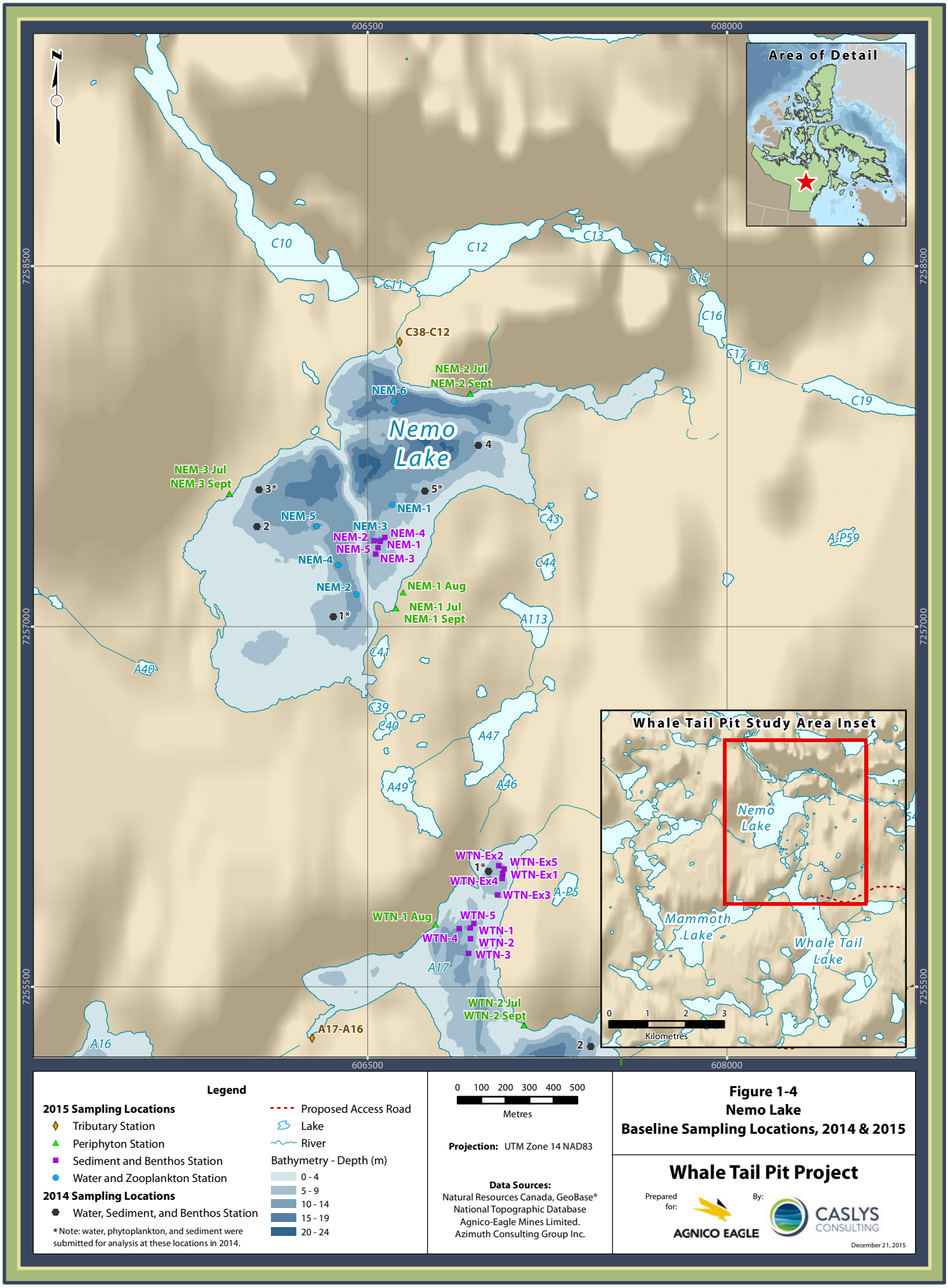
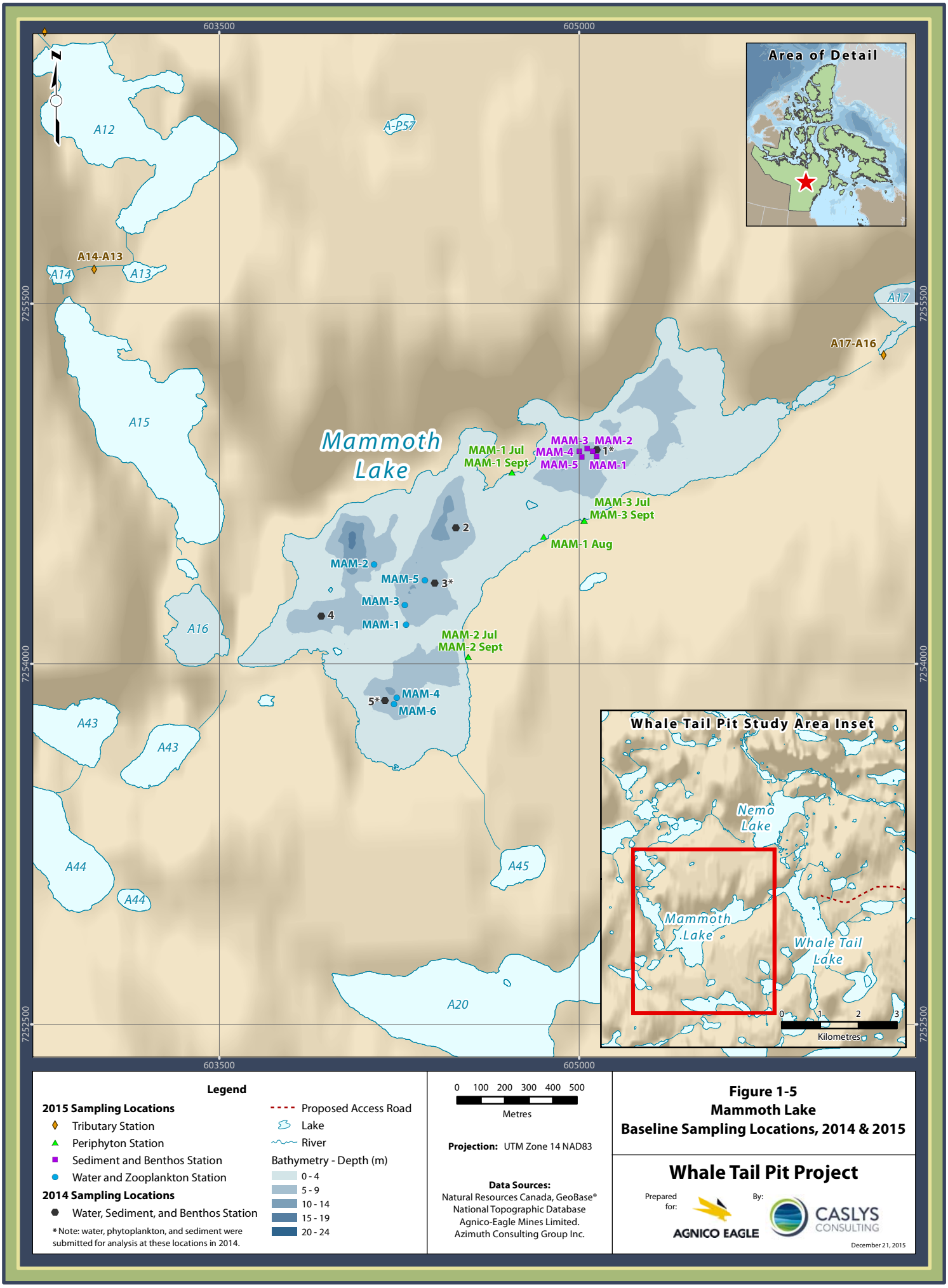

606500
608000
7258500
7257000
7255500
Area of Detail
C10
C12
C13
C14
C15
C16
C17
C18
C19
C11
C38-C12
NEM-2 Jul
NEM-2 Sept
NEM-6
Nemo
Lake
4
NEM-3 Jul
NEM-3 Sept
3*
5*
NEM-1
NEM-5
2
NEM-3
NEM-2
NEM-4
NEM-1
NEM-5
NEM-3
NEM-4
C43
A-P59
C44
NEM-2
NEM-1 Aug
NEM-1 Jul
NEM-1 Sept
1*
A113
C41
A40
C39
C40
A47
A49
A46
WTN-Ex2
1*
WTN-Ex5
WTN-Ex1
WTN-Ex4
WTN-Ex3
A-P5
WTN-1 Aug
WTN-5
WTN-1
WTN-4
WTN-2
WTN-3
A17
WTN-2 Jul
WTN-2 Sept
A17-A16
A16
2
Whale Tail Pit Study Area Inset
Nemo
Lake
Mammoth
Lake
Whale Tail
Lake
0
1
2
3
Kilometres
Legend
2015 Sampling Locations
Tributary Station
Periphyton Station
Sediment and Benthos Station
Water and Zooplankton Station
2014 Sampling Locations
Water, Sediment, and Benthos Station
* Note: water, phytoplankton, and sediment were submitted for analysis at these locations in 2014.
Proposed Access Road
Lake
River
Bathymetry - Depth (m)
0 - 4
5 - 9
10 - 14
15 - 19
20 - 24
0 100 200 300 400 500
Metres
Projection: UTM Zone 14 NAD83
Data Sources:
Natural Resources Canada, GeoBase®
National Topographic Database
Agnico-Eagle Mines Limited.
Azimuth Consulting Group Inc.
Figure 1-4
Nemo Lake
Baseline Sampling Locations, 2014 & 2015
Whale Tail Pit Project
Prepared for:
AGNICO EAGLE
By:
CASLYS CONSULTING
December 21, 2015



Legend

2015 Sampling Locations
- Tributary Station
- Periphyton Station
- Sediment and Benthos Station
- Water and Zooplankton Station

2014 Sampling Locations
- Water, Sediment, and Benthos Station

* Note: water, phytoplankton, and sediment were submitted for analysis at these locations in 2014.

- Proposed Access Road
- Lake
- River

Bathymetry - Depth (m)
- 0 - 4
- 5 - 9
- 10 - 14
- 15 - 19
- 20 - 24

0 100 200 300 400 500
Metres

Projection: UTM Zone 14 NAD83

Data Sources:
Natural Resources Canada, GeoBase®
National Topographic Database
Agnico-Eagle Mines Limited.
Azimuth Consulting Group Inc.

Figure 1-5
Mammoth Lake
Baseline Sampling Locations, 2014 & 2015

Whale Tail Pit Project

Prepared for: AGNICO EAGLE

By: CASLYS CONSULTING

December 21, 2015

2. WATER QUALITY

2.1. Methods Overview

Baseline water quality sampling at Whale Tail Lake, Nemo Lake, and Mammoth Lake was completed by Portt and Associates in 2014 and Azimuth in 2015. Water samples were collected by Azimuth at the Sentinel stations along the proposed access road in 2015. Tributaries within the Whale Tail Pit Study Area were sampled by Golder in 2015. Water sampling at the Lake and Sentinel stations was conducted according to the SOP used for the Meadowbank CREMP program[1]. The collection method/SOP used by Golder for water sampling at the Tributary stations is included as **Appendix D** of this report.

2.1.1. Sample Collection

Lake Stations (2014)

Details on the sample collection and analysis plan for the 2014 baseline study can be found in the original report prepared by Portt and Associates (2015a). The water samples were collected according to methods outlined in the Azimuth SOP described below. *In-situ* water quality measurements (temperature, pH, DO, specific conductance, and turbidity) were recorded at 1 m depth intervals at 5 locations where benthic invertebrate sampling was conducted. Water samples were collected for chemistry at stations 1, 3, and 5 in each lake at a depth of 3 m, consistent with the Azimuth SOP.

Lake and Sentinel Stations (2015)

2015 baseline water quality sampling for the Lake stations and the Sentinel stations was carried out by Azimuth in July, August, and September. Reference areas INUG and PDL are routinely sampled as part of Meadowbank CREMP monitoring and are included in this baseline report for additional context where appropriate; samples were collected in July (by AEM), August (by Azimuth) and September (by AEM). The 2015 Lake sampling locations were pre-determined by bounding the sample areas and using a random number generator to select coordinates within those bounds. Coordinates were then recorded in MapSource (Garmin Ltd.) and in the hand-held GPS units (NAD 83) before going out into the field. Lake stations (two per basin per event) were sampled in areas with a minimum water depth of 5 m. In the event that the location associated with the random sampling coordinates was situated in less than 5 m of water, the station was relocated to the nearest appropriate location

As described in **Section 1.3.2.2**, the initial locations of the Sentinel stations were established based on existing information about the proposed access road route provided by Portt and Associates (2015b). Upon arriving in the general area of each Sentinel station, the sampling locations were chosen in areas downstream of the proposed road crossing, and if possible, downwind.

In situ water quality measurements (pH, temperature, dissolved oxygen, and specific conductance) were collected using a multi-parameter probe (YSI Pro Plus). At the Lake stations, profiles were collected at 1 m intervals to a depth of approximately 1 m above the sediment. Water samples for chemistry were collected at a depth of 3 m using a battery-operated pump and tubing system according to methods outlined in the SOP (Azimuth 2015b). The pump and tubing was flushed with water from the location for approximately 2 minutes prior to collecting a sample. Dissolved water samples were collected by attaching an in-line high capacity filter (0.45 µm; Pine Environmental) to the outlet tubing. Samples were

[1] Refer to the 2014 Meadowbank CREMP report (Azimuth 2015b) for details of the SOP.

kept cool while in the field and were preserved back at the camp. Chlorophyll-*a*[2] samples were processed at camp by filtering 500 mL of water using a hand-pump vacuum filter system and 0.45 µm filter. The filters were placed in 15 mL black tubes and stored frozen prior to shipping.

Tributary Stations (2015)

Tributaries in the Whale Tail Pit Study Area were sampled by Golder in August and September 2015. Details regarding the tributary sampling program were provided as a memorandum by Golder (**Appendix D** of this report). *In situ* water quality measurements were taken with an YSI Pro Plus from 16 stations in August and 11 stations in September. Water samples for chemistry were collected from 11 stations in August and 6 stations in September. The samples were collected by hand (i.e., grab samples) at a depth of 30 cm, if possible, or 10 cm at locations with lower water levels. Samples for dissolved parameters were filtered back at the camp using a hand-pump vacuum system (0.45 µm filter).

2.1.2. Laboratory Methods

All water samples were submitted to ALS (Burnaby, BC) for analysis. The samples were transported in coolers with ice packs and shipped to ALS at the earliest convenience to minimize the possibility of exceeding the recommended hold-times between collection and analysis. A complete list of parameters, detection limits, data quality objectives, and method references is present in Table 1 of the Water Sampling SOP (Azimuth 2015b).

2.1.3. Data Handling and Analysis

Water chemistry results from the 2014 baseline study were provided to Azimuth by Portt and Associates. Water chemistry data collected from the Lake, Sentinel, and Tributary stations were tabulated in Microsoft Excel and screened against the following criteria:

1. Freshwater aquatic life water quality guidelines (CCME 2015a).
2. Guidelines for Canadian Drinking Water Quality (Health Canada 2014). Health-based standards were given priority over aesthetic and operational guidelines. Standards for the following parameters are aesthetic and meant to protect against taste and odour: chloride, sulphate, copper, iron, manganese, sodium, zinc.

Lake water quality data were also compared against trigger and threshold values developed for the Meadowbank CREMP (Azimuth 2015a). These values were included in the screening to help put the baseline water quality data in context with screening values applied to the Meadowbank project lakes[3]. A brief description of the trigger and threshold values is provided below. For more information, refer to Azimuth (2015a, Appendix D).

- Thresholds are legal requirements, regulatory guidelines (e.g., CCME), or other discrete benchmarks, below which unacceptable adverse effects are not expected and above which adverse effects may occur. If effects-based thresholds do not exist for a particular variable, then early warning triggers (based on statistical criteria) were developed without thresholds.
- Triggers are considered "early warning" criteria and are typically more conservative (lower) than threshold values. They are intended to alert management to changes so that the situation can be assessed in advance of thresholds being exceeded.

[2] Chlorophyll-*a* results are discussed in the Phytoplankton section.

[3] Meadowbank project lakes are Third Portage Lake (North, South, and East basins), Second Portage Lake, and Tehek Lake.

2.2. Quality Assurance / Quality Control

2.2.1. QA/QC Methods

The objective of quality assurance / quality control (QA/QC) is to assure that the chemical 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.

Laboratory QC

Data Quality Objectives (DQOs) are numerically definable measures of analytical precision, bias and completeness. Analytical precision is a measurement of the variability associated with duplicate analyses of the same sample in the laboratory. The laboratory duplicate is a new aliquot from the sample bottle/jar and is analyzed from the start in the same manner as the original aliquot taken from the bottle/jar. Bias refers to a systematic deviation from a known result. Certified Reference Materials (CRM), method blanks (MB), and matrix spikes (MS) are always included as part of routine laboratory QC to ensure that any bias is within the specified acceptable range. Results of the CRM, MB, and MS analyses are included in the laboratory data reports in **Appendix C**.

Field QA/QC

The standard QA/QC procedures include 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 QA procedures include collection and/or analysis of the following:

- Field Duplicates – An independent collection of water samples at the same time and location as the original, as a measure of consistency in sampling methodology and heterogeneity of chemical parameters at discrete locations. The number of field duplicates taken is approximately 10% of original samples.
- Travel Blanks – Laboratory supplied bottles of distilled water that are transported to site, carried back and forth into the field and returned to the laboratory, unopened, to test for inadvertent contamination during the transport and field sampling process.
- Equipment Blanks – Equipment blanks are included in the QA/QC program for samples collected according to the Azimuth SOP (Lake and Sentinel stations). At the beginning or end of a field sampling episode, after routine rinsing of the pump and tubing, distilled water is run through the equipment and placed in sampling bottles for analysis of a wide suite of parameters (e.g., metals, nutrients, and conventional parameters). This sample tests for possible cross-contamination of samples from the water sampling equipment (i.e., the pump and tubing).

Data Quality Objectives (DQOs)

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 a RPD is:

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

where: A = analytical result; B = duplicate result[4].

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.

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[5]. 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 anomalous or 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.

2.2.2. QA/QC Results

Detailed results of the water quality QA/QC assessment are provided in **Appendix A1**. A summary of the laboratory QC and field QA/QC results are provided below.

Laboratory QC

The QC results provided by ALS were within the DQOs for the MB, CRM, MS, and laboratory duplicates for the majority of the water quality analyses in 2015. There were a few isolated instances of elevated MDLs due to sample matrix effects and method blanks that were slightly above detection. Despite the DQOs not being met, ALS's concluded the data were reliable.

Field QA/QC

No data quality issues were reported in the QA/QC assessment of the field duplicate samples and travel blanks for the 2014 and 2015 baseline studies. The equipment blanks submitted for Lake samples in 2014 and Lake and Sentinel stations in 2015 had a few parameters that were occasionally detected above the MDL, namely aluminum, barium, lead, and manganese. Lake and Sentinel station samples that were submitted with equipment blanks that had metals concentrations above the MDL were flagged to assess the reliability of the results. The barium and manganese results were considered reliable in spite of detectable concentrations in some of the equipment blanks because the concentrations represent a small percentage of the concentrations in the Lake and Sentinel station samples (**Appendix A1**, **Section A1-1**). Cautionary flags were applied to some of the aluminum data from samples that were submitted with

[4] RPD values are not calculated when one of the analytical results is below the MDL.

