Real-Time Water Quality Deployment Report

Paddy's Pond at Outlet

NF02ZM0359

November 28, 2024 to January 21, 2025

Newfoundland Labrador

Government of Newfoundland & Labrador
Department of Environment and Climate Change
Water Resources Management Division
St. John's, NL, A1B 4J6 Canada

CONTENTS

General

The Department of Environment and Climate Change, Water Resources Management Division staff monitor water quality in real-time at Paddy's Pond at outlet to Three Arm Pond (47.488129N, 52.893809W).

Data compilation and analysis for this report includes the dates between November 28, 2024, to January 21, 2025.

Figure 1: Paddy's Pond at Outlet Real-Time Water Quality Station location.

Maintenance and Calibration of Instrument

As part of the Quality Assurance and Quality Control protocol (QAQC), an assessment of the reliability of data recorded by an instrument is made at the beginning and end of the deployment period. The procedure is based on the approach used by the United States Geological Survey.

Upon deployment, a QA/QC Sonde is temporarily deployed *in situ*, adjacent to the Field Sonde. Depending on the degree of difference between each parameter from the Field and QA/QC sondes, a qualitative rank is assigned (See Table). The possible ranks, from most to least desirable, are Excellent, Good, Fair, Marginal, and Poor. A grab sample is also taken for additional confirmation of conditions at deployment and to allow for future modelling studies.

Table 1: Ranking classifications for deployment and removal

	Rank				
Parameter	**Excellent**	**Good**	**Fair**	**Marginal**	**Poor**
Temperature (°C)	<=+/-0.2	>+/-0.2 to 0.5	>+/-0.5 to 0.8	>+/-0.8 to 1	<+/-1
pH (unit)	<=+/-0.2	>+/-0.2 to 0.5	>+/-0.5 to 0.8	>+/-0.8 to 1	>+/-1
Sp. Conductance (µS/cm)	<=+/-3	>+/-3 to 10	>+/-10 to 15	>+/-15 to 20	>+/-20
Sp. Conductance > 35 µS/cm (%)	<=+/-3	>+/-3 to 10	>+/-10 to 15	>+/-15 to 20	>+/-20
Dissolved Oxygen (mg/L) (% Sat)	<=+/-0.3	>+/-0.3 to 0.5	>+/-0.5 to 0.8	>+/-0.8 to 1	>+/-1
Turbidity <40 NTU (NTU)	<=+/-2	>+/-2 to 5	>+/-5 to 8	>+/-8 to 10	>+/-10
Turbidity > 40 NTU (%)	<=+/-5	>+/-5 to 10	>+/-10 to 15	>+/-15 to 20	>+/-20

At the end of a deployment period, a freshly cleaned and calibrated QA/QC Sonde is placed *in situ*, adjacent to the Field Sonde. Deployment and removal comparison rankings for the station at Paddy's Pond are summarized in Table 2.

Table 2: Qualitative QA/QC comparison rankings for Paddy's Pond at Outlet station November 28, 2024 to January 21, 2025.

Station	**Date**	**Action**	**Comparison Ranking**				
			Temperature	**pH**	**Conductivity**	**Dissolved Oxygen**	**Turbidity**
Paddy's Pond at Outlet	2024-11-28	Deployment	Good	Excellent	Excellent	Excellent	Excellent
	2024-11-28	Grab Sample #2024-1720-00-SI-SP	N/A	Good	Excellent	N/A	Excellent
	2025-01-21	Removal	Excellent	Good	Excellent	Good	Excellent

A comparison between the Quality Assurance/Quality Control (QAQC) instrument and the field instrument at deployment revealed alignment with all parameters with rankings of 'Good' and 'Excellent', confirming accurate and reliable measurements. Validation of these rankings is provided by equal rankings from the grab sample 2024-1720-00-SI-SP with exception to pH which ranked 'Good'.

Upon removal of the instrument, temperature, dissolved oxygen, conductivity and turbidity maintained their original deployment rankings of 'Good' and 'Excellent'. However, the pH and dissolved oxygen rankings declined to 'Good' over the deployment period, possibly due to sensor drift.

DATA INTERPRETATION

The following graphs and discussion illustrate water quality data obtained hourly from November 28, 2024, to January 21, 2025, at Paddy's Pond at outlet to Three Arm Pond, St. John's, NL.

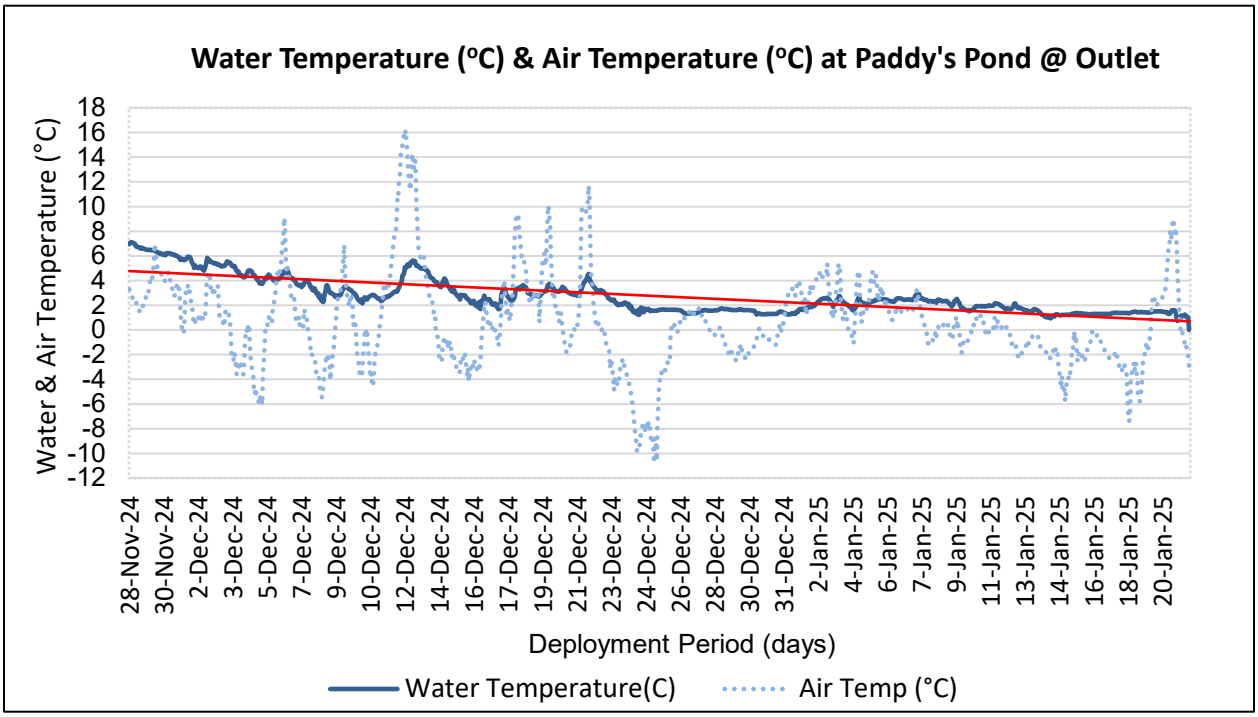
Stage is not monitored at this station to date and as such cannot be discussed with respect to other monitored water quality parameters. All data used in the preparation of the graphs and subsequent discussion adhere to this stringent QA/QC protocol.

