



# Annual Weather Station Maintenance Report

**2022**



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

Weather Station Annual Maintenance - 2022, Newfoundland and Labrador

Prepared by:

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## Overview

The Department of Environment and Climate Change – Water Resources Management Division (WRMD) operates and maintains a network of automated weather stations across the province. Reliable weather data is needed to support water resources management decisions and policy development. This network (see table below) is maintained by staff within the WRMD.

Automated Weather/Camera Stations in Operation (2022)

	Camera	Snow Water Equivalent (SWE)	Meteorological
Pippy Park in St. John's			✓
Exploits River at Badger East of Stadium	✓		✓
Sandy Lake near Birchy Narrows (Camp 55)	✓	✓	✓
Humber River At Humber Village Bridge	✓		✓
Upper Humber River above Black Brook		✓	✓
Churchill River at End of Mud Lake Road	✓		✓
Muskrat Falls MET	✓		✓
Metchin River near TLH		✓	✓
TLH between Churchill Falls and Lab City		✓	✓
Mud Lake Road MET			✓
Exploits below Noel Paul's Brook MET	✓		✓
Vale LH1 MET			✓
Vale LH2 MET			✓
Waterford River at Kilbride	✓		
Exploits River at Badger Steps	✓		
Steady Brook 470 meters above Confluence to Humber River	✓		
Churchill River at end of Mud Lake Road - Level	✓		
Churchill River below Traverspine River	✓		
Goose River at Bridge	✓		
Mud Lake Outlet Tributary at Mud Lake	✓		
Churchill River above Grizzle Rapids	✓		
Exploits River at Bishop's Falls Trestle	✓		
Humber River at Nichol'sville at Bridge	✓		

## Purpose

Annual maintenance and accuracy checks are necessary to ensure not only the longevity of the equipment, but more importantly, to ensure the accuracy and validity of the data that is being reported by the stations. This is necessary to ensure ongoing program reliability, effectiveness and delivery of high quality results for the existing automated weather station network.

## Pippy Park Weather Station

### Station Details:

- Station Identification: NLENCL0001
- Station Installed: August 2004
- Parameters measured every fifteen minutes and updated every hour:
  - Air Temperature
  - Relative Humidity
  - Atmospheric Pressure
  - Dew Point Temperature
  - Precipitation
  - Wind Speed
  - Wind Direction
  - Solar Radiation
  - Sunshine Hours
- Site Selection Rationale: Pilot weather station test site, verified that this particular technology can be integrated without issues within our existing infrastructure. A microclimate exists at this site due to the height of surrounding trees and development in close proximity to the weather station.
- Date Visited: Throughout 2022
- Location: N 47° 35' 16.7" W 52° 44' 1.3"
- Elevation: 101.2 m

