Real-Time Water Quality Report

Waterford River at Kilbride
NL02ZM0009

Deployment Period
February 26, 2024 to April 25, 2024

Government of Newfoundland & Labrador
Department of Environment & Climate Change
Water Resources Management Division

Prepared by:

Water Resources Management Division
Department of Environment & Climate Change
4th Floor, Confederation Building, West Block
PO Box 8700, St. John's NL A1B 4J6

TABLE OF CONTENTS

GENERAL

The Water Resources Management Division (WRMD), in partnership with Water Survey of Canada - Environment and Climate Change Canada (WSC-ECCC), maintain a real-time water quality and water quantity monitoring station on Waterford River at Kilbride.

The purpose of the real-time water quality station is to monitor, process and publish real-time water quality data.

This deployment report discusses water quality related events occurring at this station from the instrument deployment on February 26, 2024 until removal on April 25, 2024, 59 days later.

Figure 1: Waterford River at Kilbride Real-Time Water Quality and Quantity Station.

QUALITY ASSURANCE AND QUALITY CONTROL

As part of the Quality Assurance and Quality Control protocol (QA/QC), 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 (Table 1).

At deployment and removal, a QA/QC Sonde is temporarily deployed adjacent to the Field Sonde. Values for temperature, pH, conductivity, dissolved oxygen, and turbidity are compared between the two instruments**.** Based on the degree of difference between the parameters on the Field Sonde and QA/QC Sonde at deployment and at removal, a qualitative statement is made on the data quality (Table 2).

WRMD staff at the Department of Environment & Climate Change (ECC) are responsible for maintaining and calibrating the water quality instrument, as well as grooming, analyzing, and reporting on water quality data recorded at the station.

Waterford River at Kilbride, Newfoundland and Labrador

WSC staff are responsible for the data logging/communication aspect of the network and maintenance of the water quantity monitoring equipment. WSC staff visit the site regularly to ensure the data logging and data transmitting equipment are working properly and are responsible for handling stage and streamflow data issues. The water quantity data is transmitted via satellite and published online with the water quality data on the WRMD website. Water quantity data has not been corrected or groomed when published online or used in the monthly reports for the stations. While WSC oversees the hydrometric component of these stations, due to differences in protocols, quality control for WSC hydrometric data occurs less frequently than for water quality data.

The hydrometric data presented in this report is provisional and has not undergone quality control checks. Accurate hydrometric data can be accessed at https://wateroffice.ec.gc.ca/ or by request to Water Survey Canada.

Table 1: Instrument Performance 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

Table 2: Instrument performance rankings for Waterford River at Kilbride

Station	**Date**	**Action**	**Comparison Ranking**				
			Temperature	**pH**	**Conductivity**	**Dissolved Oxygen**	**Turbidity**
Waterford River @ Kilbride	**Feb 26, 2024**	**Deployment**	Excellent	Excellent	Fair	Excellent	Excellent
		Grab Sample # 2024-1701-00-SI-SP	N/A	Fair	Excellent	N/A	Excellent
	Apr 25, 2024	**Removal**	Excellent	Good	Good	Excellent	Excellent

The temperature, dissolved oxygen and turbidity measurements were consistently rated as excellent during both deployment and removal, indicating high-quality data with accurate and reliable readings throughout the monitoring period.

pH measurements during deployment were consistently rated as Excellent. However, the grab sample (2024-1701-00-SI-SP) pH was rated as Fair, suggesting some discrepancies between continuous monitoring and discrete grab sampling. The pH rating was good during removal, indicating the fair ranking from the grab sample may have been related to slight differences between the in-situ and lab measurements.

Waterford River at Kilbride, Newfoundland and Labrador

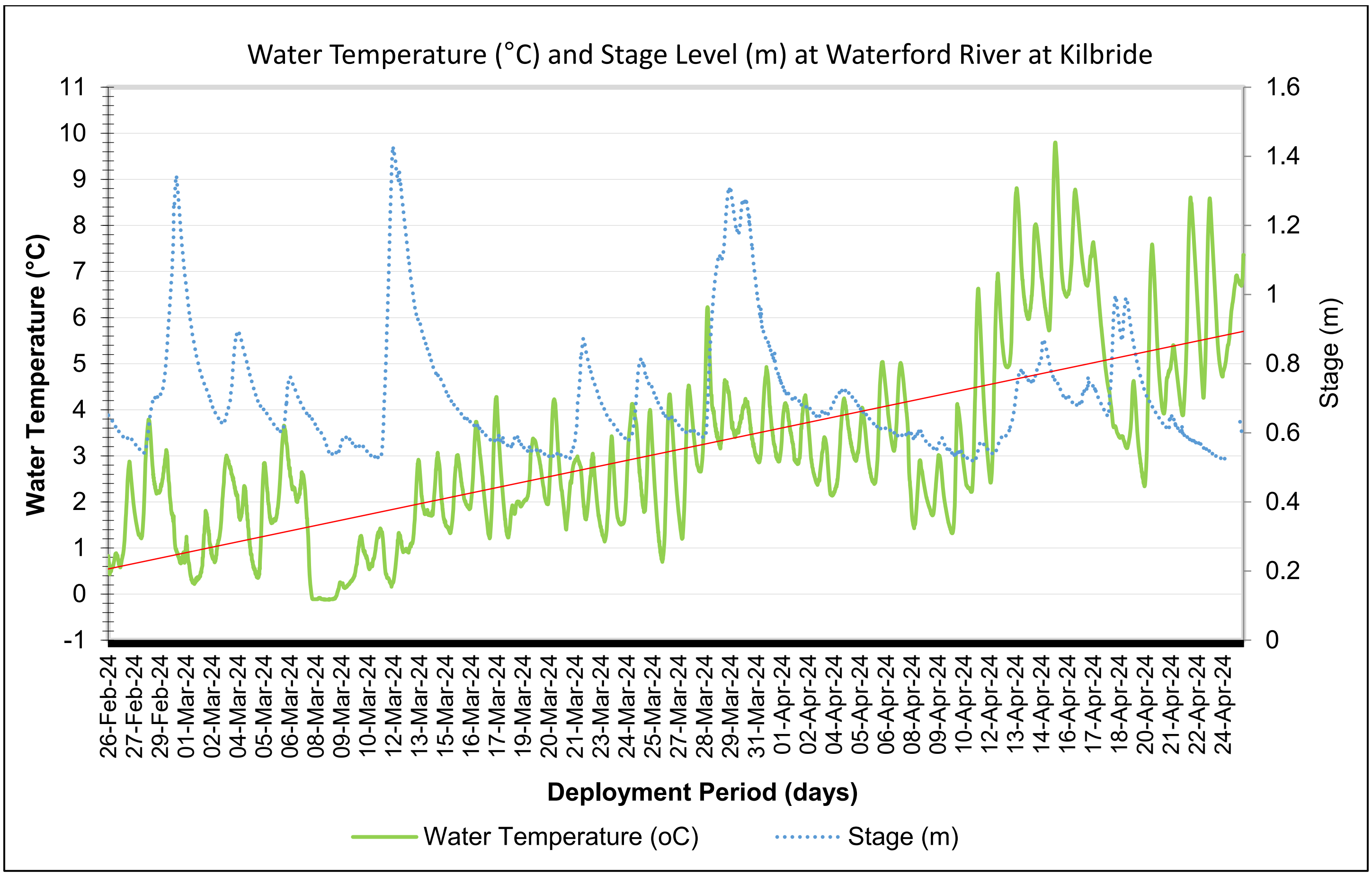
There was variability in conductivity ratings between deployment and grab sampling, with deployment rated as fair and grab sample rated as excellent. The conductivity rating improved to good during removal, indicating the sensor may have taken time to acclimate after deployment.

