

Real Time Water Quality Deployment Report

New Found Gold Corp.

NF02YQ0075 & NF02YQ0076

2024-10-08 to 2024-11-26



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



New Found Gold

In 2024, the Water Resources Management Division (WRMD), in partnership with New Found Gold Corp., established a real time water quality and quantity monitoring network in and around the Queensway Project in central Newfoundland. Two new monitoring stations for surface water quality and quantity were installed on-site in October 2024.

This report will review the water quality data for the real-time monitoring stations, Hermans Pond Brook and Pond 226 Brook, for the duration of 2024-10-08 through to 2024-11-26. The water quality instruments were removed at the conclusion of this deployment period for the winter season to prevent potential damage from ice or low temperatures. They will be redeployed in Spring 2025.

These stations are a part of the NL Real-Time Water Quality Monitoring Network. The stations are maintained by the Department of Environment and Climate Change, Water Resources Management Division. WRMD staff are responsible for the maintenance and calibration of the water quality and hydrometric instrumentation deployed at these sites. The data recorded by the real-time water quality stations is available on [WRMD's website](#).

For the purposes of this report, air temperature and total precipitation data were used from the weather station located at the Gander International Airport. The data was retrieved from <https://climate.weather.gc.ca/>

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. With the exception of water quantity data (stage), all data used in the preparation of the graphs and subsequent discussion adhere to this stringent QA/QC protocol. Corrected data can be obtained upon request.

Parameter	Excellent	Good	Fair	Marginal	Poor
pH	$\leq \pm 0.2$ units	$\leq \pm 0.21 - 0.5$ units	$\leq \pm 0.51 - 0.8$ units	$\leq \pm 0.81 - 1$ units	$> \pm 1$ units
Water Temperature	$\leq \pm 0.2^\circ\text{C}$	$\leq \pm 0.21 - 0.5^\circ\text{C}$	$\leq \pm 0.51 - 0.8^\circ\text{C}$	$\leq \pm 0.81 - 1^\circ\text{C}$	$> \pm 1^\circ\text{C}$
Dissolved oxygen	$\leq \pm 0.3 \text{ mg/L}$	$\leq \pm 0.31 - 0.5 \text{ mg/L}$	$\leq \pm 0.51 - 0.8 \text{ mg/L}$	$\leq \pm 0.81 - 1 \text{ mg/L}$	$> \pm 1 \text{ mg/L}$
Turbidity	$\leq \pm 2$ turbidity units or $\leq \pm 5\%$, whichever is greater	$\leq \pm 2.1-5$ turbidity units or $\leq \pm 5.1-10\%$, whichever is greater	$\leq \pm 5.1-8$ turbidity units or $\leq \pm 10.1-15\%$, whichever is greater	$\leq \pm 8.1-10$ turbidity units or $\leq \pm 15.1-20\%$, whichever is greater	$> \pm 10$ turbidity units or $> \pm 20\%$, whichever is greater
Specific Conductance	$\leq \pm 3 \mu\text{S/cm}$ or $\leq \pm 3\%$, whichever is greater	$\leq \pm 3.1-10 \mu\text{S/cm}$ or $\leq \pm 3.1-10\%$, whichever is greater	$\leq \pm 10 - 15 \mu\text{S/cm}$ or $\leq \pm 10.1-15\%$, whichever is greater	$\leq \pm 15.1 - 20 \mu\text{S/cm}$ or $\leq \pm 15.1-20\%$, whichever is greater	$> \pm 20 \mu\text{S/cm}$ or $> \pm 20\%$, whichever is greater

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 parameters recorded by the Field Sonde and QA/QC Sonde at deployment and at removal, a qualitative statement is made on the data quality. There are a few circumstances which may cause QA/QC rankings below excellent, including the placement of the QA/QC sonde in relation to the field sonde, the amount of time each sonde was given to stabilize before readings were recorded, and deteriorating performance of one of the sensors.

The temperature sensor on any sonde is the most important. All other parameters can be divided into subgroups of: temperature dependent, temperature compensated, and temperature independent. Due to the temperature sensor's location on the sonde, the entire sonde must be at a constant temperature before the temperature 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.

Additionally, grab samples are collected during deployment to compare pH, specific conductivity and turbidity values between the field instrument and grab samples. Variability in results may be attributed to differences in the sampling location or depth relative to the sonde's deployment site or insufficient equilibration time for the sonde when initial field data was collected.

Hydrometric Data

Water Resources Management Division hydrometric (stage and flow) data is quality controlled on a less frequent basis than water quality data due to differences in protocols. The hydrometric data shown in this report is provisional and has not undergone quality control checks.

Quality Assurance and Quality Control

Deployment Period Rankings



QAQC Rankings

Station	Parameter	Deployment Rank	Deployment Grab Sample Rank	Removal Rank	Removal Grab Sample Rank
Hermans Pond Brook	Dissolved Oxygen (mg/l)	Excellent		Excellent	
Hermans Pond Brook	pH	Excellent	Good	Excellent	Excellent
Hermans Pond Brook	Specific Conductivity (µS/cm)	Excellent	Good	Good	Good
Hermans Pond Brook	Temperature (°C)	Excellent		Excellent	
Hermans Pond Brook	Turbidity (NTU)	Excellent	Excellent	Excellent	Good
Pond 226 Brook	Dissolved Oxygen (mg/l)	Excellent		Excellent	
Pond 226 Brook	pH	Excellent	Good	Excellent	Good
Pond 226 Brook	Specific Conductivity (µS/cm)	Excellent	Excellent	Good	Excellent
Pond 226 Brook	Temperature (°C)	Excellent		Excellent	
Pond 226 Brook	Turbidity (NTU)	Excellent	Excellent	Excellent	Excellent

Upon deployment, all parameters at both stations were rated as excellent, indicating minimal discrepancies between field sonde readings and QAQC sonde measurements.

At the time of removal, all parameters were rated good or excellent at both stations.

As the instruments were removed for the winter season at the end of this deployment period, grab samples were taken during the removal process for comparison purposes, in addition to the routine grab samples collected during deployment. Upon deployment and removal, grab sample rankings were good or excellent for all parameters at both stations.

