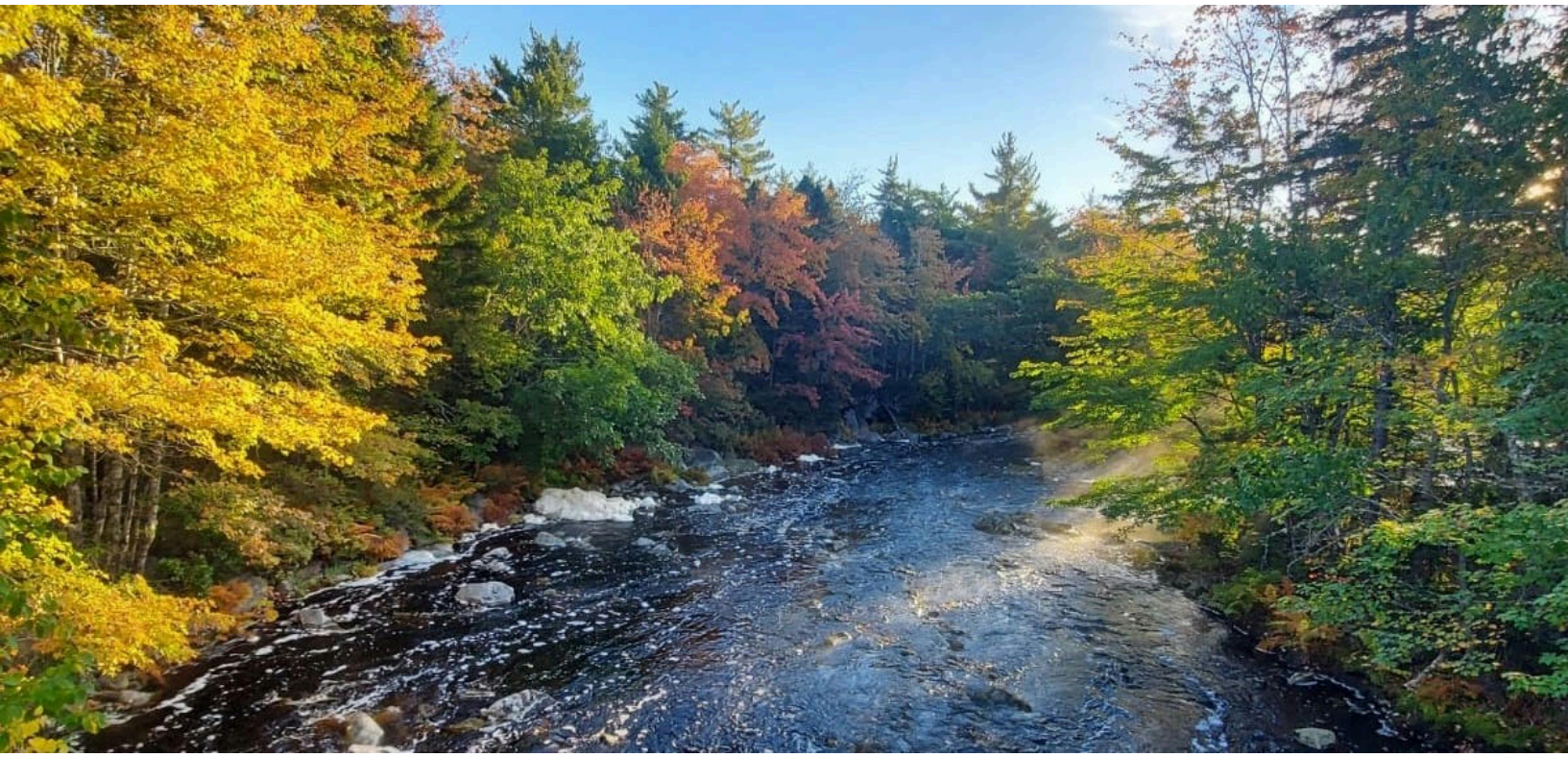
CENTRE FOR MARINE APPLIED RESEARCH



INLAND WATER QUALITY REPORT

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1 Introduction

River and lake systems provide critical habitat for some migratory marine species during key life stages and have important impacts on coastal habitat at their outflow points. In Nova Scotia, there are are identified gaps in water quality data for inland waterbodies (Weitzman et al. 2025).

To address this gap, the Centre for Marine Applied Research (CMAR) has measured Water Quality (temperature and occasionally dissolved oxygen) at several rivers and lakes in the province. This document presents deployment details and summary figures from this data collection effort (Figure 1). The data are available for download from the Nova Scotia Open Data Portal.

This document should be considered as a guide only. Data collection and retrieval are ongoing. The information may be revised pending ongoing data collection and analyses.

CMAR also operates a Coastal Monitoring Program to measure essential ocean variables (e.g., temperature, dissolved oxygen, salinity) around the coast of Nova Scotia. For more information on CMAR and the Coastal Monitoring Program, visit the CMAR website.

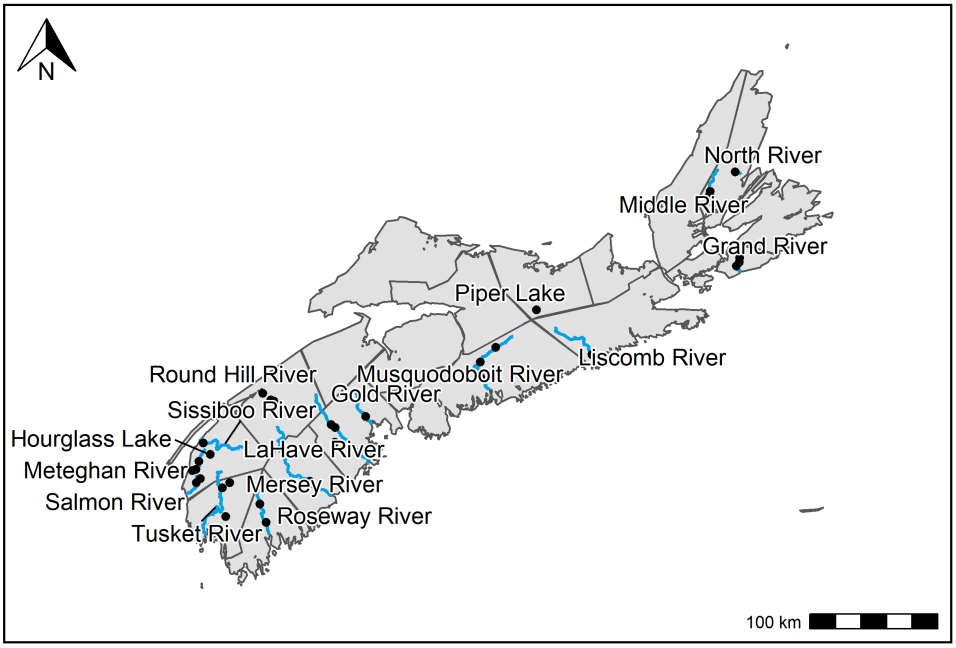

Figure 1: Inland Water Quality sampling station locations.

1.1 Data Collection

CMAR typically collects inland Water Quality data using sensors secured inside a perforated PVC housing and anchored to the riverbed by a cinderblock (Figure 2). Sensors are usually deployed in 1.5 m depths or shallower, and accessed by foot.

Figure 2: Image of a sensor deployed within a perforated PVC sensor housing attached to a cinderblock anchor.

CMAR occasionally collects inland temperature and dissolved oxygen data using moorings referred to as "sensor strings". A typical sensor string configuration consists of a rope attached to the seafloor by an anchor and suspended by a sub-surface buoy, with sensors attached at various depths (Figure 3). Alternatively, sensors may be attached to floating docks, surface buoys, equipment, or fixed structures (Table 1).

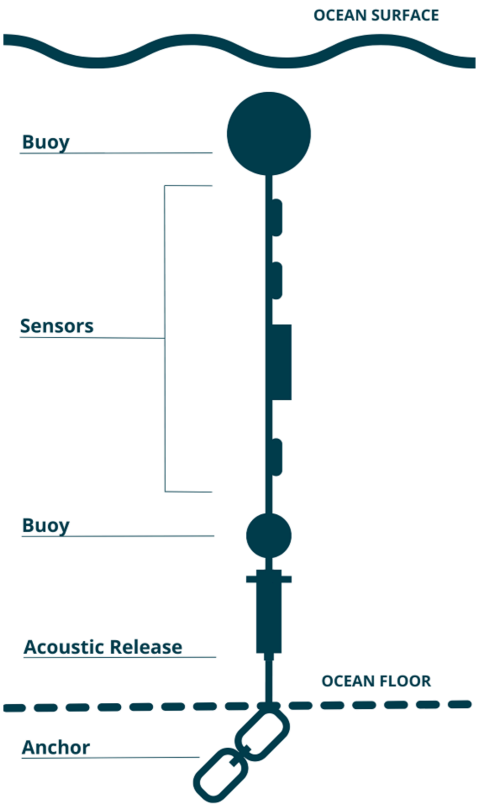

Figure 3: Example sensor string configuration (not to scale).

Sensors are typically deployed at a station for several months to a year, and data are logged every 15 minutes. Sensors must be retrieved to offload the data. The retrieval method depends on the sensor configuration, and may include triggering an acoustic release, directly removing sensors from surface moorings, or removing shallow water bottom-mounted sensors on foot (Table 1). Interest-holder needs and characteristics of the station dictate the deployment design, including anchor weight, number and type of sensors, and configuration.

Table 1: Description of sensor deployment configurations.

Configuration	Description
Sub-surface buoy	Attached to sub-surface buoy. Typically has an acoustic release, but sometimes retrieved by diver or drag line. Does not float with the tide.
Surface buoy	Attached to a surface buoy. Floats with the tide.
Attached to fixed structure	Typically attached to a wharf, but may be attached to a bridge or pole. Does not float with the tide.
Floating dock	Attached to a floating dock. Floats with the tide.
Unknown	Configuration not indicated in historical deployment log.

1.2 Quality Control

Automated Quality Control tests were applied to the data to identify outlying and unexpected observations. Following Quality Assurance/Quality Control of Real-Time Oceanographic Data (QARTOD) guidance, each data point was assigned a flag of "Pass", "Fail", "Suspect/Of Interest", or "Not Evaluated" (IOOS 2020). These automated flags were reviewed by human experts, and modified where necessary (e.g., upgrading "Suspect/Of Interest" flags to "Fail" if there were known issues with the deployment).

Observations flagged as "Pass" passed all tests and were included in the figures below. "Suspect/Of Interest" dissolved oxygen observations may be indicative of sensor biofouling. "Suspect/Of Interest" temperature observations may be indicative of sensor exposure to air during periods of low water, or rapid changes in temperature due to a rainfall event. Most of the flagged "Suspect/Of Interest" observations were considered "Of Interest" and are shown in the figures below. Observations that failed any test were considered poor quality data and excluded from the figures.

Some tests cannot be applied to certain observations, which were flagged as "Not Evaluated". These data points were not included in the figures.

Removing flagged observations can result in patchy time series. The full inland Water Quality Datasets, including Quality Control flags, can be downloaded from the Nova Scotia Open Data Portal. Data gaps can also be caused by battery failure, delays between retrieval and re-deployment, and accidental or intentional interference with equipment.

Note that some sensors may drift over time. The existing Quality Control tests do not explicitly detect sensor drift, and users should review all data prior to use.

For more technical details about the Quality Control tests, visit the CMAR Data Governance website.

2 Inland Water Quality Data

Inland Water Quality data is presented by waterbody. For each waterbody, there is a table of deployment details followed by figures showing the station locations and the data at each station. Note the differences in scales between figures (x-axis, y-axis, and colour). Some sensors may have been deployed in tributaries of the named deployment waterbody.

