Howse Property Annual Report

April 2022 - March 2023 Activities

TATA

June 2023

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1 HOWSE PROPERTY PROJECT UPDATE

As of March 31st, 2023, Tata Steel Minerals Canada (TSMC) has not started any work, including any construction activities, on the Howse Property Project. Pre-construction activities are being planned and compliance obligations towards the provincial release are being prepared. As per the Annual Report requirement of the Howse Property Iron Mine Project Decision Statement issued in June 2018, the present report covers the pre-construction phase for the reporting period of April 1st, 2022, to March 31st, 2023.

A Table of Concordance for Conditions is provided at the end of the text.

2 GENERAL CONDITIONS

Section 2 covers Conditions 2.1-2.13

As per condition 2.12 the Wetland Monitoring Plan was modified (see Section 4.2 for details) and request for feedback was forwarded via email to members of all five Indigenous groups on September 14th, 2018, with the invitation to submit comments. No feedback was received, from April 2022 to March 2023 regarding modifications to the wetland monitoring plan submitted in 2018.

No other updates were made to the follow-up programs and there has been no changes to the project during the reporting year.

As per Condition 2.10, TSMC's landing webpage went live in February 2021. TSMC's Howse Annual Reports for the years 2019, 2020 and 2021 are available through this medium

3 FISH AND FISH HABITAT

3.1 Erosion and sediment control

TSMC's Environment team conducted revegetation trials at the Pinette Lake well pad in 2020. Willow cuttings were planted in exposed areas in an effort to mitigate erosion at this site. The survival rate of the cuttings exceeded 80% and cuttings have continued to grow over the years, showing that this revegetation approach could be implemented successfully in the Howse Project area. Currently, there is no deposition of deleterious substances in waters frequented by fish in relation to the Howse Property Project, which is not started.

3.2 Follow Up Program

3.2.1 Surface Water Quality

Surface water quality samples were taken between June 14th and October 30th, 2022 for four quarters (taken at least 1 month apart). These samples are collected as a part of the baseline monitoring of surface water quality for the Water Chemistry Analysis Program in the creeks and lakes potentially affected once the Howse project will go into the construction and subsequently into the mining phase. The locations sampled are Triangle Lake (TL), Burnetta Creek (BC), Burnetta Lake (BL), Morley Lake (ML), Pinette Lake (SW5) and 4 points along Goodream Creek and its tributaries (SW1,2,3 and 4) which are located into the watersheds that might be affected by Howse operations.

Sampling results for the baseline surface water quality monitoring are presented in Appendix I.

3.2.2 Lake Water Levels

Lake water levels were not measured in 2022 as no activities that could cause impact on the lakes were performed.

Upon visiting the stations in early summer 2022, it was noted that the station at O'Nelly Lake had been damaged with a probe cord cut and a missing barometer, likely as a result of bear interaction or vandalism. The material required to reinstall the station has been received and will be reinstalled in a less accessible area prior to the start of construction.

3.3 Groundwater Levels

Groundwater levels in the wells on the Howse Property were not measured in 2022 since construction was not started and no activities impacting the deep aquifer occurred.

4 MIGRATORY BIRDS

4.1 Bank Swallow

No Bank Swallows were observed in the designated Howse project area or in any of the surrounding areas between April 1st, 2022, to March 31st, 2023.

4.2 Howse Wetland Monitoring (avifauna habitat)

Wetland levels were not measured in 2022 as no activities that could cause impact on the wetlands were performed.

A Wetland Monitoring Campaign was carried out in Summer 2022 by Groupe Hemispheres, in anticipation of construction activities to begin in the next years. The report is included in Appendix 2.

5 HEALTH AND SOCIO-ECONOMIC CONDITIONS OF INDIGENOUS PEOPLES

5.1 Air Quality

TSMC's Follow up program for air quality is set to be implemented from the start of construction to the end of decommissioning of the Designated Project.

Following multiple consultations with community leadership from the Schefferville-Matimekush-Kawawachikamach area, and in order to minimize any exposure risks for workers and for community members, TSMC took the following measures which also had a positive effect on air quality. These measures remained effective throughout the reporting period:

- Prevented any unauthorized workers from leaving the site to go to Schefferville except to board outgoing charter or to reach in-town accommodations.
- Incoming and outgoing flights were limited to once every two weeks; subsequently, rotations were extended to every three weeks during the winter period.
- Optional bus service is provided to local workers in order to minimize the number of personal vehicles travelling to site.

5.2 Country Foods

Under the Country Food Follow Up Plan, TSMC is committed to duplicating the Country Foods sampling program 2 years after the commencement of the Howse Operations phase and, subsequently, every five years for the duration of the operations phase.

6 CURRENT USE OF LANDS AND RESOURCES FOR TRADITIONAL PURPOSES

6.1 Bypass roads

Upgrade work on the Howse bypass road has not started yet and no upgrade was done on the Direct Shipping Ore 4 bypass road during the reporting period

6.2 Caribou

TSMC no longer has a formal arrangement to receive caribou data. TSMC is currently in discussion with Caribou Ungava to resume the agreement. No data is available for the reporting year.

6.3 Communication

TSMC communicated progress and high-level results of its current monitoring programs to Indigenous groups during its Joint Community Health, Safety and Environment Committee meetings, held in this reporting period on October 27, 2022.

7 PHYSICAL AND CULTURAL HERITAGE AND STRUCTURES, SITES OR THINGS OF HISTORICAL, ARCHAEOLOGICAL, PALEONTOLOGICAL OR ARCHITECTURAL SIGNIFICANCE

All conditions pertaining to Conditions 7.1-7.6 were respected during the reporting year.

8 CUMULATIVE EFFECTS

As the Howse Project is not yet in the Construction Phase, this requirement is not yet in place.

9 ACCIDENTS AND MALFUNCTIONS

There were no incidents on the Howse Property during the reporting year.

9.1 Communication Plan

No changes were made to the Communication Plan during the reporting year.

10 SCHEDULES AND RECORD KEEPING

Conditions 10.1-10.4 of the Howse Property Decision Statement indicate how the Proponent will submit to the Agency schedules associated with the Howse Property Project after the start of construction. Currently, this is not applicable, as the construction phase has not started.

TSMC has maintained all records required to demonstrate compliance with the conditions of the release of the Howse Property Project.

The Annual Report requirements under conditions 2.8 and 2.9 of the Howse Property Iron Mine Project Decision Statement issued in June 2018 are presented below for the reporting period of April 1st, 2022 to March 31st, 2023.

Table of Concordance for Conditions

	CEAA Release Condition	2022-2023 Activities
2. General Conditions		
2.1	The Proponent shall ensure that its actions in meeting the conditions set out in this Decision Statement are considered in a careful and precautionary manner, promote sustainable development, are informed by the best information and knowledge available at the time the Proponent takes action, including community and Indigenous traditional knowledge, are based on methods and models that are recognized by standard-setting bodies, are undertaken by qualified individuals, and have applied the best available economically and technically feasible technologies.	▪ TSMC is committed to follow best practices for all its activities.
2.2	The Proponent shall, where consultation is a requirement of a condition set out in this Decision Statement:	▪ TSMC is committed to follow this requirement for all consultation activities.
	2.2.1 provide a written notice of the opportunity for the party or parties being consulted to present their views and information on the subject of the consultation;	
	2.2.2 provide sufficient information on the scope and the subject matter of the consultation and a reasonable period of time to permit the party or parties being consulted to prepare their views and information;	
	2.2.3 undertake an impartial consideration of all views and information presented by the party or parties being consulted on the subject matter of the consultation; and	
	2.2.4 advise in a timely manner the party or parties being consulted on how the views and information received have been considered by the Proponent.	
2.3	The Proponent shall, where consultation with Indigenous groups is a requirement of a condition set out in this Decision Statement, communicate with each Indigenous group with respect to the manner by which to satisfy the consultation requirements referred to in condition 2.2, including methods of notification, the type of information, the period of time to be provided when seeking input, the process to be used by the Proponent to undertake impartial consideration of all views and information presented on the subject of the consultation, the period of time to advise Indigenous groups of how their views and information were considered by the Proponent and the means by which Indigenous groups will be advised.	▪ TSMC is committed to follow this requirement for all consultation activities.
2.4	The Proponent shall, where a follow-up program is a requirement of a condition set out in this Decision Statement, determine the following information, for each follow-up program:	▪ Existing follow-up programs for TSMC's DSO and Howse sites, include this information.
	2.4.1 the methodology, location, frequency, timing and duration of monitoring associated with the follow-up program;	
	2.4.2 the scope, content and frequency of reporting of the results of the follow-up program;	
	2.4.3 the levels of environmental change relative to baseline conditions that would require the Proponent to implement modified or additional mitigation measure(s), including instances where the Proponent may require Designated Project activities to be stopped; and	
	2.4.4 the technically and economically feasible mitigation measures to be implemented by the Proponent if monitoring conducted as part of the follow-up program shows that the levels of environmental change referred to in condition 2.4.3 have been reached or exceeded.	
2.5	The Proponent shall submit the information referred to in condition 2.4 to the Agency prior to the implementation of each follow-up program. The Proponent shall update that information in consultation with Indigenous groups and relevant authorities during the implementation of each follow-up program, and shall provide the updated	▪ No updates were done on the follow-up program during this reporting year.

	CEAA Release Condition	2022-2023 Activities
	information to the Agency, Indigenous groups and relevant authorities within 30 days of the information being updated.	
2.6	The Proponent shall, where a follow-up program is a requirement of a condition set out in this Decision Statement:	▪ Follow-up programs for the Howse Project were submitted to the Agency and Indigenous groups in Spring 2018. Follow-up programs will be implemented when the construction will start.
	2.6.1 conduct the follow-up program according to the information determined pursuant to condition 2.4;	
	2.6.2 undertake monitoring and analysis to verify the accuracy of the environmental assessment as it pertains to the particular condition and/or to determine the effectiveness of any mitigation measure(s);	
	2.6.3 determine whether modified or additional mitigation measures are required based on the monitoring and analysis undertaken pursuant to condition 2.6.2; and	
	2.6.4 if modified or additional mitigation measures are required pursuant to condition 2.6.3, implement these mitigation measures in a timely manner and monitor them pursuant to condition 2.6.2.	
2.7	Where consultation with Indigenous groups is a requirement of a follow-up program, the Proponent shall discuss with each Indigenous group opportunities for the participation of that Indigenous group in the implementation of the follow-up program, including the analysis of the follow-up results and whether modified or additional mitigation measures are required, as set out in condition 2.6.	▪ TSMC is committed to follow this requirement for all consultation activities.
2.8	The Proponent shall, commencing in the reporting year during which the Proponent begins the implementation of the conditions set out in this Decision Statement, prepare an annual report that sets out:	▪ TSMC has produced an annual report for its 2018-2019, 2019-2020, 2020-2021 and 2021-2022 activities; and the current report covers 2022-2023 activities.
	2.8.1 the activities undertaken by the Proponent in the reporting year to comply with each of the conditions set out in this Decision Statement;	
	2.8.2 how the Proponent complied with condition 2.1;	
	2.8.3 for conditions set out in this Decision Statement for which consultation is a requirement, how the Proponent considered any views and information that the Proponent received during or as a result of the consultation;	
	2.8.4 the information referred to in conditions 2.4 and 2.5 for each follow-up program;	
	2.8.5 the results of the follow-up program requirements identified in conditions 3.6, 4.7, 4.8, 5.9, 5.10, 6.6, 6.7, and 7.5; and	
	2.8.6 any modified or additional mitigation measures implemented or proposed to be implemented by the Proponent, as determined under condition 2.6.	
2.9	The Proponent shall submit to the Agency the annual report referred to in condition 2.8, including an executive summary in both official languages, no later than June 30 following the reporting year to which the annual report applies.	▪ TSMC is committed to comply with this condition
2.10	The Proponent shall publish on the Internet, or any medium which is publicly available, the annual reports and the executive summaries referred to in conditions 2.8 and 2.9, the dust management strategy referred to in condition 5.7, the communication plan referred to in condition 6.8, the cultural heritage control plan referred to in condition 7.6, the communication plan referred to in condition 9.5, the schedules referred to in conditions 10.1, and 10.2, and any update(s) or revision(s) to the above documents, upon submission of these documents to the parties referenced in the respective conditions. The Proponent shall keep these documents publicly available for 25 years following the end of operation, or until the end of decommissioning of the Designated Project, whichever comes first. The Proponent shall notify the Agency and Indigenous groups of the availability of these documents within 48 hours of their publication.	▪ Annual reports have been placed on TSMC's website: https://www.tatasteelcanada.com/

	CEAA Release Condition	2022-2023 Activities
2.11	The Proponent shall notify the Agency and Indigenous groups in writing no later than 60 days after the day on which there is a transfer of ownership, care, control or management of the Designated Project in whole or in part.	▪ TSMC is committed to comply with this condition.
2.12	The Proponent shall consult with Indigenous groups prior to initiating any material change(s) to the Designated Project that may result in adverse environmental effects and shall notify the Agency in writing no later than 60 days prior to initiating the change(s).	▪ There were no changes to the Designated Project in the reporting year.
2.13	In notifying the Agency pursuant to condition 2.12, the Proponent shall provide the Agency with a description of the potential adverse environmental effects of the change(s) to the Designated Project, the proposed mitigation measures and follow-up requirements to be implemented by the Proponent and the results of the consultation with Indigenous groups.	▪ TSMC is committed to comply with this condition.
3. Fish and fish habitat		
3.1	The Proponent shall implement erosion and sedimentation control measures within the Designated Project area during all phases of the Designated Project to avoid the deposit of deleterious substances in waters frequented by fish.	▪ There is no deposition of deleterious substances in waters frequented by fish in relation to the Howse Property Project, which is not started.
3.2	The Proponent shall collect site runoff and pit dewatering water into HowseA and Timmins4 sedimentations ponds. The Proponent shall treat water at the sedimentation ponds prior to its discharge into the environment, if necessary, to meet the requirements of subsection 36(3) of the Fisheries Act.	▪ Not applicable, as the Project has not started.
3.3	The Proponent shall use a time delay blasting technique when blasting.	▪ Not applicable as there is no activity, including blasting, on the Howse Property.
3.4	The Proponent shall not set the blast charge per delay to above 1092 kilograms.	▪ Not applicable as there is no activity, including blasting, on the Howse Property
3.5	The Proponent shall manage waste rock acid generation taking into account the Mine Environment Neutral Drainage program's *Prediction Manual for Drainage Chemistry from Sulphidic Geological Materials*.	▪ TSMC is committed to comply with this condition once the Project starts.
3.6	The Proponent shall develop, prior to construction, a follow-up program to verify the accuracy of the environmental assessment as it pertains to fish and fish habitat and to determine the effectiveness of mitigation measures referred to in conditions 3.1 to 3.5. The Proponent shall provide the follow-up program to the Agency prior to construction. The Proponent shall implement the follow-up program from the start of construction to the end of decommissioning. The Proponent shall review and update the follow-up program in consultation with Indigenous groups and relevant authorities and shall provide this update to the Agency prior to operation or within 120 days of the issuance of this Decision Statement, whichever comes first. As part of the follow-up program, the Proponent shall:	▪ Follow-up programs for the Howse Project were submitted to the Agency and Indigenous groups in Spring 2018.
	3.6.1 monitor water quality and quantity parameters as per the Water Management Plan (October 2015) in the environmental impact statement and at locations outlined in figure 1 of the Proponent's final response to Information Request 106 (July 24, 2017), including:	▪ TSMC is committed to comply with this condition, see below.
	3.6.1.1 water levels in Triangle Lake, Morley Lake, Burnetta Lake and Pinette Lake;	▪ Water gauges were installed at these locations in fall 2017 ▪ Data collection was not done

	CEAA Release Condition	2022-2023 Activities
		in 2022, but will resume once construction starts.
	3.6.1.2 groundwater levels at monitoring well locations outlined in figure 1 or equivalent locations where groundwater may be impacted by the Designated Project;	▪ Additional monitoring well will be installed at the beginning of the construction phase near Triangle Lake.
	3.6.1.3 iron concentration at the final discharge points of the HowseA and Timmins 4 sedimentation ponds;	▪ Not applicable, as the Project has not started.
	3.6.1.4 effluent quality at the final discharge points of the HowseA and Timmins 4 sedimentation ponds, in accordance with the Metal Mining Effluent Regulations and taking into account the Canadian Council of Ministers of the Environment's Water Quality Guidelines for the Protection of Aquatic Life; and	▪ Not applicable, as the Project has not started.
	3.6.1.5 water quality between the HowseA sedimentation pond final discharge point and Triangle Lake, and in Triangle Lake, Burnetta Lake and Pinette Lake.	▪ Not applicable, as the Project has not started.
	3.6.2 update the hydrogeological groundwater model from the Proponent's final response to Information Request 106 (July 24, 2017) at the end of mining phases I, II and III based on the results from 3.6.1; and	▪ Updates will be done following the mining phases.
	3.6.3 monitor fish and fish habitat in Triangle Lake, Burnetta Lake, Pinette Lake and Goodream Creek.	▪ Not applicable, as the Project has not started.
4. Migratory birds		
4.1	The Proponent shall carry out the Designated Project in a manner that protects migratory birds and avoids harming, killing or disturbing migratory birds or destroying, disturbing or taking their nests or eggs. In this regard, the Proponent shall take into account Environment and Climate Change Canada's Avoidance Guidelines. The Proponent's actions when taking into account the Avoidance Guidelines shall be in compliance with the Migratory Birds Convention Act, 1994 and with the Species at Risk Act.	▪ Not applicable, as the Project has not started.
4.2	The Proponent shall have a qualified individual survey, during operation, the mine pit walls annually during the nesting period to determine if bank swallows (Riparia riparia) are using the open pit as a nesting site. The Proponent shall conduct an additional survey one to two days prior to undertaking any new activity associated with the Designated Project during the nesting period areas where bank swallows (Riparia riparia) may occur. The Proponent shall identify, in consultation with Environment and Climate Change Canada and other relevant authorities, and implement a setback distance in which no Designated Project activity shall take place around any bank swallow (Riparia riparia) nest(s) found and shall maintain the setback distance until the young have permanently left the area of the nest. The Proponent shall implement additional measures to deter bank swallows (Riparia riparia) from nesting in the area prior to the next breeding period.	▪ Not applicable as the operations phase has not begun at Howse.
4.3	The Proponent shall notify Environment and Climate Change Canada if it finds bank swallow (*Riparia riparia*) nests within the Designated Project area.	▪ Bank Swallow were not observed in the Howse Property area during the reporting year.
4.4	The Proponent shall control lighting required for the construction, operation and decommissioning of the Designated Project, including direction, timing and intensity, to avoid adverse effects on migratory birds, while meeting health and safety requirements.	▪ Not applicable as construction activities have not begun at Howse.
4.5	The Proponent shall prohibit vehicles and heavy equipment associated with the Designated Project from entering wetlands except those affected by components of the Designated Project as identified in figure 7-33 of the environmental impact statement.	▪ No vehicles and/or heavy equipment entered wetlands during the reporting year.

	CEAA Release Condition	2022-2023 Activities
4.6	The Proponent shall not undertake vehicle, machinery and equipment cleaning, fueling and maintenance and shall not store substance with the potential to cause harmful effects to the receiving environment, within 20 metres of any wetland.	▪ This was respected in the reporting year.
4.7	The Proponent shall develop, prior to construction and in consultation with relevant authorities, a follow-up program to determine the effectiveness of all mitigation measures to avoid harm to migratory birds, their eggs and nests. The Proponent shall provide the follow-up program to the Agency prior to construction. The Proponent shall implement the follow-up program during all phases of the Designated Project. The Proponent shall review and update the follow-up program in consultation with Indigenous groups and relevant authorities and shall provide this update to the Agency prior to operation or within 120 days of the issuance of this Decision Statement, whichever comes first. As part of the follow-up program, the Proponent shall:	▪ Follow-up programs for the Howse Project were submitted to the Agency in Spring 2018.
	4.7.1 conduct migratory bird surveys in the Triangle Lake, Burnetta Lake and Pinette Lake watersheds every year for the first three years following completion of construction. After three years, the Proponent shall determine, in consultation with Indigenous groups and relevant authorities, the frequency of additional surveys based on the results of the follow-up program.	▪ Not applicable at this time.
4.8	The Proponent shall develop, prior to construction, and implement a follow-up program to verify the predictions of the environmental assessment as it pertains to the adverse environmental effects of the Designated Project on wetland functions that support migratory birds, and to determine the effectiveness of the mitigation measures referred to in conditions 4.5 and 4.6 during all phases of the Designated Project. The Proponent shall provide the follow-up program to the Agency prior to construction. The Proponent shall review and update the follow-up program in consultation with Indigenous groups and Environment and Climate Change Canada and shall provide this update to the Agency prior to operation or within 120 days of the issuance of this Decision Statement, whichever comes first. As part of the follow-up program, the Proponent shall:	▪ This condition was complied with.
	4.8.1 have a qualified individual conduct a wetland disturbance survey every five years, with the first survey conducted at the start of construction, to assess wetland functions that support migratory birds; and	▪ Survey done in 2022.
	4.8.2 monitor groundwater levels associated with the wetlands located north of the open pit to verify the effects of pit dewatering on wetlands. Monitoring wells shall be spaced no more than 50 metres apart and measurements shall be taken every two weeks during operation.	▪ Not conducted in 2022 as no construction activities occurred
5. Health and socio-economic conditions of Indigenous peoples		
5.1	The Proponent shall, in consultation with Indigenous groups, undertake progressive reclamation of the areas disturbed by the Designated Project, including by stabilizing, compacting and revegetating with native plant species overburden stockpiles and waste rock piles.	▪ Not applicable, as the Designated project area has not been disturbed.
5.2	Using a qualified individual, the Proponent shall design overburden stockpiles and waste rock piles, in consultation with Indigenous groups and relevant authorities, and in consideration of reducing effects to viewscapes. The Proponent shall implement the design throughout all phases of the Designated Project.	▪ The design of the overburden stockpiles and waste rock piles was completed during the Howse EIS.
5.3	The Proponent shall apply dust suppressant on the Howse haul road during all phases of the Designated Project to control the release of dust. The Proponent shall select, in consultation with relevant authorities, dust suppressants with the least potential effects on human health and the environment.	▪ Not applicable at this time.
5.4	The Proponent shall control dust, if observed visually, during the unloading of ore from trucks, except if not feasible for safety reasons.	▪ Not applicable at this time.
5.5	The Proponent shall implement measures to mitigate dust emissions at the conveyor transfer and drop points	▪ Not applicable, as the Project has

	CEAA Release Condition	2022-2023 Activities
	when the conveyor is active, in the drum scrubber when ore is mixed and at the crude ore recovery tunnel, the secondary crusher and the dryer during ore processing activities	not started.
5.6	The Proponent shall fill borehole necks with clean crushed rock to reduce dust and gas emissions from blasting during construction and operation.	▪ Not applicable, as the Project has not started.
5.7	The Proponent shall develop, prior to construction, a dust management strategy to control dust generated by vehicles associated with the Designated Project using the road to Schefferville and for vehicles entering Schefferville. The Proponent shall implement the strategy during all phases of the Designated Project. The Proponent shall provide the dust management strategy to the Agency prior to the start of construction. The Proponent shall review and update the dust management strategy in consultation with Indigenous groups, relevant authorities and the Town of Schefferville prior to operation or within 120 days of the issuance of this Decision Statement, whichever comes first.	▪ Follow-up programs for the Howse Project were submitted to the Agency in Spring 2018.
5.8	Throughout all phases of the Designated Project, the Proponent shall implement incentive measures to reduce the number of vehicles from the Designated Project, including by providing shuttle buses to transport workers to and from the Designated Project area.	▪ TSMC is complying with this condition.
5.9	The Proponent shall develop, prior to construction, a follow-up program to verify the accuracy of the environmental assessment as it pertains to air quality and the effects of dust on the health of Indigenous peoples and to determine the effectiveness of the mitigation measures referred to in conditions 5.3 to 5.8. The Proponent shall provide the follow-up program to the Agency prior to the start of construction. The Proponent shall implement the follow-up program from the start of construction to the end of decommissioning of the Designated Project. The Proponent shall review and update the follow-up program in consultation with Indigenous groups and relevant authorities and shall provide the update to the Agency prior to operation or within 120 days of the issuance of this Decision Statement, whichever comes first. As part of the follow-up program, the Proponent shall:	▪ Follow-up programs for the Howse Project were submitted to the Agency in Spring 2018.
	5.9.1 monitor air quality at receptors R3, R9, R10, R16, R18, R24, R36, R38 and R40 identified by the Proponent in Table 7-13 of the environmental impact statement, including for total particulate matter, particulate matter less than 10 microns, particulate matter less than 2.5 microns, dustfall, nitrogen oxides, sulfur oxides, carbon monoxide, and periodic monitoring of nitrogen dioxides after blasting activities;	
	5.9.2 monitor dust generation and deposition from the Designated Project at locations potentially affected by the Designated Project, using a dust tracking system and mobile monitoring equipment;	
	5.9.3 analyse concentrations of contaminants of concern in dust, including a minimum of one sampling of heavy metal content between the months of June and August of every year that analyses are conducted; and	
	5.9.4 if the results of the follow-up program demonstrate that modified or additional mitigation measures are required, as determined in condition 2.6, at the Howse mini-plant, Designated Project roads, waste rock piles or overburden stockpiles, the Proponent shall implement modified or additional mitigation measures.	
5.10	The Proponent shall develop, prior to operation or within 120 days of the issuance of this Decision Statement, whichever comes first, and in consultation with Indigenous groups and relevant authorities, a follow-up program to verify the accuracy of the environmental assessment as it pertains to country foods. Country foods may include game birds, mammals, fish, and plant species. The Proponent shall implement the follow-up program. As part of the follow-up program, the Proponent shall:	▪ Follow-up programs for the Howse Project were submitted to the Agency in Spring 2018.
	5.10.1 sample country food species commonly consumed by Indigenous groups and identified in consultation with Indigenous groups including brook trout (Salvelinus fontinalis) and lake trout (Salvelinus namaycush);	
	5.10.2 sample species identified in condition 5.10.1 for heavy metals, and other contaminants of concern	

	CEAA Release Condition	2022-2023 Activities
	identified in consultation with Indigenous groups and relevant authorities;	
	5.10.3 sample in areas where Indigenous groups harvest country foods and that may be adversely affected by the Designated Project and in a control site that is not affected by activities of the Designated Project. Fish sampling shall include sampling in Goodream Creek, Triangle Lake, and Pinette Lake; and	
	5.10.4 start sampling two years after the start of operation and continue sampling at a frequency and for a duration determined in consultation with Indigenous groups and relevant authorities.	
6. Current use of lands and resources for traditional purposes		
6.1	The Proponent shall upgrade, from the start of construction, a bypass road around the Designated Project in order to provide access for Indigenous groups to Pinette Lake, Kauteitnat and the Howells River Valley. The Proponent shall maintain the bypass road at least twice per calendar year until the end of decommissioning to ensure its usability.	▪ Not applicable, as the Construction Phase of the Project has not started.
6.2	The Proponent shall upgrade, from the start of construction, a bypass road around the Direct Shipping Ore 4 area in order to provide access for Indigenous groups to hunting grounds to the northwest of the Designated Project near the Kivivic and Goodwood deposits. The Proponent shall maintain the bypass road at least twice per calendar year until the end of decommissioning to ensure its usability.	▪ Not applicable at this time.
6.3	The Proponent shall not use the bypass roads, referred to in conditions 6.1 and 6.2, for Designated Project activities, except when undertaking the maintenance of those bypass roads as required by conditions 6.1 and 6.2, or if required for safety or emergency reasons.	▪ TSMC has not used the bypass road for any Project activities during the reporting year (this road is accessed only for the purposes of environmental monitoring, and only when no other access exists).
6.4	The Proponent shall prohibit employees and contractors associated with the Designated Project from fishing and hunting within the designated project area, unless an employee or a contractor is provided access by the Proponent for traditional purposes or for exercising Aboriginal rights, to the extent that such access is safe.	▪ This was respected during the reporting year.
6.5	If the Proponent is made aware of or observes caribou within a 20-kilometre radius of the active pit or of the Howse mini-plant, the Proponent shall consult the Newfoundland and Labrador Department of Fisheries and Land Resources to determine the appropriate course of action.	▪ TSMC is not aware of any caribou within 20km of the active pit or the Howse mini-Plant.
6.6	The Proponent shall develop, prior to construction, and implement during all phases of the Designated Project, a follow-up program to verify the accuracy of the environmental assessment as it pertains to the adverse effects of the Designated Project on the current use of lands and resources for traditional purposes and to determine the effectiveness of the mitigation measures referred to in conditions 6.1 to 6.4, including maintenance of the bypass roads. The Proponent shall provide the follow-up program to the Agency prior to the start of construction. The Proponent shall review and update the follow-up program in consultation with Indigenous groups and shall provide this update to the Agency prior to operation or within 120 days of the issuance of this Decision Statement, whichever comes first.	▪ Follow-up programs for the Howse Project were submitted to the Agency in Spring 2018.
6.7	The Proponent shall develop, prior to construction, and implement during all phases of the Designated Project, a follow-up program to verify the accuracy of the environmental assessment as it pertains to the adverse effects of the Designated Project on the George River herd of Eastern migratory caribou (Rangifer tarandus caribou). The Proponent shall provide the follow-up program to the Agency prior to the start of construction. The Proponent shall review and update the follow-up program in consultation with Indigenous groups and the Government of Newfoundland and Labrador, and shall provide this update to the Agency prior to operation or within 120 days of	▪ Follow-up programs for the Howse Project were submitted to the Agency in Spring 2018.

	CEAA Release Condition	2022-2023 Activities
	the issuance of this Decision Statement, whichever comes first. As part of the follow-up program, the Proponent shall monitor movement of the George River herd of Eastern migratory caribou (*Rangifer tarandus caribou*) and develop and implement modified or additional mitigation measures if the range of the George River herd of Eastern migratory caribou (*Rangifer tarandus caribou*) expands to occupy areas within a 20-kilometre radius of the Designated Project.	
6.8	The Proponent shall develop, prior to construction and in consultation with Indigenous groups, a communication plan to share information related to the Designated Project with Indigenous groups. The Proponent shall implement and maintain the communication plan up to date during all phases of the Designated Project. The communication plan shall include procedures, including timing, for sharing information on the following:	▪ Follow-up programs for the Howse Project were submitted to the Agency in Spring 2018 ▪ TSMC is committed to comply with this condition.
	6.8.1 the Designated Project activities requiring notification to Indigenous groups and the timing of these notifications. For blasting, the Proponent shall advertise blasting schedules via local radio stations and directly to Indigenous groups at a minimum 48 hours prior to each blasting event;	
	6.8.2 follow-up activities and monitoring results referred to in conditions 3.6, 4.7, 4.8, 5.9, 5.10, 6.6, 6.7, and 7.5; and	
	6.8.3 temporary and permanent restrictions on access to traditional territories, including the location and timing of these restrictions, the availability of alternate routes, and the timing of maintenance activities for the bypass roads as per 6.1 and 6.2.	
6.9	The Proponent shall develop, as part of the communication plan referred to in condition in 6.8, procedures for Indigenous groups to provide feedback to the Proponent about adverse environmental effects caused by the Designated Project related to access to and use of traditional territories, traffic, air quality, including dust and dust deposition, and country foods and procedures for the Proponent to document and respond in a timely manner to the feedback received and demonstrate how issues have been addressed. The Proponent shall implement these procedures during all phases of the Designated Project.	▪ These procedures were in place during the reporting year.
6.10	The Proponent shall provide Indigenous groups with the schedules referred to in conditions 10.1 and 10.2 and updates or revisions to the initial schedules pursuant to condition 10.3 and 10.4 at the same time these documents are provided to the Agency.	▪ Not applicable at this time.
7. Physical and cultural heritage and structures, sites or things of historical, archaeological, paleontological or architectural significance		
7.1	If requested by Indigenous groups 48 hours prior to their planned use of Kauteitnat, the Proponent shall refrain from blasting for a period of 24 hours during that time of planned use of Kauteitnat, or less if Indigenous groups are no longer using Kauteitnat.	▪ Not applicable at this time.
7.2	The Proponent shall not conduct any Designated Project activity to the south of proposed water diversion ditch, identified in figure 2 in the environmental assessment report, except for activities required for the construction and maintenance of the diversion ditch. The Proponent shall clearly identify the exclusion zone with signage on the ground, within its lease area, posted at the edge of the exclusion zone.	▪ Not applicable as no project activity has taken place.
7.3	During the months of June, July, August and September, the Proponent shall not blast more than twice in a week and more than five times per month.	▪ Not applicable as no project activity has taken place.
7.4	The Proponent shall develop, prior to construction, and implement during all phases of the Designated Project, a protocol for receiving complaints related to the exposure to noise from the Designated Project. The Proponent shall provide the protocol to the Agency and Indigenous groups prior to the start of construction. The Proponent shall review and update the protocol in consultation with Indigenous groups and shall provide this update to the Agency and Indigenous groups prior to operation or within 120 days of the issuance of this Decision Statement,	▪ Follow-up programs for the Howse Project were submitted to the Agency in Spring 2018.

	CEAA Release Condition	2022-2023 Activities
	whichever comes first. The Proponent shall respond to any noise complaints within 48 hours of the complaint being received and shall implement corrective actions to reduce exposure to noise in a timely manner.	
7.5	The Proponent shall develop prior to construction, and implement during all phases of the Designated Project, a follow-up program to verify the accuracy of the environmental assessment as it pertains to the effects of the Designated Project on the use of cultural and other sites as a result of noise levels. The Proponent shall provide the follow-up program to the Agency prior to the start of construction. The Proponent shall review and update the follow-up program in consultation with Indigenous groups and shall provide this update to the Agency prior to operation or within 120 days of the issuance of this Decision Statement, whichever comes first. As part of the follow-up program, the Proponent shall:	▪ Follow-up programs for the Howse Project were submitted to the Agency in Spring 2018.
	7.5.1 monitor noise levels at receptor sites R9, R10, R11, R13 and R24 identified by the Proponent in figure 7.10 of the environmental impact statement. The Proponent shall implement modified or additional mitigation measures if noise levels at these sites exceed 5 decibels above the baseline noise levels as a result of the Designated Project, except during blasting.	
7.6	The Proponent shall develop, prior to construction, and implement during all phases of the Designated Project a cultural heritage control plan. The Proponent shall provide the cultural heritage control plan to the Agency prior to the start of construction. The Proponent shall review and update the plan in consultation with Indigenous groups and the Government of Newfoundland and Labrador and shall provide this update to the Agency prior to operation or within 120 days of the issuance of this Decision Statement, whichever comes first. If any previously unidentified structures, sites or things of historical, archaeological, paleontological or architectural significance are discovered within the Designated Project area by the Proponent or brought to the attention of the Proponent by an Indigenous group or another party during construction, the Proponent shall:	▪ All required programs for the Howse Project were submitted to the Agency in Spring 2018.
	7.6.2 delineate an area of at least 30 metres around the discovery as a no-work zone. The no-work requirement shall not apply to action(s) required to be undertaken to protect the integrity of the discovery;	
	7.6.3 have a qualified individual conduct an assessment at the location of the discovery;	
	7.6.4 inform Indigenous groups within 24 hours of the discovery, and allow for monitoring by Indigenous groups during work related to the discovery; and	
	7.6.5 comply, in consultation with Indigenous groups and relevant authorities, with all applicable legislative or legal requirements and associated regulations and protocols respecting the discovery, recording, transferring and safekeeping of previously unidentified structures, sites or things of historical, archaeological, paleontological or architectural significance.	
8. Cumulative Effects		
8.1	The Proponent shall participate in regional initiative(s), if requested by a relevant authority or the Town of Schefferville, relating to the monitoring, assessment and management of cumulative environmental effects, including cumulative health effects related to dust likely to result from the Designated Project in combination with other mining activities that have or will be carried out in the region, should there be any such initiative(s) during the construction and operation phases of the Designated Project.	▪ TSMC will continue to participate in regional initiatives if requested by regional Indigenous groups and/or authorities.
9. Accidents and malfunctions		
9.1	The Proponent shall take all reasonable measures to prevent accidents and malfunctions that may result in adverse environmental effects. The measures taken by the Proponent shall include measures to prevent slope failures, sedimentation pond failures, ditch failures, destabilization of waste rock piles and overburden stockpiles, and rock slides.	▪ An accident and malfunction response plan specific for the Howse project is currently drafted.

	CEAA Release Condition	2022-2023 Activities
9.2	The Proponent shall develop, prior to construction, and implement during all phases of the Designated Project, an accident and malfunction response plan. The accident and malfunction plan shall include the types of accidents and malfunctions that may cause adverse environmental effects, and response plans for slope failures, sedimentation pond failures, ditch failures, destabilization of waste rock piles and overburden stockpiles, or rock slides in addition to all emergency response plans identified in the environmental impact statement. The Proponent shall provide the accident and malfunction response plan to the Agency prior to the start of construction.	▪ See above.
9.3	The Proponent shall review and update the measures to be implemented to prevent accidents and malfunctions and the accidents and malfunctions response plan in consultation with Indigenous groups and relevant authorities prior to operation or within 120 days of the issuance of this Decision Statement, whichever comes first.	▪ Not applicable for this reporting year.
9.4	In the event of an accident or malfunction with the potential to cause adverse environmental effects, the Proponent shall implement the accidents and malfunctions response plan referred to in condition 9.2 or any subsequent update(s) referred to in condition 9.3 and shall:	▪ Not applicable for this reporting year.
	9.4.1 notify, as soon as possible, Indigenous groups and relevant authorities of the accident or malfunction, and notify the Agency in writing no later than 24 hours following the accident or malfunction. When notifying Indigenous groups and in the notification to the Agency, the Proponent shall specify;	
	9.4.1.1 the date the accident or malfunction occurred;	
	9.4.1.2 a description of the accident or malfunction;	
	9.4.1.3 a list of all substances potentially released in the environment as a result of the accident or malfunction.	
	9.4.2 implement immediate measures to mitigate any adverse environmental effects caused by the accident or malfunction;	
	9.4.3 submit a written report to the Agency no later than 30 days after the day on which the accident or malfunction took place. The written report shall include:	▪ Not applicable for this reporting year.
	9.4.3.1 a description of the accident or malfunction and of its adverse environmental effects;	
	9.4.3.2 the measures that were taken by the Proponent to mitigate the adverse environmental effects caused by the accident or malfunction;	
	9.4.3.3 any view(s) from Indigenous groups and advice from relevant authorities received with respect to the accident or malfunction, its adverse environmental effects and the measures taken by the Proponent to mitigate these adverse environmental effects;	
	9.4.3.4 a description of any residual adverse environmental effects and any modified or additional measures required by the Proponent to mitigate residual adverse environmental effects; and	
	9.4.3.5 details concerning the implementation of the accident or malfunction response plan referred to in condition 9.2 or any subsequent update(s) referred to in condition 9.3.	
	9.4.4 submit a written report to the Agency no later than 90 days after the day on which the accident or malfunction took place, on the changes made to avoid a subsequent occurrence of the accident or malfunction and on the implementation of any modified or additional measure(s) to mitigate and monitor residual adverse environmental effects and to carry out any required progressive reclamation, taking into account the information submitted in the written report pursuant to condition 9.4.3. The report shall include all additional views from Indigenous groups and advice from relevant authorities since the views and advice referred to in condition 9.4.3.3	▪ Not applicable for this reporting year.

	CEAA Release Condition	2022-2023 Activities
	have been received by the Proponent.	
9.5	The Proponent shall develop a communication plan in consultation with Indigenous groups. The Proponent shall develop the communication plan prior to construction and shall implement and keep it up to date during all phases of the Designated Project. The plan shall include:	▪ Communication plan for the Howse Project was submitted to the Agency in April 2018 and is currently being updated
	9.5.1 the types of accidents and malfunctions requiring the Proponent to notify the respective Indigenous groups;	
	9.5.2 the manner by which Indigenous group shall be notified by the Proponent of an accident or malfunction and of any opportunities for the Indigenous groups to assist in the response to the accident or malfunction; and	
	9.5.3 the contact information of the representatives of the Proponent that the Indigenous groups may contact and of the representatives of the respective Indigenous groups to which the Proponent provides notification.	
10. Schedules		
10.1	The Proponent shall submit to the Agency a schedule for all conditions set out in this Decision Statement no later than 30 days after the start of construction. The schedule shall detail all activities planned to fulfill each condition set out in this Decision Statement and the commencement and estimated completion month(s) and year(s) for each of these activities.	▪ Not applicable, as construction phase has not started.
10.2	The Proponent shall submit to the Agency a schedule outlining all activities required to carry out all phases of the Designated Project no later than 30 days after the start of construction. The schedule shall indicate the commencement and estimated completion month(s) and year(s) and duration of each of these activities.	▪ Not applicable, as construction phase has not started.
10.3	The Proponent shall submit to the Agency in writing an update to schedules referred to in conditions 10.1 and 10.2 every year no later than June 30, until completion of all activities referred to in each schedule.	▪ Not applicable, as construction phase has not started.
10.4	The Proponent shall provide to the Agency revised schedules if any change(s) are made to the initial schedules referred to in condition 10.1 and 10.2 or to any subsequent update(s) referred to in condition 10.3, upon revision of the schedules.	▪ Not applicable, as construction phase has not started.
11. Record Keeping		
11.1	The Proponent shall maintain all records required to demonstrate compliance with the conditions set out in this Decision Statement. The Proponent shall provide the aforementioned records to the Agency upon demand within a timeframe specified by the Agency.	▪ TSMC is committed to comply with this condition.
11.2	The Proponent shall retain all records referred to in condition 11.1 at a facility in Canada. The records shall be retained and made available throughout construction and operation and for 25 years following the end of operation or until the end of decommissioning of the Designated Project, whichever comes first. The Proponent shall notify the Agency at least 30 days prior to any change to the physical location of the facility where the records are retained, and shall provide to the Agency the address of the new location.	▪ TSMC is committed to comply with this condition.

Appendix 1 Surface Water Quality Certificates

Your P.O. #: 3000000997
Your Project #: SRVLNNO10-NL-SURFACE WATER
Site#: 00025
Site Location: HOWSE
Your C.O.C. #: N-A

Attention: Vivek Agarwal

TATA STEEL MINERALS CANADA
1000, RUE SHERBROOKE OUEST
BUREAU 1120
MONTRÉAL, QC
CANADA H3A 3G4

Report Date: 2022/07/11
Report #: R2770089
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C229026
Received: 2022/06/16, 08:00

Sample Matrix: Surface Water
Samples Received: 16

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Total Alkalinity (pH end point 4.5)	5	N/A	2022/06/17	STLSOP-00038	SM 23 2320-B m
Total Alkalinity (pH end point 4.5)	11	N/A	2022/06/20	STLSOP-00038	SM 23 2320-B m
Anions in water	1	N/A	2022/06/16	STLSOP-00014	MA.300–Ions 1.3 R3 m
Anions in water	15	N/A	2022/06/17	STLSOP-00014	MA.300–Ions 1.3 R3 m
Real Color	16	N/A	2022/06/16	STLSOP-00046	MA103 - Col. 2.0 R4m
Conductivity	16	N/A	2022/06/17	STLSOP-00038	SM 23 2510-B m
Dissolved Organic Carbon (3)	16	2022/06/17	2022/06/17	STL SOP-00243	SM 23 5310-B m
Total Suspended Solids	7	2022/06/17	2022/06/20	STL SOP-00015	MA.104–S.S. 2.0 m
Total Suspended Solids	9	2022/06/21	2022/06/24	STL SOP-00015	MA.104–S.S. 2.0 m
Total Extractable Metals by ICP	12	2022/06/23	2022/06/24	STL SOP-00062	MA.200–Mét. 1.2 R7 m
Total Extractable Metals by ICP	3	2022/06/23	2022/07/05	STL SOP-00062	MA.200–Mét. 1.2 R7 m
Total Extractable Metals by ICP	1	2022/06/29	2022/06/30	STL SOP-00062	MA.200–Mét. 1.2 R7 m
Ammonia Nitrogen	16	N/A	2022/06/30	STLSOP-00040	MA.300–N 2.0 R2 m
Nitrates(NO3-), Nitrites(NO2-)-water	1	N/A	2022/06/16	STLSOP-00014	MA.300–Ions 1.3 R3 m
Nitrates(NO3-), Nitrites(NO2-)-water	15	N/A	2022/06/17	STLSOP-00014	MA.300–Ions 1.3 R3 m
Dissolved Oxygen	16	N/A	2022/06/16	STLSOP-00008	MA.315–DBO 1.1 R3 m
pH in water	16	N/A	2022/06/17	STLSOP-00038	MA.100–pH 1.1 R3 m
pH Measured @ 15° C	16	N/A	2022/06/16	STLSOP-00016	MA.100–pH 1.1 R3 m
Total Phenols by 4-AAP in water	16	2022/06/28	2022/06/28	STL SOP-00033	MA404–I.Phé 2.2 R2 m
Ortho Phosphate	16	N/A	2022/06/16	STLSOP-00003	MA.303–P 1.1 R2 m
Sulfides (as S2-)	16	2022/07/09	2022/07/09	STL SOP-00005	MA. 300 – S 1.2 R3 m
Total Dissolved Solids	7	2022/06/18	2022/06/20	STL SOP-00050	MA.115–S.D. 1.0 R4 m
Total Dissolved Solids	9	2022/06/21	2022/06/23	STL SOP-00050	MA.115–S.D. 1.0 R4 m
Total Nitrogen	16	2022/06/22	2022/06/23	STL SOP-00077	MOE:TOTNUT-E3516v1.3
Turbidity	16	N/A	2022/06/16	STLSOP-00022	MA.103–Tur. 1.0 R5 m
Un-ionized Ammonia as N @ 15° C	16	N/A	2022/07/04	STLSOP-00040	MA.300 – N 2.0 R1 m
Total Extractable Mercury - Cold Vapour (1)	16	2022/06/20	2022/06/21	CAM SOP-00453	EPA 7470 m
Reactive Silica(SiO2) (2)	3	2022/06/23	2022/06/23	ATL SOP 00022	EPA 366.0 m
Reactive Silica(SiO2) (2)	10	2022/06/24	2022/06/23	ATL SOP 00022	EPA 366.0 m
Reactive Silica(SiO2) (2)	3	2022/06/24	2022/06/24	ATL SOP 00022	EPA 366.0 m

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Your P.O. #: 3000000997
Your Project #: SRVLNNO10-NL-SURFACE WATER
Site#: 00025
Site Location: HOWSE
Your C.O.C. #: N-A

Attention: Vivek Agarwal

TATA STEEL MINERALS CANADA
1000, RUE SHERBROOKE OUEST
BUREAU 1120
MONTRÉAL, QC
CANADA H3A 3G4

Report Date: 2022/07/11
Report #: R2770089
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C229026
Received: 2022/06/16, 08:00

Remarks:

Bureau Veritas is accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Bureau Veritas are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Bureau Veritas' profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Bureau Veritas in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

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Results relate to samples tested. When sampling is not conducted by Bureau Veritas, results relate to the supplied samples tested.
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Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.
Note: RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
(1) This test was performed by Bureau Veritas Mississauga, 6740 Campobello Rd. , Mississauga, ON, L5N 2L8
(2) This test was performed by Bureau Veritas Bedford, Suit 105, 200 Bluewater Rd. , Bedford, NS, B4B1G9
(3) DOC present in the sample should be considered as non-purgeable DOC

Note: All parameters included in the present certificate are accredited by the MELCC unless stated otherwise.