Water Temperature (°C)



Hermans Pond Brook

6.81	6.73
Average	Median
2.01	12.68
Minimum	Maximum

Pond 226 Brook

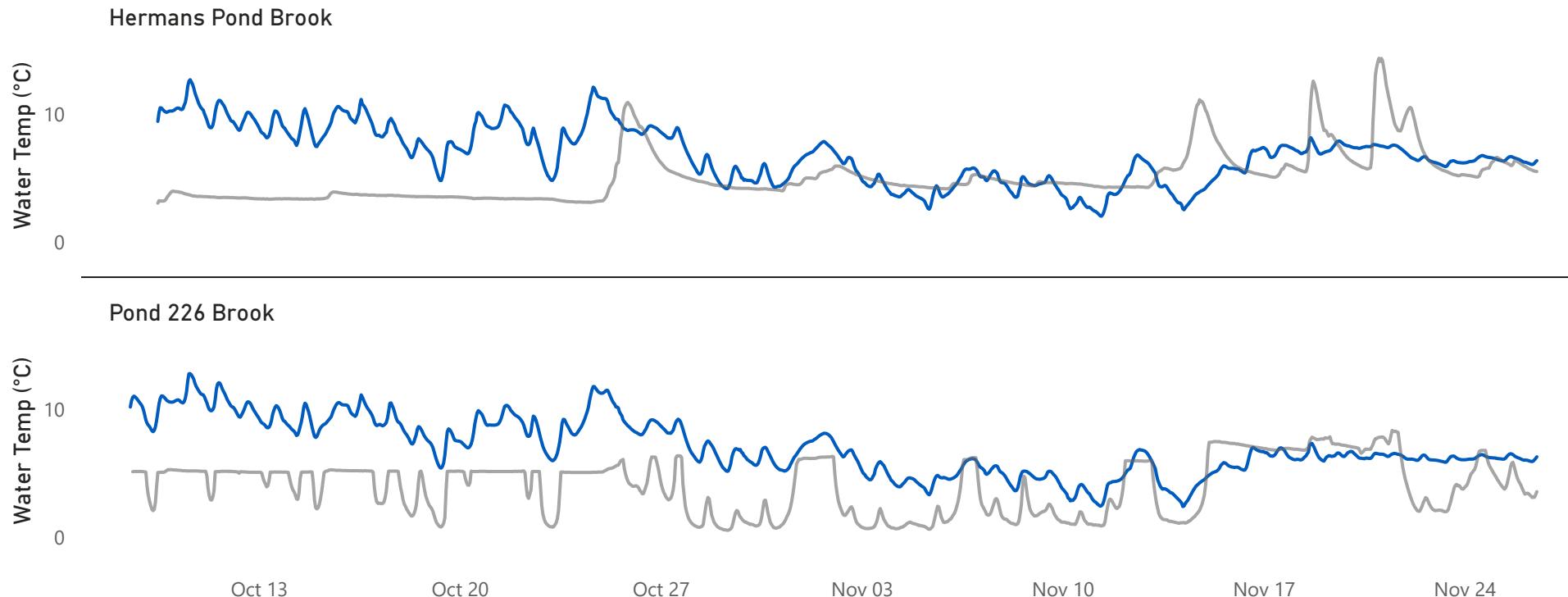
7.03	6.50
Average	Median
2.39	12.78
Minimum	Maximum

Water temperature plays a crucial role in wildlife health, as many organisms rely on air and water conditions to regulate their body temperatures. Additionally, water temperature affects other key parameters, such as dissolved oxygen levels and specific conductivity.

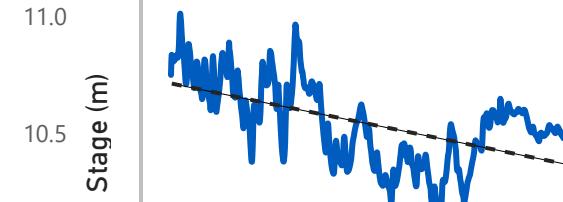
Water temperature at Hermans Pond Brook ranged between 2.01°C to 12.68°C, while water temperature at Pond 226 Brook ranged between 2.39°C to 12.78°C. Medians at both stations are similar.

Throughout this deployment period, a natural diurnal pattern was evident, with warmer temperatures during daylight hours and cooler temperatures at night. A decreasing trend was observed at both stations, which would be expected during the seasonal transition into winter.

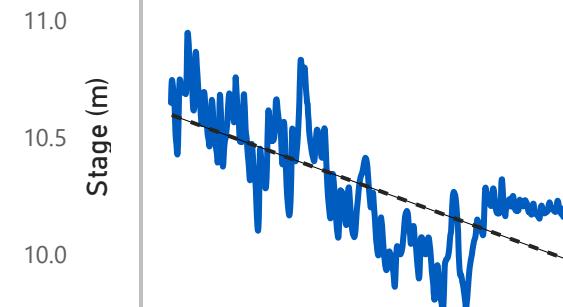
● Water Temp (°C) ● Stage (m)



Hermans Pond Brook Trendline



Pond 226 Brook Trendline



pH (pH Units)



Hermans Pond Brook

6.82	6.88
Average	Median
6.17	7.03
Minimum	Maximum

Pond 226 Brook

6.43	6.46
Average	Median
5.99	6.63
Minimum	Maximum

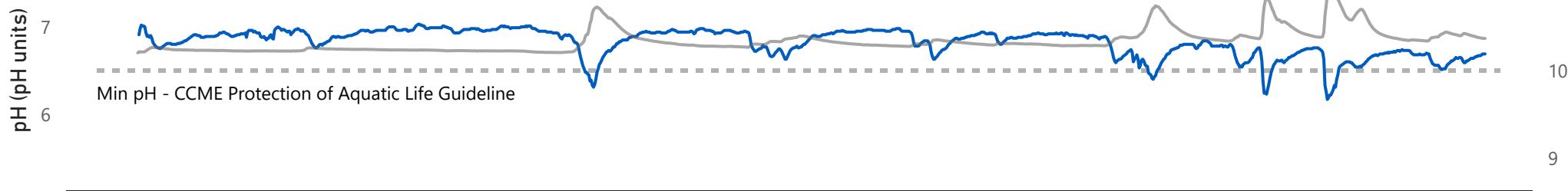
pH relates to the free hydrogen ions in water and it is a measure of acidity in water. According to the [Canadian Council of Ministers of the Environment](#) (CCME) Freshwater Aquatic Life Guidelines, the recommended pH range for aquatic health is between 6.5 and 9.0. However, many rivers in Newfoundland and Labrador are naturally more acidic due to the local geology. Water parameter maps can be found on the [Water Resources Management website](#).