2.1 Gold River

Table 2: Deployment details for Gold River.

Station	Deployment Date	Retrieval Date	Latitude	Longitude	Configuration	Variables Measured
Gold River 2	2023-06-13	2023-10-04	44.5964	−64.3724	attached to fixed structure	temperature

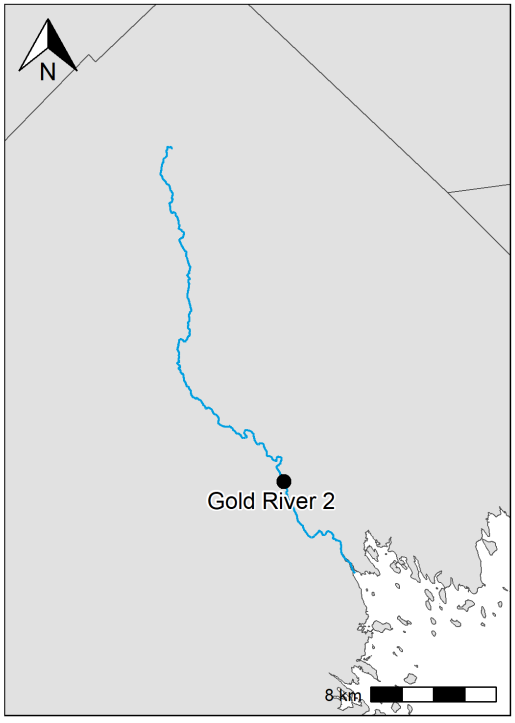

Figure 4: Gold River station location(s).

2.1.1 Gold River 2

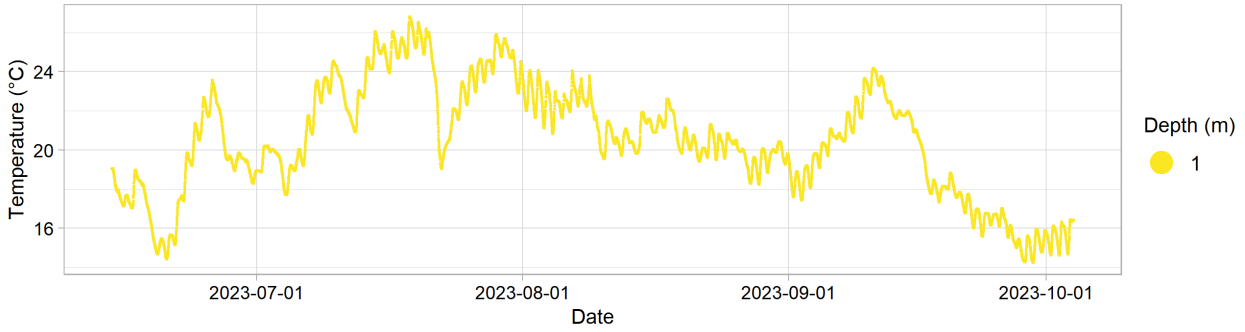

Figure 5: Gold River 2 temperature data.

2.2 Grand River

Table 3: Deployment details for Grand River.

Station	Deployment Date	Retrieval Date	Latitude	Longitude	Configuration	Variables Measured
Grand River 1	2024-06-10	2024-09-30	45.6556	−60.6599	attached to fixed structure	temperature
Grand River 2	2024-06-10	2024-09-30	45.6809	−60.6313	attached to fixed structure	temperature
Grand River 3	2024-06-10	2024-09-30	45.7107	−60.6262	attached to fixed structure	temperature

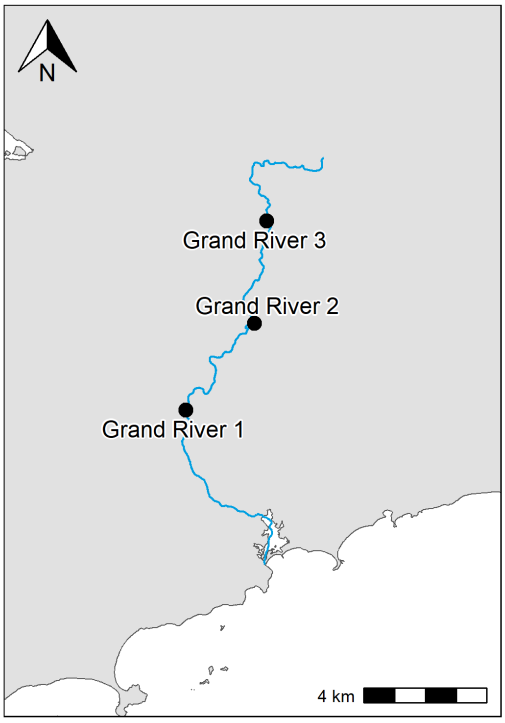

Figure 6: Grand River station location(s).

2.2.1 Grand River 1

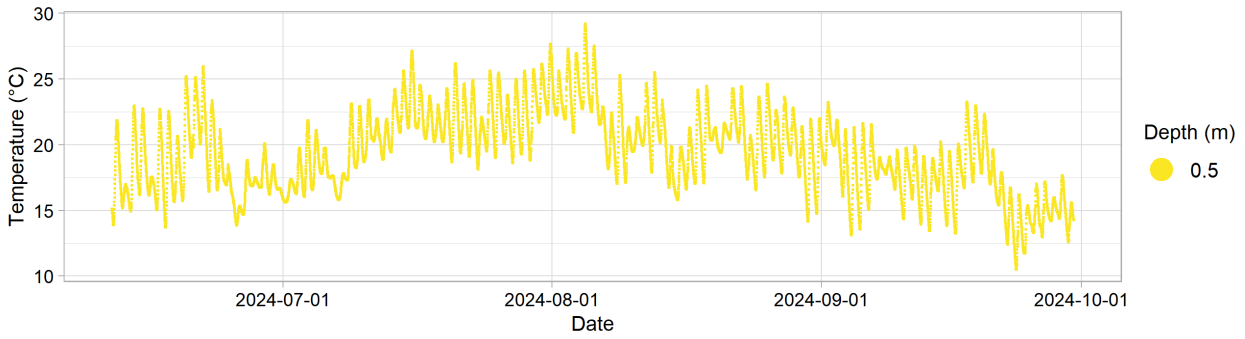

Figure 7: Grand River 1 temperature data.

2.2.2 Grand River 2

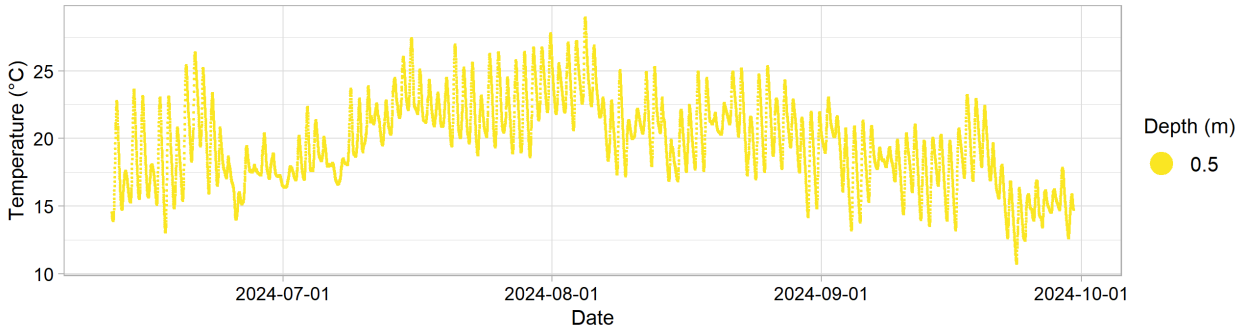

Figure 8: Grand River 2 temperature data.

2.2.3 Grand River 3

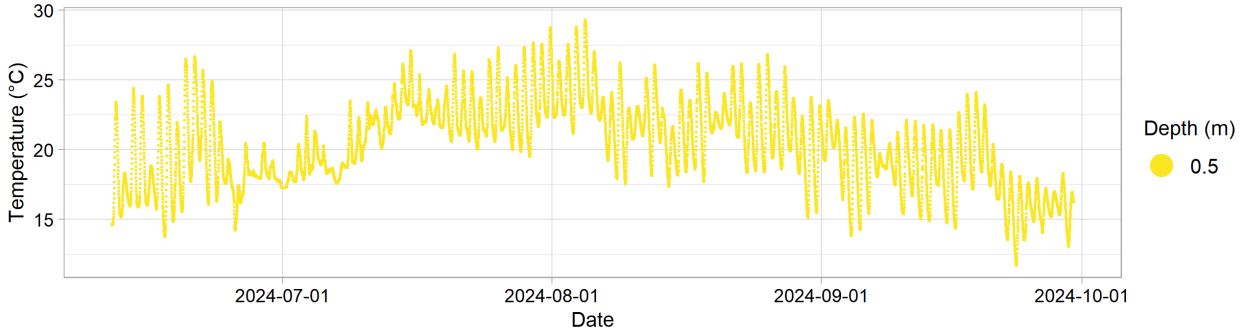

Figure 9: Grand River 3 temperature data.

2.3 Hourglass Lake

Table 4: Deployment details for Hourglass Lake.

Station	Deployment Date	Retrieval Date	Latitude	Longitude	Configuration	Variables Measured
Hourglass Lake	2019-10-02	2020-07-23	44.3279	−65.9282	sub-surface buoy	dissolved oxygen (% sat) temperature

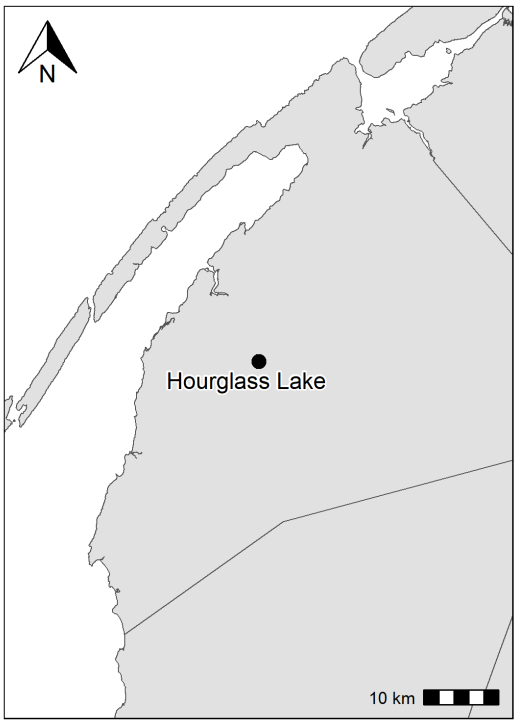

Figure 10: Hourglass Lake station location(s).