Mean daily temperature and total precipitation data was obtained from the Department of Environment and Climate Change Canada (ECCC) historical weather data at https://climate.weather.gc.ca/historical_data/search_historic_data_e.html and can be found illustrated in Appendix A. Gaps in available daily data were removed for graphing purposes.

Water Temperature

Water Temperature is a major factor used to describe water quality. Temperature has major implications on both the ecology and chemistry of a water body, governing processes such as the metabolic rate of aquatic plants and animals and the degree of dissolved oxygen saturation.

It should be noted that the temperature sensor on any sonde is the most important. All other parameters can be broken down into three groups: temperature dependent, temperature compensated and temperature independent. As the temperature sensor is not isolated from the rest of the sonde, the entire sonde must be at the same temperature before the sensor will stabilize. The values may take some time to climb to the appropriate reading; if a reading is taken too soon it may not accurately portray the water body.



Water Temp	Mean	Median	Min	Max
Hourly	2.74	2.38	0.01	7.11

Figure 2: Water temperature (°C) values at Paddy's Pond at Outlet.

During the 55-day deployment period, water temperatures fluctuated between a minimum of 0.01°C and a maximum of 7.11°C, with a median temperature of 2.38°C and a mean of 2.74°C. These variations reflect seasonal changes from late fall to winter, as the water temperature naturally fluctuated in response to air temperature.

Initially, the water temperature was recorded at 6.96°C on November 28, 2024. A consistent overall decrease in temperature was observed from late November to mid-January, reaching a low of approximately 0.01°C on January 21, 2025. In mid-December, there was a slight fluctuation

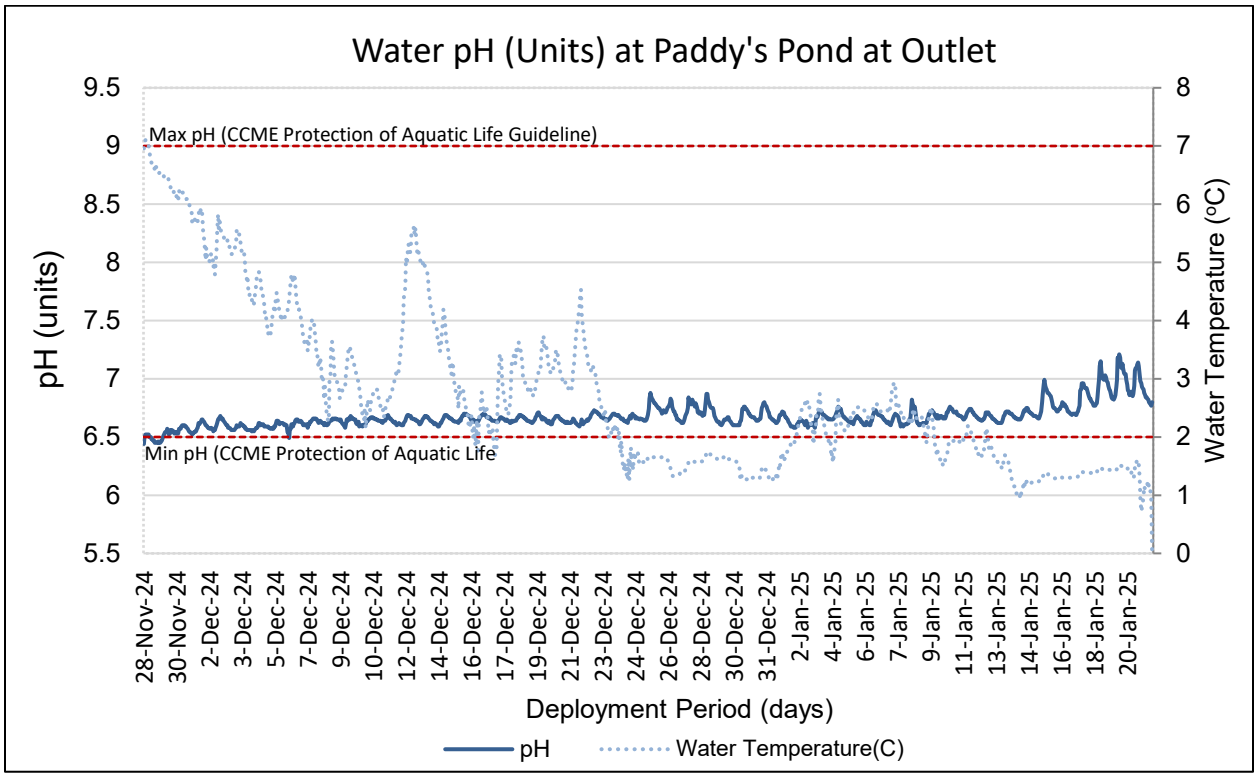
in water temperature. However, as December and January progressed, a decline in temperature continued.

Additionally, diurnal fluctuation pattern was less evident, as day to night temperature variations are narrower during winter months.

pH

pH is used to give an indication of the acidity or basicity of a solution. A pH of seven (7) denotes a neutral solution while lower values are acidic and higher values are basic. Technically, the pH of a solution indicates the availability of protons to react with molecules dissolved in water. Such reactions can affect how molecules function chemically and metabolically.

pH values are temperature dependant as well as influenced by photosynthesis and respiration by aquatic organisms. The concentration of dissolved carbon dioxide in the water throughout the day, especially overnight when oxygen production is reduced relative to carbon dioxide levels. Carbon dioxide dissolved in water yields a slightly acidic solution.



pH	Mean	Median	Min	Max
Hourly	6.67	6.65	6.44	7.21

Figure 3: pH (pH units) at Paddy's Pond at outlet.