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

equipment blanks in September 2014 (dissolved), July 2015 (dissolved), and August 2015 (total), specifically, samples where the dissolved and total aluminum concentrations were less than 5-times the detected concentration in the equipment blank. Total lead was detected in the September 2014 equipment blank, and all three equipment blanks submitted in 2015; however, the majority of the Lake and Sentinel station samples were below the MDL (**Table 2ï1** [2014 Lake stations], **Table 2ï2** [2015 Lake stations], **Table 2ï3** [2015 Sentinel stations]). The few detected concentrations of lead in the Lake and Sentinel station samples from 2014 and 2015 were considered unreliable based on the QA/QC assessment. A few other anomalous results were flagged as unreliable in **Section A1-1**, and were not included in the discussion of the water quality results below.

2.3. Results

2.3.1. Lake Stations

Locations of the 2014 and 2015 baseline water quality stations and bathymetry are shown in **Figure 1ï3** (Whale Tail Lake), **Figure 1ï4** (Nemo Lake), and **Figure 1ï5** (Mammoth Lake). An overview of the water quality monitoring stations sampled at INUG and PDL in are shown in **Figure 1ï1**.

Field Measurements

Field-collected data from the water quality stations are presented in **Appendix B**. *In-situ* water quality depth profiles from the 2014 and 2015 Lake stations are provided in **Table B1ï1** and **Table B2ï1**, respectively.

Water temperatures were between 9°C and 12°C during the summer months in 2014 and 2015 (July to early September). Some minor thermal stratification was noted at a few of the deeper locations (> 9 m) in the July 2015 sampling event (i.e., shortly after ice-off), but the difference in temperature was less than 4°C. For the majority of the open-water season, wind maintains uniform temperature and high oxygen profiles in the water column in all lakes due to vertical mixing. Whale Tail, Nemo, and Mammoth Lakes are shallow oligotrophic lakes with low concentrations of dissolved solids and major ions as evidenced by specific conductance measuring at or below 25 µS/cm. Conductivity was uniform throughout the water column at all stations sampled during the open water season and consistent with results collected during the 2014 survey (Portt and Associates 2015a).

Chemistry

Water chemistry data from the 2014 and 2015 baseline studies are presented in **Table 2ï1** and **Table 2ï2**, respectively. The 2014 data presented in **Table 2ï1** were adapted from Portt and Associates (2015a). ALS laboratory reports for the 2015 baseline study are included in **Appendix C** of this document. Chlorophyll-*a* results are discussed in **Section 4.3** along with the phytoplankton taxonomy and biomass results.

Surface water collected during the open water season was soft, measuring less than 10 mg/L (as $CaCO_3$) at all of the sampling stations. The buffering capacity of the surface water is also quite low as evidenced by alkalinity concentrations (as bicarbonate) of approximately 5 mg/L, characteristic of low productivity headwater lakes in the Arctic. Consistent with the low turbidity and high Secchi depth results, TSS levels were at or below detection for all Lake samples (**Table 2ï1**, and **Table 2ï2**).

The majority of the chemistry parameters were below their respective MDLs for the samples collected in 2014 and 2015, including cyanides (free and total), most metals (total and dissolved fractions), nitrates and nitrites, and ammonia (as N) to name a few. Importantly, there were no exceedances of the

GCDWQs or the CCME freshwater aquatic life criteria in the Lake samples collected in 2014 and 2015[6]. There were a few instances of parameters exceeding the Meadowbank trigger values, particularly at Nemo Lake in 2014 and 2015 and Mammoth Lake in 2015, namely conductivity, hardness, calcium, magnesium, and potassium. However, triggers for all those parameters were based on baseline/reference data from the Meadowbank project lakes and are shown for context only. Overall, the water quality results from the Lakes were similar to results from the reference areas in 2015.

2.3.2. Sentinel Stations

Field Measurements

Field measured water quality parameters are presented in **Table B3ï1**. *In-situ* water quality measurements from the Sentinel stations were overall quite similar to the field measurements reported for the Lake stations. Conductivity was below 25 µS/cm, the dissolved oxygen concentrations were high, and pH was circumneutral (6.78 to 7.36) at all of the Sentinel stations in 2015.

Chemistry

Results of the water chemistry analyses for the Sentinel stations are presented in **Table 2ï3**. The ALS laboratory reports are included in **Appendix C**.

Water chemistry results were generally quite similar between the Lake and Sentinel station samples. There were three instances in September where total phosphorus was measured above the CCME aquatic life guideline of 0.004 mg/L (C14, C20, and C41). The elevated phosphorus at C14 and C41 may be related to detectable TSS in the sample (all other Sentinel station samples had TSS below the DL). A few results were also flagged because of detectable concentrations in the equipment blank, dissolved analyses that were detected when the total concentration was less than the MDL, or TSS-related issues. Refer to **Section A1-1.2** for more information on the data that were flagged when interpreting the water chemistry at the Sentinel stations.

2.3.3. Tributary Stations

Field Measurements

In-situ water quality results were provided to Azimuth by Golder and are attached as **Appendix D** of this report. August water temperatures in the Tributaries were between 12.6°C and 17.2°C. September temperatures were below 6°C, and depth was recorded as less than 30 cm at the 11 stations. Dissolved oxygen saturation levels were high (>95%) at all locations sampled in August and September, corresponding to DO concentrations above 9.5 mg/L at most locations. pH in August ranged between slight acidic (6.23) to neutral (7.02), while the September samples were neutral (7.08) to slightly alkaline (8.04). It's unclear whether the difference in pH is an artifact of the variability in the instrument or actual seasonal difference in pH. By comparison, pH measurements taken at the Sentinel stations in August and September were circumneutral, with little temporal variability (August = 7.19 ± 0.24; September = 6.96 ± 0.05).

[6] Rep-1 from Whale Tail exceeds the CCME aquatic life guideline for lead, but the result was flagged as unreliable in the QA/QC assessment (see **Section A1-1.1**).

Chemistry

Water chemistry results for the Tributary stations are presented in **Table 2ï4**. Concentrations of metals, major ions, and nutrients were largely below the aquatic life and human health screening criteria, with the exception of the following:

- Total aluminum concentrations exceeded the CCME aquatic life criteria at A55-A17 (stream to the east of Whale Tail Lake) and A5-A4 (6 km NW of the camp) in August and A55-A17 in September. The August samples had pH values below 6.5, triggering the application of the more sensitive WQG for aluminum of 0.005 mg/L. As noted above, it is unclear if the lower pH values seen in August are real or the result of measurement error. The September exceedance coincided with elevated TSS in the sample and is not considered a reliable measurement (see below).
- Elevated TSS (11 mg/L) was noted in sample A55-A17 that also had exceedances of the WQG for aluminum (CCME), chromium (CCME), and iron (CCME and GCWQG). The elevated TSS concentration is likely an artifact of sample collection and the WQG exceedance are not considered reflective of September water quality at these locations. A few other metals, including lead, molybdenum, vanadium, and zinc were detected in the total fraction that were below the MDL for all other locations. The metals concentrations from this sample should be interpreted cautiously in light of the effect of high TSS.

Table 2-1. Water chemistry data for the Lake stations, Whale Tail Pit Baseline, 2014.

Lake					Whale Tail Lake			Nemo Lake			Mammoth Lake		
Station	**Aquatic Life Guidelines**	**Human Health Guidelines**	**Trigger[3]**	**Threshold[3]**	IVR-WHALE-REP-1	IVR-WHALE-REP-3	IVR-WHALE-REP-5	IVR-NEMO-REP-1	IVR-NEMO-REP-3	IVR-NEMO-REP-5	IVR-LAKE3-REP-1	IVR-LAKE3-REP-3	IVR-LAKE3-REP-5
Area-Replicate ID					3	3	3	3	3	3	3	3	3
Depth (m)													
Date	**CCME[1]**	**GCDWQ[2]**	**Meadowbank**		5-Sep-14	5-Sep-14	4-Sep-14	6-Sep-14	6-Sep-14	6-Sep-14	4-Sep-14	4-Sep-14	4-Sep-14
Field Measurements (Surface)													
Temperature (°C)					9.3	9.4	9.2	9.2	9.3	9.4	9.3	9.4	9.2
Specific Conductivity (µS/cm)					21.8	17.3	17.4	25.1	25.1	25.0	21.6	20.9	20.8
Dissolved Oxygen (mg/L)					11.6	11.5	11.4	11.5	11.4	11.4	11.5	11.7	11.2
pH	6.5 - 9.0		6.5 - 7.94	6.5 - 9.0	7.30	7.02	7.12	7.32	7.09	7.29	7.59	7.00	7.04
Physical Tests (mg/L)													
Conductivity (µS/cm)			23.5		21	17	17	**25**	**25**	**25**	23	20	20
Hardness			8.5		8.2	6.7	6.6	**9.3**	**10.0**	**10.0**	8.1	8.0	8.0
pH (Laboratory)	6.5 - 9.0		6.50 - 7.94	6.5 - 9.0	6.99	6.91	6.92	7.11	7.11	7.11	7.17	6.83	7.14
Total Suspended Solids			3.0	5.0	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	1	*<1.0*
Total Dissolved Solids			18.0		**20**	14	**21**	**22**	**20**	**21**	**21**	**22**	17
Turbidity (NTU)					0.38	0.40	0.39	0.28	0.28	0.25	0.49	0.40	0.42
Anions and Nutrients (mg/L)													
Alkalinity - Bicarbonate			8.6		5.5	4.7	4.7	7.1	7.0	6.9	5.8	4.4	5.7
Alkalinity - Carbonate			4		*<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*
Alkalinity - Total			8.5		5.5	4.7	4.7	7.1	7.0	6.9	5.8	4.4	5.7
Ammonia (as N)[4]	***equation***		0.065	0.126	*<0.0050*	**0.10**	0.02	*<0.0050*	0.01	*<0.0050*	0.03	0.03	0.03
Bromide					*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*
Chloride	120	250	60.28	120	0.93	0.72	0.73	0.55	0.55	0.55	0.86	0.69	0.69
Fluoride	0.120	1.5			0.034	0.031	0.033	0.026	0.026	0.027	0.033	0.032	0.032
Nitrate (as N)	3.0	10	1.50	3	*<0.0050*	*<0.0050*	*<0.0050*	*<0.0050*	*<0.0050*	*<0.0050*	*<0.0050*	*<0.0050*	*<0.0050*
Nitrite (as N)	0.060	1	0.031	0.060	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*
Total Kjeldahl Nitrogen			0.170										
Ortho Phosphate (as P)			0.002		0.0018	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	0.0013	0.0013	*<0.0010*
Phosphorus (P)-Total Diss.					*<0.0020*	*<0.0020*	*<0.0020*	*<0.0020*	*<0.0020*	*<0.0020*	*<0.0020*	*<0.0020*	0.0021
Phosphorus (P)-Total	0.0040		0.0060	0.004	*<0.0020*	***0.0833***	*<0.0020*	0.0030	*<0.0020*	*<0.0020*	*<0.0020*	*<0.0020*	*<0.0020*
Silicate (as SiO_2)			1.0		*<0.50*	*<0.50*	*<0.50*	*<0.50*	*<0.50*	*<0.50*	0.64	*<0.50*	0.51
Sulphate (SO_4)		500	64.71	128	2.59	1.61	1.64	3.30	3.30	3.29	2.88	2.84	2.83
Cyanides													
Total Cyanide					*<0.0050*	*<0.0050*	*<0.0050*	*<0.0050*	*<0.0050*	*<0.0050*	*<0.0050*	*<0.0050*	*<0.0050*
Free Cyanide					*<0.0050*	*<0.0050*	*<0.0050*	*<0.0050*	*<0.0050*	*<0.0050*	*<0.0050*	*<0.0050*	*<0.0050*
Organic / Inorganic Carbon (mg/L)													
Dissolved Organic Carbon			2.6		***2.8***	***2.4***	***2.8***	***2.2***	***2.1***	***2.1***	***2.6***	***2.3***	***2.2***
Total Organic Carbon			2.8		2.6	2.7	2.6	1.9	1.9	2.0	2.3	2.1	1.9
Plant Pigments (µg/L)													
Chlorophyll-*a*					0.29	0.38	0.55	0.25	0.27	0.25	0.34	0.36	0.34
Total Metals (mg/L)													
Aluminum[4]	***equation***		0.054	0.100	0.0120	0.0165	0.0155	0.0046	0.0055	0.0072	0.0157	0.0106	0.0095
Antimony		0.006	0.0101	0.020	0.00	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Arsenic	0.0050	0.01	0.00255	0.005	0.0003	0.0002	0.0002	0.0003	0.0003	0.0003	0.0005	0.0005	0.0004
Barium		1	0.50	1	0.0034	0.0030	0.0027	0.0037	0.0038	0.0038	0.0035	0.0035	0.0035
Beryllium			0.0027	0.0053	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Bismuth					*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*
Boron	1.5	5	0.76	1.5	*<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	0.000040	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*
Calcium			2.15		2.05	1.56	1.47	**2.29**	**2.28**	**2.35**	1.92	1.89	1.91
Chromium[5]	0.001	0.05	0.00056	0.001	0.0001	0.0001	0.0001	*<0.00010*	0.0002	0.0001	0.0002	0.0001	0.0001
Cobalt					*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Copper[3]	***equation***	1	0.00124	0.002	0.0006	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	0.0005	0.0006	*<0.00050*
Iron	0.3	0.3	0.155	0.3	0.033	0.037	0.032	*<0.010*	0.012	0.014	0.031	0.022	0.021
Lead[3]	***equation***	0.01	0.000525	0.001	***0.00686***	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	~~0.00007~~	*<0.000050*
Lithium			0.048	0.096	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*
Magnesium			0.83		0.79	0.72	0.68	**1.07**	**1.06**	**1.07**	0.78	0.73	0.74
Manganese[4]		0.05	0.3157	***equation***	0.0034	0.0016	0.0015	0.0020	0.0022	0.0023	0.0015	0.0014	0.0014
Mercury	0.000026	0.001	0.000018	0.000026	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*
Molybdenum	0.073		0.0365	0.073	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*
Nickel[4]	***equation***		0.0127	0.025	0.0007	*<0.00050*	*<0.00050*	*<0.00050*	0.0005	0.0005	0.0007	0.0005	0.0005
Phosphorus					*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*
Potassium			0.50		0.44	0.40	0.36	**0.58**	**0.57**	**0.58**	0.48	0.48	**0.53**
Selenium	0.001	0.01	0.00055	0.001	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Silicon					0.31	0.31	0.31	0.21	0.21	0.23	0.38	0.32	0.32

Table 2-1. Water chemistry data for the Lake stations, Whale Tail Pit Baseline, 2014.

Lake					Whale Tail Lake			Nemo Lake			Mammoth Lake		
Station	**Aquatic Life Guidelines**	**Human Health Guidelines**	**Trigger[3]**	**Threshold[3]**	IVR-WHALE-REP-1	IVR-WHALE-REP-3	IVR-WHALE-REP-5	IVR-NEMO-REP-1	IVR-NEMO-REP-3	IVR-NEMO-REP-5	IVR-LAKE3-REP-1	IVR-LAKE3-REP-3	IVR-LAKE3-REP-5
Area-Replicate ID					3	3	3	3	3	3	3	3	3
Depth (m)					5-Sep-14	5-Sep-14	4-Sep-14	6-Sep-14	6-Sep-14	6-Sep-14	4-Sep-14	4-Sep-14	4-Sep-14
Date	**CCME[1]**	**GCDWQ[2]**	**Meadowbank**										
Silver	0.0001				*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*
Sodium		200	0.975		0.53	0.55	0.52	0.47	0.49	0.48	0.51	0.50	0.50
Strontium			0.0279	0.049	0.0090	0.0076	0.0071	0.0098	0.0098	0.0099	0.0081	0.0077	0.0078
Sulfur					0.91	0.61	0.56	1.15	1.14	1.12	0.95	0.94	0.96
Thallium	0.0008		0.00041	0.0008	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*
Tin			0.0002		*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Titanium			1.00	2	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*
Uranium	0.015	0.02	0.0075	0.015	0.000034	0.000039	0.000039	*<0.000010*	*<0.000010*	0.000010	0.000032	0.000026	0.000024
Vanadium			0.0035	0.006	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*
Zinc[4]	0.030	0.5	0.0063	***equation***	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*
Dissolved Metals (mg/L)													
Aluminum[4]			0.0263	0.05	~~0.0079~~	~~0.0087~~	0.0106	~~0.0050~~	~~0.0033~~	~~0.0047~~	0.0101	~~0.0057~~	~~0.0060~~
Antimony			0.0101	0.020	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Arsenic			0.0026	0.005	0.0003	0.0002	0.0002	0.0003	0.0003	0.0003	0.0005	0.0004	0.0004
Barium			0.5010	1	0.0033	0.0027	0.0027	0.0037	0.0037	0.0037	0.0035	0.0035	0.0035
Beryllium			0.0027	0.0053	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Bismuth					*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*
Boron			0.76	1.5	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*
Cadmium			0.000025	0.00004	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*
Calcium					1.99	1.52	1.50	2.14	2.26	2.27	1.96	1.96	1.94
Chromium			0.00055	0.001	*<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*
Copper			0.00119	0.002	0.00040	0.00037	0.00039	0.00024	0.00024	0.00023	0.00050	0.00042	0.00039
Iron			0.155	0.3	0.02	0.02	0.02	*<0.010*	*<0.010*	*<0.010*	0.02	0.01	0.01
Lead			0.000525	0.001	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*
Lithium			0.048	0.096	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*
Magnesium					0.78	0.69	0.68	0.97	1.05	1.06	0.79	0.76	0.76
Manganese[4]			0.315	***equation***	0.0027	0.0011	0.0011	0.0012	0.0011	0.0016	0.0011	0.0010	0.0010
Mercury			0.000018	0.000026	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*
Molybdenum			0.037	0.073	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*
Nickel			0.013	0.025	0.0006	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	0.0006	*<0.00050*	*<0.00050*
Phosphorus					*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*
Potassium					0.44	0.36	0.36	0.50	0.55	0.60	0.49	0.51	0.53
Selenium			0.00055	0.001	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Silicon					0.30	0.31	0.31	0.19	0.22	0.21	0.37	0.33	0.33
Silver					*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*
Sodium					0.52	0.53	0.53	0.48	0.47	0.47	0.52	0.50	0.50
Strontium			0.028	0.049	0.0086	0.0070	0.0070	0.0095	0.0095	0.0095	0.0079	0.0076	0.0075
Sulfur					0.91	0.58	0.57	1.18	1.12	1.09	0.97	1.02	0.93
Thallium			0.00041	0.0008	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*
Tin			0.0002		*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Titanium			1.01	2	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*
Uranium			0.0075	0.015	0.00003	0.00004	0.00003	0.00001	*<0.000010*	*<0.000010*	0.00003	0.00002	0.00002
Vanadium			0.0035	0.006	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*
Zinc[4]			0.0053	***equation***	*<0.0010*	*<0.0010*	*<0.0010*	0.001	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*

Notes:

Data presented here were adapted from Portt and Associates (2015a).

[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] 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.

123	Shaded concentrations exceed the CCME aquatic life guidelines.
123	Bordered concentrations exceed the GCDWQ.
123	Bolded concentrations exceed the trigger value.
123	Bold, italicized concentrations exceed the threshold value.

Italicized numbers are below detection limits.

"-" not collected.

~~strikethrough~~ = results flagged as unreliable in the QC assessement (see Section 2.2.1. for more details).

Table 2-2. Water chemistry data for the Lake stations, Whale Tail Pit Baseline, 2015.