<Original signed by>

Encryption Key

Josue Moran
Project Manager
11 Jul 2022 10:10:27

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Josue Moran, Project Manager
Email: josue.moran@bureauveritas.com
Phone# (514) 448-9001

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Bureau Veritas Job #: C229026
Report Date: 2022/07/11

TATA STEEL MINERALS CANADA
Client Project #: SRVLNNO10-NL-SURFACE WATER
Site Location: HOWSE
Your P.O. #: 3000000997

RESULTS OF ANALYSES OF SURFACE WATER

Bureau Veritas ID		KN5320		KN5417		KN5418		
Sampling Date		2022/06/14 09:50		2022/06/14 10:25		2022/06/14 11:04		
COC Number		N-A		N-A		N-A		
	Units	HOW-SWBL-Q1-2022	QC Batch	HOW-SWBC-Q1-2022	QC Batch	HOW-SWTL-Q1-2022	RDL	QC Batch
INORGANICS								
Reactive silica (SiO2) †	mg/L	6.1	2306104	2.6	2306104	4.4	0.50	2306104
METALS								
Mercury (Hg) †	ug/L	<0.01	2305398	<0.01	2305101	<0.01	0.01	2305398

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
† Parameter is not accreditable

Bureau Veritas ID		KN5419	KN5419		KN5420		
Sampling Date		2022/06/14 12:00	2022/06/14 12:00		2022/06/14 13:11		
COC Number		N-A	N-A		N-A		
	Units	HOW-SW5-Q1-2022	HOW-SW5-Q1-2022 Lab-Dup	QC Batch	HOW-SW2-Q1-2022	RDL	QC Batch
INORGANICS							
Reactive silica (SiO2) †	mg/L	1.2	N/A	2306105	4.0	0.50	2306105
METALS							
Mercury (Hg) †	ug/L	<0.01	<0.01	2305101	<0.01	0.01	2305398

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
† Parameter is not accreditable
N/A = Not Applicable

Bureau Veritas ID		KN5421		KN5422	KN5423	KN5424		
Sampling Date		2022/06/14 13:25		2022/06/14 14:20	2022/06/14 14:45	2022/06/14 16:00		
COC Number		N-A		N-A	N-A	N-A		
	Units	HOW-SW3-Q1-2022	QC Batch	HOW-SW4-Q1-2022	HOW-SW1-Q1-2022	HOW-SWML-Q1-2022	RDL	QC Batch
INORGANICS								
Reactive silica (SiO2) †	mg/L	2.0	2306105	4.0	4.2	0.54	0.50	2306105
METALS								
Mercury (Hg) †	ug/L	<0.01	2305101	<0.01	<0.01	<0.01	0.01	2305398

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
† Parameter is not accreditable

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RESULTS OF ANALYSES OF SURFACE WATER

Bureau Veritas ID		KN5425	KN5426	KN5427		
Sampling Date		2022/06/11 12:14	2022/06/11 11:47	2022/06/11 11:29		
COC Number		N-A	N-A	N-A		
	Units	DSO3-COASW8-Q1-2022	DSO3-COASW13-Q1-2022	DSO3-COASW4-Q1-2022	RDL	QC Batch
INORGANICS						
Reactive silica (SiO2) †	mg/L	2.9	1.2	4.5	0.50	2306105
METALS						
Mercury (Hg) †	ug/L	<0.01	<0.01	<0.01	0.01	2305398

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
† Parameter is not accreditable

Bureau Veritas ID		KN5428	KN5429		KN5430		
Sampling Date		2022/06/11 10:56	2022/06/11 11:15		2022/06/11 10:07		
COC Number		N-A	N-A		N-A		
	Units	DSO3-COASW10-Q1-2022	DSO3-COASW3-Q1-2022	QC Batch	DSO3-COASW7-Q1-2022	RDL	QC Batch
INORGANICS							
Reactive silica (SiO2) †	mg/L	0.91	3.7	2306105	3.0	0.50	2306105
METALS							
Mercury (Hg) †	ug/L	<0.01	<0.01	2305101	<0.01	0.01	2305398

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
† Parameter is not accreditable

Bureau Veritas ID		KN5431		
Sampling Date		2022/06/11 09:51		
COC Number		N-A		
	Units	DSO3-COASW9-Q1-2022	RDL	QC Batch
INORGANICS				
Reactive silica (SiO2) †	mg/L	0.92	0.50	2306106
METALS				
Mercury (Hg) †	ug/L	<0.01	0.01	2305101

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
† Parameter is not accreditable

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TOTAL EXTRACTABLE METALS (SURFACE WATER)

Bureau Veritas ID		KN5320	KN5417		KN5418		
Sampling Date		2022/06/14 09:50	2022/06/14 10:25		2022/06/14 11:04		
COC Number		N-A	N-A		N-A		
	Units	HOW-SWBL-Q1-2022	HOW-SWBC-Q1-2022	QC Batch	HOW-SWTL-Q1-2022	RDL	QC Batch
METALS							
Aluminum (Al)	ug/L	<10	85	2305682	19	10	2305669
Antimony (Sb)	ug/L	<1.0	<1.0	2305682	<1.0	1.0	2305669
Silver (Ag)	ug/L	<1.0	<1.0	2305682	<1.0	1.0	2305669
Arsenic (As)	ug/L	<1.0	<1.0	2305682	<1.0	1.0	2305669
Barium (Ba)	ug/L	<2.0	<2.0	2305682	2.8	2.0	2305669
Beryllium (Be)	ug/L	<2.0	<2.0	2305682	<2.0	2.0	2305669
Bismuth (Bi) ††	ug/L	<1.0	<1.0	2305682	<1.0	1.0	2305669
Boron (B) †	ug/L	<50	<50	2305682	<50	50	2305669
Cadmium (Cd)	ug/L	<0.20	<0.20	2305682	<0.20	0.20	2305669
Calcium (Ca) †	ug/L	4300	<500	2305682	2600	500	2305669
Chromium (Cr)	ug/L	<5.0	<5.0	2305682	<5.0	5.0	2305669
Cobalt (Co)	ug/L	<1.0	<1.0	2305682	<1.0	1.0	2305669
Copper (Cu)	ug/L	<1.0	<1.0	2305682	<1.0	1.0	2305669
Total Hardness (CaCO3) ††	ug/L	22000	2500	2305682	15000	1000	2305669
Tin (Sn)	ug/L	<2.0	<2.0	2305682	<2.0	2.0	2305669
Iron (Fe)	ug/L	<60	69	2305682	79	60	2305669
Magnesium (Mg) †	ug/L	2700	330	2305682	2000	100	2305669
Manganese (Mn)	ug/L	2.3	5.3	2305682	23	1.0	2305669
Mercury (Hg)	ug/L	<0.10	<0.10	2305682	<0.10	0.10	2305669
Molybdenum (Mo)	ug/L	<1.0	<1.0	2305682	<1.0	1.0	2305669
Nickel (Ni)	ug/L	<2.0	<2.0	2305682	<2.0	2.0	2305669
P2O5 ††	ug/L	40	<25	2305682	<25	25	2305669
Total phosphorous	ug/L	17	<10	2305682	<10	10	2305669
Lead (Pb)	ug/L	<0.50	<0.50	2305682	<0.50	0.50	2305669
Potassium (K) †	ug/L	<500	<500	2305682	<500	500	2305669
Selenium (Se)	ug/L	<3.0	<3.0	2305682	<3.0	3.0	2305669
Sodium (Na)	ug/L	2300	1200	2305682	540	500	2305669
Strontium (Sr) †	ug/L	27	12	2305682	5.3	2.0	2305669
Thallium (Tl)	ug/L	<2.0	<2.0	2305682	<2.0	2.0	2305669
Titanium (Ti) ††	ug/L	<10	<10	2305682	<10	10	2305669
Uranium (U) ††	ug/L	<1.0	<1.0	2305682	<1.0	1.0	2305669
Vanadium (V)	ug/L	<2.0	<2.0	2305682	<2.0	2.0	2305669

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
†† Parameter is not accreditable
† Parameter is not accredited

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TOTAL EXTRACTABLE METALS (SURFACE WATER)

Bureau Veritas ID		KN5320	KN5417		KN5418		
Sampling Date		2022/06/14 09:50	2022/06/14 10:25		2022/06/14 11:04		
COC Number		N-A	N-A		N-A		
	Units	**HOW-SWBL-Q1-2022**	**HOW-SWBC-Q1-2022**	**QC Batch**	**HOW-SWTL-Q1-2022**	**RDL**	**QC Batch**
Zinc (Zn)	ug/L	<7.0	<7.0	2305682	<7.0	7.0	2305669

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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TOTAL EXTRACTABLE METALS (SURFACE WATER)

Bureau Veritas ID		KN5419	KN5420	KN5421		KN5422		
Sampling Date		2022/06/14 12:00	2022/06/14 13:11	2022/06/14 13:25		2022/06/14 14:20		
COC Number		N-A	N-A	N-A		N-A		
	Units	HOW-SW5-Q1-2022	HOW-SW2-Q1-2022	HOW-SW3-Q1-2022	QC Batch	HOW-SW4-Q1-2022	RDL	QC Batch
METALS								
Aluminum (Al)	ug/L	16	54	47	2305682	16	10	2305669
Antimony (Sb)	ug/L	<1.0	<1.0	<1.0	2305682	<1.0	1.0	2305669
Silver (Ag)	ug/L	<1.0	<1.0	<1.0	2305682	<1.0	1.0	2305669
Arsenic (As)	ug/L	<1.0	<1.0	<1.0	2305682	<1.0	1.0	2305669
Barium (Ba)	ug/L	<2.0	2.5	<2.0	2305682	<2.0	2.0	2305669
Beryllium (Be)	ug/L	<2.0	<2.0	<2.0	2305682	<2.0	2.0	2305669
Bismuth (Bi) ††	ug/L	<1.0	<1.0	<1.0	2305682	<1.0	1.0	2305669
Boron (B) †	ug/L	<50	<50	<50	2305682	<50	50	2305669
Cadmium (Cd)	ug/L	<0.20	<0.20	<0.20	2305682	<0.20	0.20	2305669
Calcium (Ca) †	ug/L	<500	520	<500	2305682	2400	500	2305669
Chromium (Cr)	ug/L	<5.0	<5.0	<5.0	2305682	<5.0	5.0	2305669
Cobalt (Co)	ug/L	<1.0	<1.0	<1.0	2305682	<1.0	1.0	2305669
Copper (Cu)	ug/L	<1.0	<1.0	<1.0	2305682	<1.0	1.0	2305669
Total Hardness (CaCO3) ††	ug/L	1900	2200	1100	2305682	12000	1000	2305669
Tin (Sn)	ug/L	<2.0	<2.0	<2.0	2305682	<2.0	2.0	2305669
Iron (Fe)	ug/L	<60	370	<60	2305682	<60	60	2305669
Magnesium (Mg) †	ug/L	190	220	120	2305682	1500	100	2305669
Manganese (Mn)	ug/L	7.4	61	7.2	2305682	<1.0	1.0	2305669
Mercury (Hg)	ug/L	<0.10	<0.10	<0.10	2305682	<0.10	0.10	2305669
Molybdenum (Mo)	ug/L	<1.0	<1.0	<1.0	2305682	<1.0	1.0	2305669
Nickel (Ni)	ug/L	<2.0	<2.0	<2.0	2305682	<2.0	2.0	2305669
P2O5 ††	ug/L	<25	<25	<25	2305682	<25	25	2305669
Total phosphorous	ug/L	<10	<10	<10	2305682	<10	10	2305669
Lead (Pb)	ug/L	<0.50	<0.50	<0.50	2305682	<0.50	0.50	2305669
Potassium (K) †	ug/L	<500	<500	<500	2305682	<500	500	2305669
Selenium (Se)	ug/L	<3.0	<3.0	<3.0	2305682	<3.0	3.0	2305669
Sodium (Na)	ug/L	1000	1100	770	2305682	580	500	2305669
Strontium (Sr) †	ug/L	2.5	3.6	6.0	2305682	5.2	2.0	2305669
Thallium (Tl)	ug/L	<2.0	<2.0	<2.0	2305682	<2.0	2.0	2305669
Titanium (Ti) ††	ug/L	<10	<10	<10	2305682	<10	10	2305669
Uranium (U) ††	ug/L	<1.0	<1.0	<1.0	2305682	<1.0	1.0	2305669
Vanadium (V)	ug/L	<2.0	<2.0	<2.0	2305682	<2.0	2.0	2305669

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
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TOTAL EXTRACTABLE METALS (SURFACE WATER)

Bureau Veritas ID		KN5419	KN5420	KN5421		KN5422		
Sampling Date		2022/06/14 12:00	2022/06/14 13:11	2022/06/14 13:25		2022/06/14 14:20		
COC Number		N-A	N-A	N-A		N-A		
	Units	**HOW-SW5-Q1-2022**	**HOW-SW2-Q1-2022**	**HOW-SW3-Q1-2022**	**QC Batch**	**HOW-SW4-Q1-2022**	**RDL**	**QC Batch**
Zinc (Zn)	ug/L	<7.0	<7.0	<7.0	2305682	<7.0	7.0	2305669

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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TOTAL EXTRACTABLE METALS (SURFACE WATER)

Bureau Veritas ID		KN5423		KN5424	KN5425		
Sampling Date		2022/06/14 14:45		2022/06/14 16:00	2022/06/11 12:14		
COC Number		N-A		N-A	N-A		
	Units	HOW-SW1-Q1-2022	QC Batch	HOW-SWML-Q1-2022	DSO3-COASW8-Q1-2022	RDL	QC Batch
METALS							
Aluminum (Al)	ug/L	10	2307337	48	47	10	2305682
Antimony (Sb)	ug/L	<1.0	2307337	<1.0	<1.0	1.0	2305682
Silver (Ag)	ug/L	<1.0	2307337	<1.0	<1.0	1.0	2305682
Arsenic (As)	ug/L	<1.0	2307337	<1.0	<1.0	1.0	2305682
Barium (Ba)	ug/L	2.1	2307337	<2.0	<2.0	2.0	2305682
Beryllium (Be)	ug/L	<2.0	2307337	<2.0	<2.0	2.0	2305682
Bismuth (Bi) ††	ug/L	<1.0	2307337	<1.0	<1.0	1.0	2305682
Boron (B) †	ug/L	<50	2307337	<50	<50	50	2305682
Cadmium (Cd)	ug/L	<0.20	2307337	<0.20	<0.20	0.20	2305682
Calcium (Ca) †	ug/L	2500	2307337	970	<500	500	2305682
Chromium (Cr)	ug/L	<5.0	2307337	<5.0	<5.0	5.0	2305682
Cobalt (Co)	ug/L	<1.0	2307337	<1.0	<1.0	1.0	2305682
Copper (Cu)	ug/L	<1.0	2307337	<1.0	<1.0	1.0	2305682
Total Hardness (CaCO3) ††	ug/L	14000	2307337	4900	1400	1000	2305682
Tin (Sn)	ug/L	6.0	2307337	<2.0	<2.0	2.0	2305682
Iron (Fe)	ug/L	82	2307337	110	73	60	2305682
Magnesium (Mg) †	ug/L	1800	2307337	610	160	100	2305682
Manganese (Mn)	ug/L	4.6	2307337	7.9	2.2	1.0	2305682
Mercury (Hg)	ug/L	<0.10	2307337	<0.10	<0.10	0.10	2305682
Molybdenum (Mo)	ug/L	<1.0	2307337	<1.0	<1.0	1.0	2305682
Nickel (Ni)	ug/L	<2.0	2307337	<2.0	<2.0	2.0	2305682
P2O5 ††	ug/L	64	2307337	<25	<25	25	2305682
Total phosphorous	ug/L	<10	2307337	<10	<10	10	2305682
Lead (Pb)	ug/L	<0.50	2307337	<0.50	<0.50	0.50	2305682
Potassium (K) †	ug/L	<500	2307337	<500	<500	500	2305682
Selenium (Se)	ug/L	<3.0	2307337	<3.0	<3.0	3.0	2305682
Sodium (Na)	ug/L	1200	2307337	720	870	500	2305682
Strontium (Sr) †	ug/L	8.2	2307337	6.6	5.3	2.0	2305682
Thallium (Tl)	ug/L	<2.0	2307337	<2.0	<2.0	2.0	2305682
Titanium (Ti) ††	ug/L	<10	2307337	<10	<10	10	2305682
Uranium (U) ††	ug/L	<1.0	2307337	<1.0	<1.0	1.0	2305682
Vanadium (V)	ug/L	<2.0	2307337	<2.0	<2.0	2.0	2305682

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
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TOTAL EXTRACTABLE METALS (SURFACE WATER)

Bureau Veritas ID		KN5423		KN5424	KN5425		
Sampling Date		2022/06/14 14:45		2022/06/14 16:00	2022/06/11 12:14		
COC Number		N-A		N-A	N-A		
	Units	HOW-SW1-Q1-2022	QC Batch	HOW-SWML-Q1-2022	DSO3-COASW8-Q1-2022	RDL	QC Batch
Zinc (Zn)	ug/L	<7.0	2307337	<7.0	<7.0	7.0	2305682

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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TOTAL EXTRACTABLE METALS (SURFACE WATER)

Bureau Veritas ID		KN5426	KN5427	KN5428		
Sampling Date		2022/06/11 11:47	2022/06/11 11:29	2022/06/11 10:56		
COC Number		N-A	N-A	N-A		
	Units	DSO3-COASW13-Q1-2022	DSO3-COASW4-Q1-2022	DSO3-COASW10-Q1-2022	RDL	QC Batch
METALS						
Aluminum (Al)	ug/L	16	<10	240	10	2305682
Antimony (Sb)	ug/L	<1.0	<1.0	<1.0	1.0	2305682
Silver (Ag)	ug/L	<1.0	<1.0	<1.0	1.0	2305682
Arsenic (As)	ug/L	<1.0	<1.0	<1.0	1.0	2305682
Barium (Ba)	ug/L	<2.0	2.2	2.9	2.0	2305682
Beryllium (Be)	ug/L	<2.0	<2.0	<2.0	2.0	2305682
Bismuth (Bi) ††	ug/L	<1.0	<1.0	<1.0	1.0	2305682
Boron (B) †	ug/L	<50	<50	<50	50	2305682
Cadmium (Cd)	ug/L	<0.20	<0.20	<0.20	0.20	2305682
Calcium (Ca) †	ug/L	<500	25000	620	500	2305682
Chromium (Cr)	ug/L	<5.0	<5.0	<5.0	5.0	2305682
Cobalt (Co)	ug/L	<1.0	<1.0	<1.0	1.0	2305682
Copper (Cu)	ug/L	<1.0	<1.0	1.2	1.0	2305682
Total Hardness (CaCO3) ††	ug/L	1600	69000	3000	1000	2305682
Tin (Sn)	ug/L	<2.0	<2.0	<2.0	2.0	2305682
Iron (Fe)	ug/L	62	<60	760	60	2305682
Magnesium (Mg) †	ug/L	200	1800	360	100	2305682
Manganese (Mn)	ug/L	10	24	30	1.0	2305682
Mercury (Hg)	ug/L	<0.10	<0.10	<0.10	0.10	2305682
Molybdenum (Mo)	ug/L	<1.0	<1.0	<1.0	1.0	2305682
Nickel (Ni)	ug/L	<2.0	<2.0	<2.0	2.0	2305682
P2O5 ††	ug/L	<25	<25	59	25	2305682
Total phosphorous	ug/L	10	11	<10	10	2305682
Lead (Pb)	ug/L	<0.50	<0.50	<0.50	0.50	2305682
Potassium (K) †	ug/L	<500	1600	<500	500	2305682
Selenium (Se)	ug/L	<3.0	<3.0	<3.0	3.0	2305682
Sodium (Na)	ug/L	840	2200	720	500	2305682
Strontium (Sr) †	ug/L	4.2	360	8.0	2.0	2305682
Thallium (Tl)	ug/L	<2.0	<2.0	<2.0	2.0	2305682
Titanium (Ti) ††	ug/L	<10	<10	<10	10	2305682
Uranium (U) ††	ug/L	<1.0	<1.0	<1.0	1.0	2305682
Vanadium (V)	ug/L	<2.0	<2.0	<2.0	2.0	2305682

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
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TOTAL EXTRACTABLE METALS (SURFACE WATER)

Bureau Veritas ID		KN5426	KN5427	KN5428		
Sampling Date		2022/06/11 11:47	2022/06/11 11:29	2022/06/11 10:56		
COC Number		N-A	N-A	N-A		
	Units	**DSO3-COASW13-Q1-2022**	**DSO3-COASW4-Q1-2022**	**DSO3-COASW10-Q1-2022**	**RDL**	**QC Batch**
Zinc (Zn)	ug/L	<7.0	<7.0	<7.0	7.0	2305682

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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TOTAL EXTRACTABLE METALS (SURFACE WATER)

Bureau Veritas ID		KN5429	KN5430		KN5431		
Sampling Date		2022/06/11 11:15	2022/06/11 10:07		2022/06/11 09:51		
COC Number		N-A	N-A		N-A		
	Units	DSO3-COASW3-Q1-2022	DSO3-COASW7-Q1-2022	QC Batch	DSO3-COASW9-Q1-2022	RDL	QC Batch
METALS							
Aluminum (Al)	ug/L	33	35	2305682	130	10	2305669
Antimony (Sb)	ug/L	<1.0	<1.0	2305682	<1.0	1.0	2305669
Silver (Ag)	ug/L	<1.0	<1.0	2305682	<1.0	1.0	2305669
Arsenic (As)	ug/L	<1.0	<1.0	2305682	<1.0	1.0	2305669
Barium (Ba)	ug/L	7.8	3.1	2305682	2.6	2.0	2305669
Beryllium (Be)	ug/L	<2.0	<2.0	2305682	<2.0	2.0	2305669
Bismuth (Bi) ††	ug/L	<1.0	<1.0	2305682	<1.0	1.0	2305669
Boron (B) †	ug/L	<50	<50	2305682	<50	50	2305669
Cadmium (Cd)	ug/L	<0.20	<0.20	2305682	<0.20	0.20	2305669
Calcium (Ca) †	ug/L	2100	1100	2305682	<500	500	2305669
Chromium (Cr)	ug/L	<5.0	<5.0	2305682	<5.0	5.0	2305669
Cobalt (Co)	ug/L	<1.0	<1.0	2305682	<1.0	1.0	2305669
Copper (Cu)	ug/L	<1.0	<1.0	2305682	<1.0	1.0	2305669
Total Hardness (CaCO3) ††	ug/L	11000	6100	2305682	<1000	1000	2305669
Tin (Sn)	ug/L	<2.0	<2.0	2305682	<2.0	2.0	2305669
Iron (Fe)	ug/L	82	65	2305682	180	60	2305669
Magnesium (Mg) †	ug/L	1400	800	2305682	<100	100	2305669
Manganese (Mn)	ug/L	20	3.2	2305682	29	1.0	2305669
Mercury (Hg)	ug/L	<0.10	<0.10	2305682	<0.10	0.10	2305669
Molybdenum (Mo)	ug/L	<1.0	<1.0	2305682	<1.0	1.0	2305669
Nickel (Ni)	ug/L	<2.0	<2.0	2305682	<2.0	2.0	2305669
P2O5 ††	ug/L	29	<25	2305682	<25	25	2305669
Total phosphorous	ug/L	<10	<10	2305682	<10	10	2305669
Lead (Pb)	ug/L	<0.50	<0.50	2305682	<0.50	0.50	2305669
Potassium (K) †	ug/L	<500	<500	2305682	<500	500	2305669
Selenium (Se)	ug/L	<3.0	<3.0	2305682	<3.0	3.0	2305669
Sodium (Na)	ug/L	1000	830	2305682	780	500	2305669
Strontium (Sr) †	ug/L	13	9.1	2305682	<2.0	2.0	2305669
Thallium (Tl)	ug/L	<2.0	<2.0	2305682	<2.0	2.0	2305669
Titanium (Ti) ††	ug/L	<10	<10	2305682	<10	10	2305669
Uranium (U) ††	ug/L	<1.0	<1.0	2305682	<1.0	1.0	2305669
Vanadium (V)	ug/L	<2.0	<2.0	2305682	<2.0	2.0	2305669

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
†† Parameter is not accreditable
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TOTAL EXTRACTABLE METALS (SURFACE WATER)

Bureau Veritas ID		KN5429	KN5430		KN5431		
Sampling Date		2022/06/11 11:15	2022/06/11 10:07		2022/06/11 09:51		
COC Number		N-A	N-A		N-A		
	Units	**DSO3-COASW3-Q1-2022**	**DSO3-COASW7-Q1-2022**	**QC Batch**	**DSO3-COASW9-Q1-2022**	**RDL**	**QC Batch**
Zinc (Zn)	ug/L	<7.0	<7.0	2305682	<7.0	7.0	2305669

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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CONVENTIONAL PARAMETERS (SURFACE WATER)

Bureau Veritas ID		KN5320	KN5320	KN5417		
Sampling Date		2022/06/14 09:50	2022/06/14 09:50	2022/06/14 10:25		
COC Number		N-A	N-A	N-A		
	Units	HOW-SWBL-Q1-2022	HOW-SWBL-Q1-2022 Lab-Dup	HOW-SWBC-Q1-2022	RDL	QC Batch
CONVENTIONALS						
Conductivity	mS/cm	0.048	N/A	0.0051	0.0010	2303774
Dissolved organic carbon †	mg/L	0.44	N/A	4.1	0.20	2303540
Dissolved oxygen †	mg/L	7.9	N/A	9.6	1.0	2303403
Nitrate (N) and Nitrite(N)	mg/L	<0.020	0.021	<0.020	0.020	2303524
Nitrates (N-NO3-)	mg/L	<0.020	0.021	<0.020	0.020	2303524
Nitrites (N-NO2-)	mg/L	<0.020	<0.020	<0.020	0.020	2303524
Nitrogen ammonia (N-NH4+ and N-NH3)	mg/L	<0.020	N/A	<0.020	0.020	2305219
Orthophosphate (P)	mg/L	<0.050	N/A	<0.050	0.050	2303412
pH	pH	6.67	N/A	5.92	N/A	2303766
pH (15° C) †	pH	7.31	N/A	5.66	N/A	2303507
Phenols-4AAP	mg/L	<0.0020	<0.0020	<0.0020	0.0020	2306928
Real Color	UCV	<2.0	N/A	31	2.0	2303417
Sulfides (S2-)	mg/L	<0.020	N/A	<0.020	0.020	2310362
TKN Total Kjeldahl Nitrogen	mg/L	<0.40	<0.40	<0.40	0.40	2305332
Turbidity	NTU	0.12	N/A	0.30	0.10	2303319
Un-ionized Ammonia at 15°C †	mg/L	<0.0005	N/A	<0.0005	0.0005	2303161
Alkalinity Total (as CaCO3) pH 4.5 †	mg/L	25	N/A	1.1	1.0	2303771
Bicarbonates (HCO3 as CaCO3) †	mg/L	25	N/A	1.1	1.0	2303771
Carbonate (CO3 as CaCO3) †	mg/L	<1.0	N/A	<1.0	1.0	2303771
Chloride (Cl)	mg/L	0.16	0.17	<0.050	0.050	2303526
Sulfates (SO4)	mg/L	1.9	1.9	<0.50	0.50	2303526
Total Dissolved Solids	mg/L	59	N/A	31	10	2304886
Total suspended solids (TSS)	mg/L	<2.0	N/A	<2.0	2.0	2305008

RDL = Reportable Detection Limit QC Batch = Quality Control Batch N/A = Not Applicable
† Parameter is not accreditable

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CONVENTIONAL PARAMETERS (SURFACE WATER)

Bureau Veritas ID		KN5417	KN5418	KN5418		
Sampling Date		2022/06/14 10:25	2022/06/14 11:04	2022/06/14 11:04		
COC Number		N-A	N-A	N-A		
	Units	HOW-SWBC-Q1-2022 Lab-Dup	HOW-SWTL-Q1-2022	HOW-SWTL-Q1-2022 Lab-Dup	RDL	QC Batch
CONVENTIONALS						
Conductivity	mS/cm	N/A	0.032	N/A	0.0010	2303774
Dissolved organic carbon †	mg/L	N/A	1.2	N/A	0.20	2303540
Dissolved oxygen †	mg/L	N/A	9.6	N/A	1.0	2303403
Nitrate (N) and Nitrite(N)	mg/L	N/A	0.069	N/A	0.020	2303524
Nitrates (N-NO3-)	mg/L	N/A	0.069	N/A	0.020	2303524
Nitrites (N-NO2-)	mg/L	N/A	<0.020	N/A	0.020	2303524
Nitrogen ammonia (N-NH4+ and N-NH3)	mg/L	<0.020	<0.020	N/A	0.020	2305219
Orthophosphate (P)	mg/L	N/A	<0.050	<0.050	0.050	2303412
pH	pH	N/A	6.58	N/A	N/A	2303766
pH (15° C) †	pH	N/A	7.19	N/A	N/A	2303507
Phenols-4AAP	mg/L	N/A	<0.0020	N/A	0.0020	2306928
Real Color	UCV	N/A	9.4	N/A	2.0	2303417
Sulfides (S2-)	mg/L	N/A	<0.020	N/A	0.020	2310362
TKN Total Kjeldahl Nitrogen	mg/L	N/A	<0.40	N/A	0.40	2305332
Turbidity	NTU	N/A	0.52	N/A	0.10	2303319
Un-ionized Ammonia at 15°C †	mg/L	N/A	<0.0005	N/A	0.0005	2303161
Alkalinity Total (as CaCO3) pH 4.5 †	mg/L	N/A	13	N/A	1.0	2303771
Bicarbonates (HCO3 as CaCO3) †	mg/L	N/A	13	N/A	1.0	2303771
Carbonate (CO3 as CaCO3) †	mg/L	N/A	<1.0	N/A	1.0	2303771
Chloride (Cl)	mg/L	N/A	0.23	N/A	0.050	2303526
Sulfates (SO4)	mg/L	N/A	2.0	N/A	0.50	2303526
Total Dissolved Solids	mg/L	N/A	40	N/A	10	2304886
Total suspended solids (TSS)	mg/L	N/A	<2.0	N/A	2.0	2305008

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable
† Parameter is not accreditable

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CONVENTIONAL PARAMETERS (SURFACE WATER)

Bureau Veritas ID		KN5419	KN5420	KN5421		
Sampling Date		2022/06/14 12:00	2022/06/14 13:11	2022/06/14 13:25		
COC Number		N-A	N-A	N-A		
	Units	HOW-SW5-Q1-2022	HOW-SW2-Q1-2022	HOW-SW3-Q1-2022	RDL	QC Batch
CONVENTIONALS						
Conductivity	mS/cm	0.0040	0.0049	0.0033	0.0010	2303774
Dissolved organic carbon †	mg/L	1.3	3.1	3.5	0.20	2303540
Dissolved oxygen †	mg/L	9.5	9.5	9.1	1.0	2303403
Nitrate (N) and Nitrite(N)	mg/L	<0.020	0.032	<0.020	0.020	2303524
Nitrates (N-NO3-)	mg/L	<0.020	0.032	<0.020	0.020	2303524
Nitrites (N-NO2-)	mg/L	<0.020	<0.020	<0.020	0.020	2303524
Nitrogen ammonia (N-NH4+ and N-NH3)	mg/L	<0.020	0.020	<0.020	0.020	2305219
Orthophosphate (P)	mg/L	<0.050	<0.050	<0.050	0.050	2303412
pH	pH	6.30	6.02	5.59	N/A	2303766
pH (15° C) †	pH	6.42	6.12	5.47	N/A	2303507
Phenols-4AAP	mg/L	<0.0020	<0.0020	<0.0020	0.0020	2306928
Real Color	UCV	7.5	27	19	2.0	2303417
Sulfides (S2-)	mg/L	<0.020	<0.020	<0.020	0.020	2310362
TKN Total Kjeldahl Nitrogen	mg/L	<0.40	<0.40	<0.40	0.40	2305332
Turbidity	NTU	0.71	0.61	0.21	0.10	2303319
Un-ionized Ammonia at 15°C †	mg/L	<0.0005	<0.0005	<0.0005	0.0005	2303161
Alkalinity Total (as CaCO3) pH 4.5 †	mg/L	1.9	1.5	<1.0	1.0	2303771
Bicarbonates (HCO3 as CaCO3) †	mg/L	1.9	1.5	<1.0	1.0	2303771
Carbonate (CO3 as CaCO3) †	mg/L	<1.0	<1.0	<1.0	1.0	2303771
Chloride (Cl)	mg/L	0.068	0.18	0.050	0.050	2303526
Sulfates (SO4)	mg/L	<0.50	<0.50	<0.50	0.50	2303526
Total Dissolved Solids	mg/L	22	20	23	10	2304886
Total suspended solids (TSS)	mg/L	3.0	<2.0	2.0	2.0	2305008

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
† Parameter is not accreditable
N/A = Not Applicable

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CONVENTIONAL PARAMETERS (SURFACE WATER)

Bureau Veritas ID		KN5421	KN5422	KN5423		
Sampling Date		2022/06/14 13:25	2022/06/14 14:20	2022/06/14 14:45		
COC Number		N-A	N-A	N-A		
	Units	HOW-SW3-Q1-2022 Lab-Dup	HOW-SW4-Q1-2022	HOW-SW1-Q1-2022	RDL	QC Batch
CONVENTIONALS						
Conductivity	mS/cm	N/A	0.025	0.029	0.0010	2303774
Dissolved organic carbon †	mg/L	N/A	0.65	1.6	0.20	2303540
Dissolved oxygen †	mg/L	N/A	9.1	10	1.0	2303403
Nitrate (N) and Nitrite(N)	mg/L	N/A	0.26	0.20	0.020	2303524
Nitrates (N-NO3-)	mg/L	N/A	0.26	0.20	0.020	2303524
Nitrites (N-NO2-)	mg/L	N/A	<0.020	<0.020	0.020	2303524
Nitrogen ammonia (N-NH4+ and N-NH3)	mg/L	N/A	<0.020	<0.020	0.020	2305219
Orthophosphate (P)	mg/L	N/A	<0.050	<0.050	0.050	2303412
pH	pH	N/A	6.41	6.64	N/A	2303766
pH (15° C) †	pH	5.50	7.01	7.19	N/A	2303507
Phenols-4AAP	mg/L	N/A	<0.0020	<0.0020	0.0020	2306928
Real Color	UCV	19	3.7	7.0	2.0	2303417
Sulfides (S2-)	mg/L	N/A	<0.020	<0.020	0.020	2310362
TKN Total Kjeldahl Nitrogen	mg/L	N/A	<0.40	<0.40	0.40	2305332
Turbidity	NTU	N/A	0.27	0.23	0.10	2303319
Un-ionized Ammonia at 15°C †	mg/L	N/A	<0.0005	<0.0005	0.0005	2303161
Alkalinity Total (as CaCO3) pH 4.5 †	mg/L	N/A	8.7	12	1.0	2303771
Bicarbonates (HCO3 as CaCO3) †	mg/L	N/A	8.7	12	1.0	2303771
Carbonate (CO3 as CaCO3) †	mg/L	N/A	<1.0	<1.0	1.0	2303771
Chloride (Cl)	mg/L	N/A	0.40	0.42	0.050	2303526
Sulfates (SO4)	mg/L	N/A	1.7	1.9	0.50	2303526
Total Dissolved Solids	mg/L	N/A	28	37	10	2304886
Total suspended solids (TSS)	mg/L	N/A	<2.0	3.0	2.0	2305008

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable
† Parameter is not accreditable

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CONVENTIONAL PARAMETERS (SURFACE WATER)

Bureau Veritas ID		KN5423	KN5424		KN5425		
Sampling Date		2022/06/14 14:45	2022/06/14 16:00		2022/06/11 12:14		
COC Number		N-A	N-A		N-A		
	Units	HOW-SW1-Q1-2022 Lab-Dup	HOW-SWML-Q1-2022	QC Batch	DSO3-COASW8-Q1-2022	RDL	QC Batch
CONVENTIONALS							
Conductivity	mS/cm	N/A	0.011	2303774	0.0033	0.0010	2303774
Dissolved organic carbon †	mg/L	N/A	2.0	2303540	3.2	0.20	2303540
Dissolved oxygen †	mg/L	N/A	10	2303403	11	1.0	2303403
Nitrate (N) and Nitrite(N)	mg/L	N/A	<0.020	2303524	<0.020	0.020	2303524
Nitrates (N-NO3-)	mg/L	N/A	<0.020	2303524	<0.020	0.020	2303524
Nitrites (N-NO2-)	mg/L	N/A	<0.020	2303524	<0.020	0.020	2303524
Nitrogen ammonia (N-NH4+ and N-NH3)	mg/L	N/A	<0.020	2305219	<0.020	0.020	2305219
Orthophosphate (P)	mg/L	N/A	<0.050	2303412	<0.050	0.050	2303412
pH	pH	N/A	6.44	2303766	6.05	N/A	2303766
pH (15° C) †	pH	N/A	6.73	2303507	5.95	N/A	2303507
Phenols-4AAP	mg/L	N/A	<0.0020	2306928	<0.0020	0.0020	2306928
Real Color	UCV	N/A	17	2303417	20	2.0	2303417
Sulfides (S2-)	mg/L	<0.020	<0.020	2310362	<0.020	0.020	2310362
TKN Total Kjeldahl Nitrogen	mg/L	N/A	<0.40	2305332	<0.40	0.40	2305449
Turbidity	NTU	N/A	5.0	2303319	0.37	0.10	2303319
Un-ionized Ammonia at 15°C †	mg/L	N/A	<0.0005	2303161	<0.0005	0.0005	2303161
Alkalinity Total (as CaCO3) pH 4.5 †	mg/L	N/A	3.1	2303771	<1.0	1.0	2303771
Bicarbonates (HCO3 as CaCO3) †	mg/L	N/A	3.1	2303771	<1.0	1.0	2303771
Carbonate (CO3 as CaCO3) †	mg/L	N/A	<1.0	2303771	<1.0	1.0	2303771
Chloride (Cl)	mg/L	N/A	0.12	2303526	<0.050	0.050	2303526
Sulfates (SO4)	mg/L	N/A	1.6	2303526	<0.50	0.50	2303526
Total Dissolved Solids	mg/L	N/A	24	2304886	34	10	2304113
Total suspended solids (TSS)	mg/L	N/A	5.0	2305008	<2.0	2.0	2303886

RDL = Reportable Detection Limit QC Batch = Quality Control Batch N/A = Not Applicable
† Parameter is not accreditable

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CONVENTIONAL PARAMETERS (SURFACE WATER)

Bureau Veritas ID		KN5426	KN5426		
Sampling Date		2022/06/11 11:47	2022/06/11 11:47		
COC Number		N-A	N-A		
	Units	DSO3-COASW13-Q1-2022	DSO3-COASW13-Q1-2022 Lab-Dup	RDL	QC Batch
CONVENTIONALS					
Conductivity	mS/cm	<0.0010	<0.0010	0.0010	2303774
Dissolved organic carbon †	mg/L	1.3	N/A	0.20	2303540
Dissolved oxygen †	mg/L	10	N/A	1.0	2303403
Nitrate (N) and Nitrite(N)	mg/L	<0.020	N/A	0.020	2303524
Nitrates (N-NO3-)	mg/L	<0.020	N/A	0.020	2303524
Nitrites (N-NO2-)	mg/L	<0.020	N/A	0.020	2303524
Nitrogen ammonia (N-NH4+ and N-NH3)	mg/L	<0.020	N/A	0.020	2305219
Orthophosphate (P)	mg/L	<0.050	N/A	0.050	2303412
pH	pH	6.13	6.13	N/A	2303766
pH (15° C) †	pH	6.41	N/A	N/A	2303507
Phenols-4AAP	mg/L	<0.0020	N/A	0.0020	2306928
Real Color	UCV	9.0	N/A	2.0	2303417
Sulfides (S2-)	mg/L	<0.020	N/A	0.020	2310362
TKN Total Kjeldahl Nitrogen	mg/L	<0.40	N/A	0.40	2305332
Turbidity	NTU	0.75	N/A	0.10	2303319
Un-ionized Ammonia at 15°C †	mg/L	<0.0005	N/A	0.0005	2303161
Alkalinity Total (as CaCO3) pH 4.5 †	mg/L	1.9	1.7	1.0	2303771
Bicarbonates (HCO3 as CaCO3) †	mg/L	1.9	1.7	1.0	2303771
Carbonate (CO3 as CaCO3) †	mg/L	<1.0	<1.0	1.0	2303771
Chloride (Cl)	mg/L	0.068	N/A	0.050	2303526
Sulfates (SO4)	mg/L	<0.50	N/A	0.50	2303526
Total Dissolved Solids	mg/L	15	N/A	10	2304113
Total suspended solids (TSS)	mg/L	2.0	N/A	2.0	2303886

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
† Parameter is not accreditable
N/A = Not Applicable

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CONVENTIONAL PARAMETERS (SURFACE WATER)

Bureau Veritas ID		KN5427			KN5428		
Sampling Date		2022/06/11 11:29			2022/06/11 10:56		
COC Number		N-A			N-A		
	Units	DSO3-COASW4-Q1-2022	RDL	QC Batch	DSO3-COASW10-Q1-2022	RDL	QC Batch
CONVENTIONALS							
Conductivity	mS/cm	0.22	0.0010	2303774	0.0048	0.0010	2303871
Dissolved organic carbon †	mg/L	1.7	0.20	2303540	2.2	0.20	2303540
Dissolved oxygen †	mg/L	10	1.0	2303403	9.9	1.0	2303403
Nitrate (N) and Nitrite(N)	mg/L	3.1	0.020	2303524	0.057	0.020	2303524
Nitrates (N-NO3-)	mg/L	3.0	0.020	2303524	0.057	0.020	2303524
Nitrites (N-NO2-)	mg/L	0.058	0.020	2303524	<0.020	0.020	2303524
Nitrogen ammonia (N-NH4+ and N-NH3)	mg/L	1.1	0.040	2305219	<0.020	0.020	2305219
Orthophosphate (P)	mg/L	<0.050	0.050	2303412	<0.050	0.050	2303412
pH	pH	6.06	N/A	2303766	6.02	N/A	2303867
pH (15° C) †	pH	6.63	N/A	2303507	6.35	N/A	2303507
Phenols-4AAP	mg/L	<0.0020	0.0020	2306928	<0.0020	0.0020	2306928
Real Color	UCV	<2.0	2.0	2303417	160	2.0	2303417
Sulfides (S2-)	mg/L	<0.020	0.020	2310362	<0.020	0.020	2310362
TKN Total Kjeldahl Nitrogen	mg/L	<0.40	0.40	2305332	<0.40	0.40	2305332
Turbidity	NTU	0.95	0.10	2303319	120	0.10	2303319
Un-ionized Ammonia at 15°C †	mg/L	0.0013	0.0005	2303161	<0.0005	0.0005	2303161
Alkalinity Total (as CaCO3) pH 4.5 †	mg/L	2.2	1.0	2303771	1.5	1.0	2303869
Bicarbonates (HCO3 as CaCO3) †	mg/L	2.2	1.0	2303771	1.5	1.0	2303869
Carbonate (CO3 as CaCO3) †	mg/L	<1.0	1.0	2303771	<1.0	1.0	2303869
Chloride (Cl)	mg/L	53	0.050	2303526	0.074	0.050	2303526
Sulfates (SO4)	mg/L	<0.50	0.50	2303526	<0.50	0.50	2303526
Total Dissolved Solids	mg/L	180	10	2304113	16	10	2304113
Total suspended solids (TSS)	mg/L	3.0	2.0	2303886	7.0	2.0	2303886

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
† Parameter is not accreditable
N/A = Not Applicable

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CONVENTIONAL PARAMETERS (SURFACE WATER)

Bureau Veritas ID		KN5429	KN5430		KN5430	
Sampling Date		2022/06/11 11:15	2022/06/11 10:07		2022/06/11 10:07	
COC Number		N-A	N-A		N-A	
	Units	DSO3-COASW3-Q1-2022	DSO3-COASW7-Q1-2022	RDL	DSO3-COASW7-Q1-2022 Lab-Dup	QC Batch
CONVENTIONALS						
Conductivity	mS/cm	0.026	0.015	0.0010	N/A	2303871
Dissolved organic carbon †	mg/L	0.26	1.6	0.20	N/A	2303540
Dissolved oxygen †	mg/L	10	10	1.0	N/A	2303403
Nitrate (N) and Nitrite(N)	mg/L	0.19	0.088	0.020	N/A	2303524
Nitrates (N-NO3-)	mg/L	0.19	0.088	0.020	N/A	2303524
Nitrites (N-NO2-)	mg/L	<0.020	<0.020	0.020	N/A	2303524
Nitrogen ammonia (N-NH4+ and N-NH3)	mg/L	<0.020	<0.020	0.020	N/A	2305219
Orthophosphate (P)	mg/L	<0.050	<0.050	0.050	N/A	2303412
pH	pH	6.44	6.52	N/A	N/A	2303867
pH (15° C) †	pH	7.02	6.82	N/A	6.89	2303507
Phenols-4AAP	mg/L	<0.0020	<0.0020	0.0020	N/A	2306928
Real Color	UCV	41	15	2.0	N/A	2303417
Sulfides (S2-)	mg/L	<0.020	<0.020	0.020	N/A	2310362
TKN Total Kjeldahl Nitrogen	mg/L	<0.40	<0.40	0.40	N/A	2305332
Turbidity	NTU	17	4.5	0.10	N/A	2303319
Un-ionized Ammonia at 15°C †	mg/L	<0.0005	<0.0005	0.0005	N/A	2303161
Alkalinity Total (as CaCO3) pH 4.5 †	mg/L	9.1	4.8	1.0	N/A	2303869
Bicarbonates (HCO3 as CaCO3) †	mg/L	9.1	4.8	1.0	N/A	2303869
Carbonate (CO3 as CaCO3) †	mg/L	<1.0	<1.0	1.0	N/A	2303869
Chloride (Cl)	mg/L	0.51	0.29	0.050	N/A	2303526
Sulfates (SO4)	mg/L	1.8	1.3	0.50	N/A	2303526
Total Dissolved Solids	mg/L	20	16	10	N/A	2304113
Total suspended solids (TSS)	mg/L	3.0	4.0	2.0	N/A	2303886

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable
† Parameter is not accreditable

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CONVENTIONAL PARAMETERS (SURFACE WATER)

Bureau Veritas ID		KN5431	KN5431		
Sampling Date		2022/06/11 09:51	2022/06/11 09:51		
COC Number		N-A	N-A		
	Units	DSO3-COASW9-Q1-2022	DSO3-COASW9-Q1-2022 Lab-Dup	RDL	QC Batch
CONVENTIONALS					
Conductivity	mS/cm	0.0058	N/A	0.0010	2303871
Dissolved organic carbon †	mg/L	3.5	3.5	0.20	2303540
Dissolved oxygen †	mg/L	10	N/A	1.0	2303403
Nitrate (N) and Nitrite(N)	mg/L	<0.020	N/A	0.020	2303524
Nitrates (N-NO3-)	mg/L	<0.020	N/A	0.020	2303524
Nitrites (N-NO2-)	mg/L	<0.020	N/A	0.020	2303524
Nitrogen ammonia (N-NH4+ and N-NH3)	mg/L	<0.020	N/A	0.020	2305219
Orthophosphate (P)	mg/L	<0.050	N/A	0.050	2303412
pH	pH	5.73	N/A	N/A	2303867
pH (15° C) †	pH	5.30	N/A	N/A	2303507
Phenols-4AAP	mg/L	<0.0020	N/A	0.0020	2306928
Real Color	UCV	34	N/A	2.0	2303417
Sulfides (S2-)	mg/L	<0.020	N/A	0.020	2310362
TKN Total Kjeldahl Nitrogen	mg/L	<0.40	N/A	0.40	2305449
Turbidity	NTU	5.0	4.8	0.10	2303319
Un-ionized Ammonia at 15°C †	mg/L	<0.0005	N/A	0.0005	2303161
Alkalinity Total (as CaCO3) pH 4.5 †	mg/L	<1.0	N/A	1.0	2303869
Bicarbonates (HCO3 as CaCO3) †	mg/L	<1.0	N/A	1.0	2303869
Carbonate (CO3 as CaCO3) †	mg/L	<1.0	N/A	1.0	2303869
Chloride (Cl)	mg/L	0.77	N/A	0.050	2303526
Sulfates (SO4)	mg/L	<0.50	N/A	0.50	2303526
Total Dissolved Solids	mg/L	10	N/A	10	2304113
Total suspended solids (TSS)	mg/L	5.0	N/A	2.0	2303886

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable
† Parameter is not accreditable

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GENERAL COMMENTS

Samples temperature is above 10°C.: KN5320, KN5320
pH in water: Holding time already past upon reception.: KN5320
pH Measured @ 15° C: Holding time already past upon reception.: KN5320
Samples temperature is above 10°C.: KN5320, KN5320, KN5320, KN5320
Dissolved Oxygen: Holding time already past upon reception.: KN5320
Samples temperature is above 10°C.: KN5320, KN5320, KN5320, KN5320, KN5417, KN5417
pH in water: Holding time already past upon reception.: KN5417
pH Measured @ 15° C: Holding time already past upon reception.: KN5417
Samples temperature is above 10°C.: KN5417, KN5417, KN5417, KN5417
Dissolved Oxygen: Holding time already past upon reception.: KN5417
Samples temperature is above 10°C.: KN5417, KN5417, KN5417, KN5417, KN5418, KN5418
pH in water: Holding time already past upon reception.: KN5418
pH Measured @ 15° C: Holding time already past upon reception.: KN5418
Samples temperature is above 10°C.: KN5418, KN5418, KN5418, KN5418
Dissolved Oxygen: Holding time already past upon reception.: KN5418
Samples temperature is above 10°C.: KN5418, KN5418, KN5418, KN5418, KN5419, KN5419
pH in water: Holding time already past upon reception.: KN5419
pH Measured @ 15° C: Holding time already past upon reception.: KN5419
Samples temperature is above 10°C.: KN5419, KN5419, KN5419, KN5419
Dissolved Oxygen: Holding time already past upon reception.: KN5419
Samples temperature is above 10°C.: KN5419, KN5419, KN5419, KN5419, KN5420, KN5420
pH in water: Holding time already past upon reception.: KN5420
pH Measured @ 15° C: Holding time already past upon reception.: KN5420
Samples temperature is above 10°C.: KN5420, KN5420, KN5420, KN5420
Dissolved Oxygen: Holding time already past upon reception.: KN5420
Samples temperature is above 10°C.: KN5420, KN5420, KN5420, KN5420, KN5421, KN5421
pH in water: Holding time already past upon reception.: KN5421
pH Measured @ 15° C: Holding time already past upon reception.: KN5421
Samples temperature is above 10°C.: KN5421, KN5421, KN5421, KN5421
Dissolved Oxygen: Holding time already past upon reception.: KN5421
Samples temperature is above 10°C.: KN5421, KN5421, KN5421, KN5421, KN5422, KN5422
pH in water: Holding time already past upon reception.: KN5422
pH Measured @ 15° C: Holding time already past upon reception.: KN5422
Samples temperature is above 10°C.: KN5422, KN5422, KN5422, KN5422
Dissolved Oxygen: Holding time already past upon reception.: KN5422
Samples temperature is above 10°C.: KN5422, KN5422, KN5422, KN5422, KN5423, KN5423
pH in water: Holding time already past upon reception.: KN5423
pH Measured @ 15° C: Holding time already past upon reception.: KN5423
Samples temperature is above 10°C.: KN5423, KN5423, KN5423, KN5423
Dissolved Oxygen: Holding time already past upon reception.: KN5423
Samples temperature is above 10°C.: KN5423, KN5423, KN5423, KN5423, KN5424, KN5424
pH in water: Holding time already past upon reception.: KN5424
pH Measured @ 15° C: Holding time already past upon reception.: KN5424
Samples temperature is above 10°C.: KN5424, KN5424, KN5424, KN5424
Dissolved Oxygen: Holding time already past upon reception.: KN5424
Samples temperature is above 10°C.: KN5424, KN5424, KN5424, KN5424, KN5425, KN5425
Real Color: Holding time already past upon reception.: KN5425
Nitrates(NO3-), Nitrites(NO2-)-water: Holding time already past upon reception.: KN5425
pH in water: Holding time already past upon reception.: KN5425
pH Measured @ 15° C: Holding time already past upon reception.: KN5425
Ortho Phosphate: Holding time already past upon reception.: KN5425
Turbidity: Holding time already past upon reception.: KN5425

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Samples temperature is above 10°C.: KN5425, KN5425, KN5425, KN5425
Dissolved Oxygen: Holding time already past upon reception.: KN5425
Samples temperature is above 10°C.: KN5425
Dissolved Organic Carbon: Holding time already past upon reception.: KN5425
Samples temperature is above 10°C.: KN5425, KN5425, KN5425, KN5426, KN5426
Real Color: Holding time already past upon reception.: KN5426
Nitrates(NO3-), Nitrites(NO2-)-water: Holding time already past upon reception.: KN5426
pH in water: Holding time already past upon reception.: KN5426
pH Measured @ 15° C: Holding time already past upon reception.: KN5426
Ortho Phosphate: Holding time already past upon reception.: KN5426
Turbidity: Holding time already past upon reception.: KN5426
Samples temperature is above 10°C.: KN5426, KN5426, KN5426, KN5426
Dissolved Oxygen: Holding time already past upon reception.: KN5426
Samples temperature is above 10°C.: KN5426
Dissolved Organic Carbon: Holding time already past upon reception.: KN5426
Samples temperature is above 10°C.: KN5426, KN5426, KN5426, KN5427, KN5427
Real Color: Holding time already past upon reception.: KN5427
Nitrates(NO3-), Nitrites(NO2-)-water: Holding time already past upon reception.: KN5427
pH in water: Holding time already past upon reception.: KN5427
pH Measured @ 15° C: Holding time already past upon reception.: KN5427
Ortho Phosphate: Holding time already past upon reception.: KN5427
Turbidity: Holding time already past upon reception.: KN5427
Samples temperature is above 10°C.: KN5427, KN5427, KN5427, KN5427
Dissolved Oxygen: Holding time already past upon reception.: KN5427
Samples temperature is above 10°C.: KN5427
Dissolved Organic Carbon: Holding time already past upon reception.: KN5427
Samples temperature is above 10°C.: KN5427, KN5427, KN5427, KN5428, KN5428
Real Color: Holding time already past upon reception.: KN5428
Nitrates(NO3-), Nitrites(NO2-)-water: Holding time already past upon reception.: KN5428
pH in water: Holding time already past upon reception.: KN5428
pH Measured @ 15° C: Holding time already past upon reception.: KN5428
Ortho Phosphate: Holding time already past upon reception.: KN5428
Turbidity: Holding time already past upon reception.: KN5428
Samples temperature is above 10°C.: KN5428, KN5428, KN5428, KN5428
Dissolved Oxygen: Holding time already past upon reception.: KN5428
Samples temperature is above 10°C.: KN5428
Dissolved Organic Carbon: Holding time already past upon reception.: KN5428
Samples temperature is above 10°C.: KN5428, KN5428, KN5428, KN5429, KN5429
Real Color: Holding time already past upon reception.: KN5429
Nitrates(NO3-), Nitrites(NO2-)-water: Holding time already past upon reception.: KN5429
pH in water: Holding time already past upon reception.: KN5429
pH Measured @ 15° C: Holding time already past upon reception.: KN5429
Ortho Phosphate: Holding time already past upon reception.: KN5429
Turbidity: Holding time already past upon reception.: KN5429
Samples temperature is above 10°C.: KN5429, KN5429, KN5429, KN5429
Dissolved Oxygen: Holding time already past upon reception.: KN5429
Samples temperature is above 10°C.: KN5429
Dissolved Organic Carbon: Holding time already past upon reception.: KN5429
Samples temperature is above 10°C.: KN5429, KN5429, KN5429, KN5430, KN5430
Real Color: Holding time already past upon reception.: KN5430
Nitrates(NO3-), Nitrites(NO2-)-water: Holding time already past upon reception.: KN5430
pH in water: Holding time already past upon reception.: KN5430
pH Measured @ 15° C: Holding time already past upon reception.: KN5430
Ortho Phosphate: Holding time already past upon reception.: KN5430
Turbidity: Holding time already past upon reception.: KN5430

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Samples temperature is above 10°C.: KN5430, KN5430, KN5430, KN5430
Dissolved Oxygen: Holding time already past upon reception.: KN5430
Samples temperature is above 10°C.: KN5430
Dissolved Organic Carbon: Holding time already past upon reception.: KN5430
Samples temperature is above 10°C.: KN5430, KN5430, KN5430, KN5431, KN5431
Real Color: Holding time already past upon reception.: KN5431
Nitrates(NO3-), Nitrites(NO2-)-water: Holding time already past upon reception.: KN5431
pH in water: Holding time already past upon reception.: KN5431
pH Measured @ 15° C: Holding time already past upon reception.: KN5431
Ortho Phosphate: Holding time already past upon reception.: KN5431
Turbidity: Holding time already past upon reception.: KN5431
Samples temperature is above 10°C.: KN5431, KN5431, KN5431, KN5431
Dissolved Oxygen: Holding time already past upon reception.: KN5431
Samples temperature is above 10°C.: KN5431
Dissolved Organic Carbon: Holding time already past upon reception.: KN5431
Samples temperature is above 10°C.: KN5431, KN5431, KN5431

CONVENTIONAL PARAMETERS (SURFACE WATER)

Oxygène dissous: Le contenant n'était pas plein (présence d'un espace d'air) .

Reported detection limits are multiplied by dilution factors used for sample analysis.

TKN < azote ammoniac: Both values fall within acceptable RPD limits for duplicates and are likely equivalent. KN5427

Results relate only to the items tested.