DATA INTERPRETATION

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. Variations in water temperature can influence biological processes, aquatic habitats, and water chemistry, making it a crucial parameter to monitor in understanding ecosystem dynamics. Additionally, tracking temperature trends over time can provide valuable information for assessing the impacts of climate change, seasonal variations, and anthropogenic influences on aquatic ecosystems.

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.



Temperature (oC)	Mean	Median	Min	Max
Hourly Temp	3.13	2.81	-0.12	9.80
Average Daily)	3.16	2.68	0.59	8.23

Figure 2: Water temperature (°C) and Stage (m) values at Waterford River at Kilbride

The water temperature data in Figure 2, provides valuable insights into the thermal characteristics of the aquatic environment under consideration. With a mean temperature of 3.13°C and a median of 2.81°C, the dataset indicates relatively consistent temperatures across the observations, suggesting stability in thermal conditions over the measured period. The minimum temperature recorded at -0.12° (March 8-9), represents extremely cold conditions, possibly associated with freezing or near-freezing temperatures and expected for this time of year. Conversely, the maximum temperature of 9.80°C (April 15), signifies warmer conditions, likely occurring during periods of higher solar radiation as spring begins.

Analyzing the average daily water temperature for the Waterford River from February 26, 2024, to April 25, 2024, reveals a pattern of seasonal variation and fluctuation influenced by environmental factors. Beginning at 0.59°C on February 26, temperatures gradually rise through March, with occasional drops most likely due to weather fluctuations or changes in water flow dynamics. As the transition from late winter to early spring progresses, temperatures exhibit a more pronounced upward trend, with significant spikes occurring towards the end of March and into April. Notably, the peak temperature of 8.23°C on April 25 marks a substantial increase from the initial measurement.

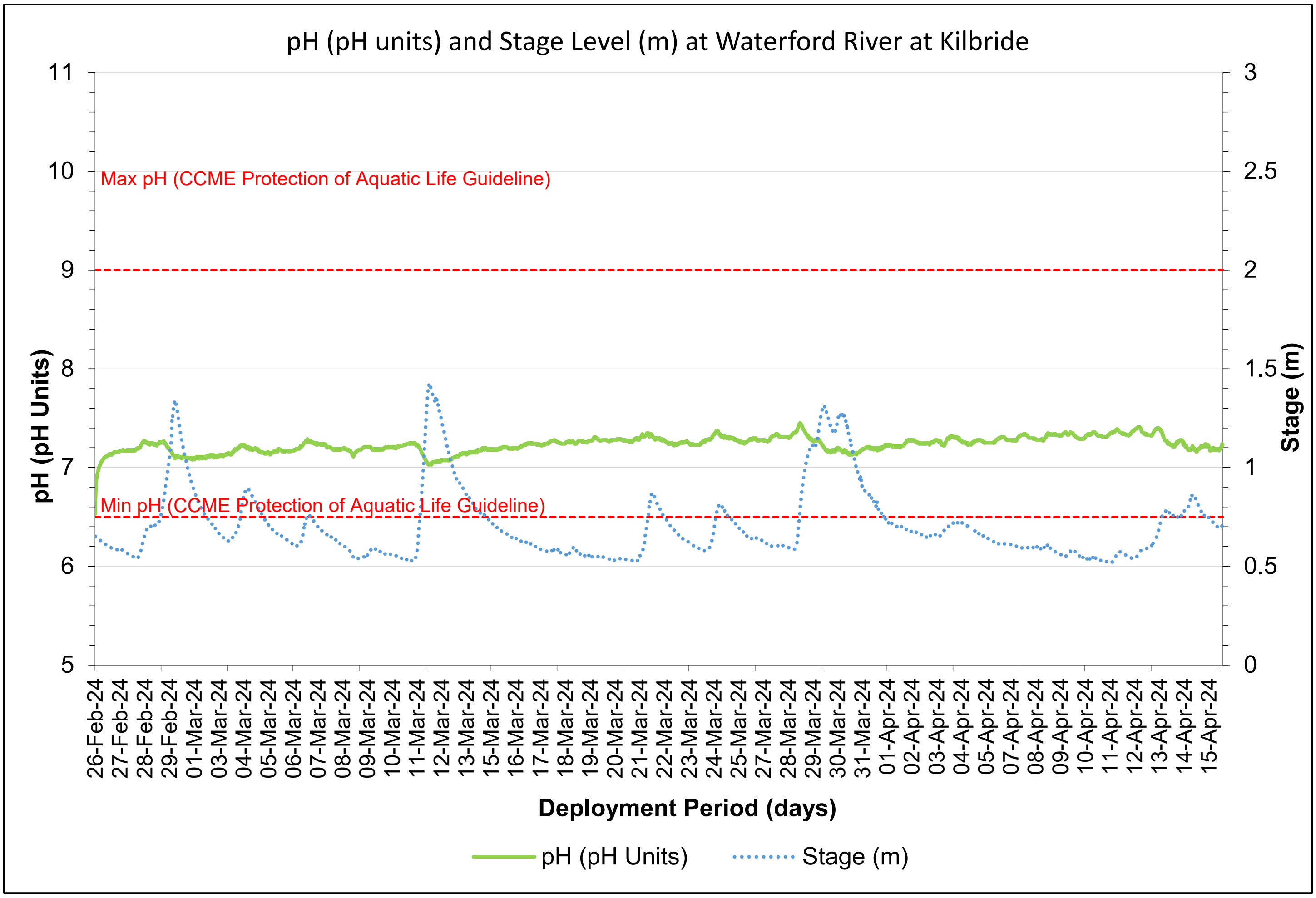
The water temperature dynamics observed reveal an unstable diurnal pattern characterized by temperature increases during the day and decreases overnight. This pattern highlights the river's responsiveness to external influences, particularly daily air temperature fluctuations and precipitation events. Warmer air temperatures during the day contribute to elevated water temperatures, while cooler nighttime temperatures lead to declines. Precipitation events, such as rainfall and snowmelt, also play a significant role, introducing cooler water into the river and contributing to fluctuations in temperature. Additionally, the changing length of days, with increasing daylight hours as spring progresses, likely influences the river's thermal patterns, affecting the duration and intensity of temperature fluctuations.