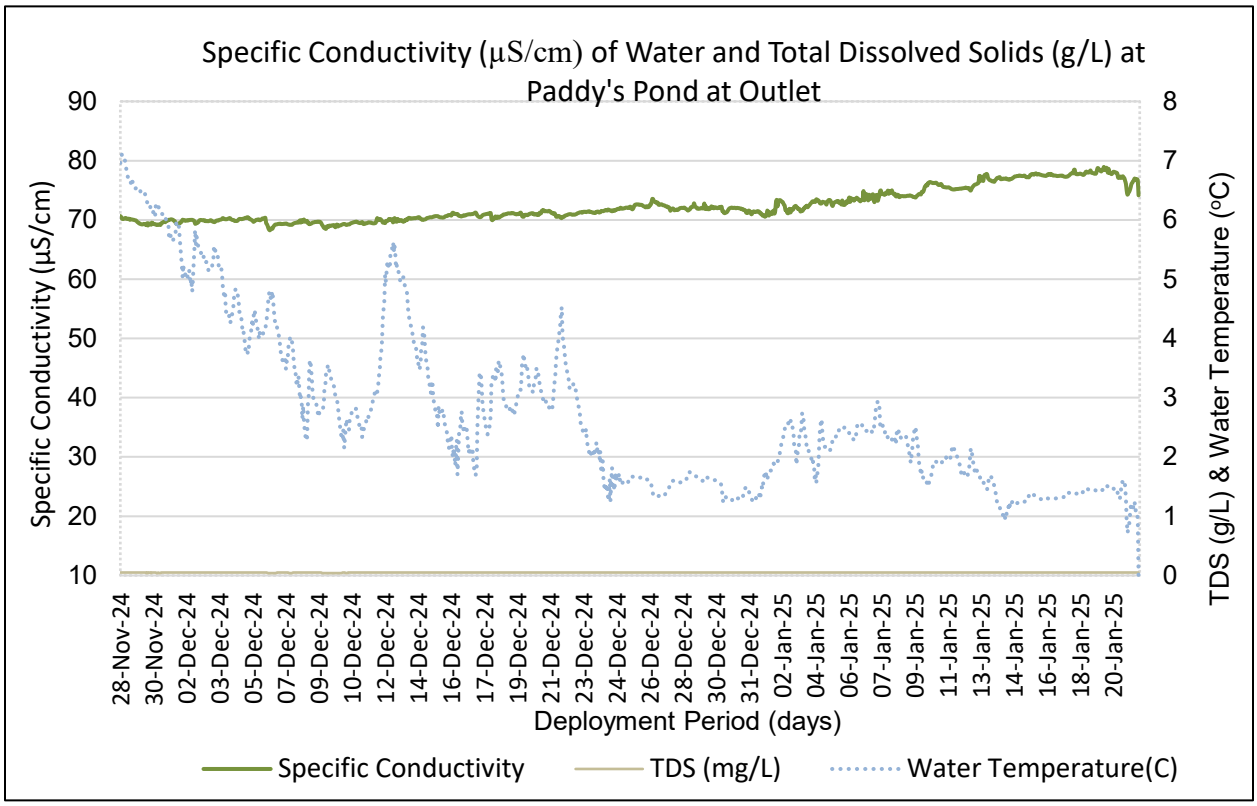
The pH of Paddy's Pond exhibited minimal variation over time and ranged from 6.44 to 7.21 pH units, with a median of 6.67 and mean of 6.65 pH units. A slight increase in pH is observed throughout the deployment period, with notable increasing trend after December 26, 2024. The maximum pH was observed on January 19th and may be a result of lower precipitation amounts received in comparison to the rest of the deployment period or sensor drift.

Overall, the pH of Paddy's Pond remained slightly acidic. The majority of pH values were at or above the CCME Protection of Aquatic Life minimum pH guideline of 6.5 units while all values were near the maximum pH CCME Protection of Aquatic Life guideline (horizontal dashed lines). It must be noted that these are national guidelines and do not reflect the peculiarities of Newfoundland geology. This guideline provides a basis for the overall health of the waterbody. Paddy's Pond at Outlet pH values were slightly below the minimum guideline but historically typical for this waterbody. Other pH reducing influences include lower water temperatures and the addition of more acidic rainwater and/or snowmelt runoff during precipitation events. (See Figure 7 – Appendix A).

Diurnal variation pattern was visible as the magnitude of variation correlates to daily water temperature range, length of days and fluctuations in photosynthesis and respiration rates. Inconsistencies to the diurnal variation pattern are likely the result of an increase in precipitation events as seen in Appendix A - Figure 7.

Specific Conductivity

Conductivity relates to the ease of passing an electric charge – or resistance – through a solution. Conductivity is highly influenced by the concentration of dissolved ions in solution: distilled water has zero conductivity (infinite resistance) while salty solutions have high conductivity (low resistance). Specific Conductivity is corrected to 25°C to allow comparison across variable temperatures.



Parameter	Mean	Median	Min	Max
Sp. Conductivity	72.33	71.46	68.26	78.94
TDS	0.05	0.05	0.04	0.05

Figure 4: Specific Conductivity (µS/cm) & TDS values at Paddy's Pond at Outlet.

Specific conductivity measurements depicted in Figure 4, indicates a minimum and maximum range of 68.26 to 78.94 µS/cm, a mean of 72.33 µS/cm and median of 71.46 µS/cm.

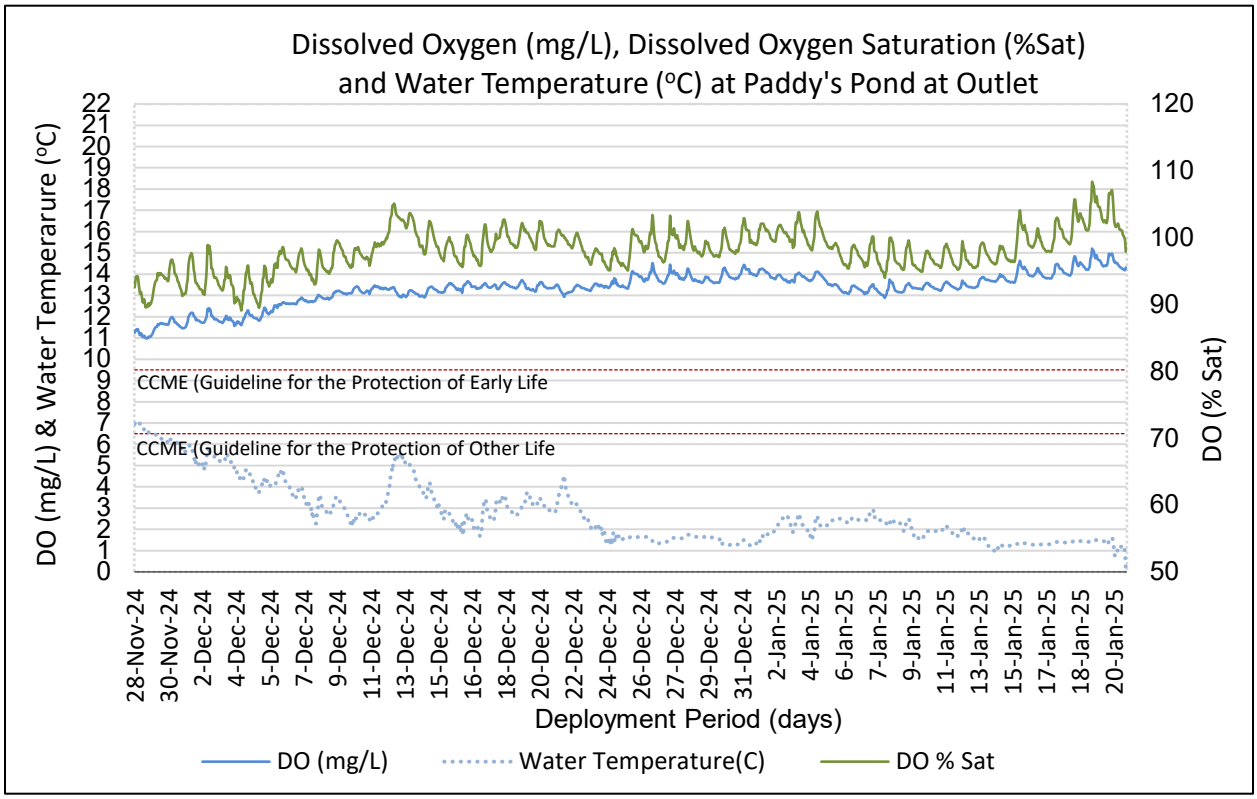
Overall, conductivity remains relatively stable with a slight increase from the beginning of the deployment period until January 21st, indicating an increase in dissolved ion concentration in the water over time. This is most likely in correlation with decreasing water temperatures and lower ionic activity.

