This analysis is carried out using procedures adapted from APHA Method 2510 "Conductivity". Conductivity is determined using a conductivity electrode.

EC-SCREEN-VA Water Conductivity Screen (Internal Use Only) APHA 2510

Qualitative analysis of conductivity where required during preparation of other tests - e.g. TDS, metals, etc.

F-IC-N-VA Water Fluoride in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

HARDNESS-CALC-VA Water Hardness APHA 2340B

Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

HG-D-CVAA-VA Water Diss. Mercury in Water by CVAAS or CVAFS APHA 3030B/EPA 1631E (mod)

Water samples are filtered (0.45 um), preserved with hydrochloric acid, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

HG-T-CVAA-VA Water Total Mercury in Water by CVAAS or CVAFS EPA 1631E (mod)

Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

MET-D-CCMS-VA Water Dissolved Metals in Water by CRC ICPMS APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

MET-T-CCMS-VA Water Total Metals in Water by CRC ICPMS EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

NH3-F-VA Water Ammonia in Water by Fluorescence J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

NO2-L-IC-N-VA Water Nitrite in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

NO3-L-IC-N-VA Water Nitrate in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

P-T-PRES-COL-VA Water Total P in Water by Colour APHA 4500-P Phosphorus

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is determined colourimetrically after persulphate digestion of the sample.
Samples with very high dissolved solids (i.e. seawaters, brackish waters) may produce a negative bias by this method. Alternate methods are available for these types of samples.

Arsenic (5+), at elevated levels, is a positive interference on colourimetric phosphate analysis.

P-TD-COL-VA Water Total Dissolved P in Water by Colour APHA 4500-P Phosphorous

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Dissolved Phosphorus is determined colourimetrically after persulphate digestion of a sample that has been lab or field filtered through a 0.45 micron membrane filter.
Samples with very high dissolved solids (i.e. seawaters, brackish waters) may produce a negative bias by this method. Alternate methods are available for these types of samples.

Arsenic (5+), at elevated levels, is a positive interference on colourimetric phosphate analysis.

PH-PCT-VA Water pH by Meter (Automated) APHA 4500-H pH Value

This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode

It is recommended that this analysis be conducted in the field.

PO4-DO-COL-VA Water Diss. Orthophosphate in Water by Colour APHA 4500-P Phosphorus

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.
Samples with very high dissolved solids (i.e. seawaters, brackish waters) may produce a negative bias by this method. Alternate methods are

Reference Information

available for these types of samples.

Arsenic (5+), at elevated levels, is a positive interference on colourimetric phosphate analysis.

SILICATE-COL-VA Water Silicate by Colourimetric analysis APHA 4500-SiO2 E.

This analysis is carried out using procedures adapted from APHA Method 4500-SiO2 E. "Silica". Silicate (molybdate-reactive silica) is determined by the molybdosilicate-heteropoly blue colourimetric method.

SO4-IC-N-VA Water Sulfate in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

TDS-LOW-VA Water Low Level TDS (3.0mg/L) by Gravimetric APHA 2540C

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total dissolved solids (TDS) are determined by filtering a sample through a glass fibre filter, TDS is determined by evaporating the filtrate to dryness at 180 degrees celsius.

TKN-F-VA Water TKN in Water by Fluorescence APHA 4500-NORG D.

This analysis is carried out using procedures adapted from APHA Method 4500-Norg D. "Block Digestion and Flow Injection Analysis". Total Kjeldahl Nitrogen is determined using block digestion followed by Flow-injection analysis with fluorescence detection.

TSS-LOW-VA Water Total Suspended Solids by Grav. (1 mg/L) APHA 2540D

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total suspended solids (TSS) are determined by filtering a sample through a glass fibre filter, TSS is determined by drying the filter at 104 degrees celsius.
Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.

TURBIDITY-VA Water Turbidity by Meter APHA 2130 Turbidity

This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

ALS Environmental

Ch

L2149758-COFC

COC # _____

Page 1 of 2

Report To		Report Format / Distribution		Service Requested (Rush for routine analysis subject to availability)
Company:	Azimuth Consulting Group	☑ Standard ☐ Other		◉ Regular (Standard Turnaround Times - Business Days)
Contact:	Eric Franz	☑ PDF ☑ Excel ☐ Digital ☐ Fax		○ Priority (2-4 Business Days) - 50% Surcharge - Contact ALS to Confirm TAT
Address:	218-2902 West Broadway	Email 1: efranz@azimuthgroup.ca		○ Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT
	Vancouver, BC V6K2G8	Email 2: gmann@azimuthgroup.ca		○ Same Day or Weekend Emergency - Contact ALS to Confirm TAT
Phone:	604-730-1220 Fax:	Email 3: robin.allard@agnicoeagle.com		
Invoice To	Same as Report ? ☑ Yes ☐ No	Client / Project Information		Analysis Request
Hardcopy of Invoice with Report?	☐ Yes ☑ No	Job #:	Meadowbank CREMP - Surfacewater	Please indicate below Filtered, Preserved or both (F, P, F/P)
Company:		PO / AFE:		
Contact:		LSD:		
Address:				
Phone:	Fax:	Quote #:	Q39503	
Lab Work Order # (lab use only)		ALS Contact:	Brent Mack	Sampler: Eric Franz

Sample #	Sample Identification (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Conventionals** see notes	TSS-Low, TDS-Low	TOC, Ammonia, TKN, Total P	DOC	T-CN (Low), Free CN (Low)	Total mercury	Dissolved mercury	Total Metals	Dissolved metals	Chlorophyll-a NOT SHIPPED			Number of Containers
							P	F/P	P	P	F/P	P	F/P	F			
1	WAL-84	13/08/18	9:38	WATER	✓	✓	✓	✓	✓	✓	✓	✓	✓	X			9
2	WAL-83	13/08/18	9:02											X			9
3	SP-114		10:41											X			9
4	SP-115		11:10											X			9
5	AVG-DUP-2													X			9
6	TPE-114		16:37											X			9
7	TPE-115		16:06											X			9
8	AVG-DUP-1													X			9
9	TPN-114		17:41											X			9
10	TPN-115		17:13											X			9
11																	
12																	

Special Instructions / Regulations with water or land use (CCME-Freshwater Aquatic Life/BC CSR - Commercial/AB Tier 1 - Natural, etc) / Hazardous Details

**Conventionals includes: Alk Species, pH, EC, Turbidity, Conductivity, Anions (F, NO2, NO3, Br, SO4), low-level Chloride, Silicate, TD-P, and Ortho-PO4.

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.

By the use of this form the user acknowledges and agrees with the Terms and Conditions as provided on a separate Excel tab.

Also provided on another Excel tab are the ALS location addresses, phone numbers and sample container / preservation / holding time table for common analyses.

SHIPMENT RELEASE (client use)			SHIPMENT RECEPTION (lab use only)				SHIPMENT VERIFICATION (lab use only)			
Released by:	Date (dd-mmm-yy)	Time (hh-mm)	Received by:	Date:	Time:	Temperature:	Verified by:	Date:	Time:	Observations: Yes / No ? If Yes add SIF
Eric Franz	15/08/18		HA	8/20	12:20	20 °C				

NO CHLORO SHIPPED

GENF 20.00 Front

ALS Environmental

L2149758-COFC

COC # _____

Page 2 of 2

Report To				Report Format / Distribution				Service Requested (Rush for routine analysis subject to availability)
Company:	Azimuth Consulting Group			☑ Standard	☐ Other			◉ Regular (Standard Turnaround Times - Business Days)
Contact:	Eric Franz			☑ PDF	☑ Excel	☐ Digital	☐ Fax	○ Priority (2-4 Business Days) - 50% Surcharge - Contact ALS to Confirm TAT
Address:	218-2902 West Broadway			Email 1:	efranz@azimuthgroup.ca			○ Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT
	Vancouver, BC V6K2G8			Email 2:	gmann@azimuthgroup.ca			○ Same Day or Weekend Emergency - Contact ALS to Confirm TAT
Phone:	604-730-1220	Fax:		Email 3:	robin.allard@agnicoeagle.com			
Invoice To	Same as Report ?	☑ Yes	☐ No	**Client / Project Information**				**Analysis Request**
Hardcopy of Invoice with Report?		☐ Yes	☑ No	Job #:	Meadowbank CREMP - Surfacewater			Please indicate below Filtered, Preserved or both (F, P, F/P)
Company:				PO / AFE:				
Contact:				LSD:				
Address:								
Phone:		Fax:		Quote #:	Q39503			
Lab Work Order # (lab use only)				**ALS Contact:**	Brent Mack	**Sampler:**	Eric Franz	

Sample #	Sample Identification (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Conventionals** see notes	TSS-Low, TDS-Low	TOC, Ammonia, TKN, Total P	DOC	T-CN (Low), Free CN (Low)	Total mercury	Dissolved mercury	Total Metals	Dissolved metals	Chlorophyll-a	Arsenic Speciation		Number of Containers
							P	F/P	P	P	F/P	P	F/P	F			
	INUG-102	14/08/18		WATER	X	X	X	X	X	X	X	X	X		X		10
	INUG-103	1	9:51	1	X	X	X	X	X	X	X	X	X		X		10
	PDL-67	1	14:30	1	X	X	X	X	X	X	X	X	X		X		10
	PDL-68	1	15:00	1	X	X	X	X	X	X	X	X	X		X		10
	Please archive arsenic for: PDL-67 INUG-103																

Special Instructions / Regulations with water or land use (CCME-Freshwater Aquatic Life/BC CSR - Commercial/AB Tier 1 - Natural, etc) / Hazardous Details

**Conventionals includes: Alk Species, pH, EC, Turbidity, Conductivity, Anions (F, NO2, NO3, Br, SO4), low-level Chloride, Silicate, TD-P, and Ortho-PO4.

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.

By the use of this form the user acknowledges and agrees with the Terms and Conditions as provided on a separate Excel tab.

Also provided on another Excel tab are the ALS location addresses, phone numbers and sample container / preservation / holding time table for common analyses.

SHIPMENT RELEASE (client use)			SHIPMENT RECEPTION (lab use only)				SHIPMENT VERIFICATION (lab use only)			
Released by:	Date (dd-mmm-yy)	Time (hh-mm)	Received by:	Date:	Time:	Temperature:	Verified by:	Date:	Time:	Observations: Yes / No ? If Yes add SIF
Eric Franz	15/08/18		HA	8/20	12:00	20 °C				

GENF 20.00 Front

AZIMUTH CONSULTING GROUP INC.
ATTN: Eric Franz
218 - 2902 West Broadway
Vancouver BC V6K 2G8

Date Received: 28-AUG-18
Report Date: 05-SEP-18 16:10 (MT)
Version: FINAL

Client Phone: 604-730-1220

Certificate of Analysis

Lab Work Order #: L2154274

Project P.O. #: NOT SUBMITTED
Job Reference: MEADOWBANK CREMP - SURFACE WATER
C of C Numbers:
Legal Site Desc:

Brent Mack, B.Sc.
Account Manager

[This report shall not be reproduced except in full without the written authority of the Laboratory.]

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2154274-4	L2154274-5	L2154274-6	L2154274-7	L2154274-8
Description	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water
Sampled Date	21-AUG-18	21-AUG-18	21-AUG-18	21-AUG-18	20-AUG-18
Sampled Time	10:15	10:40	11:15	11:45	13:15
Client ID	BPJ-57	BPJ-58	BBD-57	BBD-58	BAP-57
Grouping **Analyte**					
FILTER					
Plant Pigments Chlorophyll a (ug/L)	0.380	0.387	0.438	0.462	0.395

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2154274-9	L2154274-10	L2154274-11	L2154274-12	L2154274-13
Description	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water
Sampled Date	20-AUG-18	13-AUG-18	13-AUG-18	13-AUG-18	13-AUG-18
Sampled Time	13:45	09:02	09:38	10:41	11:10
Client ID	BAP-58	WAL-83	WAL-84	SP-114	SP-115
Grouping **Analyte**					
FILTER					
Plant Pigments Chlorophyll a (ug/L)	0.605	0.457	0.533	0.355	0.376

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2154274-14	L2154274-15	L2154274-16	L2154274-17	L2154274-18
Description	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water
Sampled Date	13-AUG-18	13-AUG-18	13-AUG-18	13-AUG-18	
Sampled Time	16:37	16:06	17:41	17:13	
Client ID	TPE-114	TPE-115	TPN-114	TPN-115	AUG DUP 1
Grouping **Analyte**					
FILTER					
Plant Pigments Chlorophyll a (ug/L)	0.321	0.293	0.260	0.327	0.285

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2154274-19	L2154274-20	L2154274-21	L2154274-22	L2154274-23
Description	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water
Sampled Date		14-AUG-18	14-AUG-18	14-AUG-18	14-AUG-18
Sampled Time		09:20	09:51	14:30	16:00
Client ID	AUG DUP 2	INUG-102	INUG-103	PDL-67	PDL-68
Grouping **Analyte**					
FILTER					
Plant Pigments Chlorophyll a (ug/L)	0.430	0.234	0.252	0.220	0.281

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2154274-1	L2154274-2	L2154274-3	L2154274-4	L2154274-5
Description	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water
Sampled Date		22-AUG-18	22-AUG-18	21-AUG-18	21-AUG-18
Sampled Time		16:00	16:20	10:15	10:40
Client ID	TB-1	DI-1	EB-1	BPJ-57	BPJ-58
Grouping / **Analyte**					
WATER					
Physical Tests Conductivity (uS/cm)	<2.0	<2.0	<2.0	334	334
Hardness (as CaCO3) (mg/L)	<0.50 HTC	<0.50	<0.50	35.9	35.6
pH (pH)	5.43	5.39	5.36	7.18	7.21
Total Suspended Solids (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
Total Dissolved Solids (mg/L)	<3.0	<3.0	<3.0	188	186
Turbidity (NTU)	<0.10	<0.10	<0.10	0.27	0.30
Anions and Nutrients Alkalinity, Bicarbonate (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	9.6	9.8
Alkalinity, Carbonate (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
Alkalinity, Total (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	9.6	9.8
Ammonia, Total (as N) (mg/L)	<0.0050	<0.0050	<0.0050	0.0070	0.0325
Bromide (Br) (mg/L)	<0.050	<0.050	<0.050	0.306	0.303
Chloride (Cl) (mg/L)	<0.10	<0.10	<0.10	86.7	85.6
Fluoride (F) (mg/L)	<0.020	<0.020	<0.020	0.067	0.068
Nitrate (as N) (mg/L)	<0.0050	<0.0050	<0.0050	0.0403	0.0394
Nitrite (as N) (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Total Kjeldahl Nitrogen (mg/L)	<0.050	<0.050	<0.050	0.146	0.177
Orthophosphate-Dissolved (as P) (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Phosphorus (P)-Total Dissolved (mg/L)	<0.0020	<0.0020	<0.0020	<0.0020	0.0021
Phosphorus (P)-Total (mg/L)	<0.0020	<0.0020	<0.0020	0.0031	0.0031
Silicate (as SiO2) (mg/L)	<0.50	<0.50	<0.50	<0.50	<0.50
Sulfate (SO4) (mg/L)	<0.30	<0.30	<0.30	13.1	12.8
Cyanides Cyanide, Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Cyanide, Free (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Organic / Inorganic Carbon Dissolved Organic Carbon (mg/L)		<0.50	<0.50	2.96	2.91
Total Organic Carbon (mg/L)	<0.50	<0.50	<0.50	3.10	3.20
Total Metals Aluminum (Al)-Total (mg/L)	<0.0030	<0.0030	<0.0030	0.0089	0.0089
Antimony (Sb)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic (As)-Total (mg/L)	<0.00010	<0.00010	<0.00010	0.00013	0.00015
Barium (Ba)-Total (mg/L)	<0.00010	<0.00010	<0.00010	0.0189	0.0166
Beryllium (Be)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth (Bi)-Total (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron (B)-Total (mg/L)	<0.010	<0.010	<0.010	0.021	0.020
Cadmium (Cd)-Total (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Calcium (Ca)-Total (mg/L)	<0.050	<0.050	<0.050	4.12	4.13
Cesium (Cs)-Total (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2154274-6	L2154274-7	L2154274-8	L2154274-9	
Description	Surface Water	Surface Water	Surface Water	Surface Water	
Sampled Date	21-AUG-18	21-AUG-18	20-AUG-18	20-AUG-18	
Sampled Time	11:15	11:45	13:15	13:45	
Client ID	BBD-57	BBD-58	BAP-57	BAP-58	
Grouping	**Analyte**				
WATER					
Physical Tests	Conductivity (uS/cm)	319	322	382	352
	Hardness (as CaCO3) (mg/L)	33.2	34.4	39.0	37.3
	pH (pH)	7.19	7.20	7.21	7.20
	Total Suspended Solids (mg/L)	<1.0	<1.0	<1.0	<1.0
	Total Dissolved Solids (mg/L)	185	178	209	192
	Turbidity (NTU)	0.30	0.26	0.22	0.22
Anions and Nutrients	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	10.1	9.9	9.9	9.8
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0
	Alkalinity, Total (as CaCO3) (mg/L)	10.1	9.9	9.9	9.8
	Ammonia, Total (as N) (mg/L)	0.0218	0.0406	0.0098	0.0331
	Bromide (Br) (mg/L)	0.286	0.290	0.349	0.314
	Chloride (Cl) (mg/L)	81.2	81.8	97.3	89.9
	Fluoride (F) (mg/L)	0.067	0.066	0.070	0.069
	Nitrate (as N) (mg/L)	0.0380	0.0384	0.0420	0.0406
	Nitrite (as N) (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010
	Total Kjeldahl Nitrogen (mg/L)	0.167	0.213	0.172	0.188
	Orthophosphate-Dissolved (as P) (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010
	Phosphorus (P)-Total Dissolved (mg/L)	<0.0020	0.0023	<0.0020	<0.0020
	Phosphorus (P)-Total (mg/L)	0.0030	0.0038	<0.0020	0.0023
	Silicate (as SiO2) (mg/L)	<0.50	<0.50	<0.50	<0.50
	Sulfate (SO4) (mg/L)	12.2	12.3	14.5	13.4
Cyanides	Cyanide, Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010
	Cyanide, Free (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	3.05	3.13	3.12	3.06
	Total Organic Carbon (mg/L)	3.11	3.32	3.33	3.26
Total Metals	Aluminum (Al)-Total (mg/L)	0.0092	0.0106	0.0080	0.0083
	Antimony (Sb)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010
	Arsenic (As)-Total (mg/L)	0.00014	0.00015	0.00014	0.00014
	Barium (Ba)-Total (mg/L)	0.0167	0.0172	0.0165	0.0164
	Beryllium (Be)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010
	Bismuth (Bi)-Total (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050
	Boron (B)-Total (mg/L)	0.019	0.020	0.024	0.021
	Cadmium (Cd)-Total (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050
	Calcium (Ca)-Total (mg/L)	4.06	4.11	4.45	4.17
	Cesium (Cs)-Total (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2154274-1	L2154274-2	L2154274-3	L2154274-4	L2154274-5
Description	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water
Sampled Date		22-AUG-18	22-AUG-18	21-AUG-18	21-AUG-18
Sampled Time		16:00	16:20	10:15	10:40
Client ID	TB-1	DI-1	EB-1	BPJ-57	BPJ-58
Grouping / **Analyte**					
WATER					
Total Metals Chromium (Cr)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Cobalt (Co)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper (Cu)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Iron (Fe)-Total (mg/L)	<0.010	<0.010	<0.010	0.012	0.013
Lead (Pb)-Total (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium (Li)-Total (mg/L)	<0.0010	<0.0010	<0.0010	0.0015	0.0015
Magnesium (Mg)-Total (mg/L)	<0.0050	<0.0050	<0.0050	6.36	6.35
Manganese (Mn)-Total (mg/L)	<0.00010	<0.00010	<0.00010	0.00189	0.00198
Mercury (Hg)-Total (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Molybdenum (Mo)-Total (mg/L)	<0.000050	<0.000050	<0.000050	0.000116	0.000103
Nickel (Ni)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Phosphorus (P)-Total (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050
Potassium (K)-Total (mg/L)	<0.050	<0.050	<0.050	1.93	1.92
Rubidium (Rb)-Total (mg/L)	<0.00020	<0.00020	<0.00020	0.00132	0.00135
Selenium (Se)-Total (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Silicon (Si)-Total (mg/L)	<0.10	<0.10	<0.10	0.21	0.20
Silver (Ag)-Total (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)-Total (mg/L)	<0.050	<0.050	<0.050	43.2	42.7
Strontium (Sr)-Total (mg/L)	<0.00020	<0.00020	<0.00020	0.0520	0.0485
Sulfur (S)-Total (mg/L)	<0.50	<0.50	<0.50	4.42	4.35
Tellurium (Te)-Total (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Thallium (Tl)-Total (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Thorium (Th)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Tin (Sn)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)-Total (mg/L)	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030
Tungsten (W)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Uranium (U)-Total (mg/L)	<0.000010	<0.000010	<0.000010	0.000059	0.000056
Vanadium (V)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc (Zn)-Total (mg/L)	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Zirconium (Zr)-Total (mg/L)	<0.000060	<0.000060	<0.000060	<0.000060	<0.000060
Dissolved Metals Dissolved Mercury Filtration Location		FIELD	FIELD	FIELD	FIELD
Dissolved Metals Filtration Location		FIELD	FIELD	FIELD	FIELD
Aluminum (Al)-Dissolved (mg/L)		<0.0010	<0.0010	0.0036	0.0040
Antimony (Sb)-Dissolved (mg/L)		<0.00010	<0.00010	<0.00010	<0.00010
Arsenic (As)-Dissolved (mg/L)		<0.00010	<0.00010	0.00011	0.00011
Barium (Ba)-Dissolved (mg/L)		<0.00010	<0.00010	0.0169	0.0166
Beryllium (Be)-Dissolved (mg/L)		<0.00010	<0.00010	<0.00010	<0.00010

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2154274-6	L2154274-7	L2154274-8	L2154274-9	
Description	Surface Water	Surface Water	Surface Water	Surface Water	
Sampled Date	21-AUG-18	21-AUG-18	20-AUG-18	20-AUG-18	
Sampled Time	11:15	11:45	13:15	13:45	
Client ID	BBD-57	BBD-58	BAP-57	BAP-58	
Grouping	**Analyte**				
WATER					
Total Metals	Chromium (Cr)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	
	Cobalt (Co)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	
	Copper (Cu)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	
	Iron (Fe)-Total (mg/L)	0.014	0.015	0.010	0.010	
	Lead (Pb)-Total (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	
	Lithium (Li)-Total (mg/L)	0.0015	0.0015	0.0016	0.0015	
	Magnesium (Mg)-Total (mg/L)	6.19	6.09	7.22	6.47	
	Manganese (Mn)-Total (mg/L)	0.00259	0.00281	0.00156	0.00155	
	Mercury (Hg)-Total (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	
	Molybdenum (Mo)-Total (mg/L)	0.000104	0.000101	0.000115	0.000100	
	Nickel (Ni)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	
	Phosphorus (P)-Total (mg/L)	<0.050	<0.050	<0.050	<0.050	
	Potassium (K)-Total (mg/L)	1.83	1.85	2.14	2.01	
	Rubidium (Rb)-Total (mg/L)	0.00125	0.00124	0.00138	0.00143	
	Selenium (Se)-Total (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	
	Silicon (Si)-Total (mg/L)	0.20	0.21	0.21	0.19	
	Silver (Ag)-Total (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	
	Sodium (Na)-Total (mg/L)	40.4	41.1	48.8	45.3	
	Strontium (Sr)-Total (mg/L)	0.0470	0.0489	0.0582	0.0498	
	Sulfur (S)-Total (mg/L)	3.96	4.12	5.14	4.59	
	Tellurium (Te)-Total (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020	
	Thallium (Tl)-Total (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	
	Thorium (Th)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	
	Tin (Sn)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	
	Titanium (Ti)-Total (mg/L)	<0.00030	<0.00030	<0.00030	<0.00030	
	Tungsten (W)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	
	Uranium (U)-Total (mg/L)	0.000061	0.000055	0.000062	0.000058	
	Vanadium (V)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	
	Zinc (Zn)-Total (mg/L)	<0.0030	<0.0030	<0.0030	<0.0030	
	Zirconium (Zr)-Total (mg/L)	<0.000060	<0.000060	<0.000060	<0.000060	
Dissolved Metals	Dissolved Mercury Filtration Location	FIELD	FIELD	FIELD	FIELD	
	Dissolved Metals Filtration Location	FIELD	FIELD	FIELD	FIELD	
	Aluminum (Al)-Dissolved (mg/L)	0.0040	0.0045	0.0051	0.0044	
	Antimony (Sb)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	
	Arsenic (As)-Dissolved (mg/L)	0.00011	0.00011	0.00013	0.00013	
	Barium (Ba)-Dissolved (mg/L)	0.0170	0.0177	0.0162	0.0165	
	Beryllium (Be)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2154274-1	L2154274-2	L2154274-3	L2154274-4	L2154274-5
Description	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water
Sampled Date		22-AUG-18	22-AUG-18	21-AUG-18	21-AUG-18
Sampled Time		16:00	16:20	10:15	10:40
Client ID	TB-1	DI-1	EB-1	BPJ-57	BPJ-58
Grouping / **Analyte**					
WATER					
Dissolved Metals Bismuth (Bi)-Dissolved (mg/L)		<0.000050	<0.000050	<0.000050	<0.000050
Boron (B)-Dissolved (mg/L)		<0.010	<0.010	0.020	0.020
Cadmium (Cd)-Dissolved (mg/L)		<0.0000050	<0.0000050	<0.0000050	<0.0000050
Calcium (Ca)-Dissolved (mg/L)		<0.050	<0.050	3.98	4.02
Cesium (Cs)-Dissolved (mg/L)		<0.000010	<0.000010	<0.000010	<0.000010
Chromium (Cr)-Dissolved (mg/L)		<0.00010	<0.00010	<0.00010	0.00014
Cobalt (Co)-Dissolved (mg/L)		<0.00010	<0.00010	<0.00010	<0.00010
Copper (Cu)-Dissolved (mg/L)		<0.00020	<0.00020	0.00029	0.00030
Iron (Fe)-Dissolved (mg/L)		<0.010	<0.010	<0.010	<0.010
Lead (Pb)-Dissolved (mg/L)		<0.000050	<0.000050	<0.000050	<0.000050
Lithium (Li)-Dissolved (mg/L)		<0.0010	<0.0010	0.0014	0.0014
Magnesium (Mg)-Dissolved (mg/L)		<0.0050	<0.0050	6.31	6.20
Manganese (Mn)-Dissolved (mg/L)		<0.00010	<0.00010	0.00044	0.00047
Mercury (Hg)-Dissolved (mg/L)		<0.0000050	<0.0000050	<0.0000050	<0.0000050
Molybdenum (Mo)-Dissolved (mg/L)		<0.000050	<0.000050	0.000097	0.000097
Nickel (Ni)-Dissolved (mg/L)		<0.00050	<0.00050	<0.00050	<0.00050
Phosphorus (P)-Dissolved (mg/L)		<0.050	<0.050	<0.050	<0.050
Potassium (K)-Dissolved (mg/L)		<0.050	<0.050	1.91	1.93
Rubidium (Rb)-Dissolved (mg/L)		<0.00020	<0.00020	0.00127	0.00131
Selenium (Se)-Dissolved (mg/L)		<0.000050	<0.000050	<0.000050	<0.000050
Silicon (Si)-Dissolved (mg/L)		<0.050	<0.050	0.158	0.163
Silver (Ag)-Dissolved (mg/L)		<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)-Dissolved (mg/L)		<0.050	<0.050	42.3	42.2
Strontium (Sr)-Dissolved (mg/L)		<0.00020	<0.00020	0.0487	0.0502
Sulfur (S)-Dissolved (mg/L)		<0.50	<0.50	4.19	4.21
Tellurium (Te)-Dissolved (mg/L)		<0.00020	<0.00020	<0.00020	<0.00020
Thallium (Tl)-Dissolved (mg/L)		<0.000010	<0.000010	<0.000010	<0.000010
Thorium (Th)-Dissolved (mg/L)		<0.00010	<0.00010	<0.00010	<0.00010
Tin (Sn)-Dissolved (mg/L)		<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)-Dissolved (mg/L)		<0.00030	<0.00030	<0.00030	<0.00030
Tungsten (W)-Dissolved (mg/L)		<0.00010	<0.00010	<0.00010	<0.00010
Uranium (U)-Dissolved (mg/L)		<0.000010	<0.000010	0.000052	0.000060
Vanadium (V)-Dissolved (mg/L)		<0.00050	<0.00050	<0.00050	<0.00050
Zinc (Zn)-Dissolved (mg/L)		<0.0010	0.0010 RRV	<0.0010	<0.0010
Zirconium (Zr)-Dissolved (mg/L)		<0.000060	<0.000060	<0.000060	<0.000060

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	L2154274-6 Surface Water 21-AUG-18 11:15 BBD-57	L2154274-7 Surface Water 21-AUG-18 11:45 BBD-58	L2154274-8 Surface Water 20-AUG-18 13:15 BAP-57	L2154274-9 Surface Water 20-AUG-18 13:45 BAP-58	
WATER						
Dissolved Metals	Bismuth (Bi)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	
	Boron (B)-Dissolved (mg/L)	0.019	0.018	0.022	0.020	
	Cadmium (Cd)-Dissolved (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	
	Calcium (Ca)-Dissolved (mg/L)	3.97	3.93	4.28	4.17	
	Cesium (Cs)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	
	Chromium (Cr)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	
	Cobalt (Co)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	
	Copper (Cu)-Dissolved (mg/L)	0.00030	0.00029	0.00043	0.00030	
	Iron (Fe)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010	
	Lead (Pb)-Dissolved (mg/L)	<0.000050	<0.000050	0.000087	<0.000050	
	Lithium (Li)-Dissolved (mg/L)	0.0014	0.0014	0.0015	0.0014	
	Magnesium (Mg)-Dissolved (mg/L)	5.66	5.98	6.89	6.53	
	Manganese (Mn)-Dissolved (mg/L)	0.00102	0.00103	0.00056	0.00028	
	Mercury (Hg)-Dissolved (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	
	Molybdenum (Mo)-Dissolved (mg/L)	0.000084	0.000091	0.000095	0.000107	
	Nickel (Ni)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	
	Phosphorus (P)-Dissolved (mg/L)	<0.050	<0.050	<0.050	<0.050	
	Potassium (K)-Dissolved (mg/L)	1.81	1.83	2.14	2.03	
	Rubidium (Rb)-Dissolved (mg/L)	0.00125	0.00120	0.00135	0.00133	
	Selenium (Se)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	
	Silicon (Si)-Dissolved (mg/L)	0.175	0.165	0.153	0.151	
	Silver (Ag)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	
	Sodium (Na)-Dissolved (mg/L)	39.7	39.9	46.8	45.0	
	Strontium (Sr)-Dissolved (mg/L)	0.0470	0.0490	0.0528	0.0525	
	Sulfur (S)-Dissolved (mg/L)	3.85	3.97	4.68	4.27	
	Tellurium (Te)-Dissolved (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020	
	Thallium (Tl)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	
	Thorium (Th)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	
	Tin (Sn)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	
	Titanium (Ti)-Dissolved (mg/L)	<0.00030	<0.00030	<0.00030	<0.00030	
	Tungsten (W)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	
	Uranium (U)-Dissolved (mg/L)	0.000056	0.000056	0.000054	0.000055	
	Vanadium (V)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	
	Zinc (Zn)-Dissolved (mg/L)	<0.0010	<0.0010	0.0017	<0.0010	
	Zirconium (Zr)-Dissolved (mg/L)	<0.000060	<0.000060	0.000062	<0.000060	

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Matrix Spike	Dissolved Organic Carbon	MS-B	L2154274-2
Matrix Spike	Barium (Ba)-Total	MS-B	L2154274-1, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Calcium (Ca)-Total	MS-B	L2154274-1, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Copper (Cu)-Total	MS-B	L2154274-1, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Magnesium (Mg)-Total	MS-B	L2154274-1, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Manganese (Mn)-Total	MS-B	L2154274-1, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Potassium (K)-Total	MS-B	L2154274-1, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Sodium (Na)-Total	MS-B	L2154274-1, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Strontium (Sr)-Total	MS-B	L2154274-1, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Sulfur (S)-Total	MS-B	L2154274-1, -2, -3, -4, -5, -6, -7, -8, -9

Qualifiers for Individual Parameters Listed:

Qualifier	Description
HTC	Hardness was calculated from Total Ca and/or Mg concentrations and may be biased high (dissolved Ca/Mg results unavailable).
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RRV	Reported Result Verified By Repeat Analysis

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ALK-TITR-VA	Water	Alkalinity Species by Titration	APHA 2320 Alkalinity

This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.

BR-L-IC-N-VA	Water	Bromide in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

CARBONS-DOC-VA	Water	Dissolved organic carbon by combustion	APHA 5310B

This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)". Dissolved carbon (DOC) fractions are determined by filtering the sample through a 0.45 micron membrane filter prior to analysis.

CARBONS-TOC-VA	Water	Total organic carbon by combustion	APHA 5310B TOTAL ORGANIC CARBON (TOC)

This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)".

CHLOROA-F-VA	Filter	Chlorophyll a by Fluorometer (Filter)	EPA 445.0

This analysis is done using procedures modified from EPA Method 445.0. Chlorophyll-a is determined by a routine acetone extraction followed with analysis by fluorometry using the non-acidification procedure. This method is not subject to interferences from chlorophyll b.

CL-L-IC-N-VA	Water	Chloride in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

CN-FREE-L-CFA-VA	Water	Low Level Free Cyanide in water by CFA	ASTM 7237

This analysis is carried out using procedures adapted from ASTM Method 7237 "Free Cyanide with Flow Injection Analysis (FIA) Utilizing Gas Diffusion Separation and Amperometric Detection". Free cyanide is determined by in-line gas diffusion at pH 6 with final determination by colourimetric analysis.

CN-T-L-CFA-VA	Water	Low Level Total Cyanide in water by CFA	ISO 14403:2002

This analysis is carried out using procedures adapted from ISO Method 14403:2002 "Determination of Total Cyanide using Flow Analysis (FIA and CFA)". Total or strong acid dissociable (SAD) cyanide is determined by in-line UV digestion along with sample distillation and final determination by colourimetric analysis. Method Limitation: This method is susceptible to interference from thiocyanate (SCN). If SCN is present in the sample, there could be a positive interference with this method, but it would be less than 1% and could be as low as zero.

EC-PCT-VA	Water	Conductivity (Automated)	APHA 2510 Auto. Conduc.

This analysis is carried out using procedures adapted from APHA Method 2510 "Conductivity". Conductivity is determined using a conductivity electrode.

EC-SCREEN-VA	Water	Conductivity Screen (Internal Use Only)	APHA 2510

Qualitative analysis of conductivity where required during preparation of other tests - e.g. TDS, metals, etc.

F-IC-N-VA	Water	Fluoride in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

HARDNESS-CALC-VA	Water	Hardness	APHA 2340B

Reference Information

Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

HG-D-CVAA-VA Water Diss. Mercury in Water by CVAAS or CVAFS APHA 3030B/EPA 1631E (mod)

Water samples are filtered (0.45 um), preserved with hydrochloric acid, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

HG-T-CVAA-VA Water Total Mercury in Water by CVAAS or CVAFS EPA 1631E (mod)

Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

MET-D-CCMS-VA Water Dissolved Metals in Water by CRC ICPMS APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

MET-T-CCMS-VA Water Total Metals in Water by CRC ICPMS EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

NH3-F-VA Water Ammonia in Water by Fluorescence J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

NO2-L-IC-N-VA Water Nitrite in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

NO3-L-IC-N-VA Water Nitrate in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

P-T-PRES-COL-VA Water Total P in Water by Colour APHA 4500-P Phosphorus

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is determined colourimetrically after persulphate digestion of the sample.
Samples with very high dissolved solids (i.e. seawaters, brackish waters) may produce a negative bias by this method. Alternate methods are available for these types of samples.

Arsenic (5+), at elevated levels, is a positive interference on colourimetric phosphate analysis.

P-TD-COL-VA Water Total Dissolved P in Water by Colour APHA 4500-P Phosphorous

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Dissolved Phosphorus is determined colourimetrically after persulphate digestion of a sample that has been lab or field filtered through a 0.45 micron membrane filter.
Samples with very high dissolved solids (i.e. seawaters, brackish waters) may produce a negative bias by this method. Alternate methods are available for these types of samples.

Arsenic (5+), at elevated levels, is a positive interference on colourimetric phosphate analysis.

PH-PCT-VA Water pH by Meter (Automated) APHA 4500-H pH Value

This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode

It is recommended that this analysis be conducted in the field.

PO4-DO-COL-VA Water Diss. Orthophosphate in Water by Colour APHA 4500-P Phosphorus

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.
Samples with very high dissolved solids (i.e. seawaters, brackish waters) may produce a negative bias by this method. Alternate methods are available for these types of samples.

Arsenic (5+), at elevated levels, is a positive interference on colourimetric phosphate analysis.

SILICATE-COL-VA Water Silicate by Colourimetric analysis APHA 4500-SiO2 E.

This analysis is carried out using procedures adapted from APHA Method 4500-SiO2 E. "Silica". Silicate (molybdate-reactive silica) is determined by the molybdosilicate-heteropoly blue colourimetric method.

SO4-IC-N-VA Water Sulfate in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

Reference Information

TDS-LOW-VA	Water	Low Level TDS (3.0mg/L) by Gravimetric	APHA 2540C

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total dissolved solids (TDS) are determined by filtering a sample through a glass fibre filter, TDS is determined by evaporating the filtrate to dryness at 180 degrees celsius.

TKN-F-VA	Water	TKN in Water by Fluorescence	APHA 4500-NORG D.

This analysis is carried out using procedures adapted from APHA Method 4500-Norg D. "Block Digestion and Flow Injection Analysis". Total Kjeldahl Nitrogen is determined using block digestion followed by Flow-injection analysis with fluorescence detection.

TSS-LOW-VA	Water	Total Suspended Solids by Grav. (1 mg/L)	APHA 2540D

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total suspended solids (TSS) are determined by filtering a sample through a glass fibre filter, TSS is determined by drying the filter at 104 degrees celsius.
Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.

TURBIDITY-VA	Water	Turbidity by Meter	APHA 2130 Turbidity

This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

ALS Environmental

L2154274-COFC

f Custody / Analytical Request Form
nada Toll Free: 1 800 668 9878
www.alsglobal.com

COC # _____

Page 1 of 2

Report To		**Report Format / Distribution**	**Service Requested** (Rush for routine analysis subject to availability)
Company:	Azimuth Consulting Group	☑ Standard ☐ Other	◉ Regular (Standard Turnaround Times - Business Days)
Contact:	Eric Franz	☑ PDF ☑ Excel ☐ Digital ☐ Fax	○ Priority (2-4 Business Days) - 50% Surcharge - Contact ALS to Confirm TAT
Address:	218-2902 West Broadway	Email 1: efranz@azimuthgroup.ca	○ Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT
	Vancouver, BC V6K2G8	Email 2: mfinley@azimuthgroup.ca	○ Same Day or Weekend Emergency - Contact ALS to Confirm TAT
Phone:	604-730-1220 Fax:	Email 3: robin.allard@agnicoeagle.com	**Analysis Request**
Invoice To	Same as Report ? ☑ Yes ☐ No	**Client / Project Information**	Please indicate below Filtered, Preserved or both (F, P, F/P)
Hardcopy of Invoice with Report?	☐ Yes ☑ No	Job #: Meadowbank CREMP - Surfacewater	
Company:		PO / AFE:	
Contact:		LSD:	
Address:			
Phone:	Fax:	Quote #: Q39503 and Q66772	
Lab Work Order # (lab use only)		**ALS Contact:** Brent Mack **Sampler:** E. Franz, M. Finley	

Sample #	Sample Identification (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	TOC, Ammonia, TKN, Total P (P)	DOC (F/P)	T-CN (Low), Free CN (Low) (P)	Total mercury (P)	Dissolved mercury (F/P)	Total Metals (P)	Dissolved Metals (F/P)	Conventionals** see notes	TSS-Low, TDS-Low	Chlorophyll-a (F)			Number of Containers
	TB-1	-	-	Surface Water	X		X	X		X		X	X				5
	DI-1	22-Aug-18	16:00	Surface Water	X	X	X	X	X	X	X	X	X				9
	EB-1	22-Aug-18	16:20	Surface Water	X	X	X	X	X	X	X	X	X				9
	BPJ-57	21-Aug-18	10:15	Surface Water	X	X	X	X	X	X	X	X	X	X			10
	BPJ-58	21-Aug-18	10:40	Surface Water	X	X	X	X	X	X	X	X	X	X			10
	BBD-57	21-Aug-18	11:15	Surface Water	X	X	X	X	X	X	X	X	X	X			10
	BBD-58	21-Aug-18	11:45	Surface Water	X	X	X	X	X	X	X	X	X	X			10
	BAP-57	20-Aug-18	13:15	Surface Water	X	X	X	X	X	X	X	X	X	X			10
	BAP-58	20-Aug-18	13:45	Surface Water	X	X	X	X	X	X	X	X	X	X			10
	WAL-83	13-Aug-18	9:02	Surface Water										X			1
	WAL-84	13-Aug-18	9:38	Surface Water										X			1
	SP-114	13-Aug-18	10:41	Surface Water										X			1

Special Instructions / Regulations with water or land use (CCME-Freshwater Aquatic Life/BC CSR - Commercial/AB Tier 1 - Natural, etc) / Hazardous Details

**Conventionals includes: Alk Species, pH, EC, Turbidity, Conductivity, Anions (F, NO2, NO3, Br, SO4), low-level Chloride, Silicate, TD-P, and Ortho-PO4.

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.
By the use of this form the user acknowledges and agrees with the Terms and Conditions as provided on a separate Excel tab.
Also provided on another Excel tab are the ALS location addresses, phone numbers and sample container / preservation / holding time table for common analyses.

SHIPMENT RELEASE (client use)			SHIPMENT RECEPTION (lab use only)				SHIPMENT VERIFICATION (lab use only)			
Released by:	Date (dd-mmm-yy)	Time (hh-mm)	Received by:	Date:	Time:	Temperature:	Verified by:	Date:	Time:	Observations: Yes / No ? If Yes add SIF
Eric Franz	23-Aug-18	9:00	JC	AUG 28 2018	840hrs	22 °C				

GENF 20.00 Front

ALS Environmental

L2154274-COFC

Analytical Request Form
Free: 1 800 668 9878
alsglobal.com

COC # _____

Page 2 of 2

Report To		Report Format / Distribution		Service Requested (Rush for routine analysis subject to availability)
Company:	Azimuth Consulting Group	☑ Standard ☐ Other		◉ Regular (Standard Turnaround Times - Business Days)
Contact:	Eric Franz	☑ PDF ☑ Excel ☐ Digital ☐ Fax		○ Priority (2-4 Business Days) - 50% Surcharge - Contact ALS to Confirm TAT
Address:	218-2902 West Broadway	Email 1:	efranz@azimuthgroup.ca	○ Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT
	Vancouver, BC V6K2G8	Email 2:	mfinley@azimuthgroup.ca	○ Same Day or Weekend Emergency - Contact ALS to Confirm TAT
Phone:	604-730-1220 Fax:	Email 3:	robin.allard@agnicoeagle.com	
Invoice To	Same as Report ? ☑ Yes ☐ No	**Client / Project Information**		**Analysis Request**
Hardcopy of Invoice with Report?	☐ Yes ☑ No	Job #:	Meadowbank CREMP - Surfacewater	Please indicate below Filtered, Preserved or both (F, P, F/P)
Company:		PO / AFE:		
Contact:		LSD:		
Address:				
Phone:	Fax:	Quote #:	Q39503 and Q66772	
Lab Work Order # (lab use only)		**ALS Contact:**	Brent Mack	**Sampler:** E. Franz, M. Finley

Sample #	Sample Identification (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	TOC, Ammonia, TKN, Total P (P)	DOC (F/P)	T-CN (Low), Free CN (Low) (P)	Total mercury (P)	Dissolved mercury (F/P)	Total Metals (P)	Dissolved Metals (F/P)	Conventionals** see notes	TSS-Low, TDS-Low	Chlorophyll-a (F)			Number of Containers
	SP-115	13-Aug-18	11:10	Surface Water										X			1
	TPE-114	13-Aug-18	16:37	Surface Water										X			1
	TPE-115	13-Aug-18	16:06	Surface Water										X			1
	TPN-114	13-Aug-18	17:41	Surface Water										X			1
	TPN-115	13-Aug-18	17:13	Surface Water										X			1
	AUG DUP-1	-	-	Surface Water										X			1
	AUG DUP-2	-	-	Surface Water										X			1
	INUG-102	14-Aug-18	9:20	Surface Water										X			1
	INUG-103	14-Aug-18	9:51	Surface Water										X			1
	PDL-67	14-Aug-18	14:30	Surface Water										X			1
	PDL-68	14-Aug-18	16:00	Surface Water										X			1

Special Instructions / Regulations with water or land use (CCME-Freshwater Aquatic Life/BC CSR - Commercial/AB Tier 1 - Natural, etc) / Hazardous Details

**Conventionals includes: Alk Species, pH, EC, Turbidity, Conductivity, Anions (F, NO2, NO3, Br, SO4), low-level Chloride, Silicate, TD-P, and Ortho-PO4.

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SHIPMENT RELEASE (client use)			SHIPMENT RECEPTION (lab use only)				SHIPMENT VERIFICATION (lab use only)			
Released by:	Date (dd-mmm-yy)	Time (hh-mm)	Received by:	Date:	Time:	Temperature:	Verified by:	Date:	Time:	Observations: Yes / No ? If Yes add SIF
Eric Franz	23-Aug-18	9:00	JC	AUG 28 2018	840Am	22 °C				

GENF 20.00 Front

AZIMUTH CONSULTING GROUP INC.
ATTN: Eric Franz
218 - 2902 West Broadway
Vancouver BC V6K 2G8

Date Received: 11-SEP-18
Report Date: 20-SEP-18 15:27 (MT)
Version: FINAL

Client Phone: 604-730-1220

Certificate of Analysis

Lab Work Order #: L2161885

Project P.O. #: NOT SUBMITTED
Job Reference: MEADOWBANK CREMP - SURFACEWATER
C of C Numbers:
Legal Site Desc:

Brent Mack, B.Sc.
Account Manager

[This report shall not be reproduced except in full without the written authority of the Laboratory.]

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2161885-1	L2161885-2	L2161885-3	L2161885-4	L2161885-5
Description	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water
Sampled Date	02-SEP-18	02-SEP-18	02-SEP-18	02-SEP-18	02-SEP-18
Sampled Time	14:55	15:30	13:30	14:05	15:00
Client ID	SEPT-SP-116	SEPT-SP-117	SEPT-WAL-85	SEPT-WAL-86	CREMP-SEP-DI-1
Grouping / **Analyte**					
WATER					
Physical Tests Conductivity (uS/cm)	41.3	41.1	40.4	40.4	<2.0
Hardness (as CaCO3) (mg/L)	16.0	15.8	17.1	17.0	<0.50
pH (pH)	7.32	7.34	7.39	7.40	5.45
Total Suspended Solids (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
Total Dissolved Solids (mg/L)	26.5	24.8	27.1	27.2	<3.0
Turbidity (NTU)	0.20	0.26	0.22	0.23	<0.10
Anions and Nutrients Alkalinity, Bicarbonate (as CaCO3) (mg/L)	11.8	11.6	14.2	14.0	<1.0
Alkalinity, Carbonate (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
Alkalinity, Total (as CaCO3) (mg/L)	11.8	11.6	14.2	14.0	<1.0
Ammonia, Total (as N) (mg/L)	0.0202	0.0166	0.0185	0.0144	0.0118 RRV
Bromide (Br) (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050
Chloride (Cl) (mg/L)	0.97	0.97	0.84	0.82	<0.10
Fluoride (F) (mg/L)	0.072	0.073	0.049	0.050	<0.020
Nitrate (as N) (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Nitrite (as N) (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Total Kjeldahl Nitrogen (mg/L)	0.118	0.114	0.118	0.118	<0.050
Orthophosphate-Dissolved (as P) (mg/L)	0.0012	0.0013	0.0012	0.0013	<0.0010
Phosphorus (P)-Total Dissolved (mg/L)	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Phosphorus (P)-Total (mg/L)	<0.0020	<0.0020	<0.0020	0.0027	<0.0020
Silicate (as SiO2) (mg/L)	<0.50	<0.50	0.56	0.57	<0.50
Sulfate (SO4) (mg/L)	5.70	5.71	4.70	4.72	<0.30
Cyanides Cyanide, Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Cyanide, Free (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Organic / Inorganic Carbon Dissolved Organic Carbon (mg/L)	1.56	1.84	2.11	2.22	<0.50
Total Organic Carbon (mg/L)	1.71	1.79	2.05	1.99	<0.50
Total Metals Aluminum (Al)-Total (mg/L)	0.0052	0.0051	0.0051	<0.0030	<0.0030
Antimony (Sb)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic (As)-Total (mg/L)	0.00026	0.00025	0.00033	0.00027	<0.00010
Barium (Ba)-Total (mg/L)	0.00252	0.00246	0.00220	0.00197	<0.00010
Beryllium (Be)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth (Bi)-Total (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron (B)-Total (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)-Total (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Calcium (Ca)-Total (mg/L)	4.26	4.16	4.72	4.55	<0.050
Cesium (Cs)-Total (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	L2161885-6 Surface Water 03-SEP-18 15:20 SEPT-TPE-116	L2161885-7 Surface Water 03-SEP-18 15:00 SEPT-TPE-117	L2161885-8 Surface Water 03-SEP-18 13:45 SEPT-TPN-116	L2161885-9 Surface Water 03-SEP-18 14:20 SEPT-TPN-117	L2161885-10 Surface Water 03-SEP-18 13:45 SEPT-CREMP-DUP-1
WATER						
Physical Tests	Conductivity (uS/cm)	29.4	29.6	26.2	26.6	26.7
	Hardness (as CaCO3) (mg/L)	10.5	10.5	8.80	8.89	8.93
	pH (pH)	7.16	7.17	7.06	7.09	7.05
	Total Suspended Solids (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
	Total Dissolved Solids (mg/L)	19.6	19.7	18.0	17.8	17.6
	Turbidity (NTU)	0.24	0.19	0.17	0.17	0.21
Anions and Nutrients	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	8.2	8.6	6.6	6.8	6.4
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
	Alkalinity, Total (as CaCO3) (mg/L)	8.2	8.6	6.6	6.8	6.4
	Ammonia, Total (as N) (mg/L)	0.0104	0.0139	0.0115	0.0104	0.0117
	Bromide (Br) (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050
	Chloride (Cl) (mg/L)	0.77	0.77	0.78	0.78	0.78
	Fluoride (F) (mg/L)	0.075	0.074	0.066	0.065	0.065
	Nitrate (as N) (mg/L)	<0.0050	<0.0050	0.0137	0.0138	0.0132
	Nitrite (as N) (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Total Kjeldahl Nitrogen (mg/L)	0.080	0.091	0.097	0.110	0.081
	Orthophosphate-Dissolved (as P) (mg/L)	0.0013	<0.0010	<0.0010	0.0013	<0.0010
	Phosphorus (P)-Total Dissolved (mg/L)	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
	Phosphorus (P)-Total (mg/L)	<0.0020	<0.0020	<0.0020	0.0046	<0.0020
	Silicate (as SiO2) (mg/L)	<0.50	<0.50	<0.50	<0.50	<0.50
	Sulfate (SO4) (mg/L)	4.77	4.77	4.70	4.67	4.67
Cyanides	Cyanide, Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Cyanide, Free (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	1.48	1.48	1.31	1.34	1.42
	Total Organic Carbon (mg/L)	1.48	1.62	1.34	1.50	1.35
Total Metals	Aluminum (Al)-Total (mg/L)	0.0058	0.0049	0.0044	0.0040	0.0036
	Antimony (Sb)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Arsenic (As)-Total (mg/L)	0.00038	0.00037	0.00017	0.00016	0.00016
	Barium (Ba)-Total (mg/L)	0.00275	0.00259	0.00272	0.00269	0.00270
	Beryllium (Be)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Bismuth (Bi)-Total (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Boron (B)-Total (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
	Cadmium (Cd)-Total (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
	Calcium (Ca)-Total (mg/L)	2.64	2.58	2.11	2.16	2.17
	Cesium (Cs)-Total (mg/L)	0.000015	0.000016	<0.000010	<0.000010	<0.000010

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2161885-11
	Description	Surface Water
	Sampled Date	03-SEP-18
	Sampled Time	16:30
	Client ID	SEPT-CREMP-EB-1
Grouping	**Analyte**	
WATER		
Physical Tests	Conductivity (uS/cm)	<2.0
	Hardness (as CaCO3) (mg/L)	<0.50
	pH (pH)	5.48
	Total Suspended Solids (mg/L)	<1.0
	Total Dissolved Solids (mg/L)	<3.0
	Turbidity (NTU)	<0.10
Anions and Nutrients	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	<1.0
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<1.0
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0
	Alkalinity, Total (as CaCO3) (mg/L)	<1.0
	Ammonia, Total (as N) (mg/L)	0.0083
	Bromide (Br) (mg/L)	<0.050
	Chloride (Cl) (mg/L)	<0.10
	Fluoride (F) (mg/L)	<0.020
	Nitrate (as N) (mg/L)	<0.0050
	Nitrite (as N) (mg/L)	<0.0010
	Total Kjeldahl Nitrogen (mg/L)	<0.050
	Orthophosphate-Dissolved (as P) (mg/L)	<0.0010
	Phosphorus (P)-Total Dissolved (mg/L)	<0.0020
	Phosphorus (P)-Total (mg/L)	<0.0020
	Silicate (as SiO2) (mg/L)	<0.50
	Sulfate (SO4) (mg/L)	<0.30
Cyanides	Cyanide, Total (mg/L)	<0.0010
	Cyanide, Free (mg/L)	<0.0010
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	<0.50
	Total Organic Carbon (mg/L)	<0.50
Total Metals	Aluminum (Al)-Total (mg/L)	<0.0030
	Antimony (Sb)-Total (mg/L)	<0.00010
	Arsenic (As)-Total (mg/L)	<0.00010
	Barium (Ba)-Total (mg/L)	0.00017 RRV
	Beryllium (Be)-Total (mg/L)	<0.00010
	Bismuth (Bi)-Total (mg/L)	<0.000050
	Boron (B)-Total (mg/L)	<0.010
	Cadmium (Cd)-Total (mg/L)	<0.0000050
	Calcium (Ca)-Total (mg/L)	<0.050
	Cesium (Cs)-Total (mg/L)	<0.000010

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2161885-1	L2161885-2	L2161885-3	L2161885-4	L2161885-5
Description	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water
Sampled Date	02-SEP-18	02-SEP-18	02-SEP-18	02-SEP-18	02-SEP-18
Sampled Time	14:55	15:30	13:30	14:05	15:00
Client ID	SEPT-SP-116	SEPT-SP-117	SEPT-WAL-85	SEPT-WAL-86	CREMP-SEP-DI-1
Grouping / **Analyte**					
WATER					
Total Metals Chromium (Cr)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Cobalt (Co)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper (Cu)-Total (mg/L)	0.00059	0.00058	0.00087	0.00084	<0.00050
Iron (Fe)-Total (mg/L)	0.015	0.015	0.013	<0.010	<0.010
Lead (Pb)-Total (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium (Li)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Magnesium (Mg)-Total (mg/L)	1.33	1.31	1.39	1.33	<0.0050
Manganese (Mn)-Total (mg/L)	0.00139	0.00127	0.00185	0.00035	<0.00010
Mercury (Hg)-Total (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Molybdenum (Mo)-Total (mg/L)	0.000199	0.000190	0.000261	0.000258	<0.000050
Nickel (Ni)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Phosphorus (P)-Total (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050
Potassium (K)-Total (mg/L)	0.538	0.533	0.502	0.480	<0.050
Rubidium (Rb)-Total (mg/L)	0.00089	0.00086	0.00073	0.00072	<0.00020
Selenium (Se)-Total (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Silicon (Si)-Total (mg/L)	0.19	0.19	0.29	0.28	<0.10
Silver (Ag)-Total (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)-Total (mg/L)	0.901	0.838	0.634	0.593	<0.050
Strontium (Sr)-Total (mg/L)	0.0208	0.0215	0.0255	0.0261	<0.00020
Sulfur (S)-Total (mg/L)	2.04	2.17	1.91	1.93	<0.50
Tellurium (Te)-Total (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Thallium (Tl)-Total (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Thorium (Th)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Tin (Sn)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)-Total (mg/L)	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030
Tungsten (W)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Uranium (U)-Total (mg/L)	0.000045	0.000046	0.000057	0.000054	<0.000010
Vanadium (V)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc (Zn)-Total (mg/L)	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Zirconium (Zr)-Total (mg/L)	<0.000060	<0.000060	<0.000060	<0.000060	<0.000060
Dissolved Metals Dissolved Mercury Filtration Location	FIELD	FIELD	FIELD	FIELD	FIELD
Dissolved Metals Filtration Location	FIELD	FIELD	FIELD	FIELD	FIELD
Aluminum (Al)-Dissolved (mg/L)	0.0022	0.0016	0.0012	0.0025	<0.0010
Antimony (Sb)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic (As)-Dissolved (mg/L)	0.00022	0.00021	0.00025	0.00026	<0.00010
Barium (Ba)-Dissolved (mg/L)	0.00254	0.00252	0.00198	0.00206	<0.00010
Beryllium (Be)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2161885-6	L2161885-7	L2161885-8	L2161885-9	L2161885-10
Description	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water
Sampled Date	03-SEP-18	03-SEP-18	03-SEP-18	03-SEP-18	03-SEP-18
Sampled Time	15:20	15:00	13:45	14:20	13:45
Client ID	SEPT-TPE-116	SEPT-TPE-117	SEPT-TPN-116	SEPT-TPN-117	SEPT-CREMP-DUP-1
Grouping / **Analyte**					
WATER					
Total Metals Chromium (Cr)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Cobalt (Co)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper (Cu)-Total (mg/L)	<0.00050	<0.00050	0.00050	<0.00050	<0.00050
Iron (Fe)-Total (mg/L)	0.011	<0.010	0.013	<0.010	0.012
Lead (Pb)-Total (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium (Li)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Magnesium (Mg)-Total (mg/L)	1.02	0.985	0.856	0.869	0.874
Manganese (Mn)-Total (mg/L)	0.00114	0.00108	0.00168	0.00147	0.00156
Mercury (Hg)-Total (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Molybdenum (Mo)-Total (mg/L)	0.000145	0.000131	0.000156	0.000129	0.000142
Nickel (Ni)-Total (mg/L)	<0.00050	<0.00050	0.00063	<0.00050	0.00060
Phosphorus (P)-Total (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050
Potassium (K)-Total (mg/L)	0.513	0.503	0.459	0.471	0.474
Rubidium (Rb)-Total (mg/L)	0.00089	0.00087	0.00066	0.00073	0.00069
Selenium (Se)-Total (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Silicon (Si)-Total (mg/L)	0.10	<0.10	<0.10	<0.10	<0.10
Silver (Ag)-Total (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)-Total (mg/L)	1.08	1.01	1.03	1.07	1.06
Strontium (Sr)-Total (mg/L)	0.0113	0.0110	0.0101	0.0101	0.00998
Sulfur (S)-Total (mg/L)	1.70	1.86	1.65	1.74	1.66
Tellurium (Te)-Total (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Thallium (Tl)-Total (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Thorium (Th)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Tin (Sn)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)-Total (mg/L)	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030
Tungsten (W)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Uranium (U)-Total (mg/L)	0.000043	0.000041	0.000033	0.000033	0.000035
Vanadium (V)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc (Zn)-Total (mg/L)	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Zirconium (Zr)-Total (mg/L)	<0.000060	<0.000060	<0.000060	<0.000060	<0.000060
Dissolved Metals Dissolved Mercury Filtration Location	FIELD	FIELD	FIELD	FIELD	FIELD
Dissolved Metals Filtration Location	FIELD	FIELD	FIELD	FIELD	FIELD
Aluminum (Al)-Dissolved (mg/L)	0.0018	0.0013	0.0010	0.0016	0.0027
Antimony (Sb)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic (As)-Dissolved (mg/L)	0.00030	0.00028	0.00015	0.00016	0.00016
Barium (Ba)-Dissolved (mg/L)	0.00292	0.00262	0.00279	0.00271	0.00289
Beryllium (Be)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2161885-11				
	Description	Surface Water				
	Sampled Date	03-SEP-18				
	Sampled Time	16:30				
	Client ID	SEPT-CREMP-EB-1				
Grouping	**Analyte**					
WATER						
Total Metals	Chromium (Cr)-Total (mg/L)	<0.00010				
	Cobalt (Co)-Total (mg/L)	<0.00010				
	Copper (Cu)-Total (mg/L)	<0.00050				
	Iron (Fe)-Total (mg/L)	<0.010				
	Lead (Pb)-Total (mg/L)	0.000108 RRV				
	Lithium (Li)-Total (mg/L)	<0.0010				
	Magnesium (Mg)-Total (mg/L)	<0.0050				
	Manganese (Mn)-Total (mg/L)	<0.00010				
	Mercury (Hg)-Total (mg/L)	<0.0000050				
	Molybdenum (Mo)-Total (mg/L)	<0.000050				
	Nickel (Ni)-Total (mg/L)	<0.00050				
	Phosphorus (P)-Total (mg/L)	<0.050				
	Potassium (K)-Total (mg/L)	<0.050				
	Rubidium (Rb)-Total (mg/L)	<0.00020				
	Selenium (Se)-Total (mg/L)	<0.000050				
	Silicon (Si)-Total (mg/L)	<0.10				
	Silver (Ag)-Total (mg/L)	<0.000010				
	Sodium (Na)-Total (mg/L)	<0.050				
	Strontium (Sr)-Total (mg/L)	<0.00020				
	Sulfur (S)-Total (mg/L)	<0.50				
	Tellurium (Te)-Total (mg/L)	<0.00020				
	Thallium (Tl)-Total (mg/L)	<0.000010				
	Thorium (Th)-Total (mg/L)	<0.00010				
	Tin (Sn)-Total (mg/L)	<0.00010				
	Titanium (Ti)-Total (mg/L)	<0.00030				
	Tungsten (W)-Total (mg/L)	<0.00010				
	Uranium (U)-Total (mg/L)	<0.000010				
	Vanadium (V)-Total (mg/L)	<0.00050				
	Zinc (Zn)-Total (mg/L)	<0.0030				
	Zirconium (Zr)-Total (mg/L)	<0.000060				
Dissolved Metals	Dissolved Mercury Filtration Location	FIELD				
	Dissolved Metals Filtration Location	FIELD				
	Aluminum (Al)-Dissolved (mg/L)	<0.0010				
	Antimony (Sb)-Dissolved (mg/L)	<0.00010				
	Arsenic (As)-Dissolved (mg/L)	<0.00010				
	Barium (Ba)-Dissolved (mg/L)	<0.00010				
	Beryllium (Be)-Dissolved (mg/L)	<0.00010				

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	L2161885-1 Surface Water 02-SEP-18 14:55 SEPT-SP-116	L2161885-2 Surface Water 02-SEP-18 15:30 SEPT-SP-117	L2161885-3 Surface Water 02-SEP-18 13:30 SEPT-WAL-85	L2161885-4 Surface Water 02-SEP-18 14:05 SEPT-WAL-86	L2161885-5 Surface Water 02-SEP-18 15:00 CREMP-SEP-DI-1
WATER						
Dissolved Metals	Bismuth (Bi)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Boron (B)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
	Cadmium (Cd)-Dissolved (mg/L)	0.0000067	<0.0000050	<0.0000050	<0.0000050	0.0000253 RRV
	Calcium (Ca)-Dissolved (mg/L)	4.18	4.16	4.60	4.59	<0.050
	Cesium (Cs)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Chromium (Cr)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Cobalt (Co)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Copper (Cu)-Dissolved (mg/L)	0.00072	0.00067	0.00088	0.00092	<0.00020
	Iron (Fe)-Dissolved (mg/L)	<0.010	<0.010	<0.010	0.012	<0.010
	Lead (Pb)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Lithium (Li)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Magnesium (Mg)-Dissolved (mg/L)	1.34	1.33	1.37	1.36	<0.0050
	Manganese (Mn)-Dissolved (mg/L)	0.00057	0.00034	0.00024	0.00156 DTMF	<0.00010
	Mercury (Hg)-Dissolved (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
	Molybdenum (Mo)-Dissolved (mg/L)	0.000199	0.000189	0.000252	0.000254	<0.000050
	Nickel (Ni)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Phosphorus (P)-Dissolved (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050
	Potassium (K)-Dissolved (mg/L)	0.534	0.516	0.485	0.485	<0.050
	Rubidium (Rb)-Dissolved (mg/L)	0.00088	0.00087	0.00072	0.00070	<0.00020
	Selenium (Se)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Silicon (Si)-Dissolved (mg/L)	0.145	0.148	0.240	0.251	<0.050
	Silver (Ag)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Sodium (Na)-Dissolved (mg/L)	0.908	0.888	0.655	0.653	<0.050
	Strontium (Sr)-Dissolved (mg/L)	0.0191	0.0192	0.0236	0.0232	<0.00020
	Sulfur (S)-Dissolved (mg/L)	2.13	2.09	1.92	1.90	<0.50
	Tellurium (Te)-Dissolved (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
	Thallium (Tl)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Thorium (Th)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Tin (Sn)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Titanium (Ti)-Dissolved (mg/L)	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030
	Tungsten (W)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Uranium (U)-Dissolved (mg/L)	0.000040	0.000042	0.000048	0.000054	<0.000010
	Vanadium (V)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Zinc (Zn)-Dissolved (mg/L)	0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Zirconium (Zr)-Dissolved (mg/L)	<0.000060	<0.000060	<0.000060	<0.000060	<0.000060

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	L2161885-6 Surface Water 03-SEP-18 15:20 SEPT-TPE-116	L2161885-7 Surface Water 03-SEP-18 15:00 SEPT-TPE-117	L2161885-8 Surface Water 03-SEP-18 13:45 SEPT-TPN-116	L2161885-9 Surface Water 03-SEP-18 14:20 SEPT-TPN-117	L2161885-10 Surface Water 03-SEP-18 13:45 SEPT-CREMP-DUP-1
WATER						
Dissolved Metals	Bismuth (Bi)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Boron (B)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
	Cadmium (Cd)-Dissolved (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000058
	Calcium (Ca)-Dissolved (mg/L)	2.59	2.58	2.11	2.14	2.14
	Cesium (Cs)-Dissolved (mg/L)	0.000020	0.000017	<0.000010	<0.000010	<0.000010
	Chromium (Cr)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Cobalt (Co)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Copper (Cu)-Dissolved (mg/L)	0.00046	0.00045	0.00050	0.00059	0.00053
	Iron (Fe)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
	Lead (Pb)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	0.000123	<0.000050
	Lithium (Li)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Magnesium (Mg)-Dissolved (mg/L)	0.988	0.981	0.858	0.864	0.873
	Manganese (Mn)-Dissolved (mg/L)	0.00058	0.00055	0.00053	0.00060	0.00060
	Mercury (Hg)-Dissolved (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
	Molybdenum (Mo)-Dissolved (mg/L)	0.000161	0.000143	0.000129	0.000129	0.000132
	Nickel (Ni)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	0.00087	<0.00050
	Phosphorus (P)-Dissolved (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050
	Potassium (K)-Dissolved (mg/L)	0.496	0.494	0.457	0.466	0.470
	Rubidium (Rb)-Dissolved (mg/L)	0.00085	0.00081	0.00073	0.00070	0.00067
	Selenium (Se)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Silicon (Si)-Dissolved (mg/L)	0.066	0.062	<0.050	<0.050	0.051
	Silver (Ag)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Sodium (Na)-Dissolved (mg/L)	1.06	1.06	1.08	1.10	1.09
	Strontium (Sr)-Dissolved (mg/L)	0.0115	0.0114	0.00980	0.00966	0.00974
	Sulfur (S)-Dissolved (mg/L)	1.77	1.77	1.76	1.82	1.75
	Tellurium (Te)-Dissolved (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
	Thallium (Tl)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Thorium (Th)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Tin (Sn)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Titanium (Ti)-Dissolved (mg/L)	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030
	Tungsten (W)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Uranium (U)-Dissolved (mg/L)	0.000033	0.000033	0.000027	0.000026	0.000030
	Vanadium (V)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Zinc (Zn)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	0.0018
	Zirconium (Zr)-Dissolved (mg/L)	<0.000060	<0.000060	<0.000060	<0.000060	<0.000060

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2161885-11				
	Description	Surface Water				
	Sampled Date	03-SEP-18				
	Sampled Time	16:30				
	Client ID	SEPT-CREMP-EB-1				
Grouping	**Analyte**					
WATER						
Dissolved Metals	Bismuth (Bi)-Dissolved (mg/L)	<0.000050				
	Boron (B)-Dissolved (mg/L)	<0.010				
	Cadmium (Cd)-Dissolved (mg/L)	<0.0000050				
	Calcium (Ca)-Dissolved (mg/L)	<0.050				
	Cesium (Cs)-Dissolved (mg/L)	<0.000010				
	Chromium (Cr)-Dissolved (mg/L)	<0.00010				
	Cobalt (Co)-Dissolved (mg/L)	<0.00010				
	Copper (Cu)-Dissolved (mg/L)	<0.00020				
	Iron (Fe)-Dissolved (mg/L)	<0.010				
	Lead (Pb)-Dissolved (mg/L)	<0.000050				
	Lithium (Li)-Dissolved (mg/L)	<0.0010				
	Magnesium (Mg)-Dissolved (mg/L)	<0.0050				
	Manganese (Mn)-Dissolved (mg/L)	<0.00010				
	Mercury (Hg)-Dissolved (mg/L)	<0.0000050				
	Molybdenum (Mo)-Dissolved (mg/L)	<0.000050				
	Nickel (Ni)-Dissolved (mg/L)	<0.00050				
	Phosphorus (P)-Dissolved (mg/L)	<0.050				
	Potassium (K)-Dissolved (mg/L)	<0.050				
	Rubidium (Rb)-Dissolved (mg/L)	<0.00020				
	Selenium (Se)-Dissolved (mg/L)	<0.000050				
	Silicon (Si)-Dissolved (mg/L)	<0.050				
	Silver (Ag)-Dissolved (mg/L)	<0.000010				
	Sodium (Na)-Dissolved (mg/L)	<0.050				
	Strontium (Sr)-Dissolved (mg/L)	<0.00020				
	Sulfur (S)-Dissolved (mg/L)	<0.50				
	Tellurium (Te)-Dissolved (mg/L)	<0.00020				
	Thallium (Tl)-Dissolved (mg/L)	<0.000010				
	Thorium (Th)-Dissolved (mg/L)	<0.00010				
	Tin (Sn)-Dissolved (mg/L)	<0.00010				
	Titanium (Ti)-Dissolved (mg/L)	<0.00030				
	Tungsten (W)-Dissolved (mg/L)	<0.00010				
	Uranium (U)-Dissolved (mg/L)	<0.000010				
	Vanadium (V)-Dissolved (mg/L)	<0.00050				
	Zinc (Zn)-Dissolved (mg/L)	0.0010 RRV				
	Zirconium (Zr)-Dissolved (mg/L)	<0.000060				

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Duplicate	Aluminum (Al)-Total	DUP-H	L2161885-11
Matrix Spike	Dissolved Organic Carbon	MS-B	L2161885-10, -11, -8, -9
Matrix Spike	Total Organic Carbon	MS-B	L2161885-10, -11, -8, -9
Matrix Spike	Total Organic Carbon	MS-B	L2161885-6
Matrix Spike	Manganese (Mn)-Dissolved	MS-B	L2161885-1, -10, -11, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Barium (Ba)-Total	MS-B	L2161885-1, -10, -11, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Calcium (Ca)-Total	MS-B	L2161885-1, -10, -11, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Calcium (Ca)-Total	MS-B	L2161885-11
Matrix Spike	Copper (Cu)-Total	MS-B	L2161885-11
Matrix Spike	Lead (Pb)-Total	MS-B	L2161885-11
Matrix Spike	Magnesium (Mg)-Total	MS-B	L2161885-1, -10, -11, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Magnesium (Mg)-Total	MS-B	L2161885-11
Matrix Spike	Sodium (Na)-Total	MS-B	L2161885-1, -10, -11, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Sodium (Na)-Total	MS-B	L2161885-11
Matrix Spike	Strontium (Sr)-Total	MS-B	L2161885-1, -10, -11, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Phosphorus (P)-Total	MS-B	L2161885-1, -10, -11, -2, -3, -4, -5, -6, -7, -8, -9
Duplicate	Total Kjeldahl Nitrogen	TKND	L2161885-10, -11

Qualifiers for Individual Parameters Listed:

Qualifier	Description
DTMF	Dissolved concentration exceeds total for field-filtered metals sample. Metallic contaminants may have been introduced to dissolved sample during field filtration.
DUP-H	Duplicate results outside ALS DQO, due to sample heterogeneity.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RRV	Reported Result Verified By Repeat Analysis
TKND	TKN duplication was poor due to interference from high nitrate, which causes negative bias on TKN.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ALK-TITR-VA	Water	Alkalinity Species by Titration	APHA 2320 Alkalinity

This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.

BR-L-IC-N-VA	Water	Bromide in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

CARBONS-DOC-VA	Water	Dissolved organic carbon by combustion	APHA 5310B

This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)". Dissolved carbon (DOC) fractions are determined by filtering the sample through a 0.45 micron membrane filter prior to analysis.

CARBONS-TOC-VA	Water	Total organic carbon by combustion	APHA 5310B TOTAL ORGANIC CARBON (TOC)

This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)".

CL-L-IC-N-VA	Water	Chloride in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

CN-FREE-L-CFA-VA	Water	Low Level Free Cyanide in water by CFA	ASTM 7237

This analysis is carried out using procedures adapted from ASTM Method 7237 "Free Cyanide with Flow Injection Analysis (FIA) Utilizing Gas Diffusion Separation and Amperometric Detection". Free cyanide is determined by in-line gas diffusion at pH 6 with final determination by colourimetric analysis.

CN-T-L-CFA-VA	Water	Low Level Total Cyanide in water by CFA	ISO 14403:2002

This analysis is carried out using procedures adapted from ISO Method 14403:2002 "Determination of Total Cyanide using Flow Analysis (FIA and CFA)". Total or strong acid dissociable (SAD) cyanide is determined by in-line UV digestion along with sample distillation and final determination by colourimetric analysis. Method Limitation: This method is susceptible to interference from thiocyanate (SCN). If SCN is present in the sample, there could be a positive interference with this method, but it would be less than 1% and could be as low as zero.

EC-PCT-VA	Water	Conductivity (Automated)	APHA 2510 Auto. Conduc.

This analysis is carried out using procedures adapted from APHA Method 2510 "Conductivity". Conductivity is determined using a conductivity electrode.

Reference Information

EC-SCREEN-VA	Water	Conductivity Screen (Internal Use Only)	APHA 2510

Qualitative analysis of conductivity where required during preparation of other tests - e.g. TDS, metals, etc.

F-IC-N-VA	Water	Fluoride in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

HARDNESS-CALC-VA	Water	Hardness	APHA 2340B

Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

HG-D-CVAA-VA	Water	Diss. Mercury in Water by CVAAS or CVAFS	APHA 3030B/EPA 1631E (mod)

Water samples are filtered (0.45 um), preserved with hydrochloric acid, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

HG-T-CVAA-VA	Water	Total Mercury in Water by CVAAS or CVAFS	EPA 1631E (mod)

Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

MET-D-CCMS-VA	Water	Dissolved Metals in Water by CRC ICPMS	APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

MET-T-CCMS-VA	Water	Total Metals in Water by CRC ICPMS	EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

NH3-F-VA	Water	Ammonia in Water by Fluorescence	J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

NO2-L-IC-N-VA	Water	Nitrite in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

NO3-L-IC-N-VA	Water	Nitrate in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

P-T-PRES-COL-VA	Water	Total P in Water by Colour	APHA 4500-P Phosphorus

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is determined colourimetrically after persulphate digestion of the sample.
Samples with very high dissolved solids (i.e. seawaters, brackish waters) may produce a negative bias by this method. Alternate methods are available for these types of samples.

Arsenic (5+), at elevated levels, is a positive interference on colourimetric phosphate analysis.

P-TD-COL-VA	Water	Total Dissolved P in Water by Colour	APHA 4500-P Phosphorous

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Dissolved Phosphorus is determined colourimetrically after persulphate digestion of a sample that has been lab or field filtered through a 0.45 micron membrane filter.
Samples with very high dissolved solids (i.e. seawaters, brackish waters) may produce a negative bias by this method. Alternate methods are available for these types of samples.

Arsenic (5+), at elevated levels, is a positive interference on colourimetric phosphate analysis.

PH-PCT-VA	Water	pH by Meter (Automated)	APHA 4500-H pH Value

This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode

It is recommended that this analysis be conducted in the field.

PO4-DO-COL-VA	Water	Diss. Orthophosphate in Water by Colour	APHA 4500-P Phosphorus

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.
Samples with very high dissolved solids (i.e. seawaters, brackish waters) may produce a negative bias by this method. Alternate methods are available for these types of samples.

Arsenic (5+), at elevated levels, is a positive interference on colourimetric phosphate analysis.

Reference Information

SILICATE-COL-VA	Water	Silicate by Colourimetric analysis	APHA 4500-SiO2 E.

This analysis is carried out using procedures adapted from APHA Method 4500-SiO2 E. "Silica". Silicate (molybdate-reactive silica) is determined by the molybdosilicate-heteropoly blue colourimetric method.

SO4-IC-N-VA	Water	Sulfate in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

TDS-LOW-VA	Water	Low Level TDS (3.0mg/L) by Gravimetric	APHA 2540C

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total dissolved solids (TDS) are determined by filtering a sample through a glass fibre filter, TDS is determined by evaporating the filtrate to dryness at 180 degrees celsius.

TKN-F-VA	Water	TKN in Water by Fluorescence	APHA 4500-NORG D.

This analysis is carried out using procedures adapted from APHA Method 4500-Norg D. "Block Digestion and Flow Injection Analysis". Total Kjeldahl Nitrogen is determined using block digestion followed by Flow-injection analysis with fluorescence detection.

TSS-LOW-VA	Water	Total Suspended Solids by Grav. (1 mg/L)	APHA 2540D

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total suspended solids (TSS) are determined by filtering a sample through a glass fibre filter, TSS is determined by drying the filter at 104 degrees celsius.
Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.

TURBIDITY-VA	Water	Turbidity by Meter	APHA 2130 Turbidity

This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

ALS Environmental

L2161885-COFC

COC # _____

Page 1 of 1

Report To					
Company:	Azimuth Consulting Group		☐ Other		
Contact:	Eric Franz		☑ PDF	☑ Excel	☐ Digital ☐ Fax
Address:	218-2902 West Broadway		Email 1:	efranz@azimuthgroup.ca	
	Vancouver, BC V6K2G8		Email 2:	marie-pier.marcil@agnicoeagle.com	
Phone:	604-730-1220	Fax:	Email 3:	robin.allard@agnicoeagle.com	
Invoice To	Same as Report ? ☑ Yes	☐ No	Client / Project Information		
Hardcopy of Invoice with Report?	☐ Yes	☑ No	Job #:	Meadowbank CREMP - Surfacewater	
Company:			PO / AFE:		
Contact:			LSD:		
Address:					
Phone:		Fax:	Quote #:	Q39503	

Lab Work Order # (lab use only)		ALS Contact:	Brent Mack	Sampler:	Jamie K/Robin A

Service Requested (Rush for routine analysis subject to availability)

- ◉ Regular (Standard Turnaround Times - Business Days)
- ○ Priority (2-4 Business Days) - 50% Surcharge - Contact ALS to Confirm TAT
- ○ Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT
- ○ Same Day or Weekend Emergency - Contact ALS to Confirm TAT

Analysis Request

Please indicate below Filtered, Preserved or both (F, P, F/P)

Sample #	Sample Identification (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Conventionals** see notes	TSS-Low, TDS-Low	TOC, Ammonia, TKN, Total P	DOC	T-CN (Low), Free CN (Low)	Total mercury	Dissolved mercury	Total Metals	Dissolved metals	Chlorophyll-a			Number of Containers
						P	F/P	P	P	F/P	P	F/P	F				
	Sept-SP-116	02-Sep-18	14:55	Surface Water	X	X	X	X	X	X	X	X	X	X			10
	Sept-SP-117	02-Sep-18	15:30	Surface Water	X	X	X	X	X	X	X	X	X	X			10
	Sept-WAL-85	02-Sep-18	13:30	Surface Water	X	X	X	X	X	X	X	X	X	X			10
	Sept-WAL-86	02-Sep-18	14:05	Surface Water	X	X	X	X	X	X	X	X	X	X			10
	CREMP-SEP-DI-1	02-Sep-18	15:00	Surface Water	X	X	X	X	X	X	X	X	[redacted]				7
	Sept-TPE-116	03-Sep-18	15:20	Surface Water	X	X	X	X	X	X	X	X	X	X			10
	Sept-TPE-117	03-Sep-18	15:00	Surface Water	X	X	X	X	X	X	X	X	X	X			10
	Sept-TPN-116	03-Sep-18	13:45	Surface Water	X	X	X	X	X	X	X	X	X	X			10
	Sept-TPN-117	03-Sep-18	14:20	Surface Water	X	X	X	X	X	X	X	X	X	X			10
	Sept-CREMP-Dup-1	03-Sep-18	13:45	Surface Water	X	X	X	X	X	X	X	X	X	X			10
	Sept-CREMP-EB-1	03-Sep-18	16:30		X	X	X	X	X	X	X	X	X				9

Special Instructions / Regulations with water or land use (CCME-Freshwater Aquatic Life/BC CSR - Commercial/AB Tier 1 - Natural, etc) / Hazardous Details

**Conventionals includes: Alk Species, pH, EC, Turbidity, Conductivity, Anions (F, NO2, NO3, Br, SO4), low-level Chloride, Silicate, TD-P, and Ortho-PO4.

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.

By the use of this form the user acknowledges and agrees with the Terms and Conditions as provided on a separate Excel tab.

Also provided on another Excel tab are the ALS location addresses, phone numbers and sample container / preservation / holding time table for common analyses.

SHIPMENT RELEASE (client use)			SHIPMENT RECEPTION (lab use only)				SHIPMENT VERIFICATION (lab use only)			
Released by:	Date (dd-mmm-yy)	Time (hh-mm)	Received by:	Date:	Time:	Temperature:	Verified by:	Date:	Time:	Observations: Yes / No ? If Yes add SIF
Jamie Kataluk	4-Sep-18	9:00	RIC	11 Sep 18	8:50 am	16 °C				

GENF 20.00 Front

ALS Environmental



COC # _____

Page 1 of 1

Report To					
Company:	Azimuth Consulting Group		☐ Other		
Contact:	Eric Franz		☑ PDF	☑ Excel	☐ Digital ☐ Fax
Address:	218-2902 West Broadway		Email 1:	efranz@azimuthgroup.ca	
	Vancouver, BC V6K2G8		Email 2:	marie-pier.marcil@agnicoeagle.com	
Phone:	604-730-1220	Fax:	Email 3:	robin.allard@agnicoeagle.com	
Invoice To	Same as Report ? ☑ Yes ☐ No		Client / Project Information		
Hardcopy of Invoice with Report?	☐ Yes ☑ No		Job #:	Meadowbank CREMP - Surfacewater	
Company:			PO / AFE:		
Contact:			LSD:		
Address:					
Phone:		Fax:	Quote #:	Q39503	
Lab Work Order # (lab use only)			ALS Contact:	Brent Mack	Sampler: Jamie K/Robin A

Service Requested (Rush for routine analysis subject to availability)

- ◉ Regular (Standard Turnaround Times - Business Days)
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Analysis Request

Please indicate below Filtered, Preserved or both (F, P, F/P)

Sample #	Sample Identification (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Conventionals** see notes	TSS-Low, TDS-Low	TOC, Ammonia, TKN, Total P	DOC	T-CN (Low), Free CN (Low)	Total mercury	Dissolved mercury	Total Metals	Dissolved metals	Chlorophyll-a			Number of Containers
							P	F/P	P	P	F/P	P	F/P	F			
	Sept-SP-116	02-Sep-18	14:55	Surface Water	X	X	X	X	X	X	X	X	X	X			10
	Sept-SP-117	02-Sep-18	15:30	Surface Water	X	X	X	X	X	X	X	X	X	X			10
	Sept-WAL-85	02-Sep-18	13:30	Surface Water	X	X	X	X	X	X	X	X	X	X			10
	Sept-WAL-88	02-Sep-18	14:05	Surface Water	X	X	X	X	X	X	X	X	X	X			10
	CREMP-SEP-DI-1	02-Sep-18	15:00	Surface Water	X	X	X	X	X	X	X	X	[redacted]				7
	Sept-TPE-116	03-Sep-18	15:20	Surface Water	X	X	X	X	X	X	X	X	X	X			10
	Sept-TPE-117	03-Sep-18	15:00	Surface Water	X	X	X	X	X	X	X	X	X	X			10
	Sept-TPN-116	03-Sep-18	13:45	Surface Water	X	X	X	X	X	X	X	X	X	X			10
	Sept-TPN-117	03-Sep-18	14:20	Surface Water	X	X	X	X	X	X	X	X	X	X			10
	Sept-CREMP-Dup-1	03-Sep-18	13:45	Surface Water	X	X	X	X	X	X	X	X	X	X			10
	Sept-CREMP-EB-1	03-Sep-18	16:30		X	X	X	X	X	X	X	X	X				9

Special Instructions / Regulations with water or land use (CCME-Freshwater Aquatic Life/BC CSR - Commercial/AB Tier 1 - Natural, etc) / Hazardous Details

**Conventionals includes: Alk Species, pH, EC, Turbidity, Conductivity, Anions (F, NO2, NO3, Br, SO4), low-level Chloride, Silicate, TD-P, and Ortho-PO4.

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.

By the use of this form the user acknowledges and agrees with the Terms and Conditions as provided on a separate Excel tab.

Also provided on another Excel tab are the ALS location addresses, phone numbers and sample container / preservation / holding time table for common analyses.

SHIPMENT RELEASE (client use)			SHIPMENT RECEPTION (lab use only)				SHIPMENT VERIFICATION (lab use only)			
Released by:	Date (dd-mmm-yy)	Time (hh:mm)	Received by:	Date:	Time:	Temperature:	Verified by:	Date:	Time:	Observations: Yes / No ? If Yes add SIF
Jamie Kataluk	4-Sep-18	9:00	RK	11 Sep 18	8:50am	16 °C				

RK, SEP 12 2018, 8:45am, 16°C

GENF 20.00 Front

AZIMUTH CONSULTING GROUP INC.
ATTN: Eric Franz
218 - 2902 West Broadway
Vancouver BC V6K 2G8

Date Received: 11-SEP-18
Report Date: 20-SEP-18 15:28 (MT)
Version: FINAL

Client Phone: 604-730-1220

Certificate of Analysis

Lab Work Order #: L2162149

Project P.O. #: NOT SUBMITTED
Job Reference: MEADOWBANK CREMP - SURFACEWATER
C of C Numbers:
Legal Site Desc:

Brent Mack, B.Sc.
Account Manager

[This report shall not be reproduced except in full without the written authority of the Laboratory.]

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2162149-1	L2162149-2	L2162149-3	L2162149-4	L2162149-5
Description	Water	Water	Water	Water	Water
Sampled Date	01-SEP-18	01-SEP-18	01-SEP-18	01-SEP-18	01-SEP-18
Sampled Time	11:00	11:29	14:53	15:15	09:49
Client ID	MAM-34	MAM-33	WTS-33	WTS-34	PDL-69
Grouping / **Analyte**					
WATER					
Physical Tests Conductivity (uS/cm)	62.3	67.6	40.4	40.5	23.4
Hardness (as CaCO3) (mg/L)	21.0	22.9	13.4	13.5	8.82
pH (pH)	6.95	6.95	6.99	6.99	7.19
Total Suspended Solids (mg/L)	1.1	<1.0	<1.0	1.4	1.3
Total Dissolved Solids (mg/L)	47	51	27.4	28.4	15.0
Turbidity (NTU)	0.18	0.31	0.70	0.66	0.19
Anions and Nutrients Alkalinity, Bicarbonate (as CaCO3) (mg/L)	4.8	5.2	5.5	5.5	8.0
Alkalinity, Carbonate (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
Alkalinity, Total (as CaCO3) (mg/L)	4.8	5.2	5.5	5.5	8.0
Ammonia, Total (as N) (mg/L)	0.0107	<0.0050	<0.0050	<0.0050	0.0115
Bromide (Br) (mg/L)	0.152	0.172	0.083	0.080	<0.050
Chloride (Cl) (mg/L)	12.2	13.6	6.85	6.87	0.67
Fluoride (F) (mg/L)	0.026	0.027	0.029	0.029	0.038
Nitrate (as N) (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Nitrite (as N) (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Total Kjeldahl Nitrogen (mg/L)	0.085	0.083	0.098	0.115	0.109
Orthophosphate-Dissolved (as P) (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Phosphorus (P)-Total Dissolved (mg/L)	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Phosphorus (P)-Total (mg/L)	<0.0020	<0.0020	<0.0020	0.0029	<0.0020
Silicate (as SiO2) (mg/L)	0.63	0.64	<0.50	<0.50	<0.50
Sulfate (SO4) (mg/L)	3.26	3.32	1.67	1.68	1.79
Cyanides Cyanide, Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Cyanide, Free (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Organic / Inorganic Carbon Dissolved Organic Carbon (mg/L)	1.59	1.69	2.12	2.04	1.83
Total Organic Carbon (mg/L)	1.68	1.66	1.97	2.05	1.79
Total Metals Aluminum (Al)-Total (mg/L)	0.0034	0.0076	0.0199	0.0265	0.0040
Antimony (Sb)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic (As)-Total (mg/L)	0.00037	0.00039	0.00032	0.00037	0.00020
Barium (Ba)-Total (mg/L)	0.0104	0.0112	0.00800	0.00813	0.00189
Beryllium (Be)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth (Bi)-Total (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron (B)-Total (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)-Total (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Calcium (Ca)-Total (mg/L)	6.41	7.05	3.80	3.85	2.26
Cesium (Cs)-Total (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2162149-6	L2162149-7	L2162149-8	L2162149-9	L2162149-10
Description	Water	Water	Water	Water	Water
Sampled Date	01-SEP-18	01-SEP-18	01-SEP-18	01-SEP-18	01-SEP-18
Sampled Time	10:24	12:25	13:00	13:00	13:30
Client ID	PDL-70	INUG-105	INUG-104	AMQ SEPT EB-1	AMQ SEPT DI-1
Grouping / **Analyte**					
WATER					
Physical Tests Conductivity (uS/cm)	23.2	16.9	17.0	<2.0	<2.0
Hardness (as CaCO3) (mg/L)	8.87	5.75	5.73	<0.50	<0.50
pH (pH)	7.20	7.02	6.97	5.68	5.60
Total Suspended Solids (mg/L)	<1.0	1.0	<1.0	<1.0	<1.0
Total Dissolved Solids (mg/L)	15.9	13.0	13.0	<3.0	<3.0
Turbidity (NTU)	0.16	0.23	0.21	0.27	<0.10
Anions and Nutrients Alkalinity, Bicarbonate (as CaCO3) (mg/L)	8.0	5.5	5.3	<1.0	<1.0
Alkalinity, Carbonate (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
Alkalinity, Total (as CaCO3) (mg/L)	8.0	5.5	5.3	<1.0	<1.0
Ammonia, Total (as N) (mg/L)	0.0056	0.0088	0.0155	<0.0050	0.0371 RRV
Bromide (Br) (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050
Chloride (Cl) (mg/L)	0.67	0.86	0.86	<0.10	<0.10
Fluoride (F) (mg/L)	0.038	0.063	0.063	<0.020	<0.020
Nitrate (as N) (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Nitrite (as N) (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Total Kjeldahl Nitrogen (mg/L)	0.103	0.122	0.131	<0.050	<0.050
Orthophosphate-Dissolved (as P) (mg/L)	<0.0010	0.0012	<0.0010	<0.0010	<0.0010
Phosphorus (P)-Total Dissolved (mg/L)	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Phosphorus (P)-Total (mg/L)	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Silicate (as SiO2) (mg/L)	<0.50	<0.50	<0.50	<0.50	<0.50
Sulfate (SO4) (mg/L)	1.79	0.98	0.97	<0.30	<0.30
Cyanides Cyanide, Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Cyanide, Free (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Organic / Inorganic Carbon Dissolved Organic Carbon (mg/L)	1.71	2.22	2.19	0.50	<0.50
Total Organic Carbon (mg/L)	2.03	2.17	2.17	<0.50	<0.50
Total Metals Aluminum (Al)-Total (mg/L)	0.0034	0.0046	0.0057	<0.0030	<0.0030
Antimony (Sb)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic (As)-Total (mg/L)	0.00021	0.00014	0.00014	<0.00010	<0.00010
Barium (Ba)-Total (mg/L)	0.00184	0.00154	0.00159	<0.00010	<0.00010
Beryllium (Be)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth (Bi)-Total (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron (B)-Total (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)-Total (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Calcium (Ca)-Total (mg/L)	2.26	1.15	1.14	<0.050	<0.050
Cesium (Cs)-Total (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2162149-11	L2162149-12			
Description	Water	Water			
Sampled Date	01-SEP-18	01-SEP-18			
Sampled Time	14:00	14:45			
Client ID	NEM-33	NEM-34			
Grouping / **Analyte**					
WATER					
Physical Tests Conductivity (uS/cm)	27.2	27.2			
Hardness (as CaCO3) (mg/L)	9.85	10.1			
pH (pH)	7.19	7.10			
Total Suspended Solids (mg/L)	<1.0	<1.0			
Total Dissolved Solids (mg/L)	15.5	15.7			
Turbidity (NTU)	0.20	0.24			
Anions and Nutrients Alkalinity, Bicarbonate (as CaCO3) (mg/L)	7.6	7.7			
Alkalinity, Carbonate (as CaCO3) (mg/L)	<1.0	<1.0			
Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0	<1.0			
Alkalinity, Total (as CaCO3) (mg/L)	7.6	7.7			
Ammonia, Total (as N) (mg/L)	<0.0050	0.0182			
Bromide (Br) (mg/L)	<0.050	<0.050			
Chloride (Cl) (mg/L)	0.84	0.84			
Fluoride (F) (mg/L)	0.025	0.025			
Nitrate (as N) (mg/L)	<0.0050	<0.0050			
Nitrite (as N) (mg/L)	<0.0010	<0.0010			
Total Kjeldahl Nitrogen (mg/L)	0.087	0.147			
Orthophosphate-Dissolved (as P) (mg/L)	<0.0010	<0.0010			
Phosphorus (P)-Total Dissolved (mg/L)	<0.0020	<0.0020			
Phosphorus (P)-Total (mg/L)	<0.0020	<0.0020			
Silicate (as SiO2) (mg/L)	<0.50	<0.50			
Sulfate (SO4) (mg/L)	3.38	3.37			
Cyanides Cyanide, Total (mg/L)	<0.0010	<0.0010			
Cyanide, Free (mg/L)	<0.0010	<0.0010			
Organic / Inorganic Carbon Dissolved Organic Carbon (mg/L)	1.63	1.72			
Total Organic Carbon (mg/L)	1.78	1.73			
Total Metals Aluminum (Al)-Total (mg/L)	0.0036	0.0030			
Antimony (Sb)-Total (mg/L)	<0.00010	<0.00010			
Arsenic (As)-Total (mg/L)	0.00034	0.00033			
Barium (Ba)-Total (mg/L)	0.00396	0.00395			
Beryllium (Be)-Total (mg/L)	<0.00010	<0.00010			
Bismuth (Bi)-Total (mg/L)	<0.000050	<0.000050			
Boron (B)-Total (mg/L)	<0.010	<0.010			
Cadmium (Cd)-Total (mg/L)	<0.0000050	<0.0000050			
Calcium (Ca)-Total (mg/L)	2.29	2.31			
Cesium (Cs)-Total (mg/L)	<0.000010	<0.000010			

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2162149-1	L2162149-2	L2162149-3	L2162149-4	L2162149-5
Description	Water	Water	Water	Water	Water
Sampled Date	01-SEP-18	01-SEP-18	01-SEP-18	01-SEP-18	01-SEP-18
Sampled Time	11:00	11:29	14:53	15:15	09:49
Client ID	MAM-34	MAM-33	WTS-33	WTS-34	PDL-69
Grouping / **Analyte**					
WATER					
Total Metals Chromium (Cr)-Total (mg/L)	<0.00010	<0.00010	0.00023	0.00026	<0.00010
Cobalt (Co)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper (Cu)-Total (mg/L)	<0.00050	0.00051	0.00060	0.00061	0.00057
Iron (Fe)-Total (mg/L)	<0.010	0.023	0.040	0.047	0.031
Lead (Pb)-Total (mg/L)	<0.000050	<0.000050	0.000072	0.000062	<0.000050
Lithium (Li)-Total (mg/L)	0.0022	0.0025	0.0012	0.0012	<0.0010
Magnesium (Mg)-Total (mg/L)	1.29	1.37	0.983	0.998	0.774
Manganese (Mn)-Total (mg/L)	0.00125	0.00152	0.00206	0.00215	0.00167
Mercury (Hg)-Total (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Molybdenum (Mo)-Total (mg/L)	<0.000050	<0.000050	0.000052	0.000056	<0.000050
Nickel (Ni)-Total (mg/L)	0.00065	0.00071	0.00062	0.00057	0.00051
Phosphorus (P)-Total (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050
Potassium (K)-Total (mg/L)	0.818	0.869	0.704	0.716	0.335
Rubidium (Rb)-Total (mg/L)	0.00123	0.00133	0.00130	0.00141	0.00048
Selenium (Se)-Total (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Silicon (Si)-Total (mg/L)	0.29	0.31	0.23	0.26	0.14
Silver (Ag)-Total (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)-Total (mg/L)	0.718	0.770	0.704	0.701	0.487
Strontium (Sr)-Total (mg/L)	0.0580	0.0696	0.0350	0.0345	0.00932
Sulfur (S)-Total (mg/L)	1.05	1.02	<0.50	<0.50	0.51
Tellurium (Te)-Total (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Thallium (Tl)-Total (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Thorium (Th)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Tin (Sn)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)-Total (mg/L)	<0.00030	<0.00030	0.00090	0.00106	<0.00030
Tungsten (W)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Uranium (U)-Total (mg/L)	0.000012	0.000016	0.000039	0.000041	0.000020
Vanadium (V)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc (Zn)-Total (mg/L)	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Zirconium (Zr)-Total (mg/L)	<0.000060	<0.000060	<0.000060	<0.000060	<0.000060
Dissolved Metals Dissolved Mercury Filtration Location	FIELD	FIELD	FIELD	FIELD	FIELD
Dissolved Metals Filtration Location	FIELD	FIELD	FIELD	FIELD	FIELD
Aluminum (Al)-Dissolved (mg/L)	<0.0010	0.0021	0.0028	0.0036	0.0010
Antimony (Sb)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic (As)-Dissolved (mg/L)	0.00030	0.00032	0.00025	0.00026	0.00013
Barium (Ba)-Dissolved (mg/L)	0.0101	0.0112	0.00785	0.00782	0.00186
Beryllium (Be)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2162149-6	L2162149-7	L2162149-8	L2162149-9	L2162149-10
Description	Water	Water	Water	Water	Water
Sampled Date	01-SEP-18	01-SEP-18	01-SEP-18	01-SEP-18	01-SEP-18
Sampled Time	10:24	12:25	13:00	13:00	13:30
Client ID	PDL-70	INUG-105	INUG-104	AMQ SEPT EB-1	AMQ SEPT DI-1
Grouping / **Analyte**					
WATER					
Total Metals Chromium (Cr)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Cobalt (Co)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper (Cu)-Total (mg/L)	0.00056	<0.00050	<0.00050	<0.00050	<0.00050
Iron (Fe)-Total (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
Lead (Pb)-Total (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	0.000082
Lithium (Li)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Magnesium (Mg)-Total (mg/L)	0.792	0.700	0.708	<0.0050	<0.0050
Manganese (Mn)-Total (mg/L)	0.00128	0.00173	0.00178	<0.00010	<0.00010
Mercury (Hg)-Total (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Molybdenum (Mo)-Total (mg/L)	0.000053	<0.000050	<0.000050	<0.000050	<0.000050
Nickel (Ni)-Total (mg/L)	0.00053	<0.00050	<0.00050	<0.00050	<0.00050
Phosphorus (P)-Total (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050
Potassium (K)-Total (mg/L)	0.339	0.372	0.373	<0.050	<0.050
Rubidium (Rb)-Total (mg/L)	0.00050	0.00052	0.00046	<0.00020	<0.00020
Selenium (Se)-Total (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Silicon (Si)-Total (mg/L)	0.15	0.15	0.15	<0.10	<0.10
Silver (Ag)-Total (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)-Total (mg/L)	0.509	0.561	0.556	<0.050	<0.050
Strontium (Sr)-Total (mg/L)	0.00938	0.00651	0.00644	<0.00020	<0.00020
Sulfur (S)-Total (mg/L)	0.58	<0.50	<0.50	<0.50	<0.50
Tellurium (Te)-Total (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Thallium (Tl)-Total (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Thorium (Th)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Tin (Sn)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)-Total (mg/L)	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030
Tungsten (W)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Uranium (U)-Total (mg/L)	0.000019	0.000032	0.000032	<0.000010	<0.000010
Vanadium (V)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc (Zn)-Total (mg/L)	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Zirconium (Zr)-Total (mg/L)	<0.000060	<0.000060	<0.000060	<0.000060	<0.000060
Dissolved Metals Dissolved Mercury Filtration Location	FIELD	FIELD	FIELD	FIELD	FIELD
Dissolved Metals Filtration Location	FIELD	FIELD	FIELD	FIELD	FIELD
Aluminum (Al)-Dissolved (mg/L)	0.0011	0.0014	0.0012	<0.0010	<0.0010
Antimony (Sb)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic (As)-Dissolved (mg/L)	0.00015	<0.00010	<0.00010	<0.00010	<0.00010
Barium (Ba)-Dissolved (mg/L)	0.00184	0.00152	0.00153	<0.00010	<0.00010
Beryllium (Be)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2162149-11	L2162149-12			
	Description	Water	Water			
	Sampled Date	01-SEP-18	01-SEP-18			
	Sampled Time	14:00	14:45			
	Client ID	NEM-33	NEM-34			
Grouping	**Analyte**					
WATER						
Total Metals	Chromium (Cr)-Total (mg/L)	<0.00010	<0.00010			
	Cobalt (Co)-Total (mg/L)	<0.00010	<0.00010			
	Copper (Cu)-Total (mg/L)	<0.00050	<0.00050			
	Iron (Fe)-Total (mg/L)	<0.010	<0.010			
	Lead (Pb)-Total (mg/L)	<0.000050	<0.000050			
	Lithium (Li)-Total (mg/L)	<0.0010	<0.0010			
	Magnesium (Mg)-Total (mg/L)	1.07	1.07			
	Manganese (Mn)-Total (mg/L)	0.00269	0.00271			
	Mercury (Hg)-Total (mg/L)	<0.0000050	<0.0000050			
	Molybdenum (Mo)-Total (mg/L)	<0.000050	<0.000050			
	Nickel (Ni)-Total (mg/L)	<0.00050	<0.00050			
	Phosphorus (P)-Total (mg/L)	<0.050	<0.050			
	Potassium (K)-Total (mg/L)	0.581	0.582			
	Rubidium (Rb)-Total (mg/L)	0.00071	0.00073			
	Selenium (Se)-Total (mg/L)	<0.000050	<0.000050			
	Silicon (Si)-Total (mg/L)	0.21	0.21			
	Silver (Ag)-Total (mg/L)	<0.000010	<0.000010			
	Sodium (Na)-Total (mg/L)	0.499	0.495			
	Strontium (Sr)-Total (mg/L)	0.0101	0.0102			
	Sulfur (S)-Total (mg/L)	1.06	1.04			
	Tellurium (Te)-Total (mg/L)	<0.00020	<0.00020			
	Thallium (Tl)-Total (mg/L)	<0.000010	<0.000010			
	Thorium (Th)-Total (mg/L)	<0.00010	<0.00010			
	Tin (Sn)-Total (mg/L)	<0.00010	<0.00010			
	Titanium (Ti)-Total (mg/L)	<0.00030	<0.00030			
	Tungsten (W)-Total (mg/L)	<0.00010	<0.00010			
	Uranium (U)-Total (mg/L)	<0.000010	<0.000010			
	Vanadium (V)-Total (mg/L)	<0.00050	<0.00050			
	Zinc (Zn)-Total (mg/L)	<0.0030	<0.0030			
	Zirconium (Zr)-Total (mg/L)	<0.000060	<0.000060			
Dissolved Metals	Dissolved Mercury Filtration Location	FIELD	FIELD			
	Dissolved Metals Filtration Location	FIELD	FIELD			
	Aluminum (Al)-Dissolved (mg/L)	<0.0010	0.0012			
	Antimony (Sb)-Dissolved (mg/L)	<0.00010	<0.00010			
	Arsenic (As)-Dissolved (mg/L)	0.00026	0.00028			
	Barium (Ba)-Dissolved (mg/L)	0.00409	0.00391			
	Beryllium (Be)-Dissolved (mg/L)	<0.00010	<0.00010			

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	L2162149-1 Water 01-SEP-18 11:00 MAM-34	L2162149-2 Water 01-SEP-18 11:29 MAM-33	L2162149-3 Water 01-SEP-18 14:53 WTS-33	L2162149-4 Water 01-SEP-18 15:15 WTS-34	L2162149-5 Water 01-SEP-18 09:49 PDL-69
WATER						
Dissolved Metals	Bismuth (Bi)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Boron (B)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
	Cadmium (Cd)-Dissolved (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
	Calcium (Ca)-Dissolved (mg/L)	6.30	6.92	3.76	3.74	2.23
	Cesium (Cs)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Chromium (Cr)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Cobalt (Co)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Copper (Cu)-Dissolved (mg/L)	0.00038	0.00038	0.00043	0.00043	0.00045
	Iron (Fe)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010	0.014
	Lead (Pb)-Dissolved (mg/L)	<0.000050	0.000298 DTMF	<0.000050	<0.000050	<0.000050
	Lithium (Li)-Dissolved (mg/L)	0.0022	0.0025	0.0012	0.0012	<0.0010
	Magnesium (Mg)-Dissolved (mg/L)	1.29	1.36	0.965	1.00	0.788
	Manganese (Mn)-Dissolved (mg/L)	0.00062	0.00074	0.00081	0.00100	0.00031
	Mercury (Hg)-Dissolved (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
	Molybdenum (Mo)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	0.000051	<0.000050
	Nickel (Ni)-Dissolved (mg/L)	0.00060	0.00070	<0.00050	0.00051	<0.00050
	Phosphorus (P)-Dissolved (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050
	Potassium (K)-Dissolved (mg/L)	0.810	0.869	0.693	0.712	0.342
	Rubidium (Rb)-Dissolved (mg/L)	0.00118	0.00133	0.00130	0.00137	0.00048
	Selenium (Se)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Silicon (Si)-Dissolved (mg/L)	0.257	0.272	0.184	0.196	0.124
	Silver (Ag)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Sodium (Na)-Dissolved (mg/L)	0.721	0.758	0.701	0.714	0.499
	Strontium (Sr)-Dissolved (mg/L)	0.0541	0.0642	0.0314	0.0321	0.00921
	Sulfur (S)-Dissolved (mg/L)	0.84	0.87	<0.50	0.57	0.58
	Tellurium (Te)-Dissolved (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
	Thallium (Tl)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Thorium (Th)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Tin (Sn)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Titanium (Ti)-Dissolved (mg/L)	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030
	Tungsten (W)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Uranium (U)-Dissolved (mg/L)	0.000011	0.000014	0.000032	0.000033	0.000019
	Vanadium (V)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Zinc (Zn)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	0.0014	<0.0010
	Zirconium (Zr)-Dissolved (mg/L)	<0.000060	<0.000060	<0.000060	<0.000060	<0.000060

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	L2162149-6 Water 01-SEP-18 10:24 PDL-70	L2162149-7 Water 01-SEP-18 12:25 INUG-105	L2162149-8 Water 01-SEP-18 13:00 INUG-104	L2162149-9 Water 01-SEP-18 13:00 AMQ SEPT EB-1	L2162149-10 Water 01-SEP-18 13:30 AMQ SEPT DI-1
WATER						
Dissolved Metals	Bismuth (Bi)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Boron (B)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
	Cadmium (Cd)-Dissolved (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
	Calcium (Ca)-Dissolved (mg/L)	2.25	1.14	1.13	<0.050	<0.050
	Cesium (Cs)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Chromium (Cr)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	0.00134 DTC
	Cobalt (Co)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Copper (Cu)-Dissolved (mg/L)	0.00042	0.00033	0.00046	<0.00020	<0.00020
	Iron (Fe)-Dissolved (mg/L)	<0.010	<0.010	0.020	<0.010	<0.010
	Lead (Pb)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	
	Lithium (Li)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Magnesium (Mg)-Dissolved (mg/L)	0.791	0.705	0.708	<0.0050	<0.0050
	Manganese (Mn)-Dissolved (mg/L)	0.00029	0.00032	0.00049	<0.00010	<0.00010
	Mercury (Hg)-Dissolved (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
	Molybdenum (Mo)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Nickel (Ni)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Phosphorus (P)-Dissolved (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050
	Potassium (K)-Dissolved (mg/L)	0.339	0.377	0.390	<0.050	<0.050
	Rubidium (Rb)-Dissolved (mg/L)	0.00043	0.00052	0.00057	<0.00020	<0.00020
	Selenium (Se)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Silicon (Si)-Dissolved (mg/L)	0.116	0.113	0.112	<0.050	<0.050
	Silver (Ag)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Sodium (Na)-Dissolved (mg/L)	0.502	0.588	0.576	<0.050	<0.050
	Strontium (Sr)-Dissolved (mg/L)	0.00919	0.00643	0.00643	<0.00020	<0.00020
	Sulfur (S)-Dissolved (mg/L)	0.55	<0.50	<0.50	<0.50	<0.50
	Tellurium (Te)-Dissolved (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
	Thallium (Tl)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Thorium (Th)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Tin (Sn)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Titanium (Ti)-Dissolved (mg/L)	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030
	Tungsten (W)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Uranium (U)-Dissolved (mg/L)	0.000019	0.000032	0.000034	<0.000010	<0.000010
	Vanadium (V)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Zinc (Zn)-Dissolved (mg/L)	0.0013	<0.0010	0.0014	<0.0010	0.0017
	Zirconium (Zr)-Dissolved (mg/L)	<0.000060	<0.000060	<0.000060	<0.000060	<0.000060

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2162149-11	L2162149-12			
	Description	Water	Water			
	Sampled Date	01-SEP-18	01-SEP-18			
	Sampled Time	14:00	14:45			
	Client ID	NEM-33	NEM-34			
Grouping	**Analyte**					
WATER						
Dissolved Metals	Bismuth (Bi)-Dissolved (mg/L)	<0.000050	<0.000050			
	Boron (B)-Dissolved (mg/L)	<0.010	<0.010			
	Cadmium (Cd)-Dissolved (mg/L)	<0.0000050	<0.0000050			
	Calcium (Ca)-Dissolved (mg/L)	2.23	2.31			
	Cesium (Cs)-Dissolved (mg/L)	<0.000010	<0.000010			
	Chromium (Cr)-Dissolved (mg/L)	<0.00010	<0.00010			
	Cobalt (Co)-Dissolved (mg/L)	<0.00010	<0.00010			
	Copper (Cu)-Dissolved (mg/L)	0.00023	0.00026			
	Iron (Fe)-Dissolved (mg/L)	<0.010	<0.010			
	Lead (Pb)-Dissolved (mg/L)	<0.000050	<0.000050			
	Lithium (Li)-Dissolved (mg/L)	<0.0010	<0.0010			
	Magnesium (Mg)-Dissolved (mg/L)	1.04	1.05			
	Manganese (Mn)-Dissolved (mg/L)	0.00038	0.00044			
	Mercury (Hg)-Dissolved (mg/L)	<0.0000050	<0.0000050			
	Molybdenum (Mo)-Dissolved (mg/L)	<0.000050	<0.000050			
	Nickel (Ni)-Dissolved (mg/L)	<0.00050	0.00050			
	Phosphorus (P)-Dissolved (mg/L)	<0.050	<0.050			
	Potassium (K)-Dissolved (mg/L)	0.580	0.591			
	Rubidium (Rb)-Dissolved (mg/L)	0.00074	0.00072			
	Selenium (Se)-Dissolved (mg/L)	<0.000050	<0.000050			
	Silicon (Si)-Dissolved (mg/L)	0.182	0.186			
	Silver (Ag)-Dissolved (mg/L)	<0.000010	<0.000010			
	Sodium (Na)-Dissolved (mg/L)	0.497	0.515			
	Strontium (Sr)-Dissolved (mg/L)	0.00992	0.0100			
	Sulfur (S)-Dissolved (mg/L)	0.99	1.36			
	Tellurium (Te)-Dissolved (mg/L)	<0.00020	<0.00020			
	Thallium (Tl)-Dissolved (mg/L)	<0.000010	<0.000010			
	Thorium (Th)-Dissolved (mg/L)	<0.00010	<0.00010			
	Tin (Sn)-Dissolved (mg/L)	<0.00010	0.00042 DTMF			
	Titanium (Ti)-Dissolved (mg/L)	<0.00030	<0.00030			
	Tungsten (W)-Dissolved (mg/L)	<0.00010	<0.00010			
	Uranium (U)-Dissolved (mg/L)	<0.000010	<0.000010			
	Vanadium (V)-Dissolved (mg/L)	<0.00050	<0.00050			
	Zinc (Zn)-Dissolved (mg/L)	<0.0010	0.0058			
	Zirconium (Zr)-Dissolved (mg/L)	<0.000060	<0.000060			

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L2162149-10
Matrix Spike	Barium (Ba)-Total	MS-B	L2162149-10
Matrix Spike	Calcium (Ca)-Total	MS-B	L2162149-1, -10, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Calcium (Ca)-Total	MS-B	L2162149-10
Matrix Spike	Magnesium (Mg)-Total	MS-B	L2162149-1, -10, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Magnesium (Mg)-Total	MS-B	L2162149-10
Matrix Spike	Manganese (Mn)-Total	MS-B	L2162149-10
Matrix Spike	Sodium (Na)-Total	MS-B	L2162149-10
Matrix Spike	Strontium (Sr)-Total	MS-B	L2162149-1, -10, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Strontium (Sr)-Total	MS-B	L2162149-10
Matrix Spike	Orthophosphate-Dissolved (as P)	MS-B	L2162149-1, -10, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9

Qualifiers for Individual Parameters Listed:

Qualifier	Description
DTC	Dissolved concentration exceeds total. Results were confirmed by re-analysis.
DTMF	Dissolved concentration exceeds total for field-filtered metals sample. Metallic contaminants may have been introduced to dissolved sample during field filtration.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RRV	Reported Result Verified By Repeat Analysis

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ALK-TITR-VA	Water	Alkalinity Species by Titration	APHA 2320 Alkalinity

This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.