pH at Hermans Pond Brook ranged between 6.17 to 7.03 pH units, while pH at Pond 226 Brook ranged between 5.99 to 6.63 pH units. Overall, pH was generally stable at both stations throughout the deployment period. Daily fluctuations in pH are typical and are often influenced by temperature changes, precipitation and the respiration of aquatic plants. There is a noticeable decrease in pH around October 25th at both stations coinciding with a stage increase, related to a precipitation event. Rainwater, naturally lower in pH, can briefly dilute the water and cause a temporary drop in pH, but levels generally return to normal within a few days to weeks. pH at Hermans Pond Brook is more variable towards the end of the deployment period due to frequent precipitation events.

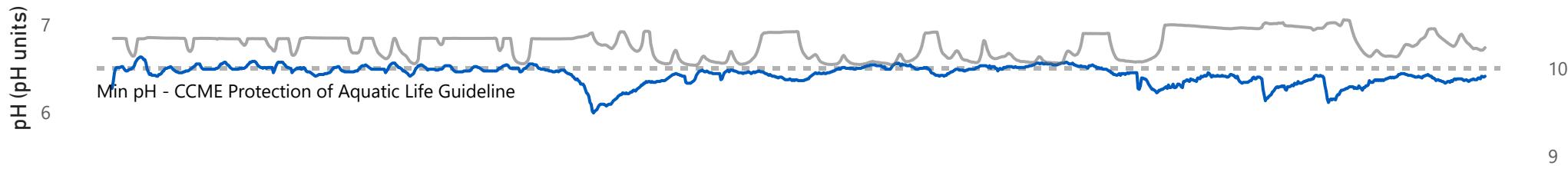
pH levels at Hermans Pond Brook generally remained within the CCME guidelines of 6.5 to 9.0 pH units, with occasional brief dips below the minimum guideline. These dips occurred when stage levels increased during precipitation events, but the pH quickly rose back above 6.5 shortly afterward. At Pond 226 Brook, pH fluctuated around the minimum guideline value of 6.5, though it remained below this minimum for most of the deployment period.

● pH (pH units) ● Stage (m)

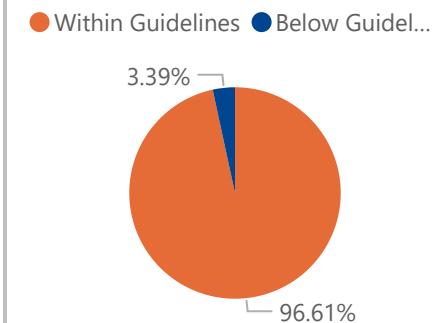
Hermans Pond Brook



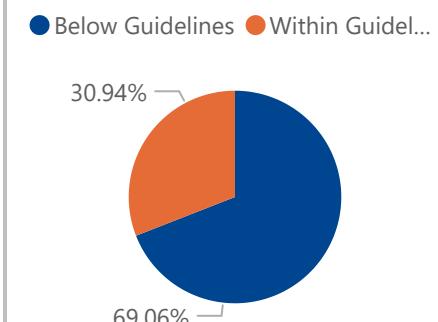
Pond 226 Brook



Hermans Pond Brook



Pond 226 Brook



Specific Conductivity ($\mu\text{S}/\text{cm}$)



Conductivity relates to the ability of an electric charge to pass through a solution. Pure water has low conductance and water with dissolved ions has higher conductance. Specific conductance is corrected to 25°C to allow comparison across variable temperatures. Water parameter maps can be found on the [Water Resources Management website](#). Specific conductivity is often affected by precipitation, as rainwater often has a lower conductivity and can temporarily dilute the water column, resulting in a short-term decrease in conductivity.