Total dissolved solids (TDS), which measure the combined content of all inorganic and organic substances dissolved in the water, have a mean value of 0.05 g/L and a median of 0.05 g/L over

the deployment period. The equal values of the mean and median values suggest a balanced distribution. The minimum TDS recorded is 0.040 g/L, while the maximum is 0.050 g/L.

Dissolved Oxygen

- Dissolved oxygen is a metabolic requirement of aquatic plants and animals. The concentration of oxygen in water depends on many factors, especially temperature – the saturation of oxygen in water is inversely proportional to water temperature. Oxygen concentrations also tend to be higher in flowing water compared to still, lake environments. Low oxygen concentrations can give an indication of excessive decomposition of organic matter or the presence of oxidizing materials.



Parameter	Mean	Median	Min	Max
DO (mg/L)	13.31	13.41	10.98	15.19
DO (% Sat)	98.06	98.2	89.1	108.3

Figure 5: Dissolved Oxygen (mg/L & Percent (%) Saturation) values at Paddy's Pond at Outlet.

Statistical analysis of dissolved oxygen (DO) levels in Paddy's Pond, detailing both concentrations measured in (mg/L) and percent saturation (% Sat) were calculated and mean and median values for DO concentration were determined to be 13.31 mg/L and 13.41 mg/L respectively, indicating

stability within this range. A gradual increasing trend is observed with instances of lower concentrations (minimum value of 10.98 mg/L) and higher concentrations (maximum value of 15.19 mg/L) observed across the sampling period. Similarly, the mean and median values for DO saturation percentage indicate a generally high level of oxygen saturation at around 98.06% and 98.2%.

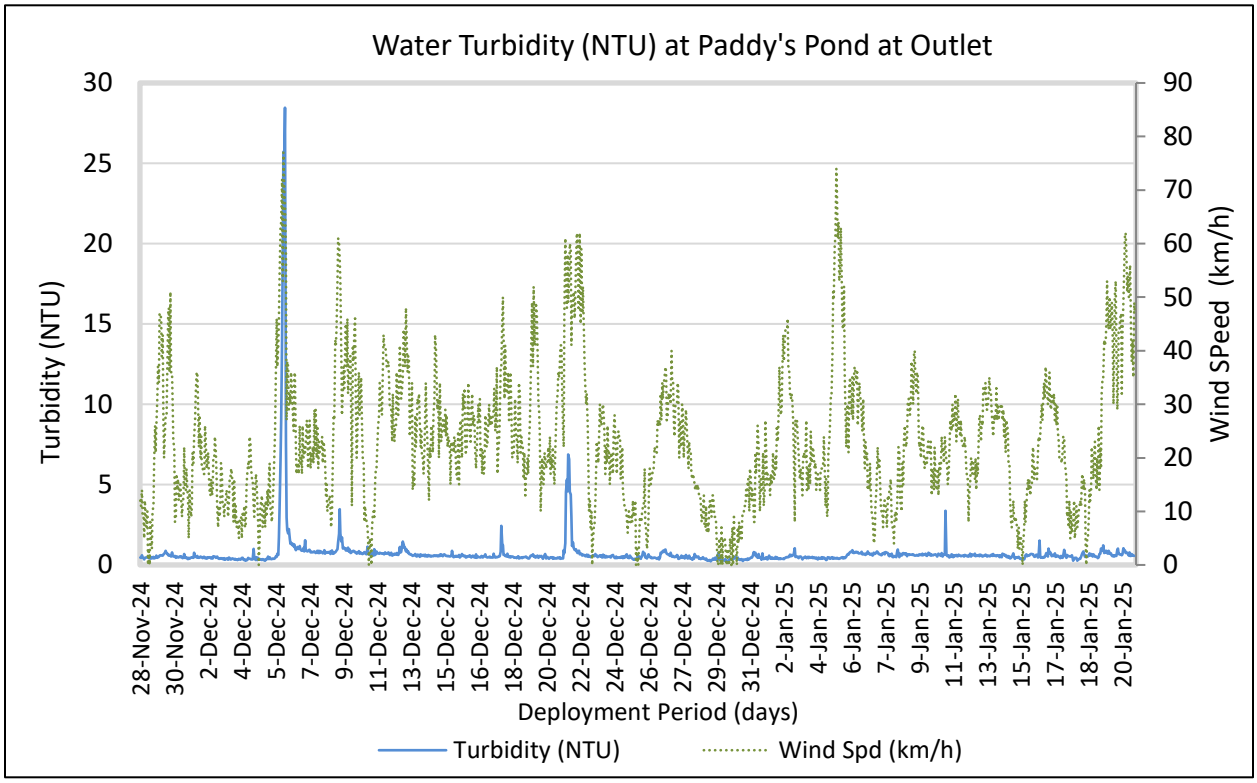
The range between the minimum (89.1%) and maximum (108.3%) values indicates notable variability, potentially reflecting environmental dynamics or measurement anomalies. Low DO concentrations indicate possible instances where the water may be relatively undersaturated with oxygen. The maximum value is somewhat high and could indicate either an error in measurement or some exceptional environmental conditions, such as super-saturation due to rapid aeration or photosynthesis. Dissolved oxygen (% Saturation) readings of greater than 100% air saturation can occur in ambient water because of the production of pure oxygen by photosynthetically-active organisms and/or aeration due to wave activity.

Diurnal variation pattern was visible throughout the deployment period due to the correlation between water temperature and air temperature. Variations can be influenced by water depth during deployment as shallow water temperatures will change more rapidly, especially in a lake environment such as Paddy's Pond. Variations may also be linked to the daily range of water temperature, duration of daylight, precipitation, and fluctuations in rates of photosynthesis and respiration.