Lake					Whale Tail Lake											
Station	Aquatic Life Guidelines	Human Health Guidelines	Trigger[3]	Threshold[3]	North Basin (WTN)						South Basin (WTS)					
Area-Replicate ID					WTN-01-S	WTN-02-S	WTN-03-S	WTN-04-S	WTN-05-S	WTN-06-S	WTS-01-S	WTS-02-S	WTS-03-S	WTS-04-S	WTS-05-S	WTS-06-S
Depth (m)					3	3	3	3	3	3	3	3	3	3	3	3
Date	CCME[1]	GCDWQ[2]	Meadowbank		17-Jul-15	17-Jul-15	20-Aug-15	20-Aug-15	18-Sep-15	18-Sep-15	17-Jul-15	17-Jul-15	21-Aug-15	21-Aug-15	18-Sep-15	18-Sep-15
Field Measurements (Surface)																
Temperature (°C)					10.1	9.2	11.4	11.3	4.8	4.9	9.1	7.7	10.8	10.8	4.9	4.9
Specific Conductivity (µS/cm)					19.2	15.8	17.1	18.2	23.5	20.4	15.3	15.2	17	17.1	19.8	19.8
Dissolved Oxygen (mg/L)					11.3	11.4	10.5	10.1	12.2	11.2	11.4	11.7	10.3	10.3	13.1	12.1
pH	6.5 - 9.0		6.5 - 7.94	6.5 - 9.0	6.81	6.85	7.03	6.99	6.81	6.82	6.85	6.79	6.77	6.84	6.59	6.76
Physical Tests (mg/L)																
Conductivity (µS/cm)			23.5		20	17	19	20	**25**	22	16	16	19	19	20	21
Hardness			8.5		7.3	6.2	6.7	7.2	**8.6**	7.8	5.9	5.8	6.7	6.7	7.3	7.3
pH (Laboratory)	6.5 - 9.0		6.50 - 7.94	6.5 - 9.0	6.83	6.81	6.83	6.82	6.81	6.75	6.78	6.78	6.66	6.74	6.75	6.76
Total Suspended Solids			3.0	5.0	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*
Total Dissolved Solids			18.0		16	13	14	13	18	18	13	14	12	15	16	16
Turbidity (NTU)					0.42	0.39	0.23	0.28	0.32	0.35	0.43	0.35	0.26	0.23	0.34	0.35
Anions and Nutrients (mg/L)																
Alkalinity - Bicarbonate			8.6		4.5	4.2	4.9	3.9	5.3	4.6	4.2	4.2	4.5	3.8	4.4	4.3
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			8.5		4.5	4.2	4.9	3.9	5.3	4.6	4.2	4.2	4.5	3.8	4.4	4.3
Ammonia (as N)[4]	***equation***		0.065	0.126	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<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*	*<0.05*	*<0.05*
Chloride	120	250	60.28	120	1.94	1.22	1.57	1.84	2.99	2.38	1.06	1.06	1.57	1.58	2.11	2.10
Fluoride	0.120	1.5			0.022	0.025	0.025	0.025	0.026	0.026	0.023	0.025	0.024	0.024	0.026	0.026
Nitrate (as N)	3.0	10	1.50	3	*<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)	0.060	1	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			0.170		**0.173**	0.137	0.109	0.107	0.116	0.118	0.140	0.143	0.128	0.111	0.120	0.129
Ortho Phosphate (as P)			0.002		*<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 Diss.					*<0.002*	*<0.002*	0.0025	0.0028	*<0.002*	*<0.002*	*<0.002*	0.0020	0.0024	0.0022	*<0.002*	*<0.002*
Phosphorus (P)-Total	0.0040		0.0060	0.004	0.0020	0.0028	*<0.002*	0.0023	*<0.002*	0.0031	0.0025	0.0024	*<0.002*	0.0028	0.0023	*<0.002*
Silicate (as SiO_2)			1.0		0.56	0.57	0.56	0.57	0.69	0.67	0.54	0.54	0.59	0.60	0.68	0.65
Sulphate (SO_4)		500	64.71	128	1.39	1.24	1.31	1.37	1.49	1.37	1.20	1.22	1.30	1.31	1.32	1.32
Cyanides																
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					*<0.001*	*<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			2.6		2.2	2.1	1.7	2.1	1.8	1.7	2.0	2.0	1.9	1.9	1.7	1.8
Total Organic Carbon			2.8		2.3	2.1	1.7	1.8	1.7	1.8	2.2	2.0	1.7	1.7	1.8	1.7
Plant Pigments (µg/L)																
Chlorophyll-*a*					0.32	0.25	0.65	0.70	0.77	0.93	0.28	0.28	0.67	0.64	0.82	0.88
Total Metals (mg/L)																
Aluminum[4]	***equation***		0.054	0.100	0.0215	0.0176	~~0.0083~~	~~0.0099~~	0.0116	0.0120	0.0172	0.0170	~~0.0094~~	~~0.0077~~	0.0107	0.0111
Antimony		0.006	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	0.01	0.00255	0.005	0.0002	0.0001	0.0002	0.0002	0.0002	0.0002	0.0001	0.0001	0.0002	0.0002	0.0002	0.0002
Barium		1	0.50	1	0.0044	0.0034	0.0033	0.0035	0.0041	0.0037	0.0034	0.0033	0.0032	0.0033	0.0035	0.0035
Beryllium			0.0027	0.0053	*<0.00002*	*<0.00002*	*<0.00002*	*<0.00002*	*<0.00002*	*<0.00002*	*<0.00002*	*<0.00002*	*<0.00002*	*<0.00002*	*<0.00002*	*<0.00002*
Bismuth					*<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	5	0.76	1.5	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*

Table 2-2. Water chemistry data for the Lake stations, Whale Tail Pit Baseline, 2015.

Lake					Whale Tail Lake											
Station					North Basin (WTN)						South Basin (WTS)					
Area-Replicate ID	Aquatic Life Guidelines	Human Health Guidelines	Trigger[3]	Threshold[3]	WTN-01-S	WTN-02-S	WTN-03-S	WTN-04-S	WTN-05-S	WTN-06-S	WTS-01-S	WTS-02-S	WTS-03-S	WTS-04-S	WTS-05-S	WTS-06-S
Depth (m)	CCME[1]	GCDWQ[2]	Meadowbank		3	3	3	3	3	3	3	3	3	3	3	3
Date					17-Jul-15	17-Jul-15	20-Aug-15	20-Aug-15	18-Sep-15	18-Sep-15	17-Jul-15	17-Jul-15	21-Aug-15	21-Aug-15	18-Sep-15	18-Sep-15
Cadmium[4]	***equation***	0.005	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			2.15		1.87	1.44	1.64	1.77	**2.15**	1.95	1.39	1.37	1.62	1.63	1.77	1.78
Chromium[5]	0.001	0.05	0.00056	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
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***	1	0.00124	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	0.3	0.155	0.3	0.036	0.037	0.016	0.019	0.021	0.024	0.037	0.037	0.020	0.017	0.024	0.022
Lead[3]	***equation***	0.01	0.000525	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*
Lithium			0.048	0.096	*<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			0.83		0.63	0.59	0.64	0.65	0.71	0.70	0.57	0.56	0.62	0.62	0.66	0.66
Manganese[4]		0.05	0.3157	***equation***	0.0064	0.0049	0.0020	0.0026	0.0037	0.0029	0.0049	0.0052	0.0021	0.0020	0.0026	0.0025
Mercury	0.000026	0.001	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*	*<0.00005*	*<0.00005*	*<0.00005*	0.0001	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*
Nickel[4]	***equation***		0.0127	0.025	0.0009	0.0007	0.0006	0.0006	0.0006	0.0006	0.0007	0.0007	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			0.50		0.38	0.32	0.39	0.37	0.39	0.38	0.33	0.33	0.37	0.36	0.37	0.36
Selenium	0.001	0.01	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					0.31	0.31	0.25	0.27	0.25	0.26	0.30	0.31	0.26	0.26	0.26	0.26
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		200	0.975		0.51	0.47	0.50	0.49	0.53	0.55	0.49	0.47	0.52	0.51	0.53	0.54
Strontium			0.0279	0.049	0.0131	0.0087	0.0099	0.0111	0.0145	0.0128	0.0080	0.0078	0.0099	0.0102	0.0113	0.0115
Sulfur					0.50	*<0.5*	0.50	*<0.5*	0.54	0.53	*<0.5*	*<0.5*	0.52	0.50	*<0.5*	0.50
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*
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	0.00038	0.00030	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*
Uranium	0.015	0.02	0.0075	0.015	0.000045	0.000045	0.000037	0.000035	0.000032	0.000035	0.000047	0.000043	0.000037	0.000036	0.000035	0.000035
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[4]	0.030	0.5	0.0063	***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					*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*
Dissolved Metals (mg/L)																
Aluminum[4]			0.0263	0.05	0.0081	0.0085	0.0045	0.0048	0.0035	0.0038	0.0110	0.0120	0.0061	0.0053	0.0033	0.0033
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			0.0026	0.005	0.0001	0.0001	0.0001	0.0002	0.0002	0.0002	0.0001	0.0001	0.0002	0.0002	0.0001	0.0001
Barium			0.5010	1	0.0042	0.0034	0.0032	0.0035	0.0042	0.0037	0.0033	0.0033	0.0032	0.0033	0.0034	0.0034
Beryllium			0.0027	0.0053	*<0.00002*	*<0.00002*	*<0.00002*	*<0.00002*	*<0.00002*	*<0.00002*	*<0.00002*	0.00	*<0.00002*	*<0.00002*	*<0.00002*	*<0.00002*
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			0.76	1.5	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*
Cadmium			0.000025	0.00004	*<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					1.89	1.48	1.65	1.80	2.24	1.96	1.42	1.39	1.62	1.63	1.82	1.82
Chromium			0.00055	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*
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			0.00119	0.002	**0.00170**	0.00035	0.00037	0.00037	0.00034	0.0003	0.00031	0.00034	0.00036	0.00034	0.00033	0.00031
Iron			0.155	0.3	*<0.01*	0.10	*<0.01*	*<0.01*	*<0.01*	*<0.01*	0.02	0.02	0.01	0.01	*<0.01*	*<0.01*
Lead			0.000525	0.001	~~0.00010~~	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	~~0.00008~~	*<0.00005*	*<0.00005*	~~0.00005~~	*<0.00005*
Lithium			0.048	0.096	*<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					0.64	0.60	0.63	0.66	0.74	0.70	0.57	0.56	0.63	0.63	0.67	0.67
Manganese[4]			0.315	***equation***	0.0045	0.0043	0.0006	0.0013	0.0014	0.0008	0.0038	0.0042	0.0012	0.0014	0.0006	0.0007
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	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*

Table 2-2. Water chemistry data for the Lake stations, Whale Tail Pit Baseline, 2015.

Lake					Whale Tail Lake											
Station					North Basin (WTN)						South Basin (WTS)					
Area-Replicate ID	Aquatic Life Guidelines	Human Health Guidelines	Trigger[3]	Threshold[3]	WTN-01-S	WTN-02-S	WTN-03-S	WTN-04-S	WTN-05-S	WTN-06-S	WTS-01-S	WTS-02-S	WTS-03-S	WTS-04-S	WTS-05-S	WTS-06-S
Depth (m)					3	3	3	3	3	3	3	3	3	3	3	3
Date	CCME[1]	GCDWQ[2]	Meadowbank		17-Jul-15	17-Jul-15	20-Aug-15	20-Aug-15	18-Sep-15	18-Sep-15	17-Jul-15	17-Jul-15	21-Aug-15	21-Aug-15	18-Sep-15	18-Sep-15
Nickel			0.013	0.025	0.0008	0.0007	*<0.0005*	0.0005	0.0006	0.0005	0.0007	0.0007	*<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					0.38	0.34	0.38	0.37	0.41	0.39	0.35	0.31	0.37	0.36	0.36	0.37
Selenium			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					0.29	0.29	0.25	0.26	0.25	0.25	0.30	0.30	0.25	0.25	0.24	0.24
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					0.49	0.48	0.50	0.50	0.53	0.53	0.47	0.46	0.51	0.50	0.52	0.52
Strontium			0.028	0.049	0.0128	0.0086	0.0097	0.0110	0.0150	0.0128	0.0078	0.0077	0.0096	0.0098	0.0116	0.0115
Sulfur					*<0.5*	*<0.5*	*<0.5*	*<0.5*	0.53	*<0.5*	*<0.5*	*<0.5*	*<0.5*	*<0.5*	*<0.5*	*<0.5*
Thallium			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*
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			1.01	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*
Uranium			0.0075	0.015	0.00004	0.00004	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	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*
Zinc[4]			0.0053	***equation***	0.002	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*
Zirconium					*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*

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] 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.

123	Shaded concentrations exceed the CCME aquatic life guidelines.
123	Bordered concentrations exceed the GCDWQ.
123	Bolded concentrations exceed the trigger value.
123	Bold, italicized concentrations exceed the threshold value.

Italicized numbers are below detection limits.

"-" not collected.

~~strikethrough~~ = results flagged as unreliable in the QC assessment (see **Section 2.2.1.** for more details).

Table 2-2. Water chemistry data for the Lake stations, Whale Tail Pit Baseline, 2015.

Lake					Nemo Lake (NEM)						Mammoth Lake (MAM)					
Station	**Aquatic Life**	**Human Health**	**Trigger**[3]	**Threshold**[3]	NEM-01-S	NEM-02-S	NEM-03-S	NEM-04-S	NEM-05-S	NEM-06-S	MAM-01-S	MAM-02-S	MAM-03-S	MAM-04-S	MAM-05-S	MAM-06-S
Area-Replicate ID	**Guidelines**	**Guidelines**														
Depth (m)	**CCME**[1]	**GCDWQ**[2]	**Meadowbank**		3	3	3	3	3	3	3	3	3	3	3	3
Date					18-Jul-15	18-Jul-15	23-Aug-15	23-Aug-15	19-Sep-15	19-Sep-15	18-Jul-15	18-Jul-15	24-Aug-05	24-Aug-05	19-Sep-15	19-Sep-15
Field Measurements (Surface)																
Temperature (°C)					6.2	6.4	11.3	11.1	5.5	5.8	10.6	10.2	11.0	11.0	4.5	4.5
Specific Conductivity (µS/cm)					24.1	24.1	21.7	21.7	23.4	23.4	22.1	22.1	21.3	21.3	24	23.8
Dissolved Oxygen (mg/L)					14.8	15.3	11.7	12.9	14.1	14.3	12.5	12.5	11.1	12.6	14.5	15.2
pH	6.5 - 9.0		6.5 - 7.94	6.5 - 9.0	7.06	7.01	7.25	7.08	7.17	7.20	7.09	7.09	6.96	7.11	7.04	6.97
Physical Tests (mg/L)																
Conductivity (µS/cm)			23.5		**25**	**25**	**26**	**25**	**25**	**25**	23	23	**25**	**24**	**26**	**26**
Hardness			8.5		**9.8**	**9.8**	**9.8**	**10.0**	**9.6**	**9.6**	**8.5**	8.4	**9.1**	**9.1**	**9.2**	**9.2**
pH (Laboratory)	6.5 - 9.0		6.50 - 7.94	6.5 - 9.0	7.03	7.04	7.06	7.05	7.05	7.04	6.86	6.86	6.85	6.83	6.86	6.83
Total Suspended Solids			3.0	5.0	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*
Total Dissolved Solids			18.0		17	18	16	16	17	17	17	16	15	15	18	**18**
Turbidity (NTU)					0.24	0.23	0.19	0.21	0.21	0.20	0.36	0.37	0.24	0.27	0.26	0.30
Anions and Nutrients (mg/L)																
Alkalinity - Bicarbonate			8.6		7.1	7.0	6.8	6.7	7.5	7.2	4.8	5.0	4.8	4.5	5.2	5.1
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			8.5		7.1	7.0	6.8	6.7	7.5	7.2	4.8	5.0	4.8	4.5	5.2	5.1
Ammonia (as N)[4]	***equation***		0.065	0.126	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<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*	*<0.05*	*<0.05*
Chloride	120	250	60.28	120	0.53	0.53	0.54	0.54	0.53	0.54	1.98	1.98	2.33	2.32	2.59	2.58
Fluoride	0.120	1.5			0.023	0.021	0.022	0.022	0.023	0.023	0.023	0.024	0.026	0.025	0.025	0.025
Nitrate (as N)	3.0	10	1.50	3	*<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)	0.060	1	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			0.170		**0.171**	**0.171**	0.084	0.107	0.123	0.115	0.139	0.137	0.095	0.129	0.135	0.131
Ortho Phosphate (as P)			0.002		*<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 Diss.					*<0.002*	*<0.002*	0.0022	0.0023	*<0.002*	*<0.002*	*<0.002*	*<0.002*	0.0038	0.0023	*<0.002*	*<0.002*
Phosphorus (P)-Total	0.0040		0.0060	0.004	*<0.002*	0.0035	*<0.002*	*<0.002*	*<0.002*	*<0.002*	0.0031	0.0033	*<0.002*	*<0.002*	*<0.002*	0.0031
Silicate (as SiO_2)			1.0		*<0.5*	*<0.5*	*<0.5*	*<0.5*	0.62	0.60	0.55	0.58	0.63	0.67	0.79	0.76
Sulphate (SO_4)		500	64.71	128	3.19	3.19	3.24	3.24	3.22	3.19	2.10	2.11	2.23	2.23	2.24	2.24
Cyanides																
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					*<0.001*	*<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			2.6		1.5	1.4	1.4	1.6	1.4	1.2	1.8	1.9	1.6	1.6	1.5	1.5
Total Organic Carbon			2.8		1.5	2.0	1.3	1.4	1.3	1.6	1.9	1.9	1.9	1.6	1.6	1.6
Plant Pigments (µg/L)																
Chlorophyll-*a*					0.15	0.13	0.32	0.39	0.53	0.50	0.24	0.23	0.39	0.47	0.80	0.70
Total Metals (mg/L)																
Aluminum[4]	***equation***		0.054	0.100	0.0043	**0.0981**	~~0.0043~~	~~0.0050~~	0.0032	0.0043	0.0152	0.0142	~~0.0050~~	~~0.0058~~	0.0062	0.0080
Antimony		0.006	0.0101	0.020	*<0.0001*	*<0.0001*	0.00	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*
Arsenic	0.0050	0.01	0.00255	0.005	0.0003	0.0002	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0004	0.0004	0.0004	0.0004
Barium		1	0.50	1	0.0043	0.0042	0.0041	0.0041	0.0038	0.0039	0.0049	0.0048	0.0044	0.0044	0.0046	0.0046
Beryllium			0.0027	0.0053	*<0.00002*	*<0.00002*	*<0.00002*	*<0.00002*	*<0.00002*	*<0.00002*	*<0.00002*	*<0.00002*	*<0.00002*	*<0.00002*	*<0.00002*	*<0.00002*
Bismuth					*<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	5	0.76	1.5	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*

Table 2-2. Water chemistry data for the Lake stations, Whale Tail Pit Baseline, 2015.