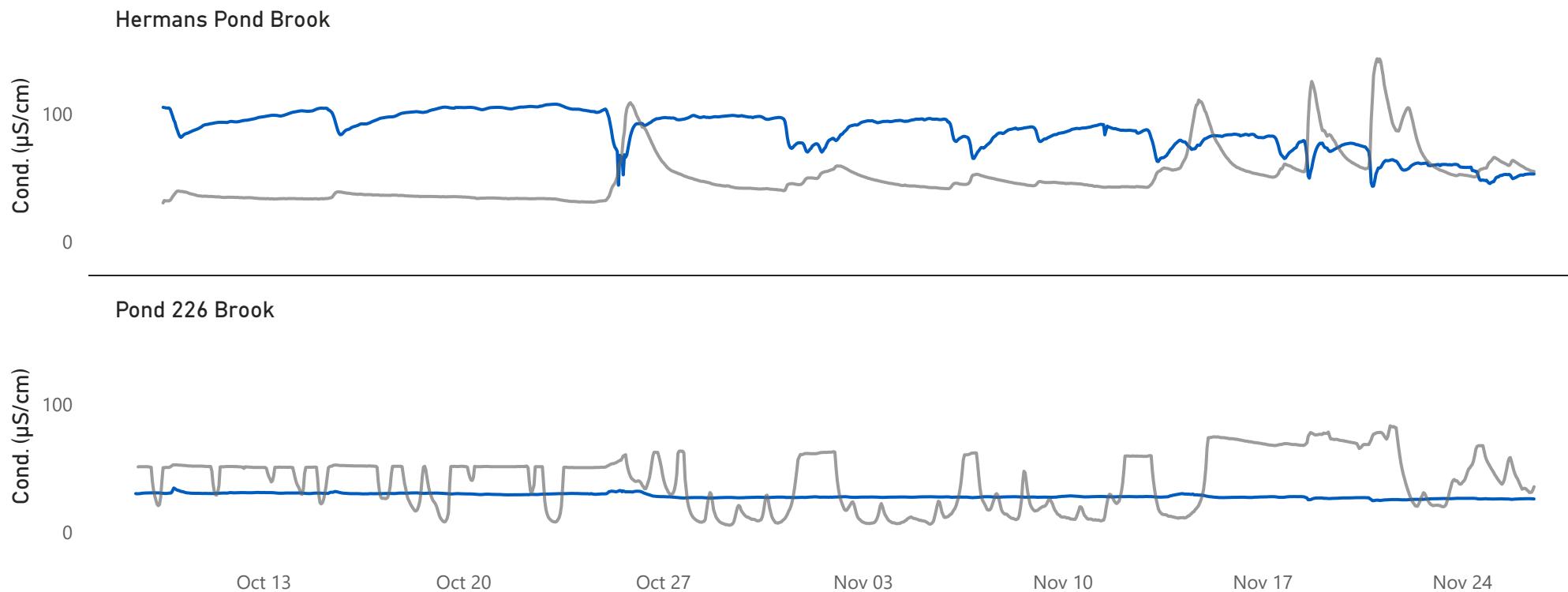
Hermans Pond Brook

86.39	89.74
Average	Median
43.37	107.86
Minimum	Maximum

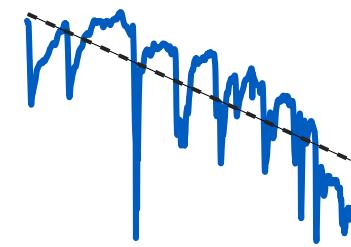
Pond 226 Brook

28.37	27.67
Average	Median
24.57	34.56
Minimum	Maximum

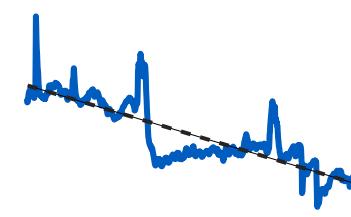
● Specific Conductivity ($\mu\text{S}/\text{cm}$) ● Stage (m)



Hermans Pond Brook Trendline



Pond 226 Brook Trendline



Dissolved Oxygen

(mg/L and % Sat)



Hermans Pond Brook

12.13	12.15
Average	Median
9.80	14.10
Minimum	Maximum

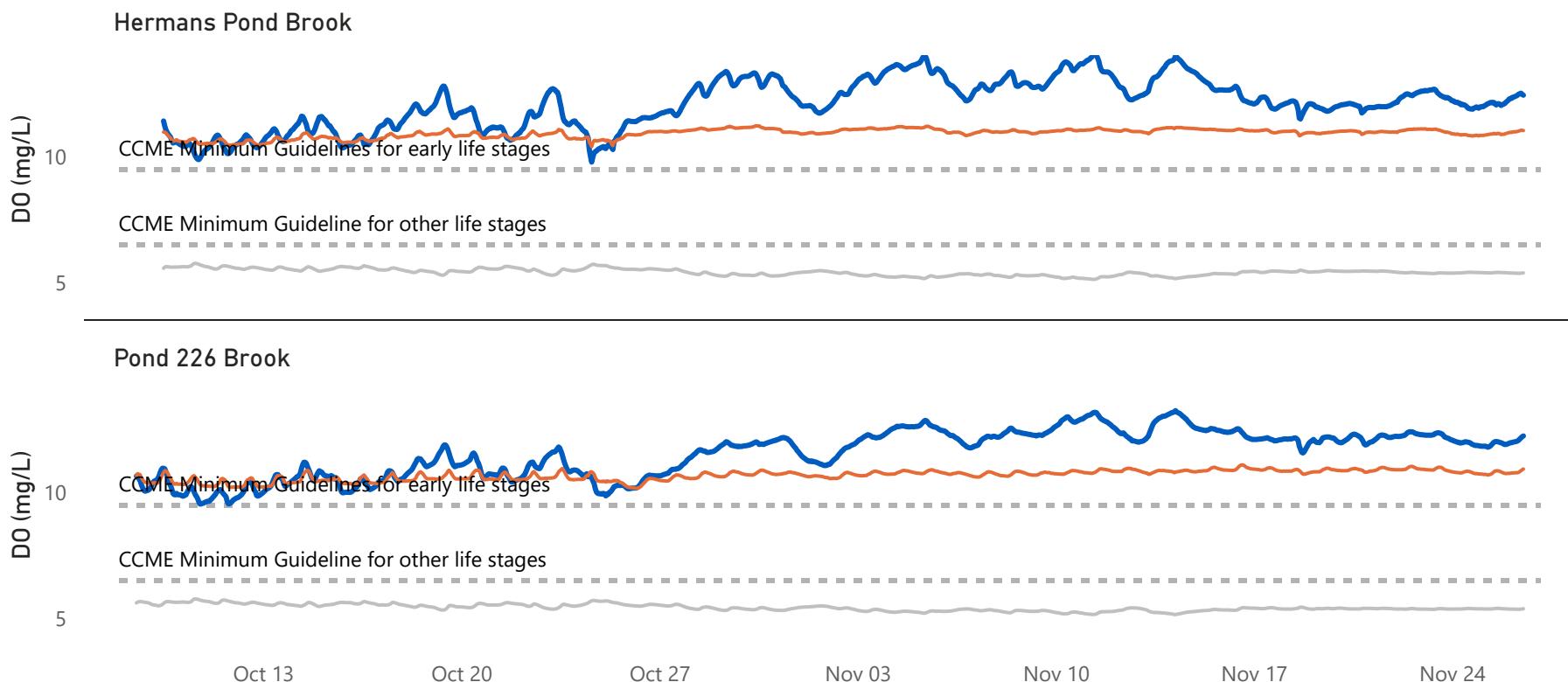
Pond 226 Brook

11.57	11.89
Average	Median
9.55	13.28
Minimum	Maximum

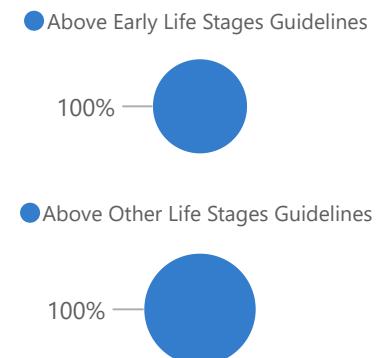
Dissolved oxygen (DO) in water is crucial for aquatic life. The [CCME](#) Freshwater Aquatic Life Guidelines provide benchmarks to assess waterway health, with the minimum DO guideline being 9.5 mg/L for early life stages in cold water and 6.5 mg/L for other life stages. DO levels are influenced by water temperature, with colder water able to retain higher DO concentrations. This inverse relationship can be observed on the graphs below, as well as daily fluctuations that can be attributed to changes in temperature and respiration of aquatic plants.

