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Mr. Mason Mantla, Chair
Wek’èezhìi Land and Water Board
PO Box 32
Wekweètì, NT X0E 1W0 Canada

31 March 2022

Dear Mr. Mantla:

Subject: 2021 Annual AEMP Report

Diavik Diamond Mines (2012) Inc. (DDMI) is pleased to submit the attached 2021 Aquatic Effects Monitoring Plan (AEMP) Annual Report as required under the Wek'èezhìı Land and Water Board (WLWB or Board) Water Licence W2015L2-0001 Part I, Condition 8 and Schedule 8, Condition 4. Sampling for the AEMP in 2021 was carried out according to the requirements specified in the *AEMP Study Design Version 5.2* for an interim monitoring year, which included sampling in the Near-field and Mid-field areas of Lac de Gras, as well as Stations FF1-2, FFD-1, LDS-4, and LDG-48. Dust deposition monitoring, and sampling of water quality, plankton, and eutrophication indicators occurred.

Under Water Licence W2015L2-0001, Action Level exceedance reporting (Part I, Condition 6) is required as part of the 2021 AEMP Annual Report. However, as described and approved in the WLWB Decision letter dated 3 March 2022 “RE: AEMP Response Framework – Notification of Action Level Exceedances”, DDMI has also committed to a concomitant reporting schedule for Action Level reporting[1], where Action Level exceedances for water quality ice-cover sampling (which typically occurs between April and May) will be submitted to the WLWB on 31 August of the same year, and the open-water sampling will be submitted to the WLWB on 20 December of the same year. Therefore, the 2021 Action Level exceedances for water quality have already been reported to the WLWB[2], but are reported again in Table 1 (attached to this letter) alongside the Action Level exceedances for all interim monitoring year components. The 2021 Action Level exceedances are detailed within the 2021 AEMP Annual Report. No Action Levels were triggered as part of the Plankton component in 2021.

The results of the Action Level evaluation completed for the 2021 AEMP identified 20 water quality variables that triggered Action Level 1 (out of nine Action Levels) and nine variables that also triggered Action Level 2 (Table 1). None of the water quality variables triggered Action Level 3. Under the approved AEMP Response Framework, no action is required when a water quality variable triggers Action Level 1. When a variable triggers Action Level 2, the required management action is to develop an AEMP Effects Benchmark for that variable if one does not already exist. Since all nine variables that triggered Action

[1] See WLWB Online Registry for Diavik - Reporting of AEMP Action Level Exceedances - Jul 6_21
[2] See WLWB Online Registry for Diavik - 2021 Under-Ice AEMP Action Level Exceedances - Aug 31_21; and Diavik - 2021 Open-Water AEMP Action Level Exceedances Dec 20_21

Level 2 have existing Effects Benchmarks, no further action is required based on the results of the Action Level evaluation for water quality in 2021.

The 2021 AEMP results also indicated that chlorophyll *a* triggered Action Level 2 and Total Phosphorus (TP) triggered Action Level 1 for Indicators of Eutrophication (Table 1). No management action is required under the Response Framework when a variable triggers Action Level 1, and because an Action Level 2 has been triggered in previous years for chlorophyll *a*, an Effects Benchmark for chlorophyll *a* already exists (i.e., 4.5 ug/L); therefore, no further action is required in response to the Action Level 2 trigger for chlorophll *a* in 2021.

Per the Water Licence Schedule 8, Condition 3, the applicable requirements for each water chemistry and eutrophication indicator variable that has been reported in the AEMP Annual Report to have exceeded an Action Level 2 or 3 requires a Response Plan. The response plan is to include a description of the specific actions that will be undertaken, or outcomes of specific actions to be undertaken to address the response actions as outlined in the Response Framework. Given that the response actions required (i.e., development of an Effects Benchmark) have already been completed for all variables that triggered an Action Level 2 in 2021, no further action is required to satisfy this requirement.

To assist the Board in its review of this document, a Concordance Table (Table 2) is attached to this letter to identify the sections of the report in which the applicable WLWB directives, commitments, and comments have been addressed.

Please do not hesitate to contact the undersigned or Kyla Gray (kyla.gray@riotinto.com) if you have any questions related to this submission.

Yours sincerely,

Kofi Boa-Antwi
Superintendent, Environment

cc: Marie-Eve, WLWB
Anneli Jokela, WLWB

Attachments:

- Table 1. Summary of Action Level Exceedances and Required Management Actions, 2021 AEMP
- Table 2. Concordance Table for the AEMP 2021 Annual Report, Version 0
- AEMP 2021 Annual Report

Table 1. Summary of Action Level Exceedances and Required Management Actions, 2021 AEMP

Component	Variable	Action Level	How the Action Level Exceedance was Determined	Detailed Results of Action Level Evaluation	Relation to Significance Threshold	Action Required[(a)]
Water Quality	Total Dissolved Solids (calculated) - Ice-Cover and Open-Water	2	See Appendix II, Section 2.4.5.1	See Appendix II, Section 3.5	Below Significance Threshold	None
	Turbidity - lab - Ice-Cover	1				None
	Calcium - Ice-Cover and Open-Water	1				None
	Chloride - Ice-Cover and Open-Water	2				None
	Magnesium - Ice-Cover	1				None
	Potassium - Ice-Cover	1				None
	Sodium - Ice-Cover and Open-Water	2				None
	Sulphate - Ice-Cover and Open-Water	2				None
	Ammonia - Open-Water	1				None
	Nitrate - Ice-cover and Open-Water	2				None
	Aluminum - Ice-Cover	1				None
	Antimony - Ice-cover	1				None
	Barium - Ice-Cover	1				None
	Chromium - Ice-Cover	1				None
	Copper - Ice-Cover	1				None
	Manganese - Ice-Cover	1				None
	Molybdenum - Ice-Cover and Open-Water	2				None
	Silicon - Ice-Cover	2				None
	Strontium - Ice-Cover and Open-Water	2				None
	Uranium - Ice-Cover and Open-Water	2				None
Eutrophication	Chlorophyll *a*	2	See Appendix XIII, Section 2.5	See Appendix XIII, Section 3.3		None
	Total Phosphorus	1	See Appendix XIII, Section 2.5	See Appendix XIII, Section 3.3		None

(a) Management action required under the AEMP Response Framework

Table 2: AEMP 2021 Annual Report Concordance Items

Item #	Location of Direction	Type	Description	Location in Report
1	21 October 2019 Letter re: 2018 AEMP Annual Report	Decision	2 - The Board requires DDMI to include a description of all blank sample types in future AEMP annual Reports *Background: EMAB id'd confusions about the various blanks included as part of DDMI's QA/QC protocol (i.e. all applicable components). DDMI agreed they would include these descriptions in future AEMP reports.*	Appendix I, Sections 2.3, 3.3 and 3.5, Appendices A, E, F, and G Appendix II, Attachment B Appendix XIII, Attachment B
2	W2015L2-0001 Part J, Item 8	Water Licence Condition	This Report shall satisfy the requirements of Schedule 8, Item 4, and include information relating to data collected in the preceding calendar year	*Generally practiced throughout the AEMP 2021 Annual Report.*
3	W2015L2-0001 Schedule 8, Item 4 (REQUIREMENTS)	Water Licence Condition	a) a summary of activities conducted under the Aquatic Effects Monitoring Program;	Main Report, Sections 2.2, 3.2, 4.2, 6.2 and 10.2 Appendix I, Section 2 Appendix II, Section 2 Appendix XI, Section 2 Appendix XIII, Section 2
4	W2015L2-0001 Schedule 8, Item 4 (REQUIREMENTS)	Water Licence Condition	b) tabular summaries of all data and information generated under the AEMP in an electronic and printed format acceptable to the Board	Appendix I, Appendices B, C and D Appendix II, Attachment D (Water Quality) and E (Toxicity) Appendix XI, Attachment B (Phytoplankton) and C (Zooplankton) Appendix XIII, Attachment F
5	W2015L2-0001 Schedule 8, Item 4 (REQUIREMENTS)	Water Licence Condition	c) An interpretation of the results, including an evaluation of any identified environmental changes that occurred as a result of the Project	Main Report, Sections 2.3, 3.3, 4.3, 6.3 and 10.3 Appendix I, Sections 3 and 4 Appendix II, Sections 3 and 4 Appendix XI, Sections 3 and 4 Appendix XIII, Sections 3 and 4
6	W2015L2-0001 Schedule 8, Item 4 (REQUIREMENTS)	Water Licence Condition	d) an evaluation of any adaptive management response actions implemented during the year	Main Report, Section 12 Appendix II, Section 5 Appendix XI, Section 5 Appendix XIII, Section 5
7	W2015L2-0001 Schedule 8, Item 4 (REQUIREMENTS)	Water Licence Condition	e) recommendations for refining the Aquatic Effects Monitoring Program to improve its effectiveness as required; and,	Main Report, Section 13.2 Appendix II, Section 3.7
8	W2015L2-0001 Schedule 8, Item 4 (REQUIREMENTS)	Water Licence Condition	f) an evaluation of the overall effectiveness of the Aquatic Effects Monitoring Program to date; and, any other information specified in the approved Aquatic Effects Monitoring Program or that may be requested by the Board.	Main Report, Section 13.3
9	25 March 2019 Letter re: 2014 to 2016 Aquatic Effects Re-evaluation Report and AEMP Design Plan, Version 5.0	Decision	6B. Provide full rationale for deviations to general statistical methods in all future AEMP-related reports; and	*No deviations from general statistical methods were undertaken in 2021.*
10	25 March 2019 Letter re: 2017 Aquatic Effects Monitoring Program (AEMP) Annual Report	Decision	3B - Directs DDMI to identify and explain any deviations from the Board-approved AEMP Design Plan in future Annual Reports and to propose required changes as updates to the AEMP Design Plan if necessary	*No deviations from the approved AEMP Design Plan (i.e., Version 5.2) occurred in 2021.*
11	21 October 2019 Letter re: 2018 AEMP Annual Report	Decision	6 - The Board requires DDMI to identify erroneous data in future AEMP Annual Reports *Background: WLWB comment 5 identified an example of where erroneous values were excluded from a graphical summary of the data but were not described or identified clearly. In response, DDMI explained why sometimes data is considered to be erroneous (for example, due to equipment failure) and indicated that if required by the Board, they could highlight these erroneous values in future reports.*	Appendix I, Section 3.5 Appendix II, Section 2.3 and Attachment B Appendix XI, Section 2.3 and Attachment A Appendix XIII, Section 2.3 and Attachment B
12	21 October 2019 Letter re: 2018 AEMP Annual Report	Decision	4 - The Board reminds DDMI to provide a discussion of all potential mine effects, regardless of their cause, including those related to the construction or dewatering of A21, in future AEMP Annual Reports *Background: The Board reminds DDMI that the AEMP should measure and evaluate all aquatic effects resulting from mine activities, including effects associated with dewatering and construction activities.*	Main Report, Sections 2.3, 3.3, 4.3, 6.3 and 10.3 Appendix I, Sections 3 and 4 Appendix II, Sections 3 and 4 Appendix XI, Sections 3 and 4 Appendix XIII, Sections 3 and 4
13	28 August 2017 Letter re: 2016 AEMP Annual Report and Update to Schedule 8, Condition 3	Decision	4B. Provide all raw data for all variables monitored as part of the AEMP in excel spreadsheet format;	Appendix I, Appendices B, C and D Appendix II, Attachment D (Water Quality) and E (Toxicity) Appendix XI, Attachment B (Phytoplankton) and C (Zooplankton) Appendix XIII, Attachment F
14	28 August 2017 Letter re: 2016 AEMP Annual Report and Update to Schedule 8, Condition 3	Commitment	1e. DDMI will remove reference to an 80% threshold in the RPD calculations for snow water chemistry (EMAB comment 25).	*This threshold is not referenced in the AEMP 2021 Annual Report.*
15	24 April 2017 Letter re: 2015 AEMP Annual Report	Directive	2C) Clarify the meaning of 'slight increase in trophic status'	*This phrase is not used in the AEMP 2021 Annual Report.*
16	25 March 2019 Letter re: 2017 Aquatic Effects Monitoring Program (AEMP) Annual Report	Decision	2B - Directs DDMI to present the spatial extent of effects of eutrophication indicators for both the ice-covered and open-water seasons in future AEMP Annual Reports.	Appendix XIII, Sections 2.4.4.3 and 3.2.6 Attachment D
17	25 March 2019 Letter re: 2017 Aquatic Effects Monitoring Program (AEMP) Annual Report	Decision	2D - Directs DDMI to provide a tabular summary of results for eutrophication indicators, with percent change from baseline and the previous year, for 2017 (included in Table 1) and in future AEMP Annual Reports.	Appendix XIII, Attachment C
18	24 April 2017 Letter re: 2015 AEMP Annual Report	Directive	2E) Include an explanation of the lower and upper range of the BC dustfall objective for the mining industry.	Main Report, Section 2.2.1 Appendix I, Section 2.1 *The BC dustfall objective is no longer included in the AEMP 2021 Annual Report; the* Alberta Ambient Air Quality Objectives and Guidelines for Dustfall *(Alberta Environment and Parks 2019) are used.*
19	28 August 2017 Letter re: 2016 AEMP Annual Report and Update to Schedule 8, Condition 3	Commitment	1d. DDMI will consider including seasonal dust deposition data (EMAB comment 21).	Appendix I, Sections 2.2 and 3, Table 3-1
20	21 October 2019 Letter re: 2018 AEMP Annual Report	Decision	5 - The Board requires DDMI to include a discussion of the role that dust plays in nutrient enrichment in the main body of future AEMP Annual Reports. *Background: It its review of the 2018 AEMP Annual Report, EMAB id'd that the main body of the Eutrophication chapter does not include a discussion of the role that dust loadings play towards nutrient enrichment in Lac de Gras; this discussion is included in an Appendix. DDMI provided this discussion in response to EMAB's comment, and the Board requires DDMI to be included in future reports.*	Main Report, Sections 3.3.6, 4.3.4 and 13.1
21	21 October 2019 Letter re: 2018 AEMP Annual Report	Decision	7 - The Board requires DDMI to include the QA/QC analysis for phytoplankton biomass in future AEMP Annual Reports *Background: DDMI indicated (in its response to EMAB requests of the 2017 and 2018 AEMP Annual Reports to include the QA/QC data) that it could provide this data in future reports.*	Appendix XI, Attachment A
22	21 October 2019 Letter re: 2018 AEMP Annual Report	Decision	3 - The Board requires DDMI to continue to monitor pH and evaluate for trends. Should DDMI observe more sites exhibiting a trend of increasing pH with depth, DDMI should discuss potential causes and impacts of this observation *Background: The Board understands that the anomalous observations could have been the result of a problem with the sampling equipment; however, is of the opinion that DDMI should monitor these sites (MF2-3 and FF2-3) in future AEMP sampling periods for emerging trends*	Appendix II, Section 3.3

Table 2: AEMP 2021 Annual Report Concordance Items

Item #	Location of Direction	Type	Description	Location in Report
23	28 August 2017 Letter re: 2016 AEMP Annual Report and Update to Schedule 8, Condition 3 24 April 2017 Letter re: 2015 AEMP Annual Report 25 March 2019 Letter re: 2017 Aquatic Effects Monitoring Program (AEMP) Annual Report	Decision	2. DDMI is to include the results of its investigation and proposed recommendations regarding ammonia contamination issues	Appendix II, Attachment B
24	24 April 2017 Letter re: 2015 AEMP Annual Report	Directive	2A) Include the vertical profile data and Secchi depth data collected at all AEMP stations in the data appendices;	Appendix II, Attachment D Appendix XII, Attachment F
25	24 April 2017 Letter re: 2015 AEMP Annual Report	Directive	2B) Include all relevant information, such as changes in detection limits, necessary to interpret monitoring results;	Appendix II, Attachment B Appendix XII, Attachment B
26	Response to Comments re. 2020 AEMP Annual Report	Commitment	DOC was added to the list of water quality variables measured in the AEMP samples in the 2021 ice-cover season. DOC results will be included in the 2021 Annual Report.	Appendix II, Section 2.4.4.3 and 3.2.5
27	Response to Comments re. 2020 AEMP Annual Report	Commitment	In 2020, DDMI again sent lake water quality samples to both BV Labs and ALS for analysis of ammonia. Evidence from the 2020 AEMP suggests that an ammonia source other than the lake water itself continues to be an issue and that the sulphuric acid preservative is part of the problem. As a result, DDMI used only unpreserved ammonia vials in the 2020 open water program. BV Labs continues to investigate ways to improve ammonia results, results of these studies will be included in the 2021 inter-laboratory comparison studies.	Appendix II, Attachment B
28	31 January 2022 Letter re: 2020 AEMP Annual Report	Decision	2a. - The Board does not approve removal of the analysis to evaluate potential effects from dust emissions on water quality from future AEMP Annual Reports;	Appendix II, Section 3.7
29	31 January 2022 Letter re: 2020 AEMP Annual Report	Decision	2b - nor the metric for richness from the Action Level evaluation for phytoplankton;	Appendix XI, Sections 3.1 and 3.3
30	31 January 2022 Letter re: 2020 AEMP Annual Report	Decision	2c - nor the comparison between individual plankton taxonomic groups and the normal range, as proposed in Section 13.2 of the Report.	Appendix XI, Sections 3.1 and 3.3
31	31 January 2022 Letter re: 2020 AEMP Annual Report	Decision	3D - Include the temperature data in the raw data files for the SNP stations associated with the AEMP;	Appendix II, Attachment D
32	31 January 2022 Letter re: 2020 AEMP Annual Report	Decision	3E - Include a description under Figure 3-32 (Eutrophication Indicators Affected Area in Lac de Gras, 2007 to 2020) detailing how the extent of effects were calculated for phytoplankton biomass; and	Appendix XIII, Section 3.2.6
33	31 January 2022 Letter re: 2020 AEMP Annual Report	Decision	3F - Include the commitments DDMI made in response to EMAB comment 19: Ensuring Figure E-1 in the Eutrophication Indicators Report cites the correct year.	Appendix XIII, Attachment D
34	32 January 2022 Letter re: 2020 AEMP Annual Report	Directive	3A - Include estimates of dust deposition for the summer and winter periods in a table format, as well as a discussion of the results	Appendix I, Table 3-1, Section 2.1, Section 3
35	33 January 2022 Letter re: 2020 AEMP Annual Report	Directive	3B - Include additional details on what data is represented in the box-plots in Figure 3.1-5	Appendix I, Section 3.1
36	34 January 2022 Letter re: 2020 AEMP Annual Report	Directive	3C - clarify in the caption of Figures 3.3-1 to 3.3-4 re. what "AEMP" represents and update any relevant text in Section 3.3 of the Dust Deposition Report;	*These sites were not discussed in Appendix I in the AEMP 2021 Annual Report because there were no new data collected at these sites in 2021; these sites will be sampled in 2022 and will be called "control-assessment" sites in the AEMP 2022 Annual Report, Appendix I.*
37	35 January 2022 Letter re: 2020 AEMP Annual Report	Commitment	Providing tabulated data for seasonal dustfall rates with explained methodology (response to EMAB comment 1)	Appendix I, Table 3-1, Section 2.1, Section 3
38	36 January 2022 Letter re: 2020 AEMP Annual Report	Commitment	EMAB 2: Using consistent site IDs in the text and figures when referring to the dustfall stations (response to EMAB comment 2);	Appendix I
39	37 January 2022 Letter re: 2020 AEMP Annual Report	Commitment	Presenting the snow chemistry results similar to how it is presented in the Aquatic Effects Re-evaluation Report, i.e., as mg/m^2/year in tables and figures (response to EMAB comment 5);	Appendix I *The snow chemistry results for 2021 are presented as deposition rates in mg/dm^2 /year, which is consistent with the* 2017 to 2019 Aquatic Effects Re-evaluation Report*. The comparison between the 2021 results and historical data are presented as concentrations in µg/L.*

DIAVIK DIAMOND MINES (2012) INC.

AQUATIC EFFECTS MONITORING PROGRAM
2021 ANNUAL REPORT

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March 2022
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Executive Summary

Diavik Diamond Mines (2012) Inc. (DDMI) conducts environmental monitoring programs under the terms and conditions of Water Licence W2015L2-0001 issued for the Diavik Diamond Mine (Mine). The Aquatic Effects Monitoring Program (AEMP) is the primary program specified in the Water Licence for monitoring the aquatic environment of Lac de Gras.

As stated in the Water Licence, the AEMP is "designed to determine the short and long-term effects on the aquatic environment resulting from the Project, to evaluate the accuracy of impact predictions, to assess the effectiveness of impact mitigation measures, and to identify additional impact mitigation measures to reduce or eliminate environmental effects of the licensed undertaking". The goal of the AEMP is to protect the valued ecosystem components of Lac de Gras, which consist of water quality (water chemistry), sediment quality (sediment chemistry), lake productivity, plankton and benthic invertebrate communities, fish, fish habitat, and the use of fisheries resources in Lac de Gras.

To accomplish these objectives, aquatic effects monitoring conducted by DDMI has included an East Island-based monitoring program of source waters, represented by the Surveillance Network Program (SNP), and a lake-based monitoring program, represented by the AEMP. The lake monitoring program consists of the following components:

- water chemistry monitoring in Lac de Gras
- aquatic biota monitoring in Lac de Gras (including fish surveys, plankton and benthic invertebrate community studies, and supporting sediment and water chemistry data collection)
- water chemistry and plankton monitoring in Lac du Sauvage, immediately upstream of the outflow (the Narrows) to Lac de Gras
- water chemistry and phytoplankton monitoring at the Narrows and the Lac de Gras outflow near the mouth of the Coppermine River
- dust deposition monitoring on the East Island and on ice in Lac de Gras during winter
- special effects studies (SES), as required
- traditional knowledge studies

The lake monitoring program in Lac de Gras generally occurs in three areas:

- the near-field (NF) area located near the effluent diffusers
- three mid-field (MF) areas, MF1, MF2, and MF3, generally surrounding the East Island, and extending away from the NF area
- three far-field (FF) areas, FF1, FFA and FFB, located farther from the Mine

In addition, a new station (FFD-1) was added in 2020 which falls between the FF1 and MF3 areas in Lac de Gras. Additional monitoring occurs at the inflow to Lac de Gras from Lac du Sauvage (i.e., Station LDS-4, located at the Narrows), near the outflow of Lac du Sauvage to Lac de Gras (i.e., Station LDS-1, located in Lac du Sauvage), and at the Lac de Gras outflow to the Coppermine River (i.e., Station LDG-48).

All AEMP sampling areas were exposed to Mine effluent to varying degrees, with the greatest exposure in the NF area, lowest exposure in the FF1, FFA, FFB areas (former reference areas), and intermediate levels of exposure in the MF1, MF2 and MF3 areas. The 2021 AEMP was carried out according to the requirements specified in the *AEMP Design Plan Version 5.2* for an interim monitoring year, which does not require sampling in all designated sampling areas in the lake. All sampling areas in Lac de Gras are sampled every third year during the comprehensive monitoring program to allow a detailed assessment of Mine-related effects. During the interim monitoring program, sampling is carried out in the NF and MF areas, and at stations LDS-4, LDG-48, FF1-2 and FFD-1.

The focus of the assessment for an interim year Annual Report is on the analyses of effects on water quality, nutrients, and plankton, to determine whether actions are required to manage effects. This is done by evaluating the presence and magnitude of each effect (e.g., is the concentration of a water quality variable greater than the background range and is it reaching limits in a guideline?) and spatial extent of effects (e.g., how much of the lake is affected?). Dust deposition is also monitored during interim years, and in 2021 a Traditional Knowledge (TK) camp occurred. The importance of effects related to water quality, nutrients and plankton is evaluated by comparisons to Action Levels, which are part of a Response Framework that is described in the *AEMP Design Plan Version 5.2*. The goal of the Response Framework is to prevent significant adverse effects from ever occurring in Lac de Gras. A detailed assessment of trends over time was provided in the *2017 to 2019 Aquatic Effects Re-evaluation Report*.

To better communicate AEMP results to the range of technical and non-technical parties who are interested in the results, we have provided information in two ways. First, the main body of the report provides a non-technical summary of the most important results from the 2021 studies. Second, technical appendices provide a full description of the analyses conducted and results obtained. These appendices are intended for parties with more technical interests.

Key findings from the 2021 AEMP include the following:

- Action Levels for effluent and water chemistry, and eutrophication indicators were triggered in 2021, as described below:
  - There are 9 defined Action Levels for the effluent and water chemistry component. Mine effluent triggered Action Level 1 (which is considered an early-warning indicator of effects in the NF area) for 20 water quality variables, including total dissolved solids [TDS; calculated]], turbidity, calcium, chloride, magnesium, potassium, sodium, sulphate, ammonia, nitrate, aluminum, antimony, barium, chromium, copper, manganese, molybdenum, silicon, strontium, and uranium. All 20 water quality variables were included as substances of interest (SOIs) in 2021. Of the 20 SOIs that triggered Action Level 1, nine also triggered Action Level 2, and included TDS [calculated], chloride, sodium, sulphate, nitrate, molybdenum, silicon, strontium, and uranium. None of the water quality variables triggered Action Level 3. All regulated effluent parameters were below applicable effluent quality criteria (EQC). The 2021 effluent toxicity results indicated that the effluent discharged to Lac de Gras in 2021 was non-toxic.
  - Action Level 2 was triggered for eutrophication indicators based on chlorophyll *a* concentrations, and an Action Level 1 was triggered based on total phosphorus (TP). This is the first year that Action Levels have been evaluated for TP. Elevated concentrations of nutrients and chlorophyll *a* in the NF and MF areas indicated that the Mine is having a nutrient enrichment effect in Lac de Gras. Concentrations of TP were above the normal range at the top depths at NF1, NF4, and MF2-1

and the middle depths at MF2-1 and MF2-3 during the ice-cover season and were within the normal range in all other sampling locations for the interim year program. The extent of effect on TP was 0% during the open-water season and 3.4% during the ice-cover season. The extent of effect on total nitrogen (TN) was 20% of lake area during the open-water season and 41% during the ice-cover season. The extent of effects on chlorophyll *a*, phytoplankton biomass and zooplankton biomass were 100%, 0%, and greater than or equal to 58% of Lac de Gras, respectively.

  - No Action Levels were triggered for plankton in 2021. The 2021 plankton data indicate that a toxicological effect is not occurring in Lac de Gras. Rather, results continue to be consistent with nutrient enrichment. Greater plankton biomass was observed in the NF area compared to the MF areas and the normal range. The NF area mean values for total phytoplankton and zooplankton taxonomic richness and biomass were greater than the reference condition mean, indicating that Action Level 1 for toxicological impairment was not triggered.

- Dust deposition rates were greatest close to the Mine infrastructure and decreased with distance from the Mine, as also observed in previous monitoring years, and as predicted in the Environmental Assessment for the Project.
- Although there are no dustfall standards for the Northwest Territories, 2021 dustfall rates were below the non-residential Alberta Ambient Air Quality Objectives and Guidelines for dustfall (i.e., 1,922 $mg/dm^2/y$). Dustfall rates at three stations (i.e., Dust 3, Dust 10 and Dust 11) were higher than the residential limit of the Alberta Ambient Air Quality Objectives and Guidelines for dustfall (646 $mg/dm^2/y$).
- Snow water chemistry variables of interest included variables with EQC or a load limit specified in the Water Licence (i.e., aluminum, ammonia, arsenic, cadmium, chromium, copper, lead, nickel, nitrite, phosphorus, and zinc). All 2021 concentrations were below the corresponding EQC values. DDMI compares the measured total metals levels for dust with EQC only because these criteria provide concentrations that can serve as general performance indicators. There is no intention or requirement that snow samples must meet the EQC or Alberta dustfall objectives.
- The results and discussion of the 2021 Traditional Knowledge Camp (i.e., Appendix XIV) are still pending and will be provided in the next AEMP Annual Report. Overall observations, however, made by participants during the camp indicated concerns about fish health and water quality in Lac de Gras because of parasite loads observed in the fish sampled during the camp.

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Acronyms and Abbreviations

AEMP	Aquatic Effects Monitoring Program
AFDM	ash-free dry mass
ALS	ALS Laboratories
Biologica	Biologica Environmental Services, Ltd.
BV Labs	Bureau Veritas Laboratories
CWQGs	Canadian Water Quality Guidelines
DDMI	Diavik Diamond Mines (2012) Inc.
DO	dissolved oxygen
EA	Environmental Assessment
EQC	effluent quality criteria
ERM	ERM Consultants Canada Ltd.
FF	far-field
Golder	Golder Associates Ltd.
LDG	Lac de Gras
LDS	Lac du Sauvage
MF	mid-field
Mine	Diavik Diamond Mine
Mine centroid	geographic centre of the Mine
MZ	mixing zone
NF	near-field
NIWTP	North Inlet Water Treatment Plant
QAPP	Quality Assurance Project Plan
SD	standard deviation
SES	special effects study
SNP	Surveillance Network Program
SOI	substance of interest
SRP	soluble reactive phosphorus
SRSi	soluble reactive silica
TDS	total dissolved solids
TDP	total dissolved phosphorus
TN	total nitrogen
TP	total phosphorus
WLWB	Wek'èezhìı Land and Water Board
ZOI	zone of influence

Symbols and Units of Measure

+	plus
%	percent
>	greater than
≥	greater than or equal to
±	plus or minus
µg/L	micrograms per litre
µg-N/L	micrograms nitrogen per litre
µg-P/L	micrograms phosphorus per litre
cm	centimetre
km	kilometre
km^2	square kilometre
m	metre
kg	kilogram
kg/mo	kilograms per month
kg/yr	kilograms per year
mg/dm^2	milligrams per square decimetre
$mg/dm^2/y$	milligrams per square decimetre per year

1 INTRODUCTION

1.1 Background Information

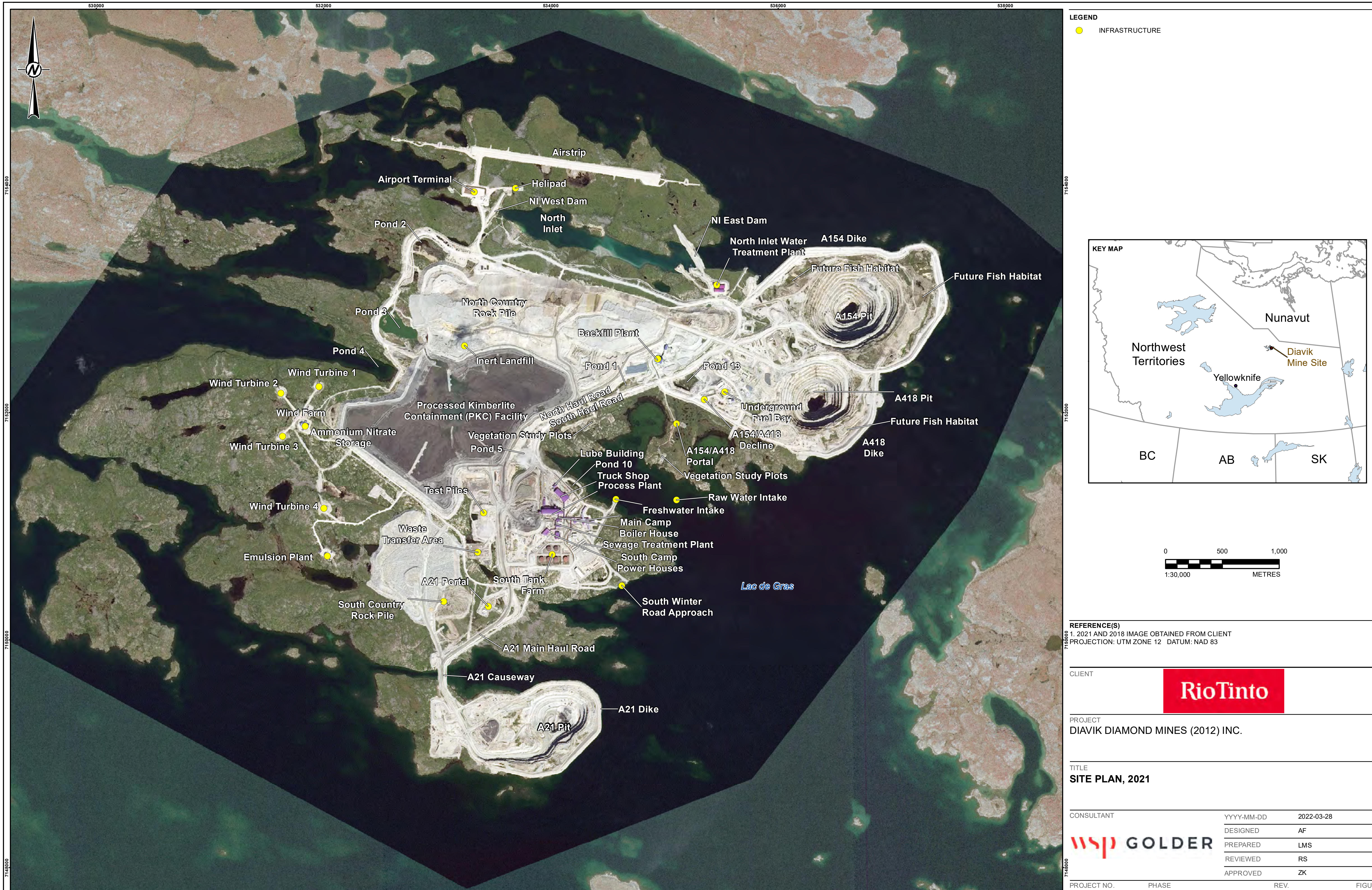
Diavik Diamond Mines (2012) Inc. (DDMI) conducts environmental monitoring programs under the terms and conditions of Water Licence W2015L2-0001 (WLWB 2021) issued for the Diavik Diamond Mine (Mine). The Mine is a diamond mining operation that discharges effluent to Lac de Gras following treatment at an on-site water treatment plant, the North Inlet Water Treatment Plan (NIWTP) (Figure 1-1). The Aquatic Effects Monitoring Program (AEMP) is the primary program described in the Water Licence for monitoring the aquatic environment of Lac de Gras.

The Water Licence for the Mine requires that DDMI review and update the AEMP design plan every three years, or as directed by the Wek’èezhìı Land and Water Board (WLWB). The current AEMP design is described in the *AEMP Design Plan Version 5.2* (Golder 2020a). The design plan describes how water, sediment, and biological monitoring studies are to be conducted under the AEMP. The reader is encouraged to review the document for specifics regarding the current AEMP design.

As summarized in the *AEMP Design Plan Version 5.2* (Golder 2020a), the Mine effluent discharge (i.e., effluent) represents the main concern for potential effect in Lac de Gras. The effluent, combined with other Mine-related stressors (e.g., dust deposition) and their potential impact on the lake ecosystem, is the principal focus of the AEMP. The AEMP has also been designed to include the results of other sources of information, specifically the outcomes of Traditional Knowledge studies, on potential effects on the lake. A summary of all AEMP data collected since before mining began, up to and including 2019, was provided in the *2017 to 2019 Aquatic Effects Re-evaluation Report* (Golder 2020b). The report evaluated trends over time in AEMP components, and as such, the *2017 to 2019 Aquatic Effects Re-evaluation Report* (Golder 2020b) is an important reference when considering ongoing monitoring results.

Sampling for the AEMP is required once during late ice-cover conditions (i.e., April and/or May) and once during open-water conditions (i.e., between 15 August and 15 September). The magnitudes of effects are evaluated by comparing water chemistry and biological results for the near-field (NF) and mid-field (MF) areas to “reference conditions”. Reference conditions for Lac de Gras are those that fall within the range of natural variability, referred to as the “normal range”. The normal ranges used to assess effects of the Mine on individual components of the AEMP are described in the *AEMP Reference Conditions Report Version 1.4* (Golder 2019a). Values that exceed the normal range are considered different from what would be considered natural levels for Lac de Gras, but do not represent levels that are harmful. To evaluate whether water quality variables are reaching potentially harmful concentrations, results are compared to AEMP Effects Benchmarks (as defined in the *AEMP Design Plan Version 5.2* [Golder 2020a]). Similar to water quality guidelines, AEMP Effects Benchmarks are intended to protect fish and other aquatic life in Lac de Gras. Comparison of water quality results to Effects Benchmarks provides an indication of how close the concentrations of water quality variables (e.g., metals[1]) are to concentrations that could be harmful to aquatic life in the lake.

[1] The term metal is used throughout this report and includes non-metals (e.g., selenium) and metalloids (e.g., arsenic).



REFERENCE(S)

1. 2021 AND 2018 IMAGE OBTAINED FROM CLIENT
PROJECTION: UTM ZONE 12 DATUM: NAD 83

CLIENT

RioTinto

PROJECT

DIAVIK DIAMOND MINES (2012) INC.

TITLE

SITE PLAN, 2021

CONSULTANT

WSP GOLDER

YYYY-MM-DD	2022-03-28
DESIGNED	AF
PREPARED	LMS
REVIEWED	RS
APPROVED	ZK

PROJECT NO.	PHASE	REV.	FIGURE
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1.2 Purpose and Objectives

As defined in the Water Licence, the AEMP is a monitoring program designed to “determine the short and long-term effects in the aquatic environment resulting from the Project, to evaluate the accuracy of impact predictions, to assess the effectiveness of impact mitigation measures, and to identify additional impact mitigation measures to reduce or eliminate environmental effects of the licensed undertaking”. The AEMP is focused on the valued ecosystem components of Lac de Gras, which have been evaluated in previous site investigations, including the Environmental Assessment (EA), and consist of fish, fish habitat, water quality, sediment quality, lake productivity, plankton and benthic invertebrate communities, and the use of fisheries resources in Lac de Gras (DDMI 1998).

In 2015, DDMI’s Water Licence was renewed for a period of eight years, effective 19 October 2015. In 2021, the Water Licence was amended to allow deposition of processed kimberlite in the Mine workings (i.e., underground) and was re-issued for a period of ten years (i.e., expiring 31 December 2025). This AEMP 2021 Annual Report addresses the requirements specified in Part I Condition 8 (Table 1-1) of the Water Licence.

Table 1-1 Aquatic Effects Monitoring Program Annual Reporting Requirements Specified in Part I, Condition 8 of the Water Licence

Item	Location in the AEMP 2021 Annual Report
a) a summary of activities conducted under the AEMP;	Main Report, Section 2.2, 3.2, 4.2, and 6.2. Appendix I, Section 2 Appendix II, Section 2 Appendix XI, Section 2 Appendix XIII, Section 2
b) tabular summaries of all data and information generated under the AEMP in an electronic and printable format acceptable to the Board;	Appendix I, Attachments B to D Appendix II, Attachments D and E Appendix XI, Attachments B and C Appendix XIII, Attachment F (*also provided in attached electronic files)
c) an interpretation of the results, including an evaluation of any identified environmental changes that occurred as a result of the Project;	Main Report, Section 13.1 Appendix I, Sections 3 and 4 Appendix II, Sections 3 and 4 Appendix XI, Sections 3 and 4 Appendix XIII, Sections 3 and 4
d) an evaluation of any adaptive management response actions implemented during the year;	Main Report, Section 12 Appendix II, Section 5 Appendix XI, Section 5 Appendix XIII, Section 5
e) recommendations for refining the AEMP to improve its effectiveness as required; and	Main Report, Section 13.2
f) an evaluation of the overall effectiveness of the AEMP to date; and, any other information specified in the approved AEMP or that may be requested by the Board.	Main Report, Section 13.3

An objective of the AEMP is to monitor the Mine effluent discharge and assess potential ecological risks, so that appropriate actions can be taken to prevent adverse effects from occurring in the environment. The AEMP is updated at regular intervals and incorporates new information and findings as they become available. The AEMP compares effluent quality to effluent quality criteria (EQC), as defined in the Water Licence, and evaluates compliance and the effectiveness of operational management (e.g., mitigation) measures.

The AEMP consists of the following components:

- a water and sediment chemistry program in Lac de Gras
- an aquatic biota monitoring program in Lac de Gras, including fish, benthic invertebrate, and plankton surveys
- a dust deposition monitoring program
- special effects studies (SES), as required, as part of the Water Licence and the Fisheries Authorization for the Mine
- traditional knowledge studies

Three general areas of Lac de Gras are monitored under the AEMP:

- the NF exposure area, located near the effluent diffusers (Figure 1-2)
- the MF exposure areas (i.e., MF1, MF2, and MF3), generally surrounding the East Island and extending away from the NF area (Figure 1-2)
- the far-field (FF) exposure areas (i.e., FF1, FFA, FFB) located farther from the Mine[2]

In addition, a new Station FFD-1 was added in 2020 that falls between the FF1 and MF3 areas (Figure 1-2). The FF1, FFA and FFB areas were formerly reference areas, and data from these areas were used to develop normal ranges as presented in the *AEMP Reference Conditions Report Version 1.4* (Golder 2019a).

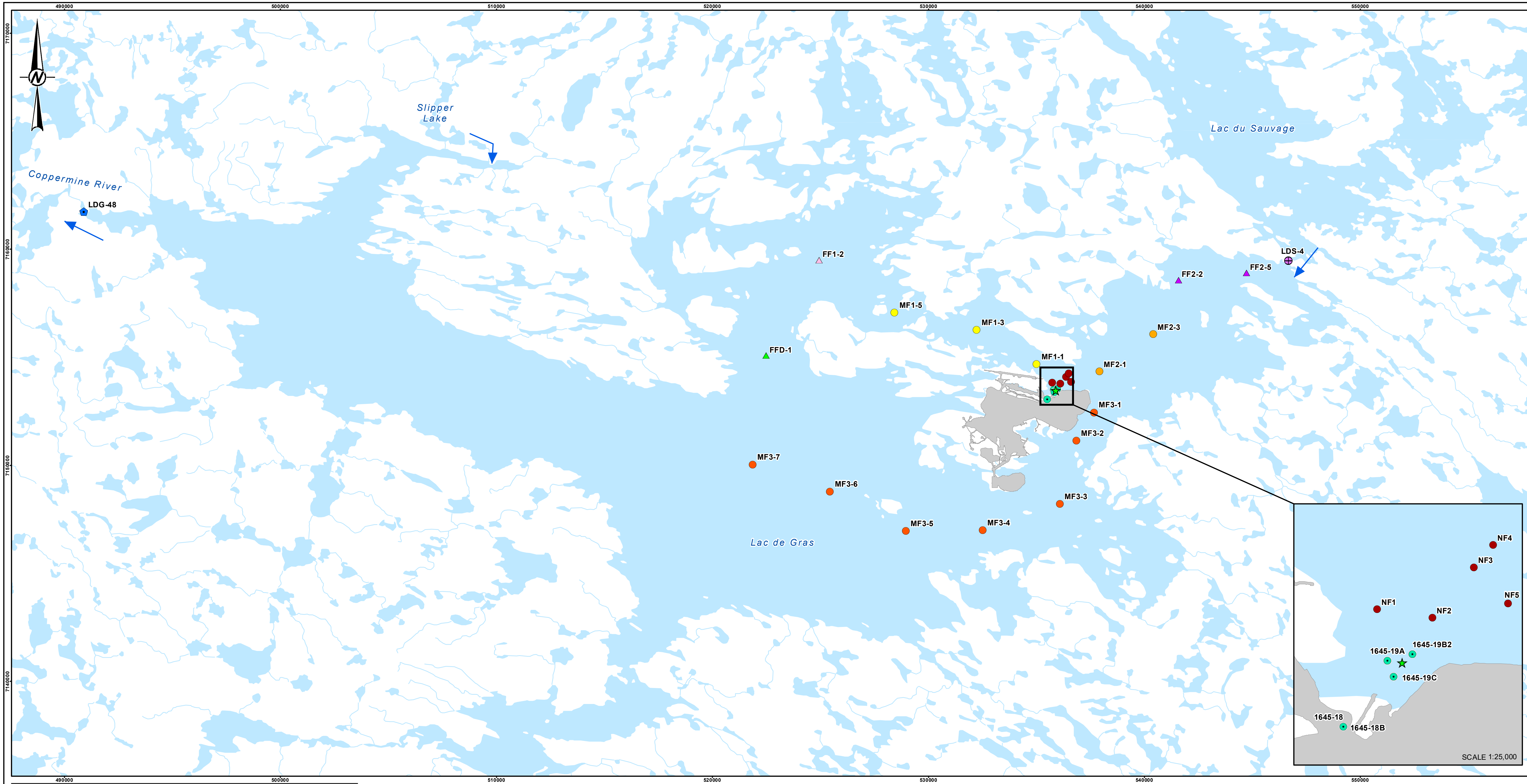
In addition to sampling in the above areas of Lac de Gras, water quality, sediment quality and eutrophication indicators are also sampled at the inflow to Lac de Gras from Lac du Sauvage (i.e., Station LDS-4 located at the Narrows), at Station LDS-1 in Lac du Sauvage near the outflow to Lac de Gras, and at the Lac de Gras outflow to the Coppermine River (i.e., Station LDG-48). Phytoplankton and zooplankton are also sampled in Lac du Sauvage at LDS-1, and phytoplankton is sampled at LDS-4 and LDG-48.

Sampling for the AEMP in 2021 was carried out according to the requirements specified in the *AEMP Design Plan Version 5.2* (Golder 2020a) for an interim monitoring year. Dust deposition monitoring, and sampling of water quality, plankton, and eutrophication indicators occurred. Monitoring was undertaken in the NF area and MF areas (i.e., MF1, MF2, and MF3) of Lac de Gras, as well as Stations FF1-2, FFD-1, LDS-4, and LDG-48. The three FF areas (i.e., FF1, FFA, FFB) in Lac de Gras and the additional station located in Lac du Sauvage near the outflow to Lac de Gras (i.e., LDS-1) are sampled every third year during the

[2] Far-field sampling areas are only sampled in comprehensive years, and 2021 was not a comprehensive year. The far-field sampling areas are shown on Figure 3.4-1 in the *AEMP Design Plan Version 5.2* (Golder 2020a).

comprehensive monitoring program to allow detailed spatial assessment of Mine-related effects, and were not sampled in 2021. The comprehensive program also includes sediment sampling, more detailed biological sampling (i.e., benthic invertebrates and fish sampling) and an overall weight-of-evidence analysis. The next comprehensive monitoring program is scheduled for 2022.

The objective of this annual report is to present the results of the 2021 interim monitoring program. Similar annual reports containing results of the 2007 to 2020 AEMP years were prepared by DDMI (2008, 2009, 2010, 2011, 2012, 2013) and Golder (2014, 2016a,b, 2017, 2018, 2019b, 2020c, 2021). Every third year, AEMP results from the previous three years are integrated in an Aquatic Effects Re-evaluation Report, which includes detailed spatial analysis of effects, analyses of trends over time, and a comparison of results to predicted effects (Government of Canada 1999). The last re-evaluation report was submitted in December 2020 as the *2017 to 2019 Aquatic Effects Re-evaluation Report* (Golder 2020b), and the next *2020 to 2022 Aquatic Effects Re-evaluation Report* is expected to be submitted by 31 December 2023.



LEGEND

- DIFFUSERS
- SURVEILLANCE NETWORK PROGRAM

STATION LOCATIONS

- FAR-FIELD 1
- FAR-FIELD 2
- FAR-FIELD D
- LAC DE GRAS OUTLET
- LAC DU SAUVAGE OUTLET
- MID-FIELD 1
- MID-FIELD 2
- MID-FIELD 3
- NEAR-FIELD

- FLOW DIRECTION
- WATERCOURSE
- DIAVIK FOOTPRINT
- WATERBODY

0 5 10
1:175,000 KILOMETRES

REFERENCE(S)
HYDROGRAPHY DATA OBTAINED FROM GEOGRATIS, © DEPARTMENT OF NATURAL RESOURCES CANADA. ALL RIGHTS RESERVED.
PROJECTION: UTM ZONE 12 DATUM: NAD 83

CLIENT
RioTinto

PROJECT
DIAVIK DIAMOND MINES (2012) INC.

CONSULTANT
WSP GOLDER

YYYY-MM-DD	2022-03-28
DESIGNED	AF
PREPARED	LMS
REVIEWED	RS
APPROVED	ZK

TITLE
SAMPLING STATIONS, 2021 AEMP

PROJECT NO.	PHASE	REV.	FIGURE
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1.3 AEMP Annual Report Content and Organization

The organization of this report follows the outline provided in Section 7.3 of the *AEMP Design Plan Version 5.2* (Golder 2020a). To better communicate the results of the AEMP to the range of technical and non-technical parties who are interested, we have provided information in two ways. First, this main body of the report provides a summary of the most important results from the 2021 studies, presented in a non-technical way. Second, the appendices provide a full technical description of analyses conducted and results obtained. These appendices are intended for parties with more technical interests. The technical appendices prepared for the 2021 annual report include:

- Appendix I – Dust Deposition Report
- Appendix II – Effluent and Water Chemistry Report
- Appendix XI – Plankton Report
- Appendix XIII – Eutrophication Indicators Report
- Appendix XIV – Traditional Knowledge Studies

Appendix I was prepared by ERM Consultants Canada Ltd. (ERM) and technical Appendices II, XI and XIII were prepared by Golder Associates Ltd. (Golder). Appendix XIV is in preparation by Thorpe Consulting Services and will be provided in the next AEMP Annual Report.

The order in which the appendices appear in the annual report and the appendix number for a given component is the same from year to year, even though there may not be a technical report for a given component in each year. This was done to meet reporting commitments stated in the *AEMP Design Plan Version 5.2* (Golder 2020a) and as a means of tracking available information. The technical report "placeholder" appendices, which do not contain a technical report for 2021 include:

- Appendix III – Sediment Quality Report
- Appendix IV – Benthic Invertebrate Report
- Appendix V – Fish Report[3]
- Appendix VI – Plume Delineation Survey
- Appendix VII – Dike Monitoring Study
- Appendix VIII – Fish Salvage Program
- Appendix IX – Fish Habitat Compensation Monitoring
- Appendix X – Fish Palatability, Fish Health, and Fish Tissue Chemistry Survey[4]
- Appendix XII – Special Effects Study Reports
- Appendix XIV – Traditional Knowledge Studies[5]

[3] Appendix V includes the Slimy Sculpin fish health and fish tissue survey report.
[4] Appendix X is a placeholder for Fisheries Authorization surveys (e.g., Fish Habitat Utilization surveys).
[5] Appendix XIV includes the fish palatability data from Lake Trout collected as part of the Traditional Knowledge Studies program.

- Appendix XV – Weight-of-Evidence Report

There are no technical reports for these components in 2021; therefore, a note has been inserted in the appropriate appendix placeholder stating that the component was not monitored in 2021.

2 DUST DEPOSITION

2.1 Introduction and Objectives

Many of the activities at the Mine generate dust, including trucks travelling on roads, the dumping of Mine rock on the waste rock piles, and activities associated with construction. The dust in the air can be transported by wind, but eventually settles on the ground or the lake surface. In accordance with the EA and requirements associated with the AEMP, a dust monitoring program was initiated in 2001. The objective of the dust monitoring program is to measure the amount of dustfall at various distances from the Mine footprint and to describe the chemical characteristics of the dustfall deposited into Lac de Gras and the surrounding area.

The following is a summary of the 2021 dust deposition monitoring program. The Dust Deposition Report (Appendix I) presents detailed results.

2.2 Methods

The 2021 dustfall monitoring program used three sampling methods: dustfall gauges, snow surveys, and snow water chemistry. Sampling was completed at varying distances around the Mine along five transects, including two reference dustfall gauges and three reference snow sampling stations intended to measure the background dust deposition rate. The reference dustfall gauges and snow sampling stations are both referred to as “control stations” with this report and Appendix I.

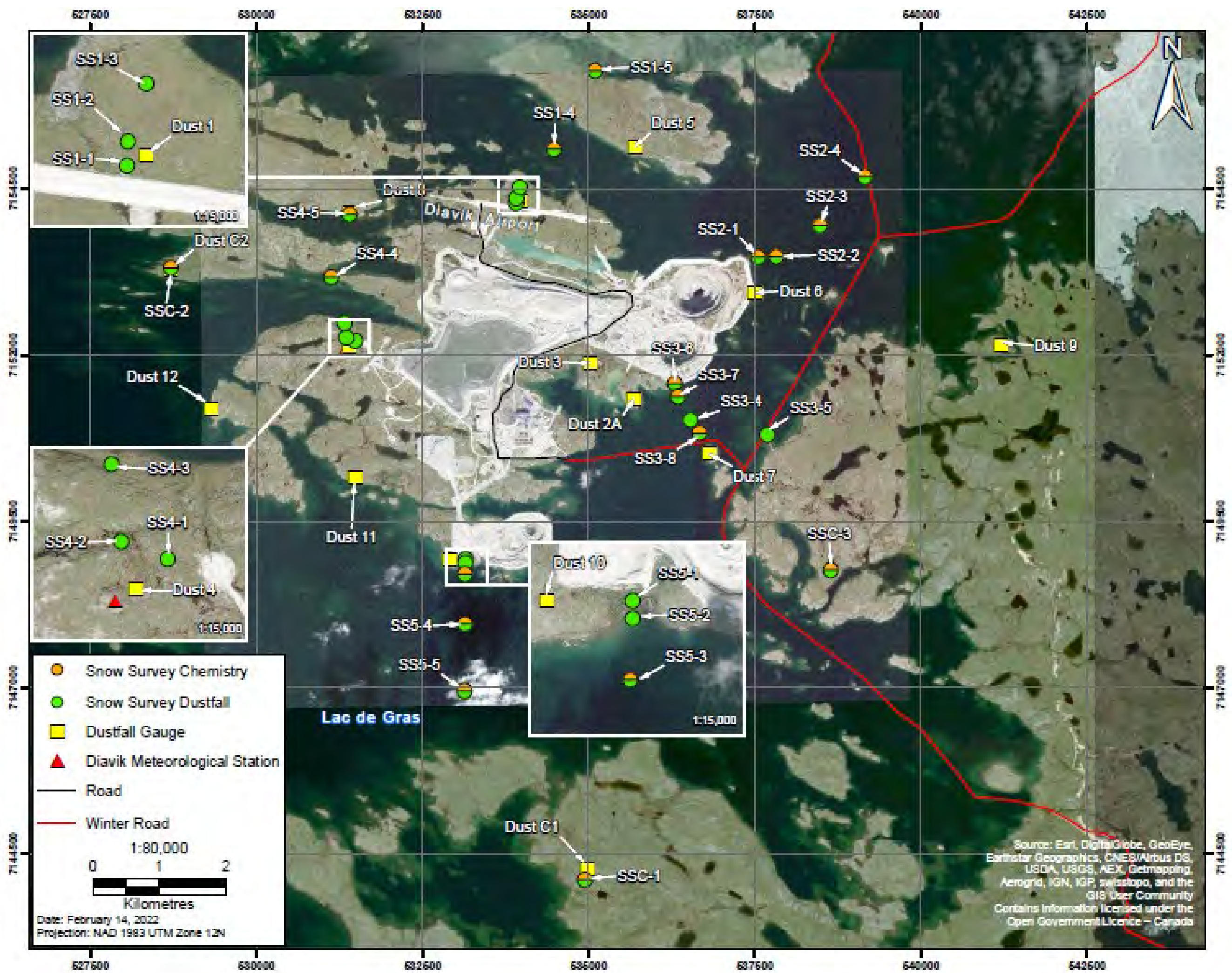
2.2.1 Dustfall Gauges

Passive sampling of airborne particles was done using dust collection gauges. A dust gauge is a hollow brass cylinder, 52 cm in length and 12.5 cm in diameter, surrounded by a fibreglass shield with the shape of an inverted bell (Photo 2-1). Dustfall gauges were placed at 14 stations (including two control stations) around the Project at distances ranging from approximately 13 to 4,646 m from mining operations (Figure 2-1). All fourteen stations collected dustfall year-round, with samples collected every three months from late 2020 to early 2022, for an average total sampling period of 352 days. The dry weight of the material collected in the gauges was recorded, and the mean daily dustfall rate over the collection period was estimated.

The Northwest Territories has no guidelines or objectives for dustfall deposition. Estimated dustfall rates were, therefore, compared to the Alberta Ambient Air Quality Objectives and Guidelines for dustfall (AEP 2019), which are used only as general performance indicators and are not a regulatory requirement in compliance evaluation. The Alberta Ambient Air Quality Guidelines for dustfall include a guideline for residential and recreational areas (i.e., 53 mg/dm^2 per 30 days, or 646 mg/dm^2 per year), and a guideline for commercial and industrial areas where higher dustfall rates are expected (i.e., 158 mg/dm^2 per 30 days, or 1,924 mg/dm^2 per year).

Photo 2-1 Dustfall gauge during sample collection. The dustfall gauge consisted of a hollow brass cylinder (centre) housed inside a Nipher snow gauge (right).

Figure 2-1 Dustfall Gauge and Snow Core Survey Sampling Stations, 2021



2.2.2 Snow Core Surveys

In the snow core surveys, a cylindrical section of snow was collected by drilling into the snowpack with a hollow tube (Photo 2-2). The collected snow was then brought back to the laboratory, thawed, filtered, and the residue was dried, and weighed. Mean daily dustfall was calculated over the collection period, and dustfall rates were compared to the Alberta Ambient Air Quality Objectives and Guidelines for dustfall (AEP 2019), which are used only as general performance indicators and are not a regulatory requirement in compliance evaluation.

Snow survey samples were collected along five transects at 27 stations, including three control stations (Figure 2-1). The average total sampling season in 2021 was 162 days for on-ice stations, and 192 days for land stations. The start dates corresponded to the first snowfall for land stations on 01 October 2020, and the period shortly after freeze-up for on-ice stations, 30 October 2021.

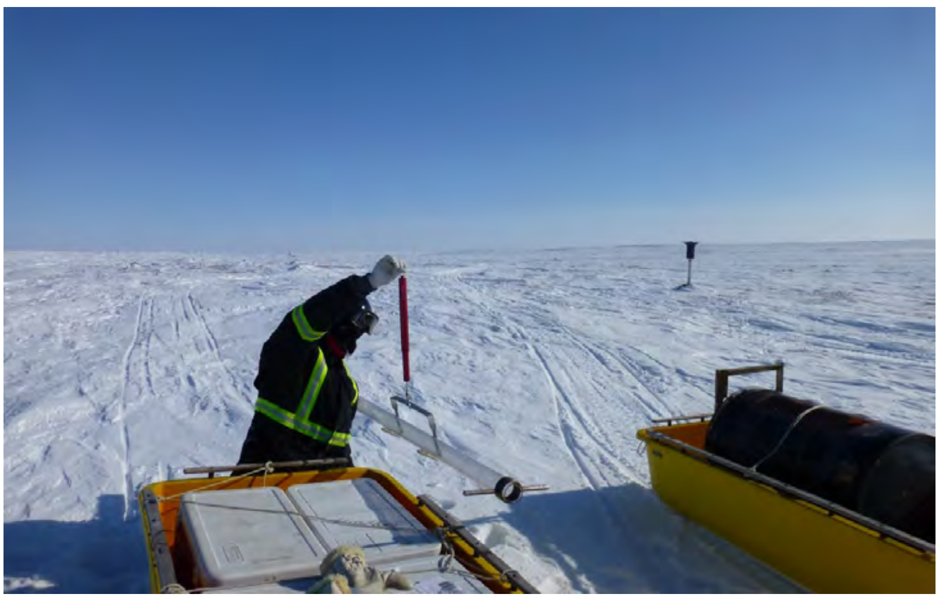


Photo 2-2 Snow core sampling

2.2.3 Snow Water Chemistry

Samples for snow water chemistry analysis were collected using a snow corer at 19 locations, including 16 dustfall snow survey stations located on ice and 3 control locations (on ice adjacent to the control stations) (Figure 2-1). On average, for the 16 sampling locations on ice, the total sampling season was 162 days in 2021 (control stations not included). Snow cores were processed and shipped to Bureau Veritas Laboratories (BV Labs) for water chemistry analyses. Snow water chemistry results were compared to the EQCs outlined in DDMI's Water Licence. Snow chemistry analytes of interest included variables with EQC or a load limit specified in the Water Licence (i.e., aluminum, ammonia, arsenic, cadmium, chromium, copper, lead, nickel, nitrite, phosphorus and zinc).

During the 2021 snow sampling program, snow water volumes were missing for twelve out of twenty-two snow samples (including duplicates). Since the snow water volume is needed for converting total phosphorus (TP) concentrations into areal deposition rate, the average snow water volume (i.e., 3,348 mL) from last three years (i.e., 2019, 2020, and 2021), with a standard deviation of 223 mL, was used as a surrogate for the missing snow water volume for the TP deposition calculations.

2.3 Results and Discussion

2.3.1 Dustfall Gauges

The total dustfall collected from each dustfall gauge is summarized in Table 2-1 and Figure 2-2. As expected, dustfall levels generally decreased with distance from the Mine site. Annual dustfall estimated from each of the 14 dustfall gauges ranged from 50 to 706 mg/dm^2/y. The highest estimated dustfall rate was measured at Dust 3 (706 mg/dm^2/y; 22 m from the Mine perimeter). The second highest estimated dustfall rate was measured at Dust 10 (669 mg/dm^2/y; 46 m from the Mine perimeter). The lowest dustfall rate was recorded at Dust 9 (50 mg/dm^2/y; 3,796 m to the east). Control stations Dust C1 (98 mg/dm^2/y; 4,646 m to the south) and Dust C2 (101 mg/dm^2/y; 3,031 m to the west) both recorded higher dustfall rates than Dust 9, which was similar to 2020 results, and is explained by the distance of Dust 9 from the Project footprint, placing it within the control station zone.

The dustfall rates estimated from dustfall gauges in 2021 were slightly higher on average compared to the 2020 rates. Higher recorded dustfall values have been reported since 2018 compared to earlier years, which suggests that dustfall rates from 2018 to 2021 were likely influenced by the surface activity at the Mine (e.g., the A21 open pit). The 2021 annualized dustfall rates estimated from gauges at all stations were below the upper limit of the Alberta Ambient Air Quality Objectives and Guidelines for dustfall (1,922 mg/dm^2/y), which is applied to commercial and industrial areas (AEP 2019).

2.3.2 Snow Core Surveys

The total dustfall collected from each snow survey station is summarized in Table 2-1 and Figure 2-2. Annual dustfall rates estimated from 2021 snow survey data ranged from 6 to 1,648 mg/dm^2/y. In general, dustfall rates decreased with increasing distance from the Mine site, with the greatest dust deposition rate recorded at SS5-1 (1,648 mg/dm^2/y) followed by SS1-1 (1,102 mg/dm^2/y). SS1-1 is located due north of the airstrip, which explains the higher levels of dustfall; this site recorded the highest dustfall rates from 2017 to 2019. (Figure 2-2).

Annualized dustfall rates estimated from snow survey stations in 2021 were generally comparable to 2020 dustfall estimates. Annualized dustfall rates measured at all stations during the 2021 snow survey were below the Alberta Ambient Air Quality Objectives and Guidelines for commercial and industrial areas (AEP 2019).

2.3.3 Snow Water Chemistry

In general, analyte concentrations in snow meltwater decreased with distance from the Mine. Concentrations in 2021 were generally higher compared to recent years for all parameters. The highest concentrations of all variables were less than their corresponding EQC, with one exception (i.e., SS3-6 aluminum of 3,360 µg/L).

Table 2-1 2021 Dustfall Deposition Results

Zone	Station	Approximate Distance from 2021 Mine Footprint (m)	Dustfall ($mg/dm^2/y$)
0 to 100 m	Dust 1	70	386
	Dust 3	22	706
	Dust 6	13	188
	Dust 10	46	669
	SS1-1	30	1102
	SS3-6	35	311
	SS4-1	61	105
	SS5-1	26	1,648
	SS5-2	55	276
	Mean (SD)		599 (502)
	95% Confidence Interval (Mean ±)		386
	Lower to Upper Limit of 95% Confidence Interval		(213 – 985)
	Median		173
101 to 250 m	Dust 4	173	173
	SS1-2	115	115
	SS2-1	145	145
	SS3-7	239	239
	SS4-2	196	196
	Mean (SD)		233 (214)
	95% Confidence Interval (Mean ±)		265
	Lower to Upper Limit of 95% Confidence Interval		(0 – 498)
	Median		173
251 to 1,000 m	Dust 2	425	373
	Dust 11	747	664
	SS1-3	260	64
	SS1-4	899	22
	SS2-2	427	6
	SS3-4	585	63
	SS3-8	826	106
	SS4-3	335	59
	SS5-3	259	833
	SS5-4	941	67
	Mean (SD)		226 (297)
	95% Confidence Interval (Mean ±)		212
	Lower to Upper Limit of 95% Confidence Interval		(14 – 438)
	Median		66

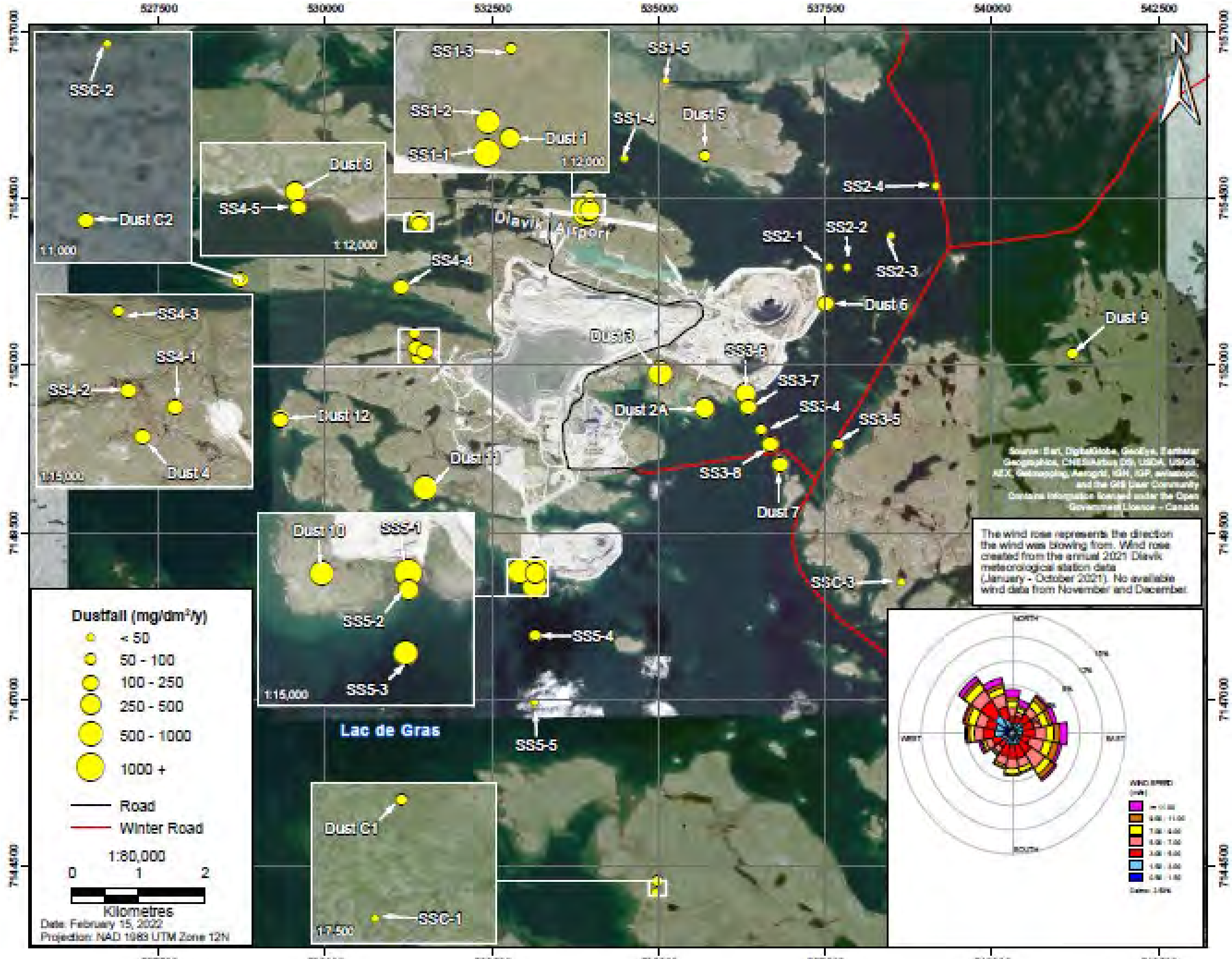
Table 2-2 2021 Dustfall Deposition Results (continued)

Zone	Station	Approximate Distance from 2020 Mine Footprint (m)	Dustfall ($mg/dm^2/y$)
1,001 to 2,500+ m	Dust 5	1,183	84
	Dust 7	1,147	174
	Dust 8	1,213	279
	Dust 12	2,326	185
	SS1-5	2,175	8
	SS2-3	1,194	6
	SS2-4	2,164	24
	SS3-5	1,325	71
	SS4-4	1,022	116
	SS4-5	1,214	210
	SS5-5	1,894	19
	Dust 9	3,796	50
	Mean (SD)		107 (93)
	95% Confidence Interval (Mean ±)		63
	Lower to Upper Limit of 95% Confidence Interval		(44 – 170)
	Median		84
Control	Dust C1	4,646	98
	Dust C2	3,031	101
	Control 1	4,802	14
	Control 2	3,042	36
	Control 3	3,550	21
	Mean (SD)		54 (43)
	95% Confidence Interval (Mean ±)		53
	Lower to Upper Limit of 95% Confidence Interval		(1 – 107)
	Median		36
Reference Levels[a]			646 and 1,922

a) Alberta Ambient Air Quality Objectives and Guidelines for dustfall for residential and commercial or industrial areas, respectively (AEP 2019).

SD = standard deviation; ± = plus or minus; $mg/dm^2/y$ = milligrams per square decimetre per year.

Figure 2-2 Dustfall Results, 2021



3 EFFLUENT AND WATER CHEMISTRY

3.1 Introduction and Objectives

Substances released from the Mine must enter the water of Lac de Gras before aquatic organisms can be exposed to them and potentially affected by them. Water quality represents a valuable early-warning indicator of potential effects on aquatic life in Lac de Gras. The objective of the water quality monitoring component of the AEMP is to assess the effects of Mine effluent and other Mine-related stressors on water quality in Lac de Gras.

The following is a summary of the 2021 effluent and water chemistry program. The Effluent and Water Chemistry Report (Appendix II) presents detailed results.

3.2 Methods

In total, water quality samples were collected at 23 stations in 2021 (Figure 1-2). Sampling occurred at five stations in the NF area (i.e., NF1 to NF5), multiple stations located along transects in the MF areas (i.e., MF1, MF2, and MF3) and two FF stations (i.e., FF1-2 and FFD-1). Three stations were located in the MF1 area (i.e., MF1-1, MF1-3, MF1-5), four stations in the MF2 area (i.e., MF2-1, MF2-3, FF2-2, FF2-5), and seven stations in the larger MF3 area (i.e., MF3-1 to MF3-7). Single stations were sampled at the Lac du Sauvage outflow to Lac de Gras (LDS-4) and the Lac de Gras outflow to the Coppermine River (LDG-48).

The AEMP water quality sampling was carried out over two monitoring seasons: ice-cover and open-water. During the ice-cover season, samples were collected in late winter, from 19 April to 9 May 2021. Open-water sampling was completed from 15 August to 15 September 2021. The same locations were sampled in each season, with the exception of LDS-4, which was sampled in the open-water season only.

Stations in the NF and MF areas were approximately 20 m deep and sampled at three depths (i.e., top, middle, and bottom) during each season, as these stations water quality varied by depth due to the Mine discharge (i.e., reflecting the vertical position of the effluent plume). Near-surface water samples (i.e., top) were collected at a depth of 2 m below the water surface or top of the ice, and bottom samples were collected at 2 m above the lake bottom. Middle samples were collected from the mid-point of the total water column depth. Stations FF1-2, FFD-1, LDG-48, and LDS-4 were sampled at mid-depth only.

Data from the Surveillance Network Program (SNP) were incorporated into the 2021 AEMP report. Effluent samples were collected once every six days from the NIWTP from both diffusers (i.e., stations SNP 1645-18 and SNP 1645-18B), and monthly at the mixing zone boundary (i.e., stations SNP 1645-19A, SNP 1645-19B2, and SNP 1645-19C). The SNP sampling period summarized in this report extended from 1 November 2020 to 31 October 2021.

Water samples were sent to BV Labs in Edmonton or Calgary, Alberta (AB), Canada for chemical analysis. Additionally, water samples were analyzed for ammonia by both BV Labs in Edmonton or Calgary, AB, Canada, and ALS Laboratories (ALS) in Vancouver, BC, Canada. Field measurements of water quality were also taken at AEMP stations by lowering a water quality meter (YSI) slowly down to the bottom of the lake while recording the measurements of temperature, dissolved oxygen (DO) concentration, conductivity, turbidity, and pH.

Initial data analyses were conducted to identify substances of interest (SOIs), which are a subset of variables with the potential to show Mine-related effects. The intent of defining SOIs was to identify a meaningful set of variables that would undergo further analyses, while limiting analyses on variables that were less likely to be affected. The selection of SOIs considered concentrations in the final effluent (i.e., at stations SNP 1645-18 and SNP 1645-18B), and in the fully-mixed exposure area of Lac de Gras, according to four criteria based on comparisons to EQC, comparisons of mixing zone data to AEMP Effects Benchmarks, Action Level assessment results, and the potential for dust deposition effects.

The following analyses were completed on SOIs:

- an examination of loads in Mine effluent and effluent chemistry (i.e., from SNP 1645-18 and 1645-18B)
- an examination of water chemistry at the edge of the mixing zone (i.e., from SNP 1645-19A, 1645-19B2, and 1645-19C)
- an assessment of magnitude and extent of effects, as defined by the Action Levels in the Response Framework for water quality
- an evaluation of spatial trends in SOI concentrations with distance from the diffusers, including an evaluation of spatial trends in SOI concentrations along the MF transects
- an examination of potential effects from dust deposition, for SOIs that exceeded Action Level 1 in the zone of influence (ZOI) from dust deposition in Lac de Gras

Water quality variables were assessed for a Mine-related effect according to the Response Framework for water chemistry per *AEMP Design Plan Version 5.2* (Golder 2020a) as presented in Table 3-1. Magnitude of effects on water chemistry variables was evaluated by comparing variable concentrations between NF, MF, and FF sampling areas, reference conditions, and benchmark values. Reference conditions for Lac de Gras are those that fall within the range of natural variability, referred to as the normal range. The normal ranges used in the Action Level screening for water quality are described in the *AEMP Reference Conditions Report Version 1.4* (Golder 2019a).

The water quality benchmark values used in the Action Level assessment, otherwise known as Effects Benchmarks, are intended to protect human health or aquatic life. They are based on the Canadian Water Quality Guidelines (CWQGs) for the protection of aquatic life (CCME 1999), the Canadian Drinking Water Quality Guidelines (Health Canada 1996, 2020), guidelines from other jurisdictions (e.g., provincial and state guidelines), adaptations of general guidelines to site-specific conditions in Lac de Gras (DDMI 2007), or values from the scientific literature. Effects were assessed separately for the ice-cover and open-water seasons.

Effluent was tested to evaluate whether Mine effluent had the potential to cause toxic responses in the biota in Lac de Gras using standardized toxicity tests. The results of toxicity testing were carried out on effluent samples from stations SNP 1645-18 and SNP 1645-18B. Effluent samples were submitted to BV Labs in Burnaby, BC, Canada, or Edmonton, AB, Canada and Nautilus Environmental in Burnaby for toxicity testing.

An analysis of dust effects at stations potentially affected by dust emissions was also conducted. The ZOI from dust deposition in Lac de Gras was estimated to extend between 3.7 and 4.8 km from the geographic centre of the Mine (Mine centroid), or between 0.3 and 4.2 km from the boundary of the Mine footprint. The AEMP sampling stations that fall within the expected ZOI from dust deposition include the five stations in the NF area and stations MF1-1, MF3-1, MF3-2, and MF3-3[6].

[6] The list of stations included in the dust ZOI is based on the revised ZOI delineated in the *2017 to 2019 Aquatic Effects Re-evaluation Report* (Golder 2020b). Station MF2-1 was previously considered to be within in the ZOI but is no longer expected to be measurably affected by dust. Station MF3-3 now falls within the revised dust ZOI.

Table 3-1 Action Levels for Water Chemistry, Excluding Indicators of Eutrophication

Action Level	Magnitude of Effect[a]	Extent of Effect	Action/Note
1	Median of NF greater than two times the median of reference dataset[b] (open-water or ice-cover) and strong evidence of link to Mine	NF	Early warning.
2	5th percentile of NF values greater than 2 times the median of reference areas AND normal range[b]	NF	Establish Effects Benchmark if one does not exist.
3	75th percentile of MZ values greater than normal range plus 25% of Effects Benchmark[c]	MZ	Confirm site-specific relevance of Effects Benchmark. Establish Effects Threshold. Define the Significance Threshold if it does not exist. The WLWB to consider developing an EQC if one does not exist
4	75th percentile of MZ values greater than normal range plus 50% of Effects Threshold[c]	MZ	Investigate mitigation options.
5	95th percentile of MZ values greater than Effects Threshold	MZ	The WLWB to re-assess EQC. Implement mitigation required to meet new EQC if applicable.
6	95th percentile of NF values greater than Effects Threshold + 20%	NF	The WLWB to re-assess EQC. Implement mitigation required to meet new EQC if applicable.
7	95th percentile of MF values greater than Effects Threshold + 20%	MF	The WLWB to re-assess EQC. Implement mitigation required to meet new EQC if applicable.
8	95th percentile of FFB values greater than Effects Threshold + 20%	FFB	The WLWB to re-assess EQC. Implement mitigation required to meet new EQC if applicable.
9	95th percentile of FFA values greater than Effects Threshold + 20%	FFA	Significance Threshold.[d]

a) Calculations are based on pooled data from all depths.

b) Normal ranges and reference datasets are obtained from the *AEMP Reference Conditions Report Version 1.4* (Golder 2019a); the normal range for open-water was based on the 15 August to 15 September period. In cases where the reference area median value reported in the reference conditions report was equal to the detection limit, half the detection limit was used to calculate the 2 x reference area median criterion, to be consistent with data handling methods used for the AEMP.

c) Indicates 25% or 50% of the difference between the Effects Benchmark/Threshold and the top of the normal range.

d) Although the Significance Threshold is not an Action Level, it is presented as the highest Action Level to show escalation of effects towards the Significance Threshold.

NF = near-field; MZ = mixing zone; MF = mid-field; FF = far-field; WLWB = Wek'èezhìı Land and Water Board; EQC = Effluent Quality Criteria.

3.3 Results and Discussion

3.3.1 Substances of Interest

Water quality variables measured in Lac de Gras as part of the 2021 AEMP were assessed for a Mine-related effect according to Action Levels as defined in the *AEMP Design Plan Version 5.2* (Golder 2020a). Twenty-three variables met the criteria for inclusion as SOIs in 2021 (Table 3-2).

Table 3-2 Water Quality Substances of Interest, 2021

Substance of Interest	Substances of Interest Criteria			
	1 Effluent Screening	2 Mixing Zone Screening	3 Action Level 1	4 Potential Dust Effects
Conventional Parameters				
Total dissolved solids, calculated	-	-	X	X
Turbidity – lab	-	-	X	X
Major Ions				
Calcium (dissolved)	-	-	X[(a)]	X[(a)]
Chloride	-	-	X	X
Magnesium (dissolved)	-	-	X[(a)]	-
Potassium (dissolved)	-	-	X[(a)]	-
Sodium (dissolved)	-	-	X[(a)]	X[(a)]
Sulphate	-	-	X	X
Nutrients				
Ammonia	-	-	X	X
Nitrate	-	-	X	X
Total Metals				
Aluminum	-	-	X	-
Antimony	-	-	X	-
Barium	-	-	X	-
Boron	-	-	-	X
Chromium	-	-	X	X
Copper	-	-	X	-
Lithium	-	-	-	X
Manganese			X	-
Molybdenum	-	-	X	X
Silicon	-	-	X	-
Strontium	-	-	X	X
Uranium	-	-	X	X
Zinc	-	-	-	X

a) Both the total and dissolved fractions triggered Action Level 1. To avoid redundancy and match methods from previous annual reports, the analysis was conducted on the dissolved fraction only.

X = criterion met; - = criterion not met.

3.3.2 Effluent Quality

The monthly loads of total dissolved solids (TDS) and associated ions (i.e., calcium, chloride, magnesium, potassium, sodium, and sulphate) from the NIWTP remained either within a similar range (i.e., calcium and chloride) or generally decreased (i.e., TDS, magnesium, potassium, sodium, sulphate) through April, reflecting the monthly volume of effluent discharged (Figure 3-1). The loads of these SOIs increased during the late ice-cover season, peaking in May (i.e., calcium and chloride) or June (i.e., TDS, magnesium, potassium, sodium, and sulphate) before decreasing in July, increasing again in August, and then decreasing through the remainder of the open-water season as flow rates from the NIWTP decreased.

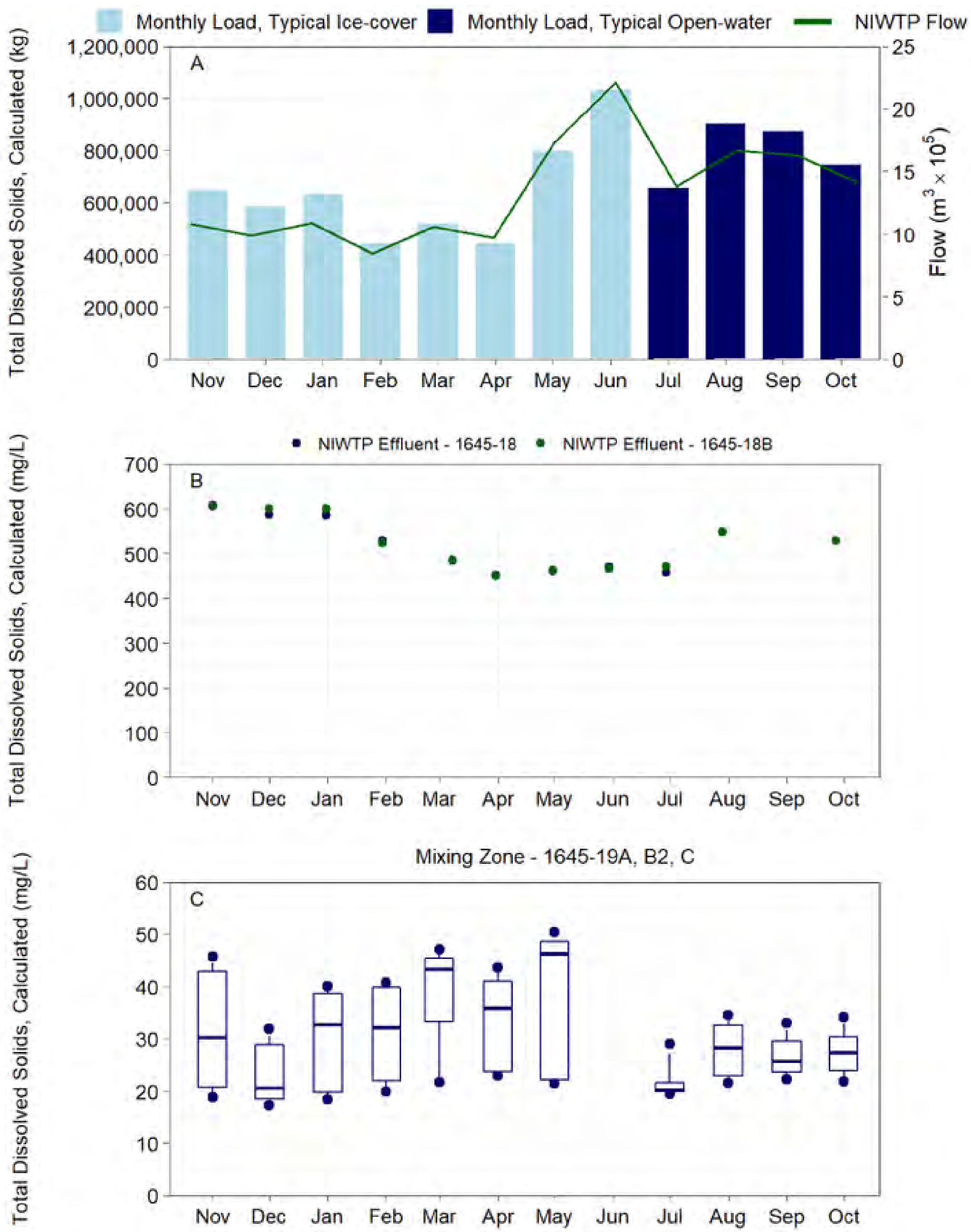
The monthly loading rate of ammonia increased from November to December, decreased through April, and then increased again through late ice-cover before subsequently decreasing to a lower level throughout the open-water season. The seasonal trend in the loading rate of nitrate reflected trends both in the effluent flow rate and concentration in effluent. The load and concentration of nitrate generally declined through the early ice-cover season from November to April, and then increased through late ice-cover to peak in June, after which it decreased in July, increased again in August, before decreasing again in September and October.

In general, the monthly loading rates of total metal SOIs either reflected trends in the effluent flow rate or chemistry, or were influenced by a combination of the two. The seasonal pattern in the concentrations of variables in the effluent over the reporting period were variable-specific. Concentrations of most total metal SOIs in the effluent were greater than the concentrations measured at the mixing zone boundary, indicating that the Mine effluent is a source of these variables to Lac de Gras. One exception was copper, which had generally lower concentrations in the effluent than those recorded at the mixing zone boundary. The concentrations of most of these SOIs at the mixing zone boundary were generally more variable during the ice-cover season than during the open-water season.

The water chemistry monitoring data collected from the NIWTP final discharge (i.e., SNP 1645-18 and SNP 1645-18B) were compared to the EQC defined in the Water Licence. Concentrations of variables in effluent with EQC were below applicable EQC.

Water chemistry at the mixing zone boundary was compared to the relevant AEMP water quality Effects Benchmarks for the protection of aquatic life and drinking water. None of the pH values measured at the mixing zone boundary in 2021 exceeded the upper limits of the aquatic life and drinking water Effects Benchmarks (i.e., 8.5 and 10.5). However, pH values measured at the mixing zone boundary in 2021 were below the drinking water Effects Benchmark value of 7.0 in 95% of samples and below the aquatic life Effects Benchmark value of 6.5 in 49% of samples. Because the pH of the Mine effluent was slightly alkaline (median pH of 7.4) and the pH throughout Lac de Gras was often below the aquatic life Effects Benchmark of 6.5, during both ice-cover and open-water conditions at various depths, and over time (i.e., 2002 to 2020; Golder 2020b, 2021), these exceedances were attributed to natural conditions and unrelated to the Mine discharge. Therefore, pH was not considered an SOI.

Figure 3-1 Total Dissolved Solids, Calculated: A) Monthly Loading Rate from the North Inlet Water Treatment Plant, B) Concentration in Effluent (SNP 1645-18 and SNP 1645-18B), and C) Concentration at the Mixing Zone Boundary (SNP 1645-19), 1 November 2020 to 31 October 2021



Notes: Effluent values represent concentrations in individual samples. Mixing zone boxplots represent the 10th, 25th, 50th (median), 75th, and 90th percentile concentrations at three stations (i.e., 1645-19A, 1645-19B2, 1645-19C) and five depths (i.e., 2 m, 5 m, 10 m, 15 m, and 20 m); filled symbols represent the 5th and 95th percentile concentrations. The mixing zone samples could not be collected in June 2021 due to unsafe ice conditions.
NIWTP = North Inlet Water Treatment Plant; SNP = Surveillance Network Program.

3.3.2.1 Effluent Toxicity

Toxicity testing results in 2021 indicated that effluent samples were not toxic to aquatic organisms. These results are consistent with results in previous years, which have also indicated that the Mine effluent is non-toxic.

3.3.3 Depth Profiles

Depth profiles were prepared for conductivity, DO, water temperature, pH, and turbidity at AEMP stations. The greater specific gravity of the effluent, combined with the absence of wind and wave-driven mixing during ice-cover conditions, resulted in elevated conductivity in the bottom two thirds of the water column in the NF area. Complete vertical mixing of the effluent was observed at most stations along the MF transects. During the open-water season, specific conductivity was typically uniform throughout the water column.

During the ice-cover season, water temperature in Lac de Gras increased gradually with depth at most stations. Turbidity was typically uniform throughout the water column, while DO decreased with depth, and pH values were typically uniform throughout the water column or decreased with depth. During the open-water season, temperature, turbidity, DO and pH were typically uniform throughout the water column.

3.3.4 Assessment of Effects and Action Levels

Twenty variables triggered Action Level 1, which is considered an early-warning indication of effects in the NF area (Table 3-3). Most of these variables were measured in the NIWTP effluent at concentrations greater than the concentration in Lac de Gras. The exceptions were copper (which generally had similar to lower concentrations in the effluent than in Lac de Gras), turbidity (which had similar values in the effluent as in Lac de Gras), and ammonia and manganese (which at times in the open-water season had similar concentrations in the effluent to those in Lac de Gras). No management action is required under the Response Framework when a water quality variable triggers Action Level 1.

Of the 20 variables that triggered Action Level 1, 9 also triggered Action Level 2 (Table 3-3). In most cases, Action Level 2 was triggered during both the ice-cover and open-water seasons. The exception was silicon, which triggered Action Level 2 only during the ice-cover season. Under the Response Framework, when a water quality variable triggers Action Level 2, the required management action is to establish an AEMP Effects Benchmark for that variable if one does not already exist. Each of the nine variables that triggered Action Level 2 in 2021 have existing Effects Benchmarks, and therefore no action was required. None of the SOIs evaluated triggered Action Level 3 in 2021.

Table 3-3 Action Level Summary for Water Quality Substances of Interest, 2021

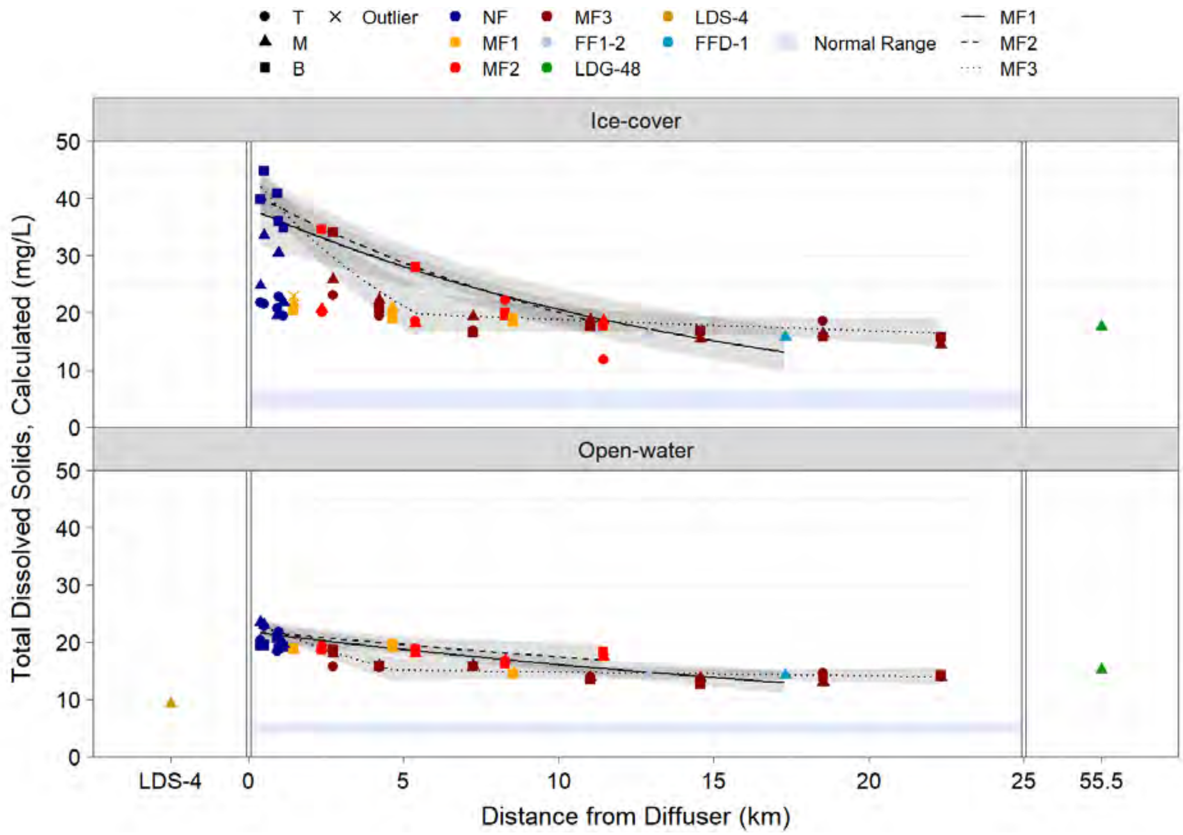
2020 SOIs	Action Level Classification
Conventional Parameters	
Total dissolved solids, calculated	2
Turbidity – lab	1
Major Ions	
Calcium (dissolved)	1
Chloride	2
Magnesium (dissolved)	1
Potassium (dissolved)	1
Sodium (dissolved)	2
Sulphate	2
Nutrients	
Ammonia	1
Nitrate	2
Total Metals	
Aluminum	1
Antimony	1
Barium	1
Chromium	1
Copper	1
Manganese	1
Molybdenum	2
Silicon	2
Strontium	2
Uranium	2

SOI = substance of interest; 1 = Action Level 1 triggered; 2 = Action Level 2 triggered.

3.3.5 Gradient Analysis

Spatial trends of decreasing concentrations with distance from the Mine effluent discharge were evident for most variables that triggered Action Levels. An exception was turbidity, which had an increasing trend with distance from the Mine effluent discharge in the ice-cover season. Spatial trends were generally more pronounced during the ice-cover season than during open-water conditions. An example showing the plot developed for TDS is provided in Figure 3-2.

Figure 3-2 Concentrations of Total Dissolved Solids (Calculated) According to Distance from the Effluent Discharge, 2021



Note: Values represent concentrations in individual samples collected at top, middle and bottom depths. Shaded bands around fitted prediction lines are 95% confidence intervals (back-transformed to original scale of the variable).

T = top depth; M = middle depth; B = bottom depth; NF = near-field; MF = mid-field; FF = far-field; LDG = Lac de Gras; LDS = Lac du Sauvage.

3.3.6 Effects from Dust Deposition

In 2021, median concentrations of 15 SOIs met Criterion 4 (Table 3-2) because they exceeded two times the median of the reference dataset at one or more of the four MF area stations located within the estimated ZOI from dust deposition (Section 3.3.1). Of the 15 SOIs, 12 also triggered Action Level 1 in the NF area, indicating that the exceedances of the dust criterion at the MF stations were likely caused by dispersion of Mine effluent into the lake. Compared to the highest NF median concentrations, four SOIs were elevated at one or more of the four MF stations. These results indicate that the elevated values within the ZOI may not be solely related to dispersion of effluent in the lake. Turbidity exceeded the criterion at MF1-1 and concentrations of chromium exceeded the criterion at MF3-1. Both turbidity and chromium also triggered Action Level 1 in the NF area. While there is some potential that these elevated values may be related to dust deposition, this interpretation is not supported by similar increases at the other stations within the ZOI. Concentrations of boron and lithium exceeded the criterion at MF1-1 and MF3-1, respectively, but did not trigger Action Level 1 in the NF area in either season, indicating that the increases at the MF stations may not be solely related to effluent. Overall, analysis of the 2021 AEMP water quality data indicate that effluent is the main source of Mine effects on Lac de Gras, with a negligible contribution from dust deposition.

4 EUTROPHICATION INDICATORS

4.1 Introduction and Objectives

One of the more important predictions from the EA was that operation of the Mine would release nutrients (i.e., nitrogen and phosphorus) into Lac de Gras. Phosphorus naturally occurs in the groundwater that seeps into the Mine workings. Nitrogen enters minewater as a residue from ammonium nitrate used as an explosive during mining. Although phosphorus is reduced to the lowest level practical in the NIWTP and nitrogen is managed to the extent practical through blasting and water management practices, both phosphorus and nitrogen are found at higher concentrations in the NIWTP effluent compared to baseline concentrations in Lac de Gras.

Lac de Gras is a nutrient-poor (i.e., oligotrophic) lake. Aquatic organisms in the lake, including algae, invertebrates, and fish, live with limited nutrient availability, but have low abundances compared to more productive lakes. It is expected, and was predicted, that increasing the nutrient levels in Lac de Gras would affect aquatic organisms (Government of Canada 1999). The primary effect of nutrient enrichment on Lac de Gras was expected to be an increase in primary productivity (i.e., greater abundance of microscopic plants called algae or phytoplankton), sometimes referred to as eutrophication.

The objective of the eutrophication indicators assessment is to describe the AEMP results for nutrients, chlorophyll *a*, phytoplankton biomass, and zooplankton biomass, which are monitored as indicators of eutrophication. Chlorophyll *a* is the pigment that gives plants their green colour and can be used to measure the amount of algae in the water. Algae or phytoplankton are small aquatic plants, which are the first aquatic organisms to respond to a change in nutrient levels. Zooplankton biomass is a measure of the total mass of tiny animals that live in the water and feed on algae, and is measured as ash-free dry mass (AFDM).

The following is a summary of the 2021 eutrophication indicators program. The Eutrophication Indicators Report (Appendix XIII) provides detailed results.

4.2 Methods

The AEMP eutrophication indicators program was completed over two sampling seasons. The ice-cover sampling was conducted from19 April to 9 May 2021, and the open-water sampling was conducted between 15 August to 15 September 2021. Nutrient samples were collected during both ice-cover and open-water conditions from the NF area, three MF areas (i.e., MF1, MF2, and MF3), and stations FF1-2 and FFD-1 in Lac de Gras, the outlet of Lac de Gras to the Coppermine River (LDG-48), and the Narrows between Lac de Gras and Lac du Sauvage (LDS-4; Figure 1-2). Chlorophyll *a*, phytoplankton biomass, and zooplankton biomass samples were collected during the open-water season, when biological activity was greatest; however, zooplankton samples were not collected from LDG-48 and LDS-4 due to the shallow depths at these AEMP stations.

During the ice-cover season, nutrient samples were collected at three depths (i.e., top, middle, and bottom) at each NF, MF, and FF2 station, and at a single depth (i.e., middle) at the FF1-2, FFD-1, and LDG-48 station.

During the open-water season, samples for nutrients, chlorophyll *a* and phytoplankton biomass were collected using a depth-integrated sampler. This device collected lake water over a range of depths. The top 10 m of the water column was sampled for nutrients, chlorophyll *a* and phytoplankton biomass during the open-water season, because this is the depth where most of the algae are found. Zooplankton samples were collected using a specially designed fine mesh net (i.e., a plankton net) that was pulled up through the entire water column.

The 2021 nutrient and zooplankton biomass samples were analyzed by BV Labs in Edmonton or Calgary, AB, Canada. Soluble reactive silica (SRSi) samples were sent to ALS Laboratories (ALS), Vancouver, British Columbia, Canada. Analysis of samples for total ammonia were completed by both BV Labs and ALS. The total ammonia results used for analysis in 2021 were from ALS for the ice-cover season and from BV Labs for the open-water season. Chlorophyll *a* samples were analyzed by the Biogeochemical Analytical Service Laboratory at the University of Alberta, Edmonton, AB, Canada. Phytoplankton biomass samples were analyzed by Biologica Environmental Services, Ltd. (Biologica), Victoria, British Columbia, Canada.

The 2021 AEMP results were analyzed to identify and understand spatial patterns in relation to the Mine effluent discharge. Data were compared to background values (i.e., normal range) to determine if they fell within the natural range of variability. To assess potential effects from dust emissions on nutrient enrichment in Lac de Gras, open-water phosphorus and chlorophyll *a* concentrations within the estimated ZOI from dust deposition were evaluated visually and compared to results at other nearby stations and the normal range. The magnitude of effects for chlorophyll *a* and TP were evaluated according to Action Levels (Table 4-1).

Table 4-1 Action Levels for Chlorophyll *a* and Total Phosphorus

Action Level	Magnitude of Effect	Extent of Effect	Action/Notes
1	95th percentile of MF values greater than normal range[(a)]	MF station	Early warning.
2	NF and MF values greater than normal range[(a)]	20% of lake area or more	Establish Effects Benchmark.
3	NF and MF values greater than normal range plus 25% of Effects Benchmark[(b)]	20% of lake area or more	Confirm site-specific relevance of existing benchmark. Establish Effects Threshold.
4	NF and MF values greater than normal range plus 50% of Effects Threshold[(c)]	20% of lake area or more	Investigate mitigation options.
5	NF and MF values greater than Effects Threshold	20% of lake area or more	The WLWB to re-assess EQC for phosphorus. Implement mitigation required to meet new EQC if applicable.
6	NF and MF values greater than Effects Threshold +20%	20% of lake area or more	The WLWB to re-assess EQC for phosphorus. Implement mitigation required to meet new EQC if applicable.
7	95th percentile of MF values greater than Effects Threshold +20%	All MF stations	The WLWB to re-assess EQC for phosphorus. Implement mitigation required to meet new EQC if applicable.
8	95th percentile of FFB values greater than Effects Threshold +20%	FFB	The WLWB to re-assess EQC for phosphorus. Implement mitigation required to meet new EQC if applicable.
9[(d)]	95th percentile of FFA values greater than Effects Threshold+20%	FFA	Significance Threshold[(d)].

a) The normal ranges for chlorophyll *a* and total phosphorus were obtained from the *AEMP Reference Conditions Report Version 1.4* (Golder 2019a).
b) Indicates 25% of the difference between the Effects Benchmark and the top of the normal range.
c) Indicates 50% of the difference between the Effects Threshold and the top of the normal range.
d) Although the Significance Threshold is not an Action Level, it is shown as the greatest Action Level to demonstrate escalation of effects towards the Significance Threshold.
NF = near-field; MF = mid-field; FF = far-field; WLWB = Wek'èezhìı Land and Water Board; EQC = Effluent Quality Criteria.