The dissolved oxygen values were above the CCME Guideline for the Protection of Early Life Stages (9.5 mg/L) and as well as the CCME Guideline for the Protection of Other Life Stages (6.5mg/L) for the entire deployment period.

Turbidity

Turbidity is typically caused by fine suspended solids such as silt, clay, or organic material. Consistently high levels of turbidity tend to block sunlight penetration into a waterbody, discouraging plant growth. High turbidity can also damage the delicate respiratory organs of aquatic animals and cover spawning areas.



Parameter	Mean	Median	Min	Max
Turbidity	0.724	0.55	0.21	28.46
Wind Speed	23.3	22.0	0.0	77.0

Figure 6: Water turbidity (NTU) and wind speed (km/h) values at Paddy's Pond at Outlet.

Figure 6 reveals a consistent low turbidity pattern with minimal fluctuations. With a mean turbidity of 0.72 NTU, the average clarity suggests generally significantly clear water conditions with minimal suspended particles or sediment. The median turbidity of 0.55 NTU aligns with the mean, indicating relatively consistent clarity across the dataset, albeit with some variability. The minimum turbidity value of 0.21 NTU represents exceptionally clear water, highlighting periods of excellent visibility within the pond. However, the maximum turbidity of 28.46 NTU signifies instances of slightly elevated cloudiness, likely attributed to environmental factors such as temporary sediment buildup within the casing, precipitation, runoff, or wave action. On December 6th, a precipitation event bringing 39.4mm was observed, in addition to the maximum observed wind speed of 77.0 km/h.

APPENDIX A: MEAN DAILY TEMPERATURE AND TOTAL PRECIPITATION

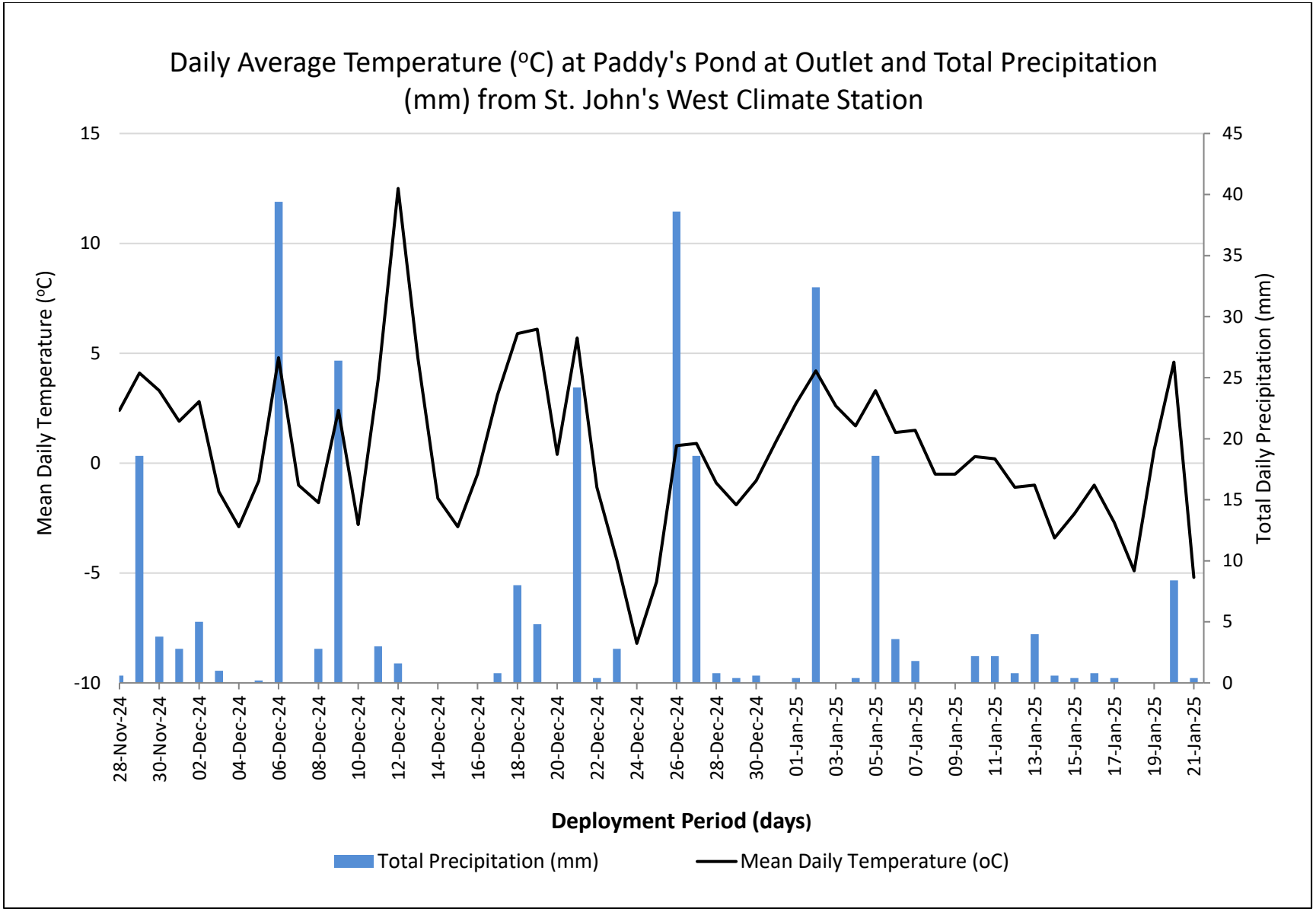


Figure 7: Mean daily air temperature and total precipitation at St. John's West near Paddy's Pond November 28, 2024 to January 21, 2025..

APPENDIX B: Water Parameter Description

Dissolved Oxygen - The amount of Dissolved Oxygen (DO) (mg/l) in the water is vital to aquatic organisms for their survival. The concentration of DO is affected by such things as water temperature, water depth and flow (e.g., aeration by rapids, riffles etc.), consumption by aerobic organisms, consumption by inorganic chemical reactions, consumption by plants during darkness, and production by plants during the daylight (Allan 2010).

pH - pH is the measure of hydrogen ion activity and affects: (i) the availability of nutrients to aquatic life; (ii) the concentration of biochemical substances dissolved in water; (iii) the efficiency of hemoglobin in the blood of vertebrates; and (iv) the toxicity of pollutants. Changes in pH can be attributed to industrial effluence, saline inflows or aquatic organisms involved in the photosynthetic cycling of CO_2 (Allan 2010).

Specific conductivity - Specific conductivity (µS/cm) is a measure of water's ability to conduct electricity, with values normalized to a water temperature of 25ºC. Specific conductance indicates the concentration of dissolved solids (such as salts) in the water, which can affect the growth and reproduction of aquatic life. Specific conductivity is affected by rainfall events, the composition of inflowing tributaries and their associated geology, saline inflow (e.g., road salt), agricultural run-off and industrial inputs (Allan 2010; Swanson and Baldwin 1965).