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QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units
2303319	FLE	Spiked Blank	Turbidity	2022/06/16		97	%
2303319	FLE	Method Blank	Turbidity	2022/06/16	<0.10		NTU
2303412	AGO	QC Standard	Orthophosphate (P)	2022/06/16		103	%
2303412	AGO	Spiked Blank	Orthophosphate (P)	2022/06/16		101	%
2303412	AGO	Method Blank	Orthophosphate (P)	2022/06/16	<0.050		mg/L
2303417	FLE	Spiked Blank	Real Color	2022/06/16		98	%
2303417	FLE	Method Blank	Real Color	2022/06/16	<2.0		UCV
2303507	FLE	Spiked Blank	pH (15° C)	2022/06/16		99	%
2303524	SF5	Spiked Blank	Nitrate (N) and Nitrite(N)	2022/06/16		103	%
			Nitrates (N-NO3-)	2022/06/16		105	%
			Nitrites (N-NO2-)	2022/06/16		100	%
2303524	SF5	Method Blank	Nitrate (N) and Nitrite(N)	2022/06/16	<0.020		mg/L
			Nitrates (N-NO3-)	2022/06/16	<0.020		mg/L
			Nitrites (N-NO2-)	2022/06/16	<0.020		mg/L
2303526	SF5	Spiked Blank	Chloride (Cl)	2022/06/16		101	%
			Sulfates (SO4)	2022/06/16		102	%
2303526	SF5	Method Blank	Chloride (Cl)	2022/06/16	<0.050		mg/L
			Sulfates (SO4)	2022/06/16	<0.50		mg/L
2303540	BAG	Spiked Blank	Dissolved organic carbon	2022/06/17		98	%
2303540	BAG	Method Blank	Dissolved organic carbon	2022/06/17	<0.20		mg/L
2303766	LI	Spiked Blank	pH	2022/06/17		102	%
2303771	LI	Spiked Blank	Alkalinity Total (as CaCO3) pH 4.5	2022/06/17		100	%
			Bicarbonates (HCO3 as CaCO3)	2022/06/17		100	%
			Carbonate (CO3 as CaCO3)	2022/06/17		100	%
2303771	LI	Method Blank	Alkalinity Total (as CaCO3) pH 4.5	2022/06/17	<1.0		mg/L
			Bicarbonates (HCO3 as CaCO3)	2022/06/17	<1.0		mg/L
			Carbonate (CO3 as CaCO3)	2022/06/17	<1.0		mg/L
2303774	LI	Spiked Blank	Conductivity	2022/06/17		106	%
2303774	LI	Method Blank	Conductivity	2022/06/17	<0.0010		mS/cm
2303867	LI	Spiked Blank	pH	2022/06/17		102	%
2303869	LI	Spiked Blank	Alkalinity Total (as CaCO3) pH 4.5	2022/06/17		105	%
			Bicarbonates (HCO3 as CaCO3)	2022/06/17		105	%
			Carbonate (CO3 as CaCO3)	2022/06/17		105	%
2303869	LI	Method Blank	Alkalinity Total (as CaCO3) pH 4.5	2022/06/17	<1.0		mg/L
			Bicarbonates (HCO3 as CaCO3)	2022/06/17	<1.0		mg/L
			Carbonate (CO3 as CaCO3)	2022/06/17	<1.0		mg/L
2303871	LI	Spiked Blank	Conductivity	2022/06/17		102	%
2303871	LI	Method Blank	Conductivity	2022/06/17	<0.0010		mS/cm
2303886	SAT	Spiked Blank	Total suspended solids (TSS)	2022/06/20		97	%
2303886	SAT	Method Blank	Total suspended solids (TSS)	2022/06/20	<2.0		mg/L
2304113	ZZH	Spiked Blank	Total Dissolved Solids	2022/06/20		91	%
2304113	ZZH	Method Blank	Total Dissolved Solids	2022/06/20	<10		mg/L
2304886	SAT	Spiked Blank	Total Dissolved Solids	2022/06/23		97	%
2304886	SAT	Method Blank	Total Dissolved Solids	2022/06/23	<10		mg/L
2305008	YLI	Spiked Blank	Total suspended solids (TSS)	2022/06/24		97	%
2305008	YLI	Method Blank	Total suspended solids (TSS)	2022/06/24	<2.0		mg/L
2305101	TLG	Matrix Spike [KN5419-04]	Mercury (Hg)	2022/06/21		107	%
2305101	TLG	Spiked Blank	Mercury (Hg)	2022/06/21		104	%
2305101	TLG	Method Blank	Mercury (Hg)	2022/06/21	<0.01		ug/L
2305219	AGO	Spiked Blank	Nitrogen ammonia (N-NH4+ and N-NH3)	2022/06/30		107	%
2305219	AGO	Method Blank	Nitrogen ammonia (N-NH4+ and N-NH3)	2022/06/30	<0.020		mg/L

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units
2305332	SKL	Spiked Blank	TKN Total Kjeldahl Nitrogen	2022/06/27		107	%
2305332	SKL	Method Blank	TKN Total Kjeldahl Nitrogen	2022/06/23	<0.40		mg/L
2305398	TLG	Matrix Spike	Mercury (Hg)	2022/06/21		108	%
2305398	TLG	Spiked Blank	Mercury (Hg)	2022/06/21		107	%
2305398	TLG	Method Blank	Mercury (Hg)	2022/06/21	<0.01		ug/L
2305449	SKL	Spiked Blank	TKN Total Kjeldahl Nitrogen	2022/06/27		103	%
2305449	SKL	Method Blank	TKN Total Kjeldahl Nitrogen	2022/06/23	<0.40		mg/L
2305669	DZE	Spiked Blank	Aluminum (Al)	2022/06/24		99	%
			Antimony (Sb)	2022/06/24		103	%
			Silver (Ag)	2022/06/24		90	%
			Arsenic (As)	2022/06/24		105	%
			Barium (Ba)	2022/06/24		93	%
			Beryllium (Be)	2022/06/24		92	%
			Bismuth (Bi)	2022/06/24		90	%
			Boron (B)	2022/06/24		98	%
			Cadmium (Cd)	2022/06/24		101	%
			Calcium (Ca)	2022/06/24		90	%
			Chromium (Cr)	2022/06/24		100	%
			Cobalt (Co)	2022/06/24		100	%
			Copper (Cu)	2022/06/24		100	%
			Tin (Sn)	2022/06/24		99	%
			Iron (Fe)	2022/06/24		99	%
			Magnesium (Mg)	2022/06/24		97	%
			Manganese (Mn)	2022/06/24		101	%
			Mercury (Hg)	2022/06/24		106	%
			Molybdenum (Mo)	2022/06/24		105	%
			Nickel (Ni)	2022/06/24		99	%
			Total phosphorous	2022/06/24		96	%
			Lead (Pb)	2022/06/24		94	%
			Potassium (K)	2022/06/24		98	%
			Selenium (Se)	2022/06/24		123 (1)	%
			Sodium (Na)	2022/06/24		102	%
			Strontium (Sr)	2022/06/24		95	%
			Thallium (Tl)	2022/06/24		82	%
			Titanium (Ti)	2022/06/24		100	%
			Uranium (U)	2022/06/24		90	%
			Vanadium (V)	2022/06/24		99	%
			Zinc (Zn)	2022/06/24		96	%
2305669	DZE	Method Blank	Aluminum (Al)	2022/07/05	<10		ug/L
			Antimony (Sb)	2022/07/05	<1.0		ug/L
			Silver (Ag)	2022/07/05	<1.0		ug/L
			Arsenic (As)	2022/07/05	<1.0		ug/L
			Barium (Ba)	2022/07/05	<2.0		ug/L
			Beryllium (Be)	2022/07/05	<2.0		ug/L
			Bismuth (Bi)	2022/07/05	<1.0		ug/L
			Boron (B)	2022/07/05	<50		ug/L
			Cadmium (Cd)	2022/07/05	<0.20		ug/L
			Calcium (Ca)	2022/07/05	<500		ug/L
			Chromium (Cr)	2022/07/05	<5.0		ug/L
			Cobalt (Co)	2022/07/05	<1.0		ug/L
			Copper (Cu)	2022/07/05	<1.0		ug/L

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units
			Total Hardness (CaCO3)	2022/07/05	<1000		ug/L
			Tin (Sn)	2022/07/05	<2.0		ug/L
			Iron (Fe)	2022/07/05	<60		ug/L
			Magnesium (Mg)	2022/07/05	<100		ug/L
			Manganese (Mn)	2022/07/05	<1.0		ug/L
			Mercury (Hg)	2022/07/05	<0.10		ug/L
			Molybdenum (Mo)	2022/07/05	<1.0		ug/L
			Nickel (Ni)	2022/07/05	<2.0		ug/L
			P2O5	2022/07/05	<25		ug/L
			Total phosphorous	2022/07/05	<10		ug/L
			Lead (Pb)	2022/07/05	<0.50		ug/L
			Potassium (K)	2022/07/05	<500		ug/L
			Selenium (Se)	2022/07/05	<3.0		ug/L
			Sodium (Na)	2022/07/05	<500		ug/L
			Strontium (Sr)	2022/07/05	<2.0		ug/L
			Thallium (Tl)	2022/07/05	<2.0		ug/L
			Titanium (Ti)	2022/07/05	<10		ug/L
			Uranium (U)	2022/07/05	<1.0		ug/L
			Vanadium (V)	2022/07/05	<2.0		ug/L
			Zinc (Zn)	2022/07/05	<7.0		ug/L
2305682	DZE	Spiked Blank	Aluminum (Al)	2022/06/24		87	%
			Antimony (Sb)	2022/06/24		98	%
			Silver (Ag)	2022/06/24		86	%
			Arsenic (As)	2022/06/24		99	%
			Barium (Ba)	2022/06/24		88	%
			Beryllium (Be)	2022/06/24		89	%
			Bismuth (Bi)	2022/06/24		85	%
			Boron (B)	2022/06/24		97	%
			Cadmium (Cd)	2022/06/24		94	%
			Calcium (Ca)	2022/06/24		80	%
			Chromium (Cr)	2022/06/24		93	%
			Cobalt (Co)	2022/06/24		92	%
			Copper (Cu)	2022/06/24		93	%
			Tin (Sn)	2022/06/24		94	%
			Iron (Fe)	2022/06/24		92	%
			Magnesium (Mg)	2022/06/24		90	%
			Manganese (Mn)	2022/06/24		93	%
			Mercury (Hg)	2022/06/24		101	%
			Molybdenum (Mo)	2022/06/24		97	%
			Nickel (Ni)	2022/06/24		92	%
			Total phosphorous	2022/06/24		91	%
			Lead (Pb)	2022/06/24		89	%
			Potassium (K)	2022/06/24		90	%
			Selenium (Se)	2022/06/24		109	%
			Sodium (Na)	2022/06/24		88	%
			Strontium (Sr)	2022/06/24		87	%
			Thallium (Tl)	2022/06/24		78 (1)	%
			Titanium (Ti)	2022/06/24		91	%
			Uranium (U)	2022/06/24		85	%
			Vanadium (V)	2022/06/24		92	%
			Zinc (Zn)	2022/06/24		89	%

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units
2305682	DZE	Method Blank	Aluminum (Al)	2022/06/24	<10		ug/L
			Antimony (Sb)	2022/06/24	<1.0		ug/L
			Silver (Ag)	2022/06/24	<1.0		ug/L
			Arsenic (As)	2022/06/24	<1.0		ug/L
			Barium (Ba)	2022/06/24	<2.0		ug/L
			Beryllium (Be)	2022/06/24	<2.0		ug/L
			Bismuth (Bi)	2022/06/24	<1.0		ug/L
			Boron (B)	2022/06/24	<50		ug/L
			Cadmium (Cd)	2022/06/24	<0.20		ug/L
			Calcium (Ca)	2022/06/24	<500		ug/L
			Chromium (Cr)	2022/06/24	<5.0		ug/L
			Cobalt (Co)	2022/06/24	<1.0		ug/L
			Copper (Cu)	2022/06/24	<1.0		ug/L
			Total Hardness (CaCO3)	2022/06/24	<1000		ug/L
			Tin (Sn)	2022/06/24	<2.0		ug/L
			Iron (Fe)	2022/06/24	<60		ug/L
			Magnesium (Mg)	2022/06/24	<100		ug/L
			Manganese (Mn)	2022/06/24	<1.0		ug/L
			Mercury (Hg)	2022/06/24	<0.10		ug/L
			Molybdenum (Mo)	2022/06/24	<1.0		ug/L
			Nickel (Ni)	2022/06/24	<2.0		ug/L
			P2O5	2022/06/24	<25		ug/L
			Total phosphorous	2022/06/24	<10		ug/L
			Lead (Pb)	2022/06/24	<0.50		ug/L
			Potassium (K)	2022/06/24	<500		ug/L
			Selenium (Se)	2022/06/24	<3.0		ug/L
			Sodium (Na)	2022/06/24	<500		ug/L
			Strontium (Sr)	2022/06/24	<2.0		ug/L
			Thallium (Tl)	2022/06/24	<2.0		ug/L
			Titanium (Ti)	2022/06/24	<10		ug/L
			Uranium (U)	2022/06/24	<1.0		ug/L
			Vanadium (V)	2022/06/24	<2.0		ug/L
			Zinc (Zn)	2022/06/24	<7.0		ug/L
2306104	EMT	Matrix Spike	Reactive silica (SiO2)	2022/06/23		NC	%
2306104	EMT	Spiked Blank	Reactive silica (SiO2)	2022/06/23		95	%
2306104	EMT	Method Blank	Reactive silica (SiO2)	2022/06/23	<0.50		mg/L
2306105	éC7	Matrix Spike	Reactive silica (SiO2)	2022/06/23		88	%
2306105	éC7	Spiked Blank	Reactive silica (SiO2)	2022/06/23		94	%
2306105	éC7	Method Blank	Reactive silica (SiO2)	2022/06/23	<0.50		mg/L
2306106	éC7	Matrix Spike	Reactive silica (SiO2)	2022/06/24		91	%
2306106	éC7	Spiked Blank	Reactive silica (SiO2)	2022/06/24		92	%
2306106	éC7	Method Blank	Reactive silica (SiO2)	2022/06/24	<0.50		mg/L
2306928	DMI	Spiked Blank	Phenols-4AAP	2022/06/28		98	%
2306928	DMI	Method Blank	Phenols-4AAP	2022/06/28	<0.0020		mg/L
2307337	DZE	Spiked Blank	Aluminum (Al)	2022/06/30		103	%
			Antimony (Sb)	2022/06/30		110	%
			Silver (Ag)	2022/06/30		106	%
			Arsenic (As)	2022/06/30		99	%
			Barium (Ba)	2022/06/30		107	%
			Beryllium (Be)	2022/06/30		102	%
			Bismuth (Bi)	2022/06/30		104	%

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units
			Boron (B)	2022/06/30		117	%
			Cadmium (Cd)	2022/06/30		98	%
			Calcium (Ca)	2022/06/30		95	%
			Chromium (Cr)	2022/06/30		96	%
			Cobalt (Co)	2022/06/30		94	%
			Copper (Cu)	2022/06/30		101	%
			Tin (Sn)	2022/06/30		107	%
			Iron (Fe)	2022/06/30		95	%
			Magnesium (Mg)	2022/06/30		94	%
			Manganese (Mn)	2022/06/30		97	%
			Mercury (Hg)	2022/06/30		88	%
			Molybdenum (Mo)	2022/06/30		99	%
			Nickel (Ni)	2022/06/30		96	%
			Total phosphorous	2022/06/30		88	%
			Lead (Pb)	2022/06/30		112	%
			Potassium (K)	2022/06/30		93	%
			Selenium (Se)	2022/06/30		93	%
			Sodium (Na)	2022/06/30		96	%
			Strontium (Sr)	2022/06/30		108	%
			Thallium (Tl)	2022/06/30		96	%
			Titanium (Ti)	2022/06/30		92	%
			Uranium (U)	2022/06/30		108	%
			Vanadium (V)	2022/06/30		96	%
			Zinc (Zn)	2022/06/30		91	%
2307337	DZE	Method Blank	Aluminum (Al)	2022/06/30	<10		ug/L
			Antimony (Sb)	2022/06/30	<1.0		ug/L
			Silver (Ag)	2022/06/30	<1.0		ug/L
			Arsenic (As)	2022/06/30	<1.0		ug/L
			Barium (Ba)	2022/06/30	<2.0		ug/L
			Beryllium (Be)	2022/06/30	<2.0		ug/L
			Bismuth (Bi)	2022/06/30	<1.0		ug/L
			Boron (B)	2022/06/30	<50		ug/L
			Cadmium (Cd)	2022/06/30	<0.20		ug/L
			Calcium (Ca)	2022/06/30	<500		ug/L
			Chromium (Cr)	2022/06/30	<5.0		ug/L
			Cobalt (Co)	2022/06/30	<1.0		ug/L
			Copper (Cu)	2022/06/30	<1.0		ug/L
			Total Hardness (CaCO3)	2022/06/30	<1000		ug/L
			Tin (Sn)	2022/06/30	<2.0		ug/L
			Iron (Fe)	2022/06/30	<60		ug/L
			Magnesium (Mg)	2022/06/30	<100		ug/L
			Manganese (Mn)	2022/06/30	<1.0		ug/L
			Mercury (Hg)	2022/06/30	<0.10		ug/L
			Molybdenum (Mo)	2022/06/30	<1.0		ug/L
			Nickel (Ni)	2022/06/30	<2.0		ug/L
			P2O5	2022/06/30	<25		ug/L
			Total phosphorous	2022/06/30	<10		ug/L
			Lead (Pb)	2022/06/30	<0.50		ug/L
			Potassium (K)	2022/06/30	<500		ug/L
			Selenium (Se)	2022/06/30	<3.0		ug/L
			Sodium (Na)	2022/06/30	<500		ug/L

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units
			Strontium (Sr)	2022/06/30	<2.0		ug/L
			Thallium (Tl)	2022/06/30	<2.0		ug/L
			Titanium (Ti)	2022/06/30	<10		ug/L
			Uranium (U)	2022/06/30	<1.0		ug/L
			Vanadium (V)	2022/06/30	<2.0		ug/L
			Zinc (Zn)	2022/06/30	<7.0		ug/L
2310362	QKB	Spiked Blank	Sulfides (S2-)	2022/07/09		109	%
2310362	QKB	Method Blank	Sulfides (S2-)	2022/07/09	<0.020		mg/L

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

QC Standard: A sample of known concentration prepared by an external agency under stringent conditions. Used as an independent check of method accuracy.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

(1) Recovery or relative percent difference (RPD) for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria

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VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:

<Original signed by>

Alex Thibert
Membre OCQ #2020-05
Alex Thibert, B.Sc., Chemist, Montréal, Analyst II, Chemist in Training

<Original signed by>

Caroline Bougie, B.Sc. Chemist, Montreal, Laboratory Coordinator

<Original signed by>

Anastassia Hamanov, Scientific Service Specialist

<Original signed by>

Michelina Cinquino, Analyst II

<Original signed by>

Mira El Masri, M.Sc. Chemist, Montréal, Analyst II

<Original signed by>

Shu Yang, B.Sc. Chemist, Montreal, Analyst II

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Zineb El Ouali
Membre OCQ#2021-051
Zineb El Ouali, M.Sc.,Chemist in training, Analyst II

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VALIDATION SIGNATURE PAGE(CONT'D)

The analytical data and all QC contained in this report were reviewed and validated by:

Bureau Veritas Proprietary Software
Logiciel Propriétaire de Bureau Veritas

Automated Statchk

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Your P.O. #: 3000000997
Your Project #: Howse surface water
Site Location: Howse
Your C.O.C. #: 71974

Attention: TSMC Environnement

TATA STEEL MINERALS CANADA
1000, RUE SHERBROOKE OUEST
BUREAU 1120
MONTRÉAL, QC
CANADA H3A 3G4

Report Date: 2022/08/22
Report #: R2782509
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C240959
Received: 2022/08/05, 10:40

Sample Matrix: Surface Water
Samples Received: 9

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Total Alkalinity (pH end point 4.5)	9	N/A	2022/08/06	STLSOP-00038	SM 23 2320-B m
Anions in water	5	N/A	2022/08/05	STLSOP-00014	MA.300–Ions 1.3 R3 m
Anions in water	4	N/A	2022/08/06	STLSOP-00014	MA.300–Ions 1.3 R3 m
Real Color	9	N/A	2022/08/05	STLSOP-00046	MA103 - Col. 2.0 R4m
Conductivity	4	N/A	2022/08/10	STLSOP-00038	SM 23 2510-B m
Conductivity	5	N/A	2022/08/06	STLSOP-00038	SM 23 2510-B m
Dissolved Organic Carbon (3)	9	2022/08/08	2022/08/08	STL SOP-00243	SM 23 5310-B m
Total Suspended Solids	9	2022/08/10	2022/08/11	STL SOP-00015	MA.104–S.S. 2.0 m
Total Extractable Metals by ICP	9	2022/08/12	2022/08/18	STL SOP-00062	MA.200–Mét. 1.2 R7 m
Ammonia Nitrogen	9	N/A	2022/08/11	STLSOP-00040	MA.300–N 2.0 R2 m
Nitrates(NO3-), Nitrites(NO2-)-water	5	N/A	2022/08/05	STLSOP-00014	MA.300–Ions 1.3 R3 m
Nitrates(NO3-), Nitrites(NO2-)-water	4	N/A	2022/08/06	STLSOP-00014	MA.300–Ions 1.3 R3 m
Dissolved Oxygen	9	N/A	2022/08/05	STLSOP-00008	MA.315–DBO 1.1 R3 m
pH in water	9	N/A	2022/08/06	STLSOP-00038	MA.100–pH 1.1 R3 m
Total Phenols by 4-AAP in water	9	2022/08/10	2022/08/10	STL SOP-00033	MA404–I.Phé 2.2 R2 m
Ortho Phosphate	9	N/A	2022/08/05	STL SOP-00003	MA.303–P 1.1 R2 m
Sulfides (as S2-)	9	2022/08/10	2022/08/10	STL SOP-00005	MA. 300 – S 1.2 R3 m
Total Dissolved Solids	9	2022/08/10	2022/08/11	STL SOP-00050	MA.115–S.D. 1.0 R4 m
Turbidity	9	N/A	2022/08/05	STL SOP-00022	MA.103–Tur. 1.0 R5 m
Total Extractable Mercury - Cold Vapour (1)	9	2022/08/11	2022/08/12	CAM SOP-00453	EPA 7470 m
Reactive Silica(SiO2) (2)	9	2022/08/10	2022/08/11	ATL SOP 00022	EPA 366.0 m

Remarks:

Bureau Veritas is accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Bureau Veritas are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Bureau Veritas' profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Bureau Veritas in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

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Your P.O. #: 3000000997
Your Project #: Howse surface water
Site Location: Howse
Your C.O.C. #: 71974

Attention: TSMC Environnement
TATA STEEL MINERALS CANADA
1000, RUE SHERBROOKE OUEST
BUREAU 1120
MONTRÉAL, QC
CANADA H3A 3G4

Report Date: 2022/08/22
Report #: R2782509
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C240959
Received: 2022/08/05, 10:40

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Bureau Veritas, results relate to the supplied samples tested.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.
Note: RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
(1) This test was performed by Bureau Veritas Mississauga, 6740 Campobello Rd. , Mississauga, ON, L5N 2L8
(2) This test was performed by Bureau Veritas Bedford, Suit 105, 200 Bluewater Rd. , Bedford, NS, B4B1G9
(3) DOC present in the sample should be considered as non-purgeable DOC

Note: All parameters included in the present certificate are accredited by the MELCC unless stated otherwise.

<Original signed by>

Encryption Key

Josue Moran
Project Manager
22 Aug 2022 16:42:07

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Josue Moran, Project Manager
Email: josue.moran@bureauveritas.com
Phone# (514) 448-9001
==========
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For Service Group specific validation please refer to the Validation Signature Page.

Bureau Veritas Job #: C240959
Report Date: 2022/08/22

TATA STEEL MINERALS CANADA
Client Project #: Howse surface water
Site Location: Howse
Your P.O. #: 3000000997

RESULTS OF ANALYSES OF SURFACE WATER

Bureau Veritas ID		KT1570	KT1571	KT1572	KT1573	KT1574		
Sampling Date		2022/08/03 11:10	2022/08/03 10:50	2022/08/03 16:00	2022/08/03 11:37	2022/08/03 15:20		
COC Number		71974	71974	71974	71974	71974		
	Units	HOW-BC-Q2-2022	HOW-BL-Q2-2022	HOW-ML-Q2-2022	HOW-TL-Q2-2022	HOW-SW1-Q2-2022	RDL	QC Batch
INORGANICS								
Reactive silica (SiO2) †	mg/L	4.3	5.4	0.63	4.3	4.4	0.50	2321516
METALS								
Mercury (Hg) †	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	2322121

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
† Parameter is not accreditable

Bureau Veritas ID		KT1575	KT1575	KT1576	KT1576		
Sampling Date		2022/08/03 13:50	2022/08/03 13:50	2022/08/03 13:40	2022/08/03 13:40		
COC Number		71974	71974	71974	71974		
	Units	HOW-SW2-Q2-2022	HOW-SW2-Q2-2022 Lab-Dup	HOW-SW3-Q2-2022	HOW-SW3-Q2-2022 Lab-Dup	RDL	QC Batch
INORGANICS							
Reactive silica (SiO2) †	mg/L	4.4	N/A	2.2	2.2	0.50	2321516
METALS							
Mercury (Hg) †	ug/L	<0.01	<0.01	<0.01	N/A	0.01	2322121

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
† Parameter is not accreditable
N/A = Not Applicable

Bureau Veritas ID		KT1577	KT1578		
Sampling Date		2022/08/03 14:50	2022/08/03 00:17		
COC Number		71974	71974		
	Units	HOW-SW4-Q2-2022	HOW-SW5-Q2-2022	RDL	QC Batch
INORGANICS					
Reactive silica (SiO2) †	mg/L	4.2	0.96	0.50	2321516
METALS					
Mercury (Hg) †	ug/L	<0.01	<0.01	0.01	2322121

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
† Parameter is not accreditable

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TOTAL EXTRACTABLE METALS (SURFACE WATER)

Bureau Veritas ID		KT1570		KT1571		KT1572	KT1573		
Sampling Date		2022/08/03 11:10		2022/08/03 10:50		2022/08/03 16:00	2022/08/03 11:37		
COC Number		71974		71974		71974	71974		
	Units	HOW-BC-Q2-2022	RDL	HOW-BL-Q2-2022	RDL	HOW-ML-Q2-2022	HOW-TL-Q2-2022	RDL	QC Batch
METALS									
Aluminum (Al)	ug/L	180	10	20	10	44	<10	10	2321623
Antimony (Sb)	ug/L	<1.0	1.0	<1.0	1.0	<1.0	<1.0	1.0	2321623
Silver (Ag)	ug/L	<1.0	1.0	<1.0	1.0	<1.0	<1.0	1.0	2321623
Arsenic (As)	ug/L	<1.0	1.0	<1.0	1.0	<1.0	<1.0	1.0	2321623
Barium (Ba)	ug/L	2.5	2.0	<2.0	2.0	<2.0	2.5	2.0	2321623
Beryllium (Be)	ug/L	<2.0	2.0	<2.0	2.0	<2.0	<2.0	2.0	2321623
Bismuth (Bi) ††	ug/L	<1.0	1.0	<1.0	1.0	<1.0	<1.0	1.0	2321623
Boron (B) †	ug/L	<50	50	<50	50	<50	<50	50	2321623
Cadmium (Cd)	ug/L	<0.20	0.20	<0.20	0.20	<0.20	<0.20	0.20	2321623
Calcium (Ca) †	ug/L	<500	500	4300	500	1500	3400	500	2321623
Chromium (Cr)	ug/L	<5.0	5.0	<5.0	5.0	<5.0	<5.0	5.0	2321623
Cobalt (Co)	ug/L	<1.0	1.0	<1.0	1.0	<1.0	<1.0	1.0	2321623
Copper (Cu)	ug/L	48	1.0	8.5 (1)	3.0	56	<1.0	1.0	2321623
Total Hardness (CaCO3) ††	ug/L	2300	1000	23000	1000	8100	19000	1000	2321623
Tin (Sn)	ug/L	<2.0	2.0	<2.0	2.0	<2.0	<2.0	2.0	2321623
Iron (Fe)	ug/L	210	60	<60	60	95	61	60	2321623
Magnesium (Mg) †	ug/L	330	100	3000	100	1100	2500	100	2321623
Manganese (Mn)	ug/L	18	1.0	3.7	1.0	10	5.1	1.0	2321623
Molybdenum (Mo)	ug/L	<1.0	1.0	<1.0	1.0	<1.0	<1.0	1.0	2321623
Nickel (Ni)	ug/L	<2.0	2.0	<2.0	2.0	5.8	<2.0	2.0	2321623
Total phosphorous	ug/L	<10	10	<10	10	<10	<10	10	2321623
Lead (Pb)	ug/L	<0.50	0.50	<0.50	0.50	<0.50	<0.50	0.50	2321623
Potassium (K) †	ug/L	<500	500	<500	500	<500	<500	500	2321623
Selenium (Se)	ug/L	<3.0	3.0	<3.0	3.0	<3.0	<3.0	3.0	2321623
Sodium (Na)	ug/L	<500	500	810	500	<500	660	500	2321623
Strontium (Sr) †	ug/L	2.9	2.0	6.7	2.0	3.7	7.3	2.0	2321623
Thallium (Tl)	ug/L	<2.0	2.0	<2.0	2.0	<2.0	<2.0	2.0	2321623
Titanium (Ti) ††	ug/L	<10	10	<10	10	<10	<10	10	2321623
Uranium (U) ††	ug/L	<1.0	1.0	<1.0	1.0	<1.0	<1.0	1.0	2321623
Vanadium (V)	ug/L	<2.0	2.0	<2.0	2.0	<2.0	<2.0	2.0	2321623
Zinc (Zn)	ug/L	23	7.0	<7.0	7.0	23	<7.0	7.0	2321623

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
†† Parameter is not accreditable
† Parameter is not accredited
(1) The detection limit was raised due to instrumentation.

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TOTAL EXTRACTABLE METALS (SURFACE WATER)

Bureau Veritas ID		KT1574	KT1575	KT1576		KT1577		
Sampling Date		2022/08/03 15:20	2022/08/03 13:50	2022/08/03 13:40		2022/08/03 14:50		
COC Number		71974	71974	71974		71974		
	Units	HOW-SW1-Q2-2022	HOW-SW2-Q2-2022	HOW-SW3-Q2-2022	QC Batch	HOW-SW4-Q2-2022	RDL	QC Batch
METALS								
Aluminum (Al)	ug/L	28	120	75	2321604	39	10	2321623
Antimony (Sb)	ug/L	<1.0	<1.0	<1.0	2321604	<1.0	1.0	2321623
Silver (Ag)	ug/L	<1.0	<1.0	<1.0	2321604	<1.0	1.0	2321623
Arsenic (As)	ug/L	<1.0	<1.0	<1.0	2321604	<1.0	1.0	2321623
Barium (Ba)	ug/L	<2.0	4.0	2.3	2321604	<2.0	2.0	2321623
Beryllium (Be)	ug/L	<2.0	<2.0	<2.0	2321604	<2.0	2.0	2321623
Bismuth (Bi) ††	ug/L	<1.0	<1.0	<1.0	2321604	<1.0	1.0	2321623
Boron (B) †	ug/L	<50	<50	<50	2321604	<50	50	2321623
Cadmium (Cd)	ug/L	<0.20	<0.20	<0.20	2321604	<0.20	0.20	2321623
Calcium (Ca) †	ug/L	2300	<500	<500	2321604	2400	500	2321623
Chromium (Cr)	ug/L	<5.0	<5.0	<5.0	2321604	<5.0	5.0	2321623
Cobalt (Co)	ug/L	<1.0	<1.0	<1.0	2321604	<1.0	1.0	2321623
Copper (Cu)	ug/L	50	<1.0	<1.0	2321604	<1.0	1.0	2321623
Total Hardness (CaCO3) ††	ug/L	14000	2200	1400	2321604	14000	1000	2321623
Tin (Sn)	ug/L	<2.0	<2.0	<2.0	2321604	<2.0	2.0	2321623
Iron (Fe)	ug/L	170	370	230	2321604	69	60	2321623
Magnesium (Mg) †	ug/L	1900	240	160	2321604	1900	100	2321623
Manganese (Mn)	ug/L	12	56	14	2321604	<1.0	1.0	2321623
Molybdenum (Mo)	ug/L	<1.0	<1.0	<1.0	2321604	<1.0	1.0	2321623
Nickel (Ni)	ug/L	<2.0	<2.0	<2.0	2321604	<2.0	2.0	2321623
Total phosphorous	ug/L	<10	<10	<10	2321604	<10	10	2321623
Lead (Pb)	ug/L	<0.50	<0.50	<0.50	2321604	<0.50	0.50	2321623
Potassium (K) †	ug/L	<500	<500	<500	2321604	<500	500	2321623
Selenium (Se)	ug/L	<3.0	<3.0	<3.0	2321604	<3.0	3.0	2321623
Sodium (Na)	ug/L	870	530	<500	2321604	600	500	2321623
Strontium (Sr) †	ug/L	5.5	4.2	2.4	2321604	6.1	2.0	2321623
Thallium (Tl)	ug/L	<2.0	<2.0	<2.0	2321604	<2.0	2.0	2321623
Titanium (Ti) ††	ug/L	<10	<10	<10	2321604	<10	10	2321623
Uranium (U) ††	ug/L	<1.0	<1.0	<1.0	2321604	<1.0	1.0	2321623
Vanadium (V)	ug/L	<2.0	<2.0	<2.0	2321604	<2.0	2.0	2321623
Zinc (Zn)	ug/L	21	<7.0	<7.0	2321604	<7.0	7.0	2321623

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
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TATA STEEL MINERALS CANADA
Client Project #: Howse surface water
Site Location: Howse
Your P.O. #: 3000000997

TOTAL EXTRACTABLE METALS (SURFACE WATER)

Bureau Veritas ID		KT1578		
Sampling Date		2022/08/03 00:17		
COC Number		71974		
	Units	HOW-SW5-Q2-2022	RDL	QC Batch
METALS				
Aluminum (Al)	ug/L	13	10	2321604
Antimony (Sb)	ug/L	<1.0	1.0	2321604
Silver (Ag)	ug/L	<1.0	1.0	2321604
Arsenic (As)	ug/L	<1.0	1.0	2321604
Barium (Ba)	ug/L	<2.0	2.0	2321604
Beryllium (Be)	ug/L	<2.0	2.0	2321604
Bismuth (Bi) ††	ug/L	<1.0	1.0	2321604
Boron (B) †	ug/L	<50	50	2321604
Cadmium (Cd)	ug/L	<0.20	0.20	2321604
Calcium (Ca) †	ug/L	<500	500	2321604
Chromium (Cr)	ug/L	<5.0	5.0	2321604
Cobalt (Co)	ug/L	<1.0	1.0	2321604
Copper (Cu)	ug/L	<1.0	1.0	2321604
Total Hardness (CaCO3) ††	ug/L	1400	1000	2321604
Tin (Sn)	ug/L	<2.0	2.0	2321604
Iron (Fe)	ug/L	69	60	2321604
Magnesium (Mg) †	ug/L	200	100	2321604
Manganese (Mn)	ug/L	4.3	1.0	2321604
Molybdenum (Mo)	ug/L	<1.0	1.0	2321604
Nickel (Ni)	ug/L	<2.0	2.0	2321604
Total phosphorous	ug/L	<10	10	2321604
Lead (Pb)	ug/L	<0.50	0.50	2321604
Potassium (K) †	ug/L	<500	500	2321604
Selenium (Se)	ug/L	<3.0	3.0	2321604
Sodium (Na)	ug/L	600	500	2321604
Strontium (Sr) †	ug/L	<2.0	2.0	2321604
Thallium (Tl)	ug/L	<2.0	2.0	2321604
Titanium (Ti) ††	ug/L	<10	10	2321604
Uranium (U) ††	ug/L	<1.0	1.0	2321604
Vanadium (V)	ug/L	<2.0	2.0	2321604
Zinc (Zn)	ug/L	<7.0	7.0	2321604

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
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TATA STEEL MINERALS CANADA
Client Project #: Howse surface water
Site Location: Howse
Your P.O. #: 3000000997

CONVENTIONAL PARAMETERS (SURFACE WATER)

Bureau Veritas ID		KT1570	KT1570	KT1571	KT1571		
Sampling Date		2022/08/03 11:10	2022/08/03 11:10	2022/08/03 10:50	2022/08/03 10:50		
COC Number		71974	71974	71974	71974		
	Units	HOW-BC-Q2-2022	HOW-BC-Q2-2022 Lab-Dup	HOW-BL-Q2-2022	HOW-BL-Q2-2022 Lab-Dup	RDL	QC Batch
CONVENTIONALS							
Conductivity	mS/cm	0.0037	N/A	0.049	0.050	0.0010	2319690
Dissolved organic carbon †	mg/L	8.1	N/A	0.83	N/A	0.20	2319868
Dissolved oxygen †	mg/L	9.4	N/A	9.6	N/A	1.0	2319653
Nitrate (N) and Nitrite(N)	mg/L	<0.020	<0.020	<0.020	N/A	0.020	2319685
Nitrates (N-NO3-)	mg/L	<0.020	<0.020	<0.020	N/A	0.020	2319685
Nitrites (N-NO2-)	mg/L	<0.020	<0.020	<0.020	N/A	0.020	2319685
Nitrogen ammonia (N-NH4+ and N-NH3)	mg/L	<0.020	N/A	<0.020	N/A	0.020	2321463
Orthophosphate (P)	mg/L	<0.050	N/A	<0.050	N/A	0.050	2319684
pH	pH	5.55	N/A	7.10	7.16	N/A	2319663
Phenols-4AAP	mg/L	<0.0020	N/A	<0.0020	N/A	0.0020	2320945
Real Color	UCV	55	N/A	5.8	N/A	2.0	2319682
Sulfides (S2-)	mg/L	<0.020	N/A	<0.020	N/A	0.020	2320675
Turbidity	NTU	0.40	N/A	1.8	N/A	0.10	2319681
Alkalinity Total (as CaCO3) pH 4.5 †	mg/L	1.1	N/A	23	N/A	1.0	2319691
Bicarbonates (HCO3 as CaCO3) †	mg/L	1.1	N/A	23	N/A	1.0	2319691
Carbonate (CO3 as CaCO3) †	mg/L	<1.0	N/A	<1.0	N/A	1.0	2319691
Chloride (Cl)	mg/L	0.13	N/A	0.23	N/A	0.050	2319686
Sulfates (SO4)	mg/L	<0.50	N/A	2.5	N/A	0.50	2319686
Total Dissolved Solids	mg/L	45	N/A	44	N/A	10	2320966
Total suspended solids (TSS)	mg/L	2.0	N/A	2.0	N/A	2.0	2320737

RDL = Reportable Detection Limit QC Batch = Quality Control Batch N/A = Not Applicable
† Parameter is not accreditable

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CONVENTIONAL PARAMETERS (SURFACE WATER)

Bureau Veritas ID		KT1572	KT1572	KT1573	KT1574		
Sampling Date		2022/08/03 16:00	2022/08/03 16:00	2022/08/03 11:37	2022/08/03 15:20		
COC Number		71974	71974	71974	71974		
	Units	HOW-ML-Q2-2022	HOW-ML-Q2-2022 Lab-Dup	HOW-TL-Q2-2022	HOW-SW1-Q2-2022	RDL	QC Batch
CONVENTIONALS							
Conductivity	mS/cm	0.018	N/A	0.040	0.029	0.0010	2319690
Dissolved organic carbon †	mg/L	2.0	N/A	0.98	1.6	0.20	2319868
Dissolved oxygen †	mg/L	9.8	N/A	9.5	9.9	1.0	2319653
Nitrate (N) and Nitrite(N)	mg/L	<0.020	N/A	0.062	0.16	0.020	2319685
Nitrates (N-NO3-)	mg/L	<0.020	N/A	0.062	0.16	0.020	2319685
Nitrites (N-NO2-)	mg/L	<0.020	N/A	<0.020	<0.020	0.020	2319685
Nitrogen ammonia (N-NH4+ and N-NH3)	mg/L	<0.020	<0.020	<0.020	<0.020	0.020	2321463
Orthophosphate (P)	mg/L	<0.050	N/A	<0.050	<0.050	0.050	2319684
pH	pH	6.87	N/A	7.29	7.01	N/A	2319663
Phenols-4AAP	mg/L	<0.0020	N/A	<0.0020	<0.0020	0.0020	2320945
Real Color	UCV	15	N/A	6.2	12	2.0	2319682
Sulfides (S2-)	mg/L	<0.020	N/A	<0.020	<0.020	0.020	2320675
Turbidity	NTU	4.1	N/A	0.34	0.52	0.10	2319681
Alkalinity Total (as CaCO3) pH 4.5 †	mg/L	5.2	N/A	16	11	1.0	2319691
Bicarbonates (HCO3 as CaCO3) †	mg/L	5.2	N/A	16	11	1.0	2319691
Carbonate (CO3 as CaCO3) †	mg/L	<1.0	N/A	<1.0	<1.0	1.0	2319691
Chloride (Cl)	mg/L	0.15	N/A	0.33	0.42	0.050	2319686
Sulfates (SO4)	mg/L	2.9	N/A	2.7	2.3	0.50	2319686
Total Dissolved Solids	mg/L	33	N/A	42	34	10	2320966
Total suspended solids (TSS)	mg/L	3.0	N/A	2.0	2.0	2.0	2320737

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable
† Parameter is not accreditable

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CONVENTIONAL PARAMETERS (SURFACE WATER)

Bureau Veritas ID		KT1575	KT1576	KT1576		
Sampling Date		2022/08/03 13:50	2022/08/03 13:40	2022/08/03 13:40		
COC Number		71974	71974	71974		
	Units	HOW-SW2-Q2-2022	HOW-SW3-Q2-2022	HOW-SW3-Q2-2022 Lab-Dup	RDL	QC Batch
CONVENTIONALS						
Conductivity	mS/cm	0.0025	0.0013	N/A	0.0010	2319690
Dissolved organic carbon †	mg/L	6.0	5.1	N/A	0.20	2319868
Dissolved oxygen †	mg/L	9.5	9.0	N/A	1.0	2319653
Nitrate (N) and Nitrite(N)	mg/L	<0.020	<0.020	N/A	0.020	2319685
Nitrates (N-NO3-)	mg/L	<0.020	<0.020	N/A	0.020	2319685
Nitrites (N-NO2-)	mg/L	<0.020	<0.020	N/A	0.020	2319685
Nitrogen ammonia (N-NH4+ and N-NH3)	mg/L	<0.020	<0.020	N/A	0.020	2321463
Orthophosphate (P)	mg/L	<0.050	<0.050	N/A	0.050	2319684
pH	pH	5.89	5.67	N/A	N/A	2319663
Phenols-4AAP	mg/L	<0.0020	<0.0020	N/A	0.0020	2320945
Real Color	UCV	46	36	N/A	2.0	2319682
Sulfides (S2-)	mg/L	<0.020	<0.020	N/A	0.020	2320675
Turbidity	NTU	0.67	0.32	0.30	0.10	2319681
Alkalinity Total (as CaCO3) pH 4.5 †	mg/L	1.4	<1.0	N/A	1.0	2319691
Bicarbonates (HCO3 as CaCO3) †	mg/L	1.4	<1.0	N/A	1.0	2319691
Carbonate (CO3 as CaCO3) †	mg/L	<1.0	<1.0	N/A	1.0	2319691
Chloride (Cl)	mg/L	0.14	0.11	N/A	0.050	2319686
Sulfates (SO4)	mg/L	<0.50	<0.50	N/A	0.50	2319686
Total Dissolved Solids	mg/L	26	21	N/A	10	2320966
Total suspended solids (TSS)	mg/L	2.0	<2.0	N/A	2.0	2320737

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable
† Parameter is not accreditable

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CONVENTIONAL PARAMETERS (SURFACE WATER)

Bureau Veritas ID		KT1577	KT1578		
Sampling Date		2022/08/03 14:50	2022/08/03 00:17		
COC Number		71974	71974		
	Units	HOW-SW4-Q2-2022	HOW-SW5-Q2-2022	RDL	QC Batch
CONVENTIONALS					
Conductivity	mS/cm	0.030	0.0019	0.0010	2319690
Dissolved organic carbon †	mg/L	0.93	1.3	0.20	2319868
Dissolved oxygen †	mg/L	10	9.8	1.0	2319653
Nitrate (N) and Nitrite(N)	mg/L	0.21	<0.020	0.020	2319685
Nitrates (N-NO3-)	mg/L	0.21	<0.020	0.020	2319685
Nitrites (N-NO2-)	mg/L	<0.020	<0.020	0.020	2319685
Nitrogen ammonia (N-NH4+ and N-NH3)	mg/L	<0.020	<0.020	0.020	2321463
Orthophosphate (P)	mg/L	<0.050	<0.050	0.050	2319684
pH	pH	6.92	6.79	N/A	2319663
Phenols-4AAP	mg/L	<0.0020	<0.0020	0.0020	2320945
Real Color	UCV	5.7	8.1	2.0	2319682
Sulfides (S2-)	mg/L	<0.020	<0.020	0.020	2320675
Turbidity	NTU	0.26	0.54	0.10	2319681
Alkalinity Total (as CaCO3) pH 4.5 †	mg/L	9.9	3.6	1.0	2319691
Bicarbonates (HCO3 as CaCO3) †	mg/L	9.9	3.6	1.0	2319691
Carbonate (CO3 as CaCO3) †	mg/L	<1.0	<1.0	1.0	2319691
Chloride (Cl)	mg/L	0.43	0.16	0.050	2319686
Sulfates (SO4)	mg/L	2.7	<0.50	0.50	2319686
Total Dissolved Solids	mg/L	34	14	10	2320966
Total suspended solids (TSS)	mg/L	2.0	2.0	2.0	2320737

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
† Parameter is not accreditable
N/A = Not Applicable

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GENERAL COMMENTS

Dissolved Oxygen: Holding time already past upon reception.: KT1570
pH in water: Holding time already past upon reception.: KT1570
Dissolved Oxygen: Holding time already past upon reception.: KT1571
pH in water: Holding time already past upon reception.: KT1571
Dissolved Oxygen: Holding time already past upon reception.: KT1572
pH in water: Holding time already past upon reception.: KT1572
Dissolved Oxygen: Holding time already past upon reception.: KT1573
pH in water: Holding time already past upon reception.: KT1573
Dissolved Oxygen: Holding time already past upon reception.: KT1574
pH in water: Holding time already past upon reception.: KT1574
Dissolved Oxygen: Holding time already past upon reception.: KT1575
pH in water: Holding time already past upon reception.: KT1575
Dissolved Oxygen: Holding time already past upon reception.: KT1576
pH in water: Holding time already past upon reception.: KT1576
Dissolved Oxygen: Holding time already past upon reception.: KT1577
pH in water: Holding time already past upon reception.: KT1577
Dissolved Oxygen: Holding time already past upon reception.: KT1578
pH in water: Holding time already past upon reception.: KT1578

CONVENTIONAL PARAMETERS (SURFACE WATER)

Dissolved oxygen: presence of headspace.

Results relate only to the items tested.