Lake					Nemo Lake (NEM)						Mammoth Lake (MAM)					
Station	Aquatic Life Guidelines	Human Health Guidelines	Trigger[3]	Threshold[3]	NEM-01-S	NEM-02-S	NEM-03-S	NEM-04-S	NEM-05-S	NEM-06-S	MAM-01-S	MAM-02-S	MAM-03-S	MAM-04-S	MAM-05-S	MAM-06-S
Area-Replicate ID																
Depth (m)	CCME[1]	GCDWQ[2]	Meadowbank		3	3	3	3	3	3	3	3	3	3	3	3
Date					18-Jul-15	18-Jul-15	23-Aug-15	23-Aug-15	19-Sep-15	19-Sep-15	18-Jul-15	18-Jul-15	24-Aug-05	24-Aug-05	19-Sep-15	19-Sep-15
Cadmium[4]	***equation***	0.005	0.000025	0.000040	*<0.000005*	*<0.000005*	~~0.000012~~	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	0.000006
Calcium			2.15		**2.20**	**2.24**	**2.23**	**2.22**	2.14	2.14	**2.16**	2.14	**2.32**	**2.29**	**2.33**	**2.41**
Chromium[5]	0.001	0.05	0.00056	0.001	*<0.0001*	0.0001	*<0.0001*	0.0001	0.0001	0.0001	0.0002	0.0002	*<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***	1	0.00124	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	0.3	0.155	0.3	0.018	0.021	0.013	0.011	0.011	0.010	0.024	0.024	0.014	0.014	0.016	0.019
Lead[3]	***equation***	0.01	0.000525	0.001	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	~~0.00009~~
Lithium			0.048	0.096	*<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			0.83		**1.00**	**1.02**	**1.01**	**1.01**	**0.98**	**0.97**	0.74	0.73	0.77	0.77	0.77	0.79
Manganese[4]		0.05	0.3157	***equation***	0.0104	0.0097	0.0036	0.0034	0.0025	0.0027	0.0043	0.0040	0.0017	0.0017	0.0022	0.0025
Mercury	0.000026	0.001	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*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*
Nickel[4]	***equation***		0.0127	0.025	0.0008	0.0007	0.0006	0.0006	0.0005	0.0005	0.0009	0.0009	0.0006	0.0006	0.0006	0.0006
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			0.50		**0.59**	**0.59**	**0.58**	**0.56**	**0.56**	**0.53**	0.49	0.49	**0.53**	**0.52**	0.48	0.49
Selenium	0.001	0.01	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					0.21	0.21	0.22	0.21	0.21	0.21	0.31	0.31	0.29	0.30	0.29	0.30
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		200	0.975		0.48	0.48	0.49	0.48	0.49	0.49	0.51	0.50	0.53	0.52	0.54	0.55
Strontium			0.0279	0.049	0.0091	0.0092	0.0095	0.0096	0.0095	0.0095	0.0119	0.0119	0.0126	0.0126	0.0133	0.0134
Sulfur					1.07	1.07	1.15	1.16	1.12	1.11	0.73	0.73	0.83	0.81	0.79	0.86
Thallium	0.0008		0.00041	0.0008	*<0.00001*	*<0.00001*	0.00	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*
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*	0.00032	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*
Uranium	0.015	0.02	0.0075	0.015	*<0.00001*	*<0.00001*	0.000014	*<0.00001*	*<0.00001*	*<0.00001*	0.000031	0.000034	0.000025	0.000024	0.000022	0.000024
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[4]	0.030	0.5	0.0063	***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					*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*
Dissolved Metals (mg/L)																
Aluminum[4]			0.0263	0.05	~~0.0023~~	~~0.0017~~	0.0016	0.0012	0.0024	0.0017	0.0064	0.0066	0.0022	0.0024	0.0025	0.0033
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			0.0026	0.005	0.0002	0.0002	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0004	0.0004	0.0003	0.0004
Barium			0.5010	1	0.0041	0.0042	0.0039	0.0039	0.0040	0.0039	0.0047	0.0046	0.0043	0.0043	0.0043	0.0044
Beryllium			0.0027	0.0053	*<0.00002*	*<0.00002*	*<0.00002*	*<0.00002*	*<0.00002*	*<0.00002*	*<0.00002*	*<0.00002*	*<0.00002*	*<0.00002*	*<0.00002*	*<0.00002*
Bismuth					*<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			0.76	1.5	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*
Cadmium			0.000025	0.00004	*<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					2.28	2.26	2.25	2.29	2.19	2.19	2.20	2.19	2.34	2.35	2.38	2.40
Chromium			0.00055	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*
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			0.00119	0.002	*<0.0002*	0.00021	0.00023	0.00024	0.00026	0.00021	0.00036	0.00037	0.00036	0.00042	0.00037	0.00054
Iron			0.155	0.3	*<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			0.000525	0.001	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	~~**0.00056**~~	~~0.00010~~	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	~~0.00027~~	*<0.00005*
Lithium			0.048	0.096	*<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					1.01	1.00	1.02	1.04	1.01	1.01	0.72	0.72	0.79	0.79	0.78	0.78
Manganese[4]			0.315	***equation***	0.0077	0.0075	0.0006	0.0005	0.0006	0.0005	0.0032	0.0031	0.0003	0.0003	0.0007	0.0007
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*	0.00	0.00
Molybdenum			0.037	0.073	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*

Table 2-2. Water chemistry data for the Lake stations, Whale Tail Pit Baseline, 2015.

Lake					Nemo Lake (NEM)						Mammoth Lake (MAM)					
Station	Aquatic Life Guidelines	Human Health Guidelines	Trigger[3]	Threshold[3]	NEM-01-S	NEM-02-S	NEM-03-S	NEM-04-S	NEM-05-S	NEM-06-S	MAM-01-S	MAM-02-S	MAM-03-S	MAM-04-S	MAM-05-S	MAM-06-S
Area-Replicate ID					3	3	3	3	3	3	3	3	3	3	3	3
Depth (m)	CCME[1]	GCDWQ[2]	Meadowbank													
Date					18-Jul-15	18-Jul-15	23-Aug-15	23-Aug-15	19-Sep-15	19-Sep-15	18-Jul-15	18-Jul-15	24-Aug-05	24-Aug-05	19-Sep-15	19-Sep-15
Nickel			0.013	0.025	0.0007	0.0007	0.0005	0.0005	*<0.0005*	*<0.0005*	0.0009	0.0009	0.0005	0.0005	0.0005	0.0006
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					0.57	0.55	0.59	0.60	0.56	0.56	0.46	0.46	0.53	0.52	0.49	0.49
Selenium			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					0.21	0.21	0.20	0.21	0.21	0.21	0.30	0.30	0.29	0.29	0.28	0.28
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					0.47	0.47	0.48	0.47	0.48	0.48	0.50	0.50	0.52	0.52	0.53	0.52
Strontium			0.028	0.049	0.0089	0.0090	0.0094	0.0094	0.0094	0.0094	0.0116	0.0116	0.0125	0.0123	0.0130	0.0130
Sulfur					1.05	1.07	1.14	1.12	1.08	1.08	0.71	0.71	0.81	0.79	0.78	0.79
Thallium			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*
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			1.01	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*
Uranium			0.0075	0.015	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	0.00003	0.00003	0.00002	0.00002	0.00002	0.00002
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[4]			0.0053	***equation***	*<0.001*	*<0.001*	*<0.001*	*<0.001*	0.001	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*
Zirconium					*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*

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] 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.

123	Shaded concentrations exceed the CCME aquatic life guidelines.
123	Bordered concentrations exceed the GCDWQ.
123	Bolded concentrations exceed the trigger value.
123	Bold, italicized concentrations exceed the threshold value.

Italicized numbers are below detection limits.

"-" not collected.

~~strikethrough~~ = results flagged as unreliable in the QC assessment (see **Section 2.2.1.** for more details).

Table 2-2. Water chemistry data for the Lake stations, Whale Tail Pit Baseline, 2015.

Lake					Inuggugayualik Lake (INUG)						Pipedream Lake (PDL)				
Station	Aquatic Life Guidelines	Human Health Guidelines	Trigger[3]	Threshold[3]	INUG-70-S	INUG-71-S	INUG-72-S	INUG-73-S	INUG-74-S	INUG-75-S	PDL-37-S	PDL-38-S	PDL-39-S	PDL-40-S	PDL-41-S
Area-Replicate ID															
Depth (m)					3	3	3	3	3	3	3	3	3	3	3
Date	CCME[1]	GCDWQ[2]	Meadowbank		27-Jul-15	27-Jul-15	27-Aug-15	27-Aug-15	1-Oct-15	1-Oct-15	28-Jul-15	28-Jul-15	26-Aug-15	26-Aug-15	4-Oct-15
Field Measurements (Surface)															
Temperature (°C)					10.7	10.7	11.5	11.5	2.5	2.4	7.9	6.3	10.6	10.6	3.0
Specific Conductivity (µS/cm)					12	12	13.3	13.2	157	43	15	18	18.7	18.7	37
Dissolved Oxygen (mg/L)					10.0	10.0	10.0	10.1	10.4	10.3	11.6	10.7	12.2	13.0	10.6
pH	6.5 - 9.0		6.5 - 7.94	6.5 - 9.0	7.04	7.12	7.31	6.94	6.74	7	6.55	6.5	7.16	7.27	6.43
Physical Tests (mg/L)															
Conductivity (µS/cm)			23.5		15.2	15.3	16.1	15.7	15.9	16.7	22.3	21.9	21.9	22	23
Hardness			8.5		5.76	5.87	5.7	5.69	5.75	5.88	**8.83**	**8.68**	**8.92**	**8.78**	**8.91**
pH (Laboratory)	6.5 - 9.0		6.50 - 7.94	6.5 - 9.0	6.89	6.9	6.84	6.82	6.73	6.75	7	6.97	7.05	7.04	7.07
Total Suspended Solids			3.0	5.0	*<1.0*	*<1.0*	*<1.0*	*<1.0*	1	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*
Total Dissolved Solids			18.0		16.4	16.7	16.1	15.2	13	11.9	12.4	12.5	17.3	17.4	17.8
Turbidity (NTU)					0.31	0.29	0.29	0.28	0.38	0.37	0.2	0.22	0.22	0.19	0.23
Anions and Nutrients (mg/L)															
Alkalinity - Bicarbonate			8.6		4.8	5	4.9	4.9	5.7	5.3	8.1	7.5	7.6	6.9	8.2
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*
Alkalinity - Hydroxide					*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*
Alkalinity - Total			8.5		4.8	5	4.9	4.9	5.7	5.3	8.1	7.5	7.6	6.9	8.2
Ammonia (as N)[4]	***equation***		0.065	0.126	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<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*	*<0.05*
Chloride	120	250	60.28	120	0.73	0.73	0.77	0.76	0.75	0.75	0.59	0.59	0.62	0.62	0.6
Fluoride	0.120	1.5			0.056	0.056	0.059	0.058	0.058	0.059	0.035	0.036	0.036	0.035	0.035
Nitrate (as N)	3.0	10	1.50	3	*<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)	0.060	1	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*
Total Kjeldahl Nitrogen			0.170		0.09	0.093	0.12	0.115	0.145	0.135	0.077	0.081	0.112	0.106	**0.172**
Ortho Phosphate (as P)			0.002		*<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 Diss.					*<0.002*	*<0.002*	0.0021	*<0.002*	0.002	*<0.002*	*<0.002*	*<0.002*	*<0.002*	*<0.002*	*<0.002*
Phosphorus (P)-Total	0.0040		0.0060	0.004	*<0.002*	***0.0058***	0.0028	*<0.002*	*<0.002*	0.0025	0.0023	*<0.002*	*<0.002*	*<0.002*	*<0.002*
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*
Sulphate (SO_4)		500	64.71	128	0.88	0.88	0.9	0.9	0.87	0.87	1.59	1.6	1.67	1.68	1.63
Cyanides															
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			2.6		1.9	1.9	1.8	1.5	1.6	1.6	1.8	1.9	1.3	1.3	1.5
Total Organic Carbon			2.8		1.9	2.0	1.6	1.6	1.9	1.8	1.8	1.8	1.3	1.5	1.6
Plant Pigments (µg/L)															
Chlorophyll-*a*					0.30	0.27	0.39	0.44	0.32	0.37	0.30	0.33	0.38	0.39	0.35
Total Metals (mg/L)															
Aluminum[4]	***equation***		0.054	0.100	0.0104	0.0099	~~0.0079~~	~~0.0085~~	0.0124	0.0109	0.005	0.0046	~~0.0048~~	~~0.0047~~	0.0059
Antimony		0.006	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*
Arsenic	0.0050	0.01	0.00255	0.005	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	0.00016	0.00014	0.00013	0.00013	0.00016
Barium		1	0.50	1	0.0021	0.00192	0.00186	0.0019	0.00169	0.00179	0.00206	0.002	0.00199	0.00204	0.00202
Beryllium			0.0027	0.0053	*<0.00002*	*<0.00002*	*<0.00002*	*<0.00002*	*<0.00002*	*<0.00002*	*<0.00002*	*<0.00002*	*<0.00002*	*<0.00002*	*<0.00002*
Bismuth					*<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	5	0.76	1.5	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*

Table 2-2. Water chemistry data for the Lake stations, Whale Tail Pit Baseline, 2015.

Lake					Inuggugayualik Lake (INUG)						Pipedream Lake (PDL)				
Station	Aquatic Life	Human Health	Trigger[3]	Threshold[3]	INUG-70-S	INUG-71-S	INUG-72-S	INUG-73-S	INUG-74-S	INUG-75-S	PDL-37-S	PDL-38-S	PDL-39-S	PDL-40-S	PDL-41-S
Area-Replicate ID															
Depth (m)					3	3	3	3	3	3	3	3	3	3	3
Date	CCME[1]	GCDWQ[2]	Meadowbank		27-Jul-15	27-Jul-15	27-Aug-15	27-Aug-15	1-Oct-15	1-Oct-15	28-Jul-15	28-Jul-15	26-Aug-15	26-Aug-15	4-Oct-15
Cadmium[4]	***equation***	0.005	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*
Calcium			2.15		1.18	1.13	1.16	1.14	1.12	1.17	**2.33**	**2.28**	**2.18**	**2.2**	**2.24**
Chromium[5]	0.001	0.05	0.00056	0.001	0.0002	*<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*
Copper[3]	***equation***	1	0.00124	0.002	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	0.00052	0.0005	*<0.0005*	*<0.0005*	*<0.0005*
Iron	0.3	0.3	0.155	0.3	0.02	0.019	0.02	0.015	0.022	0.023	*<0.01*	*<0.01*	0.017	*<0.01*	0.012
Lead[3]	***equation***	0.01	0.000525	0.001	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	~~0.000489~~	*<0.00005*	*<0.00005*
Lithium			0.048	0.096	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*
Magnesium			0.83		0.71	0.69	0.69	0.69	0.68	0.72	0.79	0.78	0.76	0.77	0.8
Manganese[4]		0.05	0.3157	***equation***	0.00496	0.00495	0.00232	0.00243	0.00225	0.00224	0.00175	0.00164	0.00125	0.00125	0.00147
Mercury	0.000026	0.001	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*
Molybdenum	0.073		0.0365	0.073	0.000075	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	0.000051	*<0.00005*	0.000055	*<0.00005*	*<0.00005*
Nickel[4]	***equation***		0.0127	0.025	0.00051	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	0.00074	0.00062	0.00059	0.0006	0.00055
Phosphorus					*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*
Potassium			0.50		0.38	0.4	0.4	0.4	0.36	0.39	0.36	0.34	0.37	0.35	0.35
Selenium	0.001	0.01	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*
Silicon					0.153	0.149	0.122	0.123	0.122	0.129	0.143	0.14	0.121	0.123	0.118
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		200	0.975		0.563	0.54	0.565	0.563	0.577	0.56	0.502	0.497	0.478	0.502	0.508
Strontium			0.0279	0.049	0.00637	0.0061	0.00683	0.00663	0.00641	0.00659	0.00914	0.00908	0.00932	0.00937	0.00947
Sulfur					*<0.5*	*<0.5*	*<0.5*	*<0.5*	*<0.5*	*<0.5*	0.59	0.56	0.58	0.58	0.64
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*
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*
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*
Uranium	0.015	0.02	0.0075	0.015	0.000054	0.000048	0.000048	0.000048	0.000043	0.000044	0.000021	0.000021	0.000023	0.000024	0.000021
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*
Zinc[4]	0.030	0.5	0.0063	***equation***	*<0.003*	*<0.003*	*<0.003*	*<0.003*	*<0.003*	*<0.003*	*<0.003*	*<0.003*	*<0.003*	*<0.003*	*<0.003*
Zirconium					*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*
Dissolved Metals (mg/L)															
Aluminum[4]			0.0263	0.05	0.004	0.0052	0.003	0.0036	0.0018	0.0024	0.0025	0.0018	0.0024	0.0019	0.0036
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*
Arsenic			0.0026	0.005	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	0.00014	0.00013	0.00014	0.00014	0.00014
Barium			0.5010	1	0.00187	0.00195	0.00183	0.00188	0.00166	0.00164	0.00198	0.002	0.00196	0.00199	0.00194
Beryllium			0.0027	0.0053	*<0.00002*	*<0.00002*	*<0.00002*	*<0.00002*	*<0.00002*	*<0.00002*	*<0.00002*	*<0.00002*	*<0.00002*	*<0.00002*	*<0.00002*
Bismuth					*<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	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*
Cadmium			0.000025	0.00004	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*
Calcium					1.15	1.17	1.15	1.14	1.15	1.18	2.27	2.23	2.27	2.23	2.26
Chromium			0.00055	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					*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*
Copper			0.00119	0.002	0.00032	0.0003	0.00032	0.00033	0.00029	0.0003	0.00046	0.0004	0.0004	0.00038	0.00048
Iron			0.155	0.3	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<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*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*
Lithium			0.048	0.096	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*
Magnesium					0.7	0.71	0.69	0.69	0.7	0.72	0.77	0.76	0.79	0.78	0.79
Manganese[4]			0.315	***equation***	0.0031	0.00331	0.00032	0.00034	0.00051	0.0005	0.00106	0.001	0.00056	0.00051	0.00043
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*
Molybdenum			0.037	0.073	*<0.00005*	*<0.00005*	*<0.00005*	0.000202	*<0.00005*	*<0.00005*	0.000051	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*

Table 2-2. Water chemistry data for the Lake stations, Whale Tail Pit Baseline, 2015.

Lake					Inuggugayualik Lake (INUG)						Pipedream Lake (PDL)				
Station	Aquatic Life Guidelines	Human Health Guidelines	Trigger[3]	Threshold[3]	INUG-70-S	INUG-71-S	INUG-72-S	INUG-73-S	INUG-74-S	INUG-75-S	PDL-37-S	PDL-38-S	PDL-39-S	PDL-40-S	PDL-41-S
Area-Replicate ID					3	3	3	3	3	3	3	3	3	3	3
Depth (m)	CCME[1]	GCDWQ[2]	Meadowbank												
Date					27-Jul-15	27-Jul-15	27-Aug-15	27-Aug-15	1-Oct-15	1-Oct-15	28-Jul-15	28-Jul-15	26-Aug-15	26-Aug-15	4-Oct-15
Nickel			0.013	0.025	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	0.00071	0.00062	0.00057	0.00054	*<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*
Potassium					0.4	0.41	0.35	0.37	0.38	0.39	0.35	0.31	0.34	0.33	0.32
Selenium			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*
Silicon					0.141	0.137	0.111	0.108	0.1	0.108	0.135	0.128	0.119	0.117	0.107
Silver					*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*
Sodium					0.527	0.538	0.534	0.559	0.552	0.565	0.483	0.474	0.489	0.479	0.503
Strontium			0.028	0.049	0.00603	0.00606	0.00658	0.00649	0.00644	0.00641	0.00873	0.0086	0.0095	0.00939	0.00904
Sulfur					*<0.5*	*<0.5*	*<0.5*	*<0.5*	*<0.5*	*<0.5*	0.55	0.55	0.57	0.58	0.59
Thallium			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*
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*
Titanium			1.01	2	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*
Uranium			0.0075	0.015	0.000041	0.000043	0.000042	0.000041	0.000033	0.000034	0.000016	0.00002	0.000021	0.000021	0.000018
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*
Zinc[4]			0.0053	***equation***	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	0.0012	*<0.001*	*<0.001*	*<0.001*	*<0.001*
Zirconium					*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*

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] 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.