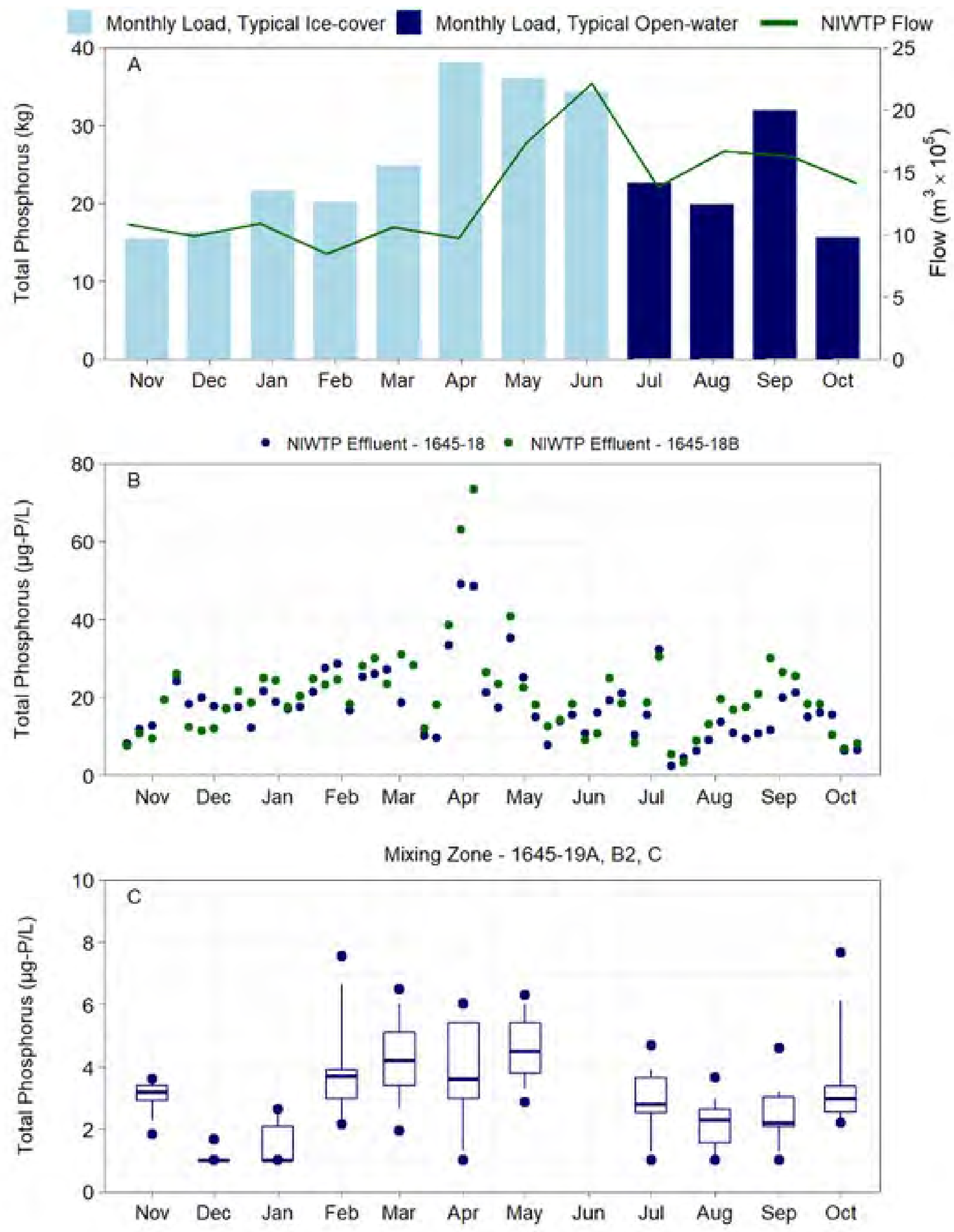
4.3 Results and Discussion

4.3.1 Effluent and Mixing Zone

During 2021, phosphorus loads to Lac de Gras and concentrations in effluent tended to be variable throughout the year, with the highest monthly loads in April, May, June, and September (Figure 4-1). The annual TP load in 2021 was 297 kg, which was similar to the 2020 annual load of 289 kg, and was less than both the monthly and average annual loading criteria of 300 kg/mo and 1,000 kg/yr, respectively, defined in the Water Licence. Concentrations of TP, total dissolved phosphorus (TDP) and soluble reactive phosphorus (SRP) in effluent were generally greater during the ice-cover season, which resulted in greater monthly loads. Patterns in phosphorus concentrations at the mixing zone boundary generally reflected patterns observed in the Mine effluent.

Concentrations and loads of total nitrogen (TN), nitrate, nitrite, and total ammonia in effluent tracked closely together, and followed a similar trend to effluent volume (e.g., Figure 4-2). Most of the TN was present as nitrate in the effluent. On average, loads were greater during the open-water season than in the ice-cover season. Concentrations at the mixing zone boundary generally followed the trends in the effluent. The decreases in concentrations of nitrate and total ammonia between May and July at the mixing zone boundary (Figure 4-3 and Figure 4-4) reflect quick assimilation by algae and bacterial nitrification (Wetzel 2001) during the shift between the seasons.

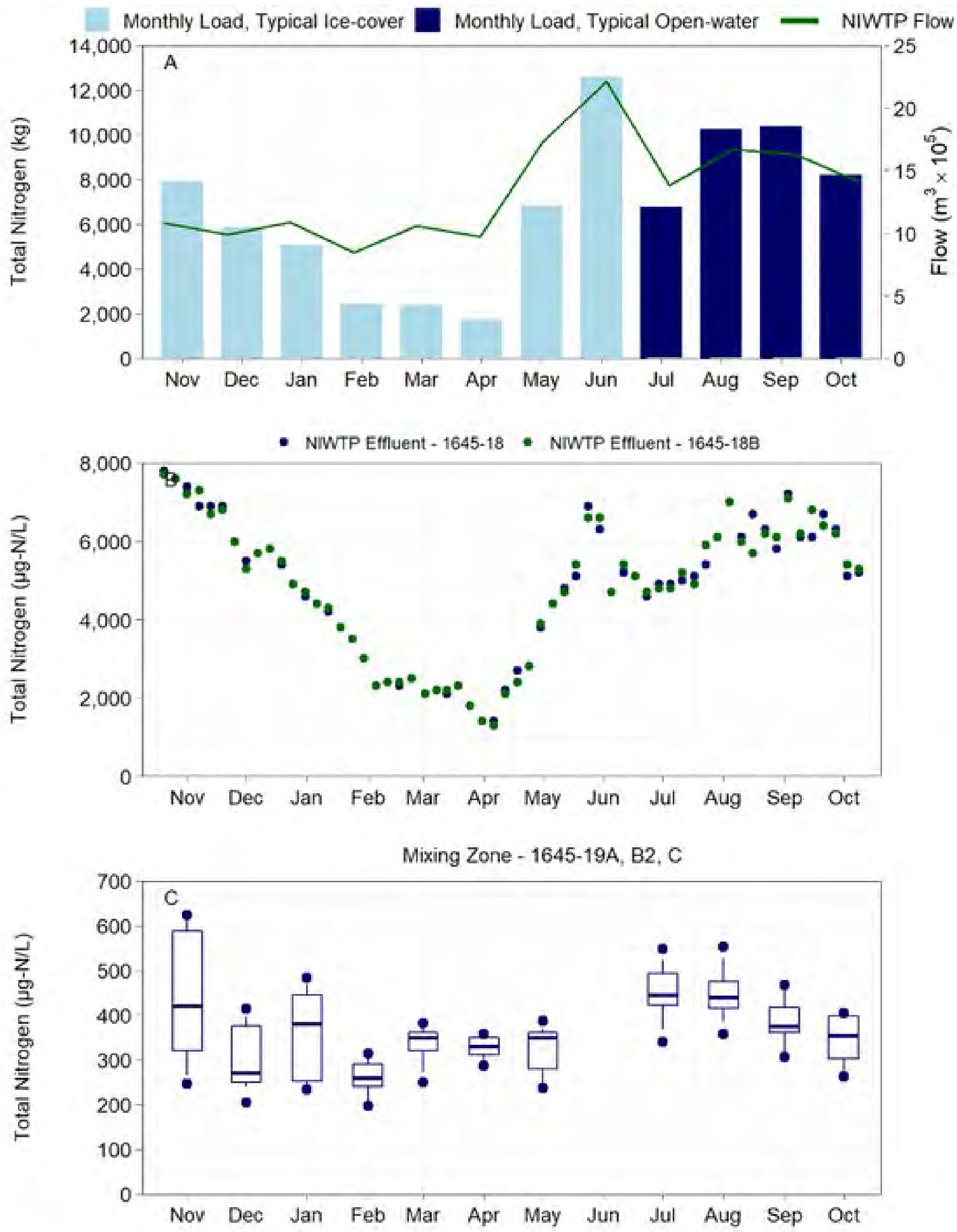
Figure 4-1 Total Phosphorus: A) Monthly Loads in the Effluent, B) Concentrations in the Effluent, C) at the Mixing Zone Boundary, November 2020 to October 2021



Notes: Concentrations in effluent are for individual samples. Mixing zone values represent the monthly 5th percentile, median, and 95th percentile concentrations at three stations (1645-19A, 1645-19B2, 1645-19C) and five depths (2 m, 5 m, 10 m, 15 m and 20 m). The mixing zone samples could not be collected in June 2021 due to hazardous ice conditions. Boxplots represent the 10th, 25th, 50th (i.e., median), 75th, and 90th percentile concentrations in each sampling area. The filled symbols in the boxplots represent the 5th (on the bottom) and 95th (on the top) percentiles.

µg-P/L = micrograms phosphorus per litre; NIWTP = North Inlet Water Treatment Plant.

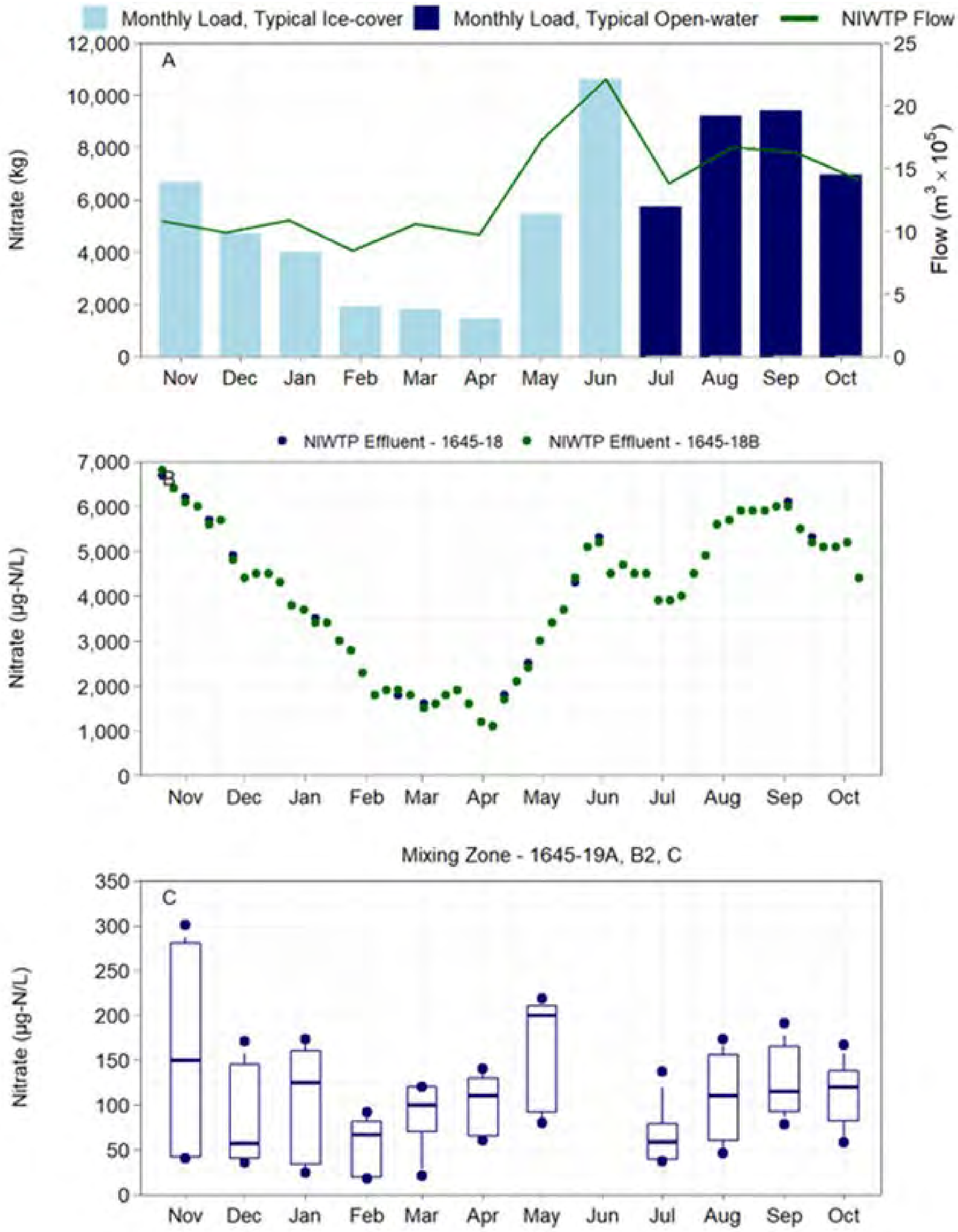
Figure 4-2 Total Nitrogen: A) Monthly Loads in the Effluent, B) Concentrations in the Effluent, C) at the Mixing Zone Boundary, November 2020 to October 2021



Notes: Concentrations in effluent are for individual samples. Mixing zone values represent the monthly 5th percentile, median, and 95th percentile concentrations at three stations (1645-19A, 1645-19B2, 1645-19C) and five depths (2 m, 5 m, 10 m, 15 m and 20 m). The mixing zone samples could not be collected in June 2021 due to hazardous ice conditions. Boxplots represent the 10th, 25th, 50th (i.e., median), 75th, and 90th percentile concentrations in each sampling area. The filled symbols in the boxplots represent the 5th (on the bottom) and 95th (on the top) percentiles.

µg-N/L = micrograms nitrogen per litre; NIWTP = North Inlet Water Treatment Plant.

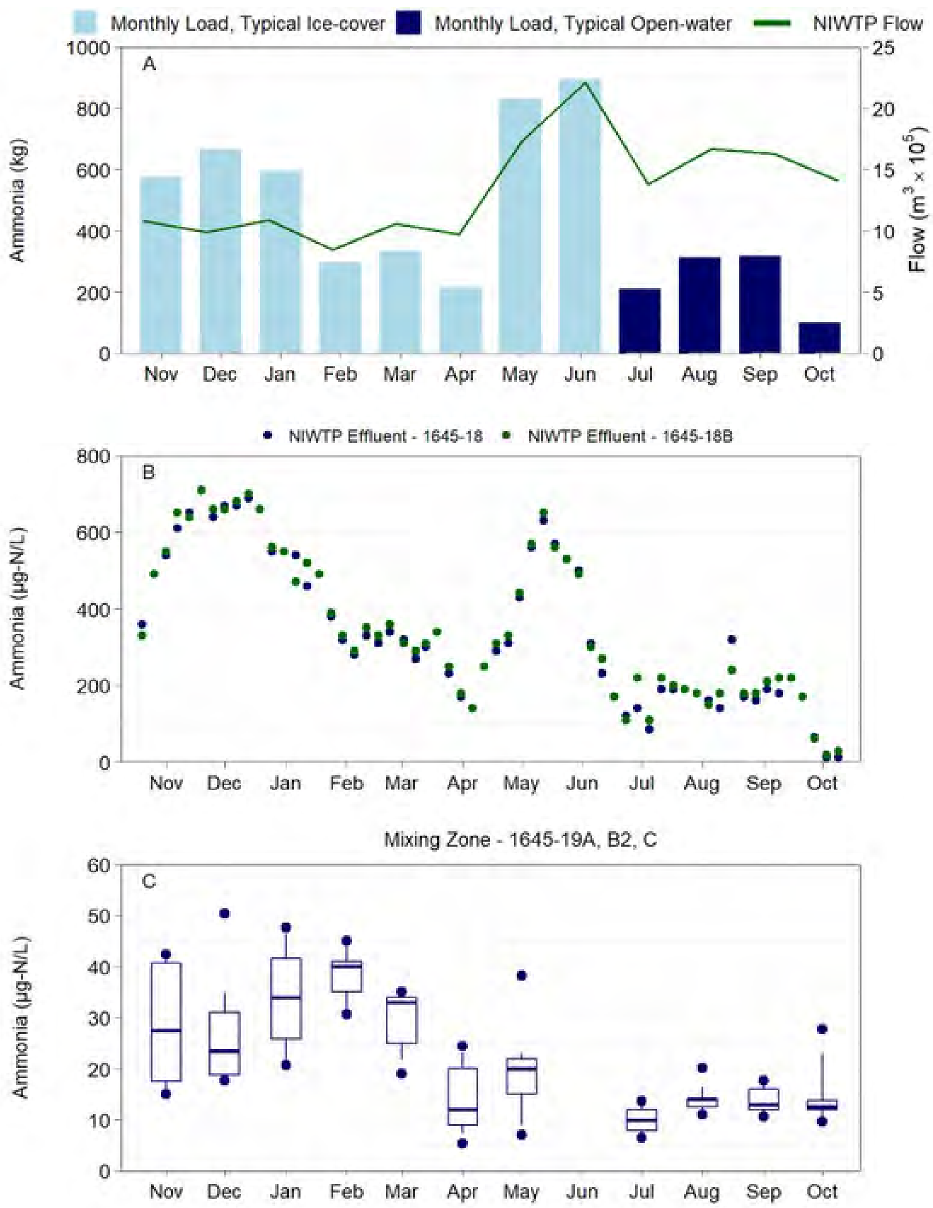
Figure 4-3 Nitrate: A) Monthly Loads in the Effluent, B) Concentrations in the Effluent, C) at the Mixing Zone Boundary, November 2020 to October 2021



Notes: Concentrations in effluent are for individual samples. Mixing zone values represent the monthly 5th percentile, median, and 95th percentile concentrations at three stations (1645-19A, 1645-19B2, 1645-19C) and five depths (2 m, 5 m, 10 m, 15 m and 20 m). The mixing zone samples could not be collected in June 2021 due to hazardous ice conditions. Boxplots represent the 10th, 25th, 50th (i.e., median), 75th, and 90th percentile concentrations in each sampling area. The filled symbols in the boxplots represent the 5th (on the bottom) and 95th (on the top) percentiles.

µg-N/L = micrograms nitrogen per litre; NIWTP = North Inlet Water Treatment Plant.

Figure 4-4 Total Ammonia: A) Monthly Loads in the Effluent, B) Concentrations in the Effluent, C) at the Mixing Zone Boundary, November 2020 to October 2021



Notes: Concentrations in effluent are for individual samples. Mixing zone values represent the monthly 5th percentile, median, and 95th percentile concentrations at three stations (1645-19A, 1645-19B2, 1645-19C) and five depths (2 m, 5 m, 10 m, 15 m and 20 m). The mixing zone samples could not be collected in June 2021 due to hazardous ice conditions. Boxplots represent the 10th, 25th, 50th (i.e., median), 75th, and 90th percentile concentrations in each sampling area. The filled symbols in the boxplots represent the 5th (on the bottom) and 95th (on the top) percentiles.

µg-N/L = micrograms nitrogen per litre; NIWTP = North Inlet Water Treatment Plant.

4.3.2 Lac de Gras

Secchi depth measurements indicated good light penetration in all areas of Lac de Gras, indicating that a large proportion of the total volume of Lac de Gras was within the euphotic zone, and could support phytoplankton growth.

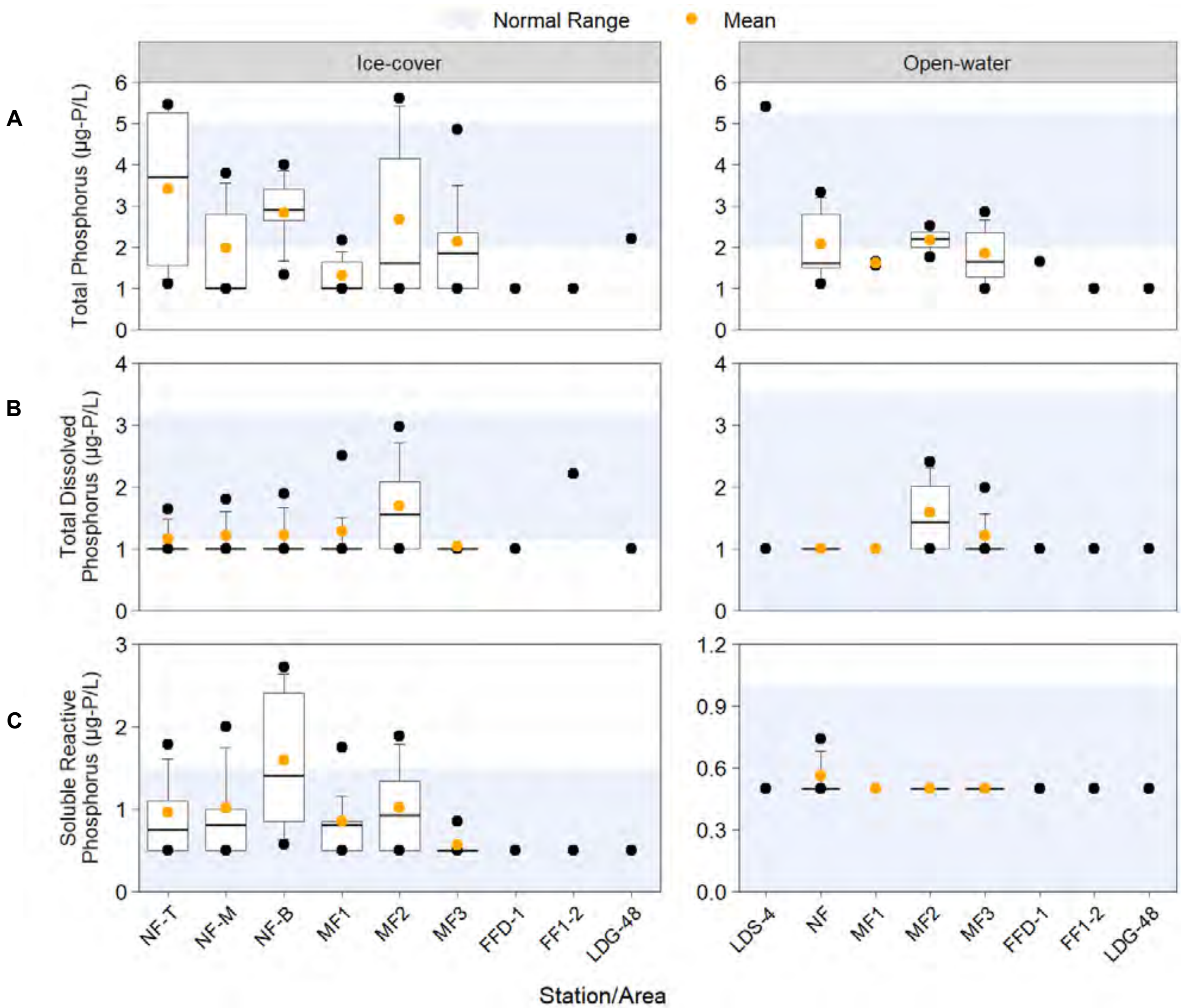
Phosphorus and nitrogen enter Lac de Gras from Mine effluent throughout the year; however, seasonal cycles are apparent in nutrient concentrations in effluent, with concentrations being somewhat higher in the ice-cover season than in the open-water season. Phosphorus concentrations continued to be low in 2021, as observed in 2020, likely due to the lower phosphorus load from effluent compared to previous years. Phosphorus concentrations in the lake were within or below the normal range during the open-water season, but above the normal range at some depths and NF and MF1 stations during the ice-cover season (Figure 4-5). Concentrations of nitrogen species were greater during the ice-cover season compared to the open-water season. Concentrations of TN were greater in the NF area, generally above the normal range, and decreased with distance from the diffuser (Figure 4-6 and Figure 4-7).

Seasonal differences in soluble reactive silica (SRSi) were observed, with greater concentrations during the ice-cover season compared to the open-water season. Concentrations were greater in the NF area, and decreased with distance from diffuser (Figure 4-8). The lower concentrations of dissolved inorganic nutrients (i.e., total ammonia, nitrate + nitrite, SRSi) in Lac de Gras during the open-water season may be the result of quick assimilation of nutrients by bacteria and algae.

Despite low nutrient concentrations compared to a number of previous years, a Mine-related nutrient enrichment effect on the primary producers in Lac de Gras was evident in 2021. This was indicated by the gradient analysis results and spatial trends apparent along transects sampled in Lac de Gras. Chlorophyll *a* concentrations were highest in the NF area and decreased with distance from the diffuser, with all values above the normal range (Figure 4-9), while the effect on total phytoplankton biomass was smaller, with values below normal range in the NF area and at all stations except for MF1-1 (Figure 4-10). Zooplankton biomass responded similarly to chlorophyll *a* , with the highest values in the NF area, which decreased with distance form the diffuser; all values were above the normal range (Figure 4-11). The smaller extent of effects for total phytoplankton biomass was generally consistent with the results for TP but inconsistent with the results for chlorophyll a. It is not clear why chlorophyll *a* concentrations would be elevated without a corresponding increase in phytoplankton biomass, suggesting a potential data quality issue associated with the chlorophyll *a* dataset. Field procedures were reviewed and the analytical laboratory was contacted to verify the 2021 chlorophyll *a* results; this review identified no data quality issues.

Overall, the conclusions from the 2021 AEMP are consistent with those reported in previous AEMPs, in that the Mine is having a nutrient enrichment effect in Lac de Gras, inputs of phosphorus appear to be the main driver of increases in primary productivity, and the main source of Mine-related effects on eutrophication indicators is the effluent. Despite the observed nutrient enrichment, Lac de Gras remains a nutrient-poor (i.e., oligotrophic) lake.

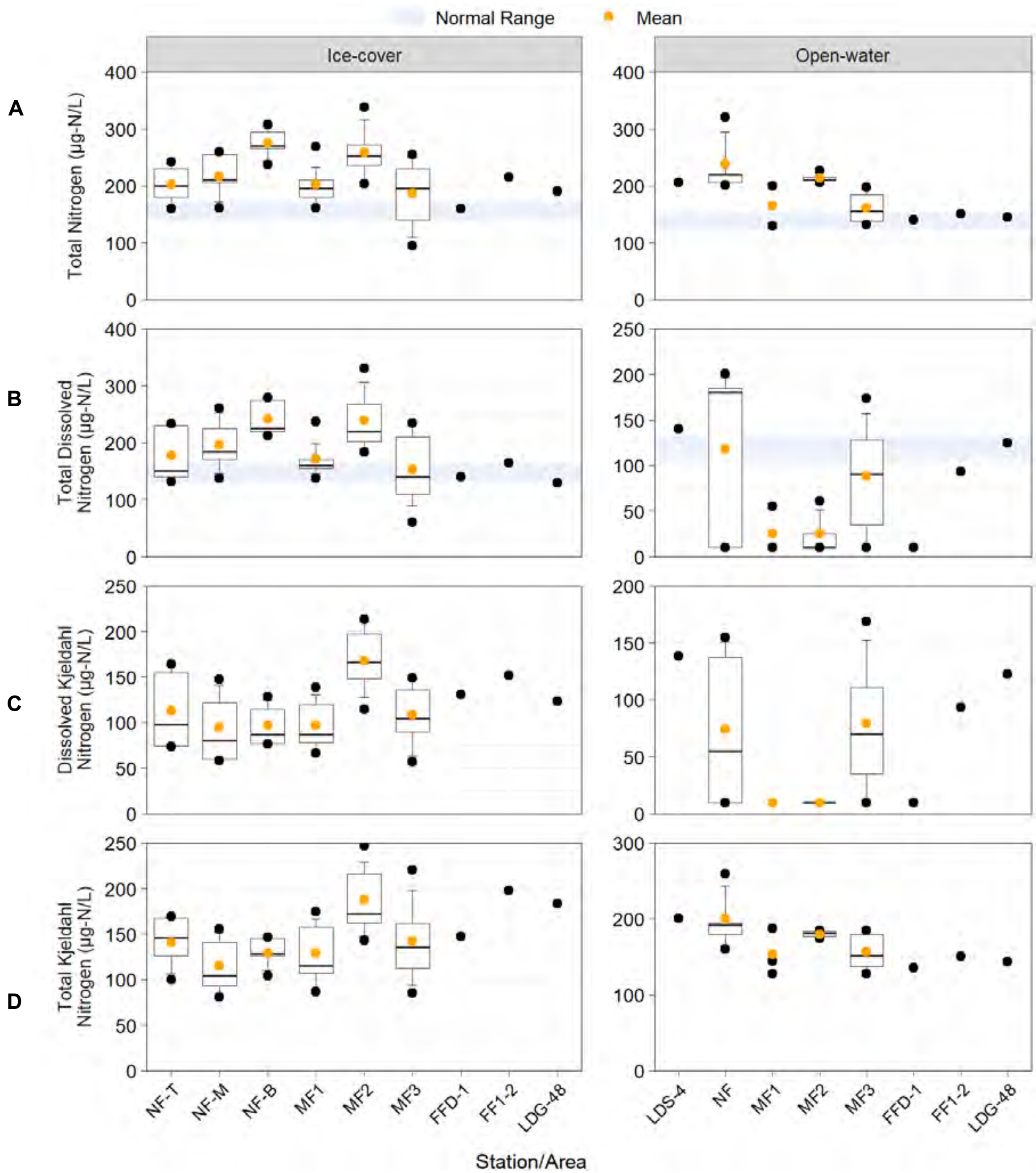
Figure 4-5 Concentrations of Total Phosphorus (A), Total Dissolved Phosphorus (B), and Soluble Reactive Phosphorus (C) in Lac de Gras during the Ice-Cover and Open-Water Season, 2021



Notes: Boxplots represent the 10th, 25th, 50th (median), 75th, and 90th percentile concentrations in each sampling area. The black dots in the boxplots represent the 5th (on the bottom) and 95th (on the top) percentiles, except in cases with three or less data points, where the reported values are shown. Non-detect values are plotted at half detection limit.

µg-P/L = micrograms phosphorus per litre; LDS-4 = Lac du Sauvage outlet (the Narrows); NF = near-field; MF = mid-field; FF = far-field; LDG-48 = Lac de Gras outlet; T = top depth; M = middle depth; B = bottom depth.

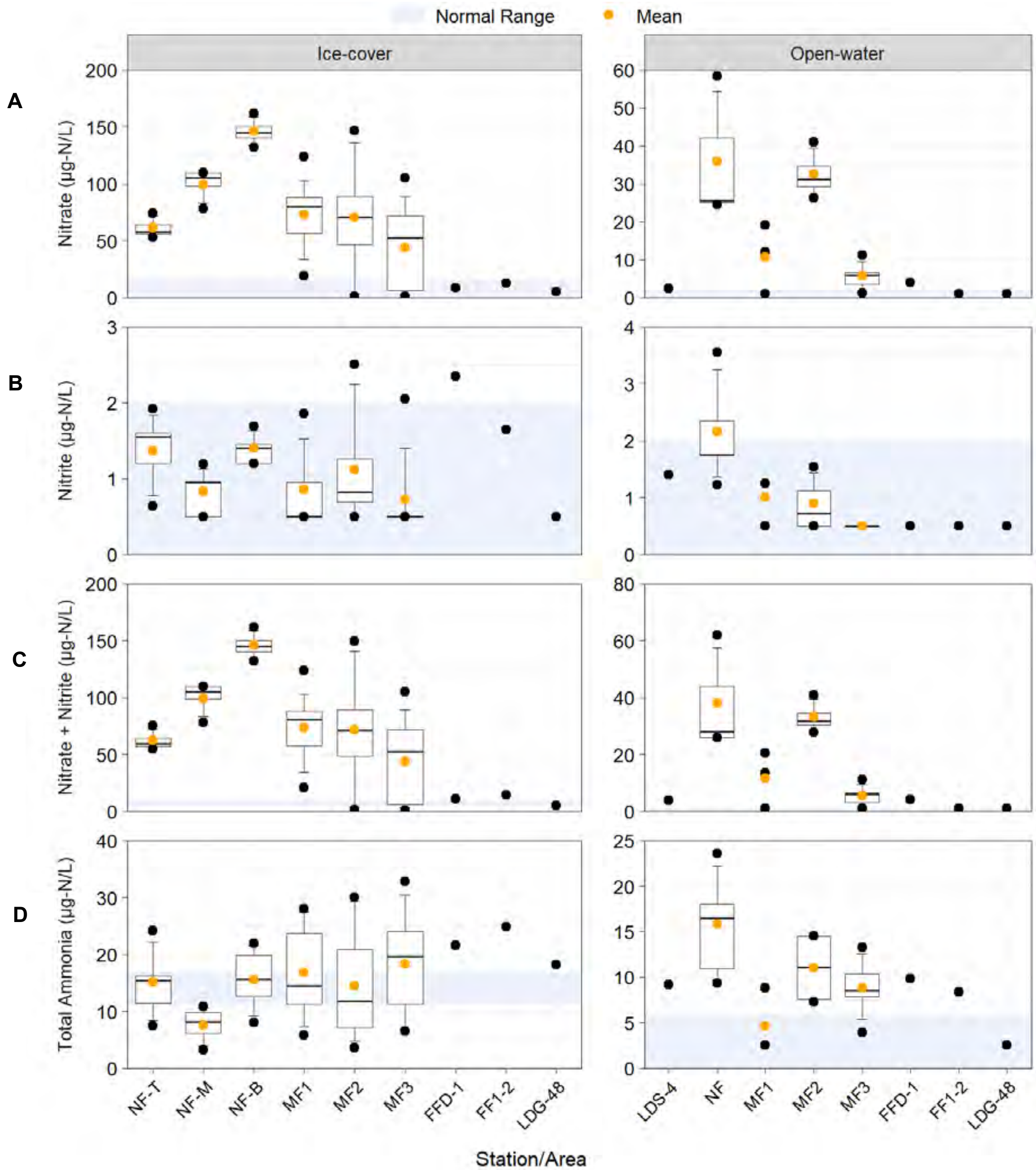
Figure 4-6 Concentrations of Total Nitrogen (A), Total Dissolved Nitrogen (B), Dissolved Kjeldahl Nitrogen (C), and Total Kjeldahl Nitrogen (D) in Lac de Gras during the Ice-Cover and Open-Water Season, 2021



Notes: Boxplots represent the 10th, 25th, 50th (median), 75th, and 90th percentile concentrations in each sampling area. The black dots in the boxplots represent the 5th (on the bottom) and 95th (on the top) percentiles, except in cases with three or less data points, where the reported values are shown.

µg-N/L = micrograms nitrogen per litre; LDS-4 = Lac du Sauvage outlet (the Narrows); NF = near-field; MF = mid-field; FF = far-field; LDG-48 = Lac de Gras outlet; T = top depth; M = middle depth; B = bottom depth.

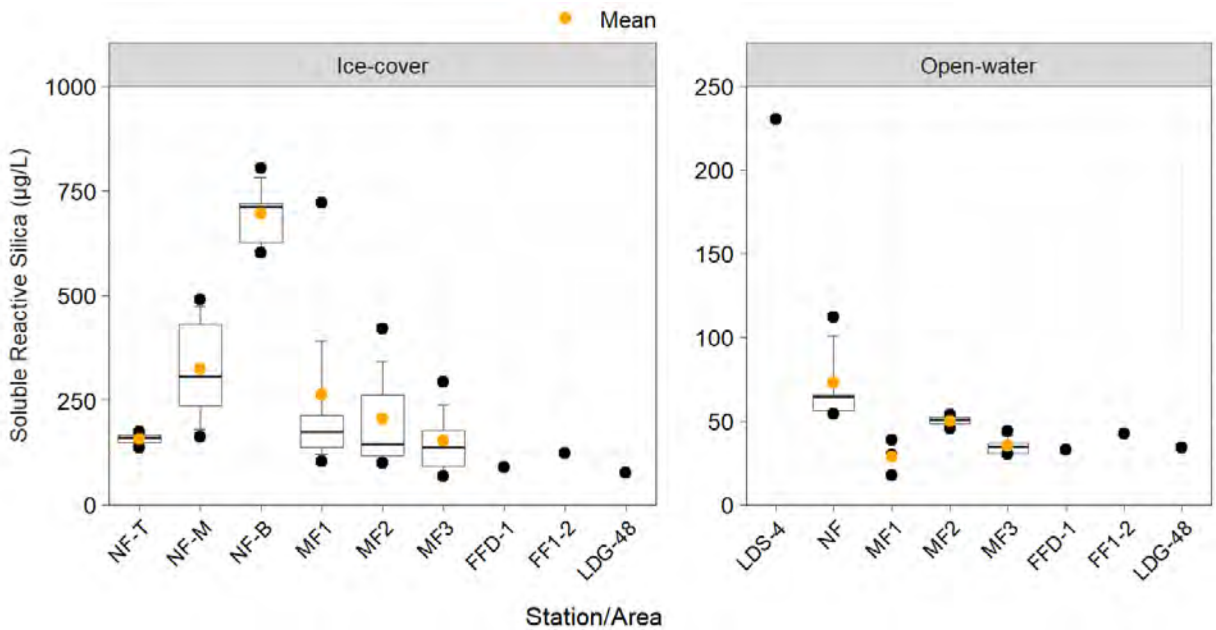
Figure 4-7 Concentrations of Nitrate (A), Nitrite (B), Nitrate + Nitrite (C) and Total Ammonia (D) in Lac de Gras during the Ice-Cover and Open-Water Season, 2021



Notes: Boxplots represent the 10th, 25th, 50th (median), 75th, and 90th percentile concentrations in each sampling area. The black dots in the boxplots represent the 5th (on the bottom) and 95th (on the top) percentiles, except in cases with three or less data points, where the reported values are shown. Non-detect values are plotted at half detection limit.

µg-N/L = micrograms nitrogen per litre; LDS-4 = Lac du Sauvage outlet (the Narrows); NF = near-field; MF = mid-field; FF = far-field; LDG-48 = Lac de Gras outlet; T = top depth; M = middle depth; B = bottom depth.

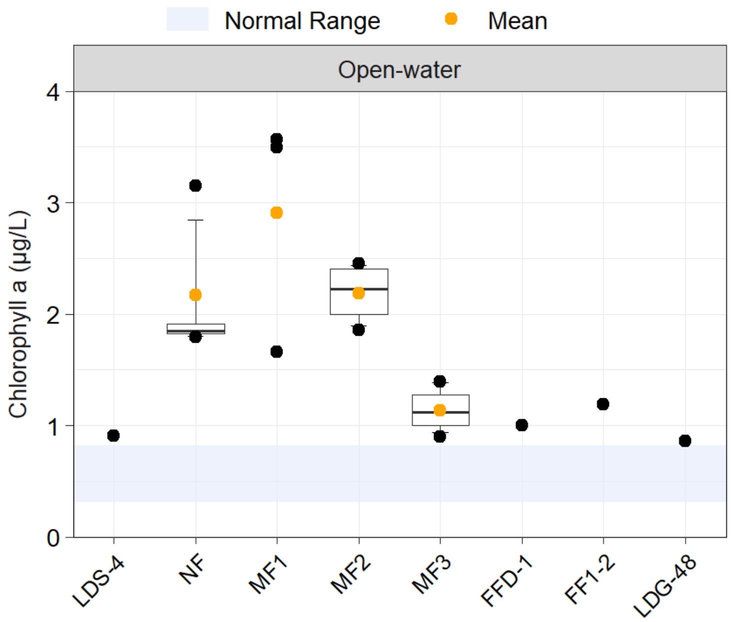
Figure 4-8 Concentrations of Soluble Reactive Silica in Lac de Gras during the Ice-Cover and Open-Water Season, 2021



Notes: Boxplots represent the 10th, 25th, 50th (median), 75th, and 90th percentile concentrations in each sampling area. The black dots in the boxplots represent the 5th (on the bottom) and 95th (on the top) percentiles, except in cases with three or less data points, where the reported values are shown.

µg/L = micrograms per litre; LDS-4 = Lac du Sauvage outlet (the Narrows); NF = near-field; MF = mid-field; FF = far-field; LDG-48 = Lac de Gras outlet; T = top depth; M = middle depth; B = bottom depth.

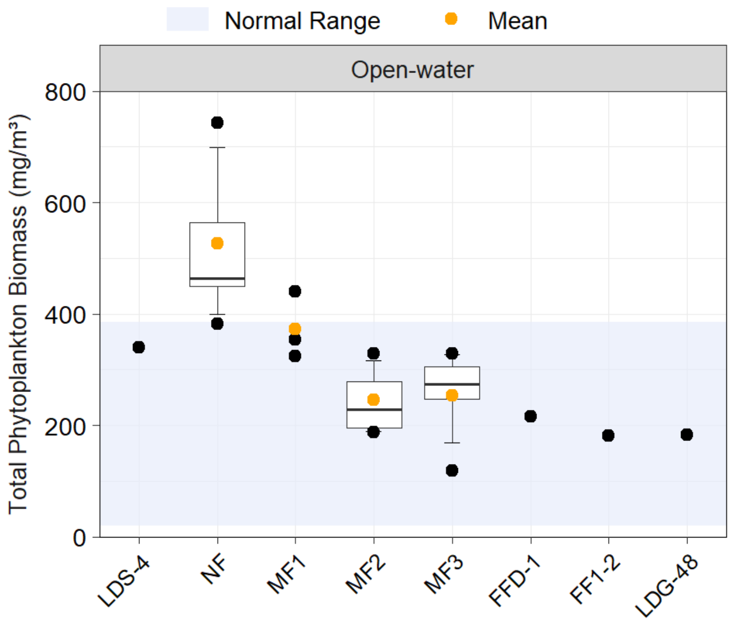
Figure 4-9 Chlorophyll *a* Concentrations in Lac de Gras during the Open-Water Season, 2021



Notes: Boxplots represent the 10th, 25th, 50th (median), 75th, and 90th percentile concentrations in each sampling area. The black dots in the boxplots represent the 5th (on the bottom) and 95th (on the top) percentiles, except in cases with three or less data points, where the reported values are shown.

µg/L = micrograms per litre; LDS-4 = Lac du Sauvage outlet (the Narrows); NF = near-field; MF = mid-field; FF = far-field; LDG-48 = Lac de Gras outlet.

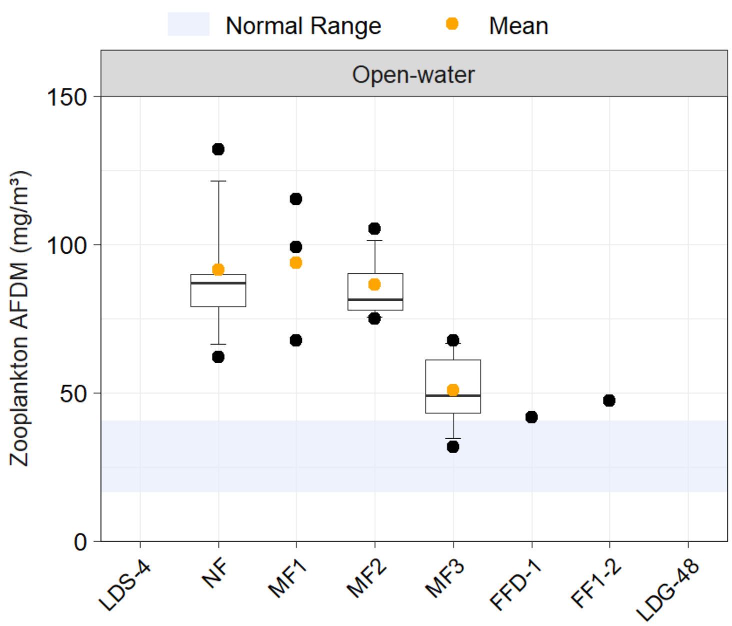
Figure 4-10 Total Phytoplankton Biomass in Lac de Gras during the Open-Water Season, 2021



Notes: Boxplots represent the 10th, 25th, 50th (median), 75th, and 90th percentile concentrations in each sampling area. The black dots in the boxplots represent the 5th (on the bottom) and 95th (on the top) percentiles, except in cases with three or less data points, where the reported values are shown.

mg/m^3 = milligrams per cubic metre; NF = near-field; MF = mid-field; FF = far-field; LDG-48 = Lac de Gras outlet; LDS-4 = Lac du Sauvage outlet (the Narrows).

Figure 4-11 Total Zooplankton Biomass (as AFDM) in Lac de Gras during the Open-Water Season, 2021



Notes: Zooplankton is not measured at LDS-4 and LDG-48. Boxplots represent the 10th, 25th, 50th (median), 75th, and 90th percentile concentrations in each sampling area. The black dots in the boxplots represent the 5th (on the bottom) and 95th (on the top) percentiles, except in cases with three or less data points, where the reported values are shown.

AFDM = ash-free dry mass; mg/m^3 = milligrams per cubic metre; LDS-4 = Lac du Sauvage outlet (the Narrows); NF = near-field; MF = mid-field; FF = far-field; LDG-48 = Lac de Gras outlet.

4.3.3 Extent of Effects

Concentrations of TP were below the normal range at all stations in the open-water season and at the bottom depth in the ice-cover season. Concentrations of TP were above the normal range at the top depths at NF1, NF4, and MF2-1 and the middle depths at MF2-1 and MF2-3 during the ice-cover season. Therefore, the area of the lake affected was 0% during the open-water season and 3.4% during the ice-cover season. These conditions indicate that Action Level 1 has been triggered for nutrient enrichment based on TP results.

Concentrations of TN were greater than the normal range at some stations along the MF1 and MF3 transects and at all stations along the MF2-FF2 transect, with the area affected lower during the open-water season and varying with depth during the ice-cover season. The area of the lake affected for TN was 20% during the open-water season and 41% during the ice-cover season based on middle depth concentrations.

In 2021, chlorophyll *a* concentrations were higher than in recent years, with concentrations at all stations above the normal range. It is not clear why chlorophyll *a* concentrations were elevated without a corresponding increase in phytoplankton biomass; review of field procedures and follow-up with the analytical laboratory identified no data quality issues associated with the chlorophyll *a* dataset. Although FFA and FFB areas were not sampled this year, stations FF1-2 and FFD-1 provided useful information as to the extent of the elevated concentrations along the MF1 and MF3 transects. Thus, based on measured concentrations, it was assumed that the entire lake was affected (100%). The elevated concentration at LDG-48 results in a higher spatial extent of effects than has been previously reported. However, the concentration at LDG-48 was only slightly above the normal range. As data are not available for a large extent of Lac de Gras between stations MF3-7 and LDG-48, the estimated extent of effects is subject to greater uncertainty that those for other variables, which had boundaries of effects within the sampled areas. Current conditions indicate that Action Level 2 has been triggered for nutrient enrichment based on chlorophyll *a* results. According to the Response Framework, exceedance of Action Level 2 requires establishing an Effects Benchmark; however, as previous AEMP reports have triggered Action Level 2, the Effects Benchmark has already been established (i.e., 4.5 µg/L) as presented in *AEMP Design Plan Version 5.2* (Golder 2020a). Therefore, no further action is required.

Total phytoplankton biomass was below the normal range in the NF area and at all stations except for MF1-1. The area of the lake affected was 0%. This smaller extent of effects is consistent with the results for TP, but inconsistent with the results for chlorophyll *a.*

Effects on zooplankton biomass (as AFDM) were observed in the NF area and along all three transects. The boundary of effects on zooplankton biomass to the northwest (i.e., MF1 transect) extended to FF1-2 and FFD-1 stations. The boundary of effects to the northeast of the Mine (i.e., MF3 transect) extended to MF3-7. As zooplankton biomass was greater than the normal range at the MF3-7 station, and sampling did not occur in the FFA and FFB areas during the 2021 sampling program, the extent of effects could have been greater than the estimated area. Thus, the area demonstrating effects on zooplankton biomass (as AFDM) represents greater than or equal to 332 km^2, or 58% of the lake area.

4.3.4 Effects from Dust Deposition

In 2021, as in previous years, the rate of dust deposition was highest within the Mine footprint and declined with distance from the Mine. In the *2017 to 2019 Aquatic Effects Re-evaluation Report* (Golder 2020b), the ZOI from dust deposition was estimated to extend to approximately 4.8 km from the Mine centroid.

The anthropogenic (i.e., associated with human activity) TP loads to Lac de Gras and the watershed (excluding the Mine and lake) in 2021 were estimated as 0.63 and 0.46 t, respectively, for a total (including Mine effluent) of 1.4 t in 2021. The anthropogenic TP load to Lac de Gras (i.e., both direct and indirect sources) was consistent with those estimated for 2020 (0.69 t/yr; Golder 2021) and for the 2017 to 2019 period considered in the last re-evaluation report (0.69 t/yr; Golder 2020b). The indirect anthropogenic TP load was higher in 2021 (0.46 t/yr) compared to 0.35 t/yr in 2020, and 0.33 t/yr in the 2017 to 2019 period. The estimated contribution of background TP loads to the Lac de Gras watershed was, however, much lower in 2021 (5.2 t/yr) than previously reported (23 t/yr in 2020, and 21 t/yr in the 2017 to 2019 period). Therefore, although the TP loadings due to the Mine were similar in 2021 to previous years, the percent contribution appears much higher due to the low background TP deposition rate estimated for 2021.

Although the magnitude of the estimated TP load from dust suggests that dust is a greater contributor to phosphorus-related effects in Lac de Gras than effluent, several lines of evidence indicate that this is not the case:

- TP loads from dust are subject to uncertainty, in part because the loading estimates related to dust do not take into account retention of deposited phosphorus on land.

- A large proportion of phosphorus from dust deposition that reaches the lake may not be bioavailable because it would be mostly in particulate form. Dust-associated phosphorus would settle to the sediment instead of dissolving and becoming available for algae to uptake. Therefore, dust-associated phosphorus is unlikely to contribute to dissolved phosphorus in amounts that would result in a measurable contribution to the nutrient enrichment observed in the lake.

- Water quality results indicate that effluent is the primary driver of nutrient enrichment in Lac de Gras. Concentrations of TP and chlorophyll *a* decrease with distance from the diffuser (Figure 4-12).

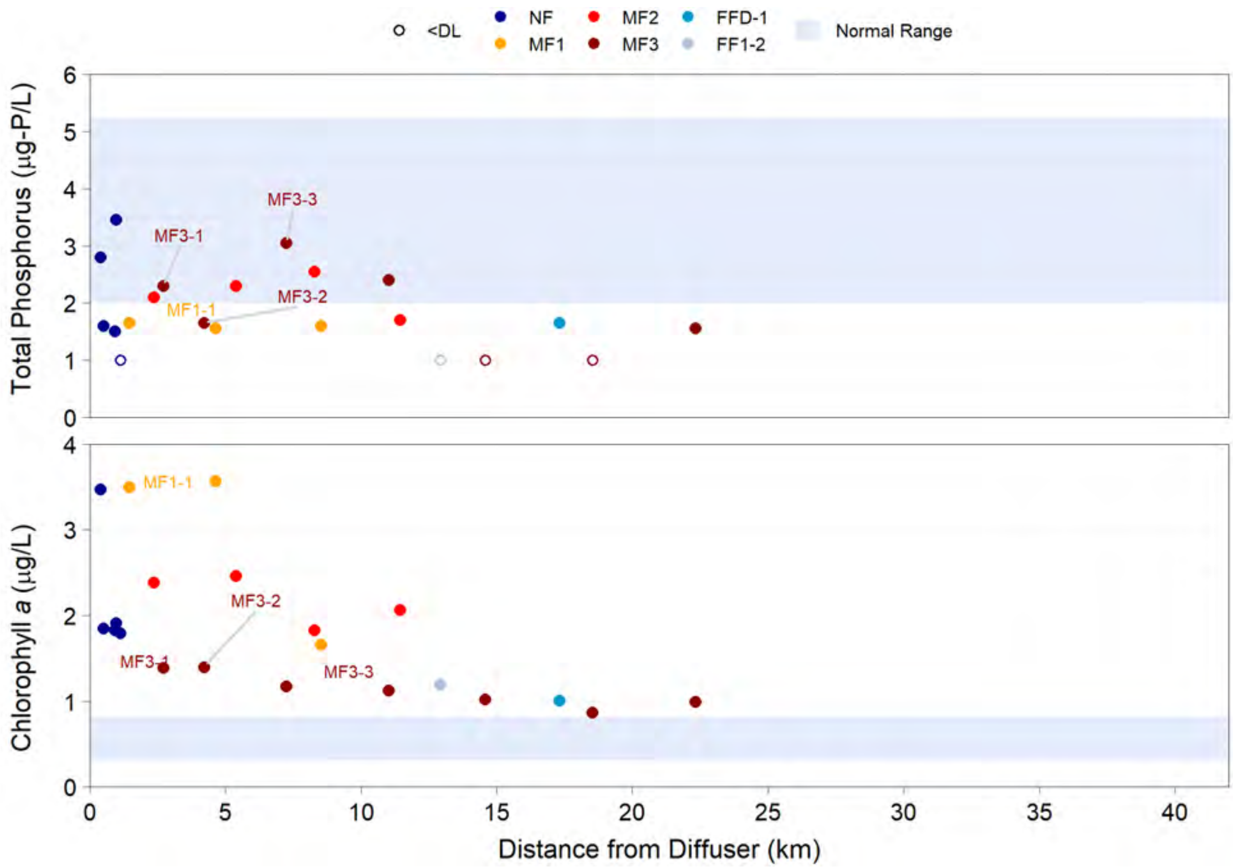
- In 2021, predominant wind directions at the Mine site were omnidirectional from the northeast, southeast and east. However, the results of the 2021 Dust Deposition Report (Appendix I) show that proximity to Mine activity is a stronger indicator of dust deposition than wind direction.

- The lack of obvious dust-related effects on TP and chlorophyll *a* in the 2021 AEMP are supported by the Dust SES that was conducted in 2019.

- The *2017 to 2019 Aquatic Effects Re-evaluation Report* estimated phosphorus input from dust under the annual worst-case loading condition (i.e., spring break-up) at AEMP sampling stations within and outside the dust ZOI. Calculations indicated that adding all TP and SRP deposited to snow during the ice-cover season to the lake at spring break-up would likely result in negligible to small increases in TP and SRP in lake water, within and outside the dust ZOI. Open-water season phosphorus loading from dust deposition is diffuse and episodic, and would be even less likely to result in a measurable increase in phosphorus concentrations in lake water or a biological effect. In addition, only a portion of the added phosphorus would remain in the water column and be bioavailable.

Results of the 2021 AEMP continue to indicate that effluent is the main source of Mine effects on Lac de Gras, with a negligible contribution from dust deposition. This conclusion is consistent with the results of the Special Effects Study – Dust Deposition (Appendix XII of the 2019 AEMP Annual Report; Golder 2020c), which did not detect a dust-related chemical signature in lake water and suggested limited bioavailability of phosphorus in dust.

Figure 4-12 Concentrations of Total Phosphorus and Chlorophyll *a* in Lac de Gras in Relation to Dust Deposition during the Open-water Season, 2021



Note: MF stations in the zone of influence from dust deposition are labelled (i.e., MF1-1, MF3-1, MF3-2, MF3-3); all NF stations are within the zone of influence.
µg-P/L = micrograms phosphorus per litre; µg/L = micrograms per litre; NF = near-field; MF = mid-field; FF = far-field.

5 SEDIMENT CHEMISTRY

Sediment chemistry sampling was not completed in 2021. Consequently, Appendix III is a placeholder in this AEMP Annual Report.

6 PLANKTON

6.1 Introduction and Objectives

Plankton are small, usually microscopic plants and animals that live suspended in open water. For the purpose of the AEMP, phytoplankton refers to algae and zooplankton refers to microscopic animals, such as crustaceans (i.e., animals with hard shells similar to, but much smaller than, crabs or shrimp) that live suspended in lake water.

The overall objective of the plankton component of the AEMP is to monitor the potential effects of the Mine on the phytoplankton and zooplankton communities in Lac de Gras. The plankton component monitors phytoplankton and zooplankton community endpoints (i.e., abundance, biomass, and taxonomic composition) as indicators of potential effects.

The following is a summary of the 2021 plankton program. The Plankton Report (Appendix XI) provides detailed results.

6.2 Methods

Totals of 23 phytoplankton and 21 zooplankton samples were collected in 2021. Five stations were sampled for both phytoplankton and zooplankton in the NF area, three stations were sampled in the MF1 area, four stations were sampled in the MF2 area, seven stations were sampled in the MF3 area, and two additional stations were sampled between the MF1 and MF3 areas (i.e., FF1-2 and FFD-1). Single stations were also sampled for phytoplankton only at the outlet of Lac du Sauvage (LDS-4) and the outlet of Lac de Gras (LDG-48) (Figure 1-2). Samples were collected between 27 August and 14 September 2021. A depth-integrated sampler, which collects water from the surface to a depth of 10 m, was used to collect phytoplankton samples. Zooplankton samples were collected using a plankton net that was pulled up through the entire water column three times at each station.

Phytoplankton samples were sent to Biologica Environmental Services, Ltd. (Biologica), Victoria, British Columbia, Canada, and zooplankton samples were sent to Salki Consultants Inc. in Winnipeg, Manitoba, Canada, for analysis of taxonomic composition, abundance, and biomass in 2021.

The importance of effects on phytoplankton or zooplankton biomass and taxonomic richness (i.e., the number of different types of organisms) was evaluated according to Action Levels defined in *AEMP Design Plan Version 5.2* (Golder 2020a; Table 6-1). The magnitude of effect was evaluated by comparing community endpoints in the NF area to reference conditions. To evaluate spatial trends relative to the Mine discharge, total phytoplankton and zooplankton biomass and taxonomic richness at individual stations were plotted against distance from the effluent discharge and gradient analyses were conducted.

Table 6-1 Action Levels for Plankton Effects

Action Level	Plankton	Extent	Action
1	Mean biomass or richness significantly less than reference condition mean[(a)]	NF	Confirm effect
2	Mean biomass or richness significantly less than reference condition mean[(a)]	Nearest MF station	Investigate cause
3	Mean biomass or richness less than normal range[(b)]	NF	Examine ecological significance Set Action Level 4 Identify mitigation options
4	TBD[(c)]	TBD[(c)]	Define conditions required for the Significance Threshold
5[(d)]	Decline in biomass or richness likely to cause a >20% change in fish population(s)	FFA	Significance Threshold

a) The reference condition dataset was obtained from the *AEMP Reference Conditions Report Version 1.4* (Golder 2019a).
b) Normal ranges were obtained from the *AEMP Reference Conditions Report Version 1.4* (Golder 2019a).
c) To be determined if Action Level 3 is triggered.
d) Although the Significance Threshold is not an Action Level, it is shown as the highest Action Level to demonstrate escalation of effects towards the Significance Threshold.

> = greater than; TBD = to be determined; NF = near-field; MF = mid-field; FF = far-field.

6.3 Results and Discussion

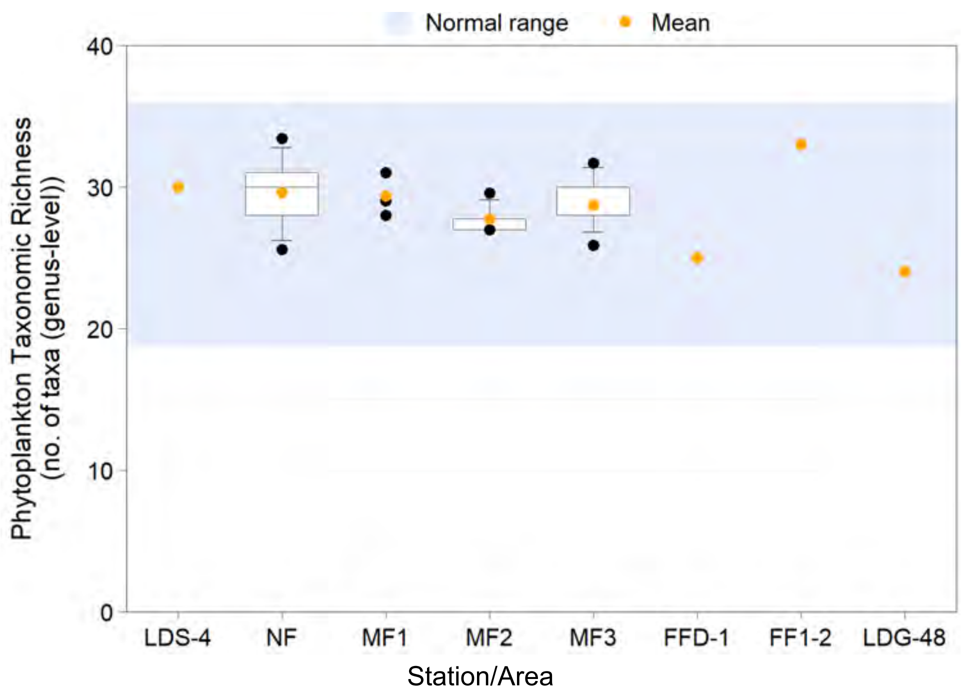
6.3.1 Phytoplankton

Phytoplankton taxonomic richness and biomass were within or above the normal range in all areas of Lac de Gras in 2021 (Figure 6-1 and Figure 6-2). Mean taxonomic richness in the NF area was above the reference condition mean and mean phytoplankton biomass was within the normal range. Gradient analysis demonstrated that phytoplankton richness, biomass, and the biomass of major ecological groups decreased with distance from the diffusers (Figure 6-3). These results are consistent with a Mine-related nutrient enrichment effect.

Phytoplankton community composition in the NF area of Lac de Gras did not substantially differ from those in MF areas in terms of relative biomass in 2021 (Figure 6-4). The phytoplankton communities in all areas of Lac de Gras, were dominated by microflagellates and diatoms in terms of biomass, while diatoms dominated the community in the Lac du Sauvage inflow. At the Lac de Gras outflow, the phytoplankton community was dominated by microflagellates and chlorophytes.

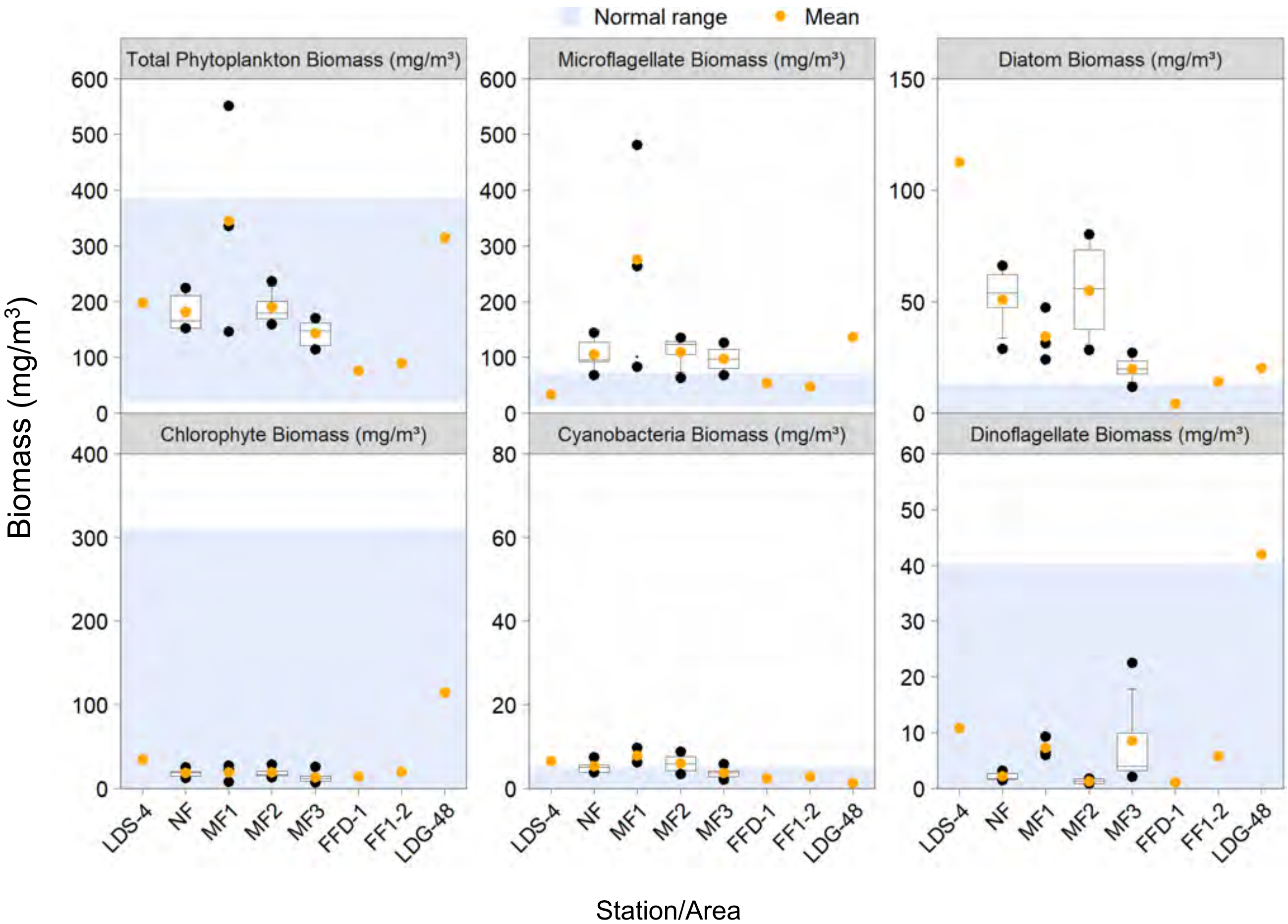
Overall, the 2021 phytoplankton results did not provide evidence of toxicological impairment, and Action Level 1 for toxicological impairment was not triggered based on phytoplankton taxonomic richness or biomass.

Figure 6-1 Phytoplankton Taxonomic Richness by Sampling Area in Lac de Gras and Lac du Sauvage, 2021



NF = near-field; MF = mid-field; FF = far-field; LDS = Lac du Sauvage; LDG = Lac de Gras.

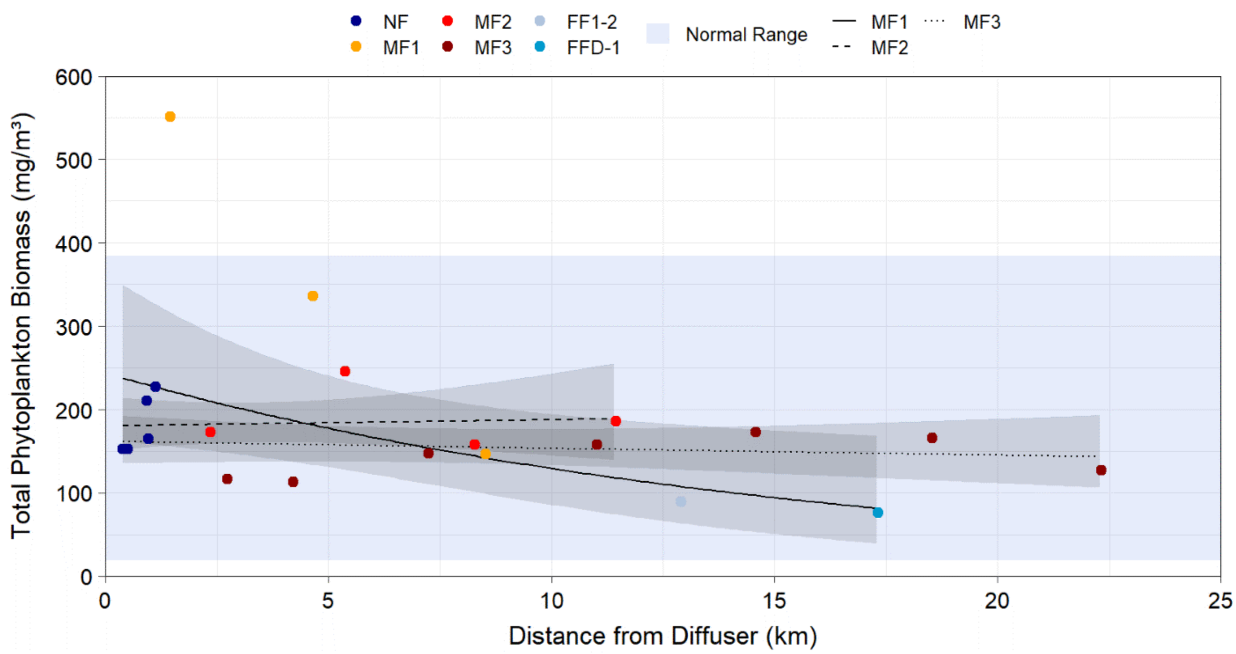
Figure 6-2 Phytoplankton Biomass of Major Ecological Groups by Sampling Area in Lac de Gras and Lac du Sauvage, 2021



Note: boxplots represent the 10th, 25th, 50th (i.e., median), 75th, and 90th percentile concentrations in each sampling area. The black dots in the boxplots represent the 5th (on the bottom) and 95th (on the top) percentiles.

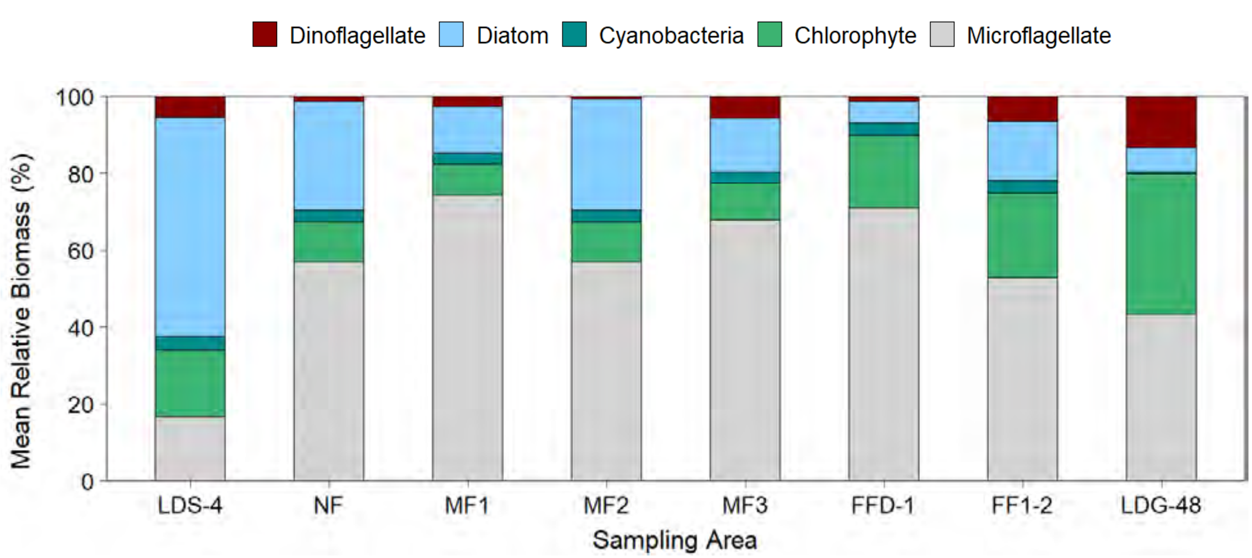
mg/m³ = milligrams per cubic metre; NF = near-field; MF = mid-field; FF = far-field; LDS = Lac du Sauvage; LDG = Lac de Gras.

Figure 6-3 Phytoplankton Biomass in Lac de Gras and Lac du Sauvage Relative to Distance from the Effluent Discharge, 2021



Note: Shaded bands around fitted prediction lines are 95% confidence intervals (back-transformed to original scale of the variable). mg/m^3 = milligrams per cubic metre; NF = near-field; MF = mid-field; FF = far-field;; LDG = Lac de Gras.

Figure 6-4 Mean Relative Phytoplankton Biomass in Lac de Gras and Lac du Sauvage, 2021



NF = near-field; MF = mid-field; FF = far-field; LDS = Lac du Sauvage; LDG = Lac de Gras.

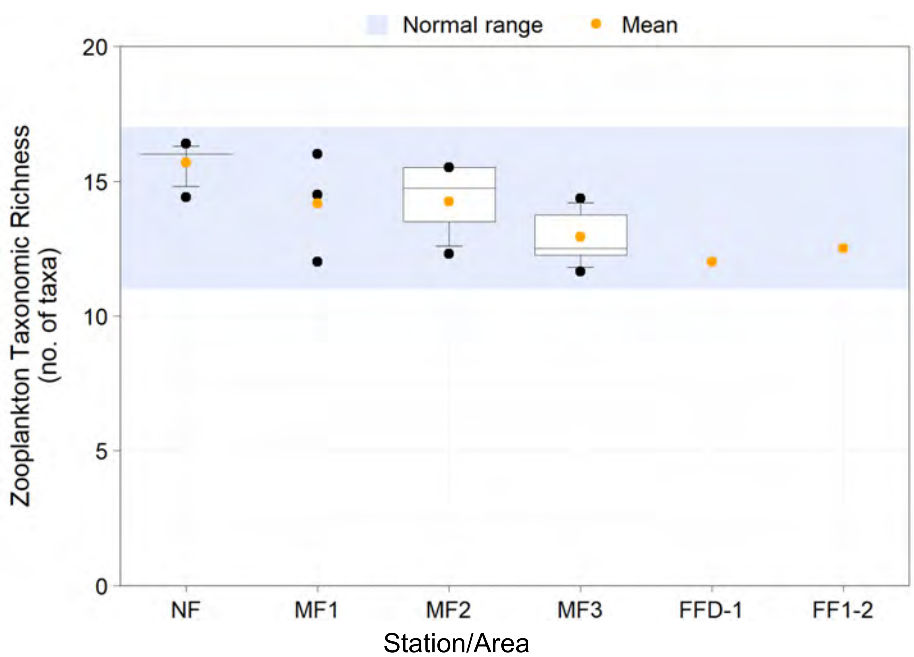
6.3.2 Zooplankton

Mean zooplankton taxonomic richness was within the normal range in all areas of Lac de Gras in 2021, and was greater in the NF area compared to the MF areas and the two FF stations. Mean total zooplankton biomass in the NF area was above the normal range and above the reference condition mean in 2021 (Figure 6-5). In the NF area, mean biomass values of cladocerans, and calanoid and cyclopoid copepods were above the normal range, while the mean biomass of rotifers was within the normal range (Figure 6-6). The gradient analysis of zooplankton richness, biomass and the biomass of major ecological groups indicated that these variables have generally not shown a decrease close to the effluent diffusers; rather, richness, total biomass, and biomass of the major ecological groups have generally decreased with distance away from the effluent diffusers, consistent with nutrient enrichment (e.g., Figure 6-7).

Zooplankton communities, based on biomass, in Lac de Gras were dominated by calanoid copepods, with cyclopoid copepod sub-dominance (Figure 6-8). Cladoceran biomass was greater in the NF area in 2021 compared to the other areas.

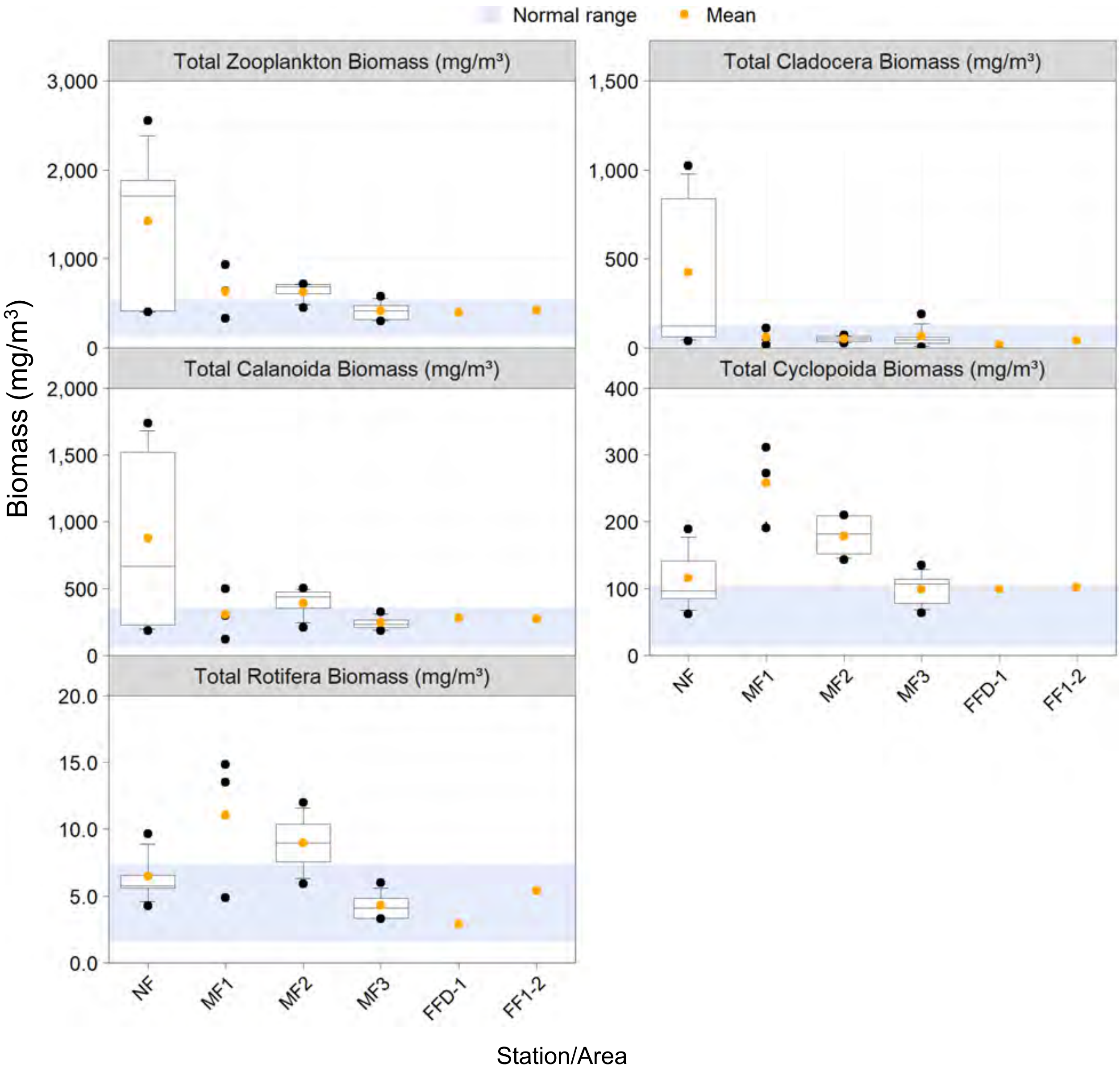
The 2021 zooplankton community did not show a response consistent with toxicological impairment and the Action Level 1 for toxicological impairment was not triggered. Rather, results were consistent with Mine-related nutrient enrichment, as demonstrated by greater zooplankton biomass in the NF area compared to the other sampling areas, and compared to the reference condition mean. Results reported in the Eutrophication Indicators Report (Appendix XIII) also indicate that nutrient enrichment is occurring in Lac de Gras.

Figure 6-5 Zooplankton Taxonomic Richness by Sampling Area in Lac de Gras, 2021



Note: Boxplots represent the 10th, 25th, 50th (i.e., median), 75th, and 90th percentile concentrations in each sampling area. The black dots in the boxplots represent the 5th (on the bottom) and 95th (on the top) percentiles.
NF = near-field; MF = mid-field; FF = far-field.

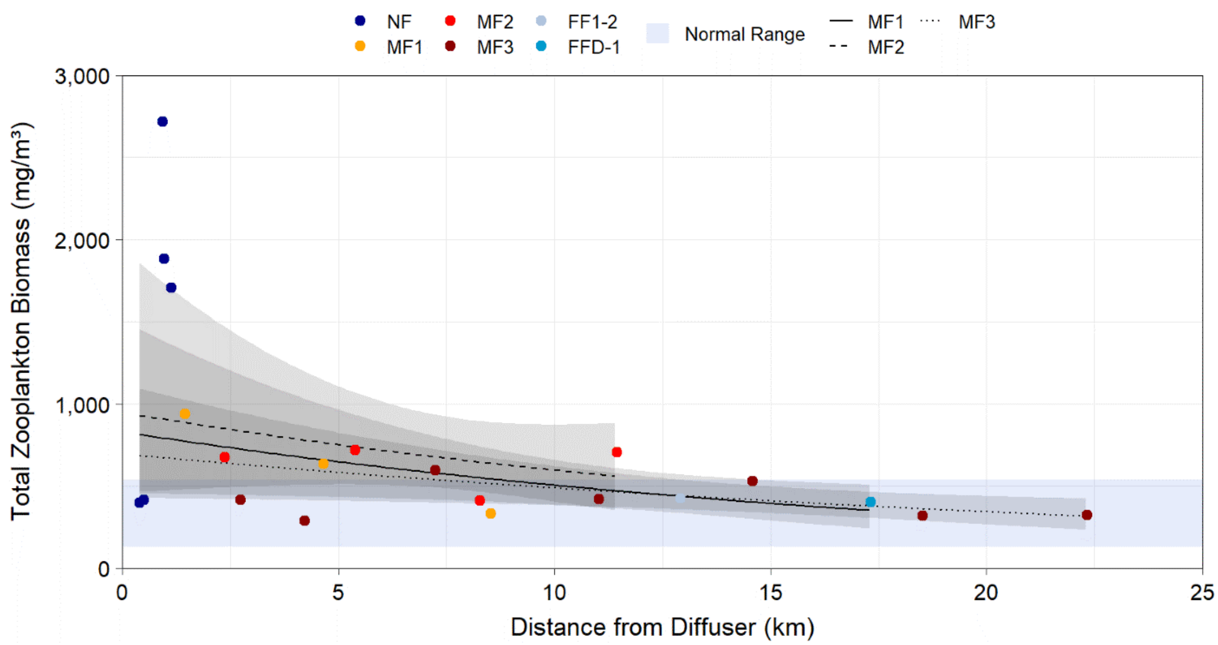
Figure 6-6 Zooplankton Biomass of Major Ecological Groups by Sampling Area in Lac de Gras and Lac du Sauvage, 2021



Note: Boxplots represent the 10th, 25th, 50th (i.e., median), 75th, and 90th percentile concentrations in each sampling area. The black dots in the boxplots represent the 5th (on the bottom) and 95th (on the top) percentiles.

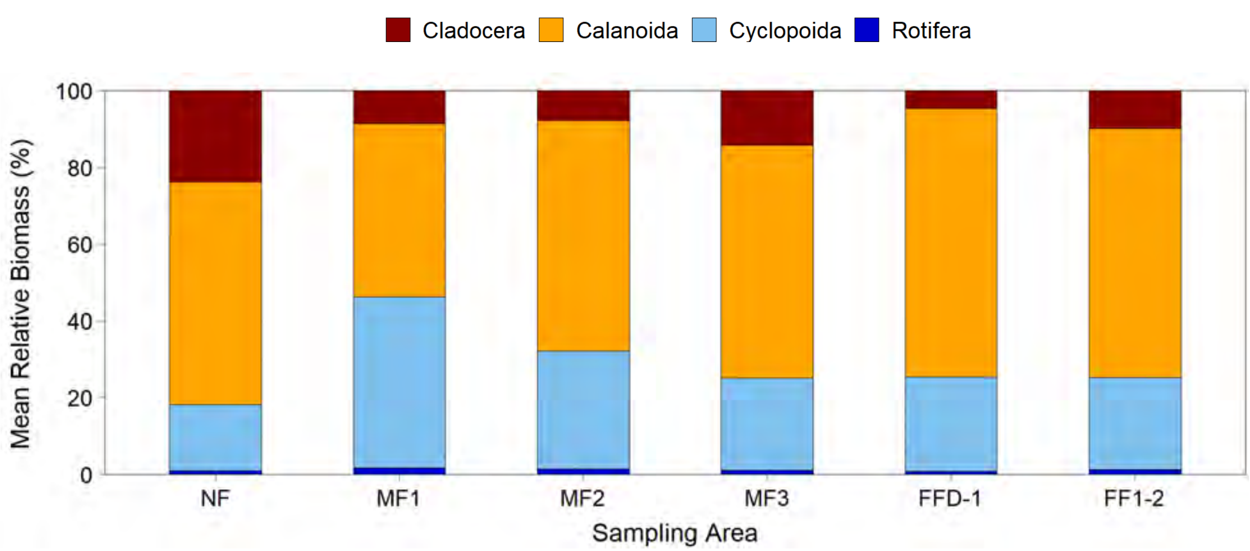
NF = near-field; MF = mid-field; FF = far-field;.

Figure 6-7 Zooplankton Biomass in Lac de Gras and Lac du Sauvage Relative to Distance from the Effluent Discharge, 2021



Note: Shaded bands around fitted prediction lines are 95% confidence intervals (back-transformed to original scale of the variable).
NF = near-field; MF = mid-field; FF = far-field.

Figure 6-8 Mean Relative Zooplankton Biomass in Lac de Gras and Lac du Sauvage, 2021



NF = near-field; MF = mid-field; FF = far-field.

7 BENTHIC INVERTEBRATES

Benthic invertebrate sampling was not completed in 2021. Consequently, Appendix IV is a placeholder in this AEMP Annual Report.

8 FISH

Fish tissue sampling was not completed in 2021. Consequently, Appendix V is a placeholder in this AEMP Annual Report.

9 FISHERIES AUTHORIZATION AND SPECIAL EFFECTS STUDIES

9.1 Plume Delineation Survey

Plume delineation surveys did not take place in 2021. Consequently, Appendix VI is a placeholder in this AEMP Annual Report.

9.2 Fisheries Authorization Studies

9.2.1 Dike Monitoring Study

Dike monitoring did not take place in 2021. Consequently, Appendix VII is a placeholder in this AEMP Annual Report.

9.2.2 Fish Salvage Program

A fish salvage program did not take place in 2021. Consequently, Appendix VIII is a placeholder in this AEMP Annual Report.

9.2.3 Fish Habitat Compensation Monitoring

A fish habitat compensation monitoring program was not conducted in 2021. Consequently, Appendix IX is a placeholder in this AEMP Annual Report.

9.2.4 Fish Palatability, Fish Health, and Fish Tissue Chemistry Survey

A fish palatability survey was not completed in 2021. Consequently, Appendix X is a placeholder in this AEMP Annual Report.

9.3 AEMP Special Effects Study Reports

There were no special effects studies in 2021. Consequently, Appendix XII is a placeholder in this AEMP Annual Report.

10 TRADITIONAL KNOWLEDGE STUDIES

10.1 Introduction and Objectives

Traditional Knowledge is an integral component of the AEMP, and while the following is a summary of the 2021 Traditional Knowledge camp activities, the Traditional Knowledge Report (i.e., Appendix XIV) and its associated summary of the camp and associated data are not yet available. Appendix XIV will provide a more complete analysis and detailed results of the Traditional Knowledge studies when it becomes available.

The objective of the Traditional Knowledge camp is to facilitate a two-way flow of information, resources, and understanding between the Traditional Knowledge holders and scientists regarding the health of fish and water in Lac de Gras during a camp held near the Mine at Lac de Gras during the summer of 2021. These efforts were part of the AEMP, established by DDMI with five Aboriginal parties to their Environmental Agreement: Kitikmeot Inuit Association (KIA), Łutsel K'e Dene First Nation (LKDFN), North Slave Métis Alliance (NSMA), Tłı̨chǫ Government (TG or Tłı̨chǫ), and Yellowknives Dene First Nation (YKDFN). A companion deliverable to the TK Report (i.e., Appendix XIV) will be released in the future; it will be a video-documentary which was filmed and produced through a partnership of participating youth and a production crew (aRTLeSS Collective 2018 during the TK camp and verification workshop in Yellowknife, Northwest Territories (NT) in December 2021. The authors of the TK Report advise that it is important to consider the Traditional Knowledge report in conjunction with the video.

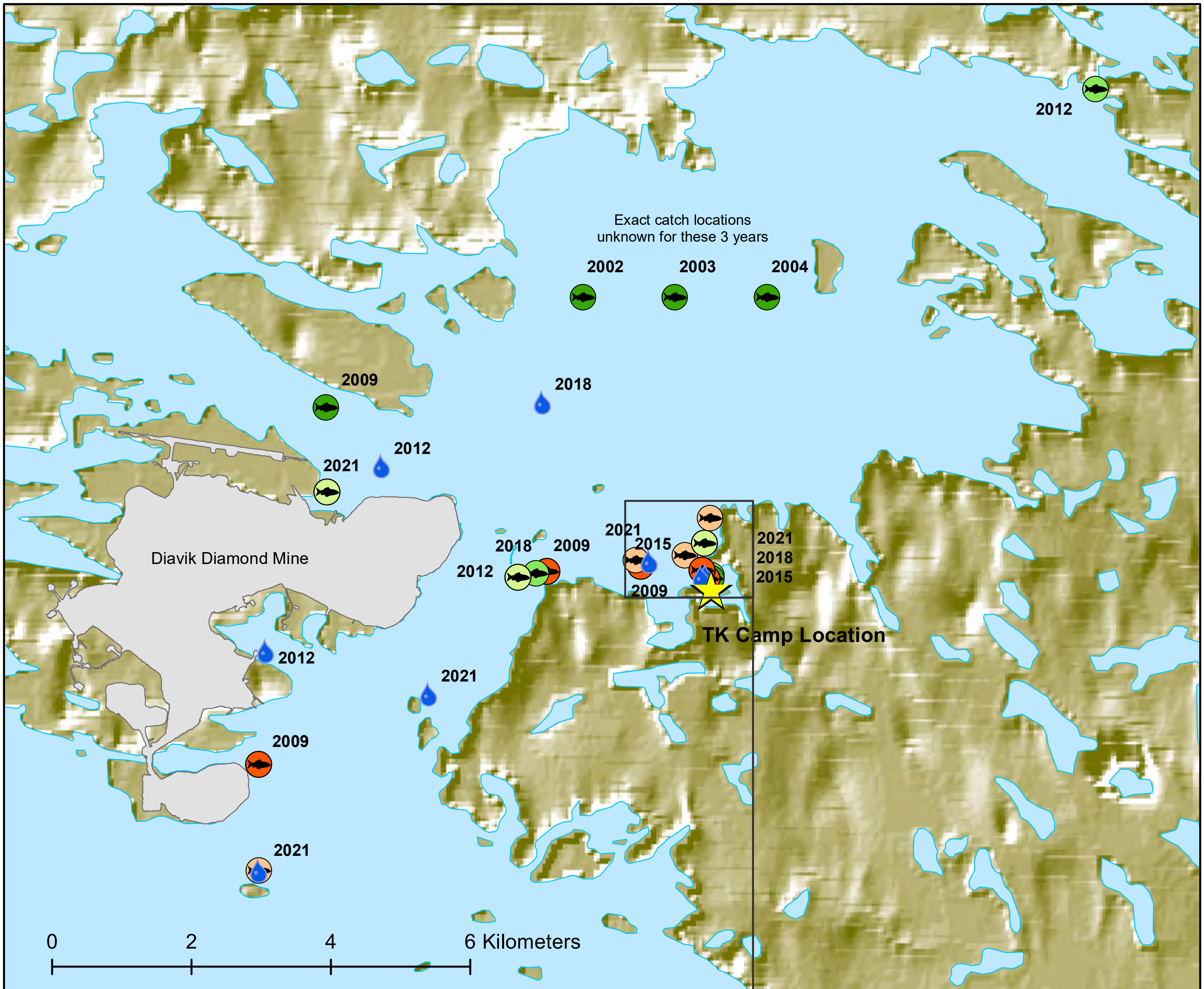
10.2 Methods

A two-day Planning Session was held in Yellowknife, NT from 23 to 25 June 2021, where previous results were reviewed, and thoughts were shared about the future camp agenda, activities, logistics and lessons to teach. The 2021 Traditional Knowledge Camp with Elders, youth and scientists occurred from 31 July 2021 to 9 August 2021 on the southeast side of Lac de Gras (approximately 2 km from the Mine; Figure 10-1). Activities at Traditional Knowledge Camp consisted of the fish health and palatability test, water quality and taste test, excursions on-the-land, recording a video-documentary, various interviews, honouring of cultural practices and ceremonies, and health and safety preparations. A verification workshop was held on 15 and 16 December 2021 in Yellowknife, NT to discuss preliminary results and substantial concerns expressed during and following the Traditional Knowledge Camp by Elders and other participants regarding the presence and abundance of parasites in most of the fish collected.

Fillet samples collected from the fish caught during the Traditional Knowledge Camp were submitted to Bureau Veritas Laboratories (BV Labs) in Edmonton or Calgary, AB, Canada, for tissue chemistry analysis, and water samples collected from Lac de Gras were submitted to BV Labs in Edmonton or Calgary, AB, Canada for water chemistry analysis. Parasite samples collected during the Traditional Knowledge Camp were submitted for identification to Biologica Environmental Services, Ltd. (Biologica) in Victoria, BC.

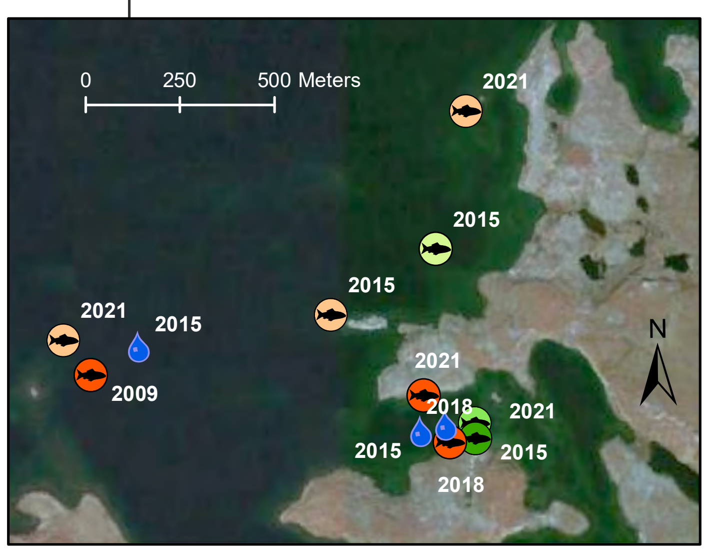
Figure 10-1: Fish Catch and Water Sample Locations

Diavik Traditional Knowledge Camp: 2002 to 2021



Fish Catch (#) 0 - 2 3 - 5 6 - 10 11 - 20 21 - 50

Water Sample Locations



Year	Total Fish Caught	Lake Trout	Lake Whitefish	Round Whitefish	Cisco	Long Nose Sucker
2002	46	43	0	1	2	0
2003	32	32	0	0	0	0
2004	39	37	0	1	0	1
2009	23	19	3	1	0	0
2012	35	27	6	0	0	2
2015	27	15	8	2	1	1
2018	36	35	1	0	0	0
2021	19	19	0	0	0	0

10.3 Results and Discussion

Overall, the observations made by participants during the 2021 Traditional Knowledge Camp indicated concerns about fish health and water quality in Lac de Gras because of parasite loads observed in the fish during the camp. Following analysis of water and fish tissue by the laboratory, science indicated water and fish quality were good in 2021. The Report presenting the results and discussion of the camp and the samples collected during the studies (i.e., Appendix XIV) is pending and will be provided in the next AEMP Annual Report.

11 WEIGHT-OF-EVIDENCE

The weight-of-evidence evaluation was not required in 2021. Consequently, Appendix XV is a placeholder in this AEMP Annual Report.

12 ADAPTIVE MANAGEMENT RESPONSE ACTIONS

A summary of the adaptive management responses and actions for each section of the 2021 interim AEMP report are summarized below.

Dust Deposition

There are no Action Levels for Dust Deposition in the Response Framework.

Effluent and Water Chemistry

Water quality variables were assessed for a Mine-related effect according to Action Levels in the Response Framework. Twenty variables triggered Action Level 1. No management action is required under the Response Framework when a variable triggers Action Level 1. Of the 20 variables that triggered Action Level 1, nine also triggered Action Level 2. The required management action when a water quality variable triggers Action Level 2 is to establish an AEMP Effects Benchmark for that variable if one does not already exist. All nine variables that triggered Action Level 2 have existing Effects Benchmarks; therefore, no action is required. No water quality variables triggered Action Level 3 in 2021.

Eutrophication Indicators

Chlorophyll *a* and TP concentrations were assessed for a Mine-related effect according to Action Levels in the Response Framework. Chlorophyll *a* concentrations in 2021 indicated that Action Level 2 was triggered for eutrophication indicators, and the magnitude and extent of effects of TP triggered Action Level 1. No management action is required under the Response Framework when a variable triggers Action Level 1. According to the Response Framework, exceedance of Action Level 2 requires an action to establish an Effects Benchmark. An Effects Benchmark has already been established for chlorophyll *a* (i.e., 4.5 µg/L) as presented in *AEMP Design Plan Version 5.2* (Golder 2020a); therefore, no further action is required.

Plankton

No Action Levels were triggered for plankton based on total phytoplankton and zooplankton biomass and zooplankton taxonomic richness results. Therefore, no further action is required.

Traditional Knowledge

There are no Action Levels for Traditional Knowledge in the Response Framework.

13 CONCLUSIONS AND RECOMMENDATIONS

13.1 Conclusions

Conclusions for each section of the 2021 AEMP comprehensive report are summarized below.

Dust Deposition

- Dustfall rates decreased with distance from the Mine, as observed in previous years, and as predicted in the Environmental Assessment for the Project.
- Although there are no dustfall standards for the Northwest Territories, 2021 dustfall rates were below the commercial and industrial objective of 1,922 mg/dm^2/y documented in the Alberta Ambient Air Quality Objectives for dustfall (AEP 2019), and at three stations (Dust 3, Dust 10 and Dust 11) were higher than the residential limit of the Alberta Ambient Air Quality Objectives for dustfall (646 mg/dm^2/y).
- Snow water chemistry variables of interest included aluminum, ammonia, arsenic, cadmium, chromium, copper, lead, nickel, nitrite, zinc, and phosphorus. All 2021 concentrations and the phosphorus load were below the corresponding EQC values. DDMI compares the measured total metal levels for dust with EQC only because these criteria provide concentrations that can serve as general performance indicators. There is no intention or requirement that snow samples must meet the EQC or Alberta dustfall objectives.

Effluent and Water Chemistry

- The 2021 effluent toxicity results indicated that the effluent discharged to Lac de Gras in 2021 was non-toxic; all effluent samples submitted for lethal and sublethal toxicity testing passed test criteria.
- The concentrations of all regulated effluent variables were below applicable EQC values.
- Nearly all concentrations (>99%) measured in samples collected at the mixing zone boundary were within the relevant AEMP water quality Effects Benchmarks for the protection of aquatic life and drinking water.
- In the ice-cover season, elevated conductivity was measured in the bottom two-thirds of the water column in the NF area, corresponding to the depth range where the effluent plume was located. During the open-water season, in situ water quality measurements were typically uniform throughout the water column.
- Concentrations of nearly all variables in samples collected during the 2021 AEMP were below the relevant Effects Benchmarks for the protection of aquatic life and drinking water. In most cases, identified exceedances appeared to be caused by contamination or data errors, or were attributable to natural conditions in Lac de Gras.
- In 2021, 20 water quality variables demonstrated an effect equivalent to Action Level 1 (i.e., TDS [calculated], turbidity, calcium, chloride, magnesium, potassium, sodium, sulphate, ammonia, nitrate, aluminum, antimony, barium, chromium, copper, manganese, molybdenum, silicon, strontium, and uranium), and were included in the list of SOIs in 2021.

- Of the 20 SOIs that triggered Action Level 1, nine also triggered Action Level 2 (i.e., TDS [calculated], chloride, sodium, sulphate, nitrate, molybdenum, silicon, strontium, and uranium); these nine variables already have existing Effects Benchmarks.
- None of the SOIs triggered Action Level 3.
- Spatial trends of decreasing concentrations with distance from the Mine effluent discharge were evident for most SOIs based on a graphical and statistical evaluation of the data. An exception was turbidity which had increasing trend with distance from the Mine effluent discharge in the ice-cover season.
- Fifteen variables triggered an effect equivalent to Action Level 1 at one or more of the four MF area stations located within the estimated ZOI from dust deposition from the Mine site. Of these 15 SOIs, 12 also triggered Action Level 1 in the NF area, indicating that the exceedances at the MF stations were at most likely caused by dispersion of Mine effluent into the lake. Analysis of the 2021 AEMP water quality data did not provide evidence to suggest an effect of dust deposition from the Mine site on the water quality of Lac de Gras.

Eutrophication Indicators

- The Mine is having a nutrient enrichment effect in Lac de Gras, as evidenced by greater nutrient and chlorophyll *a* concentrations, and zooplankton biomass in the NF and MF areas, compared to the rest of the lake. This result is consistent with observations reported in previous AEMP years as summarized in the *2017 to 2019 Aquatic Effects Re-evaluation Report* (Golder 2020c) and the 2020 AEMP annual report (Golder 2021).
- TP, TDP, and SRP concentrations were within or below the normal range throughout most of Lac de Gras during the open-water season, but above the normal range at some depths and NF and MF stations during the ice-cover season. The lower phosphorus concentrations in lake water relative to previous years were at least partly due to the lower TP loads from Mine effluent in 2021.
- Nitrogen concentrations were above the normal range in a large proportion of Lac de Gras, with significant decreasing concentrations with distance from the diffusers.
- Along most transects, a significant decreasing trend in SRSi concentration was observed, indicating a Mine effect.
- Chlorophyll *a* concentrations and zooplankton biomass decreased with distance from the diffuser and were above the normal range across the whole lake for chlorophyll *a*, and in the NF and MF areas for zooplankton biomass. The FFA and FFB areas were not sampled in 2021, thus there is some uncertainty of the spatial extent of effects past the boundary of the end of the MF3 transect. Total phytoplankton biomass decreased with distance from the diffuser; however, most results were within the normal range.
- The spatial extent of effects on eutrophication indicators in 2021 varied from 0% to 100% of the lake area depending on indicator:
  - The extent of effect was 0% to 3.4% for TP, and 20% to 41% of the lake area for TN, depending on season.

  - The extent of effect was 100% for chlorophyll *a* concentration (although subject to uncertainty), 0% for phytoplankton biomass and ≥58% of the lake area for zooplankton biomass. As FFA and FFB areas were not sampled this year due to it being an interim year, there is some uncertainty in the effect boundary at the end of the MF3 transect.
- The 2021 results indicate that effluent is the main source of Mine effects on Lac de Gras, with a negligible contribution from dust deposition. This conclusion is consistent with the results of the Special Effects Study – Dust Deposition (Appendix XII of the 2019 AEMP Annual Report), which did not detect a dust-related chemical signature in lake water and suggested limited bioavailability of phosphorus in dust.
- The magnitude and extent of effects on chlorophyll *a* triggered Action Level 2. This is consistent with observations reported in previous AEMP years as summarized in the *2017 to 2019 Aquatic Effects Re-evaluation Report* (Golder 2020b); either Action Level 1 or 2 were triggered in the 2007 to 2018 AEMPs, and no Action Level was triggered in 2019.
- This is the first year that Action Levels have been evaluated for TP. The magnitude and extent of effects on TP triggered Action Level 1.
- The 2021 results are consistent with the EA prediction of greater concentrations of nutrients, particularly phosphorus from the minewater discharge, resulting in an increase in primary productivity.

Plankton

- The 2021 plankton data indicate that a toxicological effect is not occurring in Lac de Gras. Rather, results continue to be consistent with nutrient enrichment.
- Greater plankton biomass was observed in NF area compared to the MF areas and the normal range.
- The NF area mean values for total phytoplankton and zooplankton taxonomic richness and biomass were greater than the reference condition mean, indicating that Action Level 1 was not triggered.

Traditional Knowledge

- Detailed results and discussion of the 2021 Traditional Knowledge Camp (i.e., Appendix XIV) are still pending and will be provided in the next AEMP Annual Report.
- Overall observations made by participants during the camp indicated concerns about fish health and water quality in Lac de Gras because of parasite loads observed in the fish during the camp.
- Science indicated water and fish quality were good based on results from the laboratory analysis of water and fish tissue chemistry.

13.2 Recommendations

Based on the 2021 AEMP results, there is one recommendation for the dust deposition, effluent and water chemistry, and plankton components of the AEMP. It is recommended that the analysis used to evaluate potential effects from dust emissions water quality in Lac de Gras be discontinued in future AEMP reports. The AEMP sampling design provides sufficient and appropriate data to evaluate the combined effects in Lac de Gras from all Mine-related sources, including dustfall. Additionally, since the potential effect of dust deposition and the known effluent effect are spatially confounded, an approach based on AEMP field data to separate the two effects is highly unlikely to be successful.

13.3 Summary

The AEMP is effective at monitoring the Mine effluent discharge and assessing potential ecological risks so that appropriate actions can be taken in the Mine operations to prevent adverse effects from occurring in the environment. Under the Response Framework, the AEMP is subject to response actions, if triggered, to confirm, further investigate, or mitigate the effects documented. The AEMP design will be updated as new information and findings indicate it is necessary, or as directed by the WLWB. No response actions are required as a result of the 2021 AEMP monitoring results.