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QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units
2319663	SF5	Spiked Blank	pH	2022/08/06		101	%
2319681	ESW	Spiked Blank	Turbidity	2022/08/05		95	%
2319681	ESW	Method Blank	Turbidity	2022/08/05	<0.10		NTU
2319682	ESW	Spiked Blank	Real Color	2022/08/05		100	%
2319682	ESW	Method Blank	Real Color	2022/08/05	<2.0		UCV
2319684	AGO	Spiked Blank	Orthophosphate (P)	2022/08/05		102	%
2319684	AGO	Method Blank	Orthophosphate (P)	2022/08/05	<0.050		mg/L
2319685	SF5	Spiked Blank	Nitrate (N) and Nitrite(N)	2022/08/05		106	%
			Nitrates (N-NO3-)	2022/08/05		111	%
			Nitrites (N-NO2-)	2022/08/05		102	%
2319685	SF5	Method Blank	Nitrate (N) and Nitrite(N)	2022/08/05	<0.020		mg/L
			Nitrates (N-NO3-)	2022/08/05	<0.020		mg/L
			Nitrites (N-NO2-)	2022/08/05	<0.020		mg/L
2319686	SF5	Spiked Blank	Chloride (Cl)	2022/08/05		104	%
			Sulfates (SO4)	2022/08/05		109	%
2319686	SF5	Method Blank	Chloride (Cl)	2022/08/05	<0.050		mg/L
			Sulfates (SO4)	2022/08/05	<0.50		mg/L
2319690	SF5	Spiked Blank	Conductivity	2022/08/06		102	%
2319690	SF5	Method Blank	Conductivity	2022/08/06	<0.0010		mS/cm
2319691	SF5	Spiked Blank	Alkalinity Total (as CaCO3) pH 4.5	2022/08/06		93	%
2319691	SF5	Method Blank	Alkalinity Total (as CaCO3) pH 4.5	2022/08/06	<1.0		mg/L
			Bicarbonates (HCO3 as CaCO3)	2022/08/06	<1.0		mg/L
			Carbonate (CO3 as CaCO3)	2022/08/06	<1.0		mg/L
2319868	BAG	Spiked Blank	Dissolved organic carbon	2022/08/08		102	%
2319868	BAG	Method Blank	Dissolved organic carbon	2022/08/08	<0.20		mg/L
2320675	ANB	Spiked Blank	Sulfides (S2-)	2022/08/10		104	%
2320675	ANB	Method Blank	Sulfides (S2-)	2022/08/10	<0.020		mg/L
2320737	SAT	Spiked Blank	Total suspended solids (TSS)	2022/08/11		98	%
2320737	SAT	Method Blank	Total suspended solids (TSS)	2022/08/11	<2.0		mg/L
2320945	DMI	QC Standard	Phenols-4AAP	2022/08/10		95	%
2320945	DMI	Spiked Blank	Phenols-4AAP	2022/08/10		94	%
2320945	DMI	Method Blank	Phenols-4AAP	2022/08/10	<0.0020		mg/L
2320966	SAT	Spiked Blank	Total Dissolved Solids	2022/08/11		96	%
2320966	SAT	Method Blank	Total Dissolved Solids	2022/08/11	<10		mg/L
2321463	AGO	Spiked Blank	Nitrogen ammonia (N-NH4+ and N-NH3)	2022/08/11		110	%
2321463	AGO	Method Blank	Nitrogen ammonia (N-NH4+ and N-NH3)	2022/08/11	<0.020		mg/L
2321516	TGO	Matrix Spike [KT1576-09]	Reactive silica (SiO2)	2022/08/11		93	%
2321516	TGO	Spiked Blank	Reactive silica (SiO2)	2022/08/11		94	%
2321516	TGO	Method Blank	Reactive silica (SiO2)	2022/08/11	<0.50		mg/L
2321604	CBO	Spiked Blank	Aluminum (Al)	2022/08/18		94	%
			Antimony (Sb)	2022/08/18		108	%
			Silver (Ag)	2022/08/18		101	%
			Arsenic (As)	2022/08/18		105	%
			Barium (Ba)	2022/08/18		99	%
			Beryllium (Be)	2022/08/18		103	%
			Bismuth (Bi)	2022/08/18		110	%
			Boron (B)	2022/08/18		103	%
			Cadmium (Cd)	2022/08/18		99	%
			Calcium (Ca)	2022/08/18		93	%
			Chromium (Cr)	2022/08/18		100	%
			Cobalt (Co)	2022/08/18		99	%

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units
			Copper (Cu)	2022/08/18		96	%
			Tin (Sn)	2022/08/18		109	%
			Iron (Fe)	2022/08/18		104	%
			Magnesium (Mg)	2022/08/18		98	%
			Manganese (Mn)	2022/08/18		102	%
			Molybdenum (Mo)	2022/08/18		103	%
			Nickel (Ni)	2022/08/18		97	%
			Total phosphorous	2022/08/18		102	%
			Lead (Pb)	2022/08/18		102	%
			Potassium (K)	2022/08/18		99	%
			Selenium (Se)	2022/08/18		110	%
			Sodium (Na)	2022/08/18		98	%
			Strontium (Sr)	2022/08/18		106	%
			Thallium (Tl)	2022/08/18		95	%
			Titanium (Ti)	2022/08/18		96	%
			Uranium (U)	2022/08/18		106	%
			Vanadium (V)	2022/08/18		100	%
			Zinc (Zn)	2022/08/18		95	%
2321604	CBO	Method Blank	Aluminum (Al)	2022/08/18	<10		ug/L
			Antimony (Sb)	2022/08/18	<1.0		ug/L
			Silver (Ag)	2022/08/18	<1.0		ug/L
			Arsenic (As)	2022/08/18	<1.0		ug/L
			Barium (Ba)	2022/08/18	<2.0		ug/L
			Beryllium (Be)	2022/08/18	<2.0		ug/L
			Bismuth (Bi)	2022/08/18	<1.0		ug/L
			Boron (B)	2022/08/18	<50		ug/L
			Cadmium (Cd)	2022/08/18	<0.20		ug/L
			Calcium (Ca)	2022/08/18	<500		ug/L
			Chromium (Cr)	2022/08/18	<5.0		ug/L
			Cobalt (Co)	2022/08/18	<1.0		ug/L
			Copper (Cu)	2022/08/18	<1.0		ug/L
			Total Hardness (CaCO3)	2022/08/18	<1000		ug/L
			Tin (Sn)	2022/08/18	<2.0		ug/L
			Iron (Fe)	2022/08/18	<60		ug/L
			Magnesium (Mg)	2022/08/18	<100		ug/L
			Manganese (Mn)	2022/08/18	<1.0		ug/L
			Molybdenum (Mo)	2022/08/18	<1.0		ug/L
			Nickel (Ni)	2022/08/18	<2.0		ug/L
			Total phosphorous	2022/08/18	<10		ug/L
			Lead (Pb)	2022/08/18	<0.50		ug/L
			Potassium (K)	2022/08/18	<500		ug/L
			Selenium (Se)	2022/08/18	<3.0		ug/L
			Sodium (Na)	2022/08/18	<500		ug/L
			Strontium (Sr)	2022/08/18	<2.0		ug/L
			Thallium (Tl)	2022/08/18	<2.0		ug/L
			Titanium (Ti)	2022/08/18	<10		ug/L
			Uranium (U)	2022/08/18	<1.0		ug/L
			Vanadium (V)	2022/08/18	<2.0		ug/L
			Zinc (Zn)	2022/08/18	<7.0		ug/L
2321623	CBO	Spiked Blank	Aluminum (Al)	2022/08/18		95	%
			Antimony (Sb)	2022/08/18		109	%

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units
			Silver (Ag)	2022/08/18		101	%
			Arsenic (As)	2022/08/18		105	%
			Barium (Ba)	2022/08/18		100	%
			Beryllium (Be)	2022/08/18		103	%
			Bismuth (Bi)	2022/08/18		108	%
			Boron (B)	2022/08/18		108	%
			Cadmium (Cd)	2022/08/18		101	%
			Calcium (Ca)	2022/08/18		93	%
			Chromium (Cr)	2022/08/18		99	%
			Cobalt (Co)	2022/08/18		99	%
			Copper (Cu)	2022/08/18		96	%
			Tin (Sn)	2022/08/18		110	%
			Iron (Fe)	2022/08/18		103	%
			Magnesium (Mg)	2022/08/18		99	%
			Manganese (Mn)	2022/08/18		103	%
			Molybdenum (Mo)	2022/08/18		102	%
			Nickel (Ni)	2022/08/18		97	%
			Total phosphorous	2022/08/18		102	%
			Lead (Pb)	2022/08/18		102	%
			Potassium (K)	2022/08/18		101	%
			Selenium (Se)	2022/08/18		109	%
			Sodium (Na)	2022/08/18		99	%
			Strontium (Sr)	2022/08/18		108	%
			Thallium (Tl)	2022/08/18		95	%
			Titanium (Ti)	2022/08/18		99	%
			Uranium (U)	2022/08/18		104	%
			Vanadium (V)	2022/08/18		100	%
			Zinc (Zn)	2022/08/18		97	%
2321623	CBO	Method Blank	Aluminum (Al)	2022/08/18	<10		ug/L
			Antimony (Sb)	2022/08/18	<1.0		ug/L
			Silver (Ag)	2022/08/18	<1.0		ug/L
			Arsenic (As)	2022/08/18	<1.0		ug/L
			Barium (Ba)	2022/08/18	<2.0		ug/L
			Beryllium (Be)	2022/08/18	<2.0		ug/L
			Bismuth (Bi)	2022/08/18	<1.0		ug/L
			Boron (B)	2022/08/18	<50		ug/L
			Cadmium (Cd)	2022/08/18	<0.20		ug/L
			Calcium (Ca)	2022/08/18	<500		ug/L
			Chromium (Cr)	2022/08/18	<5.0		ug/L
			Cobalt (Co)	2022/08/18	<1.0		ug/L
			Copper (Cu)	2022/08/18	<3.0		ug/L
			Total Hardness (CaCO3)	2022/08/18	<1000		ug/L
			Tin (Sn)	2022/08/18	<2.0		ug/L
			Iron (Fe)	2022/08/18	<60		ug/L
			Magnesium (Mg)	2022/08/18	<100		ug/L
			Manganese (Mn)	2022/08/18	<1.0		ug/L
			Molybdenum (Mo)	2022/08/18	<1.0		ug/L
			Nickel (Ni)	2022/08/18	<2.0		ug/L
			Total phosphorous	2022/08/18	<10		ug/L
			Lead (Pb)	2022/08/18	<0.50		ug/L
			Potassium (K)	2022/08/18	<500		ug/L

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units
			Selenium (Se)	2022/08/18	<3.0		ug/L
			Sodium (Na)	2022/08/18	<500		ug/L
			Strontium (Sr)	2022/08/18	<2.0		ug/L
			Thallium (Tl)	2022/08/18	<2.0		ug/L
			Titanium (Ti)	2022/08/18	<10		ug/L
			Uranium (U)	2022/08/18	<1.0		ug/L
			Vanadium (V)	2022/08/18	<2.0		ug/L
			Zinc (Zn)	2022/08/18	<7.0		ug/L
2322121	JGC	Matrix Spike	Mercury (Hg)	2022/08/12		96	%
2322121	JGC	Spiked Blank	Mercury (Hg)	2022/08/12		97	%
2322121	JGC	Method Blank	Mercury (Hg)	2022/08/12	<0.01		ug/L

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

QC Standard: A sample of known concentration prepared by an external agency under stringent conditions. Used as an independent check of method accuracy.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

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TATA STEEL MINERALS CANADA
Client Project #: Howse surface water
Site Location: Howse
Your P.O. #: 3000000997

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:

<Original signed by>

Caroline Bougie, B.Sc. Chemist, Montreal, Laboratory Coordinator

<Original signed by>

Cristina Carriere, Scientific Services

<Original signed by>

Michelina Cinquino, Analyst II

<Original signed by>

Mira El Masri, M.Sc. Chemist, Montréal, Analyst II

<Original signed by>

Shu Yang, B.Sc. Chemist, Montreal, Analyst II

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Your P.O. #: 3000000997
Your Project #: Howse surface water
Site#: 00025
Site Location: Howse
Your C.O.C. #: 74814

Attention: Vivek Agarwal

TATA STEEL MINERALS CANADA
1000, RUE SHERBROOKE OUEST
BUREAU 1120
MONTRÉAL, QC
CANADA H3A 3G4

Report Date: 2022/10/05
Report #: R2794037
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C249760
Received: 2022/09/14, 12:00

Sample Matrix: Surface Water
Samples Received: 9

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Total Alkalinity (pH end point 4.5)	9	N/A	2022/09/14	STLSOP-00038	SM 23 2320-B m
Anions in water	3	N/A	2022/09/17	STLSOP-00014	MA.300–Ions 1.3 R3 m
Anions in water	6	N/A	2022/09/18	STLSOP-00014	MA.300–Ions 1.3 R3 m
Real Color	9	N/A	2022/09/18	STLSOP-00046	MA103 - Col. 2.0 R4m
Conductivity	6	N/A	2022/09/14	STLSOP-00038	SM 23 2510-B m
Conductivity	3	N/A	2022/09/17	STLSOP-00038	SM 23 2510-B m
Dissolved Organic Carbon (3)	9	2022/09/20	2022/09/21	STL SOP-00243	SM 23 5310-B m
Total Suspended Solids	1	2022/09/15	2022/09/16	STL SOP-00015	MA.104–S.S. 2.0 m
Total Suspended Solids	8	2022/09/17	2022/09/23	STL SOP-00015	MA.104–S.S. 2.0 m
Total Extractable Metals by ICP	9	2022/09/17	2022/09/21	STL SOP-00062	MA.200–Mét. 1.2 R7 m
Ammonia Nitrogen	7	N/A	2022/09/20	STLSOP-00040	MA.300–N 2.0 R2 m
Ammonia Nitrogen	2	N/A	2022/09/21	STLSOP-00040	MA.300–N 2.0 R2 m
Nitrates(NO3-), Nitrites(NO2-)-water	3	N/A	2022/09/17	STLSOP-00014	MA.300–Ions 1.3 R3 m
Nitrates(NO3-), Nitrites(NO2-)-water	6	N/A	2022/09/18	STLSOP-00014	MA.300–Ions 1.3 R3 m
Dissolved Oxygen	9	N/A	2022/09/14	STLSOP-00008	MA.315–DBO 1.1 R3 m
pH in water	9	N/A	2022/09/14	STLSOP-00038	MA.100–pH 1.1 R3 m
pH Measured @ 15° C	9	N/A	2022/09/14	STLSOP-00016	MA.100–pH 1.1 R3 m
Total Phenols by 4-AAP in water	9	2022/09/20	2022/09/20	STL SOP-00033	MA404–I.Phé 2.2 R2 m
Ortho Phosphate	9	N/A	2022/09/15	STL SOP-00003	MA.303–P 1.1 R2 m
Sulfides (as S2-)	9	2022/09/21	2022/09/21	STL SOP-00005	MA. 300 – S 1.2 R3 m
Total Dissolved Solids	1	2022/09/15	2022/09/16	STL SOP-00050	MA.115–S.D. 1.0 R4 m
Total Dissolved Solids	8	2022/09/17	2022/09/19	STL SOP-00050	MA.115–S.D. 1.0 R4 m
Turbidity	9	N/A	2022/09/14	STL SOP-00022	MA.103–Tur. 1.0 R5 m
Total Extractable Mercury - Cold Vapour (1)	9	2022/09/19	2022/09/19	CAM SOP-00453	EPA 7470 m
Reactive Silica(SiO2) (2)	5	2022/09/28	2022/09/30	ATL SOP 00022	EPA 366.0 m
Reactive Silica(SiO2) (2)	4	2022/09/30	2022/09/30	ATL SOP 00022	EPA 366.0 m

Remarks:

Bureau Veritas is accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Bureau Veritas are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

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Your P.O. #: 3000000997
Your Project #: Howse surface water
Site#: 00025
Site Location: Howse
Your C.O.C. #: 74814

Attention: Vivek Agarwal

TATA STEEL MINERALS CANADA
1000, RUE SHERBROOKE OUEST
BUREAU 1120
MONTRÉAL, QC
CANADA H3A 3G4

Report Date: 2022/10/05
Report #: R2794037
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C249760
Received: 2022/09/14, 12:00

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Bureau Veritas' profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Bureau Veritas in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Bureau Veritas liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Bureau Veritas has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Bureau Veritas, unless otherwise agreed in writing. Bureau Veritas is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Bureau Veritas, results relate to the supplied samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.
Note: RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
(1) This test was performed by Bureau Veritas Mississauga, 6740 Campobello Rd. , Mississauga, ON, L5N 2L8
(2) This test was performed by Bureau Veritas Bedford, Suit 105, 200 Bluewater Rd. , Bedford, NS, B4B1G9
(3) DOC present in the sample should be considered as non-purgeable DOC

Note: All parameters included in the present certificate are accredited by the MELCC unless stated otherwise.

<Original signed by>

Josue Moran
Project Manager
06 Oct 2022 17:39:51

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Josue Moran, Project Manager
Email: josue.moran@bureauveritas.com
Phone# (514) 448-9001
==========
Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports.
For Service Group specific validation please refer to the Validation Signature Page.

TATA STEEL MINERALS CANADA
Client Project #: Howse surface water
Site Location: Howse
Your P.O. #: 3000000997

RESULTS OF ANALYSES OF SURFACE WATER

Bureau Veritas ID		KX3411	KX3412		KX3413	KX3414	KX3415		
Sampling Date		2022/09/06 09:45	2022/09/06 09:20		2022/09/06 15:00	2022/09/06 10:10	2022/09/06 13:24		
COC Number		74814	74814		74814	74814	74814		
	Units	HOW-BC-Q3	HOW-BL-Q3	QC Batch	HOW-ML-Q3	HOW-TL-Q3	HOW-SW1-Q3	RDL	QC Batch
INORGANICS									
Reactive silica (SiO2) †	mg/L	4.7	5.7	2337930	0.78	4.6	4.8	0.50	2337930
METALS									
Mercury (Hg) †	ug/L	<0.01	<0.01	2333508	<0.01	<0.01	<0.01	0.01	2333509

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
† Parameter is not accreditable

Bureau Veritas ID		KX3416	KX3417	KX3418		KX3419		
Sampling Date		2022/09/06 12:27	2022/09/06 12:20	2022/09/06 13:04		2022/09/06 14:15		
COC Number		74814	74814	74814		74814		
	Units	HOW-SW2-Q3	HOW-SW3-Q3	HOW-SW4-Q3	QC Batch	HOW-SW5-Q3	RDL	QC Batch
INORGANICS								
Reactive silica (SiO2) †	mg/L	5.2	2.3	4.2	2337931	1.2	0.50	2337931
METALS								
Mercury (Hg) †	ug/L	<0.01	<0.01	<0.01	2333508	<0.01	0.01	2333509

RDL = Reportable Detection Limit QC Batch = Quality Control Batch
† Parameter is not accreditable

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TOTAL EXTRACTABLE METALS (SURFACE WATER)

Bureau Veritas ID		KX3411	KX3412	KX3413	KX3414	KX3415	KX3416		
Sampling Date		2022/09/06 09:45	2022/09/06 09:20	2022/09/06 15:00	2022/09/06 10:10	2022/09/06 13:24	2022/09/06 12:27		
COC Number		74814	74814	74814	74814	74814	74814		
	Units	HOW-BC-Q3	HOW-BL-Q3	HOW-ML-Q3	HOW-TL-Q3	HOW-SW1-Q3	HOW-SW2-Q3	RDL	QC Batch
METALS									
Aluminum (Al)	ug/L	190	<10	39	16	<10	84	10	2332962
Antimony (Sb)	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	2332962
Silver (Ag)	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	2332962
Arsenic (As)	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	2332962
Barium (Ba)	ug/L	2.9	<2.0	<2.0	2.9	<2.0	4.2	2.0	2332962
Beryllium (Be)	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	2332962
Bismuth (Bi) ††	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	2332962
Boron (B) †	ug/L	<50	<50	<50	<50	<50	<50	50	2332962
Cadmium (Cd)	ug/L	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	0.20	2332962
Calcium (Ca) †	ug/L	<500	4900	2000	3500	3100	590	500	2332962
Chromium (Cr)	ug/L	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	5.0	2332962
Cobalt (Co)	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	2332962
Copper (Cu)	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	2332962
Total Hardness (CaCO3) ††	ug/L	2300	26000	11000	20000	17000	2900	1000	2332962
Tin (Sn)	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	2332962
Iron (Fe)	ug/L	290	63	100	75	99	1400	60	2332962
Magnesium (Mg) †	ug/L	350	3300	1400	2700	2200	330	100	2332962
Manganese (Mn)	ug/L	23	3.9	8.2	5.9	6.2	220	1.0	2332962
Mercury (Hg)	ug/L	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.10	2332962
Molybdenum (Mo)	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	2332962
Nickel (Ni)	ug/L	12	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	2332962
P2O5 ††	ug/L	<25	<25	<25	<25	<25	<25	25	2332962
Total phosphorous	ug/L	<10	<10	<10	<10	<10	<10	10	2332962
Lead (Pb)	ug/L	<0.50	0.83	<0.50	<0.50	<0.50	<0.50	0.50	2332962
Potassium (K) †	ug/L	<500	<500	<500	<500	<500	<500	500	2332962
Selenium (Se)	ug/L	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	3.0	2332962
Sodium (Na)	ug/L	580	920	<500	650	680	550	500	2332962
Strontium (Sr) †	ug/L	2.6	7.4	4.6	6.5	6.5	4.7	2.0	2332962
Thallium (Tl)	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	2332962
Titanium (Ti) ††	ug/L	<10	<10	<10	<10	<10	<10	10	2332962
Uranium (U) ††	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	2332962
Vanadium (V)	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	2332962

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
†† Parameter is not accreditable
† Parameter is not accredited

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TOTAL EXTRACTABLE METALS (SURFACE WATER)

Bureau Veritas ID		KX3411	KX3412	KX3413	KX3414	KX3415	KX3416		
Sampling Date		2022/09/06 09:45	2022/09/06 09:20	2022/09/06 15:00	2022/09/06 10:10	2022/09/06 13:24	2022/09/06 12:27		
COC Number		74814	74814	74814	74814	74814	74814		
	Units	**HOW-BC-Q3**	**HOW-BL-Q3**	**HOW-ML-Q3**	**HOW-TL-Q3**	**HOW-SW1-Q3**	**HOW-SW2-Q3**	**RDL**	**QC Batch**
Zinc (Zn)	ug/L	<7.0	<7.0	<7.0	<7.0	<7.0	<7.0	7.0	2332962

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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TATA STEEL MINERALS CANADA
Client Project #: Howse surface water
Site Location: Howse
Your P.O. #: 3000000997

TOTAL EXTRACTABLE METALS (SURFACE WATER)

Bureau Veritas ID		KX3417	KX3418	KX3419		
Sampling Date		2022/09/06 12:20	2022/09/06 13:04	2022/09/06 14:15		
COC Number		74814	74814	74814		
	Units	HOW-SW3-Q3	HOW-SW4-Q3	HOW-SW5-Q3	RDL	QC Batch
METALS						
Aluminum (Al)	ug/L	60	10	11	10	2332962
Antimony (Sb)	ug/L	<1.0	<1.0	<1.0	1.0	2332962
Silver (Ag)	ug/L	<1.0	<1.0	<1.0	1.0	2332962
Arsenic (As)	ug/L	<1.0	<1.0	<1.0	1.0	2332962
Barium (Ba)	ug/L	2.2	<2.0	<2.0	2.0	2332962
Beryllium (Be)	ug/L	<2.0	<2.0	<2.0	2.0	2332962
Bismuth (Bi) ††	ug/L	<1.0	<1.0	<1.0	1.0	2332962
Boron (B) †	ug/L	<50	<50	<50	50	2332962
Cadmium (Cd)	ug/L	<0.20	<0.20	<0.20	0.20	2332962
Calcium (Ca) †	ug/L	<500	2400	<500	500	2332962
Chromium (Cr)	ug/L	<5.0	<5.0	<5.0	5.0	2332962
Cobalt (Co)	ug/L	<1.0	<1.0	<1.0	1.0	2332962
Copper (Cu)	ug/L	<1.0	<1.0	<1.0	1.0	2332962
Total Hardness (CaCO3) ††	ug/L	1300	14000	1500	1000	2332962
Tin (Sn)	ug/L	<2.0	<2.0	<2.0	2.0	2332962
Iron (Fe)	ug/L	100	<60	<60	60	2332962
Magnesium (Mg) †	ug/L	140	1900	220	100	2332962
Manganese (Mn)	ug/L	19	2.8	3.7	1.0	2332962
Mercury (Hg)	ug/L	<0.10	<0.10	<0.10	0.10	2332962
Molybdenum (Mo)	ug/L	<1.0	<1.0	<1.0	1.0	2332962
Nickel (Ni)	ug/L	<2.0	<2.0	<2.0	2.0	2332962
P2O5 ††	ug/L	<25	<25	<25	25	2332962
Total phosphorous	ug/L	<10	<10	<10	10	2332962
Lead (Pb)	ug/L	<0.50	<0.50	<0.50	0.50	2332962
Potassium (K) †	ug/L	<500	<500	<500	500	2332962
Selenium (Se)	ug/L	<3.0	<3.0	<3.0	3.0	2332962
Sodium (Na)	ug/L	<500	550	<500	500	2332962
Strontium (Sr) †	ug/L	2.0	6.1	<2.0	2.0	2332962
Thallium (Tl)	ug/L	<2.0	<2.0	<2.0	2.0	2332962
Titanium (Ti) ††	ug/L	<10	<10	<10	10	2332962
Uranium (U) ††	ug/L	<1.0	<1.0	<1.0	1.0	2332962
Vanadium (V)	ug/L	<2.0	<2.0	<2.0	2.0	2332962

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
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TOTAL EXTRACTABLE METALS (SURFACE WATER)

Bureau Veritas ID		KX3417	KX3418	KX3419		
Sampling Date		2022/09/06 12:20	2022/09/06 13:04	2022/09/06 14:15		
COC Number		74814	74814	74814		
	Units	**HOW-SW3-Q3**	**HOW-SW4-Q3**	**HOW-SW5-Q3**	**RDL**	**QC Batch**
Zinc (Zn)	ug/L	<7.0	<7.0	<7.0	7.0	2332962

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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CONVENTIONAL PARAMETERS (SURFACE WATER)

Bureau Veritas ID		KX3411	KX3412	KX3412		KX3413		
Sampling Date		2022/09/06 09:45	2022/09/06 09:20	2022/09/06 09:20		2022/09/06 15:00		
COC Number		74814	74814	74814		74814		
	Units	HOW-BC-Q3	HOW-BL-Q3	HOW-BL-Q3 Lab-Dup	QC Batch	HOW-ML-Q3	RDL	QC Batch
CONVENTIONALS								
Conductivity	mS/cm	0.0027	0.050	N/A	2331955	0.020	0.0010	2331955
Dissolved organic carbon †	mg/L	7.6	0.77	N/A	2333637	2.3	0.20	2333637
Dissolved oxygen †	mg/L	9.8	10	N/A	2332020	10	1.0	2332020
Nitrate (N) and Nitrite(N)	mg/L	<0.020	0.022	N/A	2332987	<0.020	0.020	2332987
Nitrates (N-NO3-)	mg/L	<0.020	0.022	N/A	2332987	<0.020	0.020	2332987
Nitrites (N-NO2-)	mg/L	<0.020	<0.020	N/A	2332987	<0.020	0.020	2332987
Nitrogen ammonia (N-NH4+ and N-NH3)	mg/L	<0.020	<0.020	N/A	2333842	<0.020	0.020	2333855
Orthophosphate (P)	mg/L	<0.050	<0.050	N/A	2332120	<0.050	0.050	2332120
pH	pH	5.66	6.53	N/A	2331848	6.26	N/A	2331848
pH (15° C) †	pH	5.44	7.01	N/A	2332015	7.02	N/A	2332015
Phenols-4AAP	mg/L	<0.0020	<0.0020	N/A	2333832	<0.0020	0.0020	2333832
Real Color	UCV	51	5.5	N/A	2333098	12	2.0	2333098
Sulfides (S2-)	mg/L	<0.020	<0.020	<0.020	2334108	<0.020	0.020	2334108
Turbidity	NTU	0.44	0.27	N/A	2332051	3.1	0.10	2332051
Alkalinity Total (as CaCO3) pH 4.5 †	mg/L	<1.0	22	N/A	2331959	5.9	1.0	2331959
Bicarbonates (HCO3 as CaCO3) †	mg/L	1.8	22	N/A	2331959	5.9	1.0	2331959
Carbonate (CO3 as CaCO3) †	mg/L	<1.0	<1.0	N/A	2331959	<1.0	1.0	2331959
Chloride (Cl)	mg/L	0.24	0.21	N/A	2333024	0.16	0.050	2333024
Sulfates (SO4)	mg/L	0.52	2.2	N/A	2333024	2.8	0.50	2333024
Total Dissolved Solids	mg/L	58	54	N/A	2332975	46	10	2332975
Total suspended solids (TSS)	mg/L	2.0	7.0	N/A	2332915	3.0	2.0	2332442

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable
† Parameter is not accreditable

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CONVENTIONAL PARAMETERS (SURFACE WATER)

Bureau Veritas ID		KX3414		KX3415		KX3416		
Sampling Date		2022/09/06 10:10		2022/09/06 13:24		2022/09/06 12:27		
COC Number		74814		74814		74814		
	Units	HOW-TL-Q3	QC Batch	HOW-SW1-Q3	QC Batch	HOW-SW2-Q3	RDL	QC Batch
CONVENTIONALS								
Conductivity	mS/cm	0.040	2331955	0.034	2331955	0.0030	0.0010	2331955
Dissolved organic carbon †	mg/L	1.5	2333637	0.92	2333637	4.2	0.20	2333637
Dissolved oxygen †	mg/L	9.9	2332020	9.9	2332020	9.8	1.0	2332020
Nitrate (N) and Nitrite(N)	mg/L	0.056	2332987	0.16	2332987	<0.020	0.020	2332987
Nitrates (N-NO3-)	mg/L	0.056	2332987	0.16	2332987	<0.020	0.020	2332987
Nitrites (N-NO2-)	mg/L	<0.020	2332987	<0.020	2332987	<0.020	0.020	2332987
Nitrogen ammonia (N-NH4+ and N-NH3)	mg/L	<0.020	2333842	<0.020	2333855	<0.020	0.020	2333842
Orthophosphate (P)	mg/L	<0.050	2332120	<0.050	2332120	<0.050	0.050	2332120
pH	pH	6.59	2331848	6.52	2331848	5.97	N/A	2331848
pH (15° C) †	pH	7.21	2332015	7.21	2332015	6.04	N/A	2332015
Phenols-4AAP	mg/L	<0.0020	2333832	<0.0020	2333832	<0.0020	0.0020	2333832
Real Color	UCV	8.2	2333098	6.8	2333098	48	2.0	2333098
Sulfides (S2-)	mg/L	<0.020	2334108	<0.020	2334108	<0.020	0.020	2334108
Turbidity	NTU	0.28	2332051	0.41	2332051	0.84	0.10	2332051
Alkalinity Total (as CaCO3) pH 4.5 †	mg/L	16	2331959	12	2331959	2.7	1.0	2331959
Bicarbonates (HCO3 as CaCO3) †	mg/L	16	2331959	12	2331959	2.7	1.0	2331959
Carbonate (CO3 as CaCO3) †	mg/L	<1.0	2331959	<1.0	2331959	<1.0	1.0	2331959
Chloride (Cl)	mg/L	0.33	2333024	0.42	2333024	0.20	0.050	2333024
Sulfates (SO4)	mg/L	2.4	2333024	2.6	2333024	<0.50	0.50	2333024
Total Dissolved Solids	mg/L	54	2332975	42	2332975	35	10	2332224
Total suspended solids (TSS)	mg/L	2.0	2332915	2.0	2332915	4.0	2.0	2332915

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
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N/A = Not Applicable

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CONVENTIONAL PARAMETERS (SURFACE WATER)

Bureau Veritas ID		KX3417		KX3418		KX3419		
Sampling Date		2022/09/06 12:20		2022/09/06 13:04		2022/09/06 14:15		
COC Number		74814		74814		74814		
	Units	HOW-SW3-Q3	QC Batch	HOW-SW4-Q3	QC Batch	HOW-SW5-Q3	RDL	QC Batch
CONVENTIONALS								
Conductivity	mS/cm	<0.0010	2331955	0.029	2331955	0.0053	0.0010	2332016
Dissolved organic carbon †	mg/L	4.4	2333637	1.4	2333637	1.5	0.20	2333637
Dissolved oxygen †	mg/L	9.4	2332020	10	2332020	10	1.0	2332020
Nitrate (N) and Nitrite(N)	mg/L	<0.020	2332987	0.17	2332987	<0.020	0.020	2332987
Nitrates (N-NO3-)	mg/L	<0.020	2332987	0.17	2332987	<0.020	0.020	2332987
Nitrites (N-NO2-)	mg/L	<0.020	2332987	<0.020	2332987	<0.020	0.020	2332987
Nitrogen ammonia (N-NH4+ and N-NH3)	mg/L	<0.020	2333842	<0.020	2333855	<0.020	0.020	2333855
Orthophosphate (P)	mg/L	<0.050	2332120	<0.050	2332120	<0.050	0.050	2332120
pH	pH	5.45	2331848	6.35	2331848	6.02	N/A	2331965
pH (15° C) †	pH	5.51	2332015	6.84	2332015	6.52	N/A	2332015
Phenols-4AAP	mg/L	<0.0020	2333832	<0.0020	2333832	<0.0020	0.0020	2333832
Real Color	UCV	24	2333098	7.5	2333098	20	2.0	2333098
Sulfides (S2-)	mg/L	<0.020	2334108	<0.020	2334108	<0.020	0.020	2334108
Turbidity	NTU	0.23	2332051	0.68	2332051	0.54	0.10	2332051
Alkalinity Total (as CaCO3) pH 4.5 †	mg/L	<1.0	2331959	8.5	2331959	2.6	1.0	2332017
Bicarbonates (HCO3 as CaCO3) †	mg/L	<1.0	2331959	8.5	2331959	2.6	1.0	2332017
Carbonate (CO3 as CaCO3) †	mg/L	<1.0	2331959	<1.0	2331959	<1.0	1.0	2332017
Chloride (Cl)	mg/L	0.17	2333024	0.40	2333024	0.17	0.050	2333024
Sulfates (SO4)	mg/L	<0.50	2333024	2.8	2333024	0.62	0.50	2333024
Total Dissolved Solids	mg/L	46	2332975	50	2332975	29	10	2332975
Total suspended solids (TSS)	mg/L	2.0	2332915	2.0	2332915	2.0	2.0	2332915

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
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N/A = Not Applicable

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GENERAL COMMENTS

Dissolved Oxygen: Holding time already past upon reception.: KX3411
pH Measured @ 15° C: Holding time already past upon reception.: KX3411
Dissolved Organic Carbon: Holding time already past upon reception.: KX3411
Total Suspended Solids: Holding time already past upon reception.: KX3411
Total Dissolved Solids: Holding time already past upon reception.: KX3411
Real Color: Holding time already past upon reception.: KX3411
Nitrates(NO3-), Nitrites(NO2-)-water: Holding time already past upon reception.: KX3411
pH in water: Holding time already past upon reception.: KX3411
Ortho Phosphate: Holding time already past upon reception.: KX3411
Turbidity: Holding time already past upon reception.: KX3411
Dissolved Oxygen: Holding time already past upon reception.: KX3412
pH Measured @ 15° C: Holding time already past upon reception.: KX3412
Dissolved Organic Carbon: Holding time already past upon reception.: KX3412
Total Suspended Solids: Holding time already past upon reception.: KX3412
Total Dissolved Solids: Holding time already past upon reception.: KX3412
Real Color: Holding time already past upon reception.: KX3412
Nitrates(NO3-), Nitrites(NO2-)-water: Holding time already past upon reception.: KX3412
pH in water: Holding time already past upon reception.: KX3412
Ortho Phosphate: Holding time already past upon reception.: KX3412
Turbidity: Holding time already past upon reception.: KX3412
Dissolved Oxygen: Holding time already past upon reception.: KX3413
pH Measured @ 15° C: Holding time already past upon reception.: KX3413
Dissolved Organic Carbon: Holding time already past upon reception.: KX3413
Total Suspended Solids: Holding time already past upon reception.: KX3413
Total Dissolved Solids: Holding time already past upon reception.: KX3413
Real Color: Holding time already past upon reception.: KX3413
Nitrates(NO3-), Nitrites(NO2-)-water: Holding time already past upon reception.: KX3413
pH in water: Holding time already past upon reception.: KX3413
Ortho Phosphate: Holding time already past upon reception.: KX3413
Turbidity: Holding time already past upon reception.: KX3413
Dissolved Oxygen: Holding time already past upon reception.: KX3414
pH Measured @ 15° C: Holding time already past upon reception.: KX3414
Dissolved Organic Carbon: Holding time already past upon reception.: KX3414
Total Suspended Solids: Holding time already past upon reception.: KX3414
Total Dissolved Solids: Holding time already past upon reception.: KX3414
Real Color: Holding time already past upon reception.: KX3414
Nitrates(NO3-), Nitrites(NO2-)-water: Holding time already past upon reception.: KX3414
pH in water: Holding time already past upon reception.: KX3414
Ortho Phosphate: Holding time already past upon reception.: KX3414
Turbidity: Holding time already past upon reception.: KX3414
Dissolved Oxygen: Holding time already past upon reception.: KX3415
pH Measured @ 15° C: Holding time already past upon reception.: KX3415
Dissolved Organic Carbon: Holding time already past upon reception.: KX3415
Total Suspended Solids: Holding time already past upon reception.: KX3415
Total Dissolved Solids: Holding time already past upon reception.: KX3415
Real Color: Holding time already past upon reception.: KX3415
Nitrates(NO3-), Nitrites(NO2-)-water: Holding time already past upon reception.: KX3415
pH in water: Holding time already past upon reception.: KX3415
Ortho Phosphate: Holding time already past upon reception.: KX3415
Turbidity: Holding time already past upon reception.: KX3415
Dissolved Oxygen: Holding time already past upon reception.: KX3416
pH Measured @ 15° C: Holding time already past upon reception.: KX3416

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Dissolved Organic Carbon: Holding time already past upon reception.: KX3416
Total Suspended Solids: Holding time already past upon reception.: KX3416
Total Dissolved Solids: Holding time already past upon reception.: KX3416
Real Color: Holding time already past upon reception.: KX3416
Nitrates(NO3-), Nitrites(NO2-)-water: Holding time already past upon reception.: KX3416
pH in water: Holding time already past upon reception.: KX3416
Ortho Phosphate: Holding time already past upon reception.: KX3416
Turbidity: Holding time already past upon reception.: KX3416
Dissolved Oxygen: Holding time already past upon reception.: KX3417
pH Measured @ 15° C: Holding time already past upon reception.: KX3417
Dissolved Organic Carbon: Holding time already past upon reception.: KX3417
Total Suspended Solids: Holding time already past upon reception.: KX3417
Total Dissolved Solids: Holding time already past upon reception.: KX3417
Real Color: Holding time already past upon reception.: KX3417
Nitrates(NO3-), Nitrites(NO2-)-water: Holding time already past upon reception.: KX3417
pH in water: Holding time already past upon reception.: KX3417
Ortho Phosphate: Holding time already past upon reception.: KX3417
Turbidity: Holding time already past upon reception.: KX3417
Dissolved Oxygen: Holding time already past upon reception.: KX3418
pH Measured @ 15° C: Holding time already past upon reception.: KX3418
Dissolved Organic Carbon: Holding time already past upon reception.: KX3418
Total Suspended Solids: Holding time already past upon reception.: KX3418
Total Dissolved Solids: Holding time already past upon reception.: KX3418
Real Color: Holding time already past upon reception.: KX3418
Nitrates(NO3-), Nitrites(NO2-)-water: Holding time already past upon reception.: KX3418
pH in water: Holding time already past upon reception.: KX3418
Ortho Phosphate: Holding time already past upon reception.: KX3418
Turbidity: Holding time already past upon reception.: KX3418
Dissolved Oxygen: Holding time already past upon reception.: KX3419
pH Measured @ 15° C: Holding time already past upon reception.: KX3419
Dissolved Organic Carbon: Holding time already past upon reception.: KX3419
Total Suspended Solids: Holding time already past upon reception.: KX3419
Total Dissolved Solids: Holding time already past upon reception.: KX3419
Real Color: Holding time already past upon reception.: KX3419
Nitrates(NO3-), Nitrites(NO2-)-water: Holding time already past upon reception.: KX3419
pH in water: Holding time already past upon reception.: KX3419
Ortho Phosphate: Holding time already past upon reception.: KX3419
Turbidity: Holding time already past upon reception.: KX3419

CONVENTIONAL PARAMETERS (SURFACE WATER)

Dissolved oxygen: presence of headspace.

Results relate only to the items tested.

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QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units
2331848	ZLI	Spiked Blank	pH	2022/09/14		101	%
2331955	ZLI	Spiked Blank	Conductivity	2022/09/14		104	%
2331955	ZLI	Method Blank	Conductivity	2022/09/14	0.0023, RDL=0.0010		mS/cm
2331959	ZLI	Spiked Blank	Alkalinity Total (as CaCO3) pH 4.5	2022/09/14		92	%
2331959	ZLI	Method Blank	Alkalinity Total (as CaCO3) pH 4.5	2022/09/14	<1.0		mg/L
2331965	ZLI	Spiked Blank	pH	2022/09/14		101	%
2332015	LI	QC Standard	pH (15° C)	2022/09/14		100	%
2332015	LI	Spiked Blank	pH (15° C)	2022/09/14		101	%
2332016	ZLI	Spiked Blank	Conductivity	2022/09/14		105	%
2332016	ZLI	Method Blank	Conductivity	2022/09/14	<0.0010		mS/cm
2332017	ZLI	Spiked Blank	Alkalinity Total (as CaCO3) pH 4.5	2022/09/14		94	%
2332017	ZLI	Method Blank	Alkalinity Total (as CaCO3) pH 4.5	2022/09/14	<1.0		mg/L
2332051	NOL	Spiked Blank	Turbidity	2022/09/14		91	%
2332051	NOL	Method Blank	Turbidity	2022/09/14	<0.10		NTU
2332120	CLO	QC Standard	Orthophosphate (P)	2022/09/15		98	%
2332120	CLO	Spiked Blank	Orthophosphate (P)	2022/09/15		102	%
2332120	CLO	Method Blank	Orthophosphate (P)	2022/09/15	<0.050		mg/L
2332224	ZZH	Spiked Blank	Total Dissolved Solids	2022/09/16		99	%
2332224	ZZH	Method Blank	Total Dissolved Solids	2022/09/16	<10		mg/L
2332442	SKL	Spiked Blank	Total suspended solids (TSS)	2022/09/16		93	%
2332442	SKL	Method Blank	Total suspended solids (TSS)	2022/09/16	<2.0		mg/L
2332915	SKL	Spiked Blank	Total suspended solids (TSS)	2022/09/23		97	%
2332915	SKL	Method Blank	Total suspended solids (TSS)	2022/09/23	<2.0		mg/L
2332962	ST5	Spiked Blank	Aluminum (Al)	2022/09/21		101	%
			Antimony (Sb)	2022/09/21		116	%
			Silver (Ag)	2022/09/21		111	%
			Arsenic (As)	2022/09/21		116	%
			Barium (Ba)	2022/09/21		110	%
			Beryllium (Be)	2022/09/21		104	%
			Bismuth (Bi)	2022/09/21		103	%
			Boron (B)	2022/09/21		123 (1)	%
			Cadmium (Cd)	2022/09/21		109	%
			Calcium (Ca)	2022/09/21		99	%
			Chromium (Cr)	2022/09/21		112	%
			Cobalt (Co)	2022/09/21		110	%
			Copper (Cu)	2022/09/21		109	%
			Tin (Sn)	2022/09/21		115	%
			Iron (Fe)	2022/09/21		111	%
			Magnesium (Mg)	2022/09/21		106	%
			Manganese (Mn)	2022/09/21		107	%
			Mercury (Hg)	2022/09/21		112	%
			Molybdenum (Mo)	2022/09/21		116	%
			Nickel (Ni)	2022/09/21		112	%
			Total phosphorous	2022/09/21		101	%
			Lead (Pb)	2022/09/21		107	%
			Potassium (K)	2022/09/21		104	%
			Selenium (Se)	2022/09/21		110	%
			Sodium (Na)	2022/09/21		109	%
			Strontium (Sr)	2022/09/21		109	%
			Thallium (Tl)	2022/09/21		107	%

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units
			Titanium (Ti)	2022/09/21		107	%
			Uranium (U)	2022/09/21		104	%
			Vanadium (V)	2022/09/21		112	%
			Zinc (Zn)	2022/09/21		108	%
2332962	ST5	Method Blank	Aluminum (Al)	2022/09/21	<10		ug/L
			Antimony (Sb)	2022/09/21	<1.0		ug/L
			Silver (Ag)	2022/09/21	<1.0		ug/L
			Arsenic (As)	2022/09/21	<1.0		ug/L
			Barium (Ba)	2022/09/21	<2.0		ug/L
			Beryllium (Be)	2022/09/21	<2.0		ug/L
			Bismuth (Bi)	2022/09/21	<1.0		ug/L
			Boron (B)	2022/09/21	55, RDL=50		ug/L
			Cadmium (Cd)	2022/09/21	<0.20		ug/L
			Calcium (Ca)	2022/09/21	<500		ug/L
			Chromium (Cr)	2022/09/21	<5.0		ug/L
			Cobalt (Co)	2022/09/21	<1.0		ug/L
			Copper (Cu)	2022/09/21	<1.0		ug/L
			Total Hardness (CaCO3)	2022/09/21	<1000		ug/L
			Tin (Sn)	2022/09/21	<2.0		ug/L
			Iron (Fe)	2022/09/21	<60		ug/L
			Magnesium (Mg)	2022/09/21	<100		ug/L
			Manganese (Mn)	2022/09/21	<1.0		ug/L
			Mercury (Hg)	2022/09/21	<0.10		ug/L
			Molybdenum (Mo)	2022/09/21	<1.0		ug/L
			Nickel (Ni)	2022/09/21	<2.0		ug/L
			P2O5	2022/09/21	<25		ug/L
			Total phosphorous	2022/09/21	<10		ug/L
			Lead (Pb)	2022/09/21	<0.50		ug/L
			Potassium (K)	2022/09/21	<500		ug/L
			Selenium (Se)	2022/09/21	<3.0		ug/L
			Sodium (Na)	2022/09/21	<500		ug/L
			Strontium (Sr)	2022/09/21	<2.0		ug/L
			Thallium (Tl)	2022/09/21	<2.0		ug/L
			Titanium (Ti)	2022/09/21	<10		ug/L
			Uranium (U)	2022/09/21	<1.0		ug/L
			Vanadium (V)	2022/09/21	<2.0		ug/L
			Zinc (Zn)	2022/09/21	<7.0		ug/L
2332975	SAT	Spiked Blank	Total Dissolved Solids	2022/09/19		93	%
2332975	SAT	Method Blank	Total Dissolved Solids	2022/09/19	<10		mg/L
2332987	VCH	Spiked Blank	Nitrate (N) and Nitrite(N)	2022/09/17		100	%
			Nitrates (N-NO3-)	2022/09/17		99	%
			Nitrites (N-NO2-)	2022/09/17		101	%
2332987	VCH	Method Blank	Nitrate (N) and Nitrite(N)	2022/09/17	<0.020		mg/L
			Nitrates (N-NO3-)	2022/09/17	<0.020		mg/L
			Nitrites (N-NO2-)	2022/09/17	<0.020		mg/L
2333024	VCH	Spiked Blank	Chloride (Cl)	2022/09/17		97	%
			Sulfates (SO4)	2022/09/17		98	%
2333024	VCH	Method Blank	Chloride (Cl)	2022/09/17	<0.050		mg/L
			Sulfates (SO4)	2022/09/17	<0.50		mg/L
2333098	QKB	Spiked Blank	Real Color	2022/09/18		96	%

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units
2333098	QKB	Method Blank	Real Color	2022/09/18	<2.0		UCV
2333508	JGC	Matrix Spike	Mercury (Hg)	2022/09/19		96	%
			Mercury (Hg)	2022/09/19		96	%
2333508	JGC	Spiked Blank	Mercury (Hg)	2022/09/19		103	%
			Mercury (Hg)	2022/09/19		103	%
2333508	JGC	Method Blank	Mercury (Hg)	2022/09/19	<0.01		ug/L
			Mercury (Hg)	2022/09/19	<0.01		ug/L
2333509	JGC	Matrix Spike	Mercury (Hg)	2022/09/19		96	%
			Mercury (Hg)	2022/09/19		96	%
2333509	JGC	Spiked Blank	Mercury (Hg)	2022/09/19		100	%
			Mercury (Hg)	2022/09/19		100	%
2333509	JGC	Method Blank	Mercury (Hg)	2022/09/19	<0.01		ug/L
			Mercury (Hg)	2022/09/19	<0.01		ug/L
2333637	HPA	Spiked Blank	Dissolved organic carbon	2022/09/21		106	%
2333637	HPA	Method Blank	Dissolved organic carbon	2022/09/21	<0.20		mg/L
2333832	DMI	Spiked Blank	Phenols-4AAP	2022/09/20		96	%
2333832	DMI	Method Blank	Phenols-4AAP	2022/09/20	<0.0020		mg/L
2333842	CLO	Spiked Blank	Nitrogen ammonia (N-NH4+ and N-NH3)	2022/09/20		110	%
2333842	CLO	Method Blank	Nitrogen ammonia (N-NH4+ and N-NH3)	2022/09/21	<0.020		mg/L
2333855	CLO	Spiked Blank	Nitrogen ammonia (N-NH4+ and N-NH3)	2022/09/20		107	%
2333855	CLO	Method Blank	Nitrogen ammonia (N-NH4+ and N-NH3)	2022/09/20	<0.020		mg/L
2334108	ANB	Spiked Blank	Sulfides (S2-)	2022/09/21		90	%
2334108	ANB	Method Blank	Sulfides (S2-)	2022/09/21	<0.020		mg/L
2337930	TGO	Matrix Spike	Reactive silica (SiO2)	2022/09/30		NC	%
2337930	TGO	Spiked Blank	Reactive silica (SiO2)	2022/09/30		94	%
2337930	TGO	Method Blank	Reactive silica (SiO2)	2022/09/30	<0.50		mg/L
2337931	TGO	Matrix Spike	Reactive silica (SiO2)	2022/09/30		87	%
2337931	TGO	Spiked Blank	Reactive silica (SiO2)	2022/09/30		91	%
2337931	TGO	Method Blank	Reactive silica (SiO2)	2022/09/30	<0.50		mg/L

RDL = Reportable Detection Limit

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

QC Standard: A sample of known concentration prepared by an external agency under stringent conditions. Used as an independent check of method accuracy.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

(1) Recovery or relative percent difference (RPD) for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria

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TATA STEEL MINERALS CANADA
Client Project #: Howse surface water
Site Location: Howse
Your P.O. #: 3000000997

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:

<Original signed by>

Cristina Carriere, Scientific Services

<Original signed by>

Frédéric Arnau, B.Sc., Chemist, Montreal, Scientific Service Specialist

<Original signed by>

Michelina Cinquino, Analyst II

<Original signed by>

Mira El Masri, M.Sc. Chemist, Montréal, Analyst II

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Shu Yang, B.Sc. Chemist, Montreal, Analyst II

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Your P.O. #: 3000001390
Your Project #: HOWSE SURFACE WATER
Site#: 00025
Your C.O.C. #: 79082

Attention: Vivek Agarwal

TATA STEEL MINERALS CANADA
1000, RUE SHERBROOKE OUEST
BUREAU 1120
MONTRÉAL, QC
CANADA H3A 3G4

Report Date: 2022/12/16
Report #: R2813312
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C261833
Received: 2022/11/02, 13:30

Sample Matrix: Surface Water
Samples Received: 9

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Total Alkalinity (pH end point 4.5)	5	N/A	2022/11/02	STLSOP-00038	SM 23 2320-B m
Total Alkalinity (pH end point 4.5)	4	N/A	2022/11/03	STLSOP-00038	SM 23 2320-B m
Anions in water	9	N/A	2022/11/03	STLSOP-00014	MA.300–Ions 1.3 R6 m
Real Color	9	N/A	2022/11/02	STLSOP-00046	MA103 - Col. 2.0 R4m
Conductivity	6	N/A	2022/11/02	STLSOP-00038	SM 23 2510-B m
Conductivity	3	N/A	2022/11/03	STLSOP-00038	SM 23 2510-B m
Dissolved Organic Carbon (3)	7	2022/11/11	2022/11/11	STL SOP-00243	SM 23 5310-B m
Dissolved Organic Carbon (3)	2	2022/11/11	2022/11/12	STL SOP-00243	SM 23 5310-B m
Total Suspended Solids	9	2022/11/06	2022/11/07	STL SOP-00015	MA.104–S.S. 2.0 m
Total Extractable Metals by ICP	9	2022/11/03	2022/11/15	STL SOP-00062	MA.200–Mét. 1.2 R7 m
Ammonia Nitrogen	9	N/A	2022/11/05	STLSOP-00040	MA.300–N 2.0 R2 m
Nitrates(NO3-), Nitrites(NO2-)-water	9	N/A	2022/11/03	STLSOP-00014	MA.300–Ions 1.3 R6 m
Dissolved Oxygen	9	N/A	2022/11/03	STLSOP-00008	MA.315–DBO 1.1 R3 m
pH in water	6	N/A	2022/11/02	STLSOP-00038	MA.100–pH 1.1 R3 m
pH in water	3	N/A	2022/11/03	STLSOP-00038	MA.100–pH 1.1 R3 m
pH Measured @ 15° C	9	N/A	2022/11/02	STLSOP-00016	MA.100–pH 1.1 R3 m
Total Phenols by 4-AAP in water	9	2022/11/07	2022/11/07	STL SOP-00033	MA404–I.Phé 2.2 R2 m
Ortho Phosphate	9	N/A	2022/11/02	STL SOP-00003	MA.303–P 1.1 R2 m
Sulfides (as S2-)	9	2022/11/18	2022/11/18	STL SOP-00005	MA. 300 – S 1.2 R3 m
Total Dissolved Solids	9	2022/11/06	2022/11/07	STL SOP-00050	MA.115–S.D. 1.0 R4 m
Turbidity	9	N/A	2022/11/02	STL SOP-00022	MA.103–Tur. 1.0 R5 m
Total Extractable Mercury - Cold Vapour (1)	9	2022/11/09	2022/11/09	CAM SOP-00453	EPA 7470 m
Reactive Silica(SiO2) (2)	9	2022/11/22	2022/11/22	ATL SOP 00022	EPA 366.0 m

Remarks:

Bureau Veritas is accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Bureau Veritas are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Bureau Veritas' profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Bureau Veritas in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are

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Your P.O. #: 3000001390
Your Project #: HOWSE SURFACE WATER
Site#: 00025
Your C.O.C. #: 79082

Attention: Vivek Agarwal

TATA STEEL MINERALS CANADA
1000, RUE SHERBROOKE OUEST
BUREAU 1120
MONTRÉAL, QC
CANADA H3A 3G4

Report Date: 2022/12/16
Report #: R2813312
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C261833
Received: 2022/11/02, 13:30

reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Bureau Veritas liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Bureau Veritas has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Bureau Veritas, unless otherwise agreed in writing. Bureau Veritas is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Bureau Veritas, results relate to the supplied samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.
Note: RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
(1) This test was performed by Bureau Veritas Mississauga, 6740 Campobello Rd. , Mississauga, ON, L5N 2L8
(2) This test was performed by Bureau Veritas Bedford, Suit 105, 200 Bluewater Rd. , Bedford, NS, B4B1G9
(3) DOC present in the sample should be considered as non-purgeable DOC

Note: All parameters included in the present certificate are accredited by the MELCC unless stated otherwise.