The hydrometric data presented in this report is provisional and has not undergone quality control checks. Accurate hydrometric data can be accessed at https://wateroffice.ec.gc.ca/ or by request to Water Survey Canada.

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.



Temperature (oC)	Mean	Median	Min	Max
Hourly	7.24	7.25	6.53	7.45
Daily Average	7.24	7.25	7.03	7.36

Figure 3: pH (pH units) and stage level (m) values at Waterford River at Kilbride.

The water pH statistics for the Waterford River provide valuable insight into the acidity or alkalinity levels of the river water during the monitoring period. The mean pH of 7.24 indicates a slightly alkaline nature on average, suggesting that the water tends to be slightly basic overall. Similarly, the median pH of 7.25 reinforces this trend, indicating that most pH measurements clustered around this value. The minimum pH recorded at 6.53 represents the lowest acidity level observed, suggesting occasional fluctuations towards neutrality or even slight acidity. On the other hand, the maximum pH of 7.36 indicates the highest alkalinity level recorded, reflecting instances of relatively higher basicity in the water (Figure 3).

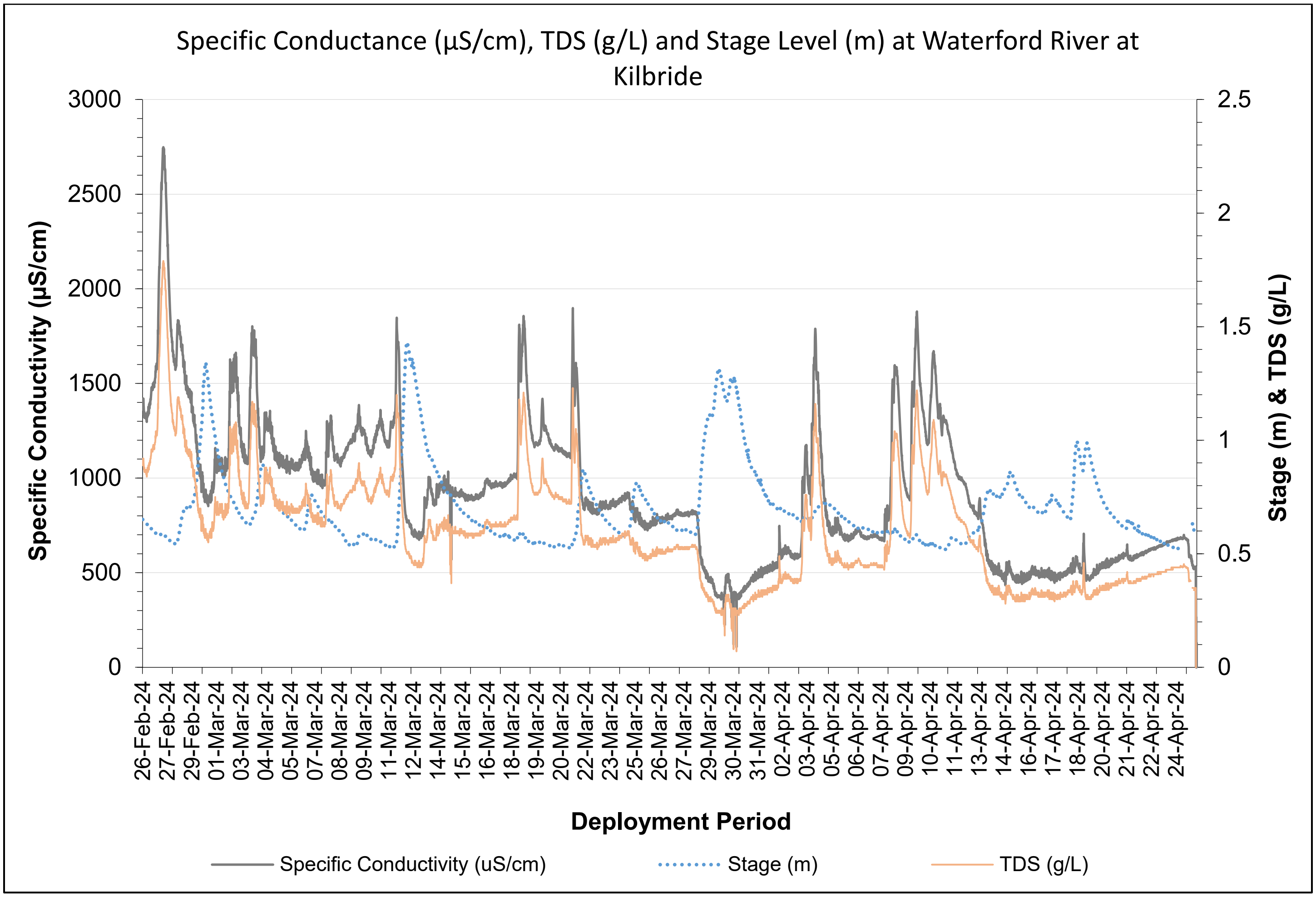
The average daily pH values for the Waterford River exhibit a relatively stable trend over the monitored period, reflecting the acidity or alkalinity levels of the river water. The pH averages range from 7.03 to 7.36, indicating that the water tends to be slightly alkaline on most days. There are minor fluctuations observed, but overall, the pH values remain within a narrow range. Notably, there are some days where the pH reaches slightly higher levels, such as on March 28 and April 11, with pH values of 7.36 and 7.34, respectively.