14 CONTRIBUTORS

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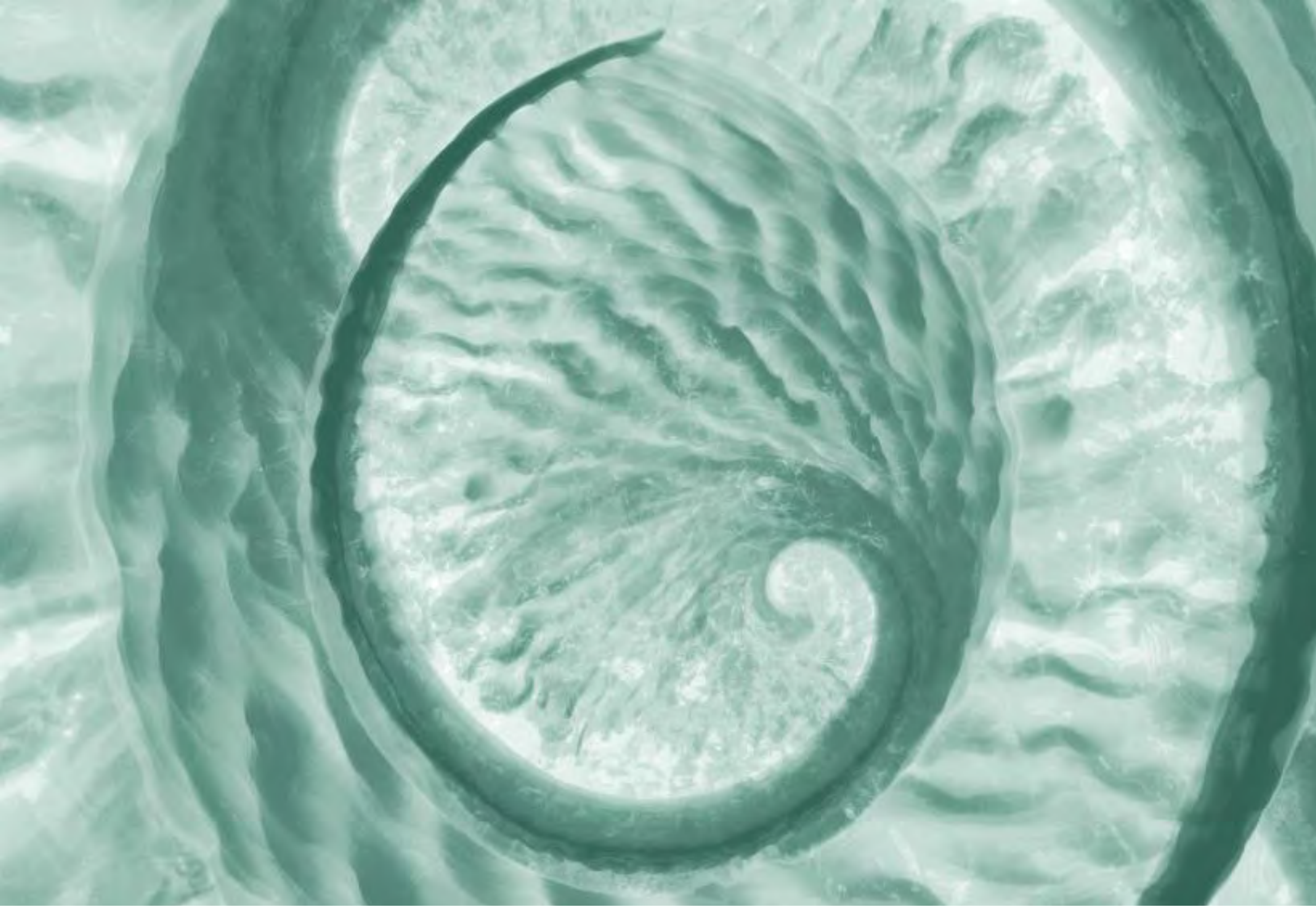
APPENDIX I

DUST DEPOSITION REPORT



Diavik Diamond Mine

2021 Dust Deposition Report

March 2022

Project No.: 0630556-0001

The business of sustainability

ERM

March 2022

Diavik Diamond Mine

2021 Dust Deposition Report

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EXECUTIVE SUMMARY

Potential air and water quality concerns associated with airborne fugitive dust, which may result from Diavik Diamond Mine (the Project) mining activities, were identified in the Diavik Diamond Mine *Environmental Assessment Report*. In accordance with the Environmental Assessment and requirements associated with the Aquatic Effects Monitoring Program (AEMP), a dust monitoring program was initiated in 2001. The program was designed to achieve the following objectives:

- determine dust deposition (dustfall) rates at various distances from the mine project footprint; and
- determine the chemical characteristics of dustfall that may be deposited onto, and subsequently into, Lac de Gras as a result of mining activities, in support of the AEMP.

In 2021, dustfall monitoring included three components, with sampling conducted at varying distances around the mine from 13 to 4,802 metres (m) away from infrastructure:

- dustfall gauges (12 monitoring and 2 control locations);
- dustfall from snow surveys (24 monitoring and 3 control locations); and
- snow water chemistry from snow surveys (16 monitoring and 3 control locations).

As expected, dustfall rates generally decreased with distance from the Project. The proximity to mine activity was the strongest indicator of dustfall deposition. In 2021, the annual dustfall estimated from each of the 14 dustfall gauges ranged from 50 to 706 mg/dm^2/y. Dust 3 (22 m from the Project) had the highest recorded dustfall followed by Dust 10 (46 m from the Project). Although it is expected that fugitive dust generation is higher during snow-free periods because of exposed road surfaces, the summer (July to September) rates were lower at most sites than the winter rates, which is likely explained by the dust suppression applied on haul roads, parking areas and the plant site during the snow-free season.

The annualized dustfall rates estimated from the 2021 snow survey data ranged from 6 to 1,648 mg/dm^2/y. Although there are no dustfall standards for the Northwest Territories, dustfall rates at all stations in 2021 were lower than the non-residential objective (1,922 mg/dm^2/y) documented in the Alberta Ambient Air Quality Objectives and Guidelines (Alberta Environment and Parks 2019), and only SS1-1, SS5-1, and SS5-3 dustfall stations exceeded the lower limit (646 mg/dm^2/y) of these guidelines, which applies to residential and recreational areas. These objectives are used as general performance indicators only.

Snow water chemistry analytes of interest included those variables with effluent quality criteria (EQC; i.e., aluminum, ammonia, arsenic, cadmium, chromium, copper, lead, nickel, nitrite, and zinc) or a load limit (i.e., phosphorus) specified in the Type A Water Licence (W2015L2-0001, formerly W2007L2-0003). All 2021 snow water chemistry sample concentrations were well below their associated reference levels as specified by the "maximum concentration of any grab sample" in Water Licence W2015L2-0001 except for the aluminum concentration at one site. Concentrations in 2021 were generally higher than the previous few years but comparable to levels on and before 2010. Typically, concentrations decreased with distance from the Project.

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ACRONYMS AND ABBREVIATIONS

AEMP	Aquatic effects monitoring program
BC	British Columbia
BC MOE	British Columbia Ministry of Environment
BV	Bureau Veritas
CI	Confidence interval
DDMI	Diavik Diamond Mines (2012) Inc.
DL	Detection limit
Dustfall	Dust deposition
EQC	Effluent quality criteria
ERM	ERM Consultants Canada Ltd.
Fugitive Dust	Atmospheric dust arises from mechanical disturbance of granular material exposed to the air and is not discharged to the atmosphere in a confined flow stream.
IQR	The interquartile range of the box plot. In box plots, the middle 50% of data occurs within the limits of the interquartile range.
Q1	The lower quartile of the box plot. In box plots, 25% of data lie below than this value.
Q3	The upper quartile of the box plot. In box plots, 25% of data lie above than this value.
QA/QC	Quality assurance and quality control
the Project	Diavik Diamond Mine
RPD	Relative percent difference
SCRP	South Country Rock Pile
SOP	Standard operating procedure
WLWB	Wek’èezhìi Land and Water Board
WRSA	Waste Rock Storage Area: an elevated surface constructed from dumping waste rock.

1. INTRODUCTION

Potential air and water quality concerns associated with airborne fugitive dust, which may result from Diavik Diamond Mine (the Project) mining activities, were identified in the Diavik Diamond Mine *Environmental Assessment Report* (DDMI 1998). In accordance with the Environmental Assessment and requirements associated with the Aquatic Effects Monitoring Program (AEMP), a dust monitoring program was initiated in 2001. The program was designed to achieve the following objectives:

- determine dust deposition (dustfall) rates at various distances from the mine project footprint; and
- determine the chemical characteristics of dustfall that may be deposited onto, and subsequently into, Lac de Gras as a result of mining activities, in support of the AEMP.

Since 2001, the dustfall monitoring program has gone through various changes, including an increase in the number of sampling locations, the relocation of some sampling stations, and improvements to the dustfall sampling methodology. Appendix A of the Dust Deposition Report summarizes the amendments and additions to the dustfall monitoring program since 2001. This report includes a comparison between the 2021 observations of dustfall to all site-specific historical data collected since 2002. Historical dustfall monitoring results have been presented each year in the Diavik Diamond Mine Dust Deposition reports from 2001 to 2020 (DDMI 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020 and 2021). The historical data presented are not considered to be representative of baseline conditions because construction of the mine began in 2001.

2. METHODOLOGY

The 2021 dustfall monitoring program incorporated three monitoring components:

- dustfall gauges (12 monitoring and 2 control locations);
- dustfall from snow surveys (24 monitoring and 3 control); and
- snow water chemistry from snow surveys (16 monitoring and 3 control).

Sampling was completed at varying distances around the mine along five transects, including three control locations (Table 2-1, Figure 2-1).

2.1 Dustfall Gauges

Dustfall gauges were placed at 14 stations (including two control stations) around the Project at distances ranging from approximately 13 m to 4,646 m from mining operations (Table 2-1; Figure 2-1). The 12 stations (plus 2 control stations) collected dustfall year-round, with samples collected approximately every three months. The average total sampling period for the 12 year-round locations was 352 days in 2021.

Dustfall gauges consisted of a hollow brass cylinder (52 cm length, 12.5 cm inner diameter) housed in a Nipher snow gauge (Photo 2.1-1). The cylinder collected dustfall, while the Nipher snow gauge reduced air turbulence around the gauge to increase dustfall catch efficiency. The cylinder was exchanged with an empty, clean cylinder at the end of each sampling period, and the content of the cylinder that was retrieved was processed in the Diavik Diamond Mines (2012) Inc. (DDMI) environment lab to determine the mass of collected dustfall. This processing involved filtration, drying in a high heat oven, and weighing of samples as specified in the Dust Gauge Collection Standard Operating Procedure (SOP; ENVI-908-0119; Appendix E) and the Quality Assurance/Quality Control SOP (ENVI-902-0119; Appendix G).

Photo 2.1-1: Dustfall gauge during sample collection. The dustfall gauge consisted of a hollow brass cylinder (centre) housed inside a Nipher snow gauge (right).

Table 2-1: Dustfall and Snow Chemistry Sampling Locations, Diavik Diamond Mine, 2021

Station ID	2021 Sampling Dates	Total Sample Exposure Duration (days)	UTM Coordinates[1]		Approx. Distance from Mining Operations (m)	Surface Description	Snow Water Chemistry Sampled[2]
			Easting (m)	Northing (m)			
Dustfall Gauges							
Dust 1	Jan 4 (2021; start), Apr 4, Jul 5, Sep 15, Dec 9 (2021; end)	339	533964	7154321	70	Land	n/a
Dust 2A	Jan 5 (2021; start), Mar 30, Jul 5, Sep 19, Jan 14 (2022; end)	374	535678	7151339	425	Land	n/a
Dust 3	Jan 3 (2021; start), Apr 4, Jul 5, Sep 15, Dec 4 (2021; end)	335	535024	7151872	22	Land	n/a
Dust 4	Jan 3 (2021; start), Mar 30, Jul 5, Sep 15, Dec 9 (2021; end)	340	531397	7152127	173	Land	n/a
Dust 5	Jan 5 (2021; start), Mar 30, Jul 2, Sep 16, Dec 9 (2021; end)	338	535696	7155138	1183	Land	n/a
Dust 6	Jan 3 (2021; start), Apr 4, Jul 5, Sep 15, Dec 4 (2021; end)	335	537502	7152934	13	Land	n/a
Dust 7	Jan 8 (2021; start), Mar 30, Jul 2, Sep 16, Jan 14 (2022; end)	371	536819	7150510	1147	Land	n/a
Dust 8	Jan 8 (2021; start), Apr 4, Jul 2, Sep 16, Dec 10 (2021; end)	336	531401	7154146	1213	Land	n/a
Dust 9	Jan 5 (2021; start), Mar 30, Jul 2, Sep 16, Jan 14 (2022; end)	374	541204	7152154	3796	Land	n/a
Dust 10	Jan 3 (2021; start), Apr 4, Jul 5, Sep 15, Dec 9 (2021; end)	340	532908	7148924	46	Land	n/a
Dust 11	Jan 6 (2021; start), Mar 30, Jul 2, Sep 16, Jan 14 (2022; end)	373	531493	7150156	747	Land	n/a
Dust 12	Jan 8 (2021; start), Mar 30, Jul 2, Sep 16, Jan 14 (2022; end)	371	529323	7151191	2326	Land	n/a

Station ID	2021 Sampling Dates	Total Sample Exposure Duration (days)	UTM Coordinates[1]		Approx. Distance from Mining Operations (m)	Surface Description	Snow Water Chemistry Sampled[2]
			Easting (m)	Northing (m)			
Dust C1	Jan 8 (2021; start), Mar 30, Jul 2, Sep 16, Jan 14 (2022; end)	371	534979	7144270	4646	Land	n/a
Dust C2	Jan 8 (2021; start), Mar 30, Jul 2, Sep 16, Jan 14 (2022; end)	371	528714	7153276	3031	Land	n/a
Snow Surveys							
SS1-1	Apr 10	191	533915	7154292	30	Land	
SS1-2	Apr 10	191	533909	7154382	115	Land	
SS1-3	Apr 10	191	533967	7154517	260	Land	
SS1-4[3]	Apr 10	162	534483	7155096	899	Ice	✓
SS1-5	Apr 10	162	535098	7156275	2175	Ice	✓
SS2-1	Apr 9	161	537553	7153474	145	Ice	✓
SS2-2	Apr 9	161	537760	7153435	427	Ice	✓
SS2-3	Apr 9	161	538485	7153933	1194	Ice	✓
SS2-4[4]	Apr 9	161	539142	7154686	2164	Ice	✓
SS3-4	Apr 11	163	536593	7150996	585	Ice	✓
SS3-5	Apr 11	163	537693	7150790	1325	Ice	✓
SS3-6	Apr 11	163	536302	7151563	35	Ice	✓
SS3-7[5]	Apr 11	163	536346	7151364	239	Ice	✓
SS3-8	Apr 11	163	536635	7150873	826	Ice	✓
SS4-1	Apr 12	193	531485	7152217	61	Land	
SS4-2	Apr 12	193	531353	7152263	196	Land	
SS4-3	Apr 12	193	531328	7152476	335	Land	
SS4-4	Apr 12	164	531140	7153172	1022	Ice	✓

Station ID	2021 Sampling Dates	Total Sample Exposure Duration (days)	UTM Coordinates[1]		Approx. Distance from Mining Operations (m)	Surface Description	Snow Water Chemistry Sampled[2]
			Easting (m)	Northing (m)			
SS4-5	Apr 12	164	531410	7154120	1214	Ice	√
SS5-1	Apr 11	192	533150	7148927	26	Land	
SS5-2	Apr 11	192	533149	7148871	55	Land	
SS5-3	Apr 11	163	533149	7148700	259	Ice	√
SS5-4	Apr 11	163	533153	7147948	941	Ice	√
SS5-5[6]	Apr 11	163	533148	7146953	1894	Ice	√
SSC-1	Apr 11	192	534989	7144273	4802	Land	√[8]
SSC-2	Apr 12	193	528714	7153273	3042	Land	√[8]
SSC-3[7]	Apr 11	192	538649	7148747	3550	Land	√[8]

Notes:

[1] UTM Zone 12W, NAD83.

[2] n/a = not applicable.

[3] Duplicate sample for snow water chemistry was collected at station SS1-4 (SS1-4-4 & SS1-4-5).

[4] Duplicate sample for dustfall snow surveys was collected at SS2-4 station (SS2-4-4 & SS2-4-5).

[5] Duplicate sample for snow water chemistry was collected at station SS3-7 (SS3-7-4 & SS3-7-5).

[6] Duplicate sample for dustfall snow surveys was collected at station SS5-5 (SS5-5-4 & SS5-5-5).

[7] Duplicate samples for dustfall snow surveys and snow water chemistry were collected at station SSC-3 (SSC-3-4 & SSC-3-5).

[8] Snow water chemistry was sampled over ice, adjacent to the on-land control station; see Section 2.3 for further details.

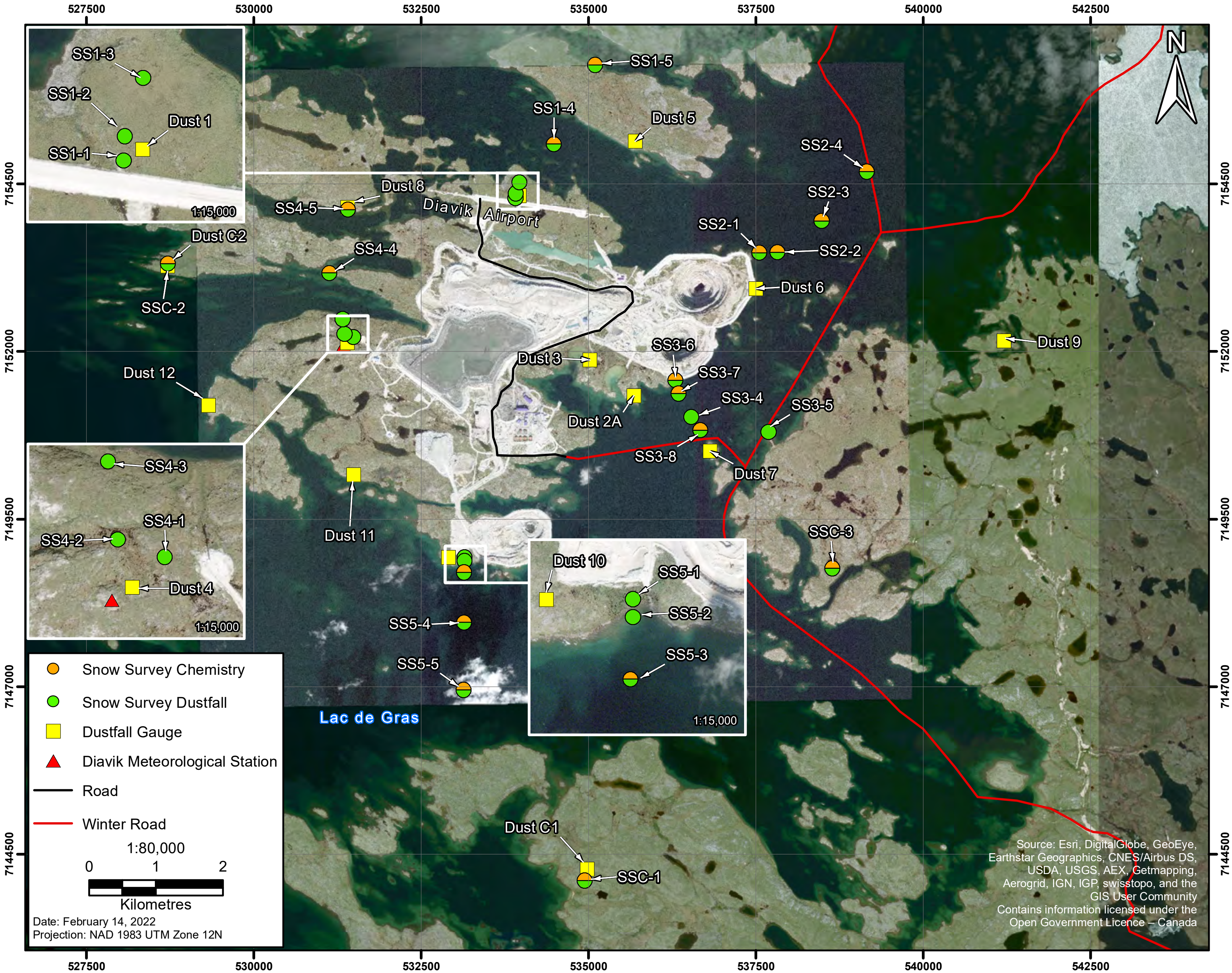


Figure 2-1: Dustfall Gauge and Snow Survey Locations, Diavik Diamond Mine, 2021

Once the mass of collected dustfall at a station was measured, the mean daily dustfall rate over the collection period was calculated as:

$$D = \frac{M}{A*T} \quad \text{[Equation 1]}$$

where:

D = mean daily dustfall rate (mg/dm^2/d) during time period T
M = mass of dustfall collected (mg) during time period T
A = surface area of dustfall gauge collection cylinder orifice (dm^2; approximately 1.227 dm^2)
T = number of days of dustfall collection (d)

The mean daily dustfall rate (mg/dm^2/d) was then multiplied by 365 days to estimate the mean annual dustfall rate (mg/dm^2/y). Similarly, seasonal dustfall rates for winter and summer were calculated based on the mean daily rates for winter and summer days, respectively. The summer was defined as the snow-free season, which extends from July to September based on the Dustfall gauges sampling dates (Table 2-1), while the rest of the year is considered winter.

The Northwest Territories has no guidelines or objectives for dustfall deposition. The estimated dustfall rates are compared to the Alberta Ambient Air Quality Objectives and Guidelines for dustfall (Alberta Environment and Parks, 2019), which are used only as general performance indicators and are not a regulatory requirement in compliance evaluation. The Alberta Ambient Air Quality Guidelines for dustfall include a guideline for residential and recreation areas (53 mg/dm^2 per 30 days) and a guideline for commercial and industrial areas where higher dustfall rates are expected (158 mg/dm^2 per 30 days). To compare dustfall rates against the Alberta Ambient Air Quality Guidelines, daily and annual thresholds were derived from the 30 days objectives. The calculated daily guideline was 1.77 mg/dm^2/d for residential and recreation areas and 5.27 mg/dm^2/d for commercial and industrial areas, while the annual guideline was 646 mg/dm^2/y for residential and recreation areas and 1,922 mg/dm^2/y for commercial and industrial areas. Snow water chemistry data were compared to effluent quality criteria (EQC) set out in Wek’èezhìi Land and Water Board (WLWB) Water Licence W2015L2-0001 (formerly W2007L2-0003).

2.2 Dustfall Snow Surveys

Dustfall snow surveys were performed at 24 monitoring and 3 control sites along 5 transects around the Project (Table 2-1 and Figure 2-1). Across stations, the distance from mining operations ranged from approximately 26 m to 2,175 m for the monitoring stations and from 3,042 m to 4,802 m for the control stations. The average total sampling period for the monitoring stations in 2021 was 192 and 162 days for the land and ice stations, respectively (control stations not included). The start dates correspond to the first snowfall for land stations (October 1, 2020), and freeze up of ice stations (October 30, 2020).

At each snow survey station, a snow corer was used to drill into the snow pack to retrieve a cylindrical snow core (6.1 cm inner diameter; Photo 2.2-1). Cores were extracted at each station and composited in the field to ensure a representative snow sample was obtained for the station. A minimum of three snow cores were collected at each (land and ice) of the snow sampling stations, as outlined in the Snow Core Survey SOP (ENVI-909-0119; Appendix F). Composited samples were bagged and brought to the DDMI environment lab for processing as specified in the Snow Core Survey SOP (ENVI-909-0119; Appendix F) and the Quality Assurance/Quality Control SOP (ENVI-902-0119; Appendix G). Processing of snow cores involved filtration, drying in a high heat oven, and weighing. For quality assurance and control (QA/QC), duplicate samples were collected at stations SS2-4, SS5-5 and SSC-3.

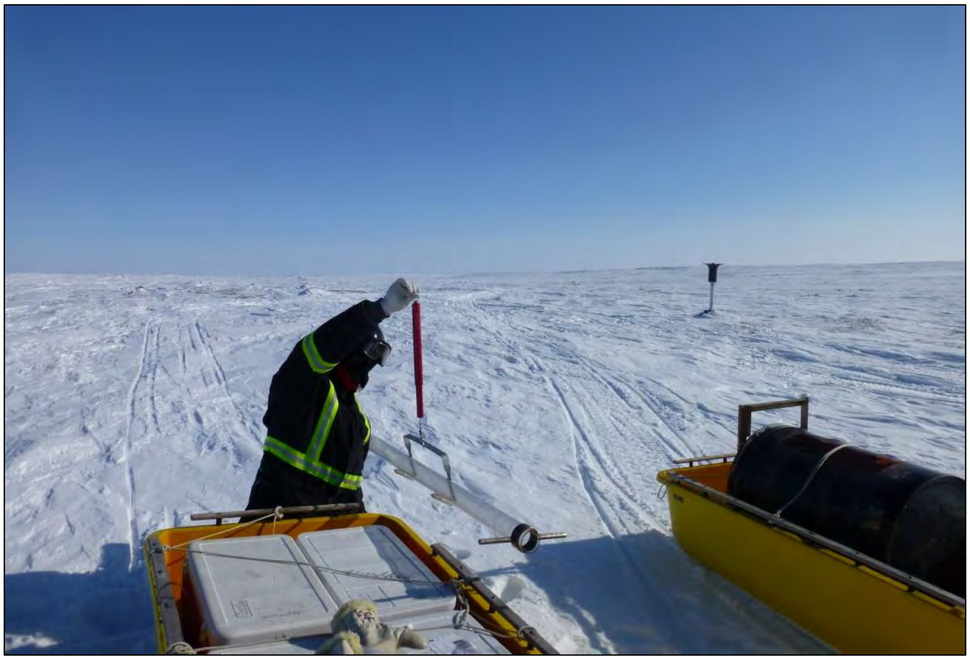


Photo 2.2-1: Snow core sample being weighed, with dustfall gauge in background.

Mean daily dustfall rate (mg/dm^2/d) was then calculated over the collection period using Equation 1, with surface area (A) equal to the surface area of the snow corer tube orifice (0.2922 dm^2) multiplied by the number of snow cores used for the composited sample at the station. The mean annual dustfall rate (mg/dm^2/y) was estimated by multiplying the mean daily dustfall rate by 365 days.

Dustfall rates were compared to the Alberta Ambient Air Quality Objectives and Guidelines for dustfall (Table 2.2-1), which served as general performance indicators only.

Table 2.2-1: Dustfall and Snow Water Chemistry Reference Values

Parameter	Value	Unit	Comment	Source
Dustfall Rate	53 or 158	mg/dm^2/ 30 day	Alberta Ambient Air Quality Guidelines for dustfall	(Alberta Environment and Parks, 2019).
Aluminum-Total	3,000	µg/L	Max. grab sample concentration	W2015L2-0001
Ammonia-N	12,000	µg/L	Max. grab sample concentration	W2015L2-0001
Arsenic-Total	100	µg/L	Max. grab sample concentration	W2015L2-0001
Cadmium-Total	3	µg/L	Max. grab sample concentration	W2015L2-0001
Chromium-Total	40	µg/L	Max. grab sample concentration	W2015L2-0001
Copper-Total	40	µg/L	Max. grab sample concentration	W2015L2-0001
Lead-Total	20	µg/L	Max. grab sample concentration	W2015L2-0001
Nickel-Total	100	µg/L	Max. grab sample concentration	W2015L2-0001
Nitrite-N	2,000	µg/L	Max. grab sample concentration	W2015L2-0001
Zinc-Total	20	µg/L	Max. grab sample concentration	W2015L2-0001

2.3 Snow Water Chemistry

Snow water chemistry analysis was performed on snow cores extracted from 19 locations, including 16 dustfall snow survey stations located on ice and three samples taken on ice adjacent to the three control locations (Table 2-1 and Figure 2-1). The distance of the snow survey stations from mining operations in 2021 ranged approximately 35 m to 2,175 m, while this distance ranged from 3,042 m to 4,802 m for the control locations. The average total sampling period in 2021 for the snow survey stations was 162 days (control stations not included). At each station located over water, cores were collected for chemistry analysis immediately after the dustfall snow cores were extracted.

Snow water chemistry cores were extracted using a snow corer in accordance with the dustfall snow survey core extraction. A minimum of three cores at each site were extracted and composited to obtain the necessary 3 L of snow water required for the laboratory chemical analysis (see Appendix F). Snow cores were then processed and prepared for shipment to Bureau Veritas (BV) where the chemical analysis was performed. For QA/QC purposes, duplicate samples were collected at stations SS1-4, SS3-7 and SSC-3, in addition to an equipment blank sample (SS EBW). Snow water chemistry sampling methodology is detailed in SOP ENVI-909-0119 (see Appendix F).

EQC, including “maximum average concentration” and “maximum concentration of any grab sample,” are stipulated in DDMI’s Water Licence (W2015L2-0001) for aluminum, ammonia, arsenic, cadmium, chromium, copper, lead, nickel, nitrite, and zinc (Table 2.2-1). Snow water chemistry results for these variables were compared to the “maximum concentration of any grab sample.” These results are also presented as part of DDMI’s AEMP report.

DDMI measures the chemistry of snow samples as this assists with characterizing the chemical content of the particulate material deposited over time. This is measured as the metal and nutrient concentrations in units of milligrams per litre (mg/L) or microgram per litre (µg/L) of the melted snow sample, which allows for direct comparison to EQC maximum grab sample concentrations. The snow chemistry concentrations (mg/L) were converted to an areal deposition rate in milligrams per square decimetre per year ($mg/dm^2/y$) using Equation 1 multiplied by the collected volume of water (L). The water volume used for snow chemistry analysis was unknown for some stations; thus, an average was calculated (3.419 L) using the known volumes and applied to stations with unknown volumes. The surface area (A) in Equation 1 is equal to the surface area of the snow corer tube orifice (0.2922 dm^2) multiplied by the number of water quality cores used for the composited sample at the station. The mean annual deposition rate ($mg/dm^2/y$) was estimated by multiplying the mean daily deposition rate by 365 days. The 2021 snow chemistry results are presented as areal deposition rates and as concentrations when compared to historical data.

DDMI compares the measured total metals levels for dust with EQC only because these criteria provide concentrations that can serve as general performance indicators, in a similar way that dustfall rates are compared with the Alberta Ambient Air Quality Objectives and Guidelines for dustfall (Alberta Environment and Parks, 2019). There is no intention or requirement that snow samples must meet the EQC or Alberta dustfall objectives.

3. RESULTS

Dustfall and snow water chemistry results were grouped into zones based on their relative distance from the mine footprint (Table 3-1). Station groupings into zones were first established at the outset of the program; however, these groupings were re-established in 2013 using satellite imagery of the site.

In 2021, the primary sources of fugitive dust were associated with unpaved road and airstrip usage and construction and mining activities at the A21 open pit. Due to construction and mining activities at A21, the distances to mining operations were recalculated in 2019. The revised distances to mining operations are shown in Tables 2-1 and 3-1.

Major waste rock material transfers in 2021 included the use of haul roads (9,240,196 tonnes) and the transfer of kimberlite ore to the crusher (2,533,761 tonnes). Another source of fugitive dust was truck traffic along the ice road to the Project. Although, the ice road is mainly covered by ice and snow there is always some exposed rock material that creates fugitive dust. However, the consistency in the dust deposition rate near the ice road alignment sites between winter and summer, in addition to the relatively lower deposition rates at these sites (e.g., Dust 7, SS2-4, SS3-5 and SS3-8) indicated that the contributions of dust from the ice road were modest relative to other sources. To suppress dust generation, roads, parking areas and the plant site were watered during the summer as needed. In 2021, approximately 19,037 m^3 of water was applied to the plant site and haul roads. The exact impact of dust suppression could not be determined from the data collected in 2021; however, it is likely that road watering reduced the amount of dust generated at the mine. In 2021, Underground Mine production continued at A154 and A418, as well as stripping and production at the A21 open pit. Fugitive dust generation is generally expected to be greatest during snow-free periods where and when there is site activity. Accordingly, it was expected that the highest fugitive dust generation and resulting dustfall would have occurred in areas closest to the roads, the airstrip, and mine footprint such as near A21 between May and September. Winter dustfall rates were always higher than summer rates except at two sites, suggesting that dust suppression methods used in the summer are effective.

Wind directions at the site in 2021 were generally omnidirectional with northwest, southeast and east being the dominant directions. Therefore, the expectation is that airborne material will be deposited in all directions around the mine with a west, northwest and southeast emphasis (Figures 2-1 and 3.1-1). Similar to previous years, the results show that the proximity to the mine activity is a stronger indicator of dust deposition than wind direction. This is supported by the fact that the three highest dust deposition rates in 2021 (Dust 10, 3, and 11) are located south of the mine footprint which was not a dominant downwind direction. Dust 10 and Dust 3, which are located only 46 and 22 m from the mine, respectively, recorded the highest dustfall rate of the dustfall gauges in 2021.

Results from the dustfall gauges, dustfall snow surveys, and the snow water chemistry analyses are presented below.

Snow water chemistry results that were below analytical detection limits were substituted with half the detection limit for the calculation of statistics and for graphing purposes.

3.1 Dustfall Gauges

For each station, total dustfall collected throughout the year is summarized in Table 3-1. Annual 2021 dustfall and the station location relative to the Project are presented in Figure 3.1-1, and the historical records of annual dustfall are presented in Figures 3.1-2 and 3.1-3. A comparison of 2021 dustfall versus distance from the mine footprint is presented in Figure 3.1-4. Boxplots summarizing the dustfall magnitude distribution measured annually are presented in Figure 3.1-5. Detailed information on 2021 measurements and calculations for each station are included in Appendix B.

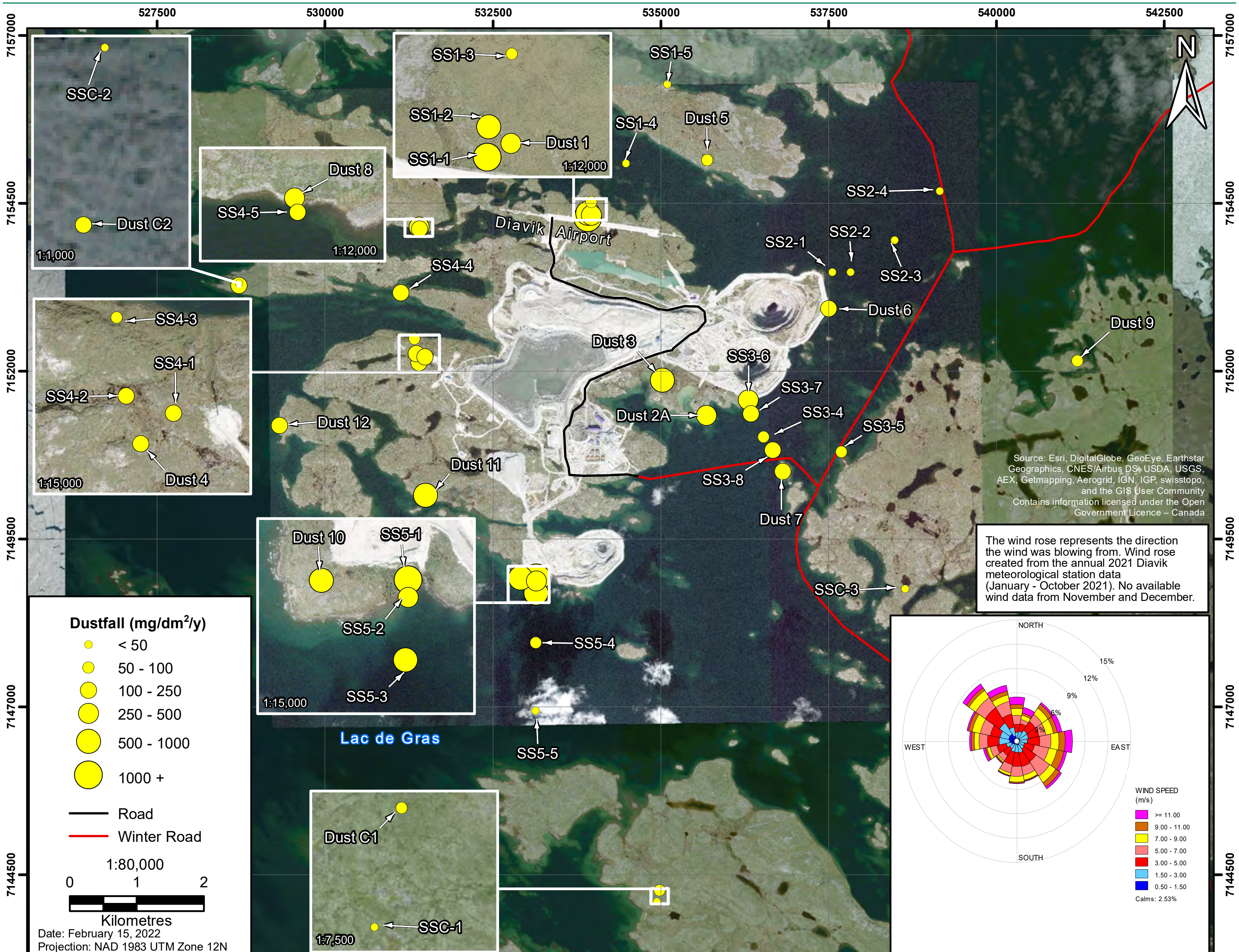


Figure 3.1-1: Dustfall Results, Diavik Diamond Mine, 2021

Table 3-1: Dustfall and Snow Water Chemistry Results, Diavik Diamond Mine, 2021

Zone	Station	Approx. Distance from Mining (m)	Dustfall (mg/dm²/y)	Winter Dustfall (mg/dm²/y)	Summer Dustfall (mg/dm²/y)	Snow Water Chemistry (mg/dm²/y)										
						Aluminum	Ammonia	Arsenic	Cadmium[1]	Chromium	Copper	Lead	Nickel	Nitrite	Phosphorus	Zinc
0-100 m	Dust 01	70	386	417	271	-	-	-	-	-	-	-	-	-	-	-
	Dust 03	22	706	728	625	-	-	-	-	-	-	-	-	-	-	-
	Dust 06	13	188	199	150	-	-	-	-	-	-	-	-	-	-	-
	Dust 10	46	669	756	346	-	-	-	-	-	-	-	-	-	-	-
	SS1-1	30	1,102	-	-	-	-	-	-	-	-	-	-	-	-	-
	SS3-6	35	311	-	-	8.8	0.18	0.00074	0.00011	0.076	0.012	0.0124	0.158	0.0013	0.414	0.049
	SS4-1	61	105	-	-	-	-	-	-	-	-	-	-	-	-	-
	SS5-1	26	1,648	-	-	-	-	-	-	-	-	-	-	-	-	-
	SS5-2	55	276	-	-	-	-	-	-	-	-	-	-	-	-	-
Mean			**599**	**525**	**348**	**8.8**	**0.18**	**0.00074**	**0.00011**	**0.076**	**0.012**	**0.0124**	**0.158**	**0.0013**	**0.414**	**0.049**
Median			**386**	**572**	**309**	**8.8**	**0.18**	**0.00074**	**0.00011**	**0.076**	**0.012**	**0.0124**	**0.158**	**0.0013**	**0.414**	**0.049**
Standard Deviation			**502**	**266**	**202**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**
95% Confidence Interval (Mean +/-)			**386**	**423**	**321**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**
Upper Limit of 95% Confidence Interval			**985**	**948**	**669**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**
Lower Limit of 95% Confidence Interval			**213**	**102**	**28**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**
101-250 m	Dust 04	173	237	280	74	-	-	-	-	-	-	-	-	-	-	-
	SS1-2	115	589	-	-	-	-	-	-	-	-	-	-	-	-	-
	SS2-1	145	20	-	-	1.1	0.09	0.00019	0.00002	0.007	0.002	0.0009	0.009	0.0016	0.021	0.006
	SS3-7	239	173	-	-	3.8	0.16	0.00046	0.00005	0.029	0.005	0.0027	0.050	0.0022	0.201	0.022
	SS4-2	196	146	-	-	-	-	-	-	-	-	-	-	-	-	-
Mean			**233**	**280**	**74**	**2.5**	**0.13**	**0.00033**	**0.00003**	**0.018**	**0.003**	**0.0018**	**0.029**	**0.0019**	**0.111**	**0.014**
Median			**173**	**280**	**74**	**2.5**	**0.13**	**0.00033**	**0.00003**	**0.018**	**0.003**	**0.0018**	**0.029**	**0.0019**	**0.111**	**0.014**
Standard Deviation			**214**	**n/a**	**n/a**	**2.0**	**0.04**	**0.00019**	**0.00002**	**0.015**	**0.002**	**0.0013**	**0.029**	**0.0004**	**0.127**	**0.011**
95% Confidence Interval (Mean +/-)			**265**	**n/a**	**n/a**	**17.7**	**0.40**	**0.00171**	**0.00020**	**0.139**	**0.017**	**0.0116**	**0.256**	**0.0039**	**1.140**	**0.100**
Upper Limit of 95% Confidence Interval			**498**	**n/a**	**n/a**	**20.2**	**0.52**	**0.00203**	**0.00023**	**0.157**	**0.021**	**0.0134**	**0.286**	**0.0058**	**1.251**	**0.114**
Lower Limit of 95% Confidence Interval			**0**	**n/a**	**n/a**	**0.0**	**0.00**	**0.00000**	**0.00000**	**0.000**	**0.000**	**0.0000**	**0.000**	**0.0000**	**0.000**	**0.000**

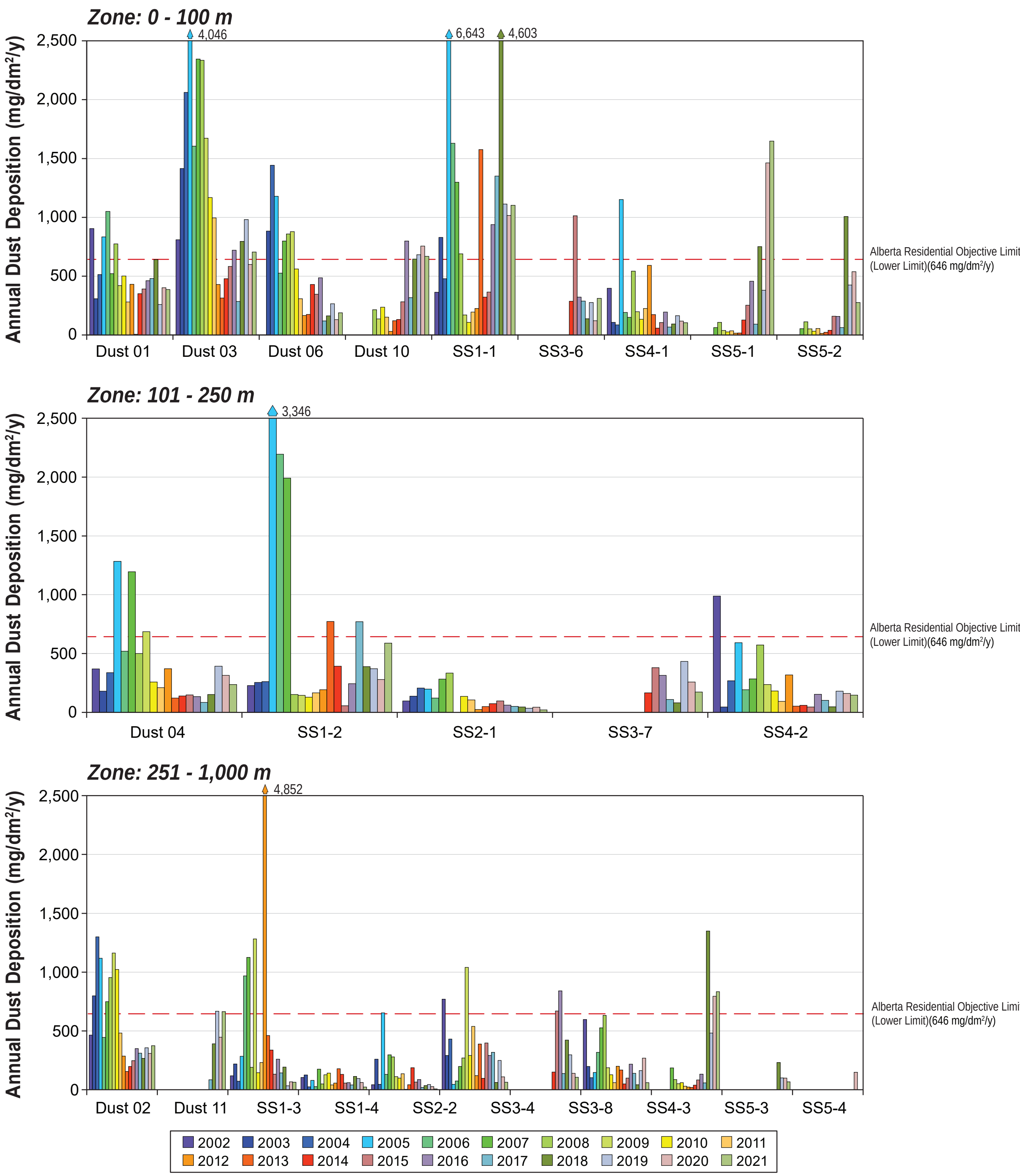
Zone	Station	Approx. Distance from Mining (m)	Dustfall (mg/dm^2/y)	Winter Dustfall (mg/dm^2/y)	Summer Dustfall (mg/dm^2/y)	Snow Water Chemistry (mg/dm^2/y)										
						Aluminum	Ammonia	Arsenic	Cadmium[1]	Chromium	Copper	Lead	Nickel	Nitrite	Phosphorus	Zinc
251-1,000 m	Dust 02	425	373	405	248	-	-	-	-	-	-	-	-	-	-	-
	Dust 11	747	664	795	152	-	-	-	-	-	-	-	-	-	-	-
	SS1-3	260	64	-	-	-	-	-	-	-	-	-	-	-	-	-
	SS1-4	899	22	-	-	0.6	0.08	0.00019	0.00002	0.005	0.002	0.0018	0.004	0.0019	0.030	0.005
	SS2-2	427	6	-	-	0.4	0.06	0.00003	0.00001	0.002	0.001	0.0006	0.002	0.0014	0.010	0.003
	SS3-4	585	63	-	-	1.2	0.10	0.00026	0.00003	0.010	0.001	0.0013	0.016	0.0022	0.100	0.006
	SS3-8	826	106	-	-	2.5	0.11	0.00007	0.00005	0.017	0.003	0.0021	0.024	0.0016	0.113	0.017
	SS4-3	335	59	-	-	-	-	-	-	-	-	-	-	-	-	-
	SS5-3	259	833	-	-	5.1	0.09	0.00055	0.00005	0.021	0.010	0.0046	0.021	0.0059	0.126	0.024
	SS5-4	941	67	-	-	2.0	0.09	0.00024	0.00004	0.015	0.002	0.0021	0.026	0.0022	0.156	0.010
Mean			**226**	**600**	**200**	**2.0**	**0.09**	**0.00022**	**0.00003**	**0.012**	**0.003**	**0.0021**	**0.016**	**0.0025**	**0.089**	**0.011**
Median			**66**	**600**	**200**	**1.6**	**0.09**	**0.00021**	**0.00004**	**0.012**	**0.002**	**0.0019**	**0.019**	**0.0020**	**0.106**	**0.008**
Standard Deviation			**297**	**276**	**68**	**1.7**	**0.02**	**0.00019**	**0.00002**	**0.007**	**0.003**	**0.0013**	**0.010**	**0.0017**	**0.057**	**0.008**
95% Confidence Interval (Mean +/-)			**212**	**2,475**	**612**	**1.8**	**0.02**	**0.00020**	**0.00002**	**0.007**	**0.004**	**0.0014**	**0.011**	**0.0018**	**0.060**	**0.009**
Upper Limit of 95% Confidence Interval			**438**	**3,076**	**812**	**3.8**	**0.11**	**0.00042**	**0.00005**	**0.019**	**0.007**	**0.0035**	**0.026**	**0.0043**	**0.149**	**0.020**
Lower Limit of 95% Confidence Interval			**14**	**0**	**0**	**0.2**	**0.07**	**0.00003**	**0.00002**	**0.004**	**0.000**	**0.0007**	**0.005**	**0.0008**	**0.029**	**0.002**
1,001-2,500 m	Dust 05	1,183	84	82	90	-	-	-	-	-	-	-	-	-	-	-
	Dust 07	1,147	174	194	96	-	-	-	-	-	-	-	-	-	-	-
	Dust 08	1,213	279	308	179	-	-	-	-	-	-	-	-	-	-	-
	Dust 12	2,326	185	221	47	-	-	-	-	-	-	-	-	-	-	-
	SS1-5	2,175	8	-	-	0.4	0.08	0.00011	0.00001	0.004	0.001	0.0006	0.003	0.0019	0.014	0.003
	SS2-3	1,194	6	-	-	0.5	0.08	0.00015	0.00001	0.004	0.001	0.0006	0.003	0.0019	0.004	0.003
	SS2-4	2,164	24	-	-	0.4	0.10	0.00011	0.00001	0.003	0.001	0.0004	0.004	0.0023	0.029	0.002
	SS3-5	1,325	71	-	-	0.4	0.08	0.00004	0.00001	0.005	0.001	0.0004	0.009	0.0019	0.027	0.002
	SS4-4	1,022	116	-	-	2.4	0.15	0.00070	0.00004	0.022	0.005	0.0017	0.045	0.0050	0.163	0.012
	SS4-5	1,214	210	-	-	2.8	0.14	0.00065	0.00008	0.025	0.005	0.0022	0.028	0.0022	0.157	0.015
	SS5-5	1,894	19	-	-	0.6	0.06	0.00009	0.00002	0.005	0.001	0.0007	0.004	0.0022	0.020	0.003
+2,500 m	Dust 09	3,796	50	58	20	-	-	-	-	-	-	-	-	-	-	-
Mean			**107**	**201**	**103**	**1.1**	**0.10**	**0.00026**	**0.00003**	**0.009**	**0.002**	**0.0009**	**0.014**	**0.0025**	**0.059**	**0.006**
Median			**84**	**207**	**93**	**0.5**	**0.08**	**0.00011**	**0.00001**	**0.005**	**0.001**	**0.0006**	**0.004**	**0.0022**	**0.027**	**0.003**
Standard Deviation			**93**	**93**	**55**	**1.1**	**0.03**	**0.00028**	**0.00003**	**0.009**	**0.002**	**0.0007**	**0.016**	**0.0011**	**0.070**	**0.005**
95% Confidence Interval (Mean +/-)			**63**	**148**	**88**	**1.0**	**0.03**	**0.00026**	**0.00002**	**0.009**	**0.002**	**0.0006**	**0.015**	**0.0010**	**0.064**	**0.005**
Upper Limit of 95% Confidence Interval			**170**	**350**	**191**	**2.1**	**0.13**	**0.00053**	**0.00005**	**0.018**	**0.004**	**0.0016**	**0.029**	**0.0035**	**0.123**	**0.011**
Lower Limit of 95% Confidence Interval			**44**	**53**	**15**	**0.1**	**0.07**	**0.00000**	**0.00000**	**0.001**	**0.000**	**0.0003**	**0.000**	**0.0014**	**0.000**	**0.001**

Zone	Station	Approx. Distance from Mining (m)	Dustfall (mg/dm²/y)	Winter Dustfall (mg/dm²/y)	Summer Dustfall (mg/dm²/y)	Snow Water Chemistry (mg/dm²/y)										
						Aluminum	Ammonia	Arsenic	Cadmium[1]	Chromium	Copper	Lead	Nickel	Nitrite	Phosphorus	Zinc
Control	Dust C1	4,646	98	87	140	-	-	-	-	-	-	-	-	-	-	-
	Dust C2	3,031	101	121	26	-	-	-	-	-	-	-	-	-	-	-
	SSC-1	4,802	14	-	-	0.3	0.07	0.00009	0.00001	0.004	0.001	0.0004	0.002	0.0016	0.003	0.002
	SSC-2	3,042	36	-	-	1.4	0.09	0.00031	0.00003	0.016	0.002	0.0013	0.026	0.0015	0.027	0.009
	SSC-3	3,550	21	-	-	0.9	0.06	0.00009	0.00001	0.007	0.001	0.0009	0.007	0.0019	0.024	0.004
Mean			**54**	**104**	**83**	**0.9**	**0.07**	**0.00016**	**0.00002**	**0.009**	**0.001**	**0.0008**	**0.012**	**0.0017**	**0.018**	**0.005**
Median			**36**	**104**	**83**	**0.9**	**0.07**	**0.00009**	**0.00001**	**0.007**	**0.001**	**0.0009**	**0.007**	**0.0016**	**0.024**	**0.004**
Standard Deviation			**43**	**23**	**81**	**0.6**	**0.01**	**0.00013**	**0.00001**	**0.007**	**0.001**	**0.0005**	**0.013**	**0.0002**	**0.013**	**0.004**
95% Confidence Interval (Mean +/-)			**53**	**211**	**726**	**1.4**	**0.03**	**0.00032**	**0.00003**	**0.017**	**0.002**	**0.0012**	**0.032**	**0.0004**	**0.032**	**0.009**
Upper Limit of 95% Confidence Interval			**107**	**315**	**809**	**2.2**	**0.11**	**0.00048**	**0.00005**	**0.026**	**0.004**	**0.0020**	**0.044**	**0.0021**	**0.050**	**0.014**
Lower Limit of 95% Confidence Interval			**1**	**0**	**0**	**0.0**	**0.04**	**0.00000**	**0.00000**	**0.000**	**0.000**	**0.0000**	**0.000**	**0.0012**	**0.000**	**0.000**

Notes:

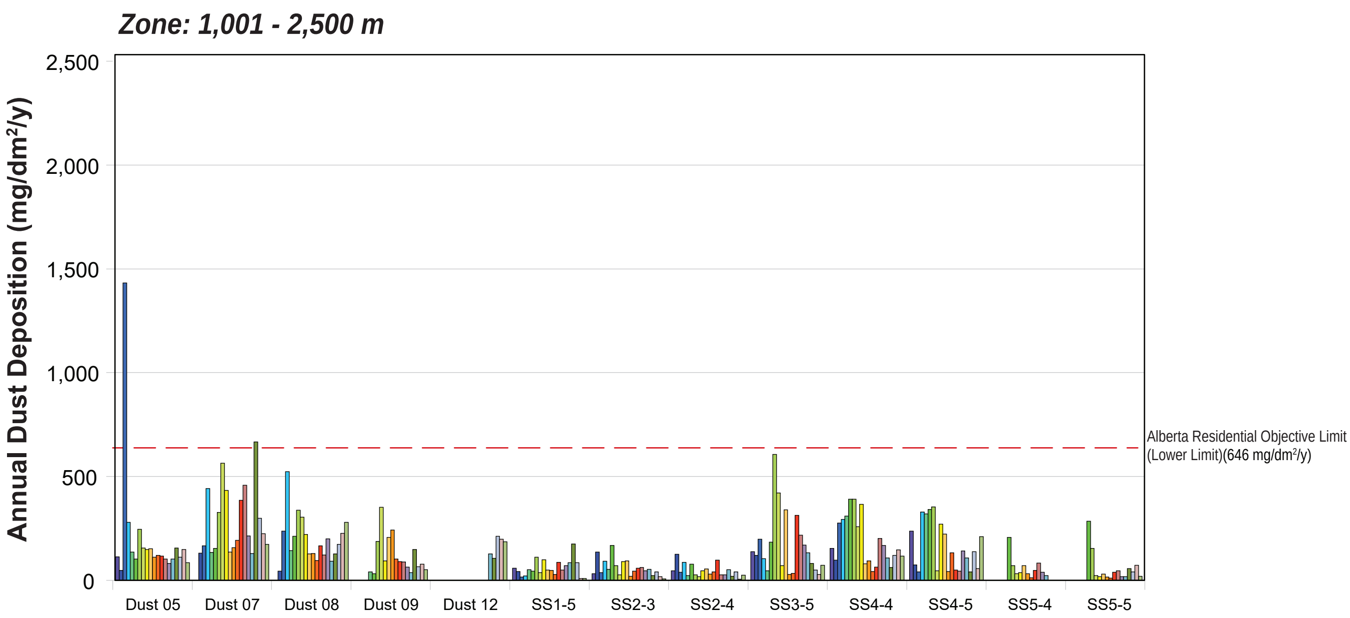
Dash (-) = not available (snow water chemistry not sampled).

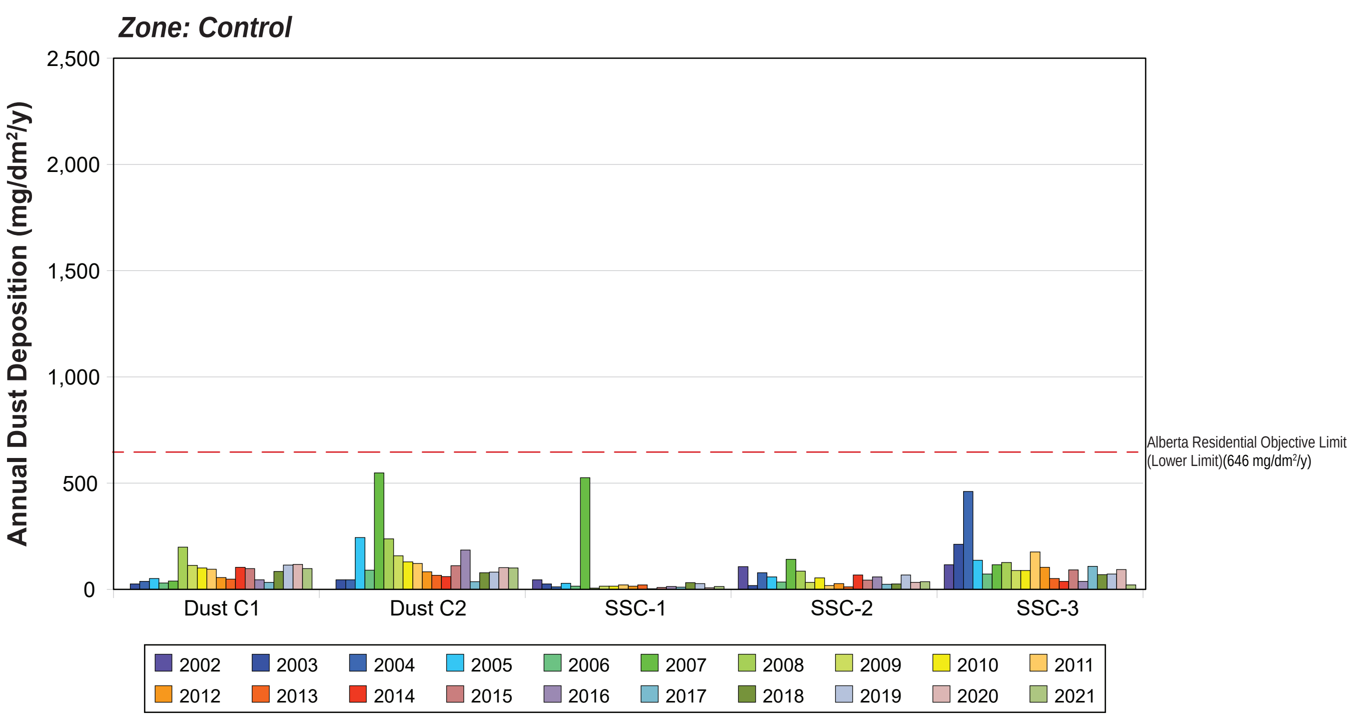
[1] For measurements that were less than the detection limit, half the detection limit was used for calculations.



Notes: Annual deposition was calculated using the methodology described in Section 2.
See Table 2-1 for actual 2021 sample exposure times.
Station locations have been grouped into zones based on their distance from the 2019 Project footprint (see Section 3 for further details).
SS5-4 moved to 251-1,000 m zone in 2018

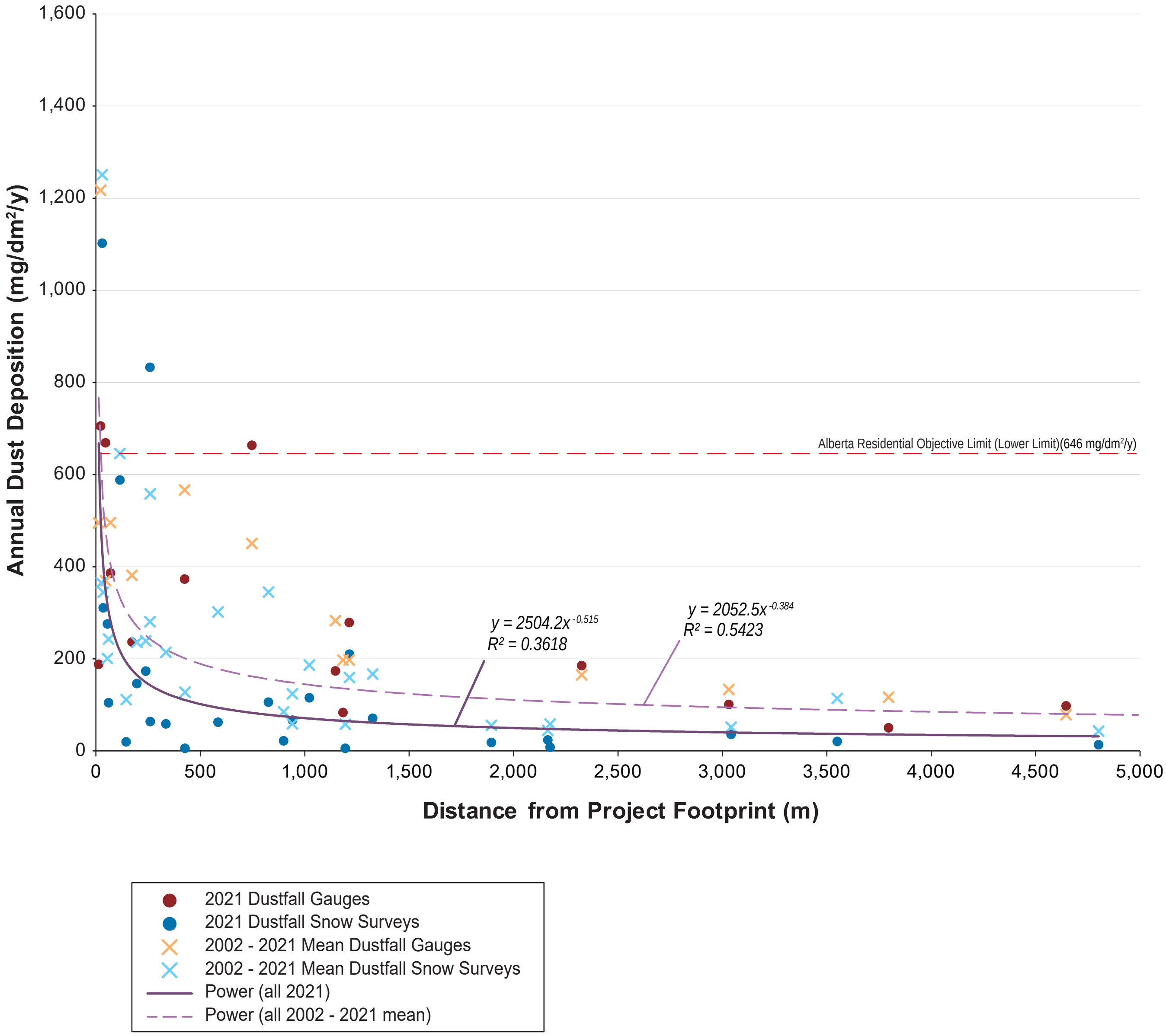
Figure 3.1-2: Calculated Annual Dust Deposition Rates at Dustfall Gauges and Snow Survey Locations up to 1,000 m from the Project Footprint, Diavik Diamond Mine, 2002 to 2021





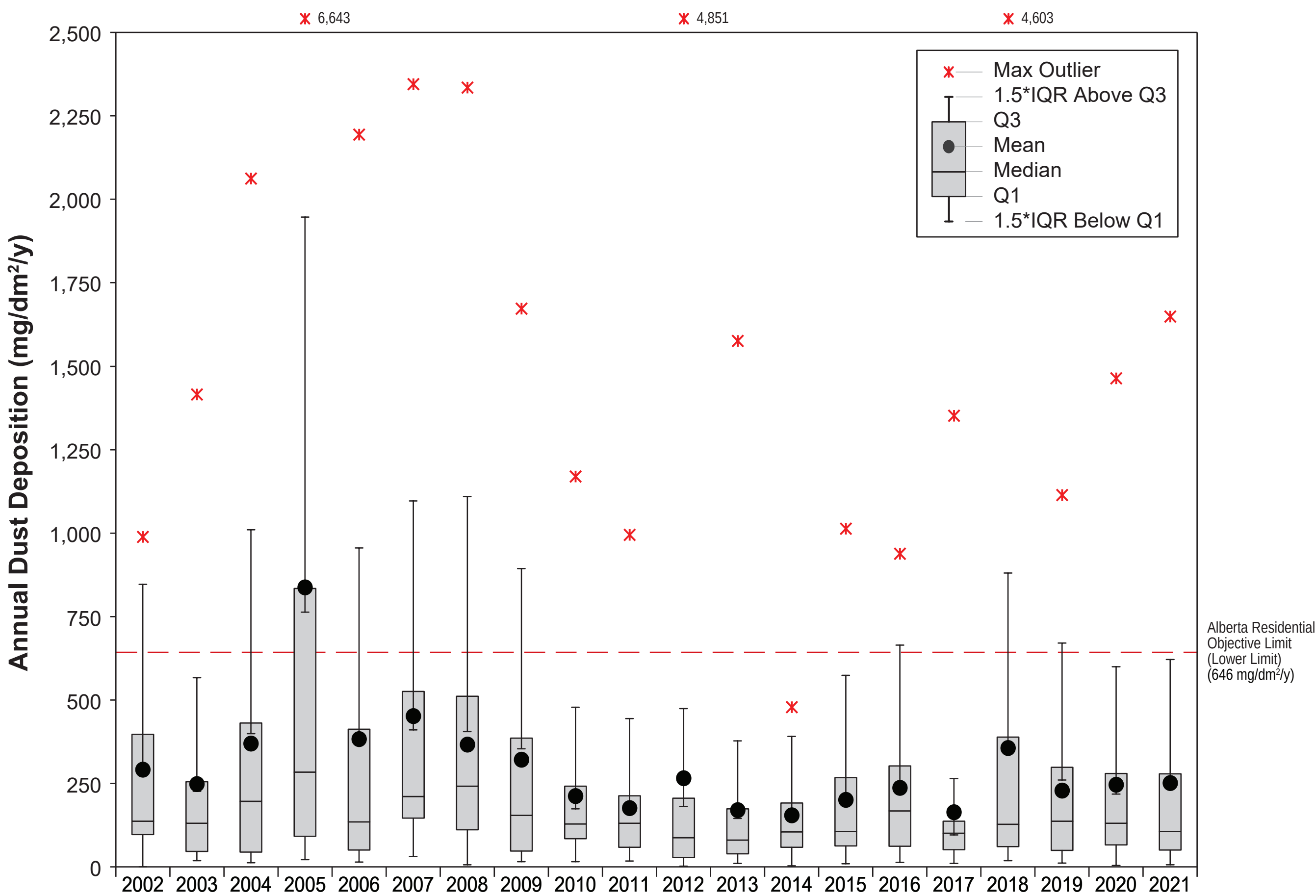
Notes: Annual deposition was calculated using the methodology described in Section 2.
See Table 2-1 for actual 2021 sample exposure times.
Station locations have been grouped into zones based on their distance from the 2019 Project footprint (see Section 3 for further details).
New locations added in 2019only include FFA-4, FFB-4, FF1-2 and LDS-1
SS5-4 moved to 251-1,000 m zone in 2018

Figure 3.1-3: Calculated Annual Dust Deposition Rates at Dustfall Gauges and Snow Survey Locations greater than 1,000 m from the Project Footprint, Diavik Diamond Mine, 2002 to 2021



Notes: Annual deposition was calculated using the methodology described in Section 2.
See Table 2-1 for actual 2021 sample exposure times.

Figure 3.1-4: Dust Deposition Versus Distance from Project Footprint, Diavik Diamond Mine, 2021



Notes: Box plots represent the magnitude distribution of the annual dustfall rates.
Annual deposition is calculated using the methodology described in Section 2.
See Table 2-1 for actual 2021 sample exposure times.
Q1: Lower quartile (25% of data are less than this value),
Q3: Upper quartile (25% of data are greater than this value),
IQR = Q3 – Q1 (the interquartile range).

Figure 3.1-5: Dust Deposition Box Plot, Diavik Diamond Mine, 2002 to 2021

The three highest estimated dustfall rates in 2021 measured using gauges occurred at Dust 3 (706 mg/dm^2/y; 22m from the Project), followed by Dust 10 (669 mg/dm^2/y; 46m from the Project) and Dust 11 (664 mg/dm^2/y; 747 m from the Project). This is similar to 2020 and 2019 as the highest rates were recorded at the same three sites (Dust 3, Dust 10 and Dust 11). The elevated rate at Dust 3 site is explained by its proximity to the Project footprint, while the high rate at Dust 10 is due to its location adjacent to the A21 open pit. Dust 11 is located west of the Waste Rock Storage Area - South Country Rock Pile (WRSA-SCRP; Figure 2-1). The lowest dustfall rate was recorded at Dust 9 (50 mg/dm^2/y; 3,796 m), lower than the control stations Dust C1 (98 mg/dm^2/y; 4,646 m to the south) and Dust C2 (101 mg/dm^2/y; 3,031 m; Table 3-1; Figures 3.1-3 and 3.1-4). This is similar to 2020 results and is explained by the distance of the Dust 9 site from the Project footprint.

The dustfall rates estimated from dustfall gauges in 2021 were slightly higher on average but comparable to 2020 rates (Figure 3.1-5). The box plots in Figure 3.1-5 represent the magnitude distribution of dustfall rates from dustfall gauges and snow surveys. All the 2021 mean, median, first quartile (Q1, the median of the lower half of the data) and third quartile (Q3; the median of the upper half of the data) of the dustfall distribution was similar to 2020 and 2019 results. The 1.5× IQR (interquartile range) above Q3, which defines the lower threshold of outliers, in 2021 was 622 mg/dm^2/y, which is similar to the last two years results. Out of 12 sites, 7 locations recorded lower deposition rates in 2021 than 2020, with an average rate of 333 mg/dm^2/y and 319 mg/dm^2/y in 2021 and 2020, respectively (Figures 3.1-2 to 3.1-4). The higher dustfall values recorded since 2018 compared to previous years suggest that dustfall rates from 2018 to 2021 were likely influenced by the surface activity at the mine, particularly at the A21 open pit, which began in December 2017, while the dustfall rates in 2017 were related mainly to the airstrip (DDMI 2018, 2019).

The annualized dustfall rates estimated from gauges at all stations were less than the Alberta Ambient Air Quality objective for dustfall of 1,922 mg/dm^2/y, which is applied to industrial locations. The lower objective of 646 mg/dm^2/y that is applied to residential and recreational areas was exceeded at three sites that recorded the highest dustfall rates in 2021 (Dust 3, Dust 10 and Dust 11). The Alberta Ambient Air Quality Objectives and Guidelines recommends that dustfall objectives be used as general performance indicators only with no compliance requirement; thus, these objectives are used here for comparison purposes only; there are currently no standards or objectives for the Northwest Territories.

3.2 Dustfall Snow Surveys

Annual dustfall rates estimated from each snow survey station in 2021 are summarized in Table 3-1. Historical records of annual snow survey dustfall rates for each station are presented in Figures 3.1-2 and 3.1-3. The relationships between annual snow survey dustfall rates and distance from the mine footprint are shown in Figures 3.1-1 and 3.1-4. Boxplots summarizing the magnitude of dustfall rates measured annually are presented in Figure 3.1-5. 2021 snow survey field datasheets and laboratory results are included in Appendix B. Duplicate samples collected at stations SS2-4, SS5-5, and SSC-3 for QA/QC purposes are discussed in Section 3.4.

Annualized dustfall rates estimated from 2021 snow survey data ranged from 6 to 1,648 mg/dm^2/y (Table 3-1; Figures 3.1-2 and 3.1-3). The maximum dust deposition rate was recorded at SS5-1 followed by SS1-1 (1,102 mg/dm^2/y). The higher dustfall rate at SS5-1 is associated with the mine activity at A21 open pit (Figure 3.1-1). SS1-1 is located due north of the airstrip, which explains the higher levels of dustfall found here. This site recorded the highest rates from 2017 to 2020.

In general, snow survey dustfall rates decreased with increasing distance from the Project. Mean dustfall rates estimated using both dustfall gauges and snow surveys within the 0 m to 100 m, 101 m to 250 m, 251 m to 1,000 m, 1,001 m to 2,500 m, and control zones were 599, 233, 226, 107, and 54 mg/dm^2/y, respectively (Table 3-1). Dustfall rates at stations SS1-1, SS5-1, SS1-2, Dust 11, SS5-3, Dust 7, Dust 8, Dust 12 and SS4-5 were greater than the upper limit of the 95% confidence interval (CI) for their respective zones in 2021. The 95% CI was exceeded at two sites in each of the 0 m to 100 m zone (SS1-1 and SS5-1) and the 251 m to 1,000 m zone (Dust 11 and SS5-3), one site in the 101 m to 250 m zone (SS1-2) and at four sites in the 1,001 m to 2,500 m zone (Dust 7, Dust 8, Dust 12 and SS4-5). In the 0 m to 100 m zone, the exceedance can be explained by the adjacent location to the airstrip for SS1-1 and the A21 open pit for SS5-1, while the exceedance at the 251 m to 1,000 m zone is likely explained by the proximity to the A21 open pit for both sites. The exceedance of the 95% CI in the 1,001 m to 2,500 m zone is associated with dust from the ice road for Dust 7 and likely with the airstrip for Dust 8. The low dust deposition rate at some sites in this zone (e.g., SS1-5 and SS2-3; Table 3-1) resulted in a relatively low value of the 95% CI, which led to four exceedances for this zone.

Annualized dustfall estimated from snow survey stations in 2021 were generally comparable to 2020 dustfall estimates (Figure 3.1-5), with several stations recording higher rates in 2021 than 2020 (Figures 3.1-2 and 3.1-3). The annualized dustfall rates estimated from snow surveys in 2021 never exceeded the upper limit (which applies to industrial locations) of the Alberta Ambient Air Quality Objectives and Guidelines at any station, while only SS1-1, SS5-1, and SS5-3 exceeded the lower limit of these guidelines (which applies to residential and recreational areas).

3.3 Snow Water Chemistry

A summary of the snow water chemistry results for each variable of interest (i.e., variables with EQC and phosphorus) is provided below. The full suite of analytical results for snow water chemistry is included in Appendix D. For QA/QC purposes, duplicate samples were collected at stations SS1-4, SS3-7 and SSC-3 station. An equipment blank sample was also collected. Results of QA/QC samples are discussed in Section 3.4.

All 2021 sample concentrations, except aluminum at one site, were less than their associated reference levels as specified by the “maximum concentration of any grab sample” in Water Licence W2015L2-0001.

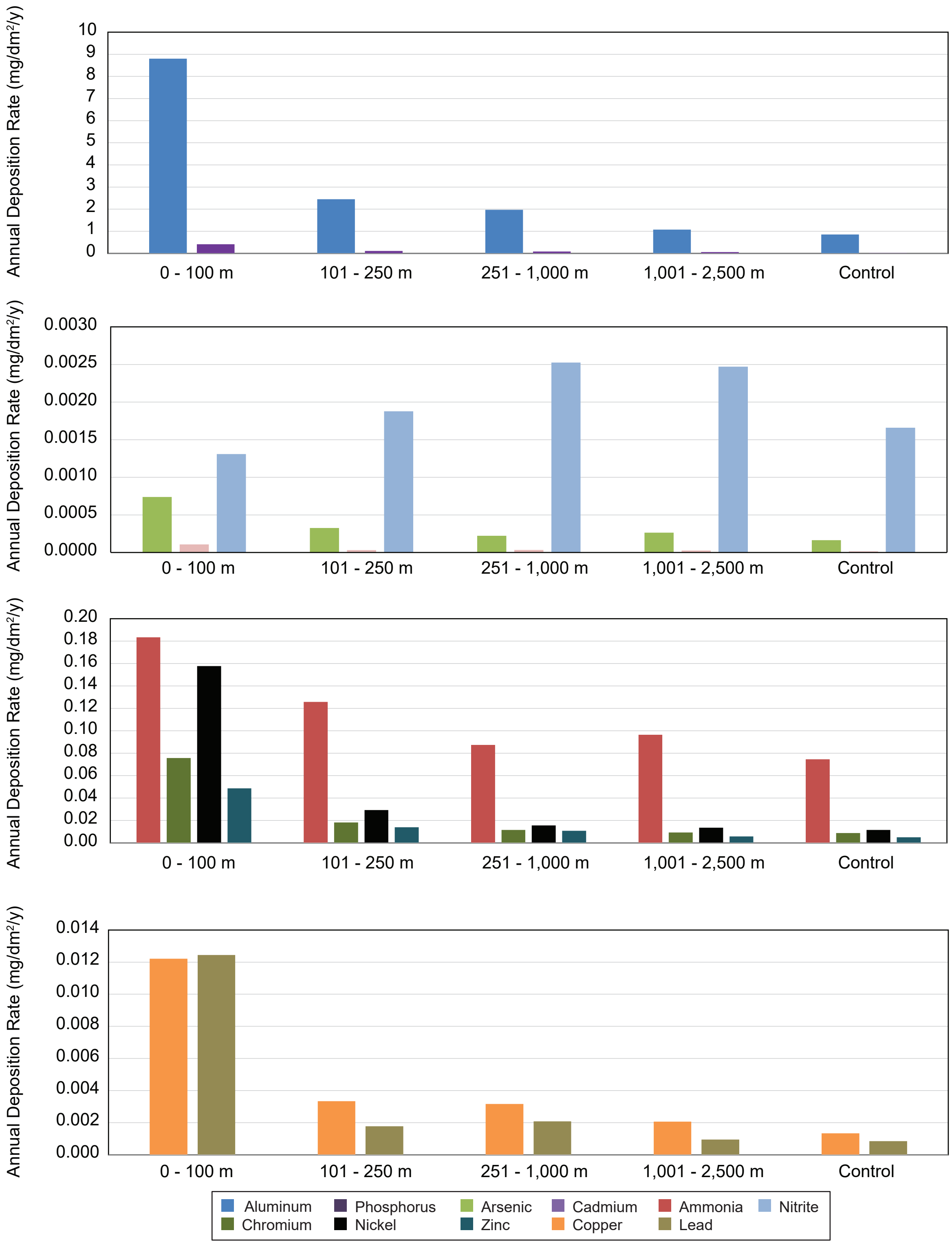
In 2021, most concentrations within the closest zone from the mine footprint (0 m to 100 m zone) were generally higher than 2019 and 2020 records (e.g. aluminum, arsenic, chromium, copper, lead, nickel, phosphorous and zinc). The average concentrations and areal deposition rates of snow water chemistry variables of interest decreased with increasing distance from the Project (Figure 3.3-1).

3.3.1 Aluminum

Aluminum concentrations in 2021 were considerably higher than 2019 and 2020 results in all zones (Figure 3.3-2). Aluminum areal deposition rates measured in 2021 ranged from 0.3 mg/dm^2/y at SSC-1 station in the control zone to 8.8 mg/dm^2/y at station SS3-6 in the 0 to 100 m zone (Table 3-1). All 2021 aluminum concentration except SS3-6 were below the EQC concentration specified in the Water Licence for maximum grab sample concentrations (3,000 µg /L; Figure 3.3-2). The concentration at SS3-6 was 3,360 µg/L.

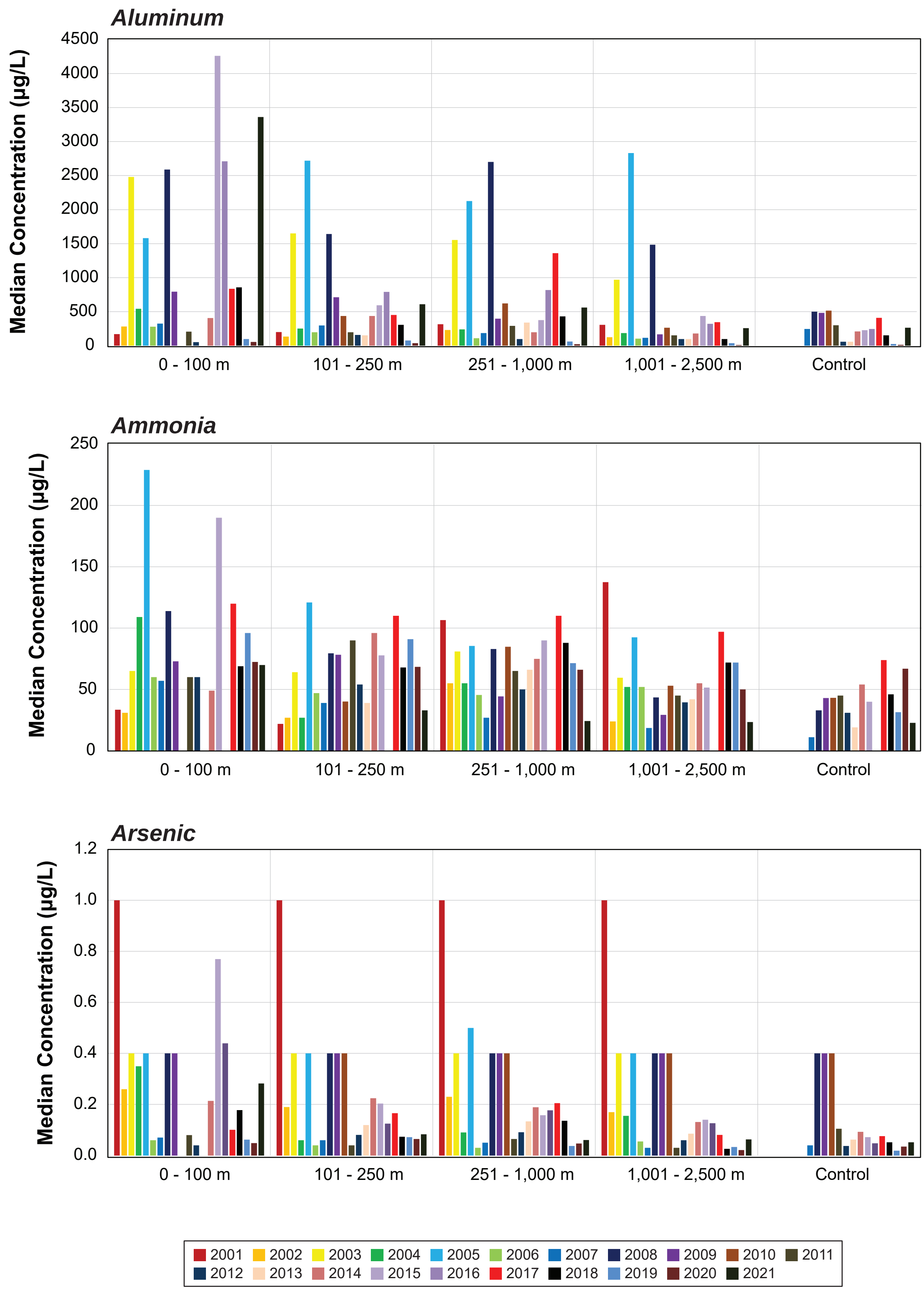
3.3.2 Ammonia

Ammonia areal deposition rates measured in 2021 ranged from 0.06 mg/dm^2/y at SS2-2 station in the 1,001 to 2,500 m zone to 0.18 mg/dm^2/y at SS3-6 station in the 101 to 250 m zone (Table 3-1). The 2021 median concentrations in all zones were generally similar to historical data (Figure 3.3-2). The ammonia 2021 areal deposition rates varied little among zones except for zone 0 to 100 m, which had relatively high deposition rates (Figure 3.3-1). All 2021 and historical ammonia concentrations were well below the EQC specified in the Water Licence for maximum grab sample concentrations (Figure 3.3-2).



Notes: *Values used for the 0-100 m zone represent one sample rather than the median.*
EQC (µg/L) = 3000 for Aluminum, 12000 for Ammonia, 100 for Arsenic, 3 for Cadmium, 40 for Chromium, 40 for Copper, 20 for Lead, 100 for Nickel, 2000 for Nitrite, 20 for Zinc, no EQC specified for Phosphorus

Figure 3.3-1: Snow Water Chemistry Results: Aluminum, Ammonia, Nitrite, Phosphorus, Arsenic, Cadmium, Chromium, Copper, Lead, Nickel and Zinc, 2021



Notes: Values used for the 0-100 m zone represent one sample rather than the median.
EQC (µg/L) = 3000 for Aluminum, 12000 for Ammonia, and 100 for Arsenic

Figure 3.3-2: Snow Water Chemistry Results: Aluminum, Ammonia and Arsenic, 2001 to 2021

3.3.3 Arsenic

Arsenic areal deposition rates measured in 2021 ranged from less than the analytical detection limit (< 0.00005 mg/dm^2/y) at SS2-2 and SS3-5 to 0.00074 mg/dm^2/y at SS3-6 in the 0 to 100 m zone (Table 3-1). Arsenic 2021 areal deposition rates were similar at all distances from the Project except for the 0 to 100 m zone (Figure 3.3-1), and the 2021 median concentrations were generally similar to historical median concentrations (Figure 3.3-2). All concentrations were well below the EQC specified in the Water Licence for maximum grab sample concentrations.

3.3.4 Cadmium

Cadmium areal deposition rates measured in 2021 ranged from less than the analytical detection limit (< 0.000014 mg/dm^2/y) at multiple stations to 0.0001 mg/dm^2/y at SS3-6 in the 0 to 100 m zone (Table 3-1). Cadmium concentrations in 2021 were similar or less than historical medians and concentrations (Figure 3.3-3). All concentrations were well below the EQC specified in the Water Licence for maximum grab sample concentrations.

3.3.5 Chromium

Chromium areal deposition rates measured in 2021 ranged from 0.002 mg/dm^2/y at SS2-4 in the 1,001 to 2,500 m zone to 0.076 mg/dm^2/y at SS3-6 (Table 3-1; Figure 3.3-1). The 2021 median concentrations were comparable to historical concentrations in each zone (Figure 3.3-3). The chromium 2021 areal deposition rate decreased with increasing distance from the Project footprint (Figure 3.3-1), and none of the concentrations exceeded the EQC specified in the Water Licence for maximum grab sample concentrations (Figure 3.3-3).

3.3.6 Copper

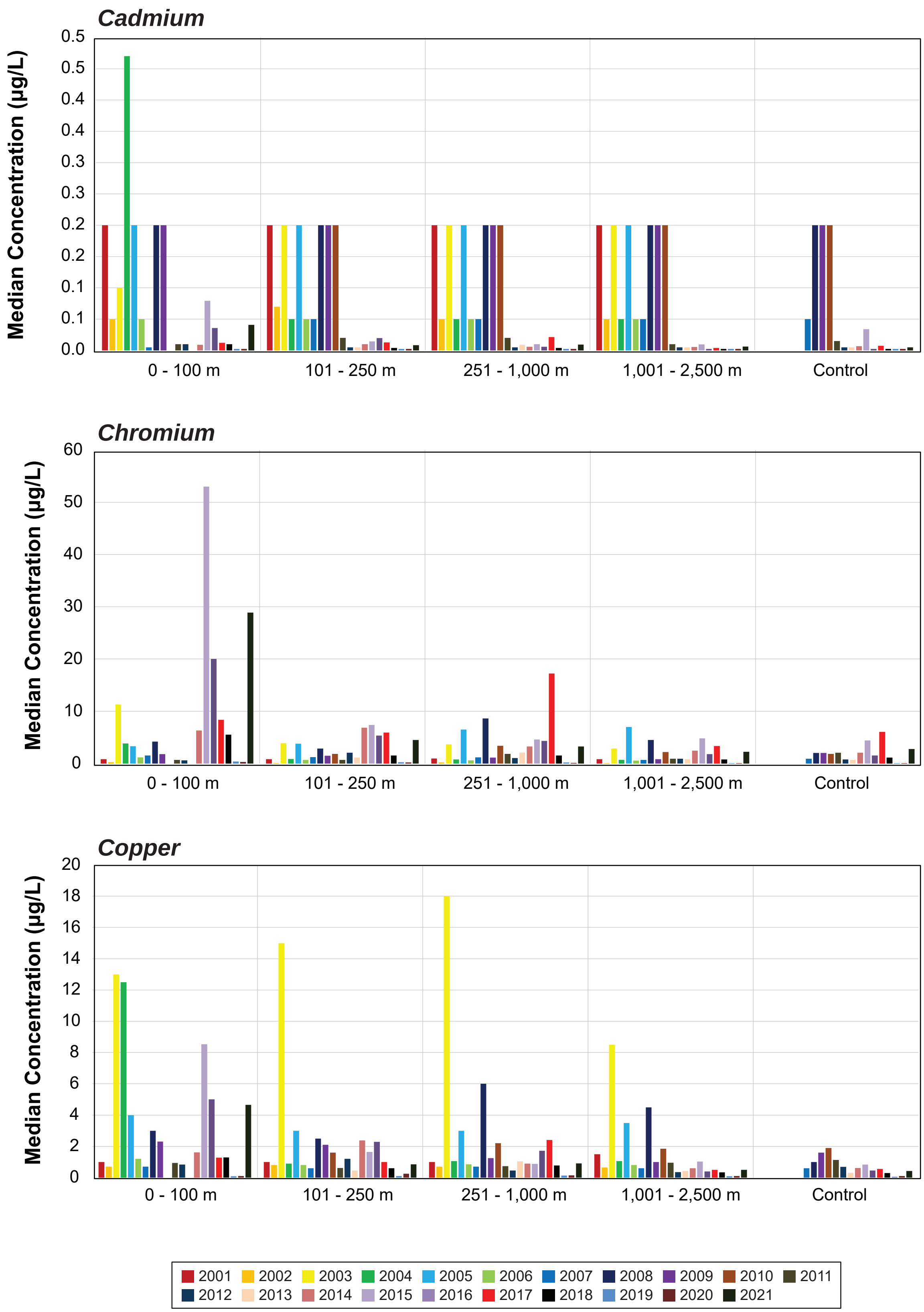
Copper areal deposition rates measured in 2021 ranged from 0.0006 mg/dm^2/y at SS3-5 in the 1,001 to 2,500 m zone to 0.012 mg/dm^2/y at SS3-6 (Table 3-1). Median 2021 copper concentrations were generally comparable to historical levels (Figure 3.3-3). All concentrations were less than the EQC specified in the Water Licence for maximum grab sample concentrations.

3.3.7 Lead

Lead areal deposition rates measured in 2021 ranged from 0.0004 mg/dm^2/y at SS2-4 and SS3-4 in the 1,001 to 2,500 m zone to 0.012 mg/dm^2/y at station SS3-6 (Table 3-1). The 2021 lead median concentrations in the 0 to 100 m zone (only one station) were considerably higher than 2019 and 2020 levels. The concentration in all other zones were similar to historical levels, with little variance among zones except for the 0 to 100 m zone (Figures 3.3-1 and 3.3-4). All concentrations were well below than the EQC specified in the Water Licence for maximum grab sample concentrations.

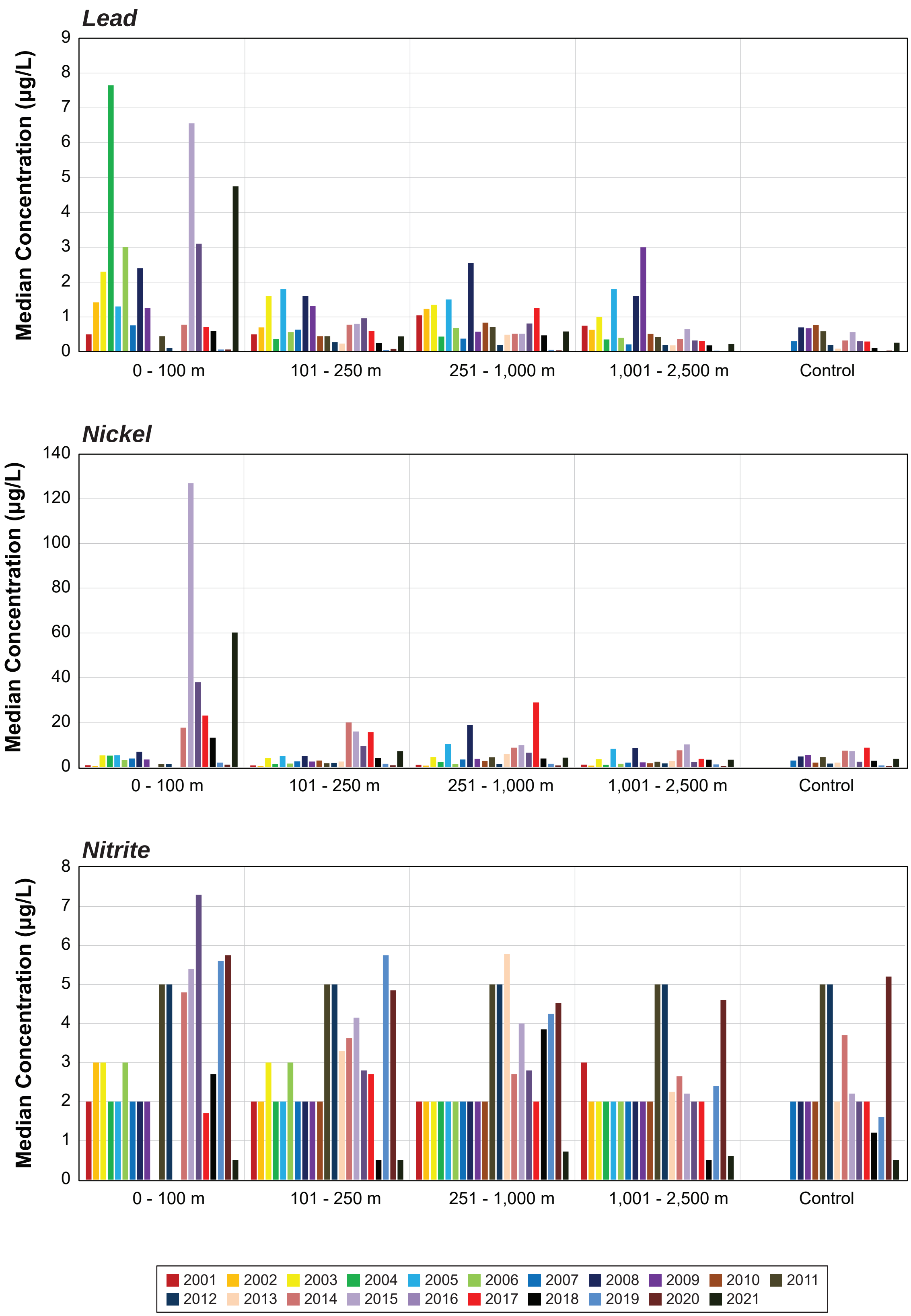
3.3.8 Nickel

Nickel areal deposition rates measured in 2021 ranged from 0.0021 mg/dm^2/y at SSC-1 station to 0.157 mg/dm^2/y at SS3-6 station (Table 3-1). Similar to lead, median 2021 nickel concentrations in the 0 to 100 m zone were higher than the 2019 and 2020 levels (Figures 3.3-4). The concentration in all other zones show little variance (Figure 3.3-1). All concentrations were well below than the EQC specified in the Water Licence for maximum grab sample concentrations.



Notes: Values used for the 0-100 m zone represent one sample rather than the median.
EQC (µg/L) = 3 for Cadmium, 40 for Chromium, and 40 for Copper.

Figure 3.3-3: Snow Water Chemistry Results: Cadmium, Chromium and Copper, 2001 to 2021



Notes: Values used for the 0-100 m zone represent one sample rather than the median.
EQC (µg/L) = 20 for Lead, 100 for Nickel, and 2000 for Nitrite.

Figure 3.3-4: Snow Water Chemistry Results: Lead, Nickel and Nitrite 2001 to 2021

3.3.9 Nitrite

Nitrite areal deposition rate measured in 2021 ranged from 0.0013 mg/dm^2/y at SS3-6 in the 0 to 100 m zone to 0.0059 mg/dm^2/y at the SS5-3 station in the 251 to 1,000 m zone (Table 3-1). Dissolved nitrite 2021 areal deposition rate were higher at the 101 to 250 m, 251 to 1,000 m and 1001 to 2,500 m zones (Figure 3.3-1). All concentrations were well below the EQC specified in the Water Licence for maximum grab sample concentrations.

3.3.10 Phosphorus

Phosphorus areal deposition rates measured in 2021 ranged from 0.003 mg/dm^2/y at SSC-1 station to 0.414 mg/dm^2/y at station SS3-6 (Table 3-1). Phosphorous 2021 areal deposition rates decreased with increasing distance from the Project (Figure 3.3-1) and were generally comparable to historical rates (Figure 3.3-5). Although the Water Licence has a load limit for phosphorus, there is no EQC specified for this parameter.

3.3.11 Zinc

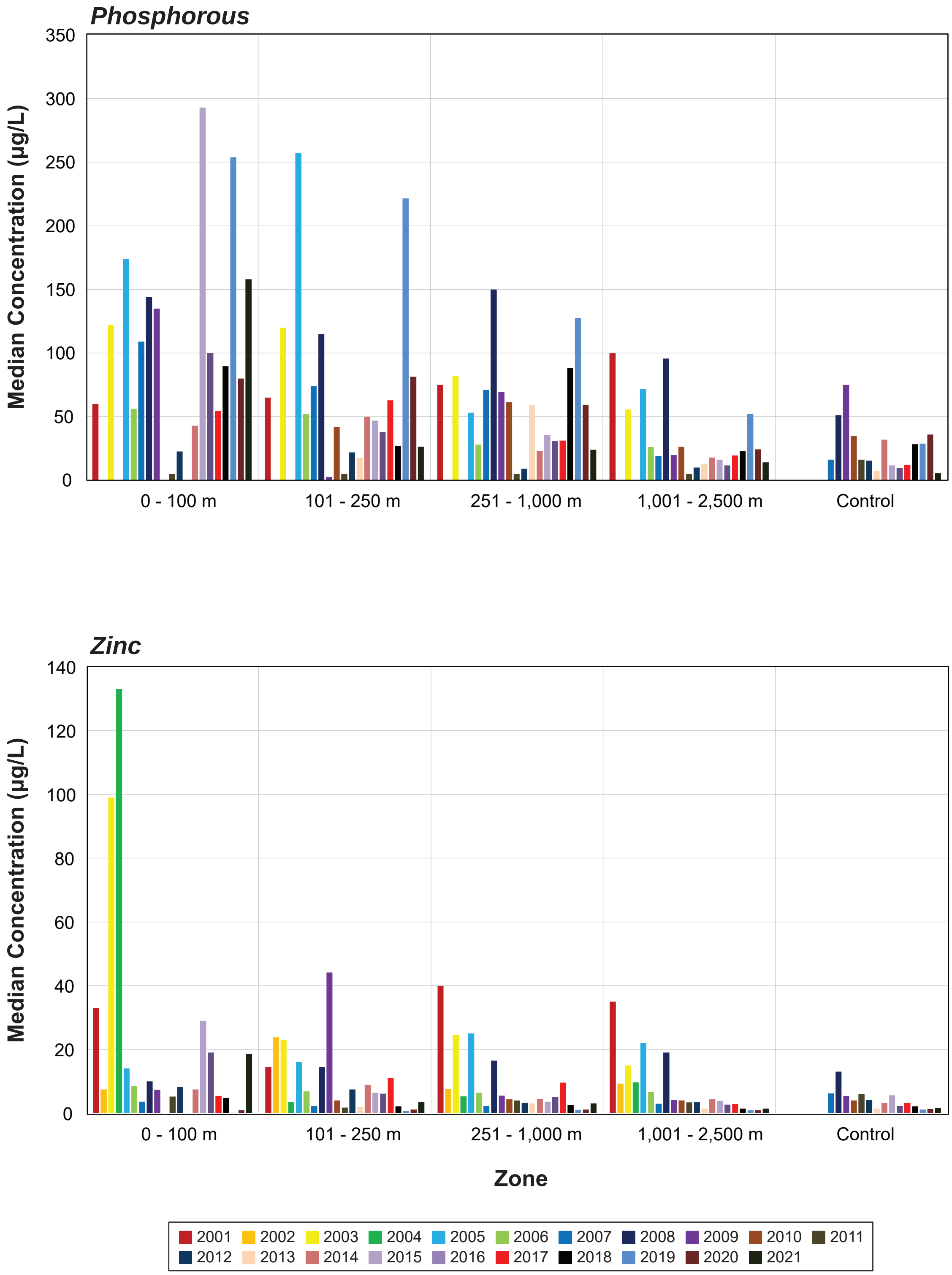
Zinc areal deposition rates measured in 2021 ranged from 0.002 mg/dm^2/y at multiple stations to 0.049 mg/dm^2/y at SS3-6 station (Table 3-1). Similar to lead and nickel, the median 2021 zinc concentration in the 0 to 100 m zone (one station only) was higher than 2019 and 2020 levels (Figure 3.3-5). There was little variability among other zones (Figure 3.3-1). All concentrations were well below the EQC specified in the Water Licence for maximum grab sample concentrations.

3.4 Evaluation of Existing Control Sites

The lowest dustfall rates in 2021 were at stations SS2-3 and SS2-2, which are 1,194 m and 427 m from mining activity, respectively. The second lowest dustfall rate was at station SS1-5, 2,175 m from mining operations. In addition, the mean dustfall rate in the control zone was the lowest of all the zones. The SS2 transect stations (SS2-1, SS2-2, SS2-3 and SS2-4), in addition to station SS1-5 all recorded low dustfall rates. Stations SS2-2, SS2-3 and SS1-5 recorded lower dustfall rates than the control sites SSC-1, SSC-2 and SSC-3, indicating that the rates at these two control sites may not be representative of background values and that dustfall rates at the control sites are potentially affected by the Project. However, the potential effects of the Project on the dustfall in the control zone have marginal impacts on the dustfall monitoring program since dustfall rates at the control zone are lower than rates within zones closer to the Project area (e.g., zones 0 m to 100 m, 101 m to 250 m). Concentrations of several snow water chemistry variables were generally consistent with distance from mining activity (zinc, nitrite, copper, ammonia, arsenic, cadmium) indicating that snow chemistry concentrations for these variables are likely not influenced by Project activity.

3.5 Quality Assurance and Control

Dustfall gauge, dustfall snow survey and snow water chemistry sampling and analysis were conducted by experienced technicians following SOPs ENVI-908-0119, ENVI-909-0119, and ENVI-902-0119 to ensure proper field sampling and laboratory analysis. As part of SOP ENVI-909-0119, duplicate and blank samples were taken for some snow survey and snow water chemistry sample sites (Table 2-1). The results from these samples are summarized in Tables 3.5-1 and 3.5-2.



Notes: Values used for the 0-100 m zone represent one sample rather than the median.
EQC (µg/L) = 20 for Zinc, no EQC specified for Phosphorus.