<Original signed by>

Encryption Key

Josue Moran
Project Manager
23 Dec 2022 11:26:22

Please direct all questions regarding this Certificate of Analysis to:
Josue Moran, Project Manager
Email: josue.moran@bureauveritas.com
Phone# (514) 448-9001

==========

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Bureau Veritas Job #: C261833
Report Date: 2022/12/16

TATA STEEL MINERALS CANADA
Client Project #: HOWSE SURFACE WATER
Your P.O. #: 3000001390

RESULTS OF ANALYSES OF SURFACE WATER

Bureau Veritas ID		LD4931		LD4932		LD4933	LD4934		
Sampling Date		2022/10/30 10:52		2022/10/30 10:25		2022/10/30 14:10	2022/10/30 11:33		
COC Number		79082		79082		79082	79082		
	Units	HOW-SWBC-Q4	QC Batch	HOW-SWBL-Q4	QC Batch	HOW-SWML-Q4	HOW-SWTL-Q4	RDL	QC Batch
INORGANICS									
Reactive silica (SiO2) †	mg/L	4.9	2356778	5.6	2356778	1.4	5.2	0.50	2356779
METALS									
Mercury (Hg) †	ug/L	<0.01	2352093	<0.01	2352092	<0.01	<0.01	0.01	2352092

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
† Parameter is not accreditable

Bureau Veritas ID		LD4935		LD4936	LD4937	LD4938	LD4939		
Sampling Date		2022/10/30 16:21		2022/10/30 15:12	2022/10/30 15:27	2022/10/31 11:35	2022/10/30 12:35		
COC Number		79082		79082	79082	79082	79082		
	Units	HOW-SW1-Q4	QC Batch	HOW-SW2-Q4	HOW-SW3-Q4	HOW-SW4-Q4	HOW-SW5-Q4	RDL	QC Batch
INORGANICS									
Reactive silica (SiO2) †	mg/L	4.9	2356779	5.1	3.3	4.7	1.1	0.50	2356779
METALS									
Mercury (Hg) †	ug/L	<0.01	2352093	<0.01	<0.01	<0.01	<0.01	0.01	2352092

RDL = Reportable Detection Limit QC Batch = Quality Control Batch
† Parameter is not accreditable

Bureau Veritas Job #: C261833
Report Date: 2022/12/16

TATA STEEL MINERALS CANADA
Client Project #: HOWSE SURFACE WATER
Your P.O. #: 3000001390

TOTAL EXTRACTABLE METALS (SURFACE WATER)

Bureau Veritas ID		LD4931	LD4932	LD4933	LD4934	LD4935		
Sampling Date		2022/10/30 10:52	2022/10/30 10:25	2022/10/30 14:10	2022/10/30 11:33	2022/10/30 16:21		
COC Number		79082	79082	79082	79082	79082		
	Units	HOW-SWBC-Q4	HOW-SWBL-Q4	HOW-SWML-Q4	HOW-SWTL-Q4	HOW-SW1-Q4	RDL	QC Batch
METALS								
Aluminum (Al)	ug/L	130	12	120	20	20	10	2349688
Antimony (Sb)	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	2349688
Silver (Ag)	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	2349688
Arsenic (As)	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	2349688
Barium (Ba)	ug/L	<2.0	<2.0	3.2	3.1	2.1	2.0	2349688
Beryllium (Be)	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	2349688
Bismuth (Bi) ††	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	2349688
Boron (B) †	ug/L	<50	<50	<50	<50	<50	50	2349688
Cadmium (Cd)	ug/L	<0.20	<0.20	<0.20	<0.20	<0.20	0.20	2349688
Calcium (Ca) †	ug/L	<500	4700	2500	3700	3000	500	2349688
Chromium (Cr)	ug/L	<5.0	<5.0	<5.0	<5.0	<5.0	5.0	2349688
Cobalt (Co)	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	2349688
Copper (Cu)	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	2349688
Total Hardness (CaCO3) ††	ug/L	2100	25000	13000	21000	17000	1000	2349688
Tin (Sn)	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	2349688
Iron (Fe)	ug/L	190	<60	330	77	90	60	2349688
Magnesium (Mg) †	ug/L	300	3200	1700	2800	2300	100	2349688
Manganese (Mn)	ug/L	16	2.2	18	4.8	4.8	1.0	2349688
Mercury (Hg)	ug/L	<0.10	<0.10	<0.10	<0.10	<0.10	0.10	2349688
Molybdenum (Mo)	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	2349688
Nickel (Ni)	ug/L	3.1	<2.0	<2.0	<2.0	<2.0	2.0	2349688
P2O5 ††	ug/L	<25	<25	<25	<25	<25	25	2349688
Total phosphorous	ug/L	<10	<10	<10	<10	<10	10	2349688
Lead (Pb)	ug/L	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	2349688
Potassium (K) †	ug/L	<500	<500	<500	<500	<500	500	2349688
Selenium (Se)	ug/L	<3.0	<3.0	<3.0	<3.0	<3.0	3.0	2349688
Sodium (Na)	ug/L	<500	820	<500	620	630	500	2349688
Strontium (Sr) †	ug/L	2.1	7.2	5.8	7.0	6.3	2.0	2349688
Thallium (Tl)	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	2349688
Titanium (Ti) ††	ug/L	<10	<10	<10	<10	<10	10	2349688
Uranium (U) ††	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	2349688
Vanadium (V)	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	2349688
Zinc (Zn)	ug/L	<7.0	<7.0	<7.0	<7.0	<7.0	7.0	2349688

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
†† Parameter is not accreditable
† Parameter is not accredited

Bureau Veritas Job #: C261833
Report Date: 2022/12/16

TATA STEEL MINERALS CANADA
Client Project #: HOWSE SURFACE WATER
Your P.O. #: 3000001390

TOTAL EXTRACTABLE METALS (SURFACE WATER)

Bureau Veritas ID		LD4935	LD4936	LD4937	LD4938	LD4939		
Sampling Date		2022/10/30 16:21	2022/10/30 15:12	2022/10/30 15:27	2022/10/31 11:35	2022/10/30 12:35		
COC Number		79082	79082	79082	79082	79082		
	Units	HOW-SW1-Q4 Lab-Dup	HOW-SW2-Q4	HOW-SW3-Q4	HOW-SW4-Q4	HOW-SW5-Q4	RDL	QC Batch
METALS								
Aluminum (Al)	ug/L	18	75	59	20	<10	10	2349688
Antimony (Sb)	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	2349688
Silver (Ag)	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	2349688
Arsenic (As)	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	2349688
Barium (Ba)	ug/L	<2.0	2.9	<2.0	<2.0	<2.0	2.0	2349688
Beryllium (Be)	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	2349688
Bismuth (Bi) ††	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	2349688
Boron (B) †	ug/L	<50	<50	<50	<50	<50	50	2349688
Cadmium (Cd)	ug/L	<0.20	<0.20	<0.20	<0.20	<0.20	0.20	2349688
Calcium (Ca) †	ug/L	3000	<500	<500	2700	<500	500	2349688
Chromium (Cr)	ug/L	<5.0	<5.0	<5.0	<5.0	<5.0	5.0	2349688
Cobalt (Co)	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	2349688
Copper (Cu)	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	2349688
Total Hardness (CaCO3) ††	ug/L	17000	1900	1200	16000	1800	1000	2349688
Tin (Sn)	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	2349688
Iron (Fe)	ug/L	75	460	180	<60	<60	60	2349688
Magnesium (Mg) †	ug/L	2300	230	120	2300	240	100	2349688
Manganese (Mn)	ug/L	4.6	70	8.9	1.8	1.7	1.0	2349688
Mercury (Hg)	ug/L	<0.10	<0.10	<0.10	<0.10	<0.10	0.10	2349688
Molybdenum (Mo)	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	2349688
Nickel (Ni)	ug/L	<2.0	<2.0	6.4	<2.0	<2.0	2.0	2349688
P2O5 ††	ug/L	<25	<25	<25	<25	<25	25	2349688
Total phosphorous	ug/L	<10	<10	<10	<10	<10	10	2349688
Lead (Pb)	ug/L	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	2349688
Potassium (K) †	ug/L	<500	<500	<500	<500	<500	500	2349688
Selenium (Se)	ug/L	<3.0	<3.0	<3.0	<3.0	<3.0	3.0	2349688
Sodium (Na)	ug/L	610	<500	<500	560	<500	500	2349688
Strontium (Sr) †	ug/L	5.9	3.3	<2.0	6.6	2.1	2.0	2349688
Thallium (Tl)	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	2349688
Titanium (Ti) ††	ug/L	<10	<10	<10	<10	<10	10	2349688
Uranium (U) ††	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	2349688
Vanadium (V)	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	2349688
Zinc (Zn)	ug/L	<7.0	<7.0	<7.0	<7.0	<7.0	7.0	2349688

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
†† Parameter is not accreditable
† Parameter is not accredited

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Bureau Veritas Job #: C261833
Report Date: 2022/12/16

TATA STEEL MINERALS CANADA
Client Project #: HOWSE SURFACE WATER
Your P.O. #: 3000001390

CONVENTIONAL PARAMETERS (SURFACE WATER)

Bureau Veritas ID		LD4931		LD4932	LD4933	LD4933		
Sampling Date		2022/10/30 10:52		2022/10/30 10:25	2022/10/30 14:10	2022/10/30 14:10		
COC Number		79082		79082	79082	79082		
	Units	HOW-SWBC-Q4	QC Batch	HOW-SWBL-Q4	HOW-SWML-Q4	HOW-SWML-Q4 Lab-Dup	RDL	QC Batch
CONVENTIONALS								
Conductivity	mS/cm	0.0047	2349378	0.046	0.023	N/A	0.0010	2349378
Dissolved organic carbon †	mg/L	4.9	2352952	0.80	2.3	N/A	0.50	2352952
Dissolved oxygen †	mg/L	10	2349602	10	10	N/A	1.0	2349602
Nitrate (N) and Nitrite(N)	mg/L	<0.020	2349329	0.027	<0.020	N/A	0.020	2349355
Nitrates (N-NO3-)	mg/L	<0.020	2349329	0.027	<0.020	N/A	0.020	2349355
Nitrites (N-NO2-)	mg/L	<0.020	2349329	<0.020	<0.020	N/A	0.020	2349355
Nitrogen ammonia (N-NH4+ and N-NH3)	mg/L	<0.020	2350644	<0.020	<0.020	<0.020	0.020	2350644
Orthophosphate (P)	mg/L	<0.050	2349296	<0.050	<0.050	N/A	0.050	2349383
pH	pH	5.83	2349313	7.06	6.97	N/A	N/A	2349313
pH (15° C) †	pH	5.54	2349385	6.75	6.72	N/A	N/A	2349385
Phenols-4AAP	mg/L	<0.0020	2351048	<0.0020	<0.0020	N/A	0.0020	2351048
Real Color	UCV	35	2349388	3.6	41	N/A	2.0	2349388
Sulfides (S2-)	mg/L	<0.020	2355437	<0.020	<0.020	N/A	0.020	2355437
Turbidity	NTU	0.46	2349368	0.16	12	N/A	0.10	2349368
Alkalinity Total (as CaCO3) pH 4.5 †	mg/L	1.3	2349382	22	8.4	N/A	1.0	2349382
Bicarbonates (HCO3 as CaCO3) †	mg/L	1.3	2349382	22	8.4	N/A	1.0	2349382
Carbonate (CO3 as CaCO3) †	mg/L	<1.0	2349382	<1.0	<1.0	N/A	1.0	2349382
Chloride (Cl)	mg/L	0.33	2349334	0.19	0.12	N/A	0.050	2349357
Sulfates (SO4)	mg/L	<0.50	2349334	2.3	3.1	N/A	0.50	2349357
Total Dissolved Solids	mg/L	<10	2350671	16	14	N/A	10	2350671
Total suspended solids (TSS)	mg/L	<2.0	2350669	2.0	2.0	N/A	2.0	2350669

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable
† Parameter is not accreditable

Bureau Veritas Job #: C261833
Report Date: 2022/12/16

TATA STEEL MINERALS CANADA
Client Project #: HOWSE SURFACE WATER
Your P.O. #: 3000001390

CONVENTIONAL PARAMETERS (SURFACE WATER)

Bureau Veritas ID		LD4934		LD4934	LD4935	LD4936		
Sampling Date		2022/10/30 11:33		2022/10/30 11:33	2022/10/30 16:21	2022/10/30 15:12		
COC Number		79082		79082	79082	79082		
	Units	HOW-SWTL-Q4	RDL	HOW-SWTL-Q4 Lab-Dup	HOW-SW1-Q4	HOW-SW2-Q4	RDL	QC Batch
CONVENTIONALS								
Conductivity	mS/cm	0.039	0.0010	N/A	0.033	0.0038	0.0010	2349369
Dissolved organic carbon †	mg/L	1.2	0.50	N/A	0.92	3.9	0.50	2352952
Dissolved oxygen †	mg/L	11	1.0	N/A	11	11	1.0	2349602
Nitrate (N) and Nitrite(N)	mg/L	0.12	0.020	N/A	0.19	0.022	0.020	2349355
Nitrates (N-NO3-)	mg/L	0.12	0.020	N/A	0.19	0.022	0.020	2349355
Nitrites (N-NO2-)	mg/L	<0.020	0.020	N/A	<0.020	<0.020	0.020	2349355
Nitrogen ammonia (N-NH4+ and N-NH3)	mg/L	<0.020	0.020	N/A	<0.020	<0.020	0.020	2350644
Orthophosphate (P)	mg/L	<0.050	0.050	N/A	<0.050	<0.050	0.050	2349383
pH	pH	6.99	N/A	7.05	6.95	6.12	N/A	2349363
pH (15° C) †	pH	7.65	N/A	N/A	6.91	5.91	N/A	2349385
Phenols-4AAP	mg/L	<0.0020	0.0020	N/A	<0.0020	<0.0020	0.0020	2351048
Real Color	UCV	7.7	2.0	N/A	6.0	36	2.0	2349388
Sulfides (S2-)	mg/L	<0.020	0.020	N/A	<0.020	<0.020	0.020	2355437
Turbidity	NTU	0.45	0.10	N/A	0.50	0.77	0.10	2349368
Alkalinity Total (as CaCO3) pH 4.5 †	mg/L	16	1.0	N/A	12	1.7	1.0	2349371
Bicarbonates (HCO3 as CaCO3) †	mg/L	16	1.0	N/A	12	1.7	1.0	2349371
Carbonate (CO3 as CaCO3) †	mg/L	<1.0	1.0	N/A	<1.0	<1.0	1.0	2349371
Chloride (Cl)	mg/L	0.31	0.050	N/A	0.43	0.23	0.050	2349357
Sulfates (SO4)	mg/L	2.5	0.50	N/A	2.6	<0.50	0.50	2349357
Total Dissolved Solids	mg/L	17	10	N/A	<10	<10	10	2350671
Total suspended solids (TSS)	mg/L	4.0	2.0	N/A	<2.0	2.0	2.0	2350669

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable
† Parameter is not accreditable

Bureau Veritas Job #: C261833
Report Date: 2022/12/16

TATA STEEL MINERALS CANADA
Client Project #: HOWSE SURFACE WATER
Your P.O. #: 3000001390

CONVENTIONAL PARAMETERS (SURFACE WATER)

Bureau Veritas ID		LD4937	LD4938	LD4939	LD4939		
Sampling Date		2022/10/30 15:27	2022/10/31 11:35	2022/10/30 12:35	2022/10/30 12:35		
COC Number		79082	79082	79082	79082		
	Units	HOW-SW3-Q4	HOW-SW4-Q4	HOW-SW5-Q4	HOW-SW5-Q4 Lab-Dup	RDL	QC Batch
CONVENTIONALS							
Conductivity	mS/cm	0.0020	0.030	0.0031	N/A	0.0010	2349378
Dissolved organic carbon †	mg/L	4.0	0.88	1.4	N/A	0.50	2352952
Dissolved oxygen †	mg/L	11	11	11	N/A	1.0	2349602
Nitrate (N) and Nitrite(N)	mg/L	<0.020	0.20	<0.020	N/A	0.020	2349355
Nitrates (N-NO3-)	mg/L	<0.020	0.20	<0.020	N/A	0.020	2349355
Nitrites (N-NO2-)	mg/L	<0.020	<0.020	<0.020	N/A	0.020	2349355
Nitrogen ammonia (N-NH4+ and N-NH3)	mg/L	<0.020	<0.020	0.034	N/A	0.020	2350644
Orthophosphate (P)	mg/L	<0.050	<0.050	<0.050	N/A	0.050	2349383
pH	pH	5.78	6.85	6.46	N/A	N/A	2349313
pH (15° C) †	pH	5.55	7.38	7.41	N/A	N/A	2349385
Phenols-4AAP	mg/L	<0.0020	<0.0020	<0.0020	N/A	0.0020	2351048
Real Color	UCV	26	6.2	5.7	N/A	2.0	2349388
Sulfides (S2-)	mg/L	<0.020	<0.020	<0.020	N/A	0.020	2355437
Turbidity	NTU	0.35	1.1	0.48	N/A	0.10	2349368
Alkalinity Total (as CaCO3) pH 4.5 †	mg/L	<1.0	9.5	2.5	N/A	1.0	2349382
Bicarbonates (HCO3 as CaCO3) †	mg/L	<1.0	9.5	2.5	N/A	1.0	2349382
Carbonate (CO3 as CaCO3) †	mg/L	<1.0	<1.0	<1.0	N/A	1.0	2349382
Chloride (Cl)	mg/L	0.18	0.36	0.16	N/A	0.050	2349357
Sulfates (SO4)	mg/L	<0.50	2.9	<0.50	N/A	0.50	2349357
Total Dissolved Solids	mg/L	<10	14	<10	<10	10	2350671
Total suspended solids (TSS)	mg/L	<2.0	<2.0	2.0	N/A	2.0	2350669

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable
† Parameter is not accreditable

GENERAL COMMENTS

Dissolved Oxygen: Holding time already past upon reception.: LD4931
pH Measured @ 15° C: Holding time already past upon reception.: LD4931
Dissolved Organic Carbon: Holding time already past upon reception.: LD4931
Real Color: Holding time already past upon reception.: LD4931
Nitrates(NO3-), Nitrites(NO2-)-water: Holding time already past upon reception.: LD4931
pH in water: Holding time already past upon reception.: LD4931
Ortho Phosphate: Holding time already past upon reception.: LD4931
Turbidity: Holding time already past upon reception.: LD4931
Dissolved Oxygen: Holding time already past upon reception.: LD4932
pH Measured @ 15° C: Holding time already past upon reception.: LD4932
Dissolved Organic Carbon: Holding time already past upon reception.: LD4932
Real Color: Holding time already past upon reception.: LD4932
Nitrates(NO3-), Nitrites(NO2-)-water: Holding time already past upon reception.: LD4932
pH in water: Holding time already past upon reception.: LD4932
Ortho Phosphate: Holding time already past upon reception.: LD4932
Turbidity: Holding time already past upon reception.: LD4932
Dissolved Oxygen: Holding time already past upon reception.: LD4933
pH Measured @ 15° C: Holding time already past upon reception.: LD4933
Dissolved Organic Carbon: Holding time already past upon reception.: LD4933
Real Color: Holding time already past upon reception.: LD4933
Nitrates(NO3-), Nitrites(NO2-)-water: Holding time already past upon reception.: LD4933
pH in water: Holding time already past upon reception.: LD4933
Ortho Phosphate: Holding time already past upon reception.: LD4933
Turbidity: Holding time already past upon reception.: LD4933
Dissolved Oxygen: Holding time already past upon reception.: LD4934
pH Measured @ 15° C: Holding time already past upon reception.: LD4934
Dissolved Organic Carbon: Holding time already past upon reception.: LD4934
Real Color: Holding time already past upon reception.: LD4934
Nitrates(NO3-), Nitrites(NO2-)-water: Holding time already past upon reception.: LD4934
pH in water: Holding time already past upon reception.: LD4934
Ortho Phosphate: Holding time already past upon reception.: LD4934
Turbidity: Holding time already past upon reception.: LD4934
Dissolved Oxygen: Holding time already past upon reception.: LD4935
pH Measured @ 15° C: Holding time already past upon reception.: LD4935
Dissolved Organic Carbon: Holding time already past upon reception.: LD4935
Real Color: Holding time already past upon reception.: LD4935
Nitrates(NO3-), Nitrites(NO2-)-water: Holding time already past upon reception.: LD4935
pH in water: Holding time already past upon reception.: LD4935
Ortho Phosphate: Holding time already past upon reception.: LD4935
Turbidity: Holding time already past upon reception.: LD4935
Dissolved Oxygen: Holding time already past upon reception.: LD4936
pH Measured @ 15° C: Holding time already past upon reception.: LD4936
Dissolved Organic Carbon: Holding time already past upon reception.: LD4936
Real Color: Holding time already past upon reception.: LD4936
Nitrates(NO3-), Nitrites(NO2-)-water: Holding time already past upon reception.: LD4936
pH in water: Holding time already past upon reception.: LD4936
Ortho Phosphate: Holding time already past upon reception.: LD4936
Turbidity: Holding time already past upon reception.: LD4936
Dissolved Oxygen: Holding time already past upon reception.: LD4937
pH Measured @ 15° C: Holding time already past upon reception.: LD4937
Dissolved Organic Carbon: Holding time already past upon reception.: LD4937
Real Color: Holding time already past upon reception.: LD4937
Nitrates(NO3-), Nitrites(NO2-)-water: Holding time already past upon reception.: LD4937

Bureau Veritas Bureau Veritas 889 Montée de Liesse, Ville St-Laurent, Québec, Canada H4T 1P5 Tel: (514) 448-9001 Fax: (514) 448-9199 Ligne sans frais : 1-877-462-9926

pH in water: Holding time already past upon reception.: LD4937
Ortho Phosphate: Holding time already past upon reception.: LD4937
Turbidity: Holding time already past upon reception.: LD4937
Dissolved Oxygen: Holding time already past upon reception.: LD4938
pH Measured @ 15° C: Holding time already past upon reception.: LD4938
pH in water: Holding time already past upon reception.: LD4938
Dissolved Oxygen: Holding time already past upon reception.: LD4939
pH Measured @ 15° C: Holding time already past upon reception.: LD4939
Dissolved Organic Carbon: Holding time already past upon reception.: LD4939
Real Color: Holding time already past upon reception.: LD4939
Nitrates(NO3-), Nitrites(NO2-)-water: Holding time already past upon reception.: LD4939
pH in water: Holding time already past upon reception.: LD4939
Ortho Phosphate: Holding time already past upon reception.: LD4939
Turbidity: Holding time already past upon reception.: LD4939

CONVENTIONAL PARAMETERS (SURFACE WATER)

Oxygène dissous: Le contenant n'était pas plein (présence d'un espace d'air) .

Results relate only to the items tested.

Bureau Veritas Bureau Veritas 889 Montée de Liesse, Ville St-Laurent, Québec, Canada H4T 1P5 Tel: (514) 448-9001 Fax: (514) 448-9199 Ligne sans frais : 1-877-462-9926

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units
2349296	CLO	QC Standard	Orthophosphate (P)	2022/11/02		98	%
2349296	CLO	Spiked Blank	Orthophosphate (P)	2022/11/02		95	%
2349296	CLO	Method Blank	Orthophosphate (P)	2022/11/02	<0.050		mg/L
2349313	ZLI	Spiked Blank	pH	2022/11/02		101	%
2349329	GXL	Spiked Blank	Nitrate (N) and Nitrite(N)	2022/11/02		100	%
			Nitrates (N-NO3-)	2022/11/02		100	%
			Nitrites (N-NO2-)	2022/11/02		101	%
2349329	GXL	Method Blank	Nitrate (N) and Nitrite(N)	2022/11/02	<0.020		mg/L
			Nitrates (N-NO3-)	2022/11/02	<0.020		mg/L
			Nitrites (N-NO2-)	2022/11/02	<0.020		mg/L
2349334	GXL	Spiked Blank	Chloride (Cl)	2022/11/02		98	%
			Sulfates (SO4)	2022/11/02		100	%
2349334	GXL	Method Blank	Chloride (Cl)	2022/11/02	<0.050		mg/L
			Sulfates (SO4)	2022/11/02	<0.50		mg/L
2349355	CLO	Spiked Blank	Nitrate (N) and Nitrite(N)	2022/11/03		101	%
			Nitrates (N-NO3-)	2022/11/03		102	%
			Nitrites (N-NO2-)	2022/11/03		101	%
2349355	CLO	Method Blank	Nitrate (N) and Nitrite(N)	2022/11/03	<0.020		mg/L
			Nitrates (N-NO3-)	2022/11/03	<0.020		mg/L
			Nitrites (N-NO2-)	2022/11/03	<0.020		mg/L
2349357	CLO	Spiked Blank	Chloride (Cl)	2022/11/03		99	%
			Sulfates (SO4)	2022/11/03		103	%
2349357	CLO	Method Blank	Chloride (Cl)	2022/11/03	<0.050		mg/L
			Sulfates (SO4)	2022/11/03	<0.50		mg/L
2349363	ZLI	Spiked Blank	pH	2022/11/03		102	%
2349368	NOL	Spiked Blank	Turbidity	2022/11/02		91	%
2349368	NOL	Method Blank	Turbidity	2022/11/02	<0.10		NTU
2349369	ZLI	Spiked Blank	Conductivity	2022/11/03		103	%
2349369	ZLI	Method Blank	Conductivity	2022/11/03	<0.0010		mS/cm
2349371	ZLI	Spiked Blank	Alkalinity Total (as CaCO3) pH 4.5	2022/11/03		102	%
2349371	ZLI	Method Blank	Alkalinity Total (as CaCO3) pH 4.5	2022/11/03	<1.0		mg/L
2349378	ZLI	Spiked Blank	Conductivity	2022/11/02		103	%
2349378	ZLI	Method Blank	Conductivity	2022/11/02	<0.0010		mS/cm
2349382	ZLI	Spiked Blank	Alkalinity Total (as CaCO3) pH 4.5	2022/11/02		98	%
2349382	ZLI	Method Blank	Alkalinity Total (as CaCO3) pH 4.5	2022/11/02	<1.0		mg/L
2349383	CLO	Spiked Blank	Orthophosphate (P)	2022/11/02		99	%
2349383	CLO	Method Blank	Orthophosphate (P)	2022/11/02	<0.050		mg/L
2349385	CLO	Spiked Blank	pH (15° C)	2022/11/02		101	%
2349388	CLO	Spiked Blank	Real Color	2022/11/02		97	%
2349388	CLO	Method Blank	Real Color	2022/11/02	<2.0		UCV
2349688	MEM	Spiked Blank	Aluminum (Al)	2022/11/15		100	%
			Antimony (Sb)	2022/11/15		112	%
			Silver (Ag)	2022/11/15		106	%
			Arsenic (As)	2022/11/15		109	%
			Barium (Ba)	2022/11/15		105	%
			Beryllium (Be)	2022/11/15		103	%
			Bismuth (Bi)	2022/11/15		109	%
			Boron (B)	2022/11/15		109	%
			Cadmium (Cd)	2022/11/15		99	%
			Calcium (Ca)	2022/11/15		101	%
			Chromium (Cr)	2022/11/15		108	%
			Cobalt (Co)	2022/11/15		103	%

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units
			Copper (Cu)	2022/11/15		108	%
			Tin (Sn)	2022/11/15		113	%
			Iron (Fe)	2022/11/15		106	%
			Magnesium (Mg)	2022/11/15		104	%
			Manganese (Mn)	2022/11/15		104	%
			Mercury (Hg)	2022/11/15		116	%
			Molybdenum (Mo)	2022/11/15		106	%
			Nickel (Ni)	2022/11/15		106	%
			Total phosphorous	2022/11/15		98	%
			Lead (Pb)	2022/11/15		105	%
			Potassium (K)	2022/11/15		102	%
			Selenium (Se)	2022/11/15		105	%
			Sodium (Na)	2022/11/15		103	%
			Strontium (Sr)	2022/11/15		110	%
			Thallium (Tl)	2022/11/15		105	%
			Titanium (Ti)	2022/11/15		102	%
			Uranium (U)	2022/11/15		106	%
			Vanadium (V)	2022/11/15		103	%
			Zinc (Zn)	2022/11/15		97	%
2349688	MEM	Method Blank	Aluminum (Al)	2022/11/15	<10		ug/L
			Antimony (Sb)	2022/11/15	<1.0		ug/L
			Silver (Ag)	2022/11/15	<1.0		ug/L
			Arsenic (As)	2022/11/15	<1.0		ug/L
			Barium (Ba)	2022/11/15	<2.0		ug/L
			Beryllium (Be)	2022/11/15	<2.0		ug/L
			Bismuth (Bi)	2022/11/15	<1.0		ug/L
			Boron (B)	2022/11/15	<50		ug/L
			Cadmium (Cd)	2022/11/15	<0.20		ug/L
			Calcium (Ca)	2022/11/15	<500		ug/L
			Chromium (Cr)	2022/11/15	<5.0		ug/L
			Cobalt (Co)	2022/11/15	<1.0		ug/L
			Copper (Cu)	2022/11/15	<1.0		ug/L
			Total Hardness (CaCO3)	2022/11/15	<1000		ug/L
			Tin (Sn)	2022/11/15	<2.0		ug/L
			Iron (Fe)	2022/11/15	<60		ug/L
			Magnesium (Mg)	2022/11/15	<100		ug/L
			Manganese (Mn)	2022/11/15	<1.0		ug/L
			Mercury (Hg)	2022/11/15	<0.10		ug/L
			Molybdenum (Mo)	2022/11/15	<1.0		ug/L
			Nickel (Ni)	2022/11/15	<2.0		ug/L
			P2O5	2022/11/15	<25		ug/L
			Total phosphorous	2022/11/15	<10		ug/L
			Lead (Pb)	2022/11/15	<0.50		ug/L
			Potassium (K)	2022/11/15	<500		ug/L
			Selenium (Se)	2022/11/15	<3.0		ug/L
			Sodium (Na)	2022/11/15	<500		ug/L
			Strontium (Sr)	2022/11/15	<2.0		ug/L
			Thallium (Tl)	2022/11/15	<2.0		ug/L
			Titanium (Ti)	2022/11/15	<10		ug/L
			Uranium (U)	2022/11/15	<1.0		ug/L
			Vanadium (V)	2022/11/15	<2.0		ug/L
			Zinc (Zn)	2022/11/15	<7.0		ug/L

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units
2350644	ESW	Spiked Blank	Nitrogen ammonia (N-NH4+ and N-NH3)	2022/11/05		103	%
2350644	ESW	Method Blank	Nitrogen ammonia (N-NH4+ and N-NH3)	2022/11/05	<0.020		mg/L
2350669	VKH	Spiked Blank	Total suspended solids (TSS)	2022/11/07		94	%
2350669	VKH	Method Blank	Total suspended solids (TSS)	2022/11/07	<2.0		mg/L
2350671	KME	Spiked Blank	Total Dissolved Solids	2022/11/07		99	%
2350671	KME	Method Blank	Total Dissolved Solids	2022/11/07	<10		mg/L
2351048	DMI	Spiked Blank	Phenols-4AAP	2022/11/07		94	%
2351048	DMI	Method Blank	Phenols-4AAP	2022/11/07	<0.0020		mg/L
2352092	JGC	Matrix Spike	Mercury (Hg)	2022/11/09		97	%
2352092	JGC	Spiked Blank	Mercury (Hg)	2022/11/09		99	%
2352092	JGC	Method Blank	Mercury (Hg)	2022/11/09	<0.01		ug/L
2352093	JGC	Matrix Spike	Mercury (Hg)	2022/11/09		98	%
2352093	JGC	Spiked Blank	Mercury (Hg)	2022/11/09		98	%
2352093	JGC	Method Blank	Mercury (Hg)	2022/11/09	<0.01		ug/L
2352952	HPA	Spiked Blank	Dissolved organic carbon	2022/11/11		102	%
2352952	HPA	Method Blank	Dissolved organic carbon	2022/11/11	<0.50		mg/L
2355437	SKL	Spiked Blank	Sulfides (S2-)	2022/11/18		89	%
2355437	SKL	Method Blank	Sulfides (S2-)	2022/11/18	<0.020		mg/L
2356778	TGO	Matrix Spike	Reactive silica (SiO2)	2022/11/22		98	%
2356778	TGO	Spiked Blank	Reactive silica (SiO2)	2022/11/22		91	%
2356778	TGO	Method Blank	Reactive silica (SiO2)	2022/11/22	<0.50		mg/L
2356779	TGO	Matrix Spike	Reactive silica (SiO2)	2022/11/22		91	%
			Reactive silica (SiO2)	2022/11/22		91	%
2356779	TGO	Spiked Blank	Reactive silica (SiO2)	2022/11/23		91	%
			Reactive silica (SiO2)	2022/11/23		91	%
2356779	TGO	Method Blank	Reactive silica (SiO2)	2022/11/22	<0.50		mg/L
			Reactive silica (SiO2)	2022/11/22	<0.50		mg/L

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

QC Standard: A sample of known concentration prepared by an external agency under stringent conditions. Used as an independent check of method accuracy.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

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Appendix 2 Wetland Monitoring Report

Groupe Hemispheres

Filiale de GROUPE GÉOS

Howse Property Wetlands Monitoring - 2022

Tata Steel Minerals Canada Ltd.

Technical report

N/D: PR185-50-22

May 31, 2023

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Revisions and publication		
Number	**Date**	**Modification or publication data**
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LIST OF ACRONYMS AND ABBREVIATIONS

FAC	Facultative (species that are likely to occur in wetlands and non-wetlands alike)
Howse Project	Howse Property Iron Mine Project
MSF	Mid-Subarctic Forest
NI	Species that are non-indicative of a wetland [non-indicator]
OBL	Obligate wetland (species that occur almost always in wetlands)
PCoA	Principal coordinate analysis
p-value	Probability of obtaining test results superior or equal to the result observed, under the assumption that the null hypothesis is correct
SD	Standard deviation
SE	Standard error
TSMC	Tata Steel Minerals Canada
T-Test	Statistical test following Student's t-distribution
WVP	Wetland vegetation point

1 CONTEXT

Tata Steel Minerals Canada (TSMC) is developing an open-pit iron ore mine in Newfoundland and Labrador. Approximately 46 Mt of iron ore will be extracted over the course of the Howse Property Iron Mine Project's lifespan ("Howse project"), or about 15 years.

In 2014, an environmental assessment of the Howse Project was conducted in accordance with the requirements of the *Canadian Environmental Assessment Act, 2012*. As a result, the Howse Project was accepted with several requirements. TSMC, in compliance with the *Migratory Birds Convention Act, 1994* and with the *Species at Risk Act*, must ensure that migratory bird populations and their habitat are not negatively impacted by the Howse Project development, operation, and decommission.

Consequently, TSMC and Groupe Hémisphères developed a follow-up program to monitor and detect any adverse environmental effects of the Howse Project on wetland functions that support migratory birds, and to determine the effectiveness of the proposed mitigation measures.

In 2018, a vegetation and water-level survey was conducted in predefined locations, to start recording the biotic and abiotic characteristics of the landscape potentially affected by the Howse Project (Groupe Hémisphères, 2018). In 2022, data were recorded in the same locations to compare the evolution of plant species diversity between 2018 and 2022 and assess the environmental effects of the Howse Project.

During the fieldwork carried out in the summer of 2022, the Howse Project had yet to start and therefore no project activities were being conducted in the vicinity of inventory areas.

This document presents the work mandated to Groupe Hémisphères by TSMC on wetlands characterization and assessment of water levels. As this was the second survey to be carried out prior to the development of the Howse Project, the specific objectives were to characterize wetland vegetation and measure the natural water levels and their variations in wetlands in a way that enables a follow-up during the Howse Project.

2 METHODOLOGY

2.1 Selection of wetlands

As stated in the Howse EIS, dewatering may potentially affect wetlands by modifying the hydrography and hydrology of the area. Based on wetlands' characteristics and the information provided by the hydrogeology survey, it was stated that only wetlands close to the pit might be affected by dewatering. Wetlands were selected based on a previous mapping done in the area (2016). Wetlands were separated into two categories:

- Wetlands possibly affected by the Howse Project, located near future installations.
- Control wetlands, located far enough from the installations that they should not be affected.

This distinction was carried out for the purposes of detecting seasonal and local changes like drought or flooding that may not be attributed to the Howse Project.

Table 1 presents a description of the ecotypes for which monitoring was carried out.

Table 1. Wetland ecotype descriptions

Ecotype	Wetland Type	Short Name	Description
MSF08	Swamp	Black Spruce / Tamarack Forested Swamp	Found on slopes or on flat expanses. These wetlands are not connected hydrologically. Soils are characterized by humic gleysol, with an organic horizon of less than 30 cm in thickness and a water-retentive horizon (composed of silt and clay). Black Spruce dominates the tree stratum, along with Tamarack. The shrub layer is diverse, with Cloudberry being the most common species. An assortment of species makes up the herb layer.
MSF10	Bog	Black Spruce Bog	This type of wetland is hydrologically fed by precipitation and runoff only. These bogs occur in isolation or as part of larger wetland complexes. The soils are relatively thick organic soils with little decomposition. Some bogs are found on an underlaying of boulders and rocks. Trees are present but sparse, with Black Spruce being the dominant species. The shrub layer is diverse and composed of several willows and ericaceous species. Sedges are the main type of herbaceous species.
MSF12	Fen	Uniform Herb Fen	These fens are found on wide plains and are not generally connected to a watercourse, although they are usually inundated. Soils are always organic and usually fibric. Trees are absent from this type of fen; Black Spruce and Tamarack may be present in shrub form. Shrubs are mostly composed of ericaceous species. Sedge species dominate the herb layer.
MSF15	Fen	Uniform Fluvial Shrub Fen	This ecotype is found exclusively adjacent to water courses. It is a diverse ecosystem which is enriched by inundation from the watercourse. Soils are regosol or humic gleysol. The tree layer is absent or negligible. The shrub layer is dense and composed of willows, Glandular Birch, and Sweet Gale. The herb layer is diverse.

2.2 Wetland vegetation survey

If the local hydrology were to be affected by the Howse Project, it would influence wetland vegetation. Herb cover and species composition would change where the shift would first be detected. To detect a long-term change, 29 permanent vegetation survey points ("stations") were positioned in wetlands close to the future installations as well as in wetlands that will not be affected. Location data were retrieved from a previous study conducted in the same area (Groupe Hémisphères, 2018).

During the 2018 fieldwork campaign, for each permanent vegetation survey point, a marker was installed in a nearby tree. Distance and angle to the survey point were noted, so it could be revisited periodically during the project. Table 2 presents the locations of survey points.

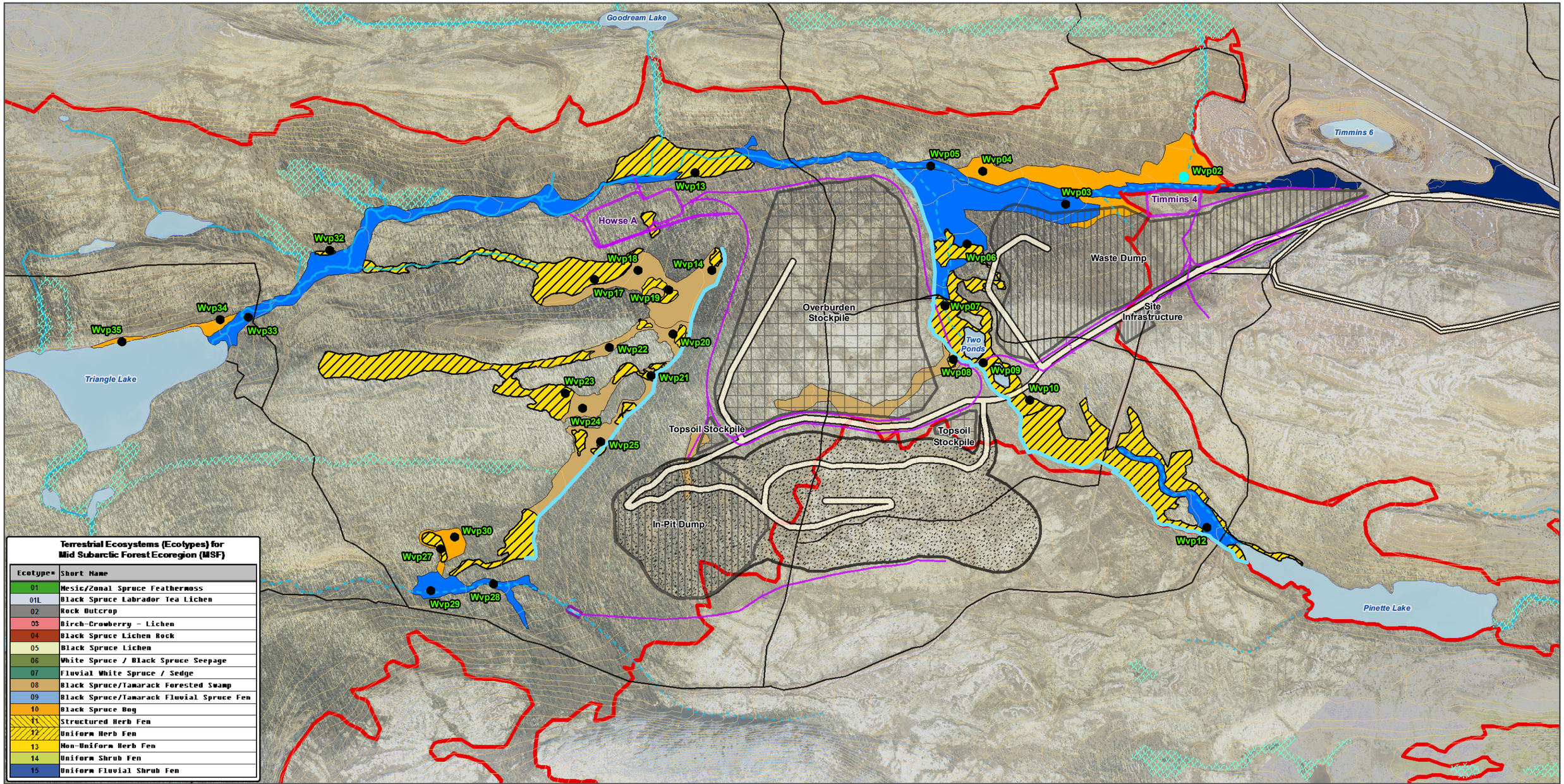
The 2018 wetland vegetation survey was designed to be replicated every five years. A permanent marker was installed and measurements from the marker (distance and angle) were noted. However, during the 2022 survey, it was impossible to repeat the 1 m^2 sampling plot at the exact same previous locations. Therefore, the methodology was changed to facilitate future surveys. At each survey point, vegetation was sampled in a 2 m radius to minimize the effect of sampling point locations. Species were identified, and their cover percentage was noted. Low vegetation (small shrubs, herbs, moss, and lichen) was sampled, and their percentage of cover was noted.

Table 2. Wetland vegetation survey point locations

Station	Ecotype	Ecotype – Short Name	Coordinates (NAD83/UTM 19N)	
			Latitude	Longitude
WVP02	MSF10	Black Spruce Bog	-67.1087525	54.9073847
WVP03	MSF15	Uniform Fluvial Shrub Fen	-67.1150303	54.9097968
WVP04	MSF10	Black Spruce Bog	-67.1170855	54.9127609
WVP05	MSF15	Uniform Fluvial Shrub Fen	-67.1190738	54.9142474
WVP06	MSF12	Uniform Herb Fen	-67.1210609	54.9113755
WVP07	MSF12	Uniform Herb Fen	-67.1247678	54.9104409
WVP08	MSF12	Uniform Herb Fen	-67.1268306	54.9089107
WVP09	MSF12	Uniform Herb Fen	-67.1256956	54.9080426
WVP10	MSF12	Uniform Herb Fen	-67.1253977	54.9059099
WVP12	MSF15	Uniform Fluvial Shrub Fen	-67.123564	54.8981871
WVP13	MSF12	Uniform Herb Fen	-67.1294545	54.9201857
WVP14	MSF08	Black Spruce / Tamarack Forested Swamp	-67.1331222	54.91735
WVP17	MSF12	Uniform Herb Fen	-67.1385522	54.9201654
WVP18	MSF08	Black Spruce / Tamarack Forested Swamp	-67.136273	54.9192713
WVP19	MSF12	Uniform Herb Fen	-67.1358511	54.9179795
WVP20	MSF08	Black Spruce / Tamarack Forested Swamp	-67.137662	54.9167924
WVP21	MSF12	Uniform Herb Fen	-67.1404672	54.9163355
WVP22	MSF08	Black Spruce / Tamarack Forested Swamp	-67.1409567	54.9181145
WVP23	MSF12	Uniform Herb Fen	-67.1449198	54.918118
WVP24	MSF08	Black Spruce / Tamarack Forested Swamp	-67.1448411	54.9173103
WVP25	MSF08	Black Spruce / Tamarack Forested Swamp	-67.1455879	54.9160162
WVP27	MSF12	Uniform Herb Fen	-67.157233	54.9175224
WVP28	MSF15	Uniform Fluvial Shrub Fen	-67.1565827	54.915297
WVP29	MSF15	Uniform Fluvial Shrub Fen	-67.1595474	54.9167695
WVP30	MSF10	Black Spruce Bog	-67.1561195	54.9174682

Station	Ecotype	Ecotype – Short Name	Coordinates (NAD83/UTM 19N)	
			Latitude	Longitude
WVP32	MSF12	Uniform Herb Fen	-67.1485404	54.9277659
WVP33	MSF15	Uniform Fluvial Shrub Fen	-67.1550156	54.9282191
WVP34	MSF10	Black Spruce Bog	-67.156345	54.9288842
WVP35	MSF10	Black Spruce Bog	-67.1615262	54.9309

The locations of the vegetation survey points are presented in Figure 1.



Terrestrial Ecosystems (Ecotypes) for Mid Subarctic Forest Ecoregion (MSF)

Ecotype	Short Name
01	Mesic/Zonal Spruce Feathermoss
01L	Black Spruce Labrador Tea Lichen
02	Rock Outcrop
03	Birch-Crowberry - Lichen
04	Black Spruce Lichen Rock
05	Black Spruce Lichen
06	White Spruce / Black Spruce Seepage
07	Fluvial White Spruce / Sedge
08	Black Spruce/Tamarack Forested Swamp
09	Black Spruce/Tamarack Fluvial Spruce Fen
10	Black Spruce Bog
11	Structured Herb Fen
12	Uniform Herb Fen
13	Non-Uniform Herb Fen
14	Uniform Shrub Fen
15	Uniform Fluvial Shrub Fen

LEGEND

Wetland survey
- Wetland vegetation point
- Wetland Delineation

Basemap
- Contour Line (5m)
- Ecoregion Boundary
- Existing Road

Howse Proposed Infrastructures
- Proposed Howse Pit
- Proposed Topsoil/Overburden Stockpile
- Proposed Waste Dump/In-Pit Dump
- Proposed Site Infrastructure
- Proposed Sedimentation Pond
- Proposed Dissipation Pool
- Haul Road
- Proposed Ditch and Outlet

Hydrography
- Permanent Watercourse
- Intermittent Watercourse
- Storm Runoff
- Water Body
- Other Wetland

FILE, PROJECT, DATE, AUTHOR:
GH-1593 , PR185-51-23, 2023-06-01, fxlafortune

N

0 150 300 450 600
Meters

UTM 19N NAD 83 SCALE: 1:15 000

SOURCES:
Basemap
Government of Canada, NTDB, 1:50,000, 1979 Government of NL and government of Quebec, Boundary used for claims
SNC Lavalin, Groupe Hémisphères, Hydrology update, 2013

Infrastructure and Mining Components
New Millennium Capital Corp., Mining sites and roads
Howse Minerals Limited/ MET-CHEM Howse Deposit Design for General Layout, 2015

HOWSE PROPERTY PROJECT

Wetlands monitoring stations
Follow Up Program

Groupe Hemispheres Filiale de GROUPE GEOS

Figure 1

2.3 Statistical analysis

Although a change in the methodology was applied, statistical analyses were carried out to compare the results between 2018 and 2022. Using R software (R Core Team, 2021), statistical analyses were conducted on the data gathered in both 2018 and 2022 to determine if significant differences could be detected in sampled vegetation communities. A T-test was chosen in order to compare variance of each statistical object (R Core Team, 2023).

Field investigation was conducted using two ensembles of data:

- Relative plant cover at each station; and
- Proportion of species according to wetland indicator status at each station.

To perform statistical tests with a significant sample size, groups of stations according to ecotype were created (MSF08, MSF10, MSF12, MSF15). The relative cover for each species per vegetation stratum was used to compare vegetation evolution since the previous survey. Additionally, a comparison of the number of species according to wetland indicator status[1] (NI [non-indicator], FAC [facultative] or OBL [obligate]; see definitions as part of Table 3) was considered. Lastly, species richness was evaluated within each ecotype across survey years. In the end, five analyses were conducted using different pools of data (see following section).

[1] "Wetland indicator status" replaces the term "hydric status" from the 2018 report

3 RESULTS

3.1 Wetland vegetation characterization

The results of the 2022 wetland vegetation survey, as well as results obtained during the 2018 campaign, are presented in detail in Appendix I. The results from the 2022 survey will be used as the reference for future monitoring. Table 3 presents species distribution according to their wetland indicator status, for each station and per ecotype. Wetland indicator status was extracted from the proposed lists for arctic and subarctic species (FloraQuebeca, 2018). Dark green cells in the Table 3 highlight when the number of species varied between 2018 and 2022. All these cases show a higher number of plants observed in 2022 as compared to 2018. These increased numbers of observed plant species only occurred in the NI and FAC categories; the number of OBL plant species did not show any change.

Table 3. Species distribution according to wetland indicator status, 2018 and 2022

Ecotype	Station	Wetland indicator status												TOTAL 2018	TOTAL 2022
		NI				FAC				OBL					
		2018		2022		2018		2022		2018		2022			
		Nb	%	Nb	%	Nb	%	Nb	%	Nb	%	Nb	%		
MSF08	WVP14	9	56.3	9	56.3	5	31.3	5	31.3	2	12.5	2	12.5	16	16
	WVP18	7	46.7	8	47.1	5	33.3	6	35.3	3	20.0	3	17.6	15	17
	WVP20	1	6.7	1	6.3	9	60.0	10	62.5	5	33.3	5	31.3	15	16
	WVP22	3	30.0	4	33.3	4	40.0	5	41.7	3	30.0	3	25.0	10	12
	WVP24	2	20.0	3	23.1	3	30.0	5	38.5	5	50.0	5	38.5	10	13
	WVP25	3	23.1	3	23.1	4	30.8	4	30.8	6	46.2	6	46.2	13	13
	Mean	**4.2**	**31.6**	**4.7**	**32.2**	**5**	**38.0**	**5.8**	**40.2**	**4**	**30.4**	**4.0**	**27.6**	**13.2**	**14.5**
MSF10	WVP02	3	33.3	3	33.3	3	33.3	3	33.3	3	33.3	3	33.3	9	9
	WVP04	2	14.3	2	14.3	7	50.0	7	50.0	5	35.7	5	35.7	14	14
	WVP30	5	41.7	5	41.7	5	41.7	5	41.7	2	16.7	2	16.7	12	12
	WVP34	2	15.4	2	15.4	5	38.5	5	38.5	6	46.2	6	46.2	13	13
	WVP35	13	68.4	13	68.4	4	21.1	4	21.1	2	10.5	2	10.5	19	19
	Mean	**5**	**37.3**	**5**	**37.3**	**4.8**	**35.8**	**4.8**	**35.8**	**3.6**	**26.9**	**3.6**	**26.9**	**13.4**	**13.4**
MSF12	WVP06	0	0.0	0	0.0	2	33.3	2	33.3	4	66.7	4	66.7	6	6
	WVP07	2	14.3	2	14.3	7	50.0	7	50.0	5	35.7	5	35.7	14	14
	WVP08	3	30.0	7	43.8	3	30.0	5	31.3	4	40.0	4	25.0	10	16
	WVP09	6	40.0	6	40.0	4	26.7	4	26.7	5	33.3	5	33.3	15	15
	WVP10	0	0.0	0	0.0	3	42.9	3	42.9	4	57.1	4	57.1	7	7
	WVP13	2	25.0	2	22.2	3	37.5	4	44.4	3	37.5	3	33.3	8	9
	WVP17	0	0.0	0	0.0	3	37.5	3	37.5	5	62.5	5	62.5	8	8
	WVP19	4	26.7	4	25.0	6	40.0	7	43.8	5	33.3	5	31.3	15	16
	WVP21	2	14.3	2	13.3	6	42.9	7	46.7	6	42.9	6	40.0	14	15
	WVP23	0	0.0	1	14.3	2	33.3	2	28.6	4	66.7	4	57.1	6	7
	WVP32	2	28.6	2	28.6	3	42.9	3	42.9	2	28.6	2	28.6	7	7
	Mean	**3.0**	**30.0**	**2.4**	**21.7**	**3.8**	**38.2**	**4.3**	**39.2**	**4.3**	**42.7**	**4.3**	**39.2**	**10.0**	**10.9**
MSF15	WVP03	4	25.0	4	25.0	7	43.8	7	43.8	5	31.3	5	31.3	16	16
	WVP05	4	30.8	4	30.8	7	53.8	7	53.8	2	15.4	2	15.4	13	13
	WVP12	6	85.7	7	87.5	1	14.3	1	12.5	0	0.0	0	0.0	7	8
	WVP27	2	22.2	2	22.2	3	33.3	3	33.3	4	44.4	4	44.4	9	9
	WVP28	7	46.7	7	46.7	5	33.3	5	33.3	3	20.0	3	20.0	15	15
	WVP29	4	33.3	4	33.3	6	50.0	6	50.0	2	16.7	2	16.7	12	12
	WVP33	7	46.7	7	46.7	6	40.0	6	40.0	2	13.3	2	13.3	15	15
	Mean	**4.9**	**39.1**	**5**	**39.8**	**5**	**40.2**	**5**	**39.8**	**3**	**24.1**	**2.6**	**20.5**	**12.4**	**12.6**

NI: Species that are non-indicative of a wetland
FAC: Facultative (species that are likely to occur in wetlands and non-wetlands alike)
OBL: Obligate wetland (species that occur almost always in wetlands)

3.2 Comparison of wetland indictor status between 2018 and 2022

A Welch two sample t-test (R Core Team, 2023), also known as a Student t-test ("T-test"), was the statistical analysis used in this study; it allows for the comparison of the plant community within an ecotype across both survey years. The comparison of plant wetland indicator status in each station was not used

here because of statistical limitations. For each one of the comparisons below, a p-value was obtained by grouping data from several stations.

Wetland indicator status data (in raw form) are presented in Appendix II.

3.2.1 Comparison of NI status between 2018 and 2022

Results of the T-tests carried out on raw data (see Appendix II) for species that are non-indicative of a wetland according to ecotype are presented in Table 4. None of the calculated p-values were statistically significant, meaning there are no differences in the number of non-indicator species between 2018 and 2022 within each ecotype.

Table 4. T-test results for non-indicator plants, according to ecotype, between 2018 and 2022

Ecotype	Nb of survey points	NI (mean per ecotype)	SD[1]	SE[2]	Max[3]	Min[4]	Year	P-Value
FSM08	6	4.17	3.13	1.28	9	1	2018	0.79
	6	4.67	3.14	1.28	9	1	2022	
FSM10	5	5.00	4.64	2.07	13	2	2018	1
	5	5.00	4.64	2.07	13	2	2022	
FSM12	11	1.91	1.92	0.58	6	0	2018	0.63
	11	2.36	2.38	0.72	7	0	2022	
FSM15	7	4.86	1.86	0.70	7	2	2018	0.89
	7	5.00	2.00	0.76	7	2	2022	

Notes: 1) SD = standard deviation; 2) SE = standard error; 3) Max = maximum number of NI species in an inventory station; 4) Min = minimum number of NI species in an inventory station

3.2.2 Comparison of FAC status between 2018 and 2022

Results of the T-tests carried out on raw data (see Appendix II) for species that are likely to occur in wetlands and non-wetlands alike according to ecotype (i.e. facultative species) are shown in Table 5. None of the calculated p-values were statistically significant, meaning there are no differences in facultative species between 2018 and 2022 within each ecotype.

Table 5. T-test results for facultative plants, according to ecotype, between 2018 and 2022

Ecotype	Number of survey points	FAC (mean per ecotype)	SD	SE	Max	Min	Year	P-value
FSM08	6	5.00	2.10	0.86	9	3	2018	0.51
	6	5.83	2.14	0.87	10	4	2022	
FSM10	5	4.80	1.48	0.66	7	3	2018	1
	5	4.80	1.48	0.66	7	3	2022	
FSM12	11	3.82	1.72	0.52	7	2	2018	0.57
	11	4.27	1.95	0.59	7	2	2022	
FSM15	7	5.00	2.24	0.85	7	1	2018	1
	7	5.00	2.24	0.85	7	1	2022	

3.2.3 Comparison of OBL status between 2018 and 2022

Results of the T-tests carried out on raw data (see Appendix II) for species occurring almost always in wetlands according to ecotype (i.e. obligate species) are shown in Table 6. None of the calculated p-values were statistically significant, meaning there are no differences in obligate species between 2018 and 2022 within each ecotype.

Table 6. T-test results for obligate plants, according to ecotype, between 2018 and 2022

Ecotype	Nb of survey points	OBL (mean per ecotype)	SD	SE	Max	Min	Year	P-value
FSM08	6	4.00	1.55	0.63	6	2	2018	1
	6	4.00	1.55	0.63	6	2	2022	
FSM10	5	3.60	1.82	0.81	6	2	2018	1
	5	3.60	1.82	0.81	6	2	2022	
FSM12	11	4.27	1.10	0.33	6	2	2018	1
	11	4.27	1.10	0.33	6	2	2022	
FSM15	7	2.57	1.62	0.61	5	0	2018	1
	7	2.57	1.62	0.61	5	0	2022	

3.3 Comparison of species richness between 2018 and 2022

Results of the T-tests carried out on raw data concerning richness (see Appendix III) are shown in Table 7. None of the calculated p-values were statistically significant, meaning there are no differences in species richness between 2018 and 2022 within each ecotype.