BR-L-IC-N-VA	Water	Bromide in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

CARBONS-DOC-VA	Water	Dissolved organic carbon by combustion	APHA 5310B

This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)". Dissolved carbon (DOC) fractions are determined by filtering the sample through a 0.45 micron membrane filter prior to analysis.

CARBONS-TOC-VA	Water	Total organic carbon by combustion	APHA 5310B TOTAL ORGANIC CARBON (TOC)

This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)".

CL-L-IC-N-VA	Water	Chloride in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

CN-FREE-L-CFA-VA	Water	Low Level Free Cyanide in water by CFA	ASTM 7237

This analysis is carried out using procedures adapted from ASTM Method 7237 "Free Cyanide with Flow Injection Analysis (FIA) Utilizing Gas Diffusion Separation and Amperometric Detection". Free cyanide is determined by in-line gas diffusion at pH 6 with final determination by colourimetric analysis.

CN-T-L-CFA-VA	Water	Low Level Total Cyanide in water by CFA	ISO 14403:2002

This analysis is carried out using procedures adapted from ISO Method 14403:2002 "Determination of Total Cyanide using Flow Analysis (FIA and CFA)". Total or strong acid dissociable (SAD) cyanide is determined by in-line UV digestion along with sample distillation and final determination by colourimetric analysis. Method Limitation: This method is susceptible to interference from thiocyanate (SCN). If SCN is present in the sample, there could be a positive interference with this method, but it would be less than 1% and could be as low as zero.

EC-PCT-VA	Water	Conductivity (Automated)	APHA 2510 Auto. Conduc.

This analysis is carried out using procedures adapted from APHA Method 2510 "Conductivity". Conductivity is determined using a conductivity electrode.

EC-SCREEN-VA	Water	Conductivity Screen (Internal Use Only)	APHA 2510

Qualitative analysis of conductivity where required during preparation of other tests - e.g. TDS, metals, etc.

F-IC-N-VA	Water	Fluoride in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

HARDNESS-CALC-VA	Water	Hardness	APHA 2340B

Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents.

Reference Information

Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

HG-D-CVAA-VA Water Diss. Mercury in Water by CVAAS or CVAFS APHA 3030B/EPA 1631E (mod)

Water samples are filtered (0.45 um), preserved with hydrochloric acid, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

HG-T-CVAA-VA Water Total Mercury in Water by CVAAS or CVAFS EPA 1631E (mod)

Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

MET-D-CCMS-VA Water Dissolved Metals in Water by CRC ICPMS APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

MET-T-CCMS-VA Water Total Metals in Water by CRC ICPMS EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

NH3-F-VA Water Ammonia in Water by Fluorescence J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

NO2-L-IC-N-VA Water Nitrite in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

NO3-L-IC-N-VA Water Nitrate in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

P-T-PRES-COL-VA Water Total P in Water by Colour APHA 4500-P Phosphorus

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is determined colourimetrically after persulphate digestion of the sample.
Samples with very high dissolved solids (i.e. seawaters, brackish waters) may produce a negative bias by this method. Alternate methods are available for these types of samples.

Arsenic (5+), at elevated levels, is a positive interference on colourimetric phosphate analysis.

P-TD-COL-VA Water Total Dissolved P in Water by Colour APHA 4500-P Phosphorous

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Dissolved Phosphorus is determined colourimetrically after persulphate digestion of a sample that has been lab or field filtered through a 0.45 micron membrane filter.
Samples with very high dissolved solids (i.e. seawaters, brackish waters) may produce a negative bias by this method. Alternate methods are available for these types of samples.

Arsenic (5+), at elevated levels, is a positive interference on colourimetric phosphate analysis.

PH-PCT-VA Water pH by Meter (Automated) APHA 4500-H pH Value

This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode

It is recommended that this analysis be conducted in the field.

PO4-DO-COL-VA Water Diss. Orthophosphate in Water by Colour APHA 4500-P Phosphorus

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.
Samples with very high dissolved solids (i.e. seawaters, brackish waters) may produce a negative bias by this method. Alternate methods are available for these types of samples.

Arsenic (5+), at elevated levels, is a positive interference on colourimetric phosphate analysis.

SILICATE-COL-VA Water Silicate by Colourimetric analysis APHA 4500-SiO2 E.

This analysis is carried out using procedures adapted from APHA Method 4500-SiO2 E. "Silica". Silicate (molybdate-reactive silica) is determined by the molybdosilicate-heteropoly blue colourimetric method.

SO4-IC-N-VA Water Sulfate in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

TDS-LOW-VA Water Low Level TDS (3.0mg/L) by Gravimetric APHA 2540C

Reference Information

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total dissolved solids (TDS) are determined by filtering a sample through a glass fibre filter, TDS is determined by evaporating the filtrate to dryness at 180 degrees celsius.

TKN-F-VA Water TKN in Water by Fluorescence APHA 4500-NORG D.

This analysis is carried out using procedures adapted from APHA Method 4500-Norg D. "Block Digestion and Flow Injection Analysis". Total Kjeldahl Nitrogen is determined using block digestion followed by Flow-injection analysis with fluorescence detection.

TSS-LOW-VA Water Total Suspended Solids by Grav. (1 mg/L) APHA 2540D

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total suspended solids (TSS) are determined by filtering a sample through a glass fibre filter, TSS is determined by drying the filter at 104 degrees celsius.
Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.

TURBIDITY-VA Water Turbidity by Meter APHA 2130 Turbidity

This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

ALS Environmental

Chain of Custody / Analytical Request Form
Canada Toll Free: 1 800 668 9878
www.alsglobal.com

COC # _____

Page 1 of 1

Report To		Report Format / Distribution		Service Requested (Rush for routine analysis subject to availability)
Company:	Azimuth Consulting Group	☑ Standard ☐ Other		◉ Regular (Standard Turnaround Times - Business Days)
Contact:	Eric Franz	☑ PDF ☑ Excel ☐ Digital ☐ Fax		○ Priority (2-4 Business Days) - 50% Surcharge - Contact ALS to Confirm TAT
Address:	218-2902 West Broadway	Email 1:	efranz@azimuthgroup.ca	○ Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT
	Vancouver, BC V6K2G8	Email 2:	marie-pier.marcil@agnicoeagle.com	○ Same Day or Weekend Emergency - Contact ALS to Confirm TAT
Phone:	604-730-1220 Fax:	Email 3:	robin.allard@agnicoeagle.com	
Invoice To	Same as Report ? ☑ Yes ☐ No	Client / Project Information		
Hardcopy of Invoice with Report?	☐ Yes ☑ No	Job #:	Meadowbank CREMP - Surfacewater	
Company:		PO / AFE:		
Contact:		LSD:		
Address:				
Phone:	Fax:	Quote #:	Q39503	
Lab Work Order # (lab use only)	L2162149	ALS Contact:	Brent Mack	Sampler: Various tech

Analysis Request

Please indicate below Filtered, Preserved or both (F, P, F/P)

Sample #	Sample Identification (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Conventionals** see notes	TSS-Low, TDS-Low	TOC, Ammonia, TKN, Total P	DOC	T-CN (Low), Free CN (Low)	Total mercury	Dissolved mercury	Total Metals	Dissolved metals	Chlorophyll-a			Number of Containers
							P	F/P	P	P	F/P	P	F/P	F			
	MAM-34	01-Sep-18	11:00	Water	X	X	X	X	X	X	X	X	X				9
	MAM-33	01-Sep-18	11:29	Water	X	X	X	X	X	X	X	X	X				9
	WTS-33	01-Sep-18	14:53	Water	X	X	X	X	X	X	X	X	X				9
	WTS-34	01-Sep-18	15:15	Water	X	X	X	X	X	X	X	X	X				9
	PDL-69	02-Sep-18	9:49	Water	X	X	X	X	X	X	X	X	X				9
	PDL-70	02-Sep-18	10:24	Water	X	X	X	X	X	X	X	X	X				9
	INUG-105	02-Sep-18	12:25	Water	X	X	X	X	X	X	X	X	X				9
	INUG-104	02-Sep-18	13:00	Water	X	X	X	X	X	X	X	X	X				9
	AMQ SEPT EB-1	03-Sep-18	13:00	Water	X	X	X	X	X	X	X	X	X				9
	AMQ SEPT DI-1	03-Sep-18	13:30	Water	X	X	X	X	X	X	X	X	X				9
	NEM-33	03-Sep-18	14:00	Water	X	X	X	X	X	X	X	X	X				9
	NEM-34	03-Sep-18	14:45	Water	X	X	X	X	X	X	X	X	X				9

L2162149-COFC

Special Instructions / Regulations with water or land use (CCME-Freshwater Aquatic Life/BC CSR - Commercial/AB Tier 1 - Natural, etc) / Hazardous Details

**Conventionals includes: Alk Species, pH, EC, Turbidity, Conductivity, Anions (F, NO2, NO3, Br, SO4), low-level Chloride, Silicate, TD-P, and Ortho-PO4.

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.

By the use of this form the user acknowledges and agrees with the Terms and Conditions as provided on a separate Excel tab.

Also provided on another Excel tab are the ALS location addresses, phone numbers and sample container / preservation / holding time table for common analyses.

SHIPMENT RELEASE (client use)			SHIPMENT RECEPTION (lab use only)				SHIPMENT VERIFICATION (lab use only)			
Released by:	Date (dd-mmm-yy)	Time (hh-mm)	Received by:	Date:	Time:	Temperature:	Verified by:	Date:	Time:	Observations: Yes / No ? If Yes add SIF
Tom Thomson	4-Sep-18	7:30	RK	11 Sept	8:50 AM	16°C °C				

GENF 20.00 Front

AZIMUTH CONSULTING GROUP INC.
ATTN: Eric Franz
218 - 2902 West Broadway
Vancouver BC V6K 2G8

Date Received: 13-SEP-18
Report Date: 22-SEP-18 16:53 (MT)
Version: FINAL

Client Phone: 604-730-1220

Certificate of Analysis

Lab Work Order #: L2163886

Project P.O. #: NOT SUBMITTED
Job Reference: MEADOWBANK CREMP - SURFACEWATER
C of C Numbers:
Legal Site Desc:

Brent Mack, B.Sc.
Account Manager

[This report shall not be reproduced except in full without the written authority of the Laboratory.]

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2163886-1	L2163886-2	L2163886-3	L2163886-4	L2163886-5
Description	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water
Sampled Date	08-SEP-18	08-SEP-18	08-SEP-18	08-SEP-18	08-SEP-18
Sampled Time	11:38	12:00	09:50	11:07	08:04
Client ID	SEPT-BBD-59	SEPT-BBD-60	SEPT-BPJ-59	SEPT-BPJ-60	SEPT-BAP-59
Grouping **Analyte**					
FILTER					
Plant Pigments Chlorophyll a (ug/L)	0.495	0.545	0.939	0.905	1.07

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2163886-6	L2163886-7	L2163886-8	L2163886-9	L2163886-10
Description	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water
Sampled Date	08-SEP-18	08-SEP-18	21-MAY-18	21-MAY-18	03-SEP-18
Sampled Time	08:50				
Client ID	SEPT-BAP-60	SEPT-DUP-2	MAY-TE-94	MAY-TE-95	SEPT-TPE-116
Grouping **Analyte**					
FILTER					
Plant Pigments Chlorophyll a (ug/L)	1.06	0.571	0.184	0.253	0.308

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2163886-11	L2163886-12	L2163886-13	L2163886-14	L2163886-15
Description	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water
Sampled Date	03-SEP-18	03-SEP-18	03-SEP-18	02-SEP-18	02-SEP-18
Sampled Time					
Client ID	SEPT-TPE-117	SEPT-TPN-116	SEPT-TPN-117	SEPT-SP-16	SEPT-SP-117
Grouping **Analyte**					
FILTER					
Plant Pigments Chlorophyll a (ug/L)	0.331	0.338	0.398	0.325	0.418

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	Sample ID Description Sampled Date Sampled Time Client ID	L2163886-16 Surface Water 02-SEP-18 SEPT-WAL-85	L2163886-17 Surface Water 02-SEP-18 SEPT-WAL-86	L2163886-18 Surface Water 02-SEP-18 SEPT-DUP-1		
FILTER							
Plant Pigments	Chlorophyll a (ug/L)		0.504	0.405	0.364		

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2163886-1	L2163886-2	L2163886-3	L2163886-4	L2163886-5
Description	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water
Sampled Date	08-SEP-18	08-SEP-18	08-SEP-18	08-SEP-18	08-SEP-18
Sampled Time	11:38	12:00	09:50	11:07	08:04
Client ID	SEPT-BBD-59	SEPT-BBD-60	SEPT-BPJ-59	SEPT-BPJ-60	SEPT-BAP-59
Grouping / **Analyte**					
WATER					
Physical Tests Conductivity (uS/cm)	357	359	318	319	300
Hardness (as CaCO3) (mg/L)	38.8	40.5	35.8	36.3	35.2
pH (pH)	7.26	7.23	7.26	7.25	7.27
Total Suspended Solids (mg/L)	<1.0	1.1	<1.0	<1.0	1.1
Total Dissolved Solids (mg/L)	187	193	177	179	173
Turbidity (NTU)	0.21	0.23	0.23	0.20	0.20
Anions and Nutrients Alkalinity, Bicarbonate (as CaCO3) (mg/L)	9.8	9.7	9.8	9.7	9.8
Alkalinity, Carbonate (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
Alkalinity, Total (as CaCO3) (mg/L)	9.8	9.7	9.8	9.7	9.8
Ammonia, Total (as N) (mg/L)	0.0269	0.0324	0.0124	0.0131	0.0151
Bromide (Br) (mg/L)	0.306	0.306	0.269	0.269	0.256
Chloride (Cl) (mg/L)	88.6	88.6	77.2	78.1	73.2
Fluoride (F) (mg/L)	0.068	0.069	0.067	0.068	0.068
Nitrate (as N) (mg/L)	0.0411	0.0399	0.0324	0.0323	0.0285
Nitrite (as N) (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Total Kjeldahl Nitrogen (mg/L)	0.163	0.179	0.157	0.160	0.160
Orthophosphate-Dissolved (as P) (mg/L)	<0.0010	<0.0010	0.0011	0.0015	0.0014
Phosphorus (P)-Total Dissolved (mg/L)	0.0024	0.0027	<0.0020	<0.0020	<0.0020
Phosphorus (P)-Total (mg/L)	0.0044	0.0042	0.0047	0.0088	0.0046
Silicate (as SiO2) (mg/L)	<0.50	<2.5 DLM	<0.50	<0.50	<0.50
Sulfate (SO4) (mg/L)	12.9	12.9	11.3	11.4	10.8
Cyanides Cyanide, Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Cyanide, Free (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Organic / Inorganic Carbon Dissolved Organic Carbon (mg/L)	3.31	3.31	3.44	3.46	3.36
Total Organic Carbon (mg/L)	3.40	3.54	3.55	3.75	3.46
Total Metals Aluminum (Al)-Total (mg/L)	0.0076	0.0074	0.0062	0.0055	0.0068
Antimony (Sb)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic (As)-Total (mg/L)	0.00018	0.00018	0.00016	0.00018	0.00018
Barium (Ba)-Total (mg/L)	0.0179	0.0185	0.0171	0.0179	0.0178
Beryllium (Be)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth (Bi)-Total (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron (B)-Total (mg/L)	0.022	0.022	0.019	0.020	0.019
Cadmium (Cd)-Total (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Calcium (Ca)-Total (mg/L)	4.35	4.33	4.00	4.10	4.00
Cesium (Cs)-Total (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2163886-6	L2163886-7			
	Description	Surface Water	Surface Water			
	Sampled Date	08-SEP-18	08-SEP-18			
	Sampled Time	08:50				
	Client ID	SEPT-BAP-60	SEPT-DUP-2			
Grouping	**Analyte**					
WATER						
Physical Tests	Conductivity (uS/cm)	298	300			
	Hardness (as CaCO3) (mg/L)	34.4	35.1			
	pH (pH)	7.26	7.26			
	Total Suspended Solids (mg/L)	<1.0	<1.0			
	Total Dissolved Solids (mg/L)	148	173			
	Turbidity (NTU)	0.19	0.20			
Anions and Nutrients	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	9.8	9.9			
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<1.0	<1.0			
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0	<1.0			
	Alkalinity, Total (as CaCO3) (mg/L)	9.8	9.9			
	Ammonia, Total (as N) (mg/L)	0.0099	0.0114			
	Bromide (Br) (mg/L)	0.247	0.253			
	Chloride (Cl) (mg/L)	72.1	73.1			
	Fluoride (F) (mg/L)	0.067	0.068			
	Nitrate (as N) (mg/L)	0.0287	0.0288			
	Nitrite (as N) (mg/L)	<0.0010	<0.0010			
	Total Kjeldahl Nitrogen (mg/L)	0.156	0.152			
	Orthophosphate-Dissolved (as P) (mg/L)	0.0014	0.0012			
	Phosphorus (P)-Total Dissolved (mg/L)	0.0023	0.0023			
	Phosphorus (P)-Total (mg/L)	0.0046	0.0030			
	Silicate (as SiO2) (mg/L)	<0.50	<0.50			
	Sulfate (SO4) (mg/L)	10.5	10.7			
Cyanides	Cyanide, Total (mg/L)	<0.0010	<0.0010			
	Cyanide, Free (mg/L)	<0.0010	<0.0010			
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	3.79	3.46			
	Total Organic Carbon (mg/L)	3.54	3.56			
Total Metals	Aluminum (Al)-Total (mg/L)	0.0070	0.0083			
	Antimony (Sb)-Total (mg/L)	<0.00010	<0.00010			
	Arsenic (As)-Total (mg/L)	0.00019	0.00019			
	Barium (Ba)-Total (mg/L)	0.0179	0.0181			
	Beryllium (Be)-Total (mg/L)	<0.00010	<0.00010			
	Bismuth (Bi)-Total (mg/L)	<0.000050	<0.000050			
	Boron (B)-Total (mg/L)	0.019	0.019			
	Cadmium (Cd)-Total (mg/L)	<0.0000050	<0.0000050			
	Calcium (Ca)-Total (mg/L)	4.04	4.08			
	Cesium (Cs)-Total (mg/L)	<0.000010	<0.000010			

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2163886-1	L2163886-2	L2163886-3	L2163886-4	L2163886-5
Description	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water
Sampled Date	08-SEP-18	08-SEP-18	08-SEP-18	08-SEP-18	08-SEP-18
Sampled Time	11:38	12:00	09:50	11:07	08:04
Client ID	SEPT-BBD-59	SEPT-BBD-60	SEPT-BPJ-59	SEPT-BPJ-60	SEPT-BAP-59
Grouping / **Analyte**					
WATER					
Total Metals Chromium (Cr)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Cobalt (Co)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper (Cu)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Iron (Fe)-Total (mg/L)	0.011	0.011	<0.010	<0.010	0.013
Lead (Pb)-Total (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium (Li)-Total (mg/L)	0.0015	0.0016	0.0014	0.0015	0.0014
Magnesium (Mg)-Total (mg/L)	6.90	7.10	6.05	6.18	5.91
Manganese (Mn)-Total (mg/L)	0.00204	0.00188	0.00085	0.00099	0.00150
Mercury (Hg)-Total (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Molybdenum (Mo)-Total (mg/L)	0.000112	0.000105	0.000089	0.000094	0.000100
Nickel (Ni)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Phosphorus (P)-Total (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050
Potassium (K)-Total (mg/L)	2.13	2.19	1.93	1.93	1.84
Rubidium (Rb)-Total (mg/L)	0.00139	0.00137	0.00131	0.00125	0.00129
Selenium (Se)-Total (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Silicon (Si)-Total (mg/L)	0.20	0.20	0.18	0.18	0.18
Silver (Ag)-Total (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)-Total (mg/L)	48.8	49.6	42.1	42.4	40.2
Strontium (Sr)-Total (mg/L)	0.0526	0.0534	0.0479	0.0492	0.0467
Sulfur (S)-Total (mg/L)	4.44	4.64	3.94	3.89	3.78
Tellurium (Te)-Total (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Thallium (Tl)-Total (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Thorium (Th)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Tin (Sn)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)-Total (mg/L)	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030
Tungsten (W)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Uranium (U)-Total (mg/L)	0.000051	0.000057	0.000046	0.000048	0.000055
Vanadium (V)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc (Zn)-Total (mg/L)	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Zirconium (Zr)-Total (mg/L)	0.000064	<0.000060	0.000074	0.000063	<0.000060
Dissolved Metals Dissolved Mercury Filtration Location	FIELD	FIELD	FIELD	FIELD	FIELD
Dissolved Metals Filtration Location	FIELD	FIELD	FIELD	FIELD	FIELD
Aluminum (Al)-Dissolved (mg/L)	0.0034	0.0042	0.0035	0.0037	0.0062
Antimony (Sb)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic (As)-Dissolved (mg/L)	0.00013	0.00011	0.00011	0.00013	0.00011
Barium (Ba)-Dissolved (mg/L)	0.0177	0.0178	0.0177	0.0179	0.0178
Beryllium (Be)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2163886-6	L2163886-7			
	Description	Surface Water	Surface Water			
	Sampled Date	08-SEP-18	08-SEP-18			
	Sampled Time	08:50				
	Client ID	SEPT-BAP-60	SEPT-DUP-2			
Grouping	**Analyte**					
WATER						
Total Metals	Chromium (Cr)-Total (mg/L)	0.00011	0.00011			
	Cobalt (Co)-Total (mg/L)	<0.00010	<0.00010			
	Copper (Cu)-Total (mg/L)	<0.00050	<0.00050			
	Iron (Fe)-Total (mg/L)	0.010	<0.010			
	Lead (Pb)-Total (mg/L)	<0.000050	<0.000050			
	Lithium (Li)-Total (mg/L)	0.0014	0.0015			
	Magnesium (Mg)-Total (mg/L)	5.97	5.96			
	Manganese (Mn)-Total (mg/L)	0.00145	0.00143			
	Mercury (Hg)-Total (mg/L)	<0.0000050	<0.0000050			
	Molybdenum (Mo)-Total (mg/L)	0.000088	0.000090			
	Nickel (Ni)-Total (mg/L)	<0.00050	<0.00050			
	Phosphorus (P)-Total (mg/L)	<0.050	<0.050			
	Potassium (K)-Total (mg/L)	1.86	1.87			
	Rubidium (Rb)-Total (mg/L)	0.00121	0.00131			
	Selenium (Se)-Total (mg/L)	<0.000050	<0.000050			
	Silicon (Si)-Total (mg/L)	0.18	0.19			
	Silver (Ag)-Total (mg/L)	<0.000010	<0.000010			
	Sodium (Na)-Total (mg/L)	40.1	41.1			
	Strontium (Sr)-Total (mg/L)	0.0469	0.0467			
	Sulfur (S)-Total (mg/L)	3.64	3.56			
	Tellurium (Te)-Total (mg/L)	<0.00020	<0.00020			
	Thallium (Tl)-Total (mg/L)	<0.000010	<0.000010			
	Thorium (Th)-Total (mg/L)	<0.00010	<0.00010			
	Tin (Sn)-Total (mg/L)	<0.00010	<0.00010			
	Titanium (Ti)-Total (mg/L)	<0.00030	<0.00030			
	Tungsten (W)-Total (mg/L)	<0.00010	<0.00010			
	Uranium (U)-Total (mg/L)	0.000053	0.000053			
	Vanadium (V)-Total (mg/L)	<0.00050	<0.00050			
	Zinc (Zn)-Total (mg/L)	<0.0030	<0.0030			
	Zirconium (Zr)-Total (mg/L)	0.000060	<0.000060			
Dissolved Metals	Dissolved Mercury Filtration Location	FIELD	FIELD			
	Dissolved Metals Filtration Location	FIELD	FIELD			
	Aluminum (Al)-Dissolved (mg/L)	0.0038	0.0032			
	Antimony (Sb)-Dissolved (mg/L)	<0.00010	<0.00010			
	Arsenic (As)-Dissolved (mg/L)	0.00012	0.00011			
	Barium (Ba)-Dissolved (mg/L)	0.0180	0.0178			
	Beryllium (Be)-Dissolved (mg/L)	<0.00010	<0.00010			

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2163886-1	L2163886-2	L2163886-3	L2163886-4	L2163886-5
Description	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water
Sampled Date	08-SEP-18	08-SEP-18	08-SEP-18	08-SEP-18	08-SEP-18
Sampled Time	11:38	12:00	09:50	11:07	08:04
Client ID	SEPT-BBD-59	SEPT-BBD-60	SEPT-BPJ-59	SEPT-BPJ-60	SEPT-BAP-59
Grouping / **Analyte**					
WATER					
Dissolved Metals Bismuth (Bi)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron (B)-Dissolved (mg/L)	0.021	0.021	0.019	0.019	0.018
Cadmium (Cd)-Dissolved (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Calcium (Ca)-Dissolved (mg/L)	4.29	4.39	4.09	4.13	4.03
Cesium (Cs)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Chromium (Cr)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Cobalt (Co)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper (Cu)-Dissolved (mg/L)	0.00037	0.00028	0.00028	0.00028	0.00029
Iron (Fe)-Dissolved (mg/L)	0.010	<0.010	<0.010	<0.010	<0.010
Lead (Pb)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium (Li)-Dissolved (mg/L)	0.0014	0.0015	0.0014	0.0014	0.0013
Magnesium (Mg)-Dissolved (mg/L)	6.82	7.16	6.20	6.31	6.09
Manganese (Mn)-Dissolved (mg/L)	0.00060	0.00066	0.00021	0.00023	0.00023
Mercury (Hg)-Dissolved (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Molybdenum (Mo)-Dissolved (mg/L)	0.000121	0.000096	0.000091	0.000094	0.000087
Nickel (Ni)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Phosphorus (P)-Dissolved (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050
Potassium (K)-Dissolved (mg/L)	2.15	2.21	1.98	1.97	1.90
Rubidium (Rb)-Dissolved (mg/L)	0.00133	0.00138	0.00126	0.00119	0.00128
Selenium (Se)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Silicon (Si)-Dissolved (mg/L)	0.163	0.171	0.162	0.157	0.155
Silver (Ag)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)-Dissolved (mg/L)	48.2	49.3	43.5	44.1	40.7
Strontium (Sr)-Dissolved (mg/L)	0.0503	0.0504	0.0475	0.0472	0.0453
Sulfur (S)-Dissolved (mg/L)	4.51	4.59	4.20	4.05	4.04
Tellurium (Te)-Dissolved (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Thallium (Tl)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Thorium (Th)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Tin (Sn)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)-Dissolved (mg/L)	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030
Tungsten (W)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Uranium (U)-Dissolved (mg/L)	0.000046	0.000053	0.000045	0.000049	0.000051
Vanadium (V)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc (Zn)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	0.0013
Zirconium (Zr)-Dissolved (mg/L)	<0.000060	<0.000060	<0.000060	<0.000060	<0.000060

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2163886-6	L2163886-7			
	Description	Surface Water	Surface Water			
	Sampled Date	08-SEP-18	08-SEP-18			
	Sampled Time	08:50				
	Client ID	SEPT-BAP-60	SEPT-DUP-2			
Grouping	**Analyte**					
WATER						
Dissolved Metals	Bismuth (Bi)-Dissolved (mg/L)	<0.000050	<0.000050			
	Boron (B)-Dissolved (mg/L)	0.018	0.018			
	Cadmium (Cd)-Dissolved (mg/L)	<0.0000050	<0.0000050			
	Calcium (Ca)-Dissolved (mg/L)	3.99	4.05			
	Cesium (Cs)-Dissolved (mg/L)	<0.000010	<0.000010			
	Chromium (Cr)-Dissolved (mg/L)	<0.00010	<0.00010			
	Cobalt (Co)-Dissolved (mg/L)	<0.00010	<0.00010			
	Copper (Cu)-Dissolved (mg/L)	0.00030	0.00029			
	Iron (Fe)-Dissolved (mg/L)	<0.010	<0.010			
	Lead (Pb)-Dissolved (mg/L)	<0.000050	<0.000050			
	Lithium (Li)-Dissolved (mg/L)	0.0013	0.0013			
	Magnesium (Mg)-Dissolved (mg/L)	5.93	6.06			
	Manganese (Mn)-Dissolved (mg/L)	0.00016	0.00013			
	Mercury (Hg)-Dissolved (mg/L)	<0.0000050	<0.0000050			
	Molybdenum (Mo)-Dissolved (mg/L)	0.000091	0.000101			
	Nickel (Ni)-Dissolved (mg/L)	<0.00050	<0.00050			
	Phosphorus (P)-Dissolved (mg/L)	<0.050	<0.050			
	Potassium (K)-Dissolved (mg/L)	1.90	1.92			
	Rubidium (Rb)-Dissolved (mg/L)	0.00129	0.00132			
	Selenium (Se)-Dissolved (mg/L)	<0.000050	<0.000050			
	Silicon (Si)-Dissolved (mg/L)	0.150	0.149			
	Silver (Ag)-Dissolved (mg/L)	<0.000010	<0.000010			
	Sodium (Na)-Dissolved (mg/L)	41.2	41.8			
	Strontium (Sr)-Dissolved (mg/L)	0.0455	0.0446			
	Sulfur (S)-Dissolved (mg/L)	3.94	3.92			
	Tellurium (Te)-Dissolved (mg/L)	<0.00020	<0.00020			
	Thallium (Tl)-Dissolved (mg/L)	<0.000010	<0.000010			
	Thorium (Th)-Dissolved (mg/L)	<0.00010	<0.00010			
	Tin (Sn)-Dissolved (mg/L)	<0.00010	<0.00010			
	Titanium (Ti)-Dissolved (mg/L)	<0.00030	<0.00030			
	Tungsten (W)-Dissolved (mg/L)	<0.00010	<0.00010			
	Uranium (U)-Dissolved (mg/L)	0.000048	0.000046			
	Vanadium (V)-Dissolved (mg/L)	<0.00050	<0.00050			
	Zinc (Zn)-Dissolved (mg/L)	<0.0010	<0.0010			
	Zirconium (Zr)-Dissolved (mg/L)	<0.000060	<0.000060			

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Method Blank	Silver (Ag)-Total	MB-LOR	L2163886-1, -2, -3, -4, -5, -6, -7
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L2163886-1, -2, -3, -4, -5, -6, -7
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L2163886-1, -2, -3, -4, -5, -6, -7
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L2163886-1, -2, -3, -4, -5, -6, -7
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L2163886-1, -2, -3, -4, -5, -6, -7
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L2163886-1, -2, -3, -4, -5, -6, -7
Matrix Spike	Sulfur (S)-Dissolved	MS-B	L2163886-1, -2, -3, -4, -5, -6, -7
Matrix Spike	Barium (Ba)-Total	MS-B	L2163886-1, -2, -3, -4, -5, -6, -7
Matrix Spike	Calcium (Ca)-Total	MS-B	L2163886-1, -2, -3, -4, -5, -6, -7
Matrix Spike	Magnesium (Mg)-Total	MS-B	L2163886-1, -2, -3, -4, -5, -6, -7
Matrix Spike	Manganese (Mn)-Total	MS-B	L2163886-1, -2, -3, -4, -5, -6, -7
Matrix Spike	Sodium (Na)-Total	MS-B	L2163886-1, -2, -3, -4, -5, -6, -7
Matrix Spike	Strontium (Sr)-Total	MS-B	L2163886-1, -2, -3, -4, -5, -6, -7
Matrix Spike	Sulfur (S)-Total	MS-B	L2163886-1, -2, -3, -4, -5, -6, -7
Matrix Spike	Orthophosphate-Dissolved (as P)	MS-B	L2163886-1, -2, -3, -4, -5, -6, -7

Qualifiers for Individual Parameters Listed:

Qualifier	Description
DLM	Detection Limit Adjusted due to sample matrix effects (e.g. chemical interference, colour, turbidity).
MB-LOR	Method Blank exceeds ALS DQO. Limits of Reporting have been adjusted for samples with positive hits below 5x blank level.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ALK-TITR-VA	Water	Alkalinity Species by Titration	APHA 2320 Alkalinity

This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.

BR-L-IC-N-VA	Water	Bromide in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

CARBONS-DOC-VA	Water	Dissolved organic carbon by combustion	APHA 5310B

This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)". Dissolved carbon (DOC) fractions are determined by filtering the sample through a 0.45 micron membrane filter prior to analysis.

CARBONS-TOC-VA	Water	Total organic carbon by combustion	APHA 5310B TOTAL ORGANIC CARBON (TOC)

This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)".

CHLOROA-F-VA	Filter	Chlorophyll a by Fluorometer (Filter)	EPA 445.0

This analysis is done using procedures modified from EPA Method 445.0. Chlorophyll-a is determined by a routine acetone extraction followed with analysis by fluorometry using the non-acidification procedure. This method is not subject to interferences from chlorophyll b.

CL-L-IC-N-VA	Water	Chloride in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

CN-FREE-L-CFA-VA	Water	Low Level Free Cyanide in water by CFA	ASTM 7237

This analysis is carried out using procedures adapted from ASTM Method 7237 "Free Cyanide with Flow Injection Analysis (FIA) Utilizing Gas Diffusion Separation and Amperometric Detection". Free cyanide is determined by in-line gas diffusion at pH 6 with final determination by colourimetric analysis.

CN-T-L-CFA-VA	Water	Low Level Total Cyanide in water by CFA	ISO 14403:2002

This analysis is carried out using procedures adapted from ISO Method 14403:2002 "Determination of Total Cyanide using Flow Analysis (FIA and CFA)". Total or strong acid dissociable (SAD) cyanide is determined by in-line UV digestion along with sample distillation and final determination by colourimetric analysis. Method Limitation: This method is susceptible to interference from thiocyanate (SCN). If SCN is present in the sample, there could be a positive interference with this method, but it would be less than 1% and could be as low as zero.

EC-PCT-VA	Water	Conductivity (Automated)	APHA 2510 Auto. Conduc.

This analysis is carried out using procedures adapted from APHA Method 2510 "Conductivity". Conductivity is determined using a conductivity electrode.

EC-SCREEN-VA	Water	Conductivity Screen (Internal Use Only)	APHA 2510

Qualitative analysis of conductivity where required during preparation of other tests - e.g. TDS, metals, etc.

Reference Information

F-IC-N-VA	Water	Fluoride in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

HARDNESS-CALC-VA	Water	Hardness	APHA 2340B

Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

HG-D-CVAA-VA	Water	Diss. Mercury in Water by CVAAS or CVAFS	APHA 3030B/EPA 1631E (mod)

Water samples are filtered (0.45 um), preserved with hydrochloric acid, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

HG-T-CVAA-VA	Water	Total Mercury in Water by CVAAS or CVAFS	EPA 1631E (mod)

Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

MET-D-CCMS-VA	Water	Dissolved Metals in Water by CRC ICPMS	APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

MET-T-CCMS-VA	Water	Total Metals in Water by CRC ICPMS	EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

NH3-F-VA	Water	Ammonia in Water by Fluorescence	J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

NO2-L-IC-N-VA	Water	Nitrite in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

NO3-L-IC-N-VA	Water	Nitrate in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

P-T-PRES-COL-VA	Water	Total P in Water by Colour	APHA 4500-P Phosphorus

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is determined colourimetrically after persulphate digestion of the sample.
Samples with very high dissolved solids (i.e. seawaters, brackish waters) may produce a negative bias by this method. Alternate methods are available for these types of samples.

Arsenic (5+), at elevated levels, is a positive interference on colourimetric phosphate analysis.

P-TD-COL-VA	Water	Total Dissolved P in Water by Colour	APHA 4500-P Phosphorous

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Dissolved Phosphorus is determined colourimetrically after persulphate digestion of a sample that has been lab or field filtered through a 0.45 micron membrane filter.
Samples with very high dissolved solids (i.e. seawaters, brackish waters) may produce a negative bias by this method. Alternate methods are available for these types of samples.

Arsenic (5+), at elevated levels, is a positive interference on colourimetric phosphate analysis.

PH-PCT-VA	Water	pH by Meter (Automated)	APHA 4500-H pH Value

This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode

It is recommended that this analysis be conducted in the field.

PO4-DO-COL-VA	Water	Diss. Orthophosphate in Water by Colour	APHA 4500-P Phosphorus

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.
Samples with very high dissolved solids (i.e. seawaters, brackish waters) may produce a negative bias by this method. Alternate methods are available for these types of samples.

Arsenic (5+), at elevated levels, is a positive interference on colourimetric phosphate analysis.

SILICATE-COL-VA	Water	Silicate by Colourimetric analysis	APHA 4500-SiO2 E.

This analysis is carried out using procedures adapted from APHA Method 4500-SiO2 E. "Silica". Silicate (molybdate-reactive silica) is determined by the molybdosilicate-heteropoly blue colourimetric method.

Reference Information

SO4-IC-N-VA	Water	Sulfate in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

TDS-LOW-VA	Water	Low Level TDS (3.0mg/L) by Gravimetric	APHA 2540C

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total dissolved solids (TDS) are determined by filtering a sample through a glass fibre filter, TDS is determined by evaporating the filtrate to dryness at 180 degrees celsius.

TKN-F-VA	Water	TKN in Water by Fluorescence	APHA 4500-NORG D.

This analysis is carried out using procedures adapted from APHA Method 4500-Norg D. "Block Digestion and Flow Injection Analysis". Total Kjeldahl Nitrogen is determined using block digestion followed by Flow-injection analysis with fluorescence detection.

TSS-LOW-VA	Water	Total Suspended Solids by Grav. (1 mg/L)	APHA 2540D

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total suspended solids (TSS) are determined by filtering a sample through a glass fibre filter, TSS is determined by drying the filter at 104 degrees celsius.
Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.

TURBIDITY-VA	Water	Turbidity by Meter	APHA 2130 Turbidity

This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

ALS Environmental

Ch

L2163886-COFC

COC # _____

Page 1 of 1

Report To				Report Format / Distribution				Requested (Rush for routine analysis subject to availability)
Company:	Azimuth Consulting Group			☑ Standard	☐ Other			☐ (Standard Turnaround Times - Business Days)
Contact:	Eric Franz			☑ PDF	☑ Excel	☐ Digital	☐ Fax	☐ Priority (2-4 Business Days) - 50% Surcharge - Contact ALS to Confirm TAT
Address:	218-2902 West Broadway			Email 1:	efranz@azimuthgroup.ca			☐ Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT
	Vancouver, BC V6K2G8			Email 2:	marie-pier.marcil@agnicoeagle.com			☐ Same Day or Weekend Emergency - Contact ALS to Confirm TAT
Phone:	604-730-1220	Fax:		Email 3:	robin.allard@agnicoeagle.com			Analysis Request
Invoice To	Same as Report ?	☑ Yes	☐ No	Client / Project Information				Please indicate below Filtered, Preserved or both (F, P, F/P)
Hardcopy of Invoice with Report?		☐ Yes	☑ No	Job #:	Meadowbank CREMP - Surfacewater			
Company:				PO / AFE:				
Contact:				LSD:				
Address:								
Phone:		Fax:		Quote #:	Q39503			
Lab Work Order # (lab use only)				ALS Contact:	Brent Mack	Sampler:	Fanny L- Jonathan P	

Sample #	Sample Identification (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Conventionals** see notes	TSS-Low, TDS-Low	TOC, Ammonia, TKN, Total P	DOC	T-CN (Low), Free CN (Low)	Total mercury	Dissolved mercury	Total Metals	Dissolved metals	Chlorophyll-a			Number of Containers
							P	F/P	P	P	F/P	P	F/P	F			
	SEPT-BBD-59	08-Sep-18	11:38	Surface Water	X	X	X	X	X	X	X	X	X	X			10
	SEPT-BBD-60	08-Sep-18	12:00	Surface Water	X	X	X	X	X	X	X	X	X	X			10
	SEPT-BPJ-59	08-Sep-18	9:50	Surface Water	X	X	X	X	X	X	X	X	X	X			10
	SEPT-BPJ-60	08-Sep-18	11:07	Surface Water	X	X	X	X	X	X	X	X	X	X			10
	SEPT-BAP-59	08-Sep-18	8:04	Surface Water	X	X	X	X	X	X	X	X	X	X			10
	SEPT-BAP-60	08-Sep-18	8:50	Surface Water	X	X	X	X	X	X	X	X	X	X			10
	SEPT-DUP-2	08-Sep-18		Surface Water	X	X	X	X	X	X	X	X	X	X			10
	MAY-TE-94	21-May-18		Surface Water										X			1
	MAY-TE-95	21-May-18		Surface Water										X			1
	SEPT-TPE-116	03-Sep-18		Surface Water										X			1
	SEPT-TPE-117	03-Sep-18		Surface Water										X			1
	SEPT-TPN-116	03-Sep-18		Surface Water										X			1
	SEPT-TPN-117	03-Sep-18		Surface Water										X			1
	SEPT-SP-116	02-Sep-18		Surface Water										X			1
	SEPT-SP-117	02-Sep-18		Surface Water										X			1
	SEPT-WAL-85	02-Sep-18		Surface Water										X			1
	SEPT-WAL-86	02-Sep-18		Surface Water										X			1
	SEPT-DUP-1													X			1

Special Instructions / Regulations with water or land use (CCME-Freshwater Aquatic Life/BC CSR - Commercial/AB Tier 1 - Natural, etc) / Hazardous Details

**Conventionals includes: Alk Species, pH, EC, Turbidity, Conductivity, Anions (F, NO2, NO3, Br, SO4), low-level Chloride, Silicate, TD-P, and Ortho-PO4.

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.

By the use of this form the user acknowledges and agrees with the Terms and Conditions as provided on a separate Excel tab.

Also provided on another Excel tab are the ALS location addresses, phone numbers and sample container / preservation / holding time table for common analyses.

SHIPMENT RELEASE (client use)			SHIPMENT RECEPTION (lab use only)				SHIPMENT VERIFICATION (lab use only)			
Released by:	Date (dd-mmm-yy)	Time (hh-mm)	Received by:	Date:	Time:	Temperature:	Verified by:	Date:	Time:	Observations: Yes / No ? If Yes add SIF
Fanny Laporte	10-Sep-18	9:00	CM	09/13/2018	11:40am	17 °C				

GENF 20.00 Front

AZIMUTH CONSULTING GROUP INC.
ATTN: Eric Franz
218 - 2902 West Broadway
Vancouver BC V6K 2G8

Date Received: 14-SEP-18
Report Date: 24-SEP-18 17:10 (MT)
Version: FINAL

Client Phone: 604-730-1220

Certificate of Analysis

Lab Work Order #: L2164419

Project P.O. #: NOT SUBMITTED
Job Reference: MEADOWBANK CREMP - SURFACEWATER
C of C Numbers:
Legal Site Desc:

Brent Mack, B.Sc.
Account Manager

[This report shall not be reproduced except in full without the written authority of the Laboratory.]

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	L2164419-1 Surface Water 01-SEP-18 11:29 MAM-33	L2164419-2 Surface Water 01-SEP-18 11:00 MAM-34	L2164419-3 Surface Water 01-SEP-18 14:53 WTS-33	L2164419-4 Surface Water 01-SEP-18 15:15 WTS-34	L2164419-5 Surface Water 02-SEP-18 13:00 INUG-104
Sample ID		L2164419-1	L2164419-2	L2164419-3	L2164419-4	L2164419-5
Description		Surface Water	Surface Water	Surface Water	Surface Water	Surface Water
Sampled Date		01-SEP-18	01-SEP-18	01-SEP-18	01-SEP-18	02-SEP-18
Sampled Time		11:29	11:00	14:53	15:15	13:00
Client ID		MAM-33	MAM-34	WTS-33	WTS-34	INUG-104
FILTER						
Plant Pigments	Chlorophyll a (ug/L)	0.282	0.245	0.393	0.291	0.233

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2164419-6	L2164419-7	L2164419-8	L2164419-9	L2164419-10
Description	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water
Sampled Date	02-SEP-18	02-SEP-18	02-SEP-18	03-SEP-18	03-SEP-18
Sampled Time	12:25	09:49	10:24	14:00	14:43
Client ID	INUG-105	PDL-69	PDL-70	NEM-33	NEM-34
Grouping **Analyte**					
FILTER					
Plant Pigments Chlorophyll a (ug/L)	0.233	0.322	0.285	0.295	0.307

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2164419-11	L2164419-12	L2164419-13	L2164419-14	L2164419-15
Description	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water
Sampled Date	03-SEP-18	03-SEP-18	09-SEP-18	09-SEP-18	10-SEP-18
Sampled Time			13:27	12:20	11:47
Client ID	ST-WTN-DC2	ST-WT-DC-2	A76-27	A76-28	DS1-25
Grouping **Analyte**					
FILTER					
Plant Pigments Chlorophyll a (ug/L)	0.214	0.241	0.308	0.232	0.780

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2164419-16				
Description	Surface Water				
Sampled Date	10-SEP-18				
Sampled Time	12:56				
Client ID	DS1-26				
Grouping **Analyte**					
FILTER					
Plant Pigments Chlorophyll a (ug/L)	0.351				

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2164419-13	L2164419-14	L2164419-15	L2164419-16	
Description	Surface Water	Surface Water	Surface Water	Surface Water	
Sampled Date	09-SEP-18	09-SEP-18	10-SEP-18	10-SEP-18	
Sampled Time	13:27	12:20	11:47	12:56	
Client ID	A76-27	A76-28	DS1-25	DS1-26	
Grouping	**Analyte**				
WATER					
Physical Tests	Conductivity (uS/cm)	38.0	38.4	19.7	25.9
	Hardness (as CaCO3) (mg/L)	13.8	13.7	6.77	8.55
	pH (pH)	6.99	7.01	6.92	6.95
	Total Suspended Solids (mg/L)	<1.0	<1.0	1.1	1.7
	Total Dissolved Solids (mg/L)	26.7	25.5	14.6	17.5
	Turbidity (NTU)	0.19	0.21	0.31	0.96
Anions and Nutrients	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	6.5	6.5	5.4	5.9
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0
	Alkalinity, Total (as CaCO3) (mg/L)	6.5	6.5	5.4	5.9
	Ammonia, Total (as N) (mg/L)	0.0216	0.0115	0.0107	0.0149
	Bromide (Br) (mg/L)	0.056	0.056	<0.050	<0.050
	Chloride (Cl) (mg/L)	4.91	4.96	1.67	2.46
	Fluoride (F) (mg/L)	0.026	0.026	0.046	0.031
	Nitrate (as N) (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050
	Nitrite (as N) (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010
	Total Kjeldahl Nitrogen (mg/L)	0.112	0.128	0.141	0.163
	Orthophosphate-Dissolved (as P) (mg/L)	0.0015	0.0013	0.0017	0.0015
	Phosphorus (P)-Total Dissolved (mg/L)	0.0021	0.0023	0.0030	0.0037
	Phosphorus (P)-Total (mg/L)	<0.0020	<0.0020	0.0031	0.0033
	Silicate (as SiO2) (mg/L)	0.94	0.94	0.58	1.40
	Sulfate (SO4) (mg/L)	3.38	3.40	1.34	2.15
Cyanides	Cyanide, Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010
	Cyanide, Free (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	1.64	1.60	2.25	3.28
	Total Organic Carbon (mg/L)	1.71	1.65	2.26	3.15
Total Metals	Aluminum (Al)-Total (mg/L)	0.0036	<0.0060 DLB	<0.0090 DLB	0.0499
	Antimony (Sb)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010
	Arsenic (As)-Total (mg/L)	0.00021	0.00022	0.00015	0.00012
	Barium (Ba)-Total (mg/L)	0.00662	0.00679	0.00369	0.00461
	Beryllium (Be)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010
	Bismuth (Bi)-Total (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050
	Boron (B)-Total (mg/L)	<0.010	<0.010	<0.010	<0.010
	Cadmium (Cd)-Total (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050
	Calcium (Ca)-Total (mg/L)	3.85	3.80	1.76	2.30
	Cesium (Cs)-Total (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2164419-13	L2164419-14	L2164419-15	L2164419-16	
Description	Surface Water	Surface Water	Surface Water	Surface Water	
Sampled Date	09-SEP-18	09-SEP-18	10-SEP-18	10-SEP-18	
Sampled Time	13:27	12:20	11:47	12:56	
Client ID	A76-27	A76-28	DS1-25	DS1-26	
Grouping	**Analyte**				
WATER					
Total Metals	Chromium (Cr)-Total (mg/L)	<0.00010	<0.00010	<0.00010	0.00020	
	Cobalt (Co)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	
	Copper (Cu)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	
	Iron (Fe)-Total (mg/L)	0.013	0.012	0.025	0.070	
	Lead (Pb)-Total (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	
	Lithium (Li)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	
	Magnesium (Mg)-Total (mg/L)	1.13	1.13	0.625	0.757	
	Manganese (Mn)-Total (mg/L)	0.00112	0.00106	0.00190	0.00193	
	Mercury (Hg)-Total (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	
	Molybdenum (Mo)-Total (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	
	Nickel (Ni)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	
	Phosphorus (P)-Total (mg/L)	<0.050	<0.050	<0.050	<0.050	
	Potassium (K)-Total (mg/L)	0.680	0.695	0.341	0.471	
	Rubidium (Rb)-Total (mg/L)	0.00104	0.00106	0.00059	0.00065	
	Selenium (Se)-Total (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	
	Silicon (Si)-Total (mg/L)	0.49	0.48	0.30	0.77	
	Silver (Ag)-Total (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	
	Sodium (Na)-Total (mg/L)	0.679	0.681	0.903	1.06	
	Strontium (Sr)-Total (mg/L)	0.0204	0.0198	0.00854	0.0109	
	Sulfur (S)-Total (mg/L)	<0.50	<0.50	<0.50	<0.50	
	Tellurium (Te)-Total (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020	
	Thallium (Tl)-Total (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	
	Thorium (Th)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	
	Tin (Sn)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	
	Titanium (Ti)-Total (mg/L)	<0.00030	<0.00030	<0.00030	0.00093	
	Tungsten (W)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	
	Uranium (U)-Total (mg/L)	0.000015	0.000016	0.000031	0.000050	
	Vanadium (V)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	
	Zinc (Zn)-Total (mg/L)	<0.0030	<0.0030	<0.0030	<0.0030	
	Zirconium (Zr)-Total (mg/L)	<0.000060	<0.000060	<0.000060	<0.00024 DLB	
Dissolved Metals	Dissolved Mercury Filtration Location	FIELD	FIELD	FIELD	FIELD	
	Dissolved Metals Filtration Location	FIELD	FIELD	FIELD	FIELD	
	Aluminum (Al)-Dissolved (mg/L)	0.0012	0.0011	0.0044	0.0137	
	Antimony (Sb)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	
	Arsenic (As)-Dissolved (mg/L)	0.00022	0.00020	0.00014	0.00014	
	Barium (Ba)-Dissolved (mg/L)	0.00669	0.00661	0.00356	0.00398	
	Beryllium (Be)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2164419-13	L2164419-14	L2164419-15	L2164419-16	
Description	Surface Water	Surface Water	Surface Water	Surface Water	
Sampled Date	09-SEP-18	09-SEP-18	10-SEP-18	10-SEP-18	
Sampled Time	13:27	12:20	11:47	12:56	
Client ID	A76-27	A76-28	DS1-25	DS1-26	
Grouping / **Analyte**					
WATER					
Dissolved Metals					
Bismuth (Bi)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	
Boron (B)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010	
Cadmium (Cd)-Dissolved (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	
Calcium (Ca)-Dissolved (mg/L)	3.66	3.61	1.65	2.19	
Cesium (Cs)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	
Chromium (Cr)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	0.00011	
Cobalt (Co)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	
Copper (Cu)-Dissolved (mg/L)	0.00027	0.00030	0.00030	0.00041	
Iron (Fe)-Dissolved (mg/L)	<0.010	<0.010	<0.010	0.028	
Lead (Pb)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	
Lithium (Li)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	
Magnesium (Mg)-Dissolved (mg/L)	1.15	1.14	0.644	0.748	
Manganese (Mn)-Dissolved (mg/L)	0.00059	0.00060	0.00027	0.00127	
Mercury (Hg)-Dissolved (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	
Molybdenum (Mo)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	
Nickel (Ni)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	
Phosphorus (P)-Dissolved (mg/L)	<0.050	<0.050	<0.050	<0.050	
Potassium (K)-Dissolved (mg/L)	0.704	0.693	0.356	0.452	
Rubidium (Rb)-Dissolved (mg/L)	0.00099	0.00096	0.00054	0.00065	
Selenium (Se)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	
Silicon (Si)-Dissolved (mg/L)	0.454	0.429	0.274	0.652	
Silver (Ag)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	
Sodium (Na)-Dissolved (mg/L)	0.644	0.646	0.790	1.01	
Strontium (Sr)-Dissolved (mg/L)	0.0193	0.0191	0.00813	0.0104	
Sulfur (S)-Dissolved (mg/L)	0.88	1.03	<0.50	0.70	
Tellurium (Te)-Dissolved (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020	
Thallium (Tl)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	
Thorium (Th)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	
Tin (Sn)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	
Titanium (Ti)-Dissolved (mg/L)	<0.00030	<0.00030	<0.00030	<0.00030	
Tungsten (W)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	
Uranium (U)-Dissolved (mg/L)	0.000011	0.000013	0.000025	0.000042	
Vanadium (V)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	
Zinc (Zn)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	
Zirconium (Zr)-Dissolved (mg/L)	<0.000060	<0.000060	<0.000060	0.000106	

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Method Blank	Aluminum (Al)-Total	MB-LOR	L2164419-13, -14, -15, -16
Method Blank	Zirconium (Zr)-Total	MB-LOR	L2164419-13, -14, -15, -16
Matrix Spike	Dissolved Organic Carbon	MS-B	L2164419-16
Matrix Spike	Dissolved Organic Carbon	MS-B	L2164419-16
Matrix Spike	Total Organic Carbon	MS-B	L2164419-16
Matrix Spike	Total Organic Carbon	MS-B	L2164419-16
Matrix Spike	Total Organic Carbon	MS-B	L2164419-16
Matrix Spike	Total Organic Carbon	MS-B	L2164419-16
Matrix Spike	Total Organic Carbon	MS-B	L2164419-16
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L2164419-13, -14, -15, -16
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L2164419-13, -14, -15, -16
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L2164419-13, -14, -15, -16
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L2164419-13, -14, -15, -16
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L2164419-13, -14, -15, -16
Matrix Spike	Aluminum (Al)-Total	MS-B	L2164419-13, -14, -15, -16
Matrix Spike	Barium (Ba)-Total	MS-B	L2164419-13, -14, -15, -16
Matrix Spike	Calcium (Ca)-Total	MS-B	L2164419-13, -14, -15, -16
Matrix Spike	Magnesium (Mg)-Total	MS-B	L2164419-13, -14, -15, -16
Matrix Spike	Molybdenum (Mo)-Total	MS-B	L2164419-13, -14, -15, -16
Matrix Spike	Silver (Ag)-Total	MS-B	L2164419-13, -14, -15, -16
Matrix Spike	Sodium (Na)-Total	MS-B	L2164419-13, -14, -15, -16
Matrix Spike	Strontium (Sr)-Total	MS-B	L2164419-13, -14, -15, -16
Matrix Spike	Uranium (U)-Total	MS-B	L2164419-13, -14, -15, -16
Matrix Spike	Orthophosphate-Dissolved (as P)	MS-B	L2164419-13, -14, -15, -16

Qualifiers for Individual Parameters Listed:

Qualifier	Description
DLB	Detection Limit Raised. Analyte detected at comparable level in Method Blank.
MB-LOR	Method Blank exceeds ALS DQO. Limits of Reporting have been adjusted for samples with positive hits below 5x blank level.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ALK-TITR-VA	Water	Alkalinity Species by Titration	APHA 2320 Alkalinity

This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.

BR-L-IC-N-VA	Water	Bromide in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

CARBONS-DOC-VA	Water	Dissolved organic carbon by combustion	APHA 5310B

This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)". Dissolved carbon (DOC) fractions are determined by filtering the sample through a 0.45 micron membrane filter prior to analysis.

CARBONS-TOC-VA	Water	Total organic carbon by combustion	APHA 5310B TOTAL ORGANIC CARBON (TOC)

This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)".

CHLOROA-F-VA	Filter	Chlorophyll a by Fluorometer (Filter)	EPA 445.0

This analysis is done using procedures modified from EPA Method 445.0. Chlorophyll-a is determined by a routine acetone extraction followed with analysis by fluorometry using the non-acidification procedure. This method is not subject to interferences from chlorophyll b.

CL-L-IC-N-VA	Water	Chloride in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

CN-FREE-L-CFA-VA	Water	Low Level Free Cyanide in water by CFA	ASTM 7237

This analysis is carried out using procedures adapted from ASTM Method 7237 "Free Cyanide with Flow Injection Analysis (FIA) Utilizing Gas Diffusion Separation and Amperometric Detection". Free cyanide is determined by in-line gas diffusion at pH 6 with final determination by colourimetric analysis.

Reference Information

CN-T-L-CFA-VA	Water	Low Level Total Cyanide in water by CFA	ISO 14403:2002

This analysis is carried out using procedures adapted from ISO Method 14403:2002 "Determination of Total Cyanide using Flow Analysis (FIA and CFA)". Total or strong acid dissociable (SAD) cyanide is determined by in-line UV digestion along with sample distillation and final determination by colourimetric analysis. Method Limitation: This method is susceptible to interference from thiocyanate (SCN). If SCN is present in the sample, there could be a positive interference with this method, but it would be less than 1% and could be as low as zero.

EC-PCT-VA	Water	Conductivity (Automated)	APHA 2510 Auto. Conduc.

This analysis is carried out using procedures adapted from APHA Method 2510 "Conductivity". Conductivity is determined using a conductivity electrode.

EC-SCREEN-VA	Water	Conductivity Screen (Internal Use Only)	APHA 2510

Qualitative analysis of conductivity where required during preparation of other tests - e.g. TDS, metals, etc.

F-IC-N-VA	Water	Fluoride in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

HARDNESS-CALC-VA	Water	Hardness	APHA 2340B

Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

HG-D-CVAA-VA	Water	Diss. Mercury in Water by CVAAS or CVAFS	APHA 3030B/EPA 1631E (mod)

Water samples are filtered (0.45 um), preserved with hydrochloric acid, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

HG-T-CVAA-VA	Water	Total Mercury in Water by CVAAS or CVAFS	EPA 1631E (mod)

Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

MET-D-CCMS-VA	Water	Dissolved Metals in Water by CRC ICPMS	APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

MET-T-CCMS-VA	Water	Total Metals in Water by CRC ICPMS	EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

NH3-F-VA	Water	Ammonia in Water by Fluorescence	J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

NO2-L-IC-N-VA	Water	Nitrite in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

NO3-L-IC-N-VA	Water	Nitrate in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

P-T-PRES-COL-VA	Water	Total P in Water by Colour	APHA 4500-P Phosphorus

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is determined colourimetrically after persulphate digestion of the sample.
Samples with very high dissolved solids (i.e. seawaters, brackish waters) may produce a negative bias by this method. Alternate methods are available for these types of samples.

Arsenic (5+), at elevated levels, is a positive interference on colourimetric phosphate analysis.

P-TD-COL-VA	Water	Total Dissolved P in Water by Colour	APHA 4500-P Phosphorous

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Dissolved Phosphorus is determined colourimetrically after persulphate digestion of a sample that has been lab or field filtered through a 0.45 micron membrane filter.
Samples with very high dissolved solids (i.e. seawaters, brackish waters) may produce a negative bias by this method. Alternate methods are available for these types of samples.

Arsenic (5+), at elevated levels, is a positive interference on colourimetric phosphate analysis.

PH-PCT-VA	Water	pH by Meter (Automated)	APHA 4500-H pH Value

This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode

Reference Information

It is recommended that this analysis be conducted in the field.

PO4-DO-COL-VA Water Diss. Orthophosphate in Water by Colour APHA 4500-P Phosphorus

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.
Samples with very high dissolved solids (i.e. seawaters, brackish waters) may produce a negative bias by this method. Alternate methods are available for these types of samples.

Arsenic (5+), at elevated levels, is a positive interference on colourimetric phosphate analysis.

SILICATE-COL-VA Water Silicate by Colourimetric analysis APHA 4500-SiO2 E.

This analysis is carried out using procedures adapted from APHA Method 4500-SiO2 E. "Silica". Silicate (molybdate-reactive silica) is determined by the molybdosilicate-heteropoly blue colourimetric method.

SO4-IC-N-VA Water Sulfate in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

TDS-LOW-VA Water Low Level TDS (3.0mg/L) by Gravimetric APHA 2540C

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total dissolved solids (TDS) are determined by filtering a sample through a glass fibre filter, TDS is determined by evaporating the filtrate to dryness at 180 degrees celsius.

TKN-F-VA Water TKN in Water by Fluorescence APHA 4500-NORG D.

This analysis is carried out using procedures adapted from APHA Method 4500-Norg D. "Block Digestion and Flow Injection Analysis". Total Kjeldahl Nitrogen is determined using block digestion followed by Flow-injection analysis with fluorescence detection.

TSS-LOW-VA Water Total Suspended Solids by Grav. (1 mg/L) APHA 2540D

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total suspended solids (TSS) are determined by filtering a sample through a glass fibre filter, TSS is determined by drying the filter at 104 degrees celsius.
Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.

TURBIDITY-VA Water Turbidity by Meter APHA 2130 Turbidity

This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

ALS Environmental

L2164419-COFC

l Request Form
) 668 9878
om

COC # _____

Page 1 of 1

Report To					
Company:	Azimuth Consulting Group	☑ Standard	☐ Other		
Contact:	Eric Franz	☑ PDF	☑ Excel	☐ Digital	☐ Fax
Address:	218-2902 West Broadway	Email 1:	efranz@azimuthgroup.ca		
	Vancouver, BC V6K2G8	Email 2:	marie-pier.marcil@agnicoeagle.com		
Phone:	604-730-1220 Fax:	Email 3:	robin.allard@agnicoeagle.com		
Invoice To	Same as Report ? ☑ Yes ☐ No	Client / Project Information			
Hardcopy of Invoice with Report?	☐ Yes ☑ No	Job #:	Meadowbank CREMP - Surfacewater		
Company:		PO / AFE:			
Contact:		LSD:			
Address:					
Phone:	Fax:	Quote #:	Q39503		
Lab Work Order # (lab use only)		ALS Contact:	Brent Mack	Sampler:	Jamie K/Tom T

Service Requested (Rush for routine analysis subject to availability)

- ◉ Regular (Standard Turnaround Times - Business Days)
- ○ Priority (2-4 Business Days) - 50% Surcharge - Contact ALS to Confirm TAT
- ○ Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT
- ○ Same Day or Weekend Emergency - Contact ALS to Confirm TAT

Analysis Request

Please indicate below Filtered, Preserved or both (F, P, F/P)

Sample #	Sample Identification (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Conventionals** see notes (F/P)	TSS-Low, TDS-Low (P)	TOC, Ammonia, TKN, Total P (P)	DOC (F/P)	T-CN (Low), Free CN (Low) (P)	Total mercury (P)	Dissolved mercury (F/P)	Total Metals (P)	Dissolved metals (F/P)	Chlorophyll-a (F)			Number of Containers
	MAM-33	01-Sep-18	11:29	Surface Water										X			1
	MAM-34	01-Sep-18	11:00	Surface Water										X			1
	WTS-33	01-Sep-18	14:53	Surface Water										X			1
	WTS-34	01-Sep-18	15:15	Surface Water										X			1
	INUG-104	02-Sep-18	13:00	Surface Water										X			1
	INUG-105	02-Sep-18	12:25	Surface Water										X			1
	PDL-69	02-Sep-18	9:49	Surface Water										X			1
	PDL-70	02-Sep-18	10:24	Surface Water										X			1
	NEM-33	03-Sep-18	14:00	Surface Water										X			1
	NEM-34	03-Sep-18	14:43	Surface Water										X			1
	ST-WTN-DC2	03-Sep-18		Surface Water										X			1
	ST-WT-DC-2	03-Sep-18		Surface Water										X			1
	A76-27	09-Sep-18	13:27	Surface Water	X	X	X	X	X	X	X	X	X	X			10
	A76-28	09-Sep-18	12:20	Surface Water	X	X	X	X	X	X	X	X	X	X			10
	DS1-25	10-Sep-18	11:47	Surface Water	X	X	X	X	X	X	X	X	X	X			10
	DS1-26	10-Sep-18	12:56	Surface Water	X	X	X	X	X	X	X	X	X	X			10

Special Instructions / Regulations with water or land use (CCME-Freshwater Aquatic Life/BC CSR - Commercial/AB Tier 1 - Natural, etc) / Hazardous Details

**Conventionals includes: Alk Species, pH, EC, Turbidity, Conductivity, Anions (F, NO2, NO3, Br, SO4), low-level Chloride, Silicate, TD-P, and Ortho-PO4.

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.

By the use of this form the user acknowledges and agrees with the Terms and Conditions as provided on a separate Excel tab.

Also provided on another Excel tab are the ALS location addresses, phone numbers and sample container / preservation / holding time table for common analyses.

SHIPMENT RELEASE (client use)			SHIPMENT RECEPTION (lab use only)				SHIPMENT VERIFICATION (lab use only)			
Released by:	Date (dd-mmm-yy)	Time (hh-mm)	Received by:	Date:	Time:	Temperature:	Verified by:	Date:	Time:	Observations: Yes / No ? If Yes add SIF
Jamie Kataluk	11-Sep-18	9:00	JC SEP 14 2018		9:10AM	-18 °C				

GENF 20.00 Front

AZIMUTH CONSULTING GROUP INC.
ATTN: Eric Franz
218 - 2902 West Broadway
Vancouver BC V6K 2G8

Date Received: 08-NOV-18
Report Date: 19-NOV-18 17:02 (MT)
Version: FINAL

Client Phone: 604-730-1220

Certificate of Analysis

Lab Work Order #: L2194150

Project P.O. #: NOT SUBMITTED
Job Reference: MEADOWBANK CREMP-SURFACEWATER
C of C Numbers:
Legal Site Desc:

Brent Mack, B.Sc.
Account Manager

[This report shall not be reproduced except in full without the written authority of the Laboratory.]

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2194150-1	L2194150-2	L2194150-3	L2194150-4	L2194150-5
Description	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water
Sampled Date	03-NOV-18	03-NOV-18	03-NOV-18	03-NOV-18	30-OCT-18
Sampled Time	14:27	15:02	10:30	11:15	14:47
Client ID	SP-118	SP-119	TPN-118	TPN-119	TPE-118
Grouping / **Analyte**					
WATER					
Physical Tests Conductivity (uS/cm)	39.9	40.8	26.5	26.7	30.3
Hardness (as CaCO3) (mg/L)	15.9	16.8	9.45	9.31	11.0
pH (pH)	7.29	7.34	7.07	7.08	7.20
Total Suspended Solids (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
Total Dissolved Solids (mg/L)	24.3	24.4	17.0	16.9	17.8
Turbidity (NTU)	0.14	0.13	0.13	0.12	0.15
Anions and Nutrients Alkalinity, Bicarbonate (as CaCO3) (mg/L)	11.1	12.4	6.6	6.7	8.4
Alkalinity, Carbonate (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
Alkalinity, Total (as CaCO3) (mg/L)	11.1	12.4	6.6	6.7	8.4
Ammonia, Total (as N) (mg/L)	<0.0050	<0.0050	0.0259	0.0116	0.0054
Bromide (Br) (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050
Chloride (Cl) (mg/L)	0.91	0.92	0.75	0.75	0.74
Fluoride (F) (mg/L)	0.072	0.072	0.068	0.067	0.077
Nitrate (as N) (mg/L)	<0.0050	<0.0050	0.0115	0.0115	<0.0050
Nitrite (as N) (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Total Kjeldahl Nitrogen (mg/L)	0.092	0.096	0.110	0.078	0.073
Orthophosphate-Dissolved (as P) (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Phosphorus (P)-Total Dissolved (mg/L)	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Phosphorus (P)-Total (mg/L)	0.0030	0.0022	<0.0020	0.0078	0.0021
Silicate (as SiO2) (mg/L)	<0.50	<0.50	<0.50	<0.50	<0.50
Sulfate (SO4) (mg/L)	5.43	5.48	4.50	4.51	4.65
Cyanides Cyanide, Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Cyanide, Free (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Organic / Inorganic Carbon Dissolved Organic Carbon (mg/L)	1.75	1.62	1.49	1.42	1.48
Total Organic Carbon (mg/L)	1.69	1.63	1.46	1.39	1.42
Total Metals Aluminum (Al)-Total (mg/L)	0.0034	0.0033	0.0033	0.0033	0.0047
Antimony (Sb)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic (As)-Total (mg/L)	0.00025	0.00024	0.00020	0.00017	0.00037
Barium (Ba)-Total (mg/L)	0.00262	0.00266	0.00276	0.00280	0.00273
Beryllium (Be)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth (Bi)-Total (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron (B)-Total (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)-Total (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Calcium (Ca)-Total (mg/L)	4.28	4.47	2.31	2.27	2.75
Cesium (Cs)-Total (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	0.000017

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2194150-6	L2194150-7	L2194150-8	L2194150-9	L2194150-10
Description	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water
Sampled Date	30-OCT-18	31-OCT-18	31-OCT-18		
Sampled Time	14:12	10:53	10:20		
Client ID	TPE-119	WAL-87	WAL-88	CREMP NOV DUP-1	CREMP NOV-DI-1
Grouping / **Analyte**					
WATER					
Physical Tests Conductivity (uS/cm)	30.1	42.7	42.1	42.2	<2.0
Hardness (as CaCO3) (mg/L)	10.8	18.6	18.2	18.9	<0.50
pH (pH)	7.18	7.42	7.40	7.40	5.41
Total Suspended Solids (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
Total Dissolved Solids (mg/L)	19.6	24.3	26.0	26.6	<3.0
Turbidity (NTU)	0.13	0.17	0.17	0.18	<0.10
Anions and Nutrients Alkalinity, Bicarbonate (as CaCO3) (mg/L)	8.4	14.2	14.3	14.8	<1.0
Alkalinity, Carbonate (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
Alkalinity, Total (as CaCO3) (mg/L)	8.4	14.2	14.3	14.8	<1.0
Ammonia, Total (as N) (mg/L)	<0.0050	<0.0050	0.0230	<0.0050	<0.0050
Bromide (Br) (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050
Chloride (Cl) (mg/L)	0.75	0.80	0.80	0.81	<0.10
Fluoride (F) (mg/L)	0.076	0.052	0.052	0.052	<0.020
Nitrate (as N) (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Nitrite (as N) (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Total Kjeldahl Nitrogen (mg/L)	0.076	0.106	0.135	0.117	<0.050
Orthophosphate-Dissolved (as P) (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Phosphorus (P)-Total Dissolved (mg/L)	<0.0020	0.0024	0.0023	0.0021	<0.0020
Phosphorus (P)-Total (mg/L)	0.0028	0.0030	0.0028	0.0031	0.0032
Silicate (as SiO2) (mg/L)	<0.50	0.56	0.54	0.52	<0.50
Sulfate (SO4) (mg/L)	4.68	4.80	4.75	4.75	<0.30
Cyanides Cyanide, Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Cyanide, Free (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Organic / Inorganic Carbon Dissolved Organic Carbon (mg/L)	1.38	2.00	1.71	2.17	1.80
Total Organic Carbon (mg/L)	1.41	1.76	1.89	2.17	1.90
Total Metals Aluminum (Al)-Total (mg/L)	0.0038	0.0036	<0.0030	0.0034	<0.0030
Antimony (Sb)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic (As)-Total (mg/L)	0.00032	0.00028	0.00027	0.00026	<0.00010
Barium (Ba)-Total (mg/L)	0.00272	0.00211	0.00209	0.00209	0.00018 RRV
Beryllium (Be)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth (Bi)-Total (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron (B)-Total (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)-Total (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Calcium (Ca)-Total (mg/L)	2.73	5.12	4.89	4.92	<0.050
Cesium (Cs)-Total (mg/L)	0.000014	<0.000010	<0.000010	<0.000010	<0.000010

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2194150-11				
	Description	Surface Water				
	Sampled Date					
	Sampled Time					
	Client ID	CREMP NOV EB-1				
Grouping	**Analyte**					
WATER						
Physical Tests	Conductivity (uS/cm)	<2.0				
	Hardness (as CaCO3) (mg/L)	<0.50				
	pH (pH)	5.37				
	Total Suspended Solids (mg/L)	<1.0				
	Total Dissolved Solids (mg/L)	<3.0				
	Turbidity (NTU)	<0.10				
Anions and Nutrients	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	<1.0				
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<1.0				
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0				
	Alkalinity, Total (as CaCO3) (mg/L)	<1.0				
	Ammonia, Total (as N) (mg/L)	<0.0050				
	Bromide (Br) (mg/L)	<0.050				
	Chloride (Cl) (mg/L)	<0.10				
	Fluoride (F) (mg/L)	<0.020				
	Nitrate (as N) (mg/L)	<0.0050				
	Nitrite (as N) (mg/L)	<0.0010				
	Total Kjeldahl Nitrogen (mg/L)	<0.050				
	Orthophosphate-Dissolved (as P) (mg/L)	<0.0010				
	Phosphorus (P)-Total Dissolved (mg/L)	<0.0020				
	Phosphorus (P)-Total (mg/L)	<0.0020				
	Silicate (as SiO2) (mg/L)	<0.50				
	Sulfate (SO4) (mg/L)	<0.30				
Cyanides	Cyanide, Total (mg/L)	<0.0010				
	Cyanide, Free (mg/L)	<0.0010				
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	<0.50				
	Total Organic Carbon (mg/L)	<0.50				
Total Metals	Aluminum (Al)-Total (mg/L)	<0.0030				
	Antimony (Sb)-Total (mg/L)	<0.00010				
	Arsenic (As)-Total (mg/L)	<0.00010				
	Barium (Ba)-Total (mg/L)	<0.00010				
	Beryllium (Be)-Total (mg/L)	<0.00010				
	Bismuth (Bi)-Total (mg/L)	<0.000050				
	Boron (B)-Total (mg/L)	<0.010				
	Cadmium (Cd)-Total (mg/L)	<0.0000050				
	Calcium (Ca)-Total (mg/L)	<0.050				
	Cesium (Cs)-Total (mg/L)	<0.000010				

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	L2194150-1 Surface Water 03-NOV-18 14:27 SP-118	L2194150-2 Surface Water 03-NOV-18 15:02 SP-119	L2194150-3 Surface Water 03-NOV-18 10:30 TPN-118	L2194150-4 Surface Water 03-NOV-18 11:15 TPN-119	L2194150-5 Surface Water 30-OCT-18 14:47 TPE-118
WATER						
Total Metals	Chromium (Cr)-Total (mg/L)	0.00011	<0.00010	<0.00010	<0.00010	<0.00010
	Cobalt (Co)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Copper (Cu)-Total (mg/L)	0.00075	0.00058	<0.00050	<0.00050	<0.00050
	Iron (Fe)-Total (mg/L)	<0.010	<0.010	0.035	<0.010	<0.010
	Lead (Pb)-Total (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Lithium (Li)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Magnesium (Mg)-Total (mg/L)	1.41	1.44	0.938	0.942	1.08
	Manganese (Mn)-Total (mg/L)	0.00088	0.00088	0.00121	0.00101	0.00072
	Mercury (Hg)-Total (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
	Molybdenum (Mo)-Total (mg/L)	0.000198	0.000215	0.000145	0.000139	0.000153
	Nickel (Ni)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Phosphorus (P)-Total (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050
	Potassium (K)-Total (mg/L)	0.579	0.593	0.521	0.523	0.552
	Rubidium (Rb)-Total (mg/L)	0.00091	0.00089	0.00076	0.00072	0.00090
	Selenium (Se)-Total (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Silicon (Si)-Total (mg/L)	0.17	0.17	<0.10	<0.10	<0.10
	Silver (Ag)-Total (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Sodium (Na)-Total (mg/L)	0.963	0.969	1.18	1.17	1.20
	Strontium (Sr)-Total (mg/L)	0.0213	0.0226	0.0113	0.0112	0.0128
	Sulfur (S)-Total (mg/L)	2.11	2.13	1.73	1.76	1.78
	Tellurium (Te)-Total (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
	Thallium (Tl)-Total (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Thorium (Th)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Tin (Sn)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Titanium (Ti)-Total (mg/L)	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030
	Tungsten (W)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Uranium (U)-Total (mg/L)	0.000042	0.000044	0.000033	0.000033	0.000040
	Vanadium (V)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Zinc (Zn)-Total (mg/L)	0.0079	<0.0030	<0.0030	<0.0030	<0.0030
	Zirconium (Zr)-Total (mg/L)	<0.000060	<0.000060	<0.000060	<0.000060	<0.000060
Dissolved Metals	Dissolved Mercury Filtration Location	FIELD	FIELD	FIELD	FIELD	FIELD
	Dissolved Metals Filtration Location	FIELD	FIELD	FIELD	FIELD	FIELD
	Aluminum (Al)-Dissolved (mg/L)	0.0011	0.0015	0.0018	0.0015	0.0019
	Antimony (Sb)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Arsenic (As)-Dissolved (mg/L)	0.00019	0.00020	0.00014	0.00013	0.00030
	Barium (Ba)-Dissolved (mg/L)	0.00265	0.00273	0.00297	0.00307	0.00275
	Beryllium (Be)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2194150-6	L2194150-7	L2194150-8	L2194150-9	L2194150-10
Description	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water
Sampled Date	30-OCT-18	31-OCT-18	31-OCT-18		
Sampled Time	14:12	10:53	10:20		
Client ID	TPE-119	WAL-87	WAL-88	CREMP NOV DUP-1	CREMP NOV-DI-1
Grouping / **Analyte**					
WATER					
Total Metals Chromium (Cr)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Cobalt (Co)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper (Cu)-Total (mg/L)	<0.00050	0.00083	0.00081	0.00081	<0.00050
Iron (Fe)-Total (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
Lead (Pb)-Total (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium (Li)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Magnesium (Mg)-Total (mg/L)	1.06	1.50	1.48	1.46	<0.0050
Manganese (Mn)-Total (mg/L)	0.00067	0.00157	0.00184	0.00181	<0.00010
Mercury (Hg)-Total (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Molybdenum (Mo)-Total (mg/L)	0.000149	0.000244	0.000237	0.000243	<0.000050
Nickel (Ni)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Phosphorus (P)-Total (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050
Potassium (K)-Total (mg/L)	0.547	0.545	0.535	0.528	<0.050
Rubidium (Rb)-Total (mg/L)	0.00084	0.00074	0.00075	0.00080	<0.00020
Selenium (Se)-Total (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Silicon (Si)-Total (mg/L)	<0.10	0.31	0.29	0.29	<0.10
Silver (Ag)-Total (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)-Total (mg/L)	1.19	0.699	0.695	0.693	<0.050
Strontium (Sr)-Total (mg/L)	0.0127	0.0272	0.0255	0.0255	<0.00020
Sulfur (S)-Total (mg/L)	1.73	1.97	1.86	1.88	<0.50
Tellurium (Te)-Total (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Thallium (Tl)-Total (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Thorium (Th)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Tin (Sn)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)-Total (mg/L)	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030
Tungsten (W)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Uranium (U)-Total (mg/L)	0.000038	0.000049	0.000048	0.000045	<0.000010
Vanadium (V)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc (Zn)-Total (mg/L)	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Zirconium (Zr)-Total (mg/L)	<0.000060	<0.000060	<0.000060	<0.000060	<0.000060
Dissolved Metals Dissolved Mercury Filtration Location	FIELD	FIELD	FIELD	FIELD	FIELD
Dissolved Metals Filtration Location	FIELD	FIELD	FIELD	FIELD	FIELD
Aluminum (Al)-Dissolved (mg/L)	0.0015	0.0016	0.0016	0.0012	<0.0010
Antimony (Sb)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic (As)-Dissolved (mg/L)	0.00027	0.00024	0.00021	0.00020	<0.00010
Barium (Ba)-Dissolved (mg/L)	0.00285	0.00216	0.00214	0.00233	<0.00010
Beryllium (Be)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2194150-11				
	Description	Surface Water				
	Sampled Date					
	Sampled Time					
	Client ID	CREMP NOV EB-1				
Grouping	**Analyte**					
WATER						
Total Metals	Chromium (Cr)-Total (mg/L)	<0.00010				
	Cobalt (Co)-Total (mg/L)	<0.00010				
	Copper (Cu)-Total (mg/L)	<0.00050				
	Iron (Fe)-Total (mg/L)	<0.010				
	Lead (Pb)-Total (mg/L)	<0.000050				
	Lithium (Li)-Total (mg/L)	<0.0010				
	Magnesium (Mg)-Total (mg/L)	<0.0050				
	Manganese (Mn)-Total (mg/L)	<0.00010				
	Mercury (Hg)-Total (mg/L)	<0.0000050				
	Molybdenum (Mo)-Total (mg/L)	<0.000050				
	Nickel (Ni)-Total (mg/L)	<0.00050				
	Phosphorus (P)-Total (mg/L)	<0.050				
	Potassium (K)-Total (mg/L)	<0.050				
	Rubidium (Rb)-Total (mg/L)	<0.00020				
	Selenium (Se)-Total (mg/L)	<0.000050				
	Silicon (Si)-Total (mg/L)	<0.10				
	Silver (Ag)-Total (mg/L)	<0.000010				
	Sodium (Na)-Total (mg/L)	<0.050				
	Strontium (Sr)-Total (mg/L)	<0.00020				
	Sulfur (S)-Total (mg/L)	<0.50				
	Tellurium (Te)-Total (mg/L)	<0.00020				
	Thallium (Tl)-Total (mg/L)	<0.000010				
	Thorium (Th)-Total (mg/L)	<0.00010				
	Tin (Sn)-Total (mg/L)	<0.00010				
	Titanium (Ti)-Total (mg/L)	<0.00030				
	Tungsten (W)-Total (mg/L)	<0.00010				
	Uranium (U)-Total (mg/L)	<0.000010				
	Vanadium (V)-Total (mg/L)	<0.00050				
	Zinc (Zn)-Total (mg/L)	<0.0030				
	Zirconium (Zr)-Total (mg/L)	<0.000060				
Dissolved Metals	Dissolved Mercury Filtration Location	FIELD				
	Dissolved Metals Filtration Location	FIELD				
	Aluminum (Al)-Dissolved (mg/L)	<0.0010				
	Antimony (Sb)-Dissolved (mg/L)	<0.00010				
	Arsenic (As)-Dissolved (mg/L)	<0.00010				
	Barium (Ba)-Dissolved (mg/L)	<0.00010				
	Beryllium (Be)-Dissolved (mg/L)	<0.00010				

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2194150-1	L2194150-2	L2194150-3	L2194150-4	L2194150-5
Description	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water
Sampled Date	03-NOV-18	03-NOV-18	03-NOV-18	03-NOV-18	30-OCT-18
Sampled Time	14:27	15:02	10:30	11:15	14:47
Client ID	SP-118	SP-119	TPN-118	TPN-119	TPE-118
Grouping / **Analyte**					
WATER					
Dissolved Metals Bismuth (Bi)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron (B)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)-Dissolved (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Calcium (Ca)-Dissolved (mg/L)	4.10	4.40	2.25	2.23	2.69
Cesium (Cs)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	0.000014
Chromium (Cr)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Cobalt (Co)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper (Cu)-Dissolved (mg/L)	0.00052	0.00052	0.00032	0.00030	0.00034
Iron (Fe)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
Lead (Pb)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium (Li)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Magnesium (Mg)-Dissolved (mg/L)	1.37	1.41	0.928	0.907	1.04
Manganese (Mn)-Dissolved (mg/L)	0.00013	0.00015	0.00025	0.00024	0.00024
Mercury (Hg)-Dissolved (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Molybdenum (Mo)-Dissolved (mg/L)	0.000187	0.000197	0.000137	0.000136	0.000150
Nickel (Ni)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Phosphorus (P)-Dissolved (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050
Potassium (K)-Dissolved (mg/L)	0.573	0.572	0.510	0.492	0.528
Rubidium (Rb)-Dissolved (mg/L)	0.00088	0.00089	0.00079	0.00072	0.00088
Selenium (Se)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Silicon (Si)-Dissolved (mg/L)	0.137	0.139	<0.050	<0.050	0.052
Silver (Ag)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)-Dissolved (mg/L)	0.949	0.945	1.15	1.10	1.11
Strontium (Sr)-Dissolved (mg/L)	0.0213	0.0226	0.0111	0.0110	0.0123
Sulfur (S)-Dissolved (mg/L)	1.82	1.75	1.59	1.55	1.71
Tellurium (Te)-Dissolved (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Thallium (Tl)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Thorium (Th)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Tin (Sn)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)-Dissolved (mg/L)	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030
Tungsten (W)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Uranium (U)-Dissolved (mg/L)	0.000039	0.000041	0.000029	0.000029	0.000034
Vanadium (V)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc (Zn)-Dissolved (mg/L)	<0.0010	<0.0010	0.0019	<0.0010	<0.0010
Zirconium (Zr)-Dissolved (mg/L)	<0.000060	<0.000060	<0.000060	<0.000060	<0.000060

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2194150-6	L2194150-7	L2194150-8	L2194150-9	L2194150-10
Description	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water
Sampled Date	30-OCT-18	31-OCT-18	31-OCT-18		
Sampled Time	14:12	10:53	10:20		
Client ID	TPE-119	WAL-87	WAL-88	CREMP NOV DUP-1	CREMP NOV-DI-1
Grouping / **Analyte**					
WATER					
Dissolved Metals Bismuth (Bi)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron (B)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)-Dissolved (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Calcium (Ca)-Dissolved (mg/L)	2.63	4.99	4.91	5.13	<0.050
Cesium (Cs)-Dissolved (mg/L)	0.000013	<0.000010	<0.000010	<0.000010	<0.000010
Chromium (Cr)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Cobalt (Co)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper (Cu)-Dissolved (mg/L)	0.00035	0.00076	0.00072	0.00077	<0.00020
Iron (Fe)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
Lead (Pb)-Dissolved (mg/L)	<0.000050	0.000055	<0.000050	<0.000050	<0.000050
Lithium (Li)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Magnesium (Mg)-Dissolved (mg/L)	1.04	1.49	1.45	1.48	<0.0050
Manganese (Mn)-Dissolved (mg/L)	0.00028	0.00013	0.00011	0.00012	<0.00010
Mercury (Hg)-Dissolved (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Molybdenum (Mo)-Dissolved (mg/L)	0.000138	0.000248	0.000249	0.000224	<0.000050
Nickel (Ni)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Phosphorus (P)-Dissolved (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050
Potassium (K)-Dissolved (mg/L)	0.533	0.530	0.517	0.549	<0.050
Rubidium (Rb)-Dissolved (mg/L)	0.00089	0.00083	0.00075	0.00087	<0.00020
Selenium (Se)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Silicon (Si)-Dissolved (mg/L)	0.051	0.279	0.271	0.248	<0.050
Silver (Ag)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)-Dissolved (mg/L)	1.13	0.700	0.690	0.725	<0.050
Strontium (Sr)-Dissolved (mg/L)	0.0122	0.0257	0.0251	0.0238	<0.00020
Sulfur (S)-Dissolved (mg/L)	1.42	1.59	1.67	1.87	<0.50
Tellurium (Te)-Dissolved (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Thallium (Tl)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Thorium (Th)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Tin (Sn)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)-Dissolved (mg/L)	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030
Tungsten (W)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Uranium (U)-Dissolved (mg/L)	0.000032	0.000045	0.000042	0.000052	<0.000010
Vanadium (V)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc (Zn)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Zirconium (Zr)-Dissolved (mg/L)	<0.000060	<0.000060	<0.000060	<0.000060	<0.000060

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2194150-11				
	Description	Surface Water				
	Sampled Date					
	Sampled Time					
	Client ID	CREMP NOV EB-1				
Grouping	**Analyte**					
WATER						
Dissolved Metals	Bismuth (Bi)-Dissolved (mg/L)	<0.000050				
	Boron (B)-Dissolved (mg/L)	<0.010				
	Cadmium (Cd)-Dissolved (mg/L)	<0.0000050				
	Calcium (Ca)-Dissolved (mg/L)	<0.050				
	Cesium (Cs)-Dissolved (mg/L)	<0.000010				
	Chromium (Cr)-Dissolved (mg/L)	<0.00010				
	Cobalt (Co)-Dissolved (mg/L)	<0.00010				
	Copper (Cu)-Dissolved (mg/L)	<0.00020				
	Iron (Fe)-Dissolved (mg/L)	<0.010				
	Lead (Pb)-Dissolved (mg/L)	<0.000050				
	Lithium (Li)-Dissolved (mg/L)	<0.0010				
	Magnesium (Mg)-Dissolved (mg/L)	<0.0050				
	Manganese (Mn)-Dissolved (mg/L)	<0.00010				
	Mercury (Hg)-Dissolved (mg/L)	<0.0000050				
	Molybdenum (Mo)-Dissolved (mg/L)	<0.000050				
	Nickel (Ni)-Dissolved (mg/L)	<0.00050				
	Phosphorus (P)-Dissolved (mg/L)	<0.050				
	Potassium (K)-Dissolved (mg/L)	<0.050				
	Rubidium (Rb)-Dissolved (mg/L)	<0.00020				
	Selenium (Se)-Dissolved (mg/L)	<0.000050				
	Silicon (Si)-Dissolved (mg/L)	<0.050				
	Silver (Ag)-Dissolved (mg/L)	<0.000010				
	Sodium (Na)-Dissolved (mg/L)	<0.050				
	Strontium (Sr)-Dissolved (mg/L)	<0.00020				
	Sulfur (S)-Dissolved (mg/L)	<0.50				
	Tellurium (Te)-Dissolved (mg/L)	<0.00020				
	Thallium (Tl)-Dissolved (mg/L)	<0.000010				
	Thorium (Th)-Dissolved (mg/L)	<0.00010				
	Tin (Sn)-Dissolved (mg/L)	<0.00010				
	Titanium (Ti)-Dissolved (mg/L)	<0.00030				
	Tungsten (W)-Dissolved (mg/L)	<0.00010				
	Uranium (U)-Dissolved (mg/L)	<0.000010				
	Vanadium (V)-Dissolved (mg/L)	<0.00050				
	Zinc (Zn)-Dissolved (mg/L)	<0.0010				
	Zirconium (Zr)-Dissolved (mg/L)	<0.000060				

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Matrix Spike	Dissolved Organic Carbon	MS-B	L2194150-1, -2, -3, -4, -5, -6
Matrix Spike	Dissolved Organic Carbon	MS-B	L2194150-11
Matrix Spike	Total Organic Carbon	MS-B	L2194150-1, -2, -3, -4, -5, -6
Matrix Spike	Total Organic Carbon	MS-B	L2194150-1, -2, -3, -4, -5, -6
Matrix Spike	Total Organic Carbon	MS-B	L2194150-8
Matrix Spike	Total Organic Carbon	MS-B	L2194150-8
Matrix Spike	Total Organic Carbon	MS-B	L2194150-8
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L2194150-10, -11, -9
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L2194150-10, -11, -9
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L2194150-10, -11, -9
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L2194150-10, -11, -9
Matrix Spike	Calcium (Ca)-Total	MS-B	L2194150-1, -10, -11, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Magnesium (Mg)-Total	MS-B	L2194150-1, -10, -11, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Strontium (Sr)-Total	MS-B	L2194150-1, -10, -11, -2, -3, -4, -5, -6, -7, -8, -9

Qualifiers for Individual Parameters Listed:

Qualifier	Description
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RRV	Reported Result Verified By Repeat Analysis

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ALK-TITR-VA	Water	Alkalinity Species by Titration	APHA 2320 Alkalinity

This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.

BR-L-IC-N-VA	Water	Bromide in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

CARBONS-DOC-VA	Water	Dissolved organic carbon by combustion	APHA 5310B

This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)". Dissolved carbon (DOC) fractions are determined by filtering the sample through a 0.45 micron membrane filter prior to analysis.

CARBONS-TOC-VA	Water	Total organic carbon by combustion	APHA 5310B TOTAL ORGANIC CARBON (TOC)

This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)".

CL-L-IC-N-VA	Water	Chloride in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

CN-FREE-L-CFA-VA	Water	Low Level Free Cyanide in water by CFA	ASTM 7237

This analysis is carried out using procedures adapted from ASTM Method 7237 "Free Cyanide with Flow Injection Analysis (FIA) Utilizing Gas Diffusion Separation and Amperometric Detection". Free cyanide is determined by in-line gas diffusion at pH 6 with final determination by colourimetric analysis.

CN-T-L-CFA-VA	Water	Low Level Total Cyanide in water by CFA	ISO 14403:2002

This analysis is carried out using procedures adapted from ISO Method 14403:2002 "Determination of Total Cyanide using Flow Analysis (FIA and CFA)". Total or strong acid dissociable (SAD) cyanide is determined by in-line UV digestion along with sample distillation and final determination by colourimetric analysis. Method Limitation: This method is susceptible to interference from thiocyanate (SCN). If SCN is present in the sample, there could be a positive interference with this method, but it would be less than 1% and could be as low as zero.

EC-PCT-VA	Water	Conductivity (Automated)	APHA 2510 Auto. Conduc.

This analysis is carried out using procedures adapted from APHA Method 2510 "Conductivity". Conductivity is determined using a conductivity electrode.

EC-SCREEN-VA	Water	Conductivity Screen (Internal Use Only)	APHA 2510

Qualitative analysis of conductivity where required during preparation of other tests - e.g. TDS, metals, etc.

F-IC-N-VA	Water	Fluoride in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

HARDNESS-CALC-VA	Water	Hardness	APHA 2340B

Reference Information

Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

HG-D-CVAA-VA Water Diss. Mercury in Water by CVAAS or CVAFS APHA 3030B/EPA 1631E (mod)

Water samples are filtered (0.45 um), preserved with hydrochloric acid, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

HG-T-CVAA-VA Water Total Mercury in Water by CVAAS or CVAFS EPA 1631E (mod)

Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

MET-D-CCMS-VA Water Dissolved Metals in Water by CRC ICPMS APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

MET-T-CCMS-VA Water Total Metals in Water by CRC ICPMS EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

NH3-F-VA Water Ammonia in Water by Fluorescence J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

NO2-L-IC-N-VA Water Nitrite in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

NO3-L-IC-N-VA Water Nitrate in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

P-T-PRES-COL-VA Water Total P in Water by Colour APHA 4500-P Phosphorus

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is determined colourimetrically after persulphate digestion of the sample.
Samples with very high dissolved solids (i.e. seawaters, brackish waters) may produce a negative bias by this method. Alternate methods are available for these types of samples.