Conversely, there are days with slightly lower pH levels, such as on February 26 and March 12, with pH values of 7.03 and 7.07, respectively. These variations may be influenced by factors such as natural fluctuations in water chemistry, input from surrounding environments, and changes in weather conditions. Sudden and temporary decreases in pH can be observed during higher stage events, such as on February 29, March 12, and March 30-31. Despite these minor fluctuations, the average pH values suggest that the Waterford River maintains a relatively stable alkaline environment throughout the monitoring period.

The diurnal fluctuation in water pH is temperature dependent and rises during the day followed by nighttime decreases. This pattern emphasizes the river's sensitivity to external factors, especially daily shifts in air temperature and precipitation. When temperatures warm up during the day, the water's pH tends to rise, whereas cooler nights correspond to a decline in pH levels. Thus, due to the minimal expected seasonal temperature range, the pH diurnal pattern is also minimal. This suggests that while daily temperature variations play a significant role in pH fluctuations, the broader seasonal changes have less impact on this particular aspect of water chemistry.

Specific Conductivity & Total Dissolved Solids

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. Monitoring specific conductivity is crucial for assessing water quality, identifying potential sources of contamination, and ensuring the health of aquatic ecosystems. Deviations from expected conductivity levels may signal the need for further investigation and management actions to maintain water quality and ecosystem integrity.



		Mean	Median	Min	Max
Specific Conductivity (µS/cm)	Hourly	920.7	877.3	105.7	2748.9
	Daily Average	921.4	867.99	391.4	2052.28
TDS (mg/L)	Hourly	0.5994	0.5700	0.0700	1.7900
	Daily Average	0.5990	0.5650	0.25	1.330

Figure 4: Specific conductivity (µS/cm), and TDS (g/mL) values at Waterford River at Kilbride.

Waterford River at Kilbride, Newfoundland and Labrador

The specific conductivity and total dissolved solids (TDS) data (Figure 4) for the Waterford River provide essential insights into its chemical composition and overall water quality. The mean specific conductivity of 920.7 µS/cm indicates a moderately high level of ion concentration, reflecting the presence of dissolved salts, minerals, and other conductive substances. This suggests that the river contains a notable amount of dissolved solids, potentially influenced by factors like urban runoff, or natural geological processes. The median conductivity closely aligns with the mean, indicating consistent conductivity levels across the dataset. The minimum conductivity value of 105.7 µS/cm suggests areas with lower ion concentration, possibly due to reduced mineral content or dilution by precipitation events or ice/snowmelt, while the maximum conductivity of 2748.9 µS/cm signifies elevated ion levels, likely influenced by various anthropogenic and natural factors.

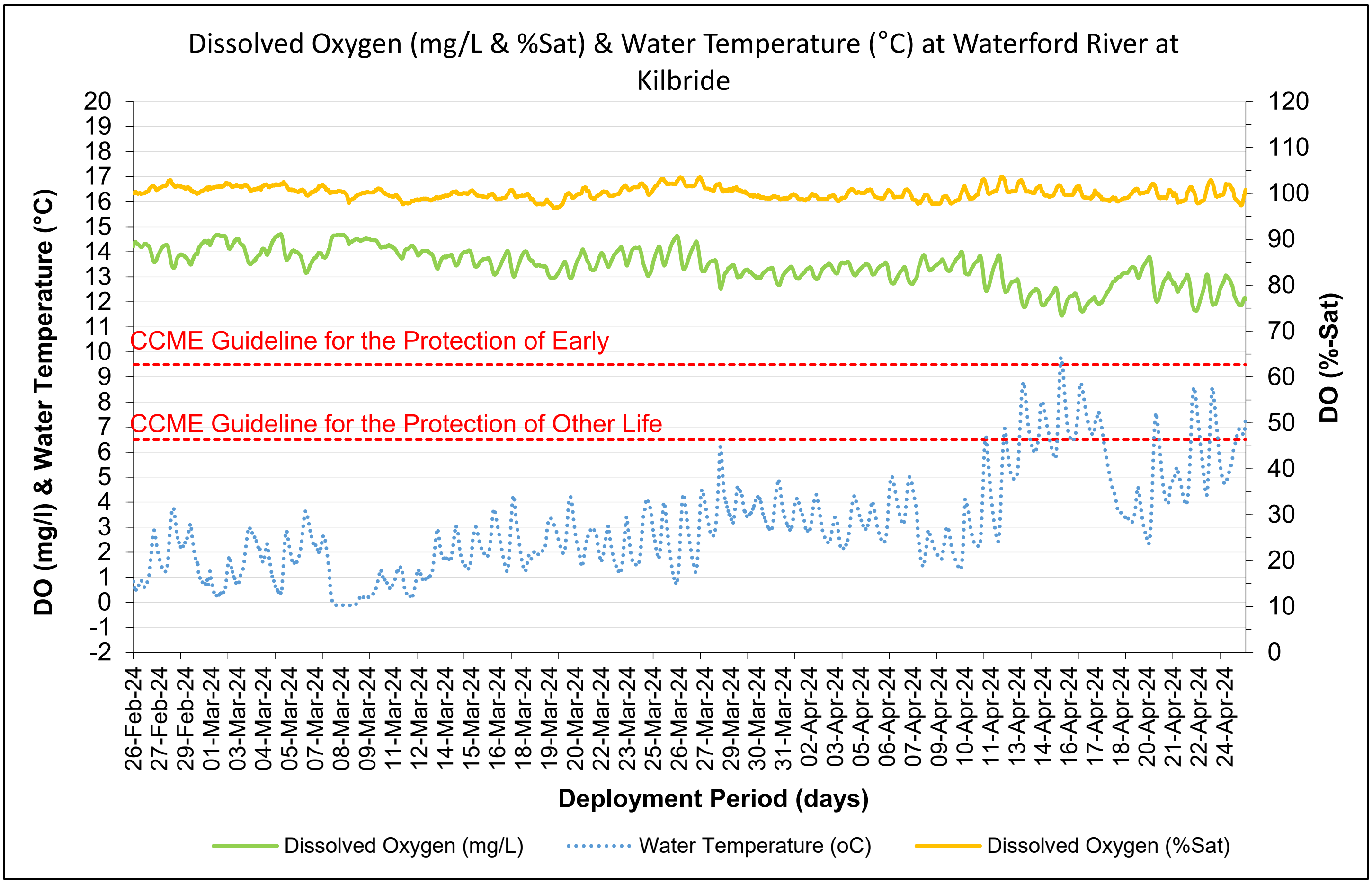
In terms of the calculated TDS, the mean value of 0.5994 mg/L indicates a low concentration of dissolved solids, which is generally favorable for freshwater ecosystems. The median TDS of 0.5700 mg/L suggests consistent dissolved solids levels throughout the dataset. Instances of exceptionally low TDS content, represented by the minimum value of 0.0700 mg/L, may occur in areas with minimal anthropogenic influence or pristine environmental conditions. Conversely, the maximum TDS of 1.7900 mg/L indicates higher concentrations of dissolved solids, potentially influenced by agricultural runoff, urban pollution, or natural geological processes.