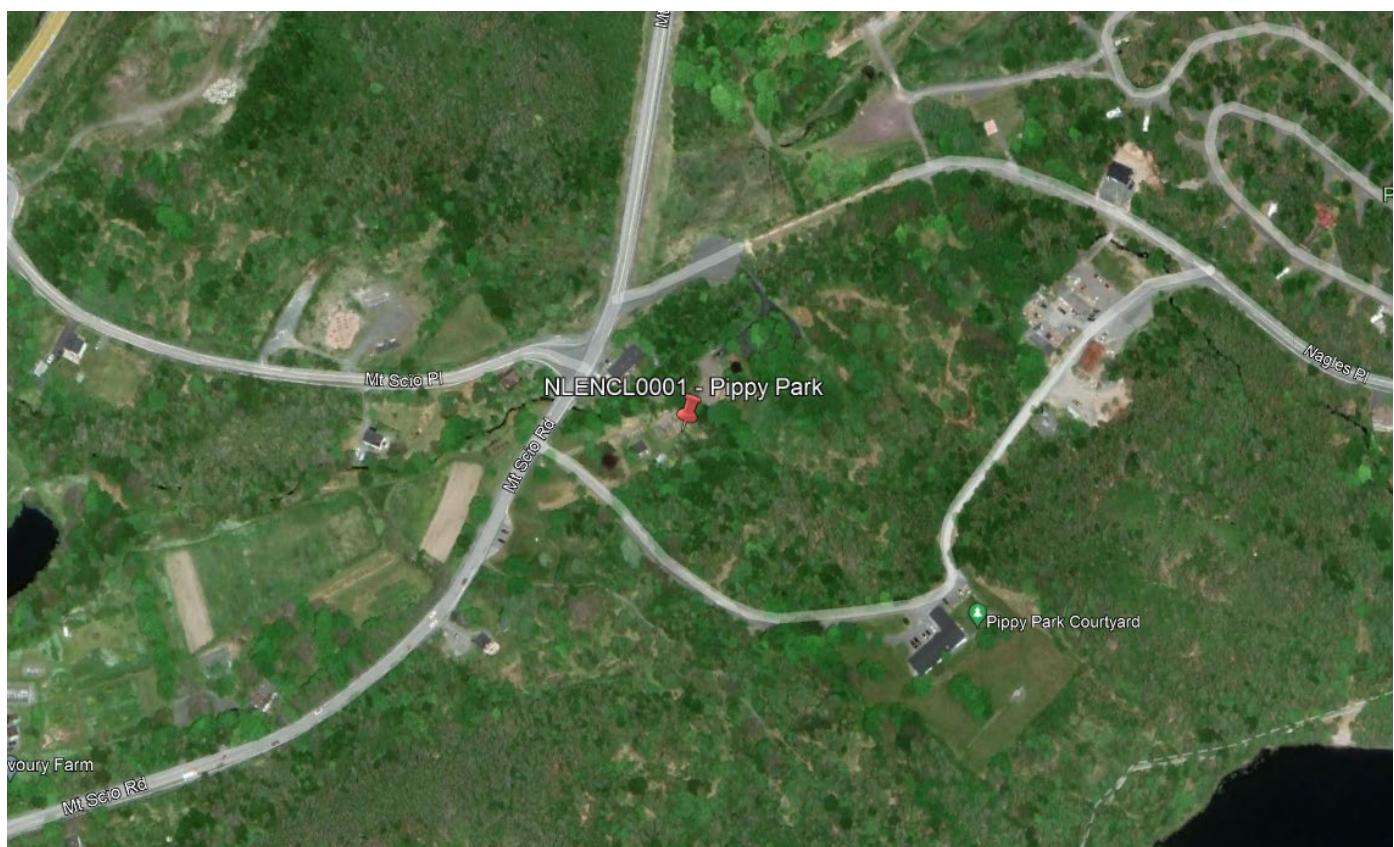


Figure 1: Pippy Park Weather Station Location

*Tasks accomplished:*

- Datalogger:
  - Model: CR1000X
  - Serial: 14253
  - Replaced desiccant
- Anemometer:
  - Model: 05103-10 RM Young
  - Serial: 57031
  - Replaced speed bearings
- Temperature/Relative Humidity:
  - Model: HygroVUE10
  - Serial: E1337
  - Replaced temp/RH chip
- Barometric Pressure:
  - Model: CS106
  - Serial: BP06403
- Precipitation:
  - TE525WS Texas Electronics
  - Serial: 81407-819
  - Cleaned funnel and bucket
- Heated Precipitation:
  - H3 rain[e] Heated Tipping Bucket
  - Cleaned funnel and bucket
  - Heated bucket now displayed on public station page
- Solar Radiation:
  - Model: SPLite 2
  - Serial: 194492
  - Wiped lens

*Follow-up tasks required:*

- Regular scheduled maintenance
- Install multiple other precipitation methods
  - Pluvio, WS100, ARG314, BC Standpipe and Snow Scale for comparative precipitation testing

## Exploits River at Badger East of Stadium

### Station Details:

- Station Identification: NLENCL0002
- Station Installed: September 2008
- Camera image taken and transmitted every hour during the day time
- Parameters measured every fifteen minutes and updated every hour:
  - Air Temperature
  - Relative Humidity
  - Atmospheric Pressure
  - Dew Point Temperature
  - Precipitation
  - Wind Speed
  - Wind Direction
  - Snow Depth
  - Solar Radiation
  - Sunshine Hours
- Site Selection Rationale: Weather information collected at this site feeds into a flood forecast modelling system for the community of Badger.
- Date Visited: June 21<sup>st</sup>, 2022
- Location: N 48° 58' 29.83" W 56° 2' 4.43"
- Elevation: 88.1 m