2.3.1 Hourglass Lake

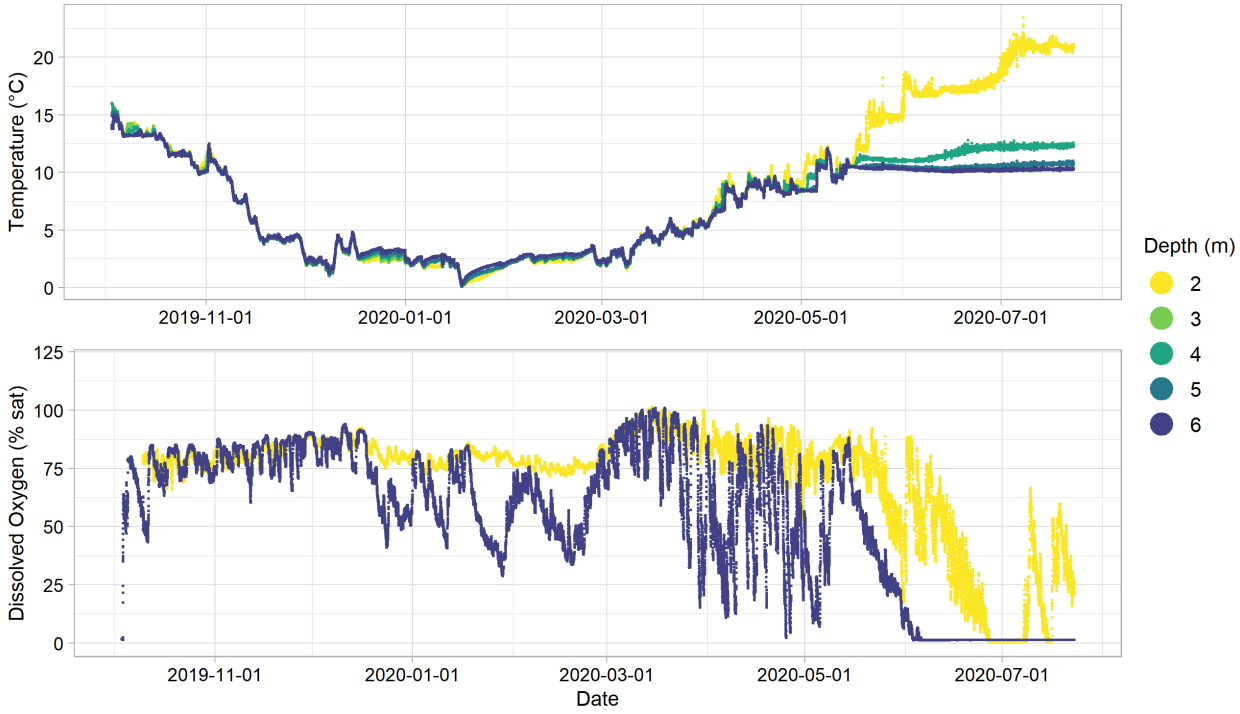

Figure 11: Hourglass Lake water quality data.

2.4 LaHave River

Table 5: Deployment details for LaHave River.

Station	Deployment Date	Retrieval Date	Latitude	Longitude	Configuration	Variables Measured
LaHave River 1	2023-06-20	2023-10-04	44.4152	−64.6782	attached to fixed structure	temperature
LaHave River 2	2023-06-20	2023-10-04	44.5395	−64.7157	attached to fixed structure	temperature
LaHave River 3	2023-06-20	2023-10-04	44.5185	−64.6751	attached to fixed structure	temperature

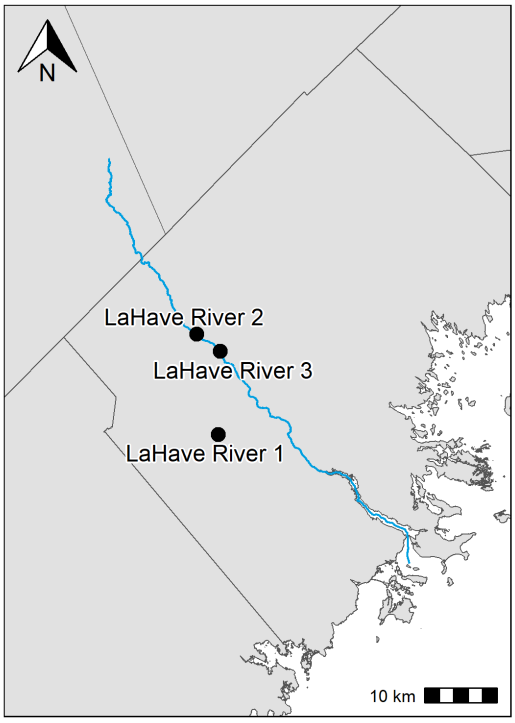

Figure 12: LaHave River station location(s).

2.4.1 LaHave River 1

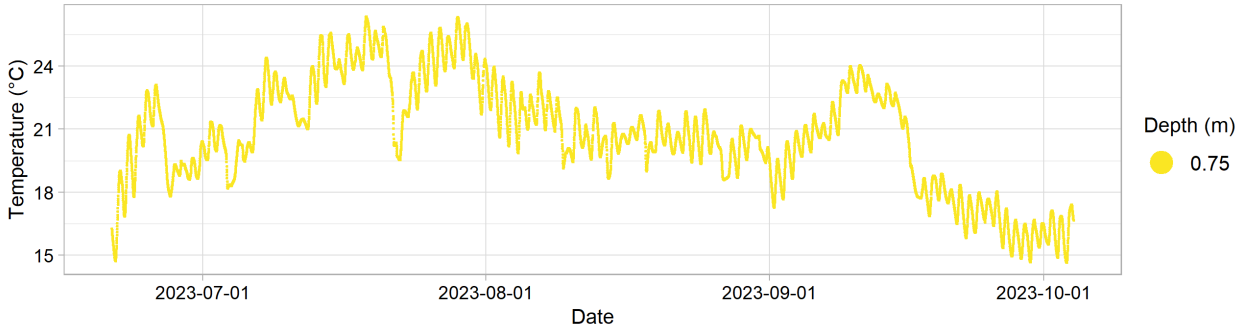

Figure 13: LaHave River 1 temperature data.

2.4.2 LaHave River 2

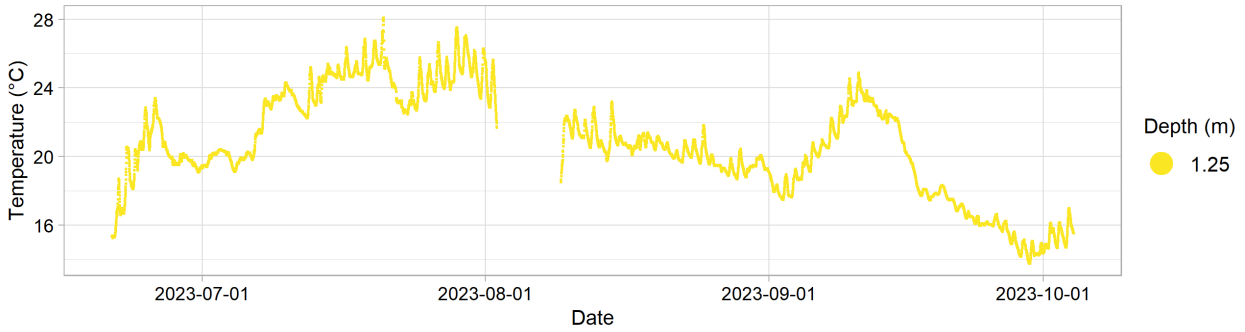

Figure 14: LaHave River 2 temperature data.

2.4.3 LaHave River 3

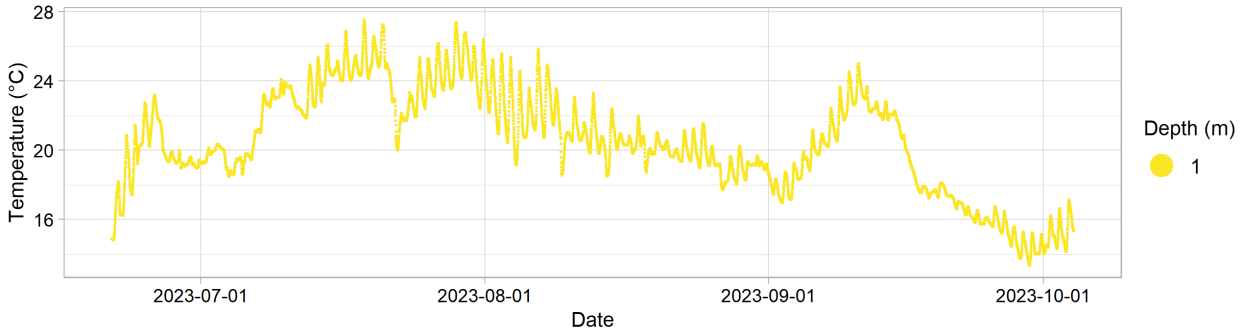

Figure 15: LaHave River 3 temperature data.

2.5 Liscomb River

Table 6: Deployment details for Liscomb River.

Station	Deployment Date	Retrieval Date	Latitude	Longitude	Configuration	Variables Measured
Liscomb River 1	2023-06-08	2023-10-11	45.0336	−62.1052	attached to fixed structure	temperature
Liscomb River 2	2023-06-08	2023-10-11	45.03	−62.1043	attached to fixed structure	temperature

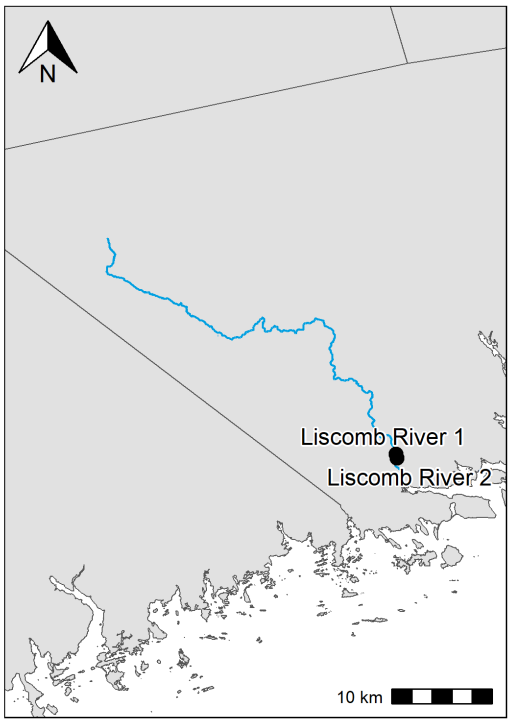

Figure 16: Liscomb River station location(s).

2.5.1 Liscomb River 1

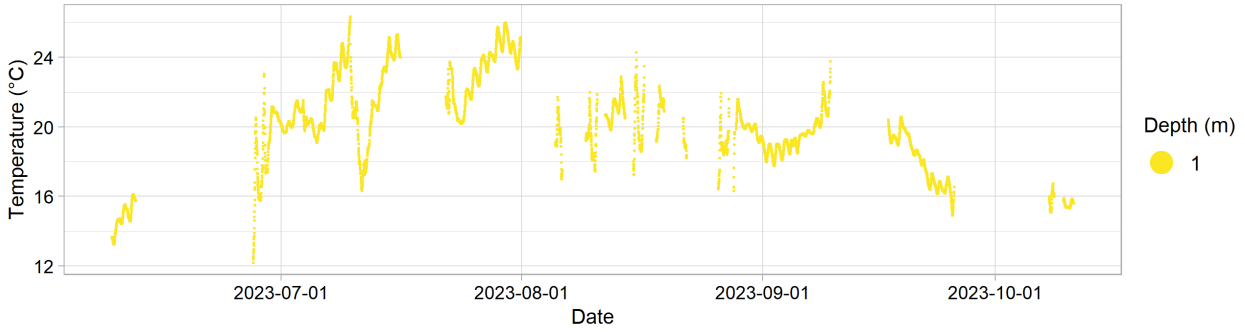

Figure 17: Liscomb River 1 temperature data.