Figure 3.3-5: Snow Water Chemistry Results: Phosphorus and Zinc, 2001 to 2021

Table 3.5-1: Sample Duplicates

Parameter	Duplicate Analytical Results (DUPW1/DUPW2; mg/dm^2/y)					Analytical Detection Limit (µg/L)	Relative Percent Difference [a] (%)				
	SS2-4	SS5-5	SS1-4	SS3-7	SSC-3		SS2-4	SS5-5	SS1-4	SS3-7	SSC-3
Dustfall	23.5/24.0	19.9/17.4	n/a	n/a	21.9/19.5	0.1	2%	14%	n/a	n/a	12%
Aluminum	n/a	n/a	0.56/0.65	3.53/4.16	0.87/0.86	0.2	n/a	n/a	16%	16%	1%
Ammonia	n/a	n/a	0.08/0.08	0.17/0.15	0.07/0.06	5	n/a	n/a	5%	11%	6%
Arsenic	n/a	n/a	0.0002/0.0002	0.0004/0.0005	0.0001/0.0001	0.02	n/a	n/a	3%	22%	4%
Cadmium	n/a	n/a	0.00001/ 0.00003	0.00006/ 0.00004	0.00001/ 0.00001	0.005	n/a	n/a	110%	26%	0%
Chromium	n/a	n/a	0.006/0.005	0.03/0.03	0.01/0.01	0.05	n/a	n/a	24%	16%	1%
Copper	n/a	n/a	0.0018/0.0013	0.0043/0.0051	0.0009/0.0008	0.05	n/a	n/a	27%	17%	12%
Lead	n/a	n/a	0.0026/0.0011	0.0026/0.0028	0.0009/0.0009	0.005	n/a	n/a	84%	8%	1%
Nickel	n/a	n/a	0.004/0.004	0.05/0.05	0.01/0.01	0.02	n/a	n/a	18%	6%	12%
Dissolved Nitrite	n/a	n/a	0.0019/0.0019	0.0022/0.0022	0.0019/0.0019	1	n/a	n/a	5%	0%	0%
Phosphorus	n/a	n/a	0.03/0.03	0.22/0.18	0.00/0.02	2	n/a	n/a	13%	17%	8%
Zinc	n/a	n/a	0.005/0.004	0.02/0.02	0.00/0.00	0.1	n/a	n/a	33%	14%	2%

Notes:

"-" = parameter is not measured.

For measurements that were less than the detection limit, half the detection limit was used for calculations and are italicized.

[a] Relative difference between duplicates, with respect to their mean: RPD = 100 × |rep1 − rep2| / [(rep1 + rep2)/2].

Table 3.5-2: Analytical Blanks for QA/QC Program

Parameter	SS Equipment Blank Sample (µg/L)	Percent of Equipment Blank Sample Above Detection Limit	Detection Limit (µg/L)
Aluminum	2.78	1390%	0.2
Ammonia	8.20	164%	5
Arsenic	<0.02	-	0.02
Cadmium	<0.005	-	0.005
Chromium	0.20	400%	0.05
Copper	0.07	144%	0.05
Lead	0.03	514%	0.005
Nickel	0.10	480%	0.02
Nitrite	1.30	130%	1
Phosphorus	2.60	130%	2
Zinc	<0.1	-	0.1

Note: For measurements that were less than the detection limit, half the detection limit was used for calculations and are italicized.

The relative percent difference (RPD) of duplicate samples from a site represents the amount of variation between duplicates. According to the Project AEMP, the data quality objective for duplicate water quality samples is a RPD of 40% when concentrations are ≥ 5 times the detection limit (DL; AEMP 2017). RPD values are only calculated when concentrations are ≥ 5 times the DL (BC MOE 2013). The calculated RPD values exceeded 40% on two occasions.

The results of the QA/QC duplicates indicate that snow chemistry is spatially variable on the scale of metres within which the duplicates are collected. The data quality objective from the AEMP (i.e., RPD less than 40%) is designed for surface *liquid* water samples. Surface water in a stream or lake will mix more readily than snow, particularly once snow has settled and has been compacted by wind. Site-specific differences between snow core sampling replicates may result in differences in the chemical composition of the snow. RPD exceeded the 40% threshold once for lead at SS1-4 station when concentrations are ≥ 5 times the detection limit (in the other exceedance, the concentration was < 5 times the detection limit). The absolute difference between observations was small in magnitude. The similarity in the magnitude of the variability is consistent with small-scale spatial variation, rather than data quality issues. The results of the sampling network of 23 sites has been demonstrated to detect and quantify Project effects on snow water chemistry (Section 3.3), and these results are concluded to be reliable despite the small-scale variation identified in the QA/QC program.

Most blank sample concentration were either slightly above the analytical DL (e.g. ammonia, copper, nitrite, phosphorus) or below it (e.g. arsenic, cadmium and zinc; Table 3.5-2), which indicates negligible impacts of contamination on these variable concentrations. For other variables (aluminum, chromium, lead and nickel), the blank sample concentrations are ≥ 4 times the analytical DL. However, these blank concentrations were still well below the concentrations of snow chemistry samples, suggesting that the potential bias due to contamination on the snow chemistry results is negligible. As an example, the aluminum concentrations ranged from 81 µg/L at SS2-4 to 3360 µg/L at SS3-6 (compared to 2.78 µg/L in the blank sample).

Additionally, all variable concentrations were below the detection limit in a blank demineralized water sample to analyze for leachate from the snow sample bag (bag sample), which would be expected for an uncontaminated blank.

4. SUMMARY

Median dustfall rates from dustfall gauges measured in 2021 were slightly higher than 2020 results but lower than 2019 rates. The 2021 rates from snow surveys were comparable to 2020 results. Similar to historical results, dustfall rates in 2021 decreased with distance from the Project. Annual dustfall estimated from the 14 dustfall gauges ranged from 50 to 706 mg/dm^2/y. The annualized dustfall rates estimated from the 2021 snow survey data ranged from 6 to 1,648 mg/dm^2/y. Because dustfall gauges continuously collect dust throughout the year, and the snow surveys are only representative of dustfall accumulated over the snow-covered period, the reported annual dustfall results from the dustfall gauges are expected to provide a better estimate of annual dustfall compared to snow survey results for similar geographic areas. However, results obtained from both methods showed similar overall patterns. It is unknown why the maximum dustfall rate from the snow surveys was more than double the highest value from the dustfall gauges, although the highest rates were all very close to mining activity. Dustfall rates in 2021 were generally within the historical data range. Annualized dustfall rates estimated from each snow survey station in 2021 were comparable to historical dustfall estimates.

As expected, dustfall rates generally decreased with distance from the Project with the lowest dustfall rate recorded at stations SS2-2 and SS2-3. The SS2 transect stations (SS2-1, SS2-2, SS2-3, and SS2-4), in addition to station SS1-5 all recorded low dustfall rates. Stations SS2-2, SS2-3, and SS1-5 recorded lower dustfall rates than the control sites SSC-1, SSC-2 and SSC-3, indicating that the rates at the control sites may not be representative of background values and that dustfall rates at the control sites are potentially affected by the Project. However, the potential effects of the Project on the dustfall in the control zone have marginal impacts on the dustfall monitoring program since dustfall rates at the control zone are lower than rates within zones closer to the Project area (e.g., zones 0 m to 100 m and 101 m to 250 m). Concentrations of several snow water chemistry variables were consistent or decreased with distance from mining activity (zinc, nitrite, copper, ammonia, arsenic, cadmium) indicating that snow chemistry concentrations for these variables are likely not related to the Project activity.

Areas that were closer to the Project, roads, and airstrip received more dustfall than other areas. Mean dustfall rates estimated using both dustfall gauges and snow surveys within the 0 m to 100 m, 101 m to 250 m, 251 m to 1,000 m, 1,001 m to 2,500 m and control zones were 599, 233, 226, 107, and 54 mg/dm^2/y, respectively. Although there are no dustfall standards for the Northwest Territories, all the 2021 dustfall rates were well below the non-residential (1,922 mg/dm^2/y) Alberta Ambient Air Quality Objective for dustfall (Alberta Environment and Parks 2019). Dust 3, Dust 10 and Dust 11 stations were higher than the residential limit of the Alberta Ambient air Quality Objective for dustfall (1.77 mg/dm^2/d; 646 mg/dm^2/y). These objectives are used only as general performance indicators.

Snow water chemistry analytes of interest included those variables with EQC (i.e., aluminum, ammonia, arsenic, cadmium, chromium, copper, lead, nickel, nitrite, and zinc) or a load limit (i.e., phosphorus) specified in the Type “A” Water Licence (W2015L2-0001, formerly W2007L2 0003). Most 2021 sample concentrations were well below their associated reference levels as specified by the “maximum concentration of any grab sample” specified in Water Licence W2015L2 0001. Concentrations in 2021 were generally higher than the 2019 and 2020. Typically, concentrations decreased with distance from the Project. The highest concentrations for all variables were less than their corresponding EQC other than SS3-6 for Aluminum.

5. REFERENCES

Definitions of the acronyms and abbreviations used in this reference list can be found in the Acronyms and Abbreviations section.

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APPENDIX A ANNUAL CHANGES TO DUSTFALL PROGRAM

Appendix A: Annual Changes to Dustfall Program

2001

The 2001 dust monitoring program was based entirely upon snow survey samples collected along four radial transects emanating from the project footprint outward to a distance of approximately 1,000 metres. All sample locations were analyzed for dust deposition, while only those locations on Lac de Gras were analyzed for snow water chemistry.

2002

DDMI amended the dust monitoring program, in response to recommendations made by the Mackenzie Valley Land and Water Board, to include two snow survey control locations. In addition, five dust gauges (passive dust collectors) were deployed, one along each of the snow survey transects and one at a control location, in efforts to enhance the monitoring program.

2003

In response to further recommendations, the dust monitoring program was modified. All four snow survey transects were extended in length to a distance of approximately 2,000 metres from the project footprint. An additional five dust gauges, including a second control, were deployed.

2004

Increased construction activity necessitated further changes to the dust monitoring program. One dust gauge (Dust 02) was removed from its location to accommodate project footprint expansion, and subsequently relocated and redeployed (Dust 2A).

2005

Dust deposition monitoring was carried out with no modifications to either the snow survey or the dust gauge portion of the program.

2006

An additional dust gauge was deployed bringing the total to eleven (including two controls). Testing of Mini-Vol portable air samplers were conducted to determine feasibility of incorporation into the dust monitoring program. Preliminary findings proved the inclusion of the Mini-Vol samplers would be impractical.

2007

The snow survey portion of the program was amended with an additional snow survey transect being incorporated bringing the total number of transects to five. As well, snow water chemistry samples were collected adjacent to the pre-existing control locations as background references.

Two additional dust gauges (temporary) were deployed adjacent to two pre-existing dust gauges. The intent of the temporary gauges was to compare results from the same location when sample collection frequency is altered.

DDMI initiated contact with Environment Canada and Golder Associates with regards to remodeling dust deposition with the intent of revising predictions made in the 1998 environmental effects report.

In light of dust deposition monitoring results from previous years, several control measures were adopted to reduce dust generation on site, including the utilization of EK-35 (suppressant) on the airport apron, taxiway and helipad, and fitting a second 830E haul truck with tank for haul road watering.

2008

All of the dust gauges were modified to accommodate the replacement of the polyacrylic dust gauge inserts with brass Nipher gauge inserts, to minimize loss associated with damage during the collection and handling of the dust gauges.

An additional dust gauge was added to the program bringing the total to twelve permanently deployed (including two control), and two temporary (reference) dust gauges.

Three snow survey sample points were not sampled as they had become overtaken by construction activity and expansion of the project footprint.

Additional preparations for dust deposition modelling were completed including data collection, identification of point source inputs, selection of a modelling program and inputs (with regulator input) and discussion of cumulative effects.

2009

The two temporary dust gauges deployed in 2007 were decommissioned. All twelve permanent gauges were collected quarterly. An error in collection/deployment resulted in “No Data” being collected for Dust 3 between July 11 and September.

Snow survey sampling was conducted in April. An error in collection/analysis resulted in the Dust Deposition sample for SS2-1 being compromised; as such “No Dust Deposition Data” was available for this location.

2010

All twelve permanent dust gauges were collected quarterly during 2010. Overall, there was a reduction of observed dustfall deposition from 2009 to 2010, with the exception of Dust 1 and Dust 10.

Snow survey sampling was conducted throughout the month of April. An error in collection/processing resulted in two missing stations for the water quality analysis. SS2-1 field results were collected; however, the sample was compromised during processing in the lab. An error also resulted with the collection of SS5-2; data collection for water quality analysis was missed in the field. No data for these two stations resulted in Zone 1 having no data for the various water chemistry results and SS5-2 was not represented in Zone 3 data for 2010.

2011

All twelve permanent dust gauges were collected quarterly during 2011. During collection and repair to Station Dust 5 in September, the sample was compromised and therefore not processed, which resulted in data loss.

Snow survey sampling was conducted throughout the month of April. Due to an internal error shipping samples, water quality samples for stations SS1-4, SS1-5, SS2-1, SS2-2, SS2-3, SS2-4, and SSC-3 arrived at the Maxxam laboratory past the recommended holding time.

2012

All twelve permanent dust gauges were collected quarterly during 2012. During collection in June, repairs were conducted on Station Dust 9 as it was found on its side, the sample was compromised, which resulted in data loss. Overall in 2012, 8 of the 12 dust gauges reported lower deposition rates compared to 2011.

Snow survey sampling was conducted on April 30, and on May 4 and 5.

2013

All twelve permanent dust gauges were collected quarterly during 2013. Station Dust 5 was dismantled upon arrival in September and the sample was compromised, which resulted in data loss for that quarter.

Snow survey sampling was conducted at 24 locations from April 26 to 28.

2014

All twelve permanent dust gauges were collected quarterly during 2014.

Snow survey sampling was conducted at 24 locations from April 7 to May 12. Three additional sites, SS3-6, SS3-7, SS3-8, were installed.

2015

No changes were made to the dustfall program in 2015.

All twelve permanent dust gauges were collected quarterly during 2015.

Snow survey sampling was conducted at 24 locations from March 31 to April 10.

2016

Due to construction activities at A21, the distance to mining operations decreased for dustfall stations Dust 10, SS5-1, SS5-2, SS5-3, SS5-4, SS5-5, Dust C1, and Control 1. The new distances to mining operations are shown in Table 2-1. Dust 10 station was 670 m from mining operations and now is 46 metres from mining operations.

All twelve permanent dust gauges were collected quarterly during 2016.

Snow survey sampling was conducted at 27 locations from March 3 to April 7.

2017

All twelve permanent dust gauges were collected quarterly during 2017.

During collection of Stations Dust 3 Dust 4, Dust 8 and Dust 10 in July were compromised and an indeterminate amount of sample was lost.

Two new permanent dust gauges (Dust 11 and Dust 12) were deployed on 2017-Oct-05.

Dust 11 and 12 are 0.805 km and 2.58 km respectively from mining operations.

Snow survey sampling was conducted at 27 locations from April 1 to April 10.

2018

No changes to the dustfall program were made in 2018. All fourteen permanent dust gauges were collected quarterly during 2018.

2019

Four new stations are added to the snow survey monitoring network to help assessing the efficiency of the existing control stations. The stations added include FF1-2, FFA-4, FFB-4 and LDS-1. All 14 permanent dust gauges were collected quarterly during 2019.

Snow survey sampling was conducted at 31 locations from April 4 to May 8.

2020

Four stations were removed in 2020. The removed stations include FF1-2, FFA-4, FFB-4 and LDS-1. All 14 permanent dust gauges were collected quarterly during 2020.

Snow survey sampling was conducted at 24 locations from April 3 to April 17.

One lab blank and one equipment blank were run every quarter. Equipment blanks commenced July 20, 2020 (Q2), lab blanks commenced January 5, 2021 (Q4).

2021

All 14 permanent dust gauges were collected quarterly during 2021.

Snow survey sampling was conducted at 24 locations from April 9 to April 12.

One lab blank and one equipment blank were run every quarter.

APPENDIX B DUSTFALL GAUGE ANALYTICAL RESULTS

Appendix B: Dustfall Gauge Analytical Results

Sample Date	Dust Gauge ID	Filter #	Weight of Filter (mg)	Filter + Residue (mg)	Cumulative Weight of Residue (mg)	Dust Deposition (mg/dm^2)	Days Deployed	Dust Deposition ($mg/dm^2/d$)	Dust Deposition ($mg/dm^2/y$)
Initial deployment date: 4-Jan-2021									
4-Apr-21	Dust 1	1	123.6	174.9	51.3		90	0.46	
5-Jul-21		1	113.1	187.3					
		2	111.6	131.6					
		3	111.5	151.7					
		4	111.2	225.2	248.4		92	2.2	
15-Sep-21		1	113.7	147.7					
		2	122.5	154.1	65.6		72	0.7	
9-Dec-21		1	117.2	191.9	74.7		85	0.7	
					TOTALS	**359**	**339**	**1.0**	**386.2**
Initial deployment date: 5-Jan-2021									
30-Mar-21	Dust 2A	1	123.2	346.9	223.7		84	2.17	
5-Jul-21		1	112.6	169.2					
		2	111.7	168.6	113.5		97	1.0	
19-Sep-21		1	119	130.7					
		2	117.4	130					
		3	121.4	135.3					
		4	121.4	146.6	63.4		76	0.7	
14-Jan-22		1	116.7	152.7					
		2	112.5	145.3	68.8		117	0.5	
					TOTALS	**382.7**	**374**	**1.1**	**373.5**
Initial deployment date: 3-Jan-2021									
4-Apr-21	Dust 3	1	118.5	267.2					
		2	123.8	214	238.9		91	2.14	
5-Jul-21		1	111.1	250.4					
		2	111.4	175.5					
		3	111.5	184.2	276.1		92	2.5	
15-Sep-21		1	118.5	161.4					
		2	124.5	166					
		3	125.7	192.6	151.3		72	1.7	
4-Dec-21		1	118.4	246.5	128.1		80	1.3	
					TOTALS	**647.1**	**335**	**1.9**	**705.7**
Initial deployment date: 3-Jan-2021									
30-Mar-21	Dust 4	1	126.3	195.5	69.2		86	0.7	
5-Jul-21		1	112.5	199					
		2	110.9	178.3	153.9		97	1.3	
15-Sep-21		1	127.1	137					
		2	115.9	124	18		72	0.2	
9-Dec-21		1	118	147.3	29.3		85	0.3	
					TOTALS	**220.5**	**340**	**0.6**	**236.7**
Initial deployment date: 5-Jan-2021									
30-Mar-21	Dust 5	1	124.9	144.2	19.3		84	0.2	
2-Jul-21		1	113.6	129.8					
		2	117.1	132.3	31.4		94	0.3	
16-Sep-21		1	117.1	140	22.9		76	0.3	
9-Dec-21		1	119.9	141.6	21.7		84	0.2	
					TOTALS	**77.7**	**338**	**0.2**	**83.9**

Appendix B: Dustfall Gauge Analytical Results

Sample Date	Dust Gauge ID	Filter #	Weight of Filter (mg)	Filter + Residue (mg)	Cumulative Weight of Residue (mg)	Dust Deposition (mg/dm^2)	Days Deployed	Dust Deposition ($mg/dm^2/d$)	Dust Deposition ($mg/dm^2/y$)
Initial deployment date: 3-Jan-2021									
4-Apr-21	Dust 6	1	121.2	150.7	29.5		91	0.3	
5-Jul-21		1	113.3	156.8					
		2	110.7	151.5	84.3		92	0.8	
15-Sep-21		1	123.8	130.4					
		2	127	130.9					
		3	116.9	124.3					
		4	124.4	142.9	36.4		72	0.4	
3-Jan-21		1	117.6	179.5	61.9		80	0.6	
					TOTALS	**172.9**	**335**	**0.5**	**188.4**
Initial deployment date: 8-Jan-2021									
30-Mar-21	Dust 7	1	124.6	178.8	54.2		81	0.6	
2-Jul-21		1	113.7	169					
		2	110.7	117.5	62.1		94	0.5	
16-Sep-21		1	118.4	125.4					
		2	124.5	130.9					
		3	118.1	124.3					
		4	119.1	124.1	24.6		76	0.3	
14-Jan-22		1	111.8	156.1					
		2	111	142.5	75.8		120	0.5	
					TOTALS	**176.7**	**371**	**0.5**	**173.8**
Initial deployment date: 8-Jan-2021									
4-Apr-21	**Dust 8**	1	119.4	135.9	84.5		86	0.8	
		2	115.8	183.8					
2-Jul-21		1	115.4	200.7					
		2	111.1	193.3	167.5		89	1.53	
16-Sep-21		1	122.9	123.2					
		2	124.7	123.1					
		3	120	149.4					
		4	124.7	118.6					
		5	123.5	123.7					
		6	124.1	124.4					
		7	118.9	130.3					
		8	118.9	120.2					
		9	120.9	122.4					
		10	121.3	121.2					
		11	117.2	119.4					
		12	119.6	120.4					
		13	118.3	121.6					
		14	119.7	122.5					
		15	118.9	119	45.8		76	0.5	
10-Dec-21		1	110.8	118.4					
		2	114.2	123.8	17.2		85	0.2	
					TOTALS	**256.8**	**336**	**0.7**	**279.0**

Appendix B: Dustfall Gauge Analytical Results

Sample Date	Dust Gauge ID	Filter #	Weight of Filter (mg)	Filter + Residue (mg)	Cumulative Weight of Residue (mg)	Dust Deposition (mg/dm^2)	Days Deployed	Dust Deposition ($mg/dm^2/d$)	Dust Deposition ($mg/dm^2/y$)
Initial deployment date: 5-Jan-2021									
30-Mar-21	Dust 9	1	127.4	137.5	10.1		84	0.2	
2-Jul-21		1	114.3	126.9					
		2	114	125	23.6		94		
16-Sep-21		1	118.9	120.4					
		2	118.2	121.7	5		76	0.2	
14-Jan-22		1	110.7	135.3	24.6		120	0.1	
					TOTALS	**51.6**	**374**	**0.5**	**50.4**
Initial deployment date: 3-Jan-2021									
4-Apr-21	Dust 10	1	118.2	155.9					
		2	115.5	348.8	271		91	2.4	
5-Jul-21		1	111.6	257.1					
		2	113.9	196.8					
		3	111.4	215.2					
		4	112.4	136.7	356.5		92	3.2	
15-Sep-21		1	123.1	135.3					
		2	122.9	135.2					
		3	123.1	138.4					
		4	124	145.3					
		5	119.8	142.4	83.7		72	1.0	
9-Dec-21		1	118.2	171.4	53.2		85	0.5	
					TOTALS	**623.2**	**340**	**1.8**	**669.0**
Initial deployment date: 6-Jan-2021									
30-Mar-21	Dust 11	1	126.3	356	229.7		83	2.26	
2-Jul-21		1	110.6	128.5					
		2	110.3	117.9					
		3	115.3	139.4					
		4	110	172.2					
		5	114.4	149.3					
		6	115.2	469.9	501.4		94	4.4	
16-Sep-21		1	119	157.8	38.8		76	0.4	
14-Jan-22		1	111.8	142.9					
		2	111.3	142.6	62.4		120	0.4	
					TOTALS	**678.6**	**373**	**1.7**	**664.0**
Initial deployment date: 8-Jan-2021									
30-Mar-21	Dust 12	1	124.2	227	102.8		81	0.5	
2-Jul-21		1	112.5	121.9					
		2	111.9	141.3					
		3	112.3	166.8	93.3		94	0.7	
16-Sep-21		1	119.1	120.9					
		2	124.4	128.2					
		3	123.6	125.1					
		4	123	127.9	12		76	0.5	
14-Jan-22		1	112.6	123					
		2	116.1	128.8	23.1		120	0.4	
					TOTALS	**188.5**	**371**	**0.5**	**185.4**

Appendix B: Dustfall Gauge Analytical Results

Sample Date	Dust Gauge ID	Filter #	Weight of Filter (mg)	Filter + Residue (mg)	Cumulative Weight of Residue (mg)	Dust Deposition (mg/dm^2)	Days Deployed	Dust Deposition (mg/dm^2/d)	Dust Deposition (mg/dm^2/y)
Initial deployment date: 8-Jan-2021									
30-Mar-21	Dust C1	1	124.8	152.1	27.3		81	0.3	
2-Jul-21		1	111.7	155.9	44.2		94	0.4	
16-Sep-21		1	124.5	127.4					
		2	125.8	139.9					
		3	124.1	142.9	35.8		76	0.4	
14-Jan-22		1	115.7	130.8	15.1		120	0.1	
					TOTALS	**99.8**	**371**	**0.3**	**98.2**
Initial deployment date: 8-Jan-2021									
30-Mar-21	Dust C2	1	123.9	175.2	51.3		81	0.5	
2-Jul-21		1	111	167.1	56.1		94	0.5	
16-Sep-21		1	124.7	126.3					
		2	125.3	130.3	6.6		76	0.1	
14-Jan-22		1	110.7	122.8	12.1		120	0.1	
					TOTALS	**102.8**	**371**	**0.3**	**101.1**

APPENDIX C DUSTFALL SNOW SURVEY FIELD SHEETS AND ANALYTICAL RESULTS

Rio Tinto

Dust Gauge Collection Field Sheet

		No:	ENVI-178-0312
Area:	8000	Revision:	R0
Effective Date:	26-Mar-2012	By:	Dianne Dul
Task:	Dust Gauge Collection Field Sheet		
		Page:	1 of 2

GENERAL

LOCATION NAME: Dust 01 **DATE (dd-mmm-yyyy):** 2021-04-04 **TIME (24:00):** 1329

SAMPLED BY: BP, NG **TYPE OF SAMPLE:** Dust **Other**____

GPS COORDINATES (UTM): 533964 **E** 7154321 **N (Zone)** 12W

DESCRIPTION: Q1 Dust

CLIMATE CONDITIONS (if sampling outside)

Air Temp: -11 °C **Wind Direction:** NA **Wind Speed (knots):** 0

Precipitation: rain / mist / snow / N/A **Cloud Cover:** 0%, 10%, 25%, 50%, 75%, 100

Snow Cover: 0%, 10%, 25%, 50%, 75%, 100% **Dust in area:** Visible, Not Visible

COLLECTION COMMENTS: (i.e. damage to station, bugs - twigs in sample, hole in vestibule, etc.)

Date Sample Collected was Deployed 2021-01-04 13:46 - BP

Slightly cloudy water when melted. Picked piece of Vegitation out of water

Total Volume of Water After Melting: 380 (mL)

Filter #	Weight of Filter	Filter + Residue	Residue Weight	Comments
1	123.6	174.9	51.3	
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
Totals	123.6	174.9	51.3	

RioTinto

Dust Gauge Collection Field Sheet

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GENERAL

LOCATION NAME: Dust 2A DATE (dd-mmm-yyyy): 2021-03-30 TIME (24:00): 10:36

SAMPLED BY: GC TYPE OF SAMPLE: Dust Other

GPS COORDINATES (UTM): 535673 E 7151339 N (Zone) 12W

DESCRIPTION: Q1 Dust

CLIMATE CONDITIONS (if sampling outside)

Air Temp: -33 °C Wind-Direction: NA Wind Speed (knots): 0

Precipitation: rain / mist / snow / N/A Cloud Cover: 0%, 10%, 25%, 50%, 75%, 100

Snow Cover: 0%, 10%, 25%, 50%, 75%, 100% Dust in area: Visible, Not Visible

COLLECTION COMMENTS: (i.e. damage to station, bugs - twigs in sample, hole in vestibule, etc.)

Date Sample Collected was Deployed 2021-01-05

Sample appeared very cloudy + white.

Total Volume of Water After Melting: 650 (mL)

Filter #	Weight of Filter	Filter + Residue	Residue Weight	Comments
1	123.2	346.9	223.7	
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
Totals	123.2	346.9	223.7	

RioTinto

Dust Gauge Collection Field Sheet

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GENERAL

LOCATION NAME: Dust 3 **DATE (dd-mmm-yyyy):** 2021-04-04 **TIME (24:00):** 1342

SAMPLED BY: BP, NG **TYPE OF SAMPLE:** Dust **Other** ________

GPS COORDINATES (UTM): 535024 **E** 7151872 **N (Zone)** 12W

DESCRIPTION: Q1 Dust

CLIMATE CONDITIONS (if sampling outside)

Air Temp: -16 °C **Wind Direction:** NA **Wind Speed (knots):** 0

Precipitation: rain / mist / snow / N/A **Cloud Cover:** 0%, 10%, 25%, 50%, 75%, 100

Snow Cover: 0%, 10%, 25%, 50%, 75%, 100% **Dust in area:** Visible, Not Visible

COLLECTION COMMENTS: (i.e. damage to station, bugs - twigs in sample, hole in vestibule, etc.)

Date Sample Collected was Deployed 2021-01-03

Very cloudy water, one piece of vegetation in water

Total Volume of Water After Melting: 660 **(mL)**

Filter #	Weight of Filter	Filter + Residue	Residue Weight	Comments
1	118.5	267.2	148.7	Piece of Veg stuck on filter, pulled off w/ tweezers
2	123.8	214.0	90.2	
3				
4				
5				
6				
7				
8				
9				
10				
11				
Totals	242.3	481.2	238.9	

Rio Tinto

Dust Gauge Collection Field Sheet			
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GENERAL

LOCATION NAME: Dust 04 DATE (dd-mmm-yyyy): 2021-03-30 TIME (24:00): 1108

SAMPLED BY: GC TYPE OF SAMPLE: Dust Other

GPS COORDINATES (UTM): 531397 E 7152127 N (Zone) 12W

DESCRIPTION: Q1 Dust

CLIMATE CONDITIONS (if sampling outside)

Air Temp: -31 °C Wind Direction: NA Wind Speed (knots): 0

Precipitation: rain / mist / snow / N/A Cloud Cover: 0%, 10%, 25%, 50%, 75%, 100

Snow Cover: 0%, 10%, 25%, 50%, 75%, 100% Dust in area: Visible, Not Visible

COLLECTION COMMENTS: (i.e. damage to station, bugs - twigs in sample, hole in vestibule, etc.)

Date Sample Collected was Deployed 2021-01-03

Slightly cloudy

Total Volume of Water After Melting: 500 (mL)

Filter #	Weight of Filter	Filter + Residue	Residue Weight	Comments
1	126.3	195.5	69.2	
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
Totals	126.3	195.5	69.2	

Rio Tinto

Dust Gauge Collection Field Sheet

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GENERAL

LOCATION NAME: Dust 5 **DATE (dd-mmm-yyyy):** 2021-03-30 **TIME (24:00):** 1024

SAMPLED BY: GC **TYPE OF SAMPLE:** Dust **Other**

GPS COORDINATES (UTM): 535696 **E** 7155138 **N (Zone)** 12W

DESCRIPTION: Q1 Dust

CLIMATE CONDITIONS (if sampling outside)

Air Temp: -33 °C **Wind Direction:** n/A **Wind Speed (knots):** 0

Precipitation: rain / mist / snow / N/A **Cloud Cover:** 0%, 10%, 25%, 50%, 75%, 100

Snow Cover: 0%, 10%, 25%, 50%, 75%, 100% **Dust in area:** Visible, Not Visible

COLLECTION COMMENTS: (i.e. damage to station, bugs - twigs in sample, hole in vestibule, etc.)

Date Sample Collected was Deployed 2021-01-05

Mostly clear, small amount of dust visible in sample

Total Volume of Water After Melting : 375 **(mL)**

Filter #	Weight of Filter	Filter + Residue	Residue Weight	Comments
1	124.9	144.2	19.3	
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
Totals	124.9	144.2	19.3	

Rio Tinto

Dust Gauge Collection Field Sheet

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GENERAL

LOCATION NAME: Dust 6 **DATE (dd-mmm-yyyy):** 2021-04-04 **TIME (24:00):** 1402

SAMPLED BY: BP, NG **TYPE OF SAMPLE:** Dust **Other**

GPS COORDINATES (UTM): 537502 **E** 7152934 **N (Zone)** 12W

DESCRIPTION: Q1 Dust

CLIMATE CONDITIONS (if sampling outside)

Air Temp: -18 °C **Wind Direction:** NW **Wind Speed (knots):** 4

Precipitation: rain / mist / snow / N/A **Cloud Cover:** 0%, 10%, 25%, 50%, 75%, 100

Snow Cover: 0%, 10%, 25%, 50%, 75%, 100% **Dust in area:** Visible, Not Visible

COLLECTION COMMENTS: (i.e. damage to station, bugs - twigs in sample, hole in vestibule, etc.)

Date Sample Collected was Deployed 2021-01-03

Total Volume of Water After Melting: 435 (mL)

Filter #	Weight of Filter	Filter + Residue	Residue Weight	Comments
1	121.2	150.7	29.5	
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
Totals	121.2	150.7	29.5	

RioTinto

Dust Gauge Collection Field Sheet

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GENERAL

LOCATION NAME: Dust 07 **DATE (dd-mmm-yyyy):** 2021-03-30 **TIME (24:00):** 1040

SAMPLED BY: CC **TYPE OF SAMPLE:** Dust **Other**

GPS COORDINATES (UTM): 536819 **E** 7150510 **N (Zone)** 12W

DESCRIPTION: Q1 Dust

CLIMATE CONDITIONS (if sampling outside)

Air Temp: -33 °C **Wind Direction:** NA **Wind Speed (knots):** 0

Precipitation: rain / mist / snow / N/A **Cloud Cover:** 0%, 10%, 25%, 50%, 75%, 100

Snow Cover: 0%, 10%, 25%, 50%, 75%, 100% **Dust in area:** Visible, Not Visible

COLLECTION COMMENTS: (i.e. damage to station, bugs - twigs in sample, hole in vestibule, etc.)

Date Sample Collected was Deployed 2021-01-08

Slightly cloudy, white dust visible.

Total Volume of Water After Melting : 475 (mL)

Filter #	Weight of Filter	Filter + Residue	Residue Weight	Comments
1	124.6	178.8	54.2	
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
Totals	124.6	178.8	54.2	

RioTinto

Dust Gauge Collection Field Sheet

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GENERAL

LOCATION NAME: Dust 08 **DATE (dd-mmm-yyyy):** 2021-03-30 **TIME (24:00):**

SAMPLED BY: GC **TYPE OF SAMPLE:** Dust **Other**

GPS COORDINATES (UTM): ______ **E** ______ **N (Zone)** ______

DESCRIPTION: Q1 Dust Not collected

CLIMATE CONDITIONS (if sampling outside)

Air Temp: ____°C **Wind Direction:** ____ **Wind Speed (knots):** ____

Precipitation: rain / mist / snow / N/A **Cloud Cover:** 0%, 10%, 25%, 50%, 75%, 100

Snow Cover: 0%, 10%, 25%, 50%, 75%, 100% **Dust in area:** Visible, Not Visible

COLLECTION COMMENTS: (i.e. damage to station, bugs - twigs in sample, hole in vestibule, etc.)

Date Sample Collected was Deployed

Dust site visited in helicopter 30 of March, Tube was completely covered by snow and not visible

Total Volume of Water After Melting : N/A (mL)

Filter #	Weight of Filter	Filter + Residue	Residue Weight	Comments
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
Totals				

RioTinto

Dust Gauge Collection Field Sheet

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GENERAL

LOCATION NAME: Dust 8 **DATE (dd-mmm-yyyy):** 2021-04-04 **TIME (24:00):** 1014

SAMPLED BY: GC **TYPE OF SAMPLE:** Dust **Other**

GPS COORDINATES (UTM): 531401 **E** 7154146 **N (Zone)** 12W

DESCRIPTION: Q1 Dust

CLIMATE CONDITIONS (if sampling outside)

Air Temp: -20 °C **Wind Direction:** E **Wind Speed (knots):** 6

Precipitation: rain / mist / snow / N/A **Cloud Cover:** 0%, 10%, 25%, 50%, 75%, 100

Snow Cover: 0%, 10%, 25%, 50%, 75%, 100% **Dust in area:** Visible, Not Visible

COLLECTION COMMENTS: (i.e. damage to station, bugs - twigs in sample, hole in vestibule, etc.)

Date Sample Collected was Deployed 2021-01-8

Snow almost up to top of the gauge holder, lots of snow in the tube. Collected by snowmobile, as it was not visible from the helicopter

Total Volume of Water After Melting: 1355 (mL)

Filter #	Weight of Filter	Filter + Residue	Residue Weight	Comments
1	119.4	135.9	16.5	
2	115.8	183.8	68.0	
3				
4				
5				
6				
7				
8				
9				
10				
11				
Totals	235.2	319.7	84.5	

RioTinto

Dust Gauge Collection Field Sheet

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GENERAL

LOCATION NAME: Dust 09 DATE (dd-mmm-yyyy): 2021-03-30 TIME (24:00): 1044

SAMPLED BY: GC TYPE OF SAMPLE: Dust Other

GPS COORDINATES (UTM): 541204 E 7182154 N (Zone) 12W

DESCRIPTION: Q1 Dust

CLIMATE CONDITIONS (if sampling outside)

Air Temp: -33 °C Wind Direction: N/A Wind Speed (knots): 0

Precipitation: rain / mist / snow / N/A Cloud Cover: 0%, 10%, 25%, 50%, 75%, 100

Snow Cover: 0%, 10%, 25%, 50%, 75%, 100% Dust in area: Visible, Not Visible

COLLECTION COMMENTS: (i.e. damage to station, bugs - twigs in sample, hole in vestibule, etc.)

Date Sample Collected was Deployed 2021-02-05

Total Volume of Water After Melting : 275 (mL)

Filter #	Weight of Filter	Filter + Residue	Residue Weight	Comments
1	127.4	137.5	10.1	
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
Totals	127.4	137.5	10.1	

RioTinto

Dust Gauge Collection Field Sheet

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GENERAL

LOCATION NAME: Dust 10 **DATE (dd-mmm-yyyy):** 2011-04-04 **TIME (24:00):** 1317

SAMPLED BY: DP, NG **TYPE OF SAMPLE:** Dust **Other**

GPS COORDINATES (UTM): 532903 **E** 7148924 **N (Zone)** 12W

DESCRIPTION: Q1 Dust

CLIMATE CONDITIONS (if sampling outside)

Air Temp: -16 **°C** **Wind Direction:** NA **Wind Speed (knots):** 0

Precipitation: rain / mist / snow / N/A **Cloud Cover:** 0%, 10%, 25%, 50%, 75%, 100

Snow Cover: 0%, 10%, 25%, 50%, 75%, 100% **Dust in area:** Visible, Not Visible

COLLECTION COMMENTS: (i.e. damage to station, bugs - twigs in sample, hole in vestibule, etc.)

Date Sample Collected was Deployed 2011-01-03

lots of sediment in water, cloudy brown

Total Volume of Water After Melting: 545 (mL)

Filter #	Weight of Filter	Filter + Residue	Residue Weight	Comments
1	118.2	155.9	37.7	
2	115.5	348.8	233.3	
3				
4				
5				
6				
7				
8				
9				
10				
11				
Totals	233.7	504.7	271.0	

RioTinto

Dust Gauge Collection Field Sheet

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GENERAL

LOCATION NAME: Dust 11 DATE (dd-mmm-yyyy): 2021-03-30 TIME (24:00): 1104

SAMPLED BY: GC TYPE OF SAMPLE: Dust Other

GPS COORDINATES (UTM): 531463 E 7150156 N (Zone) 12W

DESCRIPTION: Q1 Dust

CLIMATE CONDITIONS (if sampling outside)

Air Temp: -25 °C Wind Direction: N/A Wind Speed (knots): 0

Precipitation: rain / mist / snow / N/A Cloud Cover: 0%, 10%, 25%, 50%, 75%, 100

Snow Cover: 0%, 10%, 25%, 50%, 75%, 100% Dust in area: Visible, Not Visible

COLLECTION COMMENTS: (i.e. damage to station, bugs - twigs in sample, hole in vestibule, etc.)

Date Sample Collected was Deployed 2021-01-06

Dust tube was barely poking out above the snow top, tube was almost completely full. Sample cloudy, with white dust + black debris.

Total Volume of Water After Melting: 900 (mL)

Filter #	Weight of Filter	Filter + Residue	Residue Weight	Comments
1	126.3	356.0	229.7	
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
Totals	126.3	356.0	229.7	

RioTinto

Dust Gauge Collection Field Sheet

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GENERAL

LOCATION NAME: Dust 12 **DATE (dd-mmm-yyyy):** 2021-03-30 **TIME (24:00):** 1113

SAMPLED BY: GC **TYPE OF SAMPLE:** Dust **Other**

GPS COORDINATES (UTM): 529323 **E** 7131191 **N (Zone)** 12W

DESCRIPTION: Q1 Dust

CLIMATE CONDITIONS (if sampling outside)

Air Temp: -33 °C **Wind Direction:** NA **Wind Speed (knots):** 0

Precipitation: rain / mist / snow / N/A **Cloud Cover:** 0%, 10%, 25%, 50%, 75%, 100

Snow Cover: 0%, 10%, 25%, 50%, 75%, 100% **Dust in area:** Visible, Not Visible

COLLECTION COMMENTS: (i.e. damage to station, bugs - twigs in sample, hole in vestibule, etc.)

Date Sample Collected was Deployed 2021-01-08

Cloudy, little dust in sample

Total Volume of Water After Melting: 550 (mL)

Filter #	Weight of Filter	Filter + Residue	Residue Weight	Comments
1	1242	2270	102.8	
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
Totals	1242	2270	102.8	

Rio Tinto

Dust Gauge Collection Field Sheet

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GENERAL

LOCATION NAME: Dust C1 **DATE (dd-mmm-yyyy):** 2021-03-30 **TIME (24:00):** 1051

SAMPLED BY: GC **TYPE OF SAMPLE:** Dust **Other**

GPS COORDINATES (UTM): 534474 **E** 7144270 **N (Zone)** 17W

DESCRIPTION: Windswept

CLIMATE CONDITIONS (if sampling outside)

Air Temp: -33 °C **Wind Direction:** N/A **Wind Speed (knots):** 0

Precipitation: rain / mist / snow / N/A **Cloud Cover:** 0%, 10%, 25%, 50%, 75%, 100

Snow Cover: 0%, 10%, 25%, 50%, 75%, 100% **Dust in area:** Visible, Not Visible

COLLECTION COMMENTS: (i.e. damage to station, bugs - twigs in sample, hole in vestibule, etc.)

Date Sample Collected was Deployed 2021-01-08 1318 by BP, GC

The tube was mislabelled as C2 in the field, but was corrected upon collection on March 30th. Collected with helicopter

Total Volume of Water After Melting: 440 (mL)

Filter #	Weight of Filter	Filter + Residue	Residue Weight	Comments
1	124.8	152.1	27.3	
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
Totals	124.8	152.1	27.3	

RioTinto

Dust Gauge Collection Field Sheet

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GENERAL

LOCATION NAME: Dust C2 DATE (dd-mmm-yyyy): 2021-03-30 TIME (24:00): 1122

SAMPLED BY: GC TYPE OF SAMPLE: Dust Other

GPS COORDINATES (UTM): 528714 E 7153276 N (Zone) 12V

DESCRIPTION: Q1 Dust

CLIMATE CONDITIONS (if sampling outside)

Air Temp: -28 °C Wind Direction: NA Wind Speed (knots): 0

Precipitation: rain / mist / snow / N/A Cloud Cover: 0%, 10%, 25%, 50%, 75%, 100

Snow Cover: 0%, 10%, 25%, 50%, 75%, 100% Dust in area: Visible, Not Visible

COLLECTION COMMENTS: (i.e. damage to station, bugs - twigs in sample, hole in vestibule, etc.)

Date Sample Collected was Deployed 2021-01-08

Some plant debris in sample

Total Volume of Water After Melting: 625 (mL)

Filter #	Weight of Filter	Filter + Residue	Residue Weight	Comments
1	123.9	175.2	51.3	
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
Totals	123.9	175.2	51.3	

RioTinto

Dust Gauge Collection Field Sheet

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GENERAL

LOCATION NAME: EBW 1 **DATE (dd-mmm-yyyy):** 20210327 **TIME (24:00):** 0920

SAMPLED BY: RP **TYPE OF SAMPLE:** Dust **Other**

GPS COORDINATES (UTM): N/A **E** **N (Zone)**

DESCRIPTION: Q1 Dust

CLIMATE CONDITIONS (if sampling outside) N/A

Air Temp: ______°C **Wind Direction:** ______ **Wind Speed (knots):** ______

Precipitation: rain / mist / snow / N/A **Cloud Cover:** 0%, 10%, 25%, 50%, 75%, 100

Snow Cover: 0%, 10%, 25%, 50%, 75%, 100% **Dust in area:** Visible, Not Visible

COLLECTION COMMENTS: (i.e. damage to station, bugs - twigs in sample, hole in vestibule, etc.)

Date Sample Collected was Deployed

Very little visible dust in sample

Total Volume of Water After Melting : 350 **(mL)**

Filter #	Weight of Filter	Filter + Residue	Residue Weight	Comments
1	124.4	124.0	0	
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
Totals	124.4	124.0	0	

RioTinto

Dust Gauge Collection Field Sheet

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GENERAL

LOCATION NAME: EBW2 DATE (dd-mmm-yyyy): 2021-03-27 TIME (24:00): 0930

SAMPLED BY: BP TYPE OF SAMPLE: Dust Other

GPS COORDINATES (UTM): N/A E N (Zone)

DESCRIPTION: Q1 Dust

CLIMATE CONDITIONS (if sampling outside) N/A

Air Temp: ______°C Wind Direction: ______ Wind Speed (knots): ______

Precipitation: rain / mist / snow / N/A Cloud Cover: 0%, 10%, 25%, 50%, 75%, 100

Snow Cover: 0%, 10%, 25%, 50%, 75%, 100% Dust in area: Visible, Not Visible

COLLECTION COMMENTS: (i.e. damage to station, bugs - twigs in sample, hole in vestibule, etc.)

Date Sample Collected was Deployed ______

Very little visible dust in sample

Total Volume of Water After Melting: 375 (mL)

Filter #	Weight of Filter	Filter + Residue	Residue Weight	Comments
1	126.5	126.3	0	
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
Totals	126.5	126.3	0	

RioTinto

Dust Gauge Collection Field Sheet

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GENERAL

LOCATION NAME: Dust 1 **DATE (dd-mmm-yyyy):** 05-07-2021 **TIME (24:00):** 1336

SAMPLED BY: BP FG **TYPE OF SAMPLE:** Dust **Other**

GPS COORDINATES (UTM): 533964 **E** 7154321 **N (Zone)** 12

DESCRIPTION: Q2 Dust Analysis

CLIMATE CONDITIONS (if sampling outside)

Air Temp: 13 °C **Wind Direction:** SW **Wind Speed (knots):** 8

Precipitation: rain / mist / snow / N/A **Cloud Cover:** 0%, 10%, 25%, 50%, 75%, 100

Snow Cover: 0%, 10%, 25%, 50%, 75%, 100% **Dust in area:** Visible, Not Visible

COLLECTION COMMENTS: (i.e. damage to station, bugs - twigs in sample, hole in vestibule, etc.)

Date Sample Collected was Deployed 2021-04-04 14:25

Sample volume 300 mL

Sample light brown, can't see through (cloudy).

Suspended dust particles at bottom and organic matter

Total Volume of Water After Melting : 300 **(mL)**

Filter #	Weight of Filter (mg)	Filter + Residue	Residue Weight	Comments
1	113.1	187.3	74.2	
2	111.6	131.6	20	
3	111.5	151.7	40.2	
4	111.2	225.2	114	
5				
6				
7				
8				
9				
10				
11				
Totals	447.4	695.8	~~342.6~~ 248.4	

RioTinto

Dust Gauge Collection Field Sheet

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Area:	8000	Revision:	R0
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GENERAL

LOCATION NAME: Dust 2A DATE (dd-mmm-yyyy): 05-07-2021 TIME (24:00): 1435

SAMPLED BY: BP FG TYPE OF SAMPLE: Dust Other

GPS COORDINATES (UTM): 535678 E 7151339 N (Zone) 12

DESCRIPTION: Q2 Dust Analysis

CLIMATE CONDITIONS (if sampling outside)

Air Temp: 13 °C Wind Direction: SW Wind Speed (knots): 8

Precipitation: rain / mist / snow / N/A Cloud Cover: 0%, 10%, 25%, 50%, 75%, 100

Snow Cover: 0%, 10%, 25%, 50%, 75%, 100% Dust in area: Visible, Not Visible

COLLECTION COMMENTS: (i.e. damage to station, bugs - twigs in sample, hole in vestibule, etc.)

Date Sample Collected was Deployed 2021-03-30

Sample volume 540 mL

Sample visible suspended dust at bottom

Slightly cloudy

Total Volume of Water After Melting : 540 (mL)

Filter #	Weight of Filter (mg)	Filter + Residue	Residue Weight	Comments
1	112.6	169.2	56.6	
2	111.7	168.6	56.9	
3				
4				
5				
6				
7				
8				
9				
10				
11				
Totals	224.3	337.8	113.5	

RioTinto

Dust Gauge Collection Field Sheet			
		No:	ENVI-178-0312
Area:	8000	Revision:	R0
Effective Date:	26-Mar-2012	By:	Dianne Dul
Task:	Dust Gauge Collection Field Sheet		
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GENERAL

LOCATION NAME: Dust 3 DATE (dd-mmm-yyyy): 05-07-2021 TIME (24:00): 1406

SAMPLED BY: BP FG TYPE OF SAMPLE: Dust Other

GPS COORDINATES (UTM): 535024 E 7151872 N (Zone)

DESCRIPTION: Q2 Dust Analysis

CLIMATE CONDITIONS (if sampling outside)

Air Temp: 13 °C Wind Direction: SW Wind Speed (knots): 8

Precipitation: rain / mist / snow / N/A Cloud Cover: 0%, 10%, 25%, 50%, 75%, 100

Snow Cover: 0%, 10%, 25%, 50%, 75%, 100% Dust in area: Visible, Not Visible

COLLECTION COMMENTS: (i.e. damage to station, bugs - twigs in sample, hole in vestibule, etc.)

Date Sample Collected was Deployed 2021-04-04 13:36
Sample Volume 280 mL
Sample slightly grey-ish visible suspended dust with little organic matter at bottom

Total Volume of Water After Melting: 280 (mL)

Filter #	Weight of Filter	Filter + Residue	Residue Weight	Comments
1	111.1	250.4	139.3	
2	111.4	175.5	64.1	
3	111.5	184.2	72.7	
4				
5				
6				
7				
8				
9				
10				
11				
Totals	334	610.1	276.1	

RioTinto

Dust Gauge Collection Field Sheet			
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GENERAL

LOCATION NAME: Dust 4 **DATE (dd-mmm-yyyy):** 05-07-2021 **TIME (24:00):** 1512

SAMPLED BY: BP FG **TYPE OF SAMPLE:** Dust **Other**

GPS COORDINATES (UTM): 531397 **E** 7152127 **N (Zone)** 12

DESCRIPTION: Q2 Dust Analysis

CLIMATE CONDITIONS (if sampling outside)

Air Temp: 14 °C **Wind Direction:** SW **Wind Speed (knots):** 10

Precipitation: rain / mist / snow / N/A **Cloud Cover:** 0%, 10%, 25%, 50%, 75%, 100

Snow Cover: 0%, 10%, 25%, 50%, 75%, 100% **Dust in area:** Visible Not Visible

COLLECTION COMMENTS: (i.e. damage to station, bugs - twigs in sample, hole in vestibule, etc.)

Date Sample Collected was Deployed 2021-03-30 ?

Sample volume 440 mL
Sample visible with suspended dust at bottom
slightly cloudy

Total Volume of Water After Melting : 440 **(mL)**

Filter #	Weight of Filter (mg)	Filter + Residue	Residue Weight	Comments
1	112.5	199.0	86.5	
2	110.9	178.3	67.4	
3				
4				
5				
6				
7				
8				
9				
10				
11				
Totals	223.4	377.3	153.9	

RioTinto

Dust Gauge Collection Field Sheet

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Task:	Dust Gauge Collection Field Sheet	By:	Dianne Dul
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GENERAL

LOCATION NAME: Dust 5 DATE (dd-mmm-yyyy): 2021-07-02 TIME (24:00): 13:53

SAMPLED BY: BP FG TYPE OF SAMPLE: Dust Other

GPS COORDINATES (UTM): 535696 E 7155138 N (Zone) 12W

DESCRIPTION: Q2 Dust Sampling

CLIMATE CONDITIONS (if sampling outside)

Air Temp: 16 °C Wind Direction: E Wind Speed (knots): 7

Precipitation: rain / mist / snow / N/A Cloud Cover: 0%, 10%, 25%, 50%, 75%, 100

Snow Cover: 0%, 10%, 25%, 50%, 75%, 100% Dust in area: Visible, Not Visible

COLLECTION COMMENTS: (i.e. damage to station, bugs - twigs in sample, hole in vestibule, etc.)

Date Sample Collected was Deployed 2021-03-30 ?

Sample Volume 240 mL

Sample light yellowish suspended dust with organic matter at bottom

Total Volume of Water After Melting : 240 (mL)

Filter #	Weight of Filter (mg)	Filter + Residue	Residue Weight	Comments
1	113.6	129.8	16.2	
2	117.1	132.3	15.2	
3				
4				
5				
6				
7				
8				
9				
10				
11				
Totals	230.7	262.1	31.4	

RioTinto

Dust Gauge Collection Field Sheet			
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GENERAL

LOCATION NAME: Dust 6 **DATE (dd-mmm-yyyy):** 05-07-2021 **TIME (24:00):** 13:55

SAMPLED BY: BP FG **TYPE OF SAMPLE:** Dust **Other** ____

GPS COORDINATES (UTM): 537502 **E** 7152934 **N (Zone)** 12

DESCRIPTION: Q2 Dust Analysis

CLIMATE CONDITIONS (if sampling outside)

Air Temp: 13 °C **Wind Direction:** SW **Wind Speed (knots):** 8

Precipitation: rain / mist / snow / N/A **Cloud Cover:** 0%, 10%, 25%, 50%, 75%, 100

Snow Cover: 0%, 10%, 25%, 50%, 75%, 100% **Dust in area:** Visible, Not Visible

COLLECTION COMMENTS: (i.e. damage to station, bugs - twigs in sample, hole in vestibule, etc.)

Date Sample Collected was Deployed 2021-04-04 14:44

Sample Volume 320 mL

Sample cloudy with visible suspended dust at bottom

Total Volume of Water After Melting: 320 (mL)

Filter #	Weight of Filter (mg)	Filter + Residue	Residue Weight	Comments
1	113.3	156.8	43.5	
2	110.7	151.5	40.8	
3				
4				
5				
6				
7				
8				
9				
10				
11				
Totals	224	308.3	84.3	

RioTinto

Dust Gauge Collection Field Sheet

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GENERAL

LOCATION NAME: Dust 7 DATE (dd-mmm-yyyy): 02-07-2021 TIME (24:00): 13:34

SAMPLED BY: BP FG TYPE OF SAMPLE: Dust Other

GPS COORDINATES (UTM): 536819 E 7150510 N (Zone) 12W

DESCRIPTION: Q2 Dust Sampling

CLIMATE CONDITIONS (if sampling outside)

Air Temp: 16 °C Wind Direction: E Wind Speed (knots): 7

Precipitation: rain / mist / snow / N/A Cloud Cover: 0%, 10%, 25%, 50%, 75%, 100

Snow Cover: 0%, 10%, 25%, 50%, 75%, 100% Dust in area: Visible, Not Visible

COLLECTION COMMENTS: (i.e. damage to station, bugs - twigs in sample, hole in vestibule, etc.)

Date Sample Collected was Deployed 2021-03-30 ?

Sample Volume 450 mL

Sample visible suspended dust, bits of organic matter at bottom

Total Volume of Water After Melting : 450 (mL)

Filter #	Weight of Filter (mg)	Filter + Residue	Residue Weight	Comments
1	113.7	169.0	55.3	
2	110.7	117.5	6.8	
3				
4				
5				
6				
7				
8				
9				
10				
11				
Totals	224.4	286.5	62.1	

RioTinto

Dust Gauge Collection Field Sheet

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GENERAL

LOCATION NAME: Dust 8 **DATE (dd-mmm-yyyy):** 2021-07-02 **TIME (24:00):** 11:42

SAMPLED BY: BP FG **TYPE OF SAMPLE:** Dust **Other**

GPS COORDINATES (UTM): 531401 **E** 7154146 **N (Zone)** 12

DESCRIPTION: Q2 Dust sampling

CLIMATE CONDITIONS (if sampling outside)

Air Temp: 15 °C **Wind Direction:** E **Wind Speed (knots):** 5

Precipitation: rain / mist / snow / N/A **Cloud Cover:** 0%, 10%, 25%, 50%, 75%, 100

Snow Cover: 0%, 10%, 25%, 50%, 75%, 100% **Dust in area:** Visible, Not Visible

COLLECTION COMMENTS: (i.e. damage to station, bugs - twigs in sample, hole in vestibule, etc.)

Date Sample Collected was Deployed 2021-04-04

Gauge holder low above water and leaning

sample volume (880 + 890) 1770 mL

sample cloudy, leaf + lichen pieces in bottom

Total Volume of Water After Melting: 1770 (mL)

Filter #	Weight of Filter (mg)	Filter + Residue	Residue Weight	Comments
1	115.4	200.7	85.3	
2	111.1	193.3	82.2	
3				
4				
5				
6				
7				
8				
9				
10				
11				
Totals	226.5	394	167.5	

RioTinto

Dust Gauge Collection Field Sheet

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GENERAL

LOCATION NAME: DUST 9 DATE (dd-mmm-yyyy): 02-07-2021 TIME (24:00): 13:17

SAMPLED BY: BP FG TYPE OF SAMPLE: Dust Other

GPS COORDINATES (UTM): 541204 E 7152154 N (Zone) 12W

DESCRIPTION: Q2 Dust Sampling

CLIMATE CONDITIONS (if sampling outside)

Air Temp: 16 °C Wind Direction: E Wind Speed (knots): 7

Precipitation: rain / mist / snow / N/A Cloud Cover: 0%, 10%, 25%, 50%, 75%, 100

Snow Cover: 0%, 10%, 25%, 50%, 75%, 100% Dust in area: Visible, Not Visible

COLLECTION COMMENTS: (i.e. damage to station, bugs - twigs in sample, hole in vestibule, etc.)

Date Sample Collected was Deployed 2021-03-30

Sample volume 150 mL

Sample dark grey/brownish, cloudy, with organic particles at bottom

Total Volume of Water After Melting: 150 (mL)

Filter #	Weight of Filter	Filter + Residue	Residue Weight	Comments
1	114.3	126.9	12.6	
2	114.0	125.0	11	
3				
4				
5				
6				
7				
8				
9				
10				
11				
Totals	228.3	251.9	23.6	

RioTinto

Dust Gauge Collection Field Sheet			
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GENERAL

LOCATION NAME: Dust 10 **DATE (dd-mmm-yyyy):** 05-07-2021 **TIME (24:00):** 1537

SAMPLED BY: BP FG **TYPE OF SAMPLE:** Dust **Other**

GPS COORDINATES (UTM): 532908 **E** 7148924 **N (Zone)** 12

DESCRIPTION: Q2 Dust Analysis

CLIMATE CONDITIONS (if sampling outside)

Air Temp: 14 °C **Wind Direction:** SW **Wind Speed (knots):** 10

Precipitation: rain / mist / snow / N/A **Cloud Cover:** 0%, 10%, 25%, 50%, 75%, 100

Snow Cover: 0%, 10%, 25%, 50%, 75%, 100% **Dust in area:** Visible, Not Visible

COLLECTION COMMENTS: (i.e. damage to station, bugs - twigs in sample, hole in vestibule, etc.)

Date Sample Collected was Deployed 2021-04-04

Sample volume 430 mL

Sample slightly yellow-greyish, cloudy, with suspended dust at bottom

Organic matter at bottom

Total Volume of Water After Melting: 430 (mL)

Filter #	Weight of Filter (mg)	Filter + Residue	Residue Weight	Comments
1	111.6	257.1	145.5	
2	113.9	196.8	82.9	
3	111.4	215.2	103.8	
4	112.4	136.7	24.3	
5				
6				
7				
8				
9				
10				
11				
Totals	449.3	805.8	~~584.9~~	

356.5

RioTinto

Dust Gauge Collection Field Sheet

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GENERAL

LOCATION NAME: Dust 11 DATE (dd-mmm-yyyy): 02-07-2021 TIME (24:00): 12:40

SAMPLED BY: BP FG TYPE OF SAMPLE: Dust Other

GPS COORDINATES (UTM): 531463 E 7150156 N (Zone) 12W

DESCRIPTION: Q2 Dust Sampling

CLIMATE CONDITIONS (if sampling outside)

Air Temp: 16 °C Wind Direction: E Wind Speed (knots): 7

Precipitation: rain / mist / snow / N/A Cloud Cover: 0%, 10%, 25%, 50%, 75%, 100

Snow Cover: 0%, 10%, 25%, 50%, 75%, 100% Dust in area: Visible, Not Visible

COLLECTION COMMENTS: (i.e. damage to station, bugs - twigs in sample, hole in vestibule, etc.)

Date Sample Collected was Deployed 2021-03-30

Sample volume (560 + 450 + 550 + 475 + 480 + 350 + 275)

Sample cloudy visible dust and organic matter at bottom

Total Volume of Water After Melting : 3140 (mL)

Filter #	Weight of Filter (mg)	Filter + Residue	Residue Weight	Comments
1	110.6	128.5	17.9	
2	110.3	117.9	7.6	
3	115.3	139.4	24.1	
4	110.0	172.2	62.2	
5	114.4	149.3	34.9	
6	115.2	469.9	354.7	
7				
8				
9				
10				
11				
Totals	675.8	1177.2	501.4	

RioTinto

Dust Gauge Collection Field Sheet

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Area:	8000	Revision:	R0
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GENERAL

LOCATION NAME: Dust 12 DATE (dd-mmm-yyyy): 2021-07-02 TIME (24:00): 12:24

SAMPLED BY: BP FG TYPE OF SAMPLE: Dust Other

GPS COORDINATES (UTM): 529323 E 7151191 N (Zone) 12W

DESCRIPTION: Q2 Dust Sampling

CLIMATE CONDITIONS (if sampling outside)

Air Temp: 16 °C Wind Direction: E Wind Speed (knots): 7

Precipitation: rain / mist / snow / N/A Cloud Cover: 0%, 10%, 25%, 50%, 75%, 100

Snow Cover: 0%, 10%, 25%, 50%, 75%, 100% Dust in area: Visible, Not Visible

COLLECTION COMMENTS: (i.e. damage to station, bugs - twigs in sample, hole in vestibule, etc.)

Date Sample Collected was Deployed 2021-03-30

Sample volume 640 mL

Sample visible suspended dust, cloudy

Total Volume of Water After Melting: 640 (mL)

Filter #	Weight of Filter	Filter + Residue	Residue Weight	Comments
1	112.5	121.9	9.4	
2	111.9	141.3	29.4	
3	112.3	166.8	54.5	
4				
5				
6				
7				
8				
9				
10				
11				
Totals	336.7	430	93.3	

RioTinto

Dust Gauge Collection Field Sheet

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Area:	8000	Revision:	R0
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GENERAL

LOCATION NAME: DUST C1 **DATE (dd-mmm-yyyy):** 02-07-2021 **TIME (24:00):** 13:00

SAMPLED BY: BP FG **TYPE OF SAMPLE:** Dust **Other**

GPS COORDINATES (UTM): 534979 **E** 7144270 **N (Zone)** 12W

DESCRIPTION: Q2 Dust Sampling

CLIMATE CONDITIONS (if sampling outside)

Air Temp: 16 °C **Wind Direction:** E **Wind Speed (knots):** 7

Precipitation: rain / mist / snow / N/A **Cloud Cover:** 0%, 10%, 25%, 50%, 75%, 100

Snow Cover: 0%, 10%, 25%, 50%, 75%, 100% **Dust in area:** Visible, Not Visible

COLLECTION COMMENTS: (i.e. damage to station, bugs - twigs in sample, hole in vestibule, etc.)

Date Sample Collected was Deployed 2021-03-30

Sample volume 470mL
Sample visible suspended dust with little organic matter at bottom

Total Volume of Water After Melting: 470 (mL)

Filter #	Weight of Filter	Filter + Residue	Residue Weight	Comments
1	111.7	155.9	44.2	
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
Totals	111.7	155.9	44.2	

Rio Tinto

Dust Gauge Collection Field Sheet			
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GENERAL

LOCATION NAME: Dust C2 **DATE (dd-mmm-yyyy):** 02-07-2021 **TIME (24:00):** 12:07

SAMPLED BY: BP FG **TYPE OF SAMPLE:** Dust **Other**

GPS COORDINATES (UTM): 528714 **E** 7153276 **N (Zone)** 12N

DESCRIPTION: Q2 Dust Sampling

CLIMATE CONDITIONS (if sampling outside)

Air Temp: 16 °C **Wind Direction:** E **Wind Speed (knots):** 7

Precipitation: rain / mist / snow / N/A **Cloud Cover:** 0%, 10%, 25%, 50%, 75%, 100

Snow Cover: 0%, 10%, 25%, 50%, 75%, 100% **Dust in area:** Visible, Not Visible

COLLECTION COMMENTS: (i.e. damage to station, bugs - twigs in sample, hole in vestibule, etc.)

Date Sample Collected was Deployed 2021-03-30

Sample volume 850 mL
Sample (slightly cloudy) visible with dust particles on bottom

Total Volume of Water After Melting : 850 (mL)

Filter #	Weight of Filter (mg)	Filter + Residue	Residue Weight	Comments
1	111.0	167.1	56.1	
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
Totals	111.0	167.1	56.1	

RioTinto

Dust Gauge Collection Field Sheet			
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GENERAL

LOCATION NAME: DUST EBW **DATE (dd-mmm-yyyy):** 06-07-2021 **TIME (24:00):**

SAMPLED BY: SS FG **TYPE OF SAMPLE:** Dust **Other**

GPS COORDINATES (UTM): ______ **E** ______ **N (Zone)** ______

DESCRIPTION: Q2 Dust Analysis

CLIMATE CONDITIONS (if sampling outside)

Air Temp: ___ °C **Wind Direction:** ___ **Wind Speed (knots):** ___

Precipitation: rain / mist / snow / N/A **Cloud Cover:** 0%, 10%, 25%, 50%, 75%, 100

Snow Cover: 0%, 10%, 25%, 50%, 75%, 100% **Dust in area:** Visible, Not Visible

COLLECTION COMMENTS: (i.e. damage to station, bugs - twigs in sample, hole in vestibule, etc.)

Date Sample Collected was Deployed

LOT # 210526 (16:55) 2021-07-01 SS2
Sample volume (470 + 250 = 720 mL)

Total Volume of Water After Melting : ______ **(mL)**

Filter #	Weight of Filter (mg)	Filter + Residue	Residue Weight	Comments
1	110.5	110.4	0.1	
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
Totals	110.5	110.4	0.1	

RioTinto

Dust Gauge Collection Field Sheet

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Area:	8000	Revision:	R0
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GENERAL

LOCATION NAME: Dust 01 **DATE (dd-mmm-yyyy):** 15-Sept-2021 **TIME (24:00):** 15:26

SAMPLED BY: GC, BD **TYPE OF SAMPLE:** Dust **Other**____

GPS COORDINATES (UTM): ____ **E** ____ **N (Zone)** ____

DESCRIPTION: ____

CLIMATE CONDITIONS (if sampling outside)

Air Temp: 3 °C **Wind Direction:** E **Wind Speed (knots):** 18

Precipitation: rain / mist / snow / N/A **Cloud Cover:** 0%, 10%, 25%, 50%, 75%, 100

Snow Cover: 0%, 10%, 25%, 50%, 75%, 100% **Dust in area:** Visible, Not Visible

COLLECTION COMMENTS: (i.e. damage to station, bugs - twigs in sample, hole in vestibule, etc.)

Date Sample Collected was Deployed 2021-07-05 13:36

lots of bugs in sample water, grey brown colour, somewhat turbid

Total Volume of Water After Melting: 325 (mL)

Filter #	Weight of Filter	Filter + Residue	Residue Weight	Comments
1	113.7	147.7	34	
2	122.5	154.1	31.6	
3				
4				
5				
6				
7				
8				
9				
10				
11				
Totals	236.2	301.8	65.6	

Rio Tinto

Dust Gauge Collection Field Sheet

Area:	8000	No:	ENVI-178-0312
Effective Date:	26-Mar-2012	Revision:	R0
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GENERAL

LOCATION NAME: Dust 2A **DATE (dd-mmm-yyyy):** 2021-9-19 **TIME (24:00):** 10:40

SAMPLED BY: ________ **TYPE OF SAMPLE:** Dust **Other** ________

GPS COORDINATES (UTM): ________ **E** ________ **N (Zone)** ________

DESCRIPTION: ________

CLIMATE CONDITIONS (if sampling outside)

Air Temp: ______°C **Wind Direction:** ________ **Wind Speed (knots):** ______

Precipitation: rain / mist / snow / N/A **Cloud Cover:** 0%, 10%, 25%, 50%, 75%, 100

Snow Cover: 0%, 10%, 25%, 50%, 75%, 100% **Dust in area:** Visible, Not Visible

COLLECTION COMMENTS: (i.e. damage to station, bugs - twigs in sample, hole in vestibule, etc.)

Date Sample Collected was Deployed 2021-07-05 14:35

Collected 2021-09-18 @ 14:47

pretty clear water, slight grey colour, fewer bugs then others. Water got cloudier after rinsing, particulate size increased as more filters were used.

Total Volume of Water After Melting: 765 (mL)

Filter #	Weight of Filter	Filter + Residue	Residue Weight	Comments
1	119.0	130.7	11.7	
2	117.4	130.0	12.6	
3	121.4	135.3	13.9	
4	121.4	146.6	25.2	Still quite a few bug pieces on filter
5				
6				
7				
8				
9				
10				
11				
Totals	4792	542.6	63.4	

RioTinto

Dust Gauge Collection Field Sheet

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GENERAL

LOCATION NAME: Dust 3 **DATE (dd-mmm-yyyy):** 2021-9-15 **TIME (24:00):** 3:33

SAMPLED BY: BP, BD **TYPE OF SAMPLE:** Dust **Other**

GPS COORDINATES (UTM): ______ **E** ______ **N (Zone)** ______

DESCRIPTION: ______

CLIMATE CONDITIONS (if sampling outside)

Air Temp: 3 °C **Wind Direction:** E **Wind Speed (knots):** 18

Precipitation: rain / mist / snow / N/A **Cloud Cover:** 0%, 10%, 25%, 50%, 75%, 100

Snow Cover: 0%, 10%, 25%, 50%, 75%, 100% **Dust in area:** Visible, Not Visible

COLLECTION COMMENTS: (i.e. damage to station, bugs - twigs in sample, hole in vestibule, etc.)

Date Sample Collected was Deployed 2021-07-05 @ 14:06

lots of bugs, quite turbid with brown-grey water
very fine dust particles on filters, final filter had more coarse particles

Total Volume of Water After Melting: 665 (mL) ★ forgot to measure before 3x rinsing, put appr 100mL of DI in

Filter #	Weight of Filter	Filter + Residue	Residue Weight	Comments
1	118.5	161.4	42.9	
2	124.5	166.0	41.5	
3	125.7	192.6	66.9	
4				
5				
6				
7				
8				
9				
10				
11				
Totals	368.7	520	151.3	

RioTinto

Dust Gauge Collection Field Sheet

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Area:	8000	Revision:	R0
Effective Date:	26-Mar-2012	By:	Dianne Dul
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GENERAL

LOCATION NAME: Dust 4 **DATE (dd-mmm-yyyy):** 2021-9-15 **TIME (24:00):** 16:24

SAMPLED BY: BP, BD **TYPE OF SAMPLE:** Dust **Other**____

GPS COORDINATES (UTM): ____ **E** ____ **N (Zone)** ____

DESCRIPTION: ____

CLIMATE CONDITIONS (if sampling outside)

Air Temp: 3 °C **Wind Direction:** E **Wind Speed (knots):** 18

Precipitation: rain / mist / snow / N/A **Cloud Cover:** 0%, 10%, 25%, 50%, 75%, 100

Snow Cover: 0%, 10%, 25%, 50%, 75%, 100% **Dust in area:** Visible, Not Visible

COLLECTION COMMENTS: (i.e. damage to station, bugs - twigs in sample, hole in vestibule, etc.)

Date Sample Collected was Deployed 2021-07-05 @ 15:12 BP FG

lots of bugs, some insect eggs? stuck to the sides of the TSS funnel. unable to rinse them down into the filter.

Total Volume of Water After Melting: 535 (mL)

Filter #	Weight of Filter	Filter + Residue	Residue Weight	Comments
1	127.1	137.0	9.9	
2	115.9	124.0	8.1	
3				
4				
5				
6				
7				
8				
9				
10				
11				
Totals	243	261	18	

Rio Tinto

Dust Gauge Collection Field Sheet

Area:	8000	No:	ENVI-178-0312
Effective Date:	26-Mar-2012	Revision:	R0
Task:	Dust Gauge Collection Field Sheet	By:	Dianne Dul
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GENERAL

LOCATION NAME: Dust 5 **DATE (dd-mmm-yyyy):** 2021-09-16 **TIME (24:00):** 1341

SAMPLED BY: GC, BD **TYPE OF SAMPLE:** Dust **Other**

GPS COORDINATES (UTM): ______ **E** ______ **N (Zone)** ______

DESCRIPTION: ______

CLIMATE CONDITIONS (if sampling outside)

Air Temp: 1 °C **Wind Direction:** NE **Wind Speed (knots):** 10

Precipitation: rain / mist / snow / N/A **Cloud Cover:** 0%, 10%, 25%, 50%, 75%, 100

Snow Cover: 0%, 10%, 25%, 50%, 75%, 100% **Dust in area:** Visible, Not Visible

COLLECTION COMMENTS: (i.e. damage to station, bugs - twigs in sample, hole in vestibule, etc.)

Date Sample Collected was Deployed 2021-07-02

Sample clear, lots of bugs

Total Volume of Water After Melting: 225 (mL)

Filter #	Weight of Filter	Filter + Residue	Residue Weight	Comments
1	117.1	140.0	22.9	
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
Totals	117.1	140	22.9	

RioTinto

Dust Gauge Collection Field Sheet

Area:	8000	No:	ENVI-178-0312
Effective Date:	26-Mar-2012	Revision:	R0
Task:	Dust Gauge Collection Field Sheet	By:	Dianne Dul
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GENERAL

LOCATION NAME: Dust 6 **DATE (dd-mmm-yyyy):** 2021-9-15 **TIME (24:00):** 11:32

SAMPLED BY: BP, BD **TYPE OF SAMPLE:** Dust **Other**

GPS COORDINATES (UTM): ______ **E** ______ **N (Zone)** ______

DESCRIPTION:

CLIMATE CONDITIONS (if sampling outside)

Air Temp: 3 °C **Wind Direction:** E **Wind Speed (knots):** 18

Precipitation: rain / mist / snow / N/A **Cloud Cover:** 0%, 10%, 25%, 50%, 75%, 100

Snow Cover: 0%, 10%, 25%, 50%, 75%, 100% **Dust in area:** Visible, Not Visible

COLLECTION COMMENTS: (i.e. damage to station, bugs - twigs in sample, hole in vestibule, etc.)

Date Sample Collected was Deployed 2021-07-05 BP FG T??

Many, Many, Many bugs. Brown-Grey colour, quite turbid

Total Volume of Water After Melting : 550 (mL)

Filter #	Weight of Filter	Filter + Residue	Residue Weight	Comments
1	123.8	130.4	6.6	
2	127.0	130.9	3.9	
3	116.9	124.3	7.4	Some Residue lost into Crucible
4	124.4	142.9	18.5	Some Residue lost into Crucible
5				
6				
7				
8				
9				
10				
11				
Totals	492.1	528.5	36.4	

Rio Tinto

Dust Gauge Collection Field Sheet

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GENERAL

LOCATION NAME: Dust 7 **DATE (dd-mmm-yyyy):** 2021-9-16 **TIME (24:00):** 15:11

SAMPLED BY: GC, BD **TYPE OF SAMPLE:** Dust **Other**

GPS COORDINATES (UTM): ______ **E** ______ **N (Zone)** ______

DESCRIPTION: ______

CLIMATE CONDITIONS (if sampling outside)

Air Temp: 1 °C **Wind Direction:** NE **Wind Speed (knots):** 16

Precipitation: rain / mist / snow / N/A **Cloud Cover:** 0%, 10%, 25%, 50%, 75%, 100

Snow Cover: 0%, 10%, 25%, 50%, 75%, 100% **Dust in area:** Visible, Not Visible

COLLECTION COMMENTS: (i.e. damage to station, bugs - twigs in sample, hole in vestibule, etc.)

Date Sample Collected was Deployed 2021-07-02 @ 13:34

Total Volume of Water After Melting : 635 (mL)

Filter #	Weight of Filter	Filter + Residue	Residue Weight	Comments
1	118.4	125.4	7.0	
2	124.5	130.9	6.4	
3	118.1	124.3	6.2	
4	119.1	124.1	5.0	
5				
6				
7				
8				
9				
10				
11				
Totals	480.1	504.7	24.6	

Rio Tinto

Dust Gauge Collection Field Sheet

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Effective Date:	26-Mar-2012	Revision:	R0
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GENERAL

LOCATION NAME: Dust8 **DATE (dd-mmm-yyyy):** 2021-09-16 **TIME (24:00):** 1350

SAMPLED BY: GC, BD **TYPE OF SAMPLE:** Dust **Other**____

GPS COORDINATES (UTM): ____ **E** ____ **N (Zone)** ____

DESCRIPTION: ____

CLIMATE CONDITIONS (if sampling outside)

Air Temp: 1 °C **Wind Direction:** NE **Wind Speed (knots):** 10

Precipitation: rain / mist / snow / N/A **Cloud Cover:** 0%, 10%, 25%, 50%, 75%, 100

Snow Cover: 0%, 10%, 25%, 50%, 75%, 100% **Dust in area:** Visible, Not Visible

COLLECTION COMMENTS: (i.e. damage to station, bugs - twigs in sample, hole in vestibule, etc.)

Date Sample Collected was Deployed____ Sample Analysed by:

Very cloudy and brown, lots of bugs.
Dust gauge tilted towards site, water level is at the base of the stand

Total Volume of Water After Melting: 580 **(mL)**

Filter #	Weight of Filter	Filter + Residue	Residue Weight	Comments
1	122.9	123.2	0.3	
2	124.7	123.1	-1.6	
3	120.0	149.4	29.9	
4	124.7	118.6	-6.1	
5	123.5	123.7	0.7	
6	124.1	124.4	0.3	
7	118.9	130.3	11.4	
8	118.9	120.2	1.3	
9	120.9	122.4	1.5	
10	121.3	121.2	-0.1	
11	117.2	119.4	2.2	
Totals				

Rio Tinto

Dust Gauge Collection Field Sheet

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GENERAL

LOCATION NAME: Dust 8 DATE (dd-mmm-yyyy): 2021-09-16 TIME (24:00): 1350

SAMPLED BY: GC, BD TYPE OF SAMPLE: Dust Other________

GPS COORDINATES (UTM): ________ E ________ N (Zone) ________

DESCRIPTION: ________

CLIMATE CONDITIONS (if sampling outside)

Air Temp: 1 °C Wind Direction: NE Wind Speed (knots): 10

Precipitation: rain / mist / snow / N/A Cloud Cover: 0%, 10%, 25%, 50%, 75%, 100

Snow Cover: 0%, 10%, 25%, 50%, 75%, 100% Dust in area: Visible, Not Visible

COLLECTION COMMENTS: (i.e. damage to station, bugs - twigs in sample, hole in vestibule, etc.)

Date Sample Collected was Deployed________

Sample contained a viscous, gelatinous material that quickly clogged filters, despite containing very little dust. Thus a large number of filters were used.

Total Volume of Water After Melting :________(mL)

	Filter #	Weight of Filter	Filter + Residue	Residue Weight	Comments
12	1	119.6	120.4	0.8	
13	2	118.3	121.6	3.3	
14	3	119.7	122.5	2.8	
15	4	118.9	119.0	0.1	
	5				
	6	1813.6	1859.4	45.8	
	7				
	8				
	9				
	10				
	11				
	Totals	1813.6	1859.4	45.8	

RioTinto

Dust Gauge Collection Field Sheet

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GENERAL

LOCATION NAME: Dust 9 DATE (dd-mmm-yyyy): 2021-9-16 TIME (24:00): 15:12

SAMPLED BY: GC, BD TYPE OF SAMPLE: Dust Other

GPS COORDINATES (UTM): E N (Zone)

DESCRIPTION:

CLIMATE CONDITIONS (if sampling outside)

Air Temp: 1 'C Wind Direction: NE Wind Speed (knots): 10

Precipitation: rain / mist / snow / N/A Cloud Cover: 0%, 10%, 25%, 50%, 75%, 100

Snow Cover: 0%, 10%, 25%, 50%, 75%, 100% Dust in area: Visible, Not Visible

COLLECTION COMMENTS: (i.e. damage to station, bugs - twigs in sample, hole in vestibule, etc.)

Date Sample Collected was Deployed 2021-07-02 @ 1317

Smokey water color, lots of bugs, picked sample up @ 2021-09-16, 14:34

Total Volume of Water After Melting: 336 (mL)

Filter #	Weight of Filter	Filter + Residue	Residue Weight	Comments
1	118.9	120.4	1.5	
2	118.2	121.7	3.5	leaked abit of water
3				
4				
5				
6				
7				
8				
9				
10				
11				
Totals	237.1	242.1	5.0	

RioTinto

Dust Gauge Collection Field Sheet

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GENERAL

LOCATION NAME: Dust 10 **DATE (dd-mmm-yyyy):** 2021-9-15 **TIME (24:00):** 17:18

SAMPLED BY: BP, BD **TYPE OF SAMPLE:** Dust **Other**______

GPS COORDINATES (UTM): ______ **E** ______ **N (Zone)** ______

DESCRIPTION: ______

CLIMATE CONDITIONS (if sampling outside)

Air Temp: 3 °C **Wind Direction:** E **Wind Speed (knots):** 18

Precipitation: rain / mist / snow / N/A **Cloud Cover:** 0%, 10%, 25%, 50%, 75%, 100

Snow Cover: 0%, 10%, 25%, 50%, 75%, 100% **Dust in area:** Visible, Not Visible

COLLECTION COMMENTS: (i.e. damage to station, bugs - twigs in sample, hole in vestibule, etc.)

Date Sample Collected was Deployed 2021-07-05 15 37 BP, FG

V. Turbid, fair amount of bugs. Brown-Grey colour

Total Volume of Water After Melting: 680 (mL)

Filter #	Weight of Filter	Filter + Residue	Residue Weight	Comments
1	123.1	135.3	12.2	
2	122.9	135.2	12.3	
3	123.1	138.4	15.3	
4	124.0	145.3	21.3	
5	119.8	142.4	22.6	
6				
7				
8				
9				
10				
11				
Totals	612.9	696.6	83.7	

RioTinto

Dust Gauge Collection Field Sheet

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GENERAL

LOCATION NAME: Dust 11   DATE (dd-mmm-yyyy): 2021-09-16   TIME (24:00): 16:04

SAMPLED BY: GC, BD   TYPE OF SAMPLE: Dust   Other

GPS COORDINATES (UTM): ____ E ____ N (Zone) ____

DESCRIPTION: ____

CLIMATE CONDITIONS (if sampling outside)

Air Temp: 1 °C   Wind Direction: NE   Wind Speed (knots): 10

Precipitation: rain / mist / snow / N/A   Cloud Cover: 0%, 10%, 25%, 50%, 75%, 100

Snow Cover: 0%, 10%, 25%, 50%, 75%, 100%   Dust in area: Visible, Not Visible

COLLECTION COMMENTS: (i.e. damage to station, bugs - twigs in sample, hole in vestibule, etc.)

Date Sample Collected was Deployed 2021-07-02 @ 12:40

Sample picked up 2021-09-16 @ 14:10

- little Smokey
- very few Bugs
- after pour, Filter very green

Total Volume of Water After Melting : 1088 (mL)

Filter #	Weight of Filter	Filter + Residue	Residue Weight	Comments
1	119.0	157.8	38.8	
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
Totals	119.0	157.8	38.8	

RioTinto

Dust Gauge Collection Field Sheet

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GENERAL

LOCATION NAME: Dust 12 **DATE (dd-mmm-yyyy):** 2021-09-16 **TIME (24:00):** 1403

SAMPLED BY: ______ **TYPE OF SAMPLE:** Dust **Other** ______

GPS COORDINATES (UTM): ______ **E** ______ **N (Zone)** ______

DESCRIPTION: ______

CLIMATE CONDITIONS (if sampling outside)

Air Temp: 1 °C **Wind Direction:** NE **Wind Speed (knots):** 10

Precipitation: rain / mist / snow / N/A **Cloud Cover:** 0%, 10%, 25%, 50%, 75%, 100

Snow Cover: 0%, 10%, 25%, 50%, 75%, 100% **Dust in area:** Visible, Not Visible

COLLECTION COMMENTS: (i.e. damage to station, bugs - twigs in sample, hole in vestibule, etc.)

Date Sample Collected was Deployed 2021-07-02

Sample mostly clear but with many bugs, some covered with a white residue

Total Volume of Water After Melting : 650 (mL)

Filter #	Weight of Filter	Filter + Residue	Residue Weight	Comments
1	119.1	120.9	1.8	brown filters
2	124.4	128.2	3.8	
3	123.6	125.1	1.5	V. fine particles, totally filled
4	123.0	127.9	4.9	
5				
6				
7				
8				
9				
10				
11				
Totals	490.1	502.1	12.0	

RioTinto

Dust Gauge Collection Field Sheet

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GENERAL

LOCATION NAME: Dust C1 **DATE (dd-mmm-yyyy):** 2021-09-16 **TIME (24:00):** 1417

SAMPLED BY: GC, BD **TYPE OF SAMPLE:** Dust **Other**________

GPS COORDINATES (UTM): ________ **E** ________ **N (Zone)** ________

DESCRIPTION: ________

CLIMATE CONDITIONS (if sampling outside)

Air Temp: 1 °C **Wind Direction:** NE **Wind Speed (knots):** 10

Precipitation: rain / mist / snow / N/A **Cloud Cover:** 0%, 10%, 25%, 50%, 75%, 100

Snow Cover: 0% 10%, 25%, 50%, 75%, 100% **Dust in area:** Visible, Not Visible

COLLECTION COMMENTS: (i.e. damage to station, bugs - twigs in sample, hole in vestibule, etc.)

Date Sample Collected was Deployed 2021-07-02

Very clear, lots of bugs

Total Volume of Water After Melting: 925 (mL)

Filter #	Weight of Filter	Filter + Residue	Residue Weight	Comments
1	124.5	127.4	2.9	bright forest green colour
2	125.8	139.9	14.1	
3	124.1	142.9	18.8	
4				
5				
6				
7				
8				
9				
10				
11				
Totals	374.4	410.2	35.8	

RioTinto

Dust Gauge Collection Field Sheet

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GENERAL

LOCATION NAME: DustC2 **DATE (dd-mmm-yyyy):** 2021-09-16 **TIME (24:00):** 1352

SAMPLED BY: GC, BD **TYPE OF SAMPLE:** Dust **Other**

GPS COORDINATES (UTM): ______ **E** ______ **N (Zone)** ______

DESCRIPTION:

CLIMATE CONDITIONS (if sampling outside)

Air Temp: 1 °C **Wind Direction:** NE **Wind Speed (knots):** 10

Precipitation: rain / mist / snow / N/A **Cloud Cover:** 0%, 10%, 25%, 50%, 75%, 100

Snow Cover: 0%, 10%, 25%, 50%, 75%, 100% **Dust in area:** Visible, Not Visible

COLLECTION COMMENTS: (i.e. damage to station, bugs - twigs in sample, hole in vestibule, etc.)

Date Sample Collected was Deployed 2021-07-02

Sample cloudy, yellowish with many bugs. Smells terrible.
All filters were very green

Total Volume of Water After Melting : 500 **(mL)**

Filter #	Weight of Filter	Filter + Residue	Residue Weight	Comments
1	124.7	126.3	1.6	
2	125.3	130.3	5.0	
3				
4				
5				
6				
7				
8				
9				
10				
11				
Totals	250	256.6	6.6	

RioTinto

Dust Gauge Collection Field Sheet

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GENERAL

LOCATION NAME: EBW **DATE (dd-mmm-yyyy):** 2021-04-14 **TIME (24:00):** 14:50

SAMPLED BY: GC **TYPE OF SAMPLE:** Dust **Other** —

GPS COORDINATES (UTM): — **E** — **N (Zone)** —

DESCRIPTION: —

CLIMATE CONDITIONS (if sampling outside)

Air Temp: ____ °C **Wind Direction:** ____ **Wind Speed (knots):** ____

Precipitation: rain / mist / snow / N/A **Cloud Cover:** 0%, 10%, 25%, 50%, 75%, 100

Snow Cover: 0%, 10%, 25%, 50%, 75%, 100% **Dust in area:** Visible, Not Visible

COLLECTION COMMENTS: (i.e. damage to station, bugs - twigs in sample, hole in vestibule, etc.)

Date Sample Collected was Deployed —

DI Lot # 210772

Total Volume of Water After Melting : 730 (mL)

	Filter #	Weight of Filter	Filter + Residue	Residue Weight	Comments
EBW #1	1	113.1	115.2	2.1	
	2				
EBW #2	3	113.5	116.6	3.1	435 mL
	4				
	5				
EBW # 3	6	125.4	126.1	<2	450 mL, some dust fell into cove...
	7				
	8				
EBW #4	9	126.0	126.2	<2	673 mL, [illegible] with tube from EBW#3
	10				
	11				
	Totals				

Rio Tinto

Dust Gauge Collection Field Sheet

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GENERAL

LOCATION NAME: Dust 01 **DATE (dd-mmm-yyyy):** 2021-12-09 **TIME (24:00):** 1359

SAMPLED BY: BP BD **TYPE OF SAMPLE:** Dust **Other**

GPS COORDINATES (UTM): 533914 **E** 7154321 **N (Zone)** 12W

DESCRIPTION:

CLIMATE CONDITIONS (if sampling outside)

Air Temp: -32 °C **Wind Direction:** W **Wind Speed (knots):** 16

Precipitation: rain / mist / snow / N/A (blowing snow) **Cloud Cover:** 0%, 10%, 25%, 50%, 75%, 100

Snow Cover: 0%, 10%, 25%, 50%, 75%, 100% **Dust in area:** Visible, Not Visible

COLLECTION COMMENTS: (i.e. damage to station, bugs - twigs in sample, hole in vestibule, etc.)

Date Sample Collected was Deployed 2021-09-15

Sample very clear, minimal visible dust

Total Volume of Water After Melting: 570 (mL)

Filter #	Weight of Filter	Filter + Residue	Residue Weight	Comments
1	117.2	191.9	74.7	
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
Totals			74.7	

Rio Tinto

Dust Gauge Collection Field Sheet			
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GENERAL

LOCATION NAME: Dust 2A **DATE (dd-mmm-yyyy):** 14-01-2022 **TIME (24:00):** 10:50

SAMPLED BY: GC BD **TYPE OF SAMPLE:** Dust **Other**

GPS COORDINATES (UTM): 535678 **E** 7151339 **N (Zone)** 12W

DESCRIPTION:

CLIMATE CONDITIONS (if sampling outside)

Air Temp: -20 °C **Wind Direction:** SE **Wind Speed (knots):** 7

Precipitation: rain / mist / snow / N/A **Cloud Cover:** 0%, 10%, 25%, 50%, 75%, 100

Snow Cover: 0%, 10%, 25%, 50%, 75%, 100% **Dust in area:** Visible, Not Visible

COLLECTION COMMENTS: (i.e. damage to station, bugs - twigs in sample, hole in vestibule, etc.)

Date Sample Collected was Deployed 2021-09-18 @ ?

Bluish - Grey colour of water

Total Volume of Water After Melting: 770 (mL)

Filter #	Weight of Filter	Filter + Residue	Residue Weight	Comments
1	116.7	152.7	36.0 mg	dark Brown
2	112.5	145.3	32.8	
3				
4				
5				
6				
7				
8				
9				
10				
11				
Totals			68.8	

Rio Tinto

Dust Gauge Collection Field Sheet

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GENERAL

LOCATION NAME: Dust 3 **DATE (dd-mmm-yyyy):** 2021-12-04 **TIME (24:00):** 12/14

SAMPLED BY: BP BD **TYPE OF SAMPLE:** Dust **Other**________

GPS COORDINATES (UTM): 535024 **E** 7151872 **N (Zone)** 12W

DESCRIPTION: ________

CLIMATE CONDITIONS (if sampling outside)

Air Temp: -32 °C **Wind Direction:** W **Wind Speed (knots):** 16

Precipitation: rain / mist / snow / N/A blowing snow **Cloud Cover:** 0%, 10%, 25%, 50%, 75%, 100

Snow Cover: 0%, 10%, 25%, 50%, 75%, 100% **Dust in area:** Visible, Not Visible

COLLECTION COMMENTS: (i.e. damage to station, bugs - twigs in sample, hole in vestibule, etc.)

Date Sample Collected was Deployed 2021-09-15

Slightly cloudy, several flies in sample

Total Volume of Water After Melting: 740 (mL)

Filter #	Weight of Filter	Filter + Residue	Residue Weight	Comments
1	119.4	2465	127.1	
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
Totals			127.1	

RioTinto

Dust Gauge Collection Field Sheet

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GENERAL

LOCATION NAME: Dust 4 **DATE (dd-mmm-yyyy):** 2021-12-09 **TIME (24:00):** 1423

SAMPLED BY: BP BD **TYPE OF SAMPLE:** Dust **Other**

GPS COORDINATES (UTM): 531397 **E** 7152127 **N (Zone)** 12W

DESCRIPTION:

CLIMATE CONDITIONS (if sampling outside)

Air Temp: -32 °C **Wind Direction:** W **Wind Speed (knots):** 16

Precipitation: rain / mist snow N/A **Cloud Cover:** 0%, 10%, 25%, 50%, 75%, 100

Snow Cover: 0%, 10%, 25%, 50%, 75%, 100% **Dust in area:** Visible, Not Visible

COLLECTION COMMENTS: (i.e. damage to station, bugs - twigs in sample, hole in vestibule, etc.)

Date Sample Collected was Deployed 2021-09-13

Sample mostly clear, minimal dust visible

Total Volume of Water After Melting : 1050 (mL)

Filter #	Weight of Filter	Filter + Residue	Residue Weight	Comments
1	119.0	147.3	29.0	Several hair-like fibres on filter
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
Totals			29.0	

RioTinto

Dust Gauge Collection Field Sheet

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GENERAL

LOCATION NAME: Dust 5 **DATE (dd-mmm-yyyy):** 2021-12-07 **TIME (24:00):** 1536

SAMPLED BY: RP NG **TYPE OF SAMPLE:** Dust **Other** ______

GPS COORDINATES (UTM): 535696 **E** 7155138 **N (Zone)** 12W

DESCRIPTION: ______

CLIMATE CONDITIONS (if sampling outside)

Air Temp: -32 °C **Wind Direction:** W **Wind Speed (knots):** 16

Precipitation: rain / mist / snow / N/A **Cloud Cover:** 0%, 10%, 25%, 50%, 75%, 100

Snow Cover: 0%, 10%, 25%, 50%, 75%, 100% **Dust in area:** Visible, Not Visible

COLLECTION COMMENTS: (i.e. damage to station, bugs - twigs in sample, hole in vestibule, etc.)

Date Sample Collected was Deployed 2021-09-16

Mostly clear, one fly in sample

Total Volume of Water After Melting : 580 **(mL)**

Filter #	Weight of Filter	Filter + Residue	Residue Weight	Comments
1	119.9	141.6	21.7	
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
Totals			21.7	

Rio Tinto

Dust Gauge Collection Field Sheet

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GENERAL

LOCATION NAME: Dust 6 **DATE (dd-mmm-yyyy):** 2021-12-04 **TIME (24:00):** 1426

SAMPLED BY: RP BD **TYPE OF SAMPLE:** Dust **Other**

GPS COORDINATES (UTM): 537502 **E** 7152934 **N (Zone)** 12W

DESCRIPTION:

CLIMATE CONDITIONS (if sampling outside)

Air Temp: -32 °C **Wind Direction:** W **Wind Speed (knots):** 16

Precipitation: rain / mist / snow / N/A blowing snow **Cloud Cover:** 0%, 10%, 25%, 50%, 75%, 100

Snow Cover: 0%, 10%, 25%, 50%, 75%, 100% **Dust in area:** Visible, Not Visible

COLLECTION COMMENTS: (i.e. damage to station, bugs - twigs in sample, hole in vestibule, etc.)

Date Sample Collected was Deployed 2021-09-15

Slightly cloudy, a few bugs in sample

Total Volume of Water After Melting: 360 (mL)

Filter #	Weight of Filter	Filter + Residue	Residue Weight	Comments
1	117.6	179.5	61.9	
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
Totals			61.9	

Rio Tinto

Dust Gauge Collection Field Sheet			
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GENERAL

LOCATION NAME: Dust 7 DATE (dd-mmm-yyyy): 14-01-2022 TIME (24:00): 10:40

SAMPLED BY: GC, BD TYPE OF SAMPLE: Dust Other

GPS COORDINATES (UTM): 536819 E 7150510 N (Zone) 12W

DESCRIPTION:

CLIMATE CONDITIONS (if sampling outside)

Air Temp: -20 °C Wind Direction: SE Wind Speed (knots): 7

Precipitation: rain / mist / snow / N/A Cloud Cover: 0%, 10%, 25%, 50%, 75%, 100

Snow Cover: 0%, 10%, 25%, 50%, 75%, 100% Dust in area: Visible, Not Visible

COLLECTION COMMENTS: (i.e. damage to station, bugs - twigs in sample, hole in vestibule, etc.)

Date Sample Collected was Deployed 2021-09-16 @ 14:27

filter colour is brown after drying

Total Volume of Water After Melting : 650 (mL)

Filter #	Weight of Filter	Filter + Residue	Residue Weight	Comments
1	111.8	156.1	44.3	
2	111.0	142.5	31.5	filter dropped, no visible loss of dust (on counter)
3				
4				
5				
6				
7				
8				
9				
10				
11				
Totals			75.8	

Rio Tinto

Dust Gauge Collection Field Sheet			
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GENERAL

LOCATION NAME: Dust 8 DATE (dd-mmm-yyyy): 2021-12-10 TIME (24:00): 1030

SAMPLED BY: NG BP TYPE OF SAMPLE: Dust Other

GPS COORDINATES (UTM): 531401 E 7154146 N (Zone) 12W

DESCRIPTION: Q4 Dust

CLIMATE CONDITIONS (if sampling outside)

Air Temp: -26 °C Wind Direction: E Wind Speed (knots): 7

Precipitation: rain / mist / snow / N/A Cloud Cover: 0%, 10%, 25%, 50%, 75%, 100

Snow Cover: 0%, 10%, 25%, 50%, 75%, 100% Dust in area: Visible, Not Visible

COLLECTION COMMENTS: (i.e. damage to station, bugs - twigs in sample, hole in vestibule, etc.)

Date Sample Collected was Deployed 2021-09-16

clear w/ some white fine particulate settled on bottom. 6 insects

residue on filters before drying looks greenish

Total Volume of Water After Melting: 825 mL (mL)

Filter #	Weight of Filter	Filter + Residue	Residue Weight	Comments
1	110.8	118.4	7.6mg	
2	114.2	123.8	9.6mg	
3				
4				
5				
6				
7				
8				
9				
10				
11				
Totals	225	242.2	17.2	

RioTinto

Dust Gauge Collection Field Sheet

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GENERAL

LOCATION NAME: Dust 9 **DATE (dd-mmm-yyyy):** 14-01-2022 **TIME (24:00):** 10:15

SAMPLED BY: GC, BD **TYPE OF SAMPLE:** Dust **Other**

GPS COORDINATES (UTM): 541204 **E** 7152154 **N (Zone)** 12W

DESCRIPTION:

CLIMATE CONDITIONS (if sampling outside)

Air Temp: -20 °C **Wind Direction:** SE **Wind Speed (knots):** 7

Precipitation: rain / mist / snow / N/A **Cloud Cover:** 0%, 10%, 25%, 50%, 75%, 100

Snow Cover: 0%, 10%, 25%, 50%, 75%, 100% **Dust in area:** Visible, Not Visible

COLLECTION COMMENTS: (i.e. damage to station, bugs - twigs in sample, hole in vestibule, etc.)

Date Sample Collected was Deployed 2021-09-16 @ 14:34

mostly clear, grey, one mosquito

dark brown residue on filter

Total Volume of Water After Melting: 468 (mL)

Filter #	Weight of Filter	Filter + Residue	Residue Weight	Comments
1	110.7	135.3	24.6	
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
Totals			24.6	

Rio Tinto

Dust Gauge Collection Field Sheet			
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GENERAL

LOCATION NAME: Dust 10 DATE (dd-mmm-yyyy): 2021-12-09 TIME (24:00): 1452

SAMPLED BY: BP BD TYPE OF SAMPLE: Dust Other

GPS COORDINATES (UTM): 532906 E 7148924 N (Zone) 12W

DESCRIPTION:

CLIMATE CONDITIONS (if sampling outside)

Air Temp: -32 °C Wind Direction: W Wind Speed (knots): 16

Precipitation: rain / mist / snow / N/A Cloud Cover: 0%, 10%, 25%, 50%, 75%, 100

Snow Cover: 0%, 10%, 25%, 50%, 75%, 100% Dust in area: Visible, Not Visible

COLLECTION COMMENTS: (i.e. damage to station, bugs - twigs in sample, hole in vestibule, etc.)

Date Sample Collected was Deployed 2021-09-15

Slightly cloudy, some dust visible

Total Volume of Water After Melting : 840 (mL)

Filter #	Weight of Filter	Filter + Residue	Residue Weight	Comments
1	118.2	171.4	53.2	
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
Totals			53.2	

Rio Tinto

Dust Gauge Collection Field Sheet

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GENERAL

LOCATION NAME: Dust 11 **DATE (dd-mmm-yyyy):** 14-01-2022 **TIME (24:00):** 11:35

SAMPLED BY: GC, BD **TYPE OF SAMPLE:** Dust **Other** ______

GPS COORDINATES (UTM): 531473 **E** 7150156 **N (Zone)** 12W

DESCRIPTION: ______

CLIMATE CONDITIONS (if sampling outside)

Air Temp: -20 °C **Wind Direction:** SE **Wind Speed (knots):** 7

Precipitation: rain / mist / snow / N/A **Cloud Cover:** 0%, 10%, 25%, 50%, 75%, 100

Snow Cover: 0%, 10%, 25%, 50%, 75%, 100% **Dust in area:** Visible, Not Visible

COLLECTION COMMENTS: (i.e. damage to station, bugs - twigs in sample, hole in vestibule, etc.)

Date Sample Collected was Deployed 2021-09-16 @ 14:10

green-grey colour of water and filter, no bugs

Total Volume of Water After Melting: 1170 (mL)

Filter #	Weight of Filter	Filter + Residue	Residue Weight	Comments
1	111.8	142.9	31.1	
2	111.3	142.6	31.3	
3				
4				
5				
6				
7				
8				
9				
10				
11				
Totals			62.4	

Rio Tinto

Dust Gauge Collection Field Sheet			
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GENERAL

LOCATION NAME: Dust 12 **DATE (dd-mmm-yyyy):** 14-01-2022 **TIME (24:00):** 11:50

SAMPLED BY: **TYPE OF SAMPLE:** Dust **Other**

GPS COORDINATES (UTM): 529323 **E** 7151191 **N (Zone)** 12W

DESCRIPTION:

CLIMATE CONDITIONS (if sampling outside)

Air Temp: -20 °C **Wind Direction:** SE **Wind Speed (knots):** 7

Precipitation: rain / mist / snow / N/A **Cloud Cover:** 0%, 10%, 25%, 50%, 75%, 100

Snow Cover: 0%, 10%, 25%, 50%, 75%, 100% **Dust in area:** Visible / Not Visible

COLLECTION COMMENTS: (i.e. damage to station, bugs - twigs in sample, hole in vestibule, etc.)