Across the recorded dates, daily average specific conductivity values varied considerably. On February 26th, the specific conductivity was relatively high at 1359.19 µS/cm, indicating a notable level of dissolved ions or conductivity-inducing substances in the water. This trend continued with peaks observed on February 27th (2052.28 µS/cm) and February 28th (1701.85 µS/cm), suggesting potential influences from anthropogenic activities or environmental factors. However, a notable decrease in specific conductivity was observed from March 12th onwards, reaching a minimum of 391.4 µS/cm on March 30th. This decline could be attributed to factors such as dilution by freshwater input during high stage precipitation events.

Considering that roads are salted during winter, the elevated specific conductivity and TDS levels in the Waterford River are likely attributed to the runoff of road salt and other de-icing agents into the water. The mean specific conductivity and TDS values indicate the presence of dissolved salts consistent with road salts containing sodium chloride ($NaCl$) and other chemicals. While the median values suggest relatively consistent levels across the dataset, variations in conductivity and TDS may still occur due to other sources of ion contamination, such as natural mineral leaching or urban runoff from non-salted roads. Overall, understanding and managing the impacts of road salt runoff are crucial for maintaining water quality in the Waterford River and other similar ecosystems.

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.



		Mean	Median	Min	Max
DO (%Sat)	Hourly	100.1	100.1	96.8	103.6
	Daily Average	100.3	100.1	97.61	102.36
DO (mg/L)	Hourly	13.42	13.47	11.45	14.71
	Daily Average	13.42	13.49	11.87	14.61

Figure 5: Dissolved Oxygen (mg/L & Percent Saturation) values at Waterford River at Kilbride.

The statistical data for dissolved oxygen (DO) concentrations (mg/L) and percent saturation (% Sat) offers valuable insights into the water quality dynamics of each freshwater river within the monitoring period (Figure 5). The mean DO saturation percentage of 100.1% suggests that, on average, the water is fully saturated with oxygen, which is optimal for aquatic organisms' respiration and survival. This high mean value indicates that the river generally maintains healthy oxygen levels throughout the recorded period. The median DO saturation percentage is consistent with the mean, further confirming the overall stability of oxygen saturation levels.

Waterford River at Kilbride, Newfoundland and Labrador

Examining the minimum and maximum DO saturation percentages provides additional insights into the range of oxygen levels experienced in the river. The minimum value of 96.8% indicates a slight decrease in oxygen saturation, likely influenced by factors such as temperature fluctuations, organic matter decomposition, or reduced water flow. Conversely, the maximum value of 103.6% suggests instances of oxygen supersaturation, which could be caused by factors like increased photosynthetic activity, enhanced aeration, or lower water temperatures.

Considering dissolved oxygen concentrations in milligrams per liter (mg/L), the mean DO concentration of 13.42 mg/L aligns well with the saturation percentage data, indicating adequate oxygen levels to support aquatic life. The median DO concentration is also consistent with the mean, reflecting the stability of dissolved oxygen levels throughout the dataset. The minimum DO concentration of 11.45 mg/L represents a temporary decrease in oxygen levels, likely influenced by environmental factors impacting oxygen solubility or biological oxygen demand.