Table 7. T-test results for species richness, according to ecotype, between 2018 and 2022

Ecotype	Nb of survey points	Species richness (mean)	SD	SE	Max	Min	Year	P-Value
FSM08	6	13.17	2.64	1.08	16	10	2018	0.35
	6	14.50	2.07	0.85	17	12	2022	
FSM10	5	13.40	3.65	1.63	19	9	2018	1
	5	13.40	3.65	1.63	19	9	2022	
FSM12	11	10.00	3.74	1.13	15	6	2018	0.66
	11	10.73	4.00	1.21	16	6	2022	
FSM15	7	12.43	3.36	1.27	16	7	2018	1
	7	12.43	3.36	1.27	16	7	2022	

The raw data of relative cover of plant species per year are available in Appendix III.

A PCoA test (principal coordinate analysis) was conducted based on cover of each plant species within each station, using the appropriate R package (Paradis et al., 2023). Figure 2 shows the results of the PCoA; its calculation is based on the Bray-Curtis dissimilarity index. It shows the degree of dissimilarity within plant communities between 2018 and 2022.

Two packages were used to design the figure (Oksanen et al., 2022; Wickham et al., 2023). The two ellipsoids (2018 and 2022) are very similar to one another; in fact, they overlap to include a 95% of variability in plant community composition. Generally speaking, Figure 2 shows that plant communities are very similar between 2018 and 2022.

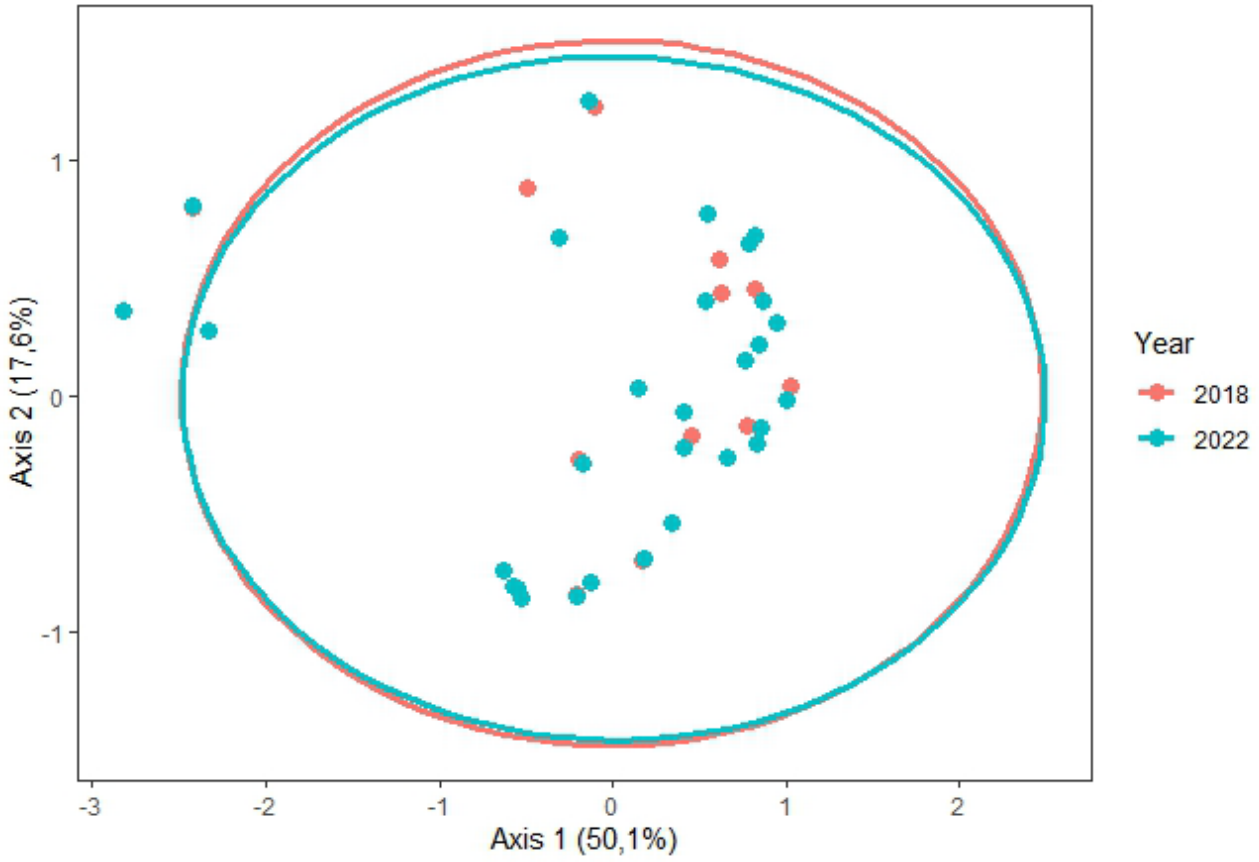


Figure 2. PCoA showing weak dissimilarities between 2018 and 2022 plant communities

4 DISCUSSION & CONCLUSION

The decision statement established several conditions that must be respected prior to and throughout the Howse Project. As part of the conditions, and as a second survey, wetlands vegetation was characterized to see if any differences could be highlighted between the sampling periods of 2018 and 2022.

Since no project operations were conducted between 2018 and 2022 close to the sampling site, it was very unlikely that the plant community would show any differences. Indeed, statistical analyses demonstrate that no significant differences were detected across ecotypes between 2018 and 2022, either when comparing wetland indicator statuses or species richness.

5 QUALITY ASSURANCE

Groupe Hémisphères possesses an internal quality control program which is derived from ISO 9001 standards. This is based on a review and approval of all concepts and document production by a senior professional. The program considers the management, the control of documentation, the personnel's continuous training, as well as the quality assurance of the deliverables. The system also includes a tight control of the field work and the prevention and safety measures specific to the project.

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APPENDICES

Appendix I

Wetland vegetation descriptions according to station

WVP02				
Vegetation description (2018)				
Latin Name	English Name	% of Cover		
		Shrubs	Herbs	Moss
Salix pellita	Satiny Willow	40		
Rubus arcticus subsp. arcticus	Arctic Raspberry	4		
Viola macloskeyi	Small White Violet		25	
Calamagrostis canadensis	Bluejoint Reedgrass		20	
Carex magellanica	Boreal Bog Sedge		15	
Juncus effusus	Soft Rush		5	
Agrostis mertensii	Northern Bentgrass		4	
Sphagnum sp.	Sphagnum			98
Polytrichum sp.	Common Haircap Moss			1
Vegetation description (2022)				
Latin Name	English Name	% of Cover		
		Shrubs	Herbs	Moss
Salix pellita	Satiny Willow	40		
Rubus arcticus subsp.arcticus	Arctic Raspberry	4		
Viola macloskeyi	Small White Violet		25	
Calamagrostis canadensis	Bluejoint Reedgrass		20	
Carex magellanica	Boreal Bog Sedge		15	
Juncus effusus	Soft Rush		5	
Agrostis mertensii	Northern Bentgrass		4	
Sphagnum sp.	Sphagnum			98
Polytrichum sp.	Common Haircap Moss			1

WVP03				
Vegetation description (2018)				
Latin Name	English Name	% of Cover		
		Shrubs	Herbs	Moss
Salix pellita	Satiny Willow	10		
Betula glandulosa	Glandular Birch	7		
Salix pedicellaris	Bog Willow	5		
Larix laricina	Tamarack	4		
Kalmia polifolia	Pale Bog Laurel	2		
Lonicera villosa	Mountain Fly-Honeysuckle	1		
Rubus chamaemorus	Cloudberry	1		
Deschampsia cespitosa	Tufted Hairgrass		7	
Trichophorum cespitosum	Tufted Clubrush		7	
Carex pauciflora	Few-Flowered Sedge		5	
Eurybia radula	Low Rough Aster		3	
Calamagrostis canadensis	Bluejoint Reedgrass		2	
Coptis trifolia	Goldthread		1	
Sphagnum sp.	Sphagnum			95
Polytrichum sp.	Common Haircap Moss			3
Tomentypnum nitens	Golden Fuzzy Fen Moss			3
Vegetation description (2022)				
Latin Name	English Name	% of Cover		
		Shrubs	Herbs	Moss
Salix pellita	Satiny Willow	10		
Betula glandulosa	Glandular Birch	7		
Salix pedicellaris	Bog Willow	5		
Larix laricina	Tamarack	4		
Kalmia polifolia	Pale Bog Laurel	2		
Lonicera villosa	Mountain Fly-Honeysuckle	1		
Rubus chamaemorus	Cloudberry	1		
Deschampsia cespitosa	Tufted Hairgrass		7	
Trichophorum cespitosum	Tufted Clubrush		7	
Carex pauciflora	Few-Flowered Sedge		5	
Eurybia radula	Low Rough Aster		3	
Calamagrostis canadensis	Bluejoint Reedgrass		2	
Coptis trifolia	Goldthread		1	
Sphagnum sp.	Sphagnum			95
Polytrichum sp.	Common Haircap Moss			3
Tomentypnum nitens	Golden Fuzzy Fen Moss			3

WVP04				
Vegetation description (2018)				
Latin Name	English Name	% of Cover		
		Shrubs	Herbs	Moss
Rubus chamaemorus	Cloudberry	20		
Betula glandulosa	Glandular Birch	15		
Larix laricina	Tamarack	10		
Kalmia polifolia	Pale Bog Laurel	4		
Lonicera villosa	Mountain Fly-Honeysuckle	1		
Salix pellita	Satiny Willow	1		
Vaccinium oxycoccos	Small Cranberry	0.1		
Carex limosa	Mud Sedge		5	
Carex pauciflora	Few-Flowered Sedge		5	
Equisetum sylvaticum	Woodland Horsetail		5	
Eurybia radula	Low Rough Aster		4	
Juncus effusus	Soft Rush		3	
Sphagnum sp.	Sphagnum			99
Polytrichum sp.	Common Haircap Moss			1
Vegetation description (2022)				
Latin Name	English Name	% of Cover		
		Shrubs	Herbs	Moss
Rubus chamaemorus	Cloudberry	20		
Betula glandulosa	Glandular Birch	15		
Larix laricina	Tamarack	10		
Kalmia polifolia	Pale Bog Laurel	4		
Lonicera villosa	Mountain Fly-Honeysuckle	1		
Salix pellita	Satiny Willow	1		
Vaccinium oxycoccos	Small Cranberry	0.1		
Carex limosa	Mud Sedge		5	
Carex pauciflora	Few-Flowered Sedge		5	
Equisetum sylvaticum	Woodland Horsetail		5	
Eurybia radula	Low Rough Aster		4	
Juncus effusus	Soft Rush		3	
Sphagnum sp.	Sphagnum			99
Polytrichum sp.	Common Haircap Moss			1

WVP05				
Vegetation description (2018)				
Latin Name	English Name	% of Cover		
		Shrubs	Herbs	Moss
Salix pellita	Satiny Willow	40		
Betula glandulosa	Glandular Birch	35		
Lonicera villosa	Mountain Fly-Honeysuckle	4		
Rubus arcticus subsp.arcticus	Arctic Raspberry	3		
Deschampsia cespitosa	Tufted Hairgrass		5	
Equisetum sylvaticum	Woodland Horsetail		5	
Petasites frigidus var. palmatus	Palmate Coltsfoot		5	
Solidago macrophylla	Large-Leaved Goldenrod		5	
Eurybia radula	Low Rough Aster		4	
Coptis trifolia	Goldthread		1	
Sphagnum sp.	Sphagnum			80
Polytrichum sp.	Common Haircap Moss			15
Tomentypnum nitens	Golden Fuzzy Fen Moss			5
Vegetation description (2022)				
Latin Name	English Name	% of Cover		
		Shrubs	Herbs	Moss
Salix pellita	Satiny Willow	40		
Betula glandulosa	Glandular Birch	35		
Lonicera villosa	Mountain Fly-Honeysuckle	4		
Rubus arcticus subsp.arcticus	Arctic Raspberry	3		
Deschampsia cespitosa	Tufted Hairgrass		5	
Equisetum sylvaticum	Woodland Horsetail		5	
Petasites frigidus var. palmatus	Palmate Coltsfoot		5	
Solidago macrophylla	Large-Leaved Goldenrod		5	
Eurybia radula	Low Rough Aster		4	
Coptis trifolia	Goldthread		1	
Sphagnum sp.	Sphagnum			80
Polytrichum sp.	Common Haircap Moss			15
Tomentypnum nitens	Golden Fuzzy Fen Moss			5

WVP06				
Vegetation description (2018)				
Latin Name	English Name	% of Cover		
		Shrubs	Herbs	Moss
Kalmia polifolia	Pale Bog Laurel	7		
Vaccinium oxycoccos	Small Cranberry	0.1		
Trichophorum cespitosum	Tufted Clubrush		30	
Carex limosa	Mud Sedge		20	
Carex rostrata	Swollen Beaked Sedge		4	
Sphagnum sp.	Sphagnum			90
Vegetation description (2022)				
Latin Name	English Name	% of Cover		
		Shrubs	Herbs	Moss
Kalmia polifolia	Pale Bog Laurel	7		
Vaccinium oxycoccos	Small Cranberry	0.1		
Trichophorum cespitosum	Tufted Clubrush		30	
Carex limosa	Mud Sedge		20	
Carex rostrata	Swollen Beaked Sedge		4	
Sphagnum sp.	Sphagnum			90

WVP07				
Vegetation description (2018)				
Latin Name	English Name	% of Cover		
		Shrubs	Herbs	Moss
Betula glandulosa	Glandular Birch	5		
Larix laricina	Tamarack	3		
Kalmia polifolia	Pale Bog Laurel	1		
Rubus arcticus subsp.arcticus	Arctic Raspberry	1		
Rubus chamaemorus	Cloudberry	1		
Carex limosa	Mud Sedge		10	
Juncus effusus	Soft Rush		10	
Coptis trifolia	Goldthread		7	
Carex oligosperma	Few-Feeded Sedge		5	
Trichophorum cespitosum	Tufted Clubrush		5	
Carex aquatilis	Water Sedge		3	
Maianthemum trifolium	Three-Leaved False Solomon's Seal		1	
Sphagnum sp.	Sphagnum			80
Tomentypnum nitens	Golden Fuzzy Fen Moss			2
Vegetation description (2022)				
Latin Name	English Name	% of Cover		
		Shrubs	Herbs	Moss
Betula glandulosa	Glandular Birch	5		
Larix laricina	Tamarack	3		
Kalmia polifolia	Pale Bog Laurel	1		
Rubus arcticus subsp.arcticus	Arctic Rasberry	1		
Rubus chamaemorus	Cloudberry	1		
Carex limosa	Mud Sedge		10	
Juncus effusus	Soft Rush		10	
Coptis trifolia	Goldthread		7	
Carex oligosperma	Few-Feeded Sedge		5	
Trichophorum cespitosum	Tufted Clubrush		5	
Carex aquatilis	Water Sedge		3	
Maianthemum trifolium	Three-Leaved False Solomon's Seal		1	
Sphagnum sp.	Sphagnum			80
Tomentypnum nitens	Golden Fuzzy Fen Moss			2

WVP08				
Vegetation description (2018)				
Latin Name	English Name	% of Cover		
		Shrubs	Herbs	Moss
Betula glandulosa	Glandular Birch	2		
Rubus chamaemorus	Cloudberry	1		
Vaccinium oxycoccos	Small Cranberry	0.1		
Trichophorum cespitosum	Tufted Clubrush		20	
Juncus effusus	Soft Rush		15	
Carex pauciflora	Few-Flowered Sedge		10	
Coptis trifolia	Goldthread		10	
Carex aquatilis	Water Sedge		2	
Sphagnum sp.	Sphagnum			95
Polytrichum sp.	Common Haircap Moss			0.5
Vegetation description (2022)				
Latin Name	English Name	% of Cover		
		Shrubs	Herbs	Moss
Betula glandulosa	Glandular Birch	2		
Rubus chamaemorus	Cloudberry	1		
Vaccinium oxycoccos	Small Cranberry	0.1		
Rhododendron groenlandicum	Common Labrador Tea	1		
Vaccinium uliginosum	Bog Bilberry	1		
Vaccinium vitis-idaea	Mountain Cranberry	1		
Empetrum nigrum	Black Crowberry	1		
Trichophorum cespitosum	Tufted Clubrush		10	
Carex pauciflora	Few-Flowered Sedge		10	
Coptis trifolia	Goldthread		2	
Carex aquatilis	Water Sedge		2	
Sphagnum sp.	Sphagnum			95
Tomentypnum nitens	Golden Fuzzy Fen Moss			2
Cladonia rangiferina	Reindeer Lichen			2

WVP09				
Vegetation description (2018)				
Latin Name	English Name	% of Cover		
		Shrubs	Herbs	Moss
Betula glandulosa	Glandular Birch	5		
Kalmia polifolia	Pale Bog Laurel	3		
Vaccinium uliginosum	Alpine Bilberry	3		
Larix laricina	Tamarack	2		
Empetrum nigrum	Black Crowberry	1		
Vaccinium oxycoccos	Small Cranberry	0.5		
Carex limosa	Mud Sedge		20	
Carex oligosperma	Few-Seeded Sedge		15	
Carex pauciflora	Few-Flowered Sedge		10	
Coptis trifolia	Goldthread		10	
Trichophorum cespitosum	Tufted Clubrush		10	
Lysimachia borealis	Northern Starflower		3	
Sphagnum sp.	Sphagnum			80
Mousse sp.	Moss			3
Tomentypnum nitens	Golden Fuzzy Fen Moss			1
Vegetation description (2022)				
Latin Name	English Name	% of Cover		
		Shrubs	Herbs	Moss
Betula glandulosa	Glandular Birch	5		
Kalmia polifolia	Pale Bog Laurel	3		
Vaccinium uliginosum	Alpine Bilberry	3		
Larix laricina	Tamarack	2		
Empetrum nigrum	Black Crowberry	1		
Vaccinium oxycoccos	Small Cranberry	0.5		
Carex limosa	Mud Sedge		20	
Carex oligosperma	Few-Seeded Sedge		15	
Carex pauciflora	Few-Flowered Sedge		10	
Coptis trifolia	Goldthread		10	
Trichophorum cespitosum	Tufted Clubrush		15	
Lysimachia borealis	Northern Starflower		3	
Sphagnum sp.	Sphagnum			80
Mousse sp.	Moss			3
Tomentypnum nitens	Golden Fuzzy Fen Moss			1

WVP10				
Vegetation description (2018)				
Latin Name	English Name	% of Cover		
		Shrubs	Herbs	Moss
Kalmia polifolia	Pale Bog Laurel	3		
Vaccinium oxycoccos	Small Cranberry	0.1		
Carex limosa	Mud Sedge		25	
Carex rostrata	Swollen Beaked Sedge		15	
Trichophorum cespitosum	Tufted Clubrush		10	
Sphagnum sp.	Sphagnum			80
Tomentypnum nitens	Golden Fuzzy Fen Moss			2
Vegetation description (2022)				
Latin Name	English Name	% of Cover		
		Shrubs	Herbs	Moss
Kalmia polifolia	Pale Bog Laurel	3		
Vaccinium oxycoccos	Small Cranberry	0.1		
Carex limosa	Mud Sedge		25	
Carex rostrata	Swollen Beaked Sedge		15	
Trichophorum cespitosum	Tufted Clubrush		10	
Sphagnum sp.	Sphagnum			80
Tomentypnum nitens	Golden Fuzzy Fen Moss			2

WVP12				
Vegetation description (2018)				
Latin Name	English Name	% of Cover		
		Shrubs	Herbs	Moss
Betula glandulosa	Glandular Birch	40		
Deschampsia cespitosa	Tufted Hairgrass		70	
Solidago macrophylla	Large-Leaved Goldenrod		20	
Coptis trifolia	Goldthread		5	
Chamaenerion angustifolium	Fireweed		2	
Pleurozium schreberi	Schreber's Big Red Stem Moss			30
Polytrichum sp.	Common Haircap Moss			5
Vegetation description (2022)				
Latin Name	English Name	% of Cover		
		Shrubs	Herbs	Moss
Betula glandulosa	Glandular Birch	40		
Deschampsia cespitosa	Tufted Hairgrass		70	
Solidago macrophylla	Large-Leaved Goldenrod		20	
Coptis trifolia	Goldthread		5	
Hierochloe odorata	Vanilla Sweetgrass		2	
Pleurozium schreberi	Schreber's Big Red Stem Moss			30
Polytrichum sp.	Common Haircap Moss			5

WVP13				
Vegetation description (2018)				
Latin Name	English Name	% of Cover		
		Shrubs	Herbs	Moss
Salix pellita	Satiny Willow	30		
Betula glandulosa	Glandular Birch	10		
Kalmia polifolia	Pale Bog Laurel	3		
Carex aquatilis	Water Sedge		20	
Carex limosa	Mud Sedge		10	
Sphagnum sp.	Sphagnum			90
Tomentypnum nitens	Golden Fuzzy Fen Moss			7
Polytrichum sp.	Common Haircap Moss			3
Salix pellita	Satiny Willow	30		
Vegetation description (2022)				
Latin Name	English Name	% of Cover		
		Shrubs	Herbs	Moss
Salix pellita	Satiny Willow	30		
Betula glandulosa	Glandular Birch	10		
Kalmia polifolia	Pale Bog Laurel	3		
Larix laricina	Tamarack	1		
Carex aquatilis	Water Sedge		20	
Carex limosa	Mud Sedge		10	
Sphagnum sp.	Sphagnum			90
Tomentypnum nitens	Golden Fuzzy Fen Moss			7
Polytrichum sp.	Common Haircap Moss			3

WVP14				
Vegetation description (2018)				
Latin Name	English Name	% of Cover		
		Shrubs	Herbs	Moss
Vaccinium uliginosum	Alpine Bilberry	25		
Rhododendron groenlandicum	Common Labrador Tea	5		
Salix pedicellaris	Bog Willow	5		
Betula glandulosa	Glandular Birch	4		
Empetrum nigrum	Black Crowberry	2		
Vaccinium vitis-idaea	Mountain Cranberry	0.5		
Equisetum sylvaticum	Woodland Horsetail		10	
Carex canescens	Hoary Sedge		5	
Petasites frigidus var. palmatus	Palmate Coltsfoot		5	
Calamagrostis canadensis	Bluejoint Reedgrass		3	
Cornus canadensis	Bunchberry		3	
Solidago macrophylla	Large-Leaved Goldenrod		2	
Coptis trifolia	Goldthread		1	
Deschampsia cespitosa	Tufted Hairgrass		1	
Lycopodium annotinum	Stiff Clubmoss		1	
Sphagnum sp.	Sphagnum			100
Vegetation description (2022)				
Latin Name	English Name	% of Cover		
		Shrubs	Herbs	Moss
Vaccinium uliginosum	Alpine Bilberry	25		
Rhododendron groenlandicum	Common Labrador Tea	5		
Salix pedicellaris	Bog Willow	5		
Betula glandulosa	Glandular Birch	4		
Empetrum nigrum	Black Crowberry	2		
Vaccinium vitis-idaea	Mountain Cranberry	0.5		
Equisetum sylvaticum	Woodland Horsetail		10	
Carex canescens	Hoary Sedge		5	
Petasites frigidus var. palmatus	Palmate Coltsfoot		5	
Calamagrostis canadensis	Bluejoint Reedgrass		3	
Cornus canadensis	Bunchberry		3	
Solidago macrophylla	Large-Leaved Goldenrod		2	
Coptis trifolia	Goldthread		1	
Deschampsia cespitosa	Tufted Hairgrass		1	
Lycopodium annotinum	Stiff Clubmoss		1	
Sphagnum sp.	Sphagnum			100

WVP17				
Vegetation description (2018)				
Latin Name	English Name	% of Cover		
		Shrubs	Herbs	Moss
Andromeda polifolia var. latifolia	Glaucous-Leaved Bog Rosemary	7		
Kalmia polifolia	Pale Bog Laurel	2		
Vaccinium oxycoccos	Small Cranberry	0.5		
Carex limosa	Mud Sedge		25	
Trichophorum cespitosum	Tufted Clubrush		15	
Carex oligosperma	Few-Seeded Sedge		5	
Sphagnum sp.	Sphagnum			70
Tomentypnum nitens	Golden Fuzzy Fen Moss			15
Vegetation description (2022)				
Latin Name	English Name	% of Cover		
		Shrubs	Herbs	Moss
Andromeda polifolia var. latifolia	Glaucous-Leaved Bog Rosemary	7		
Kalmia polifolia	Pale Bog Laurel	2		
Vaccinium oxycoccos	Small Cranberry	0.5		
Carex limosa	Mud Sedge		25	
Trichophorum cespitosum	Tufted Clubrush		15	
Carex oligosperma	Few-Seeded Sedge		5	
Sphagnum sp.	Sphagnum			70
Tomentypnum nitens	Golden Fuzzy Fen Moss			15

WVP18				
Vegetation description (2018)				
Latin Name	English Name	% of Cover		
		Shrubs	Herbs	Moss
Betula glandulosa	Glandular Birch	10		
Salix pedicellaris	Bog Willow	10		
Salix pellita	Satiny Willow	5		
Petasites frigidus var. palmatus	Palmate Coltsfoot		10	
Viola macloskeyi	Small White Violet		7	
Calamagrostis canadensis	Bluejoint Reedgrass		5	
Linnaea borealis	Twinflower		5	
Coptis trifolia	Goldthread		4	
Equisetum sylvaticum	Woodland Horsetail		4	
Chamaenerion angustifolium	Fireweed		3	
Deschampsia cespitosa	Tufted Hairgrass		3	
Cornus canadensis	Bunchberry		2	
Solidago macrophylla	Large-Leaved Goldenrod		2	
Sphagnum sp.	Sphagnum			90
Tomentypnum nitens	Golden Fuzzy Fen Moss			5
Vegetation description (2022)				
Latin Name	English Name	% of Cover		
		Shrubs	Herbs	Moss
Betula glandulosa	Glandular Birch	10		
Salix pedicellaris	Bog Willow	10		
Salix pellita	Satiny Willow	5		
Rubus arcticus	Arctic Raspberry	1		
Pyrola minor	Lesser Pyrola	1		
Petasites frigidus var. palmatus	Palmate Coltsfoot		10	
Viola macloskeyi	Small White Violet		7	
Calamagrostis canadensis	Bluejoint Reedgrass		5	
Linnaea borealis	Twinflower		5	
Coptis trifolia	Goldthread		4	
Equisetum sylvaticum	Woodland Horsetail		4	
Chamaenerion angustifolium	Fireweed		3	
Deschampsia cespitosa	Tufted Hairgrass		3	
Cornus canadensis	Bunchberry		2	
Solidago macrophylla	Large-Leaved Goldenrod		2	
Sphagnum sp.	Sphagnum			90
Tomentypnum nitens	Golden Fuzzy Fen Moss			5

WVP19				
Vegetation description (2018)				
Latin Name	English Name	% of Cover		
		Shrubs	Herbs	Moss
Vaccinium uliginosum	Alpine Bilberry	8		
Lonicera villosa	Mountain Fly-Honeysuckle	5		
Kalmia polifolia	Pale Bog Laurel	4		
Vaccinium oxycoccos	Small Cranberry	0.5		
Trichophorum cespitosum	Tufted Clubrush		20	
Carex limosa	Mud Sedge		15	
Eurybia radula	Low Rough Aster		15	
Maianthemum trifolium	Three-Leaved False Solomon's Seal		15	
Deschampsia cespitosa	Tufted Hairgrass		10	
Lysimachia borealis	Northern Starflower		1	
Agrostis mertensii	Northern Bentgrass		0.5	
Coptis trifolia	Goldthread		0.5	
Sphagnum sp.	Sphagnum			80
Scorpidium scorpioides	Hooked Scorpion Moss			5
Tomentypnum nitens	Golden Fuzzy Fen Moss			5
Vegetation description (2022)				
Latin Name	English Name	% of Cover		
		Shrubs	Herbs	Moss
Vaccinium uliginosum	Alpine Bilberry	8		
Lonicera villosa	Mountain Fly-Honeysuckle	5		
Kalmia polifolia	Pale Bog Laurel	2		
Vaccinium oxycoccos	Small Cranberry	0.5		
Phalaris arundinacea	Reed Canarygrass		2	
Trichophorum cespitosum	Tufted Clubrush		20	
Carex limosa	Mud Sedge		15	
Eurybia radula	Low Rough Aster		15	
Maianthemum trifolium	Three-Leaved False Solomon's Seal		15	
Deschampsia cespitosa	Tufted Hairgrass		10	
Lysimachia borealis	Northern Starflower		1	
Agrostis mertensii	Northern Bentgrass		0.5	
Coptis trifolia	Goldthread		0.5	
Sphagnum sp.	Sphagnum			80
Scorpidium scorpioides	Hooked Scorpion Moss			5
Tomentypnum nitens	Golden Fuzzy Fen Moss			5

WVP20				
Vegetation description (2018)				
Latin Name	English Name	% of Cover		
		Shrubs	Herbs	Moss
Betula glandulosa	Glandular Birch	3		
Lonicera villosa	Mountain Fly-Honeysuckle	3		
Kalmia polifolia	Pale Bog Laurel	2		
Rubus chamaemorus	Cloudberry	2		
Vaccinium oxycoccos	Small Cranberry	0.5		
Trichophorum cespitosum	Tufted Clubrush		30	
Maianthemum trifolium	Three-Leaved False Solomon's Seal		7	
Carex pauciflora	Few-Flowered Sedge		5	
Equisetum sylvaticum	Woodland Horsetail		4	
Juncus effusus	Soft Rush		4	
Petasites frigidus var. palmatus	Palmate Coltsfoot		4	
Carex aquatilis	Water Sedge		3	
Tomentypnum nitens	Golden Fuzzy Fen Moss			25
Scorpidium scorpioides	Hooked Scorpion Moss			15
Vegetation description (2022)				
Latin Name	English Name	% of Cover		
		Shrubs	Herbs	Moss
Betula glandulosa	Glandular Birch	3		
Lonicera villosa	Mountain Fly-Honeysuckle	3		
Kalmia polifolia	Pale Bog Laurel	2		
Rubus chamaemorus	Cloudberry	2		
Vaccinium oxycoccos	Small Cranberry	0.5		
Salix interior	Sandbar Willow	15		
Trichophorum cespitosum	Tufted Clubrush		30	
Maianthemum trifolium	Three-Leaved False Solomon's Seal		7	
Carex pauciflora	Few-Flowered Sedge		5	
Equisetum sylvaticum	Woodland Horsetail		4	
Juncus effusus	Soft Rush		4	
Petasites frigidus var. palmatus	Palmate Coltsfoot		4	
Carex aquatilis	Water Sedge		3	
Tomentypnum nitens	Golden Fuzzy Fen Moss			25
Scorpidium scorpioides	Hooked Scorpion Moss			15
Sphagnum sp.	Sphagnum			50

WVP21				
Vegetation description (2018)				
Latin Name	English Name	% of Cover		
		Shrubs	Herbs	Moss
Lonicera villosa	Mountain Fly-Honeysuckle	5		
Vaccinium uliginosum	Alpine Bilberry	3		
Kalmia polifolia	Pale Bog Laurel	2		
Vaccinium oxycoccos	Small Cranberry	1		
Trichophorum cespitosum	Tufted Clubrush		20	
Carex limosa	Mud Sedge		15	
Eriophorum virginicum	Tawny Cottongrass		5	
Deschampsia cespitosa	Tufted Hairgrass		3	
Carex pauciflora	Few-Flowered Sedge		2	
Coptis trifolia	Goldthread		2	
Platanthera dilatata	Tall White Bog Orchid		1	
Viola macloskeyi	Small White Violet		0.5	
Sphagnum sp.	Sphagnum			80
Tomentypnum nitens	Golden Fuzzy Fen Moss			2
Vegetation description (2022)				
Latin Name	English Name	% of Cover		
		Shrubs	Herbs	Moss
Lonicera villosa	Mountain Fly-Honeysuckle	5		
Vaccinium uliginosum	Alpine Bilberry	5		
Kalmia polifolia	Pale Bog Laurel	2		
Vaccinium oxycoccos	Small Cranberry	1		
Larix larinica	Tamarack	5		
Trichophorum cespitosum	Tufted Clubrush		20	
Carex limosa	Mud Sedge		15	
Eriophorum virginicum	Tawny Cottongrass		5	
Deschampsia cespitosa	Tufted Hairgrass		3	
Carex pauciflora	Few-Flowered Sedge		2	
Coptis trifolia	Goldthread		2	
Platanthera dilatata	Tall White Bog Orchid		1	
Viola macloskeyi	Small White Violet		0.5	
Sphagnum sp.	Sphagnum			80
Tomentypnum nitens	Golden Fuzzy Fen Moss			2

WVP22				
Vegetation description (2018)				
Latin Name	English Name	% of Cover		
		Shrubs	Herbs	Moss
Betula glandulosa	Glandular Birch	8		
Kalmia polifolia	Pale Bog Laurel	4		
Larix laricina	Tamarack	4		
Vaccinium oxycoccos	Small Cranberry	0.5		
Juncus effusus	Soft Rush		10	
Carex limosa	Mud Sedge		5	
Coptis trifolia	Goldthread		5	
Carex pauciflora	Few-Flowered Sedge		3	
Lysimachia borealis	Northern Starflower		1	
Sphagnum sp.	Sphagnum			95
Vegetation description (2022)				
Latin Name	English Name	% of Cover		
		Shrubs	Herbs	Moss
Betula glandulosa	Glandular Birch	8		
Kalmia polifolia	Pale Bog Laurel	4		
Larix laricina	Tamarack	4		
Vaccinium oxycoccos	Small Cranberry	0.5		
Vaccinium uliginosum	Bog Bilberry	3		
Rubus chamaemorus	Cloudberry	2		
Juncus effusus	Soft Rush		10	
Carex limosa	Mud Sedge		5	
Coptis trifolia	Goldthread		5	
Carex pauciflora	Few-Flowered Sedge		3	
Lysimachia borealis	Northern Starflower		1	
Sphagnum sp.	Sphagnum			95

WVP23				
Vegetation description (2018)				
Latin Name	English Name	% of Cover		
		Shrubs	Herbs	Moss
Kalmia polifolia	Pale Bog Laurel	2		
Vaccinium oxycoccos	Small Cranberry	1		
Carex limosa	Mud Sedge		20	
Maianthemum trifolium	Three-Leaved False Solomon's Seal		10	
Eriophorum russeolum	Russet Cottongrass		5	
Sphagnum sp.	Sphagnum			95
Vegetation description (2022)				
Latin Name	English Name	% of Cover		
		Shrubs	Herbs	Moss
Kalmia polifolia	Pale Bog Laurel	2		
Vaccinium oxycoccos	Small Cranberry	1		
Betula glandulosa	Glandular Birch	3		
Carex limosa	Mud Sedge		20	
Maianthemum trifolium	Three-Leaved False Solomon's Seal		10	
Eriophorum russeolum	Russet Cottongrass		5	
Sphagnum sp.	Sphagnum			95

WVP24				
Vegetation description (2018)				
Latin Name	English Name	% of Cover		
		Shrubs	Herbs	Moss
Larix laricina	Tamarack	15		
Andromeda polifolia var. latifolia	Glaucous-Leaved Bog Rosemary	4		
Kalmia polifolia	Pale Bog Laurel	4		
Vaccinium oxycoccos	Small Cranberry	1		
Vaccinium uliginosum	Alpine Bilberry	1		
Carex limosa	Mud Sedge		25	
Trichophorum cespitosum	Tufted Clubrush		25	
Carex pauciflora	Few-Flowered Sedge		5	
Mousse sp.	Moss			25
Sphagnum sp.	Sphagnum			20
Vegetation description (2022)				
Latin Name	English Name	% of Cover		
		Shrubs	Herbs	Moss
Larix laricina	Tamarack	15		
Andromeda polifolia var. latifolia	Glaucous-Leaved Bog Rosemary	4		
Kalmia polifolia	Pale Bog Laurel	4		
Vaccinium oxycoccos	Small Cranberry	1		
Vaccinium uliginosum	Alpine Bilberry	4		
Picea mariana	Black Spruce	3		
Rubus chamaemorus	Cloudberry	1		
Carex limosa	Mud Sedge		25	
Trichophorum cespitosum	Tufted Clubrush		25	
Carex pauciflora	Few-Flowered Sedge		5	
Mousse sp.	Moss			25
Sphagnum sp.	Sphagnum			20
Scorpidium scorpioides	Hooked Scorpion Moss			5

WVP25				
Vegetation description (2018)				
Latin Name	English Name	% of Cover		
		Shrubs	Herbs	Moss
Kalmia polifolia	Pale Bog Laurel	7		
Betula glandulosa	Glandular Birch	3		
Picea mariana	Black spruce	2		
Vaccinium oxycoccos	Small Cranberry	1		
Carex limosa	Mud Sedge		10	
Maianthemum trifolium	Three-Leaved False Solomon's Seal		10	
Trichophorum cespitosum	Tufted Clubrush		10	
Juncus effusus	Soft Rush		5	
Carex rostrata	Swollen Beaked Sedge		3	
Eriophorum russeolum	Russet Cottongrass		3	
Sphagnum sp.	Sphagnum			40
Tomentypnum nitens	Golden Fuzzy Fen Moss			2
Polytrichum sp.	Hollyfern			0.5
Vegetation description (2022)				
Latin Name	English Name	% of Cover		
		Shrubs	Herbs	Moss
Kalmia polifolia	Pale Bog Laurel	7		
Betula glandulosa	Glandular Birch	3		
Picea mariana	Black spruce	2		
Vaccinium oxycoccos	Small Cranberry	1		
Carex limosa	Mud Sedge		10	
Maianthemum trifolium	Three-Leaved False Solomon's Seal		10	
Trichophorum cespitosum	Tufted Clubrush		10	
Juncus effusus	Soft Rush		5	
Carex rostrata	Swollen Beaked Sedge		3	
Eriophorum russeolum	Russet Cottongrass		3	
Sphagnum sp.	Sphagnum			40
Tomentypnum nitens	Golden Fuzzy Fen Moss			2
Polytrichum sp.	Hollyfern			0.5

WVP27				
Vegetation description (2018)				
Latin Name	English Name	% of Cover		
		Shrubs	Herbs	Moss
Vaccinium uliginosum	Alpine Bilberry	2		
Betula glandulosa	Glandular Birch	1		
Kalmia polifolia	Pale Bog Laurel	1		
Rubus chamaemorus	Cloudberry	1		
Vaccinium oxycoccos	Small Cranberry	0.5		
Carex limosa	Mud Sedge		40	
Carex oligosperma	Few-Feeded Sedge		20	
Maianthemum trifolium	Three-Leaved False Solomon's Seal		2	
Sphagnum sp.	Sphagnum			100
Vegetation description (2022)				
Latin Name	English Name	% of Cover		
		Shrubs	Herbs	Moss
Vaccinium uliginosum	Alpine Bilberry	2		
Betula glandulosa	Glandular Birch	1		
Kalmia polifolia	Pale Bog Laurel	1		
Rubus chamaemorus	Cloudberry	1		
Vaccinium oxycoccos	Small Cranberry	0.5		
Carex limosa	Mud Sedge		40	
Carex oligosperma	Few-Feeded Sedge		20	
Maianthemum trifolium	Three-Leaved False Solomon's Seal		2	
Sphagnum sp.	Sphagnum			100

WVP28				
Vegetation description (2018)				
Latin Name	English Name	% of Cover		
		Shrubs	Herbs	Moss
Betula glandulosa	Glandular Birch	15		
Salix pellita	Satiny Willow	5		
Rubus chamaemorus	Cloudberry	4		
Rubus arcticus subsp.arcticus	Arctic Raspberry	2		
Petasites frigidus var. palmatus	Palmate Coltsfoot		20	
Carex trisperma	Three-Seeded Sedge		10	
Cornus canadensis	Bunchberry		5	
Solidago macrophylla	Large-Leaved Goldenrod		5	
Viola macloskeyi	Small White Violet		5	
Carex limosa	Mud Sedge		3	
Calamagrostis canadensis	Bluejoint Reedgrass		2	
Coptis trifolia	Goldthread		2	
Chamaenerion angustifolium	Fireweed		1	
Galium triflorum	Three-Flowered Bedstraw		1	
Sphagnum sp.	Sphagnum			95
Vegetation description (2022)				
Latin Name	English Name	% of Cover		
		Shrubs	Herbs	Moss
Betula glandulosa	Glandular Birch	15		
Salix pellita	Satiny Willow	5		
Rubus chamaemorus	Cloudberry	4		
Rubus arcticus subsp.arcticus	Arctic Raspberry	2		
Petasites frigidus var. palmatus	Palmate Coltsfoot		20	
Carex trisperma	Three-Seeded Sedge		10	
Cornus canadensis	Bunchberry		5	
Solidago macrophylla	Large-Leaved Goldenrod		5	
Viola macloskeyi	Small White Violet		5	
Carex limosa	Mud Sedge		3	
Calamagrostis canadensis	Bluejoint Reedgrass		2	
Coptis trifolia	Goldthread		2	
Chamaenerion angustifolium	Fireweed		1	
Galium triflorum	Three-Flowered Bedstraw		1	
Sphagnum sp.	Sphagnum			95

WVP29				
Vegetation description (2018)				
Latin Name	English Name	% of Cover		
		Shrubs	Herbs	Moss
Salix pellita	Satiny Willow	80		
Betula glandulosa	Glandular Birch	10		
Lonicera villosa	Mountain Fly Honeysuckle	5		
Rubus arcticus subsp.arcticus	Arctic Raspberry	2		
Carex trisperma	Three-Seeded Sedge		40	
Deschampsia cespitosa	Tufted Hairgrass		5	
Viola macloskeyi	Small White Violet		5	
Calamagrostis canadensis	Bluejoint Reedgrass		3	
Chamaenerion angustifolium	Fireweed		3	
Petasites frigidus var. palmatus	Palmate Coltsfoot		2	
Galium triflorum	Three-Flowered Bedstraw		1	
Sphagnum sp.	Sphagnum			100
Vegetation description (2022)				
Latin Name	English Name	% of Cover		
		Shrubs	Herbs	Moss
Salix pellita	Satiny Willow	80		
Betula glandulosa	Glandular Birch	10		
Lonicera villosa	Mountain Fly Honeysuckle	5		
Rubus arcticus subsp.arcticus	Arctic Raspberry	2		
Carex trisperma	Three-Seeded Sedge		40	
Deschampsia cespitosa	Tufted Hairgrass		5	
Viola macloskeyi	Small White Violet		5	
Calamagrostis canadensis	Bluejoint Reedgrass		3	
Chamaenerion angustifolium	Fireweed		3	
Petasites frigidus var. palmatus	Palmate Coltsfoot		2	
Galium triflorum	Three-Flowered Bedstraw		1	
Sphagnum sp.	Sphagnum			100

WVP30				
Vegetation description (2018)				
Latin Name	English Name	% of Cover		
		Shrubs	Herbs	Moss
Rubus chamaemorus	Cloudberry	70		
Kalmia polifolia	Pale Bog Laurel	20		
Betula glandulosa	Glandular Birch	15		
Larix laricina	Tamarack	8		
Vaccinium vitis-idaea	Mountain Cranberry	1		
Vaccinium oxycoccos	Small Cranberry	0.5		
Carex pauciflora	Few-Flower Sedge		1	
Sphagnum sp.	Sphagnum			95
Polytrichum sp.	Hollyfern			3
Cladonia sp.	Reindeer Lichen			1
Pleurozium schreberi	Schreber's Big Red Stem Moss			1
Tomentypnum nitens	Golden Fuzzy Fen Moss			1
Vegetation description (2022)				
Latin Name	English Name	% of Cover		
		Shrubs	Herbs	Moss
Rubus chamaemorus	Cloudberry	70		
Kalmia polifolia	Pale Bog Laurel	20		
Betula glandulosa	Glandular Birch	15		
Larix laricina	Tamarack	8		
Vaccinium vitis-idaea	Mountain Cranberry	1		
Vaccinium oxycoccos	Small Cranberry	0.5		
Carex pauciflora	Few-Flower Sedge		1	
Sphagnum sp.	Sphagnum			95
Polytrichum sp.	Hollyfern			3
Cladonia sp.	Reindeer Lichen			1
Pleurozium schreberi	Schreber's Big Red Stem Moss			1
Tomentypnum nitens	Golden Fuzzy Fen Moss			1

WVP32				
Vegetation description (2018)				
Latin Name	English Name	% of Cover		
		Shrubs	Herbs	Moss
Salix pellita	Satiny Willow	40		
Rubus arcticus subsp.arcticus	Arctic Raspberry	3		
Carex aquatilis	Water Sedge		35	
Calamagrostis canadensis	Bluejoint Reedgrass		5	
Sphagnum sp.	Sphagnum			85
Tomentypnum nitens	Golden Fuzzy Fen Moss			3
Mnium sp.	Leafy Moss			2
Vegetation description (2022)				
Latin Name	English Name	% of Cover		
		Shrubs	Herbs	Moss
Salix pellita	Satiny Willow	40		
Rubus arcticus subsp.arcticus	Arctic Raspberry	3		
Carex aquatilis	Water Sedge		35	
Calamagrostis canadensis	Bluejoint Reedgrass		5	
Sphagnum sp.	Sphagnum			85
Tomentypnum nitens	Golden Fuzzy Fen Moss			3
Mnium sp.	Leafy Moss			2

WVP33				
Vegetation description (2018)				
Latin Name	English Name	% of Cover		
		Shrubs	Herbs	Moss
Salix pellita	Satiny Willow	95		
Lonicera villosa	Mountain Fly Honeysuckle	0.5		
Carex sp.	Sedge		15	
Solidago macrophylla	Large-Leaved Goldenrod		15	
Equisetum sylvaticum	Woodland Horsetail		5	
Fragaria vesca subsp. americana	American Woodland Strawberry		5	
Petasites frigidus var. palmatus	Palmate Coltsfoot		5	
Calamagrostis canadensis	Bluejoint Reedgrass		3	
Mitella nuda	Naked Mitrewort		3	
Achillea borealis	Wooly Yarrow		2	
Chamaenerion angustifolium	Fireweed		1	
Luzula parviflora	Small-Flowered Woodrush		1	
Viola macloskeyi	Small White Violet		1	
Coptis trifolia	Goldthread		0.5	
Pleurozium schreberi	Schreber's Big Red Stem Moss			40
Vegetation description (2022)				
Latin Name	English Name	% of Cover		
		Shrubs	Herbs	Moss
Salix pellita	Satiny Willow	95		
Lonicera villosa	Mountain Fly Honeysuckle	0.5		
Carex sp.	Sedge		15	
Solidago macrophylla	Large-Leaved Goldenrod		15	
Equisetum sylvaticum	Woodland Horsetail		5	
Fragaria vesca subsp. americana	American Woodland Strawberry		5	
Petasites frigidus var. palmatus	Palmate Coltsfoot		5	
Calamagrostis canadensis	Bluejoint Reedgrass		3	
Mitella nuda	Naked Mitrewort		3	
Achillea borealis	Wooly Yarrow		2	
Chamaenerion angustifolium	Fireweed		1	
Luzula parviflora	Small-Flowered Woodrush		1	
Viola macloskeyi	Small White Violet		1	
Coptis trifolia	Goldthread		0.5	
Pleurozium schreberi	Schreber's Big Red Stem Moss			40

WVP34				
Vegetation description (2018)				
Latin Name	English Name	% of Cover		
		Shrubs	Herbs	Moss
Salix pedicellaris	Bog Willow	7		
Betula glandulosa	Glandular Birch	4		
Larix laricina	Tamarack	3		
Kalmia polifolia	Pale Bog Laurel	2		
Vaccinium uliginosum	Alpine Bilberry	1		
Vaccinium oxycoccos	Small Cranberry	0.5		
Carex aquatilis	Water Sedge		25	
Carex limosa	Mud Sedge		5	
Carex pauciflora	Few-Flower Sedge		3	
Juncus effusus	Soft Rush		1	
Maianthemum trifolium	Three-Leaved False Solomon's Seal		1	
Sphagnum sp.	Sphagnum			70
Tomentypnum nitens	Golden Fuzzy Fen Moss			10
Vegetation description (2022)				
Latin Name	English Name	% of Cover		
		Shrubs	Herbs	Moss
Salix pedicellaris	Bog Willow	7		
Betula glandulosa	Glandular Birch	4		
Larix laricina	Tamarack	3		
Kalmia polifolia	Pale Bog Laurel	2		
Vaccinium uliginosum	Alpine Bilberry	1		
Vaccinium oxycoccos	Small Cranberry	0.5		
Carex aquatilis	Water Sedge		25	
Carex limosa	Mud Sedge		5	
Carex pauciflora	Few-Flower Sedge		3	
Juncus effusus	Soft Rush		1	
Maianthemum trifolium	Three-Leaved False Solomon's Seal		1	
Sphagnum sp.	Sphagnum			70
Tomentypnum nitens	Golden Fuzzy Fen Moss			10

WVP35				
Vegetation description (2018)				
Latin Name	English Name	% of Cover		
		Shrubs	Herbs	Moss
Betula glandulosa	Glandular Birch	25		
Salix pellita	Satiny Willow	25		
Rubus arcticus subsp.arcticus	Arctic Raspberry	1		
Solidago macrophylla	Large-Leaved Goldenrod		40	
Agrostis mertensii	Northern Bentgrass		15	
Cerastium alpinum	Alpine Chickweed		15	
Viola macloskeyi	Small White Violet		7	
Deschampsia cespitosa	Tufted Hairgrass		5	
Luzula parviflora	Small-Flowered Woodrush		5	
Coptis trifolia	Goldthread		3	
Petasites frigidus var. palmatus	Palmate Coltsfoot		3	
Calamagrostis canadensis	Bluejoint Reedgrass		2	
Cornus canadensis	Bunchberry		1	
Equisetum arvense	Field Horsetail		1	
Phleum alpinum	Alpine Thimothy		1	
Veronica wormskjoldii	Wormskjold's Alpine Speedwell		0.5	
Mousse sp.	Moss			40
Mnium sp.	Leafy Moss			5
Pleurozium schreberi	Schreber's Big Red Stem Moss			1
Vegetation description (2022)				
Latin Name	English Name	% of Cover		
		Shrubs	Herbs	Moss
Betula glandulosa	Glandular Birch	25		
Salix pellita	Satiny Willow	25		
Rubus arcticus subsp.arcticus	Arctic Raspberry	1		
Solidago macrophylla	Large-Leaved Goldenrod		40	
Agrostis mertensii	Northern Bentgrass		15	
Cerastium alpinum	Alpine Chickweed		15	
Viola macloskeyi	Small White Violet		7	
Deschampsia cespitosa	Tufted Hairgrass		5	
Luzula parviflora	Small-Flowered Woodrush		5	
Coptis trifolia	Goldthread		3	
Petasites frigidus var. palmatus	Palmate Coltsfoot		3	
Calamagrostis canadensis	Bluejoint Reedgrass		2	
Cornus canadensis	Bunchberry		1	
Equisetum arvense	Field Horsetail		1	
Phleum alpinum	Alpine Thimothy		1	
Veronica wormskjoldii	Wormskjold's Alpine Speedwell		0.5	
Mousse sp.	Moss			40
Mnium sp.	Leafy Moss			5
Pleurozium schreberi	Schreber's Big Red Stem Moss			1