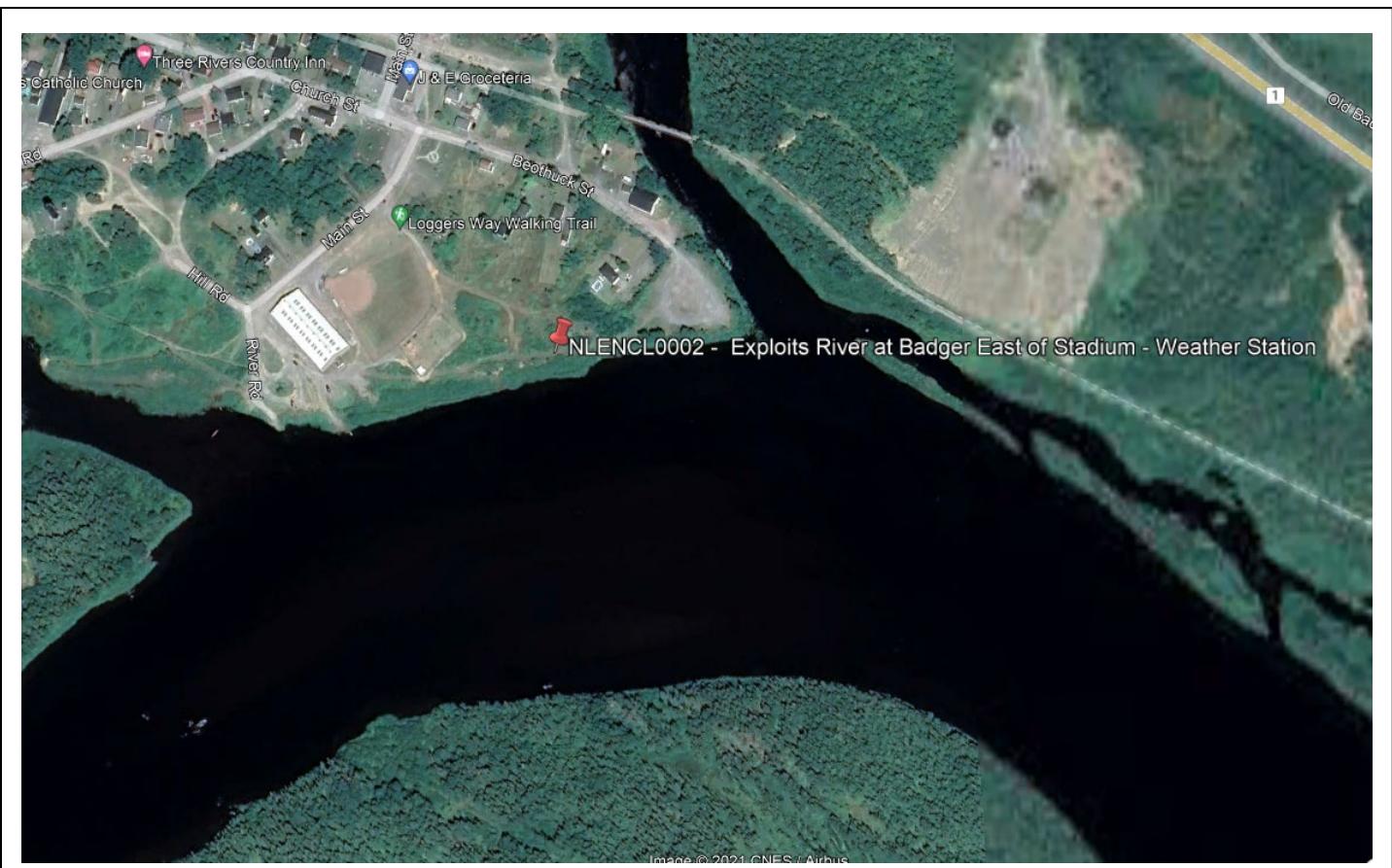


Figure 2: Exploits River at Badger Weather Station Location

*Tasks accomplished:*

- Datalogger:
  - Model: CR1000
  - Serial: 13443
  - Replaced desiccant
- Camera:
  - Model: CC5MPX
  - Installed new CC5MPX in place of CC640
- Anemometer:
  - Model: RM Young 05103-10-L
  - Serial: 58072
  - Replaced speed bearings
- Temperature/Relative Humidity:
  - Model: HMP45C
  - Serial: C3046
  - Chip was calibrated using Vaisala relative humidity calibration salts
- Snow Depth Sensor:
  - Model: SR50A Sonic Ranger
  - Serial: 31665
  - Replaced transducer with grill-less model due to pitting and peeling of surface foil
- Barometric Pressure:
  - Model: Young 61205V
  - Serial: BP05005
- Precipitation:
  - Model: Texas Electronics TE525WS
  - Serial: 44701-1007
  - Cleared funnel and bucket portion of the unit from debris
- Solar Radiation:
  - Model: Kipp & Zonen SP LITE Pyranometer
  - Serial: 080135
  - Cleaned lens
- Solar Panel:
  - Model: 50W SW Energy Panel w/ SunSaver

*Follow-up tasks required:*

- Regular scheduled maintenance
- Purchase and installation of 52202 heated tipping bucket
- Install new HygroVUE10 in place of old HMP45C temp/RH sensor

## Humber River at Humber Village Bridge

### Station Details:

- Station Identification: NLENCL0003
- Station Installed: September 2009
- Image taken hourly and transmitted three times daily
- Parameters measured every hour and downloaded three times daily\*:
  - Air Temperature
  - Relative Humidity
  - Atmospheric Pressure
  - Dew Point Temperature
  - Precipitation
  - Wind Speed
  - Wind Direction
  - Snow Depth
  - Solar Radiation
  - Sunshine Hours
- Site Selection Rationale: Weather information collected at this site is used for flood forecast monitoring of communities along the Humber River.
- Date Visited: July 26<sup>th</sup>, 2022
- Location: N 48° 58' 58.21" W 57° 45' 38.04"
- Elevation: 7.6 m