2.5.2 Liscomb River 2

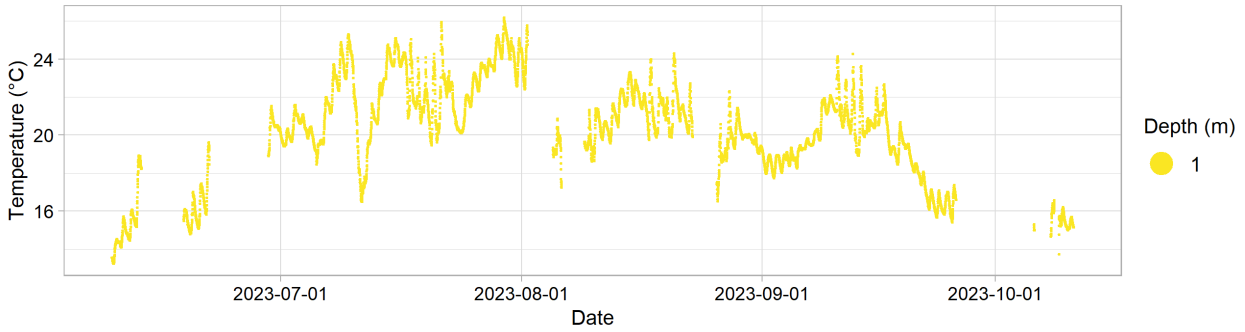

Figure 18: Liscomb River 2 temperature data.

2.6 Mersey River

Table 7: Deployment details for Mersey River.

Station	Deployment Date	Retrieval Date	Latitude	Longitude	Configuration	Variables Measured
Mersey River 2	2023-06-23	2023-10-13	44.1234	−64.9102	attached to fixed structure	temperature
Mersey River 3	2023-06-23	2024-07-03	44.1392	−64.9309	attached to fixed structure	temperature

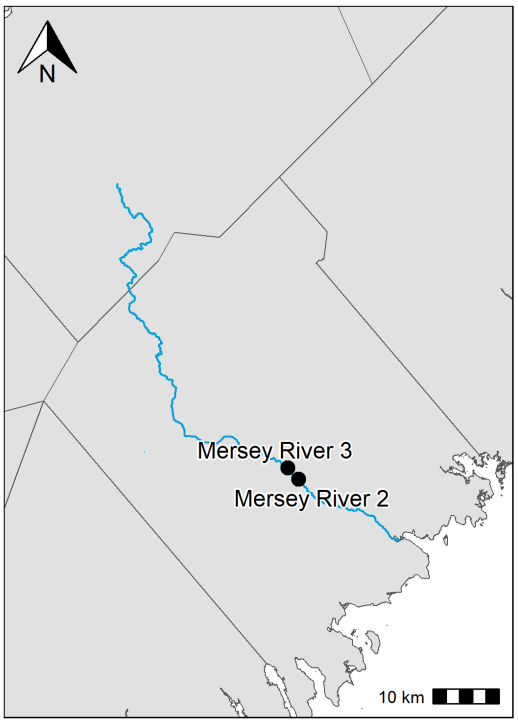

Figure 19: Mersey River station location(s).

2.6.1 Mersey River 2

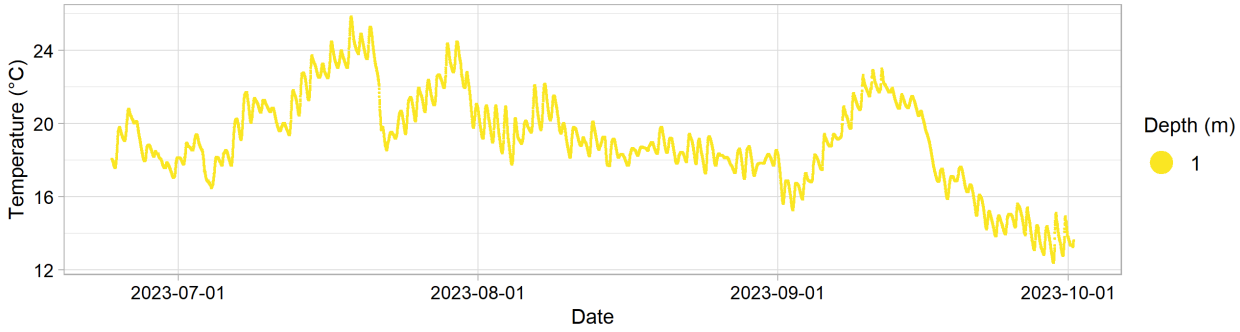

Figure 20: Mersey River 2 temperature data.

2.6.2 Mersey River 3

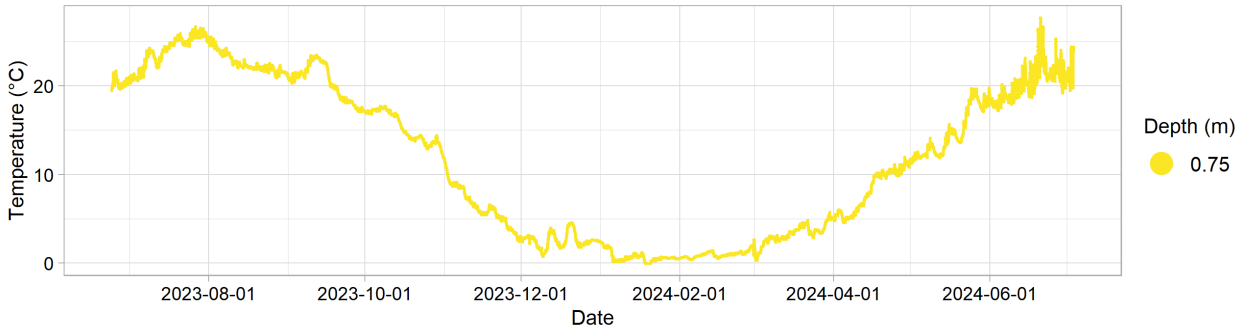

Figure 21: Mersey River 3 temperature data.

2.7 Meteghan River

Table 8: Deployment details for Meteghan River.

Station	Deployment Date	Retrieval Date	Latitude	Longitude	Configuration	Variables Measured
Meteghan River 1	2024-06-06	2024-10-11	44.2218	−66.0696	attached to fixed structure	temperature
Meteghan River 2	2024-06-06	2024-10-11	44.2788	−66.0411	attached to fixed structure	temperature
Meteghan River 3	2024-06-07	2024-10-11	44.2161	−66.1075	attached to fixed structure	temperature

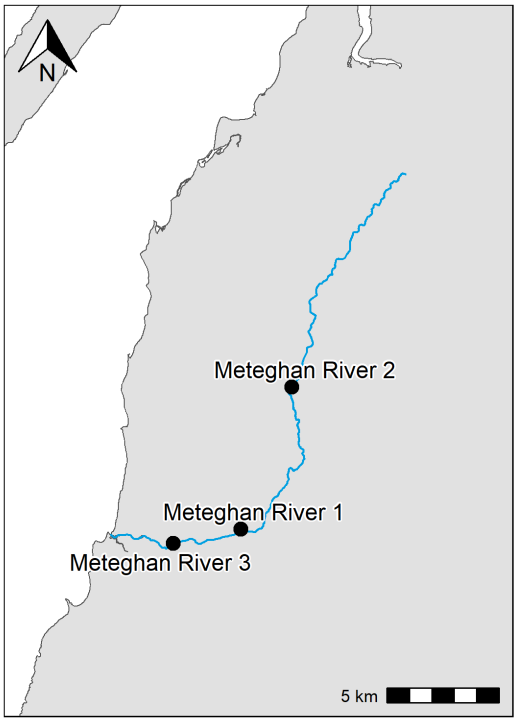

Figure 22: Meteghan River station location(s).

2.7.1 Meteghan River 1

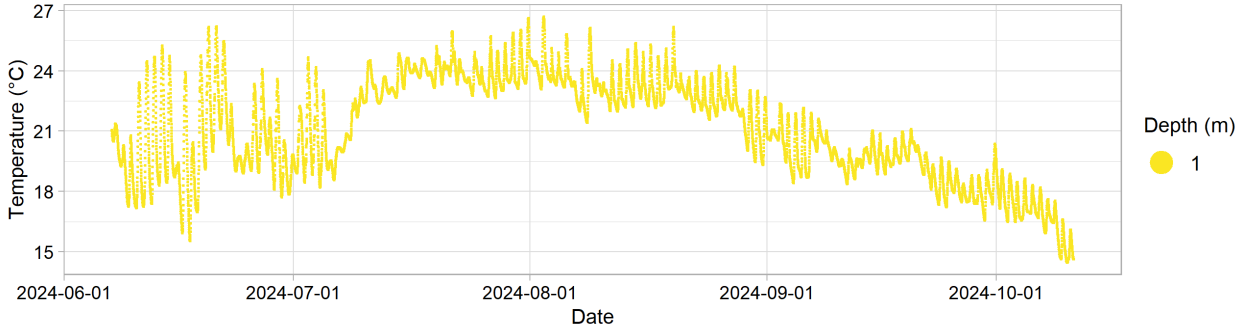

Figure 23: Meteghan River 1 temperature data.

2.7.2 Meteghan River 2

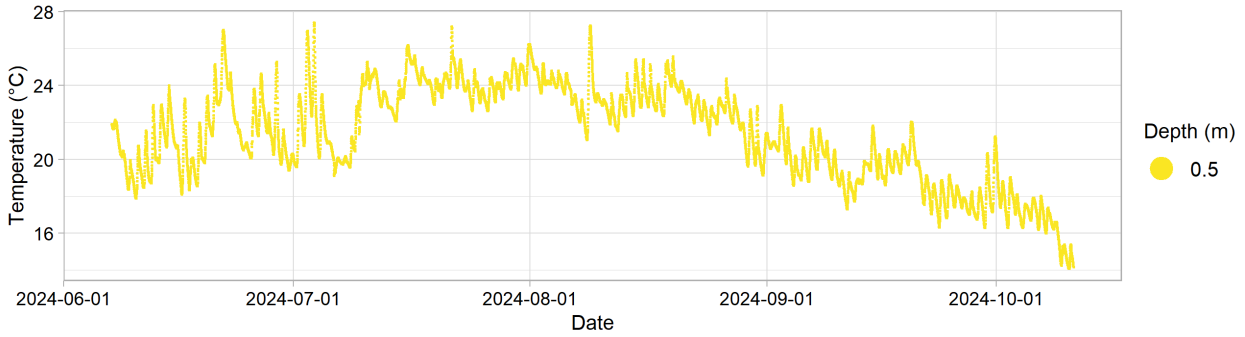

Figure 24: Meteghan River 2 temperature data.

2.7.3 Meteghan River 3

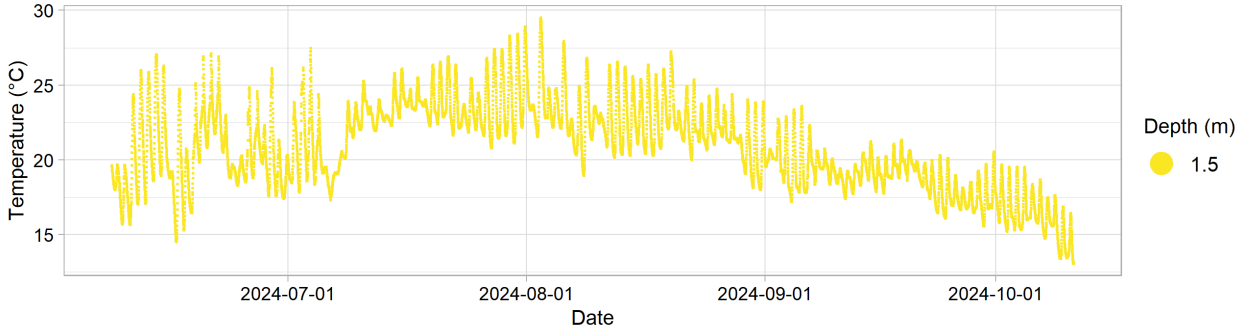

Figure 25: Meteghan River 3 temperature data.