Date Sample Collected was Deployed 2021-09-16 @ 14:03

Total Volume of Water After Melting : 959 (mL)

Filter #	Weight of Filter	Filter + Residue	Residue Weight	Comments
1	112.6	123.0	10.4	
2	116.1	128.8	12.7	
3				
4				
5				
6				
7				
8				
9				
10				
11				
Totals			23.1	

Rio Tinto

Dust Gauge Collection Field Sheet			
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GENERAL

LOCATION NAME: Dust C1 **DATE (dd-mmm-yyyy):** 14-01-2022 **TIME (24:00):** 11:20

SAMPLED BY: GC, BD **TYPE OF SAMPLE: Dust** **Other**

GPS COORDINATES (UTM): 534979 **E** 7144270 **N (Zone)** 12W

DESCRIPTION:

CLIMATE CONDITIONS (if sampling outside)

Air Temp: -20 °C **Wind Direction:** SE **Wind Speed (knots):** 7

Precipitation: rain / mist / snow / N/A **Cloud Cover:** 0%, 10%, 25%, 50%, 75%, 100

Snow Cover: 0%, 10%, 25%, 50%, 75%, 100% **Dust in area:** Visible, Not Visible

COLLECTION COMMENTS: (i.e. damage to station, bugs - twigs in sample, hole in vestibule, etc.)

Date Sample Collected was Deployed 2021-09-16 @ 14:19

filter residue is light brown colour after drying, white filter showing through

Total Volume of Water After Melting: 640 (mL)

Filter #	Weight of Filter	Filter + Residue	Residue Weight	Comments
1	115.7	130.8	15.1	
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
Totals			15.1	

RioTinto

Dust Gauge Collection Field Sheet			
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GENERAL

LOCATION NAME: Dust CZ **DATE (dd-mmm-yyyy):** 14-01-2022 **TIME (24:00):** 12:10

SAMPLED BY: GC, BD **TYPE OF SAMPLE:** Dust **Other** ______

GPS COORDINATES (UTM): 528714 **E** 7153276 **N (Zone)** 12W

DESCRIPTION: ______

CLIMATE CONDITIONS (if sampling outside)

Air Temp: -20 °C **Wind Direction:** SE **Wind Speed (knots):** 7

Precipitation: rain / mist / snow / N/A **Cloud Cover:** 0%, 10%, 25%, 50%, 75%, 100

Snow Cover: 0%, 10%, 25%, 50%, 75%, 100% **Dust in area:** Visible, Not Visible

COLLECTION COMMENTS: (i.e. damage to station, bugs - twigs in sample, hole in vestibule, etc.)

Date Sample Collected was Deployed 2021-09-16 @ 13:55

Water is clear, no visible bugs/dust
filter residue is dark brown after drying, with white filter showing through the dust

Total Volume of Water After Melting: 900 (mL)

Filter #	Weight of Filter	Filter + Residue	Residue Weight	Comments
1	110.7	122.8	12.1	
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
Totals			12.1	

Rio Tinto

Dust Gauge Collection Field Sheet			
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GENERAL

LOCATION NAME: EBW1 **DATE (dd-mmm-yyyy):** 2021-12-04 **TIME (24:00):** 0856

SAMPLED BY: BP **TYPE OF SAMPLE:** Dust **Other**

GPS COORDINATES (UTM): NA **E** **N (Zone)**

DESCRIPTION:

CLIMATE CONDITIONS (if sampling outside) NA

Air Temp: ___°C **Wind Direction:** ___ **Wind Speed (knots):** ___

Precipitation: rain / mist / snow / N/A **Cloud Cover:** 0%, 10%, 25%, 50%, 75%, 100

Snow Cover: 0%, 10%, 25%, 50%, 75%, 100% **Dust in area:** Visible, Not Visible

COLLECTION COMMENTS: (i.e. damage to station, bugs - twigs in sample, hole in vestibule, etc.)

Date Sample Collected was Deployed NA

Dust and small pieces of plastic visible in sample.
Dust gauge was sealed incorrectly, and seal was broken during storage as a result.

Total Volume of Water After Melting: 1100 (mL)

Filter #	Weight of Filter	Filter + Residue	Residue Weight	Comments
1	119.8	120.9	1.1	
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
Totals			1.1	

Rio Tinto

Dust Gauge Collection Field Sheet

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GENERAL

LOCATION NAME: EBW 2 **DATE (dd-mmm-yyyy):** 2021-12-04 **TIME (24:00):** 0857

SAMPLED BY: RP **TYPE OF SAMPLE:** Dust **Other**____

GPS COORDINATES (UTM): N/A **E** ____ **N (Zone)** ____

DESCRIPTION: ____

CLIMATE CONDITIONS (if sampling outside)

Air Temp: ____°C **Wind Direction:** N/A **Wind Speed (knots):**____

Precipitation: rain / mist / snow / N/A **Cloud Cover:** 0%, 10%, 25%, 50%, 75%, 100

Snow Cover: 0%, 10%, 25%, 50%, 75%, 100% **Dust in area:** Visible, Not Visible

COLLECTION COMMENTS: (i.e. damage to station, bugs - twigs in sample, hole in vestibule, etc.)

Date Sample Collected was Deployed N/A

No visible dust

Total Volume of Water After Melting : 800 (mL)

Filter #	Weight of Filter	Filter + Residue	Residue Weight	Comments
1	1176	1192	0	
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
Totals			0	

Rio Tinto

Dust Gauge Collection Field Sheet			
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GENERAL

LOCATION NAME: LBW DATE (dd-mmm-yyyy): 2022-Jan-15 TIME (24:00): 10:15

SAMPLED BY: GC TYPE OF SAMPLE: Dust Other

GPS COORDINATES (UTM): E N (Zone)

DESCRIPTION:

CLIMATE CONDITIONS (if sampling outside) N/A

Air Temp: °C Wind Direction: Wind Speed (knots):

Precipitation: rain / mist / snow / N/A Cloud Cover: 0%, 10%, 25%, 50%, 75%, 100

Snow Cover: 0%, 10%, 25%, 50%, 75%, 100% Dust in area: Visible, Not Visible

COLLECTION COMMENTS: (i.e. damage to station, bugs - twigs in sample, hole in vestibule, etc.)

Date Sample Collected was Deployed N/A

Total Volume of Water After Melting : (mL)

Filter #	Weight of Filter	Filter + Residue	Residue Weight	Comments
1	112.2	111.7	0	
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
Totals				

RioTinto

Snow Sampling Field Sheet

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GENERAL

LOCATION NAME: SSl-1 DATE (yyyy-mmm-dd): 2021-04-10 TIME (24:00): 1344

SAMPLED BY: BP PL TYPE OF SAMPLE: Dust ☒ Water Quality ☐ QAQC: NA

GPS COORDINATES (UTM): 533415 E 7154291 N (zone) 12W

DESCRIPTION: Distance to Diavik 0 km & Direction ______ On: Land ☒ &/or Lake ☐

CLIMATE CONDITIONS

Air Temp: -23°C Wind Direction: N Wind Speed: 9 kts.

Dust in Area: Visible ☐ Not Visible ☒

Cloud Cover: 0% / 10% / 25% / 50% / 75% / 100%

Precipitation: Rain / Mist / Snow / N/A

Snow Condition: Crystallized ☒ Packed ☒ Wet ☐ Dry ☐

	Core Number	Depth of Snow (cm)	Length of Snow Core (cm)	Weight of Tube & Core-SWE (cm)	Weight of Empty Tube-SWE (cm)	Water Content-SWE (cm)	Dust Present Yes/No	Comments (core weighed, bag #, changes in snow condition)
Dust Cores	1	50	49	56	39	17	Y N	Small pieces of veg in core
	2	~~[illegible]~~ 65	59	59	39	20	Y N	
	3	53	53	57	39	18	Y N	Small pieces of veg in bottom of core
	4						Y N	
Dust (Min. of 3 cores – Total Water Content SWE =/> 25)								
Water Quality Cores	1						Y N	
	2						Y N	
	3						Y N	
	4						Y N	
	5						Y N	
	6						Y N	
	7						Y N	
	8						Y N	
	9						Y N	
	10						Y N	
	11						Y N	
	12						Y N	
Water Quality (Min. of 3 cores – Total Water Content SWE =/> 100)								

**** Water Content$_{SWE}$ = Wt. of Tube & Core$_{SWE}$ – Wt. of Empty Tube$_{SWE}$ ****

RioTinto

Snow Sampling Field Sheet

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Dust Sample Filters

Total Volume of Melted Snow: 1735 (mL)

Filter #	Weight of Filter (mg)	Filter + Residue (mg)	Residue Weight (mg)	Comments
1	124.6	630.4	505.8	Vegetation removed from sample
2				
3				
4				
Totals	124.6	630.4	505.8	

Water Quality Bottles

Total Volume of Melted Snow:__________ (mL)

Filling Order	Analysis	Bottle Type	Triple Rinse	Sample Type *	Sample Type *	Sample Type *	Sample Comments DI Batch # for QAQC, Location preserved if not in field, label changes
1	Metals Total	60 mL Falcon Tube (x2)	Y	☐	☐	☐	
2	Metals Dissolved	60 mL Falcon Tube (x2)	Y	☐	☐	☐	
3	Total Mercury	40 mL clear glass (pre-preserved)	N	☐	☐	☐	
4	Nutrients	120 mL plastic (pre-preserved)	N	☐	☐	☐	
5	Ammonia	40 mL glass vial (pre-preserved)	N	☐	☐	☐	
6	Routine	1000 mL plastic	Y	☐	☐	☐	
7	TSS/Turb/pH	1000 mL plastic	Y	☐	☐	☐	

***Sample Type:** GW, DUPW1/DUPW2, FBW, TBW, EBW, REP1/REP2, Filter Blank

Additional Information

Sample color, odor if applicable: (equipment issues, safety concerns, weather problems, changes during sampling event, follow-up actions etc.)

RioTinto

Snow Sampling Field Sheet

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GENERAL

LOCATION NAME: SS1-2 DATE (yyyy-mmm-dd): 2021-04-10 TIME (24:00): 1405

SAMPLED BY: BP PL TYPE OF SAMPLE: Dust ☒ Water Quality ☐ QAQC: N/A

GPS COORDINATES (UTM): 533923 E 7154367 N (zone) 12W

DESCRIPTION: Distance to Diavik 0 km & Direction ______ On: Land ☒ &/or Lake ☐

CLIMATE CONDITIONS

Air Temp: -23 °C Wind Direction: N Wind Speed: 9 kts.

Dust in Area: Visible ☐ Not Visible ☒ Cloud Cover: 0% / 10% / 25% / 50% / 75% / 100%

Precipitation: Rain / Mist / Snow / N/A Snow Condition: Crystallized ☐ Packed ☒ Wet ☐ Dry ☐

	Core Number	Depth of Snow (cm)	Length of Snow Core (cm)	Weight of Tube & Core-SWE (cm)	Weight of Empty Tube-SWE (cm)	Water Content-SWE (cm)	Dust Present Yes/No	Comments (core weighed, bag #, changes in snow condition)
Dust Cores	1	~~46~~ 69	46	50	39	11	Y N	
	2	70	53	52	39	13	Y N	
	3	70	54	53	39	14	Y N	small piece of veg in core
	4						Y N	
Dust (Min. of 3 cores – Total Water Content SWE =/> 25)								
Water Quality Cores	1						Y N	
	2						Y N	
	3						Y N	
	4						Y N	
	5						Y N	
	6						Y N	
	7						Y N	
	8						Y N	
	9						Y N	
	10						Y N	
	11						Y N	
	12						Y N	
Water Quality (Min. of 3 cores – Total Water Content SWE =/> 100)								

** Water Content$_{SWE}$ = Wt. of Tube & Core$_{SWE}$ – Wt. of Empty Tube$_{SWE}$ **

RioTinto

Snow Sampling Field Sheet

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Dust Sample Filters

Total Volume of Melted Snow: 1265 **(mL)**

Filter #	Weight of Filter (mg)	Filter + Residue (mg)	Residue Weight (mg)	Comments
1	124.5	394.5	270.0	
2				
3				
4				
Totals	124.5	394.5	270.0	

Water Quality Bottles

Total Volume of Melted Snow:______________ **(mL)**

Filling Order	Analysis	Bottle Type	Triple Rinse	Sample Type *	Sample Type *	Sample Type *	Sample Comments DI Batch # for QAQC, Location preserved if not in field, label changes
1	Metals Total	60 mL Falcon Tube (x2)	Y	☐	☐	☐	
2	Metals Dissolved	60 mL Falcon Tube (x2)	Y	☐	☐	☐	
3	Total Mercury	40 mL clear glass (pre-preserved)	N	☐	☐	☐	
4	Nutrients	120 mL plastic (pre-preserved)	N	☐	☐	☐	
5	Ammonia	40 mL glass vial (pre-preserved)	N	☐	☐	☐	
6	Routine	1000 mL plastic	Y	☐	☐	☐	
7	TSS/Turb/pH	1000 mL plastic	Y	☐	☐	☐	

***Sample Type:** GW, DUPW1/DUPW2, FBW, TBW, EBW, REP1/REP2, Filter Blank

Additional Information

Sample color, odor if applicable: (equipment issues, safety concerns, weather problems, changes during sampling event, follow-up actions etc.)

RioTinto

Snow Sampling Field Sheet

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GENERAL

LOCATION NAME: SSL-3 DATE (yyyy-mmm-dd): 2021-04-10 TIME (24:00): 1423

SAMPLED BY: BPPL TYPE OF SAMPLE: Dust ☒ Water Quality ☐ QAQC: N/A

GPS COORDINATES (UTM): 533966 E 7154517 N (zone) ____

DESCRIPTION: Distance to Diavik 1 km & Direction S On: Land ☒ &/or Lake ☐

CLIMATE CONDITIONS

Air Temp: -21 °C Wind Direction: W Wind Speed: 8 kts.

Dust in Area: Visible ☐ Not Visible ☒

Precipitation: Rain / Mist / Snow / N/A

Cloud Cover: 0% / 10% / 25% / 50% / 75% / 100%

Snow Condition: Crystallized ☐ Packed ☒ Wet ☐ Dry ☐

	Core Number	Depth of Snow (cm)	Length of Snow Core (cm)	Weight of Tube & Core-SWE (cm)	Weight of Empty Tube-SWE (cm)	Water Content-SWE (cm)	Dust Present Yes/No	Comments (core weighed, bag #, changes in snow condition)
Dust Cores	1	39	24	47	38	9	Y N	
	2	37	31	50	38	12	Y N	grass in core
	3	39	34	51	39	12	Y N	
	4						Y N	
Dust (Min. of 3 cores – Total Water Content SWE =/> 25)								
Water Quality Cores	1						Y N	
	2						Y N	
	3						Y N	
	4						Y N	
	5						Y N	
	6						Y N	
	7						Y N	
	8						Y N	
	9						Y N	
	10						Y N	
	11						Y N	
	12						Y N	
Water Quality (Min. of 3 cores – Total Water Content SWE =/> 100)								

** Water Content$_{SWE}$ = Wt. of Tube & Core$_{SWE}$ – Wt. of Empty Tube$_{SWE}$ **

RioTinto

Snow Sampling Field Sheet

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Dust Sample Filters

Total Volume of Melted Snow: 1055 (mL)

Filter #	Weight of Filter (mg)	Filter + Residue (mg)	Residue Weight (mg)	Comments
1	122.9	152.2	29.3	Several pieces of grass removed from sample
2				
3				
4				
Totals	122.9	152.2	29.3	

Water Quality Bottles

Total Volume of Melted Snow:______________ (mL)

Filling Order	Analysis	Bottle Type	Triple Rinse	Sample Type *	Sample Type *	Sample Type *	Sample Comments DI Batch # for QAQC, Location preserved if not in field, label changes
1	Metals Total	60 mL Falcon Tube (x2)	Y	☐	☐	☐	
2	Metals Dissolved	60 mL Falcon Tube (x2)	Y	☐	☐	☐	
3	Total Mercury	40 mL clear glass (pre-preserved)	N	☐	☐	☐	
4	Nutrients	120 mL plastic (pre-preserved)	N	☐	☐	☐	
5	Ammonia	40 mL glass vial (pre-preserved)	N	☐	☐	☐	
6	Routine	1000 mL plastic	Y	☐	☐	☐	
7	TSS/Turb/pH	1000 mL plastic	Y	☐	☐	☐	

*Sample Type: GW, DUPW1/DUPW2, FBW, TBW, EBW, REP1/REP2, Filter Blank

Additional Information

Sample color, odor if applicable: (equipment issues, safety concerns, weather problems, changes during sampling event, follow-up actions etc.)

RioTinto

Snow Sampling Field Sheet			
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GENERAL

LOCATION NAME: SS1-4-4 DATE (yyyy-mmm-dd): 2021-04-10 TIME (24:00): 1445

SAMPLED BY: RPPL TYPE OF SAMPLE: Dust ☒ Water Quality ☒ QAQC: DUPL

GPS COORDINATES (UTM): 534415 E 7155094 N (zone) 12W

DESCRIPTION: Distance to Diavik 2 km & Direction S On: Land ☐ &/or Lake ☒

CLIMATE CONDITIONS

Air Temp: -21 °C Wind Direction: N Wind Speed: 8 kts.

Dust in Area: Visible ☐ Not Visible ☒

Cloud Cover: 0% / 10% / 25% / 50% / 75% / 100%

Precipitation: Rain / Mist / Snow / N/A

Snow Condition: Crystallized ☐ Packed ☒ Wet ☐ Dry ☐

	Core Number	Depth of Snow (cm)	Length of Snow Core (cm)	Weight of Tube & Core-SWE (cm)	Weight of Empty Tube-SWE (cm)	Water Content-SWE (cm)	Dust Present Yes/No	Comments (core weighed, bag #, changes in snow condition)
Dust Cores	1	40	28	49	39	10	Y N	
	2	39	28	48	39	9	Y N	
	3	48	48	53	39	14	Y N	
	4						Y N	
Dust (Min. of 3 cores – Total Water Content SWE =/> 25)								
Water Quality Cores	1	50	49	55	38	17	Y N	
	2	50	49	55	39	16	Y N	
	3	50	49	55	39	16	Y N	
	4 DUPL	50	48	55	39	16	Y N	
	5	50	49	55	38	17	Y N	
	6	50	49	55	38	17	Y N	
	7	50	50	55	38	17	Y N	
	8	50	49	55	38	17	Y N	
	9	49	48	54	39	15	Y N	
	10	48	47	54	38	16	Y N	
	11	50	49	55	38	17	Y N	
	12 RPPL	49	48	54	38	16	Y N	
Water Quality (Min. of 3 cores – Total Water Content SWE =/> 100)								
		48	47	53	38	15		
		49	48	54	38	16		

**** Water Content$_{SWE}$ = Wt. of Tube & Core$_{SWE}$ – Wt. of Empty Tube$_{SWE}$ ****

RioTinto

Snow Sampling Field Sheet

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Dust Sample Filters

Total Volume of Melted Snow: 1130 (mL)

Filter #	Weight of Filter (mg)	Filter + Residue (mg)	Residue Weight (mg)	Comments
1	123.5	132.2	8.7	
2				
3				
4				
Totals	123.5	132.2	8.7	

Water Quality Bottles

Total Volume of Melted Snow: 3540 (mL)
2020 + 1520

Filling Order	Analysis	Bottle Type	Triple Rinse	Sample Type * DUPW	Sample Type *	Sample Type *	Sample Comments DI Batch # for QAQC, Location preserved if not in field, label changes
1	Metals Total	60 mL Falcon Tube (x2)	Y	☑	☐	☐	
2	Metals Dissolved	60 mL Falcon Tube (x2)	Y	☑	☐	☐	
3	Total Mercury	40 mL clear glass (pre-preserved)	N	☑	☐	☐	
4	Nutrients	120 mL plastic (pre-preserved)	N	☑	☐	☐	
5	Ammonia	40 mL glass vial (pre-preserved)	N	☑	☐	☐	
6	Routine	1000 mL plastic	Y	☑	☐	☐	
7	TSS/Turb/pH	1000 mL plastic	Y	☑	☐	☐	
	Perchlorate	60mL plastic		✓			

*Sample Type: GW, DUPW1/DUPW2, FBW, TBW, EBW, REP1/REP2, Filter Blank

Additional Information

Sample color, odor if applicable: (equipment issues, safety concerns, weather problems, changes during sampling event, follow-up actions etc.)

1 bag leaking
Combined both bags into 1 before pouring into bottles

RioTinto

Snow Sampling Field Sheet

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GENERAL

LOCATION NAME: SS1-4-5 DATE (yyyy-mmm-dd): 2021-04-10 TIME (24:00): 1445

SAMPLED BY: BP DL TYPE OF SAMPLE: Dust ☐ Water Quality ☒ QAQC: DUP

GPS COORDINATES (UTM): 534485 E 7155094 N (zone) 12

DESCRIPTION: Distance to Diavik 2 km & Direction S On: Land ☐ &/or Lake ☒

CLIMATE CONDITIONS

Air Temp: -21 °C Wind Direction: N Wind Speed: 8 kts.

Dust in Area: Visible ☐ Not Visible ☒

Cloud Cover: 0% / 10% / 25% / 50% / 75% / 100%

Precipitation: Rain / Mist / Snow / N/A

Snow Condition: Crystallized ☐ Packed ☒ Wet ☐ Dry ☐

	Core Number	Depth of Snow (cm)	Length of Snow Core (cm)	Weight of Tube & Core-SWE (cm)	Weight of Empty Tube-SWE (cm)	Water Content-SWE (cm)	Dust Present Yes/No	Comments (core weighed, bag #, changes in snow condition)
Dust Cores	1						Y N	
	2						Y N	
	3						Y N	
	4						Y N	
Dust (Min. of 3 cores – Total Water Content SWE =/> 25)								
Water Quality Cores	1	50	49	55	38	17	Y N	
	2	49	48	54	39	15	Y N	
	3	48	47	54	38	16	Y N	
	4	50	49	55	38	17	Y N	
	5	49	48	54	38	16	Y N	
	6	48	47	53	38	15	Y N	
	7	49	48	54	38	16	Y N	
	8						Y N	
	9						Y N	
	10						Y N	
	11						Y N	
	12						Y N	
Water Quality (Min. of 3 cores – Total Water Content SWE =/> 100)								

**** Water Content$_{SWE}$ = Wt. of Tube & Core$_{SWE}$ – Wt. of Empty Tube$_{SWE}$ ****

RioTinto

Snow Sampling Field Sheet

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Dust Sample Filters

Total Volume of Melted Snow:________ (mL)

Filter #	Weight of Filter (mg)	Filter + Residue (mg)	Residue Weight (mg)	Comments
1				
2				
3				
4				
Totals				

Water Quality Bottles

Total Volume of Melted Snow: 1950 + 1425 (mL)
3375

Filling Order	Analysis	Bottle Type	Triple Rinse	Sample Type * DUP2	Sample Type *	Sample Type *	Sample Comments DI Batch # for QAQC, Location preserved if not in field, label changes
1	Metals Total	60 mL Falcon Tube (x2)	Y	☑	☐	☐	
2	Metals Dissolved	60 mL Falcon Tube (x2)	Y	☑	☐	☐	
3	Total Mercury	40 mL clear glass (pre-preserved)	N	☑	☐	☐	
4	Nutrients	120 mL plastic (pre-preserved)	N	☑	☐	☐	
5	Ammonia	40 mL glass vial (pre-preserved)	N	☑	☐	☐	
6	Routine	1000 mL plastic	Y	☑	☐	☐	
7	TSS/Turb/pH	1000 mL plastic	Y	☑	☐	☐	
	Perchlorate	60 mL plastic		✓			

*Sample Type: GW, DUPW1/DUPW2, FBW, TBW, EBW, REP1/REP2, Filter Blank

Additional Information

Sample color, odor if applicable: (equipment issues, safety concerns, weather problems, changes during sampling event, follow-up actions etc.)

2 bags combined into 1 for WQ bottling
No Leaks

RioTinto

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GENERAL

LOCATION NAME: SS1-5 DATE (yyyy-mmm-dd): 2021-04-10 TIME (24:00): 1042

SAMPLED BY: RP PL TYPE OF SAMPLE: Dust ☒ Water Quality ☒ QAQC: NA

GPS COORDINATES (UTM): 535100 E 7156280 N (zone) 12W

DESCRIPTION: Distance to Diavik 4 km & Direction S On: Land ☒ &/or Lake ☒

CLIMATE CONDITIONS

Air Temp: -21 °C Wind Direction: N Wind Speed: 8 kts.

Dust in Area: Visible ☐ Not Visible ☒ Cloud Cover: 0% / 10% / 25% / 50% / 75% / 100%

Precipitation: Rain / Mist / Snow / N/A Snow Condition: Crystallized ☐ Packed ☒ Wet ☐ Dry ☐

	Core Number	Depth of Snow (cm)	Length of Snow Core (cm)	Weight of Tube & Core-SWE (cm)	Weight of Empty Tube-SWE (cm)	Water Content-SWE (cm)	Dust Present Yes/No	Comments (core weighed, bag #, changes in snow condition)
Dust Cores	1	44	50	55	39	16	Y N	
	2	49	44	57	38	19	Y N	
	3	49	49	57	39	14	Y N	
	4						Y N	
Dust (Min. of 3 cores – Total Water Content SWE =/> 25)								
Water Quality Cores	1	49	49	57	39	18	Y N	
	2	48	40	53	39	14	Y N	
	3	50	44	55	39	16	Y N	
	4	48	40	54	39	15	Y N	
	5	49	49	57	39	18	Y N	
	6	49	42	55	39	16	Y N	
	7	50	43	55	38	17	Y N	
	8						Y N	
	9						Y N	
	10						Y N	
	11						Y N	
	12						Y N	
Water Quality (Min. of 3 cores – Total Water Content SWE =/> 100)								

** Water Content$_{SWE}$ = Wt. of Tube & Core$_{SWE}$ – Wt. of Empty Tube$_{SWE}$ **

RioTinto

Snow Sampling Field Sheet

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Dust Sample Filters

Total Volume of Melted Snow: 1645 (mL)

Filter #	Weight of Filter (mg)	Filter + Residue (mg)	Residue Weight (mg)	Comments
1	118.0	121.3	3.3	
2				
3				
4				
Totals	118.0	121.3	3.3	

Water Quality Bottles

Total Volume of Melted Snow:______________ (mL)

Filling Order	Analysis	Bottle Type	Triple Rinse	Sample Type *	Sample Type *	Sample Type *	Sample Comments DI Batch # for QAQC, Location preserved if not in field, label changes
1	Metals Total	60 mL Falcon Tube (x2)	Y	☐	☐	☐	
2	Metals Dissolved	60 mL Falcon Tube (x2)	Y	☐	☐	☐	
3	Total Mercury	40 mL clear glass (pre-preserved)	N	☐	☐	☐	
4	Nutrients	120 mL plastic (pre-preserved)	N	☐	☐	☐	
5	Ammonia	40 mL glass vial (pre-preserved)	N	☐	☐	☐	
6	Routine	1000 mL plastic	Y	☐	☐	☐	
7	TSS/Turb/pH	1000 mL plastic	Y	☐	☐	☐	

***Sample Type:** GW, DUPW1/DUPW2, FBW, TBW, EBW, REP1/REP2, Filter Blank

Additional Information

Sample color, odor if applicable: (equipment issues, safety concerns, weather problems, changes during sampling event, follow-up actions etc.)

RioTinto

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GENERAL

LOCATION NAME: SS2-1 DATE (yyyy-mmm-dd): 2021-04-09 TIME (24:00): 12 10

SAMPLED BY: NG BP PL TYPE OF SAMPLE: Dust [X] Water Quality [X] QAQC:

GPS COORDINATES (UTM): 537551 E 7153471 N (zone) 12W

DESCRIPTION: Distance to Diavik 0 km & Direction ______ On: Land [ ] &/or Lake [X]

CLIMATE CONDITIONS

Air Temp: -23 °C Wind Direction: NA Wind Speed: 0 kts.

Dust in Area: Visible [ ] Not Visible [X] Cloud Cover: 0% / 10% / 25% / 50% / 75% / 100%

Precipitation: Rain / Mist / Snow / N/A Snow Condition: Crystallized [X] Packed [ ] Wet [ ] Dry [ ]

	Core Number	Depth of Snow (cm)	Length of Snow Core (cm)	Weight of Tube & Core-SWE (cm)	Weight of Empty Tube-SWE (cm)	Water Content-SWE (cm)	Dust Present Yes/No	Comments (core weighed, bag #, changes in snow condition)
Dust Cores	1	~~53~~ 53	29	49	38	11	Y N	
	2	53	51	56	38	18	Y N	
	3	50	44	52	39	13	Y N	
	4						Y N	
Dust (Min. of 3 cores – Total Water Content SWE =/> 25)								
Water Quality Cores	1	49	43	52	39	13	Y N	
	2	48	42	~~48~~ 50	39	11	Y N	
	3	49	44	51	39	12	Y N	
	4	49	48	54	38	16	Y N	
	5	50	45	52	39	13	Y N	
	6	49	44	51	39	12	Y N	
	7	48	43	52	39	13	Y N	
	8	47	43	51	39	12	Y N	
	9						Y N	
	10						Y N	
	11						Y N	
	12						Y N	
Water Quality (Min. of 3 cores – Total Water Content SWE =/> 100)								

**** Water Content$_{SWE}$ = Wt. of Tube & Core$_{SWE}$ – Wt. of Empty Tube$_{SWE}$ ****

Snow Sampling Field Sheet

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Dust Sample Filters

Total Volume of Melted Snow: 1185 (mL)

Filter #	Weight of Filter (mg)	Filter + Residue (mg)	Residue Weight (mg)	Comments
1	114.4	122.1	7.7	
2				
3				
4				
Totals	114.4	122.1	7.7	

Water Quality Bottles

Total Volume of Melted Snow: ~~3245~~ 2045 1200 (mL)

Filling Order	Analysis	Bottle Type	Triple Rinse	Sample Type * GW	Sample Type *	Sample Type *	Sample Comments DI Batch # for QAQC, Location preserved if not in field, label changes
1	Metals Total	60 mL Falcon Tube (x2)	Y	☑	☐	☐	
2	Metals Dissolved	60 mL Falcon Tube (x2)	Y	☑	☐	☐	
3	Total Mercury	40 mL clear glass (pre-preserved)	N	☑	☐	☐	
4	Nutrients	120 mL plastic (pre-preserved)	N	☑	☐	☐	
5	Ammonia	40 mL glass vial (pre-preserved)	N	☑	☐	☐	
6	Routine	1000 mL plastic	Y	☑	☐	☐	
7	TSS/Turb/pH	1000 mL plastic	Y	☑	☐	☐	
	Perchlorate	60mL plastic		✓			

*Sample Type: GW, DUPW1/DUPW2, FBW, TBW, EBW, REP1/REP2, Filter Blank

Additional Information

Sample color, odor if applicable: (equipment issues, safety concerns, weather problems, changes during sampling event, follow-up actions etc.)

Perchl. collected.
Bags combined into One prior to decanting to bottles

RioTinto

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GENERAL

LOCATION NAME: SS2-2 DATE (yyyy-mmm-dd): 2021-04-09 TIME (24:00): 1251

SAMPLED BY: NL RP PL TYPE OF SAMPLE: Dust ☒ Water Quality ☒ QAQC: ____

GPS COORDINATES (UTM): 537826 E 7153477 N (zone) 12W

DESCRIPTION: Distance to Diavik 1 km & Direction W On: Land ☐ &/or Lake ☒

CLIMATE CONDITIONS

Air Temp: -23 °C Wind Direction: NW Wind Speed: 5 kts.

Dust in Area: Visible ☐ Not Visible ☒ Cloud Cover: 0% / 10% / 25% / 50% / 75% / 100%

Precipitation: Rain / Mist / Snow / N/A Snow Condition: Crystallized ☒ Packed ☐ Wet ☐ Dry ☐

	Core Number	Depth of Snow (cm)	Length of Snow Core (cm)	Weight of Tube & Core-SWE (cm)	Weight of Empty Tube-SWE (cm)	Water Content-SWE (cm)	Dust Present Yes/No	Comments (core weighed, bag #, changes in snow condition)
Dust Cores	1	3~~5~~	34	49	39	10	Y N	
	2	38	26	46	39	7	Y N	
	3	39	37	50	39	11	Y N	
	4						Y N	
Dust (Min. of 3 cores – Total Water Content SWE =/> 25)								
Water Quality Cores	1	44	44	58	39	19	Y N	
	2	35	34	48	39	9	Y N	
	3	36	34	48	39	9	Y N	
	4	37	35	48	39	9	Y N	
	5	37	36	50	39	11	Y N	
	6	39	37	49	39	10	Y N	
	7	39	38	51	39	12	Y N	
	8	39	37	51	39	12	Y N	
	9	38	35	51	39	12	Y N	
	10						Y N	
	11						Y N	
	12						Y N	
Water Quality (Min. of 3 cores – Total Water Content SWE =/> 100)								

** Water Content$_{SWE}$ = Wt. of Tube & Core$_{SWE}$ – Wt. of Empty Tube$_{SWE}$ **

RioTinto

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Dust Sample Filters

Total Volume of Melted Snow: 895 (mL)

Filter #	Weight of Filter (mg)	Filter + Residue (mg)	Residue Weight (mg)	Comments
1	119.8	122.2	2.4	
2				
3				
4				
Totals	119.8	122.2	2.4	

Water Quality Bottles

Total Volume of Melted Snow: 3140 (mL)
1980
1160

Filling Order	Analysis	Bottle Type	Triple Rinse	Sample Type *	Sample Type *	Sample Type *	Sample Comments DI Batch # for QAQC, Location preserved if not in field, label changes
				GW			
1	Metals Total	60 mL Falcon Tube (x2)	Y	☑	☐	☐	
2	Metals Dissolved	60 mL Falcon Tube (x2)	Y	☑	☐	☐	
3	Total Mercury	40 mL clear glass (pre-preserved)	N	☑	☐	☐	
4	Nutrients	120 mL plastic (pre-preserved)	N	☑	☐	☐	
5	Ammonia	40 mL glass vial (pre-preserved)	N	☑	☐	☐	
6	Routine	1000 mL plastic	Y	☑	☐	☐	
7	TSS/Turb/pH	1000 mL plastic	Y	☑	☐	☐	

***Sample Type:** GW, DUPW1/DUPW2, FBW, TBW, EBW, REP1/REP2, Filter Blank

Additional Information

Sample color, odor if applicable: (equipment issues, safety concerns, weather problems, changes during sampling event, follow-up actions etc.)

Perchl. collected.
bags combined into one prior to decant to bottles

RioTinto

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GENERAL

LOCATION NAME: SS2-3 DATE (yyyy-mmm-dd): 2021-04-09 TIME (24:00): 1334

SAMPLED BY: NG BP PL TYPE OF SAMPLE: Dust ☒ Water Quality ☒ QAQC: ______

GPS COORDINATES (UTM): 538482 E 7153937 N (zone) 12W

DESCRIPTION: Distance to Diavik 2 km & Direction W On: Land ☒ &/or Lake ☒

CLIMATE CONDITIONS

Air Temp: -23 °C Wind Direction: NW Wind Speed: 5 kts.

Dust in Area: Visible ☐ Not Visible ☒

Cloud Cover: 0% / 10% / 25% / 50% / 75% / 100%

Precipitation: Rain / Mist / Snow / N/A

Snow Condition: Crystallized ☒ Packed ☐ Wet ☐ Dry ☐

	Core Number	Depth of Snow (cm)	Length of Snow Core (cm)	Weight of Tube & Core-SWE (cm)	Weight of Empty Tube-SWE (cm)	Water Content-SWE (cm)	Dust Present Yes/No	Comments (core weighed, bag #, changes in snow condition)
Dust Cores	1	~~44~~ 45	38	52	38	14	Y N	
	2	45	39	52	38	14	Y N	
	3	45	40	51	38	13	Y N	
	4						Y N	
Dust (Min. of 3 cores – Total Water Content SWE =/> 25)								
Water Quality Cores	1	45	~~40~~	52	38	14	Y N	Disaster
	2	45	45	55	38	17	Y N	
	3	46	33	50	39	11	Y N	
	4	50	49	~~5~~ 57	39	18	Y N	
	5	50	48	56	39	17	Y N	
	6	~~50~~ 47	44	53	39	~~14~~ 14	Y N	
	7	53	51	55	39	16	Y N	
	8	52	50	56	39	17	Y N	
	9	~~50~~ 48	46	55	39	16	Y N	
	10	49	49	54	39	15	Y N	
	11	52	49	55	39	16	Y N	
	12	48	45	53	39	14	Y N	
Water Quality (Min. of 3 cores – Total Water Content SWE =/> 100)								
	13	50	47	54			N	

Water Content$_{SWE}$ = Wt. of Tube & Core$_{SWE}$ – Wt. of Empty Tube$_{SWE}$

RioTinto

Snow Sampling Field Sheet			
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Dust Sample Filters

Total Volume of Melted Snow: 1210 (mL)

Filter #	Weight of Filter (mg)	Filter + Residue (mg)	Residue Weight (mg)	Comments
1	122.7	125.1	2.4	
2				
3				
4				
Totals	122.7	125.1	2.4	

Water Quality Bottles

Total Volume of Melted Snow: 3870 (mL)
1268
1900

Filling Order	Analysis	Bottle Type	Triple Rinse	Sample Type * GW	Sample Type *	Sample Type *	Sample Comments DI Batch # for QAQC, Location preserved if not in field, label changes
1	Metals Total	60 mL Falcon Tube (x2)	Y	☑	☐	☐	
2	Metals Dissolved	60 mL Falcon Tube (x2)	Y	☑	☐	☐	
3	Total Mercury	40 mL clear glass (pre-preserved)	N	☑	☐	☐	
4	Nutrients	120 mL plastic (pre-preserved)	N	☑	☐	☐	
5	Ammonia	40 mL glass vial (pre-preserved)	N	☑	☐	☐	
6	Routine	1000 mL plastic	Y	☑	☐	☐	
7	TSS/Turb/pH	1000 mL plastic	Y	☑	☐	☐	

***Sample Type:** GW, DUPW1/DUPW2, FBW, TBW, EBW, REP1/REP2, Filter Blank

Additional Information

Sample color, odor if applicable: (equipment issues, safety concerns, weather problems, changes during sampling event, follow-up actions etc.)

Perchl. collected.
Bags combined into one prior to decanting to bottles.

RioTinto

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GENERAL

LOCATION NAME: SS2-4-4 DATE (yyyy-mmm-dd): 2021-04-09 TIME (24:00): 1427

SAMPLED BY: NG BP PL TYPE OF SAMPLE: Dust ☒ Water Quality ☒ QAQC: DUPW-Dust

GPS COORDINATES (UTM): 539150 E 7154674 N (zone) 12W

DESCRIPTION: Distance to Diavik 3 km & Direction SW On: Land ☒ &/or Lake ☒

CLIMATE CONDITIONS

Air Temp: -23 °C Wind Direction: NW Wind Speed: 5 kts.

Dust in Area: Visible ☐ Not Visible ☒ Cloud Cover: 0% / 10% / 25% / 50% / 75% / 100%

Precipitation: Rain / Mist / Snow / N/A Snow Condition: Crystallized ☒ Packed ☐ Wet ☐ Dry ☐

	Core Number	Depth of Snow (cm)	Length of Snow Core (cm)	Weight of Tube & Core-SWE (cm)	Weight of Empty Tube-SWE (cm)	Water Content-SWE (cm)	Dust Present Yes/No	Comments (core weighed, bag #, changes in snow condition)
Dust Cores	1	57	57	53	38	15	Y N	
	2	57	57	54	37		Y N	
	3	54	57	58	39		Y N	
	4						Y N	
Dust (Min. of 3 cores – Total Water Content SWE =/> 25)								
Water Quality Cores	~~1~~	~~58~~	~~58~~	~~59~~	~~39~~	~~20~~	~~Y N~~	
	~~2~~	~~57~~	~~57~~	~~59~~	~~39~~	~~20~~	~~Y N~~	
	~~3~~	~~57~~	~~56~~	~~58~~	~~39~~	~~19~~	Y N	
	4 1	57	57	58	39	19	Y N	
	5 2	57	56	58	37	21	Y N	
	6 3	56	56	52	39	13	Y N	
	7 4	57	57	60	39	21	Y N	
	8 5	57	55	56	38	18	Y N	
	9 6	58	57	58	38	20	Y N	
	10						Y N	
	11						Y N	
	12						Y N	
Water Quality (Min. of 3 cores – Total Water Content SWE =/> 100)								

Dust X Dup

**** Water Content$_{SWE}$ = Wt. of Tube & Core$_{SWE}$ – Wt. of Empty Tube$_{SWE}$ ****

RioTinto

Snow Sampling Field Sheet

Area:	8000	No:	ENVI-177-0312
Effective Date:	26-Mar-2012	Revision:	R9
Task:	Snow Sampling Field Sheet	By:	D. Dul

Dust Sample Filters

Total Volume of Melted Snow: 1830 (mL)

Filter #	Weight of Filter (mg)	Filter + Residue (mg)	Residue Weight (mg)	Comments
1	124.3	133.5	9.1	
2				
3				
4				
Totals	124.3	133.5	9.1	

Water Quality Bottles

Total Volume of Melted Snow: ~~1830~~ 3605 (mL)
2405
1200

Filling Order	Analysis	Bottle Type	Triple Rinse	Sample Type * GW	Sample Type *	Sample Type *	Sample Comments DI Batch # for QAQC, Location preserved if not in field, label changes
1	Metals Total	60 mL Falcon Tube (x2)	Y	☑	☐	☐	
2	Metals Dissolved	60 mL Falcon Tube (x2)	Y	☑	☐	☐	
3	Total Mercury	40 mL clear glass (pre-preserved)	N	☑	☐	☐	
4	Nutrients	120 mL plastic (pre-preserved)	N	☑	☐	☐	
5	Ammonia	40 mL glass vial (pre-preserved)	N	☑	☐	☐	
6	Routine	1000 mL plastic	Y	☑	☐	☐	
7	TSS/Turb/pH	1000 mL plastic	Y	☑	☐	☐	

*Sample Type: GW, DUPW1/DUPW2, FBW, TBW, EBW, REP1/REP2, Filter Blank

Additional Information

Sample color, odor if applicable: (equipment issues, safety concerns, weather problems, changes during sampling event, follow-up actions etc.)

Perchl collected
Bags combined into one prior to decanting to bottles
Bags leaking

RioTinto

Snow Sampling Field Sheet

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GENERAL

LOCATION NAME: SS2-4-5 **DATE (yyyy-mmm-dd):** 2021-04-09 **TIME (24:00):** 1440

SAMPLED BY: NGBPPL **TYPE OF SAMPLE:** Dust ☒ Water Quality ☐ **QAQC:** Dust Dup

GPS COORDINATES (UTM): 539150 **E** 7154684 **N (zone)** 12W

DESCRIPTION: Distance to Diavik 3 km & Direction SW On: Land ☐ &/or Lake ☒

CLIMATE CONDITIONS

Air Temp: -23 °C **Wind Direction:** NW **Wind Speed:** 5 **kts.**

Dust in Area: Visible ☐ Not Visible ☒ **Cloud Cover:** 0% / 10% / 25% / 50% / 75% / 100%

Precipitation: Rain / Mist / Snow / N/A **Snow Condition:** Crystallized ☒ Packed ☐ Wet ☐ Dry ☐

	Core Number	Depth of Snow (cm)	Length of Snow Core (cm)	Weight of Tube & Core-SWE (cm)	Weight of Empty Tube-SWE (cm)	Water Content-SWE (cm)	Dust Present Yes/No	Comments (core weighed, bag #, changes in snow condition)
Dust Cores	1	58	58	59	39	20	Y N	
	2	57	57	59	39	20	Y N	
	3	57	56	58	39	19	Y N	
	4						Y N	
Dust (Min. of 3 cores – Total Water Content SWE =/> 25)								
Water Quality Cores	1						Y N	
	2						Y N	
	3						Y N	
	4						Y N	
	5						Y N	
	6						Y N	
	7						Y N	
	8						Y N	
	9						Y N	
	10						Y N	
	11						Y N	
	12						Y N	
Water Quality (Min. of 3 cores – Total Water Content SWE =/> 100)								

**** Water Content$_{SWE}$ = Wt. of Tube & Core$_{SWE}$ – Wt. of Empty Tube$_{SWE}$ ****

RioTinto

Snow Sampling Field Sheet

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Dust Sample Filters

Total Volume of Melted Snow: 1785 (mL)

Filter #	Weight of Filter (mg)	Filter + Residue (mg)	Residue Weight (mg)	Comments
1	116.7	125.9	9.3	
2				
3				
4				
Totals	116.7	125.9	9.3	

Water Quality Bottles

Total Volume of Melted Snow: 1785 (mL)

Filling Order	Analysis	Bottle Type	Triple Rinse	Sample Type *	Sample Type *	Sample Type *	Sample Comments DI Batch # for QAQC, Location preserved if not in field, label changes
1	Metals Total	60 mL Falcon Tube (x2)	Y	☐	☐	☐	
2	Metals Dissolved	60 mL Falcon Tube (x2)	Y	☐	☐	☐	
3	Total Mercury	40 mL clear glass (pre-preserved)	N	☐	☐	☐	
4	Nutrients	120 mL plastic (pre-preserved)	N	☐	☐	☐	
5	Ammonia	40 mL glass vial (pre-preserved)	N	☐	☐	☐	
6	Routine	1000 mL plastic	Y	☐	☐	☐	
7	TSS/Turb/pH	1000 mL plastic	Y	☐	☐	☐	

***Sample Type:** GW, DUPW1/DUPW2, FBW, TBW, EBW, REP1/REP2, Filter Blank

Additional Information

Sample color, odor if applicable: (equipment issues, safety concerns, weather problems, changes during sampling event, follow-up actions etc.)

triple bagged, leaked into 3rd bag (dust)

RioTinto

Snow Sampling Field Sheet

Area:	8000	**No:**	ENVI-177-0312
Effective Date:	26-Mar-2012	**Revision:**	R9
Task:	Snow Sampling Field Sheet	**By:**	D. Dul

GENERAL

LOCATION NAME: SS34 **DATE (yyyy-mmm-dd):** 2021-04-11 **TIME (24:00):** 1613

SAMPLED BY: BP PL **TYPE OF SAMPLE:** Dust ☒ Water Quality ☒ **QAQC:** NA

GPS COORDINATES (UTM): 536584 **E** 7151000 **N (zone)** 12W

DESCRIPTION: Distance to Diavik 1 km & Direction S On: Land ☐ &/or Lake ☒

CLIMATE CONDITIONS

Air Temp: -20 °C **Wind Direction:** E **Wind Speed:** 4 kts.

Dust in Area: Visible ☐ Not Visible ☒ **Cloud Cover:** 0% / 10% / 25% / 50% / 75% / 100%

Precipitation: Rain / Mist / Snow / N/A **Snow Condition:** Crystallized ☒ Packed ☒ Wet ☐ Dry ☐

	Core Number	Depth of Snow (cm)	Length of Snow Core (cm)	Weight of Tube & Core-SWE (cm)	Weight of Empty Tube-SWE (cm)	Water Content-SWE (cm)	Dust Present Yes/No	Comments (core weighed, bag #, changes in snow condition)
Dust Cores	1	44	46	55	38	17	Y N	
	2	49	47	55	38	17	Y N	
	3	47	45	53	38	15	Y N	
	4						Y N	
Dust (Min. of 3 cores – Total Water Content SWE =/> 25)								
Water Quality Cores	1	48	47	55	38	17	Y N	
	2	49	47	55	38	17	Y N	
	3	49	47	55	38	17	Y N	
	4	48	47	55	38	17	Y N	
	5	44	46	54	38	16	Y N	
	6	49	48	55	38	17	Y N	
	7						Y N	
	8						Y N	
	9						Y N	
	10						Y N	
	11						Y N	
	12						Y N	
Water Quality (Min. of 3 cores – Total Water Content SWE =/> 100)								

**** Water Content$_{SWE}$ = Wt. of Tube & Core$_{SWE}$ – Wt. of Empty Tube$_{SWE}$ ****

RioTinto

Snow Sampling Field Sheet

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Dust Sample Filters

Total Volume of Melted Snow: 1480 (mL)

Filter #	Weight of Filter (mg)	Filter + Residue (mg)	Residue Weight (mg)	Comments
1	123.3	147.9	24.6	
2				
3				
4				
Totals	123.2	147.9	24.6	

Water Quality Bottles

Total Volume of Melted Snow:________ (mL)

Filling Order	Analysis	Bottle Type	Triple Rinse	Sample Type * GW	Sample Type *	Sample Type *	Sample Comments DI Batch # for QAQC, Location preserved if not in field, label changes
1	Metals Total	60 mL Falcon Tube (x2)	Y	☑	☐	☐	
2	Metals Dissolved	60 mL Falcon Tube (x2)	Y	☑	☐	☐	
3	Total Mercury	40 mL clear glass (pre-preserved)	N	☑	☐	☐	
4	Nutrients	120 mL plastic (pre-preserved)	N	☑	☐	☐	
5	Ammonia	40 mL glass vial (pre-preserved)	N	☑	☐	☐	
6	Routine	1000 mL plastic	Y	☑	☐	☐	
7	TSS/Turb/pH	1000 mL plastic	Y	☑	☐	☐	

***Sample Type:** GW, DUPW1/DUPW2, FBW, TBW, EBW, REP1/REP2, Filter Blank

Additional Information

Sample color, odor if applicable: (equipment issues, safety concerns, weather problems, changes during sampling event, follow-up actions etc.)

RioTinto

Snow Sampling Field Sheet

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GENERAL

LOCATION NAME: SS3-S **DATE (yyyy-mmm-dd):** 2021-04-11 **TIME (24:00):** 1318

SAMPLED BY: BP PL **TYPE OF SAMPLE:** Dust [X] Water Quality [X] **QAQC:** NA

GPS COORDINATES (UTM): 537625 **E** 7150811 **N (zone)** 12W

DESCRIPTION: Distance to Diavik 2 km & Direction SE On: Land [ ] &/or Lake [X]

CLIMATE CONDITIONS

Air Temp: -21 °C **Wind Direction:** SE **Wind Speed:** 4 kts.

Dust in Area: Visible [ ] Not Visible [X] **Cloud Cover:** 0% / 10% / 25% / 50% / 75% / 100%

Precipitation: Rain / Mist / Snow / N/A **Snow Condition:** Crystallized [X] Packed [X] Wet [ ] Dry [ ]

	Core Number	Depth of Snow (cm)	Length of Snow Core (cm)	Weight of Tube & Core-SWE (cm)	Weight of Empty Tube-SWE (cm)	Water Content-SWE (cm)	Dust Present Yes/No	Comments (core weighed, bag #, changes in snow condition)
Dust Cores	1	45	38	51	38	13	Y N	
	2	46	45	54	38	16	Y N	
	3	48	47	54	38	16	Y N	
	4						Y N	
Dust (Min. of 3 cores – Total Water Content SWE =/> 25)								
Water Quality Cores	1	46	45	53	38	15	Y N	
	2	47	46	53	38	15	Y N	
	3	47	46	53	38	15	Y N	
	4	50	49	55	38	17	Y N	
	5	50	50	55	38	17	Y N	
	6	49	48	54	38	16	Y N	
	7	48	46	53	38	15	Y N	
	8						Y N	
	9						Y N	
	10						Y N	
	11						Y N	
	12						Y N	
Water Quality (Min. of 3 cores – Total Water Content SWE =/> 100)								

**** Water Content$_{SWE}$ = Wt. of Tube & Core$_{SWE}$ – Wt. of Empty Tube$_{SWE}$ ****

RioTinto

Snow Sampling Field Sheet

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Dust Sample Filters

Total Volume of Melted Snow: 1330 (mL)

Filter #	Weight of Filter (mg)	Filter + Residue (mg)	Residue Weight (mg)	Comments
1	118.3	146.2	27.9	
2				
3				
4				
Totals	118.3	146.2	27.9	

Water Quality Bottles

Total Volume of Melted Snow:______________ (mL)

Filling Order	Analysis	Bottle Type	Triple Rinse	Sample Type * GW	Sample Type *	Sample Type *	Sample Comments DI Batch # for QAQC, Location preserved if not in field, label changes
1	Metals Total	60 mL Falcon Tube (x2)	Y	☑	☐	☐	
2	Metals Dissolved	60 mL Falcon Tube (x2)	Y	☑	☐	☐	
3	Total Mercury	40 mL clear glass (pre-preserved)	N	☑	☐	☐	
4	Nutrients	120 mL plastic (pre-preserved)	N	☑	☐	☐	
5	Ammonia	40 mL glass vial (pre-preserved)	N	☑	☐	☐	
6	Routine	1000 mL plastic	Y	☑	☐	☐	
7	TSS/Turb/pH	1000 mL plastic	Y	☑	☐	☐	

*Sample Type: GW, DUPW1/DUPW2, FBW, TBW, EBW, REP1/REP2, Filter Blank

Additional Information

Sample color, odor if applicable: (equipment issues, safety concerns, weather problems, changes during sampling event, follow-up actions etc.)

RioTinto

Snow Sampling Field Sheet

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GENERAL

LOCATION NAME: SS3-6 DATE (yyyy-mmm-dd): 2021-04-11 TIME (24:00): 1712

SAMPLED BY: BP PL TYPE OF SAMPLE: Dust ☒ Water Quality ☒ QAQC: N/A

GPS COORDINATES (UTM): 536302 E 7151560 N (zone) 12W

DESCRIPTION: Distance to Diavik 0 km & Direction ______ On: Land ☐ &/or Lake ☒

CLIMATE CONDITIONS

Air Temp: -20 °C Wind Direction: E Wind Speed: 4 kts.

Dust in Area: Visible ☐ Not Visible ☒

Cloud Cover: 0% / 10% / 25% / 50% / 75% / 100%

Precipitation: Rain / Mist / Snow / N/A

Snow Condition: Crystallized ☒ Packed ☒ Wet ☐ Dry ☐

	Core Number	Depth of Snow (cm)	Length of Snow Core (cm)	Weight of Tube & Core-SWE (cm)	Weight of Empty Tube-SWE (cm)	Water Content-SWE (cm)	Dust Present Yes/No	Comments (core weighed, bag #, changes in snow condition)
Dust Cores	1	32	31	50	38	12	Y N	
	2	33	31	50	38	12	Y N	
	3	32	30	50	38	12	Y N	
	4						Y N	
Dust (Min. of 3 cores – Total Water Content SWE =/> 25)								
Water Quality Cores	1	32	31	50	38	12	Y N	
	2	35	34	50	38	12	Y N	
	3	35	34	49	38	11	Y N	
	4	35	35	49	38	11	Y N	
	5	30	30	49	38	11	Y N	
	6	31	29	49	38	11	Y N	
	7	32	32	48	38	10	Y N	
	8	32	32	49	38	11	Y N	
	9	31	31	48	38	10	Y N	
	10	30	29	49	38	11	Y N	
	11						Y N	
	12						Y N	
Water Quality (Min. of 3 cores – Total Water Content SWE =/> 100)								

** Water Content$_{SWE}$ = Wt. of Tube & Core$_{SWE}$ – Wt. of Empty Tube$_{SWE}$ **

RioTinto

Snow Sampling Field Sheet

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Dust Sample Filters

Total Volume of Melted Snow: 1050 (mL)

Filter #	Weight of Filter (mg)	Filter + Residue (mg)	Residue Weight (mg)	Comments
1	118.5	~~118.5~~ 179.0	60.5	
2	123.8	185.0	61.2	Some veg on filter before oven
3				
4				
Totals	242.3	364.0	121.7	

Water Quality Bottles

Total Volume of Melted Snow:______________ (mL)

Filling Order	Analysis	Bottle Type	Triple Rinse	Sample Type * GW	Sample Type *	Sample Type *	Sample Comments DI Batch # for QAQC, Location preserved if not in field, label changes
1	Metals Total	60 mL Falcon Tube (x2)	Y	☑	☐	☐	
2	Metals Dissolved	60 mL Falcon Tube (x2)	Y	☑	☐	☐	
3	Total Mercury	40 mL clear glass (pre-preserved)	N	☑	☐	☐	
4	Nutrients	120 mL plastic (pre-preserved)	N	☑	☐	☐	
5	Ammonia	40 mL glass vial (pre-preserved)	N	☑	☐	☐	
6	Routine	1000 mL plastic	Y	☑	☐	☐	
7	TSS/Turb/pH	1000 mL plastic	Y	☑	☐	☐	

***Sample Type:** GW, DUPW1/DUPW2, FBW, TBW, EBW, REP1/REP2, Filter Blank

Additional Information

Sample color, odor if applicable: (equipment issues, safety concerns, weather problems, changes during sampling event, follow-up actions etc.)

RioTinto

Snow Sampling Field Sheet

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GENERAL

LOCATION NAME: SS3-7-4 DATE (yyyy-mmm-dd): 2021-04-11 TIME (24:00): 1638

SAMPLED BY: BP PL TYPE OF SAMPLE: Dust ☒ Water Quality ☒ QAQC: DUPW-WQ

GPS COORDINATES (UTM): 536344 E 7151365 N (zone) ______

DESCRIPTION: Distance to Diavik 0 km & Direction — On: Land ☐ &/or Lake ☒

CLIMATE CONDITIONS

Air Temp: -20 °C Wind Direction: E Wind Speed: 4 kts.

Dust in Area: Visible ☐ Not Visible ☒ Cloud Cover: 0% / 10% / 25% / 50% / 75% / 100%

Precipitation: Rain / Mist / Snow / N/A Snow Condition: Crystallized ☒ Packed ☒ Wet ☐ Dry ☐

	Core Number	Depth of Snow (cm)	Length of Snow Core (cm)	Weight of Tube & Core-SWE (cm)	Weight of Empty Tube-SWE (cm)	Water Content-SWE (cm)	Dust Present Yes/No	Comments (core weighed, bag #, changes in snow condition)
Dust Cores	1	33	33	50	38	12	Y N	
	2	50	49	55	38	17	Y N	
	3	50	50	55	38	17	Y N	
	4						Y N	
Dust (Min. of 3 cores – Total Water Content SWE =/> 25)								
Water Quality Cores (DUP/)	1	50	49	55	38	17	Y N	
	2	50	49	55	38	17	Y N	
	3	51	49	55	38	17	Y N	
	4	50	49	56	38	18	Y N	
	5	50	48	55	38	17	Y N	
	6	50	50	56	38	18	Y N	
(DUP2)	7	51	51	57	38	19	Y N	
	8	49	47	54	38	16	Y N	
	9	49	48	55	38	17	Y N	
	10	53	53	58	38	20	Y N	
	11	51	48	55	38	17	Y N	
	12	50	48	54	38	16	Y N	
Water Quality (Min. of 3 cores – Total Water Content SWE =/> 100)								

**** Water Content$_{SWE}$ = Wt. of Tube & Core$_{SWE}$ – Wt. of Empty Tube$_{SWE}$ ****

RioTinto

Snow Sampling Field Sheet			
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Dust Sample Filters

Total Volume of Melted Snow: 1380 (mL)

Filter #	Weight of Filter (mg)	Filter + Residue (mg)	Residue Weight (mg)	Comments
1	117.8	146.3	28.5	
2	117.3	156.7	39.4	Some veg on filters before oven, none after oven
3				
4				
Totals	235.1	303.0	67.9	

Water Quality Bottles

Total Volume of Melted Snow:__________ (mL)

Filling Order	Analysis	Bottle Type	Triple Rinse	Sample Type * DUP1	Sample Type *	Sample Type *	Sample Comments **DI Batch # for QAQC**, Location preserved if not in field, label changes
1	Metals Total	60 mL Falcon Tube (x2)	Y	☑	☐	☐	
2	Metals Dissolved	60 mL Falcon Tube (x2)	Y	☑	☐	☐	
3	Total Mercury	40 mL clear glass (pre-preserved)	N	☑	☐	☐	
4	Nutrients	120 mL plastic (pre-preserved)	N	☑	☐	☐	
5	Ammonia	40 mL glass vial (pre-preserved)	N	☑	☐	☐	
6	Routine	1000 mL plastic	Y	☑	☐	☐	
7	TSS/Turb/pH	1000 mL plastic	Y	☑	☐	☐	

***Sample Type:** GW, DUPW1/DUPW2, FBW, TBW, EBW, REP1/REP2, Filter Blank

Additional Information

Sample color, odor if applicable: (equipment issues, safety concerns, weather problems, changes during sampling event, follow-up actions etc.)

RioTinto

Snow Sampling Field Sheet			
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GENERAL

LOCATION NAME: SS3-7-5 **DATE (yyyy-mmm-dd):** 2021-04-11 **TIME (24:00):** 16:38

SAMPLED BY: BP PL **TYPE OF SAMPLE:** Dust ☐ Water Quality ☒ **QAQC:** DUP

GPS COORDINATES (UTM): 536344 **E** 7151365 **N (zone)** 12

DESCRIPTION: Distance to Diavik 0 km & Direction – On: Land ☐ &/or Lake ☒

CLIMATE CONDITIONS

Air Temp: -20 °C **Wind Direction:** E **Wind Speed:** 4 **kts.**

Dust in Area: Visible ☐ Not Visible ☒ **Cloud Cover:** 0% / 10% / 25% / 50% / 75% / 100%

Precipitation: Rain / Mist / Snow / N/A **Snow Condition:** Crystallized ☒ Packed ☒ Wet ☐ Dry ☐

	Core Number	Depth of Snow (cm)	Length of Snow Core (cm)	Weight of Tube & Core-SWE (cm)	Weight of Empty Tube-SWE (cm)	Water Content-SWE (cm)	Dust Present Yes/No	Comments (core weighed, bag #, changes in snow condition)
Dust Cores	1						Y N	
	2						Y N	
	3						Y N	
	4						Y N	
Dust (Min. of 3 cores – Total Water Content SWE =/> 25)								
Water Quality Cores	1	51	51	57	38	19	Y N	
	2	49	47	54	38	16	Y N	
	3	49	48	55	38	17	Y N	
	4	53	53	58	38	20	Y N	
	5	51	48	55	38	17	Y N	
	6	50	48	54	38	16	Y N	
	7						Y N	
	8						Y N	
	9						Y N	
	10						Y N	
	11						Y N	
	12						Y N	
Water Quality (Min. of 3 cores – Total Water Content SWE =/> 100)								

**** Water Content$_{SWE}$ = Wt. of Tube & Core$_{SWE}$ – Wt. of Empty Tube$_{SWE}$ ****

RioTinto

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Dust Sample Filters

Total Volume of Melted Snow:____________ (mL)

Filter #	Weight of Filter (mg)	Filter + Residue (mg)	Residue Weight (mg)	Comments
1				
2				
3				
4				
Totals				

Water Quality Bottles

Total Volume of Melted Snow:____________ (mL)

Filling Order	Analysis	Bottle Type	Triple Rinse	Sample Type * DUP2	Sample Type *	Sample Type *	Sample Comments DI Batch # for QAQC, Location preserved if not in field, label changes
1	Metals Total	60 mL Falcon Tube (x2)	Y	☑	☐	☐	
2	Metals Dissolved	60 mL Falcon Tube (x2)	Y	☑	☐	☐	
3	Total Mercury	40 mL clear glass (pre-preserved)	N	☑	☐	☐	
4	Nutrients	120 mL plastic (pre-preserved)	N	☑	☐	☐	
5	Ammonia	40 mL glass vial (pre-preserved)	N	☑	☐	☐	
6	Routine	1000 mL plastic	Y	☑	☐	☐	
7	TSS/Turb/pH	1000 mL plastic	Y	☑	☐	☐	

*Sample Type: GW, DUPW1/DUPW2, FBW, TBW, EBW, REP1/REP2, Filter Blank

Additional Information

Sample color, odor if applicable: (equipment issues, safety concerns, weather problems, changes during sampling event, follow-up actions etc.)

RioTinto

Snow Sampling Field Sheet

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Effective Date:	26-Mar-2012	**Revision:**	R9
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GENERAL

LOCATION NAME: SS3-8 **DATE (yyyy-mmm-dd):** 2021-04-11 **TIME (24:00):** 1847

SAMPLED BY: BP PL **TYPE OF SAMPLE:** Dust ☒ Water Quality ☒ **QAQC:** NA

GPS COORDINATES (UTM): 536690 **E** 7150812 **N (zone)** 12W

DESCRIPTION: Distance to Diavik 1 km & Direction S On: Land ☐ &/or Lake ☒

CLIMATE CONDITIONS

Air Temp: -21 °C **Wind Direction:** SE **Wind Speed:** 4 kts.

Dust in Area: Visible ☐ Not Visible ☒ **Cloud Cover:** 0% / 10% / 25% / 50% / 75% / 100%

Precipitation: Rain / Mist / Snow / N/A **Snow Condition:** Crystallized ☒ Packed ☒ Wet ☐ Dry ☐

	Core Number	Depth of Snow (cm)	Length of Snow Core (cm)	Weight of Tube & Core-SWE (cm)	Weight of Empty Tube-SWE (cm)	Water Content-SWE (cm)	Dust Present Yes/No	Comments (core weighed, bag #, changes in snow condition)
Dust Cores	1	40	39	52	38	14	Y N	
	2	40	38	52	38	14	Y N	
	3	40	39	52	38	14	Y N	
	4						Y N	
Dust (Min. of 3 cores – Total Water Content SWE =/> 25)								
Water Quality Cores	1	41	39	52	39	13	Y N	
	2	40	37	51	38	13	Y N	
	3	40	38	52	38	14	Y N	
	4	40	38	52	38	14	Y N	
	5	39	38	52	38	14	Y N	
	6	40	36	51	38	13	Y N	
	7	40	38	52	38	14	Y N	
	8	40	39	52	38	14	Y N	
	9						Y N	
	10						Y N	
	11						Y N	
	12						Y N	
Water Quality (Min. of 3 cores – Total Water Content SWE =/> 100)								

** Water Content$_{SWE}$ = Wt. of Tube & Core$_{SWE}$ – Wt. of Empty Tube$_{SWE}$ **

RioTinto

Snow Sampling Field Sheet			
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Dust Sample Filters **Total Volume of Melted Snow:** 1240 (mL)

Filter #	Weight of Filter (mg)	Filter + Residue (mg)	Residue Weight (mg)	Comments
1	118.6	160.1	41.5	
2				
3				
4				
Totals	118.6	160.1	41.5	

Water Quality Bottles **Total Volume of Melted Snow:**________ (mL)

Filling Order	Analysis	Bottle Type	Triple Rinse	Sample Type *	Sample Type *	Sample Type *	Sample Comments DI Batch # for QAQC, Location preserved if not in field, label changes
1	Metals Total	60 mL Falcon Tube (x2)	Y	☐	☐	☐	
2	Metals Dissolved	60 mL Falcon Tube (x2)	Y	☐	☐	☐	
3	Total Mercury	40 mL clear glass (pre-preserved)	N	☐	☐	☐	
4	Nutrients	120 mL plastic (pre-preserved)	N	☐	☐	☐	
5	Ammonia	40 mL glass vial (pre-preserved)	N	☐	☐	☐	
6	Routine	1000 mL plastic	Y	☐	☐	☐	
7	TSS/Turb/pH	1000 mL plastic	Y	☐	☐	☐	

*Sample Type: GW, DUPW1/DUPW2, FBW, TBW, EBW, REP1/REP2, Filter Blank

Additional Information

Sample color, odor if applicable: (equipment issues, safety concerns, weather problems, changes during sampling event, follow-up actions etc.)

RioTinto

Snow Sampling Field Sheet

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GENERAL

LOCATION NAME: SSG-1 DATE (yyyy-mmm-dd): 2021-04-12 TIME (24:00): 1123

SAMPLED BY: BP PL TYPE OF SAMPLE: Dust ☒ Water Quality ☐ QAQC: NA

GPS COORDINATES (UTM): 531440 E 7152210 N (zone) ______

DESCRIPTION: Distance to Diavik 0 km & Direction ______ On: Land ☒ &/or Lake ☐

CLIMATE CONDITIONS

Air Temp: ______°C Wind Direction: ______ Wind Speed: ______kts.

Dust in Area: Visible ☐ Not Visible ☒ Cloud Cover: 0% / 10% / 25% / 50% / 75% / 100%

Precipitation: Rain / Mist / Snow / N/A Snow Condition: Crystallized ☒ Packed ☒ Wet ☐ Dry ☐

	Core Number	Depth of Snow (cm)	Length of Snow Core (cm)	Weight of Tube & Core-SWE (cm)	Weight of Empty Tube-SWE (cm)	Water Content-SWE (cm)	Dust Present Yes/No	Comments (core weighed, bag #, changes in snow condition)
Dust Cores	1	64	41	51	38	13	Y N	
	2	24	24	46	38	8	Y N	veg. in core
	3	47	43	54	38	16	Y N	
	4						Y N	
Dust (Min. of 3 cores – Total Water Content SWE =/> 25)								
Water Quality Cores	1						Y N	
	2						Y N	
	3						Y N	
	4						Y N	
	5						Y N	
	6						Y N	
	7						Y N	
	8						Y N	
	9						Y N	
	10						Y N	
	11						Y N	
	12						Y N	
Water Quality (Min. of 3 cores – Total Water Content SWE =/> 100)								

**** Water Content$_{SWE}$ = Wt. of Tube & Core$_{SWE}$ – Wt. of Empty Tube$_{SWE}$ ****

RioTinto

Snow Sampling Field Sheet

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Dust Sample Filters

Total Volume of Melted Snow: 1165 (mL)

Filter #	Weight of Filter (mg)	Filter + Residue (mg)	Residue Weight (mg)	Comments
1	124.1	172.7	48.6	
2				
3				
4				
Totals	124.1	172.7	48.6	

Water Quality Bottles

Total Volume of Melted Snow:____________ (mL)

Filling Order	Analysis	Bottle Type	Triple Rinse	Sample Type *	Sample Type *	Sample Type *	Sample Comments **DI Batch # for QAQC**, Location preserved if not in field, label changes
1	Metals Total	60 mL Falcon Tube (x2)	Y	☐	☐	☐	
2	Metals Dissolved	60 mL Falcon Tube (x2)	Y	☐	☐	☐	
3	Total Mercury	40 mL clear glass (pre-preserved)	N	☐	☐	☐	
4	Nutrients	120 mL plastic (pre-preserved)	N	☐	☐	☐	
5	Ammonia	40 mL glass vial (pre-preserved)	N	☐	☐	☐	
6	Routine	1000 mL plastic	Y	☐	☐	☐	
7	TSS/Turb/pH	1000 mL plastic	Y	☐	☐	☐	

***Sample Type:** GW, DUPW1/DUPW2, FBW, TBW, EBW, REP1/REP2, Filter Blank

Additional Information

Sample color, odor if applicable: (equipment issues, safety concerns, weather problems, changes during sampling event, follow-up actions etc.)

RioTinto

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GENERAL

LOCATION NAME: SS4-2 **DATE (yyyy-mmm-dd):** 2021-04-12 **TIME (24:00):** 1140

SAMPLED BY: BP PL **TYPE OF SAMPLE:** Dust ☒ Water Quality ☐ **QAQC:** N/A

GPS COORDINATES (UTM): 531336 **E** 7152260 **N (zone)** 12W

DESCRIPTION: Distance to Diavik 1 km & Direction SE On: Land ☒ &/or Lake ☐

CLIMATE CONDITIONS

Air Temp: ______'C **Wind Direction:** ______ **Wind Speed:** ______kts.

Dust in Area: Visible ☐ Not Visible ☒ **Cloud Cover:** 0% / 10% / 25% / 50% / 75% / 100%

Precipitation: Rain / Mist / Snow / N/A **Snow Condition:** Crystallized ☒ Packed ☒ Wet ☐ Dry ☐

	Core Number	Depth of Snow (cm)	Length of Snow Core (cm)	Weight of Tube & Core-SWE (cm)	Weight of Empty Tube-SWE (cm)	Water Content-SWE (cm)	Dust Present Yes/No	Comments (core weighed, bag #, changes in snow condition)
Dust Cores	1	64	63	55	39	16	Y N	
	2	63	59	55	39	16	Y N	
	3	64	62	53	38	15	Y N	
	4						Y N	
Dust (Min. of 3 cores – Total Water Content SWE =/> 25)								
Water Quality Cores	1						Y N	
	2						Y N	
	3						Y N	
	4						Y N	
	5						Y N	
	6						Y N	
	7						Y N	
	8						Y N	
	9						Y N	
	10						Y N	
	11						Y N	
	12						Y N	
Water Quality (Min. of 3 cores – Total Water Content SWE =/> 100)								

** Water Content$_{SWE}$ = Wt. of Tube & Core$_{SWE}$ – Wt. of Empty Tube$_{SWE}$ **

RioTinto

Snow Sampling Field Sheet

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Dust Sample Filters

Total Volume of Melted Snow: 1490 (mL)

Filter #	Weight of Filter (mg)	Filter + Residue (mg)	Residue Weight (mg)	Comments
1	123.9	149.9	26.0	some vg left on filter before oven
2	125.3	167.2	41.9	
3				
4				
Totals	249.2	317.1	67.9	

Water Quality Bottles

Total Volume of Melted Snow:__________ (mL)

Filling Order	Analysis	Bottle Type	Triple Rinse	Sample Type *	Sample Type *	Sample Type *	Sample Comments DI Batch # for QAQC, Location preserved if not in field, label changes
1	Metals Total	60 mL Falcon Tube (x2)	Y	☐	☐	☐	
2	Metals Dissolved	60 mL Falcon Tube (x2)	Y	☐	☐	☐	
3	Total Mercury	40 mL clear glass (pre-preserved)	N	☐	☐	☐	
4	Nutrients	120 mL plastic (pre-preserved)	N	☐	☐	☐	
5	Ammonia	40 mL glass vial (pre-preserved)	N	☐	☐	☐	
6	Routine	1000 mL plastic	Y	☐	☐	☐	
7	TSS/Turb/pH	1000 mL plastic	Y	☐	☐	☐	

*Sample Type: GW, DUPW1/DUPW2, FBW, TBW, EBW, REP1/REP2, Filter Blank

Additional Information

Sample color, odor if applicable: (equipment issues, safety concerns, weather problems, changes during sampling event, follow-up actions etc.)

RioTinto

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GENERAL

LOCATION NAME: SS4-3 DATE (yyyy-mmm-dd): 2021-04-12 TIME (24:00): 1152

SAMPLED BY: BP PL TYPE OF SAMPLE: Dust ☒ Water Quality ☐ QAQC: NA

GPS COORDINATES (UTM): 531337 E 7152433 N (zone) 12W

DESCRIPTION: Distance to Diavik 1 km & Direction SE On: Land ☒ &/or Lake ☐

CLIMATE CONDITIONS

Air Temp: ______°C Wind Direction: ______ Wind Speed: ______kts.

Dust in Area: Visible ☐ Not Visible ☒

Cloud Cover: 0% / 10% / 25% / 50% / 75% / 100%

Precipitation: Rain / Mist / Snow / N/A

Snow Condition: Crystallized ☒ Packed ☒ Wet ☐ Dry ☐

	Core Number	Depth of Snow (cm)	Length of Snow Core (cm)	Weight of Tube & Core-SWE (cm)	Weight of Empty Tube-SWE (cm)	Water Content-SWE (cm)	Dust Present Yes/No	Comments (core weighed, bag #, changes in snow condition)
Dust Cores	1	55	45	54	39	13	Y N	
	2	48	42	52	39	13	Y N	
	3	40	32	49	39	10	Y N	veg. plug removed from end of core
	4						Y N	
Dust (Min. of 3 cores – Total Water Content SWE =/> 25)								
Water Quality Cores	1						Y N	
	2						Y N	
	3						Y N	
	4						Y N	
	5						Y N	
	6						Y N	
	7						Y N	
	8						Y N	
	9						Y N	
	10						Y N	
	11						Y N	
	12						Y N	
Water Quality (Min. of 3 cores – Total Water Content SWE =/> 100)								

** Water Content$_{SWE}$ = Wt. of Tube & Core$_{SWE}$ – Wt. of Empty Tube$_{SWE}$ **

RioTinto

Snow Sampling Field Sheet

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Dust Sample Filters

Total Volume of Melted Snow: 1150 (mL)

Filter #	Weight of Filter (mg)	Filter + Residue (mg)	Residue Weight (mg)	Comments
1	116.2	143.6	27.4	Some veg left on filter before oven
2				
3				
4				
Totals	116.2	143.6	27.4	

Water Quality Bottles

Total Volume of Melted Snow: ______ (mL)

Filling Order	Analysis	Bottle Type	Triple Rinse	Sample Type *	Sample Type *	Sample Type *	Sample Comments **DI Batch # for QAQC**, Location preserved if not in field, label changes
1	Metals Total	60 mL Falcon Tube (x2)	Y	☐	☐	☐	
2	Metals Dissolved	60 mL Falcon Tube (x2)	Y	☐	☐	☐	
3	Total Mercury	40 mL clear glass (pre-preserved)	N	☐	☐	☐	
4	Nutrients	120 mL plastic (pre-preserved)	N	☐	☐	☐	
5	Ammonia	40 mL glass vial (pre-preserved)	N	☐	☐	☐	
6	Routine	1000 mL plastic	Y	☐	☐	☐	
7	TSS/Turb/pH	1000 mL plastic	Y	☐	☐	☐	

*Sample Type: GW, DUPW1/DUPW2, FBW, TBW, EBW, REP1/REP2, Filter Blank

Additional Information

Sample color, odor if applicable: (equipment issues, safety concerns, weather problems, changes during sampling event, follow-up actions etc.)

RioTinto

Snow Sampling Field Sheet

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GENERAL

LOCATION NAME: SS4-4 **DATE (yyyy-mmm-dd):** 2021-04-12 **TIME (24:00):** 1209

SAMPLED BY: BP PL **TYPE OF SAMPLE:** Dust ☒ Water Quality ☒ **QAQC:** N/A

GPS COORDINATES (UTM): 531142 **E** 7153166 **N (zone)** 12W

DESCRIPTION: Distance to Diavik 2 km & Direction NW On: Land ☐ &/or Lake ☒

CLIMATE CONDITIONS

Air Temp: ______ °C **Wind Direction:** ______ **Wind Speed:** ______ kts.

Dust in Area: Visible ☐ Not Visible ☒ **Cloud Cover:** 0% / 10% / 25% / 50% / 75% / 100%

Precipitation: Rain / Mist / Snow / N/A **Snow Condition:** Crystallized ☒ Packed ☒ Wet ☐ Dry ☐

	Core Number	Depth of Snow (cm)	Length of Snow Core (cm)	Weight of Tube & Core-SWE (cm)	Weight of Empty Tube-SWE (cm)	Water Content-SWE (cm)	Dust Present Yes/No	Comments (core weighed, bag #, changes in snow condition)
Dust Cores	1	55	51	55	38	17	Y N	
	2	55	49	57	38	19	Y N	
	3	51	49	56	38	18	Y N	
	4						Y N	
Dust (Min. of 3 cores – Total Water Content SWE =/> 25)								
Water Quality Cores	1	53	48	55	38	17	Y N	
	2	50	50	57	38	19	Y N	
	3	50	48	56	38	18	Y N	
	4	50	50	58	38	20	Y N	
	5	50	50	56	38	18	Y N	
	6	50	44	55	38	17	Y N	
	7						Y N	
	8						Y N	
	9						Y N	
	10						Y N	
	11						Y N	
	12						Y N	
Water Quality (Min. of 3 cores – Total Water Content SWE =/> 100)								

**** Water Content$_{SWE}$ = Wt. of Tube & Core$_{SWE}$ – Wt. of Empty Tube$_{SWE}$ ****

RioTinto

Snow Sampling Field Sheet

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Dust Sample Filters

Total Volume of Melted Snow: 1645 (mL)

Filter #	Weight of Filter (mg)	Filter + Residue (mg)	Residue Weight (mg)	Comments
1	116.1	161.6.	45.5	some ver left on filter before oven
2				
3				
4				
Totals	116.1	161.6.	45.5	

Water Quality Bottles

Total Volume of Melted Snow: 3285 (mL)

1075
2210

Filling Order	Analysis	Bottle Type	Triple Rinse	Sample Type * GW	Sample Type *	Sample Type *	Sample Comments **DI Batch # for QAQC,** Location preserved if not in field, label changes
1	Metals Total	60 mL Falcon Tube (x2)	Y	☑	☐	☐	
2	Metals Dissolved	60 mL Falcon Tube (x2)	Y	☑	☐	☐	
3	Total Mercury	40 mL clear glass (pre-preserved)	N	☑	☐	☐	
4	Nutrients	120 mL plastic (pre-preserved)	N	☑	☐	☐	
5	Ammonia	40 mL glass vial (pre-preserved)	N	☑	☐	☐	
6	Routine	1000 mL plastic	Y	☑	☐	☐	
7	TSS/Turb/pH	1000 mL plastic	Y	☑	☐	☐	

***Sample Type:** GW, DUPW1/DUPW2, FBW, TBW, EBW, REP1/REP2, Filter Blank

Additional Information

Sample color, odor if applicable: (equipment issues, safety concerns, weather problems, changes during sampling event, follow-up actions etc.)

perchl. collected
Bags decanted into one before pouring into bottles

RioTinto

Snow Sampling Field Sheet

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GENERAL

LOCATION NAME: SS4-3 **DATE (yyyy-mmm-dd):** 2021-04-12 **TIME (24:00):** 1252

SAMPLED BY: BP PL **TYPE OF SAMPLE:** Dust ☒ Water Quality ☒ **QAQC:** NA

GPS COORDINATES (UTM): 531404 **E** 7154116 **N (zone)** 12W

DESCRIPTION: Distance to Diavik 2 km & Direction NW On: Land ☐ &/or Lake ☒

CLIMATE CONDITIONS

Air Temp: ______ °C **Wind Direction:** ______ **Wind Speed:** ______ kts.

Dust in Area: Visible ☐ Not Visible ☒ **Cloud Cover:** 0% / 10% / 25% / 50% / 75% / 100%

Precipitation: Rain / Mist / Snow / N/A **Snow Condition:** Crystallized ☒ Packed ☒ Wet ☐ Dry ☐

	Core Number	Depth of Snow (cm)	Length of Snow Core (cm)	Weight of Tube & Core-SWE (cm)	Weight of Empty Tube-SWE (cm)	Water Content-SWE (cm)	Dust Present Yes/No	Comments (core weighed, bag #, changes in snow condition)
Dust Cores	1	59	58	56	38	18	Y N	
	2	58	57	55	39	16	Y N	
	3	60	60	57	38	19	Y N	
	4						Y N	
Dust (Min. of 3 cores – Total Water Content SWE =/> 25)								
Water Quality Cores	1	60	59	56	38	18	Y N	
	2	60	60	57	39	18	Y N	
	3	56	55	55	39	16	Y N	
	4	63	62	58	38	20	Y N	
	5	63	63	57	38	19	Y N	
	6	64	64	58	38	20	Y N	
	7						Y N	
	8						Y N	
	9						Y N	
	10						Y N	
	11						Y N	
	12						Y N	
Water Quality (Min. of 3 cores – Total Water Content SWE =/> 100)								

** Water Content$_{SWE}$ = Wt. of Tube & Core$_{SWE}$ – Wt. of Empty Tube$_{SWE}$ **

RioTinto

Snow Sampling Field Sheet

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Dust Sample Filters

Total Volume of Melted Snow: 1630 (mL)

Filter #	Weight of Filter (mg)	Filter + Residue (mg)	Residue Weight (mg)	Comments
1	117.2	200.0	82.8	
2				
3				
4				
Totals	117.2	200.0	82.8	

Water Quality Bottles

Total Volume of Melted Snow: 3390 (mL) 2195 1195

Filling Order	Analysis	Bottle Type	Triple Rinse	Sample Type * GW	Sample Type *	Sample Type *	Sample Comments DI Batch # for QAQC, Location preserved if not in field, label changes
1	Metals Total	60 mL Falcon Tube (x2)	Y	☑	☐	☐	
2	Metals Dissolved	60 mL Falcon Tube (x2)	Y	☑	☐	☐	
3	Total Mercury	40 mL clear glass (pre-preserved)	N	☑	☐	☐	
4	Nutrients	120 mL plastic (pre-preserved)	N	☑	☐	☐	
5	Ammonia	40 mL glass vial (pre-preserved)	N	☑	☐	☐	
6	Routine	1000 mL plastic	Y	☑	☐	☐	
7	TSS/Turb/pH	1000 mL plastic	Y	☑	☐	☐	

*Sample Type: GW, DUPW1/DUPW2, FBW, TBW, EBW, REP1/REP2, Filter Blank

Additional Information

Sample color, odor if applicable: (equipment issues, safety concerns, weather problems, changes during sampling event, follow-up actions etc.)

Perchl. collected.
Bags combined into one prior to decanting into bottles

RioTinto

Snow Sampling Field Sheet

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GENERAL

LOCATION NAME: SS 5-1 DATE (yyyy-mmm-dd): 2021-04-11 TIME (24:00): 1318

SAMPLED BY: BP PL TYPE OF SAMPLE: Dust ☒ Water Quality ☐ QAQC: ____

GPS COORDINATES (UTM): 533150 E 7148926 N (zone) 12W

DESCRIPTION: Distance to Diavik 5 km & Direction ____ On: Land ☒ &/or Lake ☐

CLIMATE CONDITIONS

Air Temp: -21 °C Wind Direction: SE Wind Speed: 4 kts.

Dust in Area: Visible ☐ Not Visible ☒ Cloud Cover: 0% / 10% / 25% / 50% / 75% / 100%

Precipitation: Rain / Mist / Snow / N/A Snow Condition: Crystallized ☒ Packed ☒ Wet ☐ Dry ☐

	Core Number	Depth of Snow (cm)	Length of Snow Core (cm)	Weight of Tube & Core-SWE (cm)	Weight of Empty Tube-SWE (cm)	Water Content-SWE (cm)	Dust Present Yes/No	Comments (core weighed, bag #, changes in snow condition)
Dust Cores	1	45	44	55	38	17	Y N	
	2	60	42	55	38	17	Y N	
	3	49	39	53	38	13	Y N	
	4						Y N	
Dust (Min. of 3 cores – Total Water Content SWE =/> 25)								
Water Quality Cores	1						Y N	
	2						Y N	
	3						Y N	
	4						Y N	
	5						Y N	
	6						Y N	
	7						Y N	
	8						Y N	
	9						Y N	
	10						Y N	
	11						Y N	
	12						Y N	
Water Quality (Min. of 3 cores – Total Water Content SWE =/> 100)								

** Water Content$_{SWE}$ = Wt. of Tube & Core$_{SWE}$ – Wt. of Empty Tube$_{SWE}$ **

RioTinto

Snow Sampling Field Sheet

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Dust Sample Filters

Total Volume of Melted Snow: 1475 (mL)

Filter #	Weight of Filter (mg)	Filter + Residue (mg)	Residue Weight (mg)	Comments
1	123.2	170.3	47.1	
2	120.4	221.6	101.2	
3	123.2	194.6	71.4	
4	123.4	316.5	193.1	
Totals	126.9	474.3	347.4	
Totals	617.1	1377.3	760.2	

Water Quality Bottles

Total Volume of Melted Snow:__________ (mL)

Filling Order	Analysis	Bottle Type	Triple Rinse	Sample Type *	Sample Type *	Sample Type *	Sample Comments DI Batch # for QAQC, Location preserved if not in field, label changes
1	Metals Total	60 mL Falcon Tube (x2)	Y	☐	☐	☐	
2	Metals Dissolved	60 mL Falcon Tube (x2)	Y	☐	☐	☐	
3	Total Mercury	40 mL clear glass (pre-preserved)	N	☐	☐	☐	
4	Nutrients	120 mL plastic (pre-preserved)	N	☐	☐	☐	
5	Ammonia	40 mL glass vial (pre-preserved)	N	☐	☐	☐	
6	Routine	1000 mL plastic	Y	☐	☐	☐	
7	TSS/Turb/pH	1000 mL plastic	Y	☐	☐	☐	

*Sample Type: GW, DUPW1/DUPW2, FBW, TBW, EBW, REP1/REP2, Filter Blank

Additional Information

Sample color, odor if applicable: (equipment issues, safety concerns, weather problems, changes during sampling event, follow-up actions etc.)

RioTinto

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GENERAL

LOCATION NAME: SSS-2 DATE (yyyy-mmm-dd): 2021-04-11 TIME (24:00): 1338

SAMPLED BY: BP PL TYPE OF SAMPLE: Dust ☒ Water Quality ☐ QAQC: NA

GPS COORDINATES (UTM): 533151 E 7148873 N (zone) 12W

DESCRIPTION: Distance to Diavik 0 km & Direction ____ On: Land ☒ &/or Lake ☐

CLIMATE CONDITIONS

Air Temp: -21 °C Wind Direction: SE Wind Speed: 4 kts.

Dust in Area: Visible ☐ Not Visible ☒ Cloud Cover: 0% / 10% / 25% / 50% / 75% / 100%

Precipitation: Rain / Mist / Snow / N/A Snow Condition: Crystallized ☒ Packed ☒ Wet ☐ Dry ☐

	Core Number	Depth of Snow (cm)	Length of Snow Core (cm)	Weight of Tube & Core-SWE (cm)	Weight of Empty Tube-SWE (cm)	Water Content-SWE (cm)	Dust Present Yes/No	Comments (core weighed, bag #, changes in snow condition)
Dust Cores	1	25	25	47	38	9	Y N	
	2	27	22	45	38	7	Y N	
	3	29	26	46	38	8	Y N	
	4	28	27	46	38	8	Y N	
Dust (Min. of 3 cores – Total Water Content SWE =/> 25)								
Water Quality Cores	1						Y N	
	2						Y N	
	3						Y N	
	4						Y N	
	5						Y N	
	6						Y N	
	7						Y N	
	8						Y N	
	9						Y N	
	10						Y N	
	11						Y N	
	12						Y N	
Water Quality (Min. of 3 cores – Total Water Content SWE =/> 100)								

** Water Content$_{SWE}$ = Wt. of Tube & Core$_{SWE}$ – Wt. of Empty Tube$_{SWE}$ **

RioTinto

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Dust Sample Filters

Total Volume of Melted Snow: 910 (mL)

Filter #	Weight of Filter (mg)	Filter + Residue (mg)	Residue Weight (mg)	Comments
1	124.3	290.2	165.9	
2	117.0	120.7	3.7	
3				
4				
Totals	241.3	410.9	169.6	

Water Quality Bottles

Total Volume of Melted Snow:__________ (mL)

Filling Order	Analysis	Bottle Type	Triple Rinse	Sample Type *	Sample Type *	Sample Type *	Sample Comments DI Batch # for QAQC, Location preserved if not in field, label changes
1	Metals Total	60 mL Falcon Tube (x2)	Y	☐	☐	☐	
2	Metals Dissolved	60 mL Falcon Tube (x2)	Y	☐	☐	☐	
3	Total Mercury	40 mL clear glass (pre-preserved)	N	☐	☐	☐	
4	Nutrients	120 mL plastic (pre-preserved)	N	☐	☐	☐	
5	Ammonia	40 mL glass vial (pre-preserved)	N	☐	☐	☐	
6	Routine	1000 mL plastic	Y	☐	☐	☐	
7	TSS/Turb/pH	1000 mL plastic	Y	☐	☐	☐	

***Sample Type:** GW, DUPW1/DUPW2, FBW, TBW, EBW, REP1/REP2, Filter Blank

Additional Information

Sample color, odor if applicable: (equipment issues, safety concerns, weather problems, changes during sampling event, follow-up actions etc.)

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GENERAL

LOCATION NAME: SSS-3 DATE (yyyy-mmm-dd): 2021-04-11 TIME (24:00): 1415

SAMPLED BY: BP PL TYPE OF SAMPLE: Dust ☒ Water Quality ☒ QAQC: N/A

GPS COORDINATES (UTM): 533153 E 7148698 N (zone) 12W

DESCRIPTION: Distance to Diavik 0.5 km & Direction N On: Land ☐ &/or Lake ☒

CLIMATE CONDITIONS

Air Temp: -21 °C Wind Direction: SE Wind Speed: 4 kts.

Dust in Area: Visible ☐ Not Visible ☒

Cloud Cover: 0% / 10% / 25% / 50% / 75% / 100%

Precipitation: Rain / Mist / Snow / N/A

Snow Condition: Crystallized ☒ Packed ☐ Wet ☐ Dry ☐

	Core Number	Depth of Snow (cm)	Length of Snow Core (cm)	Weight of Tube & Core-SWE (cm)	Weight of Empty Tube-SWE (cm)	Water Content-SWE (cm)	Dust Present Yes/No	Comments (core weighed, bag #, changes in snow condition)
Dust Cores	1	52	50	55	38	17	Y N	
	2	51	48	54	38	16	Y N	
	3	50	47	54	38	16	Y N	
	4						Y N	
Dust (Min. of 3 cores – Total Water Content SWE =/> 25)								
Water Quality Cores	1	48	47	52	38	14	Y N	
	2	50	49	53	38	15	Y N	
	3	49	48	53	38	15	Y N	
	4	49	48	52	38	14	Y N	
	5	49	48	52	38	14	Y N	
	6	48	36	49	38	11	Y N	
	7	49	47	53	38	15	Y N	
	8	48	47	53	38	15	Y N	
	9						Y N	
	10						Y N	
	11						Y N	
	12						Y N	
Water Quality (Min. of 3 cores – Total Water Content SWE =/> 100)								

** Water Content$_{SWE}$ = Wt. of Tube & Core$_{SWE}$ – Wt. of Empty Tube$_{SWE}$ **

RioTinto

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Dust Sample Filters **Total Volume of Melted Snow:** 1440 (mL)

Filter #	Weight of Filter (mg)	Filter + Residue (mg)	Residue Weight (mg)	Comments
1	116.5	234.5	118.0	
2	124.4	330.6.	206.2	
3	123.7	125.7	2.0.	
4				
Totals	364.6.	690.8	326.2	

Water Quality Bottles **Total Volume of Melted Snow:**______________ (mL)

Filling Order	Analysis	Bottle Type	Triple Rinse	Sample Type *	Sample Type *	Sample Type *	Sample Comments DI Batch # for QAQC, Location preserved if not in field, label changes
1	Metals Total	60 mL Falcon Tube (x2)	Y	☐	☐	☐	
2	Metals Dissolved	60 mL Falcon Tube (x2)	Y	☐	☐	☐	
3	Total Mercury	40 mL clear glass (pre-preserved)	N	☐	☐	☐	
4	Nutrients	120 mL plastic (pre-preserved)	N	☐	☐	☐	
5	Ammonia	40 mL glass vial (pre-preserved)	N	☐	☐	☐	
6	Routine	1000 mL plastic	Y	☐	☐	☐	
7	TSS/Turb/pH	1000 mL plastic	Y	☐	☐	☐	

***Sample Type:** GW, DUPW1/DUPW2, FBW, TBW, EBW, REP1/REP2, Filter Blank

Additional Information

Sample color, odor if applicable: (equipment issues, safety concerns, weather problems, changes during sampling event, follow-up actions etc.)

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GENERAL

LOCATION NAME: SS 5-4 DATE (yyyy-mmm-dd): 2021-04-11 TIME (24:00): 1242

SAMPLED BY: BP PL TYPE OF SAMPLE: Dust [X] Water Quality [X] QAQC: N/A

GPS COORDINATES (UTM): 533147 E 7147956 N (zone) 12V

DESCRIPTION: Distance to Diavik 1 km & Direction S On: Land [ ] &/or Lake [X]

CLIMATE CONDITIONS

Air Temp: -22 °C Wind Direction: SE Wind Speed: 5 kts.

Dust in Area: Visible [ ] Not Visible [X] Cloud Cover: 0% / 10% / 25% / 50% / 75% / 100%

Precipitation: Rain / Mist / Snow / N/A Snow Condition: Crystallized [ ] Packed [X] Wet [ ] Dry [ ]

	Core Number	Depth of Snow (cm)	Length of Snow Core (cm)	Weight of Tube & Core-SWE (cm)	Weight of Empty Tube-SWE (cm)	Water Content-SWE (cm)	Dust Present Yes/No	Comments (core weighed, bag #, changes in snow condition)
Dust Cores	1	~~54~~ 55	48	52	38	14	Y N	
	2	54	39	51	38	13	Y N	
	3	51	45	52	38	14	Y N	
	4						Y N	
Dust (Min. of 3 cores – Total Water Content SWE =/> 25)								
Water Quality Cores	1	53	52	57	38	19	Y N	
	2	54	54	57	38	19	Y N	
	3	55	45	53	38	15	Y N	
	4	54	52	56	38	18	Y N	
	5	55	45	53	38	15	Y N	
	6	54	48	54	38	16	Y N	
	7						Y N	
	8						Y N	
	9						Y N	
	10						Y N	
	11						Y N	
	12						Y N	
Water Quality (Min. of 3 cores – Total Water Content SWE =/> 100)								

**** Water Content$_{SWE}$ = Wt. of Tube & Core$_{SWE}$ – Wt. of Empty Tube$_{SWE}$ ****

RioTinto

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Dust Sample Filters

Total Volume of Melted Snow: 1230 (mL)

Filter #	Weight of Filter (mg)	Filter + Residue (mg)	Residue Weight (mg)	Comments
1	117.0	143.3	26.3	some veg left on filter before oven
2				
3				
4				
Totals	117.0	143.3	26.3	

Water Quality Bottles

Total Volume of Melted Snow:______________ (mL)

Filling Order	Analysis	Bottle Type	Triple Rinse	Sample Type *	Sample Type *	Sample Type *	Sample Comments DI Batch # for QAQC, Location preserved if not in field, label changes
1	Metals Total	60 mL Falcon Tube (x2)	Y	☐	☐	☐	
2	Metals Dissolved	60 mL Falcon Tube (x2)	Y	☐	☐	☐	
3	Total Mercury	40 mL clear glass (pre-preserved)	N	☐	☐	☐	
4	Nutrients	120 mL plastic (pre-preserved)	N	☐	☐	☐	
5	Ammonia	40 mL glass vial (pre-preserved)	N	☐	☐	☐	
6	Routine	1000 mL plastic	Y	☐	☐	☐	
7	TSS/Turb/pH	1000 mL plastic	Y	☐	☐	☐	

***Sample Type:** GW, DUPW1/DUPW2, FBW, TBW, EBW, REP1/REP2, Filter Blank

Additional Information

Sample color, odor if applicable: (equipment issues, safety concerns, weather problems, changes during sampling event, follow-up actions etc.)

RioTinto

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GENERAL

LOCATION NAME: SS 5-5-4 **DATE (yyyy-mmm-dd):** 2024-04-11 **TIME (24:00):** 1155

SAMPLED BY: BP PL **TYPE OF SAMPLE:** Dust ☒ Water Quality ☒ **QAQC:** DUPW-Dust

GPS COORDINATES (UTM): 533147 E 7146862 N (zone) (12)

DESCRIPTION: Distance to Diavik 2 km & Direction S On: Land ☐ &/or Lake ☒

CLIMATE CONDITIONS

Air Temp: -22 °C **Wind Direction:** SE **Wind Speed:** 5 **kts.**

Dust in Area: Visible ☐ Not Visible ☒ **Cloud Cover:** 0% / 10% / 25% / 50% / 75% / 100%

Precipitation: Rain / Mist / Snow / N/A **Snow Condition:** Crystallized ☐ Packed ☒ Wet ☐ Dry ☐

	Core Number	Depth of Snow (cm)	Length of Snow Core (cm)	Weight of Tube & Core-SWE (cm)	Weight of Empty Tube-SWE (cm)	Water Content-SWE (cm)	Dust Present Yes/No	Comments (core weighed, bag #, changes in snow condition)
Dust Cores DUP	1	46	33	52	38	14	Y N	
	2	48	47	56	38	18	Y N	
	3	49	49	56	38	18	Y N	
	4						Y N	
Dust (Min. of 3 cores – Total Water Content SWE =/> 25)								
Water Quality Cores DUP	1	57	57	69	38	20	Y N	Seperate sheet
	2	57	57	59	38	21	Y N	
	3	56	50	57	38	19	Y N	
	4	55	47	56	38	18	Y N	
	5	56	54	58	38	20	Y N	
	6	46	43	54	38	16	Y N	
	7	55	49	56	38	18	Y N	
	8	55	50	57	38	19	Y N	
	9	55	48	56	38	18	Y N	
	10						Y N	
	11						Y N	
	12						Y N	
Water Quality (Min. of 3 cores – Total Water Content SWE =/> 100)								

** Water Content$_{SWE}$ = Wt. of Tube & Core$_{SWE}$ – Wt. of Empty Tube$_{SWE}$ **

RioTinto

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Dust Sample Filters

Total Volume of Melted Snow: 1505 (mL)
1880 (DUP2)

Filter #	Weight of Filter (mg)	Filter + Residue (mg)	Residue Weight (mg)	Comments
1	116.6	124.4	7.8	
2				
3				
4				
Totals	116.6	124.4	7.8	

Water Quality Bottles

Total Volume of Melted Snow:__________ (mL)

Filling Order	Analysis	Bottle Type	Triple Rinse	Sample Type *	Sample Type *	Sample Type *	Sample Comments DI Batch # for QAQC, Location preserved if not in field, label changes
1	Metals Total	60 mL Falcon Tube (x2)	Y	☐	☐	☐	
2	Metals Dissolved	60 mL Falcon Tube (x2)	Y	☐	☐	☐	
3	Total Mercury	40 mL clear glass (pre-preserved)	N	☐	☐	☐	
4	Nutrients	120 mL plastic (pre-preserved)	N	☐	☐	☐	
5	Ammonia	40 mL glass vial (pre-preserved)	N	☐	☐	☐	
6	Routine	1000 mL plastic	Y	☐	☐	☐	
7	TSS/Turb/pH	1000 mL plastic	Y	☐	☐	☐	

***Sample Type:** GW, DUPW1/DUPW2, FBW, TBW, EBW, REP1/REP2, Filter Blank

Additional Information

Sample color, odor if applicable: (equipment issues, safety concerns, weather problems, changes during sampling event, follow-up actions etc.)

RioTinto

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GENERAL

LOCATION NAME: SSS-5-5 DATE (yyyy-mmm-dd): 2021-04-11 TIME (24:00): 1155

SAMPLED BY: BPA TYPE OF SAMPLE: Dust ☒ Water Quality ☐ QAQC: DUP

GPS COORDINATES (UTM): 533147 E 7146162 N (zone) 12

DESCRIPTION: Distance to Diavik 2 km & Direction S On: Land ☐ &/or Lake ☒

CLIMATE CONDITIONS

Air Temp: -22 °C Wind Direction: SE Wind Speed: 5 kts.

Dust in Area: Visible ☐ Not Visible ☒ Cloud Cover: 0% / 10% / 25% / 50% / 75% / 100%

Precipitation: Rain / Mist / Snow / N/A Snow Condition: Crystallized ☐ Packed ☒ Wet ☐ Dry ☐

	Core Number	Depth of Snow (cm)	Length of Snow Core (cm)	Weight of Tube & Core-SWE (cm)	Weight of Empty Tube-SWE (cm)	Water Content-SWE (cm)	Dust Present Yes/No	Comments (core weighed, bag #, changes in snow condition)
Dust Cores	1	57	57	60	38	22	Y N	
	2	57	57	59	38	21	Y N	
	3	56	50	57	38	19	Y N	
	4						Y N	
Dust (Min. of 3 cores – Total Water Content SWE =/> 25)								
Water Quality Cores	1						Y N	
	2						Y N	
	3						Y N	
	4						Y N	
	5						Y N	
	6						Y N	
	7						Y N	
	8						Y N	
	9						Y N	
	10						Y N	
	11						Y N	
	12						Y N	
Water Quality (Min. of 3 cores – Total Water Content SWE =/> 100)								

** Water Content$_{SWE}$ = Wt. of Tube & Core$_{SWE}$ – Wt. of Empty Tube$_{SWE}$ **

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Dust Sample Filters

Total Volume of Melted Snow: 1880 (mL)

Filter #	Weight of Filter (mg)	Filter + Residue (mg)	Residue Weight (mg)	Comments
1	124.5	131.3.	6.8	
2				
3				
4				
Totals	124.5	131.3	6.8	

Water Quality Bottles

Total Volume of Melted Snow:______________ (mL)

Filling Order	Analysis	Bottle Type	Triple Rinse	Sample Type *	Sample Type *	Sample Type *	Sample Comments DI Batch # for QAQC, Location preserved if not in field, label changes
1	Metals Total	60 mL Falcon Tube (x2)	Y	☐	☐	☐	
2	Metals Dissolved	60 mL Falcon Tube (x2)	Y	☐	☐	☐	
3	Total Mercury	40 mL clear glass (pre-preserved)	N	☐	☐	☐	
4	Nutrients	120 mL plastic (pre-preserved)	N	☐	☐	☐	
5	Ammonia	40 mL glass vial (pre-preserved)	N	☐	☐	☐	
6	Routine	1000 mL plastic	Y	☐	☐	☐	
7	TSS/Turb/pH	1000 mL plastic	Y	☐	☐	☐	

*Sample Type: GW, DUPW1/DUPW2, FBW, TBW, EBW, REP1/REP2, Filter Blank

Additional Information

Sample color, odor if applicable: (equipment issues, safety concerns, weather problems, changes during sampling event, follow-up actions etc.)