Appendix II

Wetland indicator status data

ID	year	station	Ecotype	NI	FACH	OBL	Total	NI_pourcentage	FACH_pourcentage	OBL_pourcentage
WVP14_2018	2018	WVP14	FSM08	9	5	2	16	56,25	31,25	12,5
WVP14_2022	2022	WVP14	FSM08	9	5	2	16	56,25	31,25	12,5
WVP18_2018	2018	WVP18	FSM08	7	5	3	15	46,67	33,33	20
WVP18_2022	2022	WVP18	FSM08	8	6	3	17	47,06	35,29	17,65
WVP20_2018	2018	WVP20	FSM08	1	9	5	15	6,67	60	33,33
WVP20_2022	2022	WVP20	FSM08	1	10	5	16	6,25	62,5	31,25
WVP22_2018	2018	WVP22	FSM08	3	4	3	10	30	40	30
WVP22_2022	2022	WVP22	FSM08	4	5	3	12	33,33	41,67	25
WVP24_2018	2018	WVP24	FSM08	2	3	5	10	20	30	50
WVP24_2022	2022	WVP24	FSM08	3	5	5	13	23,08	38,46	38,46
WVP25_2018	2018	WVP25	FSM08	3	4	6	13	23,08	30,77	46,15
WVP25_2022	2022	WVP25	FSM08	3	4	6	13	23,08	30,77	46,15
WVP02_2018	2018	WVP02	FSM10	3	3	3	9	33,33	33,33	33,33
WVP02_2022	2022	WVP02	FSM10	3	3	3	9	33,33	33,33	33,33
WVP04_2018	2018	WVP04	FSM10	2	7	5	14	14,29	50	35,71
WVP04_2022	2022	WVP04	FSM10	2	7	5	14	14,29	50	35,71
WVP30_2018	2018	WVP30	FSM10	5	5	2	12	41,67	41,67	16,67
WVP30_2022	2022	WVP30	FSM10	5	5	2	12	41,67	41,67	16,67
WVP34_2018	2018	WVP34	FSM10	2	5	6	13	15,38	38,46	46,15
WVP34_2022	2022	WVP34	FSM10	2	5	6	13	15,38	38,46	46,15
WVP35_2018	2018	WVP35	FSM10	13	4	2	19	68,42	21,05	10,53
WVP35_2022	2022	WVP35	FSM10	13	4	2	19	68,42	21,05	10,53
WVP06_2018	2018	WVP06	FSM12	0	2	4	6	0	33,33	66,67
WVP06_2022	2022	WVP06	FSM12	0	2	4	6	0	33,33	66,67
WVP07_2018	2018	WVP07	FSM12	2	7	5	14	14,29	50	35,71
WVP07_2022	2022	WVP07	FSM12	2	7	5	14	14,29	50	35,71
WVP08_2018	2018	WVP08	FSM12	3	3	4	10	30	30	40
WVP08_2022	2022	WVP08	FSM12	7	5	4	16	43,75	31,25	25
WVP09_2018	2018	WVP09	FSM12	6	4	5	15	40	26,67	33,33
WVP09_2022	2022	WVP09	FSM12	6	4	5	15	40	26,67	33,33
WVP10_2018	2018	WVP10	FSM12	0	3	4	7	0	42,86	57,14
WVP10_2022	2022	WVP10	FSM12	0	3	4	7	0	42,86	57,14
WVP13_2018	2018	WVP13	FSM12	2	3	3	8	25	37,5	37,5
WVP13_2022	2022	WVP13	FSM12	2	4	3	9	22,22	44,44	33,33
WVP17_2018	2018	WVP17	FSM12	0	3	5	8	0	37,5	62,5
WVP17_2022	2022	WVP17	FSM12	0	3	5	8	0	37,5	62,5
WVP19_2018	2018	WVP19	FSM12	4	6	5	15	26,67	40	33,33
WVP19_2022	2022	WVP19	FSM12	4	7	5	16	25	43,75	31,25
WVP21_2018	2018	WVP21	FSM12	2	6	6	14	14,29	42,86	42,86
WVP21_2022	2022	WVP21	FSM12	2	7	6	15	13,33	46,67	40
WVP23_2018	2018	WVP23	FSM12	0	2	4	6	0	33,33	66,67
WVP23_2022	2022	WVP23	FSM12	1	2	4	7	14,29	28,57	57,14
WVP32_2018	2018	WVP32	FSM12	2	3	2	7	28,57	42,86	28,57
WVP32_2022	2022	WVP32	FSM12	2	3	2	7	28,57	42,86	28,57
WVP03_2018	2018	WVP03	FSM15	4	7	5	16	25	43,75	31,25
WVP03_2022	2022	WVP03	FSM15	4	7	5	16	25	43,75	31,25
WVP05_2018	2018	WVP05	FSM15	4	7	2	13	30,77	53,85	15,38
WVP05_2022	2022	WVP05	FSM15	4	7	2	13	30,77	53,85	15,38
WVP12_2018	2018	WVP12	FSM15	6	1	0	7	85,71	14,29	0
WVP12_2022	2022	WVP12	FSM15	7	1	0	8	87,5	12,5	0
WVP27_2018	2018	WVP27	FSM15	2	3	4	9	22,22	33,33	44,44
WVP27_2022	2022	WVP27	FSM15	2	3	4	9	22,22	33,33	44,44
WVP28_2018	2018	WVP28	FSM15	7	5	3	15	46,67	33,33	20
WVP28_2022	2022	WVP28	FSM15	7	5	3	15	46,67	33,33	20
WVP29_2018	2018	WVP29	FSM15	4	6	2	12	33,33	50	16,67
WVP29_2022	2022	WVP29	FSM15	4	6	2	12	33,33	50	16,67
WVP33_2018	2018	WVP33	FSM15	7	6	2	15	46,67	40	13,33
WVP33_2022	2022	WVP33	FSM15	7	6	2	15	46,67	40	13,33

ID	year	station	Ecotype	Abondance_Total	Richesse	Shannon_entropy	Shannon_diversity	Gini_Simpson_entropy
WVP14_2018	2018	WVP14	FSM08	16	3	0,947057152	2,578111495	0,5703125
WVP14_2022	2022	WVP14	FSM08	16	3	0,947057152	2,578111495	0,5703125
WVP18_2018	2018	WVP18	FSM08	15	3	1,043757036	2,839866478	0,631111111
WVP18_2022	2022	WVP18	FSM08	17	3	1,028394167	2,7965714	0,62283737
WVP20_2018	2018	WVP20	FSM08	15	3	0,853236151	2,347230566	0,524444444
WVP20_2022	2022	WVP20	FSM08	16	3	0,830523691	2,294520046	0,5078125
WVP22_2018	2018	WVP22	FSM08	10	3	1,088899975	2,971004097	0,66
WVP22_2022	2022	WVP22	FSM08	12	3	1,077556327	2,937492502	0,652777778
WVP24_2018	2018	WVP24	FSM08	10	3	1,029653014	2,800094073	0,62
WVP24_2022	2022	WVP24	FSM08	13	3	1,073394281	2,925291931	0,650887574
WVP25_2018	2018	WVP25	FSM08	13	3	1,057905425	2,880331595	0,639053254
WVP25_2022	2022	WVP25	FSM08	13	3	1,057905425	2,880331595	0,639053254
WVP02_2018	2018	WVP02	FSM10	9	3	1,098612289	3	0,666666667
WVP02_2022	2022	WVP02	FSM10	9	3	1,098612289	3	0,666666667
WVP04_2018	2018	WVP04	FSM10	14	3	0,992281975	2,697382814	0,602040816
WVP04_2022	2022	WVP04	FSM10	14	3	0,992281975	2,697382814	0,602040816
WVP30_2018	2018	WVP30	FSM10	12	3	1,028183859	2,795983322	0,625
WVP30_2022	2022	WVP30	FSM10	12	3	1,028183859	2,795983322	0,625
WVP34_2018	2018	WVP34	FSM10	13	3	1,012330839	2,752008033	0,615384615
WVP34_2022	2022	WVP34	FSM10	13	3	1,012330839	2,752008033	0,615384615
WVP35_2018	2018	WVP35	FSM10	19	3	0,824659324	2,281103515	0,476454294
WVP35_2022	2022	WVP35	FSM10	19	3	0,824659324	2,281103515	0,476454294
WVP06_2018	2018	WVP06	FSM12	6	2	0,636514168	1,889881575	0,444444444
WVP06_2022	2022	WVP06	FSM12	6	2	0,636514168	1,889881575	0,444444444
WVP07_2018	2018	WVP07	FSM12	14	3	0,992281975	2,697382814	0,602040816
WVP07_2022	2022	WVP07	FSM12	14	3	0,992281975	2,697382814	0,602040816
WVP08_2018	2018	WVP08	FSM12	10	3	1,088899975	2,971004097	0,66
WVP08_2022	2022	WVP08	FSM12	16	3	1,071730094	2,920427747	0,6484375
WVP09_2018	2018	WVP09	FSM12	15	3	1,085188613	2,95999806	0,657777778
WVP09_2022	2022	WVP09	FSM12	15	3	1,085188613	2,95999806	0,657777778
WVP10_2018	2018	WVP10	FSM12	7	2	0,682908105	1,97962633	0,489795918
WVP10_2022	2022	WVP10	FSM12	7	2	0,682908105	1,97962633	0,489795918
WVP13_2018	2018	WVP13	FSM12	8	3	1,08219553	2,951151786	0,65625
WVP13_2022	2022	WVP13	FSM12	9	3	1,060856947	2,888845517	0,641975309
WVP17_2018	2018	WVP17	FSM12	8	2	0,661563238	1,937819241	0,46875
WVP17_2022	2022	WVP17	FSM12	8	2	0,661563238	1,937819241	0,46875
WVP19_2018	2018	WVP19	FSM12	15	3	1,085188613	2,95999806	0,657777778
WVP19_2022	2022	WVP19	FSM12	16	3	1,071730094	2,920427747	0,6484375
WVP21_2018	2018	WVP21	FSM12	14	3	1,004242473	2,729838563	0,612244898
WVP21_2022	2022	WVP21	FSM12	15	3	0,990835386	2,693483632	0,604444444
WVP23_2018	2018	WVP23	FSM12	6	2	0,636514168	1,889881575	0,444444444
WVP23_2022	2022	WVP23	FSM12	7	3	0,955699891	2,600490006	0,571428571
WVP32_2018	2018	WVP32	FSM12	7	3	1,078992208	2,941713421	0,653061224
WVP32_2022	2022	WVP32	FSM12	7	3	1,078992208	2,941713421	0,653061224
WVP03_2018	2018	WVP03	FSM15	16	3	1,071730094	2,920427747	0,6484375
WVP03_2022	2022	WVP03	FSM15	16	3	1,071730094	2,920427747	0,6484375
WVP05_2018	2018	WVP05	FSM15	13	3	0,983961446	2,675032276	0,591715976
WVP05_2022	2022	WVP05	FSM15	13	3	0,983961446	2,675032276	0,591715976
WVP12_2018	2018	WVP12	FSM15	7	2	0,410116318	1,506993066	0,244897959
WVP12_2022	2022	WVP12	FSM15	8	2	0,376770161	1,457569265	0,21875
WVP27_2018	2018	WVP27	FSM15	9	3	1,060856947	2,888845517	0,641975309
WVP27_2022	2022	WVP27	FSM15	9	3	1,060856947	2,888845517	0,641975309
WVP28_2018	2018	WVP28	FSM15	15	3	1,043757036	2,839866478	0,631111111
WVP28_2022	2022	WVP28	FSM15	15	3	1,043757036	2,839866478	0,631111111
WVP29_2018	2018	WVP29	FSM15	12	3	1,011404265	2,749459274	0,611111111
WVP29_2022	2022	WVP29	FSM15	12	3	1,011404265	2,749459274	0,611111111
WVP33_2018	2018	WVP33	FSM15	15	3	0,990835386	2,693483632	0,604444444
WVP33_2022	2022	WVP33	FSM15	15	3	0,990835386	2,693483632	0,604444444

ID	year	station	Ecotype	Gini_Simpson_diversity	Pielou_Evenness	Shannon_Evenness	Simpson_Evenness
WVP14_2018	2018	WVP14	FSM08	2,327272727	0,86204857	0,859370498	0,775757576
WVP14_2022	2022	WVP14	FSM08	2,327272727	0,86204857	0,859370498	0,775757576
WVP18_2018	2018	WVP18	FSM08	2,710843373	0,950068598	0,946622159	0,903614458
WVP18_2022	2022	WVP18	FSM08	2,651376147	0,936084711	0,932190467	0,883792049
WVP20_2018	2018	WVP20	FSM08	2,102803738	0,776649014	0,782410189	0,700934579
WVP20_2022	2022	WVP20	FSM08	2,031746032	0,755975243	0,764840015	0,677248677
WVP22_2018	2018	WVP22	FSM08	2,941176471	0,991159471	0,990334699	0,980392157
WVP22_2022	2022	WVP22	FSM08	2,88	0,980834038	0,979164167	0,96
WVP24_2018	2018	WVP24	FSM08	2,631578947	0,937230563	0,933364691	0,877192982
WVP24_2022	2022	WVP24	FSM08	2,86440678	0,97704558	0,97509731	0,95480226
WVP25_2018	2018	WVP25	FSM08	2,770491803	0,962947016	0,960110532	0,923497268
WVP25_2022	2022	WVP25	FSM08	2,770491803	0,962947016	0,960110532	0,923497268
WVP02_2018	2018	WVP02	FSM10	3	1	1	1
WVP02_2022	2022	WVP02	FSM10	3	1	1	1
WVP04_2018	2018	WVP04	FSM10	2,512820513	0,903213977	0,899127605	0,837606838
WVP04_2022	2022	WVP04	FSM10	2,512820513	0,903213977	0,899127605	0,837606838
WVP30_2018	2018	WVP30	FSM10	2,666666667	0,935893281	0,931994441	0,888888889
WVP30_2022	2022	WVP30	FSM10	2,666666667	0,935893281	0,931994441	0,888888889
WVP34_2018	2018	WVP34	FSM10	2,6	0,92146324	0,917336011	0,866666667
WVP34_2022	2022	WVP34	FSM10	2,6	0,92146324	0,917336011	0,866666667
WVP35_2018	2018	WVP35	FSM10	1,91005291	0,750637265	0,760367838	0,636684303
WVP35_2022	2022	WVP35	FSM10	1,91005291	0,750637265	0,760367838	0,636684303
WVP06_2018	2018	WVP06	FSM12	1,8	0,918295834	0,944940787	0,9
WVP06_2022	2022	WVP06	FSM12	1,8	0,918295834	0,944940787	0,9
WVP07_2018	2018	WVP07	FSM12	2,512820513	0,903213977	0,899127605	0,837606838
WVP07_2022	2022	WVP07	FSM12	2,512820513	0,903213977	0,899127605	0,837606838
WVP08_2018	2018	WVP08	FSM12	2,941176471	0,991159471	0,990334699	0,980392157
WVP08_2022	2022	WVP08	FSM12	2,844444444	0,975530772	0,973475916	0,948148148
WVP09_2018	2018	WVP09	FSM12	2,922077922	0,987781244	0,98666602	0,974025974
WVP09_2022	2022	WVP09	FSM12	2,922077922	0,987781244	0,98666602	0,974025974
WVP10_2018	2018	WVP10	FSM12	1,96	0,985228136	0,989813165	0,98
WVP10_2022	2022	WVP10	FSM12	1,96	0,985228136	0,989813165	0,98
WVP13_2018	2018	WVP13	FSM12	2,909090909	0,985056822	0,983717262	0,96969697
WVP13_2022	2022	WVP13	FSM12	2,793103448	0,965633607	0,962948506	0,931034483
WVP17_2018	2018	WVP17	FSM12	1,882352941	0,954434003	0,96890962	0,941176471
WVP17_2022	2022	WVP17	FSM12	1,882352941	0,954434003	0,96890962	0,941176471
WVP19_2018	2018	WVP19	FSM12	2,922077922	0,987781244	0,98666602	0,974025974
WVP19_2022	2022	WVP19	FSM12	2,844444444	0,975530772	0,973475916	0,948148148
WVP21_2018	2018	WVP21	FSM12	2,578947368	0,914100892	0,909946188	0,859649123
WVP21_2022	2022	WVP21	FSM12	2,528089888	0,901897236	0,897827877	0,842696629
WVP23_2018	2018	WVP23	FSM12	1,8	0,918295834	0,944940787	0,9
WVP23_2022	2022	WVP23	FSM12	2,333333333	0,86991553	0,866830002	0,777777778
WVP32_2018	2018	WVP32	FSM12	2,882352941	0,982141033	0,98057114	0,960784314
WVP32_2022	2022	WVP32	FSM12	2,882352941	0,982141033	0,98057114	0,960784314
WVP03_2018	2018	WVP03	FSM15	2,844444444	0,975530772	0,973475916	0,948148148
WVP03_2022	2022	WVP03	FSM15	2,844444444	0,975530772	0,973475916	0,948148148
WVP05_2018	2018	WVP05	FSM15	2,449275362	0,895640306	0,891677425	0,816425121
WVP05_2022	2022	WVP05	FSM15	2,449275362	0,895640306	0,891677425	0,816425121
WVP12_2018	2018	WVP12	FSM15	1,324324324	0,591672779	0,753496533	0,662162162
WVP12_2022	2022	WVP12	FSM15	1,28	0,543564443	0,728784632	0,64
WVP27_2018	2018	WVP27	FSM15	2,793103448	0,965633607	0,962948506	0,931034483
WVP27_2022	2022	WVP27	FSM15	2,793103448	0,965633607	0,962948506	0,931034483
WVP28_2018	2018	WVP28	FSM15	2,710843373	0,950068598	0,946622159	0,903614458
WVP28_2022	2022	WVP28	FSM15	2,710843373	0,950068598	0,946622159	0,903614458
WVP29_2018	2018	WVP29	FSM15	2,571428571	0,920619836	0,916486425	0,857142857
WVP29_2022	2022	WVP29	FSM15	2,571428571	0,920619836	0,916486425	0,857142857
WVP33_2018	2018	WVP33	FSM15	2,528089888	0,901897236	0,897827877	0,842696629
WVP33_2022	2022	WVP33	FSM15	2,528089888	0,901897236	0,897827877	0,842696629

ID	year	station	Ecotype	Différence_NI	Différence_FACH	Différence_OBL
WVP14_2018	2018	WVP14	FSM08	0	0	0
WVP14_2022	2022	WVP14	FSM08			
WVP18_2018	2018	WVP18	FSM08	-1	-1	0
WVP18_2022	2022	WVP18	FSM08			
WVP20_2018	2018	WVP20	FSM08	0	-1	0
WVP20_2022	2022	WVP20	FSM08			
WVP22_2018	2018	WVP22	FSM08	-1	-1	0
WVP22_2022	2022	WVP22	FSM08			
WVP24_2018	2018	WVP24	FSM08	-1	-2	0
WVP24_2022	2022	WVP24	FSM08			
WVP25_2018	2018	WVP25	FSM08	0	0	0
WVP25_2022	2022	WVP25	FSM08			
WVP02_2018	2018	WVP02	FSM10	0	0	0
WVP02_2022	2022	WVP02	FSM10			
WVP04_2018	2018	WVP04	FSM10	0	0	0
WVP04_2022	2022	WVP04	FSM10			
WVP30_2018	2018	WVP30	FSM10	0	0	0
WVP30_2022	2022	WVP30	FSM10			
WVP34_2018	2018	WVP34	FSM10	0	0	0
WVP34_2022	2022	WVP34	FSM10			
WVP35_2018	2018	WVP35	FSM10	0	0	0
WVP35_2022	2022	WVP35	FSM10			
WVP06_2018	2018	WVP06	FSM12	0	0	0
WVP06_2022	2022	WVP06	FSM12			
WVP07_2018	2018	WVP07	FSM12	0	0	0
WVP07_2022	2022	WVP07	FSM12			
WVP08_2018	2018	WVP08	FSM12	-4	-2	0
WVP08_2022	2022	WVP08	FSM12			
WVP09_2018	2018	WVP09	FSM12	0	0	0
WVP09_2022	2022	WVP09	FSM12			
WVP10_2018	2018	WVP10	FSM12	0	0	0
WVP10_2022	2022	WVP10	FSM12			
WVP13_2018	2018	WVP13	FSM12	0	-1	0
WVP13_2022	2022	WVP13	FSM12			
WVP17_2018	2018	WVP17	FSM12	0	0	0
WVP17_2022	2022	WVP17	FSM12			
WVP19_2018	2018	WVP19	FSM12	0	-1	0
WVP19_2022	2022	WVP19	FSM12			
WVP21_2018	2018	WVP21	FSM12	0	-1	0
WVP21_2022	2022	WVP21	FSM12			
WVP23_2018	2018	WVP23	FSM12	-1	0	0
WVP23_2022	2022	WVP23	FSM12			
WVP32_2018	2018	WVP32	FSM12	0	0	0
WVP32_2022	2022	WVP32	FSM12			
WVP03_2018	2018	WVP03	FSM15	0	0	0
WVP03_2022	2022	WVP03	FSM15			
WVP05_2018	2018	WVP05	FSM15	0	0	0
WVP05_2022	2022	WVP05	FSM15			
WVP12_2018	2018	WVP12	FSM15	-1	0	0
WVP12_2022	2022	WVP12	FSM15			
WVP27_2018	2018	WVP27	FSM15	0	0	0
WVP27_2022	2022	WVP27	FSM15			
WVP28_2018	2018	WVP28	FSM15	0	0	0
WVP28_2022	2022	WVP28	FSM15			
WVP29_2018	2018	WVP29	FSM15	0	0	0
WVP29_2022	2022	WVP29	FSM15			
WVP33_2018	2018	WVP33	FSM15	0	0	0
WVP33_2022	2022	WVP33	FSM15			

Appendix III

Species diversity data

ID	year	station	Ecotype	Achillea_borealis	Agrostis_mertensii	Andromeda_polifolia_var_latifolia
WVP02_2018	2018	WVP02	FSM10	0	5,8	0
WVP02_2022	2022	WVP02	FSM10	0	5,8	0
WVP03_2018	2018	WVP03	FSM15	0	0	0
WVP03_2022	2022	WVP03	FSM15	0	0	0
WVP04_2018	2018	WVP04	FSM10	0	0	0
WVP04_2022	2022	WVP04	FSM10	0	0	0
WVP05_2018	2018	WVP05	FSM15	0	0	0
WVP05_2022	2022	WVP05	FSM15	0	0	0
WVP06_2018	2018	WVP06	FSM12	0	0	0
WVP06_2022	2022	WVP06	FSM12	0	0	0
WVP07_2018	2018	WVP07	FSM12	0	0	0
WVP07_2022	2022	WVP07	FSM12	0	0	0
WVP08_2018	2018	WVP08	FSM12	0	0	0
WVP08_2022	2022	WVP08	FSM12	0	0	0
WVP09_2018	2018	WVP09	FSM12	0	0	0
WVP09_2022	2022	WVP09	FSM12	0	0	0
WVP10_2018	2018	WVP10	FSM12	0	0	0
WVP10_2022	2022	WVP10	FSM12	0	0	0
WVP12_2018	2018	WVP12	FSM15	0	0	0
WVP12_2022	2022	WVP12	FSM15	0	0	0
WVP13_2018	2018	WVP13	FSM12	0	0	0
WVP13_2022	2022	WVP13	FSM12	0	0	0
WVP14_2018	2018	WVP14	FSM08	0	0	0
WVP14_2022	2022	WVP14	FSM08	0	0	0
WVP17_2018	2018	WVP17	FSM12	0	0	73,68
WVP17_2022	2022	WVP17	FSM12	0	0	73,68
WVP18_2018	2018	WVP18	FSM08	0	0	0
WVP18_2022	2022	WVP18	FSM08	0	0	0
WVP19_2018	2018	WVP19	FSM12	0	0,65	0
WVP19_2022	2022	WVP19	FSM12	0	0,63	0
WVP20_2018	2018	WVP20	FSM08	0	0	0
WVP20_2022	2022	WVP20	FSM08	0	0	0
WVP21_2018	2018	WVP21	FSM12	0	0	0
WVP21_2022	2022	WVP21	FSM12	0	0	0
WVP22_2018	2018	WVP22	FSM08	0	0	0
WVP22_2022	2022	WVP22	FSM08	0	0	0
WVP23_2018	2018	WVP23	FSM12	0	0	0
WVP23_2022	2022	WVP23	FSM12	0	0	0
WVP24_2018	2018	WVP24	FSM08	0	0	16
WVP24_2022	2022	WVP24	FSM08	0	0	12,5
WVP25_2018	2018	WVP25	FSM08	0	0	0
WVP25_2022	2022	WVP25	FSM08	0	0	0
WVP27_2018	2018	WVP27	FSM15	0	0	0
WVP27_2022	2022	WVP27	FSM15	0	0	0
WVP28_2018	2018	WVP28	FSM15	0	0	0
WVP28_2022	2022	WVP28	FSM15	0	0	0
WVP29_2018	2018	WVP29	FSM15	0	0	0
WVP29_2022	2022	WVP29	FSM15	0	0	0
WVP30_2018	2018	WVP30	FSM10	0	0	0
WVP30_2022	2022	WVP30	FSM10	0	0	0
WVP32_2018	2018	WVP32	FSM12	0	0	0
WVP32_2022	2022	WVP32	FSM12	0	0	0
WVP33_2018	2018	WVP33	FSM15	3,54	0	0
WVP33_2022	2022	WVP33	FSM15	3,54	0	0
WVP34_2018	2018	WVP34	FSM10	0	0	0
WVP34_2022	2022	WVP34	FSM10	0	0	0
WVP35_2018	2018	WVP35	FSM10	0	15,23	0
WVP35_2022	2022	WVP35	FSM10	0	15,23	0

ID	year	station	Ecotype	Betula_glandulosa	Calamagrostis_canadensis	Carex_aquatilis	Carex_canescens
WVP02_2018	2018	WVP02	FSM10	0	28,99	0	0
WVP02_2022	2022	WVP02	FSM10	0	28,99	0	0
WVP03_2018	2018	WVP03	FSM15	20,59	8	0	0
WVP03_2022	2022	WVP03	FSM15	20,59	8	0	0
WVP04_2018	2018	WVP04	FSM10	29,35	0	0	0
WVP04_2022	2022	WVP04	FSM10	29,35	0	0	0
WVP05_2018	2018	WVP05	FSM15	42,68	0	0	0
WVP05_2022	2022	WVP05	FSM15	42,68	0	0	0
WVP06_2018	2018	WVP06	FSM12	0	0	0	0
WVP06_2022	2022	WVP06	FSM12	0	0	0	0
WVP07_2018	2018	WVP07	FSM12	45,45	0	7,32	0
WVP07_2022	2022	WVP07	FSM12	45,45	0	7,32	0
WVP08_2018	2018	WVP08	FSM12	64,52	0	3,51	0
WVP08_2022	2022	WVP08	FSM12	28,17	0	6,25	0
WVP09_2018	2018	WVP09	FSM12	34,48	0	0	0
WVP09_2022	2022	WVP09	FSM12	44,44	0	0	0
WVP10_2018	2018	WVP10	FSM12	0	0	0	0
WVP10_2022	2022	WVP10	FSM12	0	0	0	0
WVP12_2018	2018	WVP12	FSM15	100	0	0	0
WVP12_2022	2022	WVP12	FSM15	100	0	0	0
WVP13_2018	2018	WVP13	FSM12	23,26	0	66,67	0
WVP13_2022	2022	WVP13	FSM12	22,73	0	66,67	0
WVP14_2018	2018	WVP14	FSM08	9,64	9,68	0	16,13
WVP14_2022	2022	WVP14	FSM08	11,76	9,68	0	16,13
WVP17_2018	2018	WVP17	FSM12	0	0	0	0
WVP17_2022	2022	WVP17	FSM12	0	0	0	0
WVP18_2018	2018	WVP18	FSM08	40	11,11	0	0
WVP18_2022	2022	WVP18	FSM08	40	10,64	0	0
WVP19_2018	2018	WVP19	FSM12	0	0	0	0
WVP19_2022	2022	WVP19	FSM12	0	0	0	0
WVP20_2018	2018	WVP20	FSM08	28,57	0	5,26	0
WVP20_2022	2022	WVP20	FSM08	11,76	0	5,26	0
WVP21_2018	2018	WVP21	FSM12	0	0	0	0
WVP21_2022	2022	WVP21	FSM12	0	0	0	0
WVP22_2018	2018	WVP22	FSM08	48,48	0	0	0
WVP22_2022	2022	WVP22	FSM08	37,21	0	0	0
WVP23_2018	2018	WVP23	FSM12	0	0	0	0
WVP23_2022	2022	WVP23	FSM12	50	0	0	0
WVP24_2018	2018	WVP24	FSM08	0	0	0	0
WVP24_2022	2022	WVP24	FSM08	0	0	0	0
WVP25_2018	2018	WVP25	FSM08	23,08	0	0	0
WVP25_2022	2022	WVP25	FSM08	23,08	0	0	0
WVP27_2018	2018	WVP27	FSM15	18,18	0	0	0
WVP27_2022	2022	WVP27	FSM15	18,18	0	0	0
WVP28_2018	2018	WVP28	FSM15	57,69	3,7	0	0
WVP28_2022	2022	WVP28	FSM15	57,69	3,7	0	0
WVP29_2018	2018	WVP29	FSM15	10,31	5,08	0	0
WVP29_2022	2022	WVP29	FSM15	10,31	5,08	0	0
WVP30_2018	2018	WVP30	FSM10	13,1	0	0	0
WVP30_2022	2022	WVP30	FSM10	13,1	0	0	0
WVP32_2018	2018	WVP32	FSM12	0	12,5	87,5	0
WVP32_2022	2022	WVP32	FSM12	0	12,5	87,5	0
WVP33_2018	2018	WVP33	FSM15	0	5,31	0	0
WVP33_2022	2022	WVP33	FSM15	0	5,31	0	0
WVP34_2018	2018	WVP34	FSM10	22,86	0	71,43	0
WVP34_2022	2022	WVP34	FSM10	22,86	0	71,43	0
WVP35_2018	2018	WVP35	FSM10	49,02	2,03	0	0
WVP35_2022	2022	WVP35	FSM10	49,02	2,03	0	0

ID	year	station	Ecotype	Carex_limosa	Carex_magellanica	Carex_oligosperma	Carex_pauciflora	Carex_rostrata
WVP02_2018	2018	WVP02	FSM10	0	21,74	0	0	0
WVP02_2022	2022	WVP02	FSM10	0	21,74	0	0	0
WVP03_2018	2018	WVP03	FSM15	0	0	0	20	0
WVP03_2022	2022	WVP03	FSM15	0	0	0	20	0
WVP04_2018	2018	WVP04	FSM10	22,73	0	0	22,73	0
WVP04_2022	2022	WVP04	FSM10	22,73	0	0	22,73	0
WVP05_2018	2018	WVP05	FSM15	0	0	0	0	0
WVP05_2022	2022	WVP05	FSM15	0	0	0	0	0
WVP06_2018	2018	WVP06	FSM12	37,04	0	0	0	7,41
WVP06_2022	2022	WVP06	FSM12	37,04	0	0	0	7,41
WVP07_2018	2018	WVP07	FSM12	24,39	0	12,2	0	0
WVP07_2022	2022	WVP07	FSM12	24,39	0	12,2	0	0
WVP08_2018	2018	WVP08	FSM12	0	0	0	17,54	0
WVP08_2022	2022	WVP08	FSM12	0	0	0	31,25	0
WVP09_2018	2018	WVP09	FSM12	29,41	0	22,06	14,71	0
WVP09_2022	2022	WVP09	FSM12	27,4	0	20,55	13,7	0
WVP10_2018	2018	WVP10	FSM12	50	0	0	0	30
WVP10_2022	2022	WVP10	FSM12	50	0	0	0	30
WVP12_2018	2018	WVP12	FSM15	0	0	0	0	0
WVP12_2022	2022	WVP12	FSM15	0	0	0	0	0
WVP13_2018	2018	WVP13	FSM12	33,33	0	0	0	0
WVP13_2022	2022	WVP13	FSM12	33,33	0	0	0	0
WVP14_2018	2018	WVP14	FSM08	0	0	0	0	0
WVP14_2022	2022	WVP14	FSM08	0	0	0	0	0
WVP17_2018	2018	WVP17	FSM12	55,56	0	11,11	0	0
WVP17_2022	2022	WVP17	FSM12	55,56	0	11,11	0	0
WVP18_2018	2018	WVP18	FSM08	0	0	0	0	0
WVP18_2022	2022	WVP18	FSM08	0	0	0	0	0
WVP19_2018	2018	WVP19	FSM12	19,48	0	0	0	0
WVP19_2022	2022	WVP19	FSM12	18,99	0	0	0	0
WVP20_2018	2018	WVP20	FSM08	0	0	0	8,77	0
WVP20_2022	2022	WVP20	FSM08	0	0	0	8,77	0
WVP21_2018	2018	WVP21	FSM12	30,93	0	0	4,12	0
WVP21_2022	2022	WVP21	FSM12	30,93	0	0	4,12	0
WVP22_2018	2018	WVP22	FSM08	20,83	0	0	12,5	0
WVP22_2022	2022	WVP22	FSM08	20,83	0	0	12,5	0
WVP23_2018	2018	WVP23	FSM12	57,14	0	0	0	0
WVP23_2022	2022	WVP23	FSM12	57,14	0	0	0	0
WVP24_2018	2018	WVP24	FSM08	45,45	0	0	9,09	0
WVP24_2022	2022	WVP24	FSM08	45,45	0	0	9,09	0
WVP25_2018	2018	WVP25	FSM08	24,39	0	0	0	7,32
WVP25_2022	2022	WVP25	FSM08	24,39	0	0	0	7,32
WVP27_2018	2018	WVP27	FSM15	64,52	0	32,26	0	0
WVP27_2022	2022	WVP27	FSM15	64,52	0	32,26	0	0
WVP28_2018	2018	WVP28	FSM15	5,56	0	0	0	0
WVP28_2022	2022	WVP28	FSM15	5,56	0	0	0	0
WVP29_2018	2018	WVP29	FSM15	0	0	0	0	0
WVP29_2022	2022	WVP29	FSM15	0	0	0	0	0
WVP30_2018	2018	WVP30	FSM10	0	0	0	100	0
WVP30_2022	2022	WVP30	FSM10	0	0	0	100	0
WVP32_2018	2018	WVP32	FSM12	0	0	0	0	0
WVP32_2022	2022	WVP32	FSM12	0	0	0	0	0
WVP33_2018	2018	WVP33	FSM15	0	0	0	0	0
WVP33_2022	2022	WVP33	FSM15	0	0	0	0	0
WVP34_2018	2018	WVP34	FSM10	14,29	0	0	8,57	0
WVP34_2022	2022	WVP34	FSM10	14,29	0	0	8,57	0
WVP35_2018	2018	WVP35	FSM10	0	0	0	0	0
WVP35_2022	2022	WVP35	FSM10	0	0	0	0	0

ID	year	station	Ecotype	Carex_sp	Carex_trisperma	Cerastium_alpinum	Chamaenerion_angustifolium
WVP02_2018	2018	WVP02	FSM10	0	0	0	0
WVP02_2022	2022	WVP02	FSM10	0	0	0	0
WVP03_2018	2018	WVP03	FSM15	0	0	0	0
WVP03_2022	2022	WVP03	FSM15	0	0	0	0
WVP04_2018	2018	WVP04	FSM10	0	0	0	0
WVP04_2022	2022	WVP04	FSM10	0	0	0	0
WVP05_2018	2018	WVP05	FSM15	0	0	0	0
WVP05_2022	2022	WVP05	FSM15	0	0	0	0
WVP06_2018	2018	WVP06	FSM12	0	0	0	0
WVP06_2022	2022	WVP06	FSM12	0	0	0	0
WVP07_2018	2018	WVP07	FSM12	0	0	0	0
WVP07_2022	2022	WVP07	FSM12	0	0	0	0
WVP08_2018	2018	WVP08	FSM12	0	0	0	0
WVP08_2022	2022	WVP08	FSM12	0	0	0	0
WVP09_2018	2018	WVP09	FSM12	0	0	0	0
WVP09_2022	2022	WVP09	FSM12	0	0	0	0
WVP10_2018	2018	WVP10	FSM12	0	0	0	0
WVP10_2022	2022	WVP10	FSM12	0	0	0	0
WVP12_2018	2018	WVP12	FSM15	0	0	0	2,06
WVP12_2022	2022	WVP12	FSM15	0	0	0	0
WVP13_2018	2018	WVP13	FSM12	0	0	0	0
WVP13_2022	2022	WVP13	FSM12	0	0	0	0
WVP14_2018	2018	WVP14	FSM08	0	0	0	0
WVP14_2022	2022	WVP14	FSM08	0	0	0	0
WVP17_2018	2018	WVP17	FSM12	0	0	0	0
WVP17_2022	2022	WVP17	FSM12	0	0	0	0
WVP18_2018	2018	WVP18	FSM08	0	0	0	6,67
WVP18_2022	2022	WVP18	FSM08	0	0	0	6,38
WVP19_2018	2018	WVP19	FSM12	0	0	0	0
WVP19_2022	2022	WVP19	FSM12	0	0	0	0
WVP20_2018	2018	WVP20	FSM08	0	0	0	0
WVP20_2022	2022	WVP20	FSM08	0	0	0	0
WVP21_2018	2018	WVP21	FSM12	0	0	0	0
WVP21_2022	2022	WVP21	FSM12	0	0	0	0
WVP22_2018	2018	WVP22	FSM08	0	0	0	0
WVP22_2022	2022	WVP22	FSM08	0	0	0	0
WVP23_2018	2018	WVP23	FSM12	0	0	0	0
WVP23_2022	2022	WVP23	FSM12	0	0	0	0
WVP24_2018	2018	WVP24	FSM08	0	0	0	0
WVP24_2022	2022	WVP24	FSM08	0	0	0	0
WVP25_2018	2018	WVP25	FSM08	0	0	0	0
WVP25_2022	2022	WVP25	FSM08	0	0	0	0
WVP27_2018	2018	WVP27	FSM15	0	0	0	0
WVP27_2022	2022	WVP27	FSM15	0	0	0	0
WVP28_2018	2018	WVP28	FSM15	0	18,52	0	1,85
WVP28_2022	2022	WVP28	FSM15	0	18,52	0	1,85
WVP29_2018	2018	WVP29	FSM15	0	67,8	0	5,08
WVP29_2022	2022	WVP29	FSM15	0	67,8	0	5,08
WVP30_2018	2018	WVP30	FSM10	0	0	0	0
WVP30_2022	2022	WVP30	FSM10	0	0	0	0
WVP32_2018	2018	WVP32	FSM12	0	0	0	0
WVP32_2022	2022	WVP32	FSM12	0	0	0	0
WVP33_2018	2018	WVP33	FSM15	26,55	0	0	1,77
WVP33_2022	2022	WVP33	FSM15	26,55	0	0	1,77
WVP34_2018	2018	WVP34	FSM10	0	0	0	0
WVP34_2022	2022	WVP34	FSM10	0	0	0	0
WVP35_2018	2018	WVP35	FSM10	0	0	15,23	0
WVP35_2022	2022	WVP35	FSM10	0	0	15,23	0

ID	year	station	Ecotype	Cladonia_rangiferina	Cladonia_sp	Coptis_trifolia	Cornus_canadensis
WVP02_2018	2018	WVP02	FSM10	0	0	0	0
WVP02_2022	2022	WVP02	FSM10	0	0	0	0
WVP03_2018	2018	WVP03	FSM15	0	0	4	0
WVP03_2022	2022	WVP03	FSM15	0	0	4	0
WVP04_2018	2018	WVP04	FSM10	0	0	0	0
WVP04_2022	2022	WVP04	FSM10	0	0	0	0
WVP05_2018	2018	WVP05	FSM15	0	0	4	0
WVP05_2022	2022	WVP05	FSM15	0	0	4	0
WVP06_2018	2018	WVP06	FSM12	0	0	0	0
WVP06_2022	2022	WVP06	FSM12	0	0	0	0
WVP07_2018	2018	WVP07	FSM12	0	0	17,07	0
WVP07_2022	2022	WVP07	FSM12	0	0	17,07	0
WVP08_2018	2018	WVP08	FSM12	0	0	17,54	0
WVP08_2022	2022	WVP08	FSM12	2,02	0	31,25	0
WVP09_2018	2018	WVP09	FSM12	0	0	14,71	0
WVP09_2022	2022	WVP09	FSM12	0	0	13,7	0
WVP10_2018	2018	WVP10	FSM12	0	0	0	0
WVP10_2022	2022	WVP10	FSM12	0	0	0	0
WVP12_2018	2018	WVP12	FSM15	0	0	5,15	0
WVP12_2022	2022	WVP12	FSM15	0	0	5,15	0
WVP13_2018	2018	WVP13	FSM12	0	0	0	0
WVP13_2022	2022	WVP13	FSM12	0	0	0	0
WVP14_2018	2018	WVP14	FSM08	0	0	3,23	9,68
WVP14_2022	2022	WVP14	FSM08	0	0	3,23	9,68
WVP17_2018	2018	WVP17	FSM12	0	0	0	0
WVP17_2022	2022	WVP17	FSM12	0	0	0	0
WVP18_2018	2018	WVP18	FSM08	0	0	8,89	4,44
WVP18_2022	2022	WVP18	FSM08	0	0	8,51	4,26
WVP19_2018	2018	WVP19	FSM12	0	0	0,65	0
WVP19_2022	2022	WVP19	FSM12	0	0	0,63	0
WVP20_2018	2018	WVP20	FSM08	0	0	0	0
WVP20_2022	2022	WVP20	FSM08	0	0	0	0
WVP21_2018	2018	WVP21	FSM12	0	0	4,12	0
WVP21_2022	2022	WVP21	FSM12	0	0	4,12	0
WVP22_2018	2018	WVP22	FSM08	0	0	20,83	0
WVP22_2022	2022	WVP22	FSM08	0	0	20,83	0
WVP23_2018	2018	WVP23	FSM12	0	0	0	0
WVP23_2022	2022	WVP23	FSM12	0	0	0	0
WVP24_2018	2018	WVP24	FSM08	0	0	0	0
WVP24_2022	2022	WVP24	FSM08	0	0	0	0
WVP25_2018	2018	WVP25	FSM08	0	0	0	0
WVP25_2022	2022	WVP25	FSM08	0	0	0	0
WVP27_2018	2018	WVP27	FSM15	0	0	0	0
WVP27_2022	2022	WVP27	FSM15	0	0	0	0
WVP28_2018	2018	WVP28	FSM15	0	0	3,7	9,26
WVP28_2022	2022	WVP28	FSM15	0	0	3,7	9,26
WVP29_2018	2018	WVP29	FSM15	0	0	0	0
WVP29_2022	2022	WVP29	FSM15	0	0	0	0
WVP30_2018	2018	WVP30	FSM10	0	0,99	0	0
WVP30_2022	2022	WVP30	FSM10	0	0,99	0	0
WVP32_2018	2018	WVP32	FSM12	0	0	0	0
WVP32_2022	2022	WVP32	FSM12	0	0	0	0
WVP33_2018	2018	WVP33	FSM15	0	0	0,88	0
WVP33_2022	2022	WVP33	FSM15	0	0	0,88	0
WVP34_2018	2018	WVP34	FSM10	0	0	0	0
WVP34_2022	2022	WVP34	FSM10	0	0	0	0
WVP35_2018	2018	WVP35	FSM10	0	0	3,05	1,02
WVP35_2022	2022	WVP35	FSM10	0	0	3,05	1,02

ID	year	station	Ecotype	Deschampsia_cespitosa	Empetrum_nigrum	Equisetum_arvense	Equisetum_sylvaticum
WVP02_2018	2018	WVP02	FSM10	0	0	0	0
WVP02_2022	2022	WVP02	FSM10	0	0	0	0
WVP03_2018	2018	WVP03	FSM15	28	0	0	0
WVP03_2022	2022	WVP03	FSM15	28	0	0	0
WVP04_2018	2018	WVP04	FSM10	0	0	0	22,73
WVP04_2022	2022	WVP04	FSM10	0	0	0	22,73
WVP05_2018	2018	WVP05	FSM15	20	0	0	20
WVP05_2022	2022	WVP05	FSM15	20	0	0	20
WVP06_2018	2018	WVP06	FSM12	0	0	0	0
WVP06_2022	2022	WVP06	FSM12	0	0	0	0
WVP07_2018	2018	WVP07	FSM12	0	0	0	0
WVP07_2022	2022	WVP07	FSM12	0	0	0	0
WVP08_2018	2018	WVP08	FSM12	0	0	0	0
WVP08_2022	2022	WVP08	FSM12	0	14,08	0	0
WVP09_2018	2018	WVP09	FSM12	0	6,9	0	0
WVP09_2022	2022	WVP09	FSM12	0	4,44	0	0
WVP10_2018	2018	WVP10	FSM12	0	0	0	0
WVP10_2022	2022	WVP10	FSM12	0	0	0	0
WVP12_2018	2018	WVP12	FSM15	72,16	0	0	0
WVP12_2022	2022	WVP12	FSM15	72,16	0	0	0
WVP13_2018	2018	WVP13	FSM12	0	0	0	0
WVP13_2022	2022	WVP13	FSM12	0	0	0	0
WVP14_2018	2018	WVP14	FSM08	3,23	4,82	0	32,26
WVP14_2022	2022	WVP14	FSM08	3,23	4,71	0	32,26
WVP17_2018	2018	WVP17	FSM12	0	0	0	0
WVP17_2022	2022	WVP17	FSM12	0	0	0	0
WVP18_2018	2018	WVP18	FSM08	6,67	0	0	8,89
WVP18_2022	2022	WVP18	FSM08	6,38	0	0	8,51
WVP19_2018	2018	WVP19	FSM12	12,99	0	0	0
WVP19_2022	2022	WVP19	FSM12	12,66	0	0	0
WVP20_2018	2018	WVP20	FSM08	0	0	0	7,02
WVP20_2022	2022	WVP20	FSM08	0	0	0	7,02
WVP21_2018	2018	WVP21	FSM12	6,19	0	0	0
WVP21_2022	2022	WVP21	FSM12	6,19	0	0	0
WVP22_2018	2018	WVP22	FSM08	0	0	0	0
WVP22_2022	2022	WVP22	FSM08	0	0	0	0
WVP23_2018	2018	WVP23	FSM12	0	0	0	0
WVP23_2022	2022	WVP23	FSM12	0	0	0	0
WVP24_2018	2018	WVP24	FSM08	0	0	0	0
WVP24_2022	2022	WVP24	FSM08	0	0	0	0
WVP25_2018	2018	WVP25	FSM08	0	0	0	0
WVP25_2022	2022	WVP25	FSM08	0	0	0	0
WVP27_2018	2018	WVP27	FSM15	0	0	0	0
WVP27_2022	2022	WVP27	FSM15	0	0	0	0
WVP28_2018	2018	WVP28	FSM15	0	0	0	0
WVP28_2022	2022	WVP28	FSM15	0	0	0	0
WVP29_2018	2018	WVP29	FSM15	8,47	0	0	0
WVP29_2022	2022	WVP29	FSM15	8,47	0	0	0
WVP30_2018	2018	WVP30	FSM10	0	0	0	0
WVP30_2022	2022	WVP30	FSM10	0	0	0	0
WVP32_2018	2018	WVP32	FSM12	0	0	0	0
WVP32_2022	2022	WVP32	FSM12	0	0	0	0
WVP33_2018	2018	WVP33	FSM15	0	0	0	8,85
WVP33_2022	2022	WVP33	FSM15	0	0	0	8,85
WVP34_2018	2018	WVP34	FSM10	0	0	0	0
WVP34_2022	2022	WVP34	FSM10	0	0	0	0
WVP35_2018	2018	WVP35	FSM10	5,08	0	1,02	0
WVP35_2022	2022	WVP35	FSM10	5,08	0	1,02	0

ID	year	station	Ecotype	Eriophorum_russeolum	Eriophorum_virginicum	Eurybia_radula
WVP02_2018	2018	WVP02	FSM10	0	0	0
WVP02_2022	2022	WVP02	FSM10	0	0	0
WVP03_2018	2018	WVP03	FSM15	0	0	12
WVP03_2022	2022	WVP03	FSM15	0	0	12
WVP04_2018	2018	WVP04	FSM10	0	0	18,18
WVP04_2022	2022	WVP04	FSM10	0	0	18,18
WVP05_2018	2018	WVP05	FSM15	0	0	16
WVP05_2022	2022	WVP05	FSM15	0	0	16
WVP06_2018	2018	WVP06	FSM12	0	0	0
WVP06_2022	2022	WVP06	FSM12	0	0	0
WVP07_2018	2018	WVP07	FSM12	0	0	0
WVP07_2022	2022	WVP07	FSM12	0	0	0
WVP08_2018	2018	WVP08	FSM12	0	0	0
WVP08_2022	2022	WVP08	FSM12	0	0	0
WVP09_2018	2018	WVP09	FSM12	0	0	0
WVP09_2022	2022	WVP09	FSM12	0	0	0
WVP10_2018	2018	WVP10	FSM12	0	0	0
WVP10_2022	2022	WVP10	FSM12	0	0	0
WVP12_2018	2018	WVP12	FSM15	0	0	0
WVP12_2022	2022	WVP12	FSM15	0	0	0
WVP13_2018	2018	WVP13	FSM12	0	0	0
WVP13_2022	2022	WVP13	FSM12	0	0	0
WVP14_2018	2018	WVP14	FSM08	0	0	0
WVP14_2022	2022	WVP14	FSM08	0	0	0
WVP17_2018	2018	WVP17	FSM12	0	0	0
WVP17_2022	2022	WVP17	FSM12	0	0	0
WVP18_2018	2018	WVP18	FSM08	0	0	0
WVP18_2022	2022	WVP18	FSM08	0	0	0
WVP19_2018	2018	WVP19	FSM12	0	0	19,48
WVP19_2022	2022	WVP19	FSM12	0	0	18,99
WVP20_2018	2018	WVP20	FSM08	0	0	0
WVP20_2022	2022	WVP20	FSM08	0	0	0
WVP21_2018	2018	WVP21	FSM12	0	10,31	0
WVP21_2022	2022	WVP21	FSM12	0	10,31	0
WVP22_2018	2018	WVP22	FSM08	0	0	0
WVP22_2022	2022	WVP22	FSM08	0	0	0
WVP23_2018	2018	WVP23	FSM12	14,29	0	0
WVP23_2022	2022	WVP23	FSM12	14,29	0	0
WVP24_2018	2018	WVP24	FSM08	0	0	0
WVP24_2022	2022	WVP24	FSM08	0	0	0
WVP25_2018	2018	WVP25	FSM08	7,32	0	0
WVP25_2022	2022	WVP25	FSM08	7,32	0	0
WVP27_2018	2018	WVP27	FSM15	0	0	0
WVP27_2022	2022	WVP27	FSM15	0	0	0
WVP28_2018	2018	WVP28	FSM15	0	0	0
WVP28_2022	2022	WVP28	FSM15	0	0	0
WVP29_2018	2018	WVP29	FSM15	0	0	0
WVP29_2022	2022	WVP29	FSM15	0	0	0
WVP30_2018	2018	WVP30	FSM10	0	0	0
WVP30_2022	2022	WVP30	FSM10	0	0	0
WVP32_2018	2018	WVP32	FSM12	0	0	0
WVP32_2022	2022	WVP32	FSM12	0	0	0
WVP33_2018	2018	WVP33	FSM15	0	0	0
WVP33_2022	2022	WVP33	FSM15	0	0	0
WVP34_2018	2018	WVP34	FSM10	0	0	0
WVP34_2022	2022	WVP34	FSM10	0	0	0
WVP35_2018	2018	WVP35	FSM10	0	0	0
WVP35_2022	2022	WVP35	FSM10	0	0	0

ID	year	station	Ecotype	Fragaria_vesca_subsp_americana	Galium_triflorum	Hierochloe_odorata	Juncus_effusus
WVP02_2018	2018	WVP02	FSM10	0	0	0	7,25
WVP02_2022	2022	WVP02	FSM10	0	0	0	7,25
WVP03_2018	2018	WVP03	FSM15	0	0	0	0
WVP03_2022	2022	WVP03	FSM15	0	0	0	0
WVP04_2018	2018	WVP04	FSM10	0	0	0	13,64
WVP04_2022	2022	WVP04	FSM10	0	0	0	13,64
WVP05_2018	2018	WVP05	FSM15	0	0	0	0
WVP05_2022	2022	WVP05	FSM15	0	0	0	0
WVP06_2018	2018	WVP06	FSM12	0	0	0	0
WVP06_2022	2022	WVP06	FSM12	0	0	0	0
WVP07_2018	2018	WVP07	FSM12	0	0	0	24,39
WVP07_2022	2022	WVP07	FSM12	0	0	0	24,39
WVP08_2018	2018	WVP08	FSM12	0	0	0	26,32
WVP08_2022	2022	WVP08	FSM12	0	0	0	0
WVP09_2018	2018	WVP09	FSM12	0	0	0	0
WVP09_2022	2022	WVP09	FSM12	0	0	0	0
WVP10_2018	2018	WVP10	FSM12	0	0	0	0
WVP10_2022	2022	WVP10	FSM12	0	0	0	0
WVP12_2018	2018	WVP12	FSM15	0	0	0	0
WVP12_2022	2022	WVP12	FSM15	0	0	2,06	0
WVP13_2018	2018	WVP13	FSM12	0	0	0	0
WVP13_2022	2022	WVP13	FSM12	0	0	0	0
WVP14_2018	2018	WVP14	FSM08	0	0	0	0
WVP14_2022	2022	WVP14	FSM08	0	0	0	0
WVP17_2018	2018	WVP17	FSM12	0	0	0	0
WVP17_2022	2022	WVP17	FSM12	0	0	0	0
WVP18_2018	2018	WVP18	FSM08	0	0	0	0
WVP18_2022	2022	WVP18	FSM08	0	0	0	0
WVP19_2018	2018	WVP19	FSM12	0	0	0	0
WVP19_2022	2022	WVP19	FSM12	0	0	0	0
WVP20_2018	2018	WVP20	FSM08	0	0	0	7,02
WVP20_2022	2022	WVP20	FSM08	0	0	0	7,02
WVP21_2018	2018	WVP21	FSM12	0	0	0	0
WVP21_2022	2022	WVP21	FSM12	0	0	0	0
WVP22_2018	2018	WVP22	FSM08	0	0	0	41,67
WVP22_2022	2022	WVP22	FSM08	0	0	0	41,67
WVP23_2018	2018	WVP23	FSM12	0	0	0	0
WVP23_2022	2022	WVP23	FSM12	0	0	0	0
WVP24_2018	2018	WVP24	FSM08	0	0	0	0
WVP24_2022	2022	WVP24	FSM08	0	0	0	0
WVP25_2018	2018	WVP25	FSM08	0	0	0	12,2
WVP25_2022	2022	WVP25	FSM08	0	0	0	12,2
WVP27_2018	2018	WVP27	FSM15	0	0	0	0
WVP27_2022	2022	WVP27	FSM15	0	0	0	0
WVP28_2018	2018	WVP28	FSM15	0	1,85	0	0
WVP28_2022	2022	WVP28	FSM15	0	1,85	0	0
WVP29_2018	2018	WVP29	FSM15	0	1,69	0	0
WVP29_2022	2022	WVP29	FSM15	0	1,69	0	0
WVP30_2018	2018	WVP30	FSM10	0	0	0	0
WVP30_2022	2022	WVP30	FSM10	0	0	0	0
WVP32_2018	2018	WVP32	FSM12	0	0	0	0
WVP32_2022	2022	WVP32	FSM12	0	0	0	0
WVP33_2018	2018	WVP33	FSM15	8,85	0	0	0
WVP33_2022	2022	WVP33	FSM15	8,85	0	0	0
WVP34_2018	2018	WVP34	FSM10	0	0	0	2,86
WVP34_2022	2022	WVP34	FSM10	0	0	0	2,86
WVP35_2018	2018	WVP35	FSM10	0	0	0	0
WVP35_2022	2022	WVP35	FSM10	0	0	0	0