2.8 Middle River

Table 9: Deployment details for Middle River.

Station	Deployment Date	Retrieval Date	Latitude	Longitude	Configuration	Variables Measured
Middle River 1	2024-06-11	2024-09-29	46.1555	−60.9263	attached to fixed structure	temperature
Middle River 2	2024-06-11	2024-09-29	46.18	−60.9215	attached to fixed structure	temperature
Middle River 3	2024-06-11	2024-09-29	46.1296	−60.9195	attached to fixed structure	temperature

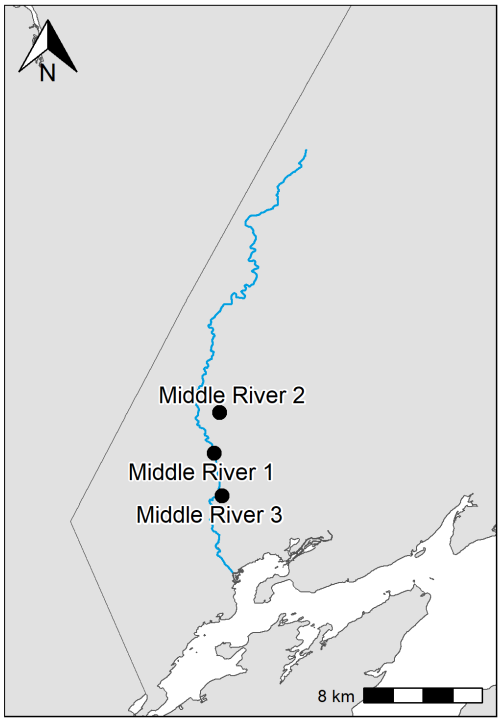

Figure 26: Middle River station location(s).

2.8.1 Middle River 1

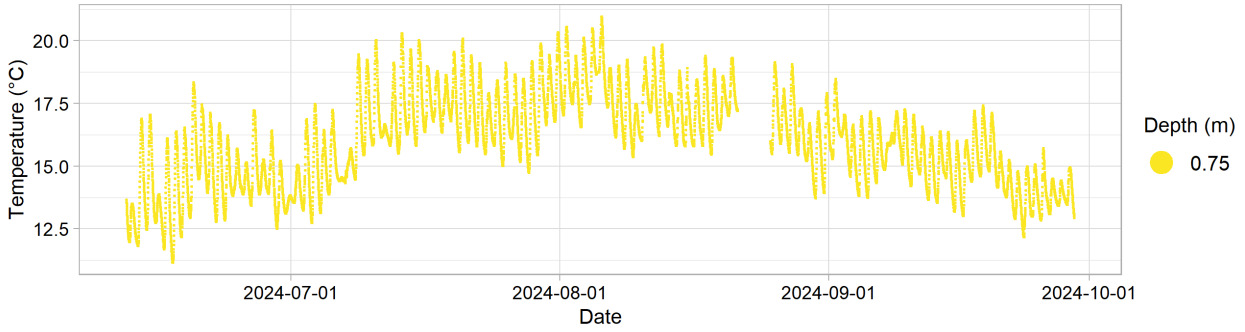

Figure 27: Middle River 1 temperature data.

2.8.2 Middle River 2

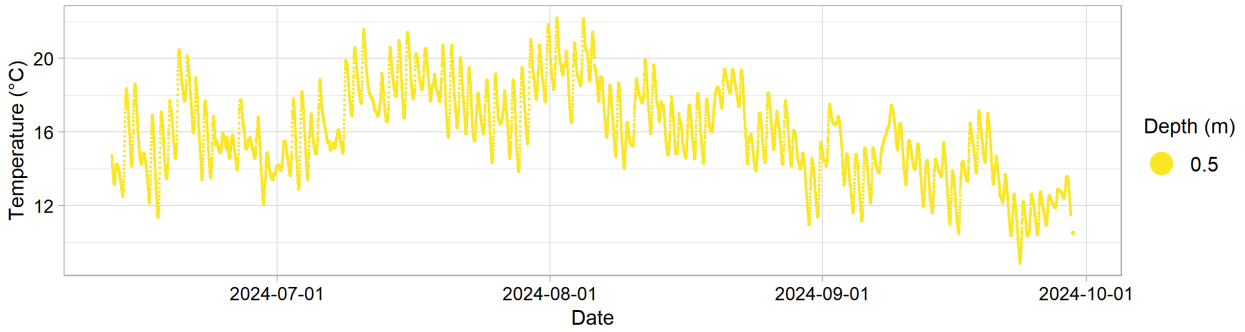

Figure 28: Middle River 2 temperature data.

2.8.3 Middle River 3

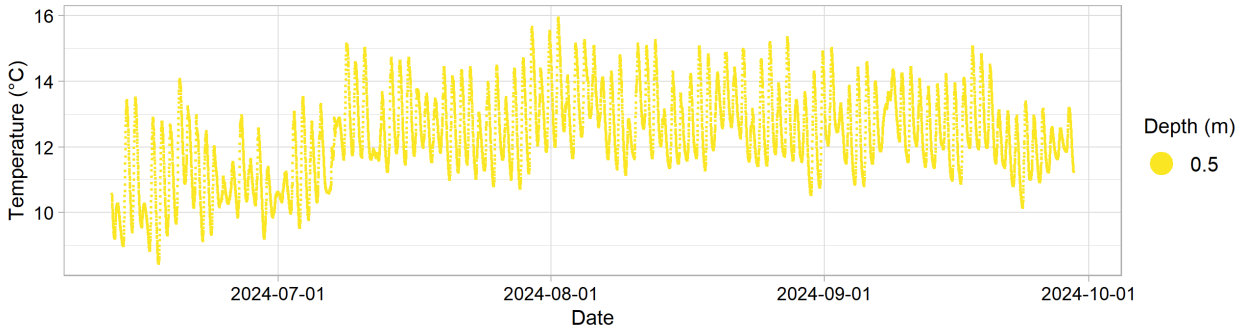

Figure 29: Middle River 3 temperature data.

2.9 Musquodoboit River

Table 10: Deployment details for Musquodoboit River.

Station	Deployment Date	Retrieval Date	Latitude	Longitude	Configuration	Variables Measured
Musquodoboit River 1	2023-07-07	2023-10-10	44.8719	−63.2208	attached to fixed structure	temperature
Musquodoboit River 2	2023-07-07	2023-10-10	44.9778	−63.2247	attached to fixed structure	temperature
Musquodoboit River 3	2023-07-07	2023-10-10	45.0821	−63.0704	attached to fixed structure	temperature

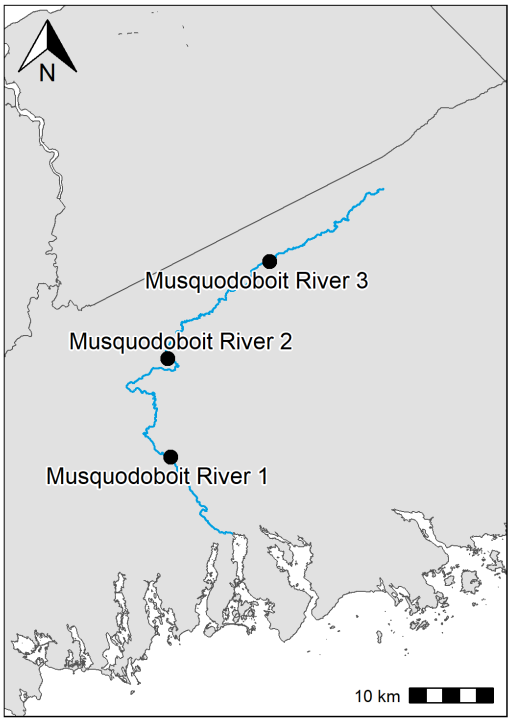

Figure 30: Musquodoboit River station location(s).

2.9.1 Musquodoboit River 1

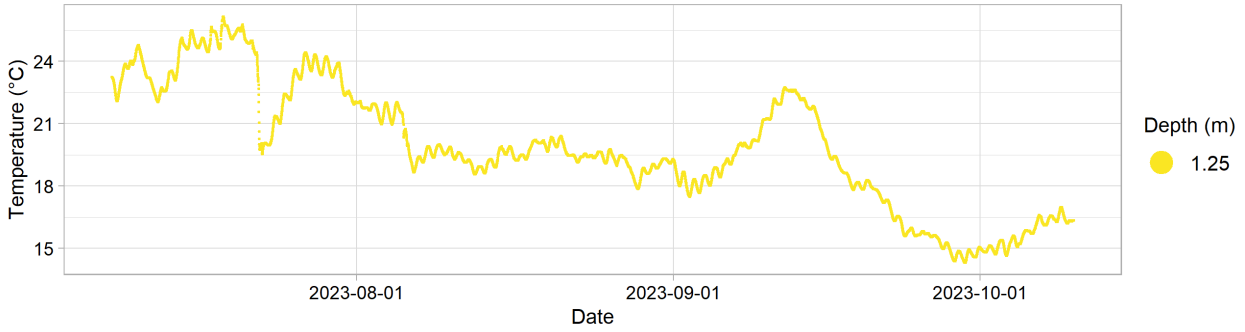

Figure 31: Musquodoboit River 1 temperature data.

2.9.2 Musquodoboit River 2

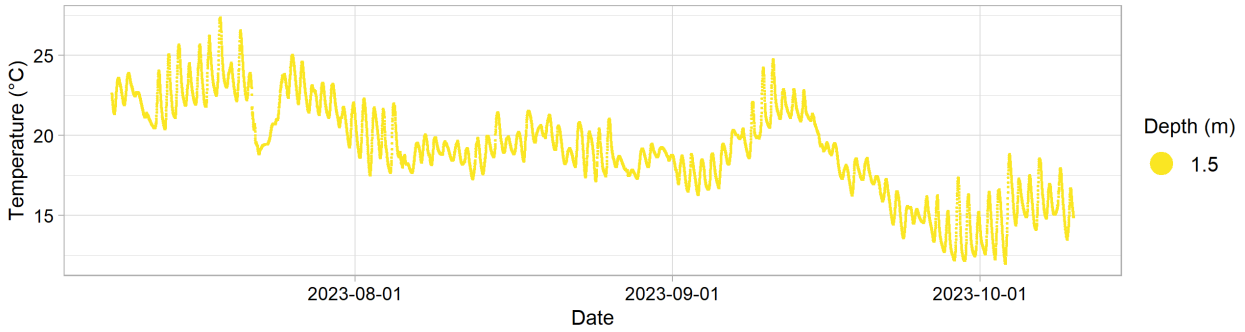

Figure 32: Musquodoboit River 2 temperature data.

2.9.3 Musquodoboit River 3

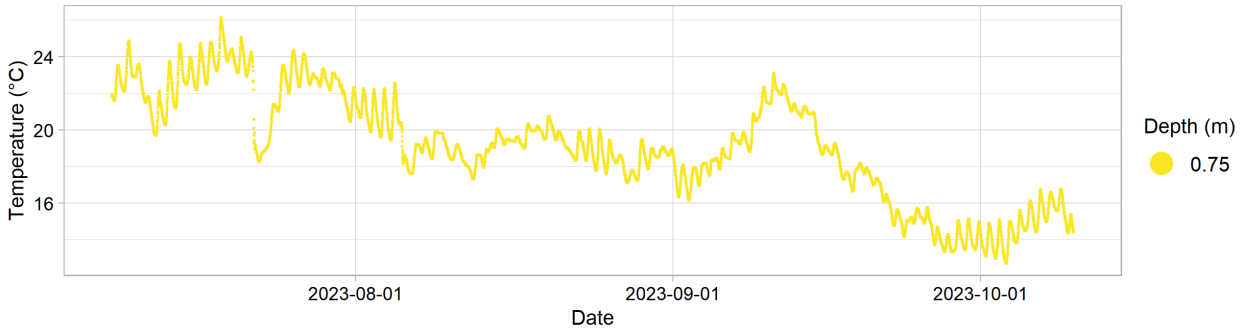

Figure 33: Musquodoboit River 3 temperature data.