Arsenic (5+), at elevated levels, is a positive interference on colourimetric phosphate analysis.

P-TD-COL-VA Water Total Dissolved P in Water by Colour APHA 4500-P Phosphorous

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Dissolved Phosphorus is determined colourimetrically after persulphate digestion of a sample that has been lab or field filtered through a 0.45 micron membrane filter.
Samples with very high dissolved solids (i.e. seawaters, brackish waters) may produce a negative bias by this method. Alternate methods are available for these types of samples.

Arsenic (5+), at elevated levels, is a positive interference on colourimetric phosphate analysis.

PH-PCT-VA Water pH by Meter (Automated) APHA 4500-H pH Value

This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode

It is recommended that this analysis be conducted in the field.

PO4-DO-COL-VA Water Diss. Orthophosphate in Water by Colour APHA 4500-P Phosphorus

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.
Samples with very high dissolved solids (i.e. seawaters, brackish waters) may produce a negative bias by this method. Alternate methods are available for these types of samples.

Arsenic (5+), at elevated levels, is a positive interference on colourimetric phosphate analysis.

SILICATE-COL-VA Water Silicate by Colourimetric analysis APHA 4500-SiO2 E.

This analysis is carried out using procedures adapted from APHA Method 4500-SiO2 E. "Silica". Silicate (molybdate-reactive silica) is determined by the molybdosilicate-heteropoly blue colourimetric method. Arsenic (5+) above 100 mg/L is a negative interference on this test.

SO4-IC-N-VA Water Sulfate in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

Reference Information

TDS-LOW-VA	Water	Low Level TDS (3.0mg/L) by Gravimetric	APHA 2540C

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total dissolved solids (TDS) are determined by filtering a sample through a glass fibre filter, TDS is determined by evaporating the filtrate to dryness at 180 degrees celsius.

TKN-F-VA	Water	TKN in Water by Fluorescence	APHA 4500-NORG D.

This analysis is carried out using procedures adapted from APHA Method 4500-Norg D. "Block Digestion and Flow Injection Analysis". Total Kjeldahl Nitrogen is determined using block digestion followed by Flow-injection analysis with fluorescence detection.

TSS-LOW-VA	Water	Total Suspended Solids by Grav. (1 mg/L)	APHA 2540D

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total suspended solids (TSS) are determined by filtering a sample through a glass fibre filter, TSS is determined by drying the filter at 104 degrees celsius.
Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.

TURBIDITY-VA	Water	Turbidity by Meter	APHA 2130 Turbidity

This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

ALS Environmental

Chain of Custody / Analytical Request Form
Canada Toll Free: 1 800 668 9878
www.alsglobal.com

COC # _____

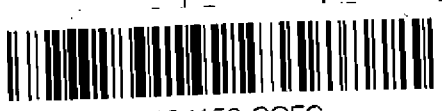
Page 1 of 1

Report To		Report Format / Distribution		Service Requested (Rush for routine analysis subject to availability)
Company:	Azimuth Consulting Group	☑ Standard ☐ Other		◉ Regular (Standard Turnaround Times - Business Days)
Contact:	Eric Franz	☑ PDF ☑ Excel ☐ Digital ☐ Fax		○ Priority (2-4 Business Days) - 50% Surcharge - Contact ALS to Confirm TAT
Address:	218-2902 West Broadway	Email 1:	efranz@azimuthgroup.ca	○ Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT
	Vancouver, BC V6K2G8	Email 2:	marie-pier.marcil@agnicoeagle.com	○ Same Day or Weekend Emergency - Contact ALS to Confirm TAT
Phone:	604-730-1220 Fax:	Email 3:	robin.allard@agnicoeagle.com	
Invoice To	Same as Report ? ☑ Yes ☐ No	Client / Project Information		
Hardcopy of Invoice with Report?	☐ Yes ☑ No	Job #:	Meadowbank CREMP - Surfacewater	
Company:		PO / AFE:		
Contact:		LSD:		
Address:				
Phone:	Fax:	Quote #:	Q39503	
Lab Work Order # (lab use only)		ALS Contact:	Brent Mack	Sampler: ENV

Analysis Request

Please indicate below Filtered, Preserved or both (F, P, F/P)

Sample #	Sample Identification (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Conventionals** see notes (—)	TSS-Low, TDS-Low (—)	TOC, Ammonia, TKN, Total P (P)	DOC (F/P)	T-CN (Low), Free CN (Low) (P)	Total mercury (P)	Dissolved mercury (F/P)	Total Metals (P)	Dissolved metals (F/P)	Chlorophyll-a (F)			Number of Containers
	SP-118	03-Nov-18	14:27	Surface Water	X	X	X	X	X	X	X	X	X	X			10
	SP-119	03-Nov-18	15:02	Surface Water	X	X	X	X	X	X	X	X	X	X			10
	TPN-118	03-Nov-18	10:30	Surface Water	X	X	X	X	X	X	X	X	X	X			10
	TPN-119	03-Nov-18	11:15	Surface Water	X	X	X	X	X	X	X	X	X	X			10
	TPE-118	30-Oct-18	14:47	Surface Water	X	X	X	X	X	X	X	X	X	X			10
	TPE-119	30-Oct-18	14:12	Surface Water	X	X	X	X	X	X	X	X	X	X			10
	WAL-87	31-Oct-18	10:53	Surface Water	X	X	X	X	X	X	X	X	X	X			10
	WAL-88	31-Oct-18	10:20	Surface Water	X	X	X	X	X	X	X	X	X	X			10
	CREMP NOV DUP-1			Surface Water	X	X	X	X	X	X	X	X	X	X			10
	CREMP NOV-DI-1				X	X	X	X	X	X	X	X	X				9
	CREMP NOV EB-1				X	X	X	X	X	X	X	X	X				9



Special Instructions / Regulations with water or land use (CCME-Freshwater Aquatic Life/BC CSR - Commercial/AB Tier 1 - Natural, etc) / Hazardous Details

**Conventionals includes: Alk Species, pH, EC, Turbidity, Conductivity, Anions (F, NO2, NO3, Br, SO4), low-level Chloride, Silicate, TD-P, and Ortho-PO4.

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.

By the use of this form the user acknowledges and agrees with the Terms and Conditions as provided on a separate Excel tab.

Also provided on another Excel tab are the ALS location addresses, phone numbers and sample container / preservation / holding time table for common analyses.

SHIPMENT RELEASE (client use)			SHIPMENT RECEPTION (lab use only)				SHIPMENT VERIFICATION (lab use only)			
Released by:	Date (dd-mmm-yy)	Time (hh-mm)	Received by:	Date:	Time:	Temperature:	Verified by:	Date:	Time:	Observations: Yes / No ? If Yes add SIF
Isabelle Couture	5-Nov-18	9:00	JC AZ	NOV - 8 2018	840Am	13,13,12 °C				

GENF 20.00 Front

AZIMUTH CONSULTING GROUP INC.
ATTN: Eric Franz
218 - 2902 West Broadway
Vancouver BC V6K 2G8

Date Received: 13-NOV-18
Report Date: 27-NOV-18 15:11 (MT)
Version: FINAL

Client Phone: 604-730-1220

Certificate of Analysis

Lab Work Order #: L2195956

Project P.O. #: NOT SUBMITTED
Job Reference: MEADOWBANK CREMP -SURFACEWATER
C of C Numbers:
Legal Site Desc:

Brent Mack, B.Sc.
Account Manager

[This report shall not be reproduced except in full without the written authority of the Laboratory.]

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2195956-1	L2195956-2			
	Description	Surface Water	Surface Water			
	Sampled Date	05-NOV-18	05-NOV-18			
	Sampled Time	15:53	16:10			
	Client ID	PDL-71	PDL-72			
Grouping	**Analyte**					
WATER						
Physical Tests	Conductivity (uS/cm)	21.9	22.1			
	Hardness (as CaCO3) (mg/L)	9.33	9.50			
	pH (pH)	7.14	7.14			
	Total Suspended Solids (mg/L)	<1.0	<1.0			
	Total Dissolved Solids (mg/L)	16.2	15.5			
	Turbidity (NTU)	0.12	0.12			
Anions and Nutrients	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	7.7	8.0			
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<1.0	<1.0			
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0	<1.0			
	Alkalinity, Total (as CaCO3) (mg/L)	7.7	8.0			
	Ammonia, Total (as N) (mg/L)	<0.0050	<0.0050			
	Bromide (Br) (mg/L)	<0.050	<0.050			
	Chloride (Cl) (mg/L)	0.67	0.67			
	Fluoride (F) (mg/L)	0.043	0.043			
	Nitrate (as N) (mg/L)	<0.0050	<0.0050			
	Nitrite (as N) (mg/L)	<0.0010	<0.0010			
	Total Kjeldahl Nitrogen (mg/L)	0.080	0.079			
	Orthophosphate-Dissolved (as P) (mg/L)	<0.0010	<0.0010			
	Phosphorus (P)-Total Dissolved (mg/L)	<0.0020	<0.0020			
	Phosphorus (P)-Total (mg/L)	<0.0020	<0.0020			
	Silicate (as SiO2) (mg/L)	<0.50	<0.50			
	Sulfate (SO4) (mg/L)	1.79	1.79			
Cyanides	Cyanide, Total (mg/L)	<0.0010	<0.0010			
	Cyanide, Free (mg/L)	<0.0010	<0.0010			
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	1.59	1.53			
	Total Organic Carbon (mg/L)	1.58	1.58			
Total Metals	Aluminum (Al)-Total (mg/L)	0.0049	<0.0030			
	Antimony (Sb)-Total (mg/L)	<0.00010	<0.00010			
	Arsenic (As)-Total (mg/L)	0.00016	0.00018			
	Barium (Ba)-Total (mg/L)	0.00201	0.00198			
	Beryllium (Be)-Total (mg/L)	<0.00010	<0.00010			
	Bismuth (Bi)-Total (mg/L)	<0.000050	<0.000050			
	Boron (B)-Total (mg/L)	<0.010	<0.010			
	Cadmium (Cd)-Total (mg/L)	<0.0000050	<0.0000050			
	Calcium (Ca)-Total (mg/L)	2.28	2.20			
	Cesium (Cs)-Total (mg/L)	<0.000010	<0.000010			

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2195956-1	L2195956-2			
	Description	Surface Water	Surface Water			
	Sampled Date	05-NOV-18	05-NOV-18			
	Sampled Time	15:53	16:10			
	Client ID	PDL-71	PDL-72			
Grouping	**Analyte**					
WATER						
Total Metals	Chromium (Cr)-Total (mg/L)	<0.00010	<0.00010			
	Cobalt (Co)-Total (mg/L)	<0.00010	<0.00010			
	Copper (Cu)-Total (mg/L)	<0.00050	<0.00050			
	Iron (Fe)-Total (mg/L)	<0.010	<0.010			
	Lead (Pb)-Total (mg/L)	<0.000050	<0.000050			
	Lithium (Li)-Total (mg/L)	<0.0010	<0.0010			
	Magnesium (Mg)-Total (mg/L)	0.876	0.868			
	Manganese (Mn)-Total (mg/L)	0.00104	0.00106			
	Mercury (Hg)-Total (mg/L)	<0.0000050	<0.0000050			
	Molybdenum (Mo)-Total (mg/L)	0.000053	0.000053			
	Nickel (Ni)-Total (mg/L)	0.00053	0.00055			
	Phosphorus (P)-Total (mg/L)	<0.050	<0.050			
	Potassium (K)-Total (mg/L)	0.359	0.351			
	Rubidium (Rb)-Total (mg/L)	0.00049	0.00050			
	Selenium (Se)-Total (mg/L)	<0.000050	<0.000050			
	Silicon (Si)-Total (mg/L)	0.15	0.15			
	Silver (Ag)-Total (mg/L)	<0.000010	<0.000010			
	Sodium (Na)-Total (mg/L)	0.528	0.518			
	Strontium (Sr)-Total (mg/L)	0.00963	0.00961			
	Sulfur (S)-Total (mg/L)	0.64	0.58			
	Tellurium (Te)-Total (mg/L)	<0.00020	<0.00020			
	Thallium (Tl)-Total (mg/L)	<0.000010	<0.000010			
	Thorium (Th)-Total (mg/L)	<0.00010	<0.00010			
	Tin (Sn)-Total (mg/L)	<0.00010	<0.00010			
	Titanium (Ti)-Total (mg/L)	<0.00030	<0.00030			
	Tungsten (W)-Total (mg/L)	<0.00010	<0.00010			
	Uranium (U)-Total (mg/L)	0.000021	0.000021			
	Vanadium (V)-Total (mg/L)	<0.00050	<0.00050			
	Zinc (Zn)-Total (mg/L)	<0.0030	<0.0030			
	Zirconium (Zr)-Total (mg/L)	<0.000060	<0.000060			
Dissolved Metals	Dissolved Mercury Filtration Location	FIELD	FIELD			
	Dissolved Metals Filtration Location	FIELD	FIELD			
	Aluminum (Al)-Dissolved (mg/L)	0.0011	0.0014			
	Antimony (Sb)-Dissolved (mg/L)	<0.00010	<0.00010			
	Arsenic (As)-Dissolved (mg/L)	0.00013	0.00013			
	Barium (Ba)-Dissolved (mg/L)	0.00197	0.00198			
	Beryllium (Be)-Dissolved (mg/L)	<0.00010	<0.00010			

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2195956-1	L2195956-2			
	Description	Surface Water	Surface Water			
	Sampled Date	05-NOV-18	05-NOV-18			
	Sampled Time	15:53	16:10			
	Client ID	PDL-71	PDL-72			
Grouping	**Analyte**					
WATER						
Dissolved Metals	Bismuth (Bi)-Dissolved (mg/L)	<0.000050	<0.000050			
	Boron (B)-Dissolved (mg/L)	<0.010	<0.010			
	Cadmium (Cd)-Dissolved (mg/L)	<0.0000050	<0.0000050			
	Calcium (Ca)-Dissolved (mg/L)	2.35	2.39			
	Cesium (Cs)-Dissolved (mg/L)	<0.000010	<0.000010			
	Chromium (Cr)-Dissolved (mg/L)	<0.00010	<0.00010			
	Cobalt (Co)-Dissolved (mg/L)	<0.00010	<0.00010			
	Copper (Cu)-Dissolved (mg/L)	0.00036	0.00042			
	Iron (Fe)-Dissolved (mg/L)	<0.010	<0.010			
	Lead (Pb)-Dissolved (mg/L)	0.000094	<0.000050			
	Lithium (Li)-Dissolved (mg/L)	<0.0010	<0.0010			
	Magnesium (Mg)-Dissolved (mg/L)	0.842	0.854			
	Manganese (Mn)-Dissolved (mg/L)	0.00011	0.00011			
	Mercury (Hg)-Dissolved (mg/L)	<0.0000050	<0.0000050			
	Molybdenum (Mo)-Dissolved (mg/L)	<0.000050	0.000057			
	Nickel (Ni)-Dissolved (mg/L)	<0.00050	0.00058			
	Phosphorus (P)-Dissolved (mg/L)	<0.050	<0.050			
	Potassium (K)-Dissolved (mg/L)	0.370	0.383			
	Rubidium (Rb)-Dissolved (mg/L)	0.00045	0.00051			
	Selenium (Se)-Dissolved (mg/L)	<0.000050	<0.000050			
	Silicon (Si)-Dissolved (mg/L)	0.118	0.113			
	Silver (Ag)-Dissolved (mg/L)	<0.000010	<0.000010			
	Sodium (Na)-Dissolved (mg/L)	0.529	0.541			
	Strontium (Sr)-Dissolved (mg/L)	0.00997	0.0102			
	Sulfur (S)-Dissolved (mg/L)	0.65	0.60			
	Tellurium (Te)-Dissolved (mg/L)	<0.00020	<0.00020			
	Thallium (Tl)-Dissolved (mg/L)	<0.000010	<0.000010			
	Thorium (Th)-Dissolved (mg/L)	<0.00010	<0.00010			
	Tin (Sn)-Dissolved (mg/L)	<0.00010	<0.00010			
	Titanium (Ti)-Dissolved (mg/L)	<0.00030	<0.00030			
	Tungsten (W)-Dissolved (mg/L)	<0.00010	<0.00010			
	Uranium (U)-Dissolved (mg/L)	0.000018	0.000017			
	Vanadium (V)-Dissolved (mg/L)	<0.00050	<0.00050			
	Zinc (Zn)-Dissolved (mg/L)	<0.0010	<0.0010			
	Zirconium (Zr)-Dissolved (mg/L)	<0.000060	<0.000060			
Speciated Metals	Arsenate (As V) (ug/L)	<0.020				
	Arsenite (As III) (ug/L)	0.037				

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2195956-1	L2195956-2			
	Description	Surface Water	Surface Water			
	Sampled Date	05-NOV-18	05-NOV-18			
	Sampled Time	15:53	16:10			
	Client ID	PDL-71	PDL-72			
Grouping	**Analyte**					
WATER						
Speciated Metals	Dimethylarsinic Acid (DMA, as As) (ug/L)	<0.020				
	Monomethylarsonic Acid (MMA, as As) (ug/L)	<0.020				
	Arsenobetaine (AsB, as As) (ug/L)	<0.050				

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Matrix Spike	Fluoride (F)	MS-B	L2195956-1, -2
Matrix Spike	Nitrate (as N)	MS-B	L2195956-1, -2
Matrix Spike	Silicate (as SiO2)	MS-B	L2195956-1, -2

Qualifiers for Individual Parameters Listed:

Qualifier	Description
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ALK-TITR-VA	Water	Alkalinity Species by Titration	APHA 2320 Alkalinity

This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.

AS-SPEC-HPLC/CCMS-VA Water Arsenic Species in Water by HPLC/CCMS USGS WRIR 02-4144

Speciated Arsenic (As) Analysis is by reverse phase HPLC-ICPMS. Sample handling, preservation and holding times outlined in USGS Report 02-4144 and AWWA Preservation of Arsenic Species, 2006. Instrumental analysis based on Afton et al, Journal of Chromatography A, 1208 (2008) 156-163 and Agilent Technologies application notes. Filtration is conducted prior to preservation. Results for unfiltered, preserved samples may be elevated due to extraction of arsenic species from particulate matter in the samples.
Elevated iron (~100+ ppm) concentrations or sulfidic water can introduce biases to the reported results for some arsenic species.

BR-L-IC-N-VA Water Bromide in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

CARBONS-DOC-VA Water Dissolved organic carbon by combustion APHA 5310B

This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)". Dissolved carbon (DOC) fractions are determined by filtering the sample through a 0.45 micron membrane filter prior to analysis.

CARBONS-TOC-VA Water Total organic carbon by combustion APHA 5310B TOTAL ORGANIC CARBON (TOC)

This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)".

CL-L-IC-N-VA Water Chloride in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

CN-FREE-L-CFA-VA Water Low Level Free Cyanide in water by CFA ASTM 7237

This analysis is carried out using procedures adapted from ASTM Method 7237 "Free Cyanide with Flow Injection Analysis (FIA) Utilizing Gas Diffusion Separation and Amperometric Detection". Free cyanide is determined by in-line gas diffusion at pH 6 with final determination by colourimetric analysis.

CN-T-L-CFA-VA Water Low Level Total Cyanide in water by CFA ISO 14403:2002

This analysis is carried out using procedures adapted from ISO Method 14403:2002 "Determination of Total Cyanide using Flow Analysis (FIA and CFA)". Total or strong acid dissociable (SAD) cyanide is determined by in-line UV digestion along with sample distillation and final determination by colourimetric analysis. Method Limitation: This method is susceptible to interference from thiocyanate (SCN). If SCN is present in the sample, there could be a positive interference with this method, but it would be less than 1% and could be as low as zero.

EC-PCT-VA Water Conductivity (Automated) APHA 2510 Auto. Conduc.

This analysis is carried out using procedures adapted from APHA Method 2510 "Conductivity". Conductivity is determined using a conductivity electrode.

EC-SCREEN-VA Water Conductivity Screen (Internal Use Only) APHA 2510

Qualitative analysis of conductivity where required during preparation of other tests - e.g. TDS, metals, etc.

F-IC-N-VA Water Fluoride in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

HARDNESS-CALC-VA Water Hardness APHA 2340B

Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

HG-D-CVAA-VA Water Diss. Mercury in Water by CVAAS or CVAFS APHA 3030B/EPA 1631E (mod)

Water samples are filtered (0.45 um), preserved with hydrochloric acid, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

HG-T-CVAA-VA Water Total Mercury in Water by CVAAS or CVAFS EPA 1631E (mod)

Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

MET-D-CCMS-VA Water Dissolved Metals in Water by CRC ICPMS APHA 3030B/6020A (mod)

Reference Information

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

MET-T-CCMS-VA Water Total Metals in Water by CRC ICPMS EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

NH3-F-VA Water Ammonia in Water by Fluorescence J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

NO2-L-IC-N-VA Water Nitrite in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

NO3-L-IC-N-VA Water Nitrate in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

P-T-PRES-COL-VA Water Total P in Water by Colour APHA 4500-P Phosphorus

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is determined colourimetrically after persulphate digestion of the sample.
Samples with very high dissolved solids (i.e. seawaters, brackish waters) may produce a negative bias by this method. Alternate methods are available for these types of samples.

Arsenic (5+), at elevated levels, is a positive interference on colourimetric phosphate analysis.

P-TD-COL-VA Water Total Dissolved P in Water by Colour APHA 4500-P Phosphorous

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Dissolved Phosphorus is determined colourimetrically after persulphate digestion of a sample that has been lab or field filtered through a 0.45 micron membrane filter.
Samples with very high dissolved solids (i.e. seawaters, brackish waters) may produce a negative bias by this method. Alternate methods are available for these types of samples.

Arsenic (5+), at elevated levels, is a positive interference on colourimetric phosphate analysis.

PH-PCT-VA Water pH by Meter (Automated) APHA 4500-H pH Value

This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode

It is recommended that this analysis be conducted in the field.

PO4-DO-COL-VA Water Diss. Orthophosphate in Water by Colour APHA 4500-P Phosphorus

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.
Samples with very high dissolved solids (i.e. seawaters, brackish waters) may produce a negative bias by this method. Alternate methods are available for these types of samples.

Arsenic (5+), at elevated levels, is a positive interference on colourimetric phosphate analysis.

SILICATE-COL-VA Water Silicate by Colourimetric analysis APHA 4500-SiO2 E.

This analysis is carried out using procedures adapted from APHA Method 4500-SiO2 E. "Silica". Silicate (molybdate-reactive silica) is determined by the molybdosilicate-heteropoly blue colourimetric method. Arsenic (5+) above 100 mg/L is a negative interference on this test.

SO4-IC-N-VA Water Sulfate in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

TDS-LOW-VA Water Low Level TDS (3.0mg/L) by Gravimetric APHA 2540C

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total dissolved solids (TDS) are determined by filtering a sample through a glass fibre filter, TDS is determined by evaporating the filtrate to dryness at 180 degrees celsius.

TKN-F-VA Water TKN in Water by Fluorescence APHA 4500-NORG D.

This analysis is carried out using procedures adapted from APHA Method 4500-Norg D. "Block Digestion and Flow Injection Analysis". Total Kjeldahl Nitrogen is determined using block digestion followed by Flow-injection analysis with fluorescence detection.

TSS-LOW-VA Water Total Suspended Solids by Grav. (1 mg/L) APHA 2540D

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total suspended solids (TSS) are determined by filtering a sample through a glass fibre filter, TSS is determined by drying the filter at 104 degrees celsius.

Reference Information

Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.

TURBIDITY-VA	Water	Turbidity by Meter	APHA 2130 Turbidity

This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

ALS Environmental

L2195956-COFC

COC # _____

Page 1 of 1

Report To		Report Format / Distribution		Turnaround Time (TAT) Requested (Rush for routine analysis subject to availability)
Company:	Azimuth Consulting Group	☑ Standard ☐ Other		☑ Regular (Standard Turnaround Times - Business Days)
Contact:	Eric Franz	☑ PDF ☑ Excel ☐ Digital ☐ Fax		○ Priority (2-4 Business Days) - 50% Surcharge - Contact ALS to Confirm TAT
Address:	218-2902 West Broadway	Email 1:	efranz@azimuthgroup.ca	○ Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT
	Vancouver, BC V6K2G8	Email 2:	marie-pier.marcil@agnicoeagle.com	○ Same Day or Weekend Emergency - Contact ALS to Confirm TAT
Phone:	604-730-1220 Fax:	Email 3:	robin.allard@agnicoeagle.com	
Invoice To	Same as Report ? ☑ Yes ☐ No	Client / Project Information		Analysis Request
Hardcopy of Invoice with Report?	☐ Yes ☑ No	Job #:	Meadowbank CREMP - Surfacewater	Please indicate below Filtered, Preserved or both (F, P, F/P)
Company:		PO / AFE:		
Contact:		LSD:		
Address:				
Phone:	Fax:	Quote #:	Q39503	
Lab Work Order # (lab use only)		ALS Contact:	Brent Mack	Sampler: ENV

Sample #	Sample Identification (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Conventionals** see notes	TSS-Low, TDS-Low	TOC, Ammonia, TKN, Total P	DOC	T-CN (Low), Free CN (Low)	Total mercury	Dissolved mercury	Total Metals	Dissolved metals	Chlorophyll-a	Arsenic speciation		Number of Containers
							P	F/P	P	P	F/P	P	F/P	F			
	PDL-71	05-Nov-18	15:53	Surface Water	X	X	X	X	X	X	X	X	X		X		10
	PDL-72	05-Nov-18	16:10	Surface Water	X	X	X	X	X	X	X	X	X				9

Special Instructions / Regulations with water or land use (CCME-Freshwater Aquatic Life/BC CSR - Commercial/AB Tier 1 - Natural, etc) / Hazardous Details

**Conventionals includes: Alk Species, pH, EC, Turbidity, Conductivity, Anions (F, NO2, NO3, Br, SO4), low-level Chloride, Silicate, TD-P, and Ortho-PO4.

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.

By the use of this form the user acknowledges and agrees with the Terms and Conditions as provided on a separate Excel tab.

Also provided on another Excel tab are the ALS location addresses, phone numbers and sample container / preservation / holding time table for common analyses.

SHIPMENT RELEASE (client use)			SHIPMENT RECEPTION (lab use only)				SHIPMENT VERIFICATION (lab use only)			
Released by:	Date (dd-mmm-yy)	Time (hh-mm)	Received by:	Date:	Time:	Temperature:	Verified by:	Date:	Time:	Observations: Yes / No ? If Yes add SIF
Isabelle Couture	5-Nov-18	9:00	HA	11/13	3pm	8.2 °C				

GENF 20.00 Front

AZIMUTH CONSULTING GROUP INC.
ATTN: Eric Franz
218 - 2902 West Broadway
Vancouver BC V6K 2G8

Date Received: 29-NOV-18
Report Date: 12-DEC-18 12:33 (MT)
Version: FINAL

Client Phone: 604-730-1220

Certificate of Analysis

Lab Work Order #: L2203338

Project P.O. #: NOT SUBMITTED
Job Reference: MEADOWBANK CREMP-SURFACEWATER
C of C Numbers:
Legal Site Desc:

Brent Mack, B.Sc.
Account Manager

[This report shall not be reproduced except in full without the written authority of the Laboratory.]

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2203338-1	L2203338-2	L2203338-3	L2203338-4	L2203338-5
Description	surface water	surface water	surface water	surface water	surface water
Sampled Date	25-NOV-18	25-NOV-18	31-OCT-18	03-NOV-18	03-NOV-18
Sampled Time	11:41	11:03			
Client ID	INUGG-106	INUGG-107	NOV-DUP-1	SP-118	SP-119
Grouping **Analyte**					
FILTER					
Plant Pigments Chlorophyll a (ug/L)	0.656	0.719	1.31	0.926	0.910

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2203338-6	L2203338-7	L2203338-8	L2203338-9	L2203338-10
Description	surface water	surface water	surface water	surface water	surface water
Sampled Date	31-OCT-18	31-OCT-18	31-OCT-18	31-OCT-18	03-NOV-18
Sampled Time					
Client ID	WAL-87	WAL-88	TPE-118	TPE-119	TPN-118
Grouping **Analyte**					
FILTER					
Plant Pigments Chlorophyll a (ug/L)	1.40	1.27	0.553	0.409	0.618

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2203338-11	L2203338-12	L2203338-13		
	Description	surface water	surface water	surface water		
	Sampled Date	03-NOV-18	05-NOV-18	05-NOV-18		
	Sampled Time					
	Client ID	TPN-119	PDL-71	PDL-72		
Grouping	**Analyte**					
FILTER						
Plant Pigments	Chlorophyll a (ug/L)	0.553	0.664	0.493		

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2203338-1	L2203338-2			
	Description	surface water	surface water			
	Sampled Date	25-NOV-18	25-NOV-18			
	Sampled Time	11:41	11:03			
	Client ID	INUGG-106	INUGG-107			
Grouping	**Analyte**					
WATER						
Physical Tests	Conductivity (uS/cm)	15.8	15.3			
	Hardness (as CaCO3) (mg/L)	6.19	5.83			
	pH (pH)	6.94	6.94			
	Total Suspended Solids (mg/L)	<1.0	<1.0			
	Total Dissolved Solids (mg/L)	9.5	9.3			
	Turbidity (NTU)	0.19	0.16			
Anions and Nutrients	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	5.4	5.2			
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<1.0	<1.0			
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0	<1.0			
	Alkalinity, Total (as CaCO3) (mg/L)	5.4	5.2			
	Ammonia, Total (as N) (mg/L)	0.0066	0.0058			
	Bromide (Br) (mg/L)	<0.050	<0.050			
	Chloride (Cl) (mg/L)	0.89	0.87			
	Fluoride (F) (mg/L)	0.067	0.067			
	Nitrate (as N) (mg/L)	<0.0050	<0.0050			
	Nitrite (as N) (mg/L)	<0.0010	<0.0010			
	Total Kjeldahl Nitrogen (mg/L)	0.098	0.098			
	Orthophosphate-Dissolved (as P) (mg/L)	0.0022	0.0021			
	Phosphorus (P)-Total Dissolved (mg/L)	0.0025	0.0025			
	Phosphorus (P)-Total (mg/L)	<0.0020	<0.0020			
	Silicate (as SiO2) (mg/L)	<0.50	<0.50			
	Sulfate (SO4) (mg/L)	1.00	0.97			
Cyanides	Cyanide, Total (mg/L)	<0.0010	<0.0010			
	Cyanide, Free (mg/L)	<0.0010	<0.0010			
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	1.63	1.56			
	Total Organic Carbon (mg/L)	1.72	1.56			
Total Metals	Aluminum (Al)-Total (mg/L)	0.0036	0.0032			
	Antimony (Sb)-Total (mg/L)	<0.00010	<0.00010			
	Arsenic (As)-Total (mg/L)	<0.00010	<0.00010			
	Barium (Ba)-Total (mg/L)	0.00203	0.00163			
	Beryllium (Be)-Total (mg/L)	<0.00010	<0.00010			
	Bismuth (Bi)-Total (mg/L)	<0.000050	<0.000050			
	Boron (B)-Total (mg/L)	<0.010	<0.010			
	Cadmium (Cd)-Total (mg/L)	<0.0000050	<0.0000050			
	Calcium (Ca)-Total (mg/L)	1.36	1.28			
	Cesium (Cs)-Total (mg/L)	<0.000010	<0.000010			

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2203338-1	L2203338-2			
	Description	surface water	surface water			
	Sampled Date	25-NOV-18	25-NOV-18			
	Sampled Time	11:41	11:03			
	Client ID	INUGG-106	INUGG-107			
Grouping	**Analyte**					
WATER						
Total Metals	Chromium (Cr)-Total (mg/L)	<0.00010	<0.00010			
	Cobalt (Co)-Total (mg/L)	<0.00010	<0.00010			
	Copper (Cu)-Total (mg/L)	<0.00050	<0.00050			
	Iron (Fe)-Total (mg/L)	<0.010	<0.010			
	Lead (Pb)-Total (mg/L)	<0.000050	<0.000050			
	Lithium (Li)-Total (mg/L)	<0.0010	<0.0010			
	Magnesium (Mg)-Total (mg/L)	0.797	0.788			
	Manganese (Mn)-Total (mg/L)	0.00086	0.00085			
	Mercury (Hg)-Total (mg/L)	<0.0000050	<0.0000050			
	Molybdenum (Mo)-Total (mg/L)	0.000070	<0.000050			
	Nickel (Ni)-Total (mg/L)	<0.00050	<0.00050			
	Phosphorus (P)-Total (mg/L)	<0.050	<0.050			
	Potassium (K)-Total (mg/L)	0.445	0.445			
	Rubidium (Rb)-Total (mg/L)	0.00062	0.00057			
	Selenium (Se)-Total (mg/L)	<0.000050	<0.000050			
	Silicon (Si)-Total (mg/L)	0.15	0.14			
	Silver (Ag)-Total (mg/L)	<0.000010	<0.000010			
	Sodium (Na)-Total (mg/L)	0.671	0.669			
	Strontium (Sr)-Total (mg/L)	0.00809	0.00696			
	Sulfur (S)-Total (mg/L)	<0.50	<0.50			
	Tellurium (Te)-Total (mg/L)	<0.00020	<0.00020			
	Thallium (Tl)-Total (mg/L)	<0.000010	<0.000010			
	Thorium (Th)-Total (mg/L)	<0.00010	<0.00010			
	Tin (Sn)-Total (mg/L)	<0.00010	<0.00010			
	Titanium (Ti)-Total (mg/L)	<0.00030	<0.00030			
	Tungsten (W)-Total (mg/L)	<0.00010	<0.00010			
	Uranium (U)-Total (mg/L)	0.000045	0.000032			
	Vanadium (V)-Total (mg/L)	<0.00050	<0.00050			
	Zinc (Zn)-Total (mg/L)	<0.0030	<0.0030			
	Zirconium (Zr)-Total (mg/L)	<0.000060	<0.000060			
Dissolved Metals	Dissolved Mercury Filtration Location	FIELD	FIELD			
	Dissolved Metals Filtration Location	FIELD	FIELD			
	Aluminum (Al)-Dissolved (mg/L)	0.0016	0.0017			
	Antimony (Sb)-Dissolved (mg/L)	<0.00010	<0.00010			
	Arsenic (As)-Dissolved (mg/L)	<0.00010	<0.00010			
	Barium (Ba)-Dissolved (mg/L)	0.00162	0.00160			
	Beryllium (Be)-Dissolved (mg/L)	<0.00010	<0.00010			

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2203338-1	L2203338-2			
	Description	surface water	surface water			
	Sampled Date	25-NOV-18	25-NOV-18			
	Sampled Time	11:41	11:03			
	Client ID	INUGG-106	INUGG-107			
Grouping	**Analyte**					
WATER						
Dissolved Metals	Bismuth (Bi)-Dissolved (mg/L)	<0.000050	<0.000050			
	Boron (B)-Dissolved (mg/L)	<0.010	<0.010			
	Cadmium (Cd)-Dissolved (mg/L)	<0.0000050	<0.0000050			
	Calcium (Ca)-Dissolved (mg/L)	1.25	1.16			
	Cesium (Cs)-Dissolved (mg/L)	<0.000010	<0.000010			
	Chromium (Cr)-Dissolved (mg/L)	<0.00010	<0.00010			
	Cobalt (Co)-Dissolved (mg/L)	<0.00010	<0.00010			
	Copper (Cu)-Dissolved (mg/L)	0.00029	0.00070			
	Iron (Fe)-Dissolved (mg/L)	<0.010	<0.010			
	Lead (Pb)-Dissolved (mg/L)	<0.000050	<0.000050			
	Lithium (Li)-Dissolved (mg/L)	<0.0010	<0.0010			
	Magnesium (Mg)-Dissolved (mg/L)	0.748	0.713			
	Manganese (Mn)-Dissolved (mg/L)	<0.00010	<0.00010			
	Mercury (Hg)-Dissolved (mg/L)	<0.0000050	<0.0000050			
	Molybdenum (Mo)-Dissolved (mg/L)	<0.000050	<0.000050			
	Nickel (Ni)-Dissolved (mg/L)	<0.00050	<0.00050			
	Phosphorus (P)-Dissolved (mg/L)	<0.050	<0.050			
	Potassium (K)-Dissolved (mg/L)	0.393	0.368			
	Rubidium (Rb)-Dissolved (mg/L)	0.00057	0.00050			
	Selenium (Se)-Dissolved (mg/L)	<0.000050	<0.000050			
	Silicon (Si)-Dissolved (mg/L)	0.100	0.104			
	Silver (Ag)-Dissolved (mg/L)	<0.000010	<0.000010			
	Sodium (Na)-Dissolved (mg/L)	0.622	0.587			
	Strontium (Sr)-Dissolved (mg/L)	0.00628	0.00596			
	Sulfur (S)-Dissolved (mg/L)	<0.50	<0.50			
	Tellurium (Te)-Dissolved (mg/L)	<0.00020	<0.00020			
	Thallium (Tl)-Dissolved (mg/L)	<0.000010	<0.000010			
	Thorium (Th)-Dissolved (mg/L)	<0.00010	<0.00010			
	Tin (Sn)-Dissolved (mg/L)	<0.00010	<0.00010			
	Titanium (Ti)-Dissolved (mg/L)	<0.00030	<0.00030			
	Tungsten (W)-Dissolved (mg/L)	<0.00010	<0.00010			
	Uranium (U)-Dissolved (mg/L)	0.000034	0.000028			
	Vanadium (V)-Dissolved (mg/L)	<0.00050	<0.00050			
	Zinc (Zn)-Dissolved (mg/L)	<0.0010	<0.0010			
	Zirconium (Zr)-Dissolved (mg/L)	<0.000060	<0.000060			
Speciated Metals	Arsenate (As V) (ug/L)	<0.020				
	Arsenite (As III) (ug/L)	<0.020				

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2203338-1	L2203338-2			
	Description	surface water	surface water			
	Sampled Date	25-NOV-18	25-NOV-18			
	Sampled Time	11:41	11:03			
	Client ID	INUGG-106	INUGG-107			
Grouping	**Analyte**					
WATER						
Speciated Metals	Dimethylarsinic Acid (DMA, as As) (ug/L)	<0.020				
	Monomethylarsonic Acid (MMA, as As) (ug/L)	<0.020				
	Arsenobetaine (AsB, as As) (ug/L)	<0.050				

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L2203338-1, -2
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L2203338-1, -2
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L2203338-1, -2
Matrix Spike	Manganese (Mn)-Dissolved	MS-B	L2203338-1, -2
Matrix Spike	Potassium (K)-Dissolved	MS-B	L2203338-1, -2
Matrix Spike	Silicon (Si)-Dissolved	MS-B	L2203338-1, -2
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L2203338-1, -2
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L2203338-1, -2
Matrix Spike	Sulfur (S)-Dissolved	MS-B	L2203338-1, -2
Matrix Spike	Uranium (U)-Dissolved	MS-B	L2203338-1, -2
Matrix Spike	Calcium (Ca)-Total	MS-B	L2203338-1, -2
Matrix Spike	Magnesium (Mg)-Total	MS-B	L2203338-1, -2
Matrix Spike	Sodium (Na)-Total	MS-B	L2203338-1, -2
Matrix Spike	Strontium (Sr)-Total	MS-B	L2203338-1, -2
Matrix Spike	Sulfur (S)-Total	MS-B	L2203338-1, -2

Qualifiers for Individual Parameters Listed:

Qualifier	Description
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ALK-TITR-VA	Water	Alkalinity Species by Titration	APHA 2320 Alkalinity

This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.

AS-SPEC-HPLC/CCMS-VA	Water	Arsenic Species in Water by HPLC/CCMS	USGS WRIR 02-4144

Speciated Arsenic (As) Analysis is by reverse phase HPLC-ICPMS. Sample handling, preservation and holding times outlined in USGS Report 02-4144 and AWWA Preservation of Arsenic Species, 2006. Instrumental analysis based on Afton et al, Journal of Chromatography A, 1208 (2008) 156-163 and Agilent Technologies application notes. Filtration is conducted prior to preservation. Results for unfiltered, preserved samples may be elevated due to extraction of arsenic species from particulate matter in the samples.
Elevated iron (~100+ ppm) concentrations or sulfidic water can introduce biases to the reported results for some arsenic species.

BR-L-IC-N-VA	Water	Bromide in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

CARBONS-DOC-VA	Water	Dissolved organic carbon by combustion	APHA 5310B

This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)". Dissolved carbon (DOC) fractions are determined by filtering the sample through a 0.45 micron membrane filter prior to analysis.

CARBONS-TOC-VA	Water	Total organic carbon by combustion	APHA 5310B TOTAL ORGANIC CARBON (TOC)

This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)".

CHLOROA-F-VA	Filter	Chlorophyll a by Fluorometer (Filter)	EPA 445.0

This analysis is done using procedures modified from EPA Method 445.0. Chlorophyll-a is determined by a routine acetone extraction followed with analysis by fluorometry using the non-acidification procedure. This method is not subject to interferences from chlorophyll b.

CL-L-IC-N-VA	Water	Chloride in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

CN-FREE-L-CFA-VA	Water	Low Level Free Cyanide in water by CFA	ASTM 7237

This analysis is carried out using procedures adapted from ASTM Method 7237 "Free Cyanide with Flow Injection Analysis (FIA) Utilizing Gas Diffusion Separation and Amperometric Detection". Free cyanide is determined by in-line gas diffusion at pH 6 with final determination by colourimetric analysis.

CN-T-L-CFA-VA	Water	Low Level Total Cyanide in water by CFA	ISO 14403:2002

This analysis is carried out using procedures adapted from ISO Method 14403:2002 "Determination of Total Cyanide using Flow Analysis (FIA and CFA)". Total or strong acid dissociable (SAD) cyanide is determined by in-line UV digestion along with sample distillation and final determination by colourimetric analysis. Method Limitation: This method is susceptible to interference from thiocyanate (SCN). If SCN is present in the sample, there could be a positive interference with this method, but it would be less than 1% and could be as low as zero.

EC-PCT-VA	Water	Conductivity (Automated)	APHA 2510 Auto. Conduc.

Reference Information

This analysis is carried out using procedures adapted from APHA Method 2510 "Conductivity". Conductivity is determined using a conductivity electrode.

EC-SCREEN-VA Water Conductivity Screen (Internal Use Only) APHA 2510

Qualitative analysis of conductivity where required during preparation of other tests - e.g. TDS, metals, etc.

F-IC-N-VA Water Fluoride in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

HARDNESS-CALC-VA Water Hardness APHA 2340B

Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

HG-D-CVAA-VA Water Diss. Mercury in Water by CVAAS or CVAFS APHA 3030B/EPA 1631E (mod)

Water samples are filtered (0.45 um), preserved with hydrochloric acid, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

HG-T-CVAA-VA Water Total Mercury in Water by CVAAS or CVAFS EPA 1631E (mod)

Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

MET-D-CCMS-VA Water Dissolved Metals in Water by CRC ICPMS APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

MET-T-CCMS-VA Water Total Metals in Water by CRC ICPMS EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

NH3-F-VA Water Ammonia in Water by Fluorescence J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

NO2-L-IC-N-VA Water Nitrite in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

NO3-L-IC-N-VA Water Nitrate in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

P-T-PRES-COL-VA Water Total P in Water by Colour APHA 4500-P Phosphorus

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is determined colourimetrically after persulphate digestion of the sample.
Samples with very high dissolved solids (i.e. seawaters, brackish waters) may produce a negative bias by this method. Alternate methods are available for these types of samples.

Arsenic (5+), at elevated levels, is a positive interference on colourimetric phosphate analysis.

P-TD-COL-VA Water Total Dissolved P in Water by Colour APHA 4500-P Phosphorous

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Dissolved Phosphorus is determined colourimetrically after persulphate digestion of a sample that has been lab or field filtered through a 0.45 micron membrane filter.
Samples with very high dissolved solids (i.e. seawaters, brackish waters) may produce a negative bias by this method. Alternate methods are available for these types of samples.

Arsenic (5+), at elevated levels, is a positive interference on colourimetric phosphate analysis.

PH-PCT-VA Water pH by Meter (Automated) APHA 4500-H pH Value

This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode

It is recommended that this analysis be conducted in the field.

PO4-DO-COL-VA Water Diss. Orthophosphate in Water by Colour APHA 4500-P Phosphorus

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.
Samples with very high dissolved solids (i.e. seawaters, brackish waters) may produce a negative bias by this method. Alternate methods are

Reference Information

available for these types of samples.

Arsenic (5+), at elevated levels, is a positive interference on colourimetric phosphate analysis.

SILICATE-COL-VA Water Silicate by Colourimetric analysis APHA 4500-SiO2 E.

This analysis is carried out using procedures adapted from APHA Method 4500-SiO2 E. "Silica". Silicate (molybdate-reactive silica) is determined by the molybdosilicate-heteropoly blue colourimetric method. Arsenic (5+) above 100 mg/L is a negative interference on this test.

SO4-IC-N-VA Water Sulfate in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

TDS-LOW-VA Water Low Level TDS (3.0mg/L) by Gravimetric APHA 2540C

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total dissolved solids (TDS) are determined by filtering a sample through a glass fibre filter, TDS is determined by evaporating the filtrate to dryness at 180 degrees celsius.

TKN-F-VA Water TKN in Water by Fluorescence APHA 4500-NORG D.

This analysis is carried out using procedures adapted from APHA Method 4500-Norg D. "Block Digestion and Flow Injection Analysis". Total Kjeldahl Nitrogen is determined using block digestion followed by Flow-injection analysis with fluorescence detection.

TSS-LOW-VA Water Total Suspended Solids by Grav. (1 mg/L) APHA 2540D

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total suspended solids (TSS) are determined by filtering a sample through a glass fibre filter, TSS is determined by drying the filter at 104 degrees celsius.
Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.

TURBIDITY-VA Water Turbidity by Meter APHA 2130 Turbidity

This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

ALS Enviro

L2203338-COFC

ain of Custody / Analytical Request Form
Canada Toll Free: 1 800 668 9878
www.alsglobal.com

COC # _____

Page 1 of 1

Report To		Format / Distribution				Service Requested (Rush for routine analysis subject to availability)
Company:	Azimuth Consulting Group	☑ Standard	☐ Other			◉ Regular (Standard Turnaround Times - Business Days)
Contact:	Eric Franz	☑ PDF	☑ Excel	☐ Digital	☐ Fax	○ Priority (2-4 Business Days) - 50% Surcharge - Contact ALS to Confirm TAT
Address:	218-2902 West Broadway	Email 1:	efranz@azimuthgroup.ca			○ Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT
	Vancouver, BC V6K2G8	Email 2:	marie-pier.marcil@agnicoeagle.com			○ Same Day or Weekend Emergency - Contact ALS to Confirm TAT
Phone:	604-730-1220 Fax:	Email 3:	robin.allard@agnicoeagle.com			
Invoice To	Same as Report ? ☑ Yes ☐ No	Client / Project Information				Analysis Request
Hardcopy of Invoice with Report?	☐ Yes ☑ No	Job #:	Meadowbank CREMP - Surfacewater			Please indicate below Filtered, Preserved or both (F, P, F/P)
Company:		PO / AFE:				
Contact:		LSD:				
Address:						
Phone:	Fax:	Quote #:	Q39503			
Lab Work Order # (lab use only)		ALS Contact:	Brent Mack	Sampler:	ENV	

Sample #	Sample Identification (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Conventionals** see notes	TSS-Low, TDS-Low	TOC, Ammonia, TKN, Total P	DOC	T-CN (Low), Free CN (Low)	Total mercury	Dissolved mercury	Total Metals	Dissolved metals	Chlorophyll-a	Arsenic speciation		Number of Containers
							P	F/P	P	P	F/P	P	F/P	F			
	Inugg-106	25-Nov-18	11:41	Surface Water	X	X	X	X	X	X	X	X	X	X	X		11
	Inugg-107	25-Nov-18	11:03	Surface Water	X	X	X	X	X	X	X	X	X	X			10
	NOV-DUP-1	31-Oct-18		Surface Water										X			1
	SP-118	03-Nov-18		Surface Water										X			1
	SP-119	03-Nov-18		Surface Water										X			1
	WAL-87	31-Oct-18		Surface Water										X			1
	WAL-88	31-Oct-18		Surface Water										X			1
	TPE-118	31-Oct-18		Surface Water										X			1
	TPE-119	31-Oct-18		Surface Water										X			1
	TPN-118	03-Nov-18		Surface Water										X			1
	TPN-119	03-Nov-18		Surface Water										X			1
	PDL-71	05-Nov-18		Surface Water										X			1
	PDL-72	05-Nov-18		Surface Water										X			1

Special Instructions / Regulations with water or land use (CCME-Freshwater Aquatic Life/BC CSR - Commercial/AB Tier 1 - Natural, etc) / Hazardous Details

**Conventionals includes: Alk Species, pH, EC, Turbidity, Conductivity, Anions (F, NO2, NO3, Br, SO4), low-level Chloride, Silicate, TD-P, and Ortho-PO4.

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.

By the use of this form the user acknowledges and agrees with the Terms and Conditions as provided on a separate Excel tab.

Also provided on another Excel tab are the ALS location addresses, phone numbers and sample container / preservation / holding time table for common analyses.

SHIPMENT RELEASE (client use)			SHIPMENT RECEPTION (lab use only)				SHIPMENT VERIFICATION (lab use only)			
Released by:	Date (dd-mmm-yy)	Time (hh-mm)	Received by:	Date:	Time:	Temperature:	Verified by:	Date:	Time:	Observations: Yes / No ? If Yes add SIF
Jamie K	26-11-18	9:00	JC	NOV 29 2018	8:10am	7 °C				

GENF 20.00 Front

AZIMUTH CONSULTING GROUP INC.
ATTN: Eric Franz
218 - 2902 West Broadway
Vancouver BC V6K 2G8

Date Received: 07-JUN-18
Report Date: 26-JUN-18 18:38 (MT)
Version: FINAL

Client Phone: 604-730-1220

Certificate of Analysis

Lab Work Order #: L2107814

Project P.O. #: NOT SUBMITTED
Job Reference: WHALE TAIL PIT CREMP - SURFACEWATER
C of C Numbers:
Legal Site Desc:

Brent Mack, B.Sc.
Account Manager

[This report shall not be reproduced except in full without the written authority of the Laboratory.]

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2107814-1	L2107814-2	L2107814-3	L2107814-4	L2107814-5
Description	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water
Sampled Date	30-MAY-18	01-JUN-18	03-JUN-18	03-JUN-18	02-JUN-18
Sampled Time	16:00	16:00	11:20	10:00	16:55
Client ID	WTS-28	WTS-27	DS1-19	DS1-20	A76-22
Grouping **Analyte**					
FILTER					
Plant Pigments Chlorophyll a (ug/L)	0.138	1.63	1.08	1.64	0.557

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	L2107814-6 Surface Water 02-JUN-18 16:00 A76-21	L2107814-7 Surface Water 02-JUN-18 08:50 A20-22	L2107814-8 Surface Water 02-JUN-18 14:00 A20-21	L2107814-9 Surface Water 01-JUN-18 11:15 MAM-27	L2107814-10 Surface Water 01-JUN-18 12:15 MAM-28
Sample ID **Description** **Sampled Date** **Sampled Time** **Client ID**						
FILTER						
Plant Pigments	Chlorophyll a (ug/L)	1.52	0.717	0.428	1.03	1.19

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2107814-11	L2107814-12	L2107814-13		
	Description	Surface Water	Surface Water	Surface Water		
	Sampled Date	01-JUN-18	01-JUN-18	02-JUN-18		
	Sampled Time	15:55	16:40			
	Client ID	NEM-28	NEM-27	WTP MAY DUP-1		
Grouping	**Analyte**					
FILTER						
Plant Pigments	Chlorophyll a (ug/L)	0.255	0.522	0.389		

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2107814-1	L2107814-2	L2107814-3	L2107814-4	L2107814-5
	Description	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water
	Sampled Date	30-MAY-18	01-JUN-18	03-JUN-18	03-JUN-18	02-JUN-18
	Sampled Time	16:00	16:00	11:20	10:00	16:55
	Client ID	WTS-28	WTS-27	DS1-19	DS1-20	A76-22
Grouping	**Analyte**					
WATER						
Physical Tests	Conductivity (umhos/cm)	55.7	54.2	26.2	38.4	48.7
	Hardness (as CaCO3) (mg/L)	18.4	18.3	10.2	12.5	17.0
	pH (pH units)	6.86	6.88	7.01	6.96	7.11
	Total Suspended Solids (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
	Total Dissolved Solids (mg/L)	41	44	19.8	27.2	42
	Turbidity (NTU)	0.25	0.22	0.31	0.38	0.21
Anions and Nutrients	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	6.7	6.7	7.8	9.7	8.5
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
	Alkalinity, Total (as CaCO3) (mg/L)	6.7	6.7	7.8	9.7	8.5
	Ammonia, Total (as N) (mg/L)	0.0187	0.0161	<0.0050	<0.0050	0.0135
	Bromide (Br) (mg/L)	0.119	0.111	<0.050	<0.050	0.063
	Chloride (Cl) (mg/L)	9.81	9.67	1.80	3.36	6.17
	Fluoride (F) (mg/L)	0.036	0.038	0.055	0.061	0.036
	Nitrate (as N) (mg/L)	0.0172	0.0075	0.0132	0.0476	0.0070
	Nitrite (as N) (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Total Kjeldahl Nitrogen (mg/L)	0.143	0.153	0.117	0.121	0.112
	Orthophosphate-Dissolved (as P) (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Phosphorus (P)-Total Dissolved (mg/L)	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
	Phosphorus (P)-Total (mg/L)	0.0024	0.0022	<0.0020	<0.0020	0.0022
	Silicate (as SiO2) (mg/L)	0.81	0.76	0.56	1.34	1.39
	Sulfate (SO4) (mg/L)	2.36	2.35	1.56	2.63	4.11
Cyanides	Cyanide, Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Cyanide, Free (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	2.48	2.52	2.68	2.52	1.93
	Total Organic Carbon (mg/L)	2.44	2.66	2.33	2.54	1.70
Total Metals	Aluminum (Al)-Total (mg/L)	0.0040	0.0037	0.0041	0.0037	<0.0030
	Antimony (Sb)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Arsenic (As)-Total (mg/L)	0.00026	0.00026	0.00018	0.00017	0.00028
	Barium (Ba)-Total (mg/L)	0.0112	0.0106	0.00532	0.00780	0.00984
	Beryllium (Be)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Bismuth (Bi)-Total (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Boron (B)-Total (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
	Cadmium (Cd)-Total (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
	Calcium (Ca)-Total (mg/L)	5.61	5.42	2.28	3.31	4.53
	Cesium (Cs)-Total (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2107814-6	L2107814-7	L2107814-8	L2107814-9	L2107814-10
	Description	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water
	Sampled Date	02-JUN-18	02-JUN-18	02-JUN-18	01-JUN-18	01-JUN-18
	Sampled Time	16:00	08:50	14:00	11:15	12:15
	Client ID	A76-21	A20-22	A20-21	MAM-27	MAM-28
Grouping	**Analyte**					
WATER						
Physical Tests	Conductivity (umhos/cm)	51.0	29.6	20.7	69.9	63.1
	Hardness (as CaCO3) (mg/L)	17.9	10.2	6.97	24.8	21.4
	pH (pH units)	6.98	7.11	6.96	6.96	6.99
	Total Suspended Solids (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
	Total Dissolved Solids (mg/L)	38	22.4	15.9	54	44
	Turbidity (NTU)	0.17	0.20	0.16	0.21	0.17
Anions and Nutrients	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	9.5	10.2	7.2	9.3	7.9
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
	Alkalinity, Total (as CaCO3) (mg/L)	9.5	10.2	7.2	9.3	7.9
	Ammonia, Total (as N) (mg/L)	0.0073	0.0096	<0.0050	<0.0050	<0.0050
	Bromide (Br) (mg/L)	0.069	<0.050	<0.050	0.133	0.120
	Chloride (Cl) (mg/L)	6.34	1.26	0.90	11.3	10.4
	Fluoride (F) (mg/L)	0.037	0.045	0.038	0.038	0.036
	Nitrate (as N) (mg/L)	<0.0050	0.0068	<0.0050	<0.0050	0.0053
	Nitrite (as N) (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	0.0013
	Total Kjeldahl Nitrogen (mg/L)	0.097	0.141	0.107	0.130	0.187
	Orthophosphate-Dissolved (as P) (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Phosphorus (P)-Total Dissolved (mg/L)	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
	Phosphorus (P)-Total (mg/L)	0.0020	<0.0020	<0.0020	0.0029	0.0024
	Silicate (as SiO2) (mg/L)	1.38	2.11	1.33	1.27	1.11
	Sulfate (SO4) (mg/L)	4.26	1.94	1.38	5.02	4.29
Cyanides	Cyanide, Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Cyanide, Free (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	1.83	2.74	2.23	2.24	2.12
	Total Organic Carbon (mg/L)	1.85	2.44	2.20	2.19	2.11
Total Metals	Aluminum (Al)-Total (mg/L)	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
	Antimony (Sb)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Arsenic (As)-Total (mg/L)	0.00029	0.00016	0.00014	0.00043	0.00042
	Barium (Ba)-Total (mg/L)	0.0105	0.00897	0.00499	0.0137	0.0118
	Beryllium (Be)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Bismuth (Bi)-Total (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Boron (B)-Total (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
	Cadmium (Cd)-Total (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
	Calcium (Ca)-Total (mg/L)	4.76	2.70	1.86	6.99	6.24
	Cesium (Cs)-Total (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2107814-11	L2107814-12	L2107814-13	L2107814-14	
Description	Surface Water	Surface Water	Surface Water		
Sampled Date	01-JUN-18	01-JUN-18	02-JUN-18	02-JUN-18	
Sampled Time	15:55	16:40			
Client ID	NEM-28	NEM-27	WTP MAY DUP-1	WTP MAY DI-1	
Grouping	**Analyte**				
WATER					
Physical Tests	Conductivity (umhos/cm)	36.3	35.5	20.6	<1.0
	Hardness (as CaCO3) (mg/L)	13.0	13.2	6.81	<0.50
	pH (pH units)	7.14	7.20	6.89	5.46
	Total Suspended Solids (mg/L)	<1.0	<1.0	<1.0	<1.0
	Total Dissolved Solids (mg/L)	24.3	24.9	15.0	<3.0
	Turbidity (NTU)	0.12	0.12	0.13	<0.10
Anions and Nutrients	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	10.6	10.5	7.4	<1.0
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0
	Alkalinity, Total (as CaCO3) (mg/L)	10.6	10.5	7.4	<1.0
	Ammonia, Total (as N) (mg/L)	<0.0050	0.0086	<0.0050	<0.0050
	Bromide (Br) (mg/L)	<0.050	<0.050	<0.050	<0.050
	Chloride (Cl) (mg/L)	1.05	1.02	0.91	<0.10
	Fluoride (F) (mg/L)	0.033	0.033	0.039	<0.020
	Nitrate (as N) (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050
	Nitrite (as N) (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010
	Total Kjeldahl Nitrogen (mg/L)	0.127	0.113	0.096	<0.050
	Orthophosphate-Dissolved (as P) (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010
	Phosphorus (P)-Total Dissolved (mg/L)	<0.0020	<0.0020	<0.0020	<0.0020
	Phosphorus (P)-Total (mg/L)	<0.0020	<0.0020	<0.0020	<0.0020
	Silicate (as SiO2) (mg/L)	<0.50	0.50	1.36	<0.50
	Sulfate (SO4) (mg/L)	4.70	4.63	1.39	<0.30
Cyanides	Cyanide, Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010
	Cyanide, Free (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	2.01	1.87	1.99	<0.50
	Total Organic Carbon (mg/L)	2.28	1.93	2.02	<0.50
Total Metals	Aluminum (Al)-Total (mg/L)	<0.0030	<0.0030	0.0036	<0.0030
	Antimony (Sb)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010
	Arsenic (As)-Total (mg/L)	0.00042	0.00041	0.00015	<0.00010
	Barium (Ba)-Total (mg/L)	0.00599	0.00593	0.00486	<0.00010
	Beryllium (Be)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010
	Bismuth (Bi)-Total (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050
	Boron (B)-Total (mg/L)	<0.010	<0.010	<0.010	<0.010
	Cadmium (Cd)-Total (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050
	Calcium (Ca)-Total (mg/L)	3.14	3.10	1.85	<0.050
	Cesium (Cs)-Total (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2107814-1	L2107814-2	L2107814-3	L2107814-4	L2107814-5
	Description	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water
	Sampled Date	30-MAY-18	01-JUN-18	03-JUN-18	03-JUN-18	02-JUN-18
	Sampled Time	16:00	16:00	11:20	10:00	16:55
	Client ID	WTS-28	WTS-27	DS1-19	DS1-20	A76-22
Grouping	**Analyte**					
WATER						
Total Metals	Chromium (Cr)-Total (mg/L)	<0.00010	<0.00010	0.00026	<0.00010	<0.00010
	Cobalt (Co)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Copper (Cu)-Total (mg/L)	0.00081	<0.00050	0.00077	<0.00050	<0.00050
	Iron (Fe)-Total (mg/L)	<0.010	<0.010	0.012	0.014	<0.010
	Lead (Pb)-Total (mg/L)	0.000158	<0.000050	<0.000050	<0.000050	<0.000050
	Lithium (Li)-Total (mg/L)	0.0016	0.0016	<0.0010	<0.0010	<0.0010
	Magnesium (Mg)-Total (mg/L)	1.52	1.54	0.970	1.17	1.51
	Manganese (Mn)-Total (mg/L)	0.00119	0.00100	0.00240	0.00182	0.00041
	Mercury (Hg)-Total (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
	Molybdenum (Mo)-Total (mg/L)	<0.000050	<0.000050	0.000064	0.000060	<0.000050
	Nickel (Ni)-Total (mg/L)	0.00102	0.00093	<0.00050	<0.00050	0.00070
	Phosphorus (P)-Total (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050
	Potassium (K)-Total (mg/L)	0.785	0.796	0.452	0.750	0.974
	Rubidium (Rb)-Total (mg/L)	0.00110	0.00109	0.00067	0.00102	0.00141
	Selenium (Se)-Total (mg/L)	<0.000050	<0.000050	<0.000050	0.000059	<0.000050
	Silicon (Si)-Total (mg/L)	0.43	0.42	0.31	0.66	0.65
	Silver (Ag)-Total (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Sodium (Na)-Total (mg/L)	0.995	1.01	0.944	1.55	0.914
	Strontium (Sr)-Total (mg/L)	0.0459	0.0449	0.00954	0.0159	0.0234
	Sulfur (S)-Total (mg/L)	1.35	1.45	1.19	1.48	1.95
	Tellurium (Te)-Total (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
	Thallium (Tl)-Total (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Thorium (Th)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Tin (Sn)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Titanium (Ti)-Total (mg/L)	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030
	Tungsten (W)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Uranium (U)-Total (mg/L)	0.000027	0.000028	0.000038	0.000032	0.000014
	Vanadium (V)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Zinc (Zn)-Total (mg/L)	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
	Zirconium (Zr)-Total (mg/L)	<0.000060	<0.000060	<0.000060	<0.000060	<0.000060
Dissolved Metals	Dissolved Mercury Filtration Location	FIELD	FIELD	FIELD	FIELD	FIELD
	Dissolved Metals Filtration Location	FIELD	FIELD	FIELD	FIELD	FIELD
	Aluminum (Al)-Dissolved (mg/L)	0.0023	0.0025	0.0029	0.0023	<0.0010
	Antimony (Sb)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Arsenic (As)-Dissolved (mg/L)	0.00019	0.00017	0.00014	0.00011	0.00020
	Barium (Ba)-Dissolved (mg/L)	0.00965	0.00915	0.00420	0.00652	0.00886
	Beryllium (Be)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2107814-6	L2107814-7	L2107814-8	L2107814-9	L2107814-10
Description	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water
Sampled Date	02-JUN-18	02-JUN-18	02-JUN-18	01-JUN-18	01-JUN-18
Sampled Time	16:00	08:50	14:00	11:15	12:15
Client ID	A76-21	A20-22	A20-21	MAM-27	MAM-28
Grouping / **Analyte**					
WATER					
Total Metals Chromium (Cr)-Total (mg/L)	0.00011	0.00014	<0.00010	<0.00010	<0.00010
Cobalt (Co)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper (Cu)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Iron (Fe)-Total (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
Lead (Pb)-Total (mg/L)	<0.000050	<0.000050	0.000113	<0.000050	<0.000050
Lithium (Li)-Total (mg/L)	<0.0010	<0.0010	<0.0010	0.0017	0.0017
Magnesium (Mg)-Total (mg/L)	1.65	0.933	0.662	1.96	1.75
Manganese (Mn)-Total (mg/L)	0.00050	0.00123	0.00051	0.00123	0.00067
Mercury (Hg)-Total (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Molybdenum (Mo)-Total (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Nickel (Ni)-Total (mg/L)	0.00075	<0.00050	<0.00050	0.00144	0.00102
Phosphorus (P)-Total (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050
Potassium (K)-Total (mg/L)	1.09	0.722	0.525	1.15	1.08
Rubidium (Rb)-Total (mg/L)	0.00162	0.00093	0.00070	0.00170	0.00174
Selenium (Se)-Total (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Silicon (Si)-Total (mg/L)	0.70	0.97	0.67	0.61	0.58
Silver (Ag)-Total (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)-Total (mg/L)	0.997	1.17	0.862	1.08	1.01
Strontium (Sr)-Total (mg/L)	0.0244	0.0144	0.00974	0.0502	0.0456
Sulfur (S)-Total (mg/L)	2.07	1.26	1.09	2.09	1.84
Tellurium (Te)-Total (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Thallium (Tl)-Total (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Thorium (Th)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Tin (Sn)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)-Total (mg/L)	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030
Tungsten (W)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Uranium (U)-Total (mg/L)	0.000015	0.000035	0.000031	0.000016	0.000016
Vanadium (V)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc (Zn)-Total (mg/L)	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Zirconium (Zr)-Total (mg/L)	<0.000060	<0.000060	<0.000060	<0.000060	<0.000060
Dissolved Metals Dissolved Mercury Filtration Location	FIELD	FIELD	FIELD	FIELD	FIELD
Dissolved Metals Filtration Location	FIELD	FIELD	FIELD	FIELD	FIELD
Aluminum (Al)-Dissolved (mg/L)	<0.0010	0.0016	0.0024	<0.0040 DLB	<0.0020 DLB
Antimony (Sb)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic (As)-Dissolved (mg/L)	0.00021	0.00011	<0.00010	0.00036	0.00035
Barium (Ba)-Dissolved (mg/L)	0.00920	0.00710	0.00424	0.0150	0.0104
Beryllium (Be)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2107814-11	L2107814-12	L2107814-13	L2107814-14	
Description	Surface Water	Surface Water	Surface Water		
Sampled Date	01-JUN-18	01-JUN-18	02-JUN-18	02-JUN-18	
Sampled Time	15:55	16:40			
Client ID	NEM-28	NEM-27	WTP MAY DUP-1	WTP MAY DI-1	
Grouping	**Analyte**				
WATER					
Total Metals	Chromium (Cr)-Total (mg/L)	0.00013	0.00018	0.00015	<0.00010
	Cobalt (Co)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010
	Copper (Cu)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050
	Iron (Fe)-Total (mg/L)	<0.010	<0.010	<0.010	<0.010
	Lead (Pb)-Total (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050
	Lithium (Li)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010
	Magnesium (Mg)-Total (mg/L)	1.55	1.51	0.665	<0.0050
	Manganese (Mn)-Total (mg/L)	0.00068	0.00060	0.00052	<0.00010
	Mercury (Hg)-Total (mg/L)	<0.0000050	0.0000055	<0.0000050	<0.0000050
	Molybdenum (Mo)-Total (mg/L)	0.000055	0.000064	<0.000050	<0.000050
	Nickel (Ni)-Total (mg/L)	0.00067	0.00067	<0.00050	<0.00050
	Phosphorus (P)-Total (mg/L)	<0.050	<0.050	<0.050	<0.050
	Potassium (K)-Total (mg/L)	0.878	0.925	0.531	<0.050
	Rubidium (Rb)-Total (mg/L)	0.00112	0.00098	0.00063	<0.00020
	Selenium (Se)-Total (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050
	Silicon (Si)-Total (mg/L)	0.27	0.28	0.66	<0.10
	Silver (Ag)-Total (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010
	Sodium (Na)-Total (mg/L)	0.743	0.725	0.871	<0.050
	Strontium (Sr)-Total (mg/L)	0.0141	0.0136	0.00988	<0.00020
	Sulfur (S)-Total (mg/L)	2.28	2.27	1.05	0.52
	Tellurium (Te)-Total (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020
	Thallium (Tl)-Total (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010
	Thorium (Th)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010
	Tin (Sn)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010 DTMF
	Titanium (Ti)-Total (mg/L)	<0.00030	<0.00030	<0.00030	<0.00030
	Tungsten (W)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010
	Uranium (U)-Total (mg/L)	<0.000010	<0.000010	0.000032	<0.000010
	Vanadium (V)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050
	Zinc (Zn)-Total (mg/L)	<0.0030	<0.0030	<0.0030	<0.0030
	Zirconium (Zr)-Total (mg/L)	<0.000060	<0.000060	<0.000060	<0.000060
Dissolved Metals	Dissolved Mercury Filtration Location	FIELD	FIELD	FIELD	FIELD
	Dissolved Metals Filtration Location	FIELD	FIELD	FIELD	FIELD
	Aluminum (Al)-Dissolved (mg/L)	<0.0010	<0.0020 DLB	<0.0020 DLB	<0.0010
	Antimony (Sb)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010
	Arsenic (As)-Dissolved (mg/L)	0.00032	0.00032	0.00011	<0.00010
	Barium (Ba)-Dissolved (mg/L)	0.00509	0.00543	0.00421	0.00018 RRV
	Beryllium (Be)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2107814-1	L2107814-2	L2107814-3	L2107814-4	L2107814-5
	Description	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water
	Sampled Date	30-MAY-18	01-JUN-18	03-JUN-18	03-JUN-18	02-JUN-18
	Sampled Time	16:00	16:00	11:20	10:00	16:55
	Client ID	WTS-28	WTS-27	DS1-19	DS1-20	A76-22
Grouping	**Analyte**					
WATER						
Dissolved Metals	Bismuth (Bi)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Boron (B)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
	Cadmium (Cd)-Dissolved (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
	Calcium (Ca)-Dissolved (mg/L)	5.10	5.09	2.59	3.24	4.46
	Cesium (Cs)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Chromium (Cr)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Cobalt (Co)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Copper (Cu)-Dissolved (mg/L)	0.00067	0.00041	0.00044	0.00039	0.00035
	Iron (Fe)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
	Lead (Pb)-Dissolved (mg/L)	0.000120	0.000073	<0.000050	<0.000050	<0.000050
	Lithium (Li)-Dissolved (mg/L)	0.0013	0.0013	<0.0010	<0.0010	<0.0010
	Magnesium (Mg)-Dissolved (mg/L)	1.38	1.35	0.901	1.08	1.43
	Manganese (Mn)-Dissolved (mg/L)	0.00056	0.00051	0.00159	0.00162	<0.00010
	Mercury (Hg)-Dissolved (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
	Molybdenum (Mo)-Dissolved (mg/L)	<0.000050	<0.000050	0.000081	<0.000050	<0.000050
	Nickel (Ni)-Dissolved (mg/L)	0.00084	0.00078	<0.00050	<0.00050	0.00066
	Phosphorus (P)-Dissolved (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050
	Potassium (K)-Dissolved (mg/L)	0.710	0.708	0.417	0.695	0.929
	Rubidium (Rb)-Dissolved (mg/L)	0.00099	0.00091	0.00065	0.00086	0.00124
	Selenium (Se)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Silicon (Si)-Dissolved (mg/L)	0.366	0.337	0.253	0.599	0.592
	Silver (Ag)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Sodium (Na)-Dissolved (mg/L)	0.896	0.892	0.891	1.44	0.857
	Strontium (Sr)-Dissolved (mg/L)	0.0431	0.0415	0.00927	0.0153	0.0225
	Sulfur (S)-Dissolved (mg/L)	0.78	0.79	<0.50	0.70	0.92
	Tellurium (Te)-Dissolved (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
	Thallium (Tl)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Thorium (Th)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Tin (Sn)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Titanium (Ti)-Dissolved (mg/L)	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030
	Tungsten (W)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Uranium (U)-Dissolved (mg/L)	0.000026	0.000026	0.000035	0.000026	0.000011
	Vanadium (V)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Zinc (Zn)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Zirconium (Zr)-Dissolved (mg/L)	<0.000060	<0.000060	<0.000060	<0.000060	<0.000060
Speciated Metals	Arsenate (As V) (ug/L)	0.020	0.032			
	Arsenite (As III) (ug/L)	0.053	0.072			

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2107814-6	L2107814-7	L2107814-8	L2107814-9	L2107814-10
	Description	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water
	Sampled Date	02-JUN-18	02-JUN-18	02-JUN-18	01-JUN-18	01-JUN-18
	Sampled Time	16:00	08:50	14:00	11:15	12:15
	Client ID	A76-21	A20-22	A20-21	MAM-27	MAM-28
Grouping	**Analyte**					
WATER						
Dissolved Metals	Bismuth (Bi)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Boron (B)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
	Cadmium (Cd)-Dissolved (mg/L)	<0.0000050	<0.0000050	<0.0000050	0.0000056	<0.0000050
	Calcium (Ca)-Dissolved (mg/L)	4.68	2.65	1.81	6.89	5.98
	Cesium (Cs)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Chromium (Cr)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	0.00017	<0.00010
	Cobalt (Co)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Copper (Cu)-Dissolved (mg/L)	0.00034	0.00037	0.00029	0.00104	0.00036
	Iron (Fe)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
	Lead (Pb)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	0.000073	<0.000050
	Lithium (Li)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	0.0016	0.0015
	Magnesium (Mg)-Dissolved (mg/L)	1.51	0.879	0.596	1.84	1.56
	Manganese (Mn)-Dissolved (mg/L)	0.00024	0.00084	0.00039	0.00101	0.00050
	Mercury (Hg)-Dissolved (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
	Molybdenum (Mo)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Nickel (Ni)-Dissolved (mg/L)	0.00068	<0.00050	<0.00050	0.00186	0.00080
	Phosphorus (P)-Dissolved (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050
	Potassium (K)-Dissolved (mg/L)	0.995	0.689	0.484	1.09	0.979
	Rubidium (Rb)-Dissolved (mg/L)	0.00132	0.00080	0.00060	0.00150	0.00133
	Selenium (Se)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Silicon (Si)-Dissolved (mg/L)	0.620	0.892	0.587	0.533	0.484
	Silver (Ag)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Sodium (Na)-Dissolved (mg/L)	0.903	1.08	0.776	1.00	0.889
	Strontium (Sr)-Dissolved (mg/L)	0.0237	0.0140	0.00956	0.0495	0.0433
	Sulfur (S)-Dissolved (mg/L)	1.09	<0.50	<0.50	1.87	1.78
	Tellurium (Te)-Dissolved (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
	Thallium (Tl)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Thorium (Th)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Tin (Sn)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Titanium (Ti)-Dissolved (mg/L)	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030
	Tungsten (W)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Uranium (U)-Dissolved (mg/L)	0.000013	0.000031	0.000027	0.000016	0.000014
	Vanadium (V)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Zinc (Zn)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	0.0039	<0.0010
	Zirconium (Zr)-Dissolved (mg/L)	<0.000060	<0.000060	<0.000060	<0.000060	<0.000060
Speciated Metals	Arsenate (As V) (ug/L)	<0.020		0.020		0.023
	Arsenite (As III) (ug/L)	0.108		0.022		0.211

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2107814-11	L2107814-12	L2107814-13	L2107814-14	
Description	Surface Water	Surface Water	Surface Water		
Sampled Date	01-JUN-18	01-JUN-18	02-JUN-18	02-JUN-18	
Sampled Time	15:55	16:40			
Client ID	NEM-28	NEM-27	WTP MAY DUP-1	WTP MAY DI-1	
Grouping / **Analyte**					
WATER					
Dissolved Metals					
Bismuth (Bi)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	
Boron (B)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010	
Cadmium (Cd)-Dissolved (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	
Calcium (Ca)-Dissolved (mg/L)	2.99	3.02	1.76	<0.050	
Cesium (Cs)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	
Chromium (Cr)-Dissolved (mg/L)	0.00012	0.00011	<0.00010	<0.00010	
Cobalt (Co)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	
Copper (Cu)-Dissolved (mg/L)	<0.00020	<0.00020	0.00021	<0.00020	
Iron (Fe)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010	
Lead (Pb)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	
Lithium (Li)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	
Magnesium (Mg)-Dissolved (mg/L)	1.35	1.37	0.586	<0.0050	
Manganese (Mn)-Dissolved (mg/L)	0.00025	<0.00010	0.00035	<0.00010	
Mercury (Hg)-Dissolved (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	
Molybdenum (Mo)-Dissolved (mg/L)	<0.000050	0.000052	<0.000050	<0.000050	
Nickel (Ni)-Dissolved (mg/L)	<0.00050	0.00053	<0.00050	<0.00050	
Phosphorus (P)-Dissolved (mg/L)	<0.050	<0.050	<0.050	<0.050	
Potassium (K)-Dissolved (mg/L)	0.775	0.770	0.479	<0.050	
Rubidium (Rb)-Dissolved (mg/L)	0.00088	0.00085	0.00062	<0.00020	
Selenium (Se)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	
Silicon (Si)-Dissolved (mg/L)	0.217	0.226	0.579	<0.050	
Silver (Ag)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	
Sodium (Na)-Dissolved (mg/L)	0.641	0.636	0.760	0.135 RRV	
Strontium (Sr)-Dissolved (mg/L)	0.0134	0.0134	0.00915	<0.00020	
Sulfur (S)-Dissolved (mg/L)	1.71	1.86	0.82	<0.50	
Tellurium (Te)-Dissolved (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020	
Thallium (Tl)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	
Thorium (Th)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	
Tin (Sn)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	0.00083 RRV	
Titanium (Ti)-Dissolved (mg/L)	<0.00030	<0.00030	<0.00030	<0.00030	
Tungsten (W)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	
Uranium (U)-Dissolved (mg/L)	<0.000010	<0.000010	0.000024	<0.000010	
Vanadium (V)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	
Zinc (Zn)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	
Zirconium (Zr)-Dissolved (mg/L)	<0.000060	<0.000060	<0.000060	<0.000060	
Speciated Metals					
Arsenate (As V) (ug/L)	0.030				
Arsenite (As III) (ug/L)	0.158				

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	L2107814-1 Surface Water 30-MAY-18 16:00 WTS-28	L2107814-2 Surface Water 01-JUN-18 16:00 WTS-27	L2107814-3 Surface Water 03-JUN-18 11:20 DS1-19	L2107814-4 Surface Water 03-JUN-18 10:00 DS1-20	L2107814-5 Surface Water 02-JUN-18 16:55 A76-22
Sample ID **Description** **Sampled Date** **Sampled Time** **Client ID**						
WATER						
Speciated Metals	Dimethylarsinic Acid (DMA, as As) (ug/L)	<0.020	<0.020			
	Monomethylarsonic Acid (MMA, as As) (ug/L)	<0.020	<0.020			
	Arsenobetaine (AsB, as As) (ug/L)	<0.050	<0.050			

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2107814-6	L2107814-7	L2107814-8	L2107814-9	L2107814-10
Description	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water
Sampled Date	02-JUN-18	02-JUN-18	02-JUN-18	01-JUN-18	01-JUN-18
Sampled Time	16:00	08:50	14:00	11:15	12:15
Client ID	A76-21	A20-22	A20-21	MAM-27	MAM-28
Grouping / **Analyte**					
WATER					
Speciated Metals					
Dimethylarsinic Acid (DMA, as As) (ug/L)	<0.020		<0.020		<0.020
Monomethylarsonic Acid (MMA, as As) (ug/L)	<0.020		<0.020		<0.020
Arsenobetaine (AsB, as As) (ug/L)	<0.050		<0.050		<0.050

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2107814-11	L2107814-12	L2107814-13	L2107814-14	
	Description	Surface Water	Surface Water	Surface Water		
	Sampled Date	01-JUN-18	01-JUN-18	02-JUN-18	02-JUN-18	
	Sampled Time	15:55	16:40			
	Client ID	NEM-28	NEM-27	WTP MAY DUP-1	WTP MAY DI-1	
Grouping	**Analyte**					
WATER						
Speciated Metals	Dimethylarsinic Acid (DMA, as As) (ug/L)	<0.020				
	Monomethylarsonic Acid (MMA, as As) (ug/L)	<0.020				
	Arsenobetaine (AsB, as As) (ug/L)	<0.050				

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

Reference Information

Qualifiers for Individual Samples Listed:

Sample Number	Client Sample ID	Qualifier	Description
L2107814-13	WTP MAY DUP-1	UCM	Unknown sample container (non-ALS) submitted for metals analysis (excluding Hg). ALS cannot verify container cleanliness or suitability for trace metals tests.

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Method Blank	Aluminum (Al)-Dissolved	MB-LOR	L2107814-10, -11, -12, -13, -14, -9
Method Blank	Sulfur (S)-Total	MB-LOR	L2107814-14
Laboratory Control Sample	Sulfur (S)-Dissolved	MES	L2107814-1, -2, -3, -4, -5, -6, -7, -8
Matrix Spike	Dissolved Organic Carbon	MS-B	L2107814-4
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L2107814-1, -2, -3, -4, -5, -6, -7, -8
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L2107814-14
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L2107814-1, -2
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L2107814-1, -2, -3, -4, -5, -6, -7, -8
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L2107814-14
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L2107814-1, -2
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L2107814-1, -2, -3, -4, -5, -6, -7, -8
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L2107814-14
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L2107814-1, -2
Matrix Spike	Manganese (Mn)-Dissolved	MS-B	L2107814-14
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L2107814-14
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L2107814-1, -2
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L2107814-1, -2, -3, -4, -5, -6, -7, -8
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L2107814-14
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L2107814-1, -2
Matrix Spike	Sulfur (S)-Dissolved	MS-B	L2107814-1, -2, -3, -4, -5, -6, -7, -8
Matrix Spike	Sulfur (S)-Dissolved	MS-B	L2107814-14
Matrix Spike	Sulfur (S)-Dissolved	MS-B	L2107814-1, -2
Matrix Spike	Uranium (U)-Dissolved	MS-B	L2107814-14
Matrix Spike	Barium (Ba)-Total	MS-B	L2107814-1, -10, -11, -12, -13, -14, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Barium (Ba)-Total	MS-B	L2107814-14
Matrix Spike	Calcium (Ca)-Total	MS-B	L2107814-1, -10, -11, -12, -13, -14, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Calcium (Ca)-Total	MS-B	L2107814-14
Matrix Spike	Magnesium (Mg)-Total	MS-B	L2107814-1, -10, -11, -12, -13, -14, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Magnesium (Mg)-Total	MS-B	L2107814-14
Matrix Spike	Manganese (Mn)-Total	MS-B	L2107814-1, -10, -11, -12, -13, -14, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Potassium (K)-Total	MS-B	L2107814-14
Matrix Spike	Sodium (Na)-Total	MS-B	L2107814-1, -10, -11, -12, -13, -14, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Sodium (Na)-Total	MS-B	L2107814-14
Matrix Spike	Strontium (Sr)-Total	MS-B	L2107814-1, -10, -11, -12, -13, -14, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Strontium (Sr)-Total	MS-B	L2107814-14
Matrix Spike	Sulfur (S)-Total	MS-B	L2107814-14

Qualifiers for Individual Parameters Listed:

Qualifier	Description
DLB	Detection Limit Raised. Analyte detected at comparable level in Method Blank.
DTMF	Dissolved concentration exceeds total for field-filtered metals sample. Metallic contaminants may have been introduced to dissolved sample during field filtration.
MB-LOR	Method Blank exceeds ALS DQO. Limits of Reporting have been adjusted for samples with positive hits below 5x blank level.
MES	Data Quality Objective was marginally exceeded (by < 10% absolute) for < 10% of analytes in a Multi-Element Scan / Multi-Parameter

Reference Information

	Scan (considered acceptable as per OMOE & CCME).
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RRV	Reported Result Verified By Repeat Analysis

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ALK-CO3-CALC-WP	Water	Alkalinity, Carbonate (as CaCO3)	CALCULATION

The Alkalinity of water is a measure of its acid neutralizing capacity.Alkalinity is imparted by bicarbonate, carbonate and hydroxide components of water. The fraction of alkalinity contributed by carbonate is calculated and reported as mg/L CaCO3.

ALK-HCO3-CALC-WP	Water	Alkalinity, Bicarbonate (as CaCO3)	CALCULATION

The Alkalinity of water is a measure of its acid neutralizing capacity.Alkalinity is imparted by bicarbonate, carbonate and hydroxide components of water. The fraction of alkalinity contributed by bicarbonate is calculated and reported as mg/L CaCO3.

ALK-OH-CALC-WP	Water	Alkalinity, Hydroxide (as CaCO3)	CALCULATION

The Alkalinity of water is a measure of its acid neutralizing capacity.Alkalinity is imparted by bicarbonate, carbonate and hydroxide components of water. The fraction of alkalinity contributed by hydroxide is calculated and reported as mg/L CaCO3.

ALK-TITR-WP	Water	Alkalinity, Total (as CaCO3)	APHA 2320B

The Alkalinity of water is a measure of its acid neutralizing capacity. Alkalinity is imparted by bicarbonate, carbonate and hydroxide components of water. Total alkalinity is determined by titration with a strong standard mineral acid to the successive HCO3- and H2CO3 endpoints indicated electrometrically.

AS-SPEC-HPLC/CCMS-VA	Water	Arsenic Species in Water by HPLC/CCMS	USGS WRIR 02-4144

Speciated Arsenic (As) Analysis is by reverse phase HPLC-ICPMS. Sample handling, preservation and holding times outlined in USGS Report 02-4144 and AWWA Preservation of Arsenic Species, 2006. Instrumental analysis based on Afton et al, Journal of Chromatography A, 1208 (2008) 156-163 and Agilent Technologies application notes. Filtration is conducted prior to preservation. Results for unfiltered, preserved samples may be elevated due to extraction of arsenic species from particulate matter in the samples.
Elevated iron (~100+ ppm) concentrations or sulfidic water can introduce biases to the reported results for some arsenic species.

BR-L-IC-N-VA	Water	Bromide in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

CARBONS-DOC-VA	Water	Dissolved organic carbon by combustion	APHA 5310B

This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)". Dissolved carbon (DOC) fractions are determined by filtering the sample through a 0.45 micron membrane filter prior to analysis.

CARBONS-TOC-VA	Water	Total organic carbon by combustion	APHA 5310B TOTAL ORGANIC CARBON (TOC)

This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)".

CHLOROA-F-VA	Filter	Chlorophyll a by Fluorometer (Filter)	EPA 445.0

This analysis is done using procedures modified from EPA Method 445.0. Chlorophyll-a is determined by a routine acetone extraction followed with analysis by fluorometry using the non-acidification procedure. This method is not subject to interferences from chlorophyll b.

CL-L-IC-N-VA	Water	Chloride in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

CN-FREE-L-CFA-VA	Water	Low Level Free Cyanide in water by CFA	ASTM 7237

This analysis is carried out using procedures adapted from ASTM Method 7237 "Free Cyanide with Flow Injection Analysis (FIA) Utilizing Gas Diffusion Separation and Amperometric Detection". Free cyanide is determined by in-line gas diffusion at pH 6 with final determination by colourimetric analysis.

CN-T-L-CFA-VA	Water	Low Level Total Cyanide in water by CFA	ISO 14403:2002

This analysis is carried out using procedures adapted from ISO Method 14403:2002 "Determination of Total Cyanide using Flow Analysis (FIA and CFA)". Total or strong acid dissociable (SAD) cyanide is determined by in-line UV digestion along with sample distillation and final determination by colourimetric analysis. Method Limitation: This method is susceptible to interference from thiocyanate (SCN). If SCN is present in the sample, there could be a positive interference with this method, but it would be less than 1% and could be as low as zero.

EC-SCREEN-VA	Water	Conductivity Screen (Internal Use Only)	APHA 2510

Qualitative analysis of conductivity where required during preparation of other tests - e.g. TDS, metals, etc.

EC-WP	Water	Conductivity	APHA 2510B

Conductivity of an aqueous solution refers to its ability to carry an electric current. Conductance of a solution is measured between two spatially fixed and chemically inert electrodes.

Reference Information

F-IC-N-VA	Water	Fluoride in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

HARDNESS-CALC-VA	Water	Hardness	APHA 2340B

Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

HG-D-CVAA-VA	Water	Diss. Mercury in Water by CVAAS or CVAFS	APHA 3030B/EPA 1631E (mod)

Water samples are filtered (0.45 um), preserved with hydrochloric acid, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

HG-T-CVAA-VA	Water	Total Mercury in Water by CVAAS or CVAFS	EPA 1631E (mod)

Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

MET-D-CCMS-VA	Water	Dissolved Metals in Water by CRC ICPMS	APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

MET-T-CCMS-VA	Water	Total Metals in Water by CRC ICPMS	EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

NH3-F-VA	Water	Ammonia in Water by Fluorescence	J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

NO2-L-IC-N-VA	Water	Nitrite in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

NO3-L-IC-N-VA	Water	Nitrate in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

P-T-PRES-COL-VA	Water	Total P in Water by Colour	APHA 4500-P Phosphorus

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is determined colourimetrically after persulphate digestion of the sample.
Samples with very high dissolved solids (i.e. seawaters, brackish waters) may produce a negative bias by this method. Alternate methods are available for these types of samples.

Arsenic (5+), at elevated levels, is a positive interference on colourimetric phosphate analysis.

P-TD-COL-VA	Water	Total Dissolved P in Water by Colour	APHA 4500-P Phosphorous

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Dissolved Phosphorus is determined colourimetrically after persulphate digestion of a sample that has been lab or field filtered through a 0.45 micron membrane filter.
Samples with very high dissolved solids (i.e. seawaters, brackish waters) may produce a negative bias by this method. Alternate methods are available for these types of samples.

Arsenic (5+), at elevated levels, is a positive interference on colourimetric phosphate analysis.

PH-WP	Water	pH	APHA 4500H

The pH of a sample is the determination of the activity of the hydrogen ions by potentiometric measurement using a standard hydrogen electrode and a reference electrode.

PO4-DO-COL-VA	Water	Diss. Orthophosphate in Water by Colour	APHA 4500-P Phosphorus

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.
Samples with very high dissolved solids (i.e. seawaters, brackish waters) may produce a negative bias by this method. Alternate methods are available for these types of samples.

Arsenic (5+), at elevated levels, is a positive interference on colourimetric phosphate analysis.

SILICATE-COL-VA	Water	Silicate by Colourimetric analysis	APHA 4500-SiO2 E.

This analysis is carried out using procedures adapted from APHA Method 4500-SiO2 E. "Silica". Silicate (molybdate-reactive silica) is determined by the molybdosilicate-heteropoly blue colourimetric method.

SO4-IC-N-VA	Water	Sulfate in Water by IC	EPA 300.1 (mod)

Reference Information

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

TDS-LOW-VA	Water	Low Level TDS (3.0mg/L) by Gravimetric	APHA 2540C

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total dissolved solids (TDS) are determined by filtering a sample through a glass fibre filter, TDS is determined by evaporating the filtrate to dryness at 180 degrees celsius.

TKN-F-VA	Water	TKN in Water by Fluorescence	APHA 4500-NORG D.

This analysis is carried out using procedures adapted from APHA Method 4500-Norg D. "Block Digestion and Flow Injection Analysis". Total Kjeldahl Nitrogen is determined using block digestion followed by Flow-injection analysis with fluorescence detection.

TSS-LOW-VA	Water	Total Suspended Solids by Grav. (1 mg/L)	APHA 2540D

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total suspended solids (TSS) are determined by filtering a sample through a glass fibre filter, TSS is determined by drying the filter at 104 degrees celsius.
Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.

TURBIDITY-VA	Water	Turbidity by Meter	APHA 2130 Turbidity

This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
WP	ALS ENVIRONMENTAL - WINNIPEG, MANITOBA, CANADA
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

ALS Environme

L2107814-COFC

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nada Toll Free: 1 800 668 9878
www.alsglobal.com

COC # _____

Page 1 of 2

Report To		at / Distribution				Service Requested (Rush for routine analysis subject to availability)
Company:	Azimuth Consulting Group	☑ Standard	☐ Other			◉ Regular (Standard Turnaround Times - Business Days)
Contact:	Eric Franz	☑ PDF	☑ Excel	☐ Digital	☐ Fax	○ Priority (2-4 Business Days) - 50% Surcharge - Contact ALS to Confirm TAT
Address:	218-2902 West Broadway	Email 1:	efranz@azimuthgroup.ca			○ Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT
	Vancouver, BC V6K2G8	Email 2:	robin.allard@agnicoeagle.com			○ Same Day or Weekend Emergency - Contact ALS to Confirm TAT
Phone:	604-730-1220 Fax:	Email 3:	marie-pier.marcil@agnicoeagle.com			
Invoice To	Same as Report ? ☑ Yes ☐ No	Client / Project Information				
Hardcopy of Invoice with Report?	☐ Yes ☑ No	Job #:	Whale Tail Pit CREMP - Surfacewater			
Company:		PO / AFE:				
Contact:		LSD:				
Address:						
Phone:	Fax:	Quote #:	Q39503			
Lab Work Order # (lab use only)		ALS Contact:	Brent Mack	Sampler:	Nicolas Saucier	

Sample #	Sample Identification (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Conventionals** see notes	TSS-Low, TDS-Low	TOC, Ammonia, TKN, Total P	DOC	T-CN (Low), Free CN (Low)	Total mercury	Dissolved mercury	Total Metals	Dissolved metals	Chlorophyll-a	Arsenic		Number of Containers
							P	F/P	P	P	F/P	P	F/P				
	WTS-28	30-May-18	16:00	Surface Water	X	X	X	X	X	X	X	X	X	X	X		10
	WTS-27	01-Jun-18	16:00	Surface Water	X	X	X	X	X	X	X	X	X	X	X		10
	DS1-19	03-Jun-18	11:20	Surface Water	X	X	X	X	X	X	X	X	X	X			9
	DS1-20	03-Jun-18	10:00	Surface Water	X	X	X	X	X	X	X	X	X	X			9
	A76-22	02-Jun-18	16:55	Surface Water	X	X	X	X	X	X	X	X	X	X			9
	A76-21	02-Jun-18	16:00	Surface Water	X	X	X	X	X	X	X	X	X	X	X		10
	A20-22	02-Jun-18	8:50	Surface Water	X	X	X	X	X	X	X	X	X	X			9
	A20-21	02-Jun-18	14:00	Surface Water	X	X	X	X	X	X	X	X	X	X	X		10
	MAM-27	01-Jun-18	11:15	Surface Water	X	X	X	X	X	X	X	X	X	X			9
	MAM-28	01-Jun-18	12:15	Surface Water	X	X	X	X	X	X	X	X	X	X	X		10
	NEM-28	01-Jun-18	15:55	Surface Water	X	X	X	X	X	X	X	X	X	X	X		10
	NEM-27	01-Jun-18	16:40	Surface Water	X	X	X	X	X	X	X	X	X	X			9

Special Instructions / Regulations with water or land use (CCME-Freshwater Aquatic Life/BC CSR - Commercial/AB Tier 1 - Natural, etc) / Hazardous Details

**Conventionals includes: Alk Species, pH, EC, Turbidity, Conductivity, Anions (F, NO2, NO3, Br, SO4), low-level Chloride, Silicate, TD-P, and Ortho-PO4.

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.

By the use of this form the user acknowledges and agrees with the Terms and Conditions as provided on a separate Excel tab.

Also provided on another Excel tab are the ALS location addresses, phone numbers and sample container / preservation / holding time table for common analyses.

SHIPMENT RELEASE (client use)			SHIPMENT RECEPTION (lab use only)				SHIPMENT VERIFICATION (lab use only)			
Released by:	Date (dd-mmm-yy)	Time (hh-mm)	Received by:	Date:	Time:	Temperature:	Verified by:	Date:	Time:	Observations: Yes / No ? If Yes add SIF
				JUN - 7 2018	940 hrs	14 ± 1 2 °C				

GENF 20.00 Front

L2107814-COFC

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COC # _____

Page 2 of 2

Report To		t / Distribution		Service Requested (Rush for routine analysis subject to availability)
Company:	Azimuth Consulting Group	☑ Standard	☐ Other	◉ Regular (Standard Turnaround Times - Business Days)
Contact:	Eric Franz	☑ PDF ☑ Excel	☐ Digital ☐ Fax	○ Priority (2-4 Business Days) - 50% Surcharge - Contact ALS to Confirm TAT
Address:	218-2902 West Broadway	Email 1:	efranz@azimuthgroup.ca	○ Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT
	Vancouver, BC V6K2G8	Email 2:	robin.allard@agnicoeagle.com	○ Same Day or Weekend Emergency - Contact ALS to Confirm TAT
Phone:	604-730-1220 Fax:	Email 3:	marie-pier.marcil@agnicoeagle.com	
Invoice To	Same as Report ? ☑ Yes ☐ No	Client / Project Information		
Hardcopy of Invoice with Report?	☐ Yes ☑ No	Job #:	Whale Tail Pit CREMP - Surfacewater	
Company:		PO / AFE:		
Contact:		LSD:		
Address:				
Phone:	Fax:	Quote #:	Q39503	
Lab Work Order # (lab use only)		ALS Contact:	Brent Mack	Sampler: Eric Franz

Analysis Request

Please indicate below Filtered, Preserved or both (F, P, F/P)

Sample #	Sample Identification (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Conventionals** see notes	TSS-Low, TDS-Low	TOC, Ammonia, TKN, Total P	DOC	T-CN (Low), Free CN (Low)	Total mercury	Dissolved mercury	Total Metals	Dissolved metals	Chlorophyll-a			Number of Containers
							P	F/P	P	P	F/P	P	F/P				
	WTP MAY DUP-1	02-Jun-17		Surface Water	X	X	X	X	X	X	X	X	X	X			9
	WTP MAY DI-1	02-Jun-17			X	X	X	X	X	X	X	X	X				

Special Instructions / Regulations with water or land use (CCME-Freshwater Aquatic Life/BC CSR - Commercial/AB Tier 1 - Natural, etc) / Hazardous Details

**Conventionals includes: Alk Species, pH, EC, Turbidity, Conductivity, Anions (F, NO2, NO3, Br, SO4), low-level Chloride, Silicate, TD-P, and Ortho-PO4.

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.

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Also provided on another Excel tab are the ALS location addresses, phone numbers and sample container / preservation / holding time table for common analyses.

SHIPMENT RELEASE (client use)			SHIPMENT RECEPTION (lab use only)				SHIPMENT VERIFICATION (lab use only)			
Released by:	Date (dd-mmm-yy)	Time (hh-mm)	Received by:	Date:	Time:	Temperature:	Verified by:	Date:	Time:	Observations: Yes / No ? If Yes add SIF
			JC	JUN - 7 2018	840 AM	14.12 °C				

GENF 20.00 Front

AZIMUTH CONSULTING GROUP INC.
ATTN: Eric Franz
218 - 2902 West Broadway
Vancouver BC V6K 2G8

Date Received: 13-JUL-18
Report Date: 23-JUL-18 13:09 (MT)
Version: FINAL

Client Phone: 604-730-1220

Certificate of Analysis

Lab Work Order #: L2129144

Project P.O. #: NOT SUBMITTED
Job Reference: WHALE TAIL PIT CREMP - SURFACEWATER
C of C Numbers:
Legal Site Desc:

Brent Mack, B.Sc.
Account Manager

[This report shall not be reproduced except in full without the written authority of the Laboratory.]