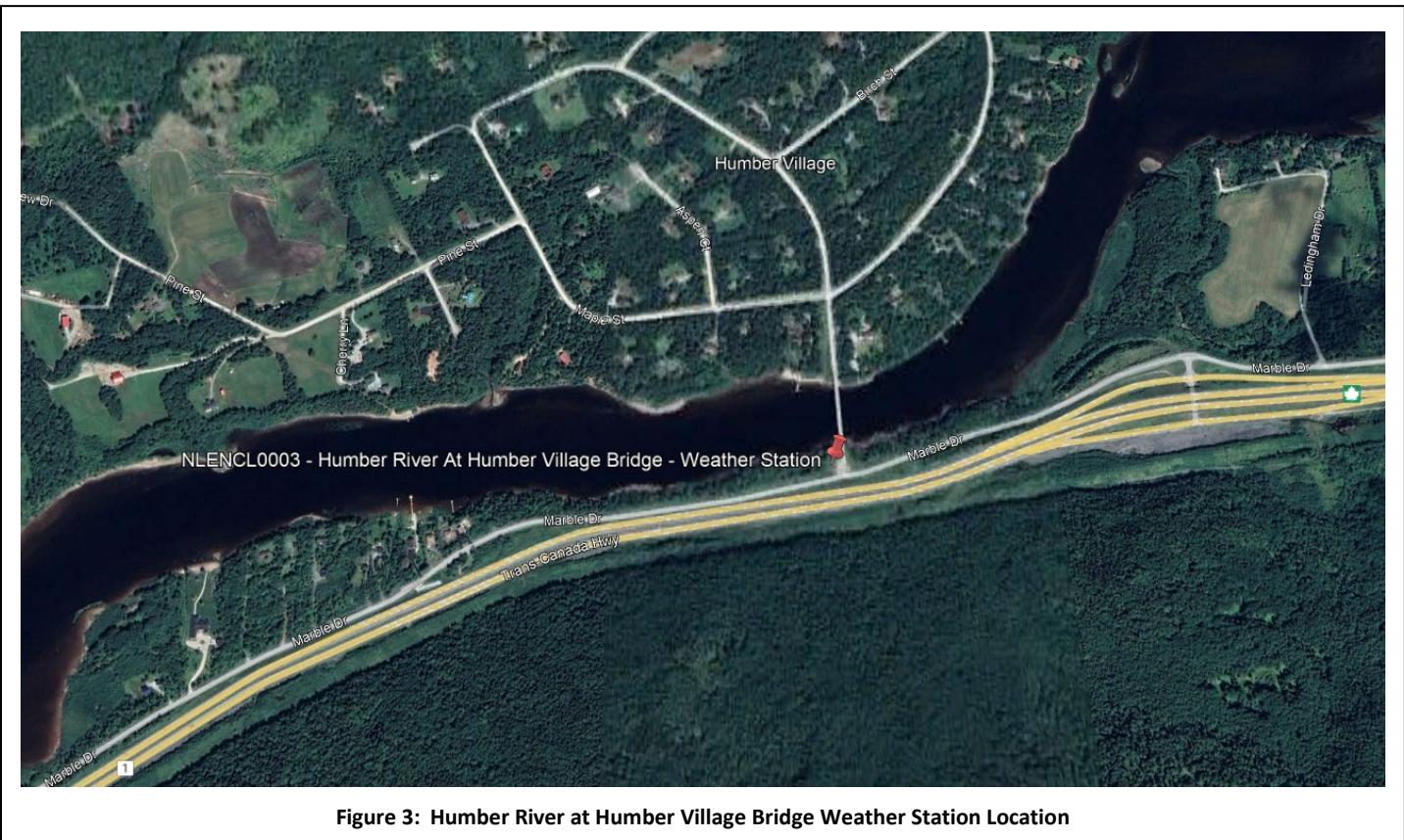


Figure 3: Humber River at Humber Village Bridge Weather Station Location

*Tasks accomplished:*

- Datalogger:
  - Model: CR1000
  - Serial: 22355
  - Replaced desiccant
- Camera:
  - Model: CC640
  - Serial: 01511
  - Cleaned enclosure window and lens, replaced desiccant
- Anemometer:
  - Model: RM Young 05103-10
  - Serial: 130198
  - Replaced speed bearings
- Temperature/Relative Humidity:
  - Model: HMP45C
  - Serial: C1407
  - Calibrated Temperature/Relative Humidity element using Vaisala calibration salts
- Snow Depth Sensor:
  - Model: Sonic Ranger SR50A
  - Serial: C13213
  - Replaced transducer due to pitting and peeling of surface foil
- Barometric Pressure:
  - Model: 61205V
  - Serial: BP05888
- Precipitation:
  - Model: TE525WS Texas Electronics
  - Serial: 49063-109
  - Cleared funnel and bucket portion of the unit from debris
- Solar Radiation:
  - Model: Kipp & Zonen SP LITE Pyranometer
  - Serial: 080395
  - Cleaned lens
- Compound:
  - Cleared vegetation
  - Surrounded 12v battery with insulated box to increase longevity in the winter months

*Follow-up tasks required:*

- Regular scheduled maintenance
- Purchase and installation of 52202 heated tipping bucket
- Install new HygroVUE10 in place of old HMP45C temp/RH sensor