ID	year	station	Ecotype	Kalmia_polifolia	Larix_laricina	Linnaea_borealis	Lonicera_villosa	Luzula_parviflora
WVP02_2018	2018	WVP02	FSM10	0	0	0	0	0
WVP02_2022	2022	WVP02	FSM10	0	0	0	0	0
WVP03_2018	2018	WVP03	FSM15	5,88	11,76	0	2,94	0
WVP03_2022	2022	WVP03	FSM15	5,88	11,76	0	2,94	0
WVP04_2018	2018	WVP04	FSM10	7,83	19,57	0	1,96	0
WVP04_2022	2022	WVP04	FSM10	7,83	19,57	0	1,96	0
WVP05_2018	2018	WVP05	FSM15	0	0	0	4,88	0
WVP05_2022	2022	WVP05	FSM15	0	0	0	4,88	0
WVP06_2018	2018	WVP06	FSM12	98,59	0	0	0	0
WVP06_2022	2022	WVP06	FSM12	98,59	0	0	0	0
WVP07_2018	2018	WVP07	FSM12	9,09	27,27	0	0	0
WVP07_2022	2022	WVP07	FSM12	9,09	27,27	0	0	0
WVP08_2018	2018	WVP08	FSM12	0	0	0	0	0
WVP08_2022	2022	WVP08	FSM12	0	0	0	0	0
WVP09_2018	2018	WVP09	FSM12	20,69	13,79	0	0	0
WVP09_2022	2022	WVP09	FSM12	13,33	22,22	0	0	0
WVP10_2018	2018	WVP10	FSM12	96,77	0	0	0	0
WVP10_2022	2022	WVP10	FSM12	96,77	0	0	0	0
WVP12_2018	2018	WVP12	FSM15	0	0	0	0	0
WVP12_2022	2022	WVP12	FSM15	0	0	0	0	0
WVP13_2018	2018	WVP13	FSM12	6,98	0	0	0	0
WVP13_2022	2022	WVP13	FSM12	6,98	2,27	0	0	0
WVP14_2018	2018	WVP14	FSM08	0	0	0	0	0
WVP14_2022	2022	WVP14	FSM08	0	0	0	0	0
WVP17_2018	2018	WVP17	FSM12	21,05	0	0	0	0
WVP17_2022	2022	WVP17	FSM12	21,05	0	0	0	0
WVP18_2018	2018	WVP18	FSM08	0	0	11,11	0	0
WVP18_2022	2022	WVP18	FSM08	0	0	10,64	0	0
WVP19_2018	2018	WVP19	FSM12	22,86	0	0	28,57	0
WVP19_2022	2022	WVP19	FSM12	12,9	0	0	32,26	0
WVP20_2018	2018	WVP20	FSM08	19,05	0	0	28,57	0
WVP20_2022	2022	WVP20	FSM08	7,84	0	0	11,76	0
WVP21_2018	2018	WVP21	FSM12	18,18	0	0	45,45	0
WVP21_2022	2022	WVP21	FSM12	11,11	27,78	0	27,78	0
WVP22_2018	2018	WVP22	FSM08	24,24	24,24	0	0	0
WVP22_2022	2022	WVP22	FSM08	18,6	18,6	0	0	0
WVP23_2018	2018	WVP23	FSM12	66,67	0	0	0	0
WVP23_2022	2022	WVP23	FSM12	33,33	0	0	0	0
WVP24_2018	2018	WVP24	FSM08	16	60	0	0	0
WVP24_2022	2022	WVP24	FSM08	12,5	46,88	0	0	0
WVP25_2018	2018	WVP25	FSM08	53,85	0	0	0	0
WVP25_2022	2022	WVP25	FSM08	53,85	0	0	0	0
WVP27_2018	2018	WVP27	FSM15	18,18	0	0	0	0
WVP27_2022	2022	WVP27	FSM15	18,18	0	0	0	0
WVP28_2018	2018	WVP28	FSM15	0	0	0	0	0
WVP28_2022	2022	WVP28	FSM15	0	0	0	0	0
WVP29_2018	2018	WVP29	FSM15	0	0	0	5,15	0
WVP29_2022	2022	WVP29	FSM15	0	0	0	5,15	0
WVP30_2018	2018	WVP30	FSM10	17,47	6,99	0	0	0
WVP30_2022	2022	WVP30	FSM10	17,47	6,99	0	0	0
WVP32_2018	2018	WVP32	FSM12	0	0	0	0	0
WVP32_2022	2022	WVP32	FSM12	0	0	0	0	0
WVP33_2018	2018	WVP33	FSM15	0	0	0	0,52	1,77
WVP33_2022	2022	WVP33	FSM15	0	0	0	0,52	1,77
WVP34_2018	2018	WVP34	FSM10	11,43	17,14	0	0	0
WVP34_2022	2022	WVP34	FSM10	11,43	17,14	0	0	0
WVP35_2018	2018	WVP35	FSM10	0	0	0	0	5,08
WVP35_2022	2022	WVP35	FSM10	0	0	0	0	5,08

ID	year	station	Ecotype	Lycopodium_annotinum	Lysimachia_borealis	Maianthemum_trifolium	Mitella_nuda
WVP02_2018	2018	WVP02	FSM10	0	0	0	0
WVP02_2022	2022	WVP02	FSM10	0	0	0	0
WVP03_2018	2018	WVP03	FSM15	0	0	0	0
WVP03_2022	2022	WVP03	FSM15	0	0	0	0
WVP04_2018	2018	WVP04	FSM10	0	0	0	0
WVP04_2022	2022	WVP04	FSM10	0	0	0	0
WVP05_2018	2018	WVP05	FSM15	0	0	0	0
WVP05_2022	2022	WVP05	FSM15	0	0	0	0
WVP06_2018	2018	WVP06	FSM12	0	0	0	0
WVP06_2022	2022	WVP06	FSM12	0	0	0	0
WVP07_2018	2018	WVP07	FSM12	0	0	2,44	0
WVP07_2022	2022	WVP07	FSM12	0	0	2,44	0
WVP08_2018	2018	WVP08	FSM12	0	0	0	0
WVP08_2022	2022	WVP08	FSM12	0	0	0	0
WVP09_2018	2018	WVP09	FSM12	0	4,41	0	0
WVP09_2022	2022	WVP09	FSM12	0	4,11	0	0
WVP10_2018	2018	WVP10	FSM12	0	0	0	0
WVP10_2022	2022	WVP10	FSM12	0	0	0	0
WVP12_2018	2018	WVP12	FSM15	0	0	0	0
WVP12_2022	2022	WVP12	FSM15	0	0	0	0
WVP13_2018	2018	WVP13	FSM12	0	0	0	0
WVP13_2022	2022	WVP13	FSM12	0	0	0	0
WVP14_2018	2018	WVP14	FSM08	3,23	0	0	0
WVP14_2022	2022	WVP14	FSM08	3,23	0	0	0
WVP17_2018	2018	WVP17	FSM12	0	0	0	0
WVP17_2022	2022	WVP17	FSM12	0	0	0	0
WVP18_2018	2018	WVP18	FSM08	0	0	0	0
WVP18_2022	2022	WVP18	FSM08	0	0	0	0
WVP19_2018	2018	WVP19	FSM12	0	1,3	19,48	0
WVP19_2022	2022	WVP19	FSM12	0	1,27	18,99	0
WVP20_2018	2018	WVP20	FSM08	0	0	12,28	0
WVP20_2022	2022	WVP20	FSM08	0	0	12,28	0
WVP21_2018	2018	WVP21	FSM12	0	0	0	0
WVP21_2022	2022	WVP21	FSM12	0	0	0	0
WVP22_2018	2018	WVP22	FSM08	0	4,17	0	0
WVP22_2022	2022	WVP22	FSM08	0	4,17	0	0
WVP23_2018	2018	WVP23	FSM12	0	0	28,57	0
WVP23_2022	2022	WVP23	FSM12	0	0	28,57	0
WVP24_2018	2018	WVP24	FSM08	0	0	0	0
WVP24_2022	2022	WVP24	FSM08	0	0	0	0
WVP25_2018	2018	WVP25	FSM08	0	0	24,39	0
WVP25_2022	2022	WVP25	FSM08	0	0	24,39	0
WVP27_2018	2018	WVP27	FSM15	0	0	3,23	0
WVP27_2022	2022	WVP27	FSM15	0	0	3,23	0
WVP28_2018	2018	WVP28	FSM15	0	0	0	0
WVP28_2022	2022	WVP28	FSM15	0	0	0	0
WVP29_2018	2018	WVP29	FSM15	0	0	0	0
WVP29_2022	2022	WVP29	FSM15	0	0	0	0
WVP30_2018	2018	WVP30	FSM10	0	0	0	0
WVP30_2022	2022	WVP30	FSM10	0	0	0	0
WVP32_2018	2018	WVP32	FSM12	0	0	0	0
WVP32_2022	2022	WVP32	FSM12	0	0	0	0
WVP33_2018	2018	WVP33	FSM15	0	0	0	5,31
WVP33_2022	2022	WVP33	FSM15	0	0	0	5,31
WVP34_2018	2018	WVP34	FSM10	0	0	2,86	0
WVP34_2022	2022	WVP34	FSM10	0	0	2,86	0
WVP35_2018	2018	WVP35	FSM10	0	0	0	0
WVP35_2022	2022	WVP35	FSM10	0	0	0	0

ID	year	station	Ecotype	Mnium_sp	Mousse_sp	Petasites_frigidus_var_palmatus	Phalaris_arundinacea
WVP02_2018	2018	WVP02	FSM10	0	0	0	0
WVP02_2022	2022	WVP02	FSM10	0	0	0	0
WVP03_2018	2018	WVP03	FSM15	0	0	0	0
WVP03_2022	2022	WVP03	FSM15	0	0	0	0
WVP04_2018	2018	WVP04	FSM10	0	0	0	0
WVP04_2022	2022	WVP04	FSM10	0	0	0	0
WVP05_2018	2018	WVP05	FSM15	0	0	20	0
WVP05_2022	2022	WVP05	FSM15	0	0	20	0
WVP06_2018	2018	WVP06	FSM12	0	0	0	0
WVP06_2022	2022	WVP06	FSM12	0	0	0	0
WVP07_2018	2018	WVP07	FSM12	0	0	0	0
WVP07_2022	2022	WVP07	FSM12	0	0	0	0
WVP08_2018	2018	WVP08	FSM12	0	0	0	0
WVP08_2022	2022	WVP08	FSM12	0	0	0	0
WVP09_2018	2018	WVP09	FSM12	0	3,57	0	0
WVP09_2022	2022	WVP09	FSM12	0	3,57	0	0
WVP10_2018	2018	WVP10	FSM12	0	0	0	0
WVP10_2022	2022	WVP10	FSM12	0	0	0	0
WVP12_2018	2018	WVP12	FSM15	0	0	0	0
WVP12_2022	2022	WVP12	FSM15	0	0	0	0
WVP13_2018	2018	WVP13	FSM12	0	0	0	0
WVP13_2022	2022	WVP13	FSM12	0	0	0	0
WVP14_2018	2018	WVP14	FSM08	0	0	16,13	0
WVP14_2022	2022	WVP14	FSM08	0	0	16,13	0
WVP17_2018	2018	WVP17	FSM12	0	0	0	0
WVP17_2022	2022	WVP17	FSM12	0	0	0	0
WVP18_2018	2018	WVP18	FSM08	0	0	22,22	0
WVP18_2022	2022	WVP18	FSM08	0	0	21,28	0
WVP19_2018	2018	WVP19	FSM12	0	0	0	0
WVP19_2022	2022	WVP19	FSM12	0	0	0	2,53
WVP20_2018	2018	WVP20	FSM08	0	0	7,02	0
WVP20_2022	2022	WVP20	FSM08	0	0	7,02	0
WVP21_2018	2018	WVP21	FSM12	0	0	0	0
WVP21_2022	2022	WVP21	FSM12	0	0	0	0
WVP22_2018	2018	WVP22	FSM08	0	0	0	0
WVP22_2022	2022	WVP22	FSM08	0	0	0	0
WVP23_2018	2018	WVP23	FSM12	0	0	0	0
WVP23_2022	2022	WVP23	FSM12	0	0	0	0
WVP24_2018	2018	WVP24	FSM08	0	55,56	0	0
WVP24_2022	2022	WVP24	FSM08	0	50	0	0
WVP25_2018	2018	WVP25	FSM08	0	0	0	0
WVP25_2022	2022	WVP25	FSM08	0	0	0	0
WVP27_2018	2018	WVP27	FSM15	0	0	0	0
WVP27_2022	2022	WVP27	FSM15	0	0	0	0
WVP28_2018	2018	WVP28	FSM15	0	0	37,04	0
WVP28_2022	2022	WVP28	FSM15	0	0	37,04	0
WVP29_2018	2018	WVP29	FSM15	0	0	3,39	0
WVP29_2022	2022	WVP29	FSM15	0	0	3,39	0
WVP30_2018	2018	WVP30	FSM10	0	0	0	0
WVP30_2022	2022	WVP30	FSM10	0	0	0	0
WVP32_2018	2018	WVP32	FSM12	2,22	0	0	0
WVP32_2022	2022	WVP32	FSM12	2,22	0	0	0
WVP33_2018	2018	WVP33	FSM15	0	0	8,85	0
WVP33_2022	2022	WVP33	FSM15	0	0	8,85	0
WVP34_2018	2018	WVP34	FSM10	0	0	0	0
WVP34_2022	2022	WVP34	FSM10	0	0	0	0
WVP35_2018	2018	WVP35	FSM10	10,87	86,96	3,05	0
WVP35_2022	2022	WVP35	FSM10	10,87	86,96	3,05	0

ID	year	station	Ecotype	Phleum_alpinum	Picea_mariana	Platanthera_dilatata	Pleurozium_schreberi
WVP02_2018	2018	WVP02	FSM10	0	0	0	0
WVP02_2022	2022	WVP02	FSM10	0	0	0	0
WVP03_2018	2018	WVP03	FSM15	0	0	0	0
WVP03_2022	2022	WVP03	FSM15	0	0	0	0
WVP04_2018	2018	WVP04	FSM10	0	0	0	0
WVP04_2022	2022	WVP04	FSM10	0	0	0	0
WVP05_2018	2018	WVP05	FSM15	0	0	0	0
WVP05_2022	2022	WVP05	FSM15	0	0	0	0
WVP06_2018	2018	WVP06	FSM12	0	0	0	0
WVP06_2022	2022	WVP06	FSM12	0	0	0	0
WVP07_2018	2018	WVP07	FSM12	0	0	0	0
WVP07_2022	2022	WVP07	FSM12	0	0	0	0
WVP08_2018	2018	WVP08	FSM12	0	0	0	0
WVP08_2022	2022	WVP08	FSM12	0	0	0	0
WVP09_2018	2018	WVP09	FSM12	0	0	0	0
WVP09_2022	2022	WVP09	FSM12	0	0	0	0
WVP10_2018	2018	WVP10	FSM12	0	0	0	0
WVP10_2022	2022	WVP10	FSM12	0	0	0	0
WVP12_2018	2018	WVP12	FSM15	0	0	0	85,71
WVP12_2022	2022	WVP12	FSM15	0	0	0	85,71
WVP13_2018	2018	WVP13	FSM12	0	0	0	0
WVP13_2022	2022	WVP13	FSM12	0	0	0	0
WVP14_2018	2018	WVP14	FSM08	0	0	0	0
WVP14_2022	2022	WVP14	FSM08	0	0	0	0
WVP17_2018	2018	WVP17	FSM12	0	0	0	0
WVP17_2022	2022	WVP17	FSM12	0	0	0	0
WVP18_2018	2018	WVP18	FSM08	0	0	0	0
WVP18_2022	2022	WVP18	FSM08	0	0	0	0
WVP19_2018	2018	WVP19	FSM12	0	0	0	0
WVP19_2022	2022	WVP19	FSM12	0	0	0	0
WVP20_2018	2018	WVP20	FSM08	0	0	0	0
WVP20_2022	2022	WVP20	FSM08	0	0	0	0
WVP21_2018	2018	WVP21	FSM12	0	0	2,06	0
WVP21_2022	2022	WVP21	FSM12	0	0	2,06	0
WVP22_2018	2018	WVP22	FSM08	0	0	0	0
WVP22_2022	2022	WVP22	FSM08	0	0	0	0
WVP23_2018	2018	WVP23	FSM12	0	0	0	0
WVP23_2022	2022	WVP23	FSM12	0	0	0	0
WVP24_2018	2018	WVP24	FSM08	0	0	0	0
WVP24_2022	2022	WVP24	FSM08	0	9,38	0	0
WVP25_2018	2018	WVP25	FSM08	0	15,38	0	0
WVP25_2022	2022	WVP25	FSM08	0	15,38	0	0
WVP27_2018	2018	WVP27	FSM15	0	0	0	0
WVP27_2022	2022	WVP27	FSM15	0	0	0	0
WVP28_2018	2018	WVP28	FSM15	0	0	0	0
WVP28_2022	2022	WVP28	FSM15	0	0	0	0
WVP29_2018	2018	WVP29	FSM15	0	0	0	0
WVP29_2022	2022	WVP29	FSM15	0	0	0	0
WVP30_2018	2018	WVP30	FSM10	0	0	0	0,99
WVP30_2022	2022	WVP30	FSM10	0	0	0	0,99
WVP32_2018	2018	WVP32	FSM12	0	0	0	0
WVP32_2022	2022	WVP32	FSM12	0	0	0	0
WVP33_2018	2018	WVP33	FSM15	0	0	0	100
WVP33_2022	2022	WVP33	FSM15	0	0	0	100
WVP34_2018	2018	WVP34	FSM10	0	0	0	0
WVP34_2022	2022	WVP34	FSM10	0	0	0	0
WVP35_2018	2018	WVP35	FSM10	1,02	0	0	2,17
WVP35_2022	2022	WVP35	FSM10	1,02	0	0	2,17

ID	year	station	Ecotype	Polytrichum_sp	Pyrola_minor	Rhododendron_groenlandicum
WVP02_2018	2018	WVP02	FSM10	1,01	0	0
WVP02_2022	2022	WVP02	FSM10	1,01	0	0
WVP03_2018	2018	WVP03	FSM15	2,97	0	0
WVP03_2022	2022	WVP03	FSM15	2,97	0	0
WVP04_2018	2018	WVP04	FSM10	1	0	0
WVP04_2022	2022	WVP04	FSM10	1	0	0
WVP05_2018	2018	WVP05	FSM15	15	0	0
WVP05_2022	2022	WVP05	FSM15	15	0	0
WVP06_2018	2018	WVP06	FSM12	0	0	0
WVP06_2022	2022	WVP06	FSM12	0	0	0
WVP07_2018	2018	WVP07	FSM12	0	0	0
WVP07_2022	2022	WVP07	FSM12	0	0	0
WVP08_2018	2018	WVP08	FSM12	0,52	0	0
WVP08_2022	2022	WVP08	FSM12	0	0	14,08
WVP09_2018	2018	WVP09	FSM12	0	0	0
WVP09_2022	2022	WVP09	FSM12	0	0	0
WVP10_2018	2018	WVP10	FSM12	0	0	0
WVP10_2022	2022	WVP10	FSM12	0	0	0
WVP12_2018	2018	WVP12	FSM15	14,29	0	0
WVP12_2022	2022	WVP12	FSM15	14,29	0	0
WVP13_2018	2018	WVP13	FSM12	3	0	0
WVP13_2022	2022	WVP13	FSM12	3	0	0
WVP14_2018	2018	WVP14	FSM08	0	0	12,05
WVP14_2022	2022	WVP14	FSM08	0	0	11,76
WVP17_2018	2018	WVP17	FSM12	0	0	0
WVP17_2022	2022	WVP17	FSM12	0	0	0
WVP18_2018	2018	WVP18	FSM08	0	0	0
WVP18_2022	2022	WVP18	FSM08	0	2,13	0
WVP19_2018	2018	WVP19	FSM12	0	0	0
WVP19_2022	2022	WVP19	FSM12	0	0	0
WVP20_2018	2018	WVP20	FSM08	0	0	0
WVP20_2022	2022	WVP20	FSM08	0	0	0
WVP21_2018	2018	WVP21	FSM12	0	0	0
WVP21_2022	2022	WVP21	FSM12	0	0	0
WVP22_2018	2018	WVP22	FSM08	0	0	0
WVP22_2022	2022	WVP22	FSM08	0	0	0
WVP23_2018	2018	WVP23	FSM12	0	0	0
WVP23_2022	2022	WVP23	FSM12	0	0	0
WVP24_2018	2018	WVP24	FSM08	0	0	0
WVP24_2022	2022	WVP24	FSM08	0	0	0
WVP25_2018	2018	WVP25	FSM08	1,18	0	0
WVP25_2022	2022	WVP25	FSM08	1,18	0	0
WVP27_2018	2018	WVP27	FSM15	0	0	0
WVP27_2022	2022	WVP27	FSM15	0	0	0
WVP28_2018	2018	WVP28	FSM15	0	0	0
WVP28_2022	2022	WVP28	FSM15	0	0	0
WVP29_2018	2018	WVP29	FSM15	0	0	0
WVP29_2022	2022	WVP29	FSM15	0	0	0
WVP30_2018	2018	WVP30	FSM10	2,97	0	0
WVP30_2022	2022	WVP30	FSM10	2,97	0	0
WVP32_2018	2018	WVP32	FSM12	0	0	0
WVP32_2022	2022	WVP32	FSM12	0	0	0
WVP33_2018	2018	WVP33	FSM15	0	0	0
WVP33_2022	2022	WVP33	FSM15	0	0	0
WVP34_2018	2018	WVP34	FSM10	0	0	0
WVP34_2022	2022	WVP34	FSM10	0	0	0
WVP35_2018	2018	WVP35	FSM10	0	0	0
WVP35_2022	2022	WVP35	FSM10	0	0	0

ID	year	station	Ecotype	Rubus_arcticus_subsp_acaulis	Rubus_chamaemorus	Salix_interior	Salix_pedicellaris
WVP02_2018	2018	WVP02	FSM10	9,09	0	0	0
WVP02_2022	2022	WVP02	FSM10	9,09	0	0	0
WVP03_2018	2018	WVP03	FSM15	0	2,94	0	14,71
WVP03_2022	2022	WVP03	FSM15	0	2,94	0	14,71
WVP04_2018	2018	WVP04	FSM10	0	39,14	0	0
WVP04_2022	2022	WVP04	FSM10	0	39,14	0	0
WVP05_2018	2018	WVP05	FSM15	3,66	0	0	0
WVP05_2022	2022	WVP05	FSM15	3,66	0	0	0
WVP06_2018	2018	WVP06	FSM12	0	0	0	0
WVP06_2022	2022	WVP06	FSM12	0	0	0	0
WVP07_2018	2018	WVP07	FSM12	9,09	9,09	0	0
WVP07_2022	2022	WVP07	FSM12	9,09	9,09	0	0
WVP08_2018	2018	WVP08	FSM12	0	32,26	0	0
WVP08_2022	2022	WVP08	FSM12	0	14,08	0	0
WVP09_2018	2018	WVP09	FSM12	0	0	0	0
WVP09_2022	2022	WVP09	FSM12	0	0	0	0
WVP10_2018	2018	WVP10	FSM12	0	0	0	0
WVP10_2022	2022	WVP10	FSM12	0	0	0	0
WVP12_2018	2018	WVP12	FSM15	0	0	0	0
WVP12_2022	2022	WVP12	FSM15	0	0	0	0
WVP13_2018	2018	WVP13	FSM12	0	0	0	0
WVP13_2022	2022	WVP13	FSM12	0	0	0	0
WVP14_2018	2018	WVP14	FSM08	0	0	0	12,05
WVP14_2022	2022	WVP14	FSM08	0	0	0	11,76
WVP17_2018	2018	WVP17	FSM12	0	0	0	0
WVP17_2022	2022	WVP17	FSM12	0	0	0	0
WVP18_2018	2018	WVP18	FSM08	0	0	0	40
WVP18_2022	2022	WVP18	FSM08	2,13	0	0	40
WVP19_2018	2018	WVP19	FSM12	0	0	0	0
WVP19_2022	2022	WVP19	FSM12	0	0	0	0
WVP20_2018	2018	WVP20	FSM08	0	19,05	0	0
WVP20_2022	2022	WVP20	FSM08	0	7,84	58,82	0
WVP21_2018	2018	WVP21	FSM12	0	0	0	0
WVP21_2022	2022	WVP21	FSM12	0	0	0	0
WVP22_2018	2018	WVP22	FSM08	0	0	0	0
WVP22_2022	2022	WVP22	FSM08	0	9,3	0	0
WVP23_2018	2018	WVP23	FSM12	0	0	0	0
WVP23_2022	2022	WVP23	FSM12	0	0	0	0
WVP24_2018	2018	WVP24	FSM08	0	0	0	0
WVP24_2022	2022	WVP24	FSM08	0	3,13	0	0
WVP25_2018	2018	WVP25	FSM08	0	0	0	0
WVP25_2022	2022	WVP25	FSM08	0	0	0	0
WVP27_2018	2018	WVP27	FSM15	0	18,18	0	0
WVP27_2022	2022	WVP27	FSM15	0	18,18	0	0
WVP28_2018	2018	WVP28	FSM15	7,69	15,38	0	0
WVP28_2022	2022	WVP28	FSM15	7,69	15,38	0	0
WVP29_2018	2018	WVP29	FSM15	2,06	0	0	0
WVP29_2022	2022	WVP29	FSM15	2,06	0	0	0
WVP30_2018	2018	WVP30	FSM10	0	61,14	0	0
WVP30_2022	2022	WVP30	FSM10	0	61,14	0	0
WVP32_2018	2018	WVP32	FSM12	6,98	0	0	0
WVP32_2022	2022	WVP32	FSM12	6,98	0	0	0
WVP33_2018	2018	WVP33	FSM15	0	0	0	0
WVP33_2022	2022	WVP33	FSM15	0	0	0	0
WVP34_2018	2018	WVP34	FSM10	0	0	0	40
WVP34_2022	2022	WVP34	FSM10	0	0	0	40
WVP35_2018	2018	WVP35	FSM10	1,96	0	0	0
WVP35_2022	2022	WVP35	FSM10	1,96	0	0	0

ID	year	station	Ecotype	Salix_pellita	Scorpidium_scorpioides	Solidago_macrophylla	Sphagnum_sp
WVP02_2018	2018	WVP02	FSM10	90,91	0	0	98,99
WVP02_2022	2022	WVP02	FSM10	90,91	0	0	98,99
WVP03_2018	2018	WVP03	FSM15	29,41	0	0	94,06
WVP03_2022	2022	WVP03	FSM15	29,41	0	0	94,06
WVP04_2018	2018	WVP04	FSM10	1,96	0	0	99
WVP04_2022	2022	WVP04	FSM10	1,96	0	0	99
WVP05_2018	2018	WVP05	FSM15	48,78	0	20	80
WVP05_2022	2022	WVP05	FSM15	48,78	0	20	80
WVP06_2018	2018	WVP06	FSM12	0	0	0	100
WVP06_2022	2022	WVP06	FSM12	0	0	0	100
WVP07_2018	2018	WVP07	FSM12	0	0	0	97,56
WVP07_2022	2022	WVP07	FSM12	0	0	0	97,56
WVP08_2018	2018	WVP08	FSM12	0	0	0	99,48
WVP08_2022	2022	WVP08	FSM12	0	0	0	100
WVP09_2018	2018	WVP09	FSM12	0	0	0	95,24
WVP09_2022	2022	WVP09	FSM12	0	0	0	95,24
WVP10_2018	2018	WVP10	FSM12	0	0	0	97,56
WVP10_2022	2022	WVP10	FSM12	0	0	0	97,56
WVP12_2018	2018	WVP12	FSM15	0	0	20,62	0
WVP12_2022	2022	WVP12	FSM15	0	0	20,62	0
WVP13_2018	2018	WVP13	FSM12	69,77	0	0	90
WVP13_2022	2022	WVP13	FSM12	69,77	0	0	90
WVP14_2018	2018	WVP14	FSM08	0	0	6,45	100
WVP14_2022	2022	WVP14	FSM08	0	0	6,45	100
WVP17_2018	2018	WVP17	FSM12	0	0	0	82,35
WVP17_2022	2022	WVP17	FSM12	0	0	0	82,35
WVP18_2018	2018	WVP18	FSM08	20	0	4,44	94,74
WVP18_2022	2022	WVP18	FSM08	20	0	4,26	94,74
WVP19_2018	2018	WVP19	FSM12	0	5,56	0	88,89
WVP19_2022	2022	WVP19	FSM12	0	5,56	0	88,89
WVP20_2018	2018	WVP20	FSM08	0	27,27	0	27,27
WVP20_2022	2022	WVP20	FSM08	0	16,67	0	55,56
WVP21_2018	2018	WVP21	FSM12	0	0	0	97,56
WVP21_2022	2022	WVP21	FSM12	0	0	0	97,56
WVP22_2018	2018	WVP22	FSM08	0	0	0	100
WVP22_2022	2022	WVP22	FSM08	0	0	0	100
WVP23_2018	2018	WVP23	FSM12	0	0	0	100
WVP23_2022	2022	WVP23	FSM12	0	0	0	100
WVP24_2018	2018	WVP24	FSM08	0	0	0	44,44
WVP24_2022	2022	WVP24	FSM08	0	10	0	40
WVP25_2018	2018	WVP25	FSM08	0	0	0	94,12
WVP25_2022	2022	WVP25	FSM08	0	0	0	94,12
WVP27_2018	2018	WVP27	FSM15	0	0	0	100
WVP27_2022	2022	WVP27	FSM15	0	0	0	100
WVP28_2018	2018	WVP28	FSM15	19,23	0	9,26	100
WVP28_2022	2022	WVP28	FSM15	19,23	0	9,26	100
WVP29_2018	2018	WVP29	FSM15	82,47	0	0	100
WVP29_2022	2022	WVP29	FSM15	82,47	0	0	100
WVP30_2018	2018	WVP30	FSM10	0	0	0	94,06
WVP30_2022	2022	WVP30	FSM10	0	0	0	94,06
WVP32_2018	2018	WVP32	FSM12	93,02	0	0	94,44
WVP32_2022	2022	WVP32	FSM12	93,02	0	0	94,44
WVP33_2018	2018	WVP33	FSM15	99,48	0	26,55	0
WVP33_2022	2022	WVP33	FSM15	99,48	0	26,55	0
WVP34_2018	2018	WVP34	FSM10	0	0	0	87,5
WVP34_2022	2022	WVP34	FSM10	0	0	0	87,5
WVP35_2018	2018	WVP35	FSM10	49,02	0	40,61	0
WVP35_2022	2022	WVP35	FSM10	49,02	0	40,61	0

ID	year	station	Ecotype	Tomentypnum_nitens	Trichophorum_cespitosum	Vaccinium_oxycoccos
WVP02_2018	2018	WVP02	FSM10	0	0	0
WVP02_2022	2022	WVP02	FSM10	0	0	0
WVP03_2018	2018	WVP03	FSM15	2,97	28	0
WVP03_2022	2022	WVP03	FSM15	2,97	28	0
WVP04_2018	2018	WVP04	FSM10	0	0	0,2
WVP04_2022	2022	WVP04	FSM10	0	0	0,2
WVP05_2018	2018	WVP05	FSM15	5	0	0
WVP05_2022	2022	WVP05	FSM15	5	0	0
WVP06_2018	2018	WVP06	FSM12	0	55,56	1,41
WVP06_2022	2022	WVP06	FSM12	0	55,56	1,41
WVP07_2018	2018	WVP07	FSM12	2,44	12,2	0
WVP07_2022	2022	WVP07	FSM12	2,44	12,2	0
WVP08_2018	2018	WVP08	FSM12	0	35,09	3,23
WVP08_2022	2022	WVP08	FSM12	2,02	31,25	1,41
WVP09_2018	2018	WVP09	FSM12	1,19	14,71	3,45
WVP09_2022	2022	WVP09	FSM12	1,19	20,55	2,22
WVP10_2018	2018	WVP10	FSM12	2,44	20	3,23
WVP10_2022	2022	WVP10	FSM12	2,44	20	3,23
WVP12_2018	2018	WVP12	FSM15	0	0	0
WVP12_2022	2022	WVP12	FSM15	0	0	0
WVP13_2018	2018	WVP13	FSM12	7	0	0
WVP13_2022	2022	WVP13	FSM12	7	0	0
WVP14_2018	2018	WVP14	FSM08	0	0	0
WVP14_2022	2022	WVP14	FSM08	0	0	0
WVP17_2018	2018	WVP17	FSM12	17,65	33,33	5,26
WVP17_2022	2022	WVP17	FSM12	17,65	33,33	5,26
WVP18_2018	2018	WVP18	FSM08	5,26	0	0
WVP18_2022	2022	WVP18	FSM08	5,26	0	0
WVP19_2018	2018	WVP19	FSM12	5,56	25,97	2,86
WVP19_2022	2022	WVP19	FSM12	5,56	25,32	3,23
WVP20_2018	2018	WVP20	FSM08	45,45	52,63	4,76
WVP20_2022	2022	WVP20	FSM08	27,78	52,63	1,96
WVP21_2018	2018	WVP21	FSM12	2,44	41,24	9,09
WVP21_2022	2022	WVP21	FSM12	2,44	41,24	5,56
WVP22_2018	2018	WVP22	FSM08	0	0	3,03
WVP22_2022	2022	WVP22	FSM08	0	0	2,33
WVP23_2018	2018	WVP23	FSM12	0	0	33,33
WVP23_2022	2022	WVP23	FSM12	0	0	16,67
WVP24_2018	2018	WVP24	FSM08	0	45,45	4
WVP24_2022	2022	WVP24	FSM08	0	45,45	3,13
WVP25_2018	2018	WVP25	FSM08	4,71	24,39	7,69
WVP25_2022	2022	WVP25	FSM08	4,71	24,39	7,69
WVP27_2018	2018	WVP27	FSM15	0	0	9,09
WVP27_2022	2022	WVP27	FSM15	0	0	9,09
WVP28_2018	2018	WVP28	FSM15	0	0	0
WVP28_2022	2022	WVP28	FSM15	0	0	0
WVP29_2018	2018	WVP29	FSM15	0	0	0
WVP29_2022	2022	WVP29	FSM15	0	0	0
WVP30_2018	2018	WVP30	FSM10	0,99	0	0,44
WVP30_2022	2022	WVP30	FSM10	0,99	0	0,44
WVP32_2018	2018	WVP32	FSM12	3,33	0	0
WVP32_2022	2022	WVP32	FSM12	3,33	0	0
WVP33_2018	2018	WVP33	FSM15	0	0	0
WVP33_2022	2022	WVP33	FSM15	0	0	0
WVP34_2018	2018	WVP34	FSM10	12,5	0	2,86
WVP34_2022	2022	WVP34	FSM10	12,5	0	2,86
WVP35_2018	2018	WVP35	FSM10	0	0	0
WVP35_2022	2022	WVP35	FSM10	0	0	0

ID	year	station	Ecotype	Vaccinium_uliginosum	Vaccinium_vitis.idaea	Veronica_wormskjoldii	Viola_macloskeyi
WVP02_2018	2018	WVP02	FSM10	0	0	0	36,23
WVP02_2022	2022	WVP02	FSM10	0	0	0	36,23
WVP03_2018	2018	WVP03	FSM15	0	0	0	0
WVP03_2022	2022	WVP03	FSM15	0	0	0	0
WVP04_2018	2018	WVP04	FSM10	0	0	0	0
WVP04_2022	2022	WVP04	FSM10	0	0	0	0
WVP05_2018	2018	WVP05	FSM15	0	0	0	0
WVP05_2022	2022	WVP05	FSM15	0	0	0	0
WVP06_2018	2018	WVP06	FSM12	0	0	0	0
WVP06_2022	2022	WVP06	FSM12	0	0	0	0
WVP07_2018	2018	WVP07	FSM12	0	0	0	0
WVP07_2022	2022	WVP07	FSM12	0	0	0	0
WVP08_2018	2018	WVP08	FSM12	0	0	0	0
WVP08_2022	2022	WVP08	FSM12	14,08	14,08	0	0
WVP09_2018	2018	WVP09	FSM12	20,69	0	0	0
WVP09_2022	2022	WVP09	FSM12	13,33	0	0	0
WVP10_2018	2018	WVP10	FSM12	0	0	0	0
WVP10_2022	2022	WVP10	FSM12	0	0	0	0
WVP12_2018	2018	WVP12	FSM15	0	0	0	0
WVP12_2022	2022	WVP12	FSM15	0	0	0	0
WVP13_2018	2018	WVP13	FSM12	0	0	0	0
WVP13_2022	2022	WVP13	FSM12	0	0	0	0
WVP14_2018	2018	WVP14	FSM08	60,24	1,2	0	0
WVP14_2022	2022	WVP14	FSM08	58,82	1,18	0	0
WVP17_2018	2018	WVP17	FSM12	0	0	0	0
WVP17_2022	2022	WVP17	FSM12	0	0	0	0
WVP18_2018	2018	WVP18	FSM08	0	0	0	15,56
WVP18_2022	2022	WVP18	FSM08	0	0	0	14,89
WVP19_2018	2018	WVP19	FSM12	45,71	0	0	0
WVP19_2022	2022	WVP19	FSM12	51,61	0	0	0
WVP20_2018	2018	WVP20	FSM08	0	0	0	0
WVP20_2022	2022	WVP20	FSM08	0	0	0	0
WVP21_2018	2018	WVP21	FSM12	27,27	0	0	1,03
WVP21_2022	2022	WVP21	FSM12	27,78	0	0	1,03
WVP22_2018	2018	WVP22	FSM08	0	0	0	0
WVP22_2022	2022	WVP22	FSM08	13,95	0	0	0
WVP23_2018	2018	WVP23	FSM12	0	0	0	0
WVP23_2022	2022	WVP23	FSM12	0	0	0	0
WVP24_2018	2018	WVP24	FSM08	4	0	0	0
WVP24_2022	2022	WVP24	FSM08	12,5	0	0	0
WVP25_2018	2018	WVP25	FSM08	0	0	0	0
WVP25_2022	2022	WVP25	FSM08	0	0	0	0
WVP27_2018	2018	WVP27	FSM15	36,36	0	0	0
WVP27_2022	2022	WVP27	FSM15	36,36	0	0	0
WVP28_2018	2018	WVP28	FSM15	0	0	0	9,26
WVP28_2022	2022	WVP28	FSM15	0	0	0	9,26
WVP29_2018	2018	WVP29	FSM15	0	0	0	8,47
WVP29_2022	2022	WVP29	FSM15	0	0	0	8,47
WVP30_2018	2018	WVP30	FSM10	0	0,87	0	0
WVP30_2022	2022	WVP30	FSM10	0	0,87	0	0
WVP32_2018	2018	WVP32	FSM12	0	0	0	0
WVP32_2022	2022	WVP32	FSM12	0	0	0	0
WVP33_2018	2018	WVP33	FSM15	0	0	0	1,77
WVP33_2022	2022	WVP33	FSM15	0	0	0	1,77
WVP34_2018	2018	WVP34	FSM10	5,71	0	0	0
WVP34_2022	2022	WVP34	FSM10	5,71	0	0	0
WVP35_2018	2018	WVP35	FSM10	0	0	0,51	7,11
WVP35_2022	2022	WVP35	FSM10	0	0	0,51	7,11

ID	year	station	Ecotype	Abondance_Total	Richesse	Shannon_entropy	Shannon_diversity	Gini_Simpson_entropy
WVP02_2018	2018	WVP02	FSM10	300,01	9	1,690300789	5,421111072	0,768247012
WVP02_2022	2022	WVP02	FSM10	300,01	9	1,690300789	5,421111072	0,768247012
WVP03_2018	2018	WVP03	FSM15	288,23	16	2,265768164	9,638525722	0,84649859
WVP03_2022	2022	WVP03	FSM15	288,23	16	2,265768164	9,638525722	0,84649859
WVP04_2018	2018	WVP04	FSM10	300,02	14	2,11863621	8,319783311	0,836534021
WVP04_2022	2022	WVP04	FSM10	300,02	14	2,11863621	8,319783311	0,836534021
WVP05_2018	2018	WVP05	FSM15	300	13	2,20007521	9,025692296	0,858219102
WVP05_2022	2022	WVP05	FSM15	300	13	2,20007521	9,025692296	0,858219102
WVP06_2018	2018	WVP06	FSM12	300,01	6	1,419075752	4,133298482	0,730731735
WVP06_2022	2022	WVP06	FSM12	300,01	6	1,419075752	4,133298482	0,730731735
WVP07_2018	2018	WVP07	FSM12	300	14	2,187522255	8,913101337	0,839783422
WVP07_2022	2022	WVP07	FSM12	300	14	2,187522255	8,913101337	0,839783422
WVP08_2018	2018	WVP08	FSM12	300,01	10	1,84465995	6,325948288	0,803766577
WVP08_2022	2022	WVP08	FSM12	304,02	14	2,170568795	8,763267124	0,840268596
WVP09_2018	2018	WVP09	FSM12	300,01	15	2,261240442	9,594983806	0,85112426
WVP09_2022	2022	WVP09	FSM12	299,99	15	2,216531743	9,175452785	0,845310604
WVP10_2018	2018	WVP10	FSM12	300	7	1,527613206	4,607167332	0,747791411
WVP10_2022	2022	WVP10	FSM12	300	7	1,527613206	4,607167332	0,747791411
WVP12_2018	2018	WVP12	FSM15	299,99	7	1,499908176	4,481277562	0,742055867
WVP12_2022	2022	WVP12	FSM15	299,99	7	1,499908176	4,481277562	0,742055867
WVP13_2018	2018	WVP13	FSM12	300,01	8	1,698244583	5,464346761	0,786998881
WVP13_2022	2022	WVP13	FSM12	301,75	9	1,728221434	5,63063055	0,789659388
WVP14_2018	2018	WVP14	FSM08	300,02	16	2,150306593	8,587490856	0,823820914
WVP14_2022	2022	WVP14	FSM08	300,01	16	2,158165114	8,6552417	0,825349098
WVP17_2018	2018	WVP17	FSM12	299,99	8	1,802225768	6,06312757	0,807611707
WVP17_2022	2022	WVP17	FSM12	299,99	8	1,802225768	6,06312757	0,807611707
WVP18_2018	2018	WVP18	FSM08	300	15	2,245631867	9,446382529	0,845860993
WVP18_2022	2022	WVP18	FSM08	300,01	17	2,283286988	9,808869114	0,846944394
WVP19_2018	2018	WVP19	FSM12	300,01	15	2,189919175	8,934490955	0,851301083
WVP19_2022	2022	WVP19	FSM12	300,02	16	2,190470693	8,939419851	0,84739315
WVP20_2018	2018	WVP20	FSM08	299,99	15	2,459547892	11,69952089	0,898803279
WVP20_2022	2022	WVP20	FSM08	299,99	16	2,363961512	10,63299084	0,875849187
WVP21_2018	2018	WVP21	FSM12	299,99	14	2,058601704	7,835006485	0,826792107
WVP21_2022	2022	WVP21	FSM12	300,01	15	2,135797247	8,463791549	0,83518092
WVP22_2018	2018	WVP22	FSM08	299,99	10	1,950187964	7,030008842	0,818738448
WVP22_2022	2022	WVP22	FSM08	299,99	12	2,09446676	8,121109318	0,831757327
WVP23_2018	2018	WVP23	FSM12	300	6	1,629359107	5,100604729	0,779542151
WVP23_2022	2022	WVP23	FSM12	300	7	1,754337875	5,779619644	0,798064373
WVP24_2018	2018	WVP24	FSM08	299,99	10	2,022662951	7,558425874	0,8508805
WVP24_2022	2022	WVP24	FSM08	300,01	13	2,249243805	9,480563968	0,875696113
WVP25_2018	2018	WVP25	FSM08	300,02	13	2,125977839	8,381088842	0,837233243
WVP25_2022	2022	WVP25	FSM08	300,02	13	2,125977839	8,381088842	0,837233243
WVP27_2018	2018	WVP27	FSM15	300	9	1,856687801	6,402495274	0,804331269
WVP27_2022	2022	WVP27	FSM15	300	9	1,856687801	6,402495274	0,804331269
WVP28_2018	2018	WVP28	FSM15	299,99	15	2,102957416	8,19035642	0,821866537
WVP28_2022	2022	WVP28	FSM15	299,99	15	2,102957416	8,19035642	0,821866537
WVP29_2018	2018	WVP29	FSM15	299,97	12	1,696585674	5,455289421	0,758344495
WVP29_2022	2022	WVP29	FSM15	299,97	12	1,696585674	5,455289421	0,758344495
WVP30_2018	2018	WVP30	FSM10	300,01	12	1,572670385	4,819500951	0,743086396
WVP30_2022	2022	WVP30	FSM10	300,01	12	1,572670385	4,819500951	0,743086396
WVP32_2018	2018	WVP32	FSM12	299,99	7	1,392501959	4,024907619	0,717215907
WVP32_2022	2022	WVP32	FSM12	299,99	7	1,392501959	4,024907619	0,717215907
WVP33_2018	2018	WVP33	FSM15	300	15	1,787406787	5,973940661	0,75977322
WVP33_2022	2022	WVP33	FSM15	300	15	1,787406787	5,973940661	0,75977322
WVP34_2018	2018	WVP34	FSM10	300,01	13	2,041352866	7,701020603	0,824494579
WVP34_2022	2022	WVP34	FSM10	300,01	13	2,041352866	7,701020603	0,824494579
WVP35_2018	2018	WVP35	FSM10	300,04	19	2,1356165	8,462261883	0,8363101
WVP35_2022	2022	WVP35	FSM10	300,04	19	2,1356165	8,462261883	0,8363101

ID	year	station	Ecotype	Gini_Simpson_diversity	Pielou_Evenness	Shannon_Evenness	Simpson_Evenness
WVP02_2018	2018	WVP02	FSM10	4,314938965	0,769289042	0,602345675	0,479437663
WVP02_2022	2022	WVP02	FSM10	4,314938965	0,769289042	0,602345675	0,479437663
WVP03_2018	2018	WVP03	FSM15	6,514598159	0,817203123	0,602407858	0,407162385
WVP03_2022	2022	WVP03	FSM15	6,514598159	0,817203123	0,602407858	0,407162385
WVP04_2018	2018	WVP04	FSM10	6,11748086	0,802800374	0,594270236	0,436962919
WVP04_2022	2022	WVP04	FSM10	6,11748086	0,802800374	0,594270236	0,436962919
WVP05_2018	2018	WVP05	FSM15	7,053136323	0,857746062	0,694284023	0,542548948
WVP05_2022	2022	WVP05	FSM15	7,053136323	0,857746062	0,694284023	0,542548948
WVP06_2018	2018	WVP06	FSM12	3,713768496	0,792001257	0,68888308	0,618961416
WVP06_2022	2022	WVP06	FSM12	3,713768496	0,792001257	0,68888308	0,618961416
WVP07_2018	2018	WVP07	FSM12	6,241551367	0,828902893	0,636650095	0,445825098
WVP07_2022	2022	WVP07	FSM12	6,241551367	0,828902893	0,636650095	0,445825098
WVP08_2018	2018	WVP08	FSM12	5,095971849	0,801125637	0,632594829	0,509597185
WVP08_2022	2022	WVP08	FSM12	6,260509687	0,822478834	0,625947652	0,447179263
WVP09_2018	2018	WVP09	FSM12	6,717011097	0,83500684	0,639665587	0,44780074
WVP09_2022	2022	WVP09	FSM12	6,464567238	0,818497287	0,611696852	0,430971149
WVP10_2018	2018	WVP10	FSM12	3,964972027	0,785037895	0,658166762	0,566424575
WVP10_2022	2022	WVP10	FSM12	3,964972027	0,785037895	0,658166762	0,566424575
WVP12_2018	2018	WVP12	FSM15	3,876808477	0,770800325	0,640182509	0,553829782
WVP12_2022	2022	WVP12	FSM15	3,876808477	0,770800325	0,640182509	0,553829782
WVP13_2018	2018	WVP13	FSM12	4,694811026	0,816683013	0,683043345	0,586851378
WVP13_2022	2022	WVP13	FSM12	4,754193639	0,786547471	0,625625617	0,528243738
WVP14_2018	2018	WVP14	FSM08	5,6760426	0,775559164	0,536718179	0,354752663
WVP14_2022	2022	WVP14	FSM08	5,725707619	0,778393527	0,540952606	0,357856726
WVP17_2018	2018	WVP17	FSM12	5,197821458	0,866687393	0,757890946	0,649727682
WVP17_2022	2022	WVP17	FSM12	5,197821458	0,866687393	0,757890946	0,649727682
WVP18_2018	2018	WVP18	FSM08	6,487650476	0,829243072	0,629758835	0,432510032
WVP18_2022	2022	WVP18	FSM08	6,533573159	0,805900125	0,576992301	0,384327833
WVP19_2018	2018	WVP19	FSM12	6,724998561	0,808670081	0,59563273	0,448333237
WVP19_2022	2022	WVP19	FSM12	6,552785823	0,790045302	0,558713741	0,409549114
WVP20_2018	2018	WVP20	FSM08	9,881743127	0,908235708	0,77996806	0,658782875
WVP20_2022	2022	WVP20	FSM08	8,05471969	0,852618887	0,664561928	0,503419981
WVP21_2018	2018	WVP21	FSM12	5,773408967	0,780051907	0,55964332	0,412386355
WVP21_2022	2022	WVP21	FSM12	6,067258731	0,78868451	0,56425277	0,404483915
WVP22_2018	2018	WVP22	FSM08	5,516889769	0,846955871	0,703000884	0,551688977
WVP22_2022	2022	WVP22	FSM08	5,943795258	0,84287543	0,67675911	0,495316272
WVP23_2018	2018	WVP23	FSM12	4,536014504	0,909362632	0,850100788	0,756002417
WVP23_2022	2022	WVP23	FSM12	4,952073176	0,901551326	0,825659949	0,707439025
WVP24_2018	2018	WVP24	FSM08	6,706031068	0,878431358	0,755842587	0,670603107
WVP24_2022	2022	WVP24	FSM08	8,044800698	0,876915483	0,729274151	0,618830823
WVP25_2018	2018	WVP25	FSM08	6,143760668	0,828857628	0,644699142	0,472596974
WVP25_2022	2022	WVP25	FSM08	6,143760668	0,828857628	0,644699142	0,472596974
WVP27_2018	2018	WVP27	FSM15	5,110678616	0,845015034	0,711388364	0,56785318
WVP27_2022	2022	WVP27	FSM15	5,110678616	0,845015034	0,711388364	0,56785318
WVP28_2018	2018	WVP28	FSM15	5,613768364	0,776557767	0,546023761	0,374251224
WVP28_2022	2022	WVP28	FSM15	5,613768364	0,776557767	0,546023761	0,374251224
WVP29_2018	2018	WVP29	FSM15	4,138122153	0,682756302	0,454607452	0,344843513
WVP29_2022	2022	WVP29	FSM15	4,138122153	0,682756302	0,454607452	0,344843513
WVP30_2018	2018	WVP30	FSM10	3,892359077	0,632889121	0,401625079	0,324363256
WVP30_2022	2022	WVP30	FSM10	3,892359077	0,632889121	0,401625079	0,324363256
WVP32_2018	2018	WVP32	FSM12	3,5362668	0,715604448	0,574986803	0,505180971
WVP32_2022	2022	WVP32	FSM12	3,5362668	0,715604448	0,574986803	0,505180971
WVP33_2018	2018	WVP33	FSM15	4,162733231	0,660034584	0,398262711	0,277515549
WVP33_2022	2022	WVP33	FSM15	4,162733231	0,660034584	0,398262711	0,277515549
WVP34_2018	2018	WVP34	FSM10	5,697829713	0,795864784	0,5923862	0,438294593
WVP34_2022	2022	WVP34	FSM10	5,697829713	0,795864784	0,5923862	0,438294593
WVP35_2018	2018	WVP35	FSM10	6,109112421	0,725305063	0,445382204	0,321532233
WVP35_2022	2022	WVP35	FSM10	6,109112421	0,725305063	0,445382204	0,321532233