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2129144-1	L2129144-2	L2129144-3	L2129144-4	L2129144-5
Description	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water
Sampled Date	08-JUL-18	08-JUL-18	08-JUL-18	08-JUL-18	08-JUL-18
Sampled Time	14:30	15:00	14:45	11:00	11:30
Client ID	WTS-29	WTS-30	WTP JULY DUP-1	WTP JULY DI-1	WTP JULY EB-1
Grouping / **Analyte**					
WATER					
Physical Tests Conductivity (uS/cm)	39.4	36.7	35.3	<2.0	<2.0
Hardness (as CaCO3) (mg/L)	12.8	12.1	12.1	<0.50	<0.50
pH (pH)	6.87	6.91	6.87	5.44	5.52
Total Suspended Solids (mg/L)	1.3	1.1	1.3	<1.0	<1.0
Total Dissolved Solids (mg/L)	38.0	29.1	25.8	<3.0	<3.0
Turbidity (NTU)	0.61	0.52	0.54	<0.10	0.19
Anions and Nutrients Alkalinity, Bicarbonate (as CaCO3) (mg/L)	4.6	4.4	4.1	<1.0	<1.0
Alkalinity, Carbonate (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
Alkalinity, Total (as CaCO3) (mg/L)	4.6	4.4	4.1	<1.0	<1.0
Ammonia, Total (as N) (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Bromide (Br) (mg/L)	0.075	0.077	0.084	<0.050	<0.050
Chloride (Cl) (mg/L)	6.68	6.61	6.75	<0.10	<0.10
Fluoride (F) (mg/L)	0.028	0.030	0.029	<0.020	<0.020
Nitrate (as N) (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Nitrite (as N) (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Total Kjeldahl Nitrogen (mg/L)	0.122	0.124	0.131	<0.050	<0.050
Orthophosphate-Dissolved (as P) (mg/L)	0.0010	0.0011	<0.0010	<0.0010	<0.0010
Phosphorus (P)-Total Dissolved (mg/L)	<0.0020	0.0022	<0.0020	<0.0020	<0.0020
Phosphorus (P)-Total (mg/L)	0.0089	0.0052	0.0064	<0.0020	<0.0020
Silicate (as SiO2) (mg/L)	0.53	0.56	0.54	<0.50	<0.50
Sulfate (SO4) (mg/L)	1.50	1.50	1.51	<0.30	<0.30
Cyanides Cyanide, Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Cyanide, Free (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Organic / Inorganic Carbon Dissolved Organic Carbon (mg/L)	2.27	2.28	2.10	<0.50	<0.50
Total Organic Carbon (mg/L)	2.29	2.27	2.41	0.57	<0.50
Total Metals Aluminum (Al)-Total (mg/L)	0.0164	0.0165	0.0155	<0.0030	0.0046 RRV
Antimony (Sb)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	0.00011 RRV
Arsenic (As)-Total (mg/L)	0.00019	0.00019	0.00020	<0.00010	<0.00010
Barium (Ba)-Total (mg/L)	0.00848	0.00828	0.00879	<0.00010	0.00018 RRV
Beryllium (Be)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth (Bi)-Total (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron (B)-Total (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)-Total (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Calcium (Ca)-Total (mg/L)	3.62	3.59	3.76	<0.050	0.055 RRV
Cesium (Cs)-Total (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	L2129144-1 Surface Water 08-JUL-18 14:30 WTS-29	L2129144-2 Surface Water 08-JUL-18 15:00 WTS-30	L2129144-3 Surface Water 08-JUL-18 14:45 WTP JULY DUP-1	L2129144-4 Surface Water 08-JUL-18 11:00 WTP JULY DI-1	L2129144-5 Surface Water 08-JUL-18 11:30 WTP JULY EB-1
WATER						
Total Metals	Chromium (Cr)-Total (mg/L)	0.00018	0.00021	0.00015	<0.00010	<0.00010
	Cobalt (Co)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Copper (Cu)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Iron (Fe)-Total (mg/L)	0.039	0.040	0.030	<0.010	<0.010
	Lead (Pb)-Total (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	0.00244 RRV
	Lithium (Li)-Total (mg/L)	0.0013	0.0012	0.0013	<0.0010	<0.0010
	Magnesium (Mg)-Total (mg/L)	0.994	0.989	1.04	<0.0050	0.0697 RRV
	Manganese (Mn)-Total (mg/L)	0.0104	0.0101	0.0102	<0.00010	0.00019 RRV
	Mercury (Hg)-Total (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
	Molybdenum (Mo)-Total (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Nickel (Ni)-Total (mg/L)	0.00096	0.00099	0.00100	<0.00050	<0.00050
	Phosphorus (P)-Total (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050
	Potassium (K)-Total (mg/L)	0.544	0.552	0.585	<0.050	<0.050
	Rubidium (Rb)-Total (mg/L)	0.00092	0.00082	0.00092	<0.00020	<0.00020
	Selenium (Se)-Total (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Silicon (Si)-Total (mg/L)	0.30	0.30	0.32	<0.10	<0.10
	Silver (Ag)-Total (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Sodium (Na)-Total (mg/L)	0.676	0.674	0.709	<0.050	<0.050
	Strontium (Sr)-Total (mg/L)	0.0317	0.0317	0.0332	<0.00020	<0.00020
	Sulfur (S)-Total (mg/L)	0.66	0.61	<0.50	<0.50	<0.50
	Tellurium (Te)-Total (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
	Thallium (Tl)-Total (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Thorium (Th)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Tin (Sn)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Titanium (Ti)-Total (mg/L)	0.00052	<0.00060 DLM	<0.00090 DLM	<0.00030	<0.00030
	Tungsten (W)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Uranium (U)-Total (mg/L)	0.000031	0.000033	0.000025	<0.000010	<0.000010
	Vanadium (V)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Zinc (Zn)-Total (mg/L)	<0.0030	<0.0030	<0.0030	<0.0030	0.0045 RRV
	Zirconium (Zr)-Total (mg/L)	<0.000060	<0.000060	<0.000060	<0.000060	<0.000060
Dissolved Metals	Dissolved Mercury Filtration Location	FIELD	FIELD	FIELD	FIELD	FIELD
	Dissolved Metals Filtration Location	FIELD	FIELD	FIELD	FIELD	FIELD
	Aluminum (Al)-Dissolved (mg/L)	0.0042	0.0049	0.0057	<0.0010	<0.0010
	Antimony (Sb)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Arsenic (As)-Dissolved (mg/L)	0.00017	0.00012	0.00018	<0.00010	<0.00010
	Barium (Ba)-Dissolved (mg/L)	0.00790	0.00739	0.00756	<0.00010	0.00030 RRV
	Beryllium (Be)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2129144-1	L2129144-2	L2129144-3	L2129144-4	L2129144-5
Description	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water
Sampled Date	08-JUL-18	08-JUL-18	08-JUL-18	08-JUL-18	08-JUL-18
Sampled Time	14:30	15:00	14:45	11:00	11:30
Client ID	WTS-29	WTS-30	WTP JULY DUP-1	WTP JULY DI-1	WTP JULY EB-1
Grouping / **Analyte**					
WATER					
Dissolved Metals Bismuth (Bi)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron (B)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)-Dissolved (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Calcium (Ca)-Dissolved (mg/L)	3.63	3.43	3.43	<0.050	<0.050
Cesium (Cs)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Chromium (Cr)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Cobalt (Co)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper (Cu)-Dissolved (mg/L)	0.00028	0.00039	0.00031	<0.00020	<0.00020
Iron (Fe)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
Lead (Pb)-Dissolved (mg/L)	<0.000050	<0.000050	0.000241 DTMF	<0.000050	0.000075 RRV
Lithium (Li)-Dissolved (mg/L)	0.0011	<0.0010	0.0011	<0.0010	<0.0010
Magnesium (Mg)-Dissolved (mg/L)	0.907	0.857	0.868	<0.0050	<0.0050
Manganese (Mn)-Dissolved (mg/L)	0.00846	0.00776	0.00806	<0.00010	<0.00010
Mercury (Hg)-Dissolved (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Molybdenum (Mo)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Nickel (Ni)-Dissolved (mg/L)	0.00090	0.00083	0.00086	<0.00050	<0.00050
Phosphorus (P)-Dissolved (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050
Potassium (K)-Dissolved (mg/L)	0.550	0.520	0.519	<0.050	<0.050
Rubidium (Rb)-Dissolved (mg/L)	0.00076	0.00087	0.00077	<0.00020	<0.00020
Selenium (Se)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Silicon (Si)-Dissolved (mg/L)	0.253	0.246	0.236	<0.050	<0.050
Silver (Ag)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)-Dissolved (mg/L)	0.648	0.605	0.616	<0.050	<0.050
Strontium (Sr)-Dissolved (mg/L)	0.0314	0.0295	0.0300	<0.00020	<0.00020
Sulfur (S)-Dissolved (mg/L)	<0.50	<0.50	<0.50	<0.50	<0.50
Tellurium (Te)-Dissolved (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Thallium (Tl)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Thorium (Th)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Tin (Sn)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)-Dissolved (mg/L)	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030
Tungsten (W)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Uranium (U)-Dissolved (mg/L)	0.000025	0.000027	0.000025	<0.000010	<0.000010
Vanadium (V)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc (Zn)-Dissolved (mg/L)	<0.0010	0.0016	<0.0010	<0.0010	0.0028 RRV
Zirconium (Zr)-Dissolved (mg/L)	<0.000060	<0.000060	<0.000060	<0.000060	<0.000060

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Method Blank	Thallium (Tl)-Total	MB-LOR	L2129144-5
Matrix Spike	Dissolved Organic Carbon	MS-B	L2129144-1, -2, -3, -4, -5
Matrix Spike	Dissolved Organic Carbon	MS-B	L2129144-1, -2, -3, -4, -5
Matrix Spike	Total Organic Carbon	MS-B	L2129144-1, -2, -3, -4, -5
Matrix Spike	Total Organic Carbon	MS-B	L2129144-1, -2, -3, -4, -5
Matrix Spike	Antimony (Sb)-Dissolved	MS-B	L2129144-5
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L2129144-5
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L2129144-5
Matrix Spike	Molybdenum (Mo)-Dissolved	MS-B	L2129144-5
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L2129144-5
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L2129144-1, -2, -3, -4, -5
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L2129144-5
Matrix Spike	Sulfur (S)-Dissolved	MS-B	L2129144-5
Matrix Spike	Tungsten (W)-Dissolved	MS-B	L2129144-5
Matrix Spike	Uranium (U)-Dissolved	MS-B	L2129144-5
Matrix Spike	Calcium (Ca)-Total	MS-B	L2129144-1, -2, -3, -4, -5
Matrix Spike	Magnesium (Mg)-Total	MS-B	L2129144-1, -2, -3, -4, -5
Matrix Spike	Potassium (K)-Total	MS-B	L2129144-1, -2, -3, -4, -5
Matrix Spike	Silicon (Si)-Total	MS-B	L2129144-1, -2, -3, -4, -5
Matrix Spike	Sodium (Na)-Total	MS-B	L2129144-1, -2, -3, -4, -5
Matrix Spike	Strontium (Sr)-Total	MS-B	L2129144-1, -2, -3, -4, -5

Qualifiers for Individual Parameters Listed:

Qualifier	Description
DLM	Detection Limit Adjusted due to sample matrix effects (e.g. chemical interference, colour, turbidity).
DTMF	Dissolved concentration exceeds total for field-filtered metals sample. Metallic contaminants may have been introduced to dissolved sample during field filtration.
MB-LOR	Method Blank exceeds ALS DQO. Limits of Reporting have been adjusted for samples with positive hits below 5x blank level.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RRV	Reported Result Verified By Repeat Analysis

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ALK-TITR-VA	Water	Alkalinity Species by Titration	APHA 2320 Alkalinity

This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.

BR-L-IC-N-VA	Water	Bromide in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

CARBONS-DOC-VA	Water	Dissolved organic carbon by combustion	APHA 5310B

This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)". Dissolved carbon (DOC) fractions are determined by filtering the sample through a 0.45 micron membrane filter prior to analysis.

CARBONS-TOC-VA	Water	Total organic carbon by combustion	APHA 5310B TOTAL ORGANIC CARBON (TOC)

This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)".

CL-L-IC-N-VA	Water	Chloride in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

CN-FREE-L-CFA-VA	Water	Low Level Free Cyanide in water by CFA	ASTM 7237

This analysis is carried out using procedures adapted from ASTM Method 7237 "Free Cyanide with Flow Injection Analysis (FIA) Utilizing Gas Diffusion Separation and Amperometric Detection". Free cyanide is determined by in-line gas diffusion at pH 6 with final determination by colourimetric analysis.

CN-T-L-CFA-VA	Water	Low Level Total Cyanide in water by CFA	ISO 14403:2002

This analysis is carried out using procedures adapted from ISO Method 14403:2002 "Determination of Total Cyanide using Flow Analysis (FIA and CFA)". Total or strong acid dissociable (SAD) cyanide is determined by in-line UV digestion along with sample distillation and final determination by colourimetric analysis. Method Limitation: This method is susceptible to interference from thiocyanate (SCN). If SCN is present in the sample, there

Reference Information

could be a positive interference with this method, but it would be less than 1% and could be as low as zero.

EC-PCT-VA Water Conductivity (Automated) APHA 2510 Auto. Conduc.

This analysis is carried out using procedures adapted from APHA Method 2510 "Conductivity". Conductivity is determined using a conductivity electrode.

EC-SCREEN-VA Water Conductivity Screen (Internal Use Only) APHA 2510

Qualitative analysis of conductivity where required during preparation of other tests - e.g. TDS, metals, etc.

F-IC-N-VA Water Fluoride in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

HARDNESS-CALC-VA Water Hardness APHA 2340B

Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

HG-D-CVAA-VA Water Diss. Mercury in Water by CVAAS or CVAFS APHA 3030B/EPA 1631E (mod)

Water samples are filtered (0.45 um), preserved with hydrochloric acid, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

HG-T-CVAA-VA Water Total Mercury in Water by CVAAS or CVAFS EPA 1631E (mod)

Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

MET-D-CCMS-VA Water Dissolved Metals in Water by CRC ICPMS APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

MET-T-CCMS-VA Water Total Metals in Water by CRC ICPMS EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

NH3-F-VA Water Ammonia in Water by Fluorescence J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

NO2-L-IC-N-VA Water Nitrite in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

NO3-L-IC-N-VA Water Nitrate in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

P-T-PRES-COL-VA Water Total P in Water by Colour APHA 4500-P Phosphorus

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is determined colourimetrically after persulphate digestion of the sample.
Samples with very high dissolved solids (i.e. seawaters, brackish waters) may produce a negative bias by this method. Alternate methods are available for these types of samples.

Arsenic (5+), at elevated levels, is a positive interference on colourimetric phosphate analysis.

P-TD-COL-VA Water Total Dissolved P in Water by Colour APHA 4500-P Phosphorous

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Dissolved Phosphorus is determined colourimetrically after persulphate digestion of a sample that has been lab or field filtered through a 0.45 micron membrane filter.
Samples with very high dissolved solids (i.e. seawaters, brackish waters) may produce a negative bias by this method. Alternate methods are available for these types of samples.

Arsenic (5+), at elevated levels, is a positive interference on colourimetric phosphate analysis.

PH-PCT-VA Water pH by Meter (Automated) APHA 4500-H pH Value

This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode

It is recommended that this analysis be conducted in the field.

PO4-DO-COL-VA Water Diss. Orthophosphate in Water by Colour APHA 4500-P Phosphorus

Reference Information

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.
Samples with very high dissolved solids (i.e. seawaters, brackish waters) may produce a negative bias by this method. Alternate methods are available for these types of samples.

Arsenic (5+), at elevated levels, is a positive interference on colourimetric phosphate analysis.

SILICATE-COL-VA	Water	Silicate by Colourimetric analysis	APHA 4500-SiO2 E.

This analysis is carried out using procedures adapted from APHA Method 4500-SiO2 E. "Silica". Silicate (molybdate-reactive silica) is determined by the molybdosilicate-heteropoly blue colourimetric method.

SO4-IC-N-VA	Water	Sulfate in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

TDS-LOW-VA	Water	Low Level TDS (3.0mg/L) by Gravimetric	APHA 2540C

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total dissolved solids (TDS) are determined by filtering a sample through a glass fibre filter, TDS is determined by evaporating the filtrate to dryness at 180 degrees celsius.

TKN-F-VA	Water	TKN in Water by Fluorescence	APHA 4500-NORG D.

This analysis is carried out using procedures adapted from APHA Method 4500-Norg D. "Block Digestion and Flow Injection Analysis". Total Kjeldahl Nitrogen is determined using block digestion followed by Flow-injection analysis with fluorescence detection.

TSS-LOW-VA	Water	Total Suspended Solids by Grav. (1 mg/L)	APHA 2540D

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total suspended solids (TSS) are determined by filtering a sample through a glass fibre filter, TSS is determined by drying the filter at 104 degrees celsius.
Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.

TURBIDITY-VA	Water	Turbidity by Meter	APHA 2130 Turbidity

This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

ALS Environmental

Chain of Custody / Analytical R
Canada Toll Free: 1 800 6
www.alsglobal.com

L2129144-COFC

)C #

Report To		Report Format / Distribution				Analysis subject to availability)
Company:	Azimuth Consulting Group	☑ Standard	☐ Other			◉ Regular (Standard Turnaround Times - Business Days)
Contact:	Eric Franz	☑ PDF	☑ Excel	☐ Digital	☐ Fax	○ Priority (2-4 Business Days) - 50% Surcharge - Contact ALS to Confirm TAT
Address:	218-2902 West Broadway	Email 1:	efranz@azimuthgroup.ca			○ Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT
	Vancouver, BC V6K2G8	Email 2:	robin.allard@agnicoeagle.com			○ Same Day or Weekend Emergency - Contact ALS to Confirm TAT
Phone:	604-730-1220 Fax:	Email 3:	marie-pier.marcil@agnicoeagle.com			**Analysis Request**
Invoice To	Same as Report ? ☑ Yes ☐ No	**Client / Project Information**				Please indicate below Filtered, Preserved or both (F, P, F/P)
Hardcopy of Invoice with Report?	☐ Yes ☑ No	Job #:	Whale Tail Pit CREMP - Surfacewater			
Company:		PO / AFE:				
Contact:		LSD:				
Address:						
Phone:	Fax:	Quote #:	Q39503			
Lab Work Order # (lab use only)		**ALS Contact:**	Brent Mack	**Sampler:**	Nicolas Saucier	

Sample #	Sample Identification (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Conventionals** see notes	TSS-Low, TDS-Low	TOC, Ammonia, TKN, Total P	DOC	T-CN (Low), Free CN (Low)	Total mercury	Dissolved mercury	Total Metals	Dissolved metals	Chlorophyll-a	Arsenic		Number of Containers
							P	F/P	P	P	F/P	P	F/P				
	WTS-29	08-Jul-18	14:30	Surface Water	X	X	X	X	X	X	X	X	X	X			10
	WTS-30	08-Jul-18	15:00	Surface Water	X	X	X	X	X	X	X	X	X	X			10
	WTP JULY DUP-1	08-Jul-18	14:45	Surface Water	X	X	X	X	X	X	X	X	X	X			10
	WTP JULY DI-1	08-Jul-18	11:00	Surface Water	X	X	X	X	X	X	X	X	X				9
	WTP JULY EB-1	08-Jul-18	11:30	Surface Water	X	X	X	X	X	X	X	X	X				9

Special Instructions / Regulations with water or land use (CCME-Freshwater Aquatic Life/BC CSR - Commercial/AB Tier 1 - Natural, etc) / Hazardous Details

**Conventionals includes: Alk Species, pH, EC, Turbidity, Conductivity, Anions (F, NO2, NO3, Br, SO4), low-level Chloride, Silicate, TD-P, and Ortho-PO4. Some arsenic bottles may have been filled with headspace.

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.
By the use of this form the user acknowledges and agrees with the Terms and Conditions as provided on a separate Excel tab.
Also provided on another Excel tab are the ALS location addresses, phone numbers and sample container / preservation / holding time table for common analyses.

SHIPMENT RELEASE (client use)			SHIPMENT RECEPTION (lab use only)				SHIPMENT VERIFICATION (lab use only)			
Released by:	Date (dd-mmm-yy)	Time (hh-mm)	Received by: RK	Date: 13 Jul 18	Time: 10:45am	Temperature: 22°C	Verified by:	Date:	Time:	Observations: Yes / No ? If Yes add SIF

AZIMUTH CONSULTING GROUP INC.
ATTN: Eric Franz
218 - 2902 West Broadway
Vancouver BC V6K 2G8

Date Received: 20-JUL-18
Report Date: 01-AUG-18 12:59 (MT)
Version: FINAL

Client Phone: 604-730-1220

Certificate of Analysis

Lab Work Order #: L2133417

Project P.O. #: NOT SUBMITTED
Job Reference:
C of C Numbers:
Legal Site Desc:

Comments: RRR = The container in which the sample was collected is composed of a clear plastic material which allows for the sample to be exposed to light. Exposure to light may cause a biased low result for chlorophyll.

Brent Mack, B.Sc.
Account Manager

[This report shall not be reproduced except in full without the written authority of the Laboratory.]

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2133417-1	L2133417-2	L2133417-3	L2133417-4	L2133417-5
Description	SURFACE WATE	SURFACE WATE	SURFACE WATE	SURFACE WATE	SURFACE WATE
Sampled Date	16-JUL-18	16-JUL-18	16-JUL-18	16-JUL-18	16-JUL-18
Sampled Time	14:30	15:30	09:45	10:15	11:45
Client ID	MAM-29	MAM-30	NEM-29	NEM-30	A20-22
Grouping	**Analyte**				
WATER					
Physical Tests	Conductivity (uS/cm)	53.7	53.3	25.6	25.8	13.0
	Hardness (as CaCO3) (mg/L)	18.7	18.4	9.81	9.68	4.46
	pH (pH)	6.87	6.92	7.14	7.01	6.70
	Total Suspended Solids (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
	Total Dissolved Solids (mg/L)	47.5	44.8	19.4	19.1	8.8
	Turbidity (NTU)	0.48	0.78	0.27	0.28	0.36
Anions and Nutrients	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	4.7	5.1	7.9	7.9	4.9
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
	Alkalinity, Total (as CaCO3) (mg/L)	4.7	5.1	7.9	7.9	4.9
	Ammonia, Total (as N) (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
	Bromide (Br) (mg/L)	0.131	0.127	<0.050	<0.050	<0.050
	Chloride (Cl) (mg/L)	10.5	10.3	0.81	0.78	0.59
	Fluoride (F) (mg/L)	0.023	0.022	0.023	0.022	0.024
	Nitrate (as N) (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
	Nitrite (as N) (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Total Kjeldahl Nitrogen (mg/L)	0.103	0.095	0.092	0.092	0.085
	Orthophosphate-Dissolved (as P) (mg/L)	0.0018	<0.0010	<0.0010	0.0014	<0.0010
	Phosphorus (P)-Total Dissolved (mg/L)	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
	Phosphorus (P)-Total (mg/L)	0.0022	0.0028	0.0034	0.0029	0.0022
	Silicate (as SiO2) (mg/L)	0.54	0.56	<0.50	<0.50	0.82
	Sulfate (SO4) (mg/L)	2.76	2.75	3.28	3.19	0.86
Cyanides	Cyanide, Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Cyanide, Free (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	1.66	1.56	1.35	1.46	1.49
	Total Organic Carbon (mg/L)	1.70	1.70	1.45	1.51	1.60
Total Metals	Aluminum (Al)-Total (mg/L)	<0.012 DLB	<0.0090 DLB	<0.0060 DLB	<0.0060 DLB	<0.0090 DLB
	Antimony (Sb)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Arsenic (As)-Total (mg/L)	0.00035	0.00034	0.00027	0.00029	<0.00010
	Barium (Ba)-Total (mg/L)	0.0116	0.0112	0.00458	0.00449	0.00346
	Beryllium (Be)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Bismuth (Bi)-Total (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Boron (B)-Total (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
	Cadmium (Cd)-Total (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
	Calcium (Ca)-Total (mg/L)	5.62	5.55	2.24	2.20	1.14
	Cesium (Cs)-Total (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2133417-6	L2133417-7	L2133417-8		
	Description	SURFACE WATE				
	Sampled Date	16-JUL-18				
	Sampled Time	12:15				
	Client ID	A20-23	NEM-26	A20-19		
Grouping	**Analyte**					
WATER						
Physical Tests	Conductivity (uS/cm)	13.1				
	Hardness (as CaCO3) (mg/L)	4.35				
	pH (pH)	6.93				
	Total Suspended Solids (mg/L)	<1.0				
	Total Dissolved Solids (mg/L)	13.0				
	Turbidity (NTU)	0.37				
Anions and Nutrients	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	5.1				
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<1.0				
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0				
	Alkalinity, Total (as CaCO3) (mg/L)	5.1				
	Ammonia, Total (as N) (mg/L)	<0.0050				
	Bromide (Br) (mg/L)	<0.050				
	Chloride (Cl) (mg/L)	0.58				
	Fluoride (F) (mg/L)	0.023				
	Nitrate (as N) (mg/L)	<0.0050				
	Nitrite (as N) (mg/L)	<0.0010				
	Total Kjeldahl Nitrogen (mg/L)	0.086				
	Orthophosphate-Dissolved (as P) (mg/L)	0.0011				
	Phosphorus (P)-Total Dissolved (mg/L)	<0.0020				
	Phosphorus (P)-Total (mg/L)	0.0026				
	Silicate (as SiO2) (mg/L)	0.78				
	Sulfate (SO4) (mg/L)	0.86				
Cyanides	Cyanide, Total (mg/L)	<0.0010				
	Cyanide, Free (mg/L)	<0.0010				
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	1.41				
	Total Organic Carbon (mg/L)	1.80				
Total Metals	Aluminum (Al)-Total (mg/L)	0.0102				
	Antimony (Sb)-Total (mg/L)	<0.00010				
	Arsenic (As)-Total (mg/L)	<0.00010				
	Barium (Ba)-Total (mg/L)	0.00328				
	Beryllium (Be)-Total (mg/L)	<0.00010				
	Bismuth (Bi)-Total (mg/L)	<0.000050				
	Boron (B)-Total (mg/L)	<0.010				
	Cadmium (Cd)-Total (mg/L)	<0.0000050				
	Calcium (Ca)-Total (mg/L)	1.17				
	Cesium (Cs)-Total (mg/L)	<0.000010				

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	L2133417-1 SURFACE WATE 16-JUL-18 14:30 MAM-29	L2133417-2 SURFACE WATE 16-JUL-18 15:30 MAM-30	L2133417-3 SURFACE WATE 16-JUL-18 09:45 NEM-29	L2133417-4 SURFACE WATE 16-JUL-18 10:15 NEM-30	L2133417-5 SURFACE WATE 16-JUL-18 11:45 A20-22
WATER						
Total Metals	Chromium (Cr)-Total (mg/L)	0.00011	0.00012	0.00018	<0.00010	<0.00010
	Cobalt (Co)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Copper (Cu)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Iron (Fe)-Total (mg/L)	0.021	0.023	0.022	0.020	0.018
	Lead (Pb)-Total (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Lithium (Li)-Total (mg/L)	0.0023	0.0023	<0.0010	<0.0010	<0.0010
	Magnesium (Mg)-Total (mg/L)	1.17	1.11	0.998	0.968	0.380
	Manganese (Mn)-Total (mg/L)	0.00550	0.00608	0.00760	0.00859	0.00252
	Mercury (Hg)-Total (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
	Molybdenum (Mo)-Total (mg/L)	<0.00010 DLB	<0.00010 DLB	<0.00010 DLB	<0.00010 DLB	<0.00010 DLB
	Nickel (Ni)-Total (mg/L)	<0.0015 DLB	0.00123	<0.0010 DLB	<0.0010 DLB	<0.00050
	Phosphorus (P)-Total (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050
	Potassium (K)-Total (mg/L)	0.745	0.727	0.569	0.545	0.308
	Rubidium (Rb)-Total (mg/L)	0.00101	0.00102	0.00062	0.00064	0.00037
	Selenium (Se)-Total (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Silicon (Si)-Total (mg/L)	0.30	0.31	0.21	0.20	0.42
	Silver (Ag)-Total (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	0.000016
	Sodium (Na)-Total (mg/L)	0.680	0.659	0.507	0.498	0.542
	Strontium (Sr)-Total (mg/L)	0.0486	0.0479	0.00989	0.00993	0.00608
	Sulfur (S)-Total (mg/L)	1.18	1.07	1.38	1.20	0.62
	Tellurium (Te)-Total (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
	Thallium (Tl)-Total (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Thorium (Th)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Tin (Sn)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Titanium (Ti)-Total (mg/L)	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030
	Tungsten (W)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Uranium (U)-Total (mg/L)	0.000021	0.000021	<0.000010	<0.000010	0.000030
	Vanadium (V)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Zinc (Zn)-Total (mg/L)	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
	Zirconium (Zr)-Total (mg/L)	<0.000060	<0.000060	<0.000060	<0.000060	<0.000060
Dissolved Metals	Dissolved Mercury Filtration Location	FIELD	FIELD	FIELD	FIELD	FIELD
	Dissolved Metals Filtration Location	FIELD	FIELD	FIELD	FIELD	FIELD
	Aluminum (Al)-Dissolved (mg/L)	0.0032	0.0032	0.0011	0.0015	0.0032
	Antimony (Sb)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Arsenic (As)-Dissolved (mg/L)	0.00029	0.00030	0.00023	0.00024	<0.00010
	Barium (Ba)-Dissolved (mg/L)	0.0104	0.0103	0.00412	0.00425	0.00300
	Beryllium (Be)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2133417-6	L2133417-7	L2133417-8		
	Description	SURFACE WATE				
	Sampled Date	16-JUL-18				
	Sampled Time	12:15				
	Client ID	A20-23	NEM-26	A20-19		
Grouping	**Analyte**					
WATER						
Total Metals	Chromium (Cr)-Total (mg/L)	0.00017				
	Cobalt (Co)-Total (mg/L)	<0.00010				
	Copper (Cu)-Total (mg/L)	<0.00050				
	Iron (Fe)-Total (mg/L)	0.025				
	Lead (Pb)-Total (mg/L)	0.000156				
	Lithium (Li)-Total (mg/L)	<0.0010				
	Magnesium (Mg)-Total (mg/L)	0.409				
	Manganese (Mn)-Total (mg/L)	0.00238				
	Mercury (Hg)-Total (mg/L)	<0.0000050				
	Molybdenum (Mo)-Total (mg/L)	<0.000050				
	Nickel (Ni)-Total (mg/L)	<0.00050				
	Phosphorus (P)-Total (mg/L)	<0.050				
	Potassium (K)-Total (mg/L)	0.314				
	Rubidium (Rb)-Total (mg/L)	0.00040				
	Selenium (Se)-Total (mg/L)	<0.000050				
	Silicon (Si)-Total (mg/L)	0.42				
	Silver (Ag)-Total (mg/L)	<0.000010				
	Sodium (Na)-Total (mg/L)	0.517				
	Strontium (Sr)-Total (mg/L)	0.00588				
	Sulfur (S)-Total (mg/L)	<0.50				
	Tellurium (Te)-Total (mg/L)	<0.00020				
	Thallium (Tl)-Total (mg/L)	<0.000010				
	Thorium (Th)-Total (mg/L)	<0.00010				
	Tin (Sn)-Total (mg/L)	<0.00010				
	Titanium (Ti)-Total (mg/L)	<0.00030				
	Tungsten (W)-Total (mg/L)	<0.00010				
	Uranium (U)-Total (mg/L)	0.000029				
	Vanadium (V)-Total (mg/L)	<0.00050				
	Zinc (Zn)-Total (mg/L)	<0.0030				
	Zirconium (Zr)-Total (mg/L)	<0.000060				
Dissolved Metals	Dissolved Mercury Filtration Location	FIELD				
	Dissolved Metals Filtration Location	FIELD				
	Aluminum (Al)-Dissolved (mg/L)	0.0029				
	Antimony (Sb)-Dissolved (mg/L)	<0.00010				
	Arsenic (As)-Dissolved (mg/L)	<0.00010				
	Barium (Ba)-Dissolved (mg/L)	0.00301				
	Beryllium (Be)-Dissolved (mg/L)	<0.00010				

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2133417-1	L2133417-2	L2133417-3	L2133417-4	L2133417-5
Description	SURFACE WATE	SURFACE WATE	SURFACE WATE	SURFACE WATE	SURFACE WATE
Sampled Date	16-JUL-18	16-JUL-18	16-JUL-18	16-JUL-18	16-JUL-18
Sampled Time	14:30	15:30	09:45	10:15	11:45
Client ID	MAM-29	MAM-30	NEM-29	NEM-30	A20-22
Grouping / **Analyte**					
WATER					
Dissolved Metals Bismuth (Bi)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron (B)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)-Dissolved (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Calcium (Ca)-Dissolved (mg/L)	5.61	5.49	2.26	2.22	1.15
Cesium (Cs)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Chromium (Cr)-Dissolved (mg/L)	<0.00010	0.00010	<0.00010	<0.00010	<0.00010
Cobalt (Co)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper (Cu)-Dissolved (mg/L)	0.00031	0.00035	<0.00020	0.00021	<0.00020
Iron (Fe)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
Lead (Pb)-Dissolved (mg/L)	0.000486 DTMF	0.00189 DTMF	<0.000050	<0.000050	0.000055
Lithium (Li)-Dissolved (mg/L)	0.0021	0.0020	<0.0010	<0.0010	<0.0010
Magnesium (Mg)-Dissolved (mg/L)	1.15	1.15	1.01	1.00	0.383
Manganese (Mn)-Dissolved (mg/L)	0.00408	0.00457	0.00450	0.00520	0.00167
Mercury (Hg)-Dissolved (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Molybdenum (Mo)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Nickel (Ni)-Dissolved (mg/L)	0.00111	0.00115	0.00064	0.00066	<0.00050
Phosphorus (P)-Dissolved (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050
Potassium (K)-Dissolved (mg/L)	0.749	0.757	0.595	0.575	0.316
Rubidium (Rb)-Dissolved (mg/L)	0.00104	0.00118	0.00073	0.00068	0.00037
Selenium (Se)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Silicon (Si)-Dissolved (mg/L)	0.273	0.259	0.162	0.176	0.383
Silver (Ag)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)-Dissolved (mg/L)	0.643	0.658	0.488	0.483	0.513
Strontium (Sr)-Dissolved (mg/L)	0.0484	0.0473	0.00987	0.00980	0.00613
Sulfur (S)-Dissolved (mg/L)	1.10	1.02	1.15	1.08	<0.50
Tellurium (Te)-Dissolved (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Thallium (Tl)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Thorium (Th)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Tin (Sn)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)-Dissolved (mg/L)	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030
Tungsten (W)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Uranium (U)-Dissolved (mg/L)	0.000017	0.000017	<0.000010	<0.000010	0.000025
Vanadium (V)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc (Zn)-Dissolved (mg/L)	<0.0010	0.0053	<0.0010	<0.0010	<0.0010
Zirconium (Zr)-Dissolved (mg/L)	0.000116	<0.000060	<0.000060	<0.000060	<0.000060
Plant Pigments Chlorophyll a (ug/L)					

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2133417-6	L2133417-7	L2133417-8		
	Description	SURFACE WATE				
	Sampled Date	16-JUL-18				
	Sampled Time	12:15				
	Client ID	A20-23	NEM-26	A20-19		
Grouping	**Analyte**					
WATER						
Dissolved Metals	Bismuth (Bi)-Dissolved (mg/L)	<0.000050				
	Boron (B)-Dissolved (mg/L)	<0.010				
	Cadmium (Cd)-Dissolved (mg/L)	<0.0000050				
	Calcium (Ca)-Dissolved (mg/L)	1.11				
	Cesium (Cs)-Dissolved (mg/L)	<0.000010				
	Chromium (Cr)-Dissolved (mg/L)	<0.00010				
	Cobalt (Co)-Dissolved (mg/L)	<0.00010				
	Copper (Cu)-Dissolved (mg/L)	<0.00020				
	Iron (Fe)-Dissolved (mg/L)	<0.010				
	Lead (Pb)-Dissolved (mg/L)	0.000561 DTMF				
	Lithium (Li)-Dissolved (mg/L)	<0.0010				
	Magnesium (Mg)-Dissolved (mg/L)	0.381				
	Manganese (Mn)-Dissolved (mg/L)	0.00148				
	Mercury (Hg)-Dissolved (mg/L)	<0.0000050				
	Molybdenum (Mo)-Dissolved (mg/L)	<0.000050				
	Nickel (Ni)-Dissolved (mg/L)	<0.00050				
	Phosphorus (P)-Dissolved (mg/L)	<0.050				
	Potassium (K)-Dissolved (mg/L)	0.320				
	Rubidium (Rb)-Dissolved (mg/L)	0.00038				
	Selenium (Se)-Dissolved (mg/L)	<0.000050				
	Silicon (Si)-Dissolved (mg/L)	0.351				
	Silver (Ag)-Dissolved (mg/L)	<0.000010				
	Sodium (Na)-Dissolved (mg/L)	0.507				
	Strontium (Sr)-Dissolved (mg/L)	0.00592				
	Sulfur (S)-Dissolved (mg/L)	<0.50				
	Tellurium (Te)-Dissolved (mg/L)	<0.00020				
	Thallium (Tl)-Dissolved (mg/L)	<0.000010				
	Thorium (Th)-Dissolved (mg/L)	<0.00010				
	Tin (Sn)-Dissolved (mg/L)	<0.00010				
	Titanium (Ti)-Dissolved (mg/L)	<0.00030				
	Tungsten (W)-Dissolved (mg/L)	<0.00010				
	Uranium (U)-Dissolved (mg/L)	0.000026				
	Vanadium (V)-Dissolved (mg/L)	<0.00050				
	Zinc (Zn)-Dissolved (mg/L)	<0.0010				
	Zirconium (Zr)-Dissolved (mg/L)	<0.000060				
Plant Pigments	Chlorophyll a (ug/L)		<0.010 RRR	<0.010 RRR		

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Method Blank	Aluminum (Al)-Total	MB-LOR	L2133417-1, -2, -3, -4, -5
Method Blank	Barium (Ba)-Total	MB-LOR	L2133417-1, -2, -3, -4, -5
Method Blank	Cadmium (Cd)-Total	MB-LOR	L2133417-1, -2, -3, -4, -5
Method Blank	Calcium (Ca)-Total	MB-LOR	L2133417-1, -2, -3, -4, -5
Method Blank	Lead (Pb)-Total	MB-LOR	L2133417-1, -2, -3, -4, -5
Method Blank	Magnesium (Mg)-Total	MB-LOR	L2133417-1, -2, -3, -4, -5
Method Blank	Manganese (Mn)-Total	MB-LOR	L2133417-1, -2, -3, -4, -5
Method Blank	Molybdenum (Mo)-Total	MB-LOR	L2133417-1, -2, -3, -4, -5
Method Blank	Nickel (Ni)-Total	MB-LOR	L2133417-1, -2, -3, -4, -5
Method Blank	Sodium (Na)-Total	MB-LOR	L2133417-1, -2, -3, -4, -5
Method Blank	Strontium (Sr)-Total	MB-LOR	L2133417-1, -2, -3, -4, -5
Method Blank	Tin (Sn)-Total	MB-LOR	L2133417-1, -2, -3, -4, -5
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L2133417-1, -2, -3, -4, -5, -6
Matrix Spike	Boron (B)-Dissolved	MS-B	L2133417-1, -2, -3, -4, -5, -6
Matrix Spike	Lithium (Li)-Dissolved	MS-B	L2133417-1, -2, -3, -4, -5, -6
Matrix Spike	Manganese (Mn)-Dissolved	MS-B	L2133417-1, -2, -3, -4, -5, -6
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L2133417-1, -2, -3, -4, -5, -6
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L2133417-1, -2, -3, -4, -5, -6
Matrix Spike	Barium (Ba)-Total	MS-B	L2133417-6
Matrix Spike	Calcium (Ca)-Total	MS-B	L2133417-1, -2, -3, -4, -5
Matrix Spike	Calcium (Ca)-Total	MS-B	L2133417-6
Matrix Spike	Iron (Fe)-Total	MS-B	L2133417-6
Matrix Spike	Magnesium (Mg)-Total	MS-B	L2133417-1, -2, -3, -4, -5
Matrix Spike	Magnesium (Mg)-Total	MS-B	L2133417-6
Matrix Spike	Manganese (Mn)-Total	MS-B	L2133417-6
Matrix Spike	Sodium (Na)-Total	MS-B	L2133417-6
Matrix Spike	Strontium (Sr)-Total	MS-B	L2133417-1, -2, -3, -4, -5
Matrix Spike	Strontium (Sr)-Total	MS-B	L2133417-6

Qualifiers for Individual Parameters Listed:

Qualifier	Description
DLB	Detection Limit Raised. Analyte detected at comparable level in Method Blank.
DTMF	Dissolved concentration exceeds total for field-filtered metals sample. Metallic contaminants may have been introduced to dissolved sample during field filtration.
MB-LOR	Method Blank exceeds ALS DQO. Limits of Reporting have been adjusted for samples with positive hits below 5x blank level.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RRR	Refer to Report Remarks for issues regarding this analysis

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ALK-TITR-VA	Water	Alkalinity Species by Titration	APHA 2320 Alkalinity
This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.			
BR-L-IC-N-VA	Water	Bromide in Water by IC (Low Level)	EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			
CARBONS-DOC-VA	Water	Dissolved organic carbon by combustion	APHA 5310B
This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)". Dissolved carbon (DOC) fractions are determined by filtering the sample through a 0.45 micron membrane filter prior to analysis.			
CARBONS-TOC-VA	Water	Total organic carbon by combustion	APHA 5310B TOTAL ORGANIC CARBON (TOC)
This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)".			
CHLOROA-F-VA	Water	Chlorophyll a by Fluorometer	EPA 445.0

Reference Information

This analysis is done using procedures modified from EPA Method 445.0. Chlorophyll-a is determined by a routine acetone extraction followed with analysis by fluorometry using the non-acidification procedure. This method is not subject to interferences from chlorophyll b.

CL-L-IC-N-VA	Water	Chloride in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

CN-FREE-L-CFA-VA	Water	Low Level Free Cyanide in water by CFA	ASTM 7237

This analysis is carried out using procedures adapted from ASTM Method 7237 "Free Cyanide with Flow Injection Analysis (FIA) Utilizing Gas Diffusion Separation and Amperometric Detection". Free cyanide is determined by in-line gas diffusion at pH 6 with final determination by colourimetric analysis.

CN-T-L-CFA-VA	Water	Low Level Total Cyanide in water by CFA	ISO 14403:2002

This analysis is carried out using procedures adapted from ISO Method 14403:2002 "Determination of Total Cyanide using Flow Analysis (FIA and CFA)". Total or strong acid dissociable (SAD) cyanide is determined by in-line UV digestion along with sample distillation and final determination by colourimetric analysis. Method Limitation: This method is susceptible to interference from thiocyanate (SCN). If SCN is present in the sample, there could be a positive interference with this method, but it would be less than 1% and could be as low as zero.

EC-PCT-VA	Water	Conductivity (Automated)	APHA 2510 Auto. Conduc.

This analysis is carried out using procedures adapted from APHA Method 2510 "Conductivity". Conductivity is determined using a conductivity electrode.

EC-SCREEN-VA	Water	Conductivity Screen (Internal Use Only)	APHA 2510

Qualitative analysis of conductivity where required during preparation of other tests - e.g. TDS, metals, etc.

F-IC-N-VA	Water	Fluoride in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

HARDNESS-CALC-VA	Water	Hardness	APHA 2340B

Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

HG-D-CVAA-VA	Water	Diss. Mercury in Water by CVAAS or CVAFS	APHA 3030B/EPA 1631E (mod)

Water samples are filtered (0.45 um), preserved with hydrochloric acid, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

HG-T-CVAA-VA	Water	Total Mercury in Water by CVAAS or CVAFS	EPA 1631E (mod)

Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

MET-D-CCMS-VA	Water	Dissolved Metals in Water by CRC ICPMS	APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

MET-T-CCMS-VA	Water	Total Metals in Water by CRC ICPMS	EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

NH3-F-VA	Water	Ammonia in Water by Fluorescence	J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

NO2-L-IC-N-VA	Water	Nitrite in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

NO3-L-IC-N-VA	Water	Nitrate in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

P-T-PRES-COL-VA	Water	Total P in Water by Colour	APHA 4500-P Phosphorus

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is determined colourimetrically after persulphate digestion of the sample.
Samples with very high dissolved solids (i.e. seawaters, brackish waters) may produce a negative bias by this method. Alternate methods are available for these types of samples.

Arsenic (5+), at elevated levels, is a positive interference on colourimetric phosphate analysis.

P-TD-COL-VA	Water	Total Dissolved P in Water by Colour	APHA 4500-P Phosphorous

Reference Information

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Dissolved Phosphorus is determined colourimetrically after persulphate digestion of a sample that has been lab or field filtered through a 0.45 micron membrane filter.
Samples with very high dissolved solids (i.e. seawaters, brackish waters) may produce a negative bias by this method. Alternate methods are available for these types of samples.

Arsenic (5+), at elevated levels, is a positive interference on colourimetric phosphate analysis.

PH-PCT-VA	Water	pH by Meter (Automated)	APHA 4500-H pH Value

This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode

It is recommended that this analysis be conducted in the field.

PO4-DO-COL-VA	Water	Diss. Orthophosphate in Water by Colour	APHA 4500-P Phosphorus

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.
Samples with very high dissolved solids (i.e. seawaters, brackish waters) may produce a negative bias by this method. Alternate methods are available for these types of samples.

Arsenic (5+), at elevated levels, is a positive interference on colourimetric phosphate analysis.

SILICATE-COL-VA	Water	Silicate by Colourimetric analysis	APHA 4500-SiO2 E.

This analysis is carried out using procedures adapted from APHA Method 4500-SiO2 E. "Silica". Silicate (molybdate-reactive silica) is determined by the molybdosilicate-heteropoly blue colourimetric method.

SO4-IC-N-VA	Water	Sulfate in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

TDS-LOW-VA	Water	Low Level TDS (3.0mg/L) by Gravimetric	APHA 2540C

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total dissolved solids (TDS) are determined by filtering a sample through a glass fibre filter, TDS is determined by evaporating the filtrate to dryness at 180 degrees celsius.

TKN-F-VA	Water	TKN in Water by Fluorescence	APHA 4500-NORG D.

This analysis is carried out using procedures adapted from APHA Method 4500-Norg D. "Block Digestion and Flow Injection Analysis". Total Kjeldahl Nitrogen is determined using block digestion followed by Flow-injection analysis with fluorescence detection.

TSS-LOW-VA	Water	Total Suspended Solids by Grav. (1 mg/L)	APHA 2540D

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total suspended solids (TSS) are determined by filtering a sample through a glass fibre filter, TSS is determined by drying the filter at 104 degrees celsius.
Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.

TURBIDITY-VA	Water	Turbidity by Meter	APHA 2130 Turbidity

This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

Reference Information

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

ALS Environmental

L2133417-COFC

COC # _____

Page 1 of 2

Report To		Report Format / Distribution	Service Requested (Rush for routine analysis subject to availability)
Company:	Azimuth Consulting Group	☑ Standard ☐ Other	◉ Regular (Standard Turnaround Times - Business Days)
Contact:	Eric Franz	☑ PDF ☑ Excel ☐ Digital ☐ Fax	○ Priority (2-4 Business Days) - 50% Surcharge - Contact ALS to Confirm TAT
Address:	218-2902 West Broadway	Email 1: efranz@azimuthgroup.ca	○ Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT
	Vancouver, BC V6K2G8	Email 2: robin.allard@agnicoeagle.com	○ Same Day or Weekend Emergency - Contact ALS to Confirm TAT
Phone:	604-730-1220 Fax:	Email 3: marie-pier.marcil@agnicoeagle.com	
Invoice To	Same as Report ? ☑ Yes ☐ No	Client / Project Information	
Hardcopy of Invoice with Report?	☐ Yes ☑ No	Job #: Whale Tail Pit CREMP - Surfacewater	
Company:		PO / AFE:	
Contact:		LSD:	
Address:			
Phone:	Fax:	Quote #: Q39503	
Lab Work Order # (lab use only)		ALS Contact: Brent Mack	Sampler: Nicolas Saucier

Analysis Request

Please indicate below Filtered, Preserved or both (F, P, F/P)

Sample #	Sample Identification (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Conventionals** see notes	TSS-Low, TDS-Low	TOC, Ammonia, TKN, Total P	DOC	T-CN (Low), Free CN (Low)	Total mercury	Dissolved mercury	Total Metals	Dissolved metals	Chlorophyll-a	Arsenic		Number of Containers
							P	F/P	P	P	F/P	P	F/P				
	MAM-29	16-Jul-18	14:30	Surface Water	X	X	X	X	X	X	X	X	X				9
	MAM-30	16-Jul-18	15:30	Surface Water	X	X	X	X	X	X	X	X	X				9
	NEM-29	16-Jul-18	9:45	Surface Water	X	X	X	X	X	X	X	X	X				9
	NEM-30	16-Jul-18	10:15	Surface Water	X	X	X	X	X	X	X	X	X				9
	A20-22	16-Jul-18	11:45	Surface Water	X	X	X	X	X	X	X	X	X				9
	A20-23	16-Jul-18	12:15	Surface Water	X	X	X	X	X	X	X	X	X				9

Special Instructions / Regulations with water or land use (CCME-Freshwater Aquatic Life/BC CSR - Commercial/AB Tier 1 - Natural, etc) / Hazardous Details

**Conventionals includes: Alk Species, pH, EC, Turbidity, Conductivity, Anions (F, NO2, NO3, Br, SO4), low-level Chloride, Silicate, TD-P, and Ortho-PO4. Some arsenic bottles may have been filled with headspace.

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.

By the use of this form the user acknowledges and agrees with the Terms and Conditions as provided on a separate Excel tab.

Also provided on another Excel tab are the ALS location addresses, phone numbers and sample container / preservation / holding time table for common analyses.

SHIPMENT RELEASE (client use)			SHIPMENT RECEPTION (lab use only)				SHIPMENT VERIFICATION (lab use only)			
Released by:	Date (dd-mmm-yy)	Time (hh-mm)	Received by:	Date:	Time:	Temperature:	Verified by:	Date:	Time:	Observations: Yes / No ? If Yes add SIF
			HA	7/20	2:25P	18 °C				

GENF 20.00 Front

AZIMUTH CONSULTING GROUP INC.
ATTN: Eric Franz
218 - 2902 West Broadway
Vancouver BC V6K 2G8

Date Received: 26-JUL-18
Report Date: 07-AUG-18 16:32 (MT)
Version: FINAL

Client Phone: 604-730-1220

Certificate of Analysis

Lab Work Order #: L2136260

Project P.O. #: NOT SUBMITTED
Job Reference:
C of C Numbers:
Legal Site Desc:

Brent Mack, B.Sc.
Account Manager

[This report shall not be reproduced except in full without the written authority of the Laboratory.]

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2136260-5	L2136260-6	L2136260-7	L2136260-8	L2136260-9
Description	A20-22	A20-23	NEM-29	MAM-29	WTS-29
Sampled Date					
Sampled Time					
Client ID					
Grouping **Analyte**					
FILTER					
Plant Pigments Chlorophyll a (ug/L)	0.242	0.298	0.314	0.322	1.32

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2136260-10	L2136260-11	L2136260-12	L2136260-13	
Description	NEM-30	MAN-30	WTS-30	CREMP SURY DUP 1	
Sampled Date					
Sampled Time					
Client ID					
Grouping **Analyte**					
FILTER					
Plant Pigments Chlorophyll a (ug/L)	0.274	0.377	0.973	0.250	

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2136260-1	L2136260-2	L2136260-3	L2136260-4	
Description	surface water	surface water	surface water	surface water	
Sampled Date	20-JUL-18	20-JUL-18	21-JUL-18	21-JUL-18	
Sampled Time	16:10	17:30	11:15	12:00	
Client ID	DS1-21	DS1-22	A76-23	A76-24	
Grouping / **Analyte**					
WATER					
Physical Tests					
Conductivity (uS/cm)	15.8	19.4	35.4	35.8	
Hardness (as CaCO3) (mg/L)	5.18	6.62	12.3	12.2	
pH (pH)	6.91	6.98	7.06	7.07	
Total Suspended Solids (mg/L)	<1.0	<1.0	<1.0	<1.0	
Total Dissolved Solids (mg/L)	11.5	10.0	25.7	24.8	
Turbidity (NTU)	0.50	0.47	0.24	0.26	
Anions and Nutrients					
Alkalinity, Bicarbonate (as CaCO3) (mg/L)	4.6	5.5	6.8	7.2	
Alkalinity, Carbonate (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	
Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	
Alkalinity, Total (as CaCO3) (mg/L)	4.6	5.5	6.8	7.2	
Ammonia, Total (as N) (mg/L)	<0.0050	<0.0050	<0.0050	0.0059	
Bromide (Br) (mg/L)	<0.050	<0.050	<0.050	<0.050	
Chloride (Cl) (mg/L)	1.11	1.66	4.22	4.21	
Fluoride (F) (mg/L)	0.049	0.034	0.026	0.026	
Nitrate (as N) (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	
Nitrite (as N) (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	
Total Kjeldahl Nitrogen (mg/L)	0.103	0.104	0.083	0.086	
Orthophosphate-Dissolved (as P) (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	
Phosphorus (P)-Total Dissolved (mg/L)	<0.0020	<0.0020	<0.0020	<0.0020	
Phosphorus (P)-Total (mg/L)	0.0033	0.0029	0.0055	<0.0020	
Silicate (as SiO2) (mg/L)	<0.50	0.74	0.92	0.97	
Sulfate (SO4) (mg/L)	0.99	1.30	2.93	2.92	
Cyanides					
Cyanide, Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	
Cyanide, Free (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	
Organic / Inorganic Carbon					
Dissolved Organic Carbon (mg/L)	2.05	2.05	1.54	1.67	
Total Organic Carbon (mg/L)	2.15	1.98	1.62	2.00	
Total Metals					
Aluminum (Al)-Total (mg/L)	0.0272	0.0133	0.0045	0.0050	
Antimony (Sb)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	
Arsenic (As)-Total (mg/L)	0.00015	0.00015	0.00025	0.00024	
Barium (Ba)-Total (mg/L)	0.00422	0.00366	0.00727	0.00732	
Beryllium (Be)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	
Bismuth (Bi)-Total (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	
Boron (B)-Total (mg/L)	<0.010	<0.010	<0.010	<0.010	
Cadmium (Cd)-Total (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	
Calcium (Ca)-Total (mg/L)	1.33	1.73	3.27	3.29	
Cesium (Cs)-Total (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2136260-1	L2136260-2	L2136260-3	L2136260-4	
Description	surface water	surface water	surface water	surface water	
Sampled Date	20-JUL-18	20-JUL-18	21-JUL-18	21-JUL-18	
Sampled Time	16:10	17:30	11:15	12:00	
Client ID	DS1-21	DS1-22	A76-23	A76-24	
Grouping / **Analyte**					
WATER					
Total Metals Chromium (Cr)-Total (mg/L)	0.00028	<0.00010	0.00013	<0.00010	
Cobalt (Co)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	
Copper (Cu)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	
Iron (Fe)-Total (mg/L)	0.057	0.057	0.015	0.016	
Lead (Pb)-Total (mg/L)	0.000072	<0.000050	<0.000050	<0.000050	
Lithium (Li)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	
Magnesium (Mg)-Total (mg/L)	0.506	0.547	1.08	1.07	
Manganese (Mn)-Total (mg/L)	0.00299	0.00250	0.00337	0.00333	
Mercury (Hg)-Total (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	
Molybdenum (Mo)-Total (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	
Nickel (Ni)-Total (mg/L)	<0.00050	<0.00050	0.00070	0.00069	
Phosphorus (P)-Total (mg/L)	<0.050	<0.050	<0.050	<0.050	
Potassium (K)-Total (mg/L)	0.322	0.377	0.662	0.658	
Rubidium (Rb)-Total (mg/L)	0.00057	0.00059	0.00096	0.00092	
Selenium (Se)-Total (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	
Silicon (Si)-Total (mg/L)	0.28	0.40	0.47	0.45	
Silver (Ag)-Total (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	
Sodium (Na)-Total (mg/L)	0.648	0.752	0.658	0.643	
Strontium (Sr)-Total (mg/L)	0.00753	0.00872	0.0168	0.0170	
Sulfur (S)-Total (mg/L)	<0.50	<0.50	0.98	1.06	
Tellurium (Te)-Total (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020	
Thallium (Tl)-Total (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	
Thorium (Th)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	
Tin (Sn)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	
Titanium (Ti)-Total (mg/L)	<0.00090 DLM	<0.00030	<0.00030	<0.00030	
Tungsten (W)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	
Uranium (U)-Total (mg/L)	0.000036	0.000031	0.000016	0.000017	
Vanadium (V)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	
Zinc (Zn)-Total (mg/L)	<0.0030	<0.0030	<0.0030	<0.0030	
Zirconium (Zr)-Total (mg/L)	<0.000060	<0.000060	<0.000060	<0.000060	
Dissolved Metals Dissolved Mercury Filtration Location	FIELD	FIELD	FIELD	FIELD	
Dissolved Metals Filtration Location	FIELD	FIELD	FIELD	FIELD	
Aluminum (Al)-Dissolved (mg/L)	0.0058	0.0040	0.0018	0.0018	
Antimony (Sb)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	
Arsenic (As)-Dissolved (mg/L)	<0.00010	0.00010	0.00017	0.00016	
Barium (Ba)-Dissolved (mg/L)	0.00391	0.00364	0.00719	0.00719	
Beryllium (Be)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2136260-1	L2136260-2	L2136260-3	L2136260-4	
Description	surface water	surface water	surface water	surface water	
Sampled Date	20-JUL-18	20-JUL-18	21-JUL-18	21-JUL-18	
Sampled Time	16:10	17:30	11:15	12:00	
Client ID	DS1-21	DS1-22	A76-23	A76-24	
Grouping / **Analyte**					
WATER					
Dissolved Metals					
Bismuth (Bi)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	
Boron (B)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010	
Cadmium (Cd)-Dissolved (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	
Calcium (Ca)-Dissolved (mg/L)	1.32	1.74	3.24	3.24	
Cesium (Cs)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	
Chromium (Cr)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	
Cobalt (Co)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	
Copper (Cu)-Dissolved (mg/L)	0.00023	0.00027	0.00029	0.00028	
Iron (Fe)-Dissolved (mg/L)	0.013	0.028	<0.010	<0.010	
Lead (Pb)-Dissolved (mg/L)	0.000088	<0.000050	<0.000050	<0.000050	
Lithium (Li)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	
Magnesium (Mg)-Dissolved (mg/L)	0.457	0.551	1.03	1.00	
Manganese (Mn)-Dissolved (mg/L)	0.00138	0.00214	0.00234	0.00223	
Mercury (Hg)-Dissolved (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	
Molybdenum (Mo)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	
Nickel (Ni)-Dissolved (mg/L)	<0.00050	<0.00050	0.00066	0.00065	
Phosphorus (P)-Dissolved (mg/L)	<0.050	<0.050	<0.050	<0.050	
Potassium (K)-Dissolved (mg/L)	0.335	0.416	0.665	0.649	
Rubidium (Rb)-Dissolved (mg/L)	0.00044	0.00058	0.00092	0.00085	
Selenium (Se)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	
Silicon (Si)-Dissolved (mg/L)	0.208	0.329	0.404	0.401	
Silver (Ag)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	
Sodium (Na)-Dissolved (mg/L)	0.626	0.751	0.623	0.603	
Strontium (Sr)-Dissolved (mg/L)	0.00704	0.00840	0.0168	0.0167	
Sulfur (S)-Dissolved (mg/L)	0.70	0.80	1.43	1.36	
Tellurium (Te)-Dissolved (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020	
Thallium (Tl)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	
Thorium (Th)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	
Tin (Sn)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	
Titanium (Ti)-Dissolved (mg/L)	<0.00030	0.00032	<0.00030	<0.00030	
Tungsten (W)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	
Uranium (U)-Dissolved (mg/L)	0.000032	0.000028	0.000016	0.000015	
Vanadium (V)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	
Zinc (Zn)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	
Zirconium (Zr)-Dissolved (mg/L)	<0.000060	<0.000060	<0.000060	<0.000060	

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Matrix Spike	Dissolved Organic Carbon	MS-B	L2136260-1, -2, -3, -4
Matrix Spike	Total Organic Carbon	MS-B	L2136260-1, -2, -3, -4
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L2136260-2
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L2136260-2
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L2136260-2
Matrix Spike	Manganese (Mn)-Dissolved	MS-B	L2136260-2
Matrix Spike	Silicon (Si)-Dissolved	MS-B	L2136260-2
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L2136260-2
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L2136260-2
Matrix Spike	Barium (Ba)-Total	MS-B	L2136260-1, -2, -3, -4
Matrix Spike	Calcium (Ca)-Total	MS-B	L2136260-1, -2, -3, -4
Matrix Spike	Magnesium (Mg)-Total	MS-B	L2136260-1, -2, -3, -4
Matrix Spike	Manganese (Mn)-Total	MS-B	L2136260-1, -2, -3, -4
Matrix Spike	Molybdenum (Mo)-Total	MS-B	L2136260-1, -2, -3, -4
Matrix Spike	Potassium (K)-Total	MS-B	L2136260-1, -2, -3, -4
Matrix Spike	Rubidium (Rb)-Total	MS-B	L2136260-1, -2, -3, -4
Matrix Spike	Sodium (Na)-Total	MS-B	L2136260-1, -2, -3, -4
Matrix Spike	Strontium (Sr)-Total	MS-B	L2136260-1, -2, -3, -4
Matrix Spike	Sulfur (S)-Total	MS-B	L2136260-1, -2, -3, -4

Qualifiers for Individual Parameters Listed:

Qualifier	Description
DLM	Detection Limit Adjusted due to sample matrix effects (e.g. chemical interference, colour, turbidity).
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ALK-TITR-VA	Water	Alkalinity Species by Titration	APHA 2320 Alkalinity

This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.

BR-L-IC-N-VA	Water	Bromide in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

CARBONS-DOC-VA	Water	Dissolved organic carbon by combustion	APHA 5310B

This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)". Dissolved carbon (DOC) fractions are determined by filtering the sample through a 0.45 micron membrane filter prior to analysis.

CARBONS-TOC-VA	Water	Total organic carbon by combustion	APHA 5310B TOTAL ORGANIC CARBON (TOC)

This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)".

CHLOROA-F-VA	Filter	Chlorophyll a by Fluorometer (Filter)	EPA 445.0

This analysis is done using procedures modified from EPA Method 445.0. Chlorophyll-a is determined by a routine acetone extraction followed with analysis by fluorometry using the non-acidification procedure. This method is not subject to interferences from chlorophyll b.

CL-L-IC-N-VA	Water	Chloride in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

CN-FREE-L-CFA-VA	Water	Low Level Free Cyanide in water by CFA	ASTM 7237

This analysis is carried out using procedures adapted from ASTM Method 7237 "Free Cyanide with Flow Injection Analysis (FIA) Utilizing Gas Diffusion Separation and Amperometric Detection". Free cyanide is determined by in-line gas diffusion at pH 6 with final determination by colourimetric analysis.

CN-T-L-CFA-VA	Water	Low Level Total Cyanide in water by CFA	ISO 14403:2002

This analysis is carried out using procedures adapted from ISO Method 14403:2002 "Determination of Total Cyanide using Flow Analysis (FIA and CFA)". Total or strong acid dissociable (SAD) cyanide is determined by in-line UV digestion along with sample distillation and final determination by colourimetric analysis. Method Limitation: This method is susceptible to interference from thiocyanate (SCN). If SCN is present in the sample, there could be a positive interference with this method, but it would be less than 1% and could be as low as zero.

EC-PCT-VA	Water	Conductivity (Automated)	APHA 2510 Auto. Conduc.

Reference Information

This analysis is carried out using procedures adapted from APHA Method 2510 "Conductivity". Conductivity is determined using a conductivity electrode.

EC-SCREEN-VA Water Conductivity Screen (Internal Use Only) APHA 2510

Qualitative analysis of conductivity where required during preparation of other tests - e.g. TDS, metals, etc.

F-IC-N-VA Water Fluoride in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

HARDNESS-CALC-VA Water Hardness APHA 2340B

Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

HG-D-CVAA-VA Water Diss. Mercury in Water by CVAAS or CVAFS APHA 3030B/EPA 1631E (mod)

Water samples are filtered (0.45 um), preserved with hydrochloric acid, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

HG-T-CVAA-VA Water Total Mercury in Water by CVAAS or CVAFS EPA 1631E (mod)

Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

MET-D-CCMS-VA Water Dissolved Metals in Water by CRC ICPMS APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

MET-T-CCMS-VA Water Total Metals in Water by CRC ICPMS EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

NH3-F-VA Water Ammonia in Water by Fluorescence J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

NO2-L-IC-N-VA Water Nitrite in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

NO3-L-IC-N-VA Water Nitrate in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

P-T-PRES-COL-VA Water Total P in Water by Colour APHA 4500-P Phosphorus

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is determined colourimetrically after persulphate digestion of the sample.
Samples with very high dissolved solids (i.e. seawaters, brackish waters) may produce a negative bias by this method. Alternate methods are available for these types of samples.

Arsenic (5+), at elevated levels, is a positive interference on colourimetric phosphate analysis.

P-TD-COL-VA Water Total Dissolved P in Water by Colour APHA 4500-P Phosphorous

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Dissolved Phosphorus is determined colourimetrically after persulphate digestion of a sample that has been lab or field filtered through a 0.45 micron membrane filter.
Samples with very high dissolved solids (i.e. seawaters, brackish waters) may produce a negative bias by this method. Alternate methods are available for these types of samples.

Arsenic (5+), at elevated levels, is a positive interference on colourimetric phosphate analysis.

PH-PCT-VA Water pH by Meter (Automated) APHA 4500-H pH Value

This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode

It is recommended that this analysis be conducted in the field.

PO4-DO-COL-VA Water Diss. Orthophosphate in Water by Colour APHA 4500-P Phosphorus

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.
Samples with very high dissolved solids (i.e. seawaters, brackish waters) may produce a negative bias by this method. Alternate methods are

Reference Information

available for these types of samples.

Arsenic (5+), at elevated levels, is a positive interference on colourimetric phosphate analysis.

SILICATE-COL-VA Water Silicate by Colourimetric analysis APHA 4500-SiO2 E.

This analysis is carried out using procedures adapted from APHA Method 4500-SiO2 E. "Silica". Silicate (molybdate-reactive silica) is determined by the molybdosilicate-heteropoly blue colourimetric method.

SO4-IC-N-VA Water Sulfate in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

TDS-LOW-VA Water Low Level TDS (3.0mg/L) by Gravimetric APHA 2540C

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total dissolved solids (TDS) are determined by filtering a sample through a glass fibre filter, TDS is determined by evaporating the filtrate to dryness at 180 degrees celsius.

TKN-F-VA Water TKN in Water by Fluorescence APHA 4500-NORG D.

This analysis is carried out using procedures adapted from APHA Method 4500-Norg D. "Block Digestion and Flow Injection Analysis". Total Kjeldahl Nitrogen is determined using block digestion followed by Flow-injection analysis with fluorescence detection.

TSS-LOW-VA Water Total Suspended Solids by Grav. (1 mg/L) APHA 2540D

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total suspended solids (TSS) are determined by filtering a sample through a glass fibre filter, TSS is determined by drying the filter at 104 degrees celsius.
Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.

TURBIDITY-VA Water Turbidity by Meter APHA 2130 Turbidity

This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

ALS Environmental

Chain of Custody / Analytical Request Form

Canada Toll Free: 1 800 668 9878

www.alsglobal.com

COC # _____

Report To		Report Format / Distribution	Service Requested (Rush for routine analysis subject to availability)
Company:	Azimuth Consulting Group	☑ Standard ☐ Other	◉ Regular (Standard Turnaround Times - Business Days)
Contact:	Eric Franz	☑ PDF ☑ Excel ☐ Digital ☐ Fax	○ Priority (2-4 Business Days) - 50% Surcharge - Contact ALS to Confirm TAT
Address:	218-2902 West Broadway	Email 1: efranz@azimuthgroup.ca	○ Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT
	Vancouver, BC V6K2G8	Email 2: robin.allard@agnicoeagle.com	○ Same Day or Weekend Emergency - Contact ALS to Confirm TAT
Phone:	604-730-1220 Fax:	Email 3: marie-pier.marcil@agnicoeagle.com	
Invoice To	Same as Report ? ☑ Yes ☐ No	**Client / Project Information**	**Analysis Request**
Hardcopy of Invoice with Report?	☐ Yes ☑ No	Job #: Whale Tail Pit CREMP - Surfacewater	Please indicate below Filtered, Preserved or both (F, P, F/P)
Company:		PO / AFE:	
Contact:		LSD:	
Address:			
Phone:	Fax:	Quote #: Q39503	
Lab Work Order # (lab use only)		**ALS Contact:** Brent Mack	**Sampler:** J-F Labbé

Sample #	Sample Identification (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Conventionals** see notes	TSS-Low, TDS-Low	P TOC, Ammonia, TKN, Total P	F/P DOC	P T-CN (Low), Free CN (Low)	P Total mercury	F/P Dissolved mercury	P Total Metals	F/P Dissolved metals	Chlorophyll-a	Arsenic		Number of Containers
	DS1-21	20-Jul-18	16:10	Surface Water	X	X	X	X	X	X	X	X	X				9
	DS1-22	20-Jul-18	17:30	Surface Water	X	X	X	X	X	X	X	X	X				9
	A76-23	21-Jul-18	11:15	Surface Water	X	X	X	X	X	X	X	X	X				9
	A76-24	21-Jul-18	12:00	Surface Water	X	X	X	X	X	X	X	X	X				9

L2136260-COFC

Special Instructions / Regulations with water or land use (CCME-Freshwater Aquatic Life/BC CSR - Commercial/AB Tier 1 - Natural, etc) / Hazardous Details

**Conventionals includes: Alk Species, pH, EC, Turbidity, Conductivity, Anions (F, NO2, NO3, Br, SO4), low-level Chloride, Silicate, TD-P, and Ortho-PO4. Some arsenic bottles may have been filled with headspace.

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.

By the use of this form the user acknowledges and agrees with the Terms and Conditions as provided on a separate Excel tab.

Also provided on another Excel tab are the ALS location addresses, phone numbers and sample container / preservation / holding time table for common analyses.

SHIPMENT RELEASE (client use)			SHIPMENT RECEPTION (lab use only)				SHIPMENT VERIFICATION (lab use only)			
Released by:	Date (dd-mmm-yy)	Time (hh-mm)	Received by:	Date:	Time:	Temperature:	Verified by:	Date:	Time:	Observations: Yes / No ? If Yes add SIF
			BP	July 26	09:10	20/22.2 °C				

AZIMUTH CONSULTING GROUP INC.
ATTN: Eric Franz
218 - 2902 West Broadway
Vancouver BC V6K 2G8

Date Received: 30-AUG-18
Report Date: 15-SEP-18 09:11 (MT)
Version: FINAL

Client Phone: 604-730-1220

Certificate of Analysis

Lab Work Order #: L2155903

Project P.O. #: NOT SUBMITTED
Job Reference: WTP SEDIMENT CORES
C of C Numbers:
Legal Site Desc:

Brent Mack, B.Sc.
Account Manager

[This report shall not be reproduced except in full without the written authority of the Laboratory.]

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2155903-1	L2155903-2	L2155903-3	L2155903-4	L2155903-5
Description	Sediment	Sediment	Sediment	Sediment	Sediment
Sampled Date	14-AUG-18	14-AUG-18	14-AUG-18	15-AUG-18	15-AUG-18
Sampled Time					
Client ID	LK1-SC-1	LK1-SC-2	LK1-SC-3	LK1-SC-4	LK1-SC-5
Grouping / **Analyte**					
SOIL					
Physical Tests Moisture (%)	82.7	86.6	87.0	88.5	89.2
pH (1:2 soil:water) (pH)	5.30	5.53	5.66	5.81	5.76
Metals Aluminum (Al) (mg/kg)	20500	20700	15900	18400	22800
Antimony (Sb) (mg/kg)	0.24	0.19	0.15	0.15	0.15
Arsenic (As) (mg/kg)	13.7	8.64	10.4	7.12	10.7
Barium (Ba) (mg/kg)	129	127	95.3	111	120
Beryllium (Be) (mg/kg)	1.19	1.24	1.21	1.44	1.85
Bismuth (Bi) (mg/kg)	0.58	0.58	0.55	0.59	0.84
Boron (B) (mg/kg)	6.0	6.1	8.5	9.5	8.5
Cadmium (Cd) (mg/kg)	0.968	0.696	0.147	0.118	0.081
Calcium (Ca) (mg/kg)	3590	3170	2310	2500	2230
Chromium (Cr) (mg/kg)	117	117	66.7	76.8	90.9
Cobalt (Co) (mg/kg)	12.9	11.6	8.03	8.59	10.6
Copper (Cu) (mg/kg)	35.9	40.7	23.5	29.7	37.0
Iron (Fe) (mg/kg)	26200	24300	27300	25900	39600
Lead (Pb) (mg/kg)	13.0	13.4	12.3	13.4	14.3
Lithium (Li) (mg/kg)	20.4	20.2	13.9	17.4	20.1
Magnesium (Mg) (mg/kg)	10600	10100	6330	7420	8190
Manganese (Mn) (mg/kg)	407	373	442	375	589
Mercury (Hg) (mg/kg)	0.0187	0.0229	0.0412	0.0452	0.0363
Molybdenum (Mo) (mg/kg)	2.96	2.11	2.21	2.66	3.21
Nickel (Ni) (mg/kg)	86.6	79.5	46.0	56.2	56.3
Phosphorus (P) (mg/kg)	628	608	668	607	737
Potassium (K) (mg/kg)	2720	2610	2060	2370	2980
Selenium (Se) (mg/kg)	0.49	0.53	0.34	0.34	0.43
Silver (Ag) (mg/kg)	0.20	0.17	0.12	0.13	<0.10
Sodium (Na) (mg/kg)	141	152	142	153	168
Strontium (Sr) (mg/kg)	34.0	30.9	23.2	23.7	25.2
Sulfur (S) (mg/kg)	1300	1000	1000	1300	1200
Thallium (Tl) (mg/kg)	0.225	0.170	0.150	0.163	0.203
Tin (Sn) (mg/kg)	<2.0	2.3	2.1	2.5	2.4
Titanium (Ti) (mg/kg)	852	733	480	493	553
Tungsten (W) (mg/kg)	<0.50	<0.50	<0.50	<0.50	<0.50
Uranium (U) (mg/kg)	23.0	20.2	10.2	12.1	14.6
Vanadium (V) (mg/kg)	34.0	30.8	22.7	25.3	31.4
Zinc (Zn) (mg/kg)	148	100	70.9	82.0	99.2
Zirconium (Zr) (mg/kg)	8.6	5.6	1.3	1.8	2.0

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	L2155903-6 Sediment 15-AUG-18 LK1-SC-6	L2155903-7 Sediment 15-AUG-18 LK1-SC-7	L2155903-8 Sediment 15-AUG-18 LK1-SC-8	L2155903-9 Sediment 15-AUG-18 LK1-SC-9	L2155903-10 Sediment 15-AUG-18 LK1-SC-10
SOIL						
Physical Tests	Moisture (%)	88.4	88.0	82.7	92.2	86.3
	pH (1:2 soil:water) (pH)	5.68	5.71	5.66	5.45	5.68
Metals	Aluminum (Al) (mg/kg)	22000	21200	23200	17400	17700
	Antimony (Sb) (mg/kg)	0.17	0.16	0.22	0.15	0.12
	Arsenic (As) (mg/kg)	15.1	10.3	78.3	10.9	6.95
	Barium (Ba) (mg/kg)	130	128	116	120	110
	Beryllium (Be) (mg/kg)	1.86	1.78	2.87	1.56	1.26
	Bismuth (Bi) (mg/kg)	0.79	0.75	0.72	0.66	0.54
	Boron (B) (mg/kg)	9.5	10.1	7.0	10.6	7.9
	Cadmium (Cd) (mg/kg)	0.136	0.116	0.055	0.184	0.066
	Calcium (Ca) (mg/kg)	2280	2370	1600	2730	2650
	Chromium (Cr) (mg/kg)	83.5	76.9	96.1	70.9	83.6
	Cobalt (Co) (mg/kg)	10.4	9.60	18.4	9.23	8.94
	Copper (Cu) (mg/kg)	34.5	33.8	48.6	28.7	27.9
	Iron (Fe) (mg/kg)	44400	37600	106000	34600	23900
	Lead (Pb) (mg/kg)	14.7	14.4	19.5	14.3	12.3
	Lithium (Li) (mg/kg)	18.6	18.4	16.0	15.6	17.0
	Magnesium (Mg) (mg/kg)	7390	7260	6500	7040	7670
	Manganese (Mn) (mg/kg)	615	496	1440	458	346
	Mercury (Hg) (mg/kg)	0.0443	0.0436	0.0345	0.0672	0.0355
	Molybdenum (Mo) (mg/kg)	3.40	2.79	7.10	2.43	2.25
	Nickel (Ni) (mg/kg)	50.4	48.5	51.2	50.6	58.8
	Phosphorus (P) (mg/kg)	685	685	868	743	563
	Potassium (K) (mg/kg)	2950	2880	2590	2480	2440
	Selenium (Se) (mg/kg)	0.43	0.40	0.76	0.50	0.29
	Silver (Ag) (mg/kg)	0.11	0.12	<0.10	0.21	0.12
	Sodium (Na) (mg/kg)	173	171	103	172	142
	Strontium (Sr) (mg/kg)	25.1	24.1	20.2	25.9	26.5
	Sulfur (S) (mg/kg)	1300	1400	<1000	1500	<1000
	Thallium (Tl) (mg/kg)	0.195	0.192	0.173	0.169	0.149
	Tin (Sn) (mg/kg)	2.9	2.4	2.1	<2.0	<2.0
	Titanium (Ti) (mg/kg)	528	505	601	514	617
	Tungsten (W) (mg/kg)	<0.50	<0.50	<0.50	<0.50	<0.50
	Uranium (U) (mg/kg)	13.6	12.9	20.9	11.4	12.1
	Vanadium (V) (mg/kg)	30.2	29.1	30.3	25.2	26.4
	Zinc (Zn) (mg/kg)	94.6	89.9	103	81.0	73.7
	Zirconium (Zr) (mg/kg)	2.2	1.8	2.6	1.8	2.6

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2155903-11	L2155903-12	L2155903-13	L2155903-14	L2155903-15
Description	Sediment	Sediment	Sediment	Sediment	Sediment
Sampled Date	16-AUG-18	16-AUG-18	16-AUG-18	16-AUG-18	16-AUG-18
Sampled Time					
Client ID	LK5-SC-1	LK5-SC-2	LK5-SC-3	LK5-SC-4	LK5-SC-5
Grouping / **Analyte**					
SOIL					
Physical Tests Moisture (%)	94.3	94.8	94.3	91.9	94.0
pH (1:2 soil:water) (pH)	5.88	6.15	4.76	4.47	4.70
Metals Aluminum (Al) (mg/kg)	16000	13800	15500	17500	12800
Antimony (Sb) (mg/kg)	0.31	0.22	0.37	0.45	0.41
Arsenic (As) (mg/kg)	12.0	9.47	49.5	69.8	94.4
Barium (Ba) (mg/kg)	103	91.5	61.7	62.5	53.8
Beryllium (Be) (mg/kg)	1.01	0.87	1.10	1.22	1.02
Bismuth (Bi) (mg/kg)	0.37	0.31	0.45	0.54	0.46
Boron (B) (mg/kg)	13.1	13.1	12.1	10.7	10.2
Cadmium (Cd) (mg/kg)	0.240	0.214	0.233	0.291	0.254
Calcium (Ca) (mg/kg)	3490	3940	2460	2030	1870
Chromium (Cr) (mg/kg)	106	92.6	116	130	96.8
Cobalt (Co) (mg/kg)	9.82	8.37	14.2	20.1	21.7
Copper (Cu) (mg/kg)	34.5	30.6	44.9	56.5	49.9
Iron (Fe) (mg/kg)	26600	22800	99700	145000	246000
Lead (Pb) (mg/kg)	12.0	11.1	12.7	13.7	11.7
Lithium (Li) (mg/kg)	13.4	12.1	13.2	13.1	8.9
Magnesium (Mg) (mg/kg)	7380	6900	7660	7880	5450
Manganese (Mn) (mg/kg)	326	368	391	454	715
Mercury (Hg) (mg/kg)	0.0706	0.0590	0.0770	0.0824	0.0872
Molybdenum (Mo) (mg/kg)	3.32	2.79	5.57	8.28	10.1
Nickel (Ni) (mg/kg)	61.2	57.2	72.0	77.4	69.8
Phosphorus (P) (mg/kg)	644	746	1060	840	1170
Potassium (K) (mg/kg)	1950	1600	1630	1690	1300
Selenium (Se) (mg/kg)	0.69	0.62	1.18	1.39	1.49
Silver (Ag) (mg/kg)	0.76	1.15	1.09	0.99	0.75
Sodium (Na) (mg/kg)	186	179	153	141	119
Strontium (Sr) (mg/kg)	23.4	23.1	18.7	17.8	13.0
Sulfur (S) (mg/kg)	2500	2600	2800	2900	3600
Thallium (Tl) (mg/kg)	0.134	0.109	0.129	0.162	0.122
Tin (Sn) (mg/kg)	<2.0	<2.0	<2.0	<2.0	<2.0
Titanium (Ti) (mg/kg)	300	257	297	328	239
Tungsten (W) (mg/kg)	<0.50	<0.50	<0.50	<0.50	<0.50
Uranium (U) (mg/kg)	7.19	5.95	8.43	10.1	8.43
Vanadium (V) (mg/kg)	24.6	21.4	25.6	27.9	20.4
Zinc (Zn) (mg/kg)	74.1	63.5	85.5	97.4	82.1
Zirconium (Zr) (mg/kg)	1.4	1.4	3.9	4.1	4.3

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	L2155903-16 Sediment 16-AUG-18 LK5-SC-6	L2155903-17 Sediment 16-AUG-18 LK5-SC-7	L2155903-18 Sediment 16-AUG-18 LK5-SC-8	L2155903-19 Sediment 16-AUG-18 LK5-SC-9	L2155903-20 Sediment 16-AUG-18 LK5-SC-10
Sample ID / **Description** / **Sampled Date** / **Sampled Time** / **Client ID**						
SOIL						
Physical Tests	Moisture (%)	92.6	91.3	93.5	93.6	93.1
	pH (1:2 soil:water) (pH)	4.55	5.13	4.91	5.78	4.46
Metals	Aluminum (Al) (mg/kg)	12500	20400	19200	18900	17700
	Antimony (Sb) (mg/kg)	0.45	0.40	0.43	0.28	0.48
	Arsenic (As) (mg/kg)	78.0	22.4	43.6	13.8	75.8
	Barium (Ba) (mg/kg)	46.1	139	100	143	61.8
	Beryllium (Be) (mg/kg)	1.01	1.39	1.38	1.20	1.32
	Bismuth (Bi) (mg/kg)	0.45	0.52	0.53	0.42	0.56
	Boron (B) (mg/kg)	10.3	11.8	13.9	13.7	11.7
	Cadmium (Cd) (mg/kg)	0.265	0.322	0.301	0.283	0.324
	Calcium (Ca) (mg/kg)	1570	2650	2540	3480	2010
	Chromium (Cr) (mg/kg)	88.1	144	129	116	128
	Cobalt (Co) (mg/kg)	26.3	14.8	17.1	11.3	25.6
	Copper (Cu) (mg/kg)	52.9	54.5	53.0	40.6	63.0
	Iron (Fe) (mg/kg)	298000	46000	83500	26200	185000
	Lead (Pb) (mg/kg)	10.6	12.6	13.3	11.7	13.7
	Lithium (Li) (mg/kg)	8.6	15.9	13.8	16.0	12.7
	Magnesium (Mg) (mg/kg)	5130	9190	8090	8630	7450
	Manganese (Mn) (mg/kg)	597	394	462	394	519
	Mercury (Hg) (mg/kg)	0.0751	0.0551	0.0822	0.0468	0.0767
	Molybdenum (Mo) (mg/kg)	10.4	7.09	7.92	4.58	10.6
	Nickel (Ni) (mg/kg)	70.8	84.8	79.7	73.2	86.7
	Phosphorus (P) (mg/kg)	1170	577	842	592	818
	Potassium (K) (mg/kg)	1200	2380	2130	2370	1780
	Selenium (Se) (mg/kg)	1.67	1.09	1.08	0.71	1.64
	Silver (Ag) (mg/kg)	0.86	1.32	1.69	0.76	1.44
	Sodium (Na) (mg/kg)	98	171	187	197	128
	Strontium (Sr) (mg/kg)	11.6	23.0	20.6	23.5	16.1
	Sulfur (S) (mg/kg)	3900	2300	3000	2400	3600
	Thallium (Tl) (mg/kg)	0.128	0.205	0.174	0.172	0.163
	Tin (Sn) (mg/kg)	<2.0	<2.0	<2.0	3.1	2.5
	Titanium (Ti) (mg/kg)	256	428	353	369	355
	Tungsten (W) (mg/kg)	<0.50	<0.50	<0.50	<0.50	<0.50
	Uranium (U) (mg/kg)	8.12	10.9	10.0	8.90	10.5
	Vanadium (V) (mg/kg)	19.5	31.8	28.6	27.4	28.3
	Zinc (Zn) (mg/kg)	79.2	141	112	102	103
	Zirconium (Zr) (mg/kg)	3.4	2.5	2.7	1.4	3.6

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2155903-21	L2155903-22	L2155903-23	L2155903-24	L2155903-25
Description	Sediment	Sediment	Sediment	Sediment	Sediment
Sampled Date	17-AUG-18	17-AUG-18	17-AUG-18	17-AUG-18	17-AUG-18
Sampled Time					
Client ID	LK8-SC-1	LK8-SC-2	LK8-SC-3	LK8-SC-4	LK8-SC-5
Grouping / **Analyte**					
SOIL					
Physical Tests Moisture (%)	74.0	79.8	80.8	87.4	74.4
pH (1:2 soil:water) (pH)	5.78	5.60	5.89	5.43	5.94
Metals Aluminum (Al) (mg/kg)	14400	12700	13300	13900	13000
Antimony (Sb) (mg/kg)	0.15	0.14	0.12	0.14	0.14
Arsenic (As) (mg/kg)	15.6	18.1	6.11	9.80	18.8
Barium (Ba) (mg/kg)	32.2	31.0	40.7	41.7	33.8
Beryllium (Be) (mg/kg)	0.78	0.57	0.58	0.64	0.50
Bismuth (Bi) (mg/kg)	0.28	0.26	0.24	0.25	0.22
Boron (B) (mg/kg)	<5.0	<5.0	<5.0	5.6	<5.0
Cadmium (Cd) (mg/kg)	0.062	0.085	0.083	0.090	0.090
Calcium (Ca) (mg/kg)	1310	1290	1690	1750	1390
Chromium (Cr) (mg/kg)	149	128	129	135	131
Cobalt (Co) (mg/kg)	11.9	10.6	8.52	9.72	15.9
Copper (Cu) (mg/kg)	35.6	27.6	27.3	30.4	24.0
Iron (Fe) (mg/kg)	31000	26900	20300	24000	31300
Lead (Pb) (mg/kg)	7.90	7.16	7.14	8.14	6.90
Lithium (Li) (mg/kg)	14.8	13.0	14.8	14.6	13.9
Magnesium (Mg) (mg/kg)	9710	8240	9110	9160	8830
Manganese (Mn) (mg/kg)	649	642	257	463	1280
Mercury (Hg) (mg/kg)	0.0137	0.0177	0.0173	0.0220	0.0142
Molybdenum (Mo) (mg/kg)	2.41	2.26	1.15	1.42	1.23
Nickel (Ni) (mg/kg)	66.8	60.8	64.5	66.7	65.5
Phosphorus (P) (mg/kg)	586	511	472	501	379
Potassium (K) (mg/kg)	1000	910	990	1090	950
Selenium (Se) (mg/kg)	<0.20	0.28	0.24	0.31	0.26
Silver (Ag) (mg/kg)	1.46	1.14	0.85	0.67	0.51
Sodium (Na) (mg/kg)	63	59	69	76	58
Strontium (Sr) (mg/kg)	17.2	17.1	17.3	20.5	18.4
Sulfur (S) (mg/kg)	<1000	<1000	<1000	<1000	<1000
Thallium (Tl) (mg/kg)	0.085	0.078	0.068	0.074	0.085
Tin (Sn) (mg/kg)	<2.0	<2.0	<2.0	<2.0	<2.0
Titanium (Ti) (mg/kg)	363	294	270	326	321
Tungsten (W) (mg/kg)	<0.50	<0.50	<0.50	<0.50	<0.50
Uranium (U) (mg/kg)	5.37	3.82	3.76	3.98	3.16
Vanadium (V) (mg/kg)	29.9	24.8	26.3	27.3	24.7
Zinc (Zn) (mg/kg)	64.5	54.8	53.4	55.5	51.2
Zirconium (Zr) (mg/kg)	<1.0	<1.0	<1.0	<1.0	<1.0

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	L2155903-26 Sediment 17-AUG-18 LK8-SC-6	L2155903-27 Sediment 17-AUG-18 LK8-SC-7	L2155903-28 Sediment 17-AUG-18 LK8-SC-8	L2155903-29 Sediment 18-AUG-18 WTS-SC-1 (0-1)	L2155903-30 Sediment 18-AUG-18 WTS-SC-1 (5-6)
SOIL						
Physical Tests	Moisture (%)	74.1	80.6	73.3	90.6	85.4
	pH (1:2 soil:water) (pH)	5.70	5.83	5.76	5.47	5.60
Metals	Aluminum (Al) (mg/kg)	14600	13200	11200	17400	22100
	Antimony (Sb) (mg/kg)	0.16	0.14	0.10	0.21	0.17
	Arsenic (As) (mg/kg)	33.9	13.1	13.7	65.8	25.3
	Barium (Ba) (mg/kg)	33.0	43.1	26.5	126	146
	Beryllium (Be) (mg/kg)	0.56	0.54	0.47	1.41	1.81
	Bismuth (Bi) (mg/kg)	0.24	<0.20	<0.20	0.54	0.64
	Boron (B) (mg/kg)	<5.0	<5.0	<5.0	8.1	6.7
	Cadmium (Cd) (mg/kg)	0.051	0.144	0.075	0.276	0.368
	Calcium (Ca) (mg/kg)	1500	1910	1520	2530	2190
	Chromium (Cr) (mg/kg)	146	125	118	66.7	81.9
	Cobalt (Co) (mg/kg)	12.4	15.3	9.23	13.8	8.79
	Copper (Cu) (mg/kg)	24.5	19.8	15.4	38.5	52.3
	Iron (Fe) (mg/kg)	35600	25500	23500	71400	34700
	Lead (Pb) (mg/kg)	6.79	6.98	5.70	13.9	14.0
	Lithium (Li) (mg/kg)	15.6	14.5	13.2	13.8	16.8
	Magnesium (Mg) (mg/kg)	9950	8870	8580	6000	7400
	Manganese (Mn) (mg/kg)	462	1520	501	2960	411
	Mercury (Hg) (mg/kg)	0.0113	0.0158	0.0108	0.0861	0.0515
	Molybdenum (Mo) (mg/kg)	1.69	1.05	0.61	4.76	3.95
	Nickel (Ni) (mg/kg)	67.3	72.8	58.6	57.1	73.3
	Phosphorus (P) (mg/kg)	628	388	374	1060	1540
	Potassium (K) (mg/kg)	1090	1050	840	2110	2640
	Selenium (Se) (mg/kg)	0.28	<0.20	<0.20	0.72	0.70
	Silver (Ag) (mg/kg)	0.95	0.86	0.31	0.27	0.37
	Sodium (Na) (mg/kg)	71	66	51	157	163
	Strontium (Sr) (mg/kg)	21.3	22.1	20.3	26.0	23.2
	Sulfur (S) (mg/kg)	<1000	<1000	<1000	1500	1200
	Thallium (Tl) (mg/kg)	0.077	0.091	0.062	0.171	0.212
	Tin (Sn) (mg/kg)	<2.0	<2.0	<2.0	<2.0	<2.0
	Titanium (Ti) (mg/kg)	405	440	368	370	472
	Tungsten (W) (mg/kg)	<0.50	<0.50	<0.50	<0.50	<0.50
	Uranium (U) (mg/kg)	3.31	2.61	2.20	10.0	14.4
	Vanadium (V) (mg/kg)	28.4	25.6	22.6	24.4	29.9
	Zinc (Zn) (mg/kg)	55.0	52.0	44.0	81.9	111
	Zirconium (Zr) (mg/kg)	<1.0	<1.0	<1.0	<1.0	1.9

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2155903-31	L2155903-32	L2155903-33	L2155903-34	L2155903-35
Description	Sediment	Sediment	Sediment	Sediment	Sediment
Sampled Date	18-AUG-18	18-AUG-18	18-AUG-18	18-AUG-18	18-AUG-18
Sampled Time					
Client ID	WTS-SC-1 (10-11)	WTS-SC-2 (0-1)	WTS-SC-2 (5-6)	WTS-SC-2 (10-11)	WTS-SC-3 (0-1)
Grouping / **Analyte**					
SOIL					
Physical Tests Moisture (%)	81.7	88.4	84.4	82.4	89.8
pH (1:2 soil:water) (pH)	5.87	5.66	4.92	4.94	5.31
Metals Aluminum (Al) (mg/kg)	21000	15400	22000	21600	16800
Antimony (Sb) (mg/kg)	0.15	0.22	0.24	0.24	0.21
Arsenic (As) (mg/kg)	26.8	332	43.3	51.0	165
Barium (Ba) (mg/kg)	158	122	137	140	123
Beryllium (Be) (mg/kg)	1.96	1.24	1.79	1.92	1.26
Bismuth (Bi) (mg/kg)	0.64	0.48	0.67	0.63	0.53
Boron (B) (mg/kg)	6.0	6.2	8.0	7.9	8.4
Cadmium (Cd) (mg/kg)	0.466	0.297	0.480	0.533	0.310
Calcium (Ca) (mg/kg)	2030	2100	2110	2040	2250
Chromium (Cr) (mg/kg)	79.3	61.6	86.8	79.9	63.8
Cobalt (Co) (mg/kg)	8.42	22.4	19.8	21.3	22.2
Copper (Cu) (mg/kg)	56.6	35.8	51.8	52.1	38.6
Iron (Fe) (mg/kg)	34100	122000	53600	51000	101000
Lead (Pb) (mg/kg)	14.3	11.8	14.9	14.1	12.6
Lithium (Li) (mg/kg)	16.7	12.3	17.2	16.3	13.0
Magnesium (Mg) (mg/kg)	7160	5740	7950	7390	5880
Manganese (Mn) (mg/kg)	357	3270	588	523	2310
Mercury (Hg) (mg/kg)	0.0421	0.0704	0.0523	0.0486	0.0743
Molybdenum (Mo) (mg/kg)	5.51	5.43	3.04	3.92	5.12
Nickel (Ni) (mg/kg)	73.3	70.2	105	114	69.9
Phosphorus (P) (mg/kg)	1520	1950	1630	1680	781
Potassium (K) (mg/kg)	2350	1950	2820	2680	2220
Selenium (Se) (mg/kg)	0.81	0.73	0.85	0.89	0.71
Silver (Ag) (mg/kg)	0.37	0.24	0.33	0.33	0.26
Sodium (Na) (mg/kg)	142	142	195	183	164
Strontium (Sr) (mg/kg)	20.8	24.9	25.1	25.6	24.7
Sulfur (S) (mg/kg)	1200	1300	1200	1000	1400
Thallium (Tl) (mg/kg)	0.204	0.184	0.337	0.289	0.193
Tin (Sn) (mg/kg)	<2.0	<2.0	<2.0	<2.0	<2.0
Titanium (Ti) (mg/kg)	428	384	666	638	413
Tungsten (W) (mg/kg)	<0.50	<0.50	<0.50	<0.50	<0.50
Uranium (U) (mg/kg)	15.3	8.92	13.4	13.3	9.80
Vanadium (V) (mg/kg)	29.3	22.5	32.2	31.8	23.6
Zinc (Zn) (mg/kg)	103	82.7	126	109	86.1
Zirconium (Zr) (mg/kg)	2.0	1.3	4.4	4.4	<1.0

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2155903-36	L2155903-39	L2155903-40	L2155903-41	L2155903-42
Description	Sediment	Sediment	Sediment	Sediment	Sediment
Sampled Date	18-AUG-18	18-AUG-18			
Sampled Time					
Client ID	WTS-SC-3 (5-6)	WTS-SC-3 (10-11)	WTP-DUP-SC-1	WTP-DUP-SC-2	WTP-DUP-SC-3
Grouping / **Analyte**					
SOIL					
Physical Tests Moisture (%)	80.9	78.4	83.1	89.8	93.9
pH (1:2 soil:water) (pH)	5.51	5.23	5.28	5.80	6.22
Metals Aluminum (Al) (mg/kg)	22800	24800	21400	19300	12300
Antimony (Sb) (mg/kg)	0.21	0.30	0.24	0.16	0.20
Arsenic (As) (mg/kg)	63.2	55.4	47.9	6.76	8.01
Barium (Ba) (mg/kg)	153	180	139	113	78.5
Beryllium (Be) (mg/kg)	1.87	2.40	1.62	1.42	0.74
Bismuth (Bi) (mg/kg)	0.68	0.75	0.65	0.56	0.26
Boron (B) (mg/kg)	7.6	8.0	8.7	8.4	13.0
Cadmium (Cd) (mg/kg)	0.295	0.774	0.871	0.079	0.179
Calcium (Ca) (mg/kg)	1990	2060	1960	2620	3850
Chromium (Cr) (mg/kg)	82.9	92.7	80.5	90.9	86.0
Cobalt (Co) (mg/kg)	11.6	11.0	11.8	9.49	7.70
Copper (Cu) (mg/kg)	54.5	74.3	53.1	31.1	26.5
Iron (Fe) (mg/kg)	55600	52800	53400	25700	20200
Lead (Pb) (mg/kg)	15.1	16.8	13.9	12.9	9.70
Lithium (Li) (mg/kg)	17.1	19.3	18.1	19.1	11.6
Magnesium (Mg) (mg/kg)	7490	8010	7420	8100	6650
Manganese (Mn) (mg/kg)	572	410	446	349	344
Mercury (Hg) (mg/kg)	0.0445	0.0412	0.0438	0.0345	0.0452
Molybdenum (Mo) (mg/kg)	5.92	8.70	4.70	2.70	2.04
Nickel (Ni) (mg/kg)	75.3	96.7	65.9	67.4	54.3
Phosphorus (P) (mg/kg)	1400	1580	1230	557	688
Potassium (K) (mg/kg)	2850	3010	2720	2490	1420
Selenium (Se) (mg/kg)	0.85	1.02	0.86	0.30	0.48
Silver (Ag) (mg/kg)	0.33	0.36	0.31	0.11	0.15
Sodium (Na) (mg/kg)	161	150	178	137	171
Strontium (Sr) (mg/kg)	25.4	25.2	22.5	26.1	23.6
Sulfur (S) (mg/kg)	<1000	<1000	1100	1100	2300
Thallium (Tl) (mg/kg)	0.241	0.312	0.236	0.156	0.093
Tin (Sn) (mg/kg)	<2.0	<2.0	<2.0	<2.0	<2.0
Titanium (Ti) (mg/kg)	633	698	592	580	286
Tungsten (W) (mg/kg)	<0.50	<0.50	<0.50	<0.50	<0.50
Uranium (U) (mg/kg)	15.5	20.0	14.1	13.2	5.11
Vanadium (V) (mg/kg)	31.4	34.4	27.3	27.3	20.1
Zinc (Zn) (mg/kg)	117	179	101	85.5	56.7
Zirconium (Zr) (mg/kg)	3.3	5.1	2.2	2.2	<1.0

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2155903-43				
	Description	Sediment				
	Sampled Date					
	Sampled Time					
	Client ID	WTP-DUP-SC-4				
Grouping	**Analyte**					
SOIL						
Physical Tests	Moisture (%)	86.2				
	pH (1:2 soil:water) (pH)	5.44				
Metals	Aluminum (Al) (mg/kg)	12900				
	Antimony (Sb) (mg/kg)	0.13				
	Arsenic (As) (mg/kg)	8.59				
	Barium (Ba) (mg/kg)	41.7				
	Beryllium (Be) (mg/kg)	0.57				
	Bismuth (Bi) (mg/kg)	0.24				
	Boron (B) (mg/kg)	6.6				
	Cadmium (Cd) (mg/kg)	0.073				
	Calcium (Ca) (mg/kg)	1920				
	Chromium (Cr) (mg/kg)	126				
	Cobalt (Co) (mg/kg)	8.42				
	Copper (Cu) (mg/kg)	27.3				
	Iron (Fe) (mg/kg)	21600				
	Lead (Pb) (mg/kg)	7.52				
	Lithium (Li) (mg/kg)	14.6				
	Magnesium (Mg) (mg/kg)	8870				
	Manganese (Mn) (mg/kg)	267				
	Mercury (Hg) (mg/kg)	0.0198				
	Molybdenum (Mo) (mg/kg)	1.40				
	Nickel (Ni) (mg/kg)	64.1				
	Phosphorus (P) (mg/kg)	459				
	Potassium (K) (mg/kg)	1010				
	Selenium (Se) (mg/kg)	0.25				
	Silver (Ag) (mg/kg)	<0.10				
	Sodium (Na) (mg/kg)	74				
	Strontium (Sr) (mg/kg)	20.2				
	Sulfur (S) (mg/kg)	<1000				
	Thallium (Tl) (mg/kg)	0.073				
	Tin (Sn) (mg/kg)	<2.0				
	Titanium (Ti) (mg/kg)	313				
	Tungsten (W) (mg/kg)	<0.50				
	Uranium (U) (mg/kg)	3.81				
	Vanadium (V) (mg/kg)	25.8				
	Zinc (Zn) (mg/kg)	54.6				
	Zirconium (Zr) (mg/kg)	<1.0				

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2155903-1	L2155903-2	L2155903-3	L2155903-4	L2155903-5
	Description	Sediment	Sediment	Sediment	Sediment	Sediment
	Sampled Date	14-AUG-18	14-AUG-18	14-AUG-18	15-AUG-18	15-AUG-18
	Sampled Time					
	Client ID	LK1-SC-1	LK1-SC-2	LK1-SC-3	LK1-SC-4	LK1-SC-5
Grouping	**Analyte**					
SOIL						
Speciated Metals	Methylmercury (as MeHg) (mg/kg)					

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2155903-6	L2155903-7	L2155903-8	L2155903-9	L2155903-10
Description	Sediment	Sediment	Sediment	Sediment	Sediment
Sampled Date	15-AUG-18	15-AUG-18	15-AUG-18	15-AUG-18	15-AUG-18
Sampled Time					
Client ID	LK1-SC-6	LK1-SC-7	LK1-SC-8	LK1-SC-9	LK1-SC-10
Grouping **Analyte**					
SOIL					
Speciated Metals Methylmercury (as MeHg) (mg/kg)					

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2155903-11	L2155903-12	L2155903-13	L2155903-14	L2155903-15
Description	Sediment	Sediment	Sediment	Sediment	Sediment
Sampled Date	16-AUG-18	16-AUG-18	16-AUG-18	16-AUG-18	16-AUG-18
Sampled Time					
Client ID	LK5-SC-1	LK5-SC-2	LK5-SC-3	LK5-SC-4	LK5-SC-5
Grouping **Analyte**					
SOIL					
Speciated Metals Methylmercury (as MeHg) (mg/kg)					

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	Sample ID Description Sampled Date Sampled Time Client ID	L2155903-16 Sediment 16-AUG-18 LK5-SC-6	L2155903-17 Sediment 16-AUG-18 LK5-SC-7	L2155903-18 Sediment 16-AUG-18 LK5-SC-8	L2155903-19 Sediment 16-AUG-18 LK5-SC-9	L2155903-20 Sediment 16-AUG-18 LK5-SC-10
SOIL							
Speciated Metals	Methylmercury (as MeHg) (mg/kg)						

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2155903-21	L2155903-22	L2155903-23	L2155903-24	L2155903-25
Description	Sediment	Sediment	Sediment	Sediment	Sediment
Sampled Date	17-AUG-18	17-AUG-18	17-AUG-18	17-AUG-18	17-AUG-18
Sampled Time					
Client ID	LK8-SC-1	LK8-SC-2	LK8-SC-3	LK8-SC-4	LK8-SC-5
Grouping **Analyte**					
SOIL					
Speciated Metals Methylmercury (as MeHg) (mg/kg)					

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2155903-26	L2155903-27	L2155903-28	L2155903-29	L2155903-30
Description	Sediment	Sediment	Sediment	Sediment	Sediment
Sampled Date	17-AUG-18	17-AUG-18	17-AUG-18	18-AUG-18	18-AUG-18
Sampled Time					
Client ID	LK8-SC-6	LK8-SC-7	LK8-SC-8	WTS-SC-1 (0-1)	WTS-SC-1 (5-6)
Grouping **Analyte**					
SOIL					
Speciated Metals Methylmercury (as MeHg) (mg/kg)				0.00126	0.000304

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2155903-31	L2155903-32	L2155903-33	L2155903-34	L2155903-35
Description	Sediment	Sediment	Sediment	Sediment	Sediment
Sampled Date	18-AUG-18	18-AUG-18	18-AUG-18	18-AUG-18	18-AUG-18
Sampled Time					
Client ID	WTS-SC-1 (10-11)	WTS-SC-2 (0-1)	WTS-SC-2 (5-6)	WTS-SC-2 (10-11)	WTS-SC-3 (0-1)
Grouping **Analyte**					
SOIL					
Speciated Metals Methylmercury (as MeHg) (mg/kg)	0.00135	0.000358	0.000294	0.000084	0.000664

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2155903-36	L2155903-39	L2155903-40	L2155903-41	L2155903-42
Description	Sediment	Sediment	Sediment	Sediment	Sediment
Sampled Date	18-AUG-18	18-AUG-18			
Sampled Time					
Client ID	WTS-SC-3 (5-6)	WTS-SC-3 (10-11)	WTP-DUP-SC-1	WTP-DUP-SC-2	WTP-DUP-SC-3
Grouping **Analyte**					
SOIL					
Speciated Metals Methylmercury (as MeHg) (mg/kg)	0.000196	0.000295	0.000160		

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2155903-43				
Description	Sediment				
Sampled Date					
Sampled Time					
Client ID	WTP-DUP-SC-4				
Grouping **Analyte**					
SOIL					
Speciated Metals Methylmercury (as MeHg) (mg/kg)					

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2155903-44	L2155903-45			
	Description	Other	Other			
	Sampled Date	17-AUG-18	18-AUG-18			
	Sampled Time					
	Client ID	WTP-SWIPE-SC-1	WTP-SWIPE-SC-2			
Grouping	**Analyte**					
SWAB						
Metals	Aluminum (Al)-Total (ug)	55				
	Antimony (Sb)-Total (ug)	<20				
	Arsenic (As)-Total (ug)	<20				
	Barium (Ba)-Total (ug)	1.2				
	Beryllium (Be)-Total (ug)	<0.50				
	Bismuth (Bi)-Total (ug)	<20				
	Cadmium (Cd)-Total (ug)	<1.0				
	Calcium (Ca)-Total (ug)	<200				
	Chromium (Cr)-Total (ug)	<2.0				
	Cobalt (Co)-Total (ug)	<1.0				
	Copper (Cu)-Total (ug)	1.7				
	Iron (Fe)-Total (ug)	124				
	Lead (Pb)-Total (ug)	<4.0				
	Lithium (Li)-Total (ug)	<1.0				
	Magnesium (Mg)-Total (ug)	190				
	Manganese (Mn)-Total (ug)	1.97				
	Mercury (Hg)-Total (ug)		<0.010			
	Molybdenum (Mo)-Total (ug)	<3.0				
	Nickel (Ni)-Total (ug)	<5.0				
	Phosphorus (P)-Total (ug)	<30				
	Potassium (K)-Total (ug)	<200				
	Selenium (Se)-Total (ug)	<20				
	Silver (Ag)-Total (ug)	<1.0				
	Sodium (Na)-Total (ug)	820				
	Strontium (Sr)-Total (ug)	0.76				
	Thallium (Tl)-Total (ug)	<20				
	Tin (Sn)-Total (ug)	<3.0				
	Titanium (Ti)-Total (ug)	2.2				
	Vanadium (V)-Total (ug)	<3.0				
	Zinc (Zn)-Total (ug)	41.4				

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
HG-200.2-CVAF-VA	Soil	Mercury in Soil by CVAAS	EPA 200.2/1631E (mod)
Soil samples are digested with hot nitric and hydrochloric acids, followed by CVAAS analysis. This method is fully compliant with the BC SALM strong acid leachable metals digestion method.			
HG-UG-CVAF-VA	Swab	Mercury in Swab by CVAFS	NIOSH 7303/EPA 245.7
This analysis is carried out using procedures adapted from Method 7303 in the NIOSH Manual of Analytcial Methods (NMAM). The procedure involves a hot block digestion of the swab material, using a combination of nitric acid and hydrochloric acid. Instrumental analysis of the swab extract is by cold vapour atomic fluorescence spectrophotometry or atomic absorption spectrophotometry (EPA Method 245.7).			
MEHG-GCAF-VA	Soil	Methylmercury in Soil by GCAFS	DeWild et al. (2004)
This method follows procedures published by DeWild, Olund, Olsen and Tate (2004) for the US Geological Survey (Techniques and Methods 5A-7). Samples are leached with an acidic copper sulphate solution to solubilize methylmercury for inorganic complexes. The methylmercury is then extracted into dichloromethane and then an aliquot is back extracted into ultra-pure water. The extract is analyzed by aqueous phase ethylation, purge and trap, desorption and GC separation. The separated species are then pyrolized to elemental Hg and quantified by cold vapour atomic flourescence spectroscopy. Results are reported "as MeHg".			
MET-200.2-CCMS-VA	Soil	Metals in Soil by CRC ICPMS	EPA 200.2/6020A (mod)
This method uses a heated strong acid digestion with HNO3 and HCl and is intended to liberate metals that may be environmentally available. Silicate minerals are not solubilized. Dependent on sample matrix, some metals may be only partially recovered, including Al, Ba, Be, Cr, Sr, Ti, Tl, V, W, and Zr. Volatile forms of sulfur (including sulfide) may not be captured, as they may be lost during sampling, storage, or digestion. Analysis is by Collision/Reaction Cell ICPMS.			
MET-UG-ICP-VA	Swab	Metals in Swab by ICPOES	NIOSH 7303/EPA 6010B
This analysis is carried out using procedures adapted from Method 7303 in the NIOSH Manual of Analytcial Methods (NMAM). The procedure involves a hot block digestion of the swab material, using a combination of nitric acid and hydrochloric acid. Instrumental analysis of the swab extract is by inductively coupled plasma - optical emission spectrophotometry (EPA 6010B).			
MOISTURE-VA	Soil	Moisture content	CWS for PHC in Soil - Tier 1
This analysis is carried out gravimetrically by drying the sample at 105 C for a minimum of six hours.			
PH-1:2-VA	Soil	pH in Soil (1:2 Soil:Water Extraction)	BC WLAP METHOD: PH, ELECTROMETRIC, SOIL
This analysis is carried out in accordance with procedures described in the pH, Electrometric in Soil and Sediment method - Section B Physical/Inorganic and Misc. Constituents, BC Environmental Laboratory Manual 2007. The procedure involves mixing the dried (at <60°C) and sieved (No. 10 / 2mm) sample with deionized/distilled water at a 1:2 ratio of sediment to water. The pH of the solution is then measured using a standard pH probe.			