2.10 North River

Table 11: Deployment details for North River.

Station	Deployment Date	Retrieval Date	Latitude	Longitude	Configuration	Variables Measured
North River 1	2024-06-11	2024-09-26	46.3167	−60.6716	attached to fixed structure	temperature

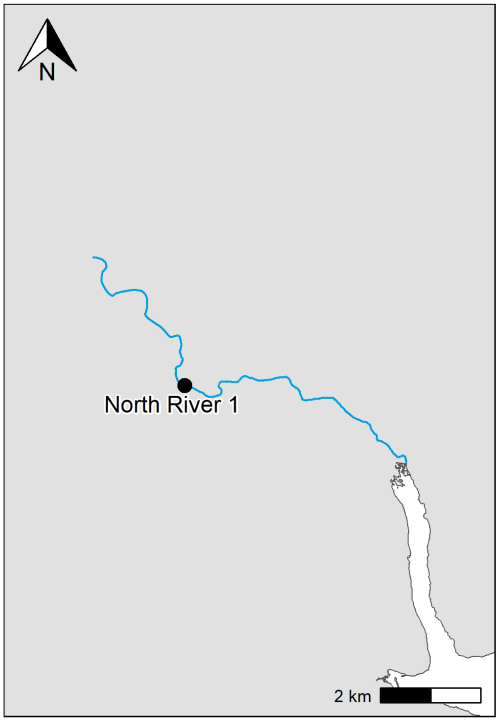

Figure 34: North River station location(s).

2.10.1 North River 1

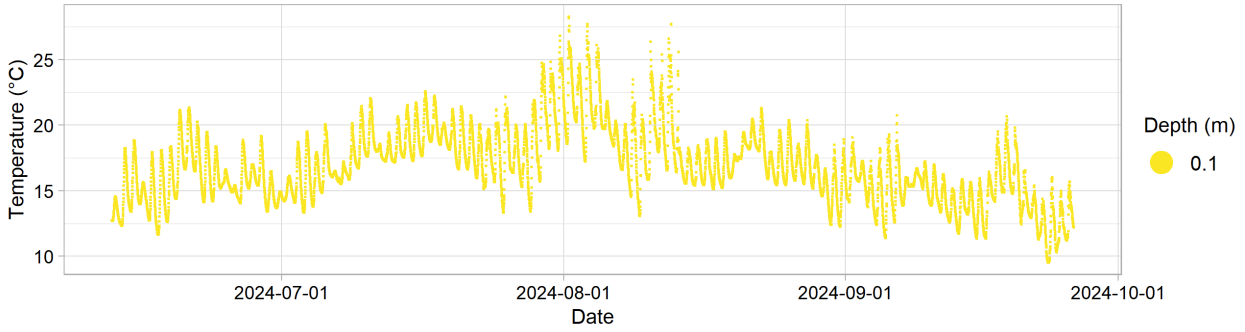

Figure 35: North River 1 temperature data.

2.11 Piper Lake

Table 12: Deployment details for Piper Lake.

Station	Deployment Date	Retrieval Date	Latitude	Longitude	Configuration	Variables Measured
Piper Lake	2020-01-15	2020-05-14	45.3464	−62.6609	sub-surface buoy	dissolved oxygen (% sat) temperature

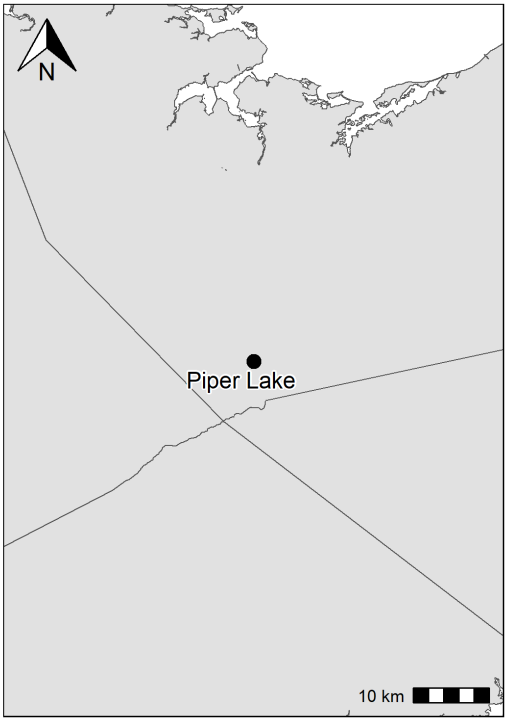

Figure 36: Piper Lake station location(s).

2.11.1 Piper Lake

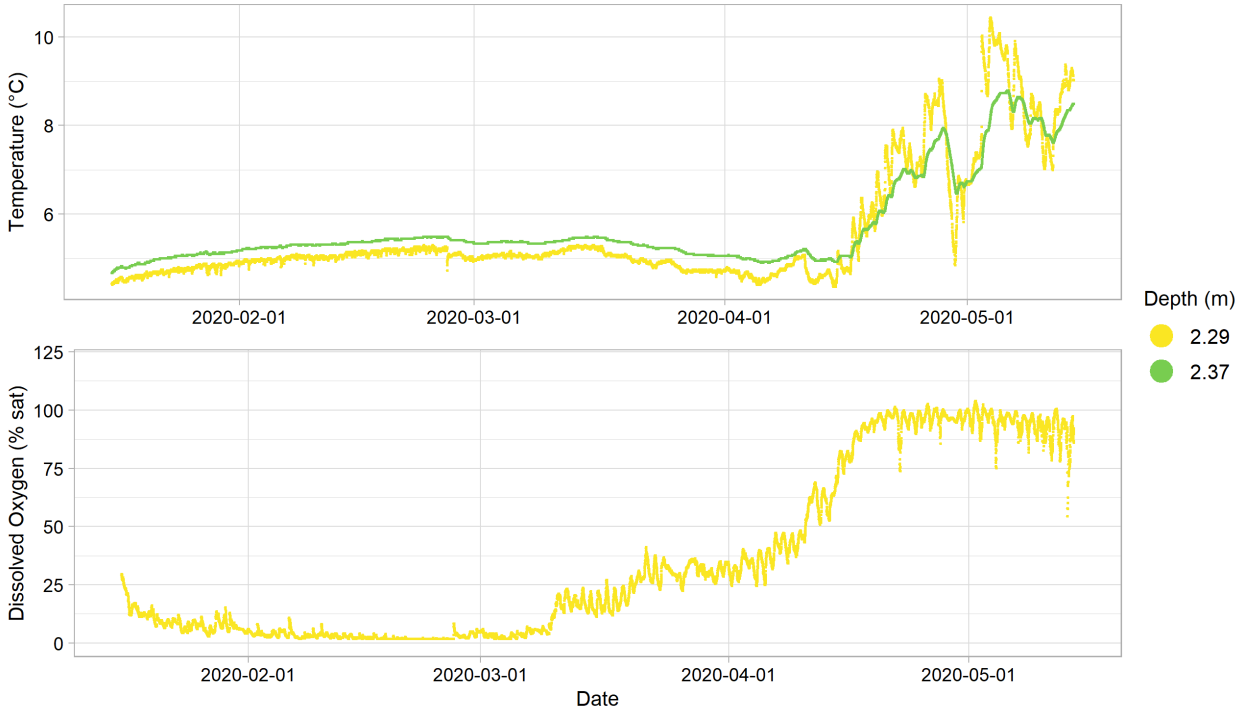

Figure 37: Piper Lake water quality data.

2.12 Roseway River

Table 13: Deployment details for Roseway River.

Station	Deployment Date	Retrieval Date	Latitude	Longitude	Configuration	Variables Measured
Roseway River 1	2023-06-29	2023-10-19	43.98	−65.4298	attached to fixed structure	temperature
Roseway River 2	2023-06-29	2023-10-19	43.8497	−65.366	attached to fixed structure	temperature

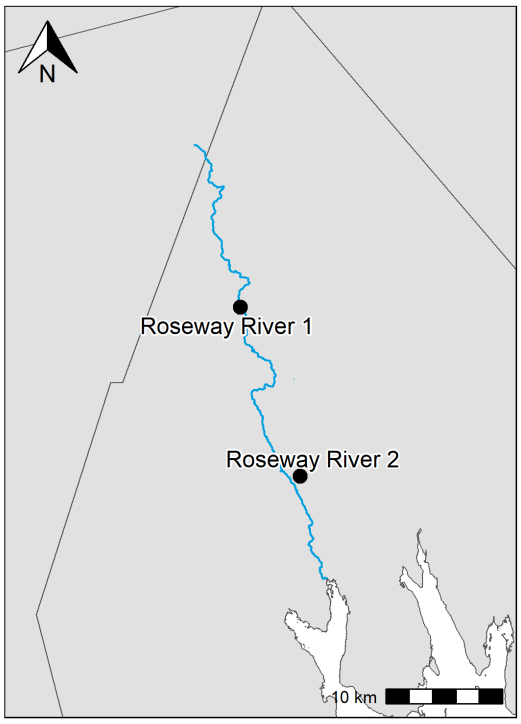

Figure 38: Roseway River station location(s).

2.12.1 Roseway River 1

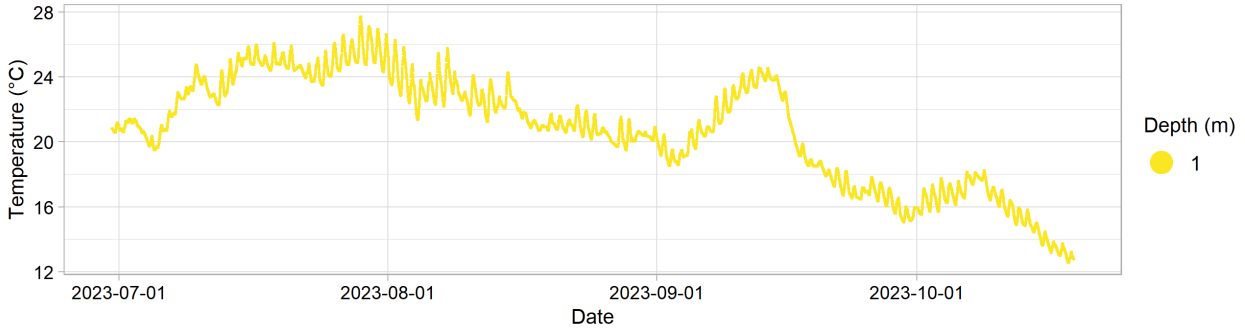

Figure 39: Roseway River 1 temperature data.