RioTinto

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GENERAL

LOCATION NAME: SSG-1 DATE (yyyy-mmm-dd): 2021-04-11 TIME (24:00): 1044

SAMPLED BY: BP PL TYPE OF SAMPLE: Dust [X] Water Quality [X] QAQC: NA

GPS COORDINATES (UTM): 534878 E 7144267 N (zone) 12W

DESCRIPTION: Distance to Diavik 5 km & Direction S On: Land [X] &/or Lake [ ]

CLIMATE CONDITIONS

Air Temp: -27 °C Wind Direction: E Wind Speed: 7 kts.

Dust in Area: Visible [ ] Not Visible [X] Cloud Cover: 0% / 10% / 25% / 50% / 75% / 100%

Precipitation: Rain / Mist / Snow / N/A Snow Condition: Crystallized [ ] Packed [X] Wet [ ] Dry [ ]

	Core Number	Depth of Snow (cm)	Length of Snow Core (cm)	Weight of Tube & Core-SWE (cm)	Weight of Empty Tube-SWE (cm)	Water Content-SWE (cm)	Dust Present Yes/No	Comments (core weighed, bag #, changes in snow condition)
Dust Cores	1	~~56~~ 58	55	56	38	18	Y N	lots of veg. matter in core
	2	40	34	50	38	12	Y N	
	3	~~58~~ 40	37	51	38	13	Y N	
	4						Y N	
Dust (Min. of 3 cores – Total Water Content SWE =/> 25)								
Water Quality Cores	1	57	47	55	38	17	Y N	
	2	41	38	52	38	14	Y N	
	3	54	48	56	38	18	Y N	
	4	54	34	51	38	13	Y N	
	5	59	44	55	38	17	Y N	
	6	58	47	56	38	18	Y N	
	7	57	49	56	38	18	Y N	
	8						Y N	
	9						Y N	
	10						Y N	
	11						Y N	
	12						Y N	
Water Quality (Min. of 3 cores – Total Water Content SWE =/> 100)								

** Water Content$_{SWE}$ = Wt. of Tube & Core$_{SWE}$ – Wt. of Empty Tube$_{SWE}$ **

RioTinto

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Dust Sample Filters

Total Volume of Melted Snow: 1280 (mL)

Filter #	Weight of Filter (mg)	Filter + Residue (mg)	Residue Weight (mg)	Comments
1	122.0	126.7	4.7	Lots of veg on sample before oven Some sample spilled over funnel, approx 5mL
2	129.4	124.0	1.6	Lots of veg on sample before oven
3				
4				
Totals	244.4	250.7	6.3	

Water Quality Bottles

Total Volume of Melted Snow: 3440 (mL)
1580
1860

Filling Order	Analysis	Bottle Type	Triple Rinse	Sample Type * GW	Sample Type *	Sample Type *	Sample Comments DI Batch # for QAQC, Location preserved if not in field, label changes
1	Metals Total	60 mL Falcon Tube (x2)	Y	☑	☐	☐	
2	Metals Dissolved	60 mL Falcon Tube (x2)	Y	☑	☐	☐	
3	Total Mercury	40 mL clear glass (pre-preserved)	N	☑	☐	☐	
4	Nutrients	120 mL plastic (pre-preserved)	N	☑	☐	☐	
5	Ammonia	40 mL glass vial (pre-preserved)	N	☑	☐	☐	
6	Routine	1000 mL plastic	Y	☑	☐	☐	
7	TSS/Turb/pH	1000 mL plastic	Y	☑	☐	☐	

*Sample Type: GW, DUPW1/DUPW2, FBW, TBW, EBW, REP1/REP2, Filter Blank

Additional Information

Sample color, odor if applicable: (equipment issues, safety concerns, weather problems, changes during sampling event, follow-up actions etc.)

Perchl collected
Combined both bags into one prior to decant into bottles.

RioTinto

Snow Sampling Field Sheet

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Area:	8000	Revision:	R9
Effective Date:	26-Mar-2012	By:	D. Dul
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GENERAL

LOCATION NAME: SSC-2 DATE (yyyy-mmm-dd): 2021-04-12 TIME (24:00): 1045

SAMPLED BY: BP PL TYPE OF SAMPLE: Dust ☒ Water Quality ☒ QAQC: N/A

GPS COORDINATES (UTM): 528715 E 7153284 N (zone) 12W

DESCRIPTION: Distance to Diavik 4 km & Direction E On: Land ☒ &/or Lake ☐

CLIMATE CONDITIONS

Air Temp: ______ °C Wind Direction: ________ Wind Speed: ________ kts.

Dust in Area: Visible ☐ Not Visible ☒ Cloud Cover: 0% / 10% / 25% / 50% / 75% / 100%

Precipitation: Rain / Mist / Snow / N/A Snow Condition: Crystallized ☐ Packed ☒ Wet ☐ Dry ☐

	Core Number	Depth of Snow (cm)	Length of Snow Core (cm)	Weight of Tube & Core-SWE (cm)	Weight of Empty Tube-SWE (cm)	Water Content-SWE (cm)	Dust Present Yes/No	Comments (core weighed, bag #, changes in snow condition)
Dust Cores	1	60	49	55	39	16	Y N	
	2	58	47	54	38	16	Y N	
	3	55	43	54	38	16	Y N	
	4						Y N	
Dust (Min. of 3 cores – Total Water Content SWE =/> 25)								
Water Quality Cores	1	58	43	52	38	14	Y N	
	2	55	52	56	39	17	Y N	
	3	53	50	55	38	17	Y N	
	4	51	43	53	39	14	Y N	
	5	45	42	52	39	13	Y N	
	6	57	54	56	38	18	Y N	
	7	55	50	56	38	18	Y N	
	8						Y N	
	9						Y N	
	10						Y N	
	11						Y N	
	12						Y N	
Water Quality (Min. of 3 cores – Total Water Content SWE =/> 100)								

** Water Content$_{SWE}$ = Wt. of Tube & Core$_{SWE}$ – Wt. of Empty Tube$_{SWE}$ **

RioTinto

Snow Sampling Field Sheet

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Dust Sample Filters

Total Volume of Melted Snow: 1460 (mL)

Filter #	Weight of Filter (mg)	Filter + Residue (mg)	Residue Weight (mg)	Comments
1	123.7	140.4	16.7	some veg on filter before oven
2				
3				
4				
Totals	123.7	140.4	16.7	

Water Quality Bottles

Total Volume of Melted Snow: 3300 (mL)
1800
1500

Filling Order	Analysis	Bottle Type	Triple Rinse	Sample Type * GW	Sample Type *	Sample Type *	Sample Comments DI Batch # for QAQC, Location preserved if not in field, label changes
1	Metals Total	60 mL Falcon Tube (x2)	Y	☑	☐	☐	
2	Metals Dissolved	60 mL Falcon Tube (x2)	Y	☑	☐	☐	
3	Total Mercury	40 mL clear glass (pre-preserved)	N	☑	☐	☐	
4	Nutrients	120 mL plastic (pre-preserved)	N	☑	☐	☐	
5	Ammonia	40 mL glass vial (pre-preserved)	N	☑	☐	☐	
6	Routine	1000 mL plastic	Y	☑	☐	☐	
7	TSS/Turb/pH	1000 mL plastic	Y	☑	☐	☐	

***Sample Type:** GW, DUPW1/DUPW2, FBW, TBW, EBW, REP1/REP2, Filter Blank

Additional Information

Sample color, odor if applicable: (equipment issues, safety concerns, weather problems, changes during sampling event, follow-up actions etc.)

perchl. collected
Leaky bag - Combined bags into one prior to decant to bottles.
Some piece of vegetation in 1L Routine bottle.

RioTinto

Snow Sampling Field Sheet

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Area:	8000	Revision:	R9
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GENERAL

LOCATION NAME: SSC-3-4 DATE (yyyy-mmm-dd): 2021-04-11 TIME (24:00): 0935

SAMPLED BY: BP PL TYPE OF SAMPLE: Dust ☒ Water Quality ☒ QAQC: DUP2 Dust+W

GPS COORDINATES (UTM): 538648 E 7148749 N (zone) 12W

DESCRIPTION: Distance to Diavik 4 km & Direction SE On: Land ☒ &/or Lake ☐

CLIMATE CONDITIONS

Air Temp: -27 °C Wind Direction: E Wind Speed: 7 kts.

Dust in Area: Visible ☐ Not Visible ☒ Cloud Cover: 0% / 10% / 25% / 50% / 75% / 100%

Precipitation: Rain / Mist / Snow / N/A Snow Condition: Crystallized ☐ Packed ☒ Wet ☐ Dry ☐

	Core Number	Depth of Snow (cm)	Length of Snow Core (cm)	Weight of Tube & Core-SWE (cm)	Weight of Empty Tube-SWE (cm)	Water Content-SWE (cm)	Dust Present Yes/No	Comments (core weighed, bag #, changes in snow condition)
Dust Cores	1	62	59	58	38	20	N	
	2	65	58	57	38	19	N	
	3	59	57	57	38	19	N	
	4						Y N	
Dust (Min. of 3 cores – Total Water Content SWE =/> 25)								
Water Quality Cores	1	58	56	56	39	17	N	
	2	60	57	57	39	18	N	
	3	58	53	56	38	18	N	
	4	61	60	59	38	21	N	
	5	60	58	58	39	19	N	
	6	57	53	56	39	17	N	
	7						Y N	
	8						Y N	
	9						Y N	
	10						Y N	
	11						Y N	
	12						Y N	
Water Quality (Min. of 3 cores – Total Water Content SWE =/> 100)								

** Water Content$_{SWE}$ = Wt. of Tube & Core$_{SWE}$ – Wt. of Empty Tube$_{SWE}$ **

Snow Sampling Field Sheet			
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Dust Sample Filters

Total Volume of Melted Snow: 1755 (mL)

Filter #	Weight of Filter (mg)	Filter + Residue (mg)	Residue Weight (mg)	Comments
1	116.1	126.2	10.1	Double bagged, leaked in 2nd bag
2				
3				
4				
Totals	116.1	126.2	10.1	

Water Quality Bottles

Total Volume of Melted Snow:__________ (mL)

Filling Order	Analysis	Bottle Type	Triple Rinse	Sample Type *	Sample Type *	Sample Type *	Sample Comments **DI Batch # for QAQC,** Location preserved if not in field, label changes
1	Metals Total	60 mL Falcon Tube (x2)	Y	☐	☐	☐	
2	Metals Dissolved	60 mL Falcon Tube (x2)	Y	☐	☐	☐	
3	Total Mercury	40 mL clear glass (pre-preserved)	N	☐	☐	☐	
4	Nutrients	120 mL plastic (pre-preserved)	N	☐	☐	☐	
5	Ammonia	40 mL glass vial (pre-preserved)	N	☐	☐	☐	
6	Routine	1000 mL plastic	Y	☐	☐	☐	
7	TSS/Turb/pH	1000 mL plastic	Y	☐	☐	☐	

***Sample Type:** GW, DUPW1/DUPW2, FBW, TBW, EBW, REP1/REP2, Filter Blank

Additional Information

Sample color, odor if applicable: (equipment issues, safety concerns, weather problems, changes during sampling event, follow-up actions etc.)

RioTinto

Snow Sampling Field Sheet

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GENERAL

LOCATION NAME: SSC-3-5 DATE (yyyy-mmm-dd): 2021-04-11 TIME (24:00): 0954

SAMPLED BY: BP PL TYPE OF SAMPLE: Dust ☒ Water Quality ☒ QAQC: DUP2

GPS COORDINATES (UTM): 538644 E 7148749 N (zone) 12W

DESCRIPTION: Distance to Diavik 4 km & Direction SE On: Land ☒ &/or Lake ☐

CLIMATE CONDITIONS

Air Temp: -27 °C Wind Direction: E Wind Speed: 7 kts.

Dust in Area: Visible ☐ Not Visible ☒

Cloud Cover: 0% / 10% / 25% / 50% / 75% / 100%

Precipitation: Rain / Mist / Snow / N/A

Snow Condition: Crystallized ☐ Packed ☒ Wet ☐ Dry ☐

	Core Number	Depth of Snow (cm)	Length of Snow Core (cm)	Weight of Tube & Core-SWE (cm)	Weight of Empty Tube-SWE (cm)	Water Content-SWE (cm)	Dust Present Yes/No	Comments (core weighed, bag #, changes in snow condition)
Dust Cores	1	57	54	56	38	18	Y N	
	2	56	54	56	38	12	Y N	
	3	57	54	56	38	12	Y N	
	4						Y N	
Dust (Min. of 3 cores – Total Water Content SWE =/> 25)								
Water Quality Cores	1	53	51	55	38	17	Y N	
	2	61	59	58	39	19	Y N	
	3	54	52	55	38	17	Y N	
	4	55	53	55	38	17	Y N	
	5	51	51	55	38	17	Y N	
	6	60	58	58	39	19	Y N	
	7						Y N	
	8						Y N	
	9						Y N	
	10						Y N	
	11						Y N	
	12						Y N	
Water Quality (Min. of 3 cores – Total Water Content SWE =/> 100)								

** Water Content$_{SWE}$ = Wt. of Tube & Core$_{SWE}$ – Wt. of Empty Tube$_{SWE}$ **

RioTinto

Snow Sampling Field Sheet

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Dust Sample Filters

Total Volume of Melted Snow: 1575 (mL)

Filter #	Weight of Filter (mg)	Filter + Residue (mg)	Residue Weight (mg)	Comments
1	118.2	127.2	9.0	
2				
3				
4				
Totals	118.2	127.2	9.0	

Water Quality Bottles

Total Volume of Melted Snow:______________ (mL)

Filling Order	Analysis	Bottle Type	Triple Rinse	Sample Type *	Sample Type *	Sample Type *	Sample Comments DI Batch # for QAQC, Location preserved if not in field, label changes
1	Metals Total	60 mL Falcon Tube (x2)	Y	☐	☐	☐	
2	Metals Dissolved	60 mL Falcon Tube (x2)	Y	☐	☐	☐	
3	Total Mercury	40 mL clear glass (pre-preserved)	N	☐	☐	☐	
4	Nutrients	120 mL plastic (pre-preserved)	N	☐	☐	☐	
5	Ammonia	40 mL glass vial (pre-preserved)	N	☐	☐	☐	
6	Routine	1000 mL plastic	Y	☐	☐	☐	
7	TSS/Turb/pH	1000 mL plastic	Y	☐	☐	☐	

***Sample Type:** GW, DUPW1/DUPW2, FBW, TBW, EBW, REP1/REP2, Filter Blank

Additional Information

Sample color, odor if applicable: (equipment issues, safety concerns, weather problems, changes during sampling event, follow-up actions etc.)

RioTinto

Snow Sampling Field Sheet

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GENERAL

LOCATION NAME: SS Bay **DATE (yyyy-mmm-dd):** 2021-04-18 **TIME (24:00):** 1630

SAMPLED BY: SS2 AH **TYPE OF SAMPLE:** Dust ☒ Water Quality ☒ **QAQC:** EBW

GPS COORDINATES (UTM): — E — N (zone) —

DESCRIPTION: Distance to Diavik — km & Direction — On: Land ☐ &/or Lake ☐

CLIMATE CONDITIONS

Air Temp: — °C **Wind Direction:** — **Wind Speed:** — kts.

Dust in Area: Visible ☐ Not Visible ☐ **Cloud Cover:** 0% / 10% / 25% / 50% / 75% / 100%

Precipitation: Rain / Mist / Snow / N/A **Snow Condition:** Crystallized ☐ Packed ☐ Wet ☐ Dry ☐

	Core Number	Depth of Snow (cm)	Length of Snow Core (cm)	Weight of Tube & Core-SWE (cm)	Weight of Empty Tube-SWE (cm)	Water Content-SWE (cm)	Dust Present Yes/No	Comments (core weighed, bag #, changes in snow condition)
Dust Cores	1						Y N	
	2						Y N	
	3						Y N	
	4						Y N	
Dust (Min. of 3 cores – Total Water Content SWE =/> 25)								
Water Quality Cores	1						Y N	
	2						Y N	
	3						Y N	
	4						Y N	
	5						Y N	
	6						Y N	
	7						Y N	
	8						Y N	
	9						Y N	
	10						Y N	
	11						Y N	
	12						Y N	
Water Quality (Min. of 3 cores – Total Water Content SWE =/> 100)								

**** Water Content$_{SWE}$ = Wt. of Tube & Core$_{SWE}$ – Wt. of Empty Tube$_{SWE}$ ****

RioTinto

Snow Sampling Field Sheet

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Dust Sample Filters

Total Volume of Melted Snow: 1335 (mL)

Filter #	Weight of Filter (mg)	Filter + Residue (mg)	Residue Weight (mg)	Comments
1	124.3	124.3	0	Actual reading 124.1 mg
2				
3				
4				
Totals	124.3	124.3	0	

Water Quality Bottles

Total Volume of Melted Snow: 2480 (mL)

Filling Order	Analysis	Bottle Type	Triple Rinse	Sample Type *	Sample Type *	Sample Type *	Sample Comments DI Batch # for QAQC, Location preserved if not in field, label changes
1	Metals Total	60 mL Falcon Tube (x2)	Y	☑	☐	☐	
2	Metals Dissolved	60 mL Falcon Tube (x2)	Y	☑	☐	☐	
3	Total Mercury	40 mL clear glass (pre-preserved)	N	☑	☐	☐	
4	Nutrients	120 mL plastic (pre-preserved)	N	☑	☐	☐	
5	Ammonia	40 mL glass vial (pre-preserved)	N	☑	☐	☐	
6	Routine	1000 mL plastic	Y	☑	☐	☐	
7	TSS/Turb/pH	1000 mL plastic	Y	☑	☐	☐	
	Perchlorate	60mL plastic		✓			

*Sample Type: GW, DUPW1/DUPW2, FBW, TBW, EBW, REP1/REP2, Filter Blank

Additional Information

Sample color, odor if applicable: (equipment issues, safety concerns, weather problems, changes during sampling event, follow-up actions etc.)

DI Lot # 210401 from BV

RioTinto

Snow Sampling Field Sheet

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Area:	8000	Revision:	R9
Effective Date:	26-Mar-2012	By:	D. Dul
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GENERAL

LOCATION NAME: SS EBW DATE (yyyy-mmm-dd): 2021-04-18 TIME (24:00): 16:15

SAMPLED BY: SS2 AH TYPE OF SAMPLE: Dust ☒ Water Quality ☒ QAQC: EBW

GPS COORDINATES (UTM): — E — N (zone) —

DESCRIPTION: Distance to Diavik — km & Direction — On: Land ☐ &/or Lake ☐

CLIMATE CONDITIONS

Air Temp: ______ °C Wind Direction: ______ Wind Speed: ______ kts.

Dust in Area: Visible ☐ Not Visible ☐ Cloud Cover: 0% / 10% / 25% / 50% / 75% / 100%

Precipitation: Rain / Mist / Snow / N/A Snow Condition: Crystallized ☐ Packed ☐ Wet ☐ Dry ☐

	Core Number	Depth of Snow (cm)	Length of Snow Core (cm)	Weight of Tube & Core-SWE (cm)	Weight of Empty Tube-SWE (cm)	Water Content-SWE (cm)	Dust Present Yes/No	Comments (core weighed, bag #, changes in snow condition)
Dust Cores	1						Y N	
	2						Y N	
	3						Y N	
	4						Y N	
Dust (Min. of 3 cores – Total Water Content SWE =/> 25)								
Water Quality Cores	1						Y N	
	2						Y N	
	3						Y N	
	4						Y N	
	5						Y N	
	6						Y N	
	7						Y N	
	8						Y N	
	9						Y N	
	10						Y N	
	11						Y N	
	12						Y N	
Water Quality (Min. of 3 cores – Total Water Content SWE =/> 100)								

**** Water Content$_{SWE}$ = Wt. of Tube & Core$_{SWE}$ – Wt. of Empty Tube$_{SWE}$ ****

RioTinto

Snow Sampling Field Sheet

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Dust Sample Filters

Total Volume of Melted Snow: 2075 (mL)

Filter #	Weight of Filter (mg)	Filter + Residue (mg)	Residue Weight (mg)	Comments
1	125.3	125.3	0	Actual reading 124.5 mg
2				
3				
4				
Totals	125.3	125.3	0	

Water Quality Bottles

Total Volume of Melted Snow: 2235 (mL)

Filling Order	Analysis	Bottle Type	Triple Rinse	Sample Type *	Sample Type *	Sample Type *	Sample Comments DI Batch # for QAQC, Location preserved if not in field, label changes
1	Metals Total	60 mL Falcon Tube (x2)	Y	☑	☐	☐	
2	Metals Dissolved	60 mL Falcon Tube (x2)	Y	☑	☐	☐	
3	Total Mercury	40 mL clear glass (pre-preserved)	N	☑	☐	☐	
4	Nutrients	120 mL plastic (pre-preserved)	N	☑	☐	☐	
5	Ammonia	40 mL glass vial (pre-preserved)	N	☑	☐	☐	
6	Routine	1000 mL plastic	Y	☑	☐	☐	
7	TSS/Turb/pH	1000 mL plastic	Y	☑	☐	☐	
	Perchlorate	60 mL Plastic		✓			

*Sample Type: GW, DUPW1/DUPW2, FBW, TBW, EBW, REP1/REP2, Filter Blank

Additional Information

Sample color, odor if applicable: (equipment issues, safety concerns, weather problems, changes during sampling event, follow-up actions etc.)

DI Lot # 210401 from BV

APPENDIX D SNOW WATER CHEMISTRY ANALYTICAL RESULTS

Appendix D: Snow Water Chemistry Analytical Results

Parameter	Unit	Sample Point	Date	Data Point	Graphable Value	Lab Ref	Sample Type
Acidity (pH 4.5)	mg/L	CONTROL 1	4/11/2021	<1.0	0.5	ZQ8672	GW
	mg/L	CONTROL 2	4/12/2021	<1.0	0.5	ZQ8673	GW
	mg/L	CONTROL 3	4/11/2021	<1.0	0.5	ZQ8674	Dup 1
	mg/L	CONTROL 3	4/11/2021	<1.0	0.5	ZQ8679	Dup 2
	mg/L	SS BAG	4/18/2021	<1.0	0.5	ZQ8675	BAG
	mg/L	SS BAG	4/18/2021	<1.0	0.5	ZQ8676	EBW
	mg/L	SS1-4	4/10/2021	<1.0	0.5	ZQ8656	Dup 1
	mg/L	SS1-4	4/10/2021	<1.0	0.5	ZQ8678	Dup 2
	mg/L	SS1-5	4/10/2021	<1.0	0.5	ZQ8657	GW
	mg/L	SS2-1	4/9/2021	<1.0	0.5	ZQ8658	GW
	mg/L	SS2-2	4/9/2021	<1.0	0.5	ZQ8659	GW
	mg/L	SS2-3	4/9/2021	<1.0	0.5	ZQ8660	GW
	mg/L	SS2-4	4/9/2021	<1.0	0.5	ZQ8661	GW
	mg/L	SS3-4	4/11/2021	<1.0	0.5	ZQ8662	GW
	mg/L	SS3-5	4/11/2021	<1.0	0.5	ZQ8663	GW
	mg/L	SS3-6	4/11/2021	<1.0	0.5	ZQ8664	GW
	mg/L	SS3-7	4/11/2021	<1.0	0.5	ZQ8665	Dup 1
	mg/L	SS3-7	4/11/2021	<1.0	0.5	ZQ8677	Dup 2
	mg/L	SS3-8	4/11/2021	<1.0	0.5	ZQ8666	GW
	mg/L	SS4-4	4/12/2021	<1.0	0.5	ZQ8667	GW
	mg/L	SS4-5	4/12/2021	<1.0	0.5	ZQ8668	GW
	mg/L	SS5-3	4/11/2021	<1.0	0.5	ZQ8669	GW
	mg/L	SS5-4	4/11/2021	<1.0	0.5	ZQ8670	GW
	mg/L	SS5-5	4/11/2021	<1.0	0.5	ZQ8671	GW
Acidity (pH 8.3)	mg/L	CONTROL 1	4/11/2021	1.4	1.4	ZQ8672	GW
	mg/L	CONTROL 2	4/12/2021	1	1	ZQ8673	GW
	mg/L	CONTROL 3	4/11/2021	1.3	1.3	ZQ8674	Dup 1
	mg/L	CONTROL 3	4/11/2021	1.2	1.2	ZQ8679	Dup 2
	mg/L	SS BAG	4/18/2021	1.2	1.2	ZQ8675	BAG
	mg/L	SS BAG	4/18/2021	<1.0	0.5	ZQ8676	EBW
	mg/L	SS1-4	4/10/2021	1.4	1.4	ZQ8656	Dup 1
	mg/L	SS1-4	4/10/2021	1.4	1.4	ZQ8678	Dup 2
	mg/L	SS1-5	4/10/2021	1.5	1.5	ZQ8657	GW
	mg/L	SS2-1	4/9/2021	1.1	1.1	ZQ8658	GW
	mg/L	SS2-2	4/9/2021	1.2	1.2	ZQ8659	GW
	mg/L	SS2-3	4/9/2021	1.6	1.6	ZQ8660	GW
	mg/L	SS2-4	4/9/2021	1.2	1.2	ZQ8661	GW
	mg/L	SS3-4	4/11/2021	1.4	1.4	ZQ8662	GW
	mg/L	SS3-5	4/11/2021	1.3	1.3	ZQ8663	GW
	mg/L	SS3-6	4/11/2021	1.4	1.4	ZQ8664	GW
	mg/L	SS3-7	4/11/2021	1.5	1.5	ZQ8665	Dup 1
	mg/L	SS3-7	4/11/2021	1.4	1.4	ZQ8677	Dup 2
	mg/L	SS3-8	4/11/2021	1.3	1.3	ZQ8666	GW
	mg/L	SS4-4	4/12/2021	1.2	1.2	ZQ8667	GW
	mg/L	SS4-5	4/12/2021	1.4	1.4	ZQ8668	GW
	mg/L	SS5-3	4/11/2021	1	1	ZQ8669	GW
	mg/L	SS5-4	4/11/2021	1.3	1.3	ZQ8670	GW
	mg/L	SS5-5	4/11/2021	1.2	1.2	ZQ8671	GW

Appendix D: Snow Water Chemistry Analytical Results

Parameter	Unit	Sample Point	Date	Data Point	Graphable Value	Lab Ref	Sample Type
Alkalinity (PP as $CaCO_3$)	mg/L	CONTROL 1	4/11/2021	<0.50	0.25	ZQ8672	GW
	mg/L	CONTROL 2	4/12/2021	<0.50	0.25	ZQ8673	GW
	mg/L	CONTROL 3	4/11/2021	<0.50	0.25	ZQ8674	Dup 1
	mg/L	CONTROL 3	4/11/2021	<0.50	0.25	ZQ8679	Dup 2
	mg/L	SS BAG	4/18/2021	<0.50	0.25	ZQ8675	BAG
	mg/L	SS BAG	4/18/2021	<0.50	0.25	ZQ8676	EBW
	mg/L	SS1-4	4/10/2021	<0.50	0.25	ZQ8656	Dup 1
	mg/L	SS1-4	4/10/2021	<0.50	0.25	ZQ8678	Dup 2
	mg/L	SS1-5	4/10/2021	<0.50	0.25	ZQ8657	GW
	mg/L	SS2-1	4/9/2021	<0.50	0.25	ZQ8658	GW
	mg/L	SS2-2	4/9/2021	<0.50	0.25	ZQ8659	GW
	mg/L	SS2-3	4/9/2021	<0.50	0.25	ZQ8660	GW
	mg/L	SS2-4	4/9/2021	<0.50	0.25	ZQ8661	GW
	mg/L	SS3-4	4/11/2021	<0.50	0.25	ZQ8662	GW
	mg/L	SS3-5	4/11/2021	<0.50	0.25	ZQ8663	GW
	mg/L	SS3-6	4/11/2021	<0.50	0.25	ZQ8664	GW
	mg/L	SS3-7	4/11/2021	<0.50	0.25	ZQ8665	Dup 1
	mg/L	SS3-7	4/11/2021	<0.50	0.25	ZQ8677	Dup 2
	mg/L	SS3-8	4/11/2021	<0.50	0.25	ZQ8666	GW
	mg/L	SS4-4	4/12/2021	<0.50	0.25	ZQ8667	GW
	mg/L	SS4-5	4/12/2021	<0.50	0.25	ZQ8668	GW
	mg/L	SS5-3	4/11/2021	<0.50	0.25	ZQ8669	GW
	mg/L	SS5-4	4/11/2021	<0.50	0.25	ZQ8670	GW
	mg/L	SS5-5	4/11/2021	<0.50	0.25	ZQ8671	GW
Alkalinity (Total as $CaCO_3$) - Total	mg/L	CONTROL 1	4/11/2021	0.53	0.53	ZQ8672	GW
	mg/L	CONTROL 2	4/12/2021	1.28	1.28	ZQ8673	GW
	mg/L	CONTROL 3	4/11/2021	<0.50	0.25	ZQ8674	Dup 1
	mg/L	CONTROL 3	4/11/2021	0.56	0.56	ZQ8679	Dup 2
	mg/L	SS BAG	4/18/2021	0.87	0.87	ZQ8675	BAG
	mg/L	SS BAG	4/18/2021	0.85	0.85	ZQ8676	EBW
	mg/L	SS1-4	4/10/2021	<0.50	0.25	ZQ8656	Dup 1
	mg/L	SS1-4	4/10/2021	0.63	0.63	ZQ8678	Dup 2
	mg/L	SS1-5	4/10/2021	0.82	0.82	ZQ8657	GW
	mg/L	SS2-1	4/9/2021	<0.50	0.25	ZQ8658	GW
	mg/L	SS2-2	4/9/2021	0.86	0.86	ZQ8659	GW
	mg/L	SS2-3	4/9/2021	0.87	0.87	ZQ8660	GW
	mg/L	SS2-4	4/9/2021	0.56	0.56	ZQ8661	GW
	mg/L	SS3-4	4/11/2021	<0.50	0.25	ZQ8662	GW
	mg/L	SS3-5	4/11/2021	<0.50	0.25	ZQ8663	GW
	mg/L	SS3-6	4/11/2021	2.75	2.75	ZQ8664	GW
	mg/L	SS3-7	4/11/2021	1.12	1.12	ZQ8665	Dup 1
	mg/L	SS3-7	4/11/2021	2.12	2.12	ZQ8677	Dup 2
	mg/L	SS3-8	4/11/2021	1.65	1.65	ZQ8666	GW
	mg/L	SS4-4	4/12/2021	0.91	0.91	ZQ8667	GW
	mg/L	SS4-5	4/12/2021	1.69	1.69	ZQ8668	GW
	mg/L	SS5-3	4/11/2021	0.67	0.67	ZQ8669	GW
	mg/L	SS5-4	4/11/2021	1.64	1.64	ZQ8670	GW
	mg/L	SS5-5	4/11/2021	0.85	0.85	ZQ8671	GW

Appendix D: Snow Water Chemistry Analytical Results

Parameter	Unit	Sample Point	Date	Data Point	Graphable Value	Lab Ref	Sample Type
Aluminum (Al) - Dissolved	ug/L	CONTROL 1	4/11/2021	35	35	ZQ8672	GW
	ug/L	CONTROL 2	4/12/2021	109	109	ZQ8673	GW
	ug/L	CONTROL 3	4/11/2021	1.96	1.96	ZQ8674	Dup 1
	ug/L	CONTROL 3	4/11/2021	79.1	79.1	ZQ8679	Dup 2
	ug/L	SS BAG	4/18/2021	<0.20	0.1	ZQ8675	BAG
	ug/L	SS BAG	4/18/2021	1.7	1.7	ZQ8676	EBW
	ug/L	SS1-4	4/10/2021	147	147	ZQ8656	Dup 1
	ug/L	SS1-4	4/10/2021	150	150	ZQ8678	Dup 2
	ug/L	SS1-5	4/10/2021	29.8	29.8	ZQ8657	GW
	ug/L	SS2-1	4/9/2021	1.8	1.8	ZQ8658	GW
	ug/L	SS2-2	4/9/2021	1.64	1.64	ZQ8659	GW
	ug/L	SS2-3	4/9/2021	37.2	37.2	ZQ8660	GW
	ug/L	SS2-4	4/9/2021	2.35	2.35	ZQ8661	GW
	ug/L	SS3-4	4/11/2021	222	222	ZQ8662	GW
	ug/L	SS3-5	4/11/2021	91.1	91.1	ZQ8663	GW
	ug/L	SS3-6	4/11/2021	1500	1500	ZQ8664	GW
	ug/L	SS3-7	4/11/2021	7.73	7.73	ZQ8665	Dup 1
	ug/L	SS3-7	4/11/2021	301	301	ZQ8677	Dup 2
	ug/L	SS3-8	4/11/2021	2.88	2.88	ZQ8666	GW
	ug/L	SS4-4	4/12/2021	11.2	11.2	ZQ8667	GW
	ug/L	SS4-5	4/12/2021	5.7	5.7	ZQ8668	GW
	ug/L	SS5-3	4/11/2021	20.2	20.2	ZQ8669	GW
	ug/L	SS5-4	4/11/2021	4.14	4.14	ZQ8670	GW
	ug/L	SS5-5	4/11/2021	1.96	1.96	ZQ8671	GW
Aluminum (Al) - Total	ug/L	CONTROL 1	4/11/2021	93.4	93.4	ZQ8672	GW
	ug/L	CONTROL 2	4/12/2021	461	461	ZQ8673	GW
	ug/L	CONTROL 3	4/11/2021	234	234	ZQ8674	Dup 1
	ug/L	CONTROL 3	4/11/2021	232	232	ZQ8679	Dup 2
	ug/L	SS BAG	4/18/2021	<0.20	0.1	ZQ8675	BAG
	ug/L	SS BAG	4/18/2021	2.78	2.78	ZQ8676	EBW
	ug/L	SS1-4	4/10/2021	143	143	ZQ8656	Dup 1
	ug/L	SS1-4	4/10/2021	176	176	ZQ8678	Dup 2
	ug/L	SS1-5	4/10/2021	101	101	ZQ8657	GW
	ug/L	SS2-1	4/9/2021	336	336	ZQ8658	GW
	ug/L	SS2-2	4/9/2021	144	144	ZQ8659	GW
	ug/L	SS2-3	4/9/2021	136	136	ZQ8660	GW
	ug/L	SS2-4	4/9/2021	81	81	ZQ8661	GW
	ug/L	SS3-4	4/11/2021	280	280	ZQ8662	GW
	ug/L	SS3-5	4/11/2021	116	116	ZQ8663	GW
	ug/L	SS3-6	4/11/2021	3360	3360	ZQ8664	GW
	ug/L	SS3-7	4/11/2021	809	809	ZQ8665	Dup 1
	ug/L	SS3-7	4/11/2021	952	952	ZQ8677	Dup 2
	ug/L	SS3-8	4/11/2021	771	771	ZQ8666	GW
	ug/L	SS4-4	4/12/2021	580	580	ZQ8667	GW
	ug/L	SS4-5	4/12/2021	660	660	ZQ8668	GW
	ug/L	SS5-3	4/11/2021	1550	1550	ZQ8669	GW
	ug/L	SS5-4	4/11/2021	460	460	ZQ8670	GW
	ug/L	SS5-5	4/11/2021	130	130	ZQ8671	GW

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Parameter	Unit	Sample Point	Date	Data Point	Graphable Value	Lab Ref	Sample Type
Ammonia (N)	mg/L	CONTROL 1	4/11/2021	0.022	0.022	ZQ8672	GW
	mg/L	CONTROL 2	4/12/2021	0.029	0.029	ZQ8673	GW
	mg/L	CONTROL 3	4/11/2021	0.018	0.018	ZQ8674	Dup 1
	mg/L	CONTROL 3	4/11/2021	0.017	0.017	ZQ8679	Dup 2
	mg/L	SS BAG	4/18/2021	<0.0050	0.00025	ZQ8675	BAG
	mg/L	SS BAG	4/18/2021	0.0082	0.0082	ZQ8676	EBW
	mg/L	SS1-4	4/10/2021	0.021	0.021	ZQ8656	Dup 1
	mg/L	SS1-4	4/10/2021	0.021	0.021	ZQ8678	Dup 2
	mg/L	SS1-5	4/10/2021	0.021	0.021	ZQ8657	GW
	mg/L	SS2-1	4/9/2021	0.03	0.03	ZQ8658	GW
	mg/L	SS2-2	4/9/2021	0.021	0.021	ZQ8659	GW
	mg/L	SS2-3	4/9/2021	0.02	0.02	ZQ8660	GW
	mg/L	SS2-4	4/9/2021	0.021	0.021	ZQ8661	GW
	mg/L	SS3-4	4/11/2021	0.022	0.022	ZQ8662	GW
	mg/L	SS3-5	4/11/2021	0.021	0.021	ZQ8663	GW
	mg/L	SS3-6	4/11/2021	0.07	0.07	ZQ8664	GW
	mg/L	SS3-7	4/11/2021	0.038	0.038	ZQ8665	Dup 1
	mg/L	SS3-7	4/11/2021	0.034	0.034	ZQ8677	Dup 2
	mg/L	SS3-8	4/11/2021	0.033	0.033	ZQ8666	GW
	mg/L	SS4-4	4/12/2021	0.035	0.035	ZQ8667	GW
	mg/L	SS4-5	4/12/2021	0.032	0.032	ZQ8668	GW
	mg/L	SS5-3	4/11/2021	0.028	0.028	ZQ8669	GW
	mg/L	SS5-4	4/11/2021	0.021	0.021	ZQ8670	GW
	mg/L	SS5-5	4/11/2021	0.014	0.014	ZQ8671	GW
Antimony (Sb) - Dissolved	ug/L	CONTROL 1	4/11/2021	<0.020	0.01	ZQ8672	GW
	ug/L	CONTROL 2	4/12/2021	<0.020	0.01	ZQ8673	GW
	ug/L	CONTROL 3	4/11/2021	<0.020	0.01	ZQ8674	Dup 1
	ug/L	CONTROL 3	4/11/2021	<0.020	0.01	ZQ8679	Dup 2
	ug/L	SS BAG	4/18/2021	<0.020	0.01	ZQ8675	BAG
	ug/L	SS BAG	4/18/2021	<0.020	0.01	ZQ8676	EBW
	ug/L	SS1-4	4/10/2021	<0.020	0.01	ZQ8656	Dup 1
	ug/L	SS1-4	4/10/2021	<0.020	0.01	ZQ8678	Dup 2
	ug/L	SS1-5	4/10/2021	<0.020	0.01	ZQ8657	GW
	ug/L	SS2-1	4/9/2021	<0.020	0.01	ZQ8658	GW
	ug/L	SS2-2	4/9/2021	<0.020	0.01	ZQ8659	GW
	ug/L	SS2-3	4/9/2021	<0.020	0.01	ZQ8660	GW
	ug/L	SS2-4	4/9/2021	<0.020	0.01	ZQ8661	GW
	ug/L	SS3-4	4/11/2021	<0.020	0.01	ZQ8662	GW
	ug/L	SS3-5	4/11/2021	<0.020	0.01	ZQ8663	GW
	ug/L	SS3-6	4/11/2021	0.026	0.026	ZQ8664	GW
	ug/L	SS3-7	4/11/2021	<0.020	0.01	ZQ8665	Dup 1
	ug/L	SS3-7	4/11/2021	<0.020	0.01	ZQ8677	Dup 2
	ug/L	SS3-8	4/11/2021	<0.020	0.01	ZQ8666	GW
	ug/L	SS4-4	4/12/2021	<0.020	0.01	ZQ8667	GW
	ug/L	SS4-5	4/12/2021	<0.020	0.01	ZQ8668	GW
	ug/L	SS5-3	4/11/2021	<0.020	0.01	ZQ8669	GW
	ug/L	SS5-4	4/11/2021	<0.020	0.01	ZQ8670	GW
	ug/L	SS5-5	4/11/2021	<0.020	0.01	ZQ8671	GW

Appendix D: Snow Water Chemistry Analytical Results

Parameter	Unit	Sample Point	Date	Data Point	Graphable Value	Lab Ref	Sample Type
Antimony (Sb) - Total	ug/L	CONTROL 1	4/11/2021	<0.020	0.01	ZQ8672	GW
	ug/L	CONTROL 2	4/12/2021	<0.020	0.01	ZQ8673	GW
	ug/L	CONTROL 3	4/11/2021	<0.020	0.01	ZQ8674	Dup 1
	ug/L	CONTROL 3	4/11/2021	<0.020	0.01	ZQ8679	Dup 2
	ug/L	SS BAG	4/18/2021	<0.020	0.01	ZQ8675	BAG
	ug/L	SS BAG	4/18/2021	<0.020	0.01	ZQ8676	EBW
	ug/L	SS1-4	4/10/2021	<0.020	0.01	ZQ8656	Dup 1
	ug/L	SS1-4	4/10/2021	0.023	0.023	ZQ8678	Dup 2
	ug/L	SS1-5	4/10/2021	<0.020	0.01	ZQ8657	GW
	ug/L	SS2-1	4/9/2021	<0.020	0.01	ZQ8658	GW
	ug/L	SS2-2	4/9/2021	<0.020	0.01	ZQ8659	GW
	ug/L	SS2-3	4/9/2021	<0.020	0.01	ZQ8660	GW
	ug/L	SS2-4	4/9/2021	<0.020	0.01	ZQ8661	GW
	ug/L	SS3-4	4/11/2021	<0.020	0.01	ZQ8662	GW
	ug/L	SS3-5	4/11/2021	<0.020	0.01	ZQ8663	GW
	ug/L	SS3-6	4/11/2021	0.045	0.045	ZQ8664	GW
	ug/L	SS3-7	4/11/2021	<0.020	0.01	ZQ8665	Dup 1
	ug/L	SS3-7	4/11/2021	0.023	0.023	ZQ8677	Dup 2
	ug/L	SS3-8	4/11/2021	<0.020	0.01	ZQ8666	GW
	ug/L	SS4-4	4/12/2021	<0.020	0.01	ZQ8667	GW
	ug/L	SS4-5	4/12/2021	<0.020	0.01	ZQ8668	GW
	ug/L	SS5-3	4/11/2021	<0.020	0.01	ZQ8669	GW
	ug/L	SS5-4	4/11/2021	<0.020	0.01	ZQ8670	GW
	ug/L	SS5-5	4/11/2021	<0.020	0.01	ZQ8671	GW
Arsenic (As) - Dissolved	ug/L	CONTROL 1	4/11/2021	<0.020	0.01	ZQ8672	GW
	ug/L	CONTROL 2	4/12/2021	0.052	0.052	ZQ8673	GW
	ug/L	CONTROL 3	4/11/2021	0.022	0.022	ZQ8674	Dup 1
	ug/L	CONTROL 3	4/11/2021	0.033	0.033	ZQ8679	Dup 2
	ug/L	SS BAG	4/18/2021	<0.020	0.01	ZQ8675	BAG
	ug/L	SS BAG	4/18/2021	<0.020	0.01	ZQ8676	EBW
	ug/L	SS1-4	4/10/2021	0.023	0.023	ZQ8656	Dup 1
	ug/L	SS1-4	4/10/2021	0.039	0.039	ZQ8678	Dup 2
	ug/L	SS1-5	4/10/2021	0.025	0.025	ZQ8657	GW
	ug/L	SS2-1	4/9/2021	0.034	0.034	ZQ8658	GW
	ug/L	SS2-2	4/9/2021	0.03	0.03	ZQ8659	GW
	ug/L	SS2-3	4/9/2021	0.029	0.029	ZQ8660	GW
	ug/L	SS2-4	4/9/2021	0.044	0.044	ZQ8661	GW
	ug/L	SS3-4	4/11/2021	0.047	0.047	ZQ8662	GW
	ug/L	SS3-5	4/11/2021	0.053	0.053	ZQ8663	GW
	ug/L	SS3-6	4/11/2021	0.225	0.225	ZQ8664	GW
	ug/L	SS3-7	4/11/2021	0.033	0.033	ZQ8665	Dup 1
	ug/L	SS3-7	4/11/2021	0.067	0.067	ZQ8677	Dup 2
	ug/L	SS3-8	4/11/2021	0.044	0.044	ZQ8666	GW
	ug/L	SS4-4	4/12/2021	0.025	0.025	ZQ8667	GW
	ug/L	SS4-5	4/12/2021	0.03	0.03	ZQ8668	GW
	ug/L	SS5-3	4/11/2021	0.068	0.068	ZQ8669	GW
	ug/L	SS5-4	4/11/2021	0.038	0.038	ZQ8670	GW
	ug/L	SS5-5	4/11/2021	<0.020	0.01	ZQ8671	GW

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Parameter	Unit	Sample Point	Date	Data Point	Graphable Value	Lab Ref	Sample Type
Arsenic (As) - Total	ug/L	CONTROL 1	4/11/2021	0.028	0.028	ZQ8672	GW
	ug/L	CONTROL 2	4/12/2021	0.102	0.102	ZQ8673	GW
	ug/L	CONTROL 3	4/11/2021	0.024	0.024	ZQ8674	Dup 1
	ug/L	CONTROL 3	4/11/2021	0.025	0.025	ZQ8679	Dup 2
	ug/L	SS BAG	4/18/2021	<0.020	0.01	ZQ8675	BAG
	ug/L	SS BAG	4/18/2021	<0.020	0.01	ZQ8676	EBW
	ug/L	SS1-4	4/10/2021	0.047	0.047	ZQ8656	Dup 1
	ug/L	SS1-4	4/10/2021	0.051	0.051	ZQ8678	Dup 2
	ug/L	SS1-5	4/10/2021	0.029	0.029	ZQ8657	GW
	ug/L	SS2-1	4/9/2021	0.061	0.061	ZQ8658	GW
	ug/L	SS2-2	4/9/2021	<0.020	0.01	ZQ8659	GW
	ug/L	SS2-3	4/9/2021	0.041	0.041	ZQ8660	GW
	ug/L	SS2-4	4/9/2021	0.024	0.024	ZQ8661	GW
	ug/L	SS3-4	4/11/2021	0.059	0.059	ZQ8662	GW
	ug/L	SS3-5	4/11/2021	<0.020	0.01	ZQ8663	GW
	ug/L	SS3-6	4/11/2021	0.282	0.282	ZQ8664	GW
	ug/L	SS3-7	4/11/2021	0.094	0.094	ZQ8665	Dup 1
	ug/L	SS3-7	4/11/2021	0.117	0.117	ZQ8677	Dup 2
	ug/L	SS3-8	4/11/2021	0.021	0.021	ZQ8666	GW
	ug/L	SS4-4	4/12/2021	0.167	0.167	ZQ8667	GW
	ug/L	SS4-5	4/12/2021	0.152	0.152	ZQ8668	GW
	ug/L	SS5-3	4/11/2021	0.169	0.169	ZQ8669	GW
	ug/L	SS5-4	4/11/2021	0.055	0.055	ZQ8670	GW
	ug/L	SS5-5	4/11/2021	0.02	0.02	ZQ8671	GW
Barium (Ba) - Dissolved	ug/L	CONTROL 1	4/11/2021	0.593	0.593	ZQ8672	GW
	ug/L	CONTROL 2	4/12/2021	4.27	4.27	ZQ8673	GW
	ug/L	CONTROL 3	4/11/2021	0.666	0.666	ZQ8674	Dup 1
	ug/L	CONTROL 3	4/11/2021	1.66	1.66	ZQ8679	Dup 2
	ug/L	SS BAG	4/18/2021	<0.020	0.01	ZQ8675	BAG
	ug/L	SS BAG	4/18/2021	0.032	0.032	ZQ8676	EBW
	ug/L	SS1-4	4/10/2021	2.12	2.12	ZQ8656	Dup 1
	ug/L	SS1-4	4/10/2021	2.09	2.09	ZQ8678	Dup 2
	ug/L	SS1-5	4/10/2021	0.552	0.552	ZQ8657	GW
	ug/L	SS2-1	4/9/2021	0.792	0.792	ZQ8658	GW
	ug/L	SS2-2	4/9/2021	0.351	0.351	ZQ8659	GW
	ug/L	SS2-3	4/9/2021	0.744	0.744	ZQ8660	GW
	ug/L	SS2-4	4/9/2021	0.766	0.766	ZQ8661	GW
	ug/L	SS3-4	4/11/2021	3.08	3.08	ZQ8662	GW
	ug/L	SS3-5	4/11/2021	2.83	2.83	ZQ8663	GW
	ug/L	SS3-6	4/11/2021	40.9	40.9	ZQ8664	GW
	ug/L	SS3-7	4/11/2021	4.41	4.41	ZQ8665	Dup 1
	ug/L	SS3-7	4/11/2021	7.77	7.77	ZQ8677	Dup 2
	ug/L	SS3-8	4/11/2021	1.99	1.99	ZQ8666	GW
	ug/L	SS4-4	4/12/2021	3.94	3.94	ZQ8667	GW
	ug/L	SS4-5	4/12/2021	1.58	1.58	ZQ8668	GW
	ug/L	SS5-3	4/11/2021	1.98	1.98	ZQ8669	GW
	ug/L	SS5-4	4/11/2021	2.36	2.36	ZQ8670	GW
	ug/L	SS5-5	4/11/2021	0.4	0.4	ZQ8671	GW

Appendix D: Snow Water Chemistry Analytical Results

Parameter	Unit	Sample Point	Date	Data Point	Graphable Value	Lab Ref	Sample Type
Barium (Ba) - Total	ug/L	CONTROL 1	4/11/2021	1.23	1.23	ZQ8672	GW
	ug/L	CONTROL 2	4/12/2021	10.7	10.7	ZQ8673	GW
	ug/L	CONTROL 3	4/11/2021	3.4	3.4	ZQ8674	Dup 1
	ug/L	CONTROL 3	4/11/2021	3.01	3.01	ZQ8679	Dup 2
	ug/L	SS BAG	4/18/2021	<0.020	0.01	ZQ8675	BAG
	ug/L	SS BAG	4/18/2021	0.05	0.05	ZQ8676	EBW
	ug/L	SS1-4	4/10/2021	3.31	3.31	ZQ8656	Dup 1
	ug/L	SS1-4	4/10/2021	3.96	3.96	ZQ8678	Dup 2
	ug/L	SS1-5	4/10/2021	1.47	1.47	ZQ8657	GW
	ug/L	SS2-1	4/9/2021	4.85	4.85	ZQ8658	GW
	ug/L	SS2-2	4/9/2021	1.92	1.92	ZQ8659	GW
	ug/L	SS2-3	4/9/2021	2.33	2.33	ZQ8660	GW
	ug/L	SS2-4	4/9/2021	1.73	1.73	ZQ8661	GW
	ug/L	SS3-4	4/11/2021	5.49	5.49	ZQ8662	GW
	ug/L	SS3-5	4/11/2021	3.46	3.46	ZQ8663	GW
	ug/L	SS3-6	4/11/2021	63.9	63.9	ZQ8664	GW
	ug/L	SS3-7	4/11/2021	16.1	16.1	ZQ8665	Dup 1
	ug/L	SS3-7	4/11/2021	15.9	15.9	ZQ8677	Dup 2
	ug/L	SS3-8	4/11/2021	13.3	13.3	ZQ8666	GW
	ug/L	SS4-4	4/12/2021	17.7	17.7	ZQ8667	GW
	ug/L	SS4-5	4/12/2021	16.5	16.5	ZQ8668	GW
	ug/L	SS5-3	4/11/2021	21.9	21.9	ZQ8669	GW
	ug/L	SS5-4	4/11/2021	9.75	9.75	ZQ8670	GW
	ug/L	SS5-5	4/11/2021	1.71	1.71	ZQ8671	GW
Beryllium (Be) - Dissolved	ug/L	CONTROL 1	4/11/2021	<0.010	0.005	ZQ8672	GW
	ug/L	CONTROL 2	4/12/2021	<0.010	0.005	ZQ8673	GW
	ug/L	CONTROL 3	4/11/2021	<0.010	0.005	ZQ8674	Dup 1
	ug/L	CONTROL 3	4/11/2021	<0.010	0.005	ZQ8679	Dup 2
	ug/L	SS BAG	4/18/2021	<0.010	0.005	ZQ8675	BAG
	ug/L	SS BAG	4/18/2021	<0.010	0.005	ZQ8676	EBW
	ug/L	SS1-4	4/10/2021	<0.010	0.005	ZQ8656	Dup 1
	ug/L	SS1-4	4/10/2021	<0.010	0.005	ZQ8678	Dup 2
	ug/L	SS1-5	4/10/2021	<0.010	0.005	ZQ8657	GW
	ug/L	SS2-1	4/9/2021	<0.010	0.005	ZQ8658	GW
	ug/L	SS2-2	4/9/2021	<0.010	0.005	ZQ8659	GW
	ug/L	SS2-3	4/9/2021	<0.010	0.005	ZQ8660	GW
	ug/L	SS2-4	4/9/2021	<0.010	0.005	ZQ8661	GW
	ug/L	SS3-4	4/11/2021	0.015	0.015	ZQ8662	GW
	ug/L	SS3-5	4/11/2021	<0.010	0.005	ZQ8663	GW
	ug/L	SS3-6	4/11/2021	0.081	0.081	ZQ8664	GW
	ug/L	SS3-7	4/11/2021	<0.010	0.005	ZQ8665	Dup 1
	ug/L	SS3-7	4/11/2021	0.015	0.015	ZQ8677	Dup 2
	ug/L	SS3-8	4/11/2021	<0.010	0.005	ZQ8666	GW
	ug/L	SS4-4	4/12/2021	<0.010	0.005	ZQ8667	GW
	ug/L	SS4-5	4/12/2021	<0.010	0.005	ZQ8668	GW
	ug/L	SS5-3	4/11/2021	0.015	0.015	ZQ8669	GW
	ug/L	SS5-4	4/11/2021	<0.010	0.005	ZQ8670	GW
	ug/L	SS5-5	4/11/2021	<0.010	0.005	ZQ8671	GW

Appendix D: Snow Water Chemistry Analytical Results

Parameter	Unit	Sample Point	Date	Data Point	Graphable Value	Lab Ref	Sample Type
Beryllium (Be) - Total	ug/L	CONTROL 1	4/11/2021	<0.010	0.005	ZQ8672	GW
	ug/L	CONTROL 2	4/12/2021	0.035	0.035	ZQ8673	GW
	ug/L	CONTROL 3	4/11/2021	<0.010	0.005	ZQ8674	Dup 1
	ug/L	CONTROL 3	4/11/2021	0.01	0.01	ZQ8679	Dup 2
	ug/L	SS BAG	4/18/2021	<0.010	0.005	ZQ8675	BAG
	ug/L	SS BAG	4/18/2021	<0.010	0.005	ZQ8676	EBW
	ug/L	SS1-4	4/10/2021	0.013	0.013	ZQ8656	Dup 1
	ug/L	SS1-4	4/10/2021	0.011	0.011	ZQ8678	Dup 2
	ug/L	SS1-5	4/10/2021	0.01	0.01	ZQ8657	GW
	ug/L	SS2-1	4/9/2021	<0.010	0.005	ZQ8658	GW
	ug/L	SS2-2	4/9/2021	<0.010	0.005	ZQ8659	GW
	ug/L	SS2-3	4/9/2021	<0.010	0.005	ZQ8660	GW
	ug/L	SS2-4	4/9/2021	<0.010	0.005	ZQ8661	GW
	ug/L	SS3-4	4/11/2021	0.016	0.016	ZQ8662	GW
	ug/L	SS3-5	4/11/2021	<0.010	0.005	ZQ8663	GW
	ug/L	SS3-6	4/11/2021	0.163	0.163	ZQ8664	GW
	ug/L	SS3-7	4/11/2021	0.063	0.063	ZQ8665	Dup 1
	ug/L	SS3-7	4/11/2021	0.046	0.046	ZQ8677	Dup 2
	ug/L	SS3-8	4/11/2021	0.021	0.021	ZQ8666	GW
	ug/L	SS4-4	4/12/2021	0.04	0.04	ZQ8667	GW
	ug/L	SS4-5	4/12/2021	0.057	0.057	ZQ8668	GW
	ug/L	SS5-3	4/11/2021	0.108	0.108	ZQ8669	GW
	ug/L	SS5-4	4/11/2021	0.015	0.015	ZQ8670	GW
	ug/L	SS5-5	4/11/2021	0.01	0.01	ZQ8671	GW
Bicarbonate (HCO_3)	mg/L	CONTROL 1	4/11/2021	0.65	0.65	ZQ8672	GW
	mg/L	CONTROL 2	4/12/2021	1.56	1.56	ZQ8673	GW
	mg/L	CONTROL 3	4/11/2021	<0.50	0.25	ZQ8674	Dup 1
	mg/L	CONTROL 3	4/11/2021	0.68	0.68	ZQ8679	Dup 2
	mg/L	SS BAG	4/18/2021	1.06	1.06	ZQ8675	BAG
	mg/L	SS BAG	4/18/2021	1.04	1.04	ZQ8676	EBW
	mg/L	SS1-4	4/10/2021	1.31	1.31	ZQ8656	Dup 1
	mg/L	SS1-4	4/10/2021	0.77	0.77	ZQ8678	Dup 2
	mg/L	SS1-5	4/10/2021	1	1	ZQ8657	GW
	mg/L	SS2-1	4/9/2021	<0.50	0.25	ZQ8658	GW
	mg/L	SS2-2	4/9/2021	1.04	1.04	ZQ8659	GW
	mg/L	SS2-3	4/9/2021	1.06	1.06	ZQ8660	GW
	mg/L	SS2-4	4/9/2021	0.68	0.68	ZQ8661	GW
	mg/L	SS3-4	4/11/2021	2.08	2.08	ZQ8662	GW
	mg/L	SS3-5	4/11/2021	2.14	2.14	ZQ8663	GW
	mg/L	SS3-6	4/11/2021	4.97	4.97	ZQ8664	GW
	mg/L	SS3-7	4/11/2021	2.39	2.39	ZQ8665	Dup 1
	mg/L	SS3-7	4/11/2021	2.59	2.59	ZQ8677	Dup 2
	mg/L	SS3-8	4/11/2021	2.01	2.01	ZQ8666	GW
	mg/L	SS4-4	4/12/2021	2.38	2.38	ZQ8667	GW
	mg/L	SS4-5	4/12/2021	2.06	2.06	ZQ8668	GW
	mg/L	SS5-3	4/11/2021	2.09	2.09	ZQ8669	GW
	mg/L	SS5-4	4/11/2021	2	2	ZQ8670	GW
	mg/L	SS5-5	4/11/2021	1.04	1.04	ZQ8671	GW

Appendix D: Snow Water Chemistry Analytical Results

Parameter	Unit	Sample Point	Date	Data Point	Graphable Value	Lab Ref	Sample Type
Bismuth (Bi) - Dissolved	ug/L	CONTROL 1	4/11/2021	<0.0050	0.0025	ZQ8672	GW
	ug/L	CONTROL 2	4/12/2021	0.0065	0.0065	ZQ8673	GW
	ug/L	CONTROL 3	4/11/2021	<0.0050	0.0025	ZQ8674	Dup 1
	ug/L	CONTROL 3	4/11/2021	<0.0050	0.0025	ZQ8679	Dup 2
	ug/L	SS BAG	4/18/2021	<0.0050	0.0025	ZQ8675	BAG
	ug/L	SS BAG	4/18/2021	<0.0050	0.0025	ZQ8676	EBW
	ug/L	SS1-4	4/10/2021	<0.0050	0.0025	ZQ8656	Dup 1
	ug/L	SS1-4	4/10/2021	0.0079	0.0079	ZQ8678	Dup 2
	ug/L	SS1-5	4/10/2021	<0.0050	0.0025	ZQ8657	GW
	ug/L	SS2-1	4/9/2021	<0.0050	0.0025	ZQ8658	GW
	ug/L	SS2-2	4/9/2021	<0.0050	0.0025	ZQ8659	GW
	ug/L	SS2-3	4/9/2021	<0.0050	0.0025	ZQ8660	GW
	ug/L	SS2-4	4/9/2021	<0.0050	0.0025	ZQ8661	GW
	ug/L	SS3-4	4/11/2021	0.0059	0.0059	ZQ8662	GW
	ug/L	SS3-5	4/11/2021	<0.0050	0.0025	ZQ8663	GW
	ug/L	SS3-6	4/11/2021	0.189	0.189	ZQ8664	GW
	ug/L	SS3-7	4/11/2021	<0.0050	0.0025	ZQ8665	Dup 1
	ug/L	SS3-7	4/11/2021	0.0106	0.0106	ZQ8677	Dup 2
	ug/L	SS3-8	4/11/2021	<0.0050	0.0025	ZQ8666	GW
	ug/L	SS4-4	4/12/2021	<0.0050	0.0025	ZQ8667	GW
	ug/L	SS4-5	4/12/2021	<0.0050	0.0025	ZQ8668	GW
	ug/L	SS5-3	4/11/2021	<0.0050	0.0025	ZQ8669	GW
	ug/L	SS5-4	4/11/2021	<0.0050	0.0025	ZQ8670	GW
	ug/L	SS5-5	4/11/2021	<0.0050	0.0025	ZQ8671	GW
Bismuth (Bi) - Total	ug/L	CONTROL 1	4/11/2021	<0.0050	0.0025	ZQ8672	GW
	ug/L	CONTROL 2	4/12/2021	0.0131	0.0131	ZQ8673	GW
	ug/L	CONTROL 3	4/11/2021	0.0069	0.0069	ZQ8674	Dup 1
	ug/L	CONTROL 3	4/11/2021	0.0053	0.0053	ZQ8679	Dup 2
	ug/L	SS BAG	4/18/2021	<0.0050	0.0025	ZQ8675	BAG
	ug/L	SS BAG	4/18/2021	<0.0050	0.0025	ZQ8676	EBW
	ug/L	SS1-4	4/10/2021	0.0081	0.0081	ZQ8656	Dup 1
	ug/L	SS1-4	4/10/2021	0.0119	0.0119	ZQ8678	Dup 2
	ug/L	SS1-5	4/10/2021	<0.0050	0.0025	ZQ8657	GW
	ug/L	SS2-1	4/9/2021	0.0099	0.0099	ZQ8658	GW
	ug/L	SS2-2	4/9/2021	0.0056	0.0056	ZQ8659	GW
	ug/L	SS2-3	4/9/2021	<0.0050	0.0025	ZQ8660	GW
	ug/L	SS2-4	4/9/2021	<0.0050	0.0025	ZQ8661	GW
	ug/L	SS3-4	4/11/2021	0.0112	0.0112	ZQ8662	GW
	ug/L	SS3-5	4/11/2021	<0.0050	0.0025	ZQ8663	GW
	ug/L	SS3-6	4/11/2021	0.14	0.14	ZQ8664	GW
	ug/L	SS3-7	4/11/2021	0.0238	0.0238	ZQ8665	Dup 1
	ug/L	SS3-7	4/11/2021	0.0246	0.0246	ZQ8677	Dup 2
	ug/L	SS3-8	4/11/2021	0.0297	0.0297	ZQ8666	GW
	ug/L	SS4-4	4/12/2021	0.0274	0.0274	ZQ8667	GW
	ug/L	SS4-5	4/12/2021	0.0323	0.0323	ZQ8668	GW
	ug/L	SS5-3	4/11/2021	0.076	0.076	ZQ8669	GW
	ug/L	SS5-4	4/11/2021	0.0163	0.0163	ZQ8670	GW
	ug/L	SS5-5	4/11/2021	<0.0050	0.0025	ZQ8671	GW

Appendix D: Snow Water Chemistry Analytical Results

Parameter	Unit	Sample Point	Date	Data Point	Graphable Value	Lab Ref	Sample Type
Boron (B) - Dissolved	ug/L	CONTROL 1	4/11/2021	<5.0	2.5	ZQ8672	GW
	ug/L	CONTROL 2	4/12/2021	<5.0	2.5	ZQ8673	GW
	ug/L	CONTROL 3	4/11/2021	<5.0	2.5	ZQ8674	Dup 1
	ug/L	CONTROL 3	4/11/2021	<5.0	2.5	ZQ8679	Dup 2
	ug/L	SS BAG	4/18/2021	<5.0	2.5	ZQ8675	BAG
	ug/L	SS BAG	4/18/2021	<5.0	2.5	ZQ8676	EBW
	ug/L	SS1-4	4/10/2021	<5.0	2.5	ZQ8656	Dup 1
	ug/L	SS1-4	4/10/2021	<5.0	2.5	ZQ8678	Dup 2
	ug/L	SS1-5	4/10/2021	<5.0	2.5	ZQ8657	GW
	ug/L	SS2-1	4/9/2021	<5.0	2.5	ZQ8658	GW
	ug/L	SS2-2	4/9/2021	<5.0	2.5	ZQ8659	GW
	ug/L	SS2-3	4/9/2021	<5.0	2.5	ZQ8660	GW
	ug/L	SS2-4	4/9/2021	<5.0	2.5	ZQ8661	GW
	ug/L	SS3-4	4/11/2021	<5.0	2.5	ZQ8662	GW
	ug/L	SS3-5	4/11/2021	<5.0	2.5	ZQ8663	GW
	ug/L	SS3-6	4/11/2021	<5.0	2.5	ZQ8664	GW
	ug/L	SS3-7	4/11/2021	<5.0	2.5	ZQ8665	Dup 1
	ug/L	SS3-7	4/11/2021	<5.0	2.5	ZQ8677	Dup 2
	ug/L	SS3-8	4/11/2021	<5.0	2.5	ZQ8666	GW
	ug/L	SS4-4	4/12/2021	<5.0	2.5	ZQ8667	GW
	ug/L	SS4-5	4/12/2021	<5.0	2.5	ZQ8668	GW
	ug/L	SS5-3	4/11/2021	<5.0	2.5	ZQ8669	GW
	ug/L	SS5-4	4/11/2021	<5.0	2.5	ZQ8670	GW
	ug/L	SS5-5	4/11/2021	<5.0	2.5	ZQ8671	GW
Boron (B) - Total	ug/L	CONTROL 1	4/11/2021	<5.0	2.5	ZQ8672	GW
	ug/L	CONTROL 2	4/12/2021	<5.0	2.5	ZQ8673	GW
	ug/L	CONTROL 3	4/11/2021	<5.0	2.5	ZQ8674	Dup 1
	ug/L	CONTROL 3	4/11/2021	<5.0	2.5	ZQ8679	Dup 2
	ug/L	SS BAG	4/18/2021	<5.0	2.5	ZQ8675	BAG
	ug/L	SS BAG	4/18/2021	<5.0	2.5	ZQ8676	EBW
	ug/L	SS1-4	4/10/2021	<5.0	2.5	ZQ8656	Dup 1
	ug/L	SS1-4	4/10/2021	<5.0	2.5	ZQ8678	Dup 2
	ug/L	SS1-5	4/10/2021	<5.0	2.5	ZQ8657	GW
	ug/L	SS2-1	4/9/2021	<5.0	2.5	ZQ8658	GW
	ug/L	SS2-2	4/9/2021	<5.0	2.5	ZQ8659	GW
	ug/L	SS2-3	4/9/2021	<5.0	2.5	ZQ8660	GW
	ug/L	SS2-4	4/9/2021	<5.0	2.5	ZQ8661	GW
	ug/L	SS3-4	4/11/2021	<5.0	2.5	ZQ8662	GW
	ug/L	SS3-5	4/11/2021	<5.0	2.5	ZQ8663	GW
	ug/L	SS3-6	4/11/2021	<5.0	2.5	ZQ8664	GW
	ug/L	SS3-7	4/11/2021	<5.0	2.5	ZQ8665	Dup 1
	ug/L	SS3-7	4/11/2021	<5.0	2.5	ZQ8677	Dup 2
	ug/L	SS3-8	4/11/2021	<5.0	2.5	ZQ8666	GW
	ug/L	SS4-4	4/12/2021	<5.0	2.5	ZQ8667	GW
	ug/L	SS4-5	4/12/2021	<5.0	2.5	ZQ8668	GW
	ug/L	SS5-3	4/11/2021	<5.0	2.5	ZQ8669	GW
	ug/L	SS5-4	4/11/2021	<5.0	2.5	ZQ8670	GW
	ug/L	SS5-5	4/11/2021	<5.0	2.5	ZQ8671	GW

Appendix D: Snow Water Chemistry Analytical Results

Parameter	Unit	Sample Point	Date	Data Point	Graphable Value	Lab Ref	Sample Type
Cadmium (Cd) - Dissolved	ug/L	CONTROL 1	4/11/2021	<0.0050	0.0025	ZQ8672	GW
	ug/L	CONTROL 2	4/12/2021	<0.0050	0.0025	ZQ8673	GW
	ug/L	CONTROL 3	4/11/2021	<0.0050	0.0025	ZQ8674	Dup 1
	ug/L	CONTROL 3	4/11/2021	<0.0050	0.0025	ZQ8679	Dup 2
	ug/L	SS BAG	4/18/2021	<0.0050	0.0025	ZQ8675	BAG
	ug/L	SS BAG	4/18/2021	<0.0050	0.0025	ZQ8676	EBW
	ug/L	SS1-4	4/10/2021	<0.0050	0.0025	ZQ8656	Dup 1
	ug/L	SS1-4	4/10/2021	<0.0050	0.0025	ZQ8678	Dup 2
	ug/L	SS1-5	4/10/2021	<0.0050	0.0025	ZQ8657	GW
	ug/L	SS2-1	4/9/2021	<0.0050	0.0025	ZQ8658	GW
	ug/L	SS2-2	4/9/2021	<0.0050	0.0025	ZQ8659	GW
	ug/L	SS2-3	4/9/2021	<0.0050	0.0025	ZQ8660	GW
	ug/L	SS2-4	4/9/2021	<0.0050	0.0025	ZQ8661	GW
	ug/L	SS3-4	4/11/2021	<0.0050	0.0025	ZQ8662	GW
	ug/L	SS3-5	4/11/2021	<0.0050	0.0025	ZQ8663	GW
	ug/L	SS3-6	4/11/2021	0.0196	0.0196	ZQ8664	GW
	ug/L	SS3-7	4/11/2021	<0.0050	0.0025	ZQ8665	Dup 1
	ug/L	SS3-7	4/11/2021	0.0054	0.0054	ZQ8677	Dup 2
	ug/L	SS3-8	4/11/2021	<0.0050	0.0025	ZQ8666	GW
	ug/L	SS4-4	4/12/2021	<0.0050	0.0025	ZQ8667	GW
	ug/L	SS4-5	4/12/2021	<0.0050	0.0025	ZQ8668	GW
	ug/L	SS5-3	4/11/2021	<0.0050	0.0025	ZQ8669	GW
	ug/L	SS5-4	4/11/2021	<0.0050	0.0025	ZQ8670	GW
	ug/L	SS5-5	4/11/2021	<0.0050	0.0025	ZQ8671	GW
Cadmium (Cd) - Total	ug/L	CONTROL 1	4/11/2021	<0.0050	0.0025	ZQ8672	GW
	ug/L	CONTROL 2	4/12/2021	0.0104	0.0104	ZQ8673	GW
	ug/L	CONTROL 3	4/11/2021	<0.0050	0.0025	ZQ8674	Dup 1
	ug/L	CONTROL 3	4/11/2021	<0.0050	0.0025	ZQ8679	Dup 2
	ug/L	SS BAG	4/18/2021	<0.0050	0.0025	ZQ8675	BAG
	ug/L	SS BAG	4/18/2021	<0.0050	0.0025	ZQ8676	EBW
	ug/L	SS1-4	4/10/2021	<0.0050	0.0025	ZQ8656	Dup 1
	ug/L	SS1-4	4/10/2021	0.009	0.009	ZQ8678	Dup 2
	ug/L	SS1-5	4/10/2021	<0.0050	0.0025	ZQ8657	GW
	ug/L	SS2-1	4/9/2021	0.0055	0.0055	ZQ8658	GW
	ug/L	SS2-2	4/9/2021	<0.0050	0.0025	ZQ8659	GW
	ug/L	SS2-3	4/9/2021	<0.0050	0.0025	ZQ8660	GW
	ug/L	SS2-4	4/9/2021	<0.0050	0.0025	ZQ8661	GW
	ug/L	SS3-4	4/11/2021	0.0079	0.0079	ZQ8662	GW
	ug/L	SS3-5	4/11/2021	<0.0050	0.0025	ZQ8663	GW
	ug/L	SS3-6	4/11/2021	0.041	0.041	ZQ8664	GW
	ug/L	SS3-7	4/11/2021	0.0126	0.0126	ZQ8665	Dup 1
	ug/L	SS3-7	4/11/2021	0.0097	0.0097	ZQ8677	Dup 2
	ug/L	SS3-8	4/11/2021	0.0145	0.0145	ZQ8666	GW
	ug/L	SS4-4	4/12/2021	0.0099	0.0099	ZQ8667	GW
	ug/L	SS4-5	4/12/2021	0.0187	0.0187	ZQ8668	GW
	ug/L	SS5-3	4/11/2021	0.0164	0.0164	ZQ8669	GW
	ug/L	SS5-4	4/11/2021	0.0093	0.0093	ZQ8670	GW
	ug/L	SS5-5	4/11/2021	0.0055	0.0055	ZQ8671	GW

Appendix D: Snow Water Chemistry Analytical Results

Parameter	Unit	Sample Point	Date	Data Point	Graphable Value	Lab Ref	Sample Type
Calcium (Ca) - Dissolved	mg/L	CONTROL 1	4/11/2021	0.076	0.076	ZQ8672	GW
	mg/L	CONTROL 2	4/12/2021	0.277	0.277	ZQ8673	GW
	mg/L	CONTROL 3	4/11/2021	0.09	0.09	ZQ8674	Dup 1
	mg/L	CONTROL 3	4/11/2021	0.116	0.116	ZQ8679	Dup 2
	mg/L	SS BAG	4/18/2021	0.017	0.017	ZQ8675	BAG
	mg/L	SS BAG	4/18/2021	0.011	0.011	ZQ8676	EBW
	mg/L	SS1-4	4/10/2021	0.168	0.168	ZQ8656	Dup 1
	mg/L	SS1-4	4/10/2021	0.231	0.231	ZQ8678	Dup 2
	mg/L	SS1-5	4/10/2021	0.095	0.095	ZQ8657	GW
	mg/L	SS2-1	4/9/2021	0.125	0.125	ZQ8658	GW
	mg/L	SS2-2	4/9/2021	0.081	0.081	ZQ8659	GW
	mg/L	SS2-3	4/9/2021	0.095	0.095	ZQ8660	GW
	mg/L	SS2-4	4/9/2021	0.118	0.118	ZQ8661	GW
	mg/L	SS3-4	4/11/2021	0.281	0.281	ZQ8662	GW
	mg/L	SS3-5	4/11/2021	0.204	0.204	ZQ8663	GW
	mg/L	SS3-6	4/11/2021	3.1	3.1	ZQ8664	GW
	mg/L	SS3-7	4/11/2021	0.55	0.55	ZQ8665	Dup 1
	mg/L	SS3-7	4/11/2021	0.719	0.719	ZQ8677	Dup 2
	mg/L	SS3-8	4/11/2021	0.252	0.252	ZQ8666	GW
	mg/L	SS4-4	4/12/2021	0.346	0.346	ZQ8667	GW
	mg/L	SS4-5	4/12/2021	0.231	0.231	ZQ8668	GW
	mg/L	SS5-3	4/11/2021	0.184	0.184	ZQ8669	GW
	mg/L	SS5-4	4/11/2021	0.221	0.221	ZQ8670	GW
	mg/L	SS5-5	4/11/2021	0.079	0.079	ZQ8671	GW
Calcium (Ca) - Total	mg/L	CONTROL 1	4/11/2021	0.068	0.068	ZQ8672	GW
	mg/L	CONTROL 2	4/12/2021	0.403	0.403	ZQ8673	GW
	mg/L	CONTROL 3	4/11/2021	0.158	0.158	ZQ8674	Dup 1
	mg/L	CONTROL 3	4/11/2021	0.143	0.143	ZQ8679	Dup 2
	mg/L	SS BAG	4/18/2021	<0.010	0.005	ZQ8675	BAG
	mg/L	SS BAG	4/18/2021	<0.010	0.005	ZQ8676	EBW
	mg/L	SS1-4	4/10/2021	0.193	0.193	ZQ8656	Dup 1
	mg/L	SS1-4	4/10/2021	0.256	0.256	ZQ8678	Dup 2
	mg/L	SS1-5	4/10/2021	0.083	0.083	ZQ8657	GW
	mg/L	SS2-1	4/9/2021	0.261	0.261	ZQ8658	GW
	mg/L	SS2-2	4/9/2021	0.115	0.115	ZQ8659	GW
	mg/L	SS2-3	4/9/2021	0.095	0.095	ZQ8660	GW
	mg/L	SS2-4	4/9/2021	0.134	0.134	ZQ8661	GW
	mg/L	SS3-4	4/11/2021	0.436	0.436	ZQ8662	GW
	mg/L	SS3-5	4/11/2021	0.167	0.167	ZQ8663	GW
	mg/L	SS3-6	4/11/2021	3.85	3.85	ZQ8664	GW
	mg/L	SS3-7	4/11/2021	1.31	1.31	ZQ8665	Dup 1
	mg/L	SS3-7	4/11/2021	0.846	0.846	ZQ8677	Dup 2
	mg/L	SS3-8	4/11/2021	0.588	0.588	ZQ8666	GW
	mg/L	SS4-4	4/12/2021	0.662	0.662	ZQ8667	GW
	mg/L	SS4-5	4/12/2021	0.712	0.712	ZQ8668	GW
	mg/L	SS5-3	4/11/2021	0.854	0.854	ZQ8669	GW
	mg/L	SS5-4	4/11/2021	0.513	0.513	ZQ8670	GW
	mg/L	SS5-5	4/11/2021	0.099	0.099	ZQ8671	GW

Appendix D: Snow Water Chemistry Analytical Results

Parameter	Unit	Sample Point	Date	Data Point	Graphable Value	Lab Ref	Sample Type
Carbonate (CO_3)	mg/L	CONTROL 1	4/11/2021	<0.50	0.25	ZQ8672	GW
	mg/L	CONTROL 2	4/12/2021	<0.50	0.25	ZQ8673	GW
	mg/L	CONTROL 3	4/11/2021	<0.50	0.25	ZQ8674	Dup 1
	mg/L	CONTROL 3	4/11/2021	<0.50	0.25	ZQ8679	Dup 2
	mg/L	SS BAG	4/18/2021	<0.50	0.25	ZQ8675	BAG
	mg/L	SS BAG	4/18/2021	<0.50	0.25	ZQ8676	EBW
	mg/L	SS1-4	4/10/2021	<0.50	0.25	ZQ8656	Dup 1
	mg/L	SS1-4	4/10/2021	<0.50	0.25	ZQ8678	Dup 2
	mg/L	SS1-5	4/10/2021	<0.50	0.25	ZQ8657	GW
	mg/L	SS2-1	4/9/2021	<0.50	0.25	ZQ8658	GW
	mg/L	SS2-2	4/9/2021	<0.50	0.25	ZQ8659	GW
	mg/L	SS2-3	4/9/2021	<0.50	0.25	ZQ8660	GW
	mg/L	SS2-4	4/9/2021	<0.50	0.25	ZQ8661	GW
	mg/L	SS3-4	4/11/2021	<0.50	0.25	ZQ8662	GW
	mg/L	SS3-5	4/11/2021	<0.50	0.25	ZQ8663	GW
	mg/L	SS3-6	4/11/2021	<0.50	0.25	ZQ8664	GW
	mg/L	SS3-7	4/11/2021	<0.50	0.25	ZQ8665	Dup 1
	mg/L	SS3-7	4/11/2021	<0.50	0.25	ZQ8677	Dup 2
	mg/L	SS3-8	4/11/2021	<0.50	0.25	ZQ8666	GW
	mg/L	SS4-4	4/12/2021	<0.50	0.25	ZQ8667	GW
	mg/L	SS4-5	4/12/2021	<0.50	0.25	ZQ8668	GW
	mg/L	SS5-3	4/11/2021	<0.50	0.25	ZQ8669	GW
	mg/L	SS5-4	4/11/2021	<0.50	0.25	ZQ8670	GW
	mg/L	SS5-5	4/11/2021	<0.50	0.25	ZQ8671	GW
Chloride (Cl) - Dissolved	mg/L	CONTROL 1	4/11/2021	0.74	0.74	ZQ8672	GW
	mg/L	CONTROL 2	4/12/2021	0.73	0.73	ZQ8673	GW
	mg/L	CONTROL 3	4/11/2021	<0.50	0.25	ZQ8674	Dup 1
	mg/L	CONTROL 3	4/11/2021	0.52	0.52	ZQ8679	Dup 2
	mg/L	SS BAG	4/18/2021	0.72	0.72	ZQ8675	BAG
	mg/L	SS BAG	4/18/2021	0.7	0.7	ZQ8676	EBW
	mg/L	SS1-4	4/10/2021	<0.50	0.25	ZQ8656	Dup 1
	mg/L	SS1-4	4/10/2021	0.89	0.89	ZQ8678	Dup 2
	mg/L	SS1-5	4/10/2021	<0.50	0.25	ZQ8657	GW
	mg/L	SS2-1	4/9/2021	0.69	0.69	ZQ8658	GW
	mg/L	SS2-2	4/9/2021	0.59	0.59	ZQ8659	GW
	mg/L	SS2-3	4/9/2021	0.68	0.68	ZQ8660	GW
	mg/L	SS2-4	4/9/2021	0.72	0.72	ZQ8661	GW
	mg/L	SS3-4	4/11/2021	<0.50	0.25	ZQ8662	GW
	mg/L	SS3-5	4/11/2021	<0.50	0.25	ZQ8663	GW
	mg/L	SS3-6	4/11/2021	1.2	1.2	ZQ8664	GW
	mg/L	SS3-7	4/11/2021	<0.50	0.25	ZQ8665	Dup 1
	mg/L	SS3-7	4/11/2021	<0.50	0.25	ZQ8677	Dup 2
	mg/L	SS3-8	4/11/2021	0.8	0.8	ZQ8666	GW
	mg/L	SS4-4	4/12/2021	0.79	0.79	ZQ8667	GW
	mg/L	SS4-5	4/12/2021	0.95	0.95	ZQ8668	GW
	mg/L	SS5-3	4/11/2021	0.97	0.97	ZQ8669	GW
	mg/L	SS5-4	4/11/2021	0.91	0.91	ZQ8670	GW
	mg/L	SS5-5	4/11/2021	<0.50	0.25	ZQ8671	GW

Appendix D: Snow Water Chemistry Analytical Results

Parameter	Unit	Sample Point	Date	Data Point	Graphable Value	Lab Ref	Sample Type
Chromium (Cr) - Dissolved	ug/L	CONTROL 1	4/11/2021	0.484	0.484	ZQ8672	GW
	ug/L	CONTROL 2	4/12/2021	1.26	1.26	ZQ8673	GW
	ug/L	CONTROL 3	4/11/2021	<0.050	0.25	ZQ8674	Dup 1
	ug/L	CONTROL 3	4/11/2021	0.599	0.599	ZQ8679	Dup 2
	ug/L	SS BAG	4/18/2021	<0.050	0.025	ZQ8675	BAG
	ug/L	SS BAG	4/18/2021	0.088	0.088	ZQ8676	EBW
	ug/L	SS1-4	4/10/2021	0.874	0.874	ZQ8656	Dup 1
	ug/L	SS1-4	4/10/2021	0.908	0.908	ZQ8678	Dup 2
	ug/L	SS1-5	4/10/2021	0.287	0.287	ZQ8657	GW
	ug/L	SS2-1	4/9/2021	0.076	0.076	ZQ8658	GW
	ug/L	SS2-2	4/9/2021	<0.050	0.025	ZQ8659	GW
	ug/L	SS2-3	4/9/2021	0.303	0.303	ZQ8660	GW
	ug/L	SS2-4	4/9/2021	<0.050	0.025	ZQ8661	GW
	ug/L	SS3-4	4/11/2021	1.12	1.12	ZQ8662	GW
	ug/L	SS3-5	4/11/2021	1.15	1.15	ZQ8663	GW
	ug/L	SS3-6	4/11/2021	12.5	12.5	ZQ8664	GW
	ug/L	SS3-7	4/11/2021	0.106	0.106	ZQ8665	Dup 1
	ug/L	SS3-7	4/11/2021	2.51	2.51	ZQ8677	Dup 2
	ug/L	SS3-8	4/11/2021	0.074	0.074	ZQ8666	GW
	ug/L	SS4-4	4/12/2021	0.091	0.091	ZQ8667	GW
	ug/L	SS4-5	4/12/2021	0.067	0.067	ZQ8668	GW
	ug/L	SS5-3	4/11/2021	0.098	0.098	ZQ8669	GW
	ug/L	SS5-4	4/11/2021	0.054	0.054	ZQ8670	GW
	ug/L	SS5-5	4/11/2021	<0.050	0.025	ZQ8671	GW
Chromium (Cr) - Total	ug/L	CONTROL 1	4/11/2021	1.14	1.14	ZQ8672	GW
	ug/L	CONTROL 2	4/12/2021	5.39	5.39	ZQ8673	GW
	ug/L	CONTROL 3	4/11/2021	1.77	1.77	ZQ8674	Dup 1
	ug/L	CONTROL 3	4/11/2021	1.79	1.79	ZQ8679	Dup 2
	ug/L	SS BAG	4/18/2021	<0.050	0.025	ZQ8675	BAG
	ug/L	SS BAG	4/18/2021	0.2	0.2	ZQ8676	EBW
	ug/L	SS1-4	4/10/2021	1.55	1.55	ZQ8656	Dup 1
	ug/L	SS1-4	4/10/2021	1.28	1.28	ZQ8678	Dup 2
	ug/L	SS1-5	4/10/2021	0.942	0.942	ZQ8657	GW
	ug/L	SS2-1	4/9/2021	2.34	2.34	ZQ8658	GW
	ug/L	SS2-2	4/9/2021	0.869	0.869	ZQ8659	GW
	ug/L	SS2-3	4/9/2021	0.972	0.972	ZQ8660	GW
	ug/L	SS2-4	4/9/2021	0.57	0.57	ZQ8661	GW
	ug/L	SS3-4	4/11/2021	2.2	2.2	ZQ8662	GW
	ug/L	SS3-5	4/11/2021	1.24	1.24	ZQ8663	GW
	ug/L	SS3-6	4/11/2021	28.9	28.9	ZQ8664	GW
	ug/L	SS3-7	4/11/2021	6.13	6.13	ZQ8665	Dup 1
	ug/L	SS3-7	4/11/2021	7.23	7.23	ZQ8677	Dup 2
	ug/L	SS3-8	4/11/2021	5.14	5.14	ZQ8666	GW
	ug/L	SS4-4	4/12/2021	5.16	5.16	ZQ8667	GW
	ug/L	SS4-5	4/12/2021	5.74	5.74	ZQ8668	GW
	ug/L	SS5-3	4/11/2021	6.36	6.36	ZQ8669	GW
	ug/L	SS5-4	4/11/2021	3.44	3.44	ZQ8670	GW
	ug/L	SS5-5	4/11/2021	1.04	1.04	ZQ8671	GW

Appendix D: Snow Water Chemistry Analytical Results

Parameter	Unit	Sample Point	Date	Data Point	Graphable Value	Lab Ref	Sample Type
Cobalt (Co) - Dissolved	ug/L	CONTROL 1	4/11/2021	0.037	0.037	ZQ8672	GW
	ug/L	CONTROL 2	4/12/2021	0.221	0.221	ZQ8673	GW
	ug/L	CONTROL 3	4/11/2021	0.0202	0.0202	ZQ8674	Dup 1
	ug/L	CONTROL 3	4/11/2021	0.101	0.101	ZQ8679	Dup 2
	ug/L	SS BAG	4/18/2021	<0.0050	0.0025	ZQ8675	BAG
	ug/L	SS BAG	4/18/2021	0.0052	0.0052	ZQ8676	EBW
	ug/L	SS1-4	4/10/2021	0.155	0.155	ZQ8656	Dup 1
	ug/L	SS1-4	4/10/2021	0.144	0.144	ZQ8678	Dup 2
	ug/L	SS1-5	4/10/2021	0.036	0.036	ZQ8657	GW
	ug/L	SS2-1	4/9/2021	0.0285	0.0285	ZQ8658	GW
	ug/L	SS2-2	4/9/2021	0.011	0.011	ZQ8659	GW
	ug/L	SS2-3	4/9/2021	0.0406	0.0406	ZQ8660	GW
	ug/L	SS2-4	4/9/2021	0.0159	0.0159	ZQ8661	GW
	ug/L	SS3-4	4/11/2021	0.261	0.261	ZQ8662	GW
	ug/L	SS3-5	4/11/2021	0.16	0.16	ZQ8663	GW
	ug/L	SS3-6	4/11/2021	2.82	2.82	ZQ8664	GW
	ug/L	SS3-7	4/11/2021	0.0705	0.0705	ZQ8665	Dup 1
	ug/L	SS3-7	4/11/2021	0.42	0.42	ZQ8677	Dup 2
	ug/L	SS3-8	4/11/2021	0.063	0.063	ZQ8666	GW
	ug/L	SS4-4	4/12/2021	0.0903	0.0903	ZQ8667	GW
	ug/L	SS4-5	4/12/2021	0.0577	0.0577	ZQ8668	GW
	ug/L	SS5-3	4/11/2021	0.0784	0.0784	ZQ8669	GW
	ug/L	SS5-4	4/11/2021	0.0739	0.0739	ZQ8670	GW
	ug/L	SS5-5	4/11/2021	0.014	0.014	ZQ8671	GW
Cobalt (Co) - Total	ug/L	CONTROL 1	4/11/2021	0.0952	0.0952	ZQ8672	GW
	ug/L	CONTROL 2	4/12/2021	0.74	0.74	ZQ8673	GW
	ug/L	CONTROL 3	4/11/2021	0.215	0.215	ZQ8674	Dup 1
	ug/L	CONTROL 3	4/11/2021	0.194	0.194	ZQ8679	Dup 2
	ug/L	SS BAG	4/18/2021	<0.0050	0.0025	ZQ8675	BAG
	ug/L	SS BAG	4/18/2021	0.0084	0.0084	ZQ8676	EBW
	ug/L	SS1-4	4/10/2021	0.213	0.213	ZQ8656	Dup 1
	ug/L	SS1-4	4/10/2021	0.174	0.174	ZQ8678	Dup 2
	ug/L	SS1-5	4/10/2021	0.0883	0.0883	ZQ8657	GW
	ug/L	SS2-1	4/9/2021	0.317	0.317	ZQ8658	GW
	ug/L	SS2-2	4/9/2021	0.129	0.129	ZQ8659	GW
	ug/L	SS2-3	4/9/2021	0.131	0.131	ZQ8660	GW
	ug/L	SS2-4	4/9/2021	0.0925	0.0925	ZQ8661	GW
	ug/L	SS3-4	4/11/2021	0.356	0.356	ZQ8662	GW
	ug/L	SS3-5	4/11/2021	0.178	0.178	ZQ8663	GW
	ug/L	SS3-6	4/11/2021	5.2	5.2	ZQ8664	GW
	ug/L	SS3-7	4/11/2021	1.16	1.16	ZQ8665	Dup 1
	ug/L	SS3-7	4/11/2021	1.23	1.23	ZQ8677	Dup 2
	ug/L	SS3-8	4/11/2021	0.842	0.842	ZQ8666	GW
	ug/L	SS4-4	4/12/2021	0.985	0.985	ZQ8667	GW
	ug/L	SS4-5	4/12/2021	1.09	1.09	ZQ8668	GW
	ug/L	SS5-3	4/11/2021	1.42	1.42	ZQ8669	GW
	ug/L	SS5-4	4/11/2021	0.624	0.624	ZQ8670	GW
	ug/L	SS5-5	4/11/2021	0.12	0.12	ZQ8671	GW

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Parameter	Unit	Sample Point	Date	Data Point	Graphable Value	Lab Ref	Sample Type
Conductivity	uS/cm	CONTROL 1	4/11/2021	2.1	2.1	ZQ8672	GW
	uS/cm	CONTROL 2	4/12/2021	2.6	2.6	ZQ8673	GW
	uS/cm	CONTROL 3	4/11/2021	2.1	2.1	ZQ8674	Dup 1
	uS/cm	CONTROL 3	4/11/2021	1.9	1.9	ZQ8679	Dup 2
	uS/cm	SS BAG	4/18/2021	1.1	1.1	ZQ8675	BAG
	uS/cm	SS BAG	4/18/2021	1.5	1.5	ZQ8676	EBW
	uS/cm	SS1-4	4/10/2021	2.4	2.4	ZQ8656	Dup 1
	uS/cm	SS1-4	4/10/2021	2.3	2.3	ZQ8678	Dup 2
	uS/cm	SS1-5	4/10/2021	2.1	2.1	ZQ8657	GW
	uS/cm	SS2-1	4/9/2021	2.6	2.6	ZQ8658	GW
	uS/cm	SS2-2	4/9/2021	2	2	ZQ8659	GW
	uS/cm	SS2-3	4/9/2021	2.2	2.2	ZQ8660	GW
	uS/cm	SS2-4	4/9/2021	2.3	2.3	ZQ8661	GW
	uS/cm	SS3-4	4/11/2021	2.6	2.6	ZQ8662	GW
	uS/cm	SS3-5	4/11/2021	2.5	2.5	ZQ8663	GW
	uS/cm	SS3-6	4/11/2021	9.3	9.3	ZQ8664	GW
	uS/cm	SS3-7	4/11/2021	4.3	4.3	ZQ8665	Dup 1
	uS/cm	SS3-7	4/11/2021	4.1	4.1	ZQ8677	Dup 2
	uS/cm	SS3-8	4/11/2021	3.2	3.2	ZQ8666	GW
	uS/cm	SS4-4	4/12/2021	4.1	4.1	ZQ8667	GW
	uS/cm	SS4-5	4/12/2021	3	3	ZQ8668	GW
	uS/cm	SS5-3	4/11/2021	3.1	3.1	ZQ8669	GW
	uS/cm	SS5-4	4/11/2021	2.9	2.9	ZQ8670	GW
	uS/cm	SS5-5	4/11/2021	2.2	2.2	ZQ8671	GW
Copper (Cu) - Dissolved	ug/L	SS BAG	4/18/2021	<0.050	0.025	ZQ8675	BAG
	ug/L	SS BAG	4/18/2021	0.053	0.053	ZQ8676	EBW
	ug/L	SS1-4	4/10/2021	0.307	0.307	ZQ8656	Dup 1
	ug/L	SS1-4	4/10/2021	0.394	0.394	ZQ8678	Dup 2
	ug/L	SS1-5	4/10/2021	0.171	0.171	ZQ8657	GW
	ug/L	SS2-1	4/9/2021	0.098	0.098	ZQ8658	GW
	ug/L	SS2-2	4/9/2021	0.08	0.08	ZQ8659	GW
	ug/L	SS2-3	4/9/2021	0.156	0.156	ZQ8660	GW
	ug/L	SS2-4	4/9/2021	0.104	0.104	ZQ8661	GW
	ug/L	SS3-4	4/11/2021	0.174	0.174	ZQ8662	GW
	ug/L	SS3-5	4/11/2021	0.143	0.143	ZQ8663	GW
	ug/L	SS3-6	4/11/2021	2.44	2.44	ZQ8664	GW
	ug/L	SS3-7	4/11/2021	0.081	0.081	ZQ8665	Dup 1
	ug/L	SS3-7	4/11/2021	0.431	0.431	ZQ8677	Dup 2
	ug/L	SS3-8	4/11/2021	0.066	0.066	ZQ8666	GW
	ug/L	SS4-4	4/12/2021	0.07	0.07	ZQ8667	GW
	ug/L	SS4-5	4/12/2021	0.085	0.085	ZQ8668	GW
	ug/L	SS5-3	4/11/2021	0.136	0.136	ZQ8669	GW
	ug/L	SS5-4	4/11/2021	0.069	0.069	ZQ8670	GW
	ug/L	SS5-5	4/11/2021	0.065	0.065	ZQ8671	GW
	ug/L	CONTROL 1	4/11/2021	0.171	0.171	ZQ8672	GW
	ug/L	CONTROL 2	4/12/2021	0.341	0.341	ZQ8673	GW
	ug/L	CONTROL 3	4/11/2021	<0.050	0.025	ZQ8674	Dup 1
	ug/L	CONTROL 3	4/11/2021	0.151	0.151	ZQ8679	Dup 2

Appendix D: Snow Water Chemistry Analytical Results

Parameter	Unit	Sample Point	Date	Data Point	Graphable Value	Lab Ref	Sample Type
Copper (Cu) - Total	ug/L	SS BAG	4/18/2021	<0.050	0.025	ZQ8675	BAG
	ug/L	SS BAG	4/18/2021	0.072	0.072	ZQ8676	EBW
	ug/L	SS1-4	4/10/2021	0.45	0.45	ZQ8656	Dup 1
	ug/L	SS1-4	4/10/2021	0.361	0.361	ZQ8678	Dup 2
	ug/L	SS1-5	4/10/2021	0.318	0.318	ZQ8657	GW
	ug/L	SS2-1	4/9/2021	0.626	0.626	ZQ8658	GW
	ug/L	SS2-2	4/9/2021	0.255	0.255	ZQ8659	GW
	ug/L	SS2-3	4/9/2021	0.211	0.211	ZQ8660	GW
	ug/L	SS2-4	4/9/2021	0.145	0.145	ZQ8661	GW
	ug/L	SS3-4	4/11/2021	0.292	0.292	ZQ8662	GW
	ug/L	SS3-5	4/11/2021	0.151	0.151	ZQ8663	GW
	ug/L	SS3-6	4/11/2021	4.66	4.66	ZQ8664	GW
	ug/L	SS3-7	4/11/2021	0.988	0.988	ZQ8665	Dup 1
	ug/L	SS3-7	4/11/2021	1.17	1.17	ZQ8677	Dup 2
	ug/L	SS3-8	4/11/2021	0.995	0.995	ZQ8666	GW
	ug/L	SS4-4	4/12/2021	1.2	1.2	ZQ8667	GW
	ug/L	SS4-5	4/12/2021	1.25	1.25	ZQ8668	GW
	ug/L	SS5-3	4/11/2021	2.99	2.99	ZQ8669	GW
	ug/L	SS5-4	4/11/2021	0.555	0.555	ZQ8670	GW
	ug/L	SS5-5	4/11/2021	0.192	0.192	ZQ8671	GW
	ug/L	CONTROL 1	4/11/2021	0.241	0.241	ZQ8672	GW
	ug/L	CONTROL 2	4/12/2021	0.777	0.777	ZQ8673	GW
	ug/L	CONTROL 3	4/11/2021	0.252	0.252	ZQ8674	Dup 1
	ug/L	CONTROL 3	4/11/2021	0.224	0.224	ZQ8679	Dup 2
Fluoride (F)	mg/L	SS BAG	4/18/2021	<0.010	0.005	ZQ8675	BAG
	mg/L	SS BAG	4/18/2021	<0.010	0.005	ZQ8676	EBW
	mg/L	SS1-4	4/10/2021	<0.010	0.005	ZQ8656	Dup 1
	mg/L	SS1-4	4/10/2021	<0.010	0.005	ZQ8678	Dup 2
	mg/L	SS1-5	4/10/2021	<0.010	0.005	ZQ8657	GW
	mg/L	SS2-1	4/9/2021	0.015	0.015	ZQ8658	GW
	mg/L	SS2-2	4/9/2021	<0.010	0.005	ZQ8659	GW
	mg/L	SS2-3	4/9/2021	<0.010	0.005	ZQ8660	GW
	mg/L	SS2-4	4/9/2021	<0.010	0.005	ZQ8661	GW
	mg/L	SS3-4	4/11/2021	<0.010	0.005	ZQ8662	GW
	mg/L	SS3-5	4/11/2021	<0.010	0.005	ZQ8663	GW
	mg/L	SS3-6	4/11/2021	<0.010	0.005	ZQ8664	GW
	mg/L	SS3-7	4/11/2021	<0.010	0.005	ZQ8665	Dup 1
	mg/L	SS3-7	4/11/2021	<0.010	0.005	ZQ8677	Dup 2
	mg/L	SS3-8	4/11/2021	<0.010	0.005	ZQ8666	GW
	mg/L	SS4-4	4/12/2021	<0.010	0.005	ZQ8667	GW
	mg/L	SS4-5	4/12/2021	<0.010	0.005	ZQ8668	GW
	mg/L	SS5-3	4/11/2021	<0.010	0.005	ZQ8669	GW
	mg/L	SS5-4	4/11/2021	<0.010	0.005	ZQ8670	GW
	mg/L	SS5-5	4/11/2021	<0.010	0.005	ZQ8671	GW
	mg/L	CONTROL 1	4/11/2021	<0.010	0.005	ZQ8672	GW
	mg/L	CONTROL 2	4/12/2021	<0.010	0.005	ZQ8673	GW
	mg/L	CONTROL 3	4/11/2021	<0.010	0.005	ZQ8674	Dup 1
	mg/L	CONTROL 3	4/11/2021	<0.010	0.005	ZQ8679	Dup 2