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

ALS Environmental

L2155903-COFC

COC # _____

Page 1 of 4

Report To		Report Format / Distribution	Service Requested (Rush for routine analysis subject to availability)
Company:	Azimuth Consulting Group	☐ Standard ☐ Other	◉ Regular (Standard Turnaround Times - Business Days)
Contact:	Eric Franz	☑ PDF ☑ Excel ☐ Digital ☐ Fax	○ Priority (2-4 Business Days) - 50% Surcharge - Contact ALS to Confirm TAT
Address:	218-2902 West Broadway	Email 1: efranz@azimuthgroup.ca	○ Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT
	Vancouver, BC V6K2G8	Email 2: mfinley@azimuthgroup.ca	○ Same Day or Weekend Emergency - Contact ALS to Confirm TAT
Phone:	604-730-1220 Fax:	Email 3: robin.allard@agnicoeagle.com	
Invoice To	Same as Report ? ☑ Yes ☐ No	**Client / Project Information**	**Analysis Request**
Hardcopy of Invoice with Report?	☐ Yes ☑ No	Job #: WTP Sediment Cores	Please indicate below Filtered, Preserved or both (F, P, F/P)
Company:		PO / AFE:	
Contact:		LSD:	
Address:			
Phone:	Fax:	Quote #: Q38011	
Lab Work Order # (lab use only)		**ALS Contact:** Brent Mack	**Sampler:** Eric Franz

Sample #	Sample Identification (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Total Metals, pH, Moisture	Methyl mercury											Number of Containers
	LK1-SC-1	14-Aug-18	-	Sediment	X												1
	LK1-SC-2	14-Aug-18	-	Sediment	X												1
	LK1-SC-3	14-Aug-18	-	Sediment	X												1
	LK1-SC-4	15-Aug-18	-	Sediment	X												1
	LK1-SC-5	15-Aug-18	-	Sediment	X												1
	LK1-SC-6	15-Aug-18	-	Sediment	X												1
	LK1-SC-7	15-Aug-18	-	Sediment	X												1
	LK1-SC-8	15-Aug-18	-	Sediment	X												1
	LK1-SC-9	15-Aug-18	-	Sediment	X												1
	LK1-SC-10	15-Aug-18	-	Sediment	X												1
	LK5-SC-1	16-Aug-18	-	Sediment	X												1
	LK5-SC-2	16-Aug-18	-	Sediment	X												1

Special Instructions / Regulations with water or land use (CCME-Freshwater Aquatic Life/BC CSR - Commercial/AB Tier 1 - Natural, etc) / Hazardous Details

Include mercury in the total metals package as per the quote.

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.

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SHIPMENT RELEASE (client use)			SHIPMENT RECEPTION (lab use only)				SHIPMENT VERIFICATION (lab use only)			
Released by:	Date (dd-mmm-yy)	Time (hh-mm)	Received by:	Date:	Time:	Temperature:	Verified by:	Date:	Time:	Observations: Yes / No ? If Yes add SIF
Eric Franz			PAUL	AUG 30	08:50	17.9 °C				

AV. OF 6 COOLERS

GENF 20.00 Front



L2155903-COFC

COC # _____

ALS Environmental

Report To		Report Format / Distribution	Service Requested (Rush for routine analysis subject to availability)
Company:	Azimuth Consulting Group	☐ Standard ☐ Other	◉ Regular (Standard Turnaround Times - Business Days)
Contact:	Eric Franz	☑ PDF ☑ Excel ☐ Digital ☐ Fax	○ Priority (2-4 Business Days) - 50% Surcharge - Contact ALS to Confirm TAT
Address:	218-2902 West Broadway	Email 1: efranz@azimuthgroup.ca	○ Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT
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Phone:	604-730-1220 Fax:	Email 3: robin.allard@agnicoeagle.com	
Invoice To	Same as Report ? ☑ Yes ☐ No	**Client / Project Information**	**Analysis Request**
Hardcopy of Invoice with Report?	☐ Yes ☑ No	Job #: WTP Sediment Cores	Please indicate below Filtered, Preserved or both (F, P, F/P)
Company:		PO / AFE:	
Contact:		LSD:	
Address:			
Phone:	Fax:	Quote #: Q38011	
Lab Work Order # (lab use only)		**ALS Contact:** Brent Mack	**Sampler:** Eric Franz

Sample #	Sample Identification (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Total Metals, pH, Moisture	Methyl mercury	Number of Containers
	LK5-SC-3	16-Aug-18	-	Sediment	X		1
	LK5-SC-4	16-Aug-18	-	Sediment	X		1
	LK5-SC-5	16-Aug-18	-	Sediment	X		1
	LK5-SC-6	16-Aug-18	-	Sediment	X		1
	LK5-SC-7	16-Aug-18	-	Sediment	X		1
	LK5-SC-8	16-Aug-18	-	Sediment	X		1
	LK5-SC-9	16-Aug-18	-	Sediment	X		1
	LK5-SC-10	16-Aug-18	-	Sediment	X		1
	LK8-SC-1	17-Aug-18	-	Sediment	X		1
	LK8-SC-2	17-Aug-18	-	Sediment	X		1
	LK8-SC-3	17-Aug-18	-	Sediment	X		1
	LK8-SC-4	17-Aug-18	-	Sediment	X		1

Special Instructions / Regulations with water or land use (CCME-Freshwater Aquatic Life/BC CSR - Commercial/AB Tier 1 - Natural, etc) / Hazardous Details

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Released by:	Date (dd-mmm-yy)	Time (hh-mm)	Received by:	Date:	Time:	Temperature:	Verified by:	Date:	Time:	Observations: Yes / No ? If Yes add SIF
Eric Franz			PAUL	AUG 30	08:50	17.9 °C				

AV. OF 6 COOLERS

ALS Environmental

L2155903-COFC

COC # _____

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Address:			
Phone:	Fax:	Quote #: Q38011	
Lab Work Order # (lab use only)		**ALS Contact:** Brent Mack	**Sampler:** Eric Franz

Sample #	Sample Identification (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Total Metals, pH, Moisture	Methyl mercury											Number of Containers
	LK8-SC-5	17-Aug-18	-	Sediment	X												1
	LK8-SC-6	17-Aug-18	-	Sediment	X												1
	LK8-SC-7	17-Aug-18	-	Sediment	X												1
	LK8-SC-8	17-Aug-18	-	Sediment	X												1
	WTS-SC-1 (0-1)	18-Aug-18	-	Sediment	X	X											1
	WTS-SC-1 (5-6)	18-Aug-18	-	Sediment	X	X											1
	WTS-SC-1 (10-11)	18-Aug-18	-	Sediment	X	X											1
	WTS-SC-2 (0-1)	18-Aug-18	-	Sediment	X	X											1
	WTS-SC-2 (5-6)	18-Aug-18	-	Sediment	X	X											1
	WTS-SC-2 (10-11)	18-Aug-18	-	Sediment	X	X											1
	WTS-SC-3 (0-1)	18-Aug-18	-	Sediment	X	X											1
	WTS-SC-3 (5-6)	18-Aug-18	-	Sediment	X	X											1

Special Instructions / Regulations with water or land use (CCME-Freshwater Aquatic Life/BC CSR - Commercial/AB Tier 1 - Natural, etc) / Hazardous Details

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Released by:	Date (dd-mmm-yy)	Time (hh-mm)	Received by:	Date:	Time:	Temperature:	Verified by:	Date:	Time:	Observations: Yes / No ? If Yes add SIF
Eric Franz			PAUL	AUG 30	08:50	17.9 °C				

AV. OF 6 COOLERS

ALS Environmental

L2155903-COFC

COC # _____

Page 4 of 4

Report To		Report Format / Distribution	Service Requested (Rush for routine analysis subject to availability)
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	Vancouver, BC V6K2G8	Email 2: mfinley@azimuthgroup.ca	○ Same Day or Weekend Emergency - Contact ALS to Confirm TAT
Phone:	604-730-1220 Fax:	Email 3: robin.allard@agnicoeagle.com	
Invoice To	Same as Report ? ☑ Yes ☐ No	**Client / Project Information**	**Analysis Request**
Hardcopy of Invoice with Report?	☐ Yes ☑ No	Job #: WTP Sediment Cores	Please indicate below Filtered, Preserved or both (F, P, F/P)
Company:		PO / AFE:	
Contact:		LSD:	
Address:			
Phone:	Fax:	Quote #: Q38011	
Lab Work Order # (lab use only)		**ALS Contact:** Brent Mack	**Sampler:** Eric Franz

Sample #	Sample Identification (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Total Metals, pH, Moisture	Methyl mercury											Number of Containers
	WTS-SC-3 (0-1)	18-Aug-18	-	Sediment	X	X											1
	WTS-SC-3 (5-6)	18-Aug-18	-	Sediment	X	X											1
	WTS-SC-3 (10-11)	18-Aug-18		Sediment	X	X											1
	WTP-DUP-SC-1	-	-	Sediment	X	X											1
	WTP-DUP-SC-2	-	-	Sediment	X												1
	WTP-DUP-SC-3	-	-	Sediment	X												1
	WTP-DUP-SC-4	-	-	Sediment	X												1
	WTP-SWIPE-SC-1	17-Aug-18	-	Other	X												1
	WTP-SWIPE-SC-2	18-Aug-18	-	Other		X											1

Special Instructions / Regulations with water or land use (CCME-Freshwater Aquatic Life/BC CSR - Commercial/AB Tier 1 - Natural, etc) / Hazardous Details

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Released by:	Date (dd-mmm-yy)	Time (hh-mm)	Received by:	Date:	Time:	Temperature:	Verified by:	Date:	Time:	Observations: Yes / No ? If Yes add SIF
Eric Franz			PAUL	AUG 30	08:50	17.9 °C				

AV. 6 COOLERS

GENF 20.00 Front

AZIMUTH CONSULTING GROUP INC.
ATTN: Eric Franz
218 - 2902 West Broadway
Vancouver BC V6K 2G8

Date Received: 30-AUG-18
Report Date: 11-SEP-18 10:39 (MT)
Version: FINAL

Client Phone: 604-730-1220

Certificate of Analysis

Lab Work Order #: L2155885

Project P.O. #: NOT SUBMITTED
Job Reference: CREMP WTP SEDIMENT
C of C Numbers:
Legal Site Desc:

Brent Mack, B.Sc.
Account Manager

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ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2155885-1	L2155885-2	L2155885-3	L2155885-4	L2155885-5
Description	Sediment	Sediment	Sediment	Sediment	Sediment
Sampled Date	13-AUG-18	13-AUG-18	13-AUG-18	13-AUG-18	13-AUG-18
Sampled Time					
Client ID	WTS-1	WTS-2	WTS-3	WTS-4	WTS-5
Grouping / **Analyte**					
SOIL					
Physical Tests Moisture (%)	82.4	82.8	80.8	88.9	83.5
pH (1:2 soil:water) (pH)	5.93	5.79	5.18	5.67	5.30
Particle Size % Gravel (>2mm) (%)	<1.0	<1.0	<1.0	<1.0	<1.0
% Sand (2.0mm - 0.063mm) (%)	5.0	4.4	2.9	1.9	3.5
% Silt (0.063mm - 4um) (%)	79.8	84.3	91.6	79.7	86.2
% Clay (<4um) (%)	15.2	11.4	5.5	18.4	10.4
Texture	Silt	Silt	Silt	Silt loam	Silt
Organic / Inorganic Carbon Total Organic Carbon (%)	4.03	3.72	4.36	7.53	4.23
Metals Aluminum (Al) (mg/kg)	20000	18500	23400	17500	19500
Antimony (Sb) (mg/kg)	0.21	0.21	0.30	0.17	0.19
Arsenic (As) (mg/kg)	67.3	77.0	28.3	10.7	155
Barium (Ba) (mg/kg)	114	107	165	118	104
Beryllium (Be) (mg/kg)	1.64	1.44	1.96	1.30	1.68
Bismuth (Bi) (mg/kg)	0.56	0.56	0.72	0.48	0.59
Boron (B) (mg/kg)	7.0	6.5	7.2	8.4	6.4
Cadmium (Cd) (mg/kg)	0.305	0.285	0.498	0.332	0.218
Calcium (Ca) (mg/kg)	2040	1890	3000	2940	1940
Chromium (Cr) (mg/kg)	72.9	71.0	88.1	68.6	74.7
Cobalt (Co) (mg/kg)	20.6	30.7	24.5	7.89	13.7
Copper (Cu) (mg/kg)	42.5	40.4	56.4	36.8	44.1
Iron (Fe) (mg/kg)	57300	75600	39600	21700	87700
Lead (Pb) (mg/kg)	13.0	12.5	15.8	12.1	13.1
Lithium (Li) (mg/kg)	15.8	15.0	21.7	15.7	15.2
Magnesium (Mg) (mg/kg)	6990	6620	9530	6770	6640
Manganese (Mn) (mg/kg)	1690	2000	482	282	1010
Mercury (Hg) (mg/kg)	0.0518	0.0560	0.0381	0.0695	0.0568
Molybdenum (Mo) (mg/kg)	4.27	3.80	8.56	1.95	5.15
Nickel (Ni) (mg/kg)	71.1	74.2	115	58.7	55.4
Phosphorus (P) (mg/kg)	1320	971	593	730	2110
Potassium (K) (mg/kg)	2390	2280	3100	2110	2400
Selenium (Se) (mg/kg)	0.55	0.71	0.90	0.51	0.74
Silver (Ag) (mg/kg)	0.23	0.23	0.34	0.34	0.26
Sodium (Na) (mg/kg)	144	138	189	152	140
Strontium (Sr) (mg/kg)	23.4	22.0	29.8	26.5	22.1
Sulfur (S) (mg/kg)	1400	1300	2000	2200	1400
Thallium (Tl) (mg/kg)	0.235	0.243	0.354	0.159	0.177

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2155885-6	L2155885-7	L2155885-8	L2155885-9	L2155885-10
Description	Sediment	Sediment	Sediment	Sediment	Sediment
Sampled Date	13-AUG-18	16-AUG-18	16-AUG-18	16-AUG-18	16-AUG-18
Sampled Time					
Client ID	WTS-COMP	MAM-1	MAM-2	MAM-3	MAM-4
Grouping / **Analyte**					
SOIL					
Physical Tests Moisture (%)	84.2	78.4	89.9	90.2	89.7
pH (1:2 soil:water) (pH)		5.60	5.50	5.55	5.48
Particle Size % Gravel (>2mm) (%)		<1.0	<1.0	<1.0	<1.0
% Sand (2.0mm - 0.063mm) (%)		4.5	<1.0	<1.0	<1.0
% Silt (0.063mm - 4um) (%)		88.8	88.9	83.3	80.7
% Clay (<4um) (%)		6.8	10.3	16.3	18.7
Texture		Silt	Silt	Silt loam	Silt loam
Organic / Inorganic Carbon Total Organic Carbon (%)		3.84	11.1	9.48	10.3
Metals Aluminum (Al) (mg/kg)		20300	20300	23900	22200
Antimony (Sb) (mg/kg)		0.39	0.28	0.38	0.33
Arsenic (As) (mg/kg)		48.1	74.5	63.2	63.3
Barium (Ba) (mg/kg)		131	137	159	142
Beryllium (Be) (mg/kg)		0.96	1.41	1.74	1.54
Bismuth (Bi) (mg/kg)		0.51	0.46	0.55	0.52
Boron (B) (mg/kg)		6.1	20.3	18.8	19.0
Cadmium (Cd) (mg/kg)		0.719	0.316	0.512	0.415
Calcium (Ca) (mg/kg)		3790	3260	3280	3670
Chromium (Cr) (mg/kg)		125	167	193	172
Cobalt (Co) (mg/kg)		15.2	12.1	13.8	13.6
Copper (Cu) (mg/kg)		46.9	61.2	74.5	67.3
Iron (Fe) (mg/kg)		29600	33900	35000	32900
Lead (Pb) (mg/kg)		14.2	17.3	20.5	18.6
Lithium (Li) (mg/kg)		20.3	19.4	23.2	20.5
Magnesium (Mg) (mg/kg)		10600	9830	11200	10100
Manganese (Mn) (mg/kg)		381	353	364	364
Mercury (Hg) (mg/kg)		0.0188	0.103	0.0872	0.103
Molybdenum (Mo) (mg/kg)		3.56	3.23	4.01	3.62
Nickel (Ni) (mg/kg)		117	106	132	117
Phosphorus (P) (mg/kg)		684	826	766	769
Potassium (K) (mg/kg)		2930	3010	3270	3190
Selenium (Se) (mg/kg)		0.63	0.63	0.76	0.66
Silver (Ag) (mg/kg)		0.21	0.42	0.48	0.49
Sodium (Na) (mg/kg)		122	166	174	179
Strontium (Sr) (mg/kg)		35.5	29.6	27.4	28.6
Sulfur (S) (mg/kg)		5100	2700	2600	2600
Thallium (Tl) (mg/kg)		0.338	0.253	0.332	0.306

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2155885-11	L2155885-12	L2155885-13	L2155885-14	L2155885-15
Description	Sediment	Sediment	Sediment	Sediment	Sediment
Sampled Date	16-AUG-18	16-AUG-18	18-AUG-18	18-AUG-18	18-AUG-18
Sampled Time					
Client ID	MAM-5	MAM-COMP	A20-1	A20-2	A20-3
Grouping / **Analyte**					
SOIL					
Physical Tests Moisture (%)	90.4	87.1	87.0	86.7	85.4
pH (1:2 soil:water) (pH)	5.62		5.84	5.78	6.12
Particle Size % Gravel (>2mm) (%)	<1.0		<1.0	<1.0	<1.0
% Sand (2.0mm - 0.063mm) (%)	1.1		<1.0	<1.0	1.8
% Silt (0.063mm - 4um) (%)	84.5		77.1	76.9	62.7
% Clay (<4um) (%)	14.4		22.2	22.2	35.5
Texture	Silt		Silt loam	Silt loam	Silt loam / Silty clay loam
Organic / Inorganic Carbon Total Organic Carbon (%)	9.60		4.67	4.54	4.06
Metals Aluminum (Al) (mg/kg)	23300		25200	24300	27900
Antimony (Sb) (mg/kg)	0.37		0.19	0.20	0.23
Arsenic (As) (mg/kg)	66.3		37.4	51.6	35.8
Barium (Ba) (mg/kg)	159		153	154	171
Beryllium (Be) (mg/kg)	1.68		2.24	2.20	2.66
Bismuth (Bi) (mg/kg)	0.53		1.08	1.14	1.32
Boron (B) (mg/kg)	19.6		8.0	8.4	8.6
Cadmium (Cd) (mg/kg)	0.412		0.192	0.144	0.140
Calcium (Ca) (mg/kg)	3360		2020	1830	2060
Chromium (Cr) (mg/kg)	189		61.0	57.3	68.1
Cobalt (Co) (mg/kg)	12.8		19.8	20.2	21.4
Copper (Cu) (mg/kg)	74.8		44.9	44.9	60.8
Iron (Fe) (mg/kg)	35000		83200	90600	73000
Lead (Pb) (mg/kg)	18.6		18.8	19.8	23.7
Lithium (Li) (mg/kg)	21.8		22.3	21.5	26.6
Magnesium (Mg) (mg/kg)	10700		8230	7380	8610
Manganese (Mn) (mg/kg)	339		1740	1970	2490
Mercury (Hg) (mg/kg)	0.0857		0.0457	0.0427	0.0414
Molybdenum (Mo) (mg/kg)	4.13		5.27	6.79	6.00
Nickel (Ni) (mg/kg)	122		40.0	37.1	43.2
Phosphorus (P) (mg/kg)	732		941	1080	912
Potassium (K) (mg/kg)	3250		3810	3890	4250
Selenium (Se) (mg/kg)	0.74		0.78	0.63	0.46
Silver (Ag) (mg/kg)	0.50		0.20	0.14	<0.10
Sodium (Na) (mg/kg)	183		232	224	185
Strontium (Sr) (mg/kg)	27.8		21.9	20.8	23.4
Sulfur (S) (mg/kg)	2600		1700	1700	1900
Thallium (Tl) (mg/kg)	0.299		0.322	0.335	0.388

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2155885-16	L2155885-17	L2155885-18	L2155885-19	L2155885-20
Description	Sediment	Sediment	Sediment	Sediment	Sediment
Sampled Date	18-AUG-18	18-AUG-18	18-AUG-18	18-AUG-18	18-AUG-18
Sampled Time					
Client ID	A20-4	A20-5	A20-COMP	A76-1	A76-2
Grouping / **Analyte**					
SOIL					
Physical Tests Moisture (%)	90.1	86.5	87.4	89.8	89.3
pH (1:2 soil:water) (pH)	5.51	5.04		5.81	5.63
Particle Size % Gravel (>2mm) (%)	<1.0	<1.0		<1.0	<1.0
% Sand (2.0mm - 0.063mm) (%)	<1.0	1.3		<1.0	<1.0
% Silt (0.063mm - 4um) (%)	71.0	77.9		80.5	77.1
% Clay (<4um) (%)	28.2	20.9		19.1	22.3
Texture	Silt loam	Silt loam		Silt loam	Silt loam
Organic / Inorganic Carbon Total Organic Carbon (%)	7.17	4.22		6.36	6.47
Metals Aluminum (Al) (mg/kg)	18900	19700		24800	24700
Antimony (Sb) (mg/kg)	0.14	0.17		0.41	0.38
Arsenic (As) (mg/kg)	7.90	158		59.9	125
Barium (Ba) (mg/kg)	151	190		215	217
Beryllium (Be) (mg/kg)	1.68	1.99		1.72	1.75
Bismuth (Bi) (mg/kg)	0.70	0.91		0.81	0.84
Boron (B) (mg/kg)	8.3	7.4		8.7	9.1
Cadmium (Cd) (mg/kg)	0.229	0.271		0.320	0.300
Calcium (Ca) (mg/kg)	2700	1730		2840	2820
Chromium (Cr) (mg/kg)	46.7	49.1		133	134
Cobalt (Co) (mg/kg)	7.22	20.4		11.7	15.1
Copper (Cu) (mg/kg)	32.6	40.5		93.7	96.8
Iron (Fe) (mg/kg)	23500	150000		45500	64300
Lead (Pb) (mg/kg)	14.6	17.6		23.7	23.9
Lithium (Li) (mg/kg)	18.4	16.5		22.4	23.2
Magnesium (Mg) (mg/kg)	6320	5850		8990	9010
Manganese (Mn) (mg/kg)	267	1980		361	968
Mercury (Hg) (mg/kg)	0.0507	0.0424		0.0470	0.0512
Molybdenum (Mo) (mg/kg)	2.28	7.19		5.19	5.16
Nickel (Ni) (mg/kg)	31.3	40.6		114	117
Phosphorus (P) (mg/kg)	490	2850		813	950
Potassium (K) (mg/kg)	2980	3020		3790	3820
Selenium (Se) (mg/kg)	0.49	0.75		0.89	1.04
Silver (Ag) (mg/kg)	0.30	0.21		0.53	0.56
Sodium (Na) (mg/kg)	228	194		204	196
Strontium (Sr) (mg/kg)	22.8	18.9		23.2	23.3
Sulfur (S) (mg/kg)	2200	1600		2300	2200
Thallium (Tl) (mg/kg)	0.233	0.319		0.360	0.367

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2155885-21	L2155885-22	L2155885-23	L2155885-24	L2155885-25
Description	Sediment	Sediment	Sediment	Sediment	Sediment
Sampled Date	18-AUG-18	18-AUG-18	18-AUG-18	18-AUG-18	19-AUG-18
Sampled Time					
Client ID	A76-3	A76-4	A76-5	A76-COMP	DS1-1
Grouping / **Analyte**					
SOIL					
Physical Tests Moisture (%)	90.2	86.7	89.5	89.1	71.5
pH (1:2 soil:water) (pH)	5.93	5.31	5.57		6.92
Particle Size % Gravel (>2mm) (%)	<1.0	<1.0	<1.0		<1.0
% Sand (2.0mm - 0.063mm) (%)	<1.0	<1.0	<1.0		<1.0
% Silt (0.063mm - 4um) (%)	79.4	78.3	80.1		81.1
% Clay (<4um) (%)	19.9	21.1	19.4		18.5
Texture	Silt loam	Silt loam	Silt loam		Silt
Organic / Inorganic Carbon Total Organic Carbon (%)	7.28	5.25	6.34		1.56
Metals Aluminum (Al) (mg/kg)	24900	22500	26200		16800
Antimony (Sb) (mg/kg)	0.41	0.38	0.45		0.29
Arsenic (As) (mg/kg)	40.2	370	159		20.4
Barium (Ba) (mg/kg)	220	158	214		122
Beryllium (Be) (mg/kg)	1.60	1.65	1.93		1.05
Bismuth (Bi) (mg/kg)	0.76	0.76	0.89		0.69
Boron (B) (mg/kg)	11.6	7.6	8.7		19.4
Cadmium (Cd) (mg/kg)	0.408	0.148	0.238		0.222
Calcium (Ca) (mg/kg)	3190	2110	2580		2310
Chromium (Cr) (mg/kg)	135	121	142		75.0
Cobalt (Co) (mg/kg)	10.9	18.7	16.1		15.8
Copper (Cu) (mg/kg)	97.4	85.2	109		15.6
Iron (Fe) (mg/kg)	38100	115000	76500		41600
Lead (Pb) (mg/kg)	22.1	21.6	25.2		16.7
Lithium (Li) (mg/kg)	24.1	19.1	23.1		23.8
Magnesium (Mg) (mg/kg)	9270	8150	9180		10200
Manganese (Mn) (mg/kg)	306	1040	824		10900
Mercury (Hg) (mg/kg)	0.0470	0.0387	0.0513		0.0561
Molybdenum (Mo) (mg/kg)	4.52	6.13	6.36		3.22
Nickel (Ni) (mg/kg)	120	95.8	118		49.2
Phosphorus (P) (mg/kg)	670	1630	1150		861
Potassium (K) (mg/kg)	3840	3530	3980		2530
Selenium (Se) (mg/kg)	0.98	0.97	1.23		0.29
Silver (Ag) (mg/kg)	0.65	0.27	0.48		0.13
Sodium (Na) (mg/kg)	195	161	192		142
Strontium (Sr) (mg/kg)	24.5	19.4	22.5		29.4
Sulfur (S) (mg/kg)	2200	1800	2300		<1000
Thallium (Tl) (mg/kg)	0.327	0.325	0.378		0.203

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2155885-26	L2155885-27	L2155885-28	L2155885-29	L2155885-30
Description	Sediment	Sediment	Sediment	Sediment	Sediment
Sampled Date	19-AUG-18	19-AUG-18	19-AUG-18	19-AUG-18	19-AUG-18
Sampled Time					
Client ID	DS1-2	DS1-3	DS1-4	DS1-5	DS1-COMP
Grouping / **Analyte**					
SOIL					
Physical Tests Moisture (%)	66.8	70.8	66.4	68.6	69.4
pH (1:2 soil:water) (pH)	6.46	6.83	6.68	6.64	
Particle Size % Gravel (>2mm) (%)	<1.0	<1.0	<1.0	<1.0	
% Sand (2.0mm - 0.063mm) (%)	<1.0	<1.0	<1.0	1.0	
% Silt (0.063mm - 4um) (%)	80.8	82.9	81.3	82.4	
% Clay (<4um) (%)	18.9	16.4	18.2	16.6	
Texture	Silt	Silt	Silt	Silt	
Organic / Inorganic Carbon Total Organic Carbon (%)	1.45	1.70	1.36	1.37	
Metals Aluminum (Al) (mg/kg)	15900	16200	17800	16800	
Antimony (Sb) (mg/kg)	0.27	0.27	0.27	0.27	
Arsenic (As) (mg/kg)	13.0	43.7	16.7	22.4	
Barium (Ba) (mg/kg)	87.2	118	104	107	
Beryllium (Be) (mg/kg)	0.99	1.02	1.03	0.98	
Bismuth (Bi) (mg/kg)	0.68	0.68	0.71	0.67	
Boron (B) (mg/kg)	13.9	14.5	14.8	15.1	
Cadmium (Cd) (mg/kg)	0.176	0.179	0.185	0.155	
Calcium (Ca) (mg/kg)	2290	2170	2430	2440	
Chromium (Cr) (mg/kg)	76.5	75.7	84.7	79.2	
Cobalt (Co) (mg/kg)	15.1	16.0	16.0	15.2	
Copper (Cu) (mg/kg)	14.6	14.9	15.7	14.9	
Iron (Fe) (mg/kg)	37800	46700	41800	39000	
Lead (Pb) (mg/kg)	16.6	16.6	17.0	16.1	
Lithium (Li) (mg/kg)	23.0	22.7	24.3	23.2	
Magnesium (Mg) (mg/kg)	9940	10100	11100	10400	
Manganese (Mn) (mg/kg)	1880	9800	2960	10700	
Mercury (Hg) (mg/kg)	0.0500	0.0569	0.0507	0.0500	
Molybdenum (Mo) (mg/kg)	1.85	3.99	1.96	2.49	
Nickel (Ni) (mg/kg)	47.1	46.8	50.5	48.4	
Phosphorus (P) (mg/kg)	727	920	808	818	
Potassium (K) (mg/kg)	2260	2320	2590	2450	
Selenium (Se) (mg/kg)	0.25	0.31	0.20	0.26	
Silver (Ag) (mg/kg)	0.14	0.13	0.14	0.13	
Sodium (Na) (mg/kg)	126	117	138	123	
Strontium (Sr) (mg/kg)	26.7	27.3	29.4	29.1	
Sulfur (S) (mg/kg)	<1000	<1000	<1000	<1000	
Thallium (Tl) (mg/kg)	0.189	0.185	0.193	0.177	

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2155885-31	L2155885-32	L2155885-33	L2155885-34	L2155885-35
Description	Sediment	Sediment	Sediment	Sediment	Sediment
Sampled Date	17-AUG-18	17-AUG-18	17-AUG-18	17-AUG-18	17-AUG-18
Sampled Time					
Client ID	NEM-1	NEM-2	NEM-3	NEM-4	NEM-5
Grouping / **Analyte**					
SOIL					
Physical Tests Moisture (%)	89.2	83.3	83.1	88.9	90.9
pH (1:2 soil:water) (pH)	6.30	6.27	6.37	6.35	6.08
Particle Size % Gravel (>2mm) (%)	<1.0	<1.0	2.1	<1.0	<1.0
% Sand (2.0mm - 0.063mm) (%)	20.9	49.1	48.4	21.2	16.4
% Silt (0.063mm - 4um) (%)	72.7	46.8	46.0	71.2	75.9
% Clay (<4um) (%)	6.5	3.4	3.5	7.5	7.8
Texture	Silt loam	Sandy loam	Sandy loam	Silt loam	Silt loam
Organic / Inorganic Carbon Total Organic Carbon (%)	6.74	4.17	3.24	6.93	8.58
Metals Aluminum (Al) (mg/kg)	11000	9720	9080	11400	10500
Antimony (Sb) (mg/kg)	0.42	0.32	0.28	0.46	0.44
Arsenic (As) (mg/kg)	22.7	26.7	13.4	25.7	30.9
Barium (Ba) (mg/kg)	84.5	85.8	56.4	86.0	74.5
Beryllium (Be) (mg/kg)	0.72	0.57	0.50	0.77	0.68
Bismuth (Bi) (mg/kg)	0.25	0.20	<0.20	0.25	0.24
Boron (B) (mg/kg)	8.3	7.0	6.0	9.7	10.3
Cadmium (Cd) (mg/kg)	0.276	0.210	0.184	0.316	0.282
Calcium (Ca) (mg/kg)	2630	1940	1880	2640	2690
Chromium (Cr) (mg/kg)	113	104	84.2	113	110
Cobalt (Co) (mg/kg)	7.15	6.95	5.81	7.74	7.23
Copper (Cu) (mg/kg)	45.3	33.6	28.5	46.7	44.2
Iron (Fe) (mg/kg)	19300	18200	15400	19700	19500
Lead (Pb) (mg/kg)	8.16	5.96	6.03	8.41	8.53
Lithium (Li) (mg/kg)	12.7	11.5	11.0	12.9	11.6
Magnesium (Mg) (mg/kg)	6560	6380	5550	6700	6340
Manganese (Mn) (mg/kg)	207	253	172	243	197
Mercury (Hg) (mg/kg)	0.0192	0.0121	0.0119	0.0179	0.0245
Molybdenum (Mo) (mg/kg)	2.70	4.68	1.47	2.87	2.90
Nickel (Ni) (mg/kg)	83.5	76.1	63.6	89.4	79.4
Phosphorus (P) (mg/kg)	478	418	311	512	558
Potassium (K) (mg/kg)	1280	1070	980	1280	1230
Selenium (Se) (mg/kg)	0.56	0.42	0.30	0.64	0.56
Silver (Ag) (mg/kg)	0.17	0.15	0.11	0.18	0.18
Sodium (Na) (mg/kg)	79	63	66	86	82
Strontium (Sr) (mg/kg)	20.9	17.8	19.3	21.8	20.8
Sulfur (S) (mg/kg)	1900	1200	1100	1900	2500
Thallium (Tl) (mg/kg)	0.096	0.087	0.068	0.111	0.095

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2155885-36	L2155885-37	L2155885-38	L2155885-39	L2155885-40
Description	Sediment	Sediment	Sediment	Sediment	Sediment
Sampled Date	17-AUG-18	15-AUG-18	15-AUG-18	15-AUG-18	15-AUG-18
Sampled Time					
Client ID	NEM-COMP	LK1-1	LK1-2	LK1-3	LK1-4
Grouping / **Analyte**					
SOIL					
Physical Tests Moisture (%)	87.1	80.6	79.7	79.9	79.7
pH (1:2 soil:water) (pH)		5.89	5.39	5.83	5.79
Particle Size % Gravel (>2mm) (%)		<1.0	<1.0	<1.0	<1.0
% Sand (2.0mm - 0.063mm) (%)		5.8	16.2	7.0	5.9
% Silt (0.063mm - 4um) (%)		86.1	77.6	75.6	76.8
% Clay (<4um) (%)		8.0	6.3	17.4	17.3
Texture		Silt	Silt loam	Silt	Silt
Organic / Inorganic Carbon Total Organic Carbon (%)		4.46	2.79	3.81	3.84
Metals Aluminum (Al) (mg/kg)		20800	11600	26400	24600
Antimony (Sb) (mg/kg)		0.22	0.14	0.18	0.19
Arsenic (As) (mg/kg)		9.17	7.79	27.8	49.7
Barium (Ba) (mg/kg)		119	46.1	120	124
Beryllium (Be) (mg/kg)		1.27	0.83	2.43	2.70
Bismuth (Bi) (mg/kg)		0.58	0.33	0.80	0.79
Boron (B) (mg/kg)		7.0	5.6	7.7	6.0
Cadmium (Cd) (mg/kg)		0.767	0.095	0.067	0.068
Calcium (Ca) (mg/kg)		3500	1740	2230	1810
Chromium (Cr) (mg/kg)		117	92.2	110	108
Cobalt (Co) (mg/kg)		12.2	9.04	16.0	16.7
Copper (Cu) (mg/kg)		38.2	13.5	47.6	50.5
Iron (Fe) (mg/kg)		24700	31500	61400	80700
Lead (Pb) (mg/kg)		13.1	7.81	16.8	17.1
Lithium (Li) (mg/kg)		21.0	11.6	24.3	21.6
Magnesium (Mg) (mg/kg)		10200	6400	9160	8360
Manganese (Mn) (mg/kg)		362	417	1160	1100
Mercury (Hg) (mg/kg)		0.0170	0.0225	0.0297	0.0311
Molybdenum (Mo) (mg/kg)		3.30	1.16	4.73	6.20
Nickel (Ni) (mg/kg)		87.1	43.0	98.8	76.2
Phosphorus (P) (mg/kg)		658	617	856	946
Potassium (K) (mg/kg)		2620	1040	3080	2580
Selenium (Se) (mg/kg)		0.51	<0.20	0.49	0.58
Silver (Ag) (mg/kg)		0.18	<0.10	0.14	0.15
Sodium (Na) (mg/kg)		134	85	118	97
Strontium (Sr) (mg/kg)		33.1	19.1	24.9	20.7
Sulfur (S) (mg/kg)		<1000	<1000	<1000	<1000
Thallium (Tl) (mg/kg)		0.179	0.074	0.194	0.175

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2155885-41	L2155885-42	L2155885-43	L2155885-44	L2155885-45
Description	Sediment	Sediment	Sediment	Sediment	Sediment
Sampled Date	15-AUG-18	15-AUG-18	16-AUG-18	16-AUG-18	16-AUG-18
Sampled Time					
Client ID	LK1-5	LK1-COMP	LK5-1	LK5-2	LK5-3
Grouping / **Analyte**					
SOIL					
Physical Tests Moisture (%)	81.5	79.9	90.6	89.6	90.3
pH (1:2 soil:water) (pH)	5.51		4.99	4.82	5.39
Particle Size % Gravel (>2mm) (%)	<1.0		<1.0	<1.0	<1.0
% Sand (2.0mm - 0.063mm) (%)	8.6		10.8	2.5	9.6
% Silt (0.063mm - 4um) (%)	78.1		83.2	91.3	82.1
% Clay (<4um) (%)	13.4		6.1	6.2	8.3
Texture	Silt		Silt	Silt	Silt
Organic / Inorganic Carbon Total Organic Carbon (%)	3.95		9.48	10.0	8.85
Metals Aluminum (Al) (mg/kg)	19500		17600	13900	18100
Antimony (Sb) (mg/kg)	0.18		0.39	0.42	0.41
Arsenic (As) (mg/kg)	8.10		44.7	94.1	34.9
Barium (Ba) (mg/kg)	120		67.8	52.3	107
Beryllium (Be) (mg/kg)	1.46		1.23	1.15	1.39
Bismuth (Bi) (mg/kg)	0.61		0.46	0.49	0.50
Boron (B) (mg/kg)	8.0		13.7	11.3	14.0
Cadmium (Cd) (mg/kg)	0.444		0.251	0.285	0.307
Calcium (Ca) (mg/kg)	3080		2450	1930	2800
Chromium (Cr) (mg/kg)	97.0		127	97.6	127
Cobalt (Co) (mg/kg)	11.3		17.9	30.8	17.8
Copper (Cu) (mg/kg)	34.3		46.8	54.4	52.3
Iron (Fe) (mg/kg)	24500		86900	257000	69100
Lead (Pb) (mg/kg)	13.9		12.8	11.2	12.6
Lithium (Li) (mg/kg)	19.5		15.1	10.5	14.7
Magnesium (Mg) (mg/kg)	8830		8370	5780	8030
Manganese (Mn) (mg/kg)	360		365	624	422
Mercury (Hg) (mg/kg)	0.0297		0.0614	0.0665	0.0669
Molybdenum (Mo) (mg/kg)	2.83		6.10	9.96	7.58
Nickel (Ni) (mg/kg)	75.9		78.5	76.1	81.5
Phosphorus (P) (mg/kg)	618		860	1060	686
Potassium (K) (mg/kg)	2480		1940	1340	2070
Selenium (Se) (mg/kg)	0.44		1.06	1.70	1.07
Silver (Ag) (mg/kg)	0.19		0.32	0.37	0.33
Sodium (Na) (mg/kg)	131		150	104	162
Strontium (Sr) (mg/kg)	28.0		19.7	13.3	21.5
Sulfur (S) (mg/kg)	<1000		3100	3600	2900
Thallium (Tl) (mg/kg)	0.183		0.153	0.136	0.173

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2155885-46	L2155885-47	L2155885-48	L2155885-49	L2155885-50
Description	Sediment	Sediment	Sediment	Sediment	Sediment
Sampled Date	16-AUG-18	16-AUG-18	16-AUG-18	17-AUG-18	17-AUG-18
Sampled Time					
Client ID	LK5-4	LK5-5	LK5-COMP	LK8-1	LK8-2
Grouping / **Analyte**					
SOIL					
Physical Tests Moisture (%)	91.1	90.0	90.6	77.2	69.6
pH (1:2 soil:water) (pH)	5.16	4.89		5.43	5.79
Particle Size % Gravel (>2mm) (%)	<1.0	41.9		<1.0	<1.0
% Sand (2.0mm - 0.063mm) (%)	12.5	2.5		13.1	21.9
% Silt (0.063mm - 4um) (%)	78.1	51.8		72.1	68.1
% Clay (<4um) (%)	9.4	3.8		14.9	10.0
Texture	Silt	Silt		Silt loam	Silt loam
Organic / Inorganic Carbon Total Organic Carbon (%)	9.93	9.33		2.20	1.57
Metals Aluminum (Al) (mg/kg)	16100	15000		15400	14100
Antimony (Sb) (mg/kg)	0.42	0.39		0.17	0.12
Arsenic (As) (mg/kg)	57.4	53.0		128	15.2
Barium (Ba) (mg/kg)	71.2	62.5		39.6	37.3
Beryllium (Be) (mg/kg)	1.25	1.16		0.79	0.64
Bismuth (Bi) (mg/kg)	0.49	0.45		0.28	0.24
Boron (B) (mg/kg)	11.7	10.8		<5.0	<5.0
Cadmium (Cd) (mg/kg)	0.275	0.260		0.088	0.065
Calcium (Ca) (mg/kg)	2160	2030		1250	1530
Chromium (Cr) (mg/kg)	115	107		138	144
Cobalt (Co) (mg/kg)	24.1	22.1		20.9	11.6
Copper (Cu) (mg/kg)	52.3	48.5		39.2	28.3
Iron (Fe) (mg/kg)	157000	147000		64400	25200
Lead (Pb) (mg/kg)	12.3	11.4		7.81	6.76
Lithium (Li) (mg/kg)	13.2	12.2		15.0	16.5
Magnesium (Mg) (mg/kg)	7370	6640		9290	9940
Manganese (Mn) (mg/kg)	472	437		1390	343
Mercury (Hg) (mg/kg)	0.0680	0.0634		0.0145	0.0093
Molybdenum (Mo) (mg/kg)	9.36	8.75		3.53	1.80
Nickel (Ni) (mg/kg)	81.5	73.9		65.1	70.8
Phosphorus (P) (mg/kg)	787	722		983	503
Potassium (K) (mg/kg)	1790	1520		1080	1000
Selenium (Se) (mg/kg)	1.35	1.30		0.29	<0.20
Silver (Ag) (mg/kg)	0.35	0.32		<0.10	<0.10
Sodium (Na) (mg/kg)	123	114		68	51
Strontium (Sr) (mg/kg)	17.3	16.2		16.8	17.5
Sulfur (S) (mg/kg)	3100	3000		<1000	<1000
Thallium (Tl) (mg/kg)	0.153	0.140		0.105	0.078

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2155885-51	L2155885-52	L2155885-53	L2155885-54	L2155885-55
Description	Sediment	Sediment	Sediment	Sediment	Sediment
Sampled Date	17-AUG-18	17-AUG-18	17-AUG-18	17-AUG-18	
Sampled Time					
Client ID	LK8-3	LK8-4	LK8-5	LK8-COMP	WTP DUP-1
Grouping / **Analyte**					
SOIL					
Physical Tests Moisture (%)	49.9	73.4	59.8	63.9	79.5
pH (1:2 soil:water) (pH)	6.12	5.51	6.04		5.21
Particle Size % Gravel (>2mm) (%)	<1.0	<1.0	<1.0		<1.0
% Sand (2.0mm - 0.063mm) (%)	14.6	17.3	53.1		3.4
% Silt (0.063mm - 4um) (%)	76.5	73.6	41.8		84.0
% Clay (<4um) (%)	8.9	9.2	5.2		12.6
Texture	Silt loam / Silt	Silt loam	Sandy loam		Silt
Organic / Inorganic Carbon Total Organic Carbon (%)	0.582	1.61	0.939		4.26
Metals Aluminum (Al) (mg/kg)	15700	14800	12100		22300
Antimony (Sb) (mg/kg)	0.14	0.15	0.11		0.27
Arsenic (As) (mg/kg)	31.0	55.0	8.49		26.6
Barium (Ba) (mg/kg)	38.4	38.8	28.1		152
Beryllium (Be) (mg/kg)	0.69	0.62	0.44		1.80
Bismuth (Bi) (mg/kg)	0.31	0.26	<0.20		0.66
Boron (B) (mg/kg)	<5.0	<5.0	<5.0		6.4
Cadmium (Cd) (mg/kg)	0.079	0.056	0.061		0.493
Calcium (Ca) (mg/kg)	1880	1470	1300		2710
Chromium (Cr) (mg/kg)	153	153	121		82.3
Cobalt (Co) (mg/kg)	12.9	14.3	10.4		22.0
Copper (Cu) (mg/kg)	35.0	28.2	17.8		53.8
Iron (Fe) (mg/kg)	30500	48100	21200		35500
Lead (Pb) (mg/kg)	8.21	7.09	5.04		14.5
Lithium (Li) (mg/kg)	19.1	17.2	13.6		20.4
Magnesium (Mg) (mg/kg)	10800	10500	8330		8640
Manganese (Mn) (mg/kg)	569	502	350		460
Mercury (Hg) (mg/kg)	0.0070	0.0097	0.0067		0.0340
Molybdenum (Mo) (mg/kg)	2.77	1.63	0.80		7.75
Nickel (Ni) (mg/kg)	79.2	72.0	57.1		106
Phosphorus (P) (mg/kg)	675	1090	326		539
Potassium (K) (mg/kg)	1200	1140	890		2930
Selenium (Se) (mg/kg)	<0.20	0.27	<0.20		0.77
Silver (Ag) (mg/kg)	<0.10	<0.10	<0.10		0.33
Sodium (Na) (mg/kg)	69	65	<50		170
Strontium (Sr) (mg/kg)	22.9	20.0	17.7		25.8
Sulfur (S) (mg/kg)	<1000	<1000	<1000		1700
Thallium (Tl) (mg/kg)	0.087	0.083	0.072		0.334

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2155885-56	L2155885-57	L2155885-58	L2155885-59	L2155885-60
Description	Sediment	Sediment	Sediment	Sediment	Sediment
Sampled Date					18-AUG-18
Sampled Time					
Client ID	WTP DUP-2	WTP DUP-3	WTP COMP DUP-1	WTP COMP DUP-2	WTN-1
Grouping / **Analyte**					
SOIL					
Physical Tests Moisture (%)	90.9	87.0	84.4	68.8	86.1
pH (1:2 soil:water) (pH)	5.48	5.04			4.96
Particle Size % Gravel (>2mm) (%)	<1.0				
% Sand (2.0mm - 0.063mm) (%)	6.0				
% Silt (0.063mm - 4um) (%)	88.7				
% Clay (<4um) (%)	5.4				
Texture	Silt				
Organic / Inorganic Carbon Total Organic Carbon (%)	10.0				
Metals Aluminum (Al) (mg/kg)	17200	17500			19100
Antimony (Sb) (mg/kg)	0.39	0.24			0.25
Arsenic (As) (mg/kg)	32.9	599			668
Barium (Ba) (mg/kg)	95.7	141			137
Beryllium (Be) (mg/kg)	1.31	1.39			1.53
Bismuth (Bi) (mg/kg)	0.48	0.47			0.51
Boron (B) (mg/kg)	11.3	5.9			7.2
Cadmium (Cd) (mg/kg)	0.312	0.329			0.314
Calcium (Ca) (mg/kg)	2450	1630			1770
Chromium (Cr) (mg/kg)	119	109			112
Cobalt (Co) (mg/kg)	17.0	17.2			14.3
Copper (Cu) (mg/kg)	50.9	42.6			45.8
Iron (Fe) (mg/kg)	65300	111000			137000
Lead (Pb) (mg/kg)	11.8	11.4			11.7
Lithium (Li) (mg/kg)	13.6	14.5			15.3
Magnesium (Mg) (mg/kg)	7470	7170			7310
Manganese (Mn) (mg/kg)	401	1990			1250
Mercury (Hg) (mg/kg)	0.0637	0.0574			0.0532
Molybdenum (Mo) (mg/kg)	7.20	5.46			5.56
Nickel (Ni) (mg/kg)	77.7	92.0			85.0
Phosphorus (P) (mg/kg)	669	2440			3310
Potassium (K) (mg/kg)	1790	1980			2160
Selenium (Se) (mg/kg)	0.98	0.71			0.83
Silver (Ag) (mg/kg)	0.33	0.30			0.30
Sodium (Na) (mg/kg)	136	144			150
Strontium (Sr) (mg/kg)	18.4	19.1			21.1
Sulfur (S) (mg/kg)	2700	1200			1200
Thallium (Tl) (mg/kg)	0.163	0.209			0.212

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2155885-61	L2155885-62	L2155885-63	L2155885-64	
Description	Sediment	Sediment	Sediment	Sediment	
Sampled Date	18-AUG-18	18-AUG-18	18-AUG-18	18-AUG-18	
Sampled Time					
Client ID	WTN-2	WTN-3	WTN-4	WTN-5	
Grouping	**Analyte**				
SOIL					
Physical Tests	Moisture (%)	87.1	85.1	87.8	87.5
	pH (1:2 soil:water) (pH)	5.07	5.36	5.05	5.13
Particle Size	% Gravel (>2mm) (%)				
	% Sand (2.0mm - 0.063mm) (%)				
	% Silt (0.063mm - 4um) (%)				
	% Clay (<4um) (%)				
	Texture				
Organic / Inorganic Carbon	Total Organic Carbon (%)				
Metals	Aluminum (Al) (mg/kg)	19100	20900	19600	19600
	Antimony (Sb) (mg/kg)	0.27	0.22	0.27	0.28
	Arsenic (As) (mg/kg)	620	76.1	705	366
	Barium (Ba) (mg/kg)	156	99.7	151	146
	Beryllium (Be) (mg/kg)	1.49	1.55	1.49	1.62
	Bismuth (Bi) (mg/kg)	0.52	0.57	0.53	0.52
	Boron (B) (mg/kg)	7.6	6.4	8.0	7.3
	Cadmium (Cd) (mg/kg)	0.371	0.196	0.417	0.393
	Calcium (Ca) (mg/kg)	1910	2000	1980	1930
	Chromium (Cr) (mg/kg)	116	132	119	123
	Cobalt (Co) (mg/kg)	17.9	11.1	19.3	20.7
	Copper (Cu) (mg/kg)	45.4	46.0	46.5	49.7
	Iron (Fe) (mg/kg)	115000	42000	111000	106000
	Lead (Pb) (mg/kg)	12.4	13.3	12.4	12.4
	Lithium (Li) (mg/kg)	15.6	18.1	16.2	15.6
	Magnesium (Mg) (mg/kg)	7770	8450	7790	7820
	Manganese (Mn) (mg/kg)	2200	446	1490	1250
	Mercury (Hg) (mg/kg)	0.0634	0.0431	0.0610	0.0522
	Molybdenum (Mo) (mg/kg)	5.65	2.78	6.37	4.64
	Nickel (Ni) (mg/kg)	96.3	66.8	98.2	112
	Phosphorus (P) (mg/kg)	2640	1400	2500	2140
	Potassium (K) (mg/kg)	2410	2350	2410	2260
	Selenium (Se) (mg/kg)	0.81	0.66	0.83	0.85
	Silver (Ag) (mg/kg)	0.33	0.27	0.34	0.30
	Sodium (Na) (mg/kg)	170	151	181	153
	Strontium (Sr) (mg/kg)	23.2	22.8	23.8	22.2
	Sulfur (S) (mg/kg)	1300	<1000	1300	1300
	Thallium (Tl) (mg/kg)	0.237	0.185	0.254	0.249

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2155885-1	L2155885-2	L2155885-3	L2155885-4	L2155885-5
Description	Sediment	Sediment	Sediment	Sediment	Sediment
Sampled Date	13-AUG-18	13-AUG-18	13-AUG-18	13-AUG-18	13-AUG-18
Sampled Time					
Client ID	WTS-1	WTS-2	WTS-3	WTS-4	WTS-5
Grouping / **Analyte**					
SOIL					
Metals / Tin (Sn) (mg/kg)	<2.0	<2.0	<2.0	<2.0	<2.0
Titanium (Ti) (mg/kg)	514	469	734	338	437
Tungsten (W) (mg/kg)	<0.50	<0.50	0.52	<0.50	<0.50
Uranium (U) (mg/kg)	11.5	10.9	21.6	9.81	11.9
Vanadium (V) (mg/kg)	27.2	26.2	33.8	22.7	26.8
Zinc (Zn) (mg/kg)	97.3	88.3	155	92.8	94.2
Zirconium (Zr) (mg/kg)	1.2	1.0	7.1	2.3	1.7
Aggregate Organics / Mineral Oil and Grease (mg/kg)					
Hydrocarbons / EPH10-19 (mg/kg)					
EPH19-32 (mg/kg)					
LEPH (mg/kg)					
HEPH (mg/kg)					
Surrogate: 2-Bromobenzotrifluoride (%)					
Polycyclic Aromatic Hydrocarbons / Acenaphthene (mg/kg)					
Acenaphthylene (mg/kg)					
Anthracene (mg/kg)					
Benz(a)anthracene (mg/kg)					
Benzo(a)pyrene (mg/kg)					
Benzo(b&j)fluoranthene (mg/kg)					
Benzo(b+j+k)fluoranthene (mg/kg)					
Benzo(g,h,i)perylene (mg/kg)					
Benzo(k)fluoranthene (mg/kg)					
Chrysene (mg/kg)					
Dibenz(a,h)anthracene (mg/kg)					
Fluoranthene (mg/kg)					
Fluorene (mg/kg)					
Indeno(1,2,3-c,d)pyrene (mg/kg)					
1-Methylnaphthalene (mg/kg)					
2-Methylnaphthalene (mg/kg)					
Naphthalene (mg/kg)					
Phenanthrene (mg/kg)					
Pyrene (mg/kg)					
Quinoline (mg/kg)					
Surrogate: Acenaphthene d10 (%)					
Surrogate: Chrysene d12 (%)					
Surrogate: Naphthalene d8 (%)					

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	L2155885-6 Sediment 13-AUG-18 WTS-COMP	L2155885-7 Sediment 16-AUG-18 MAM-1	L2155885-8 Sediment 16-AUG-18 MAM-2	L2155885-9 Sediment 16-AUG-18 MAM-3	L2155885-10 Sediment 16-AUG-18 MAM-4
SOIL						
Metals	Tin (Sn) (mg/kg)		<2.0	<2.0	<2.0	<2.0
	Titanium (Ti) (mg/kg)		845	544	641	581
	Tungsten (W) (mg/kg)		<0.50	0.94	0.63	0.64
	Uranium (U) (mg/kg)		22.2	11.6	14.2	12.8
	Vanadium (V) (mg/kg)		34.4	37.8	43.4	39.8
	Zinc (Zn) (mg/kg)		107	115	148	127
	Zirconium (Zr) (mg/kg)		7.1	3.1	3.9	3.3
Aggregate Organics	Mineral Oil and Grease (mg/kg)	2760				
Hydrocarbons	EPH10-19 (mg/kg)	<640 DLHM				
	EPH19-32 (mg/kg)	<640 DLHM				
	LEPH (mg/kg)	<640				
	HEPH (mg/kg)	<640				
	Surrogate: 2-Bromobenzotrifluoride (%)	95.3				
Polycyclic Aromatic Hydrocarbons	Acenaphthene (mg/kg)	<0.020 DLHM				
	Acenaphthylene (mg/kg)	<0.020 DLHM				
	Anthracene (mg/kg)	<0.020 DLHM				
	Benz(a)anthracene (mg/kg)	<0.020 DLHM				
	Benzo(a)pyrene (mg/kg)	<0.020 DLHM				
	Benzo(b&j)fluoranthene (mg/kg)	<0.020 DLHM				
	Benzo(b+j+k)fluoranthene (mg/kg)	<0.028				
	Benzo(g,h,i)perylene (mg/kg)	<0.020 DLHM				
	Benzo(k)fluoranthene (mg/kg)	<0.020 DLHM				
	Chrysene (mg/kg)	<0.020 DLHM				
	Dibenz(a,h)anthracene (mg/kg)	<0.020 DLHM				
	Fluoranthene (mg/kg)	<0.020 DLHM				
	Fluorene (mg/kg)	<0.020 DLHM				
	Indeno(1,2,3-c,d)pyrene (mg/kg)	<0.020 DLHM				
	1-Methylnaphthalene (mg/kg)	<0.050				
	2-Methylnaphthalene (mg/kg)	<0.020 DLHM				
	Naphthalene (mg/kg)	<0.020 DLHM				
	Phenanthrene (mg/kg)	<0.020 DLHM				
	Pyrene (mg/kg)	<0.020 DLHM				
	Quinoline (mg/kg)	<0.050				
	Surrogate: Acenaphthene d10 (%)	90.1				
	Surrogate: Chrysene d12 (%)	106.5				
	Surrogate: Naphthalene d8 (%)	85.1				

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2155885-11	L2155885-12	L2155885-13	L2155885-14	L2155885-15
Description	Sediment	Sediment	Sediment	Sediment	Sediment
Sampled Date	16-AUG-18	16-AUG-18	18-AUG-18	18-AUG-18	18-AUG-18
Sampled Time					
Client ID	MAM-5	MAM-COMP	A20-1	A20-2	A20-3
Grouping / **Analyte**					
SOIL					
Metals Tin (Sn) (mg/kg)	<2.0		<2.0	<2.0	<2.0
Titanium (Ti) (mg/kg)	606		573	599	672
Tungsten (W) (mg/kg)	0.59		0.62	0.58	0.65
Uranium (U) (mg/kg)	13.9		13.8	14.8	22.4
Vanadium (V) (mg/kg)	42.9		34.1	34.0	39.9
Zinc (Zn) (mg/kg)	134		103	99.7	117
Zirconium (Zr) (mg/kg)	3.6		2.3	2.4	2.5
Aggregate Organics Mineral Oil and Grease (mg/kg)		2230			
Hydrocarbons EPH10-19 (mg/kg)		<740 DLHM			
EPH19-32 (mg/kg)		<740 DLHM			
LEPH (mg/kg)		<740			
HEPH (mg/kg)		<740			
Surrogate: 2-Bromobenzotrifluoride (%)		98.3			
Polycyclic Aromatic Hydrocarbons Acenaphthene (mg/kg)		<0.010 DLHM			
Acenaphthylene (mg/kg)		<0.010 DLHM			
Anthracene (mg/kg)		<0.0080 DLHM			
Benz(a)anthracene (mg/kg)		<0.020 DLHM			
Benzo(a)pyrene (mg/kg)		<0.020 DLHM			
Benzo(b&j)fluoranthene (mg/kg)		<0.020 DLHM			
Benzo(b+j+k)fluoranthene (mg/kg)		<0.028			
Benzo(g,h,i)perylene (mg/kg)		<0.020 DLHM			
Benzo(k)fluoranthene (mg/kg)		<0.020 DLHM			
Chrysene (mg/kg)		<0.020 DLHM			
Dibenz(a,h)anthracene (mg/kg)		<0.010 DLHM			
Fluoranthene (mg/kg)		<0.020 DLHM			
Fluorene (mg/kg)		<0.020 DLHM			
Indeno(1,2,3-c,d)pyrene (mg/kg)		<0.020 DLHM			
1-Methylnaphthalene (mg/kg)		<0.10 DLHM			
2-Methylnaphthalene (mg/kg)		<0.020 DLHM			
Naphthalene (mg/kg)		<0.020 DLHM			
Phenanthrene (mg/kg)		<0.020 DLHM			
Pyrene (mg/kg)		<0.020 DLHM			
Quinoline (mg/kg)		<0.10 DLHM			
Surrogate: Acenaphthene d10 (%)		93.3			
Surrogate: Chrysene d12 (%)		110.7			
Surrogate: Naphthalene d8 (%)		89.1			

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	Sample ID: L2155885-16 Description: Sediment Sampled Date: 18-AUG-18 Sampled Time: Client ID: A20-4	Sample ID: L2155885-17 Description: Sediment Sampled Date: 18-AUG-18 Sampled Time: Client ID: A20-5	Sample ID: L2155885-18 Description: Sediment Sampled Date: 18-AUG-18 Sampled Time: Client ID: A20-COMP	Sample ID: L2155885-19 Description: Sediment Sampled Date: 18-AUG-18 Sampled Time: Client ID: A76-1	Sample ID: L2155885-20 Description: Sediment Sampled Date: 18-AUG-18 Sampled Time: Client ID: A76-2
SOIL						
Metals	Tin (Sn) (mg/kg)	<2.0	<2.0		<2.0	<2.0
	Titanium (Ti) (mg/kg)	470	491		607	602
	Tungsten (W) (mg/kg)	0.53	0.61		0.75	0.69
	Uranium (U) (mg/kg)	12.7	13.5		16.4	16.3
	Vanadium (V) (mg/kg)	26.0	28.8		44.8	44.7
	Zinc (Zn) (mg/kg)	83.0	95.8		130	127
	Zirconium (Zr) (mg/kg)	3.7	2.2		3.2	2.8
Aggregate Organics	Mineral Oil and Grease (mg/kg)			DLHM <1900		
Hydrocarbons	EPH10-19 (mg/kg)			DLHM <800		
	EPH19-32 (mg/kg)			DLHM <800		
	LEPH (mg/kg)			<800		
	HEPH (mg/kg)			<800		
	Surrogate: 2-Bromobenzotrifluoride (%)			102.3		
Polycyclic Aromatic Hydrocarbons	Acenaphthene (mg/kg)			DLHM <0.010		
	Acenaphthylene (mg/kg)			DLHM <0.010		
	Anthracene (mg/kg)			DLHM <0.0080		
	Benz(a)anthracene (mg/kg)			DLHM <0.020		
	Benzo(a)pyrene (mg/kg)			DLHM <0.020		
	Benzo(b&j)fluoranthene (mg/kg)			DLHM <0.020		
	Benzo(b+j+k)fluoranthene (mg/kg)			<0.028		
	Benzo(g,h,i)perylene (mg/kg)			DLHM <0.020		
	Benzo(k)fluoranthene (mg/kg)			DLHM <0.020		
	Chrysene (mg/kg)			DLHM <0.020		
	Dibenz(a,h)anthracene (mg/kg)			DLHM <0.010		
	Fluoranthene (mg/kg)			DLHM <0.020		
	Fluorene (mg/kg)			DLHM <0.020		
	Indeno(1,2,3-c,d)pyrene (mg/kg)			DLHM <0.020		
	1-Methylnaphthalene (mg/kg)			DLHM <0.10		
	2-Methylnaphthalene (mg/kg)			DLHM <0.020		
	Naphthalene (mg/kg)			DLHM <0.020		
	Phenanthrene (mg/kg)			DLHM <0.020		
	Pyrene (mg/kg)			DLHM <0.020		
	Quinoline (mg/kg)			DLHM <0.10		
	Surrogate: Acenaphthene d10 (%)			94.8		
	Surrogate: Chrysene d12 (%)			111.4		
	Surrogate: Naphthalene d8 (%)			91.7		

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2155885-21	L2155885-22	L2155885-23	L2155885-24	L2155885-25
Description	Sediment	Sediment	Sediment	Sediment	Sediment
Sampled Date	18-AUG-18	18-AUG-18	18-AUG-18	18-AUG-18	19-AUG-18
Sampled Time					
Client ID	A76-3	A76-4	A76-5	A76-COMP	DS1-1
Grouping / **Analyte**					
SOIL					
Metals Tin (Sn) (mg/kg)	<2.0	<2.0	<2.0		<2.0
Titanium (Ti) (mg/kg)	639	595	639		546
Tungsten (W) (mg/kg)	0.71	0.68	0.77		0.55
Uranium (U) (mg/kg)	16.5	15.6	18.7		4.12
Vanadium (V) (mg/kg)	44.2	41.3	48.9		36.1
Zinc (Zn) (mg/kg)	124	125	145		78.3
Zirconium (Zr) (mg/kg)	4.0	2.4	2.7		4.8
Aggregate Organics Mineral Oil and Grease (mg/kg)				2720	
Hydrocarbons EPH10-19 (mg/kg)				DLHM <920	
EPH19-32 (mg/kg)				DLHM <920	
LEPH (mg/kg)				<920	
HEPH (mg/kg)				<920	
Surrogate: 2-Bromobenzotrifluoride (%)				100.4	
Polycyclic Aromatic Hydrocarbons Acenaphthene (mg/kg)				DLHM <0.015	
Acenaphthylene (mg/kg)				DLHM <0.015	
Anthracene (mg/kg)				DLHM <0.012	
Benz(a)anthracene (mg/kg)				DLHM <0.030	
Benzo(a)pyrene (mg/kg)				DLHM <0.030	
Benzo(b&j)fluoranthene (mg/kg)				DLHM <0.030	
Benzo(b+j+k)fluoranthene (mg/kg)				<0.042	
Benzo(g,h,i)perylene (mg/kg)				DLHM <0.030	
Benzo(k)fluoranthene (mg/kg)				DLHM <0.030	
Chrysene (mg/kg)				DLHM <0.030	
Dibenz(a,h)anthracene (mg/kg)				DLHM <0.015	
Fluoranthene (mg/kg)				DLHM <0.030	
Fluorene (mg/kg)				DLHM <0.030	
Indeno(1,2,3-c,d)pyrene (mg/kg)				DLHM <0.030	
1-Methylnaphthalene (mg/kg)				DLHM <0.15	
2-Methylnaphthalene (mg/kg)				DLHM <0.030	
Naphthalene (mg/kg)				DLHM <0.030	
Phenanthrene (mg/kg)				DLHM <0.030	
Pyrene (mg/kg)				DLHM <0.030	
Quinoline (mg/kg)				DLHM <0.15	
Surrogate: Acenaphthene d10 (%)				94.7	
Surrogate: Chrysene d12 (%)				110.2	
Surrogate: Naphthalene d8 (%)				88.7	

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2155885-26	L2155885-27	L2155885-28	L2155885-29	L2155885-30
Description	Sediment	Sediment	Sediment	Sediment	Sediment
Sampled Date	19-AUG-18	19-AUG-18	19-AUG-18	19-AUG-18	19-AUG-18
Sampled Time					
Client ID	DS1-2	DS1-3	DS1-4	DS1-5	DS1-COMP
Grouping / **Analyte**					
SOIL					
Metals Tin (Sn) (mg/kg)	<2.0	<2.0	<2.0	<2.0	
Titanium (Ti) (mg/kg)	504	488	569	530	
Tungsten (W) (mg/kg)	<0.50	0.57	0.54	<0.50	
Uranium (U) (mg/kg)	3.98	3.85	4.03	3.90	
Vanadium (V) (mg/kg)	34.8	35.7	38.5	36.1	
Zinc (Zn) (mg/kg)	75.0	76.9	80.8	75.1	
Zirconium (Zr) (mg/kg)	6.5	4.7	8.1	5.0	
Aggregate Organics Mineral Oil and Grease (mg/kg)					<700 DLHM
Hydrocarbons EPH10-19 (mg/kg)					<320 DLHM
EPH19-32 (mg/kg)					<320 DLHM
LEPH (mg/kg)					<320
HEPH (mg/kg)					<320
Surrogate: 2-Bromobenzotrifluoride (%)					96.5
Polycyclic Aromatic Hydrocarbons Acenaphthene (mg/kg)					<0.0050
Acenaphthylene (mg/kg)					<0.0050
Anthracene (mg/kg)					<0.0040
Benz(a)anthracene (mg/kg)					<0.010
Benzo(a)pyrene (mg/kg)					<0.010
Benzo(b&j)fluoranthene (mg/kg)					<0.010
Benzo(b+j+k)fluoranthene (mg/kg)					<0.015
Benzo(g,h,i)perylene (mg/kg)					<0.010
Benzo(k)fluoranthene (mg/kg)					<0.010
Chrysene (mg/kg)					<0.010
Dibenz(a,h)anthracene (mg/kg)					<0.0050
Fluoranthene (mg/kg)					<0.010
Fluorene (mg/kg)					<0.010
Indeno(1,2,3-c,d)pyrene (mg/kg)					<0.010
1-Methylnaphthalene (mg/kg)					<0.050
2-Methylnaphthalene (mg/kg)					<0.010
Naphthalene (mg/kg)					<0.010
Phenanthrene (mg/kg)					<0.010
Pyrene (mg/kg)					<0.010
Quinoline (mg/kg)					<0.050
Surrogate: Acenaphthene d10 (%)					91.6
Surrogate: Chrysene d12 (%)					96.3
Surrogate: Naphthalene d8 (%)					83.3

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2155885-31	L2155885-32	L2155885-33	L2155885-34	L2155885-35
	Description	Sediment	Sediment	Sediment	Sediment	Sediment
	Sampled Date	17-AUG-18	17-AUG-18	17-AUG-18	17-AUG-18	17-AUG-18
	Sampled Time					
	Client ID	NEM-1	NEM-2	NEM-3	NEM-4	NEM-5
Grouping	**Analyte**					
SOIL						
Metals	Tin (Sn) (mg/kg)	<2.0	<2.0	<2.0	<2.0	<2.0
	Titanium (Ti) (mg/kg)	212	218	236	240	213
	Tungsten (W) (mg/kg)	<0.50	<0.50	<0.50	<0.50	<0.50
	Uranium (U) (mg/kg)	4.91	3.79	3.28	5.14	4.61
	Vanadium (V) (mg/kg)	23.4	20.5	18.1	23.6	22.5
	Zinc (Zn) (mg/kg)	61.9	53.1	46.5	66.7	63.8
	Zirconium (Zr) (mg/kg)	1.1	<1.0	<1.0	<1.0	<1.0
Aggregate Organics	Mineral Oil and Grease (mg/kg)					
Hydrocarbons	EPH10-19 (mg/kg)					
	EPH19-32 (mg/kg)					
	LEPH (mg/kg)					
	HEPH (mg/kg)					
	Surrogate: 2-Bromobenzotrifluoride (%)					
Polycyclic Aromatic Hydrocarbons	Acenaphthene (mg/kg)					
	Acenaphthylene (mg/kg)					
	Anthracene (mg/kg)					
	Benz(a)anthracene (mg/kg)					
	Benzo(a)pyrene (mg/kg)					
	Benzo(b&j)fluoranthene (mg/kg)					
	Benzo(b+j+k)fluoranthene (mg/kg)					
	Benzo(g,h,i)perylene (mg/kg)					
	Benzo(k)fluoranthene (mg/kg)					
	Chrysene (mg/kg)					
	Dibenz(a,h)anthracene (mg/kg)					
	Fluoranthene (mg/kg)					
	Fluorene (mg/kg)					
	Indeno(1,2,3-c,d)pyrene (mg/kg)					
	1-Methylnaphthalene (mg/kg)					
	2-Methylnaphthalene (mg/kg)					
	Naphthalene (mg/kg)					
	Phenanthrene (mg/kg)					
	Pyrene (mg/kg)					
	Quinoline (mg/kg)					
	Surrogate: Acenaphthene d10 (%)					
	Surrogate: Chrysene d12 (%)					
	Surrogate: Naphthalene d8 (%)					

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	L2155885-36 Sediment 17-AUG-18 NEM-COMP	L2155885-37 Sediment 15-AUG-18 LK1-1	L2155885-38 Sediment 15-AUG-18 LK1-2	L2155885-39 Sediment 15-AUG-18 LK1-3	L2155885-40 Sediment 15-AUG-18 LK1-4
SOIL						
Metals	Tin (Sn) (mg/kg)		<2.0	<2.0	<2.0	<2.0
	Titanium (Ti) (mg/kg)		771	478	689	587
	Tungsten (W) (mg/kg)		<0.50	<0.50	<0.50	<0.50
	Uranium (U) (mg/kg)		18.9	5.58	22.4	24.3
	Vanadium (V) (mg/kg)		31.1	20.0	34.1	32.7
	Zinc (Zn) (mg/kg)		109	45.3	114	103
	Zirconium (Zr) (mg/kg)		4.6	1.3	2.7	3.4
Aggregate Organics	Mineral Oil and Grease (mg/kg)	2320				
Hydrocarbons	EPH10-19 (mg/kg)	DLHM <740				
	EPH19-32 (mg/kg)	DLHM <740				
	LEPH (mg/kg)	<740				
	HEPH (mg/kg)	<740				
	Surrogate: 2-Bromobenzotrifluoride (%)	99.4				
Polycyclic Aromatic Hydrocarbons	Acenaphthene (mg/kg)	DLHM <0.010				
	Acenaphthylene (mg/kg)	DLHM <0.010				
	Anthracene (mg/kg)	DLHM <0.0080				
	Benz(a)anthracene (mg/kg)	DLHM <0.020				
	Benzo(a)pyrene (mg/kg)	DLHM <0.020				
	Benzo(b&j)fluoranthene (mg/kg)	DLHM <0.020				
	Benzo(b+j+k)fluoranthene (mg/kg)	<0.028				
	Benzo(g,h,i)perylene (mg/kg)	DLHM <0.020				
	Benzo(k)fluoranthene (mg/kg)	DLHM <0.020				
	Chrysene (mg/kg)	DLHM <0.020				
	Dibenz(a,h)anthracene (mg/kg)	DLHM <0.010				
	Fluoranthene (mg/kg)	DLHM <0.020				
	Fluorene (mg/kg)	DLHM <0.020				
	Indeno(1,2,3-c,d)pyrene (mg/kg)	DLHM <0.020				
	1-Methylnaphthalene (mg/kg)	DLHM <0.10				
	2-Methylnaphthalene (mg/kg)	DLHM <0.020				
	Naphthalene (mg/kg)	DLHM <0.020				
	Phenanthrene (mg/kg)	DLHM <0.020				
	Pyrene (mg/kg)	DLHM <0.020				
	Quinoline (mg/kg)	DLHM <0.10				
	Surrogate: Acenaphthene d10 (%)	94.5				
	Surrogate: Chrysene d12 (%)	110.6				
	Surrogate: Naphthalene d8 (%)	89.7				

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2155885-41	L2155885-42	L2155885-43	L2155885-44	L2155885-45
Description	Sediment	Sediment	Sediment	Sediment	Sediment
Sampled Date	15-AUG-18	15-AUG-18	16-AUG-18	16-AUG-18	16-AUG-18
Sampled Time					
Client ID	LK1-5	LK1-COMP	LK5-1	LK5-2	LK5-3
Grouping / **Analyte**					
SOIL					
Metals Tin (Sn) (mg/kg)	<2.0		<2.0	<2.0	<2.0
Titanium (Ti) (mg/kg)	651		419	290	383
Tungsten (W) (mg/kg)	0.59		<0.50	<0.50	<0.50
Uranium (U) (mg/kg)	17.9		9.15	9.06	10.2
Vanadium (V) (mg/kg)	29.0		28.0	21.4	28.6
Zinc (Zn) (mg/kg)	89.6		90.4	83.2	106
Zirconium (Zr) (mg/kg)	2.7		2.6	2.3	2.3
Aggregate Organics Mineral Oil and Grease (mg/kg)		1280 DLHM			
Hydrocarbons EPH10-19 (mg/kg)		<480 DLHM			
EPH19-32 (mg/kg)		<480 DLHM			
LEPH (mg/kg)		<480			
HEPH (mg/kg)		<480			
Surrogate: 2-Bromobenzotrifluoride (%)		103.2			
Polycyclic Aromatic Hydrocarbons Acenaphthene (mg/kg)		<0.010 DLHM			
Acenaphthylene (mg/kg)		<0.010 DLHM			
Anthracene (mg/kg)		<0.0080 DLHM			
Benz(a)anthracene (mg/kg)		<0.020 DLHM			
Benzo(a)pyrene (mg/kg)		<0.020 DLHM			
Benzo(b&j)fluoranthene (mg/kg)		<0.020 DLHM			
Benzo(b+j+k)fluoranthene (mg/kg)		<0.028			
Benzo(g,h,i)perylene (mg/kg)		<0.020 DLHM			
Benzo(k)fluoranthene (mg/kg)		<0.020 DLHM			
Chrysene (mg/kg)		<0.020 DLHM			
Dibenz(a,h)anthracene (mg/kg)		<0.010 DLHM			
Fluoranthene (mg/kg)		<0.020 DLHM			
Fluorene (mg/kg)		<0.020 DLHM			
Indeno(1,2,3-c,d)pyrene (mg/kg)		<0.020 DLHM			
1-Methylnaphthalene (mg/kg)		<0.10 DLHM			
2-Methylnaphthalene (mg/kg)		<0.020 DLHM			
Naphthalene (mg/kg)		<0.020 DLHM			
Phenanthrene (mg/kg)		<0.020 DLHM			
Pyrene (mg/kg)		<0.020 DLHM			
Quinoline (mg/kg)		<0.10 DLHM			
Surrogate: Acenaphthene d10 (%)		96.5			
Surrogate: Chrysene d12 (%)		113.8			
Surrogate: Naphthalene d8 (%)		91.8			

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	Sample ID: L2155885-46 Description: Sediment Sampled Date: 16-AUG-18 Sampled Time: Client ID: LK5-4	Sample ID: L2155885-47 Description: Sediment Sampled Date: 16-AUG-18 Sampled Time: Client ID: LK5-5	Sample ID: L2155885-48 Description: Sediment Sampled Date: 16-AUG-18 Sampled Time: Client ID: LK5-COMP	Sample ID: L2155885-49 Description: Sediment Sampled Date: 17-AUG-18 Sampled Time: Client ID: LK8-1	Sample ID: L2155885-50 Description: Sediment Sampled Date: 17-AUG-18 Sampled Time: Client ID: LK8-2
SOIL						
Metals	Tin (Sn) (mg/kg)	<2.0	<2.0		<2.0	<2.0
	Titanium (Ti) (mg/kg)	354	316		339	338
	Tungsten (W) (mg/kg)	<0.50	<0.50		<0.50	<0.50
	Uranium (U) (mg/kg)	9.56	8.84		5.80	4.38
	Vanadium (V) (mg/kg)	26.1	23.8		30.2	28.7
	Zinc (Zn) (mg/kg)	92.7	85.2		65.7	60.1
	Zirconium (Zr) (mg/kg)	2.9	2.6		<1.0	<1.0
Aggregate Organics	Mineral Oil and Grease (mg/kg)			DLHM <1900		
Hydrocarbons	EPH10-19 (mg/kg)			DLHM <980		
	EPH19-32 (mg/kg)			DLHM <980		
	LEPH (mg/kg)			<980		
	HEPH (mg/kg)			<980		
	Surrogate: 2-Bromobenzotrifluoride (%)			100.5		
Polycyclic Aromatic Hydrocarbons	Acenaphthene (mg/kg)			DLHM <0.015		
	Acenaphthylene (mg/kg)			DLHM <0.015		
	Anthracene (mg/kg)			DLHM <0.012		
	Benz(a)anthracene (mg/kg)			DLHM <0.030		
	Benzo(a)pyrene (mg/kg)			DLHM <0.030		
	Benzo(b&j)fluoranthene (mg/kg)			DLHM <0.030		
	Benzo(b+j+k)fluoranthene (mg/kg)			<0.042		
	Benzo(g,h,i)perylene (mg/kg)			DLHM <0.030		
	Benzo(k)fluoranthene (mg/kg)			DLHM <0.030		
	Chrysene (mg/kg)			DLHM <0.030		
	Dibenz(a,h)anthracene (mg/kg)			DLHM <0.015		
	Fluoranthene (mg/kg)			DLHM <0.030		
	Fluorene (mg/kg)			DLHM <0.030		
	Indeno(1,2,3-c,d)pyrene (mg/kg)			DLHM <0.030		
	1-Methylnaphthalene (mg/kg)			DLHM <0.15		
	2-Methylnaphthalene (mg/kg)			DLHM <0.030		
	Naphthalene (mg/kg)			DLHM <0.030		
	Phenanthrene (mg/kg)			DLHM <0.030		
	Pyrene (mg/kg)			DLHM <0.030		
	Quinoline (mg/kg)			DLHM <0.15		
	Surrogate: Acenaphthene d10 (%)			91.2		
	Surrogate: Chrysene d12 (%)			106.6		
	Surrogate: Naphthalene d8 (%)			85.0		

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2155885-51	L2155885-52	L2155885-53	L2155885-54	L2155885-55
Description	Sediment	Sediment	Sediment	Sediment	Sediment
Sampled Date	17-AUG-18	17-AUG-18	17-AUG-18	17-AUG-18	
Sampled Time					
Client ID	LK8-3	LK8-4	LK8-5	LK8-COMP	WTP DUP-1
Grouping / **Analyte**					
SOIL					
Metals Tin (Sn) (mg/kg)	<2.0	<2.0	<2.0		<2.0
Titanium (Ti) (mg/kg)	470	420	414		650
Tungsten (W) (mg/kg)	<0.50	<0.50	<0.50		<0.50
Uranium (U) (mg/kg)	5.51	3.81	2.50		19.8
Vanadium (V) (mg/kg)	32.4	30.2	23.7		31.4
Zinc (Zn) (mg/kg)	65.8	56.9	46.3		141
Zirconium (Zr) (mg/kg)	1.4	<1.0	<1.0		6.5
Aggregate Organics Mineral Oil and Grease (mg/kg)				<700 DLHM	
Hydrocarbons EPH10-19 (mg/kg)				<280 DLHM	
EPH19-32 (mg/kg)				<280 DLHM	
LEPH (mg/kg)				<280	
HEPH (mg/kg)				<280	
Surrogate: 2-Bromobenzotrifluoride (%)				96.9	
Polycyclic Aromatic Hydrocarbons Acenaphthene (mg/kg)				<0.0050	
Acenaphthylene (mg/kg)				<0.0050	
Anthracene (mg/kg)				<0.0040	
Benz(a)anthracene (mg/kg)				<0.010	
Benzo(a)pyrene (mg/kg)				<0.010	
Benzo(b&j)fluoranthene (mg/kg)				<0.010	
Benzo(b+j+k)fluoranthene (mg/kg)				<0.015	
Benzo(g,h,i)perylene (mg/kg)				<0.010	
Benzo(k)fluoranthene (mg/kg)				<0.010	
Chrysene (mg/kg)				<0.010	
Dibenz(a,h)anthracene (mg/kg)				<0.0050	
Fluoranthene (mg/kg)				<0.010	
Fluorene (mg/kg)				<0.010	
Indeno(1,2,3-c,d)pyrene (mg/kg)				<0.010	
1-Methylnaphthalene (mg/kg)				<0.050	
2-Methylnaphthalene (mg/kg)				<0.010	
Naphthalene (mg/kg)				<0.010	
Phenanthrene (mg/kg)				<0.010	
Pyrene (mg/kg)				<0.010	
Quinoline (mg/kg)				<0.050	
Surrogate: Acenaphthene d10 (%)				90.6	
Surrogate: Chrysene d12 (%)				104.4	
Surrogate: Naphthalene d8 (%)				88.3	

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	L2155885-56 Sediment WTP DUP-2	L2155885-57 Sediment WTP DUP-3	L2155885-58 Sediment WTP COMP DUP-1	L2155885-59 Sediment WTP COMP DUP-2	L2155885-60 Sediment 18-AUG-18 WTN-1
SOIL						
Metals	Tin (Sn) (mg/kg)	<2.0	<2.0			<2.0
	Titanium (Ti) (mg/kg)	289	352			458
	Tungsten (W) (mg/kg)	<0.50	<0.50			<0.50
	Uranium (U) (mg/kg)	9.59	9.75			11.1
	Vanadium (V) (mg/kg)	26.4	26.3			28.5
	Zinc (Zn) (mg/kg)	103	94.6			99.4
	Zirconium (Zr) (mg/kg)	3.1	2.4			1.7
Aggregate Organics	Mineral Oil and Grease (mg/kg)			3820	1360	
Hydrocarbons	EPH10-19 (mg/kg)			<640 DLHM	<300 DLHM	
	EPH19-32 (mg/kg)			<640 DLHM	<300 DLHM	
	LEPH (mg/kg)			<640	<300	
	HEPH (mg/kg)			<640	<300	
	Surrogate: 2-Bromobenzotrifluoride (%)			109.9	110.4	
Polycyclic Aromatic Hydrocarbons	Acenaphthene (mg/kg)			<0.0050	<0.0050	
	Acenaphthylene (mg/kg)			<0.0050	<0.0050	
	Anthracene (mg/kg)			<0.0040	<0.0040	
	Benz(a)anthracene (mg/kg)			<0.010	<0.010	
	Benzo(a)pyrene (mg/kg)			<0.010	<0.010	
	Benzo(b&j)fluoranthene (mg/kg)			<0.010	<0.010	
	Benzo(b+j+k)fluoranthene (mg/kg)			<0.015	<0.015	
	Benzo(g,h,i)perylene (mg/kg)			<0.010	0.011	
	Benzo(k)fluoranthene (mg/kg)			<0.010	<0.010	
	Chrysene (mg/kg)			<0.010	<0.010	
	Dibenz(a,h)anthracene (mg/kg)			<0.0050	<0.0050	
	Fluoranthene (mg/kg)			<0.010	<0.010	
	Fluorene (mg/kg)			<0.010	<0.010	
	Indeno(1,2,3-c,d)pyrene (mg/kg)			<0.010	0.012	
	1-Methylnaphthalene (mg/kg)			<0.050	<0.050	
	2-Methylnaphthalene (mg/kg)			<0.010	<0.010	
	Naphthalene (mg/kg)			<0.010	<0.010	
	Phenanthrene (mg/kg)			<0.010	<0.010	
	Pyrene (mg/kg)			<0.010	<0.010	
	Quinoline (mg/kg)			<0.050	<0.050	
	Surrogate: Acenaphthene d10 (%)			95.9	96.7	
	Surrogate: Chrysene d12 (%)			100.2	111.4	
	Surrogate: Naphthalene d8 (%)			91.2	90.0	

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2155885-61	L2155885-62	L2155885-63	L2155885-64	
Description	Sediment	Sediment	Sediment	Sediment	
Sampled Date	18-AUG-18	18-AUG-18	18-AUG-18	18-AUG-18	
Sampled Time					
Client ID	WTN-2	WTN-3	WTN-4	WTN-5	
Grouping	**Analyte**				
SOIL					
Metals	Tin (Sn) (mg/kg)	<2.0	<2.0	<2.0	<2.0	
	Titanium (Ti) (mg/kg)	491	534	519	482	
	Tungsten (W) (mg/kg)	0.52	<0.50	<0.50	<0.50	
	Uranium (U) (mg/kg)	10.6	12.0	11.2	12.0	
	Vanadium (V) (mg/kg)	29.5	32.5	30.1	30.3	
	Zinc (Zn) (mg/kg)	102	91.1	106	113	
	Zirconium (Zr) (mg/kg)	1.9	2.2	2.1	2.0	
Aggregate Organics	Mineral Oil and Grease (mg/kg)					
Hydrocarbons	EPH10-19 (mg/kg)					
	EPH19-32 (mg/kg)					
	LEPH (mg/kg)					
	HEPH (mg/kg)					
	Surrogate: 2-Bromobenzotrifluoride (%)					
Polycyclic Aromatic Hydrocarbons	Acenaphthene (mg/kg)					
	Acenaphthylene (mg/kg)					
	Anthracene (mg/kg)					
	Benz(a)anthracene (mg/kg)					
	Benzo(a)pyrene (mg/kg)					
	Benzo(b&j)fluoranthene (mg/kg)					
	Benzo(b+j+k)fluoranthene (mg/kg)					
	Benzo(g,h,i)perylene (mg/kg)					
	Benzo(k)fluoranthene (mg/kg)					
	Chrysene (mg/kg)					
	Dibenz(a,h)anthracene (mg/kg)					
	Fluoranthene (mg/kg)					
	Fluorene (mg/kg)					
	Indeno(1,2,3-c,d)pyrene (mg/kg)					
	1-Methylnaphthalene (mg/kg)					
	2-Methylnaphthalene (mg/kg)					
	Naphthalene (mg/kg)					
	Phenanthrene (mg/kg)					
	Pyrene (mg/kg)					
	Quinoline (mg/kg)					
	Surrogate: Acenaphthene d10 (%)					
	Surrogate: Chrysene d12 (%)					
	Surrogate: Naphthalene d8 (%)					

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2155885-1	L2155885-2	L2155885-3	L2155885-4	L2155885-5
	Description	Sediment	Sediment	Sediment	Sediment	Sediment
	Sampled Date	13-AUG-18	13-AUG-18	13-AUG-18	13-AUG-18	13-AUG-18
	Sampled Time					
	Client ID	WTS-1	WTS-2	WTS-3	WTS-4	WTS-5
Grouping	**Analyte**					
SOIL						
Polycyclic Aromatic Hydrocarbons	Surrogate: Phenanthrene d10 (%)					
	B(a)P Total Potency Equivalent (mg/kg)					
	IACR (CCME) (mg/kg)					

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2155885-6	L2155885-7	L2155885-8	L2155885-9	L2155885-10
	Description	Sediment	Sediment	Sediment	Sediment	Sediment
	Sampled Date	13-AUG-18	16-AUG-18	16-AUG-18	16-AUG-18	16-AUG-18
	Sampled Time					
	Client ID	WTS-COMP	MAM-1	MAM-2	MAM-3	MAM-4
Grouping	**Analyte**					
SOIL						
Polycyclic Aromatic Hydrocarbons	Surrogate: Phenanthrene d10 (%)	100.8				
	B(a)P Total Potency Equivalent (mg/kg)	<0.024				
	IACR (CCME) (mg/kg)	<0.24				

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2155885-11	L2155885-12	L2155885-13	L2155885-14	L2155885-15
Description	Sediment	Sediment	Sediment	Sediment	Sediment
Sampled Date	16-AUG-18	16-AUG-18	18-AUG-18	18-AUG-18	18-AUG-18
Sampled Time					
Client ID	MAM-5	MAM-COMP	A20-1	A20-2	A20-3
Grouping / **Analyte**					
SOIL					
Polycyclic Aromatic Hydrocarbons / Surrogate: Phenanthrene d10 (%)		105.2			
B(a)P Total Potency Equivalent (mg/kg)		<0.020			
IACR (CCME) (mg/kg)		<0.21			

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2155885-16	L2155885-17	L2155885-18	L2155885-19	L2155885-20
Description	Sediment	Sediment	Sediment	Sediment	Sediment
Sampled Date	18-AUG-18	18-AUG-18	18-AUG-18	18-AUG-18	18-AUG-18
Sampled Time					
Client ID	A20-4	A20-5	A20-COMP	A76-1	A76-2
Grouping / **Analyte**					
SOIL					
Polycyclic Aromatic Hydrocarbons					
Surrogate: Phenanthrene d10 (%)			105.3		
B(a)P Total Potency Equivalent (mg/kg)			<0.020		
IACR (CCME) (mg/kg)			<0.21		

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2155885-21	L2155885-22	L2155885-23	L2155885-24	L2155885-25
Description	Sediment	Sediment	Sediment	Sediment	Sediment
Sampled Date	18-AUG-18	18-AUG-18	18-AUG-18	18-AUG-18	19-AUG-18
Sampled Time					
Client ID	A76-3	A76-4	A76-5	A76-COMP	DS1-1
Grouping / **Analyte**					
SOIL					
Polycyclic Aromatic Hydrocarbons / Surrogate: Phenanthrene d10 (%)				104.3	
B(a)P Total Potency Equivalent (mg/kg)				<0.029	
IACR (CCME) (mg/kg)				<0.32	

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2155885-26	L2155885-27	L2155885-28	L2155885-29	L2155885-30
Description	Sediment	Sediment	Sediment	Sediment	Sediment
Sampled Date	19-AUG-18	19-AUG-18	19-AUG-18	19-AUG-18	19-AUG-18
Sampled Time					
Client ID	DS1-2	DS1-3	DS1-4	DS1-5	DS1-COMP
Grouping / **Analyte**					
SOIL					
Polycyclic Aromatic Hydrocarbons / Surrogate: Phenanthrene d10 (%)					86.1
B(a)P Total Potency Equivalent (mg/kg)					<0.020
IACR (CCME) (mg/kg)					<0.15

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2155885-31	L2155885-32	L2155885-33	L2155885-34	L2155885-35
	Description	Sediment	Sediment	Sediment	Sediment	Sediment
	Sampled Date	17-AUG-18	17-AUG-18	17-AUG-18	17-AUG-18	17-AUG-18
	Sampled Time					
	Client ID	NEM-1	NEM-2	NEM-3	NEM-4	NEM-5
Grouping	**Analyte**					
SOIL						
Polycyclic Aromatic Hydrocarbons	Surrogate: Phenanthrene d10 (%)					
	B(a)P Total Potency Equivalent (mg/kg)					
	IACR (CCME) (mg/kg)					

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2155885-36	L2155885-37	L2155885-38	L2155885-39	L2155885-40
	Description	Sediment	Sediment	Sediment	Sediment	Sediment
	Sampled Date	17-AUG-18	15-AUG-18	15-AUG-18	15-AUG-18	15-AUG-18
	Sampled Time					
	Client ID	NEM-COMP	LK1-1	LK1-2	LK1-3	LK1-4
Grouping	**Analyte**					
SOIL						
Polycyclic Aromatic Hydrocarbons	Surrogate: Phenanthrene d10 (%)	106.9				
	B(a)P Total Potency Equivalent (mg/kg)	<0.020				
	IACR (CCME) (mg/kg)	<0.21				

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2155885-41	L2155885-42	L2155885-43	L2155885-44	L2155885-45
	Description	Sediment	Sediment	Sediment	Sediment	Sediment
	Sampled Date	15-AUG-18	15-AUG-18	16-AUG-18	16-AUG-18	16-AUG-18
	Sampled Time					
	Client ID	LK1-5	LK1-COMP	LK5-1	LK5-2	LK5-3
Grouping	**Analyte**					
SOIL						
Polycyclic Aromatic Hydrocarbons	Surrogate: Phenanthrene d10 (%)		107.3			
	B(a)P Total Potency Equivalent (mg/kg)		<0.020			
	IACR (CCME) (mg/kg)		<0.21			

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2155885-46	L2155885-47	L2155885-48	L2155885-49	L2155885-50
Description	Sediment	Sediment	Sediment	Sediment	Sediment
Sampled Date	16-AUG-18	16-AUG-18	16-AUG-18	17-AUG-18	17-AUG-18
Sampled Time					
Client ID	LK5-4	LK5-5	LK5-COMP	LK8-1	LK8-2
Grouping / **Analyte**					
SOIL					
Polycyclic Aromatic Hydrocarbons / Surrogate: Phenanthrene d10 (%)			103.0		
B(a)P Total Potency Equivalent (mg/kg)			<0.029		
IACR (CCME) (mg/kg)			<0.32		

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2155885-51	L2155885-52	L2155885-53	L2155885-54	L2155885-55
	Description	Sediment	Sediment	Sediment	Sediment	Sediment
	Sampled Date	17-AUG-18	17-AUG-18	17-AUG-18	17-AUG-18	
	Sampled Time					
	Client ID	LK8-3	LK8-4	LK8-5	LK8-COMP	WTP DUP-1
Grouping	**Analyte**					
SOIL						
Polycyclic Aromatic Hydrocarbons	Surrogate: Phenanthrene d10 (%)				93.5	
	B(a)P Total Potency Equivalent (mg/kg)				<0.020	
	IACR (CCME) (mg/kg)				<0.15	

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2155885-56	L2155885-57	L2155885-58	L2155885-59	L2155885-60
Description	Sediment	Sediment	Sediment	Sediment	Sediment
Sampled Date					18-AUG-18
Sampled Time					
Client ID	WTP DUP-2	WTP DUP-3	WTP COMP DUP-1	WTP COMP DUP-2	WTN-1
Grouping / **Analyte**					
SOIL					
Polycyclic Aromatic Hydrocarbons / Surrogate: Phenanthrene d10 (%)			103.3	103.5	
B(a)P Total Potency Equivalent (mg/kg)			<0.020	<0.020	
IACR (CCME) (mg/kg)			<0.15	<0.15	

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2155885-61	L2155885-62	L2155885-63	L2155885-64	
	Description	Sediment	Sediment	Sediment	Sediment	
	Sampled Date	18-AUG-18	18-AUG-18	18-AUG-18	18-AUG-18	
	Sampled Time					
	Client ID	WTN-2	WTN-3	WTN-4	WTN-5	
Grouping	**Analyte**					
SOIL						
Polycyclic Aromatic Hydrocarbons	Surrogate: Phenanthrene d10 (%)					
	B(a)P Total Potency Equivalent (mg/kg)					
	IACR (CCME) (mg/kg)					

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

Reference Information

Qualifiers for Individual Samples Listed:

Sample Numbe	Client Sample ID	Qualifier	Description
L2155885-1	WTS-1	PSAL	Limited sample was available for PSA (100g minimum is standard). Measurement Uncertainty for PSA results may be higher than usual.
L2155885-10	MAM-4	PSAL	Limited sample was available for PSA (100g minimum is standard). Measurement Uncertainty for PSA results may be higher than usual.
L2155885-11	MAM-5	PSAL	Limited sample was available for PSA (100g minimum is standard). Measurement Uncertainty for PSA results may be higher than usual.
L2155885-13	A20-1	PSAL	Limited sample was available for PSA (100g minimum is standard). Measurement Uncertainty for PSA results may be higher than usual.
L2155885-14	A20-2	PSAL	Limited sample was available for PSA (100g minimum is standard). Measurement Uncertainty for PSA results may be higher than usual.
L2155885-15	A20-3	PSAL	Limited sample was available for PSA (100g minimum is standard). Measurement Uncertainty for PSA results may be higher than usual.
L2155885-16	A20-4	PSAL	Limited sample was available for PSA (100g minimum is standard). Measurement Uncertainty for PSA results may be higher than usual.
L2155885-17	A20-5	PSAL	Limited sample was available for PSA (100g minimum is standard). Measurement Uncertainty for PSA results may be higher than usual.
L2155885-19	A76-1	PSAL	Limited sample was available for PSA (100g minimum is standard). Measurement Uncertainty for PSA results may be higher than usual.
L2155885-2	WTS-2	PSAL	Limited sample was available for PSA (100g minimum is standard). Measurement Uncertainty for PSA results may be higher than usual.
L2155885-20	A76-2	PSAL	Limited sample was available for PSA (100g minimum is standard). Measurement Uncertainty for PSA results may be higher than usual.
L2155885-21	A76-3	PSAL	Limited sample was available for PSA (100g minimum is standard). Measurement Uncertainty for PSA results may be higher than usual.
L2155885-22	A76-4	PSAL	Limited sample was available for PSA (100g minimum is standard). Measurement Uncertainty for PSA results may be higher than usual.
L2155885-23	A76-5	PSAL	Limited sample was available for PSA (100g minimum is standard). Measurement Uncertainty for PSA results may be higher than usual.
L2155885-25	DS1-1	PSAL	Limited sample was available for PSA (100g minimum is standard). Measurement Uncertainty for PSA results may be higher than usual.
L2155885-26	DS1-2	PSAL	Limited sample was available for PSA (100g minimum is standard). Measurement Uncertainty for PSA results may be higher than usual.
L2155885-27	DS1-3	PSAL	Limited sample was available for PSA (100g minimum is standard). Measurement Uncertainty for PSA results may be higher than usual.
L2155885-28	DS1-4	PSAL	Limited sample was available for PSA (100g minimum is standard). Measurement Uncertainty for PSA results may be higher than usual.
L2155885-29	DS1-5	PSAL	Limited sample was available for PSA (100g minimum is standard). Measurement Uncertainty for PSA results may be higher than usual.
L2155885-3	WTS-3	PSAL	Limited sample was available for PSA (100g minimum is standard). Measurement Uncertainty for PSA results may be higher than usual.
L2155885-31	NEM-1	PSAL	Limited sample was available for PSA (100g minimum is standard). Measurement Uncertainty for PSA results may be higher than usual.
L2155885-32	NEM-2	PSAL	Limited sample was available for PSA (100g minimum is standard). Measurement Uncertainty for PSA results may be higher than usual.
L2155885-33	NEM-3	PSAL	Limited sample was available for PSA (100g minimum is standard). Measurement Uncertainty for PSA results may be higher than usual.
L2155885-34	NEM-4	PSAL	Limited sample was available for PSA (100g minimum is standard). Measurement Uncertainty for PSA results may be higher than usual.
L2155885-35	NEM-5	PSAL	Limited sample was available for PSA (100g minimum is standard). Measurement Uncertainty for PSA results may be higher than usual.
L2155885-37	LK1-1	PSAL	Limited sample was available for PSA (100g minimum is standard). Measurement Uncertainty for PSA results may be higher than usual.
L2155885-38	LK1-2	PSAL	Limited sample was available for PSA (100g minimum is standard). Measurement Uncertainty for PSA results may be higher than usual.
L2155885-39	LK1-3	PSAL	Limited sample was available for PSA (100g minimum is standard). Measurement Uncertainty for PSA results may be higher than usual.
L2155885-4	WTS-4	PSAL	Limited sample was available for PSA (100g minimum is standard). Measurement Uncertainty for PSA results may be higher than usual.
L2155885-40	LK1-4	PSAL	Limited sample was available for PSA (100g minimum is standard). Measurement Uncertainty for PSA results may be higher than usual.
L2155885-41	LK1-5	PSAL	Limited sample was available for PSA (100g minimum is standard). Measurement Uncertainty for PSA results may be higher than usual.
L2155885-43	LK5-1	PSAL	Limited sample was available for PSA (100g minimum is standard). Measurement Uncertainty for PSA results may be higher than usual.
L2155885-44	LK5-2	PSAL	Limited sample was available for PSA (100g minimum is standard). Measurement Uncertainty for PSA results may be higher than usual.
L2155885-45	LK5-3	PSAL	Limited sample was available for PSA (100g minimum is standard). Measurement Uncertainty for PSA results may be higher than usual.
L2155885-46	LK5-4	PSAL	Limited sample was available for PSA (100g minimum is standard). Measurement Uncertainty for PSA results may be higher than usual.