DO at Hermans Pond Brook ranged between 9.80 mg/L and 14.10 mg/L, while DO at Pond 226 Brook ranged between 9.55 mg/L and 13.28 mg/L. Values stayed above the CCME Guideline for the protection of other life stages and early life stages at both stations throughout the deployment period. DO generally increased throughout the period, which is expected given the decreasing water temperatures as winter approaches.

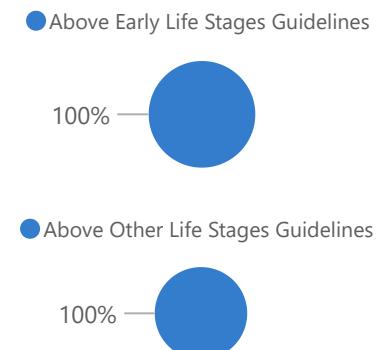
● DO (mg/L) ● % Saturation ● Water Temperature (°C)



Hermans Pond Brook



Pond 226 Brook



Turbidity (NTU)



Turbidity, or water cloudiness, often increases during precipitation events when runoff carries silt and debris into the waterbody. Elevated turbidity can block light from reaching aquatic plants, disrupt benthic habitats, and harm fish gills or equipment.

Hermans Pond Brook

9.11	5.84
Average	Median
0.47	416.23
Minimum	Maximum

Pond 226 Brook

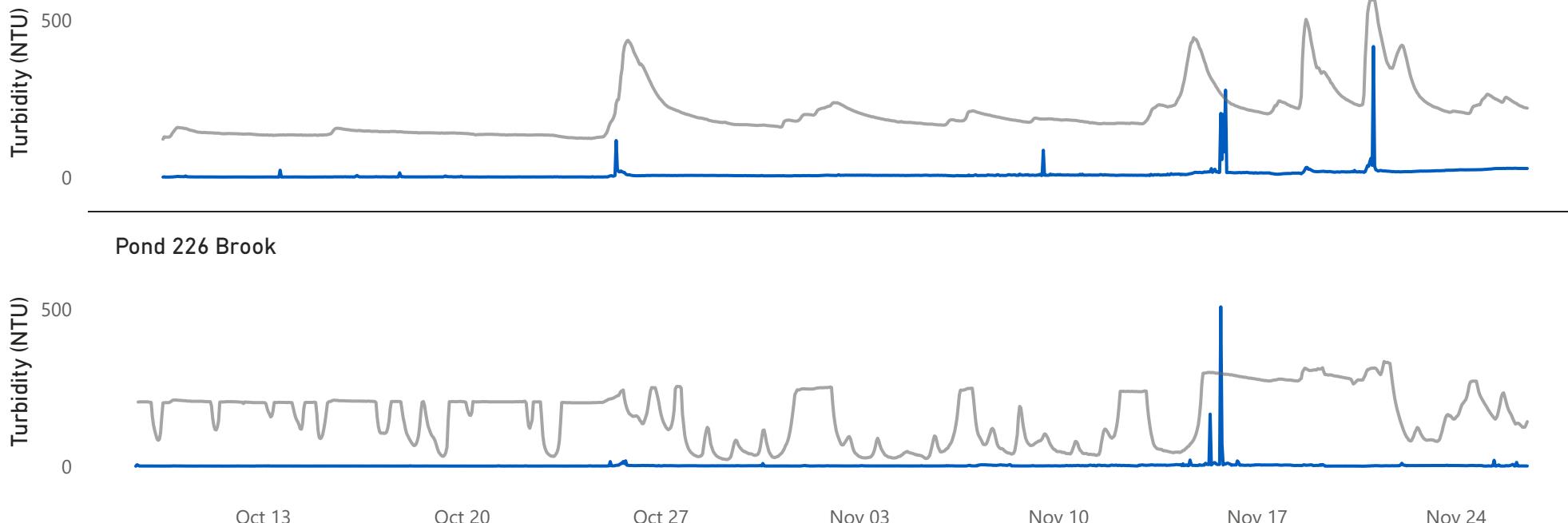
2.57	1.21
Average	Median
0.27	507.68
Minimum	Maximum

Turbidity at Hermans Pond Brook ranged between 0.47 NTU and 416.23 NTU, while turbidity at Pond 226 Brook ranged between 0.27 NTU and 507.68 NTU. Turbidity at both stations remained relatively low and stable throughout the deployment period, with a slightly increasing trend. Turbidity spikes are often associated with precipitation events or sediment passing by the sensor during measurements. A spike was observed at both stations around November 15th, likely related to the stage increase that occurred shortly before the spike.

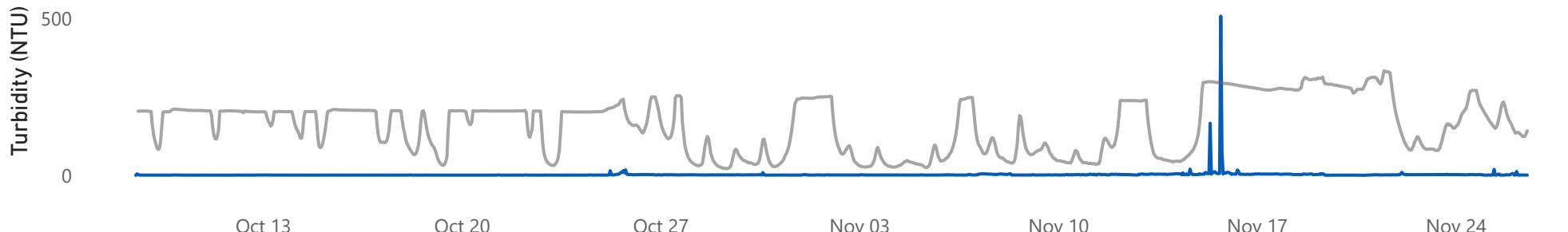
Hermans Pond Brook is a narrow, shallow waterway, with the real-time monitoring station located about 10 meters upstream from an access road bridge. This brook naturally has slightly higher background turbidity levels compared to Pond 226 Brook. Turbidity tends to spike during stage increases, typically due to precipitation, which can disturb the bottom substrate or increase runoff entering the water. While turbidity levels may rise temporarily, they generally return to background values within a few days. In contrast, Pond 226 Brook is a deeper, more secluded waterway, less noticeably affected by external influences.