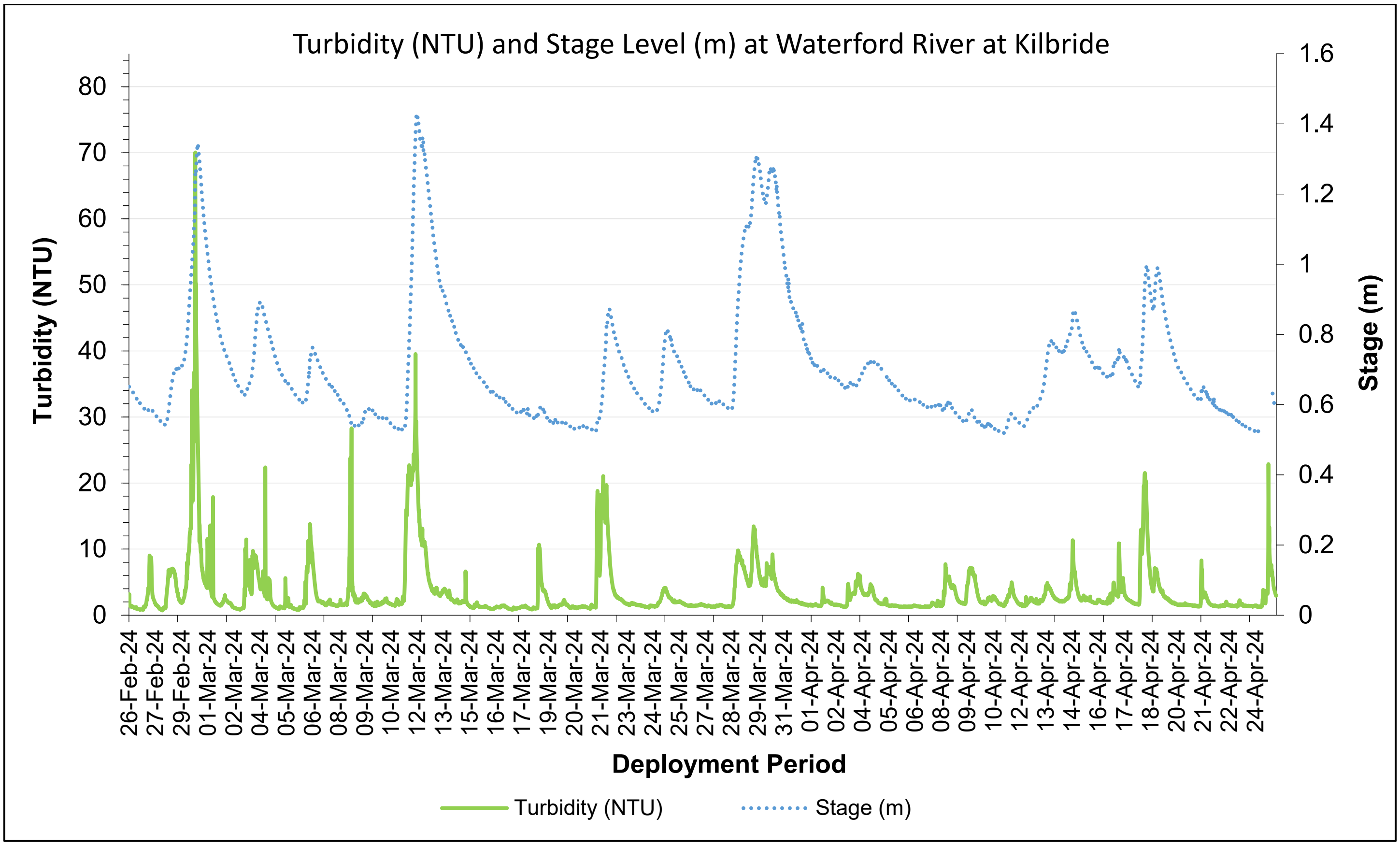
The maximum DO concentration of 14.71 mg/L indicates periods of elevated oxygen levels, which can be beneficial for supporting sensitive aquatic species and promoting overall ecosystem resilience. Together, these metrics provide a comprehensive understanding of dissolved oxygen dynamics in the Waterford River, highlighting its capacity to sustain diverse aquatic communities and ecosystem functions.

The daily average dissolved oxygen (DO) levels for the Waterford River fluctuated over the recorded period, ranging from a minimum of 11.87 mg/L on April 25th to a maximum of 14.61 mg/L on March 8th. The percentage of DO saturation also varied, with values ranging from a minimum of 96.8% on March 1st to a maximum of 103.6% on February 28th. Overall, dissolved oxygen level remained consistently above the Canadian Council of Ministers of the Environment (CCME) Guideline for the Protection of the Other Life (6.5 mg/L), and at or above the CCME guideline of 9.5 mg/l for the protection of early life stage cold water biota for most of the deployment period.

A diurnal variation pattern was evident. The extent of this variation is linked to the daily range of water temperature, duration of daylight, and fluctuations in rates of photosynthesis and respiration. Consequently, the observed attenuation of the diurnal pattern is expected (mid-March to end of deployment period), given the increase in aquatic biotic activity, and broadening daily temperature ranges during the winter to spring season.

Turbidity

Water turbidity is characterized by the cloudiness or haziness caused by suspended particles and can significantly impact water quality. High turbidity reduces light penetration, hindering photosynthesis and affecting aquatic vegetation growth and habitat suitability. It can lead to temperature fluctuations, oxygen depletion from microbial decomposition of organic matter, and sedimentation, smothering benthic habitats and compromising biodiversity. Turbidity can also transport nutrients and pollutants, contributing to eutrophication, algal blooms, and contamination of drinking water sources. Furthermore, it highlights the significance of monitoring and managing turbidity levels to uphold the health and functionality of aquatic ecosystems.



Turbidity (NTU)	Mean	Median	Min	Max
Hourly	3.4	1.9	0.7	70.1
Daily Average	3.33	2.45	1.11	15.24

Figure 6: Turbidity (NTU) and stage (m) values at Waterford River at Kilbride.

The turbidity data for the Waterford River (Figure 6) offers valuable information into the overall water quality and clarity within the river system. With a mean turbidity of 3.4 NTU, the average clarity suggests moderately clear water conditions with some suspended particles or sediment present. The median turbidity value of 1.9 NTU closely aligns with the mean, indicating relatively consistent clarity across the dataset, albeit with some variability. The minimum turbidity value of 0.7 NTU represents periods of relatively clear water, indicating good visibility within the river. However, the maximum turbidity recorded at 70.1 NTU signifies instances of significantly elevated cloudiness, likely caused by factors such as sediment runoff, increased turbidity from rainfall events, or other environmental disturbances.

Review of the average daily turbidity revealed that from February 26 to March 2, there were relatively low turbidity levels, with values mostly below 5 NTU. However, on February 29 and March 1, there were sudden spikes in turbidity, reaching 12.44 NTU and 8.93 NTU, respectively.