Reference Information

L2155885-47	LK5-5	PSAL	Limited sample was available for PSA (100g minimum is standard). Measurement Uncertainty for PSA results may be higher than usual.
L2155885-49	LK8-1	PSAL	Limited sample was available for PSA (100g minimum is standard). Measurement Uncertainty for PSA results may be higher than usual.
L2155885-5	WTS-5	PSAL	Limited sample was available for PSA (100g minimum is standard). Measurement Uncertainty for PSA results may be higher than usual.
L2155885-50	LK8-2	PSAL	Limited sample was available for PSA (100g minimum is standard). Measurement Uncertainty for PSA results may be higher than usual.
L2155885-51	LK8-3	PSAL	Limited sample was available for PSA (100g minimum is standard). Measurement Uncertainty for PSA results may be higher than usual.
L2155885-52	LK8-4	PSAL	Limited sample was available for PSA (100g minimum is standard). Measurement Uncertainty for PSA results may be higher than usual.
L2155885-53	LK8-5	PSAL	Limited sample was available for PSA (100g minimum is standard). Measurement Uncertainty for PSA results may be higher than usual.
L2155885-55	WTP DUP-1	PSAL	Limited sample was available for PSA (100g minimum is standard). Measurement Uncertainty for PSA results may be higher than usual.
L2155885-56	WTP DUP-2	PSAL	Limited sample was available for PSA (100g minimum is standard). Measurement Uncertainty for PSA results may be higher than usual.
L2155885-7	MAM-1	PSAL	Limited sample was available for PSA (100g minimum is standard). Measurement Uncertainty for PSA results may be higher than usual.
L2155885-8	MAM-2	PSAL	Limited sample was available for PSA (100g minimum is standard). Measurement Uncertainty for PSA results may be higher than usual.
L2155885-9	MAM-3	PSAL	Limited sample was available for PSA (100g minimum is standard). Measurement Uncertainty for PSA results may be higher than usual.

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Laboratory Control Sample	Benzo(b&j)fluoranthene	LCS-ND	L2155885-30
Laboratory Control Sample	Benzo(k)fluoranthene	LCS-ND	L2155885-30

Qualifiers for Individual Parameters Listed:

Qualifier	Description
DLHM	Detection Limit Adjusted: Sample has High Moisture Content
LCS-ND	Lab Control Sample recovery was slightly outside ALS DQO. Reported non-detect results for associated samples were unaffected.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
C-TIC-PCT-SK	Soil	Total Inorganic Carbon in Soil	CSSS (2008) P216-217

A known quantity of acetic acid is consumed by reaction with carbonates in the soil. The pH of the resulting solution is measured and compared against a standard curve relating pH to weight of carbonate.

C-TOC-CALC-SK	Soil	Total Organic Carbon Calculation	CSSS (2008) 21.2

Total Organic Carbon (TOC) is calculated by the difference between total carbon (TC) and total inorganic carbon. (TIC)

C-TOT-LECO-SK	Soil	Total Carbon by combustion method	CSSS (2008) 21.2

The sample is ignited in a combustion analyzer where carbon in the reduced CO2 gas is determined using a thermal conductivity detector.

EPH-TUMB-FID-VA	Soil	EPH in Solids by Tumbler and GCFID	BC MOE EPH GCFID

Analysis is in accordance with BC MOE Lab Manual method "Extractable Petroleum Hydrocarbons in Solids by GC/FID", v2.1, July 1999. Soil samples are extracted with a 1:1 mixture of hexane and acetone using a rotary extraction technique modified from EPA 3570 prior to gas chromatography with flame ionization detection (GC-FID). EPH results include Polycyclic Aromatic Hydrocarbons (PAH) and are therefore not equivalent to Light and Heavy Extractable Petroleum Hydrocarbons (LEPH/HEPH).

HG-200.2-CVAF-VA	Soil	Mercury in Soil by CVAAS	EPA 200.2/1631E (mod)

Soil samples are digested with hot nitric and hydrochloric acids, followed by CVAAS analysis. This method is fully compliant with the BC SALM strong acid leachable metals digestion method.

IC-CACO3-CALC-SK	Soil	Inorganic Carbon as CaCO3 Equivalent	Calculation
LEPH/HEPH-CALC-VA	Soil	LEPHs and HEPHs	BC MOE LEPH/HEPH

LEPHs and HEPHs are measures of Light and Heavy Extractable Petroleum Hydrocarbons in soil. Results are calculated by subtraction of applicable PAH concentrations from EPH10-19 and EPH19-32, as per the BC Lab Manual LEPH/HEPH calculation procedure.
LEPHs = EPH10-19 minus Acenaphthene, Acridine, Anthracene, Fluorene, Naphthalene and Phenanthrene.
HEPHs = EPH19-32 minus Benz(a)anthracene, Benzo(a)pyrene, Fluoranthene, and Pyrene.

MET-200.2-CCMS-VA	Soil	Metals in Soil by CRC ICPMS	EPA 200.2/6020A (mod)

Reference Information

This method uses a heated strong acid digestion with HNO3 and HCl and is intended to liberate metals that may be environmentally available. Silicate minerals are not solubilized. Dependent on sample matrix, some metals may be only partially recovered, including Al, Ba, Be, Cr, Sr, Ti, Tl, V, W, and Zr. Volatile forms of sulfur (including sulfide) may not be captured, as they may be lost during sampling, storage, or digestion. Analysis is by Collision/Reaction Cell ICPMS.

MOISTURE-VA	Soil	Moisture content	CWS for PHC in Soil - Tier 1

This analysis is carried out gravimetrically by drying the sample at 105 C for a minimum of six hours.

OGG-TUMB-SG-VA	Soil	Mineral Oil & Grease in Soil	CCME PETROLEUM HYDROCARBONS-GRAVIMETRIC

This analysis is carried out in accordance with the "Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil - Tier 1 Method, Canadian Council of Ministers of the Environment, December 2000." A subsample of the sediment/soil is extracted with 1:1 hexane:acetone using a rotary extraction apparatus. The extract undergoes a silica-gel clean-up to remove polar compounds, and is analyzed gravimetrically. Mineral Oil and Grease is equivalent to fraction F4G of the Canada-wide Standard for Petroleum Hydrocarbons.

Accuracy target values for Reference Materials used in this method are derived from averages of long-term method performance, as certified values do not exist for the reported parameters.

PAH-TMB-H/A-MS-VA	Soil	PAH - Rotary Extraction (Hexane/Acetone)	EPA 3570/8270

This analysis is carried out using procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846, Methods 3570 & 8270, published by the United States Environmental Protection Agency (EPA). The procedure uses a mechanical shaking technique to extract a subsample of the sediment/soil with a 1:1 mixture of hexane and acetone. The extract is then solvent exchanged to toluene. The final extract is analysed by capillary column gas chromatography with mass spectrometric detection (GC/MS). Surrogate recoveries may not be reported in cases where interferences from the sample matrix prevent accurate quantitation. Because the two isomers cannot be readily chromatographically separated, benzo(j)fluoranthene is reported as part of the benzo(b)fluoranthene parameter.

Benzo(a)pyrene Total Potency Equivalents [B(a)P TPE] represents the sum of estimated cancer potency relative to B(a)P for all potentially carcinogenic unsubstituted PAHs, and is calculated as per the CCME PAH Soil Quality Guidelines reference document (2010).

PH-1:2-VA	Soil	pH in Soil (1:2 Soil:Water Extraction)	BC WLAP METHOD: PH, ELECTROMETRIC, SOIL

This analysis is carried out in accordance with procedures described in the pH, Electrometric in Soil and Sediment method - Section B Physical/Inorganic and Misc. Constituents, BC Environmental Laboratory Manual 2007. The procedure involves mixing the dried (at <60°C) and sieved (No. 10 / 2mm) sample with deionized/distilled water at a 1:2 ratio of sediment to water. The pH of the solution is then measured using a standard pH probe.

PSA-PIPET+GRAVEL-SK	Soil	Particle size - Sieve and Pipette	SSIR-51 METHOD 3.2.1

Particle size distribution is determined by a combination of techniques. Dry sieving is performed for coarse particles, wet sieving for sand particles and the pipette sedimentation method for clay particles.

Reference:

Burt, R. (2009). Soil Survey Field and Laboratory Methods Manual. Soil Survey Investigations Report No. 5. Method 3.2.1.2.2. United States Department of Agriculture Natural Resources Conservation Service.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
SK	ALS ENVIRONMENTAL - SASKATOON, SASKATCHEWAN, CANADA
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

Reference Information

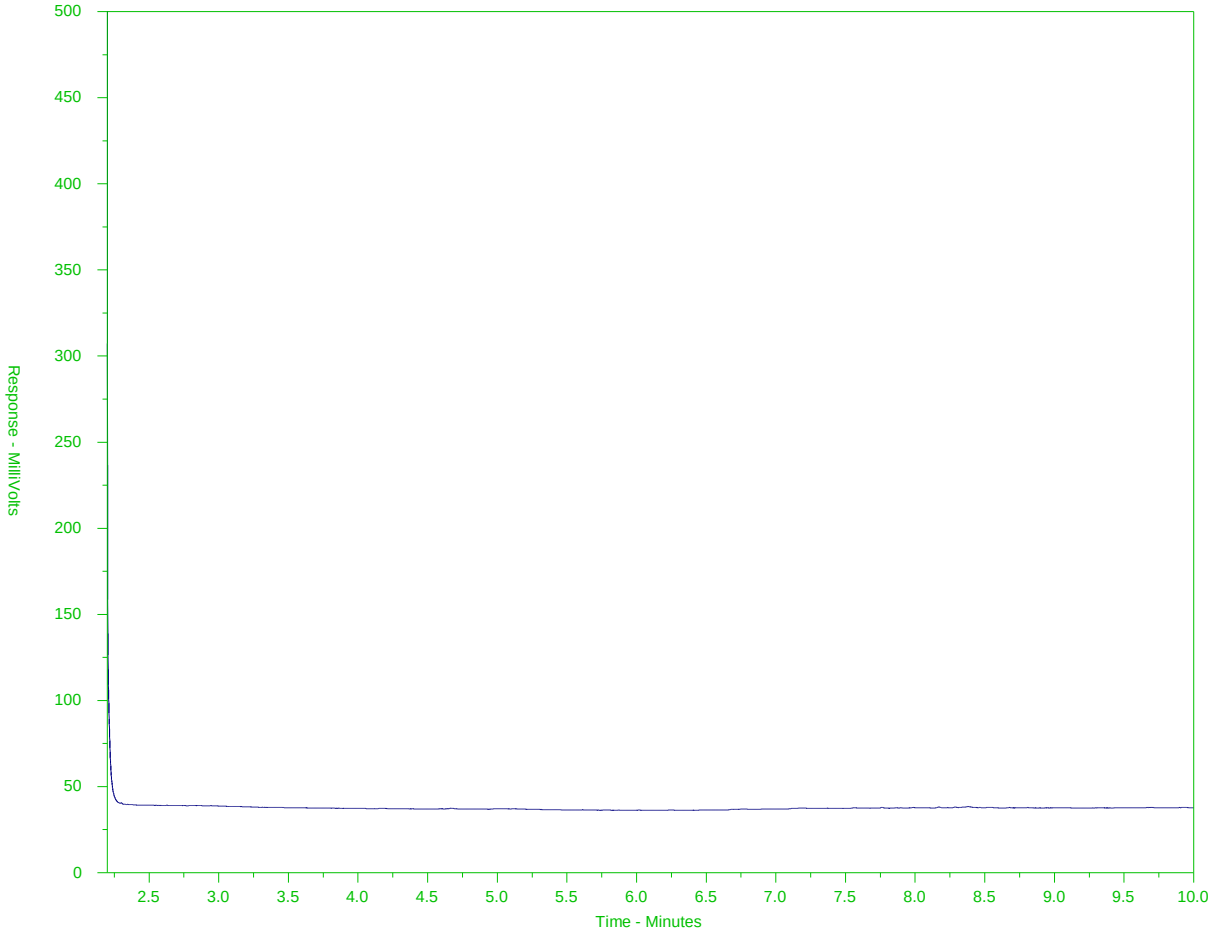
GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

BC EPH HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2155885-6
Client Sample ID: WTS-COMP



← EPH10-19 →		← EPH19-32 →
nC10	nC19	nC32
174°C	330°C	467°C
346°F	626°F	873°F
← Gasoline →	← Motor Oils/ Lube Oils/ Grease →	
← Diesel/ Jet Fuels →		

The BC EPH Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and three n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

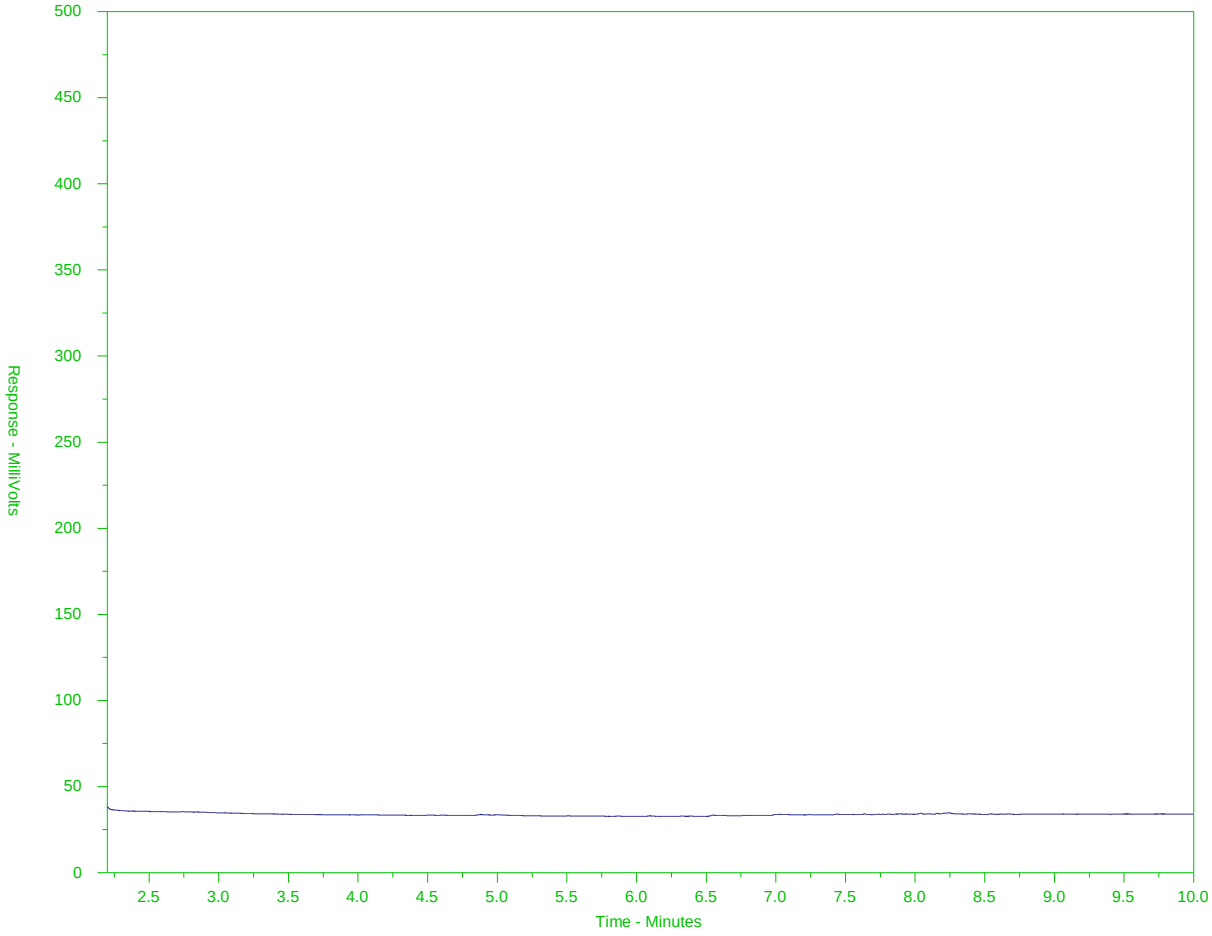
Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the scale at left.

A "-L-" in the sample ID denotes a low level sample. A "-S-" denotes a silica gel cleaned sample.

Note: This chromatogram was produced using GC conditions that are specific to the ALS Canada EPH method. Refer to the ALS Canada EPH Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR library can be found at www.alsglobal.com.

BC EPH HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: WG2865802-3#L2155885-6
Client Sample ID: WTS-COMP



← EPH10-19 →		← EPH19-32 →
nC10	nC19	nC32
174°C	330°C	467°C
346°F	626°F	873°F
← Gasoline →	← Motor Oils/ Lube Oils/ Grease →	
← Diesel/ Jet Fuels →		

The BC EPH Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and three n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

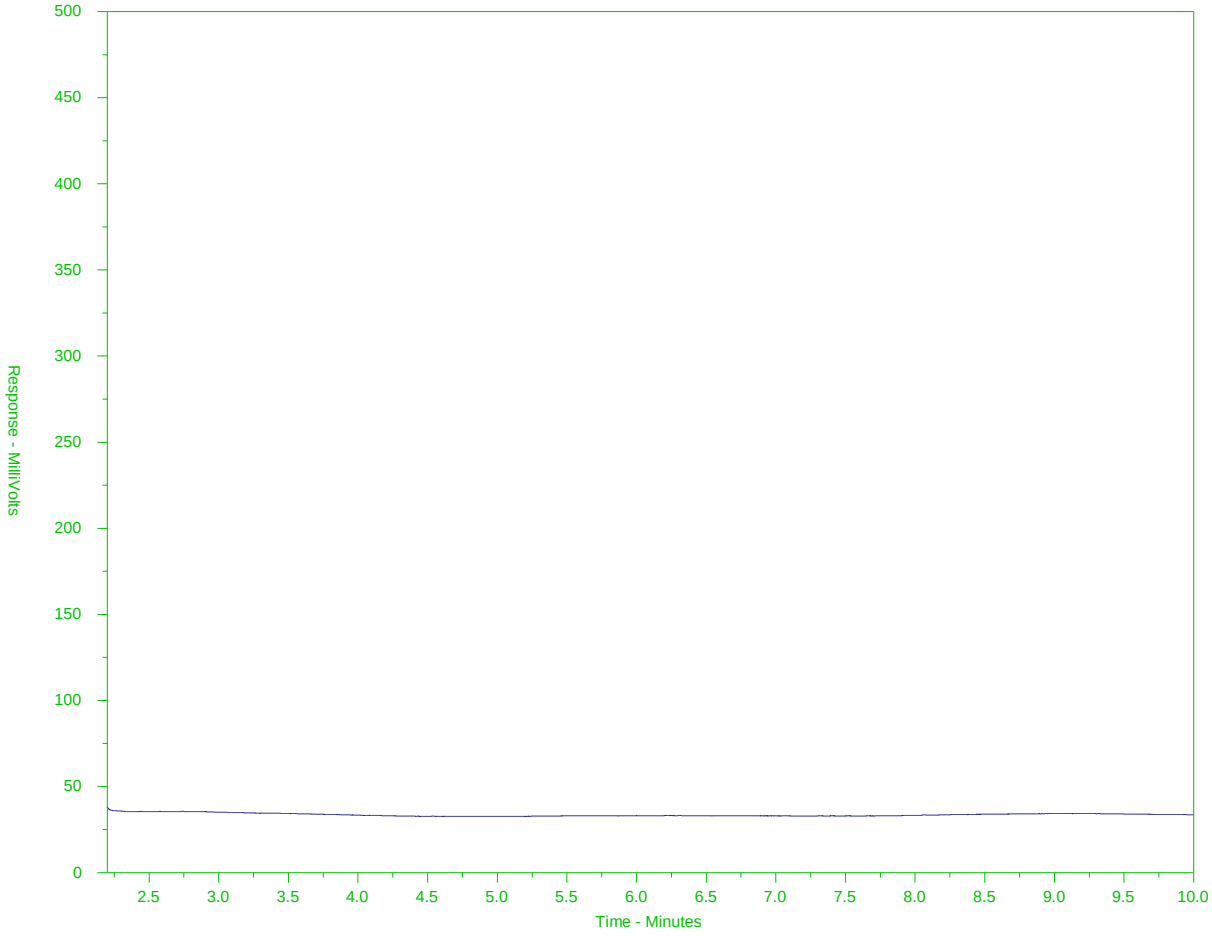
Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the scale at left.

A "-L-" in the sample ID denotes a low level sample. A "-S-" denotes a silica gel cleaned sample.

Note: This chromatogram was produced using GC conditions that are specific to the ALS Canada EPH method. Refer to the ALS Canada EPH Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR library can be found at www.alsglobal.com.

BC EPH HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2155885-12
Client Sample ID: MAM-COMP



← EPH10-19 →		← EPH19-32 →
nC10	nC19	nC32
174°C	330°C	467°C
346°F	626°F	873°F
← Gasoline →	← Motor Oils/ Lube Oils/ Grease →	
← Diesel/ Jet Fuels →		

The BC EPH Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and three n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

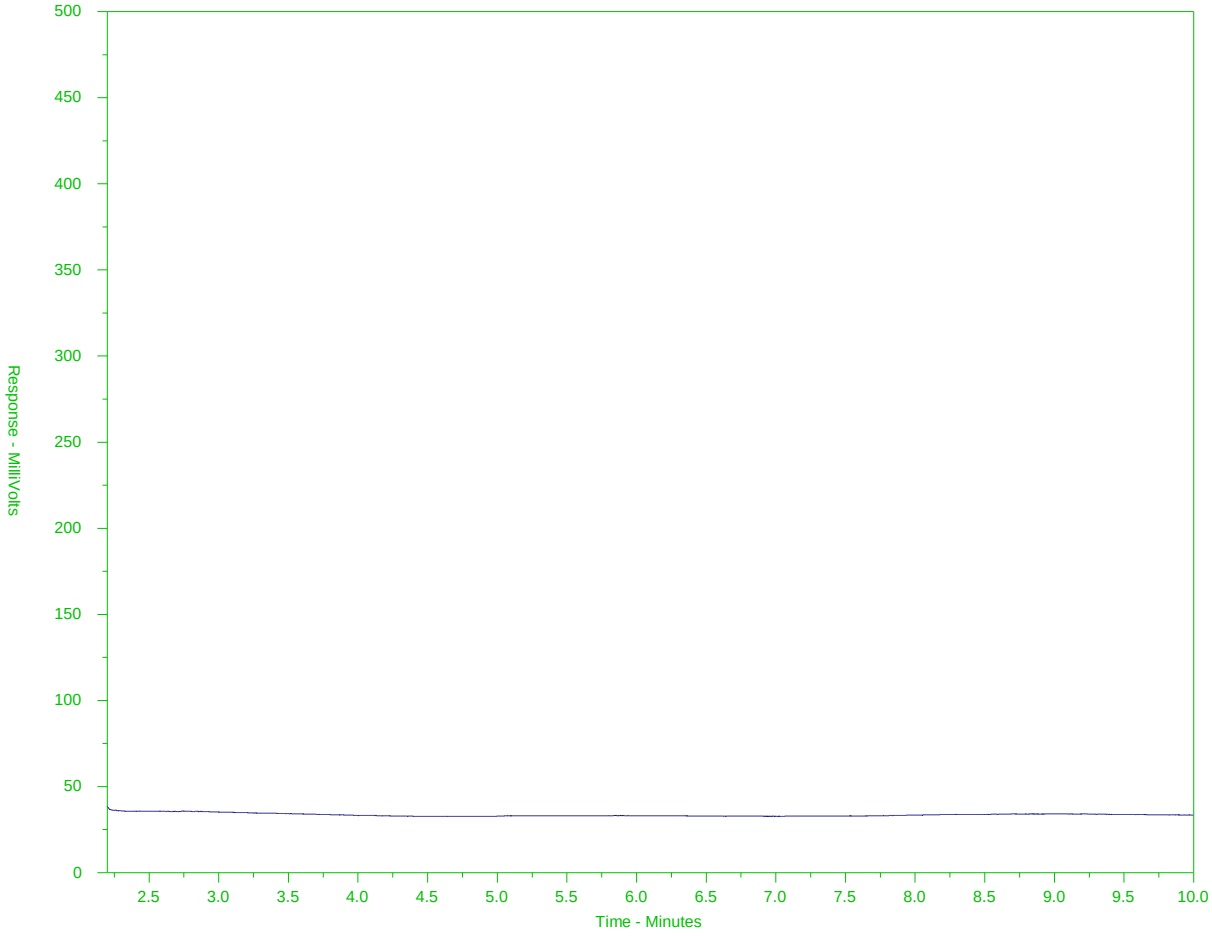
Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the scale at left.

A "-L-" in the sample ID denotes a low level sample. A "-S-" denotes a silica gel cleaned sample.

Note: This chromatogram was produced using GC conditions that are specific to the ALS Canada EPH method. Refer to the ALS Canada EPH Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR library can be found at www.alsglobal.com.

BC EPH HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2155885-18
Client Sample ID: A20-COMP



← EPH10-19 →		← EPH19-32 →
nC10	nC19	nC32
174°C	330°C	467°C
346°F	626°F	873°F
← Gasoline →	← Motor Oils/ Lube Oils/ Grease →	
← Diesel/ Jet Fuels →		

The BC EPH Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and three n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

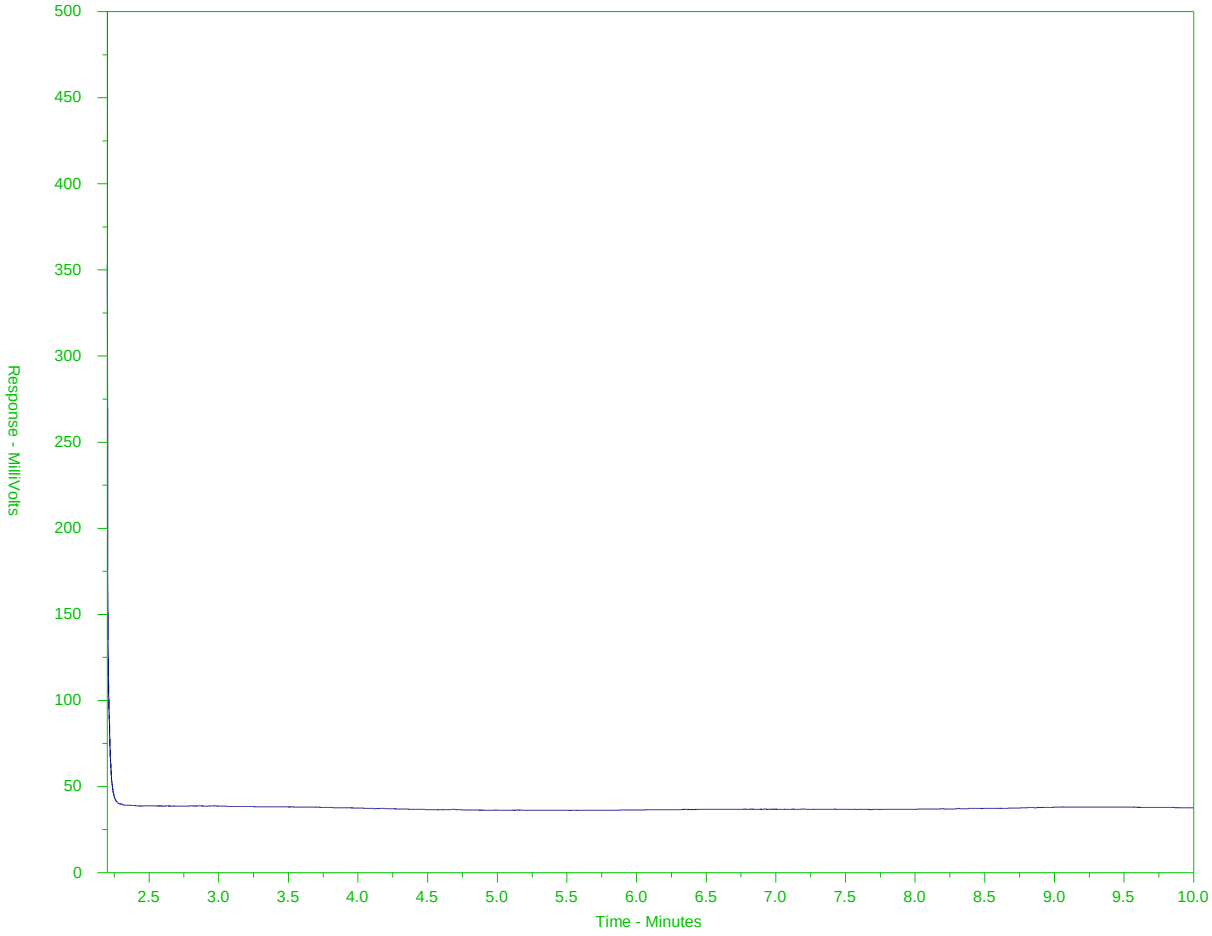
Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the scale at left.

A "-L-" in the sample ID denotes a low level sample. A "-S-" denotes a silica gel cleaned sample.

Note: This chromatogram was produced using GC conditions that are specific to the ALS Canada EPH method. Refer to the ALS Canada EPH Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR library can be found at www.alsglobal.com.

BC EPH HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2155885-24
Client Sample ID: A76-COMP



← EPH10-19 →		← EPH19-32 →
nC10	nC19	nC32
174°C	330°C	467°C
346°F	626°F	873°F
← Gasoline →	← Motor Oils/ Lube Oils/ Grease →	
← Diesel/ Jet Fuels →		

The BC EPH Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and three n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

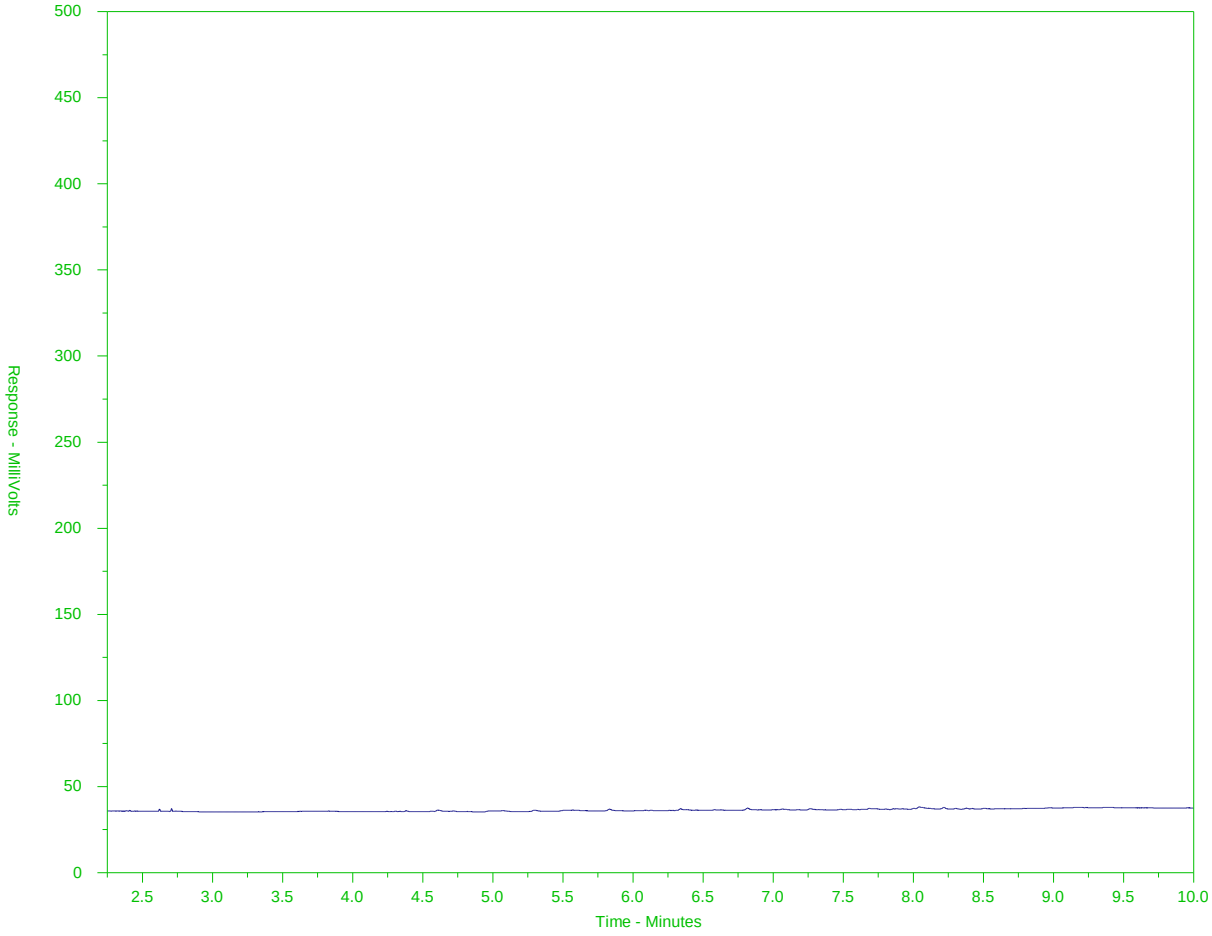
Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the scale at left.

A "-L-" in the sample ID denotes a low level sample. A "-S-" denotes a silica gel cleaned sample.

Note: This chromatogram was produced using GC conditions that are specific to the ALS Canada EPH method. Refer to the ALS Canada EPH Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR library can be found at www.alsglobal.com.

BC EPH HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2155885-30
Client Sample ID: DS1-COMP



← EPH10-19 →		← EPH19-32 →
nC10	nC19	nC32
174°C	330°C	467°C
346°F	626°F	873°F
← Gasoline →	← Motor Oils/ Lube Oils/ Grease →	
← Diesel/ Jet Fuels →		

The BC EPH Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and three n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

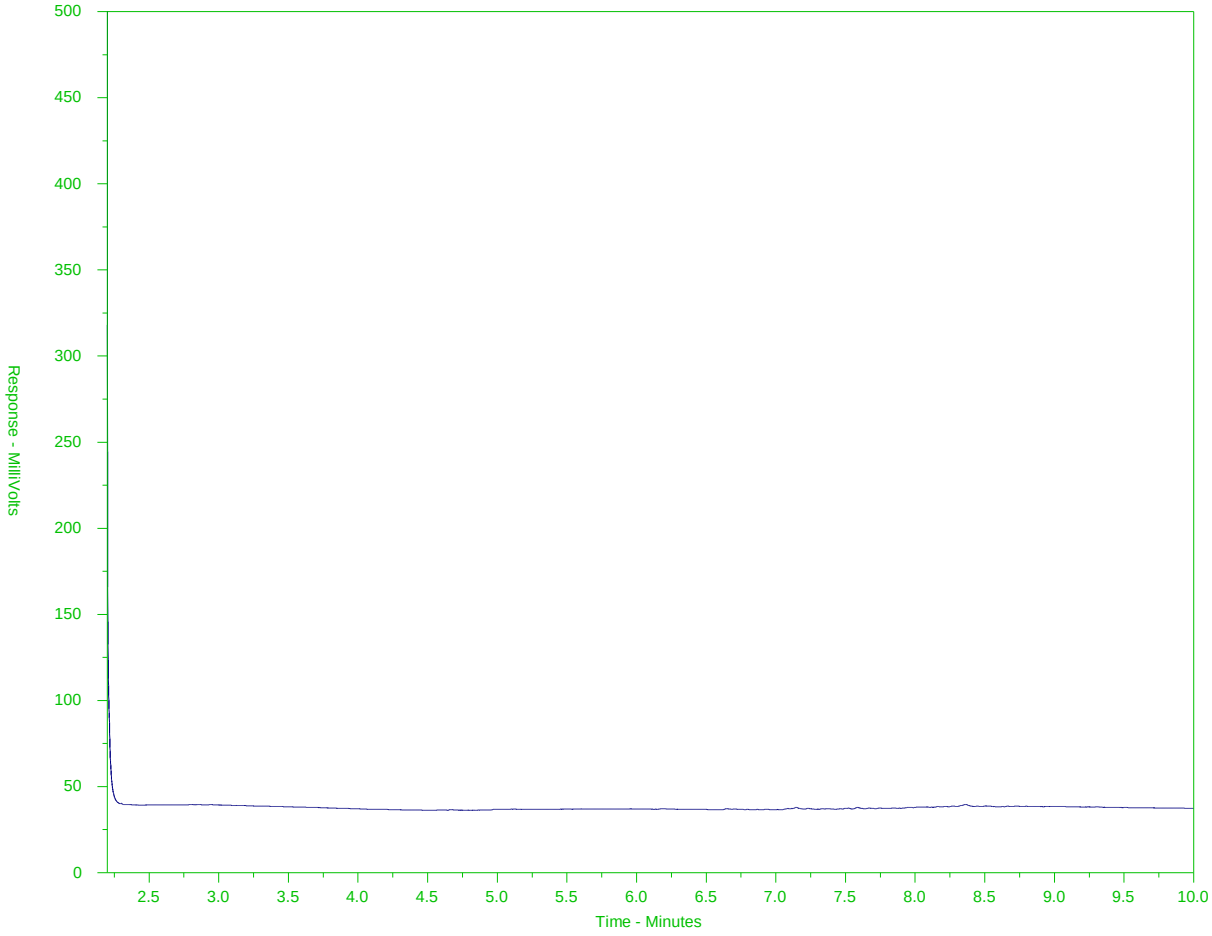
Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the scale at left.

A "-L-" in the sample ID denotes a low level sample. A "-S-" denotes a silica gel cleaned sample.

Note: This chromatogram was produced using GC conditions that are specific to the ALS Canada EPH method. Refer to the ALS Canada EPH Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR library can be found at www.alsglobal.com.

BC EPH HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2155885-36
Client Sample ID: NEM-COMP



← EPH10-19 →		← EPH19-32 →
nC10	nC19	nC32
174°C	330°C	467°C
346°F	626°F	873°F
← Gasoline →	← Motor Oils/ Lube Oils/ Grease →	
← Diesel/ Jet Fuels →		

The BC EPH Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and three n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

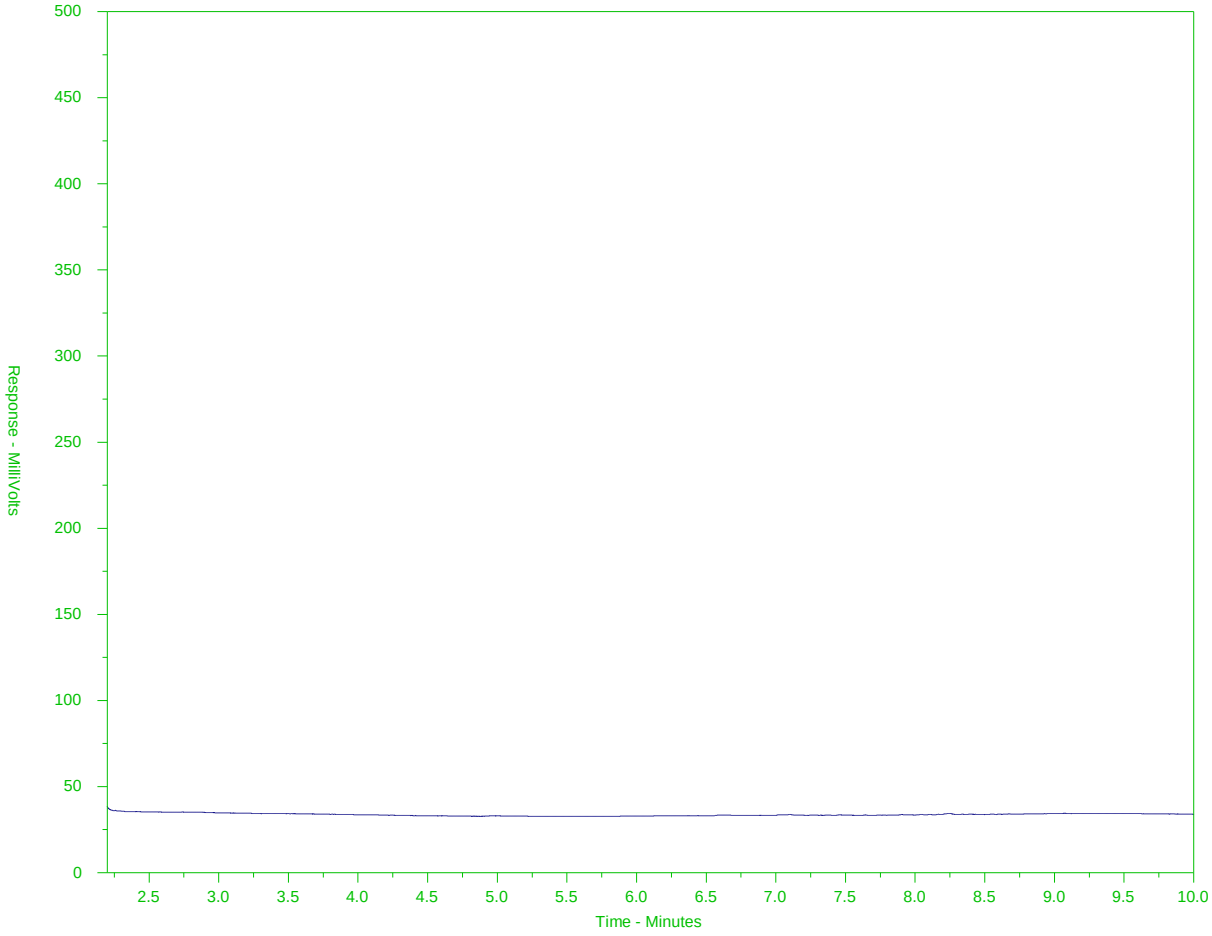
Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the scale at left.

A "-L-" in the sample ID denotes a low level sample. A "-S-" denotes a silica gel cleaned sample.

Note: This chromatogram was produced using GC conditions that are specific to the ALS Canada EPH method. Refer to the ALS Canada EPH Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR library can be found at www.alsglobal.com.

BC EPH HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2155885-42
Client Sample ID: LK1-COMP



← EPH10-19 →		← EPH19-32 →
nC10	nC19	nC32
174°C	330°C	467°C
346°F	626°F	873°F
← Gasoline →	← Motor Oils/ Lube Oils/ Grease →	
← Diesel/ Jet Fuels →		

The BC EPH Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and three n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

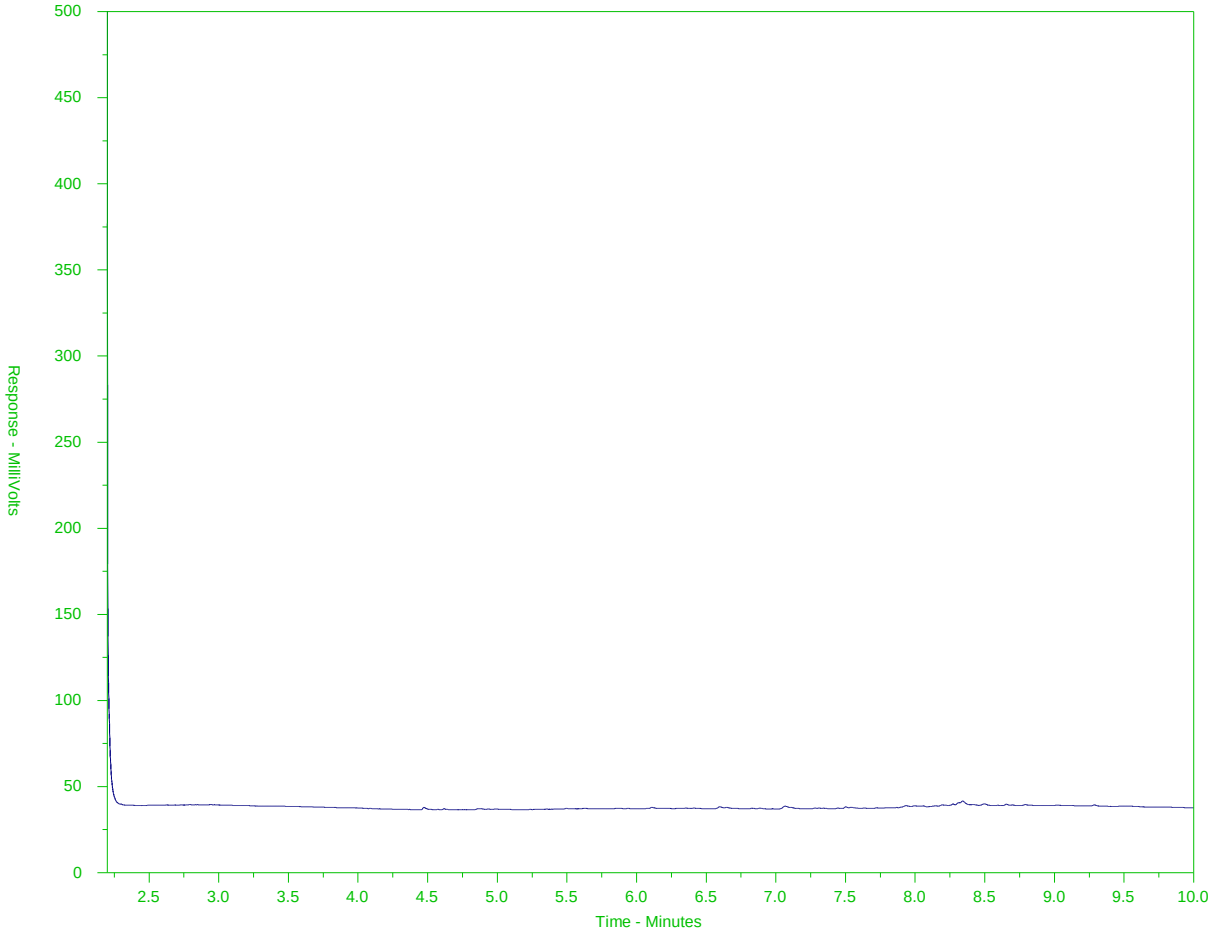
Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the scale at left.

A "-L-" in the sample ID denotes a low level sample. A "-S-" denotes a silica gel cleaned sample.

Note: This chromatogram was produced using GC conditions that are specific to the ALS Canada EPH method. Refer to the ALS Canada EPH Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR library can be found at www.alsglobal.com.

BC EPH HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2155885-48
Client Sample ID: LK5-COMP



← EPH10-19 →		← EPH19-32 →
nC10	nC19	nC32
174°C	330°C	467°C
346°F	626°F	873°F
← Gasoline →	← Motor Oils/ Lube Oils/ Grease →	
← Diesel/ Jet Fuels →		

The BC EPH Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and three n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

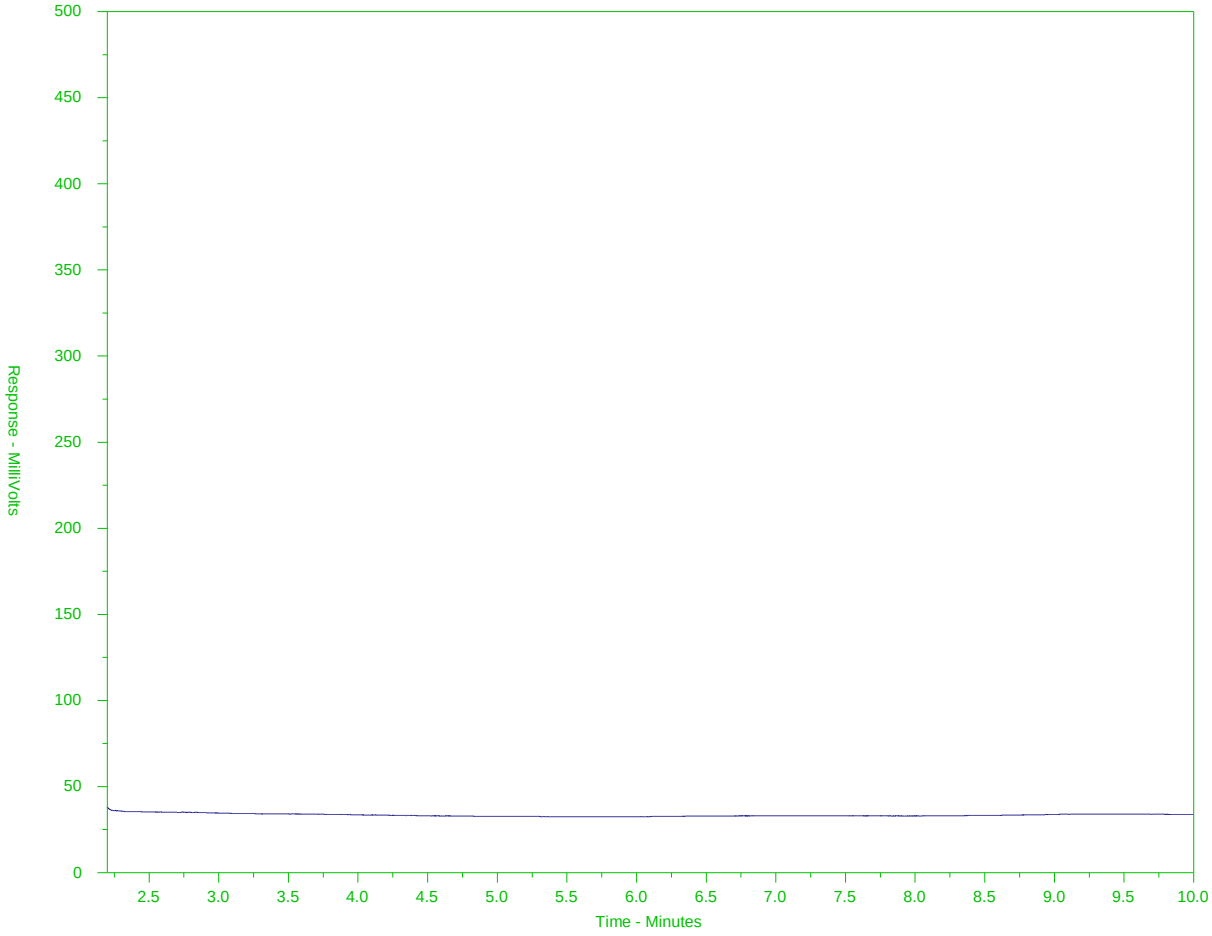
Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the scale at left.

A "-L-" in the sample ID denotes a low level sample. A "-S-" denotes a silica gel cleaned sample.

Note: This chromatogram was produced using GC conditions that are specific to the ALS Canada EPH method. Refer to the ALS Canada EPH Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR library can be found at www.alsglobal.com.

BC EPH HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2155885-54
Client Sample ID: LK8-COMP



← EPH10-19 →		← EPH19-32 →
nC10	nC19	nC32
174°C	330°C	467°C
346°F	626°F	873°F
← Gasoline →	← Motor Oils/ Lube Oils/ Grease →	
← Diesel/ Jet Fuels →		

The BC EPH Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and three n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

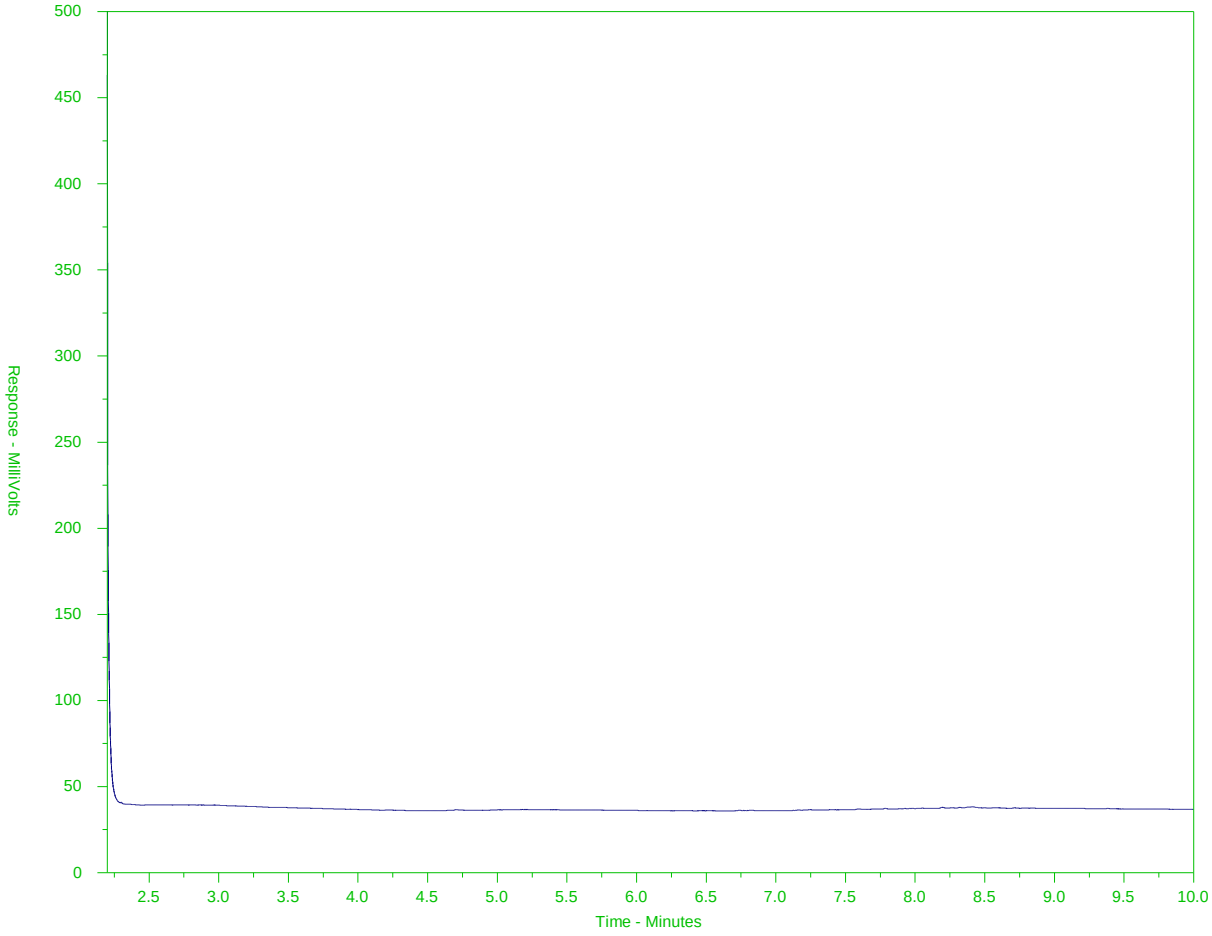
Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the scale at left.

A "-L-" in the sample ID denotes a low level sample. A "-S-" denotes a silica gel cleaned sample.

Note: This chromatogram was produced using GC conditions that are specific to the ALS Canada EPH method. Refer to the ALS Canada EPH Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR library can be found at www.alsglobal.com.

BC EPH HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2155885-58
Client Sample ID: WTP COMP DUP-1



← EPH10-19 →		← EPH19-32 →
nC10	nC19	nC32
174°C	330°C	467°C
346°F	626°F	873°F
← Gasoline →	← Motor Oils/ Lube Oils/ Grease →	
← Diesel/ Jet Fuels →		

The BC EPH Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and three n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

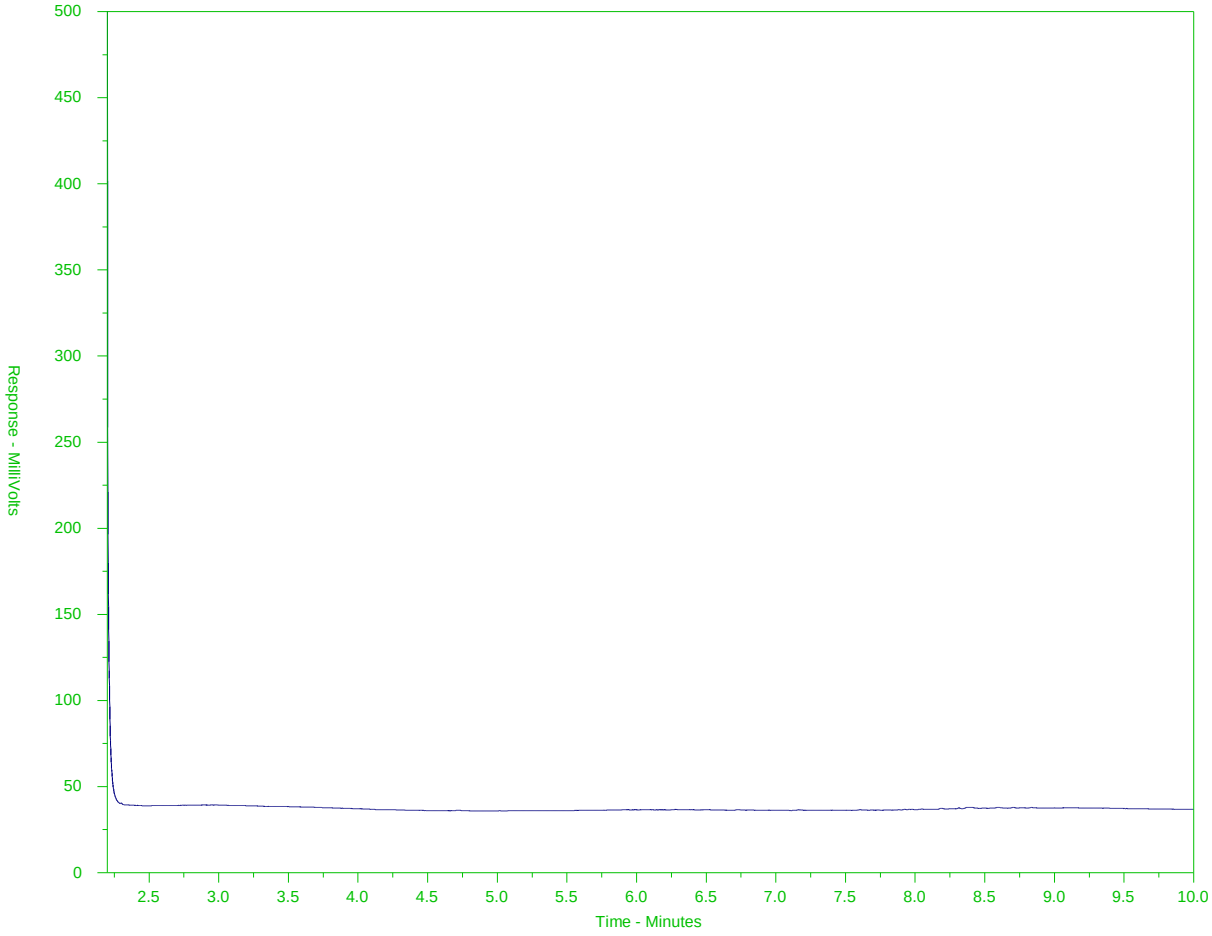
Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the scale at left.

A "-L-" in the sample ID denotes a low level sample. A "-S-" denotes a silica gel cleaned sample.

Note: This chromatogram was produced using GC conditions that are specific to the ALS Canada EPH method. Refer to the ALS Canada EPH Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR library can be found at www.alsglobal.com.

BC EPH HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2155885-59
Client Sample ID: WTP COMP DUP-2



← EPH10-19 →	← EPH19-32 →	
nC10	nC19	nC32
174°C	330°C	467°C
346°F	626°F	873°F
← Gasoline →	← Motor Oils/ Lube Oils/ Grease →	
← Diesel/ Jet Fuels →		

The BC EPH Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and three n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the scale at left.

A "-L-" in the sample ID denotes a low level sample. A "-S-" denotes a silica gel cleaned sample.

Note: This chromatogram was produced using GC conditions that are specific to the ALS Canada EPH method. Refer to the ALS Canada EPH Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR library can be found at www.alsglobal.com.

ALS Environmental

L2155885-COFC

COC # _____

Page 1 of 6

Report To		Report Format / Distribution	Service Requested (Rush for routine analysis subject to availability)
Company:	Azimuth Consulting Group	☐ Standard ☐ Other	◉ Regular (Standard Turnaround Times - Business Days)
Contact:	Eric Franz	☑ PDF ☑ Excel ☐ Digital ☐ Fax	○ Priority (2-4 Business Days) - 50% Surcharge - Contact ALS to Confirm TAT
Address:	218-2902 West Broadway	Email 1: efranz@azimuthgroup.ca	○ Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT
	Vancouver, BC V6K2G8	Email 2: mfinley@azimuthgroup.ca	○ Same Day or Weekend Emergency - Contact ALS to Confirm TAT
Phone:	604-730-1220 Fax:	Email 3: robin.allard@agnicoeagle.com	
Invoice To	Same as Report ? ☑ Yes ☐ No	**Client / Project Information**	**Analysis Request**
Hardcopy of Invoice with Report?	☐ Yes ☑ No	Job #: CREMP WTP Sediment	Please indicate below Filtered, Preserved or both (F, P, F/P)
Company:		PO / AFE:	
Contact:		LSD:	
Address:			
Phone:	Fax:	Quote #: Q38011	
Lab Work Order # (lab use only)		**ALS Contact:** Brent Mack	**Sampler:** E. Franz, M. Finley

Sample #	Sample Identification (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Total Metals, pH, Moisture	TOC, Grain size	PAHs, LEPHs, HEPHs, MOG									Number of Containers
	WTS-1	13-Aug-18	-	Sediment	X	X										3
	WTS-2	13-Aug-18	-	Sediment	X	X										3
	WTS-3	13-Aug-18	-	Sediment	X	X										3
	WTS-4	13-Aug-18	-	Sediment	X	X										3
	WTS-5	13-Aug-18	-	Sediment	X	X										3
	WTS-COMP	13-Aug-18	-	Sediment			X									1
	MAM-1	16-Aug-18	-	Sediment	X	X										3
	MAM-2	16-Aug-18	-	Sediment	X	X										3
	MAM-3	16-Aug-18	-	Sediment	X	X										3
	MAM-4	16-Aug-18	-	Sediment	X	X										3
	MAM-5	16-Aug-18	-	Sediment	X	X										3
	MAM-COMP	16-Aug-18	-	Sediment			X									1

Special Instructions / Regulations with water or land use (CCME-Freshwater Aquatic Life/BC CSR - Commercial/AB Tier 1 - Natural, etc) / Hazardous Details

Homogenize sediment from samples with 3 jars before subsampling for the various analyses.

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Also provided on another Excel tab are the ALS location addresses, phone numbers and sample container / preservation / holding time table for common analyses.

SHIPMENT RELEASE (client use)			SHIPMENT RECEPTION (lab use only)				SHIPMENT VERIFICATION (lab use only)			
Released by:	Date (dd-mmm-yy)	Time (hh-mm)	Received by:	Date:	Time:	Temperature:	Verified by:	Date:	Time:	Observations: Yes / No ? If Yes add SIF
Eric Franz			PAUL	AUG 30	08:50	17.9 °C				

AV OF 6 COOLERS

GENF 20.00 Front

ALS Environmental

L2155885-COFC

COC # _____

Page 2 of 6

Report To		Report Format / Distribution	Service Requested (Rush for routine analysis subject to availability)
Company:	Azimuth Consulting Group	☐ Standard ☐ Other	◉ Regular (Standard Turnaround Times - Business Days)
Contact:	Eric Franz	☑ PDF ☑ Excel ☐ Digital ☐ Fax	○ Priority (2-4 Business Days) - 50% Surcharge - Contact ALS to Confirm TAT
Address:	218-2902 West Broadway	Email 1: efranz@azimuthgroup.ca	○ Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT
	Vancouver, BC V6K2G8	Email 2: mfinley@azimuthgroup.ca	○ Same Day or Weekend Emergency - Contact ALS to Confirm TAT
Phone:	604-730-1220 Fax:	Email 3: robin.allard@agnicoeagle.com	
Invoice To	Same as Report ? ☑ Yes ☐ No	**Client / Project Information**	**Analysis Request**
Hardcopy of Invoice with Report?	☐ Yes ☑ No	Job #: CREMP WTP Sediment	Please indicate below Filtered, Preserved or both (F, P, F/P)
Company:		PO / AFE:	
Contact:		LSD:	
Address:			
Phone:	Fax:	Quote #: Q38011	

Lab Work Order # (lab use only)		**ALS Contact:** Brent Mack	**Sampler:** E. Franz, M. Finley

Sample #	Sample Identification (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Total Metals, pH, Moisture	TOC, Grain size	PAHs, LEPHs, HEPHs, MOG	Number of Containers
	A20-1	18-Aug-18	-	Sediment	X	X		3
	A20-2	18-Aug-18	-	Sediment	X	X		3
	A20-3	18-Aug-18	-	Sediment	X	X		3
	A20-4	18-Aug-18	-	Sediment	X	X		3
	A20-5	18-Aug-18	-	Sediment	X	X		3
	A20-COMP	18-Aug-18	-	Sediment			X	1
	A76-1	18-Aug-18	-	Sediment	X	X		3
	A76-2	18-Aug-18	-	Sediment	X	X		3
	A76-3	18-Aug-18	-	Sediment	X	X		3
	A76-4	18-Aug-18	-	Sediment	X	X		3
	A76-5	18-Aug-18	-	Sediment	X	X		3
	A76-COMP	18-Aug-18	-	Sediment			X	1

Special Instructions / Regulations with water or land use (CCME-Freshwater Aquatic Life/BC CSR - Commercial/AB Tier 1 - Natural, etc) / Hazardous Details

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SHIPMENT RELEASE (client use)			SHIPMENT RECEPTION (lab use only)				SHIPMENT VERIFICATION (lab use only)			
Released by:	Date (dd-mmm-yy)	Time (hh-mm)	Received by:	Date:	Time:	Temperature:	Verified by:	Date:	Time:	Observations: Yes / No ? If Yes add SIF
Eric Franz			PAUL	AUG 30	08:50	17.9 °C				

AV OF 6 COOLERS

GENF 20.00 Front

ALS Environmental

L2155885-COFC

COC # _____

Page 3 of 6

Report To		Report Format / Distribution	Service Requested (Rush for routine analysis subject to availability)
Company:	Azimuth Consulting Group	☐ Standard ☐ Other	◉ Regular (Standard Turnaround Times - Business Days)
Contact:	Eric Franz	☑ PDF ☑ Excel ☐ Digital ☐ Fax	○ Priority (2-4 Business Days) - 50% Surcharge - Contact ALS to Confirm TAT
Address:	218-2902 West Broadway	Email 1: efranz@azimuthgroup.ca	○ Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT
	Vancouver, BC V6K2G8	Email 2: mfinley@azimuthgroup.ca	○ Same Day or Weekend Emergency - Contact ALS to Confirm TAT
Phone:	604-730-1220 Fax:	Email 3: robin.allard@agnicoeagle.com	
Invoice To	Same as Report ? ☑ Yes ☐ No	Client / Project Information	Analysis Request
Hardcopy of Invoice with Report?	☐ Yes ☑ No	Job #: CREMP WTP Sediment	Please indicate below Filtered, Preserved or both (F, P, F/P)
Company:		PO / AFE:	
Contact:		LSD:	
Address:			
Phone:	Fax:	Quote #: Q38011	
Lab Work Order # (lab use only)		ALS Contact: Brent Mack	Sampler: E. Franz, M. Finley

Sample #	Sample Identification (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Total Metals, pH, Moisture	TOC, Grain size	PAHs, LEPHs, HEPHs, MOG									Number of Containers
	DS1-1	19-Aug-18	-	Sediment	X	X										3
	DS1-2	19-Aug-18	-	Sediment	X	X										3
	DS1-3	19-Aug-18	-	Sediment	X	X										3
	DS1-4	19-Aug-18	-	Sediment	X	X										3
	DS1-5	19-Aug-18	-	Sediment	X	X										3
	DS1-COMP	19-Aug-18	-	Sediment			X									1
	NEM-1	17-Aug-18	-	Sediment	X	X										3
	NEM-2	17-Aug-18	-	Sediment	X	X										3
	NEM-3	17-Aug-18	-	Sediment	X	X										3
	NEM-4	17-Aug-18	-	Sediment	X	X										3
	NEM-5	17-Aug-18	-	Sediment	X	X										3
	NEM-COMP	17-Aug-18	-	Sediment			X									1

Special Instructions / Regulations with water or land use (CCME-Freshwater Aquatic Life/BC CSR - Commercial/AB Tier 1 - Natural, etc) / Hazardous Details

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SHIPMENT RELEASE (client use)			SHIPMENT RECEPTION (lab use only)				SHIPMENT VERIFICATION (lab use only)			
Released by:	Date (dd-mmm-yy)	Time (hh-mm)	Received by:	Date:	Time:	Temperature:	Verified by:	Date:	Time:	Observations: Yes / No ? If Yes add SIF
Eric Franz			PAUL	AUG 30	08:50	17.9 °C				

AV. OF 6 COOLERS

GENF 20.00 Front

ALS Environmental

L2155885-COFC

rm

COC # _____

Report To		Report Format / Distribution		Service Requested (Rush for routine analysis subject to availability)
Company:	Azimuth Consulting Group	☐ Standard ☐ Other		◉ Regular (Standard Turnaround Times - Business Days)
Contact:	Eric Franz	☑ PDF ☑ Excel ☐ Digital ☐ Fax		○ Priority (2-4 Business Days) - 50% Surcharge - Contact ALS to Confirm TAT
Address:	218-2902 West Broadway	Email 1:	efranz@azimuthgroup.ca	○ Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT
	Vancouver, BC V6K2G8	Email 2:	mfinley@azimuthgroup.ca	○ Same Day or Weekend Emergency - Contact ALS to Confirm TAT
Phone:	604-730-1220 Fax:	Email 3:	robin.allard@agnicoeagle.com	
Invoice To	Same as Report ? ☑ Yes ☐ No	**Client / Project Information**		**Analysis Request**
Hardcopy of Invoice with Report?	☐ Yes ☑ No	Job #:	CREMP WTP Sediment	Please indicate below Filtered, Preserved or both (F, P, F/P)
Company:		PO / AFE:		
Contact:		LSD:		
Address:				
Phone:	Fax:	Quote #:	Q38011	
Lab Work Order # (lab use only)		**ALS Contact:**	Brent Mack	**Sampler:** E. Franz, M. Finley

Sample #	Sample Identification (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Total Metals, pH, Moisture	TOC, Grain size	PAHs, LEPHs, HEPHs, MOG									Number of Containers
	LK1-1	15-Aug-18		Sediment	X	X										3
	LK1-2	15-Aug-18		Sediment	X	X										3
	LK1-3	15-Aug-18		Sediment	X	X										3
	LK1-4	15-Aug-18		Sediment	X	X										3
	LK1-5	15-Aug-18		Sediment	X	X										3
	LK1-COMP	15-Aug-18		Sediment			X									1
	LK5-1	16-Aug-18		Sediment	X	X										3
	LK5-2	16-Aug-18		Sediment	X	X										3
	LK5-3	16-Aug-18		Sediment	X	X										3
	LK5-4	16-Aug-18		Sediment	X	X										3
	LK5-5	16-Aug-18		Sediment	X	X										3
	LK5-COMP	16-Aug-18		Sediment			X									1

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Released by:	Date (dd-mmm-yy)	Time (hh-mm)	Received by:	Date:	Time:	Temperature:	Verified by:	Date:	Time:	Observations: Yes / No ? If Yes add SIF
Eric Franz			PAUL	AUG 30	08:50	17.9 °C				

AV. OF 6 COOLERS



L2155885-COFC

rm

COC # _____

ALS Environmental

Report To		Report Format / Distribution	Service Requested (Rush for routine analysis subject to availability)
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Contact:	Eric Franz	☑ PDF ☑ Excel ☐ Digital ☐ Fax	○ Priority (2-4 Business Days) - 50% Surcharge - Contact ALS to Confirm TAT
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	Vancouver, BC V6K2G8	Email 2: mfinley@azimuthgroup.ca	○ Same Day or Weekend Emergency - Contact ALS to Confirm TAT
Phone:	604-730-1220 Fax:	Email 3: robin.allard@agnicoeagle.com	
Invoice To	Same as Report ? ☑ Yes ☐ No	**Client / Project Information**	**Analysis Request**
Hardcopy of Invoice with Report?	☐ Yes ☑ No	Job #: CREMP WTP Sediment	Please indicate below Filtered, Preserved or both (F, P, F/P)
Company:		PO / AFE:	
Contact:		LSD:	
Address:			
Phone:	Fax:	Quote #: Q38011	
Lab Work Order # (lab use only)		**ALS Contact:** Brent Mack	**Sampler:** E. Franz, M. Finley

Sample #	Sample Identification (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Total Metals, pH, Moisture	TOC, Grain size	PAHs, LEPHs, HEPHs, MOG									Number of Containers
	LK8-1	17-Aug-18	-	Sediment	X	X										3
	LK8-2	17-Aug-18	-	Sediment	X	X										3
	LK8-3	17-Aug-18	-	Sediment	X	X										3
	LK8-4	17-Aug-18	-	Sediment	X	X										3
	LK8-5	17-Aug-18	-	Sediment	X	X										3
	LK8-COMP	17-Aug-18	-	Sediment			X									1
	WTP DUP-1	-	-	Sediment	X	X										3
	WTP DUP-2	-	-	Sediment	X	X										3
	WTP-DUP-3	-	-	Sediment	X											1
	WTP COMP DUP-1	-	-	Sediment			X									1
	WTP COMP DUP-2	-	-	Sediment			X									1
	WTN-1	18-Aug-18	-	Sediment	X											1

Special Instructions / Regulations with water or land use (CCME-Freshwater Aquatic Life/BC CSR - Commercial/AB Tier 1 - Natural, etc) / Hazardous Details

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SHIPMENT RELEASE (client use)			SHIPMENT RECEPTION (lab use only)				SHIPMENT VERIFICATION (lab use only)			
Released by:	Date (dd-mmm-yy)	Time (hh-mm)	Received by:	Date:	Time:	Temperature:	Verified by:	Date:	Time:	Observations: Yes / No ? If Yes add SIF
Eric Franz			PAUL	AUG 30	08:50	17.9 °C				

AV. OF 6 COOLERS

ALS Environmental

L2155885-COFC

COC # _____

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Company:		PO / AFE:	
Contact:		LSD:	
Address:			
Phone:	Fax:	Quote #: Q38011	
Lab Work Order # (lab use only)		**ALS Contact:** Brent Mack **Sampler:** E. Franz, M. Finley	

Sample #	Sample Identification (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Total Metals, pH, Moisture	TOC, Grain size	PAHs, LEPHs, HEPHs, MOG	Number of Containers
	WTN-2	18-Aug-18	-	Sediment	X			1
	WTN-3	18-Aug-18	-	Sediment	X			1
	WTN-4	18-Aug-18	-	Sediment	X			1
	WTN-5	18-Aug-18	-	Sediment	X			1

Special Instructions / Regulations with water or land use (CCME-Freshwater Aquatic Life/BC CSR - Commercial/AB Tier 1 - Natural, etc) / Hazardous Details

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SHIPMENT RELEASE (client use)			SHIPMENT RECEPTION (lab use only)				SHIPMENT VERIFICATION (lab use only)			
Released by:	Date (dd-mmm-yy)	Time (hh-mm)	Received by:	Date:	Time:	Temperature:	Verified by:	Date:	Time:	Observations Yes / No ? If Yes add SIF
Eric Franz			PAUL	AUG 30	08:50	18, 17.9, 17.6 17.8, 18, 18.4°C				

AZIMUTH CONSULTING GROUP INC.
ATTN: Eric Franz
218 - 2902 West Broadway
Vancouver BC V6K 2G8

Date Received: 24-AUG-18
Report Date: 31-AUG-18 13:41 (MT)
Version: FINAL

Client Phone: 604-730-1220

Certificate of Analysis

Lab Work Order #: L2152738

Project P.O. #: NOT SUBMITTED
Job Reference: WHALE TAIL PIT CREMP- SURFACE WATER
C of C Numbers:
Legal Site Desc:

Brent Mack, B.Sc.
Account Manager

[This report shall not be reproduced except in full without the written authority of the Laboratory.]

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2152738-1	L2152738-2	L2152738-3	L2152738-4	L2152738-5
Description	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water
Sampled Date	16-AUG-18	16-AUG-18	16-AUG-18	16-AUG-18	17-AUG-18
Sampled Time	08:45	08:00	14:36	13:39	10:50
Client ID	WTS-31	WTS-32	MAM-31	MAM-32	NEM-31
Grouping / **Analyte**					
WATER					
Physical Tests Conductivity (uS/cm)	40.0	40.1	64.8	54.7	24.3
Hardness (as CaCO3) (mg/L)	13.3	13.5	22.1	19.5	9.70
pH (pH)	6.95	6.99	6.95	6.89	7.13
Total Suspended Solids (mg/L)	2.1	1.7	<1.0	<1.0	<1.0
Total Dissolved Solids (mg/L)	28.4	26.7	47	51	19.0
Turbidity (NTU)	2.85	2.51	0.28	0.30	0.28
Anions and Nutrients Alkalinity, Bicarbonate (as CaCO3) (mg/L)	5.5	5.3	5.3	4.7	7.3
Alkalinity, Carbonate (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
Alkalinity, Total (as CaCO3) (mg/L)	5.5	5.3	5.3	4.7	7.3
Ammonia, Total (as N) (mg/L)	0.0124	<0.0050	0.0065	0.0221	<0.0050
Bromide (Br) (mg/L)	0.078	0.077	0.160	0.139	<0.050
Chloride (Cl) (mg/L)	6.70	6.76	12.9	11.5	0.81
Fluoride (F) (mg/L)	0.028	0.028	0.027	0.026	0.025
Nitrate (as N) (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Nitrite (as N) (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Total Kjeldahl Nitrogen (mg/L)	0.125	0.110	0.098	0.116	0.110
Orthophosphate-Dissolved (as P) (mg/L)	0.0014	0.0010	0.0011	0.0012	0.0013
Phosphorus (P)-Total Dissolved (mg/L)	0.0027	<0.0020	<0.0020	<0.0020	<0.0020
Phosphorus (P)-Total (mg/L)	0.0054	0.0048	0.0022	<0.0020	<0.0020
Silicate (as SiO2) (mg/L)	<0.50	<0.50	0.52	<0.50	<0.50
Sulfate (SO4) (mg/L)	1.61	1.62	3.06	3.08	3.28
Cyanides Cyanide, Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Cyanide, Free (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Organic / Inorganic Carbon Dissolved Organic Carbon (mg/L)	1.80	1.76	1.60	1.50	1.38
Total Organic Carbon (mg/L)	1.74	1.71	1.41	1.29	1.29
Total Metals Aluminum (Al)-Total (mg/L)	0.0799	0.0809	0.0064	0.0043	0.0033
Antimony (Sb)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic (As)-Total (mg/L)	0.00040	0.00043	0.00040	0.00034	0.00029
Barium (Ba)-Total (mg/L)	0.00866	0.00877	0.0109	0.0103	0.00390
Beryllium (Be)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth (Bi)-Total (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron (B)-Total (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)-Total (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Calcium (Ca)-Total (mg/L)	3.81	3.81	6.81	5.43	2.24
Cesium (Cs)-Total (mg/L)	0.000016	0.000015	<0.000010	<0.000010	<0.000010

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2152738-6	L2152738-7	L2152738-8	L2152738-9	L2152738-10
Description	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water
Sampled Date	17-AUG-18	17-AUG-18	17-AUG-18	18-AUG-18	18-AUG-18
Sampled Time	11:37	13:50	14:27	12:52	12:06
Client ID	NEM-32	A20-25	A20-26	A76-25	A76-26
Grouping / **Analyte**					
WATER					
Physical Tests Conductivity (uS/cm)	24.5	12.9	12.5	34.3	35.3
Hardness (as CaCO3) (mg/L)	9.86	4.67	4.58	13.2	13.7
pH (pH)	7.16	6.92	6.91	7.04	7.04
Total Suspended Solids (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
Total Dissolved Solids (mg/L)	18.5	12.1	13.2	26.7	25.7
Turbidity (NTU)	0.23	0.25	0.35	0.20	<0.10
Anions and Nutrients Alkalinity, Bicarbonate (as CaCO3) (mg/L)	7.5	4.9	4.4	6.1	6.0
Alkalinity, Carbonate (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
Alkalinity, Total (as CaCO3) (mg/L)	7.5	4.9	4.4	6.1	6.0
Ammonia, Total (as N) (mg/L)	0.0064	<0.0050	0.0140	<0.0050	<0.0050
Bromide (Br) (mg/L)	<0.050	<0.050	<0.050	0.053	0.056
Chloride (Cl) (mg/L)	0.82	0.65	0.63	4.77	4.85
Fluoride (F) (mg/L)	0.025	0.027	0.027	0.027	0.027
Nitrate (as N) (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Nitrite (as N) (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Total Kjeldahl Nitrogen (mg/L)	0.105	0.079	0.110	0.086	0.074
Orthophosphate-Dissolved (as P) (mg/L)	0.0011	0.0011	0.0013	0.0013	0.0012
Phosphorus (P)-Total Dissolved (mg/L)	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Phosphorus (P)-Total (mg/L)	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Silicate (as SiO2) (mg/L)	<0.50	0.79	0.74	0.89	0.85
Sulfate (SO4) (mg/L)	3.28	0.99	0.93	3.25	3.28
Cyanides Cyanide, Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Cyanide, Free (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Organic / Inorganic Carbon Dissolved Organic Carbon (mg/L)	1.32	1.33	1.28	1.40	1.43
Total Organic Carbon (mg/L)	1.29	1.31	1.35	1.40	1.36
Total Metals Aluminum (Al)-Total (mg/L)	0.0036	0.0061	0.0059	0.0057	0.0032
Antimony (Sb)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic (As)-Total (mg/L)	0.00031	<0.00010	<0.00010	0.00021	0.00021
Barium (Ba)-Total (mg/L)	0.00397	0.00287	0.00273	0.00664	0.00686
Beryllium (Be)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth (Bi)-Total (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron (B)-Total (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)-Total (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Calcium (Ca)-Total (mg/L)	2.28	1.22	1.24	3.66	3.74
Cesium (Cs)-Total (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2152738-11	L2152738-12	L2152738-13	L2152738-14	L2152738-15
Description	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water
Sampled Date	19-AUG-18	19-AUG-18	14-AUG-18	14-AUG-18	15-AUG-18
Sampled Time	12:45	13:15	14:00	15:40	16:40
Client ID	DS1-23	DS1-24	LK1-01	LK1-02	LK5-01
Grouping / **Analyte**					
WATER					
Physical Tests Conductivity (uS/cm)	16.1	20.3	13.8	13.6	23.5
Hardness (as CaCO3) (mg/L)	5.91	7.07	5.50	5.40	9.88
pH (pH)	6.92	6.94	6.93	6.93	7.24
Total Suspended Solids (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
Total Dissolved Solids (mg/L)	14.2	17.0	13.3	11.1	18.0
Turbidity (NTU)	0.42	0.33	0.44	0.43	0.26
Anions and Nutrients Alkalinity, Bicarbonate (as CaCO3) (mg/L)	4.8	5.0	4.8	4.9	9.1
Alkalinity, Carbonate (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
Alkalinity, Total (as CaCO3) (mg/L)	4.8	5.0	4.8	4.9	9.1
Ammonia, Total (as N) (mg/L)	0.0081	<0.0050	0.0064	<0.0050	<0.0050
Bromide (Br) (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050
Chloride (Cl) (mg/L)	1.31	2.14	0.71	0.70	0.66
Fluoride (F) (mg/L)	0.049	0.036	0.035	0.035	0.032
Nitrate (as N) (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Nitrite (as N) (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Total Kjeldahl Nitrogen (mg/L)	0.127	0.111	0.119	0.102	0.105
Orthophosphate-Dissolved (as P) (mg/L)	0.0014	0.0015	0.0016	0.0014	0.0015
Phosphorus (P)-Total Dissolved (mg/L)	<0.0020	<0.0020	0.0025	<0.0020	<0.0020
Phosphorus (P)-Total (mg/L)	0.0063	0.0028	0.0039	0.0021	<0.0020
Silicate (as SiO2) (mg/L)	<0.50	0.70	<0.50	<0.50	0.79
Sulfate (SO4) (mg/L)	1.14	1.63	1.02	1.01	1.84
Cyanides Cyanide, Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Cyanide, Free (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Organic / Inorganic Carbon Dissolved Organic Carbon (mg/L)	1.63 HTP	1.43 HTP	1.39	1.53	1.34
Total Organic Carbon (mg/L)	1.51	2.89	1.50	1.63	1.35
Total Metals Aluminum (Al)-Total (mg/L)	0.0110	0.0081	0.0083	0.0087	0.0034
Antimony (Sb)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic (As)-Total (mg/L)	0.00012	0.00010	<0.00010	<0.00010	0.00017
Barium (Ba)-Total (mg/L)	0.00337	0.00351	0.00259	0.00263	0.00258
Beryllium (Be)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth (Bi)-Total (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron (B)-Total (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)-Total (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Calcium (Ca)-Total (mg/L)	1.49	1.87	1.31	1.25	2.50
Cesium (Cs)-Total (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2152738-16	L2152738-17	L2152738-18	L2152738-19	L2152738-20
Description	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water
Sampled Date	15-AUG-18	17-AUG-18	17-AUG-18		
Sampled Time	17:30	18:37	19:00		
Client ID	LK5-02	LK8-01	LK8-02	WTP DUP-1	WTP DUP-2
Grouping / **Analyte**					
WATER					
Physical Tests Conductivity (uS/cm)	23.5	12.9	12.8	13.8	16.1
Hardness (as CaCO3) (mg/L)	9.73	4.92	4.84	5.19	5.68
pH (pH)	7.23	6.90	6.90	6.94	6.94
Total Suspended Solids (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
Total Dissolved Solids (mg/L)	18.1	11.7	10.4	11.5	13.3
Turbidity (NTU)	0.27	0.23	0.25	0.42	0.37
Anions and Nutrients Alkalinity, Bicarbonate (as CaCO3) (mg/L)	9.0	4.3	4.4	5.0	4.7
Alkalinity, Carbonate (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
Alkalinity, Total (as CaCO3) (mg/L)	9.0	4.3	4.4	5.0	4.7
Ammonia, Total (as N) (mg/L)	0.0069	<0.0050	0.0080	0.0068	<0.0050
Bromide (Br) (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050
Chloride (Cl) (mg/L)	0.66	0.57	0.57	0.71	1.32
Fluoride (F) (mg/L)	0.032	0.025	0.025	0.034	0.049
Nitrate (as N) (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Nitrite (as N) (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Total Kjeldahl Nitrogen (mg/L)	0.149	0.098	0.107	0.121	0.123
Orthophosphate-Dissolved (as P) (mg/L)	<0.0010	0.0014	0.0014	0.0012	0.0012
Phosphorus (P)-Total Dissolved (mg/L)	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Phosphorus (P)-Total (mg/L)	<0.0020	0.0040	<0.0020	0.0054	0.0026
Silicate (as SiO2) (mg/L)	0.77	<0.50	<0.50	<0.50	<0.50
Sulfate (SO4) (mg/L)	1.84	1.39	1.39	1.03	1.14
Cyanides Cyanide, Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Cyanide, Free (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Organic / Inorganic Carbon Dissolved Organic Carbon (mg/L)	1.36	1.19	1.30	1.54	1.70
Total Organic Carbon (mg/L)	1.45	1.36	1.38	1.75	2.12
Total Metals Aluminum (Al)-Total (mg/L)	0.0033	0.0033	0.0038	0.0098	0.0087
Antimony (Sb)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic (As)-Total (mg/L)	0.00016	0.00011	0.00012	<0.00010	0.00011
Barium (Ba)-Total (mg/L)	0.00244	0.00220	0.00209	0.00271	0.00353
Beryllium (Be)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth (Bi)-Total (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron (B)-Total (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)-Total (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Calcium (Ca)-Total (mg/L)	2.40	1.05	1.04	1.26	1.53
Cesium (Cs)-Total (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2152738-21	L2152738-22			
	Description	Surface Water	Surface Water			
	Sampled Date	18-AUG-18	18-AUG-18			
	Sampled Time	16:00	16:20			
	Client ID	WTP EB-1	WTP DI-1			
Grouping	**Analyte**					
WATER						
Physical Tests	Conductivity (uS/cm)	<2.0	<2.0			
	Hardness (as CaCO3) (mg/L)	<0.50	<0.50			
	pH (pH)	5.50	5.44			
	Total Suspended Solids (mg/L)	<1.0	<1.0			
	Total Dissolved Solids (mg/L)	<3.0	<3.0			
	Turbidity (NTU)	<0.10	<0.10			
Anions and Nutrients	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	<1.0	<1.0			
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<1.0	<1.0			
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0	<1.0			
	Alkalinity, Total (as CaCO3) (mg/L)	<1.0	<1.0			
	Ammonia, Total (as N) (mg/L)	<0.0050	0.0107 RRV			
	Bromide (Br) (mg/L)	<0.050	<0.050			
	Chloride (Cl) (mg/L)	<0.10	<0.10			
	Fluoride (F) (mg/L)	<0.020	<0.020			
	Nitrate (as N) (mg/L)	<0.0050	<0.0050			
	Nitrite (as N) (mg/L)	<0.0010	<0.0010			
	Total Kjeldahl Nitrogen (mg/L)	<0.050	<0.050			
	Orthophosphate-Dissolved (as P) (mg/L)	<0.0010	<0.0010			
	Phosphorus (P)-Total Dissolved (mg/L)	<0.0020	<0.0020			
	Phosphorus (P)-Total (mg/L)	<0.0020	<0.0020			
	Silicate (as SiO2) (mg/L)	<0.50	<0.50			
	Sulfate (SO4) (mg/L)	<0.30	<0.30			
Cyanides	Cyanide, Total (mg/L)	<0.0010	<0.0010			
	Cyanide, Free (mg/L)	<0.0010	<0.0010			
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	<0.50	<0.50			
	Total Organic Carbon (mg/L)	<0.50	<0.50			
Total Metals	Aluminum (Al)-Total (mg/L)	<0.0030	<0.0030			
	Antimony (Sb)-Total (mg/L)	<0.00010	<0.00010			
	Arsenic (As)-Total (mg/L)	<0.00010	<0.00010			
	Barium (Ba)-Total (mg/L)	<0.00010	<0.00010			
	Beryllium (Be)-Total (mg/L)	<0.00010	<0.00010			
	Bismuth (Bi)-Total (mg/L)	<0.000050	<0.000050			
	Boron (B)-Total (mg/L)	<0.010	<0.010			
	Cadmium (Cd)-Total (mg/L)	<0.0000050	<0.0000050			
	Calcium (Ca)-Total (mg/L)	<0.050	<0.050			
	Cesium (Cs)-Total (mg/L)	<0.000010	<0.000010			

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	L2152738-1 Surface Water 16-AUG-18 08:45 WTS-31	L2152738-2 Surface Water 16-AUG-18 08:00 WTS-32	L2152738-3 Surface Water 16-AUG-18 14:36 MAM-31	L2152738-4 Surface Water 16-AUG-18 13:39 MAM-32	L2152738-5 Surface Water 17-AUG-18 10:50 NEM-31
WATER						
Total Metals	Chromium (Cr)-Total (mg/L)	0.00058	0.00057	<0.00010	<0.00010	<0.00010
	Cobalt (Co)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Copper (Cu)-Total (mg/L)	0.00062	0.00058	<0.00050	<0.00050	<0.00050
	Iron (Fe)-Total (mg/L)	0.118	0.121	0.017	0.012	0.011
	Lead (Pb)-Total (mg/L)	0.000159	0.000171	<0.000050	<0.000050	<0.000050
	Lithium (Li)-Total (mg/L)	0.0014	0.0014	0.0027	0.0021	<0.0010
	Magnesium (Mg)-Total (mg/L)	0.973	0.968	1.25	1.23	0.996
	Manganese (Mn)-Total (mg/L)	0.00376	0.00387	0.00186	0.00190	0.00348
	Mercury (Hg)-Total (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
	Molybdenum (Mo)-Total (mg/L)	<0.00050 DLB	0.000093	<0.00040 DLB	<0.00040 DLB	<0.00030 DLB
	Nickel (Ni)-Total (mg/L)	0.00076	0.00080	0.00069	0.00069	<0.00050
	Phosphorus (P)-Total (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050
	Potassium (K)-Total (mg/L)	0.711	0.713	0.820	0.794	0.563
	Rubidium (Rb)-Total (mg/L)	0.00140	0.00146	0.00123	0.00117	0.00076
	Selenium (Se)-Total (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Silicon (Si)-Total (mg/L)	0.40	0.40	0.34	0.33	0.22
	Silver (Ag)-Total (mg/L)	<0.000010	<0.000010	<0.000030 DLB	<0.000010	<0.000010
	Sodium (Na)-Total (mg/L)	0.671	0.666	0.699	0.673	0.474
	Strontium (Sr)-Total (mg/L)	0.0327	0.0324	0.0629	0.0476	0.00982
	Sulfur (S)-Total (mg/L)	0.84	0.75	1.27	1.35	1.41
	Tellurium (Te)-Total (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
	Thallium (Tl)-Total (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Thorium (Th)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Tin (Sn)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Titanium (Ti)-Total (mg/L)	0.00260	0.00289	<0.00030	<0.00030	<0.00030
	Tungsten (W)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Uranium (U)-Total (mg/L)	0.000063	0.000067	0.000014	0.000013	<0.000010
	Vanadium (V)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Zinc (Zn)-Total (mg/L)	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
	Zirconium (Zr)-Total (mg/L)	0.000125	0.000128	<0.000060	<0.000060	<0.000060
Dissolved Metals	Dissolved Mercury Filtration Location	FIELD	FIELD	FIELD	FIELD	FIELD
	Dissolved Metals Filtration Location	FIELD	FIELD	FIELD	FIELD	FIELD
	Aluminum (Al)-Dissolved (mg/L)	0.0083	0.0089	0.0020	0.0029	0.0021
	Antimony (Sb)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Arsenic (As)-Dissolved (mg/L)	0.00027	0.00030	0.00034	0.00030	0.00025
	Barium (Ba)-Dissolved (mg/L)	0.00825	0.00842	0.0110	0.0103	0.00390
	Beryllium (Be)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2152738-6	L2152738-7	L2152738-8	L2152738-9	L2152738-10
	Description	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water
	Sampled Date	17-AUG-18	17-AUG-18	17-AUG-18	18-AUG-18	18-AUG-18
	Sampled Time	11:37	13:50	14:27	12:52	12:06
	Client ID	NEM-32	A20-25	A20-26	A76-25	A76-26
Grouping	**Analyte**					
WATER						
Total Metals	Chromium (Cr)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Cobalt (Co)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Copper (Cu)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Iron (Fe)-Total (mg/L)	0.011	0.021	0.014	0.015	0.011
	Lead (Pb)-Total (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Lithium (Li)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Magnesium (Mg)-Total (mg/L)	0.996	0.403	0.378	1.06	1.11
	Manganese (Mn)-Total (mg/L)	0.00345	0.00102	0.00126	0.00142	0.00127
	Mercury (Hg)-Total (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
	Molybdenum (Mo)-Total (mg/L)	<0.00030 DLB	<0.00040 DLB	<0.00040 DLB	<0.00020 DLB	<0.00020 DLB
	Nickel (Ni)-Total (mg/L)	<0.00050	<0.00050	<0.00050	0.00050	<0.00050
	Phosphorus (P)-Total (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050
	Potassium (K)-Total (mg/L)	0.573	0.330	0.301	0.679	0.701
	Rubidium (Rb)-Total (mg/L)	0.00064	0.00037	0.00036	0.00091	0.00097
	Selenium (Se)-Total (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Silicon (Si)-Total (mg/L)	0.23	0.45	0.43	0.52	0.49
	Silver (Ag)-Total (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Sodium (Na)-Total (mg/L)	0.476	0.531	0.497	0.615	0.635
	Strontium (Sr)-Total (mg/L)	0.00992	0.00643	0.00650	0.0187	0.0192
	Sulfur (S)-Total (mg/L)	1.46	0.76	0.61	1.18	1.17
	Tellurium (Te)-Total (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
	Thallium (Tl)-Total (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Thorium (Th)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Tin (Sn)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Titanium (Ti)-Total (mg/L)	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030
	Tungsten (W)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Uranium (U)-Total (mg/L)	<0.000010	0.000023	0.000025	0.000015	0.000014
	Vanadium (V)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Zinc (Zn)-Total (mg/L)	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
	Zirconium (Zr)-Total (mg/L)	<0.000060	<0.000060	<0.000060	<0.000060	<0.000060
Dissolved Metals	Dissolved Mercury Filtration Location	FIELD	FIELD	FIELD	FIELD	FIELD
	Dissolved Metals Filtration Location	FIELD	FIELD	FIELD	FIELD	FIELD
	Aluminum (Al)-Dissolved (mg/L)	0.0021	0.0027	0.0034	0.0012	0.0014
	Antimony (Sb)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Arsenic (As)-Dissolved (mg/L)	0.00029	<0.00010	<0.00010	0.00018	0.00018
	Barium (Ba)-Dissolved (mg/L)	0.00393	0.00282	0.00300	0.00673	0.00705
	Beryllium (Be)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	L2152738-11 Surface Water 19-AUG-18 12:45 DS1-23	L2152738-12 Surface Water 19-AUG-18 13:15 DS1-24	L2152738-13 Surface Water 14-AUG-18 14:00 LK1-01	L2152738-14 Surface Water 14-AUG-18 15:40 LK1-02	L2152738-15 Surface Water 15-AUG-18 16:40 LK5-01
WATER						
Total Metals	Chromium (Cr)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Cobalt (Co)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Copper (Cu)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Iron (Fe)-Total (mg/L)	0.028	0.036	0.021	0.023	0.017
	Lead (Pb)-Total (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Lithium (Li)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Magnesium (Mg)-Total (mg/L)	0.535	0.602	0.547	0.556	1.02
	Manganese (Mn)-Total (mg/L)	0.00183	0.00149	0.00243	0.00230	0.00227
	Mercury (Hg)-Total (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
	Molybdenum (Mo)-Total (mg/L)	<0.00030 DLB	<0.00020 DLB	<0.00020 DLB	<0.00020 DLB	<0.00020 DLB
	Nickel (Ni)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Phosphorus (P)-Total (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050
	Potassium (K)-Total (mg/L)	0.330	0.423	0.281	0.278	0.321
	Rubidium (Rb)-Total (mg/L)	0.00050	0.00058	0.00041	0.00039	0.00034
	Selenium (Se)-Total (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Silicon (Si)-Total (mg/L)	0.30	0.45	0.28	0.29	0.48
	Silver (Ag)-Total (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Sodium (Na)-Total (mg/L)	0.643	0.777	0.518	0.528	0.566
	Strontium (Sr)-Total (mg/L)	0.00725	0.00893	0.00715	0.00689	0.00942
	Sulfur (S)-Total (mg/L)	0.73	0.79	<0.50	<0.50	0.94
	Tellurium (Te)-Total (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
	Thallium (Tl)-Total (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Thorium (Th)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Tin (Sn)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Titanium (Ti)-Total (mg/L)	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030
	Tungsten (W)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Uranium (U)-Total (mg/L)	0.000031	0.000022	0.000025	0.000028	0.000013
	Vanadium (V)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Zinc (Zn)-Total (mg/L)	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
	Zirconium (Zr)-Total (mg/L)	<0.000060	<0.000060	<0.000060	<0.000060	<0.000060
Dissolved Metals	Dissolved Mercury Filtration Location	FIELD	FIELD	FIELD	FIELD	FIELD
	Dissolved Metals Filtration Location	FIELD	FIELD	FIELD	FIELD	FIELD
	Aluminum (Al)-Dissolved (mg/L)	0.0042	0.0036	0.0029	0.0025	0.0016
	Antimony (Sb)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Arsenic (As)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	0.00013
	Barium (Ba)-Dissolved (mg/L)	0.00338	0.00334	0.00250	0.00273	0.00244
	Beryllium (Be)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	Sample ID: L2152738-16 Description: Surface Water Sampled Date: 15-AUG-18 Sampled Time: 17:30 Client ID: LK5-02	L2152738-17 Surface Water 17-AUG-18 18:37 LK8-01	L2152738-18 Surface Water 17-AUG-18 19:00 LK8-02	L2152738-19 Surface Water WTP DUP-1	L2152738-20 Surface Water WTP DUP-2
WATER						
Total Metals	Chromium (Cr)-Total (mg/L)	<0.00010	<0.00010	<0.00010	0.00011	<0.00010
	Cobalt (Co)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Copper (Cu)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Iron (Fe)-Total (mg/L)	0.016	<0.010	<0.010	0.023	0.032
	Lead (Pb)-Total (mg/L)	<0.000050	<0.000050	<0.000050	0.000152	<0.000050
	Lithium (Li)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Magnesium (Mg)-Total (mg/L)	0.976	0.558	0.559	0.535	0.530
	Manganese (Mn)-Total (mg/L)	0.00218	0.00197	0.00193	0.00223	0.00179
	Mercury (Hg)-Total (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
	Molybdenum (Mo)-Total (mg/L)	<0.00020 DLB	<0.00020 DLB	<0.00020 DLB	<0.00020 DLB	<0.00020 DLB
	Nickel (Ni)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Phosphorus (P)-Total (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050
	Potassium (K)-Total (mg/L)	0.305	0.298	0.291	0.267	0.325
	Rubidium (Rb)-Total (mg/L)	0.00035	0.00045	0.00052	0.00035	0.00048
	Selenium (Se)-Total (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Silicon (Si)-Total (mg/L)	0.46	0.28	0.29	0.30	0.32
	Silver (Ag)-Total (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Sodium (Na)-Total (mg/L)	0.545	0.417	0.420	0.500	0.636
	Strontium (Sr)-Total (mg/L)	0.00893	0.00481	0.00476	0.00682	0.00727
	Sulfur (S)-Total (mg/L)	0.87	0.78	0.73	0.56	0.70
	Tellurium (Te)-Total (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
	Thallium (Tl)-Total (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Thorium (Th)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Tin (Sn)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Titanium (Ti)-Total (mg/L)	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030
	Tungsten (W)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Uranium (U)-Total (mg/L)	0.000013	0.000012	0.000012	0.000027	0.000031
	Vanadium (V)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Zinc (Zn)-Total (mg/L)	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
	Zirconium (Zr)-Total (mg/L)	<0.000060	<0.000060	<0.000060	<0.000060	<0.000060
Dissolved Metals	Dissolved Mercury Filtration Location	FIELD	FIELD	FIELD	FIELD	FIELD
	Dissolved Metals Filtration Location	FIELD	FIELD	FIELD	FIELD	FIELD
	Aluminum (Al)-Dissolved (mg/L)	0.0013	0.0025	0.0018	0.0038	0.0042
	Antimony (Sb)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Arsenic (As)-Dissolved (mg/L)	0.00012	0.00011	0.00011	<0.00010	<0.00010
	Barium (Ba)-Dissolved (mg/L)	0.00243	0.00226	0.00213	0.00240	0.00331
	Beryllium (Be)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2152738-21	L2152738-22			
	Description	Surface Water	Surface Water			
	Sampled Date	18-AUG-18	18-AUG-18			
	Sampled Time	16:00	16:20			
	Client ID	WTP EB-1	WTP DI-1			
Grouping	**Analyte**					
WATER						
Total Metals	Chromium (Cr)-Total (mg/L)	<0.00010	<0.00010			
	Cobalt (Co)-Total (mg/L)	<0.00010	<0.00010			
	Copper (Cu)-Total (mg/L)	<0.00050	<0.00050			
	Iron (Fe)-Total (mg/L)	<0.010	<0.010			
	Lead (Pb)-Total (mg/L)	<0.000050	<0.000050			
	Lithium (Li)-Total (mg/L)	<0.0010	<0.0010			
	Magnesium (Mg)-Total (mg/L)	<0.0050	<0.0050			
	Manganese (Mn)-Total (mg/L)	<0.00010	<0.00010			
	Mercury (Hg)-Total (mg/L)	<0.0000050	<0.0000050			
	Molybdenum (Mo)-Total (mg/L)	<0.000050	<0.000050			
	Nickel (Ni)-Total (mg/L)	<0.00050	<0.00050			
	Phosphorus (P)-Total (mg/L)	<0.050	<0.050			
	Potassium (K)-Total (mg/L)	<0.050	<0.050			
	Rubidium (Rb)-Total (mg/L)	<0.00020	<0.00020			
	Selenium (Se)-Total (mg/L)	<0.000050	<0.000050			
	Silicon (Si)-Total (mg/L)	<0.10	<0.10			
	Silver (Ag)-Total (mg/L)	<0.000010	<0.000010			
	Sodium (Na)-Total (mg/L)	<0.050	<0.050			
	Strontium (Sr)-Total (mg/L)	<0.00020	<0.00020			
	Sulfur (S)-Total (mg/L)	<0.50	<0.50			
	Tellurium (Te)-Total (mg/L)	<0.00020	<0.00020			
	Thallium (Tl)-Total (mg/L)	<0.000010	<0.000010			
	Thorium (Th)-Total (mg/L)	<0.00010	<0.00010			
	Tin (Sn)-Total (mg/L)	<0.00010	<0.00010			
	Titanium (Ti)-Total (mg/L)	<0.00030	<0.00030			
	Tungsten (W)-Total (mg/L)	<0.00010	<0.00010			
	Uranium (U)-Total (mg/L)	<0.000010	<0.000010			
	Vanadium (V)-Total (mg/L)	<0.00050	<0.00050			
	Zinc (Zn)-Total (mg/L)	<0.0030	<0.0030			
	Zirconium (Zr)-Total (mg/L)	<0.000060	<0.000060			
Dissolved Metals	Dissolved Mercury Filtration Location	FIELD	FIELD			
	Dissolved Metals Filtration Location	FIELD	FIELD			
	Aluminum (Al)-Dissolved (mg/L)	<0.0010	<0.0010			
	Antimony (Sb)-Dissolved (mg/L)	<0.00010	<0.00010			
	Arsenic (As)-Dissolved (mg/L)	<0.00010	<0.00010			
	Barium (Ba)-Dissolved (mg/L)	<0.00010	<0.00010			
	Beryllium (Be)-Dissolved (mg/L)	<0.00010	<0.00010			