● Turbidity (NTU) ● Stage (m)

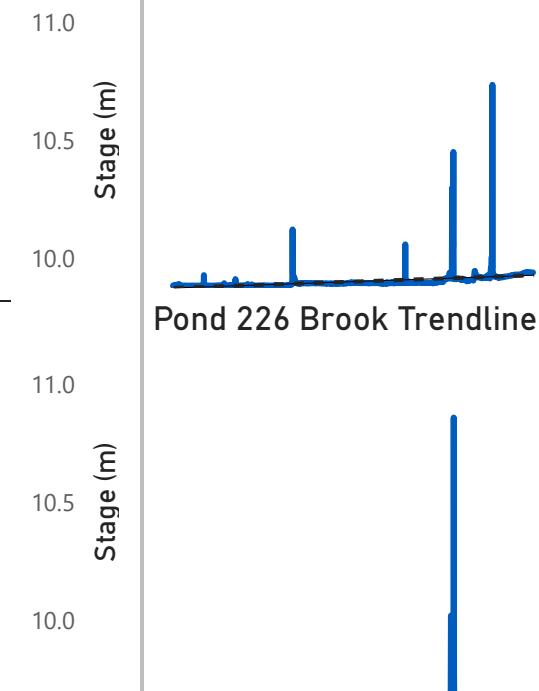
Hermans Pond Brook



Pond 226 Brook



Hermans Pond Brook Trendline



Pond 226 Brook Trendline



Stage (m)



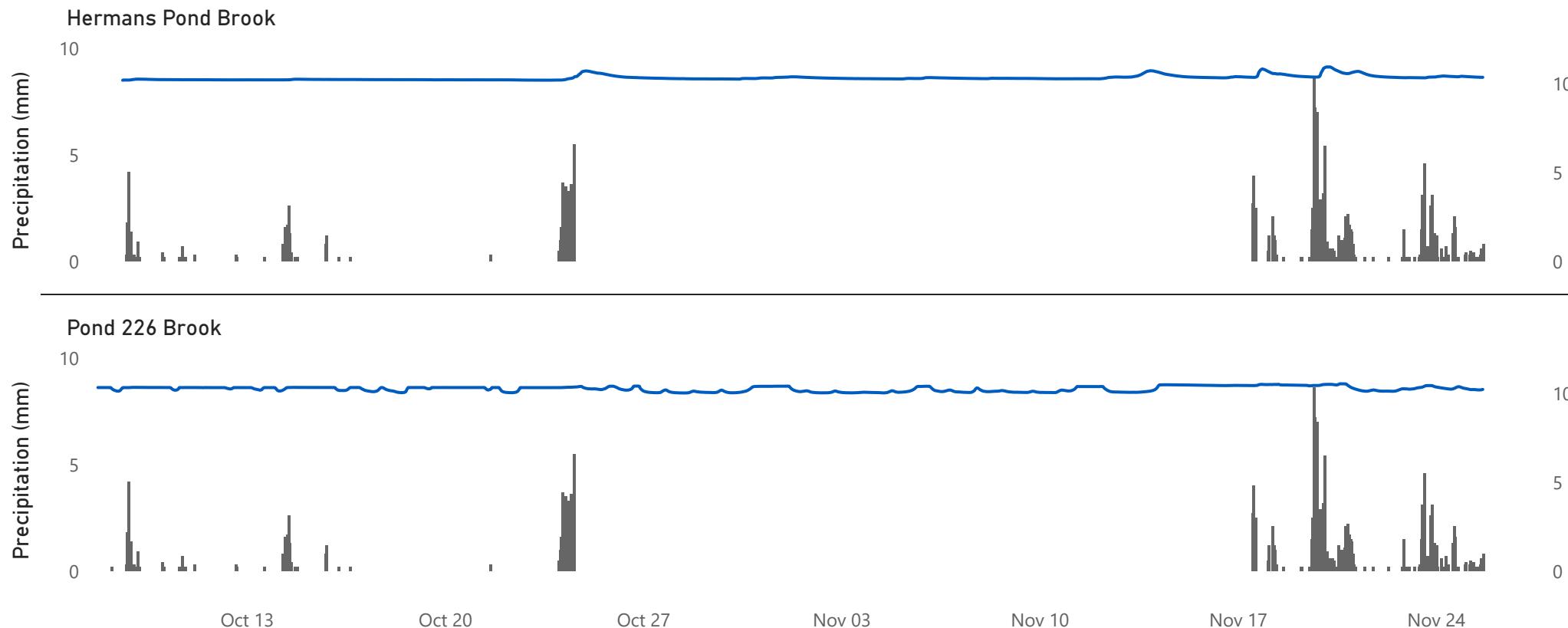
Hermans Pond Brook

10.34
Average
10.20
Minimum

Pond 226 Brook

10.30
Median
10.96
Maximum

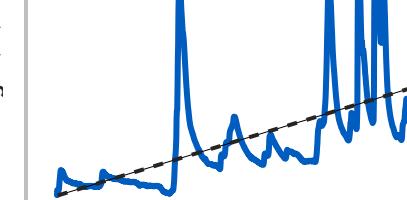
● Precipitation (mm) ● Stage (m)



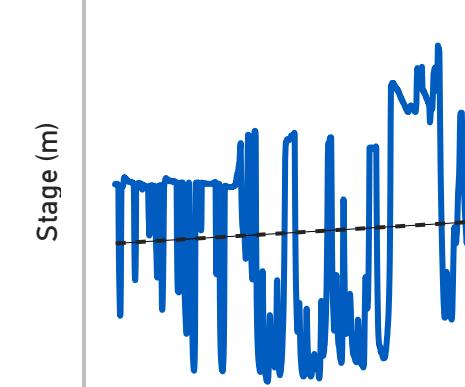
Stage provides an estimate of the water level at a monitoring station and plays a vital role in analyzing trends in water quality data, particularly for parameters such as specific conductivity, pH, and turbidity. Stage generally rises during precipitation events as rainwater and runoff enter the water column. By monitoring stage alongside precipitation events, we can better interpret our data, distinguish whether a stage increase is caused by rainfall or potential industrial activities, and assess its impact on water quality. Precipitation data was retrieved from Gander International Airport CS meteorological (MET) station.