## Churchill River at End of Mud Lake Road (retiring)

### Station Details:

- Station Identification: NLENCL0004
- Station Installed: July 2010
- Image taken and transmitted every hour during the day time
- Parameters measured every fifteen minutes and downloaded hourly:
  - Air Temperature
  - Relative Humidity
  - Atmospheric Pressure
  - Dew Point Temperature
  - Precipitation
  - Wind Speed
  - Wind Direction
  - Snow Depth
  - Solar Radiation
  - Sunshine Hours
- Site Selection Rationale: Station provides essential information for flood forecasting, hydropower generation, ice monitoring, wildlife studies, and for the study of climate change adaptation. The station also captures images of an ice road between Happy Valley – Goose Bay and the Town of Mud Lake, and provides weather data for interpreting water quality data collected along the Churchill River.
- Date Visited: Sept. 19<sup>th</sup> 2022
- Location: N 53° 20' 15.95" W 60° 11' 21.44"
- Elevation: 1.2 m

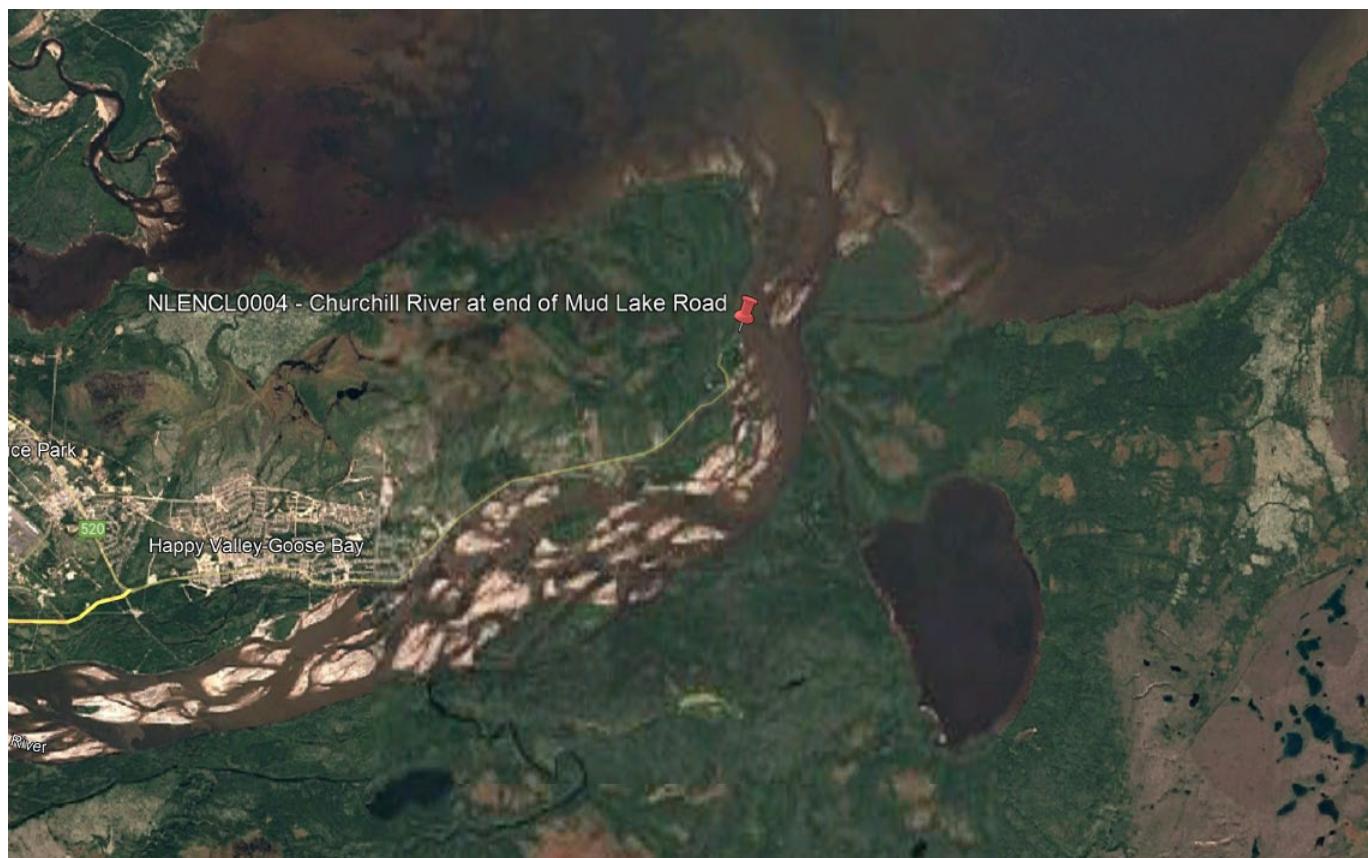


Figure 4: Churchill River at end of Mud Lake Road Weather Station Location

*Tasks accomplished:*

- Datalogger:
  - Model: CR1000
  - Serial: 29931
- Camera:
  - Model: CC640
  - Serial: AAW-TZ49
- Anemometer:
  - Model: 05103AP-10-L RM Young Alpine Version
  - Serial: 127033
- Temperature/Relative Humidity:
  - Model: CS215
  - Serial: E17154
- Snow Depth Sensor:
  - Model: Sonic Ranger SR50A
  - Serial: 3000
- Barometric Pressure:
  - Model: 61302V
  - Serial: BPA1406
- Precipitation:
  - Model: Texas Electronics TE-525WS
  - Serial: 43229-210
- Solar Radiation:
  - Model: Kipp & Zonen SP LITE Pyranometer
  - Serial: 091170

*Follow-up tasks required:*

- Monitor site degradation due to erosion caused by nearby ocean and river processes.
- Determine what equipment can be salvaged from this site
- Move core of site back from shore in order to keep camera setup

## Sandy Lake near Birchy Narrows (Camp 55)

### Station Details:

- Station Identification: NLENCL0005
- Station Installed: November 2010
- Image taken and transmitted every hour during the day time
- Parameters measured every fifteen minutes and updated hourly:
  - Air Temperature
  - Relative Humidity
  - Atmospheric Pressure
  - Dew Point Temperature
  - Precipitation
  - Wind Speed
  - Wind Direction
  - Snow Depth
  - Snow Water Equivalent (Tl)
  - Snow Water Equivalent (K)
  - Soil Moisture
  - Solar Radiation
  - Sunshine Hours