123	Shaded concentrations exceed the CCME aquatic life guidelines.
123	Bordered concentrations exceed the GCDWQ.
123	Bolded concentrations exceed the trigger value.
123	Bold, italicized concentrations exceed the threshold value.

Italicized numbers are below detection limits.

"-" not collected.

~~strikethrough~~ = results flagged as unreliable in the QC assessment (see **Section 2.2.1.** for more details).

Table 2-3. Water chemistry data for the Sentinel stations, Whale Tail Pit Baseline, 2015.

Lake			Sentinel Stations													
Station	**Aquatic Life**	**Human Health**	**C2**			**C14**			**C17**			**C20**			**C41**		
Area-Replicate ID	**Guidelines**	**Guidelines**	C2-JUL	C2-AUG	C2-SEP	C14-JUL	C14-AUG	C14-SEPT	C17-JUL	C17-AUG	C17-SEPT	C20-JUL	C20-AUG	C20-SEPT	C41-JUL	C41-AUG	C41-SEPT
Depth (m)			Surface	Surface	Surface	Surface	Surface	Surface	Surface	Surface	Surface	Surface	Surface	Surface	Surface	Surface	Surface
Date	**CCME**[1]	**GCDWQ**[2]	19-Jul-15	25-Aug-15	20-Sep-15	19-Jul-15	25-Aug-15	20-Sep-15	19-Jul-15	25-Aug-15	20-Sep-15	19-Jul-15	25-Aug-15	20-Sep-15	19-Jul-15	25-Aug-15	20-Sep-15
Field Measurements (Surface)																	
Temperature (°C)			10.3	9.6	2.7	9.4	10.9	4.0	10.0	10.1	3.2	8.2	10.6	3.6	10.7	9.6	2.5
Specific Conductivity (µS/cm)			22.7	16.9	22.6	24.8	20.4	22.7	23.4	14.1	21.3	23.4	18.6	20.3	17.2	16.9	23.3
Dissolved Oxygen (mg/L)			11.98	11.34	13.71	13.03	10.97	13.26	12.5	11.19	13.54	13.75	10.68	13.62	11.72	11.34	15
pH	6.5 - 9.0		-	7.22	7.02	7.03	7.36	6.98	7.03	6.78	6.98	7.05	7.36	6.92	7.10	7.22	6.90
Physical Tests (mg/L)																	
Conductivity (µS/cm)			22	23	24	25	24	24	23	23	23	23	22	22	17	20	25
Hardness			8.7	8.8	9.2	10.4	10.0	10.3	9.6	9.4	9.4	9.6	8.7	8.8	6.8	7.9	9.9
pH (Laboratory)	6.5 - 9.0		6.92	6.83	6.87	7.13	7.08	7.08	7.07	7.01	7.00	7.12	7.08	7.04	6.91	6.96	6.93
Total Suspended Solids			*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	2	*<1.0*	1	*<1.0*	*<1.0*	*<1.0*	*<1.0*	1	*<1.0*	9
Total Dissolved Solids			15	16	17	18	17	19	18	18	19	15	16	14	13	15	20
Turbidity (NTU)			0.33	0.24	0.31	0.32	0.35	0.72	0.38	0.82	0.50	0.21	0.24	0.45	0.83	0.33	1.53
Anions and Nutrients (mg/L)																	
Alkalinity - Bicarbonate			5.7	5.2	5.7	8.7	7.7	8.9	7.7	7.9	7.7	7.8	7.1	7.5	5.1	5.8	6.7
Alkalinity - Carbonate			*<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*
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*	*<1.0*	*<1.0*	*<1.0*
Alkalinity - Total			5.7	5.2	5.7	8.7	7.7	8.9	7.7	7.9	7.7	7.8	7.1	7.5	5.1	5.8	6.7
Ammonia (as N)[3]	***equation***		*<0.005*	0.0052	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	0.0053	*<0.005*	*<0.005*	*<0.005*	0.0051	*<0.005*	*<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*	*<0.05*	*<0.05*	*<0.05*	*<0.05*	*<0.05*
Chloride	120	250	0.47	0.51	0.51	0.55	0.56	0.55	0.57	0.59	0.58	0.67	0.64	0.63	0.50	0.58	0.62
Fluoride	0.120	1.5	0.063	0.072	0.073	0.034	0.034	0.034	0.046	0.049	0.048	0.039	0.037	0.037	0.043	0.055	0.054
Nitrate (as N)	3.0	10	*<0.005*	0.0243	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	0.0055	0.0097	0.0148
Nitrite (as N)	0.060	1	*<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			0.154	0.085	0.125	0.265	0.162	0.188	0.184	0.144	0.160	0.124	0.090	0.234	0.129	0.100	0.203
Ortho Phosphate (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 Diss.			0.0020	0.0021	*<0.002*	0.0028	0.0027	*<0.002*	0.0022	0.0031	0.0022	*<0.002*	0.0021	*<0.002*	0.0022	0.0028	0.0022
Phosphorus (P)-Total	0.0040		*<0.002*	*<0.002*	*<0.002*	0.0022	*<0.002*	0.0042	0.0022	0.0032	0.0026	*<0.002*	*<0.002*	0.0072	0.0030	*<0.002*	0.007
Silicate (as SiO_2)			0.64	0.88	1.14	0.59	0.58	0.74	0.76	0.63	0.97	*<0.5*	*<0.5*	*<0.5*	0.52	0.86	1.39
Sulphate (SO_4)		500	3.45	3.67	3.97	1.52	1.54	1.55	1.48	1.43	1.52	1.71	1.63	1.63	1.73	2.05	3.26
Cyanides																	
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			1.6	1.3	1.5	2.5	2.3	2.3	2.8	2.7	2.7	1.5	1.4	1.4	1.6	1.9	1.9
Total Organic Carbon			1.6	1.4	1.5	2.5	2.4	2.4	2.7	2.7	2.7	1.5	1.4	2.1	2.0	1.4	1.9
Plant Pigments (µg/L)																	
Chlorophyll-*a*			0.34	0.58	0.61	0.37	0.63	1.50	0.36	0.84	0.79	0.21	0.39	0.56	0.36	0.46	2.30
Total Metals (mg/L)																	
Aluminum[3]	***equation***		0.0126	~~0.0044~~	0.0091	0.0086	~~0.0064~~	0.0338	0.0148	0.0211	0.0156	0.0050	~~0.0042~~	0.0099	0.0210	~~0.0081~~	0.0647
Antimony		0.006	*<0.0001*	*<0.0001*	*<0.0001*	*<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	0.01	0.0002	0.0002	0.0002	0.0002	0.0003	0.0004	0.0002	0.0004	0.0003	0.0001	0.0002	0.0002	0.0001	0.0002	0.0003
Barium		1	0.0035	0.0032	0.0034	0.0036	0.0030	0.0037	0.0027	0.0027	0.0024	0.0021	0.0018	0.0019	0.0043	0.0039	0.0059
Beryllium			*<0.00002*	*<0.00002*	*<0.00002*	*<0.00002*	*<0.00002*	*<0.00002*	*<0.00002*	*<0.00002*	*<0.00002*	*<0.00002*	*<0.00002*	*<0.00002*	*<0.00002*	*<0.00002*	*<0.00002*
Bismuth			*<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	1.5	5	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*
Cadmium[3]	***equation***	0.005	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	0.000006	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	0.000009	*<0.000005*	*<0.000005*	0.000008
Calcium			2.15	2.10	2.26	2.82	2.71	2.84	2.49	2.44	2.43	2.27	2.26	2.17	1.42	1.64	2.18
Chromium[4]	0.001	0.05	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	0.0002	0.0001	0.0003	0.0002	*<0.0001*	*<0.0001*	0.0001	0.0004	0.0002	0.0008
Cobalt			*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	0.00	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	0.00
Copper[3]	***equation***	1	0.0010	0.0008	0.0008	0.0006	0.0007	0.0007	0.0007	0.0008	0.0007	*<0.0005*	*<0.0005*	*<0.0005*	0.0007	0.0007	0.0011
Iron	0.3	0.3	0.032	0.028	0.039	0.028	0.023	0.108	0.044	0.164	0.078	0.012	0.014	0.021	0.070	0.059	~~0.34~~
Lead[3]	***equation***	0.01	~~0.00006~~	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	~~0.00011~~	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	~~0.00037~~	*<0.00005*	~~0.00008~~	~~0.00032~~
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			0.80	0.78	0.84	0.74	0.70	0.75	0.82	0.79	0.79	0.81	0.77	0.75	0.76	0.87	1.20
Manganese[3]		0.05	0.0016	0.0003	0.0011	0.0024	0.0029	0.0091	0.0039	0.0169	0.0076	0.0013	0.0010	0.0013	0.0016	0.0017	0.0059
Mercury	0.000026	0.001	*<0.000005*	*<0.000005*	0.00	*<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		*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	0.0001	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	0.0001	0.0001	0.0001
Nickel[3]	***equation***		0.0006	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	0.0005	0.0007	0.0005	0.0006	*<0.0005*	*<0.0005*	0.0032	0.0023	0.0046
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			0.32	0.32	0.30	0.37	0.35	0.35	0.40	0.38	0.35	0.36	0.34	0.30	0.29	0.29	0.33
Selenium	0.001	0.01	*<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			0.36	0.38	0.46	0.31	0.27	0.35	0.43	0.30	0.40	0.15	0.14	0.16	0.31	0.37	0.72
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*	*<0.00001*
Sodium		200	0.49	0.52	0.54	0.51	0.51	0.53	0.56	0.56	0.56	0.51	0.49	0.49	0.42	0.48	0.56

Table 2-3. Water chemistry data for the Sentinel stations, Whale Tail Pit Baseline, 2015.

Lake			Sentinel Stations													
Station	**Aquatic Life**	**Human Health**	**C2**			**C14**			**C17**			**C20**			**C41**		
Area-Replicate ID	**Guidelines**	**Guidelines**	C2-JUL	C2-AUG	C2-SEP	C14-JUL	C14-AUG	C14-SEPT	C17-JUL	C17-AUG	C17-SEPT	C20-JUL	C20-AUG	C20-SEPT	C41-JUL	C41-AUG	C41-SEPT
Depth (m)			Surface	Surface	Surface	Surface	Surface	Surface	Surface	Surface	Surface	Surface	Surface	Surface	Surface	Surface	Surface
Date	**CCME**[1]	**GCDWQ**[2]	19-Jul-15	25-Aug-15	20-Sep-15	19-Jul-15	25-Aug-15	20-Sep-15	19-Jul-15	25-Aug-15	20-Sep-15	19-Jul-15	25-Aug-15	20-Sep-15	19-Jul-15	25-Aug-15	20-Sep-15
Strontium			0.0115	0.0113	0.0119	0.0143	0.0142	0.0150	0.0129	0.0127	0.0128	0.0091	0.0088	0.0091	0.0072	0.0082	0.0107
Sulfur			1.17	1.28	1.39	0.55	0.60	0.61	0.54	0.57	0.58	0.60	0.61	0.58	0.60	0.75	1.18
Thallium	0.0008		*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*
Tin			*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	0.0003	*<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*	0.00096	*<0.0003*	0.00036	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	0.00034	*<0.0003*	0.00134
Uranium	0.015	0.02	0.000060	0.000029	0.000036	0.000033	0.000028	0.000040	0.000043	0.000041	0.000041	0.000022	0.000020	0.000022	0.000038	0.000022	0.000060
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	0.030	0.5	*<0.003*	*<0.003*	*<0.003*	*<0.003*	*<0.003*	*<0.003*	*<0.003*	*<0.003*	*<0.003*	*<0.003*	*<0.003*	*<0.003*	*<0.003*	*<0.003*	*<0.003*
Zirconium			*<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*
Dissolved Metals (mg/L)																	
Aluminum			~~0.0038~~	0.0013	0.0033	0.0053	0.0027	0.0053	0.0065	0.0038	0.0049	~~0.0021~~	0.0018	0.0086	0.0062	0.0026	0.0053
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*	*<0.0001*	*<0.0001*	*<0.0001*
Arsenic			0.0001	0.0001	0.0001	0.0002	0.0003	0.0003	0.0002	0.0003	0.0003	0.0001	0.0001	0.0002	0.0001	0.0001	0.0001
Barium			0.0033	0.0032	0.0031	0.0035	0.0029	0.0034	0.0026	0.0024	0.0023	0.0020	0.0017	0.0020	0.0040	0.0038	0.0048
Beryllium			*<0.00002*	*<0.00002*	*<0.00002*	*<0.00002*	*<0.00002*	*<0.00002*	*<0.00002*	*<0.00002*	*<0.00002*	*<0.00002*	*<0.00002*	*<0.00002*	*<0.00002*	*<0.00002*	*<0.00002*
Bismuth			*<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*	0.00001	*<0.000005*	*<0.000005*	*<0.000005*
Calcium			2.18	2.18	2.29	2.90	2.79	2.89	2.52	2.47	2.45	2.44	2.24	2.25	1.47	1.69	2.10
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*	0.00	*<0.0001*	0.00
Cobalt			*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	0.00	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*
Copper			0.00080	0.00069	0.00070	0.00061	0.00061	0.00060	0.00062	0.00067	0.00064	0.00037	0.00041	0.00041	0.00053	0.00054	0.00068
Iron			0.01	*<0.01*	0.01	0.01	*<0.01*	0.02	0.02	0.07	0.04	0.01	*<0.01*	0.01	0.03	0.03	0.03
Lead			*<0.00005*	*<0.00005*	*<0.00005*	~~0.00005~~	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	~~0.00010~~	*<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*	*<0.001*	*<0.001*	*<0.001*
Magnesium			0.80	0.81	0.85	0.76	0.74	0.76	0.80	0.78	0.80	0.85	0.76	0.78	0.75	0.89	1.13
Manganese			0.0012	*<0.0001*	0.0008	0.0014	0.0012	0.0036	0.0030	0.0146	0.0063	0.0010	0.0005	0.0008	0.0010	0.0011	0.0017
Mercury			*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	0.00	*<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*	0.0001	0.0001
Nickel			0.0006	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	0.0005	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	0.0029	0.0023	0.0033
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			0.32	0.33	0.31	0.37	0.37	0.34	0.38	0.37	0.36	0.36	0.33	0.35	0.26	0.30	0.33
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			0.34	0.39	0.46	0.31	0.26	0.29	0.40	0.27	0.38	0.16	0.14	0.16	0.29	0.37	0.61
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			0.48	0.52	0.53	0.51	0.50	0.52	0.54	0.54	0.55	0.51	0.48	0.48	0.40	0.48	0.57
Strontium			0.0112	0.0114	0.0121	0.0143	0.0139	0.0147	0.0124	0.0123	0.0124	0.0092	0.0087	0.0092	0.0070	0.0080	0.0102
Sulfur			1.13	1.27	1.36	0.54	0.57	0.57	0.52	0.52	0.56	0.61	0.57	0.58	0.60	0.72	1.11
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*
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*	0.00	*<0.0003*	*<0.0003*	*<0.0003*
Uranium			0.00005	0.00002	0.00003	0.00003	0.00002	0.00003	0.00004	0.00003	0.00004	0.00002	0.00002	0.00002	0.00004	0.00002	0.00003
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			*<0.001*	*<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*
Zirconium			*<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*

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] 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] "***equation*** " means that CCME guidelines are calculated based on an equation which is either pH or hardness dependent. The ammonia and aluminum guidelines vary with pH; the cadmium, copper, lead, and nickel guidelines vary with hardness.

[4] Chromium CCME guideline is for Cr VI.

123	Shaded concentrations exceed the CCME aquatic life guidelines.
123	Bordered concentrations exceed the GCDWQ.
123	Bolded concentrations exceed the trigger value.
123	Bold, italicized concentrations exceed the threshold value.

Italicized numbers are below detection limits.

"-" not collected.

~~strikethrough~~ = results flagged as unreliable in the QC assessment (see **Section 2.2.1.** for more details).

Table 2-4. Water chemistry data for the Tributary stations, Whale Tail Pit Baseline, 2015.