Stage ranged between 10.20 meters to 10.96 meters at Hermans Pond Brook, and ranged between 10.04 meters to 10.56 meters at Pond 226 Brook. Stage remained stable across the deployment period, with small increases coinciding with precipitation events, such as November 20th. There is an overall increasing trend observable at both stations, which is likely a result of increased precipitation towards the end of the deployment period.

Hermans Pond Brook Trendline



Pond 226 Brook Trendline

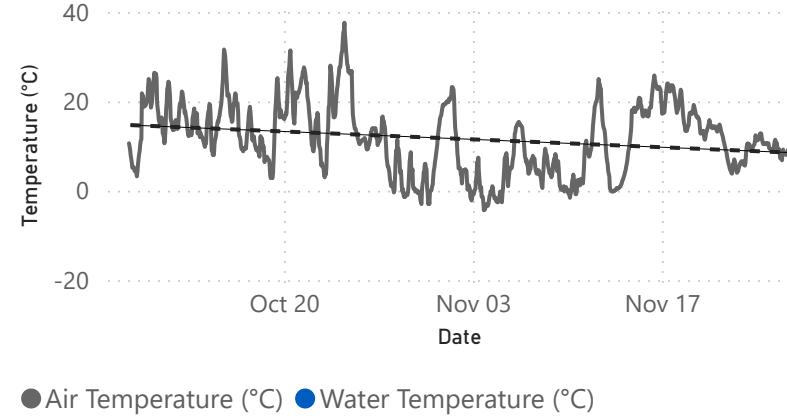


Meteorological and Hydrometric Data

Gander International Airport MET Data



Air Temperature Recorded at Gander International Airport



Air Temperature Statistics

5.85

Average (°C)

-2.20

Minimum (°C)

5.70

Median (°C)

18.80

Maximum (°C)

Precipitation Statistics

0.33

Average (mm/hr)

0.00

Median (mm/hr)

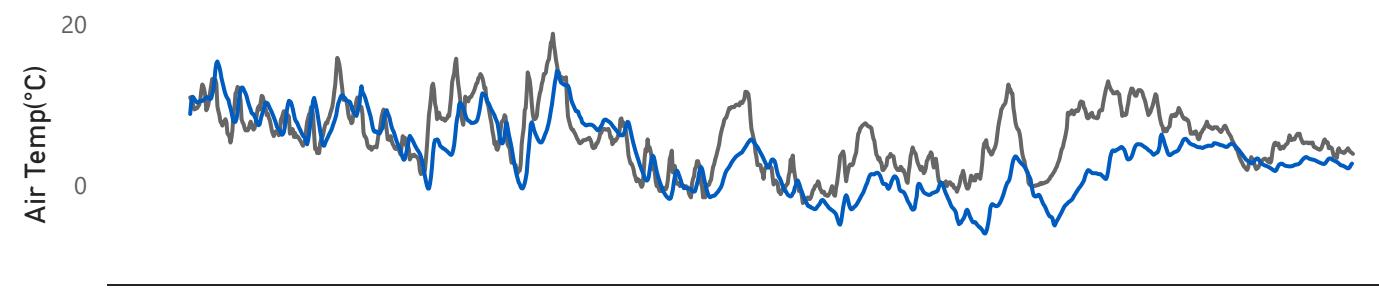
0.00

Minimum (mm/hr)

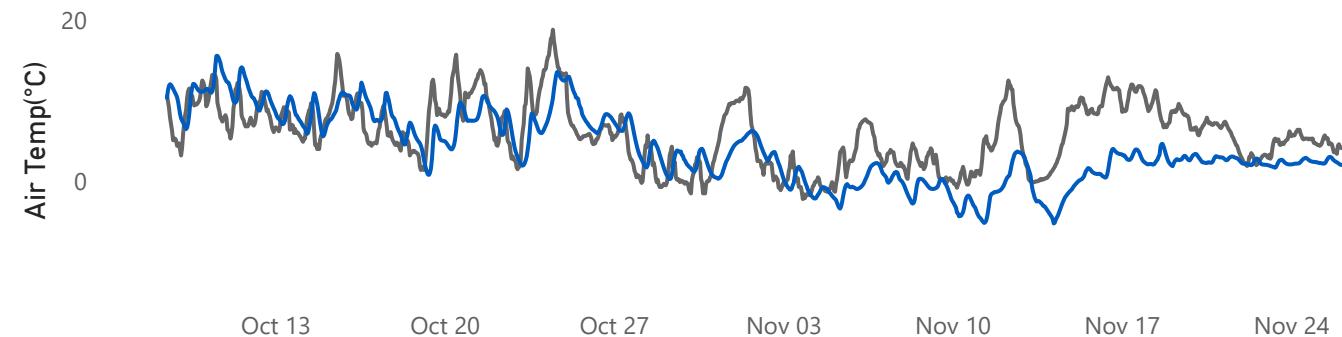
8.60

Maximum (mm/hr)