Stage – Stage (m) is the elevation of the water surface and is often used as a surrogate for the more difficult to measure flow.

Temperature - Essential to the measurement of most water quality parameters, temperature (ºC) controls most processes and dynamics of limnology. Water temperature is influenced by such things as ambient air temperature, solar radiation, meteorological events, industrial effluence, wastewater, inflowing tributaries, as well as water body size and depth (Allan 2010; Hach 2006).

Total Dissolved Solids - Total Dissolved Solids (TDS) (g/l) is a measure of alkaline salts dissolved in water or in fine suspension and can affect the growth and reproduction of aquatic life. It is affected by rainfall events, the composition of inflowing tributaries and their associated geology, saline inflow (e.g., road salt), agricultural run-off and industrial inputs (Allan 2010; Swanson and Baldwin 1965).

Turbidity - Turbidity (NTU) is a measure of the translucence of water and indicates the amount of suspended material in the water. Turbidity is caused by any substance that makes water cloudy (e.g., soil erosion, micro-organisms, vegetation, chemicals, etc.) and can correspond to precipitation events, high stage, and floating debris near the sensor (Allan 2010; Hach 2006; Swanson and Baldwin 1965.

APPENDIX C: QA/QC GRAB SAMPLE FIELD RESULTS

Your P.O. #: 224006869-3

Attention: Robert Richard Harvey

NL Department of Environment, Climate Change and Municipalities
Water Resources
PO Box 8700
St. John's, NL
CANADA A1B 4J6

Your C.O.C. #: N/A, 2024-1720-SI-SP, 2024-1721-SI-SP

Report Date: 2024/12/09
Report #: R8437769
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C4AP705
Received: 2024/11/29, 10:22

Sample Matrix: Water
Samples Received: 2

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Alkalinity	2	N/A	2024/12/04	ATL SOP 00142	SM 24 2320 B
Anions (1)	1	N/A	2024/12/03	CAM SOP-00435	SM 23 4110 B m
Anions (1)	1	N/A	2024/12/06	CAM SOP-00435	SM 23 4110 B m
Colour	2	N/A	2024/12/05	ATL SOP 00020	SM 24 2120C m
Organic carbon - Diss (DOC)-Lab Filtered (2)	1	N/A	2024/12/05	ATL SOP 00203	SM 24 5310B m
Organic carbon - Diss (DOC)-Lab Filtered (2)	1	N/A	2024/12/06	ATL SOP 00203	SM 24 5310B m
Conductance - water	2	N/A	2024/12/04	ATL SOP 00004	SM 24 2510B m
Fluoride	2	N/A	2024/12/04	ATL SOP 00043	SM 24 4500-F- C m
Hardness (calculated as CaCO3)	2	N/A	2024/12/03	ATL SOP 00048	Auto Calc
Mercury - Total (CVAA,LL)	2	2024/12/06	2024/12/06	ATL SOP 00026	EPA 245.1 R3 m
Metals Water Total MS	1	2024/12/02	2024/12/02	ATL SOP 00058	EPA 6020B R2 m
Metals Water Total MS	1	2024/12/03	2024/12/03	ATL SOP 00058	EPA 6020B R2 m
Nitrogen Ammonia - water	2	N/A	2024/12/04	ATL SOP 00015	EPA 350.1 R2 m
Nitrogen - Nitrate + Nitrite	2	N/A	2024/12/05	ATL SOP 00016	USGS I-2547-11m
Nitrogen - Nitrite	2	N/A	2024/12/05	ATL SOP 00017	SM 24 4500-NO2- B m
Nitrogen - Nitrate (as N)	2	N/A	2024/12/06	ATL SOP 00018	ASTM D3867-16
pH (3)	2	N/A	2024/12/04	ATL SOP 00003	SM 24 4500-H+ B m
Calculated TDS (DW Pkg)	2	N/A	2024/12/05	N/A	Auto Calc
Total Kjeldahl Nitrogen in Water (1)	2	2024/12/04	2024/12/04	CAM SOP-00938	SM 4500-N B m
Organic carbon - Total (TOC) (2)	1	N/A	2024/12/04	ATL SOP 00203	SM 24 5310B m
Organic carbon - Total (TOC) (2)	1	N/A	2024/12/05	ATL SOP 00203	SM 24 5310B m
Total Phosphorus (Colourimetric) (1)	2	2024/12/04	2024/12/04	CAM SOP-00407	SM 24 4500-P I
Total Suspended Solids	2	2024/12/03	2024/12/05	ATL SOP 00007	SM 24 2540D m
Turbidity	2	N/A	2024/12/05	ATL SOP 00011	EPA 180.1 R2 m

Reference Method suffix “m” indicates test methods incorporate validated modifications from specific reference methods to improve performance.

(1) This test was performed by Bureau Veritas Mississauga, 6740 Campobello Rd , Mississauga, ON, L5N 2L8
(2) TOC / DOC present in the sample should be considered as non-purgeable TOC / DOC.
(3) The APHA Standard Method requires pH to be analyzed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the APHA Standard Method holding time.

Your P.O. #: 224006869-3

Attention: Robert Richard Harvey

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Your C.O.C. #: N/A, 2024-1720-SI-SP, 2024-1721-SI-SP

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CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C4AP705
Received: 2024/11/29, 10:22

Encryption Key

Please direct all questions regarding this Certificate of Analysis to:
Maryann Comeau, Customer Experience Supervisor/PM
Email: Maryann.COMEAU@bureauveritas.com
Phone# (902)420-0203 Ext:298

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Bureau Veritas Job #: C4AP705
Report Date: 2024/12/09

NL Department of Environment, Climate Change and Municipalities
Your P.O. #: 224006869-3
Sampler Initials: LB