Sampling Event			August										September					
Station ID (maps)	**Aquatic Life Guidelines**	**Human Health Guidelines**	A21-A20	A76-A75	DS1	A81-A80	C8-C7	A55-A17	A69-DS1	A14-A13	A18-A17	C38-C12	A5-A4	A55-A17	A17-A16	C38-C12	A69-DS1	A18-A17	A15-A14
Lab Report ID			A20-A19	A8-A7	D1	A101-A100	C8-C7	A34-A16	A1-DS1	A12-A11	A17-A16	C58 OUTLET	B5-B4	A34-A16	A16-A14	C58 OUTLET	A1-DS1	A17-A16	A13-A12
Depth (m)			Surface	Surface	Surface	Surface	Surface	Surface	Surface	Surface	Surface	Surface	Surface	Surface	Surface	Surface	Surface	Surface	Surface
Date	**CCME**[1]	**GCDWQ**[2]	6-Aug-15	5-Aug-15	5-Aug-15	8-Aug-15	8-Aug-15	7-Aug-15	4-Aug-15	4-Aug-15	4-Aug-15	4-Aug-15	6-Aug-15	17-Sep-15	17-Sep-15	19-Sep-15	19-Sep-15	19-Sep-15	21-Sep-15
Field Measurements (Surface)																			
Temperature (°C)			17	13	14	15	13	17	15	14	17	16	16	-	-	5.5	4.2	4.7	1.8
Specific Conductivity (µS/cm)			13	22	21	12	25	15	17	24	15	24	21	-	18	16	13	11	18
Dissolved Oxygen (mg/L)			9.6	9.6	11	9.5	11	10	10	10	10	10	10	13	13	12	13	13	13
pH	6.5 - 9.0		6.8	6.9	7.0	6.5	6.9	6.5	6.6	6.5	6.7	6.7	6.2	7.3	7.2	7.1	7.3	7.1	7.1
Physical Tests (mg/L)																			
Conductivity (µS/cm)			14	23	22	13	26	15	16	24	15	24	22	19	34	28	21	17	28
Hardness			4.5	8.2	8.4	4.2	11	5.2	5.8	9.0	5.3	9.7	7.8	6.2	13	9.6	7.3	5.9	10
pH (Laboratory)	6.5 - 9.0		6.8	7.0	7.0	6.7	7.2	6.8	6.8	6.8	6.8	7.0	6.9	6.7	6.7	7.0	6.9	6.8	6.8
Total Suspended Solids			*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	1.7	*<1.0*	*<1.0*	*<1.0*	*<1.0*	1.8	11	3.2	*<1.0*	*<1.0*	*<1.0*	*<1.0*
Total Dissolved Solids			16	19	20	14	22	16	13	18	14	19	18	15	24	16	14	10	15
Turbidity (NTU)			0.35	0.24	0.37	0.31	0.22	0.57	0.29	0.24	0.26	0.23	0.30	15	0.31	0.25	0.81	0.22	0.36
Anions and Nutrients (mg/L)																			
Alkalinity - Bicarbonate			4.8	6.4	7.1	3.9	9.4	6.3	5.0	5.8	5.0	7.2	5.8	5.4	4.3	6.6	6.3	5.7	5.9
Alkalinity - Carbonate			*<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*
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*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*
Alkalinity - Total			4.8	6.4	7.1	3.9	9.4	6.3	5.0	5.8	5.0	7.2	5.8	5.4	4.3	6.6	6.3	5.7	5.9
Ammonia (as N)[3]	***equation***		*<0.005*	*<0.005*	0.0057	*<0.005*	*<0.005*	*<0.005*	0.0050	0.0073	*<0.005*	*<0.005*	*<0.005*	0.0064	*<0.005*	*<0.005*	*<0.005*	*<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*	*<0.05*	*<0.05*	0.063	*<0.05*	*<0.05*	*<0.05*	*<0.05*
Chloride	120	250	0.59	0.94	0.95	0.65	0.49	0.94	0.74	1.7	0.68	0.51	1.1	0.64	5.7	0.53	0.95	0.73	2.1
Fluoride	0.120	1.5	0.029	0.025	0.038	0.027	0.033	0.025	0.028	0.025	0.031	0.023	0.028	0.032	0.026	0.024	0.028	0.032	0.025
Nitrate (as N)	3.0	10	0.012	*<0.005*	*<0.005*	0.0055	*<0.005*	*<0.005*	*<0.005*	0.0065	*<0.005*	*<0.005*	*<0.005*	0.014	*<0.005*	*<0.005*	0.011	0.0068	0.014
Nitrite (as N)	0.060	1	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*
Total Kjeldahl Nitrogen			0.14	0.15	0.16	0.12	0.095	0.19	0.14	0.14	0.15	0.12	0.14	0.17	0.15	0.13	0.18	0.29	0.13
Ortho Phosphate (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*	0.0014	0.0012	0.0011	0.0014	0.0012
Phosphorus (P)-Total Diss.			0.0043	*<0.002*	*<0.002*	*<0.002*	*<0.002*	*<0.002*	*<0.002*	*<0.002*	*<0.002*	*<0.002*	*<0.002*	0.0026	*<0.002*	*<0.002*	0.0026	*<0.002*	*<0.002*
Phosphorus (P)-Total	0.0040		0.0026	*<0.002*	0.0028	0.0026	*<0.02*	0.0038	0.0026	*<0.002*	0.0023	*<0.002*	*<0.002*	-	-	-	-	-	-
Silicate (as SiO_2)			1.3	0.87	*<0.5*	0.92	1.4	0.88	*<0.5*	0.58	0.81	*<0.5*	0.76	1.4	0.65	*<0.5*	1.0	1.2	0.99
Sulphate (SO_4)		500	0.73	2.6	1.2	0.71	2.3	2.6	1.3	2.6	0.85	3.0	2.4	1.4	1.7	3.2	2.0	1.1	3.3
Cyanides																			
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*	*<0.001*	*<0.001*
Free Cyanide			*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	0.0010	*<0.001*	*<0.001*	*<0.001*	0.0010	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*
Organic / Inorganic Carbon (mg/L)																			
Dissolved Organic Carbon			2.0	1.7	2.2	1.8	1.4	2.3	1.9	1.8	1.9	1.6	1.6	2.8	13	1.8	1.9	1.8	3.5
Total Organic Carbon			2.1	1.6	2.3	1.9	1.4	2.4	1.9	1.7	1.6	1.5	1.6	2.8	2.5	1.7	1.8	3.0	1.6
Plant Pigments (µg/L)																			
Chlorophyll-*a*			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Metals (mg/L)																			
Aluminum[3]	***equation***		0.017	0.0064	0.014	0.010	0.0051	0.021	0.0090	0.0084	0.0085	0.0049	0.0088	~~0.49~~	0.0087	0.0039	0.030	0.0053	0.0086
Antimony		0.006	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<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	0.01	*<0.0001*	0.00023	0.00014	*<0.0001*	0.00036	0.00018	0.00010	0.00035	0.00011	0.00030	0.00020	0.00035	0.00027	0.00026	0.00011	*<0.0001*	0.00030
Barium		1	0.0036	0.0047	0.0028	0.0017	0.0099	0.0022	0.0030	0.0047	0.0037	0.0039	0.0046	0.0061	0.0051	0.0036	0.0038	0.0034	0.0049
Beryllium			*<0.00002*	*<0.00002*	*<0.00002*	*<0.00002*	*<0.00002*	*<0.00002*	*<0.00002*	*<0.00002*	*<0.00002*	*<0.00002*	*<0.00002*	0.00004	*<0.00002*	*<0.00002*	*<0.00002*	*<0.00002*	*<0.00002*
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*	*<0.00005*	*<0.00005*
Boron	1.5	5	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*
Cadmium[3]	***equation***	0.005	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	0.00001
Calcium			1.2	2.1	2.0	1.2	2.5	0.91	1.5	2.3	1.3	2.3	1.9	1.0	3.1	2.2	1.9	1.4	2.5
Chromium[4]	0.001	0.05	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	0.00015	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	0.00010	~~0.0020~~	0.00014	*<0.0001*	0.00014	*<0.0001*	0.00015
Cobalt			*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	0.00028	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*
Copper[3]	***equation***	1	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	0.00072	*<0.0005*	0.00050	*<0.0005*	*<0.0005*	*<0.0005*	0.0016	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	0.00063
Iron	0.3	0.3	0.038	0.017	0.028	0.031	*<0.01*	0.16	0.051	0.017	0.057	0.015	0.035	~~0.79~~	0.020	*<0.01*	0.070	0.030	0.022
Lead[3]	***equation***	0.01	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	0.00054	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	0.00026
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*	*<0.001*	*<0.001*
Magnesium			0.41	0.72	0.85	0.29	1.1	0.69	0.46	0.79	0.50	1.0	0.71	0.97	0.92	0.99	0.59	0.52	0.86
Manganese[3]		0.05	0.00077	0.0023	0.0024	0.0024	0.0027	0.0026	0.0016	0.00075	0.00080	0.0039	0.00097	0.0094	0.0031	0.0026	0.0015	0.00039	0.00081
Mercury	0.000026	0.001	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*
Molybdenum	0.073		*<0.00005*	*<0.00005*	*<0.00005*	0.00006	0.00097	0.00008	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	0.00007	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*
Nickel[3]	***equation***		*<0.0005*	0.00054	*<0.0005*	*<0.0005*	0.00056	0.00076	*<0.0005*	0.00066	*<0.0005*	0.00052	*<0.0005*	0.0020	0.0010	0.0048	*<0.0005*	*<0.0005*	0.00072
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*	*<0.05*	*<0.05*
Potassium			0.38	0.53	0.34	0.27	0.50	0.37	0.37	0.57	0.41	0.63	0.59	0.49	0.40	0.56	0.45	0.34	0.57
Selenium	0.001	0.01	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*
Silicon			0.57	0.37	0.20	0.41	0.63	0.34	0.27	0.35	0.46	0.22	0.34	1.4	0.27	0.21	0.49	0.52	0.43

Table 2-4. Water chemistry data for the Tributary stations, Whale Tail Pit Baseline, 2015.

Sampling Event			August										September					
Station ID (maps)	**Aquatic Life Guidelines**	**Human Health Guidelines**	A21-A20	A76-A75	DS1	A81-A80	C8-C7	A55-A17	A69-DS1	A14-A13	A18-A17	C38-C12	A5-A4	A55-A17	A17-A16	C38-C12	A69-DS1	A18-A17	A15-A14
Lab Report ID			A20-A19	A8-A7	D1	A101-A100	C8-C7	A34-A16	A1-DS1	A12-A11	A17-A16	C58 OUTLET	B5-B4	A34-A16	A16-A14	C58 OUTLET	A1-DS1	A17-A16	A13-A12
Depth (m)			Surface	Surface	Surface	Surface	Surface	Surface	Surface	Surface	Surface	Surface	Surface	Surface	Surface	Surface	Surface	Surface	Surface
Date	**CCME[1]**	**GCDWQ[2]**	6-Aug-15	5-Aug-15	5-Aug-15	8-Aug-15	8-Aug-15	7-Aug-15	4-Aug-15	4-Aug-15	4-Aug-15	4-Aug-15	6-Aug-15	17-Sep-15	17-Sep-15	19-Sep-15	19-Sep-15	19-Sep-15	21-Sep-15
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*	*<0.00001*	*<0.00001*	*<0.00001*
Sodium		200	0.63	0.54	0.73	0.58	0.63	0.61	0.62	0.58	0.66	0.51	0.54	0.61	0.57	0.49	0.61	0.64	0.58
Strontium			0.0070	0.0090	0.0061	0.0056	0.012	0.0052	0.0073	0.012	0.0071	0.0096	0.0083	0.0063	0.022	0.0093	0.0081	0.0070	0.011
Sulfur			*<0.5*	0.91	*<0.5*	*<0.5*	0.83	*<0.5*	0.56	0.94	*<0.5*	1.1	0.82	*<0.5*	0.61	1.1	0.67	*<0.5*	1.2
Thallium	0.0008		*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<0.00001*	*<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*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*
Titanium			0.00033	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	0.00048	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	0.016	*<0.0003*	*<0.0003*	0.00081	*<0.0003*	0.00030
Uranium	0.015	0.02	0.00005	0.00002	0.00005	0.00005	0.00002	0.00007	0.00004	0.00003	0.00003	*<0.00001*	0.00003	0.00032	0.00003	*<0.00001*	0.00003	0.00002	0.00002
Vanadium			*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	0.00081	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*
Zinc	0.030	0.5	*<0.003*	*<0.003*	*<0.003*	*<0.003*	*<0.003*	*<0.003*	*<0.003*	*<0.003*	*<0.003*	*<0.003*	*<0.003*	0.0033	*<0.003*	*<0.003*	*<0.003*	*<0.003*	*<0.003*
Zirconium			*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	0.00039	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*
Dissolved Metals (mg/L)																			
Aluminum			0.0060	0.0027	0.0054	0.0034	0.0026	0.0073	0.0040	0.0022	0.0040	0.0018	0.0033	0.045	0.0039	0.0021	0.0072	0.0023	0.0032
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*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*
Arsenic			*<0.0001*	0.00020	0.00015	*<0.0001*	0.00034	0.00015	*<0.0001*	0.00032	*<0.0001*	0.00029	0.00016	0.00019	0.00023	0.00026	0.00010	*<0.0001*	0.00024
Barium			0.0066	0.0075	0.0031	0.0026	0.012	0.0038	0.0035	0.0061	0.0048	0.0041	0.0074	0.0034	0.0073	0.0039	0.0058	0.0042	0.0055
Beryllium			*<0.00002*	*<0.00002*	*<0.00002*	*<0.00002*	*<0.00002*	*<0.00002*	*<0.00002*	*<0.00002*	*<0.00002*	*<0.00002*	*<0.00002*	*<0.00002*	*<0.00002*	*<0.00002*	*<0.00002*	*<0.00002*	*<0.00002*
Bismuth			*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*
Boron			*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*
Cadmium			*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	0.00001	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.000005*
Calcium			1.2	2.1	2.0	1.2	2.5	0.92	1.5	2.3	1.3	2.2	2.0	1.1	3.4	2.2	1.9	1.5	2.5
Chromium			*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	0.00010	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	*<0.0001*	0.00040	*<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*	*<0.0001*	*<0.0001*
Copper			0.00069	0.00063	0.00064	0.00053	0.00047	0.00074	0.00032	0.00080	0.00032	0.00026	0.00082	0.00090	0.00043	0.00025	0.00056	0.00034	0.00055
Iron			0.014	*<0.01*	0.011	*<0.01*	*<0.01*	0.080	0.014	*<0.01*	0.025	*<0.01*	0.012	0.085	*<0.01*	*<0.01*	0.021	0.012	*<0.01*
Lead			*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	0.00014	0.00014	*<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*	0.0010	*<0.001*	*<0.001*	*<0.001*	*<0.001*
Magnesium			0.38	0.72	0.85	0.28	1.1	0.70	0.47	0.79	0.49	1.0	0.71	0.84	1.0	0.99	0.62	0.54	0.89
Manganese			0.00046	0.00096	0.00068	0.00062	0.0011	0.0018	0.00065	0.00059	0.00041	0.00042	0.00055	0.0028	0.0018	0.00059	0.00083	0.00040	0.00043
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*	*<0.000005*	*<0.000005*
Molybdenum			*<0.00005*	*<0.00005*	*<0.00005*	0.00005	0.00013	*<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*	0.00052	*<0.0005*	*<0.0005*	*<0.0005*	0.00069	*<0.0005*	0.00061	*<0.0005*	*<0.0005*	*<0.0005*	0.0011	0.0010	*<0.0005*	*<0.0005*	*<0.0005*	0.00065
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*	*<0.05*	*<0.05*
Potassium			0.34	0.54	0.32	0.27	0.53	0.44	0.37	0.57	0.40	0.59	0.60	0.38	0.45	0.59	0.45	0.38	0.58
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*	*<0.00005*	*<0.00005*
Silicon			0.54	0.37	0.19	0.39	0.64	0.32	0.25	0.36	0.45	0.21	0.34	0.68	0.29	0.21	0.46	0.54	0.44
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*	*<0.00001*	*<0.00001*
Sodium			0.77	0.63	0.82	0.65	0.70	0.70	0.56	0.68	0.67	0.51	0.65	0.69	0.63	0.49	0.74	0.80	0.62
Strontium			0.0067	0.0087	0.0062	0.0053	0.012	0.0048	0.0066	0.011	0.0070	0.0093	0.0082	0.0059	0.023	0.0091	0.0080	0.0069	0.011
Sulfur			*<0.5*	0.89		*<0.5*	0.80	*<0.5*	*<0.5*	0.93	*<0.5*	1.1	0.83	*<0.5*	0.60	1.3	0.71	*<0.5*	1.1
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*	*<0.00001*	*<0.00001*
Tin			0.00016	0.00012	0.00013	0.00013	0.00011	*<0.0001*	*<0.0001*	0.00012	*<0.0001*	*<0.0001*	0.00027	*<0.0001*	0.00011	*<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*	0.0011	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*
Uranium			0.00004	0.00002	0.00004	0.00005	0.00002	0.00005	0.00003	0.00002	0.00002	*<0.00001*	0.00003	0.00014	0.00002	*<0.00001*	0.00002	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*	*<0.0005*	*<0.0005*
Zinc			*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	0.0015	*<0.001*	*<0.001*	0.0012	*<0.001*	0.0012
Zirconium			*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*	*<0.0003*

Notes:

[1] CCME (Canadian Council of Ministers of the Environment) Canadian Water Quality Guidelines for the Protection of Aquatic Life, 1999, updated up to 2014.

[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] "equation" means that CCME guidelines are calculated based on an equation which is either pH or hardness dependent. The ammonia and aluminum guidelines vary with pH; the cadmium, copper, lead, and nickel guidelines vary with hardness.

[4] Chromium CCME guideline is for Cr VI.

123 Shaded concentrations exceed the CCME aquatic life guidelines.

123 Bordered concentrations exceed the GCDWQ.

Italicized numbers are below detection limits.

"-" analysis/measurement not collected.

~~strikethrough~~ = results flagged as unreliable in the QC assessment (see Section 2.2.2 for more details).

3. SEDIMENT CHEMISTRY

3.1. Methods Overview

3.1.1. Sample Collection

Baseline sediment sampling was completed by Portt and Associates in 2014 and Azimuth in 2015 according to methods outlined in the Meadowbank CREMP SOP (Azimuth 2015b). The sampling locations for the 2014 baseline study were synoptic with the benthic invertebrate stations established broadly throughout each of the Lakes. Of the 5 benthic invertebrate locations in each lake, Locations 1, 3 and 5 were sampled for sediment (**Figure 1ï3** [Whale Tail], **Figure 1ï4** [Nemo], **Figure 1ï5** [Mammoth]). The 2015 baseline study established replicate sediment/benthic invertebrate sampling locations over a smaller spatial scale (~100 m diameter) in areas (basins) of each lake with the targeted sampling depth of 8 m ± 1.5 m. This approach to defining the sampling basins is consistent with the Meadowbank CREMP; allowing for long-term monitoring of sediment quality in the Whale Tail Pit Study Area Lakes.

Sediment and benthic invertebrate samples were collected from 5 basins during the August 2015 sampling event.

- North basin of Whale Tail Lake (WTN and WTN-Ex [shallow])
- South basin of Whale Tail Lake (WTS)
- Nemo Lake (NEM)
- Mammoth Lake (MAM)

The 5 stations (replicates) in each 2015 area were spaced a minimum of 20 m apart. WTN and WTN-Ex are located in the area of Whale Tail Lake where the open pit is planned (**Figure 1ï2**). These areas were sampled to characterize the habitat prior to anticipated development activities. The sampling locations were established in areas where the water depth was 8 m ± 1.5 m; the exception was WTN-Ex, which was located in a shallower area of the North Basin of Whale Tail Lake.

Sediment samples were collected after sampling the benthic invertebrates at each station according to the SOP (Azimuth 2015b). A Petite Ponar grab sampler was used to collect the sediment samples, and each sample was a composite of two grabs. Sediment was collected by lowering the grab to the within 1 m of the sediment, at which point the rate of decent was slowed to minimize disruption of the surficial layer of sediment. Upon retrieval, the grab was placed in a large stainless steel bowl and inspected according to the acceptability criteria outlined in the SOP, namely: the absence of large foreign objects, adequate penetration depth, the grab is not overfilled, the jaws closed completely (i.e., well-sealed), and the sediment surface in the grab is undisturbed. Grabs that failed the acceptability criteria were discarded into a 20-L bucket and retained until sampling was completed at the station. Grabs that met the acceptability criteria were sampled by scooping the top 3 to 5 cm of sediment from the grab into a stainless steel bowl using a stainless steel spoon. Sediment from the first grab was discarded into a 20-L bucket and the grab was rinsed with lake water before collecting the second grab sample. After collecting the second grab, the sediment was thoroughly homogenized and transferred into two 125 mL glass jars, one for metals, moisture and pH, and the other for particle size analysis and total organic carbon (TOC) content. A single scoop of sediment was placed in a separate stainless steel bowl used to composite sediment from each of the 5 replicate stations. This composite sample was submitted for analysis of mineral oil and grease, hydrocarbons, and polycyclic aromatic hydrocarbons (PAHs).

3.1.2. Laboratory Methods

Sediment samples were shipped to ALS and analyzed for the following parameters:

- Moisture and pH
- Particle size and TOC
- Metals
- Mineral oil and grease
- Hydrocarbons (LEPHs and HEPHs)
- PAHs

A complete list of the sediment parameters, detection limits, data quality objectives, and method references is present in Table 1 of the SOP (Azimuth 2015b).

3.1.3. Data Handling and Analysis

Sediment chemistry results from the 2014 baseline study were provided to Azimuth by Portt and Associates. The data from 2014 and 2015 were tabulated in Microsoft Excel and screened against the interim sediment quality guidelines (ISQGs) and probable effect level (PEL) concentrations in CCME (2015b). The results were also qualitatively compared to the chemistry data from the reference lakes (INUG and PDL) for additional context and the triggers/thresholds developed for the Meadowbank CREMP lakes (Azimuth 2012b).

3.2. Quality Assurance / Quality Control

The QA/QC assessment is limited to the 2015 data collected by Azimuth. Refer to Portt and Associates (2015a) for information on laboratory and field duplicate QA/QC results from the 2014 baseline study.

3.2.1. QA/QC Methods

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 SOP (Azimuth 2015b). Analysis of method blanks and CRM are also included as part of ALS's QC program.