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2152738-1	L2152738-2	L2152738-3	L2152738-4	L2152738-5
Description	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water
Sampled Date	16-AUG-18	16-AUG-18	16-AUG-18	16-AUG-18	17-AUG-18
Sampled Time	08:45	08:00	14:36	13:39	10:50
Client ID	WTS-31	WTS-32	MAM-31	MAM-32	NEM-31
Grouping / **Analyte**					
WATER					
Dissolved Metals Bismuth (Bi)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron (B)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)-Dissolved (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Calcium (Ca)-Dissolved (mg/L)	3.72	3.77	6.70	5.77	2.21
Cesium (Cs)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Chromium (Cr)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Cobalt (Co)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper (Cu)-Dissolved (mg/L)	0.00035	0.00043	0.00030	0.00031	0.00021
Iron (Fe)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
Lead (Pb)-Dissolved (mg/L)	<0.000050	0.000091	<0.000050	<0.000050	<0.000050
Lithium (Li)-Dissolved (mg/L)	0.0012	0.0012	0.0026	0.0021	<0.0010
Magnesium (Mg)-Dissolved (mg/L)	0.968	0.979	1.30	1.23	1.02
Manganese (Mn)-Dissolved (mg/L)	0.00130	0.00132	0.00089	0.00070	0.00043
Mercury (Hg)-Dissolved (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Molybdenum (Mo)-Dissolved (mg/L)	0.000088	0.000079	0.000058	0.000052	0.000063
Nickel (Ni)-Dissolved (mg/L)	0.00057	0.00059	0.00072	0.00067	<0.00050
Phosphorus (P)-Dissolved (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050
Potassium (K)-Dissolved (mg/L)	0.737	0.746	0.862	0.817	0.598
Rubidium (Rb)-Dissolved (mg/L)	0.00127	0.00123	0.00122	0.00117	0.00069
Selenium (Se)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Silicon (Si)-Dissolved (mg/L)	0.226	0.222	0.271	0.272	0.177
Silver (Ag)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)-Dissolved (mg/L)	0.676	0.696	0.705	0.670	0.478
Strontium (Sr)-Dissolved (mg/L)	0.0318	0.0319	0.0621	0.0495	0.00982
Sulfur (S)-Dissolved (mg/L)	0.86	0.92	1.11	1.25	1.40
Tellurium (Te)-Dissolved (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Thallium (Tl)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Thorium (Th)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Tin (Sn)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)-Dissolved (mg/L)	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030
Tungsten (W)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Uranium (U)-Dissolved (mg/L)	0.000035	0.000036	0.000013	0.000012	<0.000010
Vanadium (V)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc (Zn)-Dissolved (mg/L)	<0.0010	0.0015	<0.0010	<0.0010	<0.0010
Zirconium (Zr)-Dissolved (mg/L)	<0.000060	<0.000060	<0.000060	<0.000060	<0.000060
Speciated Metals Arsenate (As V) (ug/L)	<0.020			<0.020	<0.020
Arsenite (As III) (ug/L)	0.188			0.199	0.132

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2152738-6	L2152738-7	L2152738-8	L2152738-9	L2152738-10
Description	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water
Sampled Date	17-AUG-18	17-AUG-18	17-AUG-18	18-AUG-18	18-AUG-18
Sampled Time	11:37	13:50	14:27	12:52	12:06
Client ID	NEM-32	A20-25	A20-26	A76-25	A76-26
Grouping / **Analyte**					
WATER					
Dissolved Metals Bismuth (Bi)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron (B)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)-Dissolved (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Calcium (Ca)-Dissolved (mg/L)	2.25	1.20	1.18	3.48	3.61
Cesium (Cs)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Chromium (Cr)-Dissolved (mg/L)	0.00019	<0.00010	<0.00010	<0.00010	<0.00010
Cobalt (Co)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper (Cu)-Dissolved (mg/L)	<0.00020	<0.00020	<0.00020	0.00027	0.00029
Iron (Fe)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
Lead (Pb)-Dissolved (mg/L)	0.000360 DTC	<0.000050	<0.000050	<0.000050	<0.000050
Lithium (Li)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Magnesium (Mg)-Dissolved (mg/L)	1.03	0.408	0.398	1.10	1.13
Manganese (Mn)-Dissolved (mg/L)	0.00052	0.00066	0.00086	0.00028	0.00032
Mercury (Hg)-Dissolved (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Molybdenum (Mo)-Dissolved (mg/L)	0.000066	0.000079	<0.000050	0.000057	<0.000050
Nickel (Ni)-Dissolved (mg/L)	0.00059	<0.00050	<0.00050	<0.00050	0.00050
Phosphorus (P)-Dissolved (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050
Potassium (K)-Dissolved (mg/L)	0.589	0.334	0.332	0.716	0.746
Rubidium (Rb)-Dissolved (mg/L)	0.00070	0.00042	0.00038	0.00105	0.00100
Selenium (Se)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Silicon (Si)-Dissolved (mg/L)	0.183	0.393	0.374	0.438	0.456
Silver (Ag)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)-Dissolved (mg/L)	0.488	0.525	0.517	0.632	0.650
Strontium (Sr)-Dissolved (mg/L)	0.00992	0.00625	0.00613	0.0185	0.0186
Sulfur (S)-Dissolved (mg/L)	1.42	0.55	0.60	1.12	1.12
Tellurium (Te)-Dissolved (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Thallium (Tl)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Thorium (Th)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Tin (Sn)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)-Dissolved (mg/L)	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030
Tungsten (W)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Uranium (U)-Dissolved (mg/L)	<0.000010	0.000021	0.000022	0.000012	0.000011
Vanadium (V)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc (Zn)-Dissolved (mg/L)	0.0014	<0.0010	<0.0010	<0.0010	<0.0010
Zirconium (Zr)-Dissolved (mg/L)	<0.000060	<0.000060	<0.000060	<0.000060	<0.000060
Speciated Metals Arsenate (As V) (ug/L)			<0.020	<0.020	
Arsenite (As III) (ug/L)			<0.020	0.091	

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2152738-11	L2152738-12	L2152738-13	L2152738-14	L2152738-15
Description	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water
Sampled Date	19-AUG-18	19-AUG-18	14-AUG-18	14-AUG-18	15-AUG-18
Sampled Time	12:45	13:15	14:00	15:40	16:40
Client ID	DS1-23	DS1-24	LK1-01	LK1-02	LK5-01
Grouping / **Analyte**					
WATER					
Dissolved Metals Bismuth (Bi)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron (B)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)-Dissolved (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Calcium (Ca)-Dissolved (mg/L)	1.47	1.85	1.28	1.25	2.35
Cesium (Cs)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Chromium (Cr)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Cobalt (Co)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper (Cu)-Dissolved (mg/L)	0.00024	0.00022	0.00023	<0.00020	<0.00020
Iron (Fe)-Dissolved (mg/L)	<0.010	0.013	<0.010	<0.010	<0.010
Lead (Pb)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	0.000066
Lithium (Li)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Magnesium (Mg)-Dissolved (mg/L)	0.545	0.598	0.558	0.553	0.973
Manganese (Mn)-Dissolved (mg/L)	0.00031	0.00066	0.00044	0.00049	0.00035
Mercury (Hg)-Dissolved (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Molybdenum (Mo)-Dissolved (mg/L)	<0.000050	0.000050	<0.000050	<0.000050	<0.000050
Nickel (Ni)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	0.00107
Phosphorus (P)-Dissolved (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050
Potassium (K)-Dissolved (mg/L)	0.349	0.424	0.287	0.282	0.310
Rubidium (Rb)-Dissolved (mg/L)	0.00053	0.00059	0.00039	0.00036	0.00036
Selenium (Se)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Silicon (Si)-Dissolved (mg/L)	0.241	0.366	0.208	0.214	0.373
Silver (Ag)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)-Dissolved (mg/L)	0.649	0.757	0.520	0.522	0.544
Strontium (Sr)-Dissolved (mg/L)	0.00711	0.00876	0.00690	0.00682	0.00878
Sulfur (S)-Dissolved (mg/L)	0.65	0.72	<0.50	<0.50	0.79
Tellurium (Te)-Dissolved (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Thallium (Tl)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Thorium (Th)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Tin (Sn)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)-Dissolved (mg/L)	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030
Tungsten (W)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Uranium (U)-Dissolved (mg/L)	0.000028	0.000019	0.000023	0.000022	0.000012
Vanadium (V)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc (Zn)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	0.0021
Zirconium (Zr)-Dissolved (mg/L)	<0.000060	<0.000060	<0.000060	<0.000060	<0.000060
Speciated Metals Arsenate (As V) (ug/L)	<0.020		<0.020		<0.020
Arsenite (As III) (ug/L)	0.034		<0.020		0.048

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2152738-16	L2152738-17	L2152738-18	L2152738-19	L2152738-20
Description	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water
Sampled Date	15-AUG-18	17-AUG-18	17-AUG-18		
Sampled Time	17:30	18:37	19:00		
Client ID	LK5-02	LK8-01	LK8-02	WTP DUP-1	WTP DUP-2
Grouping / **Analyte**					
WATER					
Dissolved Metals Bismuth (Bi)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron (B)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)-Dissolved (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Calcium (Ca)-Dissolved (mg/L)	2.32	1.04	1.02	1.21	1.42
Cesium (Cs)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Chromium (Cr)-Dissolved (mg/L)	0.00025	0.00040 DTC	<0.00010	<0.00010	<0.00010
Cobalt (Co)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper (Cu)-Dissolved (mg/L)	<0.00020	0.00030	0.00029	<0.00020	0.00025
Iron (Fe)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
Lead (Pb)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium (Li)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Magnesium (Mg)-Dissolved (mg/L)	0.954	0.563	0.555	0.527	0.522
Manganese (Mn)-Dissolved (mg/L)	0.00028	0.00063	0.00055	0.00039	0.00032
Mercury (Hg)-Dissolved (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Molybdenum (Mo)-Dissolved (mg/L)	0.000053	0.000079	<0.000050	<0.000050	<0.000050
Nickel (Ni)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Phosphorus (P)-Dissolved (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050
Potassium (K)-Dissolved (mg/L)	0.303	0.304	0.307	0.262	0.336
Rubidium (Rb)-Dissolved (mg/L)	0.00034	0.00049	0.00053	0.00038	0.00051
Selenium (Se)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Silicon (Si)-Dissolved (mg/L)	0.394	0.215	0.214	0.220	0.211
Silver (Ag)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)-Dissolved (mg/L)	0.528	0.421	0.417	0.498	0.640
Strontium (Sr)-Dissolved (mg/L)	0.00879	0.00465	0.00472	0.00673	0.00702
Sulfur (S)-Dissolved (mg/L)	0.92	0.76	0.67	0.57	0.72
Tellurium (Te)-Dissolved (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Thallium (Tl)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Thorium (Th)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Tin (Sn)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)-Dissolved (mg/L)	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030
Tungsten (W)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Uranium (U)-Dissolved (mg/L)	0.000011	<0.000010	0.000011	0.000022	0.000026
Vanadium (V)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc (Zn)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Zirconium (Zr)-Dissolved (mg/L)	<0.000060	<0.000060	<0.000060	<0.000060	<0.000060
Speciated Metals Arsenate (As V) (ug/L)		<0.020		<0.020	<0.020
Arsenite (As III) (ug/L)		0.048		<0.020	0.033

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2152738-21	L2152738-22			
	Description	Surface Water	Surface Water			
	Sampled Date	18-AUG-18	18-AUG-18			
	Sampled Time	16:00	16:20			
	Client ID	WTP EB-1	WTP DI-1			
Grouping	**Analyte**					
WATER						
Dissolved Metals	Bismuth (Bi)-Dissolved (mg/L)	<0.000050	<0.000050			
	Boron (B)-Dissolved (mg/L)	<0.010	<0.010			
	Cadmium (Cd)-Dissolved (mg/L)	<0.0000050	<0.0000050			
	Calcium (Ca)-Dissolved (mg/L)	<0.050	<0.050			
	Cesium (Cs)-Dissolved (mg/L)	<0.000010	<0.000010			
	Chromium (Cr)-Dissolved (mg/L)	<0.00010	<0.00010			
	Cobalt (Co)-Dissolved (mg/L)	<0.00010	<0.00010			
	Copper (Cu)-Dissolved (mg/L)	<0.00020	<0.00020			
	Iron (Fe)-Dissolved (mg/L)	<0.010	<0.010			
	Lead (Pb)-Dissolved (mg/L)	<0.000050	<0.000050			
	Lithium (Li)-Dissolved (mg/L)	<0.0010	<0.0010			
	Magnesium (Mg)-Dissolved (mg/L)	<0.0050	<0.0050			
	Manganese (Mn)-Dissolved (mg/L)	<0.00010	<0.00010			
	Mercury (Hg)-Dissolved (mg/L)	<0.0000050	<0.0000050			
	Molybdenum (Mo)-Dissolved (mg/L)	<0.000050	<0.000050			
	Nickel (Ni)-Dissolved (mg/L)	<0.00050	<0.00050			
	Phosphorus (P)-Dissolved (mg/L)	<0.050	<0.050			
	Potassium (K)-Dissolved (mg/L)	<0.050	<0.050			
	Rubidium (Rb)-Dissolved (mg/L)	<0.00020	<0.00020			
	Selenium (Se)-Dissolved (mg/L)	<0.000050	<0.000050			
	Silicon (Si)-Dissolved (mg/L)	<0.050	<0.050			
	Silver (Ag)-Dissolved (mg/L)	<0.000010	<0.000010			
	Sodium (Na)-Dissolved (mg/L)	<0.050	<0.050			
	Strontium (Sr)-Dissolved (mg/L)	<0.00020	<0.00020			
	Sulfur (S)-Dissolved (mg/L)	<0.50	<0.50			
	Tellurium (Te)-Dissolved (mg/L)	<0.00020	<0.00020			
	Thallium (Tl)-Dissolved (mg/L)	<0.000010	<0.000010			
	Thorium (Th)-Dissolved (mg/L)	<0.00010	<0.00010			
	Tin (Sn)-Dissolved (mg/L)	<0.00010	<0.00010			
	Titanium (Ti)-Dissolved (mg/L)	<0.00030	<0.00030			
	Tungsten (W)-Dissolved (mg/L)	<0.00010	<0.00010			
	Uranium (U)-Dissolved (mg/L)	<0.000010	<0.000010			
	Vanadium (V)-Dissolved (mg/L)	<0.00050	<0.00050			
	Zinc (Zn)-Dissolved (mg/L)	<0.0010	<0.0010			
	Zirconium (Zr)-Dissolved (mg/L)	<0.000060	<0.000060			
Speciated Metals	Arsenate (As V) (ug/L)	<0.020	<0.020			
	Arsenite (As III) (ug/L)	<0.020	<0.020			

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2152738-1	L2152738-2	L2152738-3	L2152738-4	L2152738-5
Description	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water
Sampled Date	16-AUG-18	16-AUG-18	16-AUG-18	16-AUG-18	17-AUG-18
Sampled Time	08:45	08:00	14:36	13:39	10:50
Client ID	WTS-31	WTS-32	MAM-31	MAM-32	NEM-31
Grouping / **Analyte**					
WATER					
Speciated Metals					
Dimethylarsinic Acid (DMA, as As) (ug/L)	<0.020			0.021	0.020
Monomethylarsonic Acid (MMA, as As) (ug/L)	<0.020			<0.020	<0.020
Arsenobetaine (AsB, as As) (ug/L)	<0.050			<0.050	<0.050

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	L2152738-6 Surface Water 17-AUG-18 11:37 NEM-32	L2152738-7 Surface Water 17-AUG-18 13:50 A20-25	L2152738-8 Surface Water 17-AUG-18 14:27 A20-26	L2152738-9 Surface Water 18-AUG-18 12:52 A76-25	L2152738-10 Surface Water 18-AUG-18 12:06 A76-26
WATER						
Speciated Metals	Dimethylarsinic Acid (DMA, as As) (ug/L)			<0.020	0.020	
	Monomethylarsonic Acid (MMA, as As) (ug/L)			<0.020	<0.020	
	Arsenobetaine (AsB, as As) (ug/L)			<0.050	<0.050	

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2152738-11	L2152738-12	L2152738-13	L2152738-14	L2152738-15
Description	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water
Sampled Date	19-AUG-18	19-AUG-18	14-AUG-18	14-AUG-18	15-AUG-18
Sampled Time	12:45	13:15	14:00	15:40	16:40
Client ID	DS1-23	DS1-24	LK1-01	LK1-02	LK5-01
Grouping / **Analyte**					
WATER					
Speciated Metals					
Dimethylarsinic Acid (DMA, as As) (ug/L)	<0.020		<0.020		<0.020
Monomethylarsonic Acid (MMA, as As) (ug/L)	<0.020		<0.020		<0.020
Arsenobetaine (AsB, as As) (ug/L)	<0.050		<0.050		<0.050

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	L2152738-16 Surface Water 15-AUG-18 17:30 LK5-02	L2152738-17 Surface Water 17-AUG-18 18:37 LK8-01	L2152738-18 Surface Water 17-AUG-18 19:00 LK8-02	L2152738-19 Surface Water WTP DUP-1	L2152738-20 Surface Water WTP DUP-2
Sample ID						
Description						
Sampled Date						
Sampled Time						
Client ID						
WATER						
Speciated Metals	Dimethylarsinic Acid (DMA, as As) (ug/L)		<0.020		<0.020	<0.020
	Monomethylarsonic Acid (MMA, as As) (ug/L)		<0.020		<0.020	<0.020
	Arsenobetaine (AsB, as As) (ug/L)		<0.050		<0.050	<0.050

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2152738-21	L2152738-22			
	Description	Surface Water	Surface Water			
	Sampled Date	18-AUG-18	18-AUG-18			
	Sampled Time	16:00	16:20			
	Client ID	WTP EB-1	WTP DI-1			
Grouping	**Analyte**					
WATER						
Speciated Metals	Dimethylarsinic Acid (DMA, as As) (ug/L)	<0.020	<0.020			
	Monomethylarsonic Acid (MMA, as As) (ug/L)	<0.020	<0.020			
	Arsenobetaine (AsB, as As) (ug/L)	<0.050	<0.050			

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Method Blank	Molybdenum (Mo)-Total	MB-LOR	L2152738-10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -20, -3, -4, -5, -6, -7, -8, -9
Method Blank	Silver (Ag)-Total	MB-LOR	L2152738-10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -20, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Dissolved Organic Carbon	MS-B	L2152738-1
Matrix Spike	Total Organic Carbon	MS-B	L2152738-1
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L2152738-17, -6
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L2152738-21, -22
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L2152738-17, -6
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L2152738-21, -22
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L2152738-17, -6
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L2152738-17, -6
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L2152738-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L2152738-21, -22
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L2152738-17, -6
Matrix Spike	Sulfur (S)-Dissolved	MS-B	L2152738-17, -6
Matrix Spike	Barium (Ba)-Total	MS-B	L2152738-21, -22
Matrix Spike	Calcium (Ca)-Total	MS-B	L2152738-21, -22
Matrix Spike	Magnesium (Mg)-Total	MS-B	L2152738-21, -22
Matrix Spike	Manganese (Mn)-Total	MS-B	L2152738-21, -22
Matrix Spike	Silicon (Si)-Total	MS-B	L2152738-21, -22
Matrix Spike	Sodium (Na)-Total	MS-B	L2152738-21, -22
Matrix Spike	Strontium (Sr)-Total	MS-B	L2152738-21, -22
Matrix Spike	Strontium (Sr)-Total	MS-B	L2152738-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Orthophosphate-Dissolved (as P)	MS-B	L2152738-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -21, -22, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Silicate (as SiO2)	MS-B	L2152738-1, -10, -11, -12, -13, -2, -3, -4, -5, -6, -7, -8, -9

Qualifiers for Individual Parameters Listed:

Qualifier	Description
DLB	Detection Limit Raised. Analyte detected at comparable level in Method Blank.
DTC	Dissolved concentration exceeds total. Results were confirmed by re-analysis.
HTP	Sample preparation or preservation hold time was exceeded.
MB-LOR	Method Blank exceeds ALS DQO. Limits of Reporting have been adjusted for samples with positive hits below 5x blank level.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RRV	Reported Result Verified By Repeat Analysis

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ALK-TITR-VA	Water	Alkalinity Species by Titration	APHA 2320 Alkalinity

This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.

AS-SPEC-HPLC/CCMS-VA	Water	Arsenic Species in Water by HPLC/CCMS	USGS WRIR 02-4144

Speciated Arsenic (As) Analysis is by reverse phase HPLC-ICPMS. Sample handling, preservation and holding times outlined in USGS Report 02-4144 and AWWA Preservation of Arsenic Species, 2006. Instrumental analysis based on Afton et al, Journal of Chromatography A, 1208 (2008) 156-163 and Agilent Technologies application notes. Filtration is conducted prior to preservation. Results for unfiltered, preserved samples may be elevated due to extraction of arsenic species from particulate matter in the samples.
Elevated iron (~100+ ppm) concentrations or sulfidic water can introduce biases to the reported results for some arsenic species.

BR-L-IC-N-VA	Water	Bromide in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

CARBONS-DOC-VA	Water	Dissolved organic carbon by combustion	APHA 5310B

This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)". Dissolved carbon (DOC) fractions are determined by filtering the sample through a 0.45 micron membrane filter prior to analysis.

Reference Information

CARBONS-TOC-VA	Water	Total organic carbon by combustion	APHA 5310B TOTAL ORGANIC CARBON (TOC)

This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)".

CL-L-IC-N-VA	Water	Chloride in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

CN-FREE-L-CFA-VA	Water	Low Level Free Cyanide in water by CFA	ASTM 7237

This analysis is carried out using procedures adapted from ASTM Method 7237 "Free Cyanide with Flow Injection Analysis (FIA) Utilizing Gas Diffusion Separation and Amperometric Detection". Free cyanide is determined by in-line gas diffusion at pH 6 with final determination by colourimetric analysis.

CN-T-L-CFA-VA	Water	Low Level Total Cyanide in water by CFA	ISO 14403:2002

This analysis is carried out using procedures adapted from ISO Method 14403:2002 "Determination of Total Cyanide using Flow Analysis (FIA and CFA)". Total or strong acid dissociable (SAD) cyanide is determined by in-line UV digestion along with sample distillation and final determination by colourimetric analysis. Method Limitation: This method is susceptible to interference from thiocyanate (SCN). If SCN is present in the sample, there could be a positive interference with this method, but it would be less than 1% and could be as low as zero.

EC-PCT-VA	Water	Conductivity (Automated)	APHA 2510 Auto. Conduc.

This analysis is carried out using procedures adapted from APHA Method 2510 "Conductivity". Conductivity is determined using a conductivity electrode.

EC-SCREEN-VA	Water	Conductivity Screen (Internal Use Only)	APHA 2510

Qualitative analysis of conductivity where required during preparation of other tests - e.g. TDS, metals, etc.

F-IC-N-VA	Water	Fluoride in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

HARDNESS-CALC-VA	Water	Hardness	APHA 2340B

Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

HG-D-CVAA-VA	Water	Diss. Mercury in Water by CVAAS or CVAFS	APHA 3030B/EPA 1631E (mod)

Water samples are filtered (0.45 um), preserved with hydrochloric acid, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

HG-T-CVAA-VA	Water	Total Mercury in Water by CVAAS or CVAFS	EPA 1631E (mod)

Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

MET-D-CCMS-VA	Water	Dissolved Metals in Water by CRC ICPMS	APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

MET-T-CCMS-VA	Water	Total Metals in Water by CRC ICPMS	EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

NH3-F-VA	Water	Ammonia in Water by Fluorescence	J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

NO2-L-IC-N-VA	Water	Nitrite in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

NO3-L-IC-N-VA	Water	Nitrate in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

P-T-PRES-COL-VA	Water	Total P in Water by Colour	APHA 4500-P Phosphorus

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is determined colourimetrically after persulphate digestion of the sample.
Samples with very high dissolved solids (i.e. seawaters, brackish waters) may produce a negative bias by this method. Alternate methods are available for these types of samples.

Arsenic (5+), at elevated levels, is a positive interference on colourimetric phosphate analysis.

Reference Information

P-TD-COL-VA Water Total Dissolved P in Water by Colour APHA 4500-P Phosphorous

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Dissolved Phosphorus is determined colourimetrically after persulphate digestion of a sample that has been lab or field filtered through a 0.45 micron membrane filter.
Samples with very high dissolved solids (i.e. seawaters, brackish waters) may produce a negative bias by this method. Alternate methods are available for these types of samples.

Arsenic (5+), at elevated levels, is a positive interference on colourimetric phosphate analysis.

PH-PCT-VA Water pH by Meter (Automated) APHA 4500-H pH Value

This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode

It is recommended that this analysis be conducted in the field.

PO4-DO-COL-VA Water Diss. Orthophosphate in Water by Colour APHA 4500-P Phosphorus

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.
Samples with very high dissolved solids (i.e. seawaters, brackish waters) may produce a negative bias by this method. Alternate methods are available for these types of samples.

Arsenic (5+), at elevated levels, is a positive interference on colourimetric phosphate analysis.

SILICATE-COL-VA Water Silicate by Colourimetric analysis APHA 4500-SiO2 E.

This analysis is carried out using procedures adapted from APHA Method 4500-SiO2 E. "Silica". Silicate (molybdate-reactive silica) is determined by the molybdosilicate-heteropoly blue colourimetric method.

SO4-IC-N-VA Water Sulfate in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

TDS-LOW-VA Water Low Level TDS (3.0mg/L) by Gravimetric APHA 2540C

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total dissolved solids (TDS) are determined by filtering a sample through a glass fibre filter, TDS is determined by evaporating the filtrate to dryness at 180 degrees celsius.

TKN-F-VA Water TKN in Water by Fluorescence APHA 4500-NORG D.

This analysis is carried out using procedures adapted from APHA Method 4500-Norg D. "Block Digestion and Flow Injection Analysis". Total Kjeldahl Nitrogen is determined using block digestion followed by Flow-injection analysis with fluorescence detection.

TSS-LOW-VA Water Total Suspended Solids by Grav. (1 mg/L) APHA 2540D

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total suspended solids (TSS) are determined by filtering a sample through a glass fibre filter, TSS is determined by drying the filter at 104 degrees celsius.
Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.

TURBIDITY-VA Water Turbidity by Meter APHA 2130 Turbidity

This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

Reference Information

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

ALS Environmental

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L2152738-COFC

Report To		Report Format / Distribution		Service Requested (Rush/Non-routine subject to availability)
Company:	Azimuth Consulting Group	☑ Standard ☐ Other		◉ Regular (Standard Turnaround Times - Business Days)
Contact:	Eric Franz	☑ PDF ☑ Excel ☐ Digital ☐ Fax		○ Priority (2-4 Business Days) - 50% Surcharge - Contact ALS to Confirm TAT
Address:	218-2902 West Broadway	Email 1: efranz@azimuthgroup.ca		○ Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT
	Vancouver, BC V6K2G8	Email 2: gmann@azimuthgroup.ca		○ Same Day or Weekend Emergency - Contact ALS to Confirm TAT
Phone:	604-730-1220 Fax:	Email 3: robin.allard@agnicoeagle.com		
Invoice To	Same as Report ? ☑ Yes ☐ No	Client / Project Information		Analysis Request
Hardcopy of Invoice with Report?	☐ Yes ☑ No	Job #:	Whale Tail Pit CREMP - Surfacewater	Please indicate below Filtered, Preserved or both (F, P, F/P)
Company:		PO / AFE:		
Contact:		LSD:		
Address:				
Phone:	Fax:	Quote #:	Q39503 and Q66772	
Lab Work Order # (lab use only)		ALS Contact:	Brent Mack	Sampler: E. Franz, M. Finley

Sample #	Sample Identification (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	TOC, Ammonia, TKN, Total P	DOC	T-CN (Low), Free CN (Low)	Total mercury	Dissolved mercury	Total Metals	Dissolved Metals	Conventionals** see notes	TSS-Low, TDS-Low	Arsenic speciation			Number of Containers
					P	F/P	P	P	F/P	P	F/P			F/P			
	WTS-31	16-Aug-18	8:45	Surface Water	X	X	X	X	X	X	X	X	X	X			10
	WTS-32	16-Aug-18	8:00	Surface Water	X	X	X	X	X	X	X	X	X				9
	MAM-31	16-Aug-18	14:36	Surface Water	X	X	X	X	X	X	X	X	X				9
	MAM-32	16-Aug-18	13:39	Surface Water	X	X	X	X	X	X	X	X	X	X			10
	NEM-31	17-Aug-18	10:50	Surface Water	X	X	X	X	X	X	X	X	X	X			10
	NEM-32	17-Aug-18	11:37	Surface Water	X	X	X	X	X	X	X	X	X				9
	A20-25	17-Aug-18	13:50	Surface Water	X	X	X	X	X	X	X	X	X				9
	A20-26	17-Aug-18	14:27	Surface Water	X	X	X	X	X	X	X	X	X	X			10
	A76-25	18-Aug-18	12:52	Surface Water	X	X	X	X	X	X	X	X	X	X			10
	A76-26	18-Aug-18	12:06	Surface Water	X	X	X	X	X	X	X	X	X				9
	DS1-23	19-Aug-18	12:45	Surface Water	X	X	X	X	X	X	X	X	X	X			10
	DS1-24	19-Aug-18	13:15	Surface Water	X	X	X	X	X	X	X	X	X				9

Special Instructions / Regulations with water or land use (CCME-Freshwater Aquatic Life/BC CSR - Commercial/AB Tier 1 - Natural, etc) / Hazardous Details

**Conventionals includes: Alk Species, pH, EC, Turbidity, Conductivity, Anions (F, NO2, NO3, Br, SO4), low-level Chloride, Silicate, TD-P, and Ortho-PO4.

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.
By the use of this form the user acknowledges and agrees with the Terms and Conditions as provided on a separate Excel tab.
Also provided on another Excel tab are the ALS location addresses, phone numbers and sample container / preservation / holding time table for common analyses.

SHIPMENT RELEASE (client use)			SHIPMENT RECEPTION (lab use only)				SHIPMENT VERIFICATION (lab use only)			
Released by:	Date (dd-mmm-yy)	Time (hh-mm)	Received by:	Date:	Time:	Temperature:	Verified by:	Date:	Time:	Observations: Yes / No ? If Yes add SIF
Eric Franz	21-Aug-18	7:08 AM	C.M.	24 AUG. '18	8:40am	15°C/16'/17°C				

ALS Environmental

Chain of Custody / Analytical Request For
Canada Toll Free: 1 800 668 9878
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Report To		**Report Format / Distribution**	**Service Requested** (Rush for routine analysis subject to availability)
Company:	Azimuth Consulting Group	☑ Standard ☐ Other	◉ Regular (Standard Turnaround Times - Business Days)
Contact:	Eric Franz	☑ PDF ☑ Excel ☐ Digital ☐ Fax	○ Priority (2-4 Business Days) - 50% Surcharge - Contact ALS to Confirm TAT
Address:	218-2902 West Broadway	Email 1: efranz@azimuthgroup.ca	○ Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT
	Vancouver, BC V6K2G8	Email 2: gmann@azimuthgroup.ca	○ Same Day or Weekend Emergency - Contact ALS to Confirm TAT
Phone:	604-730-1220 Fax:	Email 3: robin.allard@agnicoeagle.com	
Invoice To	Same as Report ? ☑ Yes ☐ No	**Client / Project Information**	
Hardcopy of Invoice with Report?	☐ Yes ☑ No	Job #: Whale Tail Pit CREMP - Surfacewater	
Company:		PO / AFE:	
Contact:		LSD:	
Address:			
Phone:	Fax:	Quote #: Q39503 and Q66772	
Lab Work Order # (lab use only)		**ALS Contact:** Brent Mack	**Sampler:** E. Franz, M. Finley

Analysis Request

Please indicate below Filtered, Preserved or both (F, P, F/P)

Sample #	Sample Identification (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	TOC, Ammonia, TKN, Total P (P)	DOC (F/P)	T-CN (Low), Free CN (Low) (P)	Total mercury (P)	Dissolved mercury (F/P)	Total Metals (P)	Dissolved Metals (F/P)	Conventionals** see notes	TSS-Low, TDS-Low	Arsenic speciation (F/P)			Number of Containers
	LK1-01	14-Aug-18	14:00	Surface Water	X	X	X	X	X	X	X	X	X	X			10
	LK1-02	14-Aug-18	15:40	Surface Water	X	X	X	X	X	X	X	X	X				9
	LK5-01	15-Aug-18	16:40	Surface Water	X	X	X	X	X	X	X	X	X	X			10
	LK5-02	15-Aug-18	17:30	Surface Water	X	X	X	X	X	X	X	X	X				9
	LK8-01	17-Aug-18	18:37	Surface Water	X	X	X	X	X	X	X	X	X	X			10
	LK8-02	17-Aug-18	19:00	Surface Water	X	X	X	X	X	X	X	X	X				9
	WTP DUP-1	-	-	Surface Water	X	X	X	X	X	X	X	X	X	X			10
	WTP DUP-2	-	-	Surface Water	X	X	X	X	X	X	X	X	X	X			10
	WTP EB-1	18-Aug-18	16:00	Surface Water	X	X	X	X	X	X	X	X	X	X			10
	WTP DI-1	18-Aug-18	16:20	Surface Water	X	X	X	X	X	X	X	X	X	X			10

Special Instructions / Regulations with water or land use (CCME-Freshwater Aquatic Life/BC CSR - Commercial/AB Tier 1 - Natural, etc) / Hazardous Details

**Conventionals includes: Alk Species, pH, EC, Turbidity, Conductivity, Anions (F, NO2, NO3, Br, SO4), low-level Chloride, Silicate, TD-P, and Ortho-PO4.

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Also provided on another Excel tab are the ALS location addresses, phone numbers and sample container / preservation / holding time table for common analyses.

SHIPMENT RELEASE (client use)			SHIPMENT RECEPTION (lab use only)				SHIPMENT VERIFICATION (lab use only)			
Released by:	Date (dd-mmm-yy)	Time (hh-mm)	Received by:	Date:	Time:	Temperature:	Verified by:	Date:	Time:	Observations: Yes / No ? If Yes add SIF
Eric Franz	21-Aug-18					°C				

AZIMUTH CONSULTING GROUP INC.
ATTN: Eric Franz
218 - 2902 West Broadway
Vancouver BC V6K 2G8

Date Received: 28-AUG-18
Report Date: 04-SEP-18 18:53 (MT)
Version: FINAL

Client Phone: 604-730-1220

Certificate of Analysis

Lab Work Order #: L2154273

Project P.O. #: NOT SUBMITTED
Job Reference: WHALE TAIL PIT CREMP - SURFACEWATER
C of C Numbers:
Legal Site Desc:

Brent Mack, B.Sc.
Account Manager

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ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2154273-1	L2154273-2	L2154273-3	L2154273-4	L2154273-5
Description	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water
Sampled Date	16-AUG-18	16-AUG-18	16-AUG-18	16-AUG-18	17-AUG-18
Sampled Time	08:45	08:00	14:36	13:39	10:50
Client ID	WTS-31	WTS-32	MAM-31	MAM-32	NEM-31
Grouping **Analyte**					
FILTER					
Plant Pigments Chlorophyll a (ug/L)	0.631	0.537	0.276	0.406	0.104

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2154273-6	L2154273-7	L2154273-8	L2154273-9	L2154273-10
Description	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water
Sampled Date	17-AUG-18	17-AUG-18	17-AUG-18	18-AUG-18	18-AUG-18
Sampled Time	11:37	13:50	14:27	12:52	12:06
Client ID	NEM-32	A20-25	A20-26	A76-25	A76-26
Grouping **Analyte**					
FILTER					
Plant Pigments Chlorophyll a (ug/L)	0.376	0.251	0.279	0.196	0.219

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2154273-11	L2154273-12	L2154273-13	L2154273-14	L2154273-15
Description	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water
Sampled Date	19-AUG-18	19-AUG-18	14-AUG-18	14-AUG-18	15-AUG-18
Sampled Time	12:45	13:15	14:00	15:40	16:40
Client ID	DS1-23	DS1-24	LK1-01	LK1-02	LK5-01
Grouping **Analyte**					
FILTER					
Plant Pigments Chlorophyll a (ug/L)	0.641	0.553	0.387	0.476	0.298

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2154273-16	L2154273-17	L2154273-18	L2154273-19	L2154273-20
Description	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water
Sampled Date	15-AUG-18	17-AUG-18	17-AUG-18		
Sampled Time	17:30	18:37	19:00		
Client ID	LK5-02	LK8-01	LK8-02	WTP DUP 1	WTP DUP 2
Grouping **Analyte**					
FILTER					
Plant Pigments Chlorophyll a (ug/L)	0.315	0.333	0.352	0.395	0.660

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
CHLOROA-F-VA	Filter	Chlorophyll a by Fluorometer (Filter)	EPA 445.0

This analysis is done using procedures modified from EPA Method 445.0. Chlorophyll-a is determined by a routine acetone extraction followed with analysis by fluorometry using the non-acidification procedure. This method is not subject to interferences from chlorophyll b.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

ALS Envir

L2154273-COFC

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Page 1 of 2

Report To				Report Format / Distribution				Service Requested (Rush for routine analysis subject to availability)
Company:	Azimuth Consulting Group			☑ Standard	☐ Other			◉ Regular (Standard Turnaround Times - Business Days)
Contact:	Eric Franz			☑ PDF	☑ Excel	☐ Digital	☐ Fax	○ Priority (2-4 Business Days) - 50% Surcharge - Contact ALS to Confirm TAT
Address:	218-2902 West Broadway			Email 1:	efranz@azimuthgroup.ca			○ Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT
	Vancouver, BC V6K2G8			Email 2:	mfinley@azimuthgroup.ca			○ Same Day or Weekend Emergency - Contact ALS to Confirm TAT
Phone:	604-730-1220	Fax:		Email 3:	robin.allard@agnicoeagle.com			**Analysis Request**
Invoice To	Same as Report ?	☑ Yes	☐ No	**Client / Project Information**				Please indicate below Filtered, Preserved or both (F, P, F/P)
Hardcopy of Invoice with Report?		☐ Yes	☑ No	Job #:	Whale Tail Pit CREMP - Surfacewater			F
Company:				PO / AFE:				Chlorophyll-a
Contact:				LSD:				
Address:								
Phone:		Fax:		Quote #:	Q39503			
Lab Work Order # (lab use only)				**ALS Contact:**	Brent Mack	**Sampler:**	E. Franz M. Finley	

Sample #	Sample Identification (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Chlorophyll-a	Number of Containers
	WTS-31	16-Aug-18	8:45	Surface Water	X	1
	WTS-32	16-Aug-18	8:00	Surface Water	X	1
	MAM-31	16-Aug-18	14:36	Surface Water	X	1
	MAM-32	16-Aug-18	13:39	Surface Water	X	1
	NEM-31	17-Aug-18	10:50	Surface Water	X	1
	NEM-32	17-Aug-18	11:37	Surface Water	X	1
	A20-25	17-Aug-18	13:50	Surface Water	X	1
	A20-26	17-Aug-18	14:27	Surface Water	X	1
	A76-25	18-Aug-18	12:52	Surface Water	X	1
	A76-26	18-Aug-18	12:06	Surface Water	X	1
	DS1-23	19-Aug-18	12:45	Surface Water	X	1
	DS1-24	19-Aug-18	13:15	Surface Water	X	1

Special Instructions / Regulations with water or land use (CCME-Freshwater Aquatic Life/BC CSR - Commercial/AB Tier 1 - Natural, etc) / Hazardous Details

**Conventionals includes: Alk Species, pH, EC, Turbidity, Conductivity, Anions (F, NO2, NO3, Br, SO4), low-level Chloride, Silicate, TD-P, and Ortho-PO4.

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.
By the use of this form the user acknowledges and agrees with the Terms and Conditions as provided on a separate Excel tab.
Also provided on another Excel tab are the ALS location addresses, phone numbers and sample container / preservation / holding time table for common analyses.

SHIPMENT RELEASE (client use)			SHIPMENT RECEPTION (lab use only)				SHIPMENT VERIFICATION (lab use only)			
Released by:	Date (dd-mmm-yy)	Time (hh-mm)	Received by:	Date:	Time:	Temperature:	Verified by:	Date:	Time:	Observations: Yes / No ? If Yes add SIF
Eric Franz	23-Aug-18	9:00	JC	AUG 28 2018	840AM	22 °C				

GENF 20.00 Front

L2154273-COFC

h of Custody / Analytical Request Form

Canada Toll Free: 1 800 668 9878

www.alsglobal.com

COC # _____

Report To		Report Format / Distribution	Service Requested (Rush for routine analysis subject to availability)
Company:	Azimuth Consulting Group	☑ Standard ☐ Other	◉ Regular (Standard Turnaround Times - Business Days)
Contact:	Eric Franz	☑ PDF ☑ Excel ☐ Digital ☐ Fax	○ Priority (2-4 Business Days) - 50% Surcharge - Contact ALS to Confirm TAT
Address:	218-2902 West Broadway	Email 1: efranz@azimuthgroup.ca	○ Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT
	Vancouver, BC V6K2G8	Email 2: mfinley@azimuthgroup.ca	○ Same Day or Weekend Emergency - Contact ALS to Confirm TAT
Phone:	604-730-1220 Fax:	Email 3: robin.allard@agnicoeagle.com	**Analysis Request**
Invoice To	Same as Report ? ☑ Yes ☐ No	**Client / Project Information**	Please indicate below Filtered, Preserved or both (F, P, F/P)
Hardcopy of Invoice with Report?	☐ Yes ☑ No	Job #: Whale Tail Pit CREMP - Surfacewater	
Company:		PO / AFE:	
Contact:		LSD:	
Address:			
Phone:	Fax:	Quote #: Q39503	
Lab Work Order # (lab use only)		**ALS Contact:** Brent Mack	**Sampler:** E. Franz, M. Finley

Sample #	Sample Identification (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Chlorophyll-a	F	F/P	P	P	F/P	P	F/P			F/P			Number of Containers
	LK1-01	14-Aug-18	14:00	Surface Water	X													1
	LK1-02	14-Aug-18	15:40	Surface Water	X													1
	LK5-01	15-Aug-18	16:40	Surface Water	X													1
	LK5-02	15-Aug-18	17:30	Surface Water	X													1
	LK8-01	17-Aug-18	18:37	Surface Water	X													1
	LK8-02	17-Aug-18	19:00	Surface Water	X													1
	WTP DUP-1	-	-	Surface Water	X													1
	WTP DUP-2	-	-	Surface Water	X													1

Special Instructions / Regulations with water or land use (CCME-Freshwater Aquatic Life/BC CSR - Commercial/AB Tier 1 - Natural, etc) / Hazardous Details

**Conventionals includes: Alk Species, pH, EC, Turbidity, Conductivity, Anions (F, NO2, NO3, Br, SO4), low-level Chloride, Silicate, TD-P, and Ortho-PO4.

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.

By the use of this form the user acknowledges and agrees with the Terms and Conditions as provided on a separate Excel tab.

Also provided on another Excel tab are the ALS location addresses, phone numbers and sample container / preservation / holding time table for common analyses.

SHIPMENT RELEASE (client use)			SHIPMENT RECEPTION (lab use only)				SHIPMENT VERIFICATION (lab use only)			
Released by:	Date (dd-mmm-yy)	Time (hh-mm)	Received by:	Date:	Time:	Temperature:	Verified by:	Date:	Time:	Observations: Yes / No ? If Yes add SIF
Eric Franz	23-Aug-18	9:00	JC	AUG 28 2018	840am	22 °C				

AZIMUTH CONSULTING GROUP INC.
ATTN: Eric Franz
218 - 2902 West Broadway
Vancouver BC V6K 2G8

Date Received: 01-OCT-18
Report Date: 15-OCT-18 12:06 (MT)
Version: FINAL

Client Phone: 604-730-1220

Certificate of Analysis

Lab Work Order #: L2173524

Project P.O. #: NOT SUBMITTED
Job Reference: MEADOWBANK CREMP- SURFACEWATER
C of C Numbers:
Legal Site Desc:

Brent Mack, B.Sc.
Account Manager

[This report shall not be reproduced except in full without the written authority of the Laboratory.]

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	L2173524-1 Surface Water 22-SEP-18 15:10 LK8-03	L2173524-2 Surface Water 22-SEP-18 16:05 LK8-04	L2173524-3 Surface Water 22-SEP-18 11:55 A20-27	L2173524-4 Surface Water 22-SEP-18 12:50 A20-28	L2173524-5 Surface Water 23-SEP-18 10:30 LK5-03
WATER						
Physical Tests	Conductivity (uS/cm)	14.3	14.0	14.3	13.8	25.0
	Hardness (as CaCO3) (mg/L)	5.15	5.07	5.08	5.03	10.5
	pH (pH)	6.87	6.87	6.92	6.90	7.18
	Total Suspended Solids (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
	Total Dissolved Solids (mg/L)	14.0	14.9	14.1	14.4	22.3
	Turbidity (NTU)	0.21	0.22	0.21	0.25	0.19
Anions and Nutrients	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	4.5	4.4	5.1	4.7	9.4
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
	Alkalinity, Total (as CaCO3) (mg/L)	4.5	4.4	5.1	4.7	9.4
	Ammonia, Total (as N) (mg/L)	0.0157	0.0343	0.0161	0.0080	0.0096
	Bromide (Br) (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050
	Chloride (Cl) (mg/L)	0.57	0.57	0.66	0.65	0.69
	Fluoride (F) (mg/L)	0.028	0.025	0.028	0.028	0.033
	Nitrate (as N) (mg/L)	<0.0050	0.0127	<0.0050	<0.0050	<0.0050
	Nitrite (as N) (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Total Kjeldahl Nitrogen (mg/L)	0.102	0.111	0.107	0.145	0.101
	Orthophosphate-Dissolved (as P) (mg/L)	0.0015	0.0014	0.0011	0.0014	0.0013
	Phosphorus (P)-Total Dissolved (mg/L)	0.0022	0.0020	0.0027	0.0023	0.0021
	Phosphorus (P)-Total (mg/L)	0.0021	0.0030	0.0030	0.0055	0.0073
	Silicate (as SiO2) (mg/L)	<0.50	<0.50	0.85	0.78	0.91
	Sulfate (SO4) (mg/L)	1.40	1.40	1.07	1.01	1.99
Cyanides	Cyanide, Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Cyanide, Free (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	1.24	1.48	1.64	1.84	2.13
	Total Organic Carbon (mg/L)	1.42	1.46	2.14	1.55	2.10
Total Metals	Aluminum (Al)-Total (mg/L)	0.0038	0.0038	0.0047	0.0045	0.0042
	Antimony (Sb)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Arsenic (As)-Total (mg/L)	0.00015	0.00017	<0.00010	0.00011	0.00016
	Barium (Ba)-Total (mg/L)	0.00223	0.00225	0.00293	0.00295	0.00241
	Beryllium (Be)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Bismuth (Bi)-Total (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Boron (B)-Total (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
	Cadmium (Cd)-Total (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
	Calcium (Ca)-Total (mg/L)	1.09	1.08	1.31	1.29	2.47
	Cesium (Cs)-Total (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2173524-6	L2173524-7	L2173524-8	L2173524-9	L2173524-10
Description	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water
Sampled Date	23-SEP-18	23-SEP-18	23-SEP-18	23-SEP-18	01-SEP-18
Sampled Time	09:45	13:15	12:39		
Client ID	LK5-04	LK1-03	LK1-04	WTP SEP DUP-1	CREMP-SEP-TRAV-1
Grouping / **Analyte**					
WATER					
Physical Tests Conductivity (uS/cm)	24.3	14.4	14.4	25.2	<2.0
Hardness (as CaCO3) (mg/L)	10.5	5.41	5.49	10.4	<0.50 HTC
pH (pH)	7.21	6.92	6.89	7.20	5.41
Total Suspended Solids (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
Total Dissolved Solids (mg/L)	17.6	13.9	13.5	20.3	<3.0
Turbidity (NTU)	0.18	0.30	0.30	0.19	<0.10
Anions and Nutrients Alkalinity, Bicarbonate (as CaCO3) (mg/L)	9.4	5.1	5.1	9.2	<1.0
Alkalinity, Carbonate (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
Alkalinity, Total (as CaCO3) (mg/L)	9.4	5.1	5.1	9.2	<1.0
Ammonia, Total (as N) (mg/L)	0.0257	0.0292	0.0384	0.0351	<0.0050
Bromide (Br) (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050
Chloride (Cl) (mg/L)	0.69	0.73	0.73	0.69	<0.10
Fluoride (F) (mg/L)	0.032	0.036	0.036	0.033	<0.020
Nitrate (as N) (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Nitrite (as N) (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Total Kjeldahl Nitrogen (mg/L)	0.122	0.117	0.131	0.161	<0.050
Orthophosphate-Dissolved (as P) (mg/L)	0.0017	0.0013	0.0012	0.0015	<0.0010
Phosphorus (P)-Total Dissolved (mg/L)	0.0024	0.0031	0.0024	0.0027	<0.0020
Phosphorus (P)-Total (mg/L)	0.0037	0.0040	0.0074	0.0048	<0.0020
Silicate (as SiO2) (mg/L)	0.85	<0.50	<0.50	0.87	<0.50
Sulfate (SO4) (mg/L)	1.94	1.06	1.06	1.99	<0.30
Cyanides Cyanide, Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Cyanide, Free (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Organic / Inorganic Carbon Dissolved Organic Carbon (mg/L)	2.07	2.04	1.90	1.89	<0.50
Total Organic Carbon (mg/L)	1.75	1.88	2.23	1.98	<0.50
Total Metals Aluminum (Al)-Total (mg/L)	0.0034	0.0071	0.0068	0.0036	<0.0030
Antimony (Sb)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic (As)-Total (mg/L)	0.00016	0.00010	0.00010	0.00016	<0.00010
Barium (Ba)-Total (mg/L)	0.00251	0.00246	0.00239	0.00250	<0.00010
Beryllium (Be)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth (Bi)-Total (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron (B)-Total (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)-Total (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Calcium (Ca)-Total (mg/L)	2.50	1.28	1.28	2.48	<0.050
Cesium (Cs)-Total (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	L2173524-1 Surface Water 22-SEP-18 15:10 LK8-03	L2173524-2 Surface Water 22-SEP-18 16:05 LK8-04	L2173524-3 Surface Water 22-SEP-18 11:55 A20-27	L2173524-4 Surface Water 22-SEP-18 12:50 A20-28	L2173524-5 Surface Water 23-SEP-18 10:30 LK5-03
WATER						
Total Metals	Chromium (Cr)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Cobalt (Co)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Copper (Cu)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	0.00157
	Iron (Fe)-Total (mg/L)	<0.010	<0.010	0.013	0.014	0.012
	Lead (Pb)-Total (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Lithium (Li)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Magnesium (Mg)-Total (mg/L)	0.601	0.597	0.450	0.434	1.05
	Manganese (Mn)-Total (mg/L)	0.00127	0.00125	0.00068	0.00102	0.00110
	Mercury (Hg)-Total (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
	Molybdenum (Mo)-Total (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Nickel (Ni)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Phosphorus (P)-Total (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050
	Potassium (K)-Total (mg/L)	0.314	0.310	0.336	0.327	0.305
	Rubidium (Rb)-Total (mg/L)	0.00049	0.00049	0.00041	0.00036	0.00033
	Selenium (Se)-Total (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Silicon (Si)-Total (mg/L)	0.30	0.29	0.44	0.44	0.48
	Silver (Ag)-Total (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Sodium (Na)-Total (mg/L)	0.470	0.469	0.624	0.608	0.618
	Strontium (Sr)-Total (mg/L)	0.00510	0.00510	0.00691	0.00682	0.00951
	Sulfur (S)-Total (mg/L)	0.57	0.59	<0.50	<0.50	0.78
	Tellurium (Te)-Total (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
	Thallium (Tl)-Total (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Thorium (Th)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Tin (Sn)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Titanium (Ti)-Total (mg/L)	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030
	Tungsten (W)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Uranium (U)-Total (mg/L)	0.000012	<0.000010	0.000023	0.000024	0.000013
	Vanadium (V)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Zinc (Zn)-Total (mg/L)	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
	Zirconium (Zr)-Total (mg/L)	<0.000060	<0.000060	<0.000060	<0.000060	<0.000060
Dissolved Metals	Dissolved Mercury Filtration Location	FIELD	FIELD	FIELD	FIELD	FIELD
	Dissolved Metals Filtration Location	FIELD	FIELD	FIELD	FIELD	FIELD
	Aluminum (Al)-Dissolved (mg/L)	0.0015	0.0015	0.0029	0.0025	0.0013
	Antimony (Sb)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Arsenic (As)-Dissolved (mg/L)	0.00011	<0.00010	<0.00010	<0.00010	0.00012
	Barium (Ba)-Dissolved (mg/L)	0.00229	0.00219	0.00304	0.00313	0.00243
	Beryllium (Be)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2173524-6	L2173524-7	L2173524-8	L2173524-9	L2173524-10
Description	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water
Sampled Date	23-SEP-18	23-SEP-18	23-SEP-18	23-SEP-18	01-SEP-18
Sampled Time	09:45	13:15	12:39		
Client ID	LK5-04	LK1-03	LK1-04	WTP SEP DUP-1	CREMP-SEP-TRAV-1
Grouping / **Analyte**					
WATER					
Total Metals Chromium (Cr)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Cobalt (Co)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper (Cu)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Iron (Fe)-Total (mg/L)	<0.010	0.016	0.015	0.010	<0.010
Lead (Pb)-Total (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium (Li)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Magnesium (Mg)-Total (mg/L)	1.07	0.577	0.580	1.07	<0.0050
Manganese (Mn)-Total (mg/L)	0.00109	0.00135	0.00137	0.00106	<0.00010
Mercury (Hg)-Total (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Molybdenum (Mo)-Total (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Nickel (Ni)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Phosphorus (P)-Total (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050
Potassium (K)-Total (mg/L)	0.312	0.262	0.265	0.309	<0.050
Rubidium (Rb)-Total (mg/L)	0.00034	0.00037	0.00036	0.00033	<0.00020
Selenium (Se)-Total (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Silicon (Si)-Total (mg/L)	0.46	0.25	0.25	0.48	<0.10
Silver (Ag)-Total (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)-Total (mg/L)	0.630	0.581	0.598	0.645	<0.050
Strontium (Sr)-Total (mg/L)	0.00950	0.00720	0.00716	0.00954	<0.00020
Sulfur (S)-Total (mg/L)	0.82	<0.50	0.58	0.83	<0.50
Tellurium (Te)-Total (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Thallium (Tl)-Total (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Thorium (Th)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Tin (Sn)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)-Total (mg/L)	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030
Tungsten (W)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Uranium (U)-Total (mg/L)	0.000013	0.000022	0.000023	0.000012	<0.000010
Vanadium (V)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc (Zn)-Total (mg/L)	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Zirconium (Zr)-Total (mg/L)	<0.000060	<0.000060	<0.000060	<0.000060	<0.000060
Dissolved Metals Dissolved Mercury Filtration Location	FIELD	FIELD	FIELD	FIELD	
Dissolved Metals Filtration Location	FIELD	FIELD	FIELD	FIELD	
Aluminum (Al)-Dissolved (mg/L)	0.0032	0.0022	0.0026	0.0059	
Antimony (Sb)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	
Arsenic (As)-Dissolved (mg/L)	0.00012	<0.00010	<0.00010	0.00013	
Barium (Ba)-Dissolved (mg/L)	0.00252	0.00240	0.00248	0.00318	
Beryllium (Be)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	L2173524-1 Surface Water 22-SEP-18 15:10 LK8-03	L2173524-2 Surface Water 22-SEP-18 16:05 LK8-04	L2173524-3 Surface Water 22-SEP-18 11:55 A20-27	L2173524-4 Surface Water 22-SEP-18 12:50 A20-28	L2173524-5 Surface Water 23-SEP-18 10:30 LK5-03
Sample ID		L2173524-1	L2173524-2	L2173524-3	L2173524-4	L2173524-5
Description		Surface Water	Surface Water	Surface Water	Surface Water	Surface Water
Sampled Date		22-SEP-18	22-SEP-18	22-SEP-18	22-SEP-18	23-SEP-18
Sampled Time		15:10	16:05	11:55	12:50	10:30
Client ID		LK8-03	LK8-04	A20-27	A20-28	LK5-03
WATER						
Dissolved Metals	Bismuth (Bi)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Boron (B)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
	Cadmium (Cd)-Dissolved (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
	Calcium (Ca)-Dissolved (mg/L)	1.08	1.06	1.30	1.27	2.43
	Cesium (Cs)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Chromium (Cr)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	0.00011	<0.00010
	Cobalt (Co)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Copper (Cu)-Dissolved (mg/L)	0.00032	0.00028	0.00021	0.00021	<0.00020
	Iron (Fe)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
	Lead (Pb)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Lithium (Li)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Magnesium (Mg)-Dissolved (mg/L)	0.594	0.586	0.448	0.449	1.07
	Manganese (Mn)-Dissolved (mg/L)	0.00054	0.00053	0.00041	0.00053	0.00040
	Mercury (Hg)-Dissolved (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
	Molybdenum (Mo)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Nickel (Ni)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Phosphorus (P)-Dissolved (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050
	Potassium (K)-Dissolved (mg/L)	0.305	0.293	0.316	0.329	0.303
	Rubidium (Rb)-Dissolved (mg/L)	0.00052	0.00055	0.00042	0.00044	0.00039
	Selenium (Se)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Silicon (Si)-Dissolved (mg/L)	0.229	0.233	0.384	0.371	0.418
	Silver (Ag)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Sodium (Na)-Dissolved (mg/L)	0.465	0.463	0.593	0.609	0.629
	Strontium (Sr)-Dissolved (mg/L)	0.00487	0.00485	0.00666	0.00654	0.00894
	Sulfur (S)-Dissolved (mg/L)	<0.50	<0.50	<0.50	<0.50	<0.50
	Tellurium (Te)-Dissolved (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
	Thallium (Tl)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Thorium (Th)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Tin (Sn)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Titanium (Ti)-Dissolved (mg/L)	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030
	Tungsten (W)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Uranium (U)-Dissolved (mg/L)	0.000011	0.000010	0.000023	0.000022	0.000012
	Vanadium (V)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Zinc (Zn)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Zirconium (Zr)-Dissolved (mg/L)	<0.000060	<0.000060	<0.000060	<0.000060	<0.000060

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2173524-6	L2173524-7	L2173524-8	L2173524-9	L2173524-10
Description	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water
Sampled Date	23-SEP-18	23-SEP-18	23-SEP-18	23-SEP-18	01-SEP-18
Sampled Time	09:45	13:15	12:39		
Client ID	LK5-04	LK1-03	LK1-04	WTP SEP DUP-1	CREMP-SEP-TRAV-1
Grouping **Analyte**					
WATER					
Dissolved Metals Bismuth (Bi)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	
Boron (B)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010	
Cadmium (Cd)-Dissolved (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	
Calcium (Ca)-Dissolved (mg/L)	2.41	1.22	1.24	2.40	
Cesium (Cs)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	
Chromium (Cr)-Dissolved (mg/L)	0.00014	<0.00010	0.00011	<0.00010	
Cobalt (Co)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	
Copper (Cu)-Dissolved (mg/L)	0.00073	<0.00020	<0.00020	<0.00020	
Iron (Fe)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010	
Lead (Pb)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	
Lithium (Li)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	
Magnesium (Mg)-Dissolved (mg/L)	1.08	0.572	0.582	1.06	
Manganese (Mn)-Dissolved (mg/L)	0.00040	0.00051	0.00050	0.00046	
Mercury (Hg)-Dissolved (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	
Molybdenum (Mo)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	
Nickel (Ni)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	
Phosphorus (P)-Dissolved (mg/L)	<0.050	<0.050	<0.050	<0.050	
Potassium (K)-Dissolved (mg/L)	0.303	0.255	0.263	0.323	
Rubidium (Rb)-Dissolved (mg/L)	0.00037	0.00041	0.00037	0.00043	
Selenium (Se)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	
Silicon (Si)-Dissolved (mg/L)	0.405	0.185	0.183	0.426	
Silver (Ag)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	
Sodium (Na)-Dissolved (mg/L)	0.623	0.557	0.562	0.587	
Strontium (Sr)-Dissolved (mg/L)	0.00890	0.00678	0.00674	0.00931	
Sulfur (S)-Dissolved (mg/L)	0.65	<0.50	<0.50	0.79	
Tellurium (Te)-Dissolved (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020	
Thallium (Tl)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	
Thorium (Th)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	
Tin (Sn)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	
Titanium (Ti)-Dissolved (mg/L)	<0.00030	<0.00030	<0.00030	<0.00030	
Tungsten (W)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	
Uranium (U)-Dissolved (mg/L)	0.000011	0.000021	0.000020	0.000011	
Vanadium (V)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	
Zinc (Zn)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	
Zirconium (Zr)-Dissolved (mg/L)	<0.000060	<0.000060	<0.000060	<0.000060	

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L2173524-9
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L2173524-9
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L2173524-9
Matrix Spike	Manganese (Mn)-Dissolved	MS-B	L2173524-9
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L2173524-9
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L2173524-9

Qualifiers for Individual Parameters Listed:

Qualifier	Description
HTC	Hardness was calculated from Total Ca and/or Mg concentrations and may be biased high (dissolved Ca/Mg results unavailable).
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ALK-TITR-VA	Water	Alkalinity Species by Titration	APHA 2320 Alkalinity

This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.

BR-L-IC-N-VA	Water	Bromide in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

CARBONS-DOC-VA	Water	Dissolved organic carbon by combustion	APHA 5310B

This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)". Dissolved carbon (DOC) fractions are determined by filtering the sample through a 0.45 micron membrane filter prior to analysis.

CARBONS-TOC-VA	Water	Total organic carbon by combustion	APHA 5310B TOTAL ORGANIC CARBON (TOC)

This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)".

CL-L-IC-N-VA	Water	Chloride in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

CN-FREE-L-CFA-VA	Water	Low Level Free Cyanide in water by CFA	ASTM 7237

This analysis is carried out using procedures adapted from ASTM Method 7237 "Free Cyanide with Flow Injection Analysis (FIA) Utilizing Gas Diffusion Separation and Amperometric Detection". Free cyanide is determined by in-line gas diffusion at pH 6 with final determination by colourimetric analysis.

CN-T-L-CFA-VA	Water	Low Level Total Cyanide in water by CFA	ISO 14403:2002

This analysis is carried out using procedures adapted from ISO Method 14403:2002 "Determination of Total Cyanide using Flow Analysis (FIA and CFA)". Total or strong acid dissociable (SAD) cyanide is determined by in-line UV digestion along with sample distillation and final determination by colourimetric analysis. Method Limitation: This method is susceptible to interference from thiocyanate (SCN). If SCN is present in the sample, there could be a positive interference with this method, but it would be less than 1% and could be as low as zero.

EC-PCT-VA	Water	Conductivity (Automated)	APHA 2510 Auto. Conduc.

This analysis is carried out using procedures adapted from APHA Method 2510 "Conductivity". Conductivity is determined using a conductivity electrode.

EC-SCREEN-VA	Water	Conductivity Screen (Internal Use Only)	APHA 2510

Qualitative analysis of conductivity where required during preparation of other tests - e.g. TDS, metals, etc.

F-IC-N-VA	Water	Fluoride in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

HARDNESS-CALC-VA	Water	Hardness	APHA 2340B

Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

HG-D-CVAA-VA	Water	Diss. Mercury in Water by CVAAS or CVAFS	APHA 3030B/EPA 1631E (mod)

Water samples are filtered (0.45 um), preserved with hydrochloric acid, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

HG-T-CVAA-VA	Water	Total Mercury in Water by CVAAS or CVAFS	EPA 1631E (mod)

Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

MET-D-CCMS-VA	Water	Dissolved Metals in Water by CRC ICPMS	APHA 3030B/6020A (mod)

Reference Information

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

MET-T-CCMS-VA Water Total Metals in Water by CRC ICPMS EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

NH3-F-VA Water Ammonia in Water by Fluorescence J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

NO2-L-IC-N-VA Water Nitrite in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

NO3-L-IC-N-VA Water Nitrate in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

P-T-PRES-COL-VA Water Total P in Water by Colour APHA 4500-P Phosphorus

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is determined colourimetrically after persulphate digestion of the sample.
Samples with very high dissolved solids (i.e. seawaters, brackish waters) may produce a negative bias by this method. Alternate methods are available for these types of samples.

Arsenic (5+), at elevated levels, is a positive interference on colourimetric phosphate analysis.

P-TD-COL-VA Water Total Dissolved P in Water by Colour APHA 4500-P Phosphorous

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Dissolved Phosphorus is determined colourimetrically after persulphate digestion of a sample that has been lab or field filtered through a 0.45 micron membrane filter.
Samples with very high dissolved solids (i.e. seawaters, brackish waters) may produce a negative bias by this method. Alternate methods are available for these types of samples.

Arsenic (5+), at elevated levels, is a positive interference on colourimetric phosphate analysis.

PH-PCT-VA Water pH by Meter (Automated) APHA 4500-H pH Value

This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode

It is recommended that this analysis be conducted in the field.

PO4-DO-COL-VA Water Diss. Orthophosphate in Water by Colour APHA 4500-P Phosphorus

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.
Samples with very high dissolved solids (i.e. seawaters, brackish waters) may produce a negative bias by this method. Alternate methods are available for these types of samples.

Arsenic (5+), at elevated levels, is a positive interference on colourimetric phosphate analysis.

SILICATE-COL-VA Water Silicate by Colourimetric analysis APHA 4500-SiO2 E.

This analysis is carried out using procedures adapted from APHA Method 4500-SiO2 E. "Silica". Silicate (molybdate-reactive silica) is determined by the molybdosilicate-heteropoly blue colourimetric method. Arsenic (5+) above 100 mg/L is a negative interference on this test.

SO4-IC-N-VA Water Sulfate in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

TDS-LOW-VA Water Low Level TDS (3.0mg/L) by Gravimetric APHA 2540C

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total dissolved solids (TDS) are determined by filtering a sample through a glass fibre filter, TDS is determined by evaporating the filtrate to dryness at 180 degrees celsius.

TKN-F-VA Water TKN in Water by Fluorescence APHA 4500-NORG D.

This analysis is carried out using procedures adapted from APHA Method 4500-Norg D. "Block Digestion and Flow Injection Analysis". Total Kjeldahl Nitrogen is determined using block digestion followed by Flow-injection analysis with fluorescence detection.

TSS-LOW-VA Water Total Suspended Solids by Grav. (1 mg/L) APHA 2540D

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total suspended solids (TSS) are determined by filtering a sample through a glass fibre filter, TSS is determined by drying the filter at 104 degrees celsius.

Reference Information

Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.

TURBIDITY-VA Water Turbidity by Meter APHA 2130 Turbidity

This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

ALS Environmental

L2173524-COFC

/ Analytical Request Form
Free: 1 800 668 9878
.alsglobal.com

COC # _____

Page 1 of 1

Report To				ution				Service Requested (Rush for routine analysis subject to availability)
Company:	Azimuth Consulting Group							◉ Regular (Standard Turnaround Times - Business Days)
Contact:	Eric Franz			☑ PDF	☑ Excel	☐ Digital	☐ Fax	○ Priority (2-4 Business Days) - 50% Surcharge - Contact ALS to Confirm TAT
Address:	218-2902 West Broadway			Email 1:	efranz@azimuthgroup.ca			○ Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT
	Vancouver, BC V6K2G8			Email 2:	marie-pier.marcil@agnicoeagle.com			○ Same Day or Weekend Emergency - Contact ALS to Confirm TAT
Phone:	604-730-1220	Fax:		Email 3:	robin.allard@agnicoeagle.com			
Invoice To	Same as Report ?	☑ Yes	☐ No	Client / Project Information				Analysis Request
Hardcopy of Invoice with Report?		☐ Yes	☑ No	Job #:	Meadowbank CREMP - Surfacewater			Please indicate below Filtered, Preserved or both (F, P, F/P)
Company:				PO / AFE:				
Contact:				LSD:				
Address:								
Phone:		Fax:		Quote #:	Q39503			
Lab Work Order # (lab use only)				ALS Contact:	Brent Mack	Sampler:	ENV	

Sample #	Sample Identification (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Conventionals** see notes	TSS-Low, TDS-Low	TOC, Ammonia, TKN, Total P	DOC	T-CN (Low), Free CN (Low)	Total mercury	Dissolved mercury	Total Metals	Dissolved metals	Chlorophyll-a			Number of Containers
						P	P	F/P	P	P	F/P	P	F/P	F			
	LK8-03	22-Sep-18	15:10	Surface Water	X	X	X	X	X	X	X	X	X				9
	LK8-04	22-Sep-18	16:05	Surface Water	X	X	X	X	X	X	X	X	X				9
	A20-27	22-Sep-18	11:55	Surface Water	X	X	X	X	X	X	X	X	X				9
	A20-28	22-Sep-18	12:50	Surface Water	X	X	X	X	X	X	X	X	X				9
	LK5-03	23-Sep-18	10:30	Surface Water	X	X	X	X	X	X	X	X	X				9
	LK5-04	23-Sep-18	9:45	Surface Water	X	X	X	X	X	X	X	X	X				9
	LK1-03	23-Sep-18	13:15	Surface Water	X	X	X	X	X	X	X	X	X				9
	LK1-04	23-Sep-18	12:39	Surface Water	X	X	X	X	X	X	X	X	X				9
	WTP SEP DUP-1	23-Sep-18		Surface Water	X	X	X	X	X	X	X	X	X				9
	CREMP-SEP-TRAV-1	2018-09		Surface Water	X	X	X	X	X	X		X					7

Special Instructions / Regulations with water or land use (CCME-Freshwater Aquatic Life/BC CSR - Commercial/AB Tier 1 - Natural, etc) / Hazardous Details

**Conventionals includes: Alk Species, pH, EC, Turbidity, Conductivity, Anions (F, NO2, NO3, Br, SO4), low-level Chloride, Silicate, TD-P, and Ortho-PO4.

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.

By the use of this form the user acknowledges and agrees with the Terms and Conditions as provided on a separate Excel tab.

Also provided on another Excel tab are the ALS location addresses, phone numbers and sample container / preservation / holding time table for common analyses.

SHIPMENT RELEASE (client use)			SHIPMENT RECEPTION (lab use only)				SHIPMENT VERIFICATION (lab use only)			
Released by:	Date (dd-mmm-yy)	Time (hh-mm)	Received by:	Date:	Time:	Temperature:	Verified by:	Date:	Time:	Observations: Yes / No ? If Yes add SIF
	24-Sep-18	9:00	TM	10/1/18	0850 hrs	4 °C				

GENF 20.00 Front

AZIMUTH CONSULTING GROUP INC.
ATTN: Eric Franz
218 - 2902 West Broadway
Vancouver BC V6K 2G8

Date Received: 25-OCT-18
Report Date: 05-NOV-18 14:01 (MT)
Version: FINAL

Client Phone: 604-730-1220

Certificate of Analysis

Lab Work Order #: L2187379

Project P.O. #: NOT SUBMITTED
Job Reference: MEADOWBANK CREMP - SURFACEWATER
C of C Numbers:
Legal Site Desc:

Brent Mack, B.Sc.
Account Manager

[This report shall not be reproduced except in full without the written authority of the Laboratory.]

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2187379-1	L2187379-2	L2187379-3	L2187379-4	L2187379-5
Description	Surface water	Surface water	Surface water	Surface water	Surface water
Sampled Date	22-SEP-18	22-SEP-18	22-SEP-18	22-SEP-18	23-SEP-18
Sampled Time	15:10	16:05	11:55	12:50	10:30
Client ID	LK8-03	LK8-04	A20-27	A20-28	LK5-03
Grouping **Analyte**					
FILTER					
Plant Pigments Chlorophyll a (ug/L)	0.508	0.437	0.331	0.358	0.328

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2187379-6	L2187379-7	L2187379-8	L2187379-9	
Description	Surface water	Surface water	Surface water	Surface water	
Sampled Date	23-SEP-18	23-SEP-18	23-SEP-18	23-SEP-18	
Sampled Time	09:45	13:15	12:39		
Client ID	LK5-04	LK1-03	LK1-04	WTP SEP DUP-1	
Grouping **Analyte**					
FILTER					
Plant Pigments Chlorophyll a (ug/L)	0.386	0.348	0.375	0.318	

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
CHLOROA-F-VA	Filter	Chlorophyll a by Fluorometer (Filter)	EPA 445.0

This analysis is done using procedures modified from EPA Method 445.0. Chlorophyll-a is determined by a routine acetone extraction followed with analysis by fluorometry using the non-acidification procedure. This method is not subject to interferences from chlorophyll b.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

ALS Environmental

L2187379-COFC

COC # _____

Page 1 of 1

Report To				Report Format / Distribution				Turnaround Time Requested (Rush for routine analysis subject to availability)
Company:	Azimuth Consulting Group			☑ Standard	☐	☐	☐	◉ Regular (Standard Turnaround Times - Business Days)
Contact:	Eric Franz			☑ PDF	☐ Excel	☐ Digital	☐ Fax	○ Priority (2-4 Business Days) - 50% Surcharge - Contact ALS to Confirm TAT
Address:	218-2902 West Broadway			Email 1:	efranz@azimuthgroup.ca			○ Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT
	Vancouver, BC V6K2G8			Email 2:	marie-pier.marcil@agnicoeagle.com			○ Same Day or Weekend Emergency - Contact ALS to Confirm TAT
Phone:	604-730-1220	Fax:		Email 3:	robin.allard@agnicoeagle.com			
Invoice To	Same as Report ?	☑ Yes	☐ No	Client / Project Information				Analysis Request
Hardcopy of Invoice with Report?		☐ Yes	☑ No	Job #:	Meadowbank CREMP - Surfacewater			Please indicate below Filtered, Preserved or both (F, P, F/P)
Company:				PO / AFE:				
Contact:				LSD:				
Address:								
Phone:		Fax:		Quote #:	Q39503			
Lab Work Order # (lab use only)				ALS Contact:	Brent Mack	Sampler:	ENV	

Sample #	Sample Identification (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Conventionals** see notes	TSS-Low, TDS-Low	TOC, Ammonia, TKN, Total P	DOC	T-CN (Low), Free CN (Low)	Total mercury	Dissolved mercury	Total Metals	Dissolved metals	Chlorophyll-a			Number of Containers
							P	F/P	P	P	F/P	P	F/P	F			
	LK8-03	22-Sep-18	15:10	Surface Water										X			1
	LK8-04	22-Sep-18	16:05	Surface Water										X			1
	A20-27	22-Sep-18	11:55	Surface Water										X			1
	A20-28	22-Sep-18	12:50	Surface Water										X			1
	LK5-03	23-Sep-18	10:30	Surface Water										X			1
	LK5-04	23-Sep-18	9:45	Surface Water										X			1
	LK1-03	23-Sep-18	13:15	Surface Water										X			1
	LK1-04	23-Sep-18	12:39	Surface Water										X			1
	WTP SEP DUP-1	23-Sep-18		Surface Water										X			1
	CREMP-SEP-TRAV-1	2018-09		Surface Water													

Special Instructions / Regulations with water or land use (CCME-Freshwater Aquatic Life/BC CSR - Commercial/AB Tier 1 - Natural, etc) / Hazardous Details

**Conventionals includes: Alk Species, pH, EC, Turbidity, Conductivity, Anions (F, NO2, NO3, Br, SO4), low-level Chloride, Silicate, TD-P, and Ortho-PO4.

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.

By the use of this form the user acknowledges and agrees with the Terms and Conditions as provided on a separate Excel tab.

Also provided on another Excel tab are the ALS location addresses, phone numbers and sample container / preservation / holding time table for common analyses.

SHIPMENT RELEASE (client use)			SHIPMENT RECEPTION (lab use only)				SHIPMENT VERIFICATION (lab use only)			
Released by:	Date (dd-mmm-yy)	Time (hh-mm)	Received by:	Date:	Time:	Temperature:	Verified by:	Date:	Time:	Observations: Yes / No ? If Yes add SIF
Isabelle Couture	22-Oct-18	9:00	HA	10/25	2pm	8 °C				

GENF 20.00 Front

AZIMUTH CONSULTING GROUP INC.
ATTN: Eric Franz
218 - 2902 West Broadway
Vancouver BC V6K 2G8

Date Received: 08-NOV-18
Report Date: 22-NOV-18 18:17 (MT)
Version: FINAL

Client Phone: 604-730-1220

Certificate of Analysis

Lab Work Order #: L2194149

Project P.O. #: NOT SUBMITTED
Job Reference: MEADOWBANK CREMP-SURFACEWATER
C of C Numbers:
Legal Site Desc:

Brent Mack, B.Sc.
Account Manager

[This report shall not be reproduced except in full without the written authority of the Laboratory.]

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	L2194149-1 Surface Water 01-NOV-18 11:50 A20-29	L2194149-2 Surface Water 01-NOV-18 12:16 A20-30	L2194149-3 Surface Water 31-OCT-18 15:07 WTS-35	L2194149-4 Surface Water 01-NOV-18 10:50 WTS-36	L2194149-5 Surface Water 01-NOV-18 14:05 MAM-35
WATER						
Physical Tests	Conductivity (uS/cm)	14.1	13.9	37.4	40.7	102
	Hardness (as CaCO3) (mg/L)	4.99	5.12	13.4	13.2	38.9
	pH (pH)	6.88	6.86	6.93	6.95	7.01
	Total Suspended Solids (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
	Total Dissolved Solids (mg/L)	14.7	14.8	27.7	31.5	89
	Turbidity (NTU)	0.15	0.15	0.23	0.19	1.03
Anions and Nutrients	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	4.7	4.8	5.4	6.0	7.1
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
	Alkalinity, Total (as CaCO3) (mg/L)	4.7	4.8	5.4	6.0	7.1
	Ammonia, Total (as N) (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	0.0160
	Bromide (Br) (mg/L)	<0.050	<0.050	0.072	0.079	0.280
	Chloride (Cl) (mg/L)	0.67	0.66	6.12	6.72	21.5
	Fluoride (F) (mg/L)	0.028	0.029	0.031	0.034	0.032
	Nitrate (as N) (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	0.109
	Nitrite (as N) (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	0.0023 RRV
	Total Kjeldahl Nitrogen (mg/L)	0.070	0.077	0.100	0.095	0.127
	Orthophosphate-Dissolved (as P) (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Phosphorus (P)-Total Dissolved (mg/L)	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
	Phosphorus (P)-Total (mg/L)	0.0020	0.0038	0.0028	0.0043	0.0036
	Silicate (as SiO2) (mg/L)	0.79	0.83	<0.50	0.53	0.78
	Sulfate (SO4) (mg/L)	1.06	1.04	1.75	1.94	4.32
Cyanides	Cyanide, Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Cyanide, Free (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	1.45	1.39	1.86	1.81	1.63
	Total Organic Carbon (mg/L)	1.43	1.76	1.94	1.98	1.62
Total Metals	Aluminum (Al)-Total (mg/L)	0.0039	0.0034	0.0077	0.0076	0.0493
	Antimony (Sb)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Arsenic (As)-Total (mg/L)	<0.00010	<0.00010	0.00020	0.00024	0.00047
	Barium (Ba)-Total (mg/L)	0.00299	0.00294	0.00709	0.00795	0.0188
	Beryllium (Be)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Bismuth (Bi)-Total (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Boron (B)-Total (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
	Cadmium (Cd)-Total (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
	Calcium (Ca)-Total (mg/L)	1.34	1.31	3.74	4.15	12.5
	Cesium (Cs)-Total (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	0.000012

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2194149-6	L2194149-7	L2194149-8	L2194149-9	L2194149-10
Description	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water
Sampled Date	01-NOV-18	03-NOV-18	03-NOV-18		
Sampled Time	13:05	10:15	09:45		
Client ID	MAM-36	NEM-35	NEM-36	WTP NOV DUP-1	WTP NOV DUP-2
Grouping / **Analyte**					
WATER					
Physical Tests Conductivity (uS/cm)	71.5	27.0	26.8	39.0	13.8
Hardness (as CaCO3) (mg/L)	26.1	10.4	10.7	14.1	5.11
pH (pH)	6.94	7.12	7.12	6.94	6.86
Total Suspended Solids (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
Total Dissolved Solids (mg/L)	58	19.3	16.3	28.6	11.7
Turbidity (NTU)	0.20	0.12	0.12	0.20	0.19
Anions and Nutrients Alkalinity, Bicarbonate (as CaCO3) (mg/L)	5.3	8.0	7.9	5.6	4.6
Alkalinity, Carbonate (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
Alkalinity, Total (as CaCO3) (mg/L)	5.3	8.0	7.9	5.6	4.6
Ammonia, Total (as N) (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Bromide (Br) (mg/L)	0.183	<0.050	<0.050	0.078	<0.050
Chloride (Cl) (mg/L)	14.4	0.91	0.91	6.49	0.66
Fluoride (F) (mg/L)	0.029	0.026	0.026	0.033	0.029
Nitrate (as N) (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Nitrite (as N) (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Total Kjeldahl Nitrogen (mg/L)	0.086	0.080	0.090	0.102	0.063
Orthophosphate-Dissolved (as P) (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Phosphorus (P)-Total Dissolved (mg/L)	0.0022	0.0029	0.0020	<0.0020	<0.0020
Phosphorus (P)-Total (mg/L)	0.0030	0.0029	0.0045	<0.0020	0.0030
Silicate (as SiO2) (mg/L)	0.64	<0.50	<0.50	<0.50 RRV	0.70 RRV
Sulfate (SO4) (mg/L)	3.90	3.47	3.49	1.86	1.04
Cyanides Cyanide, Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Cyanide, Free (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Organic / Inorganic Carbon Dissolved Organic Carbon (mg/L)	1.82	1.47	1.43	2.00	1.53
Total Organic Carbon (mg/L)	1.67	1.66	1.40	2.07	1.56
Total Metals Aluminum (Al)-Total (mg/L)	0.0082	<0.0030	<0.0030	0.0063	0.0039
Antimony (Sb)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic (As)-Total (mg/L)	0.00030	0.00031	0.00030	0.00023	<0.00010
Barium (Ba)-Total (mg/L)	0.0121	0.00407	0.00412	0.00760	0.00328
Beryllium (Be)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth (Bi)-Total (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron (B)-Total (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)-Total (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Calcium (Ca)-Total (mg/L)	8.15	2.50	2.45	3.96	1.34
Cesium (Cs)-Total (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2194149-11	L2194149-12			
	Description	Surface Water	Surface Water			
	Sampled Date					
	Sampled Time					
	Client ID	WTP NOV DI-1	WTP NOV EB-1			
Grouping	**Analyte**					
WATER						
Physical Tests	Conductivity (uS/cm)	<2.0	<2.0			
	Hardness (as CaCO3) (mg/L)	<0.50	<0.50			
	pH (pH)	5.45	5.45			
	Total Suspended Solids (mg/L)	<1.0	<1.0			
	Total Dissolved Solids (mg/L)	<3.0	<3.0			
	Turbidity (NTU)	<0.10	<0.10			
Anions and Nutrients	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	<1.0	<1.0			
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<1.0	<1.0			
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0	<1.0			
	Alkalinity, Total (as CaCO3) (mg/L)	<1.0	<1.0			
	Ammonia, Total (as N) (mg/L)	<0.0050	<0.0050			
	Bromide (Br) (mg/L)	<0.050	<0.050			
	Chloride (Cl) (mg/L)	<0.10	<0.10			
	Fluoride (F) (mg/L)	<0.020	<0.020			
	Nitrate (as N) (mg/L)	<0.0050	<0.0050			
	Nitrite (as N) (mg/L)	<0.0010	<0.0010			
	Total Kjeldahl Nitrogen (mg/L)	<0.050	<0.050			
	Orthophosphate-Dissolved (as P) (mg/L)	<0.0010	<0.0010			
	Phosphorus (P)-Total Dissolved (mg/L)	<0.0020	<0.0020			
	Phosphorus (P)-Total (mg/L)	<0.0020	<0.0020			
	Silicate (as SiO2) (mg/L)	<0.50	<0.50			
	Sulfate (SO4) (mg/L)	<0.30	<0.30			
Cyanides	Cyanide, Total (mg/L)	<0.0010	<0.0010			
	Cyanide, Free (mg/L)	<0.0010	<0.0010			
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	<0.50	<0.50			
	Total Organic Carbon (mg/L)	<0.50	<0.50			
Total Metals	Aluminum (Al)-Total (mg/L)	<0.0030	0.0050 RRV			
	Antimony (Sb)-Total (mg/L)	<0.00010	<0.00010			
	Arsenic (As)-Total (mg/L)	<0.00010	<0.00010			
	Barium (Ba)-Total (mg/L)	<0.00010	<0.00010			
	Beryllium (Be)-Total (mg/L)	<0.00010	<0.00010			
	Bismuth (Bi)-Total (mg/L)	<0.000050	<0.000050			
	Boron (B)-Total (mg/L)	<0.010	<0.010			
	Cadmium (Cd)-Total (mg/L)	<0.0000050	<0.0000050			
	Calcium (Ca)-Total (mg/L)	<0.050	<0.050			
	Cesium (Cs)-Total (mg/L)	<0.000010	<0.000010			

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2194149-1	L2194149-2	L2194149-3	L2194149-4	L2194149-5
Description	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water
Sampled Date	01-NOV-18	01-NOV-18	31-OCT-18	01-NOV-18	01-NOV-18
Sampled Time	11:50	12:16	15:07	10:50	14:05
Client ID	A20-29	A20-30	WTS-35	WTS-36	MAM-35
Grouping / **Analyte**					
WATER					
Total Metals Chromium (Cr)-Total (mg/L)	<0.00010	0.00020	<0.00010	0.00012	0.00023
Cobalt (Co)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper (Cu)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Iron (Fe)-Total (mg/L)	<0.010	0.012	0.012	<0.010	0.054
Lead (Pb)-Total (mg/L)	<0.000050	<0.000050	0.000066	<0.000050	0.000061
Lithium (Li)-Total (mg/L)	<0.0010	<0.0010	0.0012	0.0014	0.0048
Magnesium (Mg)-Total (mg/L)	0.452	0.436	1.02	1.11	2.05
Manganese (Mn)-Total (mg/L)	0.00071	0.00071	0.00091	0.00065	0.00185
Mercury (Hg)-Total (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Molybdenum (Mo)-Total (mg/L)	<0.000050	<0.000050	<0.000050	0.000058	0.000274
Nickel (Ni)-Total (mg/L)	<0.00050	<0.00050	0.00051	0.00056	0.00116
Phosphorus (P)-Total (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050
Potassium (K)-Total (mg/L)	0.351	0.343	0.728	0.806	1.53
Rubidium (Rb)-Total (mg/L)	0.00038	0.00041	0.00122	0.00137	0.00221
Selenium (Se)-Total (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Silicon (Si)-Total (mg/L)	0.41	0.41	0.26	0.29	0.50
Silver (Ag)-Total (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)-Total (mg/L)	0.609	0.592	0.769	0.852	1.11
Strontium (Sr)-Total (mg/L)	0.00682	0.00666	0.0310	0.0334	0.123
Sulfur (S)-Total (mg/L)	<0.50	<0.50	0.68	0.73	1.54
Tellurium (Te)-Total (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Thallium (Tl)-Total (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Thorium (Th)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Tin (Sn)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)-Total (mg/L)	<0.00030	<0.00030	<0.00030	<0.00030	<0.0012 DLM
Tungsten (W)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Uranium (U)-Total (mg/L)	0.000022	0.000023	0.000033	0.000034	0.000044
Vanadium (V)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc (Zn)-Total (mg/L)	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Zirconium (Zr)-Total (mg/L)	<0.000060	<0.000060	<0.000060	<0.000060	0.000076
Dissolved Metals Dissolved Mercury Filtration Location	FIELD	FIELD	FIELD	FIELD	FIELD
Dissolved Metals Filtration Location	FIELD	FIELD	FIELD	FIELD	FIELD
Aluminum (Al)-Dissolved (mg/L)	0.0019	0.0015	0.0028	0.0029	0.0230
Antimony (Sb)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic (As)-Dissolved (mg/L)	<0.00010	<0.00010	0.00019	0.00020	0.00038
Barium (Ba)-Dissolved (mg/L)	0.00288	0.00303	0.00747	0.00757	0.0206
Beryllium (Be)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2194149-6	L2194149-7	L2194149-8	L2194149-9	L2194149-10
Description	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water
Sampled Date	01-NOV-18	03-NOV-18	03-NOV-18		
Sampled Time	13:05	10:15	09:45		
Client ID	MAM-36	NEM-35	NEM-36	WTP NOV DUP-1	WTP NOV DUP-2
Grouping / **Analyte**					
WATER					
Total Metals Chromium (Cr)-Total (mg/L)	<0.00010	<0.00010	0.00011	<0.00010	<0.00010
Cobalt (Co)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper (Cu)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Iron (Fe)-Total (mg/L)	0.010	<0.010	<0.010	<0.010	<0.010
Lead (Pb)-Total (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium (Li)-Total (mg/L)	0.0029	<0.0010	<0.0010	0.0013	<0.0010
Magnesium (Mg)-Total (mg/L)	1.61	1.13	1.07	1.08	0.486
Manganese (Mn)-Total (mg/L)	0.00093	0.00148	0.00155	0.00065	0.00073
Mercury (Hg)-Total (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Molybdenum (Mo)-Total (mg/L)	<0.000050	<0.000050	<0.000050	0.000051	<0.000050
Nickel (Ni)-Total (mg/L)	0.00082	<0.00050	0.00057	0.00051	<0.00050
Phosphorus (P)-Total (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050
Potassium (K)-Total (mg/L)	1.01	0.632	0.584	0.748	0.361
Rubidium (Rb)-Total (mg/L)	0.00147	0.00077	0.00076	0.00134	0.00045
Selenium (Se)-Total (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Silicon (Si)-Total (mg/L)	0.35	0.23	0.22	0.26	0.44
Silver (Ag)-Total (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)-Total (mg/L)	0.875	0.551	0.498	0.806	0.618
Strontium (Sr)-Total (mg/L)	0.0728	0.0116	0.0106	0.0322	0.00717
Sulfur (S)-Total (mg/L)	1.41	1.20	1.09	0.65	<0.50
Tellurium (Te)-Total (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Thallium (Tl)-Total (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Thorium (Th)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Tin (Sn)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)-Total (mg/L)	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030
Tungsten (W)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Uranium (U)-Total (mg/L)	0.000015	<0.000010	<0.000010	0.000032	0.000023
Vanadium (V)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc (Zn)-Total (mg/L)	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Zirconium (Zr)-Total (mg/L)	<0.000060	<0.000060	<0.000060	<0.000060	<0.000060
Dissolved Metals Dissolved Mercury Filtration Location	FIELD	FIELD	FIELD	FIELD	FIELD
Dissolved Metals Filtration Location	FIELD	FIELD	FIELD	FIELD	FIELD
Aluminum (Al)-Dissolved (mg/L)	0.0043	0.0011	0.0014	0.0041	0.0011
Antimony (Sb)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic (As)-Dissolved (mg/L)	0.00028	0.00026	0.00028	0.00022	<0.00010
Barium (Ba)-Dissolved (mg/L)	0.0130	0.00402	0.00423	0.00763	0.00300
Beryllium (Be)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2194149-11	L2194149-12			
	Description	Surface Water	Surface Water			
	Sampled Date					
	Sampled Time					
	Client ID	WTP NOV DI-1	WTP NOV EB-1			
Grouping	**Analyte**					
WATER						
Total Metals	Chromium (Cr)-Total (mg/L)	<0.00010				
	Cobalt (Co)-Total (mg/L)	<0.00010	<0.00010			
	Copper (Cu)-Total (mg/L)	<0.00050	<0.00050			
	Iron (Fe)-Total (mg/L)	<0.010	<0.010			
	Lead (Pb)-Total (mg/L)	<0.000050	0.000071 RRV			
	Lithium (Li)-Total (mg/L)	<0.0010	<0.0010			
	Magnesium (Mg)-Total (mg/L)	<0.0050	<0.0050			
	Manganese (Mn)-Total (mg/L)	<0.00010				
	Mercury (Hg)-Total (mg/L)	<0.0000050	<0.0000050			
	Molybdenum (Mo)-Total (mg/L)	<0.000050	<0.000050			
	Nickel (Ni)-Total (mg/L)	<0.00050	<0.00050			
	Phosphorus (P)-Total (mg/L)	<0.050	<0.050			
	Potassium (K)-Total (mg/L)	<0.050	<0.050			
	Rubidium (Rb)-Total (mg/L)	<0.00020	<0.00020			
	Selenium (Se)-Total (mg/L)	<0.000050	<0.000050			
	Silicon (Si)-Total (mg/L)	<0.10	<0.10			
	Silver (Ag)-Total (mg/L)	<0.000010	<0.000010			
	Sodium (Na)-Total (mg/L)	<0.050	<0.050			
	Strontium (Sr)-Total (mg/L)	<0.00020	<0.00020			
	Sulfur (S)-Total (mg/L)	<0.50	<0.50			
	Tellurium (Te)-Total (mg/L)	<0.00020	<0.00020			
	Thallium (Tl)-Total (mg/L)	<0.000010	<0.000010			
	Thorium (Th)-Total (mg/L)	<0.00010	<0.00010			
	Tin (Sn)-Total (mg/L)	<0.00010	<0.00010			
	Titanium (Ti)-Total (mg/L)	<0.00030	<0.00030			
	Tungsten (W)-Total (mg/L)	<0.00010	<0.00010			
	Uranium (U)-Total (mg/L)	<0.000010	<0.000010			
	Vanadium (V)-Total (mg/L)	<0.00050	<0.00050			
	Zinc (Zn)-Total (mg/L)	<0.0030	<0.0030			
	Zirconium (Zr)-Total (mg/L)	<0.000060	<0.000060			
Dissolved Metals	Dissolved Mercury Filtration Location	FIELD	FIELD			
	Dissolved Metals Filtration Location	FIELD	FIELD			
	Aluminum (Al)-Dissolved (mg/L)	<0.0010	<0.0010			
	Antimony (Sb)-Dissolved (mg/L)	<0.00010	<0.00010			
	Arsenic (As)-Dissolved (mg/L)	<0.00010	<0.00010			
	Barium (Ba)-Dissolved (mg/L)	<0.00010	<0.00010			
	Beryllium (Be)-Dissolved (mg/L)	<0.00010	<0.00010			

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	L2194149-1 Surface Water 01-NOV-18 11:50 A20-29	L2194149-2 Surface Water 01-NOV-18 12:16 A20-30	L2194149-3 Surface Water 31-OCT-18 15:07 WTS-35	L2194149-4 Surface Water 01-NOV-18 10:50 WTS-36	L2194149-5 Surface Water 01-NOV-18 14:05 MAM-35
WATER						
Dissolved Metals	Bismuth (Bi)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Boron (B)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
	Cadmium (Cd)-Dissolved (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
	Calcium (Ca)-Dissolved (mg/L)	1.27	1.30	3.64	3.55	12.2
	Cesium (Cs)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Chromium (Cr)-Dissolved (mg/L)	0.00013	<0.00010	<0.00010	<0.00010	<0.00010
	Cobalt (Co)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Copper (Cu)-Dissolved (mg/L)	0.00020	0.00021	0.00035	0.00039	0.00037
	Iron (Fe)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
	Lead (Pb)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Lithium (Li)-Dissolved (mg/L)	<0.0010	<0.0010	0.0010	0.0010	0.0047
	Magnesium (Mg)-Dissolved (mg/L)	0.443	0.457	1.04	1.05	2.06
	Manganese (Mn)-Dissolved (mg/L)	0.00020	0.00015	<0.00010	0.00013	0.00065
	Mercury (Hg)-Dissolved (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
	Molybdenum (Mo)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	0.000314
	Nickel (Ni)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	0.00103
	Phosphorus (P)-Dissolved (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050
	Potassium (K)-Dissolved (mg/L)	0.335	0.352	0.717	0.734	1.62
	Rubidium (Rb)-Dissolved (mg/L)	0.00035	0.00046	0.00123	0.00132	0.00235
	Selenium (Se)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Silicon (Si)-Dissolved (mg/L)	0.400	0.402	0.218	0.226	0.419
	Silver (Ag)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Sodium (Na)-Dissolved (mg/L)	0.577	0.591	0.753	0.785	1.28
	Strontium (Sr)-Dissolved (mg/L)	0.00674	0.00681	0.0308	0.0318	0.130
	Sulfur (S)-Dissolved (mg/L)	<0.50	<0.50	0.60	0.69	1.48
	Tellurium (Te)-Dissolved (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
	Thallium (Tl)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Thorium (Th)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Tin (Sn)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Titanium (Ti)-Dissolved (mg/L)	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030
	Tungsten (W)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Uranium (U)-Dissolved (mg/L)	0.000018	0.000021	0.000030	0.000030	0.000031
	Vanadium (V)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Zinc (Zn)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Zirconium (Zr)-Dissolved (mg/L)	<0.000060	<0.000060	<0.000060	<0.000060	<0.000060
Speciated Metals	Arsenate (As V) (ug/L)	<0.020			<0.020	<0.020
	Arsenite (As III) (ug/L)	<0.020			0.063	0.178

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2194149-6	L2194149-7	L2194149-8	L2194149-9	L2194149-10
Description	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water
Sampled Date	01-NOV-18	03-NOV-18	03-NOV-18		
Sampled Time	13:05	10:15	09:45		
Client ID	MAM-36	NEM-35	NEM-36	WTP NOV DUP-1	WTP NOV DUP-2
Grouping / **Analyte**					
WATER					
Dissolved Metals Bismuth (Bi)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron (B)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)-Dissolved (mg/L)	<0.0000050	<0.0000050	<0.0000050	0.0000068	<0.0000050
Calcium (Ca)-Dissolved (mg/L)	7.78	2.34	2.40	3.85	1.30
Cesium (Cs)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Chromium (Cr)-Dissolved (mg/L)	<0.00010	<0.00010	0.00044 DTC	0.00010	<0.00010
Cobalt (Co)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper (Cu)-Dissolved (mg/L)	0.00033	<0.00020	<0.00020	0.00045	<0.00020
Iron (Fe)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
Lead (Pb)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium (Li)-Dissolved (mg/L)	0.0026	<0.0010	<0.0010	0.0011	<0.0010
Magnesium (Mg)-Dissolved (mg/L)	1.61	1.12	1.14	1.08	0.452
Manganese (Mn)-Dissolved (mg/L)	0.00043	0.00016	0.00017	0.00022	0.00017
Mercury (Hg)-Dissolved (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Molybdenum (Mo)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	0.000058	<0.000050
Nickel (Ni)-Dissolved (mg/L)	0.00073	<0.00050	<0.00050	0.00050	<0.00050
Phosphorus (P)-Dissolved (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050
Potassium (K)-Dissolved (mg/L)	1.02	0.612	0.617	0.777	0.344
Rubidium (Rb)-Dissolved (mg/L)	0.00151	0.00074	0.00072	0.00134	0.00042
Selenium (Se)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Silicon (Si)-Dissolved (mg/L)	0.323	0.176	0.203	0.243	0.402
Silver (Ag)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)-Dissolved (mg/L)	0.859	0.524	0.528	0.813	0.592
Strontium (Sr)-Dissolved (mg/L)	0.0712	0.0108	0.0110	0.0322	0.00698
Sulfur (S)-Dissolved (mg/L)	1.36	1.17	1.11	0.62	<0.50
Tellurium (Te)-Dissolved (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Thallium (Tl)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Thorium (Th)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Tin (Sn)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)-Dissolved (mg/L)	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030
Tungsten (W)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Uranium (U)-Dissolved (mg/L)	0.000012	<0.000010	<0.000010	0.000031	0.000019
Vanadium (V)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc (Zn)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	0.0015	<0.0010
Zirconium (Zr)-Dissolved (mg/L)	<0.000060	<0.000060	<0.000060	0.000073	<0.000060
Speciated Metals Arsenate (As V) (ug/L)		<0.020		<0.020	
Arsenite (As III) (ug/L)		0.077		0.067	

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2194149-11	L2194149-12			
	Description	Surface Water	Surface Water			
	Sampled Date					
	Sampled Time					
	Client ID	WTP NOV DI-1	WTP NOV EB-1			
Grouping	**Analyte**					
WATER						
Dissolved Metals	Bismuth (Bi)-Dissolved (mg/L)	<0.000050	<0.000050			
	Boron (B)-Dissolved (mg/L)	<0.010	<0.010			
	Cadmium (Cd)-Dissolved (mg/L)	<0.0000050	<0.0000050			
	Calcium (Ca)-Dissolved (mg/L)	<0.050	<0.050			
	Cesium (Cs)-Dissolved (mg/L)	<0.000010	<0.000010			
	Chromium (Cr)-Dissolved (mg/L)	<0.00010	<0.00010			
	Cobalt (Co)-Dissolved (mg/L)	<0.00010	<0.00010			
	Copper (Cu)-Dissolved (mg/L)	<0.00020	<0.00020			
	Iron (Fe)-Dissolved (mg/L)	<0.010	<0.010			
	Lead (Pb)-Dissolved (mg/L)	<0.000050	<0.000050			
	Lithium (Li)-Dissolved (mg/L)	<0.0010	<0.0010			
	Magnesium (Mg)-Dissolved (mg/L)	<0.0050	<0.0050			
	Manganese (Mn)-Dissolved (mg/L)	<0.00010	<0.00010			
	Mercury (Hg)-Dissolved (mg/L)	<0.0000050	<0.0000050			
	Molybdenum (Mo)-Dissolved (mg/L)	<0.000050	<0.000050			
	Nickel (Ni)-Dissolved (mg/L)	<0.00050	<0.00050			
	Phosphorus (P)-Dissolved (mg/L)	<0.050	<0.050			
	Potassium (K)-Dissolved (mg/L)	<0.050	<0.050			
	Rubidium (Rb)-Dissolved (mg/L)	<0.00020	<0.00020			
	Selenium (Se)-Dissolved (mg/L)	<0.000050	<0.000050			
	Silicon (Si)-Dissolved (mg/L)	<0.050	<0.050			
	Silver (Ag)-Dissolved (mg/L)	<0.000010	<0.000010			
	Sodium (Na)-Dissolved (mg/L)	<0.050	<0.050			
	Strontium (Sr)-Dissolved (mg/L)	<0.00020	<0.00020			
	Sulfur (S)-Dissolved (mg/L)	<0.50	<0.50			
	Tellurium (Te)-Dissolved (mg/L)	<0.00020	<0.00020			
	Thallium (Tl)-Dissolved (mg/L)	<0.000010	<0.000010			
	Thorium (Th)-Dissolved (mg/L)	<0.00010	<0.00010			
	Tin (Sn)-Dissolved (mg/L)	<0.00010	<0.00010			
	Titanium (Ti)-Dissolved (mg/L)	<0.00030	<0.00030			
	Tungsten (W)-Dissolved (mg/L)	<0.00010	<0.00010			
	Uranium (U)-Dissolved (mg/L)	<0.000010	<0.000010			
	Vanadium (V)-Dissolved (mg/L)	<0.00050	<0.00050			
	Zinc (Zn)-Dissolved (mg/L)	<0.0010	0.0015 RRV			
	Zirconium (Zr)-Dissolved (mg/L)	<0.000060	<0.000060			
Speciated Metals	Arsenate (As V) (ug/L)	<0.020				
	Arsenite (As III) (ug/L)	<0.020				

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	L2194149-1 Surface Water 01-NOV-18 11:50 A20-29	L2194149-2 Surface Water 01-NOV-18 12:16 A20-30	L2194149-3 Surface Water 31-OCT-18 15:07 WTS-35	L2194149-4 Surface Water 01-NOV-18 10:50 WTS-36	L2194149-5 Surface Water 01-NOV-18 14:05 MAM-35
WATER						
Speciated Metals	Dimethylarsinic Acid (DMA, as As) (ug/L)	<0.020			<0.020	<0.020
	Monomethylarsonic Acid (MMA, as As) (ug/L)	<0.020			<0.020	<0.020
	Arsenobetaine (AsB, as As) (ug/L)	<0.050			<0.050	<0.050

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2194149-6	L2194149-7	L2194149-8	L2194149-9	L2194149-10
Description	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water
Sampled Date	01-NOV-18	03-NOV-18	03-NOV-18		
Sampled Time	13:05	10:15	09:45		
Client ID	MAM-36	NEM-35	NEM-36	WTP NOV DUP-1	WTP NOV DUP-2
Grouping / **Analyte**					
WATER					
Speciated Metals					
Dimethylarsinic Acid (DMA, as As) (ug/L)		<0.020		<0.020	
Monomethylarsonic Acid (MMA, as As) (ug/L)		<0.020		<0.020	
Arsenobetaine (AsB, as As) (ug/L)		<0.050		<0.050	

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2194149-11	L2194149-12			
	Description	Surface Water	Surface Water			
	Sampled Date					
	Sampled Time					
	Client ID	WTP NOV DI-1	WTP NOV EB-1			
Grouping	**Analyte**					
WATER						
Speciated Metals	Dimethylarsinic Acid (DMA, as As) (ug/L)	<0.020				
	Monomethylarsonic Acid (MMA, as As) (ug/L)	<0.020				
	Arsenobetaine (AsB, as As) (ug/L)	<0.050				

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Method Blank	Calcium (Ca)-Total	B	L2194149-1, -2, -3, -4, -5, -6, -7, -9
Laboratory Control Sample	Sulfur (S)-Dissolved	MES	L2194149-8
Laboratory Control Sample	Tungsten (W)-Total	MES	L2194149-1, -2, -3, -4, -5, -6, -7, -9
Matrix Spike	Total Organic Carbon	MS-B	L2194149-7
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L2194149-12
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L2194149-12
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L2194149-12
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L2194149-12
Matrix Spike	Silicate (as SiO2)	MS-B	L2194149-10, -9

Qualifiers for Individual Parameters Listed:

Qualifier	Description
B	Method Blank exceeds ALS DQO. Associated sample results which are < Limit of Reporting or > 5 times blank level are considered reliable.
DLM	Detection Limit Adjusted due to sample matrix effects (e.g. chemical interference, colour, turbidity).
DTC	Dissolved concentration exceeds total. Results were confirmed by re-analysis.
MES	Data Quality Objective was marginally exceeded (by < 10% absolute) for < 10% of analytes in a Multi-Element Scan / Multi-Parameter Scan (considered acceptable as per OMOE & CCME).
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RRV	Reported Result Verified By Repeat Analysis

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ALK-TITR-VA	Water	Alkalinity Species by Titration	APHA 2320 Alkalinity

This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.