2.12.2 Roseway River 2

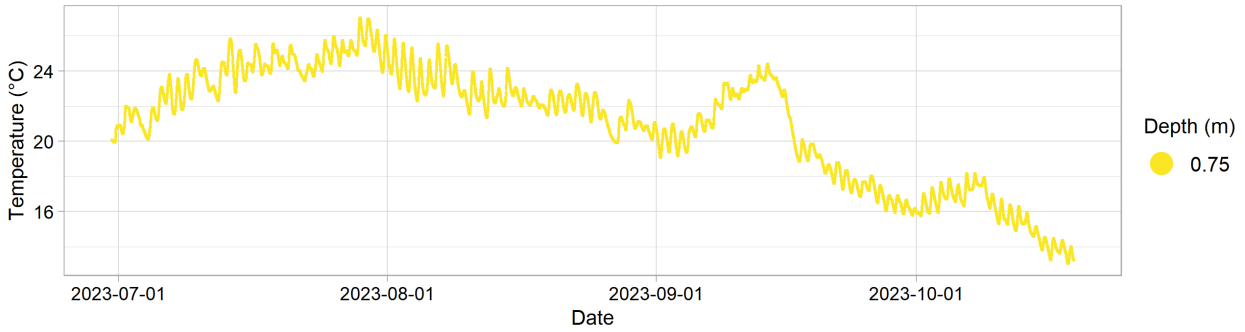

Figure 40: Roseway River 2 temperature data.

2.13 Round Hill River

Table 14: Deployment details for Round Hill River.

Station	Deployment Date	Retrieval Date	Latitude	Longitude	Configuration	Variables Measured
Round Hill River 1	2023-06-27	2023-09-29	44.7595	−65.3994	attached to fixed structure	temperature
Round Hill River 2	2023-06-27	2023-09-29	44.7123	−65.3198	attached to fixed structure	temperature
Round Hill River 3	2023-06-27	2023-09-29	44.7045	−65.2908	attached to fixed structure	temperature

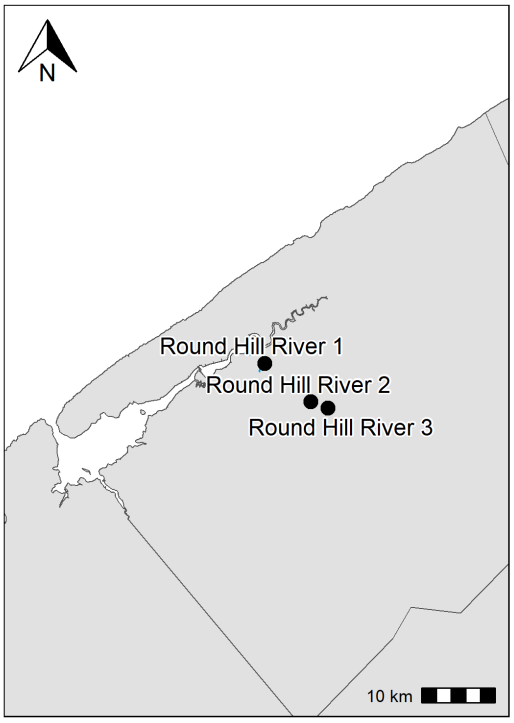

Figure 41: Round Hill River station location(s).

2.13.1 Round Hill River 1

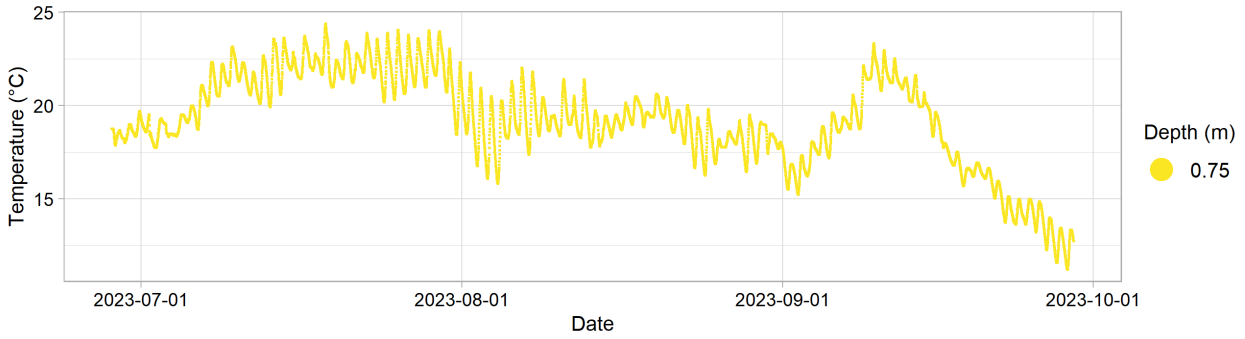

Figure 42: Round Hill River 1 temperature data.

2.13.2 Round Hill River 2

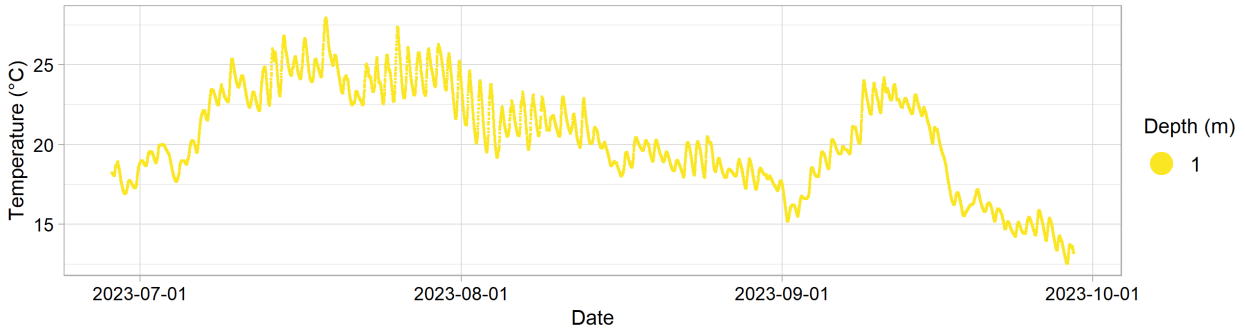

Figure 43: Round Hill River 2 temperature data.

2.13.3 Round Hill River 3

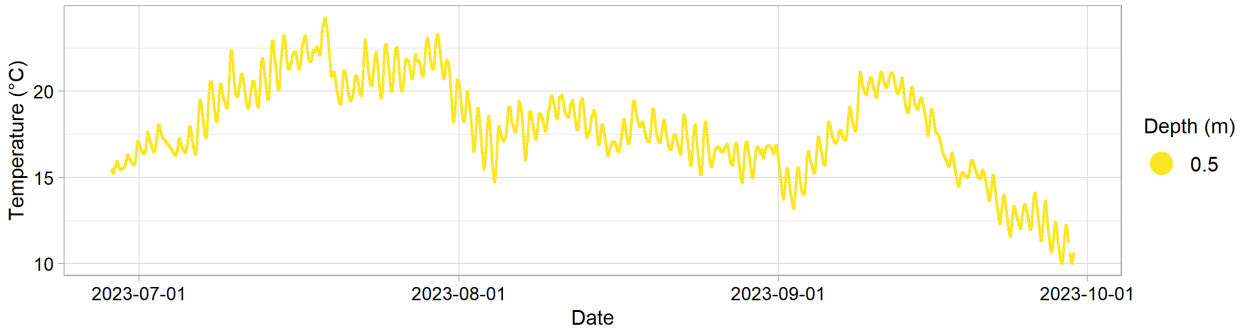

Figure 44: Round Hill River 3 temperature data.

2.14 Salmon River

Table 15: Deployment details for Salmon River.

Station	Deployment Date	Retrieval Date	Latitude	Longitude	Configuration	Variables Measured
Salmon River 1	2023-06-28	2023-10-18	44.1282	−66.0648	attached to fixed structure	temperature
Salmon River 2	2023-06-28	2023-10-18	44.1578	−66.0278	attached to fixed structure	temperature

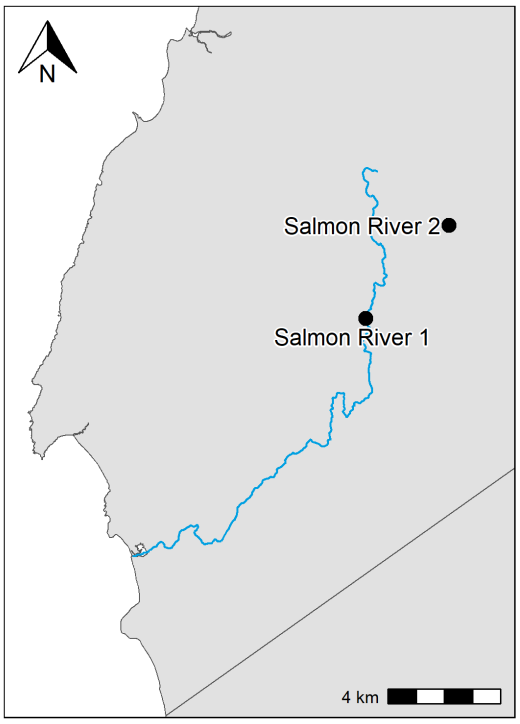

Figure 45: Salmon River station location(s).

2.14.1 Salmon River 1

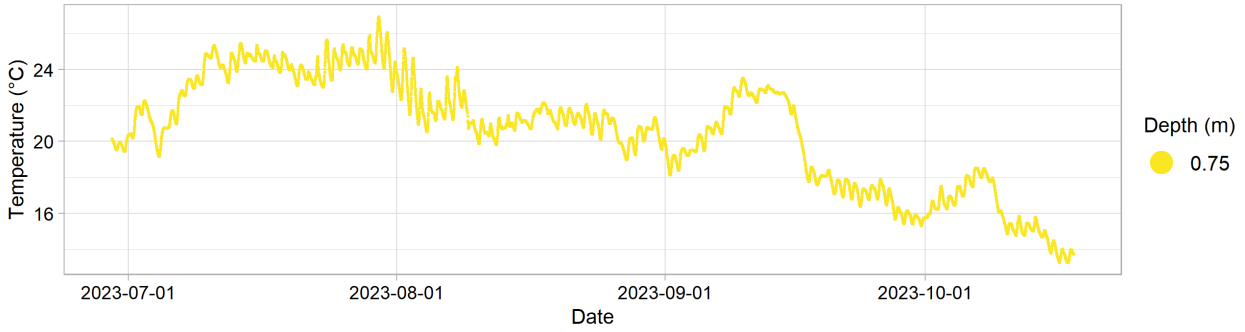

Figure 46: Salmon River 1 temperature data.

2.14.2 Salmon River 2

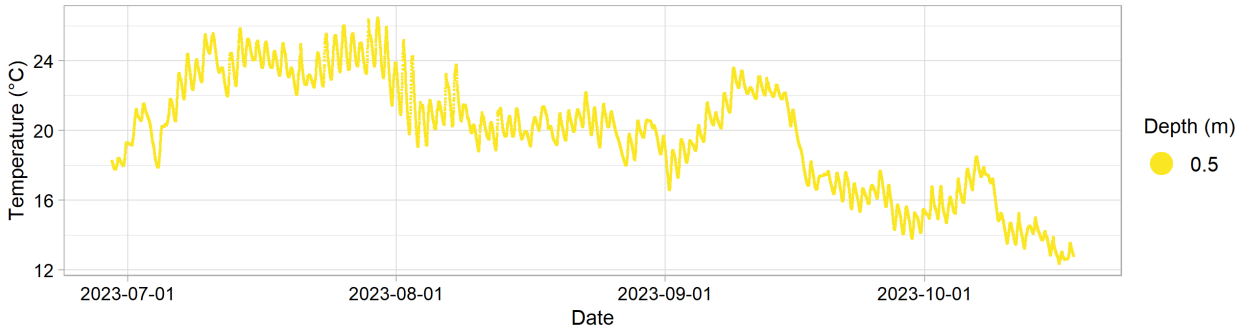

Figure 47: Salmon River 2 temperature data.

2.15 Sissiboo River

Table 16: Deployment details for Sissiboo River.