Appendix D: Snow Water Chemistry Analytical Results

Parameter	Unit	Sample Point	Date	Data Point	Graphable Value	Lab Ref	Sample Type
Hardness (as $CaCO_3$) - Dissolved	mg/L	SS BAG	4/18/2021	<0.50	0.25	ZQ8675	BAG
	mg/L	SS BAG	4/18/2021	<0.50	0.25	ZQ8676	EBW
	mg/L	SS1-4	4/10/2021	1.04	1.04	ZQ8656	Dup 1
	mg/L	SS1-4	4/10/2021	1.74	1.74	ZQ8678	Dup 2
	mg/L	SS1-5	4/10/2021	<0.50	0.25	ZQ8657	GW
	mg/L	SS2-1	4/9/2021	<0.50	0.25	ZQ8658	GW
	mg/L	SS2-2	4/9/2021	<0.50	0.25	ZQ8659	GW
	mg/L	SS2-3	4/9/2021	0.54	0.54	ZQ8660	GW
	mg/L	SS2-4	4/9/2021	<0.50	0.25	ZQ8661	GW
	mg/L	SS3-4	4/11/2021	3.25	3.25	ZQ8662	GW
	mg/L	SS3-5	4/11/2021	2.28	2.28	ZQ8663	GW
	mg/L	SS3-6	4/11/2021	27.9	27.9	ZQ8664	GW
	mg/L	SS3-7	4/11/2021	1.85	1.85	ZQ8665	Dup 1
	mg/L	SS3-7	4/11/2021	6.91	6.91	ZQ8677	Dup 2
	mg/L	SS3-8	4/11/2021	0.89	0.89	ZQ8666	GW
	mg/L	SS4-4	4/12/2021	1.38	1.38	ZQ8667	GW
	mg/L	SS4-5	4/12/2021	0.8	0.8	ZQ8668	GW
	mg/L	SS5-3	4/11/2021	0.72	0.72	ZQ8669	GW
	mg/L	SS5-4	4/11/2021	0.85	0.85	ZQ8670	GW
	mg/L	SS5-5	4/11/2021	<0.50	0.25	ZQ8671	GW
	mg/L	CONTROL 1	4/11/2021	<0.50	0.25	ZQ8672	GW
	mg/L	CONTROL 2	4/12/2021	2.56	2.56	ZQ8673	GW
	mg/L	CONTROL 3	4/11/2021	<0.50	0.25	ZQ8674	Dup 1
	mg/L	CONTROL 3	4/11/2021	1.01	1.01	ZQ8679	Dup 2
Hardness (as $CACO_3$) - Total	mg/L	SS BAG	4/18/2021	<0.50	0.25	ZQ8675	BAG
	mg/L	SS BAG	4/18/2021	<0.50	0.25	ZQ8676	EBW
	mg/L	SS1-4	4/10/2021	1.93	1.93	ZQ8656	Dup 1
	mg/L	SS1-4	4/10/2021	2.44	2.44	ZQ8678	Dup 2
	mg/L	SS1-5	4/10/2021	0.93	0.93	ZQ8657	GW
	mg/L	SS2-1	4/9/2021	3.81	3.81	ZQ8658	GW
	mg/L	SS2-2	4/9/2021	1.37	1.37	ZQ8659	GW
	mg/L	SS2-3	4/9/2021	1.29	1.29	ZQ8660	GW
	mg/L	SS2-4	4/9/2021	1.12	1.12	ZQ8661	GW
	mg/L	SS3-4	4/11/2021	7.94	7.94	ZQ8662	GW
	mg/L	SS3-5	4/11/2021	2.38	2.38	ZQ8663	GW
	mg/L	SS3-6	4/11/2021	53.4	53.4	ZQ8664	GW
	mg/L	SS3-7	4/11/2021	19.1	19.1	ZQ8665	Dup 1
	mg/L	SS3-7	4/11/2021	13.8	13.8	ZQ8677	Dup 2
	mg/L	SS3-8	4/11/2021	9.39	9.39	ZQ8666	GW
	mg/L	SS4-4	4/12/2021	16.2	16.2	ZQ8667	GW
	mg/L	SS4-5	4/12/2021	9.4	9.4	ZQ8668	GW
	mg/L	SS5-3	4/11/2021	9.88	9.88	ZQ8669	GW
	mg/L	SS5-4	4/11/2021	10.8	10.8	ZQ8670	GW
	mg/L	SS5-5	4/11/2021	1.37	1.37	ZQ8671	GW
	mg/L	CONTROL 1	4/11/2021	0.95	0.95	ZQ8672	GW
	mg/L	CONTROL 2	4/12/2021	9.58	9.58	ZQ8673	GW
	mg/L	CONTROL 3	4/11/2021	2.72	2.72	ZQ8674	Dup 1
	mg/L	CONTROL 3	4/11/2021	2.57	2.57	ZQ8679	Dup 2

Appendix D: Snow Water Chemistry Analytical Results

Parameter	Unit	Sample Point	Date	Data Point	Graphable Value	Lab Ref	Sample Type
Hydroxide (OH)	mg/L	SS BAG	4/18/2021	<0.50	0.25	ZQ8675	BAG
	mg/L	SS BAG	4/18/2021	<0.50	0.25	ZQ8676	EBW
	mg/L	SS1-4	4/10/2021	<0.50	0.25	ZQ8656	Dup 1
	mg/L	SS1-4	4/10/2021	<0.50	0.25	ZQ8678	Dup 2
	mg/L	SS1-5	4/10/2021	<0.50	0.25	ZQ8657	GW
	mg/L	SS2-1	4/9/2021	<0.50	0.25	ZQ8658	GW
	mg/L	SS2-2	4/9/2021	<0.50	0.25	ZQ8659	GW
	mg/L	SS2-3	4/9/2021	<0.50	0.25	ZQ8660	GW
	mg/L	SS2-4	4/9/2021	<0.50	0.25	ZQ8661	GW
	mg/L	SS3-4	4/11/2021	<0.50	0.25	ZQ8662	GW
	mg/L	SS3-5	4/11/2021	<0.50	0.25	ZQ8663	GW
	mg/L	SS3-6	4/11/2021	<0.50	0.25	ZQ8664	GW
	mg/L	SS3-7	4/11/2021	<0.50	0.25	ZQ8665	Dup 1
	mg/L	SS3-7	4/11/2021	<0.50	0.25	ZQ8677	Dup 2
	mg/L	SS3-8	4/11/2021	<0.50	0.25	ZQ8666	GW
	mg/L	SS4-4	4/12/2021	<0.50	0.25	ZQ8667	GW
	mg/L	SS4-5	4/12/2021	<0.50	0.25	ZQ8668	GW
	mg/L	SS5-3	4/11/2021	<0.50	0.25	ZQ8669	GW
	mg/L	SS5-4	4/11/2021	<0.50	0.25	ZQ8670	GW
	mg/L	SS5-5	4/11/2021	<0.50	0.25	ZQ8671	GW
	mg/L	CONTROL 1	4/11/2021	<0.50	0.25	ZQ8672	GW
	mg/L	CONTROL 2	4/12/2021	<0.50	0.25	ZQ8673	GW
	mg/L	CONTROL 3	4/11/2021	<0.50	0.25	ZQ8674	Dup 1
	mg/L	CONTROL 3	4/11/2021	<0.50	0.25	ZQ8679	Dup 2
Iron (Fe) - Dissolved	ug/L	SS BAG	4/18/2021	<1.0	0.5	ZQ8675	BAG
	ug/L	SS BAG	4/18/2021	21.7	21.7	ZQ8676	EBW
	ug/L	SS1-4	4/10/2021	278	278	ZQ8656	Dup 1
	ug/L	SS1-4	4/10/2021	330	330	ZQ8678	Dup 2
	ug/L	SS1-5	4/10/2021	68.4	68.4	ZQ8657	GW
	ug/L	SS2-1	4/9/2021	5	5	ZQ8658	GW
	ug/L	SS2-2	4/9/2021	3.2	3.2	ZQ8659	GW
	ug/L	SS2-3	4/9/2021	70.6	70.6	ZQ8660	GW
	ug/L	SS2-4	4/9/2021	3.5	3.5	ZQ8661	GW
	ug/L	SS3-4	4/11/2021	267	267	ZQ8662	GW
	ug/L	SS3-5	4/11/2021	219	219	ZQ8663	GW
	ug/L	SS3-6	4/11/2021	2910	2910	ZQ8664	GW
	ug/L	SS3-7	4/11/2021	13.7	13.7	ZQ8665	Dup 1
	ug/L	SS3-7	4/11/2021	556	556	ZQ8677	Dup 2
	ug/L	SS3-8	4/11/2021	4.7	4.7	ZQ8666	GW
	ug/L	SS4-4	4/12/2021	15.8	15.8	ZQ8667	GW
	ug/L	SS4-5	4/12/2021	9.9	9.9	ZQ8668	GW
	ug/L	SS5-3	4/11/2021	30.2	30.2	ZQ8669	GW
	ug/L	SS5-4	4/11/2021	5.8	5.8	ZQ8670	GW
	ug/L	SS5-5	4/11/2021	3.6	3.6	ZQ8671	GW
	ug/L	CONTROL 1	4/11/2021	80.1	80.1	ZQ8672	GW
	ug/L	CONTROL 2	4/12/2021	246	246	ZQ8673	GW
	ug/L	CONTROL 3	4/11/2021	3.5	3.5	ZQ8674	Dup 1
	ug/L	CONTROL 3	4/11/2021	164	164	ZQ8679	Dup 2

Appendix D: Snow Water Chemistry Analytical Results

Parameter	Unit	Sample Point	Date	Data Point	Graphable Value	Lab Ref	Sample Type
Iron (Fe) - Total	ug/L	SS BAG	4/18/2021	<1.0	0.5	ZQ8675	BAG
	ug/L	SS BAG	4/18/2021	60	60	ZQ8676	EBW
	ug/L	SS1-4	4/10/2021	485	485	ZQ8656	Dup 1
	ug/L	SS1-4	4/10/2021	387	387	ZQ8678	Dup 2
	ug/L	SS1-5	4/10/2021	244	244	ZQ8657	GW
	ug/L	SS2-1	4/9/2021	582	582	ZQ8658	GW
	ug/L	SS2-2	4/9/2021	264	264	ZQ8659	GW
	ug/L	SS2-3	4/9/2021	251	251	ZQ8660	GW
	ug/L	SS2-4	4/9/2021	143	143	ZQ8661	GW
	ug/L	SS3-4	4/11/2021	516	516	ZQ8662	GW
	ug/L	SS3-5	4/11/2021	237	237	ZQ8663	GW
	ug/L	SS3-6	4/11/2021	6470	6470	ZQ8664	GW
	ug/L	SS3-7	4/11/2021	1470	1470	ZQ8665	Dup 1
	ug/L	SS3-7	4/11/2021	1740	1740	ZQ8677	Dup 2
	ug/L	SS3-8	4/11/2021	1320	1320	ZQ8666	GW
	ug/L	SS4-4	4/12/2021	1830	1830	ZQ8667	GW
	ug/L	SS4-5	4/12/2021	1860	1860	ZQ8668	GW
	ug/L	SS5-3	4/11/2021	2340	2340	ZQ8669	GW
	ug/L	SS5-4	4/11/2021	788	788	ZQ8670	GW
	ug/L	SS5-5	4/11/2021	248	248	ZQ8671	GW
	ug/L	CONTROL 1	4/11/2021	245	245	ZQ8672	GW
	ug/L	CONTROL 2	4/12/2021	919	919	ZQ8673	GW
	ug/L	CONTROL 3	4/11/2021	409	409	ZQ8674	Dup 1
	ug/L	CONTROL 3	4/11/2021	406	406	ZQ8679	Dup 2
Lead (Pb) - Dissolved	ug/L	SS BAG	4/18/2021	<0.0050	0.0025	ZQ8675	BAG
	ug/L	SS BAG	4/18/2021	0.0173	0.0173	ZQ8676	EBW
	ug/L	SS1-4	4/10/2021	0.126	0.126	ZQ8656	Dup 1
	ug/L	SS1-4	4/10/2021	0.136	0.136	ZQ8678	Dup 2
	ug/L	SS1-5	4/10/2021	0.0571	0.0571	ZQ8657	GW
	ug/L	SS2-1	4/9/2021	0.0084	0.0084	ZQ8658	GW
	ug/L	SS2-2	4/9/2021	0.0072	0.0072	ZQ8659	GW
	ug/L	SS2-3	4/9/2021	0.0842	0.0842	ZQ8660	GW
	ug/L	SS2-4	4/9/2021	0.0081	0.0081	ZQ8661	GW
	ug/L	SS3-4	4/11/2021	0.11	0.11	ZQ8662	GW
	ug/L	SS3-5	4/11/2021	0.112	0.112	ZQ8663	GW
	ug/L	SS3-6	4/11/2021	1.37	1.37	ZQ8664	GW
	ug/L	SS3-7	4/11/2021	0.0175	0.0175	ZQ8665	Dup 1
	ug/L	SS3-7	4/11/2021	0.201	0.201	ZQ8677	Dup 2
	ug/L	SS3-8	4/11/2021	0.014	0.014	ZQ8666	GW
	ug/L	SS4-4	4/12/2021	0.0164	0.0164	ZQ8667	GW
	ug/L	SS4-5	4/12/2021	0.0088	0.0088	ZQ8668	GW
	ug/L	SS5-3	4/11/2021	0.0515	0.0515	ZQ8669	GW
	ug/L	SS5-4	4/11/2021	0.0184	0.0184	ZQ8670	GW
	ug/L	SS5-5	4/11/2021	0.0096	0.0096	ZQ8671	GW
	ug/L	CONTROL 1	4/11/2021	0.0601	0.0601	ZQ8672	GW
	ug/L	CONTROL 2	4/12/2021	0.144	0.144	ZQ8673	GW
	ug/L	CONTROL 3	4/11/2021	0.0192	0.0192	ZQ8674	Dup 1
	ug/L	CONTROL 3	4/11/2021	0.111	0.111	ZQ8679	Dup 2

Appendix D: Snow Water Chemistry Analytical Results

Parameter	Unit	Sample Point	Date	Data Point	Graphable Value	Lab Ref	Sample Type
Lead (Pb) - Total	ug/L	SS BAG	4/18/2021	<0.0050	0.0025	ZQ8675	BAG
	ug/L	SS BAG	4/18/2021	0.0257	0.0257	ZQ8676	EBW
	ug/L	SS1-4	4/10/2021	0.664	0.664	ZQ8656	Dup 1
	ug/L	SS1-4	4/10/2021	0.286	0.286	ZQ8678	Dup 2
	ug/L	SS1-5	4/10/2021	0.17	0.17	ZQ8657	GW
	ug/L	SS2-1	4/9/2021	0.274	0.274	ZQ8658	GW
	ug/L	SS2-2	4/9/2021	0.233	0.233	ZQ8659	GW
	ug/L	SS2-3	4/9/2021	0.16	0.16	ZQ8660	GW
	ug/L	SS2-4	4/9/2021	0.0886	0.0886	ZQ8661	GW
	ug/L	SS3-4	4/11/2021	0.306	0.306	ZQ8662	GW
	ug/L	SS3-5	4/11/2021	0.107	0.107	ZQ8663	GW
	ug/L	SS3-6	4/11/2021	4.75	4.75	ZQ8664	GW
	ug/L	SS3-7	4/11/2021	0.591	0.591	ZQ8665	Dup 1
	ug/L	SS3-7	4/11/2021	0.643	0.643	ZQ8677	Dup 2
	ug/L	SS3-8	4/11/2021	0.64	0.64	ZQ8666	GW
	ug/L	SS4-4	4/12/2021	0.4	0.4	ZQ8667	GW
	ug/L	SS4-5	4/12/2021	0.503	0.503	ZQ8668	GW
	ug/L	SS5-3	4/11/2021	1.39	1.39	ZQ8669	GW
	ug/L	SS5-4	4/11/2021	0.473	0.473	ZQ8670	GW
	ug/L	SS5-5	4/11/2021	0.169	0.169	ZQ8671	GW
	ug/L	CONTROL 1	4/11/2021	0.115	0.115	ZQ8672	GW
	ug/L	CONTROL 2	4/12/2021	0.427	0.427	ZQ8673	GW
	ug/L	CONTROL 3	4/11/2021	0.237	0.237	ZQ8674	Dup 1
	ug/L	CONTROL 3	4/11/2021	0.235	0.235	ZQ8679	Dup 2
Lithium (Li) - Dissolved	ug/L	SS BAG	4/18/2021	<0.50	0.25	ZQ8675	BAG
	ug/L	SS BAG	4/18/2021	<0.50	0.25	ZQ8676	EBW
	ug/L	SS1-4	4/10/2021	0.62	0.62	ZQ8656	Dup 1
	ug/L	SS1-4	4/10/2021	1.24	1.24	ZQ8678	Dup 2
	ug/L	SS1-5	4/10/2021	<0.50	0.25	ZQ8657	GW
	ug/L	SS2-1	4/9/2021	<0.50	0.25	ZQ8658	GW
	ug/L	SS2-2	4/9/2021	<0.50	0.25	ZQ8659	GW
	ug/L	SS2-3	4/9/2021	<0.50	0.25	ZQ8660	GW
	ug/L	SS2-4	4/9/2021	<0.50	0.25	ZQ8661	GW
	ug/L	SS3-4	4/11/2021	1.18	1.18	ZQ8662	GW
	ug/L	SS3-5	4/11/2021	<0.50	0.25	ZQ8663	GW
	ug/L	SS3-6	4/11/2021	10.1	10.1	ZQ8664	GW
	ug/L	SS3-7	4/11/2021	<0.50	0.25	ZQ8665	Dup 1
	ug/L	SS3-7	4/11/2021	1.5	1.5	ZQ8677	Dup 2
	ug/L	SS3-8	4/11/2021	<0.50	0.25	ZQ8666	GW
	ug/L	SS4-4	4/12/2021	<0.50	0.25	ZQ8667	GW
	ug/L	SS4-5	4/12/2021	<0.50	0.25	ZQ8668	GW
	ug/L	SS5-3	4/11/2021	<0.50	0.25	ZQ8669	GW
	ug/L	SS5-4	4/11/2021	<0.50	0.25	ZQ8670	GW
	ug/L	SS5-5	4/11/2021	<0.50	0.25	ZQ8671	GW
	ug/L	CONTROL 1	4/11/2021	<0.50	0.25	ZQ8672	GW
	ug/L	CONTROL 2	4/12/2021	<0.50	0.25	ZQ8673	GW
	ug/L	CONTROL 3	4/11/2021	<0.50	0.25	ZQ8674	Dup 1
	ug/L	CONTROL 3	4/11/2021	<0.50	0.25	ZQ8679	Dup 2

Appendix D: Snow Water Chemistry Analytical Results

Parameter	Unit	Sample Point	Date	Data Point	Graphable Value	Lab Ref	Sample Type
Lithium (Li) - Total	ug/L	SS BAG	4/18/2021	<0.50	0.25	ZQ8675	BAG
	ug/L	SS BAG	4/18/2021	<0.50	0.25	ZQ8676	EBW
	ug/L	SS1-4	4/10/2021	1.3	1.3	ZQ8656	Dup 1
	ug/L	SS1-4	4/10/2021	1.68	1.68	ZQ8678	Dup 2
	ug/L	SS1-5	4/10/2021	<0.50	0.25	ZQ8657	GW
	ug/L	SS2-1	4/9/2021	1.62	1.62	ZQ8658	GW
	ug/L	SS2-2	4/9/2021	0.67	0.67	ZQ8659	GW
	ug/L	SS2-3	4/9/2021	<0.50	0.25	ZQ8660	GW
	ug/L	SS2-4	4/9/2021	<0.50	0.25	ZQ8661	GW
	ug/L	SS3-4	4/11/2021	1.29	1.29	ZQ8662	GW
	ug/L	SS3-5	4/11/2021	<0.50	0.25	ZQ8663	GW
	ug/L	SS3-6	4/11/2021	15.4	15.4	ZQ8664	GW
	ug/L	SS3-7	4/11/2021	3.88	3.88	ZQ8665	Dup 1
	ug/L	SS3-7	4/11/2021	4.16	4.16	ZQ8677	Dup 2
	ug/L	SS3-8	4/11/2021	3.93	3.93	ZQ8666	GW
	ug/L	SS4-4	4/12/2021	3.94	3.94	ZQ8667	GW
	ug/L	SS4-5	4/12/2021	3.5	3.5	ZQ8668	GW
	ug/L	SS5-3	4/11/2021	7.61	7.61	ZQ8669	GW
	ug/L	SS5-4	4/11/2021	2.06	2.06	ZQ8670	GW
	ug/L	SS5-5	4/11/2021	0.54	0.54	ZQ8671	GW
	ug/L	CONTROL 1	4/11/2021	<0.50	0.25	ZQ8672	GW
	ug/L	CONTROL 2	4/12/2021	1.6	1.6	ZQ8673	GW
	ug/L	CONTROL 3	4/11/2021	0.94	0.94	ZQ8674	Dup 1
	ug/L	CONTROL 3	4/11/2021	0.89	0.89	ZQ8679	Dup 2
Magnesium (Mg) - Dissolved	mg/L	SS BAG	4/18/2021	<0.0050	0.0025	ZQ8675	BAG
	mg/L	SS BAG	4/18/2021	<0.0050	0.0025	ZQ8676	EBW
	mg/L	SS1-4	4/10/2021	0.151	0.151	ZQ8656	Dup 1
	mg/L	SS1-4	4/10/2021	0.283	0.283	ZQ8678	Dup 2
	mg/L	SS1-5	4/10/2021	0.0539	0.0539	ZQ8657	GW
	mg/L	SS2-1	4/9/2021	0.0314	0.0314	ZQ8658	GW
	mg/L	SS2-2	4/9/2021	0.0158	0.0158	ZQ8659	GW
	mg/L	SS2-3	4/9/2021	0.0725	0.0725	ZQ8660	GW
	mg/L	SS2-4	4/9/2021	0.0278	0.0278	ZQ8661	GW
	mg/L	SS3-4	4/11/2021	0.617	0.617	ZQ8662	GW
	mg/L	SS3-5	4/11/2021	0.429	0.429	ZQ8663	GW
	mg/L	SS3-6	4/11/2021	4.9	4.9	ZQ8664	GW
	mg/L	SS3-7	4/11/2021	0.115	0.115	ZQ8665	Dup 1
	mg/L	SS3-7	4/11/2021	1.24	1.24	ZQ8677	Dup 2
	mg/L	SS3-8	4/11/2021	0.0637	0.0637	ZQ8666	GW
	mg/L	SS4-4	4/12/2021	0.125	0.125	ZQ8667	GW
	mg/L	SS4-5	4/12/2021	0.0533	0.0533	ZQ8668	GW
	mg/L	SS5-3	4/11/2021	0.0643	0.0643	ZQ8669	GW
	mg/L	SS5-4	4/11/2021	0.0717	0.0717	ZQ8670	GW
	mg/L	SS5-5	4/11/2021	0.0179	0.0179	ZQ8671	GW
	mg/L	CONTROL 1	4/11/2021	0.0602	0.0602	ZQ8672	GW
	mg/L	CONTROL 2	4/12/2021	0.453	0.453	ZQ8673	GW
	mg/L	CONTROL 3	4/11/2021	0.0211	0.0211	ZQ8674	Dup 1
	mg/L	CONTROL 3	4/11/2021	0.176	0.176	ZQ8679	Dup 2

Appendix D: Snow Water Chemistry Analytical Results

Parameter	Unit	Sample Point	Date	Data Point	Graphable Value	Lab Ref	Sample Type
Magnesium (Mg) - Total	mg/L	SS BAG	4/18/2021	<0.0050	0.0025	ZQ8675	BAG
	mg/L	SS BAG	4/18/2021	0.0139	0.0139	ZQ8676	EBW
	mg/L	SS1-4	4/10/2021	0.351	0.351	ZQ8656	Dup 1
	mg/L	SS1-4	4/10/2021	0.438	0.438	ZQ8678	Dup 2
	mg/L	SS1-5	4/10/2021	0.175	0.175	ZQ8657	GW
	mg/L	SS2-1	4/9/2021	0.766	0.766	ZQ8658	GW
	mg/L	SS2-2	4/9/2021	0.264	0.264	ZQ8659	GW
	mg/L	SS2-3	4/9/2021	0.256	0.256	ZQ8660	GW
	mg/L	SS2-4	4/9/2021	0.19	0.19	ZQ8661	GW
	mg/L	SS3-4	4/11/2021	1.66	1.66	ZQ8662	GW
	mg/L	SS3-5	4/11/2021	0.476	0.476	ZQ8663	GW
	mg/L	SS3-6	4/11/2021	10.6	10.6	ZQ8664	GW
	mg/L	SS3-7	4/11/2021	3.84	3.84	ZQ8665	Dup 1
	mg/L	SS3-7	4/11/2021	2.85	2.85	ZQ8677	Dup 2
	mg/L	SS3-8	4/11/2021	1.92	1.92	ZQ8666	GW
	mg/L	SS4-4	4/12/2021	3.53	3.53	ZQ8667	GW
	mg/L	SS4-5	4/12/2021	1.85	1.85	ZQ8668	GW
	mg/L	SS5-3	4/11/2021	1.88	1.88	ZQ8669	GW
	mg/L	SS5-4	4/11/2021	2.31	2.31	ZQ8670	GW
	mg/L	SS5-5	4/11/2021	0.273	0.273	ZQ8671	GW
	mg/L	CONTROL 1	4/11/2021	0.19	0.19	ZQ8672	GW
	mg/L	CONTROL 2	4/12/2021	2.08	2.08	ZQ8673	GW
	mg/L	CONTROL 3	4/11/2021	0.564	0.564	ZQ8674	Dup 1
	mg/L	CONTROL 3	4/11/2021	0.538	0.538	ZQ8679	Dup 2
Manganese (Mn) - Dissolved	ug/L	SS BAG	4/18/2021	<0.050	0.025	ZQ8675	BAG
	ug/L	SS BAG	4/18/2021	0.124	0.124	ZQ8676	EBW
	ug/L	SS1-4	4/10/2021	5.19	5.19	ZQ8656	Dup 1
	ug/L	SS1-4	4/10/2021	6.33	6.33	ZQ8678	Dup 2
	ug/L	SS1-5	4/10/2021	1.04	1.04	ZQ8657	GW
	ug/L	SS2-1	4/9/2021	0.941	0.941	ZQ8658	GW
	ug/L	SS2-2	4/9/2021	0.498	0.498	ZQ8659	GW
	ug/L	SS2-3	4/9/2021	1.5	1.5	ZQ8660	GW
	ug/L	SS2-4	4/9/2021	0.768	0.768	ZQ8661	GW
	ug/L	SS3-4	4/11/2021	7.93	7.93	ZQ8662	GW
	ug/L	SS3-5	4/11/2021	3.29	3.29	ZQ8663	GW
	ug/L	SS3-6	4/11/2021	80.5	80.5	ZQ8664	GW
	ug/L	SS3-7	4/11/2021	2.54	2.54	ZQ8665	Dup 1
	ug/L	SS3-7	4/11/2021	12.4	12.4	ZQ8677	Dup 2
	ug/L	SS3-8	4/11/2021	1.74	1.74	ZQ8666	GW
	ug/L	SS4-4	4/12/2021	2.62	2.62	ZQ8667	GW
	ug/L	SS4-5	4/12/2021	1.91	1.91	ZQ8668	GW
	ug/L	SS5-3	4/11/2021	3.9	3.9	ZQ8669	GW
	ug/L	SS5-4	4/11/2021	1.78	1.78	ZQ8670	GW
	ug/L	SS5-5	4/11/2021	0.479	0.479	ZQ8671	GW
	ug/L	CONTROL 1	4/11/2021	1.71	1.71	ZQ8672	GW
	ug/L	CONTROL 2	4/12/2021	5.3	5.3	ZQ8673	GW
	ug/L	CONTROL 3	4/11/2021	0.561	0.561	ZQ8674	Dup 1
	ug/L	CONTROL 3	4/11/2021	3.13	3.13	ZQ8679	Dup 2

Appendix D: Snow Water Chemistry Analytical Results

Parameter	Unit	Sample Point	Date	Data Point	Graphable Value	Lab Ref	Sample Type
Manganese (Mn) - Total	ug/L	SS BAG	4/18/2021	<0.050	0.025	ZQ8675	BAG
	ug/L	SS BAG	4/18/2021	0.696	0.696	ZQ8676	EBW
	ug/L	SS1-4	4/10/2021	7.73	7.73	ZQ8656	Dup 1
	ug/L	SS1-4	4/10/2021	6.46	6.46	ZQ8678	Dup 2
	ug/L	SS1-5	4/10/2021	2.94	2.94	ZQ8657	GW
	ug/L	SS2-1	4/9/2021	10.9	10.9	ZQ8658	GW
	ug/L	SS2-2	4/9/2021	4.3	4.3	ZQ8659	GW
	ug/L	SS2-3	4/9/2021	3.53	3.53	ZQ8660	GW
	ug/L	SS2-4	4/9/2021	2.99	2.99	ZQ8661	GW
	ug/L	SS3-4	4/11/2021	9.65	9.65	ZQ8662	GW
	ug/L	SS3-5	4/11/2021	3.98	3.98	ZQ8663	GW
	ug/L	SS3-6	4/11/2021	131	131	ZQ8664	GW
	ug/L	SS3-7	4/11/2021	31.6	31.6	ZQ8665	Dup 1
	ug/L	SS3-7	4/11/2021	34.6	34.6	ZQ8677	Dup 2
	ug/L	SS3-8	4/11/2021	26.1	26.1	ZQ8666	GW
	ug/L	SS4-4	4/12/2021	32.5	32.5	ZQ8667	GW
	ug/L	SS4-5	4/12/2021	35.7	35.7	ZQ8668	GW
	ug/L	SS5-3	4/11/2021	48.6	48.6	ZQ8669	GW
	ug/L	SS5-4	4/11/2021	15	15	ZQ8670	GW
	ug/L	SS5-5	4/11/2021	3.76	3.76	ZQ8671	GW
	ug/L	CONTROL 1	4/11/2021	3.76	3.76	ZQ8672	GW
	ug/L	CONTROL 2	4/12/2021	15.1	15.1	ZQ8673	GW
	ug/L	CONTROL 3	4/11/2021	7	7	ZQ8674	Dup 1
	ug/L	CONTROL 3	4/11/2021	6.15	6.15	ZQ8679	Dup 2
Mercury (Hg) - Total	ug/L	SS BAG	4/18/2021	<0.0019	0.00095	ZQ8675	BAG
	ug/L	SS BAG	4/18/2021	<0.0019	0.00095	ZQ8676	EBW
	ug/L	SS1-4	4/10/2021	<0.0019	0.00095	ZQ8656	Dup 1
	ug/L	SS1-4	4/10/2021	<0.0019	0.00095	ZQ8678	Dup 2
	ug/L	SS1-5	4/10/2021	<0.0019	0.00095	ZQ8657	GW
	ug/L	SS2-1	4/9/2021	<0.0019	0.00095	ZQ8658	GW
	ug/L	SS2-2	4/9/2021	<0.0019	0.00095	ZQ8659	GW
	ug/L	SS2-3	4/9/2021	<0.0019	0.00095	ZQ8660	GW
	ug/L	SS2-4	4/9/2021	<0.0019	0.00095	ZQ8661	GW
	ug/L	SS3-4	4/11/2021	0.0034	0.0034	ZQ8662	GW
	ug/L	SS3-5	4/11/2021	<0.0019	0.00095	ZQ8663	GW
	ug/L	SS3-6	4/11/2021	0.0055	0.0055	ZQ8664	GW
	ug/L	SS3-7	4/11/2021	0.0029	0.0029	ZQ8665	Dup 1
	ug/L	SS3-7	4/11/2021	<0.0019	0.00095	ZQ8677	Dup 2
	ug/L	SS3-8	4/11/2021	<0.0019	0.00095	ZQ8666	GW
	ug/L	SS4-4	4/12/2021	0.0024	0.0024	ZQ8667	GW
	ug/L	SS4-5	4/12/2021	<0.0019	0.00095	ZQ8668	GW
	ug/L	SS5-3	4/11/2021	0.0024	0.0024	ZQ8669	GW
	ug/L	SS5-4	4/11/2021	0.002	0.002	ZQ8670	GW
	ug/L	SS5-5	4/11/2021	<0.0019		ZQ8671	GW
	ug/L	CONTROL 1	4/11/2021	0.0026	0.0026	ZQ8672	GW
	ug/L	CONTROL 2	4/12/2021	<0.0019	0.00095	ZQ8673	GW
	ug/L	CONTROL 3	4/11/2021	<0.0019	0.00095	ZQ8674	Dup 1
	ug/L	CONTROL 3	4/11/2021	<0.0019	0.00095	ZQ8679	Dup 2

Appendix D: Snow Water Chemistry Analytical Results

Parameter	Unit	Sample Point	Date	Data Point	Graphable Value	Lab Ref	Sample Type
Molybdenum (Mo) - Dissolved	ug/L	SS BAG	4/18/2021	<0.050	0.025	ZQ8675	BAG
	ug/L	SS BAG	4/18/2021	<0.050	0.025	ZQ8676	EBW
	ug/L	SS1-4	4/10/2021	0.064	0.064	ZQ8656	Dup 1
	ug/L	SS1-4	4/10/2021	0.153	0.153	ZQ8678	Dup 2
	ug/L	SS1-5	4/10/2021	0.064	0.064	ZQ8657	GW
	ug/L	SS2-1	4/9/2021	0.144	0.144	ZQ8658	GW
	ug/L	SS2-2	4/9/2021	0.064	0.064	ZQ8659	GW
	ug/L	SS2-3	4/9/2021	0.06	0.06	ZQ8660	GW
	ug/L	SS2-4	4/9/2021	<0.050	0.025	ZQ8661	GW
	ug/L	SS3-4	4/11/2021	0.055	0.055	ZQ8662	GW
	ug/L	SS3-5	4/11/2021	0.051	0.051	ZQ8663	GW
	ug/L	SS3-6	4/11/2021	0.289	0.289	ZQ8664	GW
	ug/L	SS3-7	4/11/2021	0.052	0.052	ZQ8665	Dup 1
	ug/L	SS3-7	4/11/2021	0.091	0.091	ZQ8677	Dup 2
	ug/L	SS3-8	4/11/2021	<0.050	0.025	ZQ8666	GW
	ug/L	SS4-4	4/12/2021	0.071	0.071	ZQ8667	GW
	ug/L	SS4-5	4/12/2021	<0.050	0.025	ZQ8668	GW
	ug/L	SS5-3	4/11/2021	<0.050	0.025	ZQ8669	GW
	ug/L	SS5-4	4/11/2021	<0.050	0.025	ZQ8670	GW
	ug/L	SS5-5	4/11/2021	<0.050	0.025	ZQ8671	GW
	ug/L	CONTROL 1	4/11/2021	0.062	0.062	ZQ8672	GW
	ug/L	CONTROL 2	4/12/2021	0.084	0.084	ZQ8673	GW
	ug/L	CONTROL 3	4/11/2021	<0.050	0.025	ZQ8674	Dup 1
	ug/L	CONTROL 3	4/11/2021	<0.050	0.025	ZQ8679	Dup 2
Molybdenum (Mo) - Total	ug/L	SS BAG	4/18/2021	<0.050	0.025	ZQ8675	BAG
	ug/L	SS BAG	4/18/2021	0.08	0.08	ZQ8676	EBW
	ug/L	SS1-4	4/10/2021	0.172	0.172	ZQ8656	Dup 1
	ug/L	SS1-4	4/10/2021	0.288	0.288	ZQ8678	Dup 2
	ug/L	SS1-5	4/10/2021	0.146	0.146	ZQ8657	GW
	ug/L	SS2-1	4/9/2021	0.097	0.097	ZQ8658	GW
	ug/L	SS2-2	4/9/2021	0.061	0.061	ZQ8659	GW
	ug/L	SS2-3	4/9/2021	0.052	0.052	ZQ8660	GW
	ug/L	SS2-4	4/9/2021	<0.050	0.025	ZQ8661	GW
	ug/L	SS3-4	4/11/2021	0.115	0.115	ZQ8662	GW
	ug/L	SS3-5	4/11/2021	0.05	0.05	ZQ8663	GW
	ug/L	SS3-6	4/11/2021	0.473	0.473	ZQ8664	GW
	ug/L	SS3-7	4/11/2021	0.167	0.167	ZQ8665	Dup 1
	ug/L	SS3-7	4/11/2021	0.12	0.12	ZQ8677	Dup 2
	ug/L	SS3-8	4/11/2021	0.159	0.159	ZQ8666	GW
	ug/L	SS4-4	4/12/2021	0.161	0.161	ZQ8667	GW
	ug/L	SS4-5	4/12/2021	0.119	0.119	ZQ8668	GW
	ug/L	SS5-3	4/11/2021	0.136	0.136	ZQ8669	GW
	ug/L	SS5-4	4/11/2021	0.121	0.121	ZQ8670	GW
	ug/L	SS5-5	4/11/2021	0.082	0.082	ZQ8671	GW
	ug/L	CONTROL 1	4/11/2021	0.201	0.201	ZQ8672	GW
	ug/L	CONTROL 2	4/12/2021	0.13	0.13	ZQ8673	GW
	ug/L	CONTROL 3	4/11/2021	0.066	0.066	ZQ8674	Dup 1
	ug/L	CONTROL 3	4/11/2021	0.082	0.082	ZQ8679	Dup 2

Appendix D: Snow Water Chemistry Analytical Results

Parameter	Unit	Sample Point	Date	Data Point	Graphable Value	Lab Ref	Sample Type
Nickel (Ni) - Dissolved	ug/L	SS BAG	4/18/2021	<0.020	0.01	ZQ8675	BAG
	ug/L	SS BAG	4/18/2021	<0.020	0.01	ZQ8676	EBW
	ug/L	SS1-4	4/10/2021	0.763	0.763	ZQ8656	Dup 1
	ug/L	SS1-4	4/10/2021	0.719	0.719	ZQ8678	Dup 2
	ug/L	SS1-5	4/10/2021	0.218	0.218	ZQ8657	GW
	ug/L	SS2-1	4/9/2021	0.334	0.334	ZQ8658	GW
	ug/L	SS2-2	4/9/2021	0.101	0.101	ZQ8659	GW
	ug/L	SS2-3	4/9/2021	0.339	0.339	ZQ8660	GW
	ug/L	SS2-4	4/9/2021	0.22	0.22	ZQ8661	GW
	ug/L	SS3-4	4/11/2021	2.37	2.37	ZQ8662	GW
	ug/L	SS3-5	4/11/2021	2.07	2.07	ZQ8663	GW
	ug/L	SS3-6	4/11/2021	30	30	ZQ8664	GW
	ug/L	SS3-7	4/11/2021	1.83	1.83	ZQ8665	Dup 1
	ug/L	SS3-7	4/11/2021	4.55	4.55	ZQ8677	Dup 2
	ug/L	SS3-8	4/11/2021	1.04	1.04	ZQ8666	GW
	ug/L	SS4-4	4/12/2021	2.08	2.08	ZQ8667	GW
	ug/L	SS4-5	4/12/2021	0.75	0.75	ZQ8668	GW
	ug/L	SS5-3	4/11/2021	0.621	0.621	ZQ8669	GW
	ug/L	SS5-4	4/11/2021	1.28	1.28	ZQ8670	GW
	ug/L	SS5-5	4/11/2021	0.159	0.159	ZQ8671	GW
	ug/L	CONTROL 1	4/11/2021	0.224	0.224	ZQ8672	GW
	ug/L	CONTROL 2	4/12/2021	2.81	2.81	ZQ8673	GW
	ug/L	CONTROL 3	4/11/2021	0.231	0.231	ZQ8674	Dup 1
	ug/L	CONTROL 3	4/11/2021	0.754	0.754	ZQ8679	Dup 2
Nickel (Ni) - Total	ug/L	SS BAG	4/18/2021	<0.020	0.01	ZQ8675	BAG
	ug/L	SS BAG	4/18/2021	0.096	0.096	ZQ8676	EBW
	ug/L	SS1-4	4/10/2021	1.15	1.15	ZQ8656	Dup 1
	ug/L	SS1-4	4/10/2021	1.01	1.01	ZQ8678	Dup 2
	ug/L	SS1-5	4/10/2021	0.675	0.675	ZQ8657	GW
	ug/L	SS2-1	4/9/2021	2.94	2.94	ZQ8658	GW
	ug/L	SS2-2	4/9/2021	0.861	0.861	ZQ8659	GW
	ug/L	SS2-3	4/9/2021	0.841	0.841	ZQ8660	GW
	ug/L	SS2-4	4/9/2021	0.821	0.821	ZQ8661	GW
	ug/L	SS3-4	4/11/2021	3.73	3.73	ZQ8662	GW
	ug/L	SS3-5	4/11/2021	2.45	2.45	ZQ8663	GW
	ug/L	SS3-6	4/11/2021	60.2	60.2	ZQ8664	GW
	ug/L	SS3-7	4/11/2021	11	11	ZQ8665	Dup 1
	ug/L	SS3-7	4/11/2021	11.7	11.7	ZQ8677	Dup 2
	ug/L	SS3-8	4/11/2021	7.28	7.28	ZQ8666	GW
	ug/L	SS4-4	4/12/2021	10.8	10.8	ZQ8667	GW
	ug/L	SS4-5	4/12/2021	6.45	6.45	ZQ8668	GW
	ug/L	SS5-3	4/11/2021	6.41	6.41	ZQ8669	GW
	ug/L	SS5-4	4/11/2021	5.97	5.97	ZQ8670	GW
	ug/L	SS5-5	4/11/2021	0.899	0.899	ZQ8671	GW
	ug/L	CONTROL 1	4/11/2021	0.661	0.661	ZQ8672	GW
	ug/L	CONTROL 2	4/12/2021	8.6	8.6	ZQ8673	GW
	ug/L	CONTROL 3	4/11/2021	1.9	1.9	ZQ8674	Dup 1
	ug/L	CONTROL 3	4/11/2021	1.68	1.68	ZQ8679	Dup 2

Appendix D: Snow Water Chemistry Analytical Results

Parameter	Unit	Sample Point	Date	Data Point	Graphable Value	Lab Ref	Sample Type
Nitrate (N)	mg/L	SS BAG	4/18/2021	<0.0020	0.001	ZQ8675	BAG
	mg/L	SS BAG	4/18/2021	0.0065	0.0065	ZQ8676	EBW
	mg/L	SS1-4	4/10/2021	0.039	0.039	ZQ8656	Dup 1
	mg/L	SS1-4	4/10/2021	0.043	0.043	ZQ8678	Dup 2
	mg/L	SS1-5	4/10/2021	0.053	0.053	ZQ8657	GW
	mg/L	SS2-1	4/9/2021	0.057	0.057	ZQ8658	GW
	mg/L	SS2-2	4/9/2021	0.039	0.039	ZQ8659	GW
	mg/L	SS2-3	4/9/2021	0.056	0.056	ZQ8660	GW
	mg/L	SS2-4	4/9/2021	0.047	0.047	ZQ8661	GW
	mg/L	SS3-4	4/11/2021	0.042	0.042	ZQ8662	GW
	mg/L	SS3-5	4/11/2021	0.033	0.033	ZQ8663	GW
	mg/L	SS3-6	4/11/2021	0.086	0.086	ZQ8664	GW
	mg/L	SS3-7	4/11/2021	0.06	0.06	ZQ8665	Dup 1
	mg/L	SS3-7	4/11/2021	0.06	0.06	ZQ8677	Dup 2
	mg/L	SS3-8	4/11/2021	0.046	0.046	ZQ8666	GW
	mg/L	SS4-4	4/12/2021	0.043	0.043	ZQ8667	GW
	mg/L	SS4-5	4/12/2021	0.056	0.056	ZQ8668	GW
	mg/L	SS5-3	4/11/2021	0.048	0.048	ZQ8669	GW
	mg/L	SS5-4	4/11/2021	0.052	0.052	ZQ8670	GW
	mg/L	SS5-5	4/11/2021	0.036	0.036	ZQ8671	GW
	mg/L	CONTROL 1	4/11/2021	0.042	0.042	ZQ8672	GW
	mg/L	CONTROL 2	4/12/2021	0.062	0.062	ZQ8673	GW
	mg/L	CONTROL 3	4/11/2021	0.04	0.04	ZQ8674	Dup 1
	mg/L	CONTROL 3	4/11/2021	0.041	0.041	ZQ8679	Dup 2
Nitrate plus Nitrite (N)	mg/L	SS BAG	4/18/2021	<0.0022	0.0011	ZQ8675	BAG
	mg/L	SS BAG	4/18/2021	0.0078	0.0078	ZQ8676	EBW
	mg/L	SS1-4	4/10/2021	0.039	0.039	ZQ8656	Dup 1
	mg/L	SS1-4	4/10/2021	0.043	0.043	ZQ8678	Dup 2
	mg/L	SS1-5	4/10/2021	0.054	0.054	ZQ8657	GW
	mg/L	SS2-1	4/9/2021	0.057	0.057	ZQ8658	GW
	mg/L	SS2-2	4/9/2021	0.039	0.039	ZQ8659	GW
	mg/L	SS2-3	4/9/2021	0.056	0.056	ZQ8660	GW
	mg/L	SS2-4	4/9/2021	0.047	0.047	ZQ8661	GW
	mg/L	SS3-4	4/11/2021	0.042	0.042	ZQ8662	GW
	mg/L	SS3-5	4/11/2021	0.033	0.033	ZQ8663	GW
	mg/L	SS3-6	4/11/2021	0.086	0.086	ZQ8664	GW
	mg/L	SS3-7	4/11/2021	0.06	0.06	ZQ8665	Dup 1
	mg/L	SS3-7	4/11/2021	0.06	0.06	ZQ8677	Dup 2
	mg/L	SS3-8	4/11/2021	0.046	0.046	ZQ8666	GW
	mg/L	SS4-4	4/12/2021	0.045	0.045	ZQ8667	GW
	mg/L	SS4-5	4/12/2021	0.056	0.056	ZQ8668	GW
	mg/L	SS5-3	4/11/2021	0.049	0.049	ZQ8669	GW
	mg/L	SS5-4	4/11/2021	0.052	0.052	ZQ8670	GW
	mg/L	SS5-5	4/11/2021	0.036	0.036	ZQ8671	GW
	mg/L	CONTROL 1	4/11/2021	0.042	0.042	ZQ8672	GW
	mg/L	CONTROL 2	4/12/2021	0.062	0.062	ZQ8673	GW
	mg/L	CONTROL 3	4/11/2021	0.04	0.04	ZQ8674	Dup 1
	mg/L	CONTROL 3	4/11/2021	0.041	0.041	ZQ8679	Dup 2

Appendix D: Snow Water Chemistry Analytical Results

Parameter	Unit	Sample Point	Date	Data Point	Graphable Value	Lab Ref	Sample Type
Nitrite (N)	mg/L	SS BAG	4/18/2021	<0.0010	0.0005	ZQ8675	BAG
	mg/L	SS BAG	4/18/2021	0.0013	0.0013	ZQ8676	EBW
	mg/L	SS1-4	4/10/2021	<0.0010	0.0005	ZQ8656	Dup 1
	mg/L	SS1-4	4/10/2021	<0.0010	0.0005	ZQ8678	Dup 2
	mg/L	SS1-5	4/10/2021	<0.0010	0.0005	ZQ8657	GW
	mg/L	SS2-1	4/9/2021	<0.0010	0.0005	ZQ8658	GW
	mg/L	SS2-2	4/9/2021	<0.0010	0.0005	ZQ8659	GW
	mg/L	SS2-3	4/9/2021	<0.0010	0.0005	ZQ8660	GW
	mg/L	SS2-4	4/9/2021	<0.0010	0.0005	ZQ8661	GW
	mg/L	SS3-4	4/11/2021	<0.0010	0.0005	ZQ8662	GW
	mg/L	SS3-5	4/11/2021	<0.0010	0.0005	ZQ8663	GW
	mg/L	SS3-6	4/11/2021	<0.0010	0.0005	ZQ8664	GW
	mg/L	SS3-7	4/11/2021	<0.0010	0.0005	ZQ8665	Dup 1
	mg/L	SS3-7	4/11/2021	<0.0010	0.0005	ZQ8677	Dup 2
	mg/L	SS3-8	4/11/2021	<0.0010	0.0005	ZQ8666	GW
	mg/L	SS4-4	4/12/2021	0.0012	0.0012	ZQ8667	GW
	mg/L	SS4-5	4/12/2021	<0.0010	0.0005	ZQ8668	GW
	mg/L	SS5-3	4/11/2021	0.0018	0.0018	ZQ8669	GW
	mg/L	SS5-4	4/11/2021	<0.0010	0.0005	ZQ8670	GW
	mg/L	SS5-5	4/11/2021	<0.0010	0.0005	ZQ8671	GW
	mg/L	CONTROL 1	4/11/2021	<0.0010	0.0005	ZQ8672	GW
	mg/L	CONTROL 2	4/12/2021	<0.0010	0.0005	ZQ8673	GW
	mg/L	CONTROL 3	4/11/2021	<0.0010	0.0005	ZQ8674	Dup 1
	mg/L	CONTROL 3	4/11/2021	<0.0010	0.0005	ZQ8679	Dup 2
Nitrogen (N) - Total	mg/L	SS BAG	4/18/2021	<0.020	0.01	ZQ8675	BAG
	mg/L	SS BAG	4/18/2021	<0.020	0.01	ZQ8676	EBW
	mg/L	SS1-4	4/10/2021	0.085	0.085	ZQ8656	Dup 1
	mg/L	SS1-4	4/10/2021	0.065	0.065	ZQ8678	Dup 2
	mg/L	SS1-5	4/10/2021	0.11	0.11	ZQ8657	GW
	mg/L	SS2-1	4/9/2021	0.11	0.11	ZQ8658	GW
	mg/L	SS2-2	4/9/2021	0.07	0.07	ZQ8659	GW
	mg/L	SS2-3	4/9/2021	0.1	0.1	ZQ8660	GW
	mg/L	SS2-4	4/9/2021	0.087	0.087	ZQ8661	GW
	mg/L	SS3-4	4/11/2021	0.068	0.068	ZQ8662	GW
	mg/L	SS3-5	4/11/2021	0.06	0.06	ZQ8663	GW
	mg/L	SS3-6	4/11/2021	0.19	0.19	ZQ8664	GW
	mg/L	SS3-7	4/11/2021	0.098	0.098	ZQ8665	Dup 1
	mg/L	SS3-7	4/11/2021	0.11	0.11	ZQ8677	Dup 2
	mg/L	SS3-8	4/11/2021	0.094	0.094	ZQ8666	GW
	mg/L	SS4-4	4/12/2021	0.098	0.098	ZQ8667	GW
	mg/L	SS4-5	4/12/2021	0.09	0.09	ZQ8668	GW
	mg/L	SS5-3	4/11/2021	0.077	0.077	ZQ8669	GW
	mg/L	SS5-4	4/11/2021	0.092	0.092	ZQ8670	GW
	mg/L	SS5-5	4/11/2021	0.08	0.08	ZQ8671	GW
	mg/L	CONTROL 1	4/11/2021	0.075	0.075	ZQ8672	GW
	mg/L	CONTROL 2	4/12/2021	0.099	0.099	ZQ8673	GW
	mg/L	CONTROL 3	4/11/2021	0.079	0.079	ZQ8674	Dup 1
	mg/L	CONTROL 3	4/11/2021	0.06	0.06	ZQ8679	Dup 2

Appendix D: Snow Water Chemistry Analytical Results

Parameter	Unit	Sample Point	Date	Data Point	Graphable Value	Lab Ref	Sample Type
Orthophosphate (PO_4-P)	mg/L	SS BAG	4/18/2021	0.0011	0.0011	ZQ8675	BAG
	mg/L	SS BAG	4/18/2021	0.0012	0.0012	ZQ8676	EBW
	mg/L	SS1-4	4/10/2021	0.002	0.002	ZQ8656	Dup 1
	mg/L	SS1-4	4/10/2021	0.0017	0.0017	ZQ8678	Dup 2
	mg/L	SS1-5	4/10/2021	0.0039	0.0039	ZQ8657	GW
	mg/L	SS2-1	4/9/2021	<0.0010	0.0005	ZQ8658	GW
	mg/L	SS2-2	4/9/2021	0.0015	0.0015	ZQ8659	GW
	mg/L	SS2-3	4/9/2021	0.0023	0.0023	ZQ8660	GW
	mg/L	SS2-4	4/9/2021	0.0035	0.0035	ZQ8661	GW
	mg/L	SS3-4	4/11/2021	0.0024	0.0024	ZQ8662	GW
	mg/L	SS3-5	4/11/2021	0.0034	0.0034	ZQ8663	GW
	mg/L	SS3-6	4/11/2021	0.0043	0.0043	ZQ8664	GW
	mg/L	SS3-7	4/11/2021	0.0035	0.0035	ZQ8665	Dup 1
	mg/L	SS3-7	4/11/2021	0.0036	0.0036	ZQ8677	Dup 2
	mg/L	SS3-8	4/11/2021	0.0045	0.0045	ZQ8666	GW
	mg/L	SS4-4	4/12/2021	0.006	0.006	ZQ8667	GW
	mg/L	SS4-5	4/12/2021	0.0044	0.0044	ZQ8668	GW
	mg/L	SS5-3	4/11/2021	0.0026	0.0026	ZQ8669	GW
	mg/L	SS5-4	4/11/2021	0.0013	0.0013	ZQ8670	GW
	mg/L	SS5-5	4/11/2021	<0.0010	0.0005	ZQ8671	GW
	mg/L	CONTROL 1	4/11/2021	0.0023	0.0023	ZQ8672	GW
	mg/L	CONTROL 2	4/12/2021	0.0039	0.0039	ZQ8673	GW
	mg/L	CONTROL 3	4/11/2021	0.0031	0.0031	ZQ8674	Dup 1
	mg/L	CONTROL 3	4/11/2021	0.0026	0.0026	ZQ8679	Dup 2
pH	pH	SS BAG	4/18/2021	4.97	4.97	ZQ8675	BAG
	pH	SS BAG	4/18/2021	5.1	5.1	ZQ8676	EBW
	pH	SS1-4	4/10/2021	5.54	5.54	ZQ8656	Dup 1
	pH	SS1-4	4/10/2021	5.05	5.05	ZQ8678	Dup 2
	pH	SS1-5	4/10/2021	5.34	5.34	ZQ8657	GW
	pH	SS2-1	4/9/2021	4.84	4.84	ZQ8658	GW
	pH	SS2-2	4/9/2021	4.83	4.83	ZQ8659	GW
	pH	SS2-3	4/9/2021	5.45	5.45	ZQ8660	GW
	pH	SS2-4	4/9/2021	4.9	4.9	ZQ8661	GW
	pH	SS3-4	4/11/2021	5.72	5.72	ZQ8662	GW
	pH	SS3-5	4/11/2021	5.68	5.68	ZQ8663	GW
	pH	SS3-6	4/11/2021	6.1	6.1	ZQ8664	GW
	pH	SS3-7	4/11/2021	5.88	5.88	ZQ8665	Dup 1
	pH	SS3-7	4/11/2021	5.85	5.85	ZQ8677	Dup 2
	pH	SS3-8	4/11/2021	5.23	5.23	ZQ8666	GW
	pH	SS4-4	4/12/2021	5.86	5.86	ZQ8667	GW
	pH	SS4-5	4/12/2021	5.21	5.21	ZQ8668	GW
	pH	SS5-3	4/11/2021	5.66	5.66	ZQ8669	GW
	pH	SS5-4	4/11/2021	5.23	5.23	ZQ8670	GW
	pH	SS5-5	4/11/2021	5.44	5.44	ZQ8671	GW
	pH	CONTROL 1	4/11/2021	5.03	5.03	ZQ8672	GW
	pH	CONTROL 2	4/12/2021	5.35	5.35	ZQ8673	GW
	pH	CONTROL 3	4/11/2021	4.86	4.86	ZQ8674	Dup 1
	pH	CONTROL 3	4/11/2021	5.04	5.04	ZQ8679	Dup 2

Appendix D: Snow Water Chemistry Analytical Results

Parameter	Unit	Sample Point	Date	Data Point	Graphable Value	Lab Ref	Sample Type
Phosphorus (P) - Dissolved (TDP)	mg/L	SS BAG	4/18/2021	<0.0020	0.001	ZQ8675	BAG
	mg/L	SS BAG	4/18/2021	0.0121	0.0121	ZQ8676	EBW
	mg/L	SS1-4	4/10/2021	<0.0020	0.001	ZQ8656	Dup 1
	mg/L	SS1-4	4/10/2021	<0.0020	0.001	ZQ8678	Dup 2
	mg/L	SS1-5	4/10/2021	<0.0020	0.001	ZQ8657	GW
	mg/L	SS2-1	4/9/2021	<0.0020	0.001	ZQ8658	GW
	mg/L	SS2-2	4/9/2021	<0.0020	0.001	ZQ8659	GW
	mg/L	SS2-3	4/9/2021	0.0028	0.0028	ZQ8660	GW
	mg/L	SS2-4	4/9/2021	<0.0020	0.001	ZQ8661	GW
	mg/L	SS3-4	4/11/2021	<0.0020	0.001	ZQ8662	GW
	mg/L	SS3-5	4/11/2021	0.0021	0.0021	ZQ8663	GW
	mg/L	SS3-6	4/11/2021	<0.0020	0.001	ZQ8664	GW
	mg/L	SS3-7	4/11/2021	<0.0020	0.001	ZQ8665	Dup 1
	mg/L	SS3-7	4/11/2021	0.0028	0.0028	ZQ8677	Dup 2
	mg/L	SS3-8	4/11/2021	0.0023	0.0023	ZQ8666	GW
	mg/L	SS4-4	4/12/2021	0.0042	0.0042	ZQ8667	GW
	mg/L	SS4-5	4/12/2021	0.0023	0.0023	ZQ8668	GW
	mg/L	SS5-3	4/11/2021	<0.0020	0.001	ZQ8669	GW
	mg/L	SS5-4	4/11/2021	0.0025	0.0025	ZQ8670	GW
	mg/L	SS5-5	4/11/2021	<0.0020	0.001	ZQ8671	GW
	mg/L	CONTROL 1	4/11/2021	<0.0020	0.001	ZQ8672	GW
	mg/L	CONTROL 2	4/12/2021	0.0024	0.0024	ZQ8673	GW
	mg/L	CONTROL 3	4/11/2021	<0.0020	0.001	ZQ8674	Dup 1
	mg/L	CONTROL 3	4/11/2021	<0.0020	0.001	ZQ8679	Dup 2
Phosphorus (P) - Total	mg/L	SS BAG	4/18/2021	<0.0020	0.001	ZQ8675	BAG
	mg/L	SS BAG	4/18/2021	0.0026	0.0026	ZQ8676	EBW
	mg/L	SS1-4	4/10/2021	0.0071	0.0071	ZQ8656	Dup 1
	mg/L	SS1-4	4/10/2021	0.0085	0.0085	ZQ8678	Dup 2
	mg/L	SS1-5	4/10/2021	0.0036	0.0036	ZQ8657	GW
	mg/L	SS2-1	4/9/2021	0.0068	0.0068	ZQ8658	GW
	mg/L	SS2-2	4/9/2021	0.0037	0.0037	ZQ8659	GW
	mg/L	SS2-3	4/9/2021	<0.0020	0.001	ZQ8660	GW
	mg/L	SS2-4	4/9/2021	0.0062	0.0062	ZQ8661	GW
	mg/L	SS3-4	4/11/2021	0.0228	0.0228	ZQ8662	GW
	mg/L	SS3-5	4/11/2021	0.0071	0.0071	ZQ8663	GW
	mg/L	SS3-6	4/11/2021	0.158	0.158	ZQ8664	GW
	mg/L	SS3-7	4/11/2021	0.05	0.05	ZQ8665	Dup 1
	mg/L	SS3-7	4/11/2021	0.042	0.042	ZQ8677	Dup 2
	mg/L	SS3-8	4/11/2021	0.0345	0.0345	ZQ8666	GW
	mg/L	SS4-4	4/12/2021	0.0392	0.0392	ZQ8667	GW
	mg/L	SS4-5	4/12/2021	0.0365	0.0365	ZQ8668	GW
	mg/L	SS5-3	4/11/2021	0.0385	0.0385	ZQ8669	GW
	mg/L	SS5-4	4/11/2021	0.0358	0.0358	ZQ8670	GW
	mg/L	SS5-5	4/11/2021	0.0046	0.0046	ZQ8671	GW
	mg/L	CONTROL 1	4/11/2021	<0.0020	0.001	ZQ8672	GW
	mg/L	CONTROL 2	4/12/2021	0.0088	0.0088	ZQ8673	GW
	mg/L	CONTROL 3	4/11/2021	0.0066	0.0066	ZQ8674	Dup 1
	mg/L	CONTROL 3	4/11/2021	0.0061	0.0061	ZQ8679	Dup 2

Appendix D: Snow Water Chemistry Analytical Results

Parameter	Unit	Sample Point	Date	Data Point	Graphable Value	Lab Ref	Sample Type
Potassium (K) - Dissolved	mg/L	SS BAG	4/18/2021	<0.010	0.005	ZQ8675	BAG
	mg/L	SS BAG	4/18/2021	<0.010	0.005	ZQ8676	EBW
	mg/L	SS1-4	4/10/2021	0.123	0.123	ZQ8656	Dup 1
	mg/L	SS1-4	4/10/2021	0.209	0.209	ZQ8678	Dup 2
	mg/L	SS1-5	4/10/2021	0.042	0.042	ZQ8657	GW
	mg/L	SS2-1	4/9/2021	0.02	0.02	ZQ8658	GW
	mg/L	SS2-2	4/9/2021	0.012	0.012	ZQ8659	GW
	mg/L	SS2-3	4/9/2021	0.053	0.053	ZQ8660	GW
	mg/L	SS2-4	4/9/2021	0.018	0.018	ZQ8661	GW
	mg/L	SS3-4	4/11/2021	0.172	0.172	ZQ8662	GW
	mg/L	SS3-5	4/11/2021	0.088	0.088	ZQ8663	GW
	mg/L	SS3-6	4/11/2021	1.83	1.83	ZQ8664	GW
	mg/L	SS3-7	4/11/2021	0.066	0.066	ZQ8665	Dup 1
	mg/L	SS3-7	4/11/2021	0.367	0.367	ZQ8677	Dup 2
	mg/L	SS3-8	4/11/2021	0.04	0.04	ZQ8666	GW
	mg/L	SS4-4	4/12/2021	0.082	0.082	ZQ8667	GW
	mg/L	SS4-5	4/12/2021	0.047	0.047	ZQ8668	GW
	mg/L	SS5-3	4/11/2021	0.065	0.065	ZQ8669	GW
	mg/L	SS5-4	4/11/2021	0.046	0.046	ZQ8670	GW
	mg/L	SS5-5	4/11/2021	0.011	0.011	ZQ8671	GW
	mg/L	CONTROL 1	4/11/2021	0.034	0.034	ZQ8672	GW
	mg/L	CONTROL 2	4/12/2021	0.151	0.151	ZQ8673	GW
	mg/L	CONTROL 3	4/11/2021	0.015	0.015	ZQ8674	Dup 1
	mg/L	CONTROL 3	4/11/2021	0.102	0.102	ZQ8679	Dup 2
Potassium (K) - Total	mg/L	SS BAG	4/18/2021	<0.010	0.005	ZQ8675	BAG
	mg/L	SS BAG	4/18/2021	<0.010	0.005	ZQ8676	EBW
	mg/L	SS1-4	4/10/2021	0.152	0.152	ZQ8656	Dup 1
	mg/L	SS1-4	4/10/2021	0.197	0.197	ZQ8678	Dup 2
	mg/L	SS1-5	4/10/2021	0.059	0.059	ZQ8657	GW
	mg/L	SS2-1	4/9/2021	0.205	0.205	ZQ8658	GW
	mg/L	SS2-2	4/9/2021	0.086	0.086	ZQ8659	GW
	mg/L	SS2-3	4/9/2021	0.085	0.085	ZQ8660	GW
	mg/L	SS2-4	4/9/2021	0.064	0.064	ZQ8661	GW
	mg/L	SS3-4	4/11/2021	0.304	0.304	ZQ8662	GW
	mg/L	SS3-5	4/11/2021	0.067	0.067	ZQ8663	GW
	mg/L	SS3-6	4/11/2021	1.73	1.73	ZQ8664	GW
	mg/L	SS3-7	4/11/2021	0.767	0.767	ZQ8665	Dup 1
	mg/L	SS3-7	4/11/2021	0.475	0.475	ZQ8677	Dup 2
	mg/L	SS3-8	4/11/2021	0.477	0.477	ZQ8666	GW
	mg/L	SS4-4	4/12/2021	0.571	0.571	ZQ8667	GW
	mg/L	SS4-5	4/12/2021	0.77	0.77	ZQ8668	GW
	mg/L	SS5-3	4/11/2021	0.949	0.949	ZQ8669	GW
	mg/L	SS5-4	4/11/2021	0.429	0.429	ZQ8670	GW
	mg/L	SS5-5	4/11/2021	0.074	0.074	ZQ8671	GW
	mg/L	CONTROL 1	4/11/2021	0.065	0.065	ZQ8672	GW
	mg/L	CONTROL 2	4/12/2021	0.277	0.277	ZQ8673	GW
	mg/L	CONTROL 3	4/11/2021	0.118	0.118	ZQ8674	Dup 1
	mg/L	CONTROL 3	4/11/2021	0.103	0.103	ZQ8679	Dup 2

Appendix D: Snow Water Chemistry Analytical Results

Parameter	Unit	Sample Point	Date	Data Point	Graphable Value	Lab Ref	Sample Type
Selenium (Se) - Dissolved	ug/L	SS BAG	4/18/2021	<0.040	0.02	ZQ8675	BAG
	ug/L	SS BAG	4/18/2021	<0.040	0.02	ZQ8676	EBW
	ug/L	SS1-4	4/10/2021	<0.040	0.02	ZQ8656	Dup 1
	ug/L	SS1-4	4/10/2021	<0.040	0.02	ZQ8678	Dup 2
	ug/L	SS1-5	4/10/2021	<0.040	0.02	ZQ8657	GW
	ug/L	SS2-1	4/9/2021	<0.040	0.02	ZQ8658	GW
	ug/L	SS2-2	4/9/2021	<0.040	0.02	ZQ8659	GW
	ug/L	SS2-3	4/9/2021	<0.040	0.02	ZQ8660	GW
	ug/L	SS2-4	4/9/2021	<0.040	0.02	ZQ8661	GW
	ug/L	SS3-4	4/11/2021	<0.040	0.02	ZQ8662	GW
	ug/L	SS3-5	4/11/2021	<0.040	0.02	ZQ8663	GW
	ug/L	SS3-6	4/11/2021	<0.040	0.02	ZQ8664	GW
	ug/L	SS3-7	4/11/2021	<0.040	0.02	ZQ8665	Dup 1
	ug/L	SS3-7	4/11/2021	<0.040	0.02	ZQ8677	Dup 2
	ug/L	SS3-8	4/11/2021	<0.040	0.02	ZQ8666	GW
	ug/L	SS4-4	4/12/2021	<0.040	0.02	ZQ8667	GW
	ug/L	SS4-5	4/12/2021	<0.040	0.02	ZQ8668	GW
	ug/L	SS5-3	4/11/2021	<0.040	0.02	ZQ8669	GW
	ug/L	SS5-4	4/11/2021	<0.040	0.02	ZQ8670	GW
	ug/L	SS5-5	4/11/2021	<0.040	0.02	ZQ8671	GW
	ug/L	CONTROL 1	4/11/2021	<0.040	0.02	ZQ8672	GW
	ug/L	CONTROL 2	4/12/2021	<0.040	0.02	ZQ8673	GW
	ug/L	CONTROL 3	4/11/2021	<0.040	0.02	ZQ8674	Dup 1
	ug/L	CONTROL 3	4/11/2021	<0.040	0.02	ZQ8679	Dup 2
Selenium (Se) - Total	ug/L	SS BAG	4/18/2021	<0.040	0.02	ZQ8675	BAG
	ug/L	SS BAG	4/18/2021	<0.040	0.02	ZQ8676	EBW
	ug/L	SS1-4	4/10/2021	<0.040	0.02	ZQ8656	Dup 1
	ug/L	SS1-4	4/10/2021	<0.040	0.02	ZQ8678	Dup 2
	ug/L	SS1-5	4/10/2021	<0.040	0.02	ZQ8657	GW
	ug/L	SS2-1	4/9/2021	<0.040	0.02	ZQ8658	GW
	ug/L	SS2-2	4/9/2021	<0.040	0.02	ZQ8659	GW
	ug/L	SS2-3	4/9/2021	<0.040	0.02	ZQ8660	GW
	ug/L	SS2-4	4/9/2021	<0.040	0.02	ZQ8661	GW
	ug/L	SS3-4	4/11/2021	<0.040	0.02	ZQ8662	GW
	ug/L	SS3-5	4/11/2021	<0.040	0.02	ZQ8663	GW
	ug/L	SS3-6	4/11/2021	0.046	0.046	ZQ8664	GW
	ug/L	SS3-7	4/11/2021	<0.040	0.02	ZQ8665	Dup 1
	ug/L	SS3-7	4/11/2021	<0.040	0.02	ZQ8677	Dup 2
	ug/L	SS3-8	4/11/2021	<0.040	0.02	ZQ8666	GW
	ug/L	SS4-4	4/12/2021	<0.040	0.02	ZQ8667	GW
	ug/L	SS4-5	4/12/2021	<0.040	0.02	ZQ8668	GW
	ug/L	SS5-3	4/11/2021	<0.040	0.02	ZQ8669	GW
	ug/L	SS5-4	4/11/2021	<0.040	0.02	ZQ8670	GW
	ug/L	SS5-5	4/11/2021	<0.040	0.02	ZQ8671	GW
	ug/L	CONTROL 1	4/11/2021	<0.040	0.02	ZQ8672	GW
	ug/L	CONTROL 2	4/12/2021	<0.040	0.02	ZQ8673	GW
	ug/L	CONTROL 3	4/11/2021	<0.040	0.02	ZQ8674	Dup 1
	ug/L	CONTROL 3	4/11/2021	<0.040	0.02	ZQ8679	Dup 2

Appendix D: Snow Water Chemistry Analytical Results

Parameter	Unit	Sample Point	Date	Data Point	Graphable Value	Lab Ref	Sample Type
Silicon (Si) - Dissolved	ug/L	SS BAG	4/18/2021	<50	25	ZQ8675	BAG
	ug/L	SS BAG	4/18/2021	<50	25	ZQ8676	EBW
	ug/L	SS1-4	4/10/2021	249	249	ZQ8656	Dup 1
	ug/L	SS1-4	4/10/2021	278	278	ZQ8678	Dup 2
	ug/L	SS1-5	4/10/2021	59	59	ZQ8657	GW
	ug/L	SS2-1	4/9/2021	<50	25	ZQ8658	GW
	ug/L	SS2-2	4/9/2021	<50	25	ZQ8659	GW
	ug/L	SS2-3	4/9/2021	64	64	ZQ8660	GW
	ug/L	SS2-4	4/9/2021	<50	25	ZQ8661	GW
	ug/L	SS3-4	4/11/2021	348	348	ZQ8662	GW
	ug/L	SS3-5	4/11/2021	240	240	ZQ8663	GW
	ug/L	SS3-6	4/11/2021	3670	3670	ZQ8664	GW
	ug/L	SS3-7	4/11/2021	108	108	ZQ8665	Dup 1
	ug/L	SS3-7	4/11/2021	798	798	ZQ8677	Dup 2
	ug/L	SS3-8	4/11/2021	<50	25	ZQ8666	GW
	ug/L	SS4-4	4/12/2021	54	54	ZQ8667	GW
	ug/L	SS4-5	4/12/2021	<50	25	ZQ8668	GW
	ug/L	SS5-3	4/11/2021	61	61	ZQ8669	GW
	ug/L	SS5-4	4/11/2021	<50	25	ZQ8670	GW
	ug/L	SS5-5	4/11/2021	<50	25	ZQ8671	GW
	ug/L	CONTROL 1	4/11/2021	53	53	ZQ8672	GW
	ug/L	CONTROL 2	4/12/2021	237	237	ZQ8673	GW
	ug/L	CONTROL 3	4/11/2021	<50	25	ZQ8674	Dup 1
	ug/L	CONTROL 3	4/11/2021	155	155	ZQ8679	Dup 2
Silicon (Si) - Total	ug/L	SS BAG	4/18/2021	<50	25	ZQ8675	BAG
	ug/L	SS BAG	4/18/2021	<50	25	ZQ8676	EBW
	ug/L	SS1-4	4/10/2021	456	456	ZQ8656	Dup 1
	ug/L	SS1-4	4/10/2021	371	371	ZQ8678	Dup 2
	ug/L	SS1-5	4/10/2021	192	192	ZQ8657	GW
	ug/L	SS2-1	4/9/2021	691	691	ZQ8658	GW
	ug/L	SS2-2	4/9/2021	277	277	ZQ8659	GW
	ug/L	SS2-3	4/9/2021	281	281	ZQ8660	GW
	ug/L	SS2-4	4/9/2021	209	209	ZQ8661	GW
	ug/L	SS3-4	4/11/2021	838	838	ZQ8662	GW
	ug/L	SS3-5	4/11/2021	427	427	ZQ8663	GW
	ug/L	SS3-6	4/11/2021	6640	6640	ZQ8664	GW
	ug/L	SS3-7	4/11/2021	2240	2240	ZQ8665	Dup 1
	ug/L	SS3-7	4/11/2021	2310	2310	ZQ8677	Dup 2
	ug/L	SS3-8	4/11/2021	1550	1550	ZQ8666	GW
	ug/L	SS4-4	4/12/2021	2230	2230	ZQ8667	GW
	ug/L	SS4-5	4/12/2021	2130	2130	ZQ8668	GW
	ug/L	SS5-3	4/11/2021	2840	2840	ZQ8669	GW
	ug/L	SS5-4	4/11/2021	1260	1260	ZQ8670	GW
	ug/L	SS5-5	4/11/2021	278	278	ZQ8671	GW
	ug/L	CONTROL 1	4/11/2021	182	182	ZQ8672	GW
	ug/L	CONTROL 2	4/12/2021	1140	1140	ZQ8673	GW
	ug/L	CONTROL 3	4/11/2021	524	524	ZQ8674	Dup 1
	ug/L	CONTROL 3	4/11/2021	533	533	ZQ8679	Dup 2

Appendix D: Snow Water Chemistry Analytical Results

Parameter	Unit	Sample Point	Date	Data Point	Graphable Value	Lab Ref	Sample Type
Silver (Ag) - Dissolved	ug/L	SS BAG	4/18/2021	<0.0050	0.0025	ZQ8675	BAG
	ug/L	SS BAG	4/18/2021	<0.0050	0.0025	ZQ8676	EBW
	ug/L	SS1-4	4/10/2021	<0.0050	0.0025	ZQ8656	Dup 1
	ug/L	SS1-4	4/10/2021	<0.0050	0.0025	ZQ8678	Dup 2
	ug/L	SS1-5	4/10/2021	<0.0050	0.0025	ZQ8657	GW
	ug/L	SS2-1	4/9/2021	<0.0050	0.0025	ZQ8658	GW
	ug/L	SS2-2	4/9/2021	<0.0050	0.0025	ZQ8659	GW
	ug/L	SS2-3	4/9/2021	<0.0050	0.0025	ZQ8660	GW
	ug/L	SS2-4	4/9/2021	<0.0050	0.0025	ZQ8661	GW
	ug/L	SS3-4	4/11/2021	<0.0050	0.0025	ZQ8662	GW
	ug/L	SS3-5	4/11/2021	<0.0050	0.0025	ZQ8663	GW
	ug/L	SS3-6	4/11/2021	0.012	0.012	ZQ8664	GW
	ug/L	SS3-7	4/11/2021	<0.0050	0.0025	ZQ8665	Dup 1
	ug/L	SS3-7	4/11/2021	<0.0050	0.0025	ZQ8677	Dup 2
	ug/L	SS3-8	4/11/2021	<0.0050	0.0025	ZQ8666	GW
	ug/L	SS4-4	4/12/2021	<0.0050	0.0025	ZQ8667	GW
	ug/L	SS4-5	4/12/2021	<0.0050	0.0025	ZQ8668	GW
	ug/L	SS5-3	4/11/2021	<0.0050	0.0025	ZQ8669	GW
	ug/L	SS5-4	4/11/2021	<0.0050	0.0025	ZQ8670	GW
	ug/L	SS5-5	4/11/2021	<0.0050	0.0025	ZQ8671	GW
	ug/L	CONTROL 1	4/11/2021	<0.0050	0.0025	ZQ8672	GW
	ug/L	CONTROL 2	4/12/2021	<0.0050	0.0025	ZQ8673	GW
	ug/L	CONTROL 3	4/11/2021	<0.0050	0.0025	ZQ8674	Dup 1
	ug/L	CONTROL 3	4/11/2021	<0.0050	0.0025	ZQ8679	Dup 2
Silver (Ag) - Total	ug/L	SS BAG	4/18/2021	<0.0050	0.0025	ZQ8675	BAG
	ug/L	SS BAG	4/18/2021	<0.0050	0.0025	ZQ8676	EBW
	ug/L	SS1-4	4/10/2021	<0.0050	0.0025	ZQ8656	Dup 1
	ug/L	SS1-4	4/10/2021	<0.0050	0.0025	ZQ8678	Dup 2
	ug/L	SS1-5	4/10/2021	<0.0050	0.0025	ZQ8657	GW
	ug/L	SS2-1	4/9/2021	<0.0050	0.0025	ZQ8658	GW
	ug/L	SS2-2	4/9/2021	<0.0050	0.0025	ZQ8659	GW
	ug/L	SS2-3	4/9/2021	<0.0050	0.0025	ZQ8660	GW
	ug/L	SS2-4	4/9/2021	<0.0050	0.0025	ZQ8661	GW
	ug/L	SS3-4	4/11/2021	0.0064	0.0064	ZQ8662	GW
	ug/L	SS3-5	4/11/2021	<0.0050	0.0025	ZQ8663	GW
	ug/L	SS3-6	4/11/2021	0.047	0.047	ZQ8664	GW
	ug/L	SS3-7	4/11/2021	0.0064	0.0064	ZQ8665	Dup 1
	ug/L	SS3-7	4/11/2021	0.0076	0.0076	ZQ8677	Dup 2
	ug/L	SS3-8	4/11/2021	<0.0050	0.0025	ZQ8666	GW
	ug/L	SS4-4	4/12/2021	0.0051	0.0051	ZQ8667	GW
	ug/L	SS4-5	4/12/2021	0.0051	0.0051	ZQ8668	GW
	ug/L	SS5-3	4/11/2021	0.01	0.01	ZQ8669	GW
	ug/L	SS5-4	4/11/2021	<0.0050	0.0025	ZQ8670	GW
	ug/L	SS5-5	4/11/2021	<0.0050	0.0025	ZQ8671	GW
	ug/L	CONTROL 1	4/11/2021	<0.0050	0.0025	ZQ8672	GW
	ug/L	CONTROL 2	4/12/2021	<0.0050	0.0025	ZQ8673	GW
	ug/L	CONTROL 3	4/11/2021	<0.0050	0.0025	ZQ8674	Dup 1
	ug/L	CONTROL 3	4/11/2021	<0.0050	0.0025	ZQ8679	Dup 2

Appendix D: Snow Water Chemistry Analytical Results

Parameter	Unit	Sample Point	Date	Data Point	Graphable Value	Lab Ref	Sample Type
Sodium (Na) - Dissolved	mg/L	SS BAG	4/18/2021	<0.010	0.005	ZQ8675	BAG
	mg/L	SS BAG	4/18/2021	<0.010	0.005	ZQ8676	EBW
	mg/L	SS1-4	4/10/2021	0.089	0.089	ZQ8656	Dup 1
	mg/L	SS1-4	4/10/2021	0.1	0.1	ZQ8678	Dup 2
	mg/L	SS1-5	4/10/2021	0.046	0.046	ZQ8657	GW
	mg/L	SS2-1	4/9/2021	0.044	0.044	ZQ8658	GW
	mg/L	SS2-2	4/9/2021	0.031	0.031	ZQ8659	GW
	mg/L	SS2-3	4/9/2021	0.037	0.037	ZQ8660	GW
	mg/L	SS2-4	4/9/2021	0.057	0.057	ZQ8661	GW
	mg/L	SS3-4	4/11/2021	0.043	0.043	ZQ8662	GW
	mg/L	SS3-5	4/11/2021	0.034	0.034	ZQ8663	GW
	mg/L	SS3-6	4/11/2021	0.21	0.21	ZQ8664	GW
	mg/L	SS3-7	4/11/2021	0.069	0.069	ZQ8665	Dup 1
	mg/L	SS3-7	4/11/2021	0.074	0.074	ZQ8677	Dup 2
	mg/L	SS3-8	4/11/2021	0.059	0.059	ZQ8666	GW
	mg/L	SS4-4	4/12/2021	0.074	0.074	ZQ8667	GW
	mg/L	SS4-5	4/12/2021	0.049	0.049	ZQ8668	GW
	mg/L	SS5-3	4/11/2021	0.046	0.046	ZQ8669	GW
	mg/L	SS5-4	4/11/2021	0.064	0.064	ZQ8670	GW
	mg/L	SS5-5	4/11/2021	0.038	0.038	ZQ8671	GW
	mg/L	CONTROL 1	4/11/2021	0.037	0.037	ZQ8672	GW
	mg/L	CONTROL 2	4/12/2021	0.076	0.076	ZQ8673	GW
	mg/L	CONTROL 3	4/11/2021	0.027	0.027	ZQ8674	Dup 1
	mg/L	CONTROL 3	4/11/2021	0.026	0.026	ZQ8679	Dup 2
Sodium (Na) - Total	mg/L	SS BAG	4/18/2021	<0.010	0.005	ZQ8675	BAG
	mg/L	SS BAG	4/18/2021	<0.010	0.005	ZQ8676	EBW
	mg/L	SS1-4	4/10/2021	0.099	0.099	ZQ8656	Dup 1
	mg/L	SS1-4	4/10/2021	0.103	0.103	ZQ8678	Dup 2
	mg/L	SS1-5	4/10/2021	0.043	0.043	ZQ8657	GW
	mg/L	SS2-1	4/9/2021	0.06	0.06	ZQ8658	GW
	mg/L	SS2-2	4/9/2021	0.035	0.035	ZQ8659	GW
	mg/L	SS2-3	4/9/2021	0.04	0.04	ZQ8660	GW
	mg/L	SS2-4	4/9/2021	0.067	0.067	ZQ8661	GW
	mg/L	SS3-4	4/11/2021	0.06	0.06	ZQ8662	GW
	mg/L	SS3-5	4/11/2021	0.037	0.037	ZQ8663	GW
	mg/L	SS3-6	4/11/2021	0.27	0.27	ZQ8664	GW
	mg/L	SS3-7	4/11/2021	0.125	0.125	ZQ8665	Dup 1
	mg/L	SS3-7	4/11/2021	0.107	0.107	ZQ8677	Dup 2
	mg/L	SS3-8	4/11/2021	0.084	0.084	ZQ8666	GW
	mg/L	SS4-4	4/12/2021	0.108	0.108	ZQ8667	GW
	mg/L	SS4-5	4/12/2021	0.11	0.11	ZQ8668	GW
	mg/L	SS5-3	4/11/2021	0.167	0.167	ZQ8669	GW
	mg/L	SS5-4	4/11/2021	0.09	0.09	ZQ8670	GW
	mg/L	SS5-5	4/11/2021	0.042	0.042	ZQ8671	GW
	mg/L	CONTROL 1	4/11/2021	0.045	0.045	ZQ8672	GW
	mg/L	CONTROL 2	4/12/2021	0.088	0.088	ZQ8673	GW
	mg/L	CONTROL 3	4/11/2021	0.041	0.041	ZQ8674	Dup 1
	mg/L	CONTROL 3	4/11/2021	0.035	0.035	ZQ8679	Dup 2

Appendix D: Snow Water Chemistry Analytical Results

Parameter	Unit	Sample Point	Date	Data Point	Graphable Value	Lab Ref	Sample Type
Strontium (Sr) - Dissolved	ug/L	SS BAG	4/18/2021	<0.050	0.025	ZQ8675	BAG
	ug/L	SS BAG	4/18/2021	<0.050	0.025	ZQ8676	EBW
	ug/L	SS1-4	4/10/2021	0.659	0.659	ZQ8656	Dup 1
	ug/L	SS1-4	4/10/2021	0.724	0.724	ZQ8678	Dup 2
	ug/L	SS1-5	4/10/2021	0.258	0.258	ZQ8657	GW
	ug/L	SS2-1	4/9/2021	0.568	0.568	ZQ8658	GW
	ug/L	SS2-2	4/9/2021	0.325	0.325	ZQ8659	GW
	ug/L	SS2-3	4/9/2021	0.317	0.317	ZQ8660	GW
	ug/L	SS2-4	4/9/2021	0.468	0.468	ZQ8661	GW
	ug/L	SS3-4	4/11/2021	1.38	1.38	ZQ8662	GW
	ug/L	SS3-5	4/11/2021	1.38	1.38	ZQ8663	GW
	ug/L	SS3-6	4/11/2021	16.2	16.2	ZQ8664	GW
	ug/L	SS3-7	4/11/2021	3.16	3.16	ZQ8665	Dup 1
	ug/L	SS3-7	4/11/2021	3.51	3.51	ZQ8677	Dup 2
	ug/L	SS3-8	4/11/2021	1.65	1.65	ZQ8666	GW
	ug/L	SS4-4	4/12/2021	3.31	3.31	ZQ8667	GW
	ug/L	SS4-5	4/12/2021	1.25	1.25	ZQ8668	GW
	ug/L	SS5-3	4/11/2021	1.33	1.33	ZQ8669	GW
	ug/L	SS5-4	4/11/2021	1.86	1.86	ZQ8670	GW
	ug/L	SS5-5	4/11/2021	0.32	0.32	ZQ8671	GW
	ug/L	CONTROL 1	4/11/2021	0.339	0.339	ZQ8672	GW
	ug/L	CONTROL 2	4/12/2021	2.46	2.46	ZQ8673	GW
	ug/L	CONTROL 3	4/11/2021	0.484	0.484	ZQ8674	Dup 1
	ug/L	CONTROL 3	4/11/2021	0.604	0.604	ZQ8679	Dup 2
Strontium (Sr) - Total	ug/L	SS BAG	4/18/2021	<0.050	0.025	ZQ8675	BAG
	ug/L	SS BAG	4/18/2021	0.062	0.062	ZQ8676	EBW
	ug/L	SS1-4	4/10/2021	0.87	0.87	ZQ8656	Dup 1
	ug/L	SS1-4	4/10/2021	0.906	0.906	ZQ8678	Dup 2
	ug/L	SS1-5	4/10/2021	0.447	0.447	ZQ8657	GW
	ug/L	SS2-1	4/9/2021	1.21	1.21	ZQ8658	GW
	ug/L	SS2-2	4/9/2021	0.424	0.424	ZQ8659	GW
	ug/L	SS2-3	4/9/2021	0.568	0.568	ZQ8660	GW
	ug/L	SS2-4	4/9/2021	0.895	0.895	ZQ8661	GW
	ug/L	SS3-4	4/11/2021	2	2	ZQ8662	GW
	ug/L	SS3-5	4/11/2021	1.64	1.64	ZQ8663	GW
	ug/L	SS3-6	4/11/2021	20.3	20.3	ZQ8664	GW
	ug/L	SS3-7	4/11/2021	6.15	6.15	ZQ8665	Dup 1
	ug/L	SS3-7	4/11/2021	5.06	5.06	ZQ8677	Dup 2
	ug/L	SS3-8	4/11/2021	3.49	3.49	ZQ8666	GW
	ug/L	SS4-4	4/12/2021	5.62	5.62	ZQ8667	GW
	ug/L	SS4-5	4/12/2021	3.7	3.7	ZQ8668	GW
	ug/L	SS5-3	4/11/2021	4.92	4.92	ZQ8669	GW
	ug/L	SS5-4	4/11/2021	3.83	3.83	ZQ8670	GW
	ug/L	SS5-5	4/11/2021	0.512	0.512	ZQ8671	GW
	ug/L	CONTROL 1	4/11/2021	0.423	0.423	ZQ8672	GW
	ug/L	CONTROL 2	4/12/2021	3.57	3.57	ZQ8673	GW
	ug/L	CONTROL 3	4/11/2021	1.1	1.1	ZQ8674	Dup 1
	ug/L	CONTROL 3	4/11/2021	0.999	0.999	ZQ8679	Dup 2

Appendix D: Snow Water Chemistry Analytical Results

Parameter	Unit	Sample Point	Date	Data Point	Graphable Value	Lab Ref	Sample Type
Sulphate (SO_4) - Dissolved	mg/L	SS BAG	4/18/2021	<0.50	0.25	ZQ8675	BAG
	mg/L	SS BAG	4/18/2021	<0.50	0.25	ZQ8676	EBW
	mg/L	SS1-4	4/10/2021	<0.50	0.25	ZQ8656	Dup 1
	mg/L	SS1-4	4/10/2021	<0.50	0.25	ZQ8678	Dup 2
	mg/L	SS1-5	4/10/2021	<0.50	0.25	ZQ8657	GW
	mg/L	SS2-1	4/9/2021	<0.50	0.25	ZQ8658	GW
	mg/L	SS2-2	4/9/2021	<0.50	0.25	ZQ8659	GW
	mg/L	SS2-3	4/9/2021	<0.50	0.25	ZQ8660	GW
	mg/L	SS2-4	4/9/2021	<0.50	0.25	ZQ8661	GW
	mg/L	SS3-4	4/11/2021	<0.50	0.25	ZQ8662	GW
	mg/L	SS3-5	4/11/2021	<0.50	0.25	ZQ8663	GW
	mg/L	SS3-6	4/11/2021	<0.50	0.25	ZQ8664	GW
	mg/L	SS3-7	4/11/2021	<0.50	0.25	ZQ8665	Dup 1
	mg/L	SS3-7	4/11/2021	<0.50	0.25	ZQ8677	Dup 2
	mg/L	SS3-8	4/11/2021	<0.50	0.25	ZQ8666	GW
	mg/L	SS4-4	4/12/2021	<0.50	0.25	ZQ8667	GW
	mg/L	SS4-5	4/12/2021	<0.50	0.25	ZQ8668	GW
	mg/L	SS5-3	4/11/2021	<0.50	0.25	ZQ8669	GW
	mg/L	SS5-4	4/11/2021	<0.50	0.25	ZQ8670	GW
	mg/L	SS5-5	4/11/2021	<0.50	0.25	ZQ8671	GW
	mg/L	CONTROL 1	4/11/2021	<0.50	0.25	ZQ8672	GW
	mg/L	CONTROL 2	4/12/2021	<0.50	0.25	ZQ8673	GW
	mg/L	CONTROL 3	4/11/2021	<0.50	0.25	ZQ8674	Dup 1
	mg/L	CONTROL 3	4/11/2021	<0.50	0.25	ZQ8679	Dup 2
Sulphur (S) - Dissolved	mg/L	SS BAG	4/18/2021	0.69	0.69	ZQ8675	BAG
	mg/L	SS BAG	4/18/2021	<0.50	0.25	ZQ8676	EBW
	mg/L	SS1-4	4/10/2021	1.14	1.14	ZQ8656	Dup 1
	mg/L	SS1-4	4/10/2021	<0.50	0.25	ZQ8678	Dup 2
	mg/L	SS1-5	4/10/2021	1.55	1.55	ZQ8657	GW
	mg/L	SS2-1	4/9/2021	1.67	1.67	ZQ8658	GW
	mg/L	SS2-2	4/9/2021	0.97	0.97	ZQ8659	GW
	mg/L	SS2-3	4/9/2021	1.83	1.83	ZQ8660	GW
	mg/L	SS2-4	4/9/2021	1.04	1.04	ZQ8661	GW
	mg/L	SS3-4	4/11/2021	0.54	0.54	ZQ8662	GW
	mg/L	SS3-5	4/11/2021	0.51	0.51	ZQ8663	GW
	mg/L	SS3-6	4/11/2021	<0.50	0.25	ZQ8664	GW
	mg/L	SS3-7	4/11/2021	2.14	2.14	ZQ8665	Dup 1
	mg/L	SS3-7	4/11/2021	1.03	1.03	ZQ8677	Dup 2
	mg/L	SS3-8	4/11/2021	1.12	1.12	ZQ8666	GW
	mg/L	SS4-4	4/12/2021	1.52	1.52	ZQ8667	GW
	mg/L	SS4-5	4/12/2021	<0.50	0.25	ZQ8668	GW
	mg/L	SS5-3	4/11/2021	1.93	1.93	ZQ8669	GW
	mg/L	SS5-4	4/11/2021	0.88	0.88	ZQ8670	GW
	mg/L	SS5-5	4/11/2021	1.33	1.33	ZQ8671	GW
	mg/L	CONTROL 1	4/11/2021	1.22	1.22	ZQ8672	GW
	mg/L	CONTROL 2	4/12/2021	1.69	1.69	ZQ8673	GW
	mg/L	CONTROL 3	4/11/2021	0.93	0.93	ZQ8674	Dup 1
	mg/L	CONTROL 3	4/11/2021	<0.50	0.25	ZQ8679	Dup 2

Appendix D: Snow Water Chemistry Analytical Results

Parameter	Unit	Sample Point	Date	Data Point	Graphable Value	Lab Ref	Sample Type
Sulphur (S) - Total	mg/L	SS BAG	4/18/2021	<0.50	0.25	ZQ8675	BAG
	mg/L	SS BAG	4/18/2021	<0.50	0.25	ZQ8676	EBW
	mg/L	SS1-4	4/10/2021	<0.50	0.25	ZQ8656	Dup 1
	mg/L	SS1-4	4/10/2021	2.25	2.25	ZQ8678	Dup 2
	mg/L	SS1-5	4/10/2021	0.74	0.74	ZQ8657	GW
	mg/L	SS2-1	4/9/2021	1.86	1.86	ZQ8658	GW
	mg/L	SS2-2	4/9/2021	<0.50	0.25	ZQ8659	GW
	mg/L	SS2-3	4/9/2021	<0.50	0.25	ZQ8660	GW
	mg/L	SS2-4	4/9/2021	2.6	2.6	ZQ8661	GW
	mg/L	SS3-4	4/11/2021	1.35	1.35	ZQ8662	GW
	mg/L	SS3-5	4/11/2021	1.12	1.12	ZQ8663	GW
	mg/L	SS3-6	4/11/2021	0.75	0.75	ZQ8664	GW
	mg/L	SS3-7	4/11/2021	<0.50	0.25	ZQ8665	Dup 1
	mg/L	SS3-7	4/11/2021	0.7	0.7	ZQ8677	Dup 2
	mg/L	SS3-8	4/11/2021	0.66	0.66	ZQ8666	GW
	mg/L	SS4-4	4/12/2021	0.91	0.91	ZQ8667	GW
	mg/L	SS4-5	4/12/2021	<0.50	0.25	ZQ8668	GW
	mg/L	SS5-3	4/11/2021	<0.50	0.25	ZQ8669	GW
	mg/L	SS5-4	4/11/2021	<0.50	0.25	ZQ8670	GW
	mg/L	SS5-5	4/11/2021	1.87	1.87	ZQ8671	GW
	mg/L	CONTROL 1	4/11/2021	<0.50	0.25	ZQ8672	GW
	mg/L	CONTROL 2	4/12/2021	1.15	1.15	ZQ8673	GW
	mg/L	CONTROL 3	4/11/2021	1.14	1.14	ZQ8674	Dup 1
	mg/L	CONTROL 3	4/11/2021	1.32	1.32	ZQ8679	Dup 2
Thallium (Tl) - Dissolved	ug/L	SS BAG	4/18/2021	<0.0020	0.001	ZQ8675	BAG
	ug/L	SS BAG	4/18/2021	<0.0020	0.001	ZQ8676	EBW
	ug/L	SS1-4	4/10/2021	<0.0020	0.001	ZQ8656	Dup 1
	ug/L	SS1-4	4/10/2021	0.0045	0.0045	ZQ8678	Dup 2
	ug/L	SS1-5	4/10/2021	<0.0020	0.001	ZQ8657	GW
	ug/L	SS2-1	4/9/2021	<0.0020	0.001	ZQ8658	GW
	ug/L	SS2-2	4/9/2021	<0.0020	0.001	ZQ8659	GW
	ug/L	SS2-3	4/9/2021	<0.0020	0.001	ZQ8660	GW
	ug/L	SS2-4	4/9/2021	<0.0020	0.001	ZQ8661	GW
	ug/L	SS3-4	4/11/2021	0.0036	0.0036	ZQ8662	GW
	ug/L	SS3-5	4/11/2021	<0.0020	0.001	ZQ8663	GW
	ug/L	SS3-6	4/11/2021	0.0564	0.0564	ZQ8664	GW
	ug/L	SS3-7	4/11/2021	<0.0020	0.001	ZQ8665	Dup 1
	ug/L	SS3-7	4/11/2021	0.0065	0.0065	ZQ8677	Dup 2
	ug/L	SS3-8	4/11/2021	<0.0020	0.001	ZQ8666	GW
	ug/L	SS4-4	4/12/2021	<0.0020	0.001	ZQ8667	GW
	ug/L	SS4-5	4/12/2021	<0.0020	0.001	ZQ8668	GW
	ug/L	SS5-3	4/11/2021	<0.0020	0.001	ZQ8669	GW
	ug/L	SS5-4	4/11/2021	<0.0020	0.001	ZQ8670	GW
	ug/L	SS5-5	4/11/2021	<0.0020	0.001	ZQ8671	GW
	ug/L	CONTROL 1	4/11/2021	<0.0020	0.001	ZQ8672	GW
	ug/L	CONTROL 2	4/12/2021	<0.0020	0.001	ZQ8673	GW
	ug/L	CONTROL 3	4/11/2021	<0.0020	0.001	ZQ8674	Dup 1
	ug/L	CONTROL 3	4/11/2021	<0.0020	0.001	ZQ8679	Dup 2

Appendix D: Snow Water Chemistry Analytical Results

Parameter	Unit	Sample Point	Date	Data Point	Graphable Value	Lab Ref	Sample Type
Thallium (Tl) - Total	ug/L	SS BAG	4/18/2021	<0.0020	0.001	ZQ8675	BAG
	ug/L	SS BAG	4/18/2021	<0.0020	0.001	ZQ8676	EBW
	ug/L	SS1-4	4/10/2021	0.0066	0.0066	ZQ8656	Dup 1
	ug/L	SS1-4	4/10/2021	0.0079	0.0079	ZQ8678	Dup 2
	ug/L	SS1-5	4/10/2021	0.0032	0.0032	ZQ8657	GW
	ug/L	SS2-1	4/9/2021	0.0074	0.0074	ZQ8658	GW
	ug/L	SS2-2	4/9/2021	0.0047	0.0047	ZQ8659	GW
	ug/L	SS2-3	4/9/2021	0.0028	0.0028	ZQ8660	GW
	ug/L	SS2-4	4/9/2021	0.002	0.002	ZQ8661	GW
	ug/L	SS3-4	4/11/2021	0.0073	0.0073	ZQ8662	GW
	ug/L	SS3-5	4/11/2021	0.0036	0.0036	ZQ8663	GW
	ug/L	SS3-6	4/11/2021	0.0683	0.0683	ZQ8664	GW
	ug/L	SS3-7	4/11/2021	0.0195	0.0195	ZQ8665	Dup 1
	ug/L	SS3-7	4/11/2021	0.0172	0.0172	ZQ8677	Dup 2
	ug/L	SS3-8	4/11/2021	0.0182	0.0182	ZQ8666	GW
	ug/L	SS4-4	4/12/2021	0.0151	0.0151	ZQ8667	GW
	ug/L	SS4-5	4/12/2021	0.0166	0.0166	ZQ8668	GW
	ug/L	SS5-3	4/11/2021	0.035	0.035	ZQ8669	GW
	ug/L	SS5-4	4/11/2021	0.0111	0.0111	ZQ8670	GW
	ug/L	SS5-5	4/11/2021	0.0037	0.0037	ZQ8671	GW
	ug/L	CONTROL 1	4/11/2021	<0.0020	0.001	ZQ8672	GW
	ug/L	CONTROL 2	4/12/2021	0.0096	0.0096	ZQ8673	GW
	ug/L	CONTROL 3	4/11/2021	0.0052	0.0052	ZQ8674	Dup 1
	ug/L	CONTROL 3	4/11/2021	0.0051	0.0051	ZQ8679	Dup 2
Tin (Sn) - Dissolved	ug/L	SS BAG	4/18/2021	<0.010	0.005	ZQ8675	BAG
	ug/L	SS BAG	4/18/2021	<0.010	0.005	ZQ8676	EBW
	ug/L	SS1-4	4/10/2021	0.023	0.023	ZQ8656	Dup 1
	ug/L	SS1-4	4/10/2021	0.035	0.035	ZQ8678	Dup 2
	ug/L	SS1-5	4/10/2021	0.055	0.055	ZQ8657	GW
	ug/L	SS2-1	4/9/2021	<0.010	0.005	ZQ8658	GW
	ug/L	SS2-2	4/9/2021	<0.010	0.005	ZQ8659	GW
	ug/L	SS2-3	4/9/2021	<0.010	0.005	ZQ8660	GW
	ug/L	SS2-4	4/9/2021	0.01	0.01	ZQ8661	GW
	ug/L	SS3-4	4/11/2021	0.032	0.032	ZQ8662	GW
	ug/L	SS3-5	4/11/2021	<0.010	0.005	ZQ8663	GW
	ug/L	SS3-6	4/11/2021	0.122	0.122	ZQ8664	GW
	ug/L	SS3-7	4/11/2021	<0.010	0.005	ZQ8665	Dup 1
	ug/L	SS3-7	4/11/2021	0.031	0.031	ZQ8677	Dup 2
	ug/L	SS3-8	4/11/2021	<0.010	0.005	ZQ8666	GW
	ug/L	SS4-4	4/12/2021	<0.010	0.005	ZQ8667	GW
	ug/L	SS4-5	4/12/2021	<0.010	0.005	ZQ8668	GW
	ug/L	SS5-3	4/11/2021	<0.010	0.005	ZQ8669	GW
	ug/L	SS5-4	4/11/2021	<0.010	0.005	ZQ8670	GW
	ug/L	SS5-5	4/11/2021	<0.010	0.005	ZQ8671	GW
	ug/L	CONTROL 1	4/11/2021	<0.010	0.005	ZQ8672	GW
	ug/L	CONTROL 2	4/12/2021	0.013	0.013	ZQ8673	GW
	ug/L	CONTROL 3	4/11/2021	<0.010	0.005	ZQ8674	Dup 1
	ug/L	CONTROL 3	4/11/2021	0.011	0.011	ZQ8679	Dup 2

Appendix D: Snow Water Chemistry Analytical Results

Parameter	Unit	Sample Point	Date	Data Point	Graphable Value	Lab Ref	Sample Type
Tin (Sn) - Total	ug/L	SS BAG	4/18/2021	<0.010	0.005	ZQ8675	BAG
	ug/L	SS BAG	4/18/2021	<0.010	0.005	ZQ8676	EBW
	ug/L	SS1-4	4/10/2021	0.049	0.049	ZQ8656	Dup 1
	ug/L	SS1-4	4/10/2021	0.059	0.059	ZQ8678	Dup 2
	ug/L	SS1-5	4/10/2021	0.106	0.106	ZQ8657	GW
	ug/L	SS2-1	4/9/2021	0.036	0.036	ZQ8658	GW
	ug/L	SS2-2	4/9/2021	0.021	0.021	ZQ8659	GW
	ug/L	SS2-3	4/9/2021	0.016	0.016	ZQ8660	GW
	ug/L	SS2-4	4/9/2021	<0.010	0.005	ZQ8661	GW
	ug/L	SS3-4	4/11/2021	0.015	0.015	ZQ8662	GW
	ug/L	SS3-5	4/11/2021	0.01	0.01	ZQ8663	GW
	ug/L	SS3-6	4/11/2021	0.226	0.226	ZQ8664	GW
	ug/L	SS3-7	4/11/2021	0.108	0.108	ZQ8665	Dup 1
	ug/L	SS3-7	4/11/2021	0.097	0.097	ZQ8677	Dup 2
	ug/L	SS3-8	4/11/2021	0.09	0.09	ZQ8666	GW
	ug/L	SS4-4	4/12/2021	0.049	0.049	ZQ8667	GW
	ug/L	SS4-5	4/12/2021	0.069	0.069	ZQ8668	GW
	ug/L	SS5-3	4/11/2021	0.145	0.145	ZQ8669	GW
	ug/L	SS5-4	4/11/2021	0.052	0.052	ZQ8670	GW
	ug/L	SS5-5	4/11/2021	0.018	0.018	ZQ8671	GW
	ug/L	CONTROL 1	4/11/2021	0.023	0.023	ZQ8672	GW
	ug/L	CONTROL 2	4/12/2021	0.036	0.036	ZQ8673	GW
	ug/L	CONTROL 3	4/11/2021	0.026	0.026	ZQ8674	Dup 1
	ug/L	CONTROL 3	4/11/2021	0.024	0.024	ZQ8679	Dup 2
Titanium (Ti) - Dissolved	ug/L	SS BAG	4/18/2021	<0.50	0.25	ZQ8675	BAG
	ug/L	SS BAG	4/18/2021	<0.50	0.25	ZQ8676	EBW
	ug/L	SS1-4	4/10/2021	13.8	13.8	ZQ8656	Dup 1
	ug/L	SS1-4	4/10/2021	15.3	15.3	ZQ8678	Dup 2
	ug/L	SS1-5	4/10/2021	3.68	3.68	ZQ8657	GW
	ug/L	SS2-1	4/9/2021	<0.50	0.25	ZQ8658	GW
	ug/L	SS2-2	4/9/2021	<0.50	0.25	ZQ8659	GW
	ug/L	SS2-3	4/9/2021	3.59	3.59	ZQ8660	GW
	ug/L	SS2-4	4/9/2021	<0.50	0.25	ZQ8661	GW
	ug/L	SS3-4	4/11/2021	13.1	13.1	ZQ8662	GW
	ug/L	SS3-5	4/11/2021	10.1	10.1	ZQ8663	GW
	ug/L	SS3-6	4/11/2021	154	154	ZQ8664	GW
	ug/L	SS3-7	4/11/2021	0.89	0.89	ZQ8665	Dup 1
	ug/L	SS3-7	4/11/2021	29.2	29.2	ZQ8677	Dup 2
	ug/L	SS3-8	4/11/2021	0.57	0.57	ZQ8666	GW
	ug/L	SS4-4	4/12/2021	0.77	0.77	ZQ8667	GW
	ug/L	SS4-5	4/12/2021	<0.50	0.25	ZQ8668	GW
	ug/L	SS5-3	4/11/2021	1.74	1.74	ZQ8669	GW
	ug/L	SS5-4	4/11/2021	0.52	0.52	ZQ8670	GW
	ug/L	SS5-5	4/11/2021	<0.50	0.25	ZQ8671	GW
	ug/L	CONTROL 1	4/11/2021	4.06	4.06	ZQ8672	GW
	ug/L	CONTROL 2	4/12/2021	11.2	11.2	ZQ8673	GW
	ug/L	CONTROL 3	4/11/2021	<0.50	0.25	ZQ8674	Dup 1
	ug/L	CONTROL 3	4/11/2021	8.29	8.29	ZQ8679	Dup 2