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:

- Field Duplicates – Field duplicate samples are collected in the immediate vicinity of original samples from randomly selected locations as a test of consistency in field methodology and to characterize heterogeneity of sediment chemistry within discrete areas. The number of field duplicates taken is approximately 10% of original samples. The DQO for field duplicate samples is based on an RPD of 50% for concentrations that are >10 x MDL. Failure of this DQO indicates high variability, which may be due to natural causes (e.g., heterogeneous mineralization) or to incomplete homogenization during mixing.

- Filter Swipes – Metals analysis is conducted on an ashless filter that is swiped over the pre-cleaned bowl and grab to assess the cleaning procedures; this is done on 10% of the samples. The significance of any metal detected on the filter is evaluated by factoring in the potential influence of those trace amounts to the entire sample. 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 volume of two 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/cm^3).

3.2.2. QA/QC Results

Detailed results of the sediment chemistry QA/QC assessment are provided in **Appendix A1** (**Section A1-2**) and summarized in the following sections.

Laboratory QC

Results of the laboratory duplicate samples analysis are presented in **Table A1ï8**. The DQOs were met for all of the laboratory duplicate samples that were analyzed as part of the 2015 baseline sediment sampling program. Method blank and CRM results were also within the laboratory DQOs in 2015. The original ALS data report for the sediment analysis is presented in **Appendix C**.

Field QA/QC

The DQOs were met for all metals analyses in the field duplicates submitted in 2015 with the exception of particle size in one set of duplicate samples (sand and clay in the duplicate from Mammoth Lake [**Table A1ï8**]). The observed difference in this field duplicate is like a result of small-scale spatial heterogeneity in the particle size distribution at this location.

There were a few parameters that were detected on at least one of the swipe samples: aluminum, barium, chromium, iron, magnesium, manganese, nickel, tin, titanium, and zinc (**Table A1ï8**). Mass balance estimates from the swipes corresponded to less than 0.1% of the total metals concentration in the sediment samples, indicating that any residual metals present on the equipment would not influence the overall sediment chemistry.

3.3. Results

Lake sediment chemistry results from the 2014 and 2015 baseline programs are presented in **Table 3ï1** (particle size, TOC, and metals) and **Table 3ï2** (mineral oil and grease, hydrocarbons, and PAHs). The original ALS data report for samples collected in 2015 is included in **Appendix C**.

The particle size distribution in the top 3-5 cm of sediment was predominantly silt/clay, characteristic of depositional areas in all the lakes sampled in this region (Azimuth 2015b). Average silt/clay content in Whale Tail Lake (WTN and WTS) and Mammoth Lake was greater than 95% in the samples collected in 2014 and 2015 with the exception of Location 1 in the North Basin of Whale Tail Lake in 2014 that had 12% sand (**Table 3ï1**). Nemo Lake had a slightly coarser particle size distribution despite similar station depths. Sediment collected from Locations 3 and 5 in 2014 were predominantly sand (68% and 50%, respectively; **Table 3ï1**). In 2015, samples collected from the NEM basin (**Figure 1ï4**) had approximately 30% sand (0.063 mm to 2 mm particle size range) compared to WTN, WTS and MAM, which all had average percent sand content of less than 5%. Sediment collected from the shallow zone of the North Basin of Whale Tail Lake (WTN-Ex [~ 5 m deep]) was also coarser (range) relative to deeper locations (range).

Arsenic, chromium, and to a lesser extent copper, exceeded the ISQG and PEL SQGs at most of the stations sampled in Whale Tail Pit Study Area Lakes in 2014 and 2015, as well as at the reference areas INUG and PDL. Meadowbank trigger values were also consistently exceeded for arsenic at WTN and chromium at WTN-Ex, MAM, and PDL (**Table 3ï1**), suggesting that development of triggers specific to the Whale Tail Pit Study Area Lakes for these metals would be appropriate. Within Whale Tail Lake, the 2014 and 2015 results are similar, with higher metals concentrations (particularly arsenic and chromium) in sediment from the North Basin (Location 1 in 2014 and WTN/ WTN-Ex in 2015) compared to the South Basin (Location 5 in 2014 and WTS in 2015). Nemo Lake (NEM) had the lowest overall metals concentrations in the samples collected in 2014 and 2015, consistent with courser overall particle size compared to the other areas that were sampled. With the exception of arsenic, the metals concentrations from the Whale Tail Pit Study Area Lakes were generally similar to the concentrations measured at INUG and PDL (**Table 3ï1**). Average arsenic concentrations in sediment from INUG and PDL were 69 mg/kg and 35 mg/kg, respectively. The highest arsenic concentrations, averaging over 1,000 mg/kg (dw) were measured in sediment from WTN in 2015. At WTN-Ex (and Location 1 in 2014), less than 100 m to the west of WTN, concentrations were an order of magnitude less, averaging approximately 100 mg/kg. High natural spatial heterogeneity in sediment metals concentrations is common in areas of natural mineralization and has previously been documented under baseline conditions for lakes monitored as part of the Meadowbank CREMP (Azimuth 2015b).

Table 3-1. Conventional sediment grab chemistry, particle size, and total metals concentrations, Whale Tail Pit Baseline, 2014 and 2015.

Baseline Year					Whale Tail Lake															
Baseline Program	**CCME (2002)**		**Meadowbank Triggers**		**2014 Baseline[1]**			**2015 Baseline**												
Basin Name & Code	**Guideline[2]**		**and Thresholds**					**North Basin - Shallow (WTN-Ex)**					**North Basin (WTN)**					**South Basin (WTS)**				
Area-Replicate ID					REP-1	REP-3	REP-5	WTN-EX-1	WTN-EX-2	WTN-EX-3	WTN-EX-4	WTN-EX-5	WTN-1	WTN-2	WTN-3	WTN-4	WTN-5	WTS-1	WTS-2	WTS-3	WTS-4	WTS-5
Date	**ISQG**	**PEL**	**Trigger[3]**	**Threshold[3]**	5-Sep-14	5-Sep-14	5-Sep-14	22-Aug-15	22-Aug-15	22-Aug-15	22-Aug-15	22-Aug-15	22-Aug-15	22-Aug-15	22-Aug-15	22-Aug-15	22-Aug-15	21-Aug-15	21-Aug-15	21-Aug-15	21-Aug-15	21-Aug-15
Physical & Organic Parameters																						
Moisture (%)					88	86	87	86	87	88	87	89	85	87	81	87	87	86	85	87	87	84
pH					6.2	5.1	6.0	6.0	5.8	6.4	6.0	6.2	6.3	6.2	5.7	5.7	5.8	5.5	5.5	5.5	5.8	5.9
Total Organic Carbon (% dw)					7.0	4.7	5.8	6.7	7.1	7.8	7.4	8.7	4.9	5.2	4.7	5.7	5.2	5.3	5.5	6.2	6.4	4.6
Particle Size																						
% Gravel (>2mm)					*<0.10*	*<0.10*	*<0.10*	*<0.10*	*<0.10*	*<0.10*	0.15	*<0.10*	*<0.10*	0.41	*<0.10*	*<0.10*	0.12	*<0.10*	*<0.10*	*<0.10*	*<0.10*	0.82
% Sand (2.00mm - 0.063mm)					12	1.5	0.85	24	9.2	22	22	9.4	4.1	4.1	4.7	3.2	4.8	5.4	3.1	2.8	2.8	4.5
% Silt (0.063mm - 4µm)					75	80	80	66	79	71	70	83	87	86	83	85	84	82	82	82	85	82
% Clay (<4µm)					13	19	20	9.9	12	7.2	8.0	8.1	9.0	9.5	13	12	12	13	15	15	13	13
Total Metals (mg/kg dw)																						
Aluminum					18800	19200	19900	14700	18400	13500	15200	16000	13900	12700	14800	14200	13400	14700	16800	17100	16200	16400
Antimony					0.31	0.23	0.22	0.27	0.29	0.29	0.29	0.35	0.25	0.27	0.25	0.34	0.27	0.23	0.26	0.22	0.23	0.22
Arsenic*	5.9	17	120.0		***51***	***151***	***8.6***	***69***	***147***	***80***	***82***	***139***	***897***	***1000***	***568***	***1760***	***809***	***102***	***152***	***80***	***112***	***118***
Barium					116	134	134	98	129	102	107	106	212	586	97	180	179	113	120	122	133	104
Beryllium					1.3	1.5	1.5	1.1	1.5	1.1	1.1	1.3	1.2	1.2	1.3	1.3	1.2	1.4	1.7	1.5	1.4	1.3
Bismuth					0.39	0.59	0.54	0.33	0.47	0.33	0.34	0.40	0.45	0.42	0.47	0.49	0.46	0.52	0.58	0.55	0.56	0.53
Cadmium*	0.6	3.5	1.10		0.41	0.35	0.47	0.30	0.48	0.30	0.33	0.38	0.32	0.48	0.15	0.36	0.41	0.41	0.18	0.18	0.30	0.22
Calcium					3040	1850	2780	3310	2950	3220	3340	3710	1950	2150	2050	2260	1660	2300	2340	2630	2530	2030
Chromium*	37.3	90	114.3		***210***	***80***	***79***	***162***	***197***	***169***	***176***	***176***	***84***	***81***	***95***	***95***	***88***	***63***	***70***	***71***	***69***	***66***
Cobalt					15	13	8.7	14	17	15	16	15	24	20	21	25	24	16	16	10	13	24
Copper*	35.7	197	126.0		***49***	***49***	***53***	33	***51***	34	35	***41***	***37***	***38***	36	***42***	***39***	***38***	***45***	***41***	***42***	***39***
Iron					33600	90000	22700	35200	51700	38600	39000	50900	151000	146000	127000	179000	139000	69000	94100	54800	77400	89500
Lead	35	91.3	32.5	35	11	13	14	10	13	9.9	10	11	11	11	12	13	12	14	14	13	14	13
Lithium					18	16	19	16	18	15	17	15	13	12	14	13	13	13	14	15	14	13
Magnesium					10400	6850	7440	8770	9750	8870	9440	9030	5800	5410	6300	6110	5880	5690	5720	6250	5900	5750
Manganese					436	622	267	916	816	1170	1230	744	6660	23500	2200	5430	3900	2010	1890	1040	2180	2760
Mercury	0.17	0.486	0.104	0.17	0.053	0.050	0.038	0.060	0.076	0.068	0.067	0.079	0.074	0.083	0.061	0.094	0.080	0.076	0.079	0.075	0.095	0.066
Molybdenum					2.6	3.3	2.0	2.3	4.6	2.4	2.3	3.8	6.3	6.9	5.3	8.6	5.8	3.3	5.6	3.9	4.0	4.1
Nickel					109	81	76	91	117	92	99	96	92	126	60	93	108	74	64	54	67	60
Phosphorus					675	2270	756	662	794	716	795	864	1830	2250	1770	2750	2020	1680	1380	1050	1330	1070
Potassium					2040	2410	2420	1940	2340	1760	2030	2150	2040	2060	2150	2110	1840	2170	2420	2580	2450	2340
Selenium					0.72	1.0	0.71	0.40	0.70	0.47	0.48	0.59	0.78	0.78	0.75	0.96	0.76	0.67	0.78	0.68	0.82	0.75
Silver					0.29	0.32	0.37	0.21	0.31	0.21	0.23	0.27	0.26	0.28	0.23	0.32	0.25	0.26	0.29	0.33	0.34	0.24
Sodium					160	180	160	293	339	327	390	506	292	302	257	355	328	282	276	344	409	330
Strontium					23	22	25	24	23	22	26	25	22	30	22	25	19	22	23	25	25	21
Thallium					0.19	0.21	0.15	0.13	0.19	0.13	0.14	0.16	0.22	0.24	0.15	0.21	0.24	0.20	0.18	0.17	0.19	0.20
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*
Titanium					529	497	458	485	537	393	507	500	379	370	413	393	308	407	437	456	425	447
Uranium					9.9	12	13	8.1	12	7.7	8.3	10	8.8	8.5	9.2	9.6	9.2	9.5	12	11	11	10
Vanadium					37	29	27	31	38	29	32	34	24	22	26	25	24	24	27	27	26	26
Zinc*	123	315	121.3		105	112	99	85	112	86	90	107	88	99	79	96	93	87	99	88	90	84

Notes:

[1] 2014 data presented here was adapted from Portt and Associates (2015a).

[2] 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. ISQG = Interim sediment quality guideline; PEL = probable effect level.

[3] Trigger and threshold values are described in (Azimuth, 2015b). Thresholds are set equal to CCME ISQG guidelines, where available.

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

123 Bold italicized concentrations exceed the ISQG guideline.

123 Bordered concentrations exceed the PEL guideline.

123 Bolded and shaded concentrations also exceed the trigger value.

Italicized numbers are below detection limits.

Table 3-1. Conventional sediment grab chemistry, particle size, and total metals concentrations, Whale Tail Pit Baseline, 2014 and 2015.

Baseline Year					Mammoth Lake (MAM)								Nemo Lake (NEM)							
Baseline Program					2014 Baseline[1]			2015 Baseline					2014 Baseline[1]			2015 Baseline				
Basin Name & Code	**CCME (2002)**		**Meadowbank Triggers**																	
Area-Replicate ID	**Guideline**[2]		**and Thresholds**		REP-1	REP-3	REP-5	MAM-1	MAM-2	MAM-3	MAM-4	MAM-5	REP-1	REP-3	REP-5	NEM-1	NEM-2	NEM-3	NEM-4	NEM-5
Date	**ISQG**	**PEL**	**Trigger**[3]	**Threshold**[3]	4-Sep-14	4-Sep-14	4-Sep-14	24-Aug-15	24-Aug-15	24-Aug-15	24-Aug-15	24-Aug-15	6-Sep-14	6-Sep-14	6-Sep-14	23-Aug-15	23-Aug-15	23-Aug-15	23-Aug-15	23-Aug-15
Physical & Organic Parameters																				
Moisture (%)					91	89	91	90	91	91	90	90	89	31	80	92	86	91	91	87
pH					5.7	5.9	6.0	5.9	6.0	5.7	5.5	5.4	5.5	6.3	5.9	6.2	6.5	6.3	6.5	6.5
Total Organic Carbon (% dw)					9.6	7.0	9.3	11	12	11	12	11	6.6	0.26	3.3	8.2	6.0	11	11	5.5
Particle Size																				
% Gravel (>2mm)					*<0.10*	*<0.10*	*<0.10*	*<0.10*	*<0.10*	*<0.10*	*<0.10*	*<0.10*	*<0.10*	6.3	0.94	*<0.10*	0.26	*<0.10*	*<0.10*	*<0.10*
% Sand (2.00mm - 0.063mm)					0.11	0.20	0.15	0.92	2.5	0.72	0.85	1.1	19	68	50	13	50	19	19	44
% Silt (0.063mm - 4µm)					84	84	84	94	92	94	93	92	76	25	46	78	47	76	77	53
% Clay (<4µm)					16	16	15	5.2	5.1	5.3	6.1	6.6	5.7	0.58	3.2	9.6	2.4	4.4	3.6	2.6
Total Metals (mg/kg dw)																				
Aluminum					21500	28500	20000	19100	18600	19500	17000	18400	11600	6390	9850	10800	9250	10800	9990	9610
Antimony					0.37	0.38	0.41	0.29	0.32	0.37	0.25	0.26	0.37	*<0.10*	0.44	0.40	0.22	0.35	0.36	0.20
Arsenic*	5.9	17	120.0		***71***	***158***	***55***	***76***	***143***	***277***	***69***	***70***	***25***	***11***	***17***	***52***	***13***	***46***	***80***	***26***
Barium					142	213	155	142	142	153	125	136	64	23	64	99	63	91	99	64
Beryllium					1.4	1.9	1.5	1.3	1.3	1.6	1.1	1.2	0.68	0.27	0.58	0.64	0.46	0.59	0.55	0.47
Bismuth					0.52	0.76	0.59	0.47	0.45	0.53	0.39	0.43	0.22	*<0.20*	0.21	0.23	*<0.20*	0.21	0.22	*<0.20*
Cadmium*	0.6	3.5	1.10		0.42	***0.61***	0.54	0.27	0.26	0.30	0.27	0.30	0.22	*<0.050*	0.38	0.25	0.18	0.22	0.20	0.14
Calcium					2530	2610	2980	3620	3370	3310	2770	2780	2690	1430	1940	3490	3030	3690	3160	2280
Chromium*	37.3	90	114.3		***174***	***211***	***163***	***161***	***162***	***168***	***141***	***158***	***112***	***66***	***87***	***113***	***97***	***110***	***104***	***106***
Cobalt					12	16	12	11	12	14	12	13	7.6	7.2	6.0	8.6	6.9	8.0	10	6.8
Copper*	35.7	197	126.0		***76***	***117***	***88***	***63***	***64***	***76***	***57***	***61***	***39***	7.1	***38***	***40***	22	***36***	33	28
Iron					35100	53100	32200	34100	43400	61200	30200	33000	19400	15800	16000	25800	14600	23800	32500	18000
Lead	35	91.3	32.5	35	17	24	19	17	17	19	16	17	7.4	3.3	6.8	9.3	6.4	8.4	8.6	7.2
Lithium					17	22	19	18	17	16	15	15	13	7.9	11	9.8	9.9	10	8.5	8.5
Magnesium					9980	12000	9310	9260	9010	8660	8380	8900	7170	5250	5640	6450	6640	6590	6130	6480
Manganese					307	583	309	349	414	468	357	408	210	408	194	407	236	302	861	301
Mercury	0.17	0.486	0.104	0.17	0.059	0.052	0.049	0.099	0.099	0.097	0.096	0.096	0.011	*<0.0050*	0.009	0.030	0.018	0.029	0.032	0.021
Molybdenum					4.3	5.1	4.1	3.2	3.7	6.0	2.8	2.9	2.6	*<0.50*	2.1	3.8	1.4	2.5	3.2	3.0
Nickel					123	194	127	105	102	109	99	107	79	37	84	88	64	78	86	66
Phosphorus					632	1220	871	868	911	951	764	796	504	345	375	697	518	664	736	498
Potassium					2860	3840	2900	3090	2950	2990	2710	2990	1310	650	1090	1470	1210	1460	1380	1230
Selenium					0.90	1.4	0.95	0.63	0.63	0.84	0.61	0.67	0.54	*<0.20*	0.50	0.56	0.34	0.51	0.56	0.36
Silver					0.46	0.55	0.54	0.42	0.42	0.48	0.43	0.44	0.13	*<0.10*	0.15	0.18	*<0.10*	0.16	0.13	0.11
Sodium					160	210	150	424	442	520	304	338	*<100*	*<100*	*<100*	430	390	555	522	297
Strontium					18	21	21	25	24	24	20	21	26	17	20	26	26	27	24	20
Thallium					0.30	0.38	0.33	0.25	0.22	0.25	0.22	0.25	0.091	*<0.050*	0.088	0.093	0.060	0.079	0.081	0.064
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*
Titanium					509	744	556	528	510	565	451	481	325	245	237	269	333	258	241	261
Uranium					13	18	15	12	12	14	11	11	4.4	1.6	4.2	4.1	2.5	3.6	3.5	3.0
Vanadium					42	56	42	40	40	43	36	38	24	14	19	24	19	23	22	21
Zinc*	123	315	121.3		***141***	***154***	***147***	110	109	***129***	99	110	63	25	54	60	44	54	55	45

Notes:

[1] 2014 data presented here was adapted from Portt and Associates (2015a).

[2] 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. ISQG = Interim sediment quality guideline; PEL = probable effect level.

[3] Trigger and threshold values are described in (Azimuth, 2015b). Thresholds are set equal to CCME ISQG guidelines, where available.