Sample Details/Parameters	A	Result	RDL	UNITS	Extracted	Analyzed	By	Batch
AKGW65 PADDY'S POND @OUTLET								
Sampling Date 2024/11/28 13:26								
Matrix W								
Sample # 2024-1720-SI-SP								
Registration # SA-0000								
RESULTS OF ANALYSES OF WATER								
Calculated Parameters								
Hardness (CaCO3)	-	7.7	1.0	mg/L	N/A	2024/12/03		9796473
Nitrate (N)	-	0.098	0.050	mg/L	N/A	2024/12/06		9796479
Total dissolved solids (calc., EC)	-	40	1.0	mg/L	N/A	2024/12/05		9796779
Inorganics								
Conductivity	-	71	1.0	uS/cm	N/A	2024/12/04	M2C	9805069
Chloride (Cl-)	-	15	1.0	mg/L	N/A	2024/12/03	SUR	9801244
Dup.Chloride (Cl-)	-	15	1.0	mg/L	N/A	2024/12/03	SUR	9801244
Bromide (Br-)	-	ND	1.0	mg/L	N/A	2024/12/03	SUR	9801244
Dup.Bromide (Br-)	-	ND	1.0	mg/L	N/A	2024/12/03	SUR	9801244
Sulphate (SO4)	-	2.6	1.0	mg/L	N/A	2024/12/03	SUR	9801244
Dup.Sulphate (SO4)	-	2.8	1.0	mg/L	N/A	2024/12/03	SUR	9801244
Total Alkalinity (Total as CaCO3)	-	4.3	2.0	mg/L	N/A	2024/12/04	M2C	9805070
Colour	-	41	5.0	TCU	N/A	2024/12/05	EMT	9805181
Dissolved Fluoride (F-)	-	ND	0.10	mg/L	N/A	2024/12/04	M2C	9805072
Total Kjeldahl Nitrogen (TKN)	-	0.19	0.10	mg/L	2024/12/04	2024/12/04	RTY	9805585
Nitrate + Nitrite (N)	-	0.098	0.050	mg/L	N/A	2024/12/05	EMT	9807598
Nitrite (N)	-	ND	0.010	mg/L	N/A	2024/12/05	EMT	9807599
Nitrogen (Ammonia Nitrogen)	-	ND	0.050	mg/L	N/A	2024/12/04	MCN	9803212
Dissolved Organic Carbon (C)	-	5.8	0.50	mg/L	N/A	2024/12/05	ACK	9807937
Total Organic Carbon (C)	-	6.2	0.50	mg/L	N/A	2024/12/04	ACK	9805976
pH	-	6.68		pH	N/A	2024/12/04	M2C	9805058
Total Phosphorus	-	0.047	0.004	mg/L	2024/12/04	2024/12/04	VKH	9806000
Total Suspended Solids	-	1.0	1.0	mg/L	2024/12/03	2024/12/05	ISM	9802054
Turbidity	-	0.97	0.10	NTU	N/A	2024/12/05	M2C	9808309
MERCURY BY COLD VAPOUR AA (WATER)								
Metals								
Total Mercury (Hg)	-	ND	0.000013	mg/L	2024/12/06	2024/12/06	JEP	9807891
ELEMENTS BY ICP/MS (WATER)								
Metals								
Total Aluminum (Al)	-	0.11	0.0050	mg/L	2024/12/02	2024/12/02	MTZ	9799720
Total Antimony (Sb)	-	ND	0.0010	mg/L	2024/12/02	2024/12/02	MTZ	9799720
Total Arsenic (As)	-	ND	0.0010	mg/L	2024/12/02	2024/12/02	MTZ	9799720
Total Barium (Ba)	-	0.0028	0.0010	mg/L	2024/12/02	2024/12/02	MTZ	9799720
Total Boron (B)	-	ND	0.050	mg/L	2024/12/02	2024/12/02	MTZ	9799720
Total Cadmium (Cd)	-	ND	0.000010	mg/L	2024/12/02	2024/12/02	MTZ	9799720
Total Calcium (Ca)	-	2.1	0.10	mg/L	2024/12/02	2024/12/02	MTZ	9799720
Total Chromium (Cr)	-	ND	0.0010	mg/L	2024/12/02	2024/12/02	MTZ	9799720
Total Copper (Cu)	-	0.00066	0.00050	mg/L	2024/12/02	2024/12/02	MTZ	9799720
Total Iron (Fe)	-	0.27	0.050	mg/L	2024/12/02	2024/12/02	MTZ	9799720

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Bureau Veritas Job #: C4AP705
Report Date: 2024/12/09

NL Department of Environment, Climate Change and Municipalities
Your P.O. #: 224006869-3
Sampler Initials: LB

Sample Details/Parameters	A	Result	RDL	UNITS	Extracted	Analyzed	By	Batch
AKGW65 PADDY'S POND @OUTLET Sampling Date 2024/11/28 13:26 Matrix W Sample # 2024-1720-SI-SP Registration # SA-0000								
ELEMENTS BY ICP/MS (WATER)								
Metals								
Total Lead (Pb)	-	ND	0.00050	mg/L	2024/12/02	2024/12/02	MTZ	9799720
Total Magnesium (Mg)	-	0.61	0.10	mg/L	2024/12/02	2024/12/02	MTZ	9799720
Total Manganese (Mn)	-	0.035	0.0020	mg/L	2024/12/02	2024/12/02	MTZ	9799720
Total Nickel (Ni)	-	ND	0.0020	mg/L	2024/12/02	2024/12/02	MTZ	9799720
Total Phosphorus (P)	-	ND	0.10	mg/L	2024/12/02	2024/12/02	MTZ	9799720
Total Potassium (K)	-	0.52	0.10	mg/L	2024/12/02	2024/12/02	MTZ	9799720
Total Selenium (Se)	-	ND	0.00050	mg/L	2024/12/02	2024/12/02	MTZ	9799720
Total Sodium (Na)	-	9.5	0.10	mg/L	2024/12/02	2024/12/02	MTZ	9799720
Total Strontium (Sr)	-	0.0063	0.0020	mg/L	2024/12/02	2024/12/02	MTZ	9799720
Total Uranium (U)	-	ND	0.00010	mg/L	2024/12/02	2024/12/02	MTZ	9799720
Total Zinc (Zn)	-	ND	0.0050	mg/L	2024/12/02	2024/12/02	MTZ	9799720