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Parameter	Unit	Sample Point	Date	Data Point	Graphable Value	Lab Ref	Sample Type
Titanium (Ti) - Total	ug/L	SS BAG	4/18/2021	<0.50	0.25	ZQ8675	BAG
	ug/L	SS BAG	4/18/2021	<0.50	0.25	ZQ8676	EBW
	ug/L	SS1-4	4/10/2021	23.8	23.8	ZQ8656	Dup 1
	ug/L	SS1-4	4/10/2021	19.4	19.4	ZQ8678	Dup 2
	ug/L	SS1-5	4/10/2021	9.66	9.66	ZQ8657	GW
	ug/L	SS2-1	4/9/2021	30.2	30.2	ZQ8658	GW
	ug/L	SS2-2	4/9/2021	15	15	ZQ8659	GW
	ug/L	SS2-3	4/9/2021	14.1	14.1	ZQ8660	GW
	ug/L	SS2-4	4/9/2021	7.06	7.06	ZQ8661	GW
	ug/L	SS3-4	4/11/2021	26.6	26.6	ZQ8662	GW
	ug/L	SS3-5	4/11/2021	9.85	9.85	ZQ8663	GW
	ug/L	SS3-6	4/11/2021	247	247	ZQ8664	GW
	ug/L	SS3-7	4/11/2021	76.5	76.5	ZQ8665	Dup 1
	ug/L	SS3-7	4/11/2021	86.2	86.2	ZQ8677	Dup 2
	ug/L	SS3-8	4/11/2021	63.1	63.1	ZQ8666	GW
	ug/L	SS4-4	4/12/2021	62.3	62.3	ZQ8667	GW
	ug/L	SS4-5	4/12/2021	67.8	67.8	ZQ8668	GW
	ug/L	SS5-3	4/11/2021	127	127	ZQ8669	GW
	ug/L	SS5-4	4/11/2021	43.1	43.1	ZQ8670	GW
	ug/L	SS5-5	4/11/2021	13.3	13.3	ZQ8671	GW
	ug/L	CONTROL 1	4/11/2021	8.19	8.19	ZQ8672	GW
	ug/L	CONTROL 2	4/12/2021	39.3	39.3	ZQ8673	GW
	ug/L	CONTROL 3	4/11/2021	20.7	20.7	ZQ8674	Dup 1
	ug/L	CONTROL 3	4/11/2021	19.4	19.4	ZQ8679	Dup 2
Total Dissolved Solids (TDS)	mg/L	SS BAG	4/18/2021	3.6	3.6	ZQ8675	BAG
	mg/L	SS BAG	4/18/2021	<1.0	0.5	ZQ8676	EBW
	mg/L	SS1-4	4/10/2021	1.6	1.6	ZQ8656	Dup 1
	mg/L	SS1-4	4/10/2021	3.2	3.2	ZQ8678	Dup 2
	mg/L	SS1-5	4/10/2021	<1.0	0.5	ZQ8657	GW
	mg/L	SS2-1	4/9/2021	1.6	1.6	ZQ8658	GW
	mg/L	SS2-2	4/9/2021	<1.0	0.5	ZQ8659	GW
	mg/L	SS2-3	4/9/2021	1.2	1.2	ZQ8660	GW
	mg/L	SS2-4	4/9/2021	<1.0	0.5	ZQ8661	GW
	mg/L	SS3-4	4/11/2021	1.2	1.2	ZQ8662	GW
	mg/L	SS3-5	4/11/2021	<1.0	0.5	ZQ8663	GW
	mg/L	SS3-6	4/11/2021	2.8	2.8	ZQ8664	GW
	mg/L	SS3-7	4/11/2021	<1.0	0.5	ZQ8665	Dup 1
	mg/L	SS3-7	4/11/2021	1.6	1.6	ZQ8677	Dup 2
	mg/L	SS3-8	4/11/2021	3.6	3.6	ZQ8666	GW
	mg/L	SS4-4	4/12/2021	4	4	ZQ8667	GW
	mg/L	SS4-5	4/12/2021	<1.1	0.55	ZQ8668	GW
	mg/L	SS5-3	4/11/2021	1.2	1.2	ZQ8669	GW
	mg/L	SS5-4	4/11/2021	<1.0	0.5	ZQ8670	GW
	mg/L	SS5-5	4/11/2021	<1.0	0.5	ZQ8671	GW
	mg/L	CONTROL 1	4/11/2021	<1.0	0.5	ZQ8672	GW
	mg/L	CONTROL 2	4/12/2021	<1.0	0.5	ZQ8673	GW
	mg/L	CONTROL 3	4/11/2021	2	2	ZQ8674	Dup 1
	mg/L	CONTROL 3	4/11/2021	1.2	1.2	ZQ8679	Dup 2

Appendix D: Snow Water Chemistry Analytical Results

Parameter	Unit	Sample Point	Date	Data Point	Graphable Value	Lab Ref	Sample Type
Total Dissolved Solids (TDS) - Calculated	mg/L	SS BAG	4/18/2021	1.3	1.3	ZQ8675	BAG
	mg/L	SS BAG	4/18/2021	1.3	1.3	ZQ8676	EBW
	mg/L	SS1-4	4/10/2021	1	1	ZQ8656	Dup 1
	mg/L	SS1-4	4/10/2021	2.7	2.7	ZQ8678	Dup 2
	mg/L	SS1-5	4/10/2021	1.1	1.1	ZQ8657	GW
	mg/L	SS2-1	4/9/2021	1.2	1.2	ZQ8658	GW
	mg/L	SS2-2	4/9/2021	1.4	1.4	ZQ8659	GW
	mg/L	SS2-3	4/9/2021	1.8	1.8	ZQ8660	GW
	mg/L	SS2-4	4/9/2021	1.5	1.5	ZQ8661	GW
	mg/L	SS3-4	4/11/2021	1.6	1.6	ZQ8662	GW
	mg/L	SS3-5	4/11/2021	1.2	1.2	ZQ8663	GW
	mg/L	SS3-6	4/11/2021	16.4	16.4	ZQ8664	GW
	mg/L	SS3-7	4/11/2021	1.8	1.8	ZQ8665	Dup 1
	mg/L	SS3-7	4/11/2021	4.6	4.6	ZQ8677	Dup 2
	mg/L	SS3-8	4/11/2021	2.5	2.5	ZQ8666	GW
	mg/L	SS4-4	4/12/2021	2.2	2.2	ZQ8667	GW
	mg/L	SS4-5	4/12/2021	2.7	2.7	ZQ8668	GW
	mg/L	SS5-3	4/11/2021	2	2	ZQ8669	GW
	mg/L	SS5-4	4/11/2021	2.6	2.6	ZQ8670	GW
	mg/L	SS5-5	4/11/2021	0.8	0.8	ZQ8671	GW
	mg/L	CONTROL 1	4/11/2021	1.6	1.6	ZQ8672	GW
	mg/L	CONTROL 2	4/12/2021	3	3	ZQ8673	GW
	mg/L	CONTROL 3	4/11/2021	<0.50	0.25	ZQ8674	Dup 1
	mg/L	CONTROL 3	4/11/2021	1.7	1.7	ZQ8679	Dup 2
Total Kjeldahl Nitrogen	mg/L	SS BAG	4/18/2021	<0.020	0.01	ZQ8675	BAG
	mg/L	SS BAG	4/18/2021	<0.020	0.01	ZQ8676	EBW
	mg/L	SS1-4	4/10/2021	0.046	0.046	ZQ8656	Dup 1
	mg/L	SS1-4	4/10/2021	0.022	0.022	ZQ8678	Dup 2
	mg/L	SS1-5	4/10/2021	0.059	0.059	ZQ8657	GW
	mg/L	SS2-1	4/9/2021	0.052	0.052	ZQ8658	GW
	mg/L	SS2-2	4/9/2021	0.031	0.031	ZQ8659	GW
	mg/L	SS2-3	4/9/2021	0.047	0.047	ZQ8660	GW
	mg/L	SS2-4	4/9/2021	0.04	0.04	ZQ8661	GW
	mg/L	SS3-4	4/11/2021	0.027	0.027	ZQ8662	GW
	mg/L	SS3-5	4/11/2021	0.027	0.027	ZQ8663	GW
	mg/L	SS3-6	4/11/2021	0.1	0.1	ZQ8664	GW
	mg/L	SS3-7	4/11/2021	0.038	0.038	ZQ8665	Dup 1
	mg/L	SS3-7	4/11/2021	0.05	0.05	ZQ8677	Dup 2
	mg/L	SS3-8	4/11/2021	0.049	0.049	ZQ8666	GW
	mg/L	SS4-4	4/12/2021	0.053	0.053	ZQ8667	GW
	mg/L	SS4-5	4/12/2021	0.034	0.034	ZQ8668	GW
	mg/L	SS5-3	4/11/2021	0.028	0.028	ZQ8669	GW
	mg/L	SS5-4	4/11/2021	0.04	0.04	ZQ8670	GW
	mg/L	SS5-5	4/11/2021	0.044	0.044	ZQ8671	GW
	mg/L	CONTROL 1	4/11/2021	0.033	0.033	ZQ8672	GW
	mg/L	CONTROL 2	4/12/2021	0.037	0.037	ZQ8673	GW
	mg/L	CONTROL 3	4/11/2021	0.039	0.039	ZQ8674	Dup 1
	mg/L	CONTROL 3	4/11/2021	<0.020	0.01	ZQ8679	Dup 2

Appendix D: Snow Water Chemistry Analytical Results

Parameter	Unit	Sample Point	Date	Data Point	Graphable Value	Lab Ref	Sample Type
Total Suspended Solids (TSS)	mg/L	SS BAG	4/18/2021	<1.0	0.5	ZQ8675	BAG
	mg/L	SS BAG	4/18/2021	<1.0	0.5	ZQ8676	EBW
	mg/L	SS1-4	4/10/2021	5.5	5.5	ZQ8656	Dup 1
	mg/L	SS1-4	4/10/2021	7.6	7.6	ZQ8678	Dup 2
	mg/L	SS1-5	4/10/2021	3.6	3.6	ZQ8657	GW
	mg/L	SS2-1	4/9/2021	8.6	8.6	ZQ8658	GW
	mg/L	SS2-2	4/9/2021	4	4	ZQ8659	GW
	mg/L	SS2-3	4/9/2021	3.1	3.1	ZQ8660	GW
	mg/L	SS2-4	4/9/2021	5.5	5.5	ZQ8661	GW
	mg/L	SS3-4	4/11/2021	11	11	ZQ8662	GW
	mg/L	SS3-5	4/11/2021	7.2	7.2	ZQ8663	GW
	mg/L	SS3-6	4/11/2021	88	88	ZQ8664	GW
	mg/L	SS3-7	4/11/2021	33	33	ZQ8665	Dup 1
	mg/L	SS3-7	4/11/2021	33	33	ZQ8677	Dup 2
	mg/L	SS3-8	4/11/2021	28	28	ZQ8666	GW
	mg/L	SS4-4	4/12/2021	28	28	ZQ8667	GW
	mg/L	SS4-5	4/12/2021	32	32	ZQ8668	GW
	mg/L	SS5-3	4/11/2021	36	36	ZQ8669	GW
	mg/L	SS5-4	4/11/2021	24	24	ZQ8670	GW
	mg/L	SS5-5	4/11/2021	4.1	4.1	ZQ8671	GW
	mg/L	CONTROL 1	4/11/2021	1.5	1.5	ZQ8672	GW
	mg/L	CONTROL 2	4/12/2021	8.3	8.3	ZQ8673	GW
	mg/L	CONTROL 3	4/11/2021	5.3	5.3	ZQ8674	Dup 1
	mg/L	CONTROL 3	4/11/2021	4.7	4.7	ZQ8679	Dup 2
Turbidity	NTU	SS BAG	4/18/2021	0.63	0.63	ZQ8675	BAG
	NTU	SS BAG	4/18/2021	0.92	0.92	ZQ8676	EBW
	NTU	SS1-4	4/10/2021	2.8	2.8	ZQ8656	Dup 1
	NTU	SS1-4	4/10/2021	2.5	2.5	ZQ8678	Dup 2
	NTU	SS1-5	4/10/2021	2.3	2.3	ZQ8657	GW
	NTU	SS2-1	4/9/2021	3.6	3.6	ZQ8658	GW
	NTU	SS2-2	4/9/2021	1.3	1.3	ZQ8659	GW
	NTU	SS2-3	4/9/2021	1.6	1.6	ZQ8660	GW
	NTU	SS2-4	4/9/2021	2.4	2.4	ZQ8661	GW
	NTU	SS3-4	4/11/2021	3.3	3.3	ZQ8662	GW
	NTU	SS3-5	4/11/2021	2	2	ZQ8663	GW
	NTU	SS3-6	4/11/2021	14	14	ZQ8664	GW
	NTU	SS3-7	4/11/2021	7.3	7.3	ZQ8665	Dup 1
	NTU	SS3-7	4/11/2021	6.6	6.6	ZQ8677	Dup 2
	NTU	SS3-8	4/11/2021	6.1	6.1	ZQ8666	GW
	NTU	SS4-4	4/12/2021	6	6	ZQ8667	GW
	NTU	SS4-5	4/12/2021	8.4	8.4	ZQ8668	GW
	NTU	SS5-3	4/11/2021	12	12	ZQ8669	GW
	NTU	SS5-4	4/11/2021	4.8	4.8	ZQ8670	GW
	NTU	SS5-5	4/11/2021	2.2	2.2	ZQ8671	GW
	NTU	CONTROL 1	4/11/2021	1.8	1.8	ZQ8672	GW
	NTU	CONTROL 2	4/12/2021	3.2	3.2	ZQ8673	GW
	NTU	CONTROL 3	4/11/2021	2.8	2.8	ZQ8674	Dup 1
	NTU	CONTROL 3	4/11/2021	2.3	2.3	ZQ8679	Dup 2

Appendix D: Snow Water Chemistry Analytical Results

Parameter	Unit	Sample Point	Date	Data Point	Graphable Value	Lab Ref	Sample Type
Uranium (U) - Dissolved	ug/L	SS BAG	4/18/2021	<0.0020	0.001	ZQ8675	BAG
	ug/L	SS BAG	4/18/2021	<0.0020	0.001	ZQ8676	EBW
	ug/L	SS1-4	4/10/2021	0.0883	0.0883	ZQ8656	Dup 1
	ug/L	SS1-4	4/10/2021	0.0937	0.0937	ZQ8678	Dup 2
	ug/L	SS1-5	4/10/2021	0.0211	0.0211	ZQ8657	GW
	ug/L	SS2-1	4/9/2021	0.0135	0.0135	ZQ8658	GW
	ug/L	SS2-2	4/9/2021	0.0076	0.0076	ZQ8659	GW
	ug/L	SS2-3	4/9/2021	0.0665	0.0665	ZQ8660	GW
	ug/L	SS2-4	4/9/2021	0.0138	0.0138	ZQ8661	GW
	ug/L	SS3-4	4/11/2021	0.121	0.121	ZQ8662	GW
	ug/L	SS3-5	4/11/2021	0.071	0.071	ZQ8663	GW
	ug/L	SS3-6	4/11/2021	1.54	1.54	ZQ8664	GW
	ug/L	SS3-7	4/11/2021	0.0641	0.0641	ZQ8665	Dup 1
	ug/L	SS3-7	4/11/2021	0.241	0.241	ZQ8677	Dup 2
	ug/L	SS3-8	4/11/2021	0.0411	0.0411	ZQ8666	GW
	ug/L	SS4-4	4/12/2021	0.0456	0.0456	ZQ8667	GW
	ug/L	SS4-5	4/12/2021	0.0427	0.0427	ZQ8668	GW
	ug/L	SS5-3	4/11/2021	0.103	0.103	ZQ8669	GW
	ug/L	SS5-4	4/11/2021	0.0266	0.0266	ZQ8670	GW
	ug/L	SS5-5	4/11/2021	0.0075	0.0075	ZQ8671	GW
	ug/L	CONTROL 1	4/11/2021	0.0153	0.0153	ZQ8672	GW
	ug/L	CONTROL 2	4/12/2021	0.0891	0.0891	ZQ8673	GW
	ug/L	CONTROL 3	4/11/2021	0.0127	0.0127	ZQ8674	Dup 1
	ug/L	CONTROL 3	4/11/2021	0.0557	0.0557	ZQ8679	Dup 2
Uranium (U) - Total	ug/L	SS BAG	4/18/2021	<0.0020	0.001	ZQ8675	BAG
	ug/L	SS BAG	4/18/2021	<0.0020	0.001	ZQ8676	EBW
	ug/L	SS1-4	4/10/2021	0.276	0.276	ZQ8656	Dup 1
	ug/L	SS1-4	4/10/2021	0.243	0.243	ZQ8678	Dup 2
	ug/L	SS1-5	4/10/2021	0.0726	0.0726	ZQ8657	GW
	ug/L	SS2-1	4/9/2021	0.275	0.275	ZQ8658	GW
	ug/L	SS2-2	4/9/2021	0.0831	0.0831	ZQ8659	GW
	ug/L	SS2-3	4/9/2021	0.0609	0.0609	ZQ8660	GW
	ug/L	SS2-4	4/9/2021	0.0543	0.0543	ZQ8661	GW
	ug/L	SS3-4	4/11/2021	0.223	0.223	ZQ8662	GW
	ug/L	SS3-5	4/11/2021	0.0608	0.0608	ZQ8663	GW
	ug/L	SS3-6	4/11/2021	3.78	3.78	ZQ8664	GW
	ug/L	SS3-7	4/11/2021	0.653	0.653	ZQ8665	Dup 1
	ug/L	SS3-7	4/11/2021	0.783	0.783	ZQ8677	Dup 2
	ug/L	SS3-8	4/11/2021	0.552	0.552	ZQ8666	GW
	ug/L	SS4-4	4/12/2021	0.586	0.586	ZQ8667	GW
	ug/L	SS4-5	4/12/2021	0.513	0.513	ZQ8668	GW
	ug/L	SS5-3	4/11/2021	1.99	1.99	ZQ8669	GW
	ug/L	SS5-4	4/11/2021	0.362	0.362	ZQ8670	GW
	ug/L	SS5-5	4/11/2021	0.0693	0.0693	ZQ8671	GW
	ug/L	CONTROL 1	4/11/2021	0.034	0.034	ZQ8672	GW
	ug/L	CONTROL 2	4/12/2021	0.258	0.258	ZQ8673	GW
	ug/L	CONTROL 3	4/11/2021	0.137	0.137	ZQ8674	Dup 1
	ug/L	CONTROL 3	4/11/2021	0.113	0.113	ZQ8679	Dup 2

Appendix D: Snow Water Chemistry Analytical Results

Parameter	Unit	Sample Point	Date	Data Point	Graphable Value	Lab Ref	Sample Type
Vanadium (V) - Dissolved	ug/L	SS BAG	4/18/2021	0.141	0.141	ZQ8675	BAG
	ug/L	SS BAG	4/18/2021	0.148	0.148	ZQ8676	EBW
	ug/L	SS1-4	4/10/2021	0.57	0.57	ZQ8656	Dup 1
	ug/L	SS1-4	4/10/2021	0.548	0.548	ZQ8678	Dup 2
	ug/L	SS1-5	4/10/2021	0.145	0.145	ZQ8657	GW
	ug/L	SS2-1	4/9/2021	0.166	0.166	ZQ8658	GW
	ug/L	SS2-2	4/9/2021	0.06	0.06	ZQ8659	GW
	ug/L	SS2-3	4/9/2021	0.201	0.201	ZQ8660	GW
	ug/L	SS2-4	4/9/2021	0.144	0.144	ZQ8661	GW
	ug/L	SS3-4	4/11/2021	0.48	0.48	ZQ8662	GW
	ug/L	SS3-5	4/11/2021	0.394	0.394	ZQ8663	GW
	ug/L	SS3-6	4/11/2021	5.47	5.47	ZQ8664	GW
	ug/L	SS3-7	4/11/2021	0.232	0.232	ZQ8665	Dup 1
	ug/L	SS3-7	4/11/2021	1.09	1.09	ZQ8677	Dup 2
	ug/L	SS3-8	4/11/2021	0.169	0.169	ZQ8666	GW
	ug/L	SS4-4	4/12/2021	0.127	0.127	ZQ8667	GW
	ug/L	SS4-5	4/12/2021	0.136	0.136	ZQ8668	GW
	ug/L	SS5-3	4/11/2021	0.276	0.276	ZQ8669	GW
	ug/L	SS5-4	4/11/2021	0.154	0.154	ZQ8670	GW
	ug/L	SS5-5	4/11/2021	0.096	0.096	ZQ8671	GW
	ug/L	CONTROL 1	4/11/2021	0.146	0.146	ZQ8672	GW
	ug/L	CONTROL 2	4/12/2021	0.459	0.459	ZQ8673	GW
	ug/L	CONTROL 3	4/11/2021	0.124	0.124	ZQ8674	Dup 1
	ug/L	CONTROL 3	4/11/2021	0.416	0.416	ZQ8679	Dup 2
Vanadium (V) - Total	ug/L	SS BAG	4/18/2021	<0.10	0.05	ZQ8675	BAG
	ug/L	SS BAG	4/18/2021	<0.10	0.05	ZQ8676	EBW
	ug/L	SS1-4	4/10/2021	1	1	ZQ8656	Dup 1
	ug/L	SS1-4	4/10/2021	1.08	1.08	ZQ8678	Dup 2
	ug/L	SS1-5	4/10/2021	0.28	0.28	ZQ8657	GW
	ug/L	SS2-1	4/9/2021	0.34	0.34	ZQ8658	GW
	ug/L	SS2-2	4/9/2021	0.26	0.26	ZQ8659	GW
	ug/L	SS2-3	4/9/2021	0.37	0.37	ZQ8660	GW
	ug/L	SS2-4	4/9/2021	0.4	0.4	ZQ8661	GW
	ug/L	SS3-4	4/11/2021	0.99	0.99	ZQ8662	GW
	ug/L	SS3-5	4/11/2021	0.92	0.92	ZQ8663	GW
	ug/L	SS3-6	4/11/2021	11.4	11.4	ZQ8664	GW
	ug/L	SS3-7	4/11/2021	0.2	0.2	ZQ8665	Dup 1
	ug/L	SS3-7	4/11/2021	2.17	2.17	ZQ8677	Dup 2
	ug/L	SS3-8	4/11/2021	0.34	0.34	ZQ8666	GW
	ug/L	SS4-4	4/12/2021	0.22	0.22	ZQ8667	GW
	ug/L	SS4-5	4/12/2021	0.35	0.35	ZQ8668	GW
	ug/L	SS5-3	4/11/2021	0.52	0.52	ZQ8669	GW
	ug/L	SS5-4	4/11/2021	0.25	0.25	ZQ8670	GW
	ug/L	SS5-5	4/11/2021	0.25	0.25	ZQ8671	GW
	ug/L	CONTROL 1	4/11/2021	0.39	0.39	ZQ8672	GW
	ug/L	CONTROL 2	4/12/2021	0.99	0.99	ZQ8673	GW
	ug/L	CONTROL 3	4/11/2021	0.21	0.21	ZQ8674	Dup 1
	ug/L	CONTROL 3	4/11/2021	0.62	0.62	ZQ8679	Dup 2

Appendix D: Snow Water Chemistry Analytical Results

Parameter	Unit	Sample Point	Date	Data Point	Graphable Value	Lab Ref	Sample Type
Zinc (Zn) - Dissolved	ug/L	SS BAG	4/18/2021	<0.10	0.05	ZQ8675	BAG
	ug/L	SS BAG	4/18/2021	<0.10	0.05	ZQ8676	EBW
	ug/L	SS1-4	4/10/2021	1	1	ZQ8656	Dup 1
	ug/L	SS1-4	4/10/2021	1.08	1.08	ZQ8678	Dup 2
	ug/L	SS1-5	4/10/2021	0.28	0.28	ZQ8657	GW
	ug/L	SS2-1	4/9/2021	0.34	0.34	ZQ8658	GW
	ug/L	SS2-2	4/9/2021	0.26	0.26	ZQ8659	GW
	ug/L	SS2-3	4/9/2021	0.37	0.37	ZQ8660	GW
	ug/L	SS2-4	4/9/2021	0.4	0.4	ZQ8661	GW
	ug/L	SS3-4	4/11/2021	0.99	0.99	ZQ8662	GW
	ug/L	SS3-5	4/11/2021	0.92	0.92	ZQ8663	GW
	ug/L	SS3-6	4/11/2021	11.4	11.4	ZQ8664	GW
	ug/L	SS3-7	4/11/2021	0.2	0.2	ZQ8665	Dup 1
	ug/L	SS3-7	4/11/2021	2.17	2.17	ZQ8677	Dup 2
	ug/L	SS3-8	4/11/2021	0.34	0.34	ZQ8666	GW
	ug/L	SS4-4	4/12/2021	0.22	0.22	ZQ8667	GW
	ug/L	SS4-5	4/12/2021	0.35	0.35	ZQ8668	GW
	ug/L	SS5-3	4/11/2021	0.52	0.52	ZQ8669	GW
	ug/L	SS5-4	4/11/2021	0.25	0.25	ZQ8670	GW
	ug/L	SS5-5	4/11/2021	0.25	0.25	ZQ8671	GW
	ug/L	CONTROL 1	4/11/2021	0.39	0.39	ZQ8672	GW
	ug/L	CONTROL 2	4/12/2021	0.99	0.99	ZQ8673	GW
	ug/L	CONTROL 3	4/11/2021	0.21	0.21	ZQ8674	Dup 1
	ug/L	CONTROL 3	4/11/2021	0.62	0.62	ZQ8679	Dup 2
Zinc (Zn) - Total	ug/L	SS BAG	4/18/2021	<0.10	0.05	ZQ8675	BAG
	ug/L	SS BAG	4/18/2021	<0.10	0.05	ZQ8676	EBW
	ug/L	SS1-4	4/10/2021	1.36	1.36	ZQ8656	Dup 1
	ug/L	SS1-4	4/10/2021	1.02	1.02	ZQ8678	Dup 2
	ug/L	SS1-5	4/10/2021	0.77	0.77	ZQ8657	GW
	ug/L	SS2-1	4/9/2021	1.98	1.98	ZQ8658	GW
	ug/L	SS2-2	4/9/2021	1.06	1.06	ZQ8659	GW
	ug/L	SS2-3	4/9/2021	0.71	0.71	ZQ8660	GW
	ug/L	SS2-4	4/9/2021	0.51	0.51	ZQ8661	GW
	ug/L	SS3-4	4/11/2021	1.42	1.42	ZQ8662	GW
	ug/L	SS3-5	4/11/2021	0.6	0.6	ZQ8663	GW
	ug/L	SS3-6	4/11/2021	18.6	18.6	ZQ8664	GW
	ug/L	SS3-7	4/11/2021	4.67	4.67	ZQ8665	Dup 1
	ug/L	SS3-7	4/11/2021	5.37	5.37	ZQ8677	Dup 2
	ug/L	SS3-8	4/11/2021	5.31	5.31	ZQ8666	GW
	ug/L	SS4-4	4/12/2021	2.88	2.88	ZQ8667	GW
	ug/L	SS4-5	4/12/2021	3.56	3.56	ZQ8668	GW
	ug/L	SS5-3	4/11/2021	7.45	7.45	ZQ8669	GW
	ug/L	SS5-4	4/11/2021	2.28	2.28	ZQ8670	GW
	ug/L	SS5-5	4/11/2021	0.79	0.79	ZQ8671	GW
	ug/L	CONTROL 1	4/11/2021	0.77	0.77	ZQ8672	GW
	ug/L	CONTROL 2	4/12/2021	2.99	2.99	ZQ8673	GW
	ug/L	CONTROL 3	4/11/2021	1.03	1.03	ZQ8674	Dup 1
	ug/L	CONTROL 3	4/11/2021	1.05	1.05	ZQ8679	Dup 2

Appendix D: Snow Water Chemistry Analytical Results

Parameter	Unit	Sample Point	Date	Data Point	Graphable Value	Lab Ref	Sample Type
Zirconium (Zr) - Dissolved	ug/L	SS BAG	4/18/2021	<0.050	0.025	ZQ8675	BAG
	ug/L	SS BAG	4/18/2021	<0.050	0.025	ZQ8676	EBW
	ug/L	SS1-4	4/10/2021	0.095	0.095	ZQ8656	Dup 1
	ug/L	SS1-4	4/10/2021	0.085	0.085	ZQ8678	Dup 2
	ug/L	SS1-5	4/10/2021	<0.050	0.025	ZQ8657	GW
	ug/L	SS2-1	4/9/2021	<0.050	0.025	ZQ8658	GW
	ug/L	SS2-2	4/9/2021	<0.050	0.025	ZQ8659	GW
	ug/L	SS2-3	4/9/2021	<0.050	0.025	ZQ8660	GW
	ug/L	SS2-4	4/9/2021	<0.050	0.025	ZQ8661	GW
	ug/L	SS3-4	4/11/2021	0.072	0.072	ZQ8662	GW
	ug/L	SS3-5	4/11/2021	0.052	0.052	ZQ8663	GW
	ug/L	SS3-6	4/11/2021	1.13	1.13	ZQ8664	GW
	ug/L	SS3-7	4/11/2021	<0.050	0.025	ZQ8665	Dup 1
	ug/L	SS3-7	4/11/2021	0.237	0.237	ZQ8677	Dup 2
	ug/L	SS3-8	4/11/2021	<0.050	0.025	ZQ8666	GW
	ug/L	SS4-4	4/12/2021	<0.050	0.025	ZQ8667	GW
	ug/L	SS4-5	4/12/2021	<0.050	0.025	ZQ8668	GW
	ug/L	SS5-3	4/11/2021	<0.050	0.025	ZQ8669	GW
	ug/L	SS5-4	4/11/2021	<0.050	0.025	ZQ8670	GW
	ug/L	SS5-5	4/11/2021	<0.050	0.025	ZQ8671	GW
	ug/L	CONTROL 1	4/11/2021	<0.050	0.025	ZQ8672	GW
	ug/L	CONTROL 2	4/12/2021	0.089	0.089	ZQ8673	GW
	ug/L	CONTROL 3	4/11/2021	<0.050	0.025	ZQ8674	Dup 1
	ug/L	CONTROL 3	4/11/2021	<0.050	0.025	ZQ8679	Dup 2
Zirconium (Zr) - Total	ug/L	SS BAG	4/18/2021	<0.050	0.025	ZQ8675	BAG
	ug/L	SS BAG	4/18/2021	<0.050	0.025	ZQ8676	EBW
	ug/L	SS1-4	4/10/2021	0.094	0.094	ZQ8656	Dup 1
	ug/L	SS1-4	4/10/2021	0.118	0.118	ZQ8678	Dup 2
	ug/L	SS1-5	4/10/2021	<0.050	0.025	ZQ8657	GW
	ug/L	SS2-1	4/9/2021	0.115	0.115	ZQ8658	GW
	ug/L	SS2-2	4/9/2021	<0.050	0.025	ZQ8659	GW
	ug/L	SS2-3	4/9/2021	<0.050	0.025	ZQ8660	GW
	ug/L	SS2-4	4/9/2021	<0.050	0.025	ZQ8661	GW
	ug/L	SS3-4	4/11/2021	0.201	0.201	ZQ8662	GW
	ug/L	SS3-5	4/11/2021	0.064	0.064	ZQ8663	GW
	ug/L	SS3-6	4/11/2021	1.52	1.52	ZQ8664	GW
	ug/L	SS3-7	4/11/2021	0.495	0.495	ZQ8665	Dup 1
	ug/L	SS3-7	4/11/2021	0.507	0.507	ZQ8677	Dup 2
	ug/L	SS3-8	4/11/2021	0.271	0.271	ZQ8666	GW
	ug/L	SS4-4	4/12/2021	0.396	0.396	ZQ8667	GW
	ug/L	SS4-5	4/12/2021	0.403	0.403	ZQ8668	GW
	ug/L	SS5-3	4/11/2021	0.904	0.904	ZQ8669	GW
	ug/L	SS5-4	4/11/2021	0.223	0.223	ZQ8670	GW
	ug/L	SS5-5	4/11/2021	0.105	0.105	ZQ8671	GW
	ug/L	CONTROL 1	4/11/2021	<0.050	0.025	ZQ8672	GW
	ug/L	CONTROL 2	4/12/2021	0.099	0.099	ZQ8673	GW
	ug/L	CONTROL 3	4/11/2021	0.074	0.074	ZQ8674	Dup 1
	ug/L	CONTROL 3	4/11/2021	0.06	0.06	ZQ8679	Dup 2

APPENDIX E DUST GAUGE COLLECTION STANDARD OPERATING PROCEDURE (ENVI-908-0119)

Rio Tinto

Environment STANDARD OPERATING PROCEDURE			
Area No.:	**8000**	**Document #:**	**ENVI-908-0119**
		Revision:	**8**
Task Title:	**SOP – Dust Gauge Collection**		
Next Review:	**1 Year from Final Approval in Documentum**		
Effective Date:	**Date on approved stamp in footer.**		

1 REFERENCES/RELATED DOCUMENTS

1.1 **ENVI-904-0119 - SOP Total Suspended Solids** - Located in: Diavik Intranet - SOPs – Environment Folder

1.2 **ENVI-901-0119 – SOP General Laboratory Safety** - Located in: Diavik Intranet – SOPs – Environment Folder

1.3 **ENVI-919-0119 - SOP Snowmobiles** – Located in: P:\DDMI Environment\10.0 Operational Control\10.1 SOPs\Working SOPs

1.4 **ENVI-917-0119 - SOP Watercraft** – Located in: P:\DDMI Environment\10.0 Operational Control\10.1 SOPs\Working SOPs

1.5 **ENVI907-0119 - SOP Remote Field Safety** – Located in: P:\DDMI Environment\10.0 Operational Control\10.1 SOPs\Working SOPs

1.6 **ENVI-895-0119 - SOP Lightning Response –** Located in: P:\DDMI Environment\10.0 Operational Control\10.1 SOPs\Working SOPs

1.7 **ENVI-916-0119 – SOP Helicopter Usage -** Located in: P:\DDMI Environment\10.0 Operational Control\10.1 SOPs\Working SOPs

1.8 **ENVI-135-0112 - Remote Field Safety Permit Form** – Located in: P:\DDMI Environment\10.0 Operational Control\10.2 Forms\Current Forms\Approved\Remote Field Safety Plans

1.9 **ENVI-178-0312 - Dust Gauge Collection Field Sheet –** Located in: P:\DDMI Environment\10.0 Operational Control\10.2 Forms\Current Forms\Approved

Environment

STANDARD OPERATING PROCEDURE

Dust Gauge Collection

Revision History			
Revision	**Revision Description**	**Date of Revision**	**Author**
0	Initial Release	11-Jan-12	D. Meredith
1	New SOP format, clarify procedures, adds photos.	23-Nov-14	D. Dul/ D. Bourassa
2	Format update	19-Jul-15	D. Birch
3	Annual Update	10-Feb-16	S. Sinclair
4	New Template, clarification of representative sampling, decrease in oven temperature to be consistent with Standard Methods	04-Nov-16/10-Nov-16	S. Martin-Elson/N. Goodman
5	Template and area manager updated	20-Oct-17	S. Skinner
6	Superintendent update	10-Mar-18	S. Skinner
7	Annual review	27-Feb-19	M. Nelson N. Goodman S. Skinner
8	Added section 6.4.4. (lab QAQC), annual review/Superintendent update	Nov 2020	N. Goodman

Authorized Electronically in Documentum By:	
Area Superintendent:	Kofi Boa-Antwi
Area Manager:	D. Patterson

Environment

STANDARD OPERATING PROCEDURE

Dust Gauge Collection

CRITICAL RISKS

Other potential critical risks not currently assessed as part of this SOP

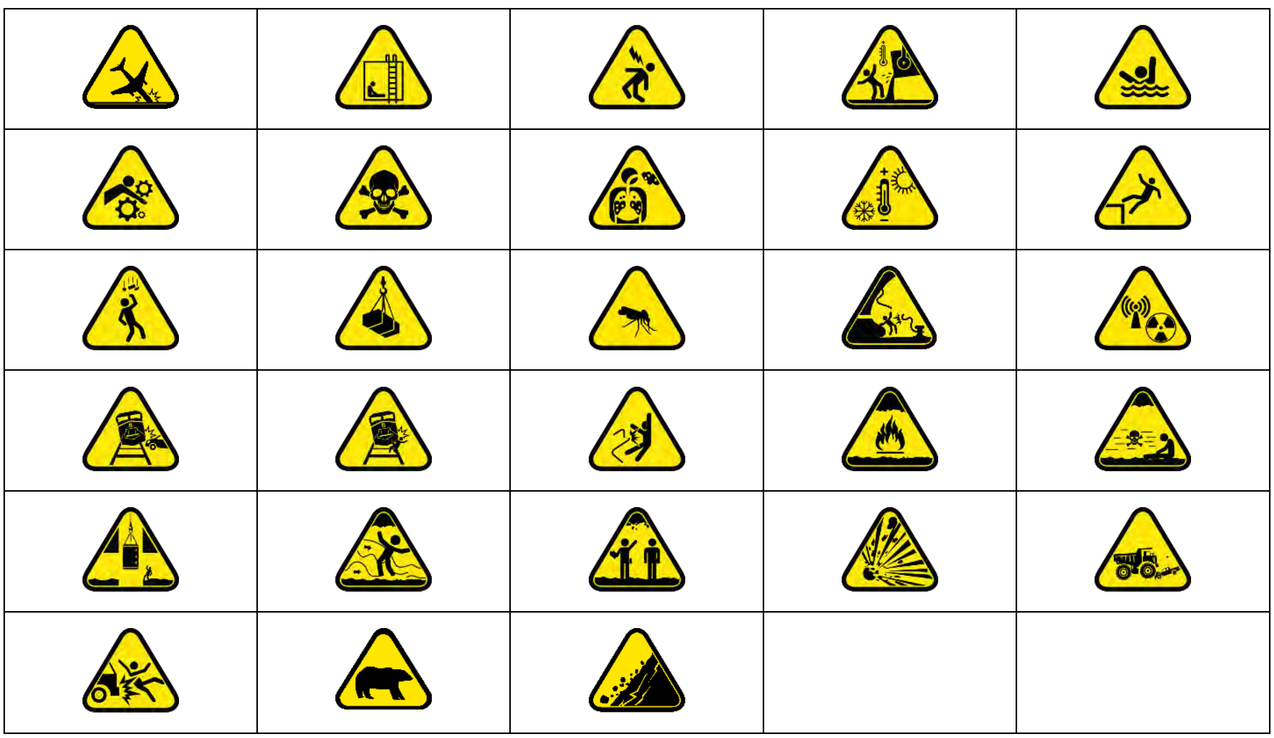


Figure 1: Dust Gauge Site 5 in the Summer

Figure 2: Dust Gauge Site 7 in the Winter

Figure 3: Dust Gauge Tubes prepared for storage

Description

This Standard Operating Procedure (SOP) provides guidelines on procedures to follow when carrying out Dust Gauge Collections.

2 PURPOSE

The purpose of this Standard Operating Procedure (SOP) is to outline the methodology for collecting dust gauge samples. This program is aimed at understanding dust deposition rates associated with project activities. Results collected from this program are compiled and included in the Appendix of the annual AEMP report.

3 SCOPE

3.1 Scope of Procedure

This SOP describes the responsibilities and processes for the deployment, collection and analysis of dust gauge samples. These procedures apply to all Diavik Mine personnel and contractor personnel authorized for sample collection activities.

3.2 Scope of Activities

Fourteen-dust gauges (12 sample sites, plus 2 control sites) are established on and around East Island for monitoring airborne dust particles. The dust gauges are collected quarterly throughout the year.

4 DEFINITIONS

Definitions							
ACTS		Groundwater		PROVE		SOP	✓
AEMP	✓	JHA	✓	QA		TSS	✓
COC		NTU		QC		TSP	
DI water	✓	PAL		Remote work	✓	WHMIS	
DO		PFD	✓	SDS		WLWB	

ELT		PPE	✓	Seepage			
GPS	✓	Problem bear		SNP			

See: ENVI-443-0415 - Environment Term Definitions - Located in: Diavik Intranet – SOPs – Environment Folder

5 RESPONSIBILITIES

See: ENVI-444-0415 - Environment Roles and Responsibilities - Located in: Diavik Intranet – SOPs – Environment Folder

6 PROCEDURE

6.1 Key HSEQ Aspects

Task Hazards							
Aircraft	✓	Extreme Weather	✓	Line of Fire		Snowmobile Operation	✓
Burns	✓	Fall into Water	✓	Manual Labour		Spills	
Chemical Contact		Falling		Noise	✓	Sprain / Strain	✓
Confined Space		Fire		Overhead Objects		Stored Energy	
Cuts Scrapes	✓	Firearms / Deterrents		Perception		Uneven Terrain / Ground	✓
Dehydration		Fumes / Gases		Pinch Points	✓	Unfamiliar Area	✓
Electrical		Glass		Risk to Wildlife		Visibility	✓

Entanglement		**Heavy Equipment**		**Rotating Parts**	✓	**Watercraft Operation**	✓
Equipment Loss or Damage		**Lifting**		**Sample Loss or Damage**	✓	**Wildlife**	✓
Ergonomics	✓	**Light Vehicle**		**Slip, Trip, Fall**	✓	**Working Remotely**	✓

See: ENVI-445-0415 - Environment Hazard Definitions - Located in: Diavik Intranet – SOPs – Environment Folder

6.2 CRM Critical Risks

Critical Risk	**Critical Control**
Drowning	PFD
Vehicle collision or rollover	Seat Belt, Defensive driving, Segregation
Vehicle impact on person	Seat Belt, Defensive driving/walking, Segregation
Wildlife	Scans, Vehicles as means of safety
Thermal extremes	Weather checks, Remote field permit
Aircraft transport	PPE, Follow pilot’s directions

It is the responsibility of all personnel to adhere to the high health and safety standards used at Diavik. Personnel are required to complete all pre-task planning and safety checks. Queries about the appropriate permits and checks should be brought to the attention of the Supervisor or their delegate. Tasks should be executed to plan using the identified controls. Any deviations from plan should be assessed prior to proceeding with the remainder of the task. All incidents will be reported to the Supervisor or their delegate as soon as possible.

6.3 Tools Required

Supplies, Tools and Equipment			
Tool / Equipment	**Quantity**	**Tool / Equipment**	**Quantity**
Snowmobile (2), Boat or Helicopter	1	Winter/Summer/Boat Survival Gear (Set)	1
GPS/ Loaded Coordinates	2	Spare Batteries	4
Satellite Phone	1	Personal Gear (per person)	1
InReach per person	1	Wildlife Deterrents (air horn/banger kit)	1
Camera (per person)	1	Field Permit and Map	1
Radio with spare battery (per person)	1	Adjustable Wrench's	1
Forceps, Pliers, Tweezers	1	Field Sheets	14
Clean Replacement Sample Tubes	6	Pencils, Pens or Markers	2
Glass Beakers (1000 mL)	6	Large/Clear/Heavy-duty Plastic Bags or Gloves	6
High Temp Oven	1	TSS Filters	12 - 36
Fire Proof Gloves/Tongs	1	Duct Tape	12 - 36
Vice Grips	1	Snowshoes (seasonal) (pair per person) and cam straps	1

6.4 Procedural Steps

6.4.1 Pre-Deployment

Spare tubes are stored in the Environment field lab Shelf B3 with two XL nitrile gloves and plastic bag duct taped closed to prevent dust deposition. **Tubes needs to be cleaned and checked for leaks prior to storage**. To clean and check for leaks, fill spare tubes with water and leave overnight on counter in Environment Lab. If leaks are discovered tag out and make arrangements with truck shop to have them fixed.

6.4.2 Sample Collection and Deployment

Depending on location and season, samples are collected using various methods of transportation; you can walk, drive, boat, snowmobile or use a helicopter to access the various sites.

When using a Helicopter, a Hot Loading Variance is permitted (a JHA must be completed and signed off by HSE Manager). When accessing near-site stations on foot in the winter, snowshoes should be taken to provide safer access. If necessary, snowshoes can be strapped to the back of the snowmobile. The map in Figure 4 provides the Dust Gauge locations and coordinates.

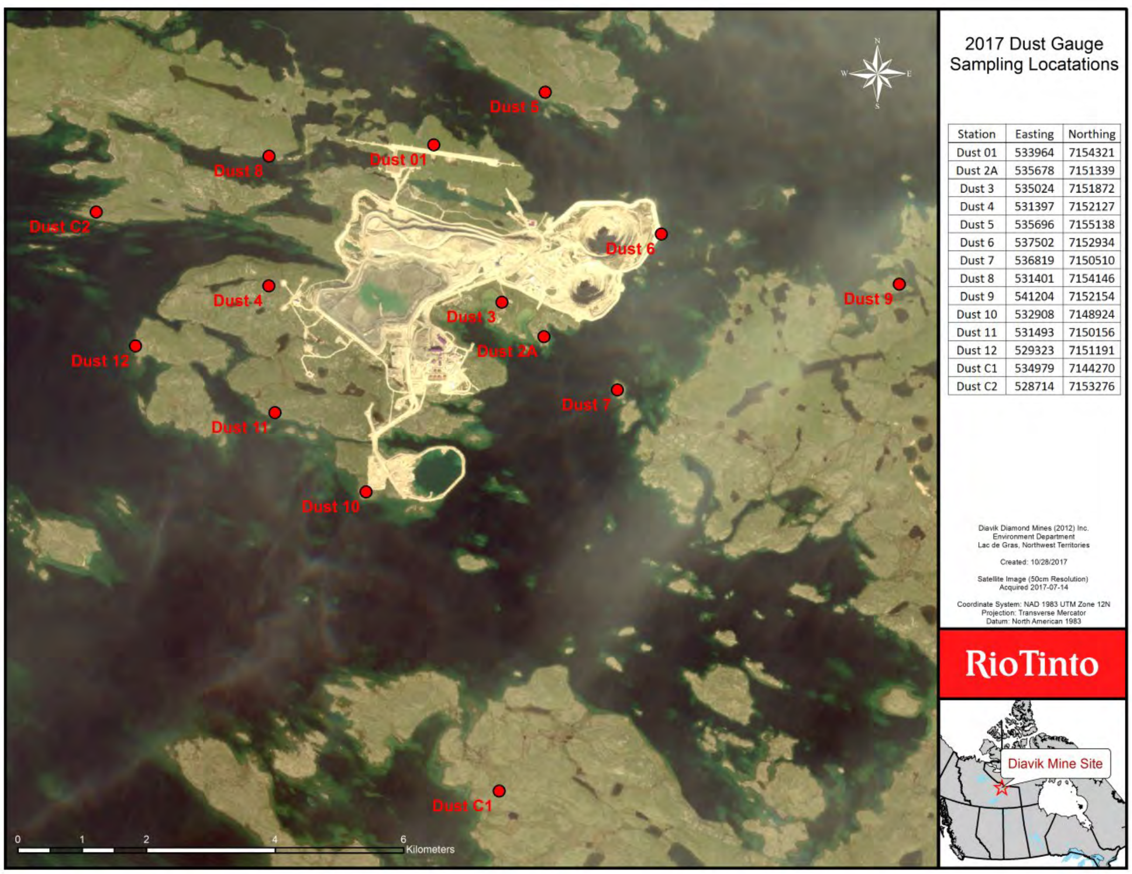


Figure 4: Dust Gauge Sites

When you arrive at the sample location, first inspect the station for damage (fiberglass tube on ground, station on angle etc.) and document anything noted on the Dust Gauge Collection Field Sheet - ENVI-178-0312.

Carefully remove the copper tube out from the center of the fiberglass shield, keeping it upright. If the tube is stuck or frozen, try wiggling it, or tapping it near the bottom. If the tube is still stuck, you may need extra leverage to free the tube and may, if absolutely necessary, use vice grips to grab the top and wiggle while pulling up. If it will not come free, you may have to remove the shield and pop the tube out. Be sure to replace the shield and insert a new tube afterwards. See Plates 1 & 2 below.

Plate 1: Tube Retrieval

Plate 2: Fiberglass Shield Removed

Once retrieved, keep the tube upright, place an extra-large latex glove over top of tube and seal with clean plastic bag and duct tape (Plate 3). Ensure tube is labelled with the station number, date and time collected. Always keep the tube upright and secure during transport.

Place a clean, leak tested tube into the fiberglass shield (the tube should be labelled with the Dust Gauge Site, deployment date and time). Note that tubes need to be *upright and secure in the base rims* in order for the sample to be considered representative. Some of the base rims are bent and the tubes will not sit in them properly. When this is the case, place rocks around the tube within the fiberglass shell to ensure that tube will stay upright. Caution should be exercised to avoid pinch points when placing rocks between the tube and shell.

Plate 3: Sealing the Tube

6.4.3 Sample Analysis

Once back in the Environment Lab, if snow is present, stand up the sample tube in a clean plastic bag (prevents sample loss if there is a leak) and allow samples to melt. Carefully transfer sample into a triple-rinsed 1000 ml glass beaker and record the total volume of water (before rinsing) on the Dust Gauge Collection Field Sheet- ENVI-178-0312. Extract all debris including bugs and twigs and be sure to triple rinse them into the beaker to capture all the dust particles. Rinse the copper tube with DI water until all dust particles are removed.

Cover the 1000 ml beaker with parafilm and store the sample in the fridge until samples can be analysed for Total Suspended Solids (ENVI-904-0119). This should be conducted as soon as possible because some solids may dissolve in water, especially after snow melt. Note that it may take multiple filters to complete one sample, and number of filters varies by season. Please refer to table 2 and use your best judgement when looking at the sample.

Table 2. Average number of filters required by season

Dust Gauge	Winter (Jan)	Spring (March)	Summer (Jun)	Fall (Sept)
1	1	2	4	2
2A	1	2	2	2
3	2	3	4	3
4	1	1	2	1
5	1	1	2	1
6	1	2	2	2
7	1	3	2	2
8	1	1	2	3
9	1	1	2	1
10	2	2	4	2
11	1	3	6	2
12	1	1	3	2
C1	1	1	1	1
C2	1	1	1	1

The resulting filter(s) with the dust particles are put into ceramic crucibles; ensure that you record the sample ID on the crucibles **in pencil** before putting them into the oven (1 filter per crucible, Plate 4). Ensure that you record the same information on the aluminium tins so that sample filters do not get mixed up.

Plate 4: Ceramic crucibles with filter

The high temperature oven is set up in the fume hood with the fan running. To avoid burns, heavy-duty fire-proof gloves and long tongs are used when placing or removing the crucibles from the oven. Filters are processed in the oven at 550 degrees Celsius for one hour. Allow oven to heat up to temperature before use. See Plates 5 & 6 below.

Plate 5: High Heat Oven

Plate 6: Fire Proof Glove and Long Tongs

When samples are removed from the oven, place the crucibles into their original labeled tin tray. Let the sample cool for at least 10 minutes before handling the tins and crucibles without heat resistant gloves. Place the tin tray into the desiccator and allow the sample to cool further for a minimum of one hour. Carefully remove the filters from their ceramic crucible using tweezers. Add any dust that has fallen off into the crucible to the top of the filter.

Weigh the filter according to the procedure outlined in the Total Suspended Solids SOP

Record the results on the Dust Gauge Data Form and in 13.14 Annual Dust Gauge Collection excel file for the given year on the P-Drive.

The dust fall deposition rate is determined using the equation below:

Daily Dust fall Deposition (mg/dm2/d) = (TP (mg) / SA (dm2)) / TDD (d)

Where:

TP (mg) = Total Particulate

SA (dm2) = Surface Area of Dust Gauge Collection Tube = (3.14*(6.25*6.25)*100)

TDD = Total Days Gauge was Deployed

Calculations are setup in the excel file. If you have any questions about entering this data contact your supervisor.

6.4.4 Quality Assurance (QA) / Quality Control (QC)

6.4.4.1 Lab Blank Samples

Anytime that dust samples are collected and subsequently analyzed, a lab blank sample must be analyzed following the same procedure.

6.4.4.2 Equipment Blank

Before dust gauge collection occurs, an equipment blank must be collected and analyzed following the procedure outlined below:

1. Remove the nitrile gloves from the copper tube and fill the tube with DI water (the amount of water not important, however, DO NOT PRE-RINSE THE TUBE)
2. Transfer the liquid into a beaker and analyze the sample as per the procedure outlined in section 6.4.3.

7 QUALITY OUTCOMES AND EXPECTATIONS

The primary objectives for implementing this SOP are:

- To safety complete the tasks outlined in this SOP, without incident.
- To produce quality, accurate and repeatable results.

APPENDIX F SNOW CORE SURVEY STANDARD OPERATING PROCEDURE (ENVI-909-0119)

RioTinto

Environment STANDARD OPERATING PROCEDURE			
Area No.:	**8000**	**Document #:**	**ENVI-909-0119**
		Revision:	**10**
Task Title:	**Snow Core Survey**		
Next Review:	**1 Year from Final Approval in Documentum**		
Effective Date:	**Date on approved stamp in footer.**		

1 REFERENCES/RELATED DOCUMENTS

1.1 ENVI-907-0119 – SOP Remote Field Safety - Located in: P:\DDMI Environment\10.0 Operational Control\10.1 SOPs\Working SOPs

1.2 ENVI-919-0119 - SOP Snowmobile - Located in: P:\DDMI Environment\10.0 Operational Control\10.1 SOPs\Working SOPs

1.3 ENVI-901-0119 - SOP General Laboratory Safety - Located in: P:\DDMI Environment\10.0 Operational Control\10.1 SOPs\Working SOPs

1.4 ENVI-902-0119 - SOP Quality Assurance and Quality Control - Located in: P:\DDMI Environment\10.0 Operational Control\10.1 SOPs\Working SOPs

1.5 ENVI-900-0119 - SOP Chain of Custody - Located in: P:\DDMI Environment\10.0 Operational Control\10.1 SOPs\Working SOPs

1.6 ENVI-904-0119 - SOP Total Suspended Solids Analysis - Located in: P:\DDMI Environment\10.0 Operational Control\10.1 SOPs\Working SOPs

1.7 ENVI-601-0916- Snowmobile Pre-Op Inspection - Located in: P:\DDMI Environment\10.0 Operational Control\10.2 Forms\Current Forms\Approved\Check Sheets

1.8 ENVI-135-0112 – Remote Field Safety Permit - Located in: P:\DDMI Environment\10.0 Operational Control\10.2 Forms\Current Forms\Approved\Remote Field Safety Plans

1.9 ENVI-177-0312 – Snow Sampling Field Sheet - Located in: P:\DDMI Environment\10.0 Operational Control\10.2 Forms\Current Forms\Approved\Water Quality Forms

Environment

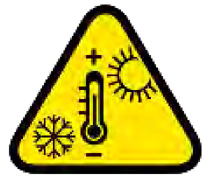
STANDARD OPERATING PROCEDURE

Snow Core Survey

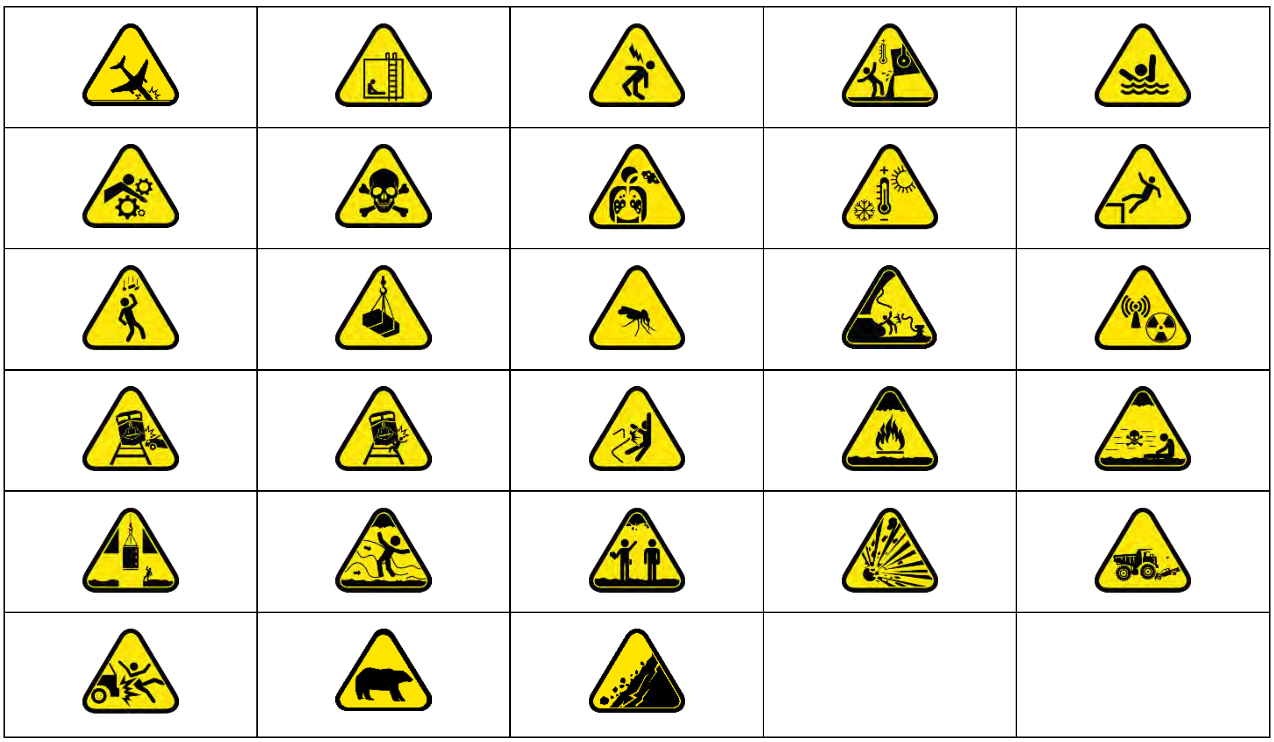
Revision History			
Revision	**Revision Description**	**Date of Revision**	**Author**
0	Original Issue	08-Feb-12	D. Grabke
1	Updated Map for 2014, added SS3-6, SS3-7, SS3-8 sample points, updated to new environment SOP format	8-Apr-14	D. Grabke
2	Format update	19-Jul-15	D. Birch
3	Format update	06-Dec-15	G.Reid
4	Format update	06-Nov-16	S. Martin-Elson
5	Format and area manager updated	20-Oct-17	S. Skinner
6	Superintendent update	10-Mar-18	S. Skinner
7	QAQC update	04-Apr-18	S. Skinner
8	Format update throughout, tables in section 4 and 6.1 updated, table 2 preservative for metals removed	25-Nov-18	S. Skinner
9	Dissolved metals added to water quality bottles to Table 2	15-Mar-18	S. Skinner
10	Annual update Changes to bottle requirements	18-Jan-20 25-Oct-20	M. Nelson A. Hehn

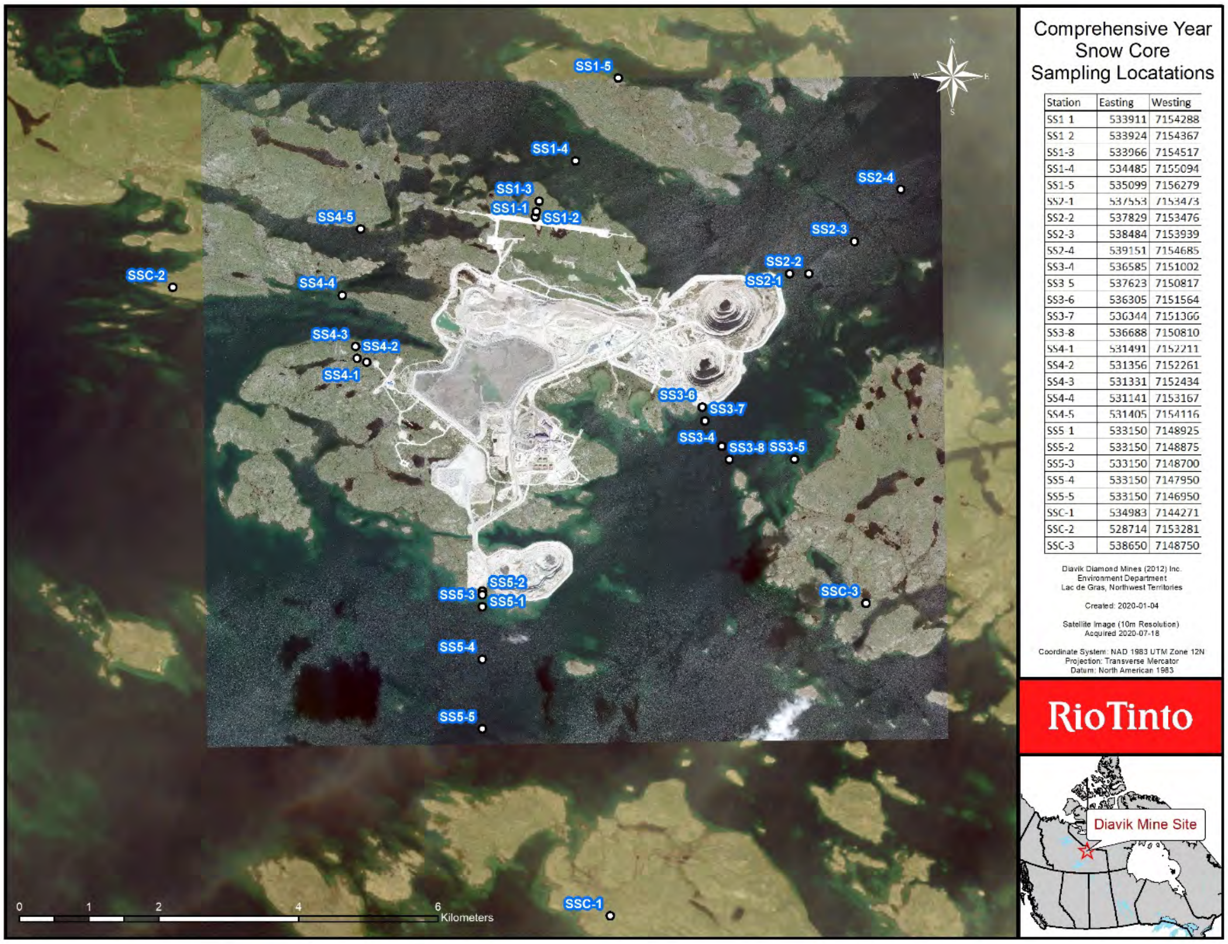
Authorized Electronically in Documentum By:	
Area Superintendent:	K. Boa-Antwi
Area Manager:	D. Patterson

CRITICAL RISKS



Other potential critical risks not currently assessed as part of this SOP





Snow Survey Sample Program Map

Description

Snow sampling at the Diavik Diamond Mine consists of snow core sampling to monitor dust deposition rates relative to predictions outlined in the DDMI Environmental Effects Report (1998), and snow water quality sampling in support of the DDMI Aquatic Effects Monitoring Program (AEMP).

2 PURPOSE

The purpose of this guide is to promote efficient and accurate snow surveying and to establish uniform sampling procedures.

3 SCOPE

3.1 Scope of Procedure

This standard operating procedure (SOP) describes the responsibilities and processes for collecting, documenting, and processing snow samples at the Diavik mine site and the surrounding Lac de Gras area (during ice cover). This procedure applies to all Diavik Diamond Mines personnel and contractor personnel authorized to collect samples under the current year's Aurora Research Institute – Aquatic Effects Monitoring Program (AEMP) Research Permit.

3.2 Scope of Activities

This procedure has been developed to be consistent with the requirements of the AEMP design document and Environmental Effects Monitoring.

4 DEFINITIONS

Definitions							
ACTS		Groundwater		PROVE		SOP	✓
AEMP	✓	JHA		QA	✓	TSS	
COC		NTU		QC	✓	TSP	
DI water	✓	PAL		Remote work		WHMIS	
DO		PFD		SDS		WLWB	
ELT		PPE		Seepage		SWE	✓

GPS	✓	Problem bear		SNP			

See: ENVI-443-0415 - Environment Term Definitions - Located in: Diavik Intranet – SOPs – Environment Folder

SWE: Snow Water Equivalent

5 RESPONSIBILITIES

See: **ENVI-444-0415 - Environment Roles and Responsibilities** - Located in: Diavik Intranet – SOPs – Environment Folder

6 PROCEDURE

6.1 Key HSEQ Aspects

Task Hazards							
Aircraft		Extreme Weather	✓	Line of Fire		Snowmobile Operation	✓
Burns		Fall into Water		Manual Labour	✓	Spills	
Chemical Contact		Falling		Noise		Sprain / Strain	✓
Confined Space		Fire		Overhead Objects		Stored Energy	
Cuts Scrapes		Firearms / Deterrents		Perception		Uneven Terrain / Ground	✓
Dehydration		Fumes / Gases		Pinch Points		Unfamiliar Area	
Electrical		Glass		Risk to Wildlife		Visibility	✓

Entanglement		**Heavy Equipment**		**Rotating Parts**		**Watercraft Operation**	
Equipment Loss or Damage	✓	**Lifting**		**Sample Loss or Damage**	✓	**Wildlife**	✓
Ergonomics	✓	**Light Vehicle**		**Slip, Trip, Fall**	✓	**Working Remotely**	✓

See: ENVI-445-0415 - Environment Hazard Definitions - Located in: Diavik Intranet – SOPs – Environment Folder

6.2 CRM Critical Risks

Critical Risk	**Critical Control**
Temperature extremes (cold)	Multiple layers, Buddy check, Remote field safety plan
Wildlife	Scans

It is the responsibility of all personnel to adhere to the high health and safety standards used at Diavik. Personnel are required to complete all pre-task planning and safety checks. Queries about the appropriate permits and checks should be brought to the attention of the Supervisor or their delegate. Tasks should be executed to plan using the identified controls. Any deviations from plan should be assessed prior to proceeding with the remainder of the task. All incidents will be reported to the Supervisor or their delegate as soon as possible.

6.3 Tools Required

Supplies, Tools and Equipment			
Tool / Equipment	**Quantity**	**Supplies**	**Quantity**
Snow Corer & Handles	1	Snow Survey Map	2
Transport Case	1	GPS & Waypoints	per person
Weighing Scale & Cradle	1	Satellite Phone	1
Sample Collection Bags & Zip Ties	20	Garmin Inreach	Per person
Black Permanent Marker	2	Survival Kit	1
Field Data Sheets	10	Ice Rescue Kit	2
Snowmobile	per person	Radio and Spare Battery	per person
Toboggan	1	Coolers	5
Camera	1		

6.4 Procedural Steps

6.4.1 Planning

6.4.1.1 Program Management:

The sampling snow survey will be completed annually in April. The survey design consists of 27 sample stations, including three control areas established along five transect lines originating from East Island and extending onto Lac de Gras (Table 1 - Snow core Sampling Locations).

Table 1 – Snow Core Sampling Locations

Transect Line	Station	UTM E (NAD 83)	UTM N (NAD 83)	Description
1	SS1-1	533911	7154288	Land
	SS1-2	533924	7154367	Land
	SS1-3	533966	7154517	Land
	SS1-4	534485	7155094	Ice
	SS1-5	535099	7156279	Ice
2	SS2-1	537553	7153473	Ice
	SS2-2	537829	7153476	Ice
	SS2-3	538484	7153939	Ice
	SS2-4	539151	7154685	Ice
3	SS3-4	536585	7151002	Ice
	SS3-5	537623	7150817	Ice
	SS3-6	536305	7151564	Ice
	SS3-7	536344	7151366	Ice
	SS3-8	536688	7150810	Ice
4	SS4-1	531491	7152211	Land
	SS4-2	531356	7152261	Land
	SS4-3	531331	7152434	Land
	SS4-4	531141	7153167	Ice
	SS4-5	531405	7154116	Ice
5	SS5-1	533150	7148925	Land
	SS5-2	533150	7148875	Land

Transect Line	Station	UTM E (NAD 83)	UTM N (NAD 83)	Description
	SS5-3	533150	7148700	Ice
	SS5-4	533150	7147950	Ice
	SS5-5	533150	7146950	Ice
Controls	SSC-1	534983	7144271	Land
	SSC-2	528714	7153281	Land
	SSC-3	538650	7148750	Land

6.4.1.2 Sampling Requirements – Dust Deposition

Dust deposition will be measured in-house using standard DDMI Total Suspended Solids (TSS) laboratory procedures ENVI-904-0119. To facilitate this analysis, a composite sample comprised of a minimum of three snow cores will be collected at **ALL** (land and ice) snow sampling stations. Water content must add up to a minimum 25cm SWE for there to be sufficient water for analysis.

> **Snow Water Equivalent (SWE)** is a measure of the water content in a snowpack. It is defined as the depth of a snowpack multiplied by the density of the snow. It represents the depth of a theoretical pool of water created from melting a known depth of snowpack. We determine SWE in the field using a snow coring tube in conjunction with a graduated scale that weighs the snow in the tube. The scale is measured in cm of water, as weight is directly contributable to water content. The scale markings are how we measure SWE. The length of core is not necessary for determining SWE when using a scale and a known tube diameter.

6.4.1.3 Sampling Requirements – Snow Water Quality

Snow water quality samples are required for all sample stations on Lac de Gras identified as **on-ice** locations, as well as at the **three control** areas (Table 1 - Snow core Sampling Locations). Snow chemistry analysis will be conducted by Bureau Veritas (BV). To facilitate the required analysis outlined in Table 2, a composite sample comprised of a minimum of three snow cores with an equivalent water depth (SWE) of at least 100 cm will be collected at all of the snow water quality stations.

Table 2- Snow Water Quality Sample Requirements

Bottle Filling Sequence	BV Bottle	Analysis	Minimum Volume of Sample Required (ml)	Preservative
1	Metals	Total ICP Metals (Ultra Low)	2x60 mL Falcon Tube	None Required
2	Metals	Dissolved ICP Metals (Ultra Low)	2x60 mL Falcon Tube	None Required
3	Mercury	Total	40 mL Glass Vial	1 ml Hydrochloric Acid - HCL
4	Nutrients	Ammonia	120 mL HDPE	1 ml Sulfuric Acid
5	Routine	Sulfates, Nitrates, and Nitrites	1000 mL HDPE	None Required
6	Ultra Low TSS, Turbidity & pH (Routine, 2nd Bottle)	TSS, Turbidity & pH	500 mL HDPE	None Required
Total Sample Volume Required			1900 ml + 25% for Triple Rinsing	**3000 ml = 100SWE**

Determining anticipated sample volume from Snow Water Equivalent (SWE)

Sample Water (ml)

=

SWE (cm representing the depth of water in the snow core tube measured by the weight of snow in the tube**)**

x

30(cm^2 representing the surface area of the snow core tube entrance**)**

Therefore:

3000ml /30cm^2 = SWE = 100cm SWE

Therefore, the aggregate Water Content SWE collected at a sample site must add up to at least 100 cm measured from the graduated scale to ensure sufficient volume for water quality analysis.

6.4.1.4 Quality Assurance and Quality Control

Quality Control (QC) will be achieved through the use of duplicate and blank samples.

Duplicate samples will be collected for a minimum 10% of the total samples (both dust and water quality samples):

- At least **three** duplicate samples for the **dust** deposition samples
- At least **three** duplicate samples for the **water quality** samples

One **equipment blank** will be collected and processed by BV for water quality chemical analysis and internally for Total Suspended Solids (TSS). BV DI water batch number will be recorded on the field sheet. Equipment blanks will be completed from a single batch of DI water. Ensure that information from the DI water is recorded on the field sheet (Batch ID and Expiry date).

Quality Assurance (QA) will be achieved via the following processes:

- Field data sheets will be utilized to document any and all observations or occurrences that may impact the integrity of the samples, as well as corrective actions implemented to address those occurrences.
- If a sample is compromised, the information will be recorded on the field data sheet, the sample will be discarded, and a new sample collected.
- Individuals collecting the samples will take precautions to eliminate sample contamination during handling. Avoid touching insides of sample bags and avoid contacting the snow samples with anything other than the sampling corer.
- Steps will be taken prior to, during, and after sampling to ensure all samples are correctly labeled with the sample date, ID, and type.

6.4.1.5 Equipment Inspection & Preparation

Prior to commencing the sampling program, inspect all sampling equipment for contamination or damage. All polyacrylic snow coring tubes that will be utilized during sampling will be rinsed with a 10% nitric acid solution to ensure they are clean prior to the initiation of the program.

Snow Corer – Inspect the core tube to ensure measurement etchings are legible. Check the cutting edge to ensure blade is not deformed or damaged. Inspect the handles and threads to ensure they will assemble and disassemble without binding. Ensure the corer has been de-contaminated (acid rinsed) prior to commencing the program.

Weighing Scale and Cradle – Inspect the scale and cradle for deformity or damage.

Snowmobiles – Inspection and use of snowmobiles will be in accordance with ENVI-919-0119.

Communication – Inspect all communication equipment (radios/sat phones, Garmin Inreach) to ensure they are operational and functional. Ensure batteries (including spares) are fully charged. Ensure check-in times and procedures are clearly identified on the Remote Field Safety Permit.

Navigation – Inspect GPS and spare batteries to ensure equipment is functioning correctly. Verify that all sample locations are present and correct, and that the GPS essentials file is loaded. Ensure an appropriate map is present to allow navigation back to site should the GPS fail.

Personal Gear – In addition to winter survival equipment, each individual participating in off-site activities is expected to carry appropriate personal gear and equipment as is deemed necessary for the individual's well-being in an emergency situation.

Survival Kit – Inspect survival kit and ice rescue kits to ensure that they are complete and all items are functional and ready for use.

Miscellaneous – Individual core samples will be placed into plastic bags (soil sampling bags) and sealed with zip-ties until they are ready for processing. Prior to sampling, ensure bags are new, clean, and leak-proof.

6.4.2 Sample Collection

The person handling the acrylic snow core tube should always wear thick, insulated gloves to minimize the heat transferred from their hands to the tube. A warmer tube will increase the likelihood that snow will melt in the tube causing sticking and making it difficult to get all snow out of the tube.

- Navigate to the sampling locations – If the sample point falls on or immediately adjacent to the winter road, adjust your location to the nearest area with natural snow coverage (i.e. not impacted by the road or snow clearing).
- Assemble the corer by threading the handles onto the tube and re-inspect the snow corer for fouling and/or damage that may have occurred during transportation.
- Fill in station location and weather information on the field data sheet. Identify snow conditions and dust observations in the comments section.
- Prior to collecting a sample, re-inspect the tube for cleanliness.
- Take the weight of the empty snow corer at each station prior to collecting any samples.
- For all stations requiring snow water chemistry, collect the dust sample first – this will effectively rinse the corer with ambient snow minimizing cross contamination from locations.
- Hold the corer vertically (cutter end down) and drive it through the snow to the ground/ice surface below. Be sure the cutter contacts the ground/ice as compacted snow/ice may feel like the ground and result in an incomplete core.
- Before raising the corer, read the depth of the snow (nearest cm) and record on the field datasheet. Turn the corer at least one full turn to cut the core loose from the ground/ice surface. Carefully raise the corer and record the length of the core extracted.

- As the length of core extracted could potentially be different from the depth of snow, inspect the cutter end of the tube for dirt or litter. With gloves on, carefully remove soil and litter from the core. If required, correct the length of the core extracted by subtracting the depth of the soil or litter (plug). Record adjusted core length and litter/soil observations on the field data sheet.
- Carefully balance the corer containing the core on the weighing cradle. Suspend the corer (like a pendulum) and do not hold the corer tube or handles. To ensure an accurate reading, gently tap the scale to be sure it is not sticking or binding. Read the weight of the tube and core from the graduations on the scale. The scale is marked in cm of water. Record the weight of the corer and the core to the nearest one-half cm.
- To transfer the core into the sample bag, lift the tube from the cradle and turn cutter end up. Gently tap the corer and the extracted core will slide out the top end. Be sure to use a clean/new sample bag to catch the core sample.
- Ensure all sample bags are clearly labelled with the station ID, sample type, date, and number of cores included in the composite.
- Ensure all bags are sealed using a clean zip-tie.
- Weigh the empty sampling tube following the first and at least every fourth sample as the weight will change as small particles of water or snow accumulate/cling to the inside and outside of the tube. Record the weight of the empty corer on the field data sheet.
- Subtract the weight of the empty tube from the weight of the tube and core to obtain the water content of the sample.
- Prior to moving to the next sampling location ensure the field datasheet is complete.

Density calculations can be completed back in the lab following the completion of the program.

Density (g/cm^3) = Total SWE Collected (g/cm^{2*}) / Total Snow Core Length Collected (cm)

***assumes pure water density $1 g/cm^3$**

6.4.3 Sample Processing

Prior to processing, all samples must be kept in a frozen state to minimize sample degradation.

When preparing the samples for decanting and analysis, remove the sample bags from the freezer. Check to ensure that the top of the bag is well twisted and the zip-tie is tight. Place the sample bag into a new (clean) sample bag and affix a zip-tie to seal the second bag. This double bagging will help to ensure no sample is lost during the melting process. To process samples, they will require 12-48 hours to thaw at room temperature.

Place the sealed sample bags upright in clean coolers in the lab to thaw overnight.

Once a sample is completely melted, it is ready for processing.

Sample volume can be determined using a scale accurate to 1g. Set up the scale by taring the sampling basin with two bags and 2 zip-ties. Place sample bags in the basin and record the weight of each of the bags on the field sheet.

Snow water quality samples will be decanted to fill the appropriate (pre-labelled) BV sample bottles as per standard water sampling procedures. Any excess sample water can be discarded.

Dust deposition samples will be processed in the DDMI Lab as per Total Suspended Solids SOP (ENVI-904-0119).

The entire volume of sample must be processed – this may require the use of multiple filters.

For samples with large quantities of organics (twigs/leaves etc.), it may be necessary to sieve the sample through a course filter prior to processing.

Given the possibility of the samples containing organic matter, sample filters will be dried in the high temperature oven (550°F) for 1hr to burn off any organics on the filter.

Allow Samples to cool in the desiccator prior to weighing the filters.

6.4.4 Sample Chain of Custody

Samples will be shipped to BV as per the Chain of Custody SOP (ENVI-900-0119) and accompanied by Chain of Custody (COC) documentation.

7 QUALITY OUTCOMES AND EXPECTATIONS

The primary objectives for implementing this SOP are:

- To safety complete the tasks outlined in this SOP, without incident.
- To produce quality, accurate and repeatable results.

APPENDIX G QUALITY ASSURANCE/QUALITY CONTROL STANDARD OPERATING PROCEDURE (ENVI-902-0119)

RioTinto

ENVIRONMENT			
STANDARD OPERATING PROCEDURE			
Area No.:	**8000**	**Document #:**	**ENVI-902-0119**
		Revision:	**8**
Task Title:	**Quality Assurance/Quality Control**		
	Supersedes: ENV SOP 303		
FOR DOCUMENT CONTROL USE ONLY:			
Next Review:	**1 year from Area Manager Authorized Signature Date below**		
Effective Date:	**See Area Manager Authorized Signature Date below**		

1 REFERENCES/RELATED DOCUMENTS

1.1 ENVI-656-0117 DDMI Environment Lab – Training – Located in: P:\DDMI Environment\10.0 Operational Control\10.13 CALA Certification\Approved Quality Manual Documents\5.2 Training

1.2 ENVI-901-0119 – SOP- General Laboratory Safety - Located in: Diavik Intranet – SOPs – Environment Folder

1.3 ENVI-900-0119 - SOP- Chain of Custody & Sample Shipping - Located in: Diavik Intranet – SOPs – Environment Folder

1.4 ENVI-133-0112 - Aquatic Effects Field Sheet - Located in: P:\DDMI Environment\10.0 Operational Control\10.2 Forms\Current Forms\Approved\Water Quality Forms

1.5 ENVI-134-0112 – 1645-19 SNP Monitoring Field Sheet – Located in: P:\DDMI Environment\10.0 Operational Control\10.2 Forms\Current Forms\Approved\Water Quality Forms

1.6 ENVI-668-0117 DDMI Environment Lab – Equipment Management - Located in: P:\DDMI Environment\10.0 Operational Control\10.13 CALA Certification\Approved Quality Manual Documents\5.5 Equipment

1.7 ENVI-669-0117 DDMI Environment Lab – Measurement Traceability - Located in: P:\DDMI Environment\10.0 Operational Control\10.13 CALA Certification\Approved Quality Manual Documents\5.6 Measurement Traceability

1.8 ENVI-653-0117 DDMI Environment Lab – Record Control - Located in: P:\DDMI Environment\10.0 Operational Control\10.13 CALA Certification\Approved Quality Manual Documents\4.13 Record Control

1.9 ENVI-650-0117 DDMI Environment Lab – Document Control - Located in: P:\DDMI Environment\10.0 Operational Control\10.13 CALA Certification\Approved Quality Manual Documents\4.3 Document Control

1.10 ENVI-904-0119 – SOP Total Suspended Solids Analysis - Located in: Diavik Intranet – SOPs – Environment Folder

1.11 ENVI-905-0119 – SOP pH Analysis - Located in: Diavik Intranet – SOPs – Environment Folder

1.12 ENVI-906-0119 – SOP Turbidity Analysis - Located in: Diavik Intranet – SOPs – Environment Folder

1.13 ENVI-918-0119 – SOP Field Meter - Located in: P:\DDMI Environment\10.0 Operational Control\10.1 SOPs\Working SOPs

Revision History			
Revision	**Revision Description**	**Date of Revision**	**Author**
0	Initial Release	01-Jan-12	D. Grabke
1	Formatting	08-Dec-15	D. Birch
2	Revision of QC schedule and measures	29-May-16	N. Goodman
3	CALA Updates	15-Dec-16	N. Goodman
4	Update to template, area manager and CRM	21-Oct-17	A. Hehn
5	Superintendent update	10-Mar-18	S. Skinner
6	Annual review	27-Feb-19	M. Nelson N. Goodman L. Case
7	Clarification on TSS LBW frequency	22-Nov-2019	N. Goodman

8	Update to QC Frequency (Section 6.3.6) Decrease LBW and LDUP frequency to every 6 days, remove various outdated CALA policies	14-Jun-2020 13-Oct-2020	A. Hehn N. Goodman

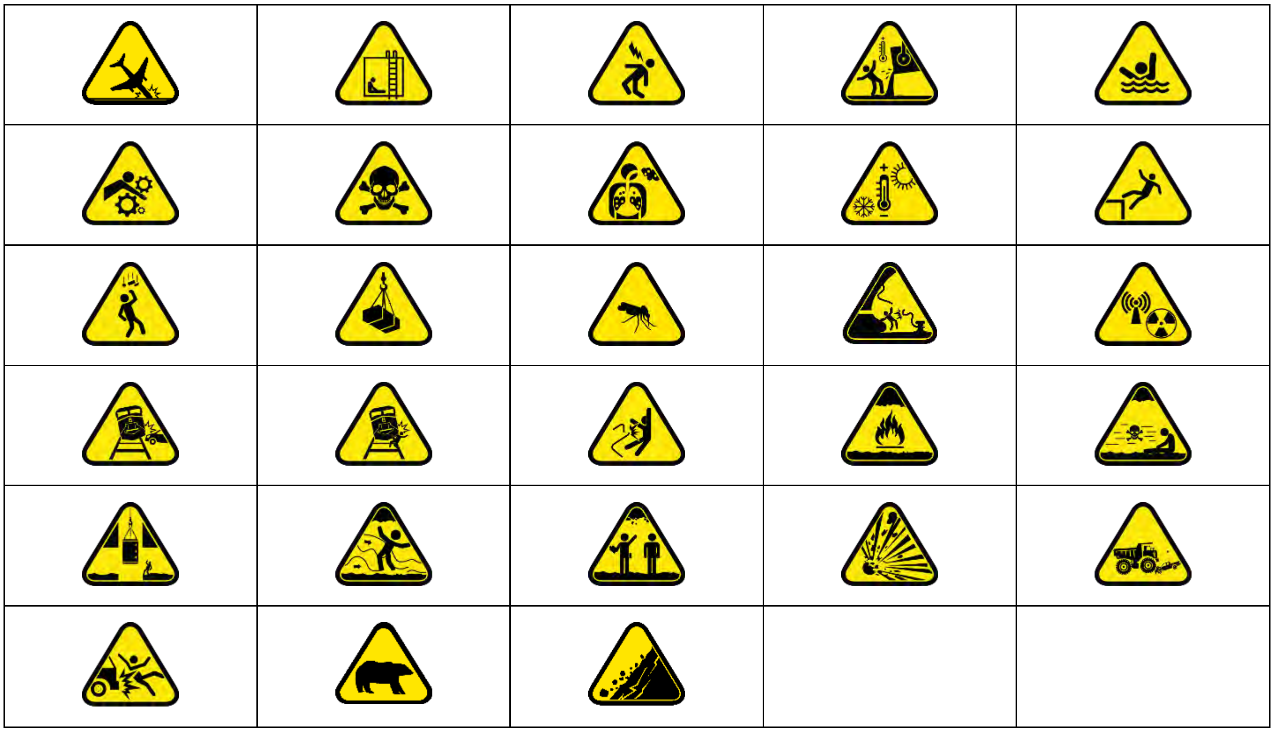
Authorized Electronically in Documentum By:	
Area Superintendent:	K. Boa-Antwi
Area Manager:	D. Patterson

(Document owners will be prompted annually to update content; however, changes may or may not result.)

CRITICAL RISKS

There are no critical risks associated with this SOP

Other potential critical risks not currently assessed as part of this SOP



Internal QA/QC
LBW
LDUPW1/ LDUPW2

External QA/QC KEY		
-1	=	EBW
-2	=	FBW
-3	=	TBW
-4	=	DUPW1
-5	=	DUPW2
-6	=	DLS

Description

This SOP reviews the quality assurance and quality control measures used to ensure best practices are being utilized while collecting and analysing samples.

2 PURPOSE

The objective of this Standard Operating Procedure (SOP) is to establish consistent and uniform criteria and procedures to be implemented for laboratory activities undertaken during water quality analysis to ensure environmental data generated and processed is scientifically valid.

This SOP is intended to define Environmental Quality Assurance (QA) and Quality Control (QC) measures in place to ensure all data generated in the DDMI Environment Laboratory shall be of known precision and accuracy, complete, representative, and comparable.

3 SCOPE

3.1 Scope of Procedure

This procedure applies to all Diavik Diamond Mines personnel and contract personnel authorized by the Environment Superintendent to collect, analyse and ship samples. All persons conducting analyses in the DDMI laboratory are required to read, understand, and fully comply with the methods outlined in the SOP for each analytical test conducted, respectively.

This procedure has been developed to be consistent with the requirements of the Rio Tinto HS & E standards.

4 DEFINITIONS

Definitions							
ACTS		Groundwater		PROVE		SOP	✓
AEMP		JHA		QA	✓	TSS	
COC	✓	NTU		QC	✓	TSP	
DI water		PAL		Remote work		WHMIS	

DO		PFD		SDS		WLWB	
ELT		PPE		Seepage			
GPS		Problem bear		SNP			

See: ENVI-443-0415 - Environment Term Definitions - Located in: Diavik Intranet – SOPs – Environment Folder

5 RESPONSIBILITIES

See ENVI-444-0415 - Environment Roles and Responsibilities - Located in: Diavik Intranet – SOPs – Environment Folder

6 PROCEDURE

6.1 Key Safety Aspects

Task Hazards							
Aircraft		Extreme Weather		Line of Fire		Snowmobile Operation	
Burns		Fall into Water		Manual Labour		Spills	
Chemical Contact		Falling		Noise		Sprain / Strain	
Confined Space		Fire		Overhead Objects		Stored Energy	

Cuts Scrapes		**Firearms / Deterrents**		**Perception**		**Uneven Terrain / Ground**	
Dehydration		**Fumes / Gases**		**Pinch Points**		**Unfamiliar Area**	
Electrical		**Glass**		**Risk to Wildlife**		**Visibility**	
Entanglement		**Heavy Equipment**		**Rotating Parts**		**Watercraft Operation**	
Equipment Loss or Damage		**Lifting**		**Sample Loss or Damage**		**Wildlife**	
Ergonomics		**Light Vehicle**		**Slip, Trip, Fall**		**Working Remotely**	

See: ENVI-445-0415 - Environment Hazard Definitions - Located in: Diavik Intranet – SOPs – Environment Folder

6.2 CRM Critical Risks

Critical Risk	Critical Control
N/A	N/A

It is the responsibility of all personnel to adhere to the high health and safety standards used at Diavik. Personnel are required to complete all pre-task planning and safety checks. Queries about the appropriate permits and checks should be brought to the attention of the Supervisor or their delegate. Tasks should be executed to plan using the identified controls. Any deviations from plan should be assessed prior to proceeding with the remainder of the task. All incidents will be reported to the Supervisor or their delegate as soon as possible.

6.3 Procedural Steps

6.3.1 Quality Assurance (QA)

Quality assurance for the environmental laboratory encompasses all quality-related activities that ensure the validity of aquatics testing and analysis and all relevant technical support. All DDMI environment personnel, from management to field laboratory technicians, are required to follow applicable quality control measures and standard operating procedures. Adherence to these documents, combined with staff vigilance, can help ensure that the analytical data and other test results collected will be acceptable as the bases for making decisions.

The DDMI laboratory ("the lab") encompasses a broad range of activities including preparation of samples for internal analytical processing, calibration and maintenance of equipment, data management, and sample handling for external analysis.

Our approach to quality assurance places an emphasis on four aspects:

- Infrastructure (instruments, testing capabilities, calibrations, SOP's)
- Control Measures (internal/external)
- Personnel (competence, ethics, and integrity)
- Data Management/Control of Non-Conforming Work

The quality of the outputs is at risk if any of these four aspects are deficient.

6.3.2 Infrastructure

6.3.2.1 Equipment

All equipment is to be maintained and operated in accordance with manufacturer instructions and SOPs. Any issues with equipment should be immediately reported to the Environment supervisor.

6.3.2.2 Calibrations

Lab equipment with the potential to impact test results are calibrated regularly. Calibrations follow a predefined schedule, and International Standard (Metric) units are used wherever possible. When performed internally, calibrations are always done in accordance with method SOPs. Reference checks are performed after calibration with secondary standards that have a different lot number from the calibration standards. All observations and maintenance actions must be reported in the QA/QC Lab Performance logbook.

The logbook must also keep record of the instrument calibration history. Calibration records for fixed and portable laboratory measuring equipment, and individual monitoring devices, shall be maintained and include dates, personnel, and specifics of calibration standards and reference solutions, such as the lot numbers for the standards used. Instrument calibration procedures and schedules are clearly outlined in individual SOP's.

6.3.3 Internal Quality Control (QC) Measures

Laboratory quality control consists of both internal and external checks on precision and accuracy of analytical results. Employees are trained in quality control and good lab practices by an experienced technician through the lab analyst certification process (ENVI-560-0616, ENVI-561-0616, ENVI-562-0616). This training is documented and saved in the Lab Analysis Competency Checklists folder (6.0) on the Environment network drive.

Best practices in water quality monitoring dictate that QC samples will comprise at least 10% of all samples analyzed, and more as required to maintain assurance of quality across homogenous sampling matrices and conditions. Due to fluctuating sample volumes the DDMI Environment department often performs more than 10% internal QC in order to ensure that any errors or sources of contamination in procedures or equipment are caught immediately.

Internal Quality Control sample types (descriptions below) consist of: Lab Blanks (LBW), Lab Duplicates (LDUPW1/LDUPW2), and Laboratory Splits (DLS). Results of Internal Quality Control samples are recorded in the current year's Internal QAQC excel document in the SNP folder of 13.3 on the Environment network drive.

6.3.3.1 Lab Blanks (LBW)

A laboratory blank is a sample comprised of deionised (DI) water, prepared in the lab, which remains in the lab for analysis. This blank is exposed to any and all reagents that are used in the analytical process and is carried through the entire analytical processes including any filtration required. Lab blanks may identify unsuspected contaminates associated with DI water purity, improper cleaning procedures, filters or air contaminants in the lab. LBWs occur every 6 days along with 6-day sampling. Lab blanks for Total Suspended Solids are performed biweekly (along with the Total Suspended Solids standard check), but can be required more frequently at supervisor discretion.

6.3.3.2 Lab Duplicates (LDUPW1/LDUPW2)

A laboratory duplicate consists of a single sample to be analyzed twice internally (using the same techniques) as though it is two separate samples. The entire lab procedure is repeated twice, using two separate aliquots of water poured from the same sample bottle. Lab duplicates evaluate analytical precision and sample homogeneity, as well as consistency of lab and operator procedures. LDUPW1/LDUPW2s occur every 6 days along with 6-day sampling.

*in Monitor Pro 5 (MP5), under regular sample data entry, the sample that is to be the LDUP is assigned a sample type of "LDUPW1". Then, in the data entry section for that day's LDUP QAQC, the corresponding sample site is to be assigned a sample type of "LDUPW2".

6.3.3.3 Allowable Discrepancy Limits between LDUPWs

If the relative percent difference (RPD) exceeds 20% when analyte concentrations are ≥ 5 times the detection limit (DL), the environment supervisor must be informed so that the data can be flagged and sampling/analytical methods and instrumentation performance can be reviewed. Relevant DLs for DDMI laboratory analysis are:

- TSS – 2.0mg/L
- Turbidity – 0.15 NTU
- Conductivity – 1.1uS/cm
- pH has no applicable detection limit.

6.3.3.4 Laboratory Splits (DLS)

A laboratory split consists of a single sample divided into two aliquots, one to be analyzed internally, and the other to be sent to an external lab using the same techniques to analyze their aliquot so that the two results would be compared. Variability of results must be considered carefully in light of analyte hold times. RPD between duplicate samples will be assessed by environment supervisor.

6.3.3.5 Equipment Blanks,

An aliquot of DI water is subjugated, in the DDMI Environmental Laboratory, to all aspects of sample collection and analysis, using the same procedures that are utilized in the field, including contact with all sampling devices and apparatus (e.g. tubing, jars, samplers, filters). The purpose of the equipment blank is to determine if the sampling devices and apparatus for sample collection have been adequately cleaned before they are utilized at the field sampling location

6.3.4 Internal QC Scheduling

DDMI Environment internal QC falls under two schedules: Station-Dependent Internal QC. Station-Dependent Internal QC is tied to different sample matrices and is included in regular sampling schedules in MP5 (ex. samplers will be required to complete one DLS every four PKC sampling events, i.e., quarterly).

Station-Dependent Internal QC	QC Frequency per sampling event

Sample Matrix	Sampling Event Frequency*	DLS	LDUP/LBW
Ponds	Monthly	none	none
Diffuser	Monthly	none	none
PKC	Monthly	1 in 4	none
UG /clarifiers	Biweekly	none	none
NIWTP Influent/Effluent	6 days	none	Every event

*Note that sampling frequency refers to the frequency with which the entire set of samples is taken, and not the number of sites sampled (ex. the monthly pond sampling includes **10** sample sites but comprises **1** sampling event).

As of November 2019 all Internal QC is station dependent since LBWs and LDUPs are only completed on 6-day samples. All QC sampling is scheduled along with a specific station sampling event from now on.

6.3.5 External Quality Control (QC) Measures

External QC samples comprise ~ 10% of all samples analyzed and are spaced across sampling matrices and sample events to capture as much process homogeneity as possible. With the exception of Trip Blanks (TBW, below), external quality control samples are prepared by DDMI Environment staff, who subject them to the relevant procedures. All external QC samples are then shipped off-site to a qualified external laboratory, where all analysis is conducted.

External QC sample types consist of Trip Blanks (TBW), Equipment Blanks (EBW), Field Blanks (FBW), and Duplicates (DUPW1/DUPW2). Results of external Quality Control samples are reported in monthly SNP reports and reviewed by Environment supervisors.

6.3.5.1 Trip Blanks (TBW)

A Trip Blank is an aliquot of laboratory grade distilled water, which is received from an external lab, in the same type of container that is required for the analytical test. The trip blank is sealed and labelled in the external lab from which it originates. Upon our receipt of the trip blanks they are to be stored, sealed, at ~ 4°C until such a time as they are to be utilized (no longer than 1 month). When utilized, trip blanks travel with the sampling cooler from the laboratory to the sampling site and back to the laboratory without being opened. The trip blank is then packaged and shipped to the originating laboratory to be analyzed. The purpose of the trip blank is to verify that no sample contamination occurred during transportation or sampling operations. Trip blanks are ordered from BV every month by Environment Supervisor.

6.3.5.2 Equipment Blanks (EBW)

An aliquot of DI water is subjected, in the Environment laboratory, to all aspects of sample collection and analysis, using the same procedures that are utilized in the field, including contact with all sampling devices and apparatus (e.g. tubing, jars, samplers, filters). The purpose of the equipment blank is to determine if the sampling devices and apparatus for sample collection are a source of contamination in the samples.

6.3.5.3 Field Blanks (FBW)

An aliquot of DI water is subjected, in the field, to all aspects of sample collection and analysis, using the same procedures that are utilized in the field, including contact with all sampling devices and apparatus (e.g. tubing, jars, samplers, filters). The purpose of the field blank is to demonstrate that sample contamination has not occurred during field sample collection and processing.

6.3.5.4 Duplicates (DUPW1/DUPW2)

Duplicate samples are independent samples collected as close as possible to the same point in space and time and are intended to assess precision of the entire program (field and laboratory components). The use of replicates for this purpose assumes that the variability between DUPW1 and DUPW2 is affected by the sampling method or technician. In most cases natural variability between samples collected in close succession will be low. When performing duplicate samples, the second sample will consist of each bottle that is regularly collected for that station, including the DDMI internal routine bottle.

*in MP5, under regular sample data entry, the sample that is to be the DUPW is assigned a sample type of “DUPW1.” Then, in the data entry section for that day’s DUPW QC, the corresponding sample site is to be assigned a sample type of “DUPW2.”

6.3.6 External QC Scheduling

DDMI Environment external QC is entirely station-dependent, and QC types have different frequencies for each sample matrix that are programmed into MP5.

External QC	QC Frequency per sampling event	

Sample Matrix*	Sampling Frequency	DUPW	FBW	TBW	EBW	Total % External QC (all types)
Ponds	Monthly	1 in 2	1 in 6	1 in 6	1 in 3	**12.7**
Reference Lakes	Biannual	None	None	None	1 in 2	**12.5**
Diffuser	Monthly	1 in 1	1 in 6	1 in 6	1 in 3	**11.5**
PKC	Monthly	1 in 4	1 in 12	1 in 12	n/a	**10.4**
UG /clarifiers	Biweekly	1 in 6*	1 in 6	1 in 12	n/a	**10.4**
A21 Dewatering	Biweekly	1 in 24	1 in 24	1 in 24	n/a	**11.5**
NIWTP Influent/Effluent	6 days	1 in 6	1 in 12	1 in 12	n/a	**10.9**
Total QC type per month**		**2.75**	**2.25**	**1.0**	**0.58**	**6.58 QC/month**

*Every other DUPW event is assigned to a clarifier sample in MP5 QAQC Schedule

Again, note that sampling frequency refers to the frequency with which the entire set of samples is taken, and not the number of sites sampled (e.g., the monthly pond sampling includes **10 sample sites but comprises **1** sampling event.)

6.4 Data Management

6.4.1 External Sample Tracking – Chain of Custody

All samples collected, packaged and shipped to external laboratories are tracked via Chain of Custody (CoC) documentation. The CoC record is used to document change in possession from sampling to delivery to receipt by the external analytical laboratory. CoC procedures are clearly outlined in ENVI-900-0119 – SOP - Chain of Custody.

6.4.2 Internal Sample Tracking

All samples collected are documented in Monitor Pro 5 on the Environment iPads as per the regular sampling schedule.

6.4.3 Data Recording/Record Keeping

Internal QAQC data is uploaded to MP5 and recorded in the current year's internal QAQC excel document in the SNP folder of 13.3 on the Environment network drive. External QAQC data is uploaded to MP5 upon receipt from BV Labs.

6.4.4 Data Reporting

Immediately following laboratory analyses, all records are transferred from the applicable field sheets, to their respective electronic databases.

Laboratory supervisors will regularly review the electronic databases to ensure that laboratory recordkeeping meets the aforementioned elements. Results can then be queried and exported as required from MP5 for reporting purposes.

6.5 Control of Nonconforming Testing and/or Calibration Work

Environment supervisors are responsible for management of nonconforming work, evaluation of non-conformance significance, and prescribing of corrective actions. Nonconforming testing and/or calibration work should be shared with all Environment lab staff.

6.5.1 Continual Improvement

The laboratory shall continually improve the effectiveness of its QAQC system and produced data through the use of the quality policy, quality objectives, audit results, analysis of data, corrective and preventive actions and management review.

6.6 Personnel

6.6.1 Competency – Certification of Analyst Proficiency

Certification of Analyst Proficiency is the process for assessing and recognizing the technical competence and the effective quality processes of the DDMI Environment Laboratory and staff.

Staff proficiency means that an individual is capable of performing specified test methods and procedures correctly, and familiar with all related policies and procedures pertaining to lab quality.

Staff will be trained and tested so as to document their competence for the range of activities they will be expected to perform in the lab, in accordance with all method SOPs. This documentation is saved in the lab analysis competency checklists folder of 6.0 in the Environment network drive.

6.6.2 Ethics

Ethics is a set of moral principles, code for right and wrong, or behaviour which conforms to acceptable professional practices.

All employees at all times shall conduct themselves in an honest and ethical manner.

Examples of unethical behaviour include but are not limited to the following:

- Improper manipulation of data or software
- Improper handling of data errors, non-compliant data, or QC outliers
- Lack of reporting unethical behaviour of others
- Artificially fabricating results
- Misrepresenting data such as peak integration, calibration, tuning, or system suitability
- Improper clock setting to meet holding times
- Intentional deletion of non-compliant data

An employee must report any suspected unethical behaviour or fraudulent activities to the Environment Supervisor.

7 QUALITY OUTCOMES AND EXPECTATIONS

The primary objectives for implementing this SOP are:

- To safety complete the tasks outlined in this SOP, without incident.
- To produce quality, accurate and repeatable results.

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