- Site Selection Rationale: Weather data collected at this site is used in flood forecasting operations for communities along the Humber River that are at risk of flooding during springtime snowmelt.
- Date Visited: July 26<sup>th</sup>, 2022
- Location: N 49° 16' 28.30" W 56° 51' 5.80"
- Elevation: 119.8 m



Figure 5: Sandy Lake near Birchy Narrows (Camp 55) Snow Monitoring Station Location

*Tasks accomplished:*

- Datalogger:
  - Model: CR1000
  - Serial: 24833
  - Replaced desiccant
- Camera:
  - Model: CC640
  - Serial: 01654
  - Cleaned enclosure window and lens, replaced desiccant
- Anemometer:
  - Model: 05103AP-10-L RM Young Wind Monitor Alpine Version
  - Serial: 83400
  - Replaced speed bearings
- Temperature/Relative Humidity:
  - Model: HygroVUE10
  - Replaced temp/RH chip
- Snow Depth Sensor:
  - Model: Sonic Ranger SR50A
  - Serial: 2999
  - Replaced transducer due to pitting and peeling of surface foil
- Barometric Pressure:
  - Model: Young 61302V
  - Serial: BPA1405
  - The 61302V is not field serviceable nor can it be field calibrated
- Precipitation:
  - Model: Texas Electronics TE525WS
  - Serial: 42377-1009
  - Cleared funnel and bucket portion of the unit of debris
- Solar Radiation:
  - Model: Kipp & Zonen SP LITE Pyranometer
  - Serial: 091169
  - Cleaned lens
- Snow Water Equivalent:
  - Model: CS725
  - Serial: 1015
- Compound:
  - Excess vegetation removed in and around compound

*Follow-up tasks required:*

- Regular scheduled maintenance
- Mark location for Pluvio installation, have concrete base poured
- Tree removal operations needed to open tree canopy to the south for better solar power exposure.

## Muskrat Falls MET

### *Station Details:*

- Station Identification: NLENCL0006
- Station Installed: July 2014
- Parameters measured every fifteen minutes and downloaded hourly:
  - Air Temperature
  - Relative Humidity
  - Atmospheric Pressure
  - Dew Point Temperature
  - Wind Chill
  - Humidex
  - Precipitation
  - Wind Speed
  - Wind Direction
  - Snow Depth
  - Solar Radiation
  - Sunshine Hours
- Site Selection Rationale: Provides essential meteorological information for site operations, water level analysis, flood forecasting, hydropower generation, wildlife studies, and climate change adaptation in the province. Provides weather data for accurate interpretation of water quality data and related events along the Churchill River
- Date Visited: September 20<sup>th</sup>, 2022
- Location: N 53° 14' 43.64" W 60° 46' 42.15"
- Elevation: 11.9 m