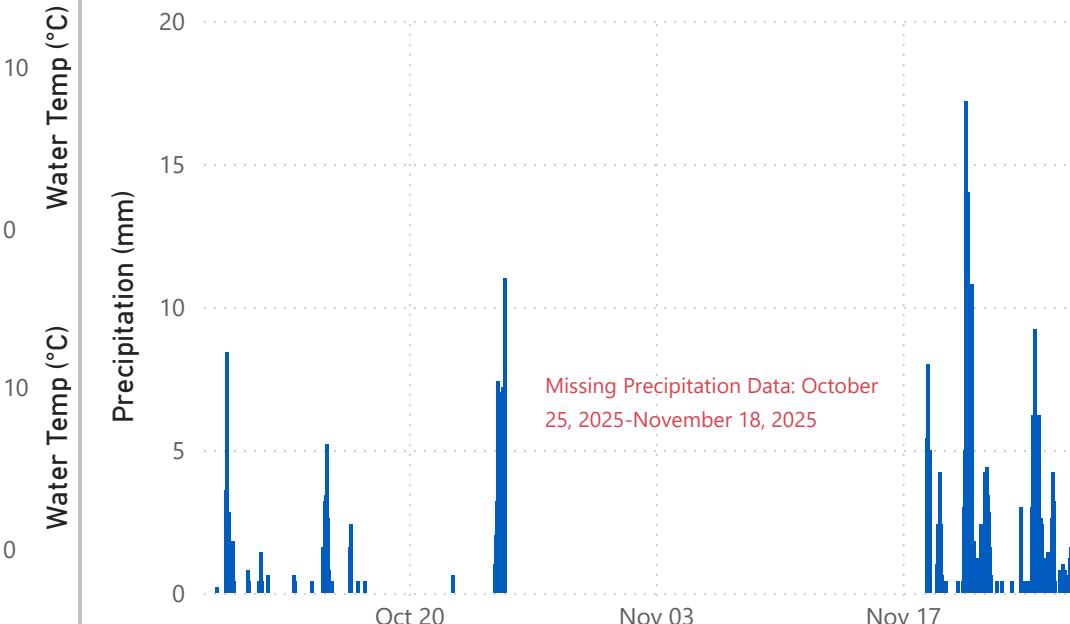
Hermans Pond Brook



Pond 226 Brook



Precipitation Recorded at Gander International Airport

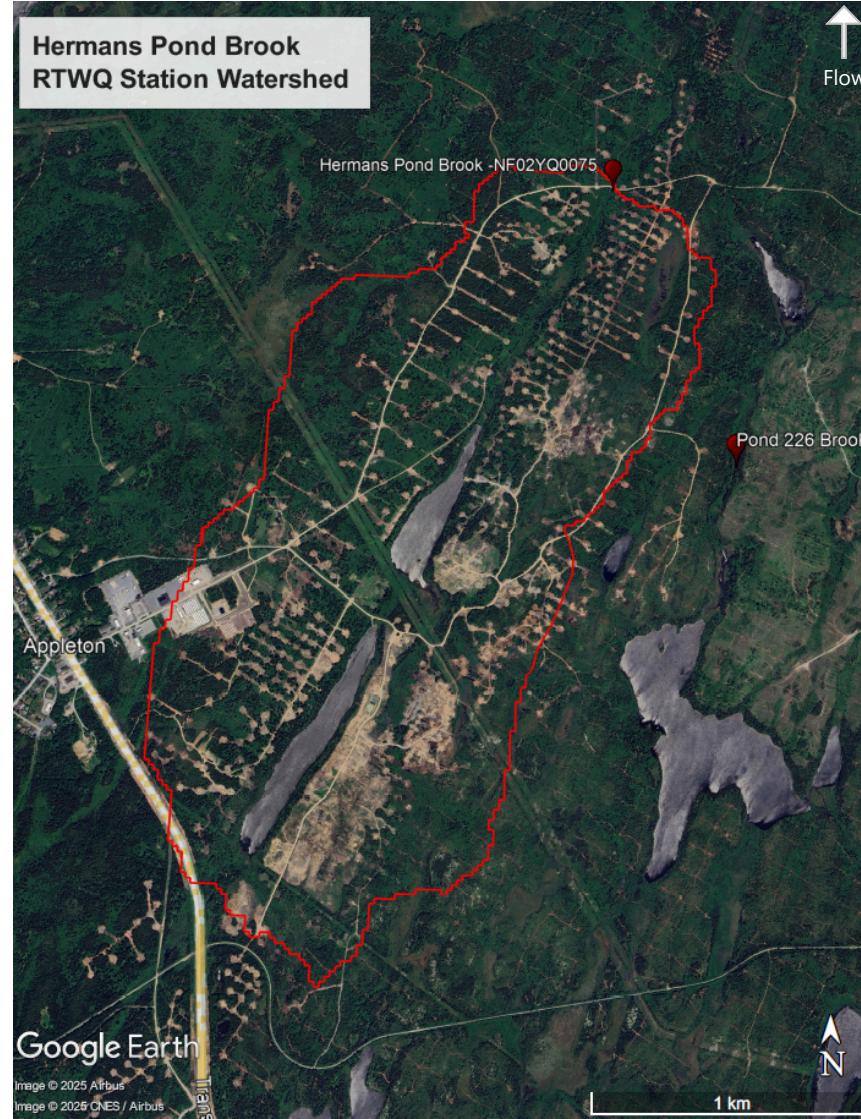


Hermans Pond Brook RTWQ Station

NF02YQ0075



Hermans Pond Brook is a small, narrow stream that flows from Herman Pond North and Herman Pond South towards Gander River. The real-time station is situated about 1.5 km downstream of Herman Pond North, with the hut located roughly 4 meters from the access road. The instrument is situated approximately 10 meters upstream of a bridge, and both the instrument and hydrometric plate are deployed at a depth of approximately 0.5 meters in the center of the brook. The streambed consists of cobbles and small rocks where the instrument is positioned, though it transitions to a softer, muddier bottom slightly upstream.



Pond 226 Brook RTWQ Station

NF02YQ0076



Pond 226 Brook is a small stream, with the station positioned about 0.75 km downstream of Pond 226 and 0.15 km upstream from a small pool.

The streambed consists of some cobble but is mostly soft organic sediment, with tall grass growing along both sides of the stream. The instrument and hydrometric plate are deployed in the center of the brook at a depth of approximately 0.50 meters. The hut is located roughly 25 meters from the streamside.



New Found Gold RTWQ Network Watersheds