AS-SPEC-HPLC/CCMS-VA	Water	Arsenic Species in Water by HPLC/CCMS	USGS WRIR 02-4144

Speciated Arsenic (As) Analysis is by reverse phase HPLC-ICPMS. Sample handling, preservation and holding times outlined in USGS Report 02-4144 and AWWA Preservation of Arsenic Species, 2006. Instrumental analysis based on Afton et al, Journal of Chromatography A, 1208 (2008) 156-163 and Agilent Technologies application notes. Filtration is conducted prior to preservation. Results for unfiltered, preserved samples may be elevated due to extraction of arsenic species from particulate matter in the samples.
Elevated iron (~100+ ppm) concentrations or sulfidic water can introduce biases to the reported results for some arsenic species.

BR-L-IC-N-VA	Water	Bromide in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

CARBONS-DOC-VA	Water	Dissolved organic carbon by combustion	APHA 5310B

This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)". Dissolved carbon (DOC) fractions are determined by filtering the sample through a 0.45 micron membrane filter prior to analysis.

CARBONS-TOC-VA	Water	Total organic carbon by combustion	APHA 5310B TOTAL ORGANIC CARBON (TOC)

This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)".

CL-L-IC-N-VA	Water	Chloride in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

CN-FREE-L-CFA-VA	Water	Low Level Free Cyanide in water by CFA	ASTM 7237

This analysis is carried out using procedures adapted from ASTM Method 7237 "Free Cyanide with Flow Injection Analysis (FIA) Utilizing Gas Diffusion Separation and Amperometric Detection". Free cyanide is determined by in-line gas diffusion at pH 6 with final determination by colourimetric analysis.

CN-T-L-CFA-VA	Water	Low Level Total Cyanide in water by CFA	ISO 14403:2002

This analysis is carried out using procedures adapted from ISO Method 14403:2002 "Determination of Total Cyanide using Flow Analysis (FIA and CFA)". Total or strong acid dissociable (SAD) cyanide is determined by in-line UV digestion along with sample distillation and final determination by colourimetric analysis. Method Limitation: This method is susceptible to interference from thiocyanate (SCN). If SCN is present in the sample, there could be a positive interference with this method, but it would be less than 1% and could be as low as zero.

EC-PCT-VA	Water	Conductivity (Automated)	APHA 2510 Auto. Conduc.

This analysis is carried out using procedures adapted from APHA Method 2510 "Conductivity". Conductivity is determined using a conductivity electrode.

EC-SCREEN-VA	Water	Conductivity Screen (Internal Use Only)	APHA 2510

Reference Information

Qualitative analysis of conductivity where required during preparation of other tests - e.g. TDS, metals, etc.

F-IC-N-VA Water Fluoride in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

HARDNESS-CALC-VA Water Hardness APHA 2340B

Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

HG-D-CVAA-VA Water Diss. Mercury in Water by CVAAS or CVAFS APHA 3030B/EPA 1631E (mod)

Water samples are filtered (0.45 um), preserved with hydrochloric acid, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

HG-T-CVAA-VA Water Total Mercury in Water by CVAAS or CVAFS EPA 1631E (mod)

Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

MET-D-CCMS-VA Water Dissolved Metals in Water by CRC ICPMS APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

MET-T-CCMS-VA Water Total Metals in Water by CRC ICPMS EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

NH3-F-VA Water Ammonia in Water by Fluorescence J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

NO2-L-IC-N-VA Water Nitrite in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

NO3-L-IC-N-VA Water Nitrate in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

P-T-PRES-COL-VA Water Total P in Water by Colour APHA 4500-P Phosphorus

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is determined colourimetrically after persulphate digestion of the sample.
Samples with very high dissolved solids (i.e. seawaters, brackish waters) may produce a negative bias by this method. Alternate methods are available for these types of samples.

Arsenic (5+), at elevated levels, is a positive interference on colourimetric phosphate analysis.

P-TD-COL-VA Water Total Dissolved P in Water by Colour APHA 4500-P Phosphorous

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Dissolved Phosphorus is determined colourimetrically after persulphate digestion of a sample that has been lab or field filtered through a 0.45 micron membrane filter.
Samples with very high dissolved solids (i.e. seawaters, brackish waters) may produce a negative bias by this method. Alternate methods are available for these types of samples.

Arsenic (5+), at elevated levels, is a positive interference on colourimetric phosphate analysis.

PH-PCT-VA Water pH by Meter (Automated) APHA 4500-H pH Value

This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode

It is recommended that this analysis be conducted in the field.

PO4-DO-COL-VA Water Diss. Orthophosphate in Water by Colour APHA 4500-P Phosphorus

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.
Samples with very high dissolved solids (i.e. seawaters, brackish waters) may produce a negative bias by this method. Alternate methods are available for these types of samples.

Arsenic (5+), at elevated levels, is a positive interference on colourimetric phosphate analysis.

SILICATE-COL-VA Water Silicate by Colourimetric analysis APHA 4500-SiO2 E.

Reference Information

This analysis is carried out using procedures adapted from APHA Method 4500-SiO2 E. "Silica". Silicate (molybdate-reactive silica) is determined by the molybdosilicate-heteropoly blue colourimetric method. Arsenic (5+) above 100 mg/L is a negative interference on this test.

SO4-IC-N-VA Water Sulfate in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

TDS-LOW-VA Water Low Level TDS (3.0mg/L) by Gravimetric APHA 2540C

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total dissolved solids (TDS) are determined by filtering a sample through a glass fibre filter, TDS is determined by evaporating the filtrate to dryness at 180 degrees celsius.

TKN-F-VA Water TKN in Water by Fluorescence APHA 4500-NORG D.

This analysis is carried out using procedures adapted from APHA Method 4500-Norg D. "Block Digestion and Flow Injection Analysis". Total Kjeldahl Nitrogen is determined using block digestion followed by Flow-injection analysis with fluorescence detection.

TSS-LOW-VA Water Total Suspended Solids by Grav. (1 mg/L) APHA 2540D

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total suspended solids (TSS) are determined by filtering a sample through a glass fibre filter, TSS is determined by drying the filter at 104 degrees celsius.
Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.

TURBIDITY-VA Water Turbidity by Meter APHA 2130 Turbidity

This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

ALS Environmental

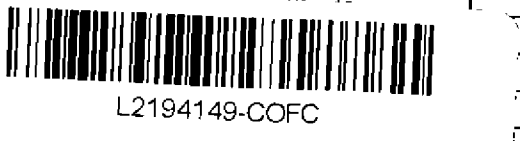
Chain of Custody / Analytical Request Form
Canada Toll Free: 1 800 668 9878
www.alsglobal.com

COC # _____

Page 1 of 1

Report To		Report Format / Distribution		Service Requested (Rush for routine analysis subject to availability)
Company:	Azimuth Consulting Group	☑ Standard ☐ Other		◉ Regular (Standard Turnaround Times - Business Days)
Contact:	Eric Franz	☑ PDF ☑ Excel ☐ Digital ☐ Fax		○ Priority (2-4 Business Days) - 50% Surcharge - Contact ALS to Confirm TAT
Address:	218-2902 West Broadway	Email 1:	efranz@azimuthgroup.ca	○ Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT
	Vancouver, BC V6K2G8	Email 2:	marie-pier.marcil@agnicoeagle.com	○ Same Day or Weekend Emergency - Contact ALS to Confirm TAT
Phone:	604-730-1220 Fax:	Email 3:	robin.allard@agnicoeagle.com	
Invoice To	Same as Report ? ☑ Yes ☐ No	Client / Project Information		Analysis Request
Hardcopy of Invoice with Report?	☐ Yes ☑ No	Job #:	Meadowbank CREMP - Surfacewater	Please indicate below Filtered, Preserved or both (F, P, F/P)
Company:		PO / AFE:		
Contact:		LSD:		
Address:				
Phone:	Fax:	Quote #:	Q39503	
Lab Work Order # (lab use only)		ALS Contact:	Brent Mack	Sampler: ENV

Sample #	Sample Identification (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Conventionals** see notes	TSS-Low, TDS-Low	TOC, Ammonia, TKN, Total P	DOC	T-CN (Low), Free CN (Low)	Total mercury	Dissolved mercury	Total Metals	Dissolved metals	Chlorophyll-a	Arsenic speciation		Number of Containers
							P	F/P	P	P	F/P	P	F/P	F	F/P		
	A20-29	01-Nov-18	11:50	Surface Water	X	X	X	X	X	X	X	X	X		X		10
	A20-30	01-Nov-18	12:16	Surface Water	X	X	X	X	X	X	X	X	X				9
	WTS-35	31-Oct-18	15:07	Surface Water	X	X	X	X	X	X	X	X	X				9
	WTS-36	01-Nov-18	10:50	Surface Water	X	X	X	X	X	X	X	X	X		X		10
	MAM-35	01-Nov-18	14:05	Surface Water	X	X	X	X	X	X	X	X	X		X		10
	MAM-36	01-Nov-18	13:05	Surface Water	X	X	X	X	X	X	X	X	X				9
	NEM-35	03-Nov-18	10:15	Surface Water	X	X	X	X	X	X	X	X	X		X		10
	NEM-36	03-Nov-18	9:45	Surface Water	X	X	X	X	X	X	X	X	X				9
	WTP NOV DUP-1			Surface Water	X	X	X	X	X	X	X	X	X		X		10
	WTP NOV DUP-2			Surface Water	X	X	X	X	X	X	X	X	X				9
	WTP NOV DI-1				X	X	X	X	X	X	X	X	X		X		10
	WTP NOV EB-1				X	X	X	X	X	X	X	X	X		X		10



Special Instructions / Regulations with water or land use (CCME-Freshwater, Commercial/AB Tier 1 - Natural, etc) / Hazardous Details

**Conventionals includes: Alk Species, pH, EC, Turbidity, Conductivity, Anions (F, NO2, NO3, Br, SO4), low-level Chloride, Silicate, TD-P, and Ortho-PO4.

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.
By the use of this form the user acknowledges and agrees with the Terms and Conditions as provided on a separate Excel tab.
Also provided on another Excel tab are the ALS location addresses, phone numbers and sample container / preservation / holding time table for common analyses.

SHIPMENT RELEASE (client use)			SHIPMENT RECEPTION (lab use only)				SHIPMENT VERIFICATION (lab use only)			
Released by:	Date (dd-mmm-yy)	Time (hh-mm)	Received by:	Date:	Time:	Temperature:	Verified by:	Date:	Time:	Observations: Yes / No ? If Yes add SIF
Isabelle Couture	5-Nov-18	9:00	ALS YC NOV	- 8 2018	840Am	11,11 °C				

GENF 20.00 Front

AZIMUTH CONSULTING GROUP INC.
ATTN: Eric Franz
218 - 2902 West Broadway
Vancouver BC V6K 2G8

Date Received: 22-NOV-18
Report Date: 06-DEC-18 17:32 (MT)
Version: FINAL

Client Phone: 604-730-1220

Certificate of Analysis

Lab Work Order #: L2200253

Project P.O. #: NOT SUBMITTED
Job Reference: MEADOWBANK CREMP - SURFACEWATER
C of C Numbers:
Legal Site Desc:

Brent Mack, B.Sc.
Account Manager

[This report shall not be reproduced except in full without the written authority of the Laboratory.]

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2200253-1	L2200253-2	L2200253-3	L2200253-4	
	Description	SURFACE WATE	SURFACE WATE	SURFACE WATE	SURFACE WATE	
	Sampled Date	16-NOV-18	16-NOV-18	16-NOV-18	16-NOV-18	
	Sampled Time	10:30	10:30	10:30	10:30	
	Client ID	LK1-05	LK1-06	LK5-05	LK5-06	
Grouping	**Analyte**					
WATER						
Physical Tests	Conductivity (uS/cm)	15.4	14.8	25.8	26.6	
	Hardness (as CaCO3) (mg/L)	6.56	6.21	11.7	11.5	
	pH (pH)	6.80	6.83	7.15	7.20	
	Total Suspended Solids (mg/L)	<1.0	<1.0	<1.0	<1.0	
	Total Dissolved Solids (mg/L)	12.6	15.0	12.9	16.9	
	Turbidity (NTU)	0.22	0.20	0.18	0.18	
Anions and Nutrients	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	5.2	5.0	10.0	10.3	
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	
	Alkalinity, Total (as CaCO3) (mg/L)	5.2	5.0	10.0	10.3	
	Ammonia, Total (as N) (mg/L)	0.0075	0.0064	<0.0050	0.0138	
	Bromide (Br) (mg/L)	<0.050	<0.050	<0.050	<0.050	
	Chloride (Cl) (mg/L)	0.76	0.75	0.74	0.74	
	Fluoride (F) (mg/L)	0.039	0.038	0.036	0.034	
	Nitrate (as N) (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	
	Nitrite (as N) (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	
	Total Kjeldahl Nitrogen (mg/L)	0.105	0.105	0.202	0.181	
	Orthophosphate-Dissolved (as P) (mg/L)	0.0011	0.0013	0.0017	0.0017	
	Phosphorus (P)-Total Dissolved (mg/L)	<0.0020	0.0030	0.0029	0.0030	
	Phosphorus (P)-Total (mg/L)	0.0045	0.0030	0.0025	0.0028	
	Silicate (as SiO2) (mg/L)	<0.50	<0.50	0.84	0.80	
	Sulfate (SO4) (mg/L)	1.15	1.12	2.18	2.08	
Cyanides	Cyanide, Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	
	Cyanide, Free (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	<0.50	1.88	1.69	1.79	
	Total Organic Carbon (mg/L)	1.88	1.90	1.75	1.70	
Total Metals	Aluminum (Al)-Total (mg/L)	0.0038	0.0043	<0.0030	<0.0030	
	Antimony (Sb)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	
	Arsenic (As)-Total (mg/L)	<0.00010	0.00010	0.00018	0.00016	
	Barium (Ba)-Total (mg/L)	0.00258	0.00258	0.00277	0.00281	
	Beryllium (Be)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	
	Bismuth (Bi)-Total (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	
	Boron (B)-Total (mg/L)	<0.010	<0.010	<0.010	<0.010	
	Cadmium (Cd)-Total (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	
	Calcium (Ca)-Total (mg/L)	1.40	1.39	2.74	2.60	
	Cesium (Cs)-Total (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2200253-1	L2200253-2	L2200253-3	L2200253-4	
	Description	SURFACE WATE	SURFACE WATE	SURFACE WATE	SURFACE WATE	
	Sampled Date	16-NOV-18	16-NOV-18	16-NOV-18	16-NOV-18	
	Sampled Time	10:30	10:30	10:30	10:30	
	Client ID	LK1-05	LK1-06	LK5-05	LK5-06	
Grouping	**Analyte**					
WATER						
Total Metals	Chromium (Cr)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	
	Cobalt (Co)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	
	Copper (Cu)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	
	Iron (Fe)-Total (mg/L)	<0.010	<0.010	<0.010	<0.010	
	Lead (Pb)-Total (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	
	Lithium (Li)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	
	Magnesium (Mg)-Total (mg/L)	0.628	0.624	1.17	1.11	
	Manganese (Mn)-Total (mg/L)	0.00075	0.00074	0.00063	0.00072	
	Mercury (Hg)-Total (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	
	Molybdenum (Mo)-Total (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	
	Nickel (Ni)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	
	Phosphorus (P)-Total (mg/L)	<0.050	<0.050	<0.050	<0.050	
	Potassium (K)-Total (mg/L)	0.291	0.295	0.344	0.327	
	Rubidium (Rb)-Total (mg/L)	0.00035	0.00033	0.00035	0.00040	
	Selenium (Se)-Total (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	
	Silicon (Si)-Total (mg/L)	0.23	0.25	0.50	0.46	
	Silver (Ag)-Total (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	
	Sodium (Na)-Total (mg/L)	0.614	0.614	0.678	0.695	
	Strontium (Sr)-Total (mg/L)	0.00760	0.00763	0.0106	0.0102	
	Sulfur (S)-Total (mg/L)	<0.50	<0.50	0.75	0.68	
	Tellurium (Te)-Total (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020	
	Thallium (Tl)-Total (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	
	Thorium (Th)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	
	Tin (Sn)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	
	Titanium (Ti)-Total (mg/L)	<0.00030	<0.00030	<0.00030	<0.00030	
	Tungsten (W)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	
	Uranium (U)-Total (mg/L)	0.000021	0.000022	0.000011	0.000011	
	Vanadium (V)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	
	Zinc (Zn)-Total (mg/L)	<0.0030	<0.0030	<0.0030	<0.0030	
	Zirconium (Zr)-Total (mg/L)	<0.000060	<0.000060	<0.000060	<0.000060	
Dissolved Metals	Dissolved Mercury Filtration Location	FIELD	FIELD	FIELD	FIELD	
	Dissolved Metals Filtration Location	FIELD	FIELD	FIELD	FIELD	
	Aluminum (Al)-Dissolved (mg/L)	0.0021	0.0015	<0.0010	<0.0010	
	Antimony (Sb)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	
	Arsenic (As)-Dissolved (mg/L)	<0.00010	<0.00010	0.00015	0.00014	
	Barium (Ba)-Dissolved (mg/L)	0.00282	0.00281	0.00290	0.00282	
	Beryllium (Be)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2200253-1	L2200253-2	L2200253-3	L2200253-4	
Description	SURFACE WATE	SURFACE WATE	SURFACE WATE	SURFACE WATE	
Sampled Date	16-NOV-18	16-NOV-18	16-NOV-18	16-NOV-18	
Sampled Time	10:30	10:30	10:30	10:30	
Client ID	LK1-05	LK1-06	LK5-05	LK5-06	
Grouping / **Analyte**					
WATER					
Dissolved Metals Bismuth (Bi)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	
Boron (B)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010	
Cadmium (Cd)-Dissolved (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	
Calcium (Ca)-Dissolved (mg/L)	1.48	1.40	2.73	2.69	
Cesium (Cs)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	
Chromium (Cr)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	
Cobalt (Co)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	
Copper (Cu)-Dissolved (mg/L)	<0.00020	0.00022	<0.00020	<0.00020	
Iron (Fe)-Dissolved (mg/L)	<0.010	<0.010	0.037 DTC	<0.010	
Lead (Pb)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	
Lithium (Li)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	
Magnesium (Mg)-Dissolved (mg/L)	0.694	0.657	1.19	1.18	
Manganese (Mn)-Dissolved (mg/L)	0.00011	0.00011	0.00033	<0.00010	
Mercury (Hg)-Dissolved (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	
Molybdenum (Mo)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	
Nickel (Ni)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	
Phosphorus (P)-Dissolved (mg/L)	<0.050	<0.050	<0.050	<0.050	
Potassium (K)-Dissolved (mg/L)	0.338	0.343	0.372	0.366	
Rubidium (Rb)-Dissolved (mg/L)	0.00046	0.00035	0.00037	0.00037	
Selenium (Se)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	
Silicon (Si)-Dissolved (mg/L)	0.215	0.206	0.453	0.417	
Silver (Ag)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	
Sodium (Na)-Dissolved (mg/L)	0.688	0.669	0.712	0.688	
Strontium (Sr)-Dissolved (mg/L)	0.00866	0.00781	0.0106	0.0106	
Sulfur (S)-Dissolved (mg/L)	<0.50	<0.50	0.52	0.63	
Tellurium (Te)-Dissolved (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020	
Thallium (Tl)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	
Thorium (Th)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	
Tin (Sn)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	
Titanium (Ti)-Dissolved (mg/L)	<0.00030	<0.00030	<0.00030	<0.00030	
Tungsten (W)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	
Uranium (U)-Dissolved (mg/L)	0.000021	0.000020	0.000013	0.000011	
Vanadium (V)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	
Zinc (Zn)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	
Zirconium (Zr)-Dissolved (mg/L)	<0.000060	<0.000060	<0.000060	<0.000060	
Speciated Metals Arsenate (As V) (ug/L)	<0.020		<0.020		
Arsenite (As III) (ug/L)	<0.020		0.025		

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2200253-1	L2200253-2	L2200253-3	L2200253-4	
	Description	SURFACE WATE	SURFACE WATE	SURFACE WATE	SURFACE WATE	
	Sampled Date	16-NOV-18	16-NOV-18	16-NOV-18	16-NOV-18	
	Sampled Time	10:30	10:30	10:30	10:30	
	Client ID	LK1-05	LK1-06	LK5-05	LK5-06	
Grouping	**Analyte**					
WATER						
Speciated Metals	Dimethylarsinic Acid (DMA, as As) (ug/L)	<0.020		<0.020		
	Monomethylarsonic Acid (MMA, as As) (ug/L)	<0.020		<0.020		
	Arsenobetaine (AsB, as As) (ug/L)	<0.050		<0.050		

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

Reference Information

Qualifiers for Individual Samples Listed:

Sample Number	Client Sample ID	Qualifier	Description
L2200253-3	LK5-05	WSMD	Water sample(s) for dissolved mercury analysis was not submitted in glass or PTFE container with HCl preservative. Results may be biased low.

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L2200253-3
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L2200253-3
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L2200253-3
Matrix Spike	Manganese (Mn)-Dissolved	MS-B	L2200253-3
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L2200253-3
Matrix Spike	Sulfur (S)-Dissolved	MS-B	L2200253-3
Matrix Spike	Nitrate (as N)	MS-B	L2200253-1, -2, -3, -4

Qualifiers for Individual Parameters Listed:

Qualifier	Description
DTC	Dissolved concentration exceeds total. Results were confirmed by re-analysis.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ALK-TITR-VA	Water	Alkalinity Species by Titration	APHA 2320 Alkalinity

This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.

AS-SPEC-HPLC/CCMS-VA	Water	Arsenic Species in Water by HPLC/CCMS	USGS WRIR 02-4144

Speciated Arsenic (As) Analysis is by reverse phase HPLC-ICPMS. Sample handling, preservation and holding times outlined in USGS Report 02-4144 and AWWA Preservation of Arsenic Species, 2006. Instrumental analysis based on Afton et al, Journal of Chromatography A, 1208 (2008) 156-163 and Agilent Technologies application notes. Filtration is conducted prior to preservation. Results for unfiltered, preserved samples may be elevated due to extraction of arsenic species from particulate matter in the samples.
Elevated iron (~100+ ppm) concentrations or sulfidic water can introduce biases to the reported results for some arsenic species.

BR-L-IC-N-VA	Water	Bromide in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

CARBONS-DOC-VA	Water	Dissolved organic carbon by combustion	APHA 5310B

This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)". Dissolved carbon (DOC) fractions are determined by filtering the sample through a 0.45 micron membrane filter prior to analysis.

CARBONS-TOC-VA	Water	Total organic carbon by combustion	APHA 5310B TOTAL ORGANIC CARBON (TOC)

This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)".

CL-L-IC-N-VA	Water	Chloride in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

CN-FREE-L-CFA-VA	Water	Low Level Free Cyanide in water by CFA	ASTM 7237

This analysis is carried out using procedures adapted from ASTM Method 7237 "Free Cyanide with Flow Injection Analysis (FIA) Utilizing Gas Diffusion Separation and Amperometric Detection". Free cyanide is determined by in-line gas diffusion at pH 6 with final determination by colourimetric analysis.

CN-T-L-CFA-VA	Water	Low Level Total Cyanide in water by CFA	ISO 14403:2002

This analysis is carried out using procedures adapted from ISO Method 14403:2002 "Determination of Total Cyanide using Flow Analysis (FIA and CFA)". Total or strong acid dissociable (SAD) cyanide is determined by in-line UV digestion along with sample distillation and final determination by colourimetric analysis. Method Limitation: This method is susceptible to interference from thiocyanate (SCN). If SCN is present in the sample, there could be a positive interference with this method, but it would be less than 1% and could be as low as zero.

EC-PCT-VA	Water	Conductivity (Automated)	APHA 2510 Auto. Conduc.

This analysis is carried out using procedures adapted from APHA Method 2510 "Conductivity". Conductivity is determined using a conductivity electrode.

EC-SCREEN-VA	Water	Conductivity Screen (Internal Use Only)	APHA 2510

Qualitative analysis of conductivity where required during preparation of other tests - e.g. TDS, metals, etc.

F-IC-N-VA	Water	Fluoride in Water by IC	EPA 300.1 (mod)

Reference Information

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

HARDNESS-CALC-VA Water Hardness APHA 2340B

Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

HG-D-CVAA-VA Water Diss. Mercury in Water by CVAAS or CVAFS APHA 3030B/EPA 1631E (mod)

Water samples are filtered (0.45 um), preserved with hydrochloric acid, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

HG-T-CVAA-VA Water Total Mercury in Water by CVAAS or CVAFS EPA 1631E (mod)

Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

MET-D-CCMS-VA Water Dissolved Metals in Water by CRC ICPMS APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

MET-T-CCMS-VA Water Total Metals in Water by CRC ICPMS EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

NH3-F-VA Water Ammonia in Water by Fluorescence J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

NO2-L-IC-N-VA Water Nitrite in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

NO3-L-IC-N-VA Water Nitrate in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

P-T-PRES-COL-VA Water Total P in Water by Colour APHA 4500-P Phosphorus

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is determined colourimetrically after persulphate digestion of the sample.
Samples with very high dissolved solids (i.e. seawaters, brackish waters) may produce a negative bias by this method. Alternate methods are available for these types of samples.

Arsenic (5+), at elevated levels, is a positive interference on colourimetric phosphate analysis.

P-TD-COL-VA Water Total Dissolved P in Water by Colour APHA 4500-P Phosphorous

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Dissolved Phosphorus is determined colourimetrically after persulphate digestion of a sample that has been lab or field filtered through a 0.45 micron membrane filter.
Samples with very high dissolved solids (i.e. seawaters, brackish waters) may produce a negative bias by this method. Alternate methods are available for these types of samples.

Arsenic (5+), at elevated levels, is a positive interference on colourimetric phosphate analysis.

PH-PCT-VA Water pH by Meter (Automated) APHA 4500-H pH Value

This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode

It is recommended that this analysis be conducted in the field.

PO4-DO-COL-VA Water Diss. Orthophosphate in Water by Colour APHA 4500-P Phosphorus

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.
Samples with very high dissolved solids (i.e. seawaters, brackish waters) may produce a negative bias by this method. Alternate methods are available for these types of samples.

Arsenic (5+), at elevated levels, is a positive interference on colourimetric phosphate analysis.

SILICATE-COL-VA Water Silicate by Colourimetric analysis APHA 4500-SiO2 E.

This analysis is carried out using procedures adapted from APHA Method 4500-SiO2 E. "Silica". Silicate (molybdate-reactive silica) is determined by the molybdosilicate-heteropoly blue colourimetric method. Arsenic (5+) above 100 mg/L is a negative interference on this test.

Reference Information

SO4-IC-N-VA	Water	Sulfate in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

TDS-LOW-VA	Water	Low Level TDS (3.0mg/L) by Gravimetric	APHA 2540C

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total dissolved solids (TDS) are determined by filtering a sample through a glass fibre filter, TDS is determined by evaporating the filtrate to dryness at 180 degrees celsius.

TKN-F-VA	Water	TKN in Water by Fluorescence	APHA 4500-NORG D.

This analysis is carried out using procedures adapted from APHA Method 4500-Norg D. "Block Digestion and Flow Injection Analysis". Total Kjeldahl Nitrogen is determined using block digestion followed by Flow-injection analysis with fluorescence detection.

TSS-LOW-VA	Water	Total Suspended Solids by Grav. (1 mg/L)	APHA 2540D

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total suspended solids (TSS) are determined by filtering a sample through a glass fibre filter, TSS is determined by drying the filter at 104 degrees celsius.
Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.

TURBIDITY-VA	Water	Turbidity by Meter	APHA 2130 Turbidity

This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

ALS Environmental

Chain of Custody / Analytical Request Form

Canada Toll Free: 1 800 668 9878

www.alsglobal.com

COC # _____

Page 1 of 1

Report To		Report Format / Distribution		Service Requested (Rush for routine analysis subject to availability)
Company:	Azimuth Consulting Group	☑ Standard ☐ Other		◉ Regular (Standard Turnaround Times - Business Days)
Contact:	Eric Franz	☑ PDF ☑ Excel ☐ Digital ☐ Fax		○ Priority (2-4 Business Days) - 50% Surcharge - Contact ALS to Confirm TAT
Address:	218-2902 West Broadway	Email 1:	efranz@azimuthgroup.ca	○ Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT
	Vancouver, BC V6K2G8	Email 2:	marie-pier.marcil@agnicoeagle.com	○ Same Day or Weekend Emergency - Contact ALS to Confirm TAT
Phone:	604-730-1220 Fax:	Email 3:	robin.allard@agnicoeagle.com	
Invoice To	Same as Report ? ☑ Yes ☐ No	Client / Project Information		Analysis Request
Hardcopy of Invoice with Report?	☐ Yes ☑ No	Job #:	Meadowbank CREMP - Surfacewater	Please indicate below Filtered, Preserved or both (F, P, F/P)
Company:		PO / AFE:		
Contact:		LSD:		
Address:				
Phone:	Fax:	Quote #:	Q39503	
Lab Work Order # (lab use only):		ALS Contact:	Brent Mack	Sampler: Eric Franz

Sample #	Sample Identification (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Conventionals** see notes	TSS-Low; TDS-Low	TOC, Ammonia, TKN, Total P	DOC	T-CN (Low), Free CN (Low)	Total mercury	Dissolved mercury	Total Metals	Dissolved metals	Chlorophyll-a			Number of Containers
							P	F/P	P	P	F/P	P	F/P	F			
	LK1-05	16-Nov-18	10:30	Surface Water	X	X	X	X	X	X	X	X	X				9
	LK1-06	16-Nov-18	10:45	Surface Water	X	X	X	X	X	X	X	X	X				9
	LK5-05	16-Nov-18	13:00	Surface Water	X	X	X	X	X	X	X	X	X				9
	LK5-06	16-Nov-18	12:30	Surface Water	X	X	X	X	X	X	X	X	X				9



Special Instructions / Regulations with water or land use (CCME-Freshwater Aquatic Life/BC CSR - Commercial/AB Tier 1 - Natural, etc) / Hazardous Details

**Conventionals includes: Alk Species, pH, EC, Turbidity, Conductivity, Anions (F, NO2, NO3, Br, SO4), low-level Chloride, Silicate, TD-P, and Ortho-PO4.

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.

By the use of this form the user acknowledges and agrees with the Terms and Conditions as provided on a separate Excel tab.

Also provided on another Excel tab are the ALS location addresses, phone numbers and sample container / preservation / holding time table for common analyses.

SHIPMENT RELEASE (client use)			SHIPMENT RECEPTION (lab use only)				SHIPMENT VERIFICATION (lab use only)			
Released by:	Date (dd-mmm-yy)	Time (hh-mm)	Received by:	Date:	Time:	Temperature:	Verified by:	Date:	Time:	Observations: Yes / No ? If Yes add SIF
Fanny Laporte	19-Nov-18	8:00	JC	11/22/18	8:30 AM	5 °C				

GENF 20.00 Front

AZIMUTH CONSULTING GROUP INC.
ATTN: Eric Franz
218 - 2902 West Broadway
Vancouver BC V6K 2G8

Date Received: 04-DEC-18
Report Date: 13-DEC-18 13:28 (MT)
Version: FINAL

Client Phone: 604-730-1220

Certificate of Analysis

Lab Work Order #: L2205457

Project P.O. #: NOT SUBMITTED
Job Reference: MEADOWBANK CREMP - SURFACEWATER
C of C Numbers:
Legal Site Desc:

Brent Mack, B.Sc.
Account Manager

[This report shall not be reproduced except in full without the written authority of the Laboratory.]

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2205457-1	L2205457-2	L2205457-3	L2205457-4	L2205457-5
Description	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water
Sampled Date	26-NOV-18	26-NOV-18	25-NOV-18	25-NOV-18	27-NOV-18
Sampled Time	13:00	12:00	11:20	10:50	11:25
Client ID	DS1-27	DS1-28	A76-29	A76-30	LK8-05
Grouping **Analyte**					
FILTER					
Plant Pigments Chlorophyll a (ug/L)	0.968	0.925	0.931	1.09	0.666

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2205457-6				
Description	Surface Water				
Sampled Date	27-NOV-18				
Sampled Time	10:40				
Client ID	LK8-06				
Grouping **Analyte**					
FILTER					
Plant Pigments Chlorophyll a (ug/L)	0.566				

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2205457-1	L2205457-2	L2205457-3	L2205457-4	L2205457-5
Description	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water
Sampled Date	26-NOV-18	26-NOV-18	25-NOV-18	25-NOV-18	27-NOV-18
Sampled Time	13:00	12:00	11:20	10:50	11:25
Client ID	DS1-27	DS1-28	A76-29	A76-30	LK8-05
Grouping / **Analyte**					
WATER					
Physical Tests Conductivity (uS/cm)	23.6	31.8	44.4	44.0	13.9
Hardness (as CaCO3) (mg/L)	8.51	11.5	16.1	17.6	5.18
pH (pH)	6.92	7.04	7.01	7.03	6.86
Total Suspended Solids (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
Total Dissolved Solids (mg/L)	17.3	18.5	21.2	25.0	8.8
Turbidity (NTU)	0.20	0.26	0.15	0.13	0.15
Anions and Nutrients Alkalinity, Bicarbonate (as CaCO3) (mg/L)	6.0	7.4	7.1	6.9	4.8
Alkalinity, Carbonate (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
Alkalinity, Total (as CaCO3) (mg/L)	6.0	7.4	7.1	6.9	4.8
Ammonia, Total (as N) (mg/L)	0.0100	<0.0050	<0.0050	<0.0050	0.0068
Bromide (Br) (mg/L)	<0.050	<0.050	0.064	0.059	<0.050
Chloride (Cl) (mg/L)	2.29	3.24	6.29	6.14	0.58
Fluoride (F) (mg/L)	0.048	0.035	0.030	0.029	0.026
Nitrate (as N) (mg/L)	<0.0050	0.0079	<0.0050	<0.0050	<0.0050
Nitrite (as N) (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Total Kjeldahl Nitrogen (mg/L)	0.095	0.135	0.117	0.081	0.072
Orthophosphate-Dissolved (as P) (mg/L)	0.0013	<0.0010	<0.0010	0.0011	<0.0010
Phosphorus (P)-Total Dissolved (mg/L)	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Phosphorus (P)-Total (mg/L)	0.0036	0.0043	<0.0020	0.0026	<0.0020
Silicate (as SiO2) (mg/L)	0.78	1.53	1.04	1.06	<0.50
Sulfate (SO4) (mg/L)	1.95	2.75	4.11	4.01	1.46
Cyanides Cyanide, Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Cyanide, Free (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Organic / Inorganic Carbon Dissolved Organic Carbon (mg/L)	2.24	2.27	1.53	1.70	1.69
Total Organic Carbon (mg/L)	2.30	2.25	1.57	1.79	1.57
Total Metals Aluminum (Al)-Total (mg/L)	0.0061	0.0091	0.0042	<0.0030	0.0031
Antimony (Sb)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic (As)-Total (mg/L)	0.00015	0.00011	0.00023	0.00021	0.00015
Barium (Ba)-Total (mg/L)	0.00520	0.00556	0.00840	0.00824	0.00254
Beryllium (Be)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth (Bi)-Total (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron (B)-Total (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)-Total (mg/L)	<0.0000050	<0.0000050	<0.0000050	0.0000063	<0.0000050
Calcium (Ca)-Total (mg/L)	2.18	3.02	4.31	4.36	1.08
Cesium (Cs)-Total (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2205457-6				
	Description	Surface Water				
	Sampled Date	27-NOV-18				
	Sampled Time	10:40				
	Client ID	LK8-06				
Grouping	**Analyte**					
WATER						
Physical Tests	Conductivity (uS/cm)	13.8				
	Hardness (as CaCO3) (mg/L)	5.25				
	pH (pH)	6.84				
	Total Suspended Solids (mg/L)	<1.0				
	Total Dissolved Solids (mg/L)	10.2				
	Turbidity (NTU)	0.15				
Anions and Nutrients	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	4.4				
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<1.0				
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0				
	Alkalinity, Total (as CaCO3) (mg/L)	4.4				
	Ammonia, Total (as N) (mg/L)	0.0056				
	Bromide (Br) (mg/L)	<0.050				
	Chloride (Cl) (mg/L)	0.58				
	Fluoride (F) (mg/L)	0.025				
	Nitrate (as N) (mg/L)	<0.0050				
	Nitrite (as N) (mg/L)	<0.0010				
	Total Kjeldahl Nitrogen (mg/L)	0.083				
	Orthophosphate-Dissolved (as P) (mg/L)	0.0014				
	Phosphorus (P)-Total Dissolved (mg/L)	<0.0020				
	Phosphorus (P)-Total (mg/L)	0.0021				
	Silicate (as SiO2) (mg/L)	0.51				
	Sulfate (SO4) (mg/L)	1.46				
Cyanides	Cyanide, Total (mg/L)	<0.0010				
	Cyanide, Free (mg/L)	<0.0010				
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	1.61				
	Total Organic Carbon (mg/L)	2.08				
Total Metals	Aluminum (Al)-Total (mg/L)	<0.0030				
	Antimony (Sb)-Total (mg/L)	<0.00010				
	Arsenic (As)-Total (mg/L)	0.00014				
	Barium (Ba)-Total (mg/L)	0.00304				
	Beryllium (Be)-Total (mg/L)	<0.00010				
	Bismuth (Bi)-Total (mg/L)	<0.000050				
	Boron (B)-Total (mg/L)	<0.010				
	Cadmium (Cd)-Total (mg/L)	<0.0000050				
	Calcium (Ca)-Total (mg/L)	1.07				
	Cesium (Cs)-Total (mg/L)	<0.000010				

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2205457-1	L2205457-2	L2205457-3	L2205457-4	L2205457-5
Description	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water
Sampled Date	26-NOV-18	26-NOV-18	25-NOV-18	25-NOV-18	27-NOV-18
Sampled Time	13:00	12:00	11:20	10:50	11:25
Client ID	DS1-27	DS1-28	A76-29	A76-30	LK8-05
Grouping / **Analyte**					
WATER					
Total Metals Chromium (Cr)-Total (mg/L)	<0.00050 DLB	0.00050	<0.00050 DLB	<0.0010 DLB	<0.00050 DLB
Cobalt (Co)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper (Cu)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Iron (Fe)-Total (mg/L)	0.015	0.020	0.010	<0.010	<0.010
Lead (Pb)-Total (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium (Li)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Magnesium (Mg)-Total (mg/L)	0.851	0.939	1.34	1.36	0.634
Manganese (Mn)-Total (mg/L)	0.00130	0.00103	0.00074	0.00068	0.00084
Mercury (Hg)-Total (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Molybdenum (Mo)-Total (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Nickel (Ni)-Total (mg/L)	0.00057	0.00053	0.00085	0.00107	0.00068
Phosphorus (P)-Total (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050
Potassium (K)-Total (mg/L)	0.453	0.585	0.766	0.783	0.318
Rubidium (Rb)-Total (mg/L)	0.00060	0.00069	0.00114	0.00116	0.00054
Selenium (Se)-Total (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Silicon (Si)-Total (mg/L)	0.51	0.76	0.55	0.56	0.29
Silver (Ag)-Total (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)-Total (mg/L)	0.964	1.22	0.757	0.732	0.463
Strontium (Sr)-Total (mg/L)	0.0110	0.0143	0.0242	0.0244	0.00512
Sulfur (S)-Total (mg/L)	0.74	1.17	1.48	1.42	0.51
Tellurium (Te)-Total (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Thallium (Tl)-Total (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Thorium (Th)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Tin (Sn)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)-Total (mg/L)	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030
Tungsten (W)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Uranium (U)-Total (mg/L)	0.000027	0.000031	0.000012	0.000012	0.000011
Vanadium (V)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc (Zn)-Total (mg/L)	<0.0030	<0.0030	0.0076	<0.0030	<0.0030
Zirconium (Zr)-Total (mg/L)	<0.000060	<0.000060	<0.000060	<0.000060	<0.000060
Dissolved Metals Dissolved Mercury Filtration Location	FIELD	FIELD	FIELD	FIELD	FIELD
Dissolved Metals Filtration Location	FIELD	FIELD	FIELD	FIELD	FIELD
Aluminum (Al)-Dissolved (mg/L)	0.0057	0.0052	0.0034	0.0019	0.0021
Antimony (Sb)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic (As)-Dissolved (mg/L)	0.00011	<0.00010	0.00020	0.00018	0.00012
Barium (Ba)-Dissolved (mg/L)	0.00493	0.00580	0.00843	0.00911	0.00255
Beryllium (Be)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2205457-6				
	Description	Surface Water				
	Sampled Date	27-NOV-18				
	Sampled Time	10:40				
	Client ID	LK8-06				
Grouping	**Analyte**					
WATER						
Total Metals	Chromium (Cr)-Total (mg/L)	<0.00050 DLB				
	Cobalt (Co)-Total (mg/L)	<0.00010				
	Copper (Cu)-Total (mg/L)	<0.00050				
	Iron (Fe)-Total (mg/L)	<0.010				
	Lead (Pb)-Total (mg/L)	<0.000050				
	Lithium (Li)-Total (mg/L)	<0.0010				
	Magnesium (Mg)-Total (mg/L)	0.623				
	Manganese (Mn)-Total (mg/L)	0.00081				
	Mercury (Hg)-Total (mg/L)	<0.0000050				
	Molybdenum (Mo)-Total (mg/L)	<0.000050				
	Nickel (Ni)-Total (mg/L)	0.00064				
	Phosphorus (P)-Total (mg/L)	<0.050				
	Potassium (K)-Total (mg/L)	0.314				
	Rubidium (Rb)-Total (mg/L)	0.00056				
	Selenium (Se)-Total (mg/L)	<0.000050				
	Silicon (Si)-Total (mg/L)	0.29				
	Silver (Ag)-Total (mg/L)	<0.000010				
	Sodium (Na)-Total (mg/L)	0.459				
	Strontium (Sr)-Total (mg/L)	0.00505				
	Sulfur (S)-Total (mg/L)	0.50				
	Tellurium (Te)-Total (mg/L)	<0.00020				
	Thallium (Tl)-Total (mg/L)	<0.000010				
	Thorium (Th)-Total (mg/L)	<0.00010				
	Tin (Sn)-Total (mg/L)	<0.00010				
	Titanium (Ti)-Total (mg/L)	<0.00030				
	Tungsten (W)-Total (mg/L)	<0.00010				
	Uranium (U)-Total (mg/L)	0.000011				
	Vanadium (V)-Total (mg/L)	<0.00050				
	Zinc (Zn)-Total (mg/L)	0.0033				
	Zirconium (Zr)-Total (mg/L)	<0.000060				
Dissolved Metals	Dissolved Mercury Filtration Location	FIELD				
	Dissolved Metals Filtration Location	FIELD				
	Aluminum (Al)-Dissolved (mg/L)	0.0022				
	Antimony (Sb)-Dissolved (mg/L)	<0.00010				
	Arsenic (As)-Dissolved (mg/L)	0.00012				
	Barium (Ba)-Dissolved (mg/L)	0.00243				
	Beryllium (Be)-Dissolved (mg/L)	<0.00010				

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2205457-1	L2205457-2	L2205457-3	L2205457-4	L2205457-5
Description	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water
Sampled Date	26-NOV-18	26-NOV-18	25-NOV-18	25-NOV-18	27-NOV-18
Sampled Time	13:00	12:00	11:20	10:50	11:25
Client ID	DS1-27	DS1-28	A76-29	A76-30	LK8-05
Grouping / **Analyte**					
WATER					
Dissolved Metals Bismuth (Bi)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron (B)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)-Dissolved (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Calcium (Ca)-Dissolved (mg/L)	2.15	3.07	4.30	4.71	1.07
Cesium (Cs)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Chromium (Cr)-Dissolved (mg/L)	0.00012	<0.00010	<0.00010	<0.00010	0.00010
Cobalt (Co)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper (Cu)-Dissolved (mg/L)	0.00032	0.00036	0.00032	0.00034	0.00031
Iron (Fe)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
Lead (Pb)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium (Li)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Magnesium (Mg)-Dissolved (mg/L)	0.760	0.938	1.31	1.41	0.606
Manganese (Mn)-Dissolved (mg/L)	0.00033	0.00041	0.00026	0.00020	0.00014
Mercury (Hg)-Dissolved (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Molybdenum (Mo)-Dissolved (mg/L)	<0.000050	0.000052	<0.000050	<0.000050	<0.000050
Nickel (Ni)-Dissolved (mg/L)	<0.00050	<0.00050	0.00056	0.00059	<0.00050
Phosphorus (P)-Dissolved (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050
Potassium (K)-Dissolved (mg/L)	0.419	0.590	0.789	0.846	0.311
Rubidium (Rb)-Dissolved (mg/L)	0.00061	0.00074	0.00116	0.00118	0.00056
Selenium (Se)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Silicon (Si)-Dissolved (mg/L)	0.367	0.759	0.536	0.535	0.260
Silver (Ag)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)-Dissolved (mg/L)	0.848	1.20	0.751	0.809	0.449
Strontium (Sr)-Dissolved (mg/L)	0.0105	0.0143	0.0246	0.0263	0.00502
Sulfur (S)-Dissolved (mg/L)	0.73	0.85	1.26	1.12	0.53
Tellurium (Te)-Dissolved (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Thallium (Tl)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Thorium (Th)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Tin (Sn)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)-Dissolved (mg/L)	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030
Tungsten (W)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Uranium (U)-Dissolved (mg/L)	0.000026	0.000030	0.000012	0.000011	<0.000010
Vanadium (V)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc (Zn)-Dissolved (mg/L)	<0.0010	<0.0010	0.0093	<0.0010	<0.0010
Zirconium (Zr)-Dissolved (mg/L)	<0.000060	<0.000060	<0.000060	<0.000060	<0.000060
Speciated Metals Arsenate (As V) (ug/L)	<0.020		<0.020		<0.020
Arsenite (As III) (ug/L)	0.028		0.067		0.038

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2205457-6				
	Description	Surface Water				
	Sampled Date	27-NOV-18				
	Sampled Time	10:40				
	Client ID	LK8-06				
Grouping	**Analyte**					
WATER						
Dissolved Metals	Bismuth (Bi)-Dissolved (mg/L)	<0.000050				
	Boron (B)-Dissolved (mg/L)	<0.010				
	Cadmium (Cd)-Dissolved (mg/L)	<0.0000050				
	Calcium (Ca)-Dissolved (mg/L)	1.09				
	Cesium (Cs)-Dissolved (mg/L)	<0.000010				
	Chromium (Cr)-Dissolved (mg/L)	0.00012				
	Cobalt (Co)-Dissolved (mg/L)	<0.00010				
	Copper (Cu)-Dissolved (mg/L)	0.00033				
	Iron (Fe)-Dissolved (mg/L)	<0.010				
	Lead (Pb)-Dissolved (mg/L)	<0.000050				
	Lithium (Li)-Dissolved (mg/L)	<0.0010				
	Magnesium (Mg)-Dissolved (mg/L)	0.611				
	Manganese (Mn)-Dissolved (mg/L)	0.00023				
	Mercury (Hg)-Dissolved (mg/L)	<0.0000050				
	Molybdenum (Mo)-Dissolved (mg/L)	<0.000050				
	Nickel (Ni)-Dissolved (mg/L)	<0.00050				
	Phosphorus (P)-Dissolved (mg/L)	<0.050				
	Potassium (K)-Dissolved (mg/L)	0.316				
	Rubidium (Rb)-Dissolved (mg/L)	0.00055				
	Selenium (Se)-Dissolved (mg/L)	<0.000050				
	Silicon (Si)-Dissolved (mg/L)	0.257				
	Silver (Ag)-Dissolved (mg/L)	<0.000010				
	Sodium (Na)-Dissolved (mg/L)	0.463				
	Strontium (Sr)-Dissolved (mg/L)	0.00517				
	Sulfur (S)-Dissolved (mg/L)	0.57				
	Tellurium (Te)-Dissolved (mg/L)	<0.00020				
	Thallium (Tl)-Dissolved (mg/L)	<0.000010				
	Thorium (Th)-Dissolved (mg/L)	<0.00010				
	Tin (Sn)-Dissolved (mg/L)	<0.00010				
	Titanium (Ti)-Dissolved (mg/L)	<0.00030				
	Tungsten (W)-Dissolved (mg/L)	<0.00010				
	Uranium (U)-Dissolved (mg/L)	0.000011				
	Vanadium (V)-Dissolved (mg/L)	<0.00050				
	Zinc (Zn)-Dissolved (mg/L)	<0.0010				
	Zirconium (Zr)-Dissolved (mg/L)	<0.000060				
Speciated Metals	Arsenate (As V) (ug/L)					
	Arsenite (As III) (ug/L)					

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2205457-1	L2205457-2	L2205457-3	L2205457-4	L2205457-5
Description	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water
Sampled Date	26-NOV-18	26-NOV-18	25-NOV-18	25-NOV-18	27-NOV-18
Sampled Time	13:00	12:00	11:20	10:50	11:25
Client ID	DS1-27	DS1-28	A76-29	A76-30	LK8-05
Grouping / **Analyte**					
WATER					
Speciated Metals					
Dimethylarsinic Acid (DMA, as As) (ug/L)	<0.020		<0.020		<0.020
Monomethylarsonic Acid (MMA, as As) (ug/L)	<0.020		<0.020		<0.020
Arsenobetaine (AsB, as As) (ug/L)	<0.050		<0.050		<0.050

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2205457-6				
	Description	Surface Water				
	Sampled Date	27-NOV-18				
	Sampled Time	10:40				
	Client ID	LK8-06				
Grouping	**Analyte**					
WATER						
Speciated Metals	Dimethylarsinic Acid (DMA, as As) (ug/L)					
	Monomethylarsonic Acid (MMA, as As) (ug/L)					
	Arsenobetaine (AsB, as As) (ug/L)					

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

Reference Information

Qualifiers for Individual Samples Listed:

Sample Number	Client Sample ID	Qualifier	Description
L2205457-6	LK8-06	WSMT	Water sample(s) for total mercury analysis was not submitted in glass or PTFE container with HCl preservative. Results may be biased low.

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Method Blank	Chromium (Cr)-Total	MB-LOR	L2205457-1, -2, -3, -4, -5, -6
Matrix Spike	Dissolved Organic Carbon	MS-B	L2205457-1
Matrix Spike	Dissolved Organic Carbon	MS-B	L2205457-1
Matrix Spike	Total Organic Carbon	MS-B	L2205457-2, -3, -4, -5, -6
Matrix Spike	Total Organic Carbon	MS-B	L2205457-1
Matrix Spike	Total Organic Carbon	MS-B	L2205457-1
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L2205457-1, -2, -3, -4, -5, -6
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L2205457-1, -2, -3, -4, -5, -6
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L2205457-1, -2, -3, -4, -5, -6
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L2205457-1, -2, -3, -4, -5, -6
Matrix Spike	Silicate (as SiO2)	MS-B	L2205457-1, -2, -3, -4, -5, -6

Qualifiers for Individual Parameters Listed:

Qualifier	Description
DLB	Detection Limit Raised. Analyte detected at comparable level in Method Blank.
MB-LOR	Method Blank exceeds ALS DQO. Limits of Reporting have been adjusted for samples with positive hits below 5x blank level.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ALK-TITR-VA	Water	Alkalinity Species by Titration	APHA 2320 Alkalinity

This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.

AS-SPEC-HPLC/CCMS-VA	Water	Arsenic Species in Water by HPLC/CCMS	USGS WRIR 02-4144

Speciated Arsenic (As) Analysis is by reverse phase HPLC-ICPMS. Sample handling, preservation and holding times outlined in USGS Report 02-4144 and AWWA Preservation of Arsenic Species, 2006. Instrumental analysis based on Afton et al, Journal of Chromatography A, 1208 (2008) 156-163 and Agilent Technologies application notes. Filtration is conducted prior to preservation. Results for unfiltered, preserved samples may be elevated due to extraction of arsenic species from particulate matter in the samples.
Elevated iron (~100+ ppm) concentrations or sulfidic water can introduce biases to the reported results for some arsenic species.

BR-L-IC-N-VA	Water	Bromide in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

CARBONS-DOC-VA	Water	Dissolved organic carbon by combustion	APHA 5310B

This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)". Dissolved carbon (DOC) fractions are determined by filtering the sample through a 0.45 micron membrane filter prior to analysis.

CARBONS-TOC-VA	Water	Total organic carbon by combustion	APHA 5310B TOTAL ORGANIC CARBON (TOC)

This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)".

CHLOROA-F-VA	Filter	Chlorophyll a by Fluorometer (Filter)	EPA 445.0

This analysis is done using procedures modified from EPA Method 445.0. Chlorophyll-a is determined by a routine acetone extraction followed with analysis by fluorometry using the non-acidification procedure. This method is not subject to interferences from chlorophyll b.

CL-L-IC-N-VA	Water	Chloride in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

CN-FREE-L-CFA-VA	Water	Low Level Free Cyanide in water by CFA	ASTM 7237

This analysis is carried out using procedures adapted from ASTM Method 7237 "Free Cyanide with Flow Injection Analysis (FIA) Utilizing Gas Diffusion Separation and Amperometric Detection". Free cyanide is determined by in-line gas diffusion at pH 6 with final determination by colourimetric analysis.

CN-T-L-CFA-VA	Water	Low Level Total Cyanide in water by CFA	ISO 14403:2002

This analysis is carried out using procedures adapted from ISO Method 14403:2002 "Determination of Total Cyanide using Flow Analysis (FIA and CFA)". Total or strong acid dissociable (SAD) cyanide is determined by in-line UV digestion along with sample distillation and final determination by colourimetric analysis. Method Limitation: This method is susceptible to interference from thiocyanate (SCN). If SCN is present in the sample, there

Reference Information

could be a positive interference with this method, but it would be less than 1% and could be as low as zero.

EC-PCT-VA Water Conductivity (Automated) APHA 2510 Auto. Conduc.

This analysis is carried out using procedures adapted from APHA Method 2510 "Conductivity". Conductivity is determined using a conductivity electrode.

EC-SCREEN-VA Water Conductivity Screen (Internal Use Only) APHA 2510

Qualitative analysis of conductivity where required during preparation of other tests - e.g. TDS, metals, etc.

F-IC-N-VA Water Fluoride in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

HARDNESS-CALC-VA Water Hardness APHA 2340B

Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

HG-D-CVAA-VA Water Diss. Mercury in Water by CVAAS or CVAFS APHA 3030B/EPA 1631E (mod)

Water samples are filtered (0.45 um), preserved with hydrochloric acid, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

HG-T-CVAA-VA Water Total Mercury in Water by CVAAS or CVAFS EPA 1631E (mod)

Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

MET-D-CCMS-VA Water Dissolved Metals in Water by CRC ICPMS APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

MET-T-CCMS-VA Water Total Metals in Water by CRC ICPMS EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

NH3-F-VA Water Ammonia in Water by Fluorescence J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

NO2-L-IC-N-VA Water Nitrite in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

NO3-L-IC-N-VA Water Nitrate in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

P-T-PRES-COL-VA Water Total P in Water by Colour APHA 4500-P Phosphorus

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is determined colourimetrically after persulphate digestion of the sample.
Samples with very high dissolved solids (i.e. seawaters, brackish waters) may produce a negative bias by this method. Alternate methods are available for these types of samples.

Arsenic (5+), at elevated levels, is a positive interference on colourimetric phosphate analysis.

P-TD-COL-VA Water Total Dissolved P in Water by Colour APHA 4500-P Phosphorous

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Dissolved Phosphorus is determined colourimetrically after persulphate digestion of a sample that has been lab or field filtered through a 0.45 micron membrane filter.
Samples with very high dissolved solids (i.e. seawaters, brackish waters) may produce a negative bias by this method. Alternate methods are available for these types of samples.

Arsenic (5+), at elevated levels, is a positive interference on colourimetric phosphate analysis.

PH-PCT-VA Water pH by Meter (Automated) APHA 4500-H pH Value

This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode

It is recommended that this analysis be conducted in the field.

PO4-DO-COL-VA Water Diss. Orthophosphate in Water by Colour APHA 4500-P Phosphorus

Reference Information

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.
Samples with very high dissolved solids (i.e. seawaters, brackish waters) may produce a negative bias by this method. Alternate methods are available for these types of samples.

Arsenic (5+), at elevated levels, is a positive interference on colourimetric phosphate analysis.

SILICATE-COL-VA	Water	Silicate by Colourimetric analysis	APHA 4500-SiO2 E.

This analysis is carried out using procedures adapted from APHA Method 4500-SiO2 E. "Silica". Silicate (molybdate-reactive silica) is determined by the molybdosilicate-heteropoly blue colourimetric method. Arsenic (5+) above 100 mg/L is a negative interference on this test.

SO4-IC-N-VA	Water	Sulfate in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

TDS-LOW-VA	Water	Low Level TDS (3.0mg/L) by Gravimetric	APHA 2540C

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total dissolved solids (TDS) are determined by filtering a sample through a glass fibre filter, TDS is determined by evaporating the filtrate to dryness at 180 degrees celsius.

TKN-F-VA	Water	TKN in Water by Fluorescence	APHA 4500-NORG D.

This analysis is carried out using procedures adapted from APHA Method 4500-Norg D. "Block Digestion and Flow Injection Analysis". Total Kjeldahl Nitrogen is determined using block digestion followed by Flow-injection analysis with fluorescence detection.

TSS-LOW-VA	Water	Total Suspended Solids by Grav. (1 mg/L)	APHA 2540D

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total suspended solids (TSS) are determined by filtering a sample through a glass fibre filter, TSS is determined by drying the filter at 104 degrees celsius.
Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.

TURBIDITY-VA	Water	Turbidity by Meter	APHA 2130 Turbidity

This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

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Report To		Report Format / Distribution		Service Requested (Rush for routine analysis subject to availability)
Company:	Azimuth Consulting Group	☑ Standard ☐ Other		◉ Regular (Standard Turnaround Times - Business Days)
Contact:	Eric Franz	☑ PDF ☑ Excel ☐ Digital ☐ Fax		○ Priority (2-4 Business Days) - 50% Surcharge - Contact ALS to Confirm TAT
Address:	218-2902 West Broadway	Email 1: efranz@azimuthgroup.ca		○ Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT
	Vancouver, BC V6K2G8	Email 2: marie-pier.marcil@agnicoeagle.com		○ Same Day or Weekend Emergency - Contact ALS to Confirm TAT
Phone:	604-730-1220 Fax:	Email 3: robin.allard@agnicoeagle.com		
Invoice To	Same as Report ? ☑ Yes ☐ No	Client / Project Information		Analysis Request
Hardcopy of Invoice with Report?	☐ Yes ☑ No	Job #:	Meadowbank CREMP - Surfacewater	Please indicate below Filtered, Preserved or both (F, P, F/P)
Company:		PO / AFE:		
Contact:		LSD:		
Address:				
Phone:	Fax:	Quote #:	Q39503	
Lab Work Order # (lab use only)		ALS Contact:	Brent Mack	Sampler: ENV

Sample #	Sample Identification (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Conventionals** see notes	TSS-Low, TDS-Low	TOC, Ammonia, TKN, Total P	DOC	T-CN (Low), Free CN (Low)	Total mercury	Dissolved mercury	Total Metals	Dissolved metals	Chlorophyll-a	Arsenic speciation		Number of Containers
							P	F/P	P	P	F/P	P	F/P	F	F/P		
	DS1-27	26-Nov-18	13:00	Surface Water	X	X	X	X	X	X	X	X	X	X	X		11
	DS1-28	26-Nov-18	12:00	Surface Water	X	X	X	X	X	X	X	X	X	X			10
	A76-29	25-Nov-18	11:20	Surface Water	X	X	X	X	X	X	X	X	X	X	X		11
	A76-30	25-Nov-18	10:50	Surface Water	X	X	X	X	X	X	X	X	X	X			10
	LK8-05	27-Nov-18	11:25	Surface Water	X	X	X	X	X	X	X	X	X	X	X		11
	LK8-06	27-Nov-18	10:40	Surface Water	X	X	X	X	X	X	X	X	X	X			10
				Surface Water													
				Surface Water													
				Surface Water													
				Surface Water													
				Surface Water													
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				Surface Water													
				Surface Water													
				Surface Water													

L2205457-COFC

Special Instructions / Regulations with water or land use (CCME-Freshwater Aquatic Life/BC CSR - Commercial/AB Tier 1 - Natural, etc) / Hazardous Details

**Conventionals includes: Alk Species, pH, EC, Turbidity, Conductivity, Anions (F, NO2, NO3, Br, SO4), low-level Chloride, Silicate, TD-P, and Ortho-PO4.

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.

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Also provided on another Excel tab are the ALS location addresses, phone numbers and sample container / preservation / holding time table for common analyses.

SHIPMENT RELEASE (client use)			SHIPMENT RECEPTION (lab use only)				SHIPMENT VERIFICATION (lab use only)			
Released by:	Date (dd-mmm-yy)	Time (hh-mm)	Received by:	Date:	Time:	Temperature:	Verified by:	Date:	Time:	Observations: Yes / No ? If Yes add SIF
Samuel Tapp	28-Nov-18	6:00	JC	DEC 4 2018	1145AM	11 °C				

AZIMUTH CONSULTING GROUP INC.
ATTN: Eric Franz
218 - 2902 West Broadway
Vancouver BC V6K 2G8

Date Received: 04-DEC-18
Report Date: 07-DEC-18 14:59 (MT)
Version: FINAL

Client Phone: 604-730-1220

Certificate of Analysis

Lab Work Order #: L2205460

Project P.O. #: NOT SUBMITTED
Job Reference: MEADOWBANK CREMP - SURFACEWATER
C of C Numbers:
Legal Site Desc:

Brent Mack, B.Sc.
Account Manager

[This report shall not be reproduced except in full without the written authority of the Laboratory.]

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2205460-1	L2205460-2	L2205460-3	L2205460-4	L2205460-5
Description	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water
Sampled Date	31-OCT-18	01-NOV-18	01-NOV-18	01-NOV-18	03-NOV-18
Sampled Time	15:07	10:50	14:05	13:05	10:15
Client ID	WTS-35	WTS-36	MAM-35	MAM-36	NEM-35
Grouping **Analyte**					
FILTER					
Plant Pigments Chlorophyll a (ug/L)	0.905	0.859	0.725	0.577	0.490

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	Sample ID Description Sampled Date Sampled Time Client ID	L2205460-6 Surface Water 03-NOV-18 09:45 NEM-36	L2205460-7 Surface Water 16-NOV-18 10:30 LK1-05	L2205460-8 Surface Water 16-NOV-18 10:45 LK1-06	L2205460-9 Surface Water 16-NOV-18 13:00 LK5-05	L2205460-10 Surface Water 16-NOV-18 12:30 LK5-06
FILTER							
Plant Pigments	Chlorophyll a (ug/L)		0.579	0.429	0.582	0.667	0.760

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2205460-11	L2205460-12	L2205460-13	L2205460-14	
Description	Surface Water	Surface Water	Surface Water	Surface Water	
Sampled Date	01-NOV-18	01-NOV-18	01-NOV-18	01-NOV-18	
Sampled Time	11:50	12:16			
Client ID	A20-29	A20-30	WTP NOV DUP-1	WTP NOV DUP-2	
Grouping **Analyte**					
FILTER					
Plant Pigments Chlorophyll a (ug/L)	0.441	0.415	0.990	0.504	

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
CHLOROA-F-VA	Filter	Chlorophyll a by Fluorometer (Filter)	EPA 445.0

This analysis is done using procedures modified from EPA Method 445.0. Chlorophyll-a is determined by a routine acetone extraction followed with analysis by fluorometry using the non-acidification procedure. This method is not subject to interferences from chlorophyll b.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

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Report To		Report Format / Distribution	Service Requested (Rush for routine analysis subject to availability)
Company:	Azimuth Consulting Group	☑ Standard ☐ Other	◉ Regular (Standard Turnaround Times - Business Days)
Contact:	Eric Franz	☑ PDF ☑ Excel ☐ Digital ☐ Fax	○ Priority (2-4 Business Days) - 50% Surcharge - Contact ALS to Confirm TAT
Address:	218-2902 West Broadway	Email 1: efranz@azimuthgroup.ca	○ Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT
	Vancouver, BC V6K2G8	Email 2: marie-pier.marcil@agnicoeagle.com	○ Same Day or Weekend Emergency - Contact ALS to Confirm TAT
Phone:	604-730-1220 Fax:	Email 3: robin.allard@agnicoeagle.com	
Invoice To	Same as Report ? ☑ Yes ☐ No	Client / Project Information	
Hardcopy of Invoice with Report?	☐ Yes ☑ No	Job #: Meadowbank CREMP - Surfacewater	
Company:		PO / AFE:	
Contact:		LSD:	
Address:			
Phone:	Fax:	Quote #: Q39503	
Lab Work Order # (lab use only)		ALS Contact: Brent Mack	Sampler: ENV

Analysis Request

Please indicate below Filtered, Preserved or both (F, P, F/P)

Sample #	Sample Identification (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Conventionals** see notes	TSS-Low, TDS-Low	TOC, Ammonia, TKN, Total P	DOC	T-CN (Low), Free CN (Low)	Total mercury	Dissolved mercury	Total Metals	Dissolved metals	Chlorophyll-a	Arsenic speciation		Number of Containers
							P	F/P	P	P	F/P	P	F/P	F	F/P		
	WTS-35	31-Oct-18	15:07	Surface Water										X			1
	WTS-36	01-Nov-18	10:50	Surface Water										X			1
	MAM-35	01-Nov-18	14:05	Surface Water										X			1
	MAM-36	01-Nov-18	13:05	Surface Water										X			1
	NEM-35	03-Nov-18	10:15	Surface Water										X			1
	NEM-36	03-Nov-18	9:45	Surface Water										X			1
	LK1-05	16-Nov-18	10:30	Surface Water										X			1
	LK1-06	16-Nov-18	10:45	Surface Water										X			1
	LK5-05	16-Nov-18	13:00	Surface Water										X			1
	LK5-06	16-Nov-18	12:30	Surface Water										X			1
	A20-29	01-Nov-18	11:50	Surface Water										X			1
	A20-30	01-Nov-18	12:16	Surface Water										X			1
	WTP NOV DUP-1	01-Nov-18		Surface Water										X			1
	WTP NOV DUP-2	01-Nov-18		Surface Water										X			1
				Surface Water													
				Surface Water													
				Surface Water													

Special Instructions / Regulations with water or land use (CCME-Freshwater Aquatic Life/BC CSR - Commercial/AB Tier 1 - Natural, etc) / Hazardous Details

**Conventionals includes: Alk Species, pH, EC, Turbidity, Conductivity, Anions (F, NO2, NO3, Br, SO4), low-level Chloride, Silicate, TD-P, and Ortho-PO4.

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.

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Also provided on another Excel tab are the ALS location addresses, phone numbers and sample container / preservation / holding time table for common analyses.

SHIPMENT RELEASE (client use)			SHIPMENT RECEPTION (lab use only)				SHIPMENT VERIFICATION (lab use only)			
Released by:	Date (dd-mmm-yy)	Time (hh-mm)	Received by:	Date:	Time:	Temperature:	Verified by:	Date:	Time:	Observations: Yes / No ? If Yes add SIF
Samuel Tapp	28-Nov-18	6:00	JC	DEC - 4 2018	1145 h	11 °C				

GENF 20.00 Front

APPENDIX G
SEDIMENT TOXICITY TESTING METHODS AND RESULTS

Toxicity testing for Azimuth Consulting

August 2018 Sediment Samples

Final Report

October 29, 2018

Submitted to: **Azimuth Consulting**
Vancouver, BC

8664 Commerce Court, Burnaby, BC V5A 4N7

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APPENDIX B – *Chironomus dilutus* Toxicity Test Data
APPENDIX C – Analytical Chemistry
APPENDIX D – Chain-of-Custody Forms

SIGNATURE PAGE

Report By:
Karen Lee, B. Sc.
Biologist – Project Manager

Reviewed By:
Armando Tang, R.P.Bio.
Senior Reviewer

This report has been prepared by Nautilus Environmental Company Inc. based on data and/or samples provided by our client and the results of this study are for their sole benefit. Any reliance on the data by a third party is at the sole and exclusive risk of that party. The results presented here relate only to the samples tested.

SUMMARY

Sample and Test Type Information

Sample ID	PDL, INUG, TPE-TOX, WAL-TOX, LK8, MAM, WTN
Sample collection date	August 10, 11, 14, 16, 17, and 18, 2018
Sample receipt date	August 30, 2018
Sample receipt temperature	18.0°C
Test types	14-d *Hyalella azteca* survival and growth 10-d *Chironomus dilutus* survival and growth

Summary of Results

	Hyalella azteca		***Chironomus dilutus***	
Sample ID	**Survival (%)**	**Dry Weight (mg)**	**Survival (%)**	**Dry Weight (mg)**
		(Mean ± SD)		
Control Sediment	96.0 ± 5.5	0.20 ± 0.05	92.0 ± 8.4	1.87 ± 0.26
PDL	98.0 ± 4.5	0.20 ± 0.03	94.0 ± 8.9	2.32 ± 0.14
INUG	92.0 ± 13.0	0.19 ± 0.01	94.0 ± 5.5	2.35 ± 0.08
TPE-TOX	28.0 ± 43.8 $^{*, \alpha, \beta}$	0.12 ± 0.03$^{*, \alpha, \beta}$	96.0 ± 8.9	1.86 ± 0.10 $^{\alpha, \beta}$
WAL-TOX	98.0 ± 4.5	0.21 ± 0.03	84.0 ± 15.2	2.38 ± 0.28
LK8	92.0 ± 11.0	0.16 ± 0.02	86.0 ± 15.2	2.15 ± 0.17
MAM	100 ± 0.0	0.21 ± 0.04	84.0 ± 8.9	2.40 ± 0.25
WTN	88.0 ± 16.4	0.11 ± 0.04$^{*, \alpha, \beta}$	90.0 ± 7.1	2.12 ± 0.19

SD = Standard Deviation

* indicates a statistical significant difference compared to the Control Sediment

$^{\alpha}$ indicates a statistical significant difference compared to the reference sample PDL

$^{\beta}$ indicates a statistical significant difference compared to the reference sample INUG

1.0 INTRODUCTION

Nautilus Environmental conducted freshwater sediment toxicity tests for Azimuth Consulting on samples identified as PDL, INUG, TPE-TOX, WAL-TOX, LK8, MAM and WTN. Samples were collected on August 10, 11, 14, 16, 17 and 18, 2018; each sample was transported in five 1-L containers. The samples were delivered to the laboratory in Burnaby, BC on August 30, 2018 at a temperature of 18.0°C and were stored in the dark at 4 ± 2°C prior to testing. A 14-d *Hyalella azteca* and a 10-d *Chironomus dilutus* survival and growth sediment toxicity tests were conducted on the samples and the test results are provided in this report. Copies of laboratory data sheets and printouts of statistical analyses for the tests are provided in Appendices A and B, analytical chemistry is provided in Appendix C and the chain-of-custody forms are provided in Appendix D.

2.0 METHODS

Methods for the toxicity tests are summarized in Tables 1 and 2. Testing was conducted according to procedures described by Environment Canada (1997 and 2013). Statistical analyses for all tests were performed using CETIS (Tidepool Scientific Software, 2013).

Ammonia concentrations were measured in-house three times per week on reference sediment samples PDL and INUG to ensure that un-ionized ammonia was below 0.2 mg/L (Environment Canada, 2013). Samples of overlying water were also collected at test initiation and termination and sent to ALS Environmental, Burnaby, BC for measurements of total ammonia concentration. Analytical results are provided in Appendix C.

Table 1. Summary of test conditions: *Hyalella azteca* survival and growth test.

Test species	*Hyalella azteca*
Organism source	Aquatic BioSystems, Fort Collins, CO
Organism age	2- to 9-days old
Test type	Static
Test duration	14 days
Test vessel	375-mL glass container
Test volume	100 mL sediment; 175 mL overlying water
Test replicates	5 field replicates per sample
Number of organisms	10 per replicate
Control/dilution water	Reconstituted water
Test solution renewal	None
Test temperature	23 ± 1°C
Feeding	0.75 mL of YCT and 1.35 mg of Tetramin per replicate daily
Light intensity	500 to 1000 lux at water surface
Photoperiod	16 hours light/8 hours dark
Aeration	Continuous gentle aeration
Test measurements	Temperature, dissolved oxygen, pH and conductivity of overlying water measured daily; hardness, alkalinity and total ammonia of overlying water measured at test initiation and termination; unionized ammonia measured three times weekly in overlying water of reference sample
Test protocol	Environment Canada (2013), EPS 1/RM/33
Statistical software	CETIS Version 1.9.4
Test endpoints	Survival and dry weight
Test acceptability criteria for controls	≥80% survival and ≥0.1 mg/amphipod dry weight
Reference toxicant	Sodium chloride (NaCl)

Table 2. Summary of test conditions: *Chironomus dilutus* survival and growth test.

Test species	*Chironomus dilutus*
Organism source	Aquatic BioSystems, Fort Collins, CO
Organism age	Third instar
Test type	Static
Test duration	10 days
Test vessel	375-mL glass container
Test volume	100 mL sediment; 175 mL overlying water
Test replicates	5 field replicates per sample
Number of organisms	10 per replicate
Control/dilution water	Reconstituted water
Test solution renewal	None
Test temperature	23 ± 1°C
Feeding	6 mg of Tetramin per replicate daily
Light intensity	500 to 1000 lux at water surface
Photoperiod	16 hours light/8 hours dark
Aeration	Continuous gentle aeration
Test measurements	Temperature, dissolved oxygen, pH and conductivity of overlying water measured daily; hardness, alkalinity and total ammonia of overlying water measured at test initiation and termination
Test protocol	Environment Canada (1997), EPS 1/RM/32
Statistical software	CETIS Version 1.9.4
Test endpoints	Survival and dry weight
Test acceptability criteria for controls	≥70% survival and ≥0.6 mg/worm dry weight
Reference toxicant	Potassium chloride (KCl)

3.0 RESULTS

A statistically significant effect was observed on survival and dry weight of *H. azteca* in sample TPE-TOX compared to the control sediment and reference sediments PDL and INUG; sample WTN was also significantly different in dry weight compared to the control and reference sediments (Table 3). No significant effects were observed on the remaining samples.

There were no statistically significant effects observed on survival of *C. dilutus* when compared to the control sediment and reference sediments PDL and INUG (Table 4). Dry weight of *C. dilutus* in TPE-TOX was statistically significant when compared to both reference sediments; no adverse effects were observed in the remaining samples.

Measured total overlying ammonia concentrations in the *H. azteca* and *C. dilutus* tests are summarized in Table 5. These concentrations were at levels that are not expected to cause adverse effects to either species. Un-ionized ammonia measurements on the reference sediment sample were below 0.2 mg/L throughout the *H. azteca* test; therefore, renewal of the overlying water was not required (Environment Canada 2013).

Table 3. Results: *Hyalella azteca* survival and growth test.

Sample ID	Mean ± SD	
	Survival (%)	Average Dry Weight (mg)
Control Sediment	96.0 ± 5.5	0.20 ± 0.05
PDL	98.0 ± 4.5	0.20 ± 0.03
INUG	92.0 ± 13.0	0.19 ± 0.01
TPE-TOX	28.0 ± 43.8 $^{*, \alpha, \beta}$	0.12 ± 0.03$^{*, \alpha, \beta}$
WAL-TOX	98.0 ± 4.5	0.21 ± 0.03
LK8	92.0 ± 11.0	0.16 ± 0.02
MAM	100 ± 0.0	0.21 ± 0.04
WTN	88.0 ± 16.4	0.11 ± 0.04$^{*, \alpha, \beta}$

SD = Standard Deviation

* indicates a statistical significant difference compared to the Control Sediment

$^{\alpha}$ indicates a statistical significant difference compared to the reference sample PDL

$^{\beta}$ indicates a statistical significant difference compared to the reference sample INUG

Table 4. Results: *Chironomus dilutus* survival and growth test.

Sample ID	Mean ± SD	
	Survival (%)	Average Dry Weight (mg)
Control Sediment	92.0 ± 8.4	1.87 ± 0.26
PDL	94.0 ± 8.9	2.32 ± 0.14
INUG	94.0 ± 5.5	2.35 ± 0.08
TPE-TOX	96.0 ± 8.9	1.86 ± 0.10 $^{\alpha, \beta}$
WAL-TOX	84.0 ± 15.2	2.38 ± 0.28
LK8	86.0 ± 15.2	2.15 ± 0.17
MAM	84.0 ± 8.9	2.40 ± 0.25
WTN	90.0 ± 7.1	2.12 ± 0.19

SD = Standard Deviation

$^{\alpha}$ indicates a statistical significant difference compared to the reference sample PDL

$^{\beta}$ indicates a statistical significant difference compared to the reference sample INUG

Table 5. Summary of total overlying ammonia concentrations (mg/L N) measured in the toxicity tests.

Sample ID	*Hyalella azteca*		*Chironomus dilutus*	
	Day 0	Day 14	Day 0	Day 10
Control Sediment	0.133	1.06	0.133	0.693
PDL	0.311	3.24	0.311	0.748
INUG	0.291	3.31	0.291	2.54
TPE-TOX	0.542	1.77	0.542	1.50
WAL-TOX	0.789	0.0588	0.789	0.918
LK8	0.0199	2.32	0.0199	0.437
MAM	0.188	2.65	0.188	1.30
WTN	0.257	3.02	0.257	2.93

4.0 QA/QC

The health histories of the test organisms used in the exposures were acceptable and met the requirements of the Environment Canada protocols. The tests met all control acceptability criteria and water quality parameters remained within ranges specified in the protocols throughout the tests. Uncertainty associated with these tests is best described by the standard deviations around the means.

Results of the reference toxicant tests conducted during the testing program are summarized in Table 6. Results for these tests fell within the acceptable range for organism performance of mean and two standard deviations, based on historical results obtained by the laboratory with these tests. Thus, the sensitivity of the organisms used in these tests was appropriate.

Table 6. Reference toxicant test results.

Test Species	Endpoint	Historical Mean (2 SD Range)	CV (%)	Test Date
H. azteca	Survival (LC50): 6.4 g/L NaCl	5.8 (5.0–6.8) g/L NaCl	8	September 7, 2018
C. dilutus	Survival (LC50): 3.8 g/L KCl	5.1 (2.9 – 8.9) g/L KCl	28	September 7, 2018

SD = Standard Deviation, CV = Coefficient of Variation, LC = Lethal Concentration

5.0 REFERENCES

Environment Canada. 2013. Biological test method: test for survival and growth in sediment and water using the freshwater amphipod, *Hyalella azteca*. EPS 1/RM/33, Second Edition, January 2013. Environment Canada, Method Development and Application Section, Environmental Technology Centre, Ottawa, ON. 150 pp.

Environment Canada. 1997. Biological test method: test for survival and growth in sediment using the larvae of freshwater midges (*Chironomus tentans* and *Chrironomus riparius*). Environmental Protection Series EPS 1/RM/32. December 1997. Environment Canada, Method Development and Application Section, Environmental Technology Centre, Ottawa, ON. 131 pp.

Tidepool Scientific Software. 2013. CETIS comprehensive environmental toxicity information system, version 1.9.4.11 Tidepool Scientific Software, McKinleyville, CA. 222 pp.

APPENDIX A – *Hyalella azteca* Toxicity Test Data

Hyalella azteca Sediment Test Summary Sheet

Client: Azimuth
Work Order No.: 181441

Start Date: Sept 7/18
Set up by: KJL, KL

Sample Information:

Sample ID: Various, see below
Sample Date: Aug 10, 11, 14, 16, 17 and 18, 20 8
Date Received: Aug 30/18
Sample Volume: 5x1L per sample

Test Organism Information:

Species: *Hyalella azteca*
Supplier: Aquatic Biosystems, CO
Date received: Sept 7/18
Age or size (Day 0): 7-9d

NaCl Reference Toxicant Results:

Reference Toxicant ID: HA153
Stock Solution ID: n/a NaCl (Sept 7/18)
Date Initiated: sept 7/18

96-h LC50 (95% CL): ~~3.8 (2.7-5.2)~~ 6.4 (5.2-8.0)

96-h LC50 Reference Toxicant Mean and Range: 5.8 (5.0-6.8) CV (%): 8

Test Results:

Sample ID	Survival ± SD (%)	Average Dry Wt. ± SD (mg)
Control Sediment	96.0 ± 5.5	0.20 ± 0.05
PDL	98.0 ± 4.5	0.20 ± 0.03
INUG	92.0 ± 13.0	0.19 ± 0.01
TPE-TOX	28.0 ± 43.8 *,α,+	0.12 ± 0.03 *,α,+
WAL-TOX	98.0 ± 4.5	0.21 ± 0.03
LK8	92.0 ± 11.0	0.16 ± 0.02
MAM	100.0 ± 0.0	0.21 ± 0.04
WTN	88.0 ± 16.4	0.11 ± 0.04 *,α,+

*significantly different from control sediment
αsignificantly different from reference sediment PDL
+significantly different from reference sediment INUG

Reviewed by: JCL Date reviewed: Oct. 18/18

Chronic *H. azteca* Sediment Toxicity Test Data Sheet

Freshwater Sediment Water Quality

Client: Azimuth Consulting
Work Order No.: 181441

Start Date: Sept 7/18
Termination Date: Sept 21/18
CER #: 9
Test Organism: *Hyalella azteca*

Temperature (°C)

Sample ID	Day														
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Control	22.0	22.5	22.5	22.0	23.0	23.0	23.0	23.5	24.0	23.0	23.5	23.0	23.0	23.0	23.0
PDL	22.0	22.5	22.5	22.0	23.0	23.0	23.0	23.5	24.0	23.0	23.5	23.0	23.0	23.0	23.0
INUG	22.0	22.5	22.5	22.0	23.0	23.0	23.0	23.5	24.0	23.0	23.5	23.0	23.0	23.0	23.0
TPE	22.0	22.5	22.5	22.0	23.0	23.0	23.0	23.5	24.0	23.0	23.5	23.0	23.0	23.0	22.5
WAL	22.0	22.5	22.5	22.0	23.0	23.0	23.0	23.5	24.0	23.0	23.5	23.0	23.0	23.0	23.0
LK8	22.0	22.5	22.5	22.0	23.0	23.0	23.0	23.5	24.0	23.0	23.5	23.0	23.0	23.0	23.0
MAM	22.0	22.5	22.5	22.0	23.0	23.0	23.0	23.5	24.0	23.0	23.5	23.0	23.0	23.0	23.0
WTN	22.0	22.5	22.5	22.0	23.0	23.0	23.0	23.5	24.0	23.0	23.5	23.0	23.0	23.0	23.0
Technician Initials	MG	A	A	MG	KL	MG	KL	KL	A	A	KL	MG	MG	MG	JAB

Thermometer: 15

Conductivity (µS)

Sample ID	Day														
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Control	391	413	424	430	440	448	454	456	463	469	474	479	476	483	500
PDL	354	348	345	333	328	326	323	321	314	317	322	315	332	333	341
INUG	293	307	299	288	283	280	290	282	267	279	283	280	302	304	314
TPE	366	368	358	350	350	351	345	351	345	335	330	337	341	352	364
WAL	330	336	350	350	356	354	355	360	349	347	354	348	356	356	367
LK8	343	360	354	350	344	341	331	330	329	324	328	326	330	330	343
MAM	314	328	313	306	309	308	304	309	297	298	308	303	301	311	321
WTN	303	313	303	293	294	291	290	285	279	281	286	282	292	294	303
Technician Initials	MG	A	A	MG	KL	MG	KL	KL	A	A	KL	MG	MG	MG	JAB

Conductivity meter/probe: 3 / 3

Comments:

Reviewed by: JGA

Date Reviewed: Oct 11/18

Chronic *H. azteca* Sediment Toxicity Test Data Sheet

Freshwater Sediment Water Quality

Client: Azimuth Consulting
Work Order No.: 181441

Start Date: Sept 7/18
Termination Date: Sept 21/18
CER #: 9
Test Organism: *Hyalella azteca*

Dissolved oxygen (mg/L)

Sample ID	Day														
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Control	8.4	8.1	8.2	8.0	8.0	8.0	8.1	8.0	7.8	7.9	8.0	7.9	7.9	7.9	7.7
PDL	8.4	8.1	8.3	8.0	8.1	8.0	8.1	8.0	7.8	7.8	8.0	7.9	7.9	7.8	7.6
INUG	8.4	8.2	8.2	8.0	8.1	8.1	8.1	7.9	7.9	7.8	7.9	7.9	7.9	7.8	7.6
TPE	8.4	8.1	8.1	8.0	8.0	8.1	8.1	7.9	7.8	7.9	8.0	8.1	8.0	7.8	7.7
WAL	8.5	8.2	8.2	8.0	8.0	8.0	8.1	7.9	7.8	8.0	7.9	8.1	8.0	7.8	7.5
LKB	8.5	8.1	8.2	8.1	8.1	8.1	8.0	8.0	7.9	7.8	7.9	8.1	8.0	7.9	7.4
MAM	8.5	8.2	8.3	8.1	8.1	8.0	8.0	8.0	7.9	7.8	7.9	8.1	8.0	7.9	7.6
WTN	8.5	8.2	8.2	8.1	8.1	8.1	8.1	7.8	7.9	7.9	8.0	8.1	8.0	7.9	7.5
Technician Initials	MG			MG	KW	MG	KW	KW			KW	MG	MG	MG	JAB

DO meter/probe: 3 / 3

pH

Sample ID	Day														
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Control	7.4	7.3	7.5	7.4	7.4	7.5	7.5	7.5	7.4	7.6	7.6	7.6	7.6	7.6	7.5
PDL	7.4	7.4	7.4	7.2	7.2	7.3	7.4	7.4	7.5	7.2	7.6	7.3	7.3	7.2	7.1
INUG	6.9	7.2	7.1	6.9	6.8 ②	6.6	6.8	6.7	6.9	6.9	6.9	6.9	6.9	6.8	6.9
TPE	7.4	7.4	7.3	7.2	7.3	7.3	7.2	7.3	7.4	7.4	7.5	7.2	7.5	7.5	7.5
WAL	7.4	7.5	7.5	7.4	7.3	7.4	7.4	7.4	7.5	7.4	7.6	7.4	7.3	7.2	7.3
LKB	7.4	7.4	7.6	7.3	7.4	7.4	7.4	7.4	7.5	7.3	7.3	7.2	7.2	7.2	7.2
MAM	7.2	7.3	7.2	7.2	7.3	7.3	7.3	7.3	7.4	7.3	7.1	7.0	7.1	7.0	7.1
WTN	6.9	7.2	7.1	7.0	6.6 ②	6.7	6.7	6.5	6.7	6.7	6.4	6.4	6.7	6.6	6.8
Technician Initials	MG			MG	KW	MG	KW	KW			KW	MG	MG	MG	JAB

pH meter/probe: 3 / 3

Light meter: Lit-1

Light intensity (Lux): 260-670

Comments: ② checked rep A, 6.6 ② checked rep A, 6.5

Reviewed by: JW

Date Reviewed: Oct-11/18

H. azteca Sediment Toxicity Test Data Sheet

Freshwater Sediment 14-d Survival and Weight

Client: Azimuth Consulting
Work Order No: 181441
Sample ID: See below

Start Date: Sept 7/18
Termination Date: Sept 21/18
Test Organism: *Hyalella azteca*
Balance: 1

Sample ID	Az Pan No. Blue	Rep	No. alive	No. dead	No. missing	Initials	Pan weight (mg)	Pan + organism (mg)	No. weighed	Initials
~~Control Sediment~~	21	A	9	0	1	MLT	993.57	995.85	9	KJL
WAL	22	B	10	0	0		1007.18	1008.98	10	
	23	C	10	0	0		1030.22	1032.13	10	
	24	D	10	0	0		1029.02	1031.21	10	
	25	E	10	0	0		1021.35	1023.34	10	
LKB	26	A	8 ①	0	2	CMP	1030.84	1031.85	8	
	27	B	10	0	0		1022.98	1024.62	10	
	28	C	10	0	0		1033.27	1034.91	10	
	29	D	8 ①	0	2		1027.79	1029.31	8	
	30	E	11	0	0		1021.47	1023.45	11	
MAM	31	A	10	0	0	KJL	1032.96	1034.96	10	
	32	B	10	0	0		1027.28	1029.08	~~9~~ ② 10	
	33	C	10	0	0		1037.06	1038.86	~~9~~ ② 10	
	34	D	10	0	0		1025.18	1027.86	10	
	35	E	10	0	0		1024.57	1026.75	10	
WTN	36	A	9	0	1	RC ①	1013.06	1013.99	9	
	37	B	6	0	4	RC ①	1018.91	1019.34	6	
	38	C	10	0	0	MLT	1013.27	1014.71	10	
	39	D	10	0	0	↓	1033.74	1034.61	10	
	40	E	~~10~~ 9 MLT	0	~~0~~ 1 MLT	KJL	1053.72	1055.21	9	

Comments: ① checked by KJL ~~② transfer lost in transfer~~
Reweighed pans 24 - 1031.25 30 - 1023.37

Reviewed by: JOL

Date Reviewed: Oct 12/18

H. azteca Sediment Toxicity Test Data Sheet

Freshwater Sediment 14-d Survival and Weight

Client: Azimuth Consulting
Work Order No: 181441
Sample ID: See below

Start Date: Sept 7/18
Termination Date: Sept 21/18
Test Organism: *Hyalella azteca*
Balance: 1

Sample ID	Az Pan No. Blue	Rep	No. alive	No. dead	No. missing	Initials	Pan weight (mg)	Pan + organism (mg)	No. weighed	Initials
Control Sediment	1	A	9	0	1	KJL	1020.26	1021.33	9	KJL
	2	B	10	0	0		1034.57	1037.01	10	
	3	C	9	0	1		1021.86	1023.63	9	
	4	D	10	0	0		1030.22	1032.40	10	
	5	E	10	0	0		1007.70	1009.76	10	
PDL	6	A	9	0	1	MLT	1012.40	1014.39	9	
	7	B	10	0	0		1039.01	1041.03	10	
	8	C	10	0	0		999.14	1001.18	10	
	9	D	10	0	0		1003.57	1005.74	10	
	10	E	10	0	0		1006.56	1007.95	10	
INUG	11	A	7 ②	0	3	JAB	1031.49	1032.82	7	
	12	B	10 ②	0	0		1012.64	1014.39	10	
	13	C	9	0	1		1012.87	1014.63	9	
	14	D	10	0	0		1016.09	1017.99	10	
	15	E	10	0	0		1001.20	1003.284	10	
TPE	16	A	0 ①	0	10	CW	994.06	–	0	
	17	B	0 ①	0	10	CW	1015.92	–	0	
	18	C	0 ①	0	10	CW	1003.23	–	0	
	19	D	4 ①	0	6	CW	1022.29	1022.68	4	
	20	E	10	0	0	CW	1001.73	1003.16	10	

Comments: ① Checked by JAB Reweighed pans: 6- 1014.62 14- 1017.97
② Checked by CW

Reviewed by: JGL

Date Reviewed: Oct. 12/18

CETIS Summary Report

Hyalella 14-d Survival and Growth Sediment Test — **Nautilus Environmental**

Batch ID:	18-2307-3027	**Test Type:**	Growth-Survival (10d)	**Analyst:**	Karen Lee
Start Date:	07 Sep-18	**Protocol:**	EC/EPS 1/RM/33	**Diluent:**	Reconstituted Water
Ending Date:	21 Sep-18	**Species:**	Hyalella azteca	**Brine:**	
Test Length:	14d 0h	**Taxon:**	Malacostraca	**Source:**	Aquatic Biosystems, CO **Age:** 7-9d

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
Control Sedimen	18-0902-3464	07 Sep-18	07 Sep-18	n/a	Azimuth	
PDL	07-5180-6523	14 Aug-18 12:00	30 Aug-18 09:30	23d 12h (18 °C)		
INUG	10-0423-6071	14 Aug-18 09:00	30 Aug-18 09:30	23d 15h (18 °C)		
TPE - TOX	08-8020-5994	10 Aug-18 09:00	30 Aug-18 09:30	27d 15h (18 °C)		
WAL - TOX	03-3406-1537	11 Aug-18 12:30	30 Aug-18 09:30	26d 11h (18 °C)		
LK8	18-6888-4228	17 Aug-18 11:00	30 Aug-18 09:30	20d 13h (18 °C)		
MAM	13-2378-6019	16 Aug-18 11:30	30 Aug-18 09:30	21d 13h (18 °C)		
WTN	09-8213-3999	18 Aug-18 10:00	30 Aug-18 09:30	19d 14h (18 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
Control Sedimen	Sediment Sample	Azimuth	Control Sediment	
PDL	Sediment Sample	Azimuth	PDL	
INUG	Sediment Sample	Azimuth	INUG	
TPE - TOX	Sediment Sample	Azimuth	TPE - TOX	
WAL - TOX	Sediment Sample	Azimuth	WAL - TOX	
LK8	Sediment Sample	Azimuth	LK8	
MAM	Sediment Sample	Azimuth	MAM	
WTN	Sediment Sample	Azimuth	WTN	

Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
01-1225-6856	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LK8 passed 10d survival rate	1
01-1225-6856	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	WTN passed 10d survival rate	1
01-1225-6856	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	TPE - TOX passed 10d survival rate	1
01-1225-6856	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	MAM passed 10d survival rate	1
01-1225-6856	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	Control Sedimen passed 10d survival rate	1
01-1225-6856	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	PDL passed 10d survival rate	1
01-1225-6856	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	WAL - TOX passed 10d survival rate	1
01-1225-6856	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	INUG passed 10d survival rate	1
11-6085-3995	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	INUG passed 10d survival rate	1
11-6085-3995	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	Control Sedimen passed 10d survival rate	1
11-6085-3995	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	TPE - TOX passed 10d survival rate	1
11-6085-3995	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	WTN passed 10d survival rate	1
11-6085-3995	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	PDL passed 10d survival rate	1
11-6085-3995	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	WAL - TOX passed 10d survival rate	1
11-6085-3995	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LK8 passed 10d survival rate	1
11-6085-3995	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	MAM passed 10d survival rate	1
07-3942-6227	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.7244	PDL passed 10d survival rate	1
07-3942-6227	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.7244	Control Sedimen passed 10d survival rate	1
07-3942-6227	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.7244	INUG passed 10d survival rate	1
07-3942-6227	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.7244	MAM passed 10d survival rate	1
07-3942-6227	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.7244	TPE - TOX passed 10d survival rate	1
07-3942-6227	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.7244	LK8 passed 10d survival rate	1
07-3942-6227	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.7244	WAL - TOX passed 10d survival rate	1
07-3942-6227	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.7244	WTN passed 10d survival rate	1
11-6085-3995	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	Control Sedimen passed 10d survival rate	1
11-6085-3995	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LK8 passed 10d survival rate	1
11-6085-3995	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	INUG passed 10d survival rate	1
11-6085-3995	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	WTN passed 10d survival rate	1
11-6085-3995	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	TPE - TOX passed 10d survival rate	1
11-6085-3995	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	MAM passed 10d survival rate	1

Single Comparison Summary

14-d

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
11-6085-3995	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	WAL - TOX passed 10d survival rate	1
11-6085-3995	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	PDL passed 10d survival rate	1
01-1225-6856	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	9.7E-11	WTN failed 10d survival rate	1
01-1225-6856	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	9.7E-11	Control Sedimen failed 10d survival rate	1
01-1225-6856	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	9.7E-11	PDL failed 10d survival rate	1
01-1225-6856	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	9.7E-11	MAM failed 10d survival rate	1
01-1225-6856	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	9.7E-11	INUG failed 10d survival rate	1
01-1225-6856	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	9.7E-11	LK8 failed 10d survival rate	1
01-1225-6856	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	9.7E-11	WAL - TOX failed 10d survival rate	1
01-1225-6856	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	9.7E-11	TPE - TOX failed 10d survival rate	1
07-3942-6227	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	8.3E-14	PDL failed 10d survival rate	1
07-3942-6227	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	8.3E-14	INUG failed 10d survival rate	1
07-3942-6227	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	8.3E-14	TPE - TOX failed 10d survival rate	1
07-3942-6227	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	8.3E-14	WAL - TOX failed 10d survival rate	1
07-3942-6227	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	8.3E-14	Control Sedimen failed 10d survival rate	1
07-3942-6227	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	8.3E-14	MAM failed 10d survival rate	1
07-3942-6227	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	8.3E-14	LK8 failed 10d survival rate	1
07-3942-6227	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	8.3E-14	WTN failed 10d survival rate	1
11-6085-3995	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.4E-12	WAL - TOX failed 10d survival rate	1
11-6085-3995	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.4E-12	Control Sedimen failed 10d survival rate	1
11-6085-3995	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.4E-12	INUG failed 10d survival rate	1
11-6085-3995	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.4E-12	TPE - TOX failed 10d survival rate	1
11-6085-3995	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.4E-12	PDL failed 10d survival rate	1
11-6085-3995	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.4E-12	LK8 failed 10d survival rate	1
11-6085-3995	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.4E-12	MAM failed 10d survival rate	1
11-6085-3995	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.4E-12	WTN failed 10d survival rate	1
01-1225-6856	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	MAM passed 10d survival rate	1
01-1225-6856	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	WAL - TOX passed 10d survival rate	1
01-1225-6856	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	TPE - TOX passed 10d survival rate	1
01-1225-6856	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	WTN passed 10d survival rate	1
01-1225-6856	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	INUG passed 10d survival rate	1
01-1225-6856	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LK8 passed 10d survival rate	1
01-1225-6856	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	PDL passed 10d survival rate	1
01-1225-6856	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	Control Sedimen passed 10d survival rate	1
07-3942-6227	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LK8 passed 10d survival rate	1
07-3942-6227	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	WTN passed 10d survival rate	1
07-3942-6227	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	MAM passed 10d survival rate	1
07-3942-6227	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	WAL - TOX passed 10d survival rate	1
07-3942-6227	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	INUG passed 10d survival rate	1
07-3942-6227	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	PDL passed 10d survival rate	1
07-3942-6227	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	Control Sedimen passed 10d survival rate	1
07-3942-6227	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	TPE - TOX passed 10d survival rate	1
11-6085-3995	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	PDL passed 10d survival rate	1
11-6085-3995	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	MAM passed 10d survival rate	1
11-6085-3995	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	TPE - TOX passed 10d survival rate	1
11-6085-3995	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LK8 passed 10d survival rate	1
11-6085-3995	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	WTN passed 10d survival rate	1
11-6085-3995	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	WAL - TOX passed 10d survival rate	1
11-6085-3995	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	Control Sedimen passed 10d survival rate	1
11-6085-3995	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	INUG passed 10d survival rate	1
01-1225-6856	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	MAM passed 10d survival rate	1
01-1225-6856	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	Control Sedimen passed 10d survival rate	1
01-1225-6856	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	WTN passed 10d survival rate	1

Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
01-1225-6856	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LK8 passed 10d survival rate	1
01-1225-6856	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	INUG passed 10d survival rate	1
01-1225-6856	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	WAL - TOX passed 10d survival rate	1
01-1225-6856	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	PDL passed 10d survival rate	1
01-1225-6856	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	TPE - TOX passed 10d survival rate	1
07-3942-6227	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.5622	MAM passed 10d survival rate	1
07-3942-6227	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.5622	TPE - TOX passed 10d survival rate	1
07-3942-6227	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.5622	WAL - TOX passed 10d survival rate	1
07-3942-6227	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.5622	LK8 passed 10d survival rate	1
07-3942-6227	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.5622	Control Sedimen passed 10d survival rate	1
07-3942-6227	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.5622	INUG passed 10d survival rate	1
07-3942-6227	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.5622	WTN passed 10d survival rate	1
07-3942-6227	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.5622	PDL passed 10d survival rate	1
11-6085-3995	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	WAL - TOX passed 10d survival rate	1
11-6085-3995	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LK8 passed 10d survival rate	1
11-6085-3995	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	TPE - TOX passed 10d survival rate	1
11-6085-3995	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	PDL passed 10d survival rate	1
11-6085-3995	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	MAM passed 10d survival rate	1
11-6085-3995	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	INUG passed 10d survival rate	1
11-6085-3995	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	Control Sedimen passed 10d survival rate	1
11-6085-3995	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	WTN passed 10d survival rate	1
01-1225-6856	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	TPE - TOX passed 10d survival rate	1
01-1225-6856	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	WTN passed 10d survival rate	1
01-1225-6856	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	MAM passed 10d survival rate	1
01-1225-6856	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	WAL - TOX passed 10d survival rate	1
01-1225-6856	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	PDL passed 10d survival rate	1
01-1225-6856	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	INUG passed 10d survival rate	1
01-1225-6856	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	Control Sedimen passed 10d survival rate	1
01-1225-6856	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LK8 passed 10d survival rate	1
07-3942-6227	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	WAL - TOX passed 10d survival rate	1
07-3942-6227	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	Control Sedimen passed 10d survival rate	1
07-3942-6227	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	INUG passed 10d survival rate	1
07-3942-6227	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	TPE - TOX passed 10d survival rate	1
07-3942-6227	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	PDL passed 10d survival rate	1
07-3942-6227	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	WTN passed 10d survival rate	1
07-3942-6227	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	MAM passed 10d survival rate	1
07-3942-6227	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LK8 passed 10d survival rate	1
11-6085-3995	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	PDL passed 10d survival rate	1
11-6085-3995	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	Control Sedimen passed 10d survival rate	1
11-6085-3995	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	WTN passed 10d survival rate	1
11-6085-3995	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	TPE - TOX passed 10d survival rate	1
11-6085-3995	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	MAM passed 10d survival rate	1
11-6085-3995	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	WAL - TOX passed 10d survival rate	1
11-6085-3995	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LK8 passed 10d survival rate	1
11-6085-3995	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	INUG passed 10d survival rate	1
01-1225-6856	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	INUG passed 10d survival rate	1
01-1225-6856	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	WTN passed 10d survival rate	1
01-1225-6856	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	MAM passed 10d survival rate	1
01-1225-6856	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LK8 passed 10d survival rate	1
01-1225-6856	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	WAL - TOX passed 10d survival rate	1
01-1225-6856	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	TPE - TOX passed 10d survival rate	1
01-1225-6856	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	Control Sedimen passed 10d survival rate	1
01-1225-6856	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	PDL passed 10d survival rate	1