Figure 6: Muskrat Falls Weather Station Location

**Tasks accomplished:**

- Datalogger:
  - Model: CR1000
  - Serial: 56808
  - Replaced desiccant and indicator card
- Cameras:
  - Model: CC5MPX
  - Serial: 01317, 01314
  - Cleaned both camera lens'
- Anemometer:
  - Model: 05130AP-10-L RM Young Alpine
  - Serial: 98398
  - Replaced speed bearings
- Temperature/Relative Humidity:
  - Model: HC2-S3-L
  - Serial: 61081111
  - Replaced sensor element/cap with new precalibrated one
- Snow Depth Sensor:
  - Model: Sonic Ranger SR50A
  - Serial: 6755
  - Replaced transducer due to pitting and peeling of surface foil
- Barometric Pressure:
  - Model: CS106
  - Serial: J1660083
  - This sensor is not field serviceable nor can it be field calibrated
- Precipitation:
  - Model: Texas Electronics TE-525WS
  - Serial: 53322-1012
  - Cleared funnel and bucket portion of the unit of debris
- Solar Radiation:
  - Model: Kipp & Zonen SP LITE2 Pyranometer
  - Serial: 136646
  - Cleaned lens
- Power Generation:
  - Replaced two older 50W solar panels with one 100W panel
  - Replaced batteries

**Follow-up tasks required:**

- Regular scheduled maintenance
- Adjust solar panels towards southern sky to ensure battery bank year round

## Upper Humber River above Black Brook

### Station Details:

- Station Identification: NLENCL0007
- Station Installed: September 30<sup>th</sup> 2015
- Parameters measured every fifteen minutes and transmitted every hour:
  - Air Temperature
  - Relative Humidity
  - Atmospheric Pressure
  - Dew Point Temperature
  - Precipitation
  - Wind Speed
  - Wind Direction
  - Snow Depth
  - Snow Water Equivalent (Tl)
  - Snow Water Equivalent (K)
  - Solar Radiation
  - Sunshine Hours
- Site Selection Rationale: Weather data collected at this site is used in flood forecasting operations for communities along the Humber River that are at risk of flooding during springtime snowmelt.
- Date Visited: July 27<sup>th</sup>, 2022
- Location: N 49° 37' 6.24" W 57° 17' 41.20"
- Elevation: 302.4 m



Figure 7: Upper Humber River above Black Brook Snow Monitoring Station Location

*Tasks accomplished:*

- Datalogger:
  - Model: CR1000
  - Replaced desiccant
- Anemometer:
  - Model: 05103AP-10-L RM Young Wind Monitor Alpine Version
  - Serial: 98399
  - Replaced speed bearings
- Temperature/Relative Humidity:
  - Model: HygroVUE10
  - Replaced sensor element/cap with new precalibrated one
- Snow Depth Sensor:
  - Model: Sonic Ranger SR50A
  - Serial: 1670
  - Replaced transducer due to pitting and peeling of surface foil
- Barometric Pressure:
  - Model: 61302V
  - Serial: BPA140
  - The 61302V is not field serviceable nor can it be field calibrated
- Precipitation:
  - Model: Texas Electronics TE525WS
  - Serial: 432-30-210
  - Cleared funnel and bucket portion of the unit of debris
- Solar Radiation:
  - Model: Kipp & Zonen SP LITE Pyranometer
  - Serial: 091168
  - Cleaned lens
- Snow Water Equivalent:
  - Model: CS725
  - Sensors cable was taut due to weight of snow, loosened so strain on cable is reduced
- Compound:
  - Marked location for Pluvio base installation
  - Contracted individual to pour concrete for Pluvio base
  - Cleared unwanted vegetation

*Follow-up tasks required:*

- Install new Pluvio weighing gauge
- Install new TE525WS extended cable to ensure snow pack in winter does not pull on and stress cable
- Regular scheduled maintenance

## TLH between Churchill Falls and Lab City

### Station Details:

- Station Identification: NLENCL0008
- Station Installed: October 2017
- Parameters measured every fifteen minutes and transmitted every hour:
  - Air Temperature
  - Relative Humidity
  - Atmospheric Pressure
  - Dew Point Temperature
  - Precipitation
  - Wind Speed
  - Wind Direction
  - Snow Depth
  - Snow Water Equivalent (Tl)
  - Snow Water Equivalent (K)
  - Solar Radiation
  - Sunshine Hours
- Site Selection Rationale: This station provides information for hydropower generation operations and flood forecast monitoring for the Churchill River
- Date Visited: September 22<sup>nd</sup>, 2022
- Location: N 53° 21' 35.23" W 65° 33' 41.27"
- Elevation: 542.8 m