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Sample Details/Parameters	A	Result	RDL	UNITS	Extracted	Analyzed	By	Batch
AKGW66 WATERFORD RIVER @KILLBRIDE								
Sampling Date 2024/11/28 11:37								
Matrix W								
Sample # 2024-1721-SI-SP								
Registration # SA-0000								
RESULTS OF ANALYSES OF WATER								
Calculated Parameters								
Hardness (CaCO3)	-	25	1.0	mg/L	N/A	2024/12/03		9796473
Nitrate (N)	-	1.0	0.050	mg/L	N/A	2024/12/06		9796479
Total dissolved solids (calc., EC)	-	180	1.0	mg/L	N/A	2024/12/05		9796779
Inorganics								
Conductivity	-	330	1.0	uS/cm	N/A	2024/12/04	M2C	9805069
Chloride (Cl-)	-	73	1.0	mg/L	N/A	2024/12/06	SUR	9801249
Bromide (Br-)	-	ND	1.0	mg/L	N/A	2024/12/06	SUR	9801249
Sulphate (SO4)	-	15	1.0	mg/L	N/A	2024/12/06	SUR	9801249
Total Alkalinity (Total as CaCO3)	-	15	2.0	mg/L	N/A	2024/12/04	M2C	9805070
Colour	-	34	5.0	TCU	N/A	2024/12/05	EMT	9805181
Dup.Colour	-	34	5.0	TCU	N/A	2024/12/05	EMT	9805181
Dissolved Fluoride (F-)	-	ND	0.10	mg/L	N/A	2024/12/04	M2C	9805072
Total Kjeldahl Nitrogen (TKN)	-	0.34	0.10	mg/L	2024/12/04	2024/12/04	RTY	9805585
Nitrate + Nitrite (N)	-	1.0	0.050	mg/L	N/A	2024/12/05	EMT	9807598
Dup.Nitrate + Nitrite (N)	-	1.0	0.050	mg/L	N/A	2024/12/05	EMT	9807598
Nitrite (N)	-	ND	0.010	mg/L	N/A	2024/12/05	EMT	9807599
Dup.Nitrite (N)	-	0.013	0.010	mg/L	N/A	2024/12/05	EMT	9807599
Nitrogen (Ammonia Nitrogen)	-	0.052	0.050	mg/L	N/A	2024/12/04	MCN	9803212
Dissolved Organic Carbon (C)	-	5.0	0.50	mg/L	N/A	2024/12/06	ACK	9808934
Dup.Dissolved Organic Carbon (C)	-	4.9	0.50	mg/L	N/A	2024/12/06	ACK	9808934
Total Organic Carbon (C)	-	5.4	0.50	mg/L	N/A	2024/12/05	ACK	9806019
pH	-	7.32		pH	N/A	2024/12/04	M2C	9805058
Total Phosphorus	-	0.029	0.004	mg/L	2024/12/04	2024/12/04	VKH	9806000
Total Suspended Solids	-	2.2	1.0	mg/L	2024/12/03	2024/12/05	ISM	9802054
Turbidity	-	3.2	0.10	NTU	N/A	2024/12/05	M2C	9808302
Dup.Turbidity	-	3.4	0.10	NTU	N/A	2024/12/05	M2C	9808302
MERCURY BY COLD VAPOUR AA (WATER)								
Metals								
Total Mercury (Hg)	-	ND	0.000013	mg/L	2024/12/06	2024/12/06	JEP	9807891
ELEMENTS BY ICP/MS (WATER)								
Metals								
Total Aluminum (Al)	-	0.14	0.0050	mg/L	2024/12/03	2024/12/03	MTZ	9801996
Total Antimony (Sb)	-	ND	0.0010	mg/L	2024/12/03	2024/12/03	MTZ	9801996
Total Arsenic (As)	-	ND	0.0010	mg/L	2024/12/03	2024/12/03	MTZ	9801996
Total Barium (Ba)	-	0.010	0.0010	mg/L	2024/12/03	2024/12/03	MTZ	9801996
Total Boron (B)	-	ND	0.050	mg/L	2024/12/03	2024/12/03	MTZ	9801996
Total Cadmium (Cd)	-	0.000016	0.000010	mg/L	2024/12/03	2024/12/03	MTZ	9801996
Total Calcium (Ca)	-	7.6	0.10	mg/L	2024/12/03	2024/12/03	MTZ	9801996
Total Chromium (Cr)	-	ND	0.0010	mg/L	2024/12/03	2024/12/03	MTZ	9801996

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Sampler Initials: LB

Sample Details/Parameters	A	Result	RDL	UNITS	Extracted	Analyzed	By	Batch
AKGW66 WATERFORD RIVER @KILLBRIDE Sampling Date 2024/11/28 11:37 Matrix W Sample # 2024-1721-SI-SP Registration # SA-0000								
ELEMENTS BY ICP/MS (WATER)								
Metals								
Total Copper (Cu)	-	0.0025	0.00050	mg/L	2024/12/03	2024/12/03	MTZ	9801996
Total Iron (Fe)	-	0.27	0.050	mg/L	2024/12/03	2024/12/03	MTZ	9801996
Total Lead (Pb)	-	ND	0.00050	mg/L	2024/12/03	2024/12/03	MTZ	9801996
Total Magnesium (Mg)	-	1.4	0.10	mg/L	2024/12/03	2024/12/03	MTZ	9801996
Total Manganese (Mn)	-	0.064	0.0020	mg/L	2024/12/03	2024/12/03	MTZ	9801996
Total Nickel (Ni)	-	ND	0.0020	mg/L	2024/12/03	2024/12/03	MTZ	9801996
Total Phosphorus (P)	-	ND	0.10	mg/L	2024/12/03	2024/12/03	MTZ	9801996
Total Potassium (K)	-	1.5	0.10	mg/L	2024/12/03	2024/12/03	MTZ	9801996
Total Selenium (Se)	-	ND	0.00050	mg/L	2024/12/03	2024/12/03	MTZ	9801996
Total Sodium (Na)	-	48	0.10	mg/L	2024/12/03	2024/12/03	MTZ	9801996
Total Strontium (Sr)	-	0.028	0.0020	mg/L	2024/12/03	2024/12/03	MTZ	9801996
Total Uranium (U)	-	ND	0.00010	mg/L	2024/12/03	2024/12/03	MTZ	9801996
Total Zinc (Zn)	-	0.0098	0.0050	mg/L	2024/12/03	2024/12/03	MTZ	9801996

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GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	7.7°C

Results relate only to the items tested.

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VALIDATION SIGNATURE PAGE

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

Ernlie Publicover, Scientific Specialist

Louise Harding, Scientific Specialist

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C4AP705
2024/11/29 10:22

NL FRIDAY COOLERS

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Page ___ of ___

BUREAU VERITAS

ADDITIONAL COOLER TEMPERATURE RECORD

CHAIN-OF-CUSTODY RECORD

Page	CHAIN OF CUSTODY #
Page ___ of ___	
Page ___ of ___	
Page ___ of ___	
Page ___ of ___	
Page ___ of ___	
Page ___ of ___	
Page ___ of ___	
Page ___ of ___	
Page ___ of ___	
Page ___ of ___	
Page ___ of ___	
Page ___ of ___	
Page ___ of ___	
Page ___ of ___	
Page ___ of ___	
Page ___ of ___	
Page ___ of ___	
Page ___ of ___	
Page ___ of ___	
Page ___ of ___	

COOLER OBSERVATIONS:

BV JOB#:

CUSTODY SEAL PRESENT (YES/NO)	CUSTODY SEAL INTACT (YES/NO)	ICE PRESENT (YES/NO)	COOLER ID	TEMP 1	TEMP 2	TEMP 3
		✓ YES		3	1	2
		✓ YES		3	0	2
		✓ YES		4	2	3
		✓ YES		5	2	2
		✓ YES		5	3	4
		✓ YES		5	4	3
		✓ YES		0	1	3
		✓ YES		1	3	4

CUSTODY SEAL PRESENT (YES/NO)	CUSTODY SEAL INTACT (YES/NO)	ICE PRESENT (YES/NO)	COOLER ID	TEMP 1	TEMP 2	TEMP 3

RECEIVED BY (SIGN & PRINT)		DATE (YYYY/MM/DD)	TIME (HH:MM)
[signature]	Swaidey Kaur		

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