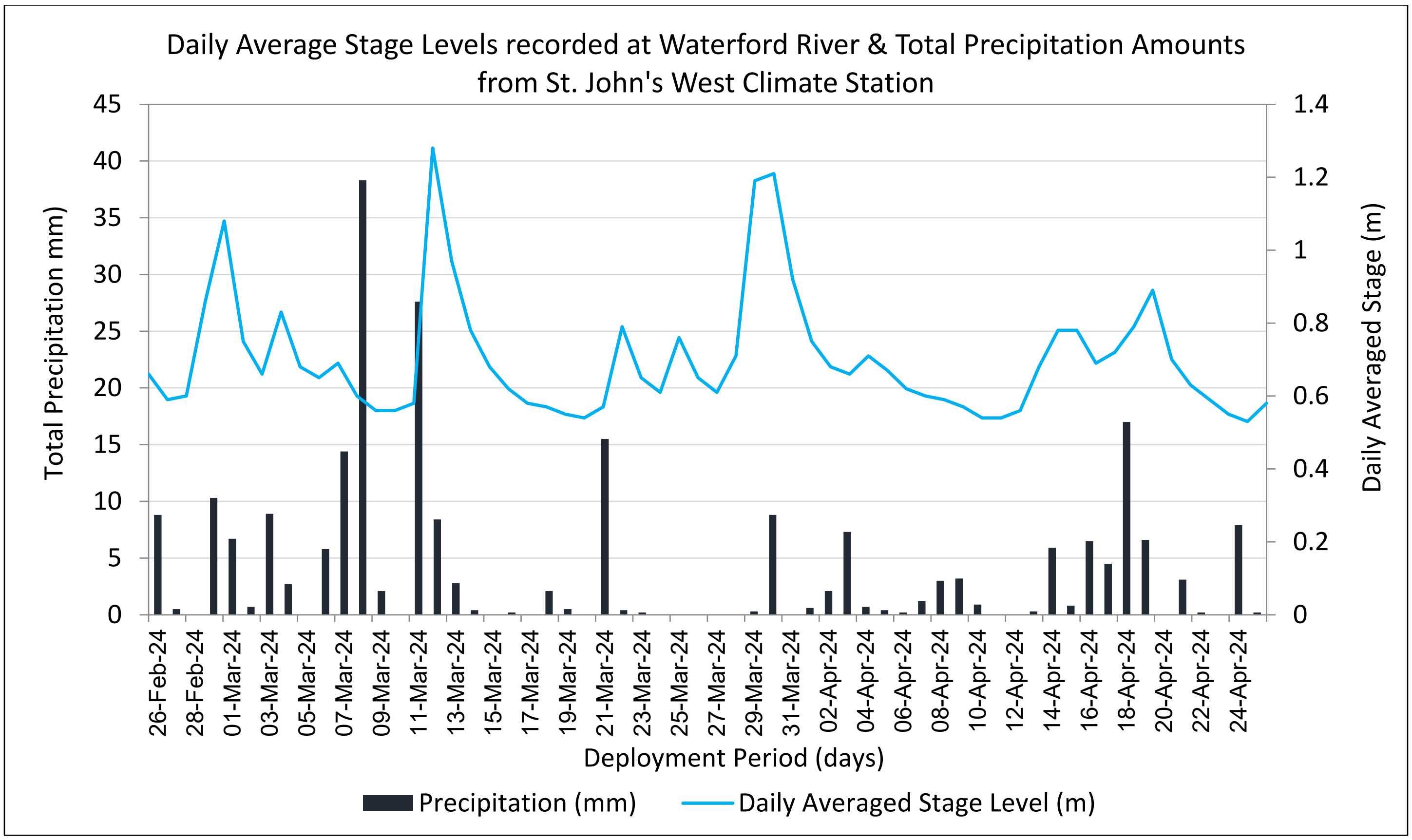
After March 2, turbidity levels generally decreased but remained somewhat variable. There were occasional spikes in turbidity, such as on March 11 and March 12, where turbidity levels rose significantly to 6.7 NTU and 15.24 NTU, respectively. These spikes could suggest episodic events like stormwater runoff or erosion.

Overall, the turbidity data indicates fluctuating water quality in the Waterford River, likely influenced by both natural processes and human activities. Monitoring turbidity levels is crucial for assessing water quality and understanding the health of aquatic ecosystems, as high turbidity can impact aquatic habitats and indicate potential pollution or sedimentation issues. Regular monitoring and management efforts may be necessary to mitigate sources of turbidity and maintain water quality in the river.

Stage and Precipitation

Stage values are determined by a vertical reference and serves as an approximation of the water level at the monitoring station. In addition, stage plays a vital role in understanding various environmental parameters like specific conductivity, dissolved oxygen (DO), and turbidity. It typically rises in response to rainfall events, reflecting the influx of water into the river system. However, during snowfall, the increase in stage may not be as pronounced due to factors such as snow accumulation, which takes time to melt and contribute significantly to the water level. By tracking stage variations, we gain valuable insights into the impact of precipitation on river dynamics, helping us assess water quantity, quality, and potential environmental implications.

The hydrometric data presented in this report is provisional and has not undergone quality control checks. Accurate hydrometric data can be accessed at https://wateroffice.ec.gc.ca/ or by request to Water Survey Canada.



Stage (m)	Mean	Median	Min	Max
Hourly	0.70	0.65	0.52	1.43
Daily Average	0.70	0.66	0.53	1.28

Figure 7: Daily average stage (m) values recorded at Waterford River at Kilbride and daily total precipitation (mm) from St. John's West Climate Station.

The stage data for the Waterford River provides valuable insights into the river's behavior and hydrological dynamics over the observed period. With a mean stage of 0.70 units, we can infer the average level of the river during this time frame, serving as a central reference point for understanding its overall behavior. The median stage of 0.65 units, closely aligned with the mean, suggests a relatively symmetrical distribution of stage levels, indicating a balance between higher and lower values. However, the range from the minimum stage of 0.52 units to the maximum stage of 1.43 units underscores the significant variability in river levels (Figure 7).