* CCME guideline not used as threshold value because threshold value is lower than trigger v

123 Bold italicized concentrations exceed the ISQG guideline.

123 Bordered concentrations exceed the PEL guideline.

123 Bolded and shaded concentrations also exceed the trigger value.

Italicized numbers are below detection limits.

Table 3-1. Conventional sediment grab chemistry, particle size, and total metals concentrations, Whale Tail Pit Baseline, 2014 and 2015.

Baseline Year					Inuggugayualik Lake (INUG)					Pipedream Lake (PDL)				
Baseline Program					2015 Baseline					2015 Baseline				
Basin Name & Code	**CCME (2002)**		**Meadowbank Triggers**											
Area-Replicate ID	**Guideline**[2]		**and Thresholds**		INUG-1	INUG-2	INUG-3	INUG-4	INUG-5	PDL-1	PDL-2	PDL-3	PDL-4	PDL-5
Date	**ISQG**	**PEL**	**Trigger**[3]	**Threshold**[3]	27-Aug-15	27-Aug-15	27-Aug-15	27-Aug-15	27-Aug-15	26-Aug-15	26-Aug-15	26-Aug-15	26-Aug-15	26-Aug-15
Physical & Organic Parameters														
Moisture (%)					82	85	85	86	84	86	79	79	81	78
pH					6.0	6.1	5.8	5.7	5.7	5.9	6.3	6.2	6.2	5.9
Total Organic Carbon (% dw)					3.8	4.4	4.9	4.9	3.8	5.1	2.5	2.4	2.7	2.5
Particle Size														
% Gravel (>2mm)					*<0.10*	*<0.10*	*<0.10*	*<0.10*	*<0.10*	*<0.10*	*<0.10*	*<0.10*	*<0.10*	*<0.10*
% Sand (2.00mm - 0.063mm)					5.6	6.3	3.5	2.7	3.1	10.0	15	5.7	5.8	14
% Silt (0.063mm - 4µm)					85	80	82	83	80	78	75	75	77	79
% Clay (<4µm)					9.8	14	15	14	17	12	9.9	19	17	7.6
Total Metals (mg/kg dw)														
Aluminum					19300	20900	20400	20100	18300	17400	19200	23600	22000	16700
Antimony					0.19	0.18	0.20	0.23	0.18	0.26	0.23	0.29	0.30	0.26
Arsenic*	5.9	17	120.0		***121***	***11***	***17***	***62***	***135***	***12***	***13***	***53***	***39***	***60***
Barium					109	126	128	132	109	99	96	109	99	82
Beryllium					1.3	1.4	1.4	1.4	1.2	0.94	1.0	1.2	1.2	0.83
Bismuth					1.1	1.2	1.3	1.2	1.1	0.77	0.89	1.2	1.1	0.73
Cadmium*	0.6	3.5	1.10		0.15	0.23	0.29	0.30	0.16	0.28	0.13	0.22	0.13	0.19
Calcium					1900	2280	2150	2110	1730	2660	2470	2320	2390	2390
Chromium*	37.3	90	114.3		***99***	***110***	***107***	***105***	***95***	***121***	***131***	***160***	***149***	***117***
Cobalt					12	11	11	13	14	10	12	21	18	15
Copper*	35.7	197	126.0		***43***	***46***	***48***	***48***	***42***	***45***	***43***	***63***	***54***	***37***
Iron					91900	37500	44900	70900	129000	26200	29900	50700	44300	50300
Lead	35	91.3	32.5	35	13	14	16	16	12	14	14	17	17	13
Lithium					26	29	28	28	25	27	29	35	33	25
Magnesium					8660	9450	9070	9120	8190	9700	10500	12200	11600	9590
Manganese					1060	712	660	1060	1440	265	338	2100	1160	675
Mercury	0.17	0.486	0.104	0.17	0.028	0.032	0.040	0.043	0.027	0.021	0.014	0.013	0.016	0.018
Molybdenum					6.8	3.3	3.9	4.9	13	1.8	2.2	4.3	3.3	5.0
Nickel					68	78	79	85	72	80	78	114	90	78
Phosphorus					2650	810	1080	1820	2010	517	508	582	519	598
Potassium					3340	3600	3450	3360	3050	2670	2970	3560	3350	2550
Selenium					0.59	0.54	0.64	0.74	0.63	0.42	0.38	0.24	0.35	0.40
Silver					0.15	0.18	0.22	0.23	0.15	0.25	0.18	*<0.10*	*<0.10*	0.15
Sodium					231	314	343	320	225	282	192	216	223	197
Strontium					24	26	25	24	21	23	25	26	26	23
Thallium					0.19	0.21	0.21	0.21	0.19	0.17	0.18	0.23	0.21	0.17
Tin					*<2.0*	*<2.0*	*<2.0*	*<2.0*	*<2.0*	*<2.0*	*<2.0*	*<2.0*	*<2.0*	*<2.0*
Titanium					544	601	550	517	474	530	617	617	597	584
Uranium					14	16	17	17	14	7.5	7.8	12	11	6.4
Vanadium					34	37	37	35	32	33	38	45	42	34
Zinc*	123	315	121.3		82	86	91	91	82	77	77	96	87	71

Notes:

[1] 2014 data presented here was adapted from Portt and Associates (2015a).

[2] 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. ISQG = Interim sediment quality guideline; PEL = probable effect level.

[3] Trigger and threshold values are described in (Azimuth, 2015b). Thresholds are set equal to CCME ISQG guidelines, where available.

* CCME guideline not used as threshold value because threshold value is lower than trigger v

123 Bold italicized concentrations exceed the ISQG guideline.

123 Bordered concentrations exceed the PEL guideline.

123 Bolded and shaded concentrations also exceed the trigger value.

Italicized numbers are below detection limits.

Table 3-2. Hydrocarbon and PAH concentrations in composite sediment grab samples, Whale Tail Pit Baseline, 2014 and 2015.

Baseline Year			2014 Baseline[1]			2015 Baseline			
Lake	CCME (2002) Guidelines[2]		Whale Tail Lake	Mammoth Lake	Nemo Lake	Whale tail Lake		Mammoth Lake	Nemo Lake
Area ID						WTN	WTS	MAM	NEM
Date	ISQG	PEL	5-Sep-14	4-Sep-14	6-Sep-14	22-Aug-15	21-Aug-15	24-Aug-15	23-Aug-15
Physical Parameters									
Moisture (%)			84.8	89.3	77.2	88.1	85.9	90.9	90.0
Aggregate Organics (mg/kg)									
Mineral Oil and Grease			1150	1690	720	*<525*	1690	1960	2990
Hydrocarbons (mg/kg)									
EPH10-19			*<540*	*<800*	*<380*	*<820*	*<680*	*<1100*	*<880*
EPH19-32			*<540*	*<800*	*<380*	*<820*	*<680*	*<1100*	*<880*
LEPH			*<540*	*<800*	*<380*	*<820*	*<680*	*<1100*	*<880*
HEPH			*<540*	*<800*	*<380*	*<820*	*<680*	*<1100*	*<880*
Polycyclic Aromatic Hydrocarbons (mg/kg)									
Acenaphthene	0.00671	0.0889	*<0.0050*	*<0.0050*	*<0.0050*	*<0.010*	*<0.0050*	*<0.015*	*<0.010*
Acenaphthylene	0.00587	0.128	*<0.0050*	*<0.0050*	*<0.0050*	*<0.010*	*<0.0050*	*<0.015*	*<0.010*
Anthracene	0.0469	0.245	*<0.0040*	*<0.0040*	*<0.0040*	*<0.0080*	*<0.0040*	*<0.012*	*<0.0080*
Benzo(a)anthracene	0.0317	0.385	*<0.010*	*<0.010*	*<0.010*	*<0.020*	*<0.010*	*<0.030*	*<0.020*
Benzo(a)pyrene	0.0319	0.782	*<0.010*	*<0.010*	*<0.010*	*<0.020*	*<0.010*	*<0.030*	*<0.020*
Benzo(b)fluoranthene			*<0.010*	*<0.010*	*<0.010*	*<0.020*	*<0.010*	*<0.030*	*<0.020*
Benzo(b+j+k)fluoranthene			*<0.015*	*<0.015*	*<0.015*	*<0.028*	*<0.015*	*<0.042*	*<0.028*
Benzo(g,h,i)perylene			*<0.010*	*<0.010*	*<0.010*	*<0.020*	*<0.010*	*<0.030*	*<0.020*
Benzo(k)fluoranthene			*<0.010*	*<0.010*	*<0.010*	*<0.020*	*<0.010*	*<0.030*	*<0.020*
Chrysene	0.0571	0.862	*<0.010*	*<0.010*	*<0.010*	*<0.020*	*<0.010*	*<0.030*	*<0.020*
Dibenz(a,h)anthracene	0.00622	0.135	*<0.0050*	*<0.0050*	*<0.0050*	*<0.010*	*<0.0050*	*<0.015*	*<0.010*
Fluoranthene	0.111	2.355	*<0.010*	*<0.010*	*<0.010*	*<0.020*	*<0.010*	*<0.030*	*<0.020*
Fluorene	0.0212	0.144	*<0.010*	*<0.010*	*<0.010*	*<0.020*	*<0.010*	*<0.030*	*<0.020*
Indeno(1,2,3-c,d)pyrene			*<0.010*	*<0.010*	*<0.010*	*<0.020*	*<0.010*	*<0.030*	*<0.020*
2-Methylnaphthalene	0.0202	0.201	*<0.010*	*<0.010*	*<0.010*	*<0.020*	*<0.010*	*<0.030*	*<0.020*
Naphthalene	0.0346	0.391	*<0.010*	*<0.010*	*<0.010*	*<0.020*	*<0.010*	*<0.030*	*<0.020*
Phenanthrene	0.0419	0.515	*<0.010*	*<0.010*	*<0.010*	*<0.020*	*<0.010*	*<0.030*	*<0.020*
Pyrene	0.053	0.875	*<0.010*	*<0.010*	*<0.010*	*<0.020*	*<0.010*	*<0.030*	*<0.020*
d10-Acenaphthene (%)			88.8	95.0	87.6	95.2	97.0	87.7	94.4
d12-Chrysene (%)			083.8	099.3	106.9	113.5	121.5	115.7	122.1
d8-Naphthalene (%)			84.6	91.6	86.5	90.2	92.2	78.1	85.3
d10-Phenanthrene (%)			83.8	94.4	97.6	108.6	114.2	108.1	115.2
B(a)P Total Potency Equivalent			*<0.020*	*<0.020*	*<0.020*	*<0.020*	*<0.020*	*<0.029*	*<0.020*
IACR (CCME)			*<0.15*	*<0.15*	*<0.15*	*<0.21*	*<0.15*	*<0.32*	*<0.21*

Notes:

[1] 2014 data presented here was adapted from Portt and Associates (2015a).

[2] 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

PEL = Probable effect level

123 Bold italicized concentrations exceed the ISQG guideline.

123 Bordered concentrations exceed the PEL guideline.

Italicized numbers are below detection limits.

4. PHYTOPLANKTON

4.1. Methods Overview

4.1.1. Sample Collection

Baseline Lake phytoplankton sampling was completed by Portt and Associates in 2014 and Azimuth in 2015 according to the Meadowbank CREMP SOP (Azimuth 2015b). Unfiltered water samples were collected for phytoplankton taxonomy from the Lake stations[7] concurrent with water samples collected for analysis of chlorophyll-*a* and other parameters discussed in **Section 2**. Baseline sampling for 2014 study was completed in early September. Sampling for the 2015 baseline program was completed monthly during the open water season (July, August, and September). Water samples were collected from 3 m using the pump and tubing system described above (**Section 2.1.1**) and preserved using Lugol's iodine solution.

4.1.2. Laboratory Methods

Phytoplankton samples were submitted to Plankton-R-Us Inc. (Winnipeg, MB) for taxonomy and biomass measurements for the 2014 and 2015 baseline studies. For the analysis, 10-mL aliquots of preserved sample were gravity settled for 24 hours. Counts were performed on an inverted microscope at magnifications of 125X, 400X, and 1200X with phase contrast illumination. Cell counts were performed using the Ütermohl technique as modified by Nauwerck (1963). Cell counts were converted to wet weight biomass (mg/m^3) by estimating cell volume. Estimates of cell volume for each species were obtained by measurements of up to 50 cells of an individual species and applying the geometric formula best fitted to the shape of the cell (Vollenweider, 1968; Rott, 1981). A specific gravity of 1 was assumed for cellular mass. All biomass (mg/m^3) and density (cells/L) estimates are summed by major taxa, per area.

4.1.3. Data Handling and Analysis

Phytoplankton taxonomy data from the 2014 baseline study were provided to Azimuth by Portt and Associates. Density and biomass results from 2014 and 2015 were tabulated in Microsoft Excel and plotted using R software. Chlorophyll-*a* data were tabulated and presented with other water quality data in **Section 2.3.1**. Density (mg/L) and biomass (mg/m^3) were discussed at the major taxa group level of identification, specifically, cyanophytes (blue green algae), chlorophytes (green algae), chrysophytes (golden-brown algae), diatoms, cryptophytes and dinoflagellates. Taxonomy, biomass, and chlorophyll-*a* results from the Whale Tail Pit Study Area Lakes were qualitatively compared against the results from the reference areas PDL and INUG.

4.2. Quality Assurance / Quality Control

4.2.1. QA/QC Methods

Field duplicates were collected for phytoplankton during each sampling event in coordination with water sample duplicates. The duplicates were taken to assess sampling variability and sample homogeneity. A RPD of 50% for total density and total biomass concentrations is considered acceptable.

As a measure of laboratory QA/QC on the enumeration method, replicate counts are performed on 10% of the samples. Replicate samples are chosen at random and processed at different times from the

[7] Phytoplankton samples were not collected at the Sentinel or Tributary stations.

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 total biomass concentrations is considered acceptable for laboratory duplicates.

4.2.2. QA/QC Results

Results of the QA/QC assessment for the 2014 and 2015 phytoplankton data are presented in **Appendix A2**. The laboratory duplicate results and field duplicate results are presented in **Table A2ï1** and **Table A2ï2**, respectively. Field and laboratory duplicates RPDs for total density and total biomass mostly met the DQOs (i.e., < 25% for laboratory and < 50% for field) with the exception of total density in the August 2015 field duplicate that slightly exceeded the DQO by approximately 2% (i.e., RPD value of 51.9%).

4.3. Results

Phytoplankton data from September 2014 samples collected by Portt and Associates (2015a) are presented in **Table 4ï1** (biomass) and **Table 4ï2** (density and richness). Results from the 2015 baseline program completed by Azimuth in July, August, and September 2015 are shown in **Table 4ï3** (biomass) and **Table 4ï4** (density and richness).

Six major taxonomic groups of phytoplankton are present in the study lakes, namely blue green algae (*Cyanophyta*), green algae (*Chlorophyta*), golden-brown algae (*Chrysophyta*), diatoms, *Cryptophyta* and *Dinoflagellata*. Richness (at the lowest practical level [LPL] of taxonomy) was somewhat variable between sampling events, but the number of taxa present was generally between 30 and 40 in the 2014 (**Table 4ï2**) and 2015 (**Table 4ï4**) baseline surveys, similar to the number of taxa reported at the reference stations in 2015. Furthermore, species richness at the Whale Tail Pit Study Area Lakes is similar to the long-term observation of between 35 and 40 taxa at PDL and INUG during the open water sampling events dating back to 2006 (Azimuth 2015b).

Phytoplankton density exceeded 1.5 million individuals per litre with total biomass ranging between approximately 100 mg/m^3 and 440 mg/m^3 during the open water season (July to September). These results are consistent with results from other lakes in the area sampled as part of the Meadowbank CREMP (Azimuth 2015b). Phytoplankton density in the summer is typically greater than 1 million individuals per liter, with average total biomass of approximately 200 mg/m^3 (Azimuth 2015b). Within the Whale Tail Pit Study Area, density and biomass were lowest in Nemo Lake and highest in Whale Tail Lake and Mammoth Lake in the 2014 (**Figure 4ï1**) and 2015 (**Figure 4ï3**) baseline studies. Lower primary productivity in Nemo Lake relative to Whale Tail Lake and Mammoth Lake is also evidenced by ultra-oligotrophic concentrations of chlorophyll-*a* (<0.5 µg/L; Villeneuve et al. 2001) during the open water period (**Table 2ï1** [2014],**Table 2ï2** [2015]). The ultra-oligotrophic status of Nemo Lake is similar to the long-term dataset for INUG and PDL where chlorophyll-*a* concentrations during the summer months range between 1 µg/L and 5 µg/L and have been relatively consistent dating back to 2006 (Azimuth 2015b).

Temporally, the highest phytoplankton density and biomass was observed during the July (2015) sampling event (**Figure 4ï3**). Chrysophytes (golden-brown algae) were the dominant major taxa group in terms of density and biomass in the 2014 and 2015 baseline studies (**Figure 4ï1** [2014] and **Figure 4ï3** [2015]). These results are consistent with observations of the phytoplankton community composition in lakes sampled as part of the Meadowbank CREMP (Azimuth 2015b). Chrysophyte density and biomass were greatest in July for all of the sampling areas, mirroring the pattern of higher total density and total biomass reported in this sampling event. Lower relative chrysophyte density and

biomass in August and September coincided with a greater proportion of the phytoplankton community comprised of other major taxa groups, particularly chlorophytes (**Figure 4ï4** [2015]). It's important to note that seasonal production of phytoplankton can vary widely depending upon water temperature, nutrient concentration, time of year, water clarity and amount of sunlight, and predation by zooplankton.

Table 4-1. Phytoplankton biomass (mg/m^3) by major taxa group, Whale Tail Pit Baseline, 2014.

			Biomass in mg/m^3 (percent of total in parentheses)						
Lake	**Sample**	**date**	Cyanophyte	Chlorophyte	Chrysophyte	Diatoms	Cryptophytes	Dinoflagellates	Total Biomass
Whale Tail Lake	WHAL - 1	5/Sep/14	1 (0.6)	9.7 (5.3)	152 (83)	6.8 (3.7)	2.2 (1.2)	11 (5.9)	183
	WHAL - 3	5/Sep/14	19 (9)	5.1 (2.4)	156 (72)	9.9 (4.6)	10 (4.8)	15 (6.9)	215
	WHAL - 5	5/Sep/14	15 (5.5)	9.1 (3.4)	213 (80)	11 (4.3)	14 (5.3)	5.1 (1.9)	267
Mammoth Lake	LAK3 - 1	4/Sep/14	0 (0)	5.7 (2.1)	176 (66)	21 (7.9)	11.6 (4.3)	53 (20)	268
	LAK3 - 3	4/Sep/14	0.1 (0.1)	4.2 (1.6)	211 (81)	12 (4.5)	7.1 (2.7)	25 (10)	259
	LAK3 - 5	4/Sep/14	0.1 (0.05)	6 (2.1)	204 (71)	13 (4.5)	5 (1.8)	57 (20)	286
Nemo Lake	NEMO - 1	6/Sep/14	0.3 (0.2)	4.6 (3)	107 (70)	29 (19)	5.9 (4)	6.4 (4.2)	154
	NEMO - 3	6/Sep/14	0 (0)	3.3 (2)	121 (72)	26 (16)	7.8 (4.7)	10 (6)	168
	NEMO - 5	6/Sep/14	15 (11)	10 (7.9)	70 (54)	22.4 (17)	1.7 (1.3)	11 (8.7)	130

Notes:

Data presented here was adapted from Portt and Associates (2015a).

Biomass (wet weight) shown by major taxa group.