Station	Deployment Date	Retrieval Date	Latitude	Longitude	Configuration	Variables Measured
Sissiboo River	2021-08-05	2021-11-08	44.4101	−65.997	floating dock	dissolved oxygen (% sat) temperature

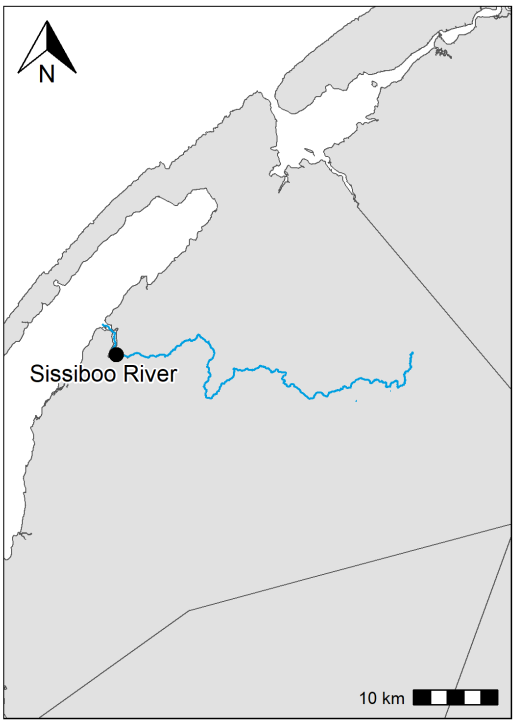

Figure 48: Sissiboo River station location(s).

2.15.1 Sissiboo River

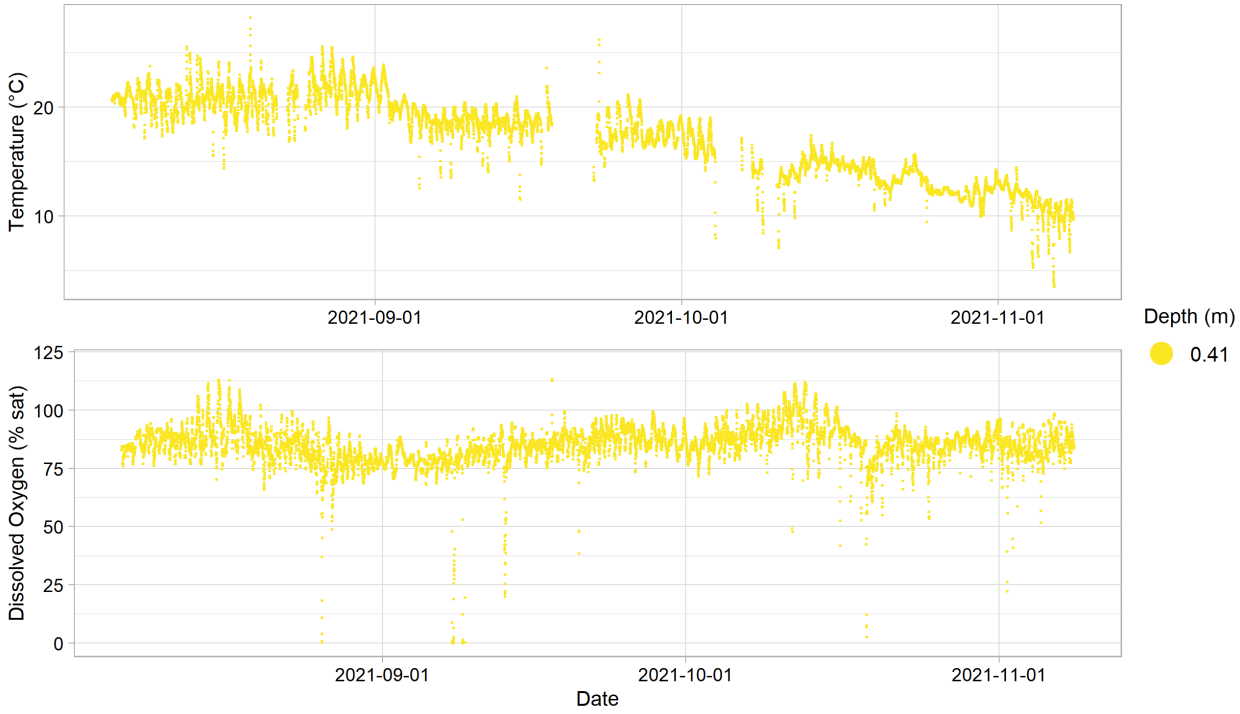

Figure 49: Sissiboo River water quality data.

2.16 Tusket River

Table 17: Deployment details for Tusket River.

Station	Deployment Date	Retrieval Date	Latitude	Longitude	Configuration	Variables Measured
Tusket River 1	2023-06-28	2023-10-18	44.0933	−65.8036	attached to fixed structure	temperature
Tusket River 2	2023-06-29	2023-10-19	43.8904	−65.7717	attached to fixed structure	temperature
Tusket River 3	2023-06-29	2023-10-18	44.1292	−65.7301	attached to fixed structure	temperature

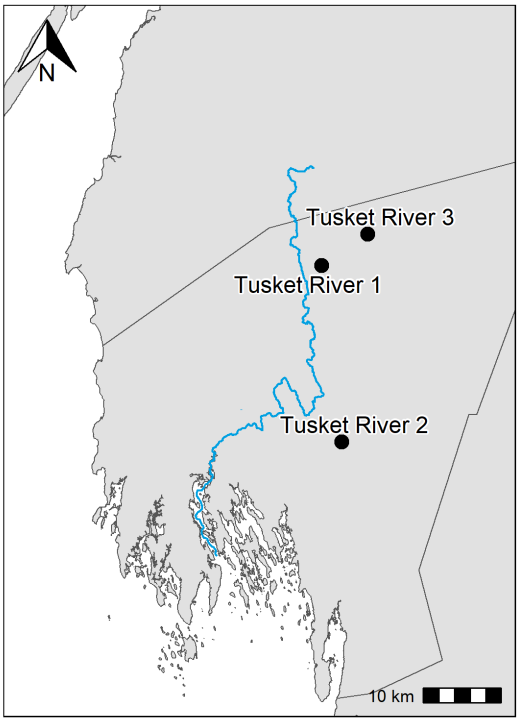

Figure 50: Tusket River station location(s).

2.16.1 Tusket River 1

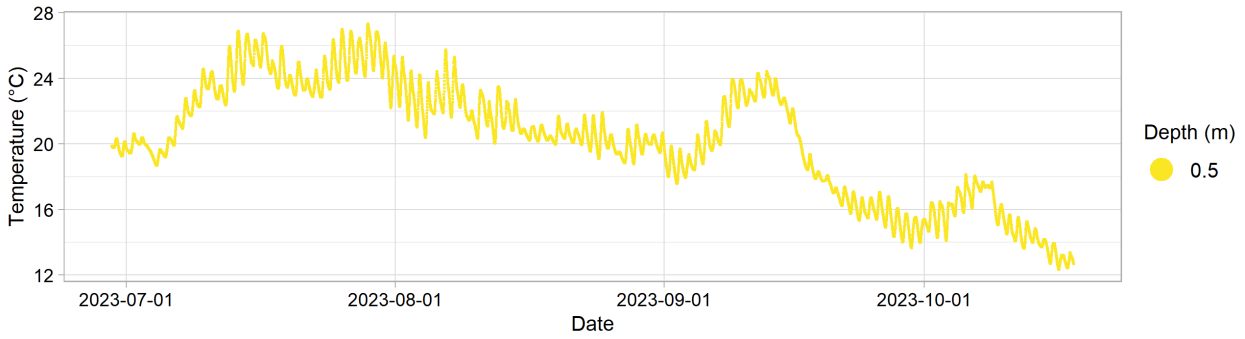

Figure 51: Tusket River 1 temperature data.

2.16.2 Tusket River 2

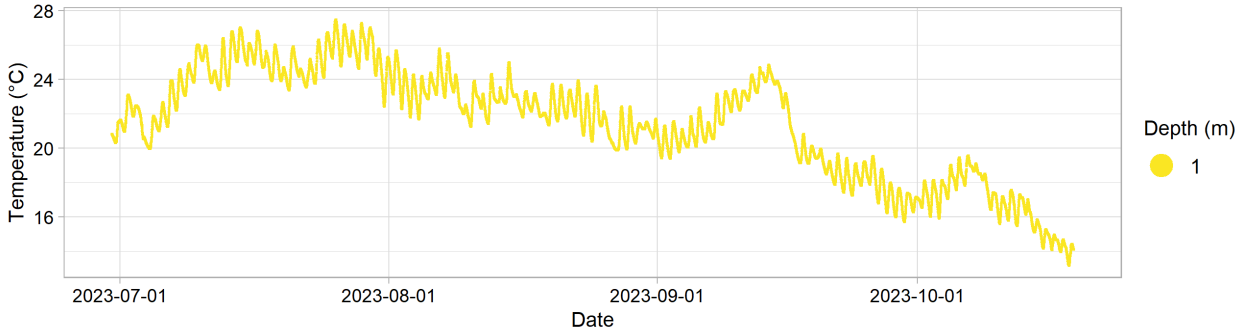

Figure 52: Tusket River 2 temperature data.

2.16.3 Tusket River 3

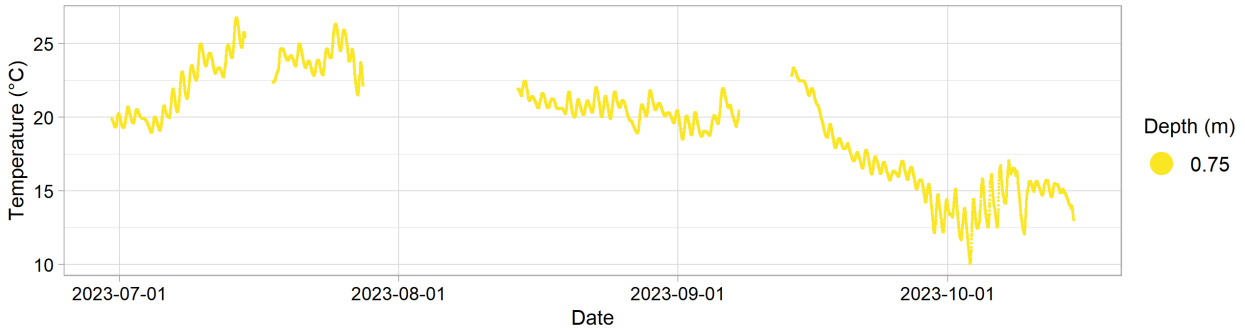

Figure 53: Tusket River 3 temperature data.

3 Data Acknowledgement

CMAR aims to prioritize data collection and processing efforts that best serve coastal interest holders. If you use this Coastal Monitoring Program Water Quality data in a project or for decision making, please complete our anonymous questionnaire with your feedback. Please cite the report and/or datasets used.

4 Document History

Table 17: Description of sensor string configurations.

Version	Date	Amendments
V1	2025-10-25	New document

References

IOOS. 2020. "QARTOD Manual for Real-Time Oceanographic Data Quality Control Flags." https://cdn.ioos.noaa.gov/media/2020/07/QARTOD-Data-Flags-Manual_version1.2final.pdf.

Weitzman, J., T. Wilson, N. Torrie, K. Watson, L. Lewis-McCrea, and G. Reid. 2025. "Evaluating River Significance for Wild Atlantic Salmon (Salmo Salar) in Nova Scotia." Report. Centre for Marine Applied Research (CMAR). https://cmar.ca/project/assessing-wild-salmon-rivers-in-nova-scotia/.