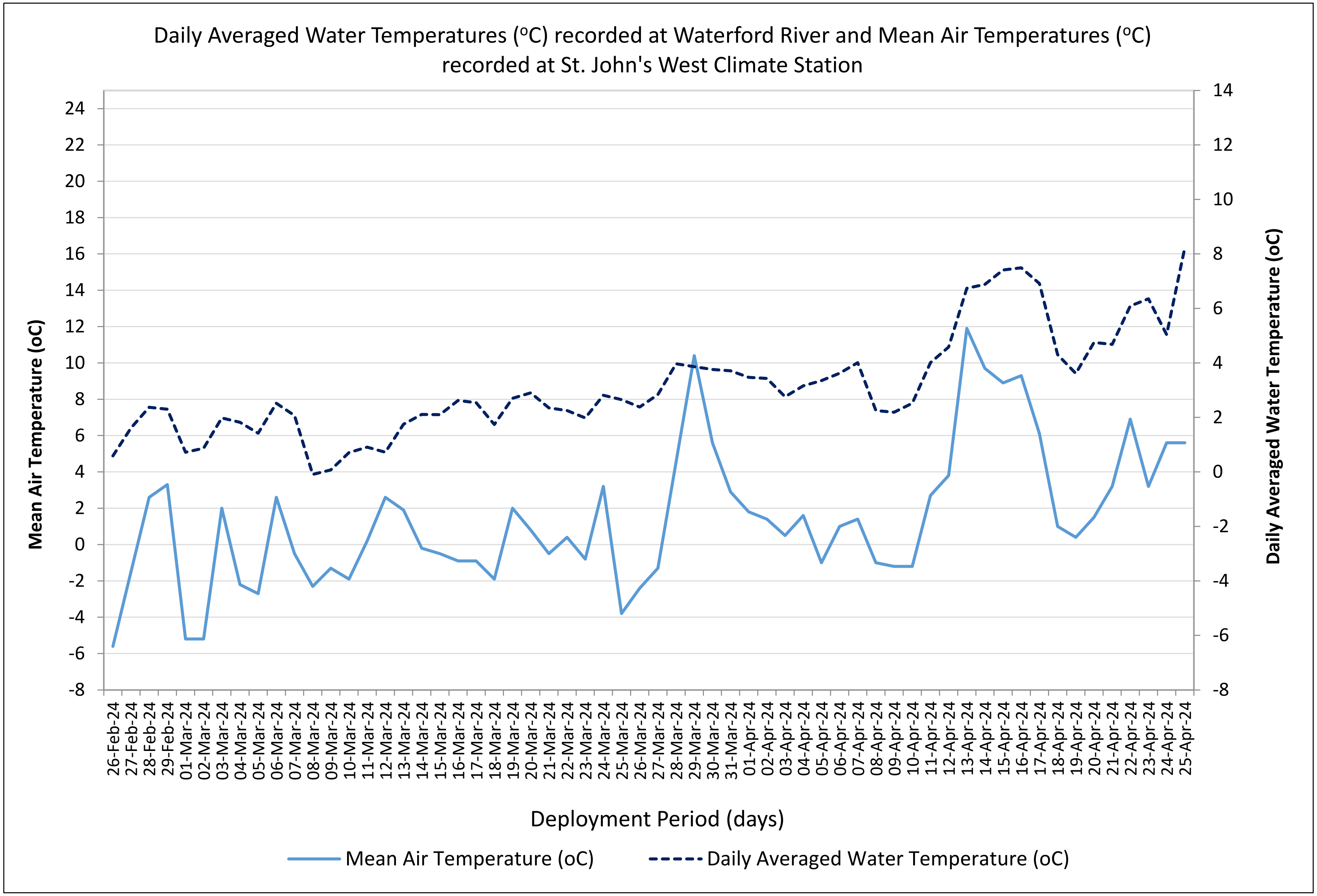
The average daily stage fluctuated throughout the recorded period, ranging from a minimum of 0.53 meters on April 24th to a maximum of 1.28 meters on March 12th. Lower stage values, such as those observed in late March and early April, indicate periods of decreased water flow conditions, which could impact water quality, aquatic life, and recreational activities dependent on the river. Conversely, higher stage values, like those recorded in late February and early March, can play a crucial role in replenishing groundwater reserves, mitigating flood risks, and supporting the movement of sediment and nutrients within the river system.

These variations in water level may be influenced by factors such as precipitation, and snowmelt. Comparing the stage data with the daily total precipitation allows us to understand the relationship between river levels and precipitation events. From February 26th to March 12th, there's a noticeable pattern: on days with higher precipitation, such as March 7th with 14.4 mm or March 8th with 38.3 mm, the average stage of the river tends to increase. This indicates that heavy rainfall contributes to rising water levels in the river, which is a typical response to increased runoff.

Conversely, during periods of low or no precipitation, such as February 28th or March 5th to March 6th, the stage of the river tends to remain relatively stable or decrease slightly. This suggests that without significant input from precipitation, the river's water level is primarily influenced by other factors such as snowmelt, groundwater discharge, or upstream reservoir releases.

It's important to note that there are instances where precipitation doesn't lead to an immediate increase in river stage. For example, on March 13th, despite receiving 2.8 mm of precipitation, the stage only experienced a slight fluctuation. This is likely because the precipitation fell as snow and did not wash into the river immediately.

APPENDIX A: MEAN DAILY AIR TEMPERATURE AND AVERAGE WATER TEMPERATURE



Daily Averaged Water Temperatures (°C) recorded at Waterford River and Mean Air Temperatures (°C) recorded at St. John's West Climate Station
Mean Air Temperature (oC)
Daily Averaged Water Temperature (oC)
24
22
20
18
16
14
12
10
8
6
4
2
0
-2
-4
-6
-8
26-Feb-24
27-Feb-24
28-Feb-24
29-Feb-24
01-Mar-24
02-Mar-24
03-Mar-24
04-Mar-24
05-Mar-24
06-Mar-24
07-Mar-24
08-Mar-24
09-Mar-24
10-Mar-24
11-Mar-24
12-Mar-24
13-Mar-24
14-Mar-24
15-Mar-24
16-Mar-24
17-Mar-24
18-Mar-24
19-Mar-24
20-Mar-24
21-Mar-24
22-Mar-24
23-Mar-24
24-Mar-24
25-Mar-24
26-Mar-24
27-Mar-24
28-Mar-24
29-Mar-24
30-Mar-24
31-Mar-24
01-Apr-24
02-Apr-24
03-Apr-24
04-Apr-24
05-Apr-24
06-Apr-24
07-Apr-24
08-Apr-24
09-Apr-24
10-Apr-24
11-Apr-24
12-Apr-24
13-Apr-24
14-Apr-24
15-Apr-24
16-Apr-24
17-Apr-24
18-Apr-24
19-Apr-24
20-Apr-24
21-Apr-24
22-Apr-24
23-Apr-24
24-Apr-24
25-Apr-24
14
12
10
8
6
4
2
0
-2
-4
-6
-8
Deployment Period (days)
Mean Air Temperature (oC)
Daily Averaged Water Temperature (oC)

APPENDIX B: QA/QC GRAB SAMPLE FIELD RESULTS