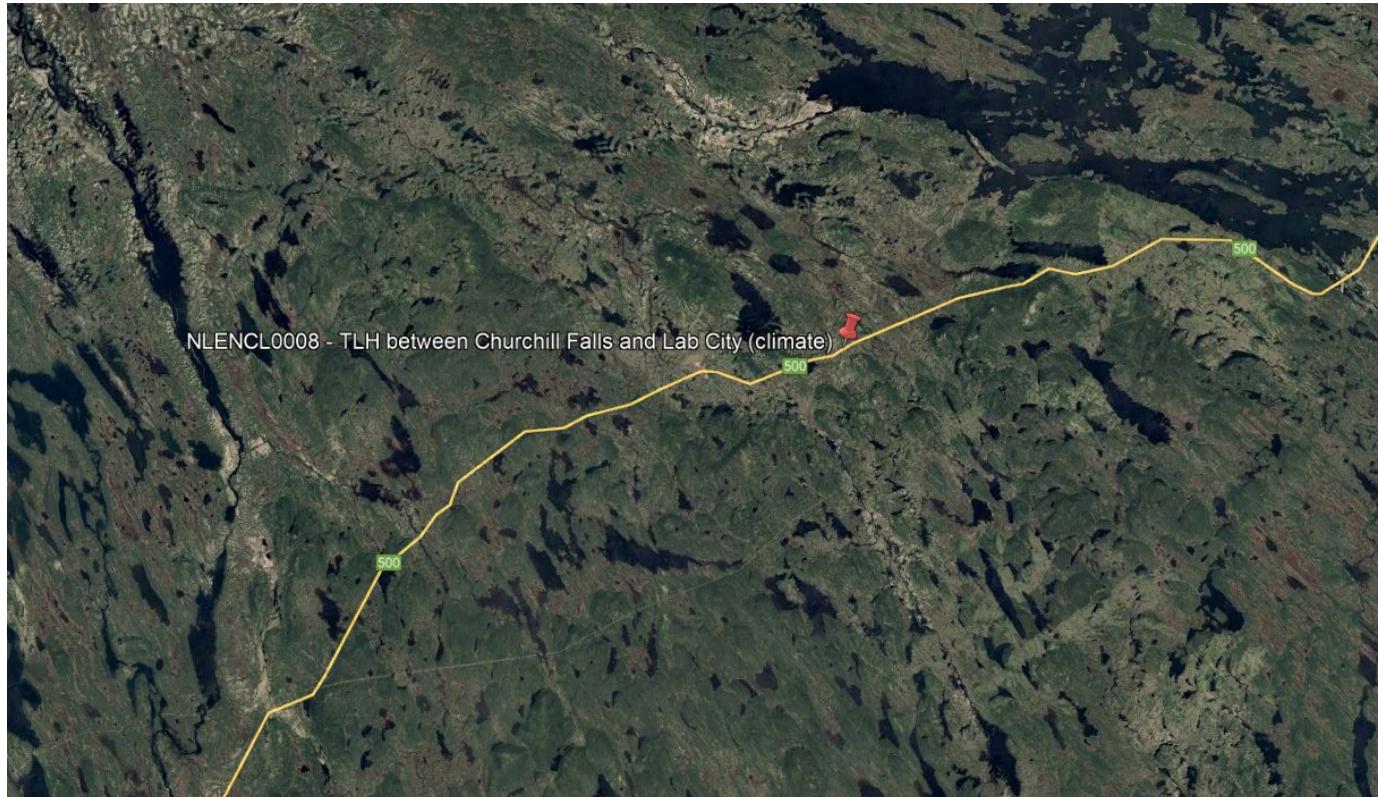


Figure 8: TLH between Churchill Falls and Lab City Snow Monitoring Station Location

*Tasks accomplished:*

- Datalogger:
  - Model: CR1000
  - Replaced desiccant and indicator card
- Anemometer
  - Model: 05103AP-10-L RM Young Alpine Version
  - Serial: 113751
  - Replaced speed, direction bearings and potentiometer
- Temperature/Relative Humidity:
  - Model: HygroVUE10
  - Serial: E3382
  - Replaced CS215 with new HygroVUE10, CS215 chips are no longer available
- Snow Depth Sensor:
  - Model: Sonic Ranger SR50A
  - Serial: 9170
  - Replaced transducer due to pitting and peeling of surface foil
- Barometric Pressure:
  - Model: CS106
  - Serial: N2250425
  - This sensor is not field serviceable nor can it be field calibrated.
- Precipitation:
  - Model: TB4-L
  - Cleared funnel and bucket portion of the unit of debris
- Solar Radiation:
  - Model: Kipp & Zonen SP LITE2 Pyranometer
  - Serial: 173212
  - Cleaned lens
- Communication:
  - Model: TX321-G GOES Transmitter
  - Antenna: FTS EON2 GOES/Meteosat Antenna
- Compound:
  - Adjusted battery connections for better power distribution across battery bank

*Follow-up tasks required:*

- Resolve wind gust reporting issue
- Regular scheduled maintenance

## Metchin River near TLH

### Station Details:

- Station Identification: NLENCL0009
- Station Installed: October 2017
- Parameters measured every fifteen minutes and transmitted every hour:
  - Air Temperature
  - Relative Humidity
  - Atmospheric Pressure
  - Dew Point Temperature
  - Precipitation
  - Wind Speed
  - Wind Direction
  - Snow Depth
  - Snow Water Equivalent (Tl)
  - Snow Water Equivalent (K)
  - Solar Radiation
  - Sunshine Hours
- Site Selection Rationale: This station provides information for hydropower generation operations and flood forecast monitoring for the Lower Churchill River
- Date Visited: September 23<sup>rd</sup>, 2022
- Location: N 53° 26' 10.12" W 63° 14' 1.38"
- Elevation: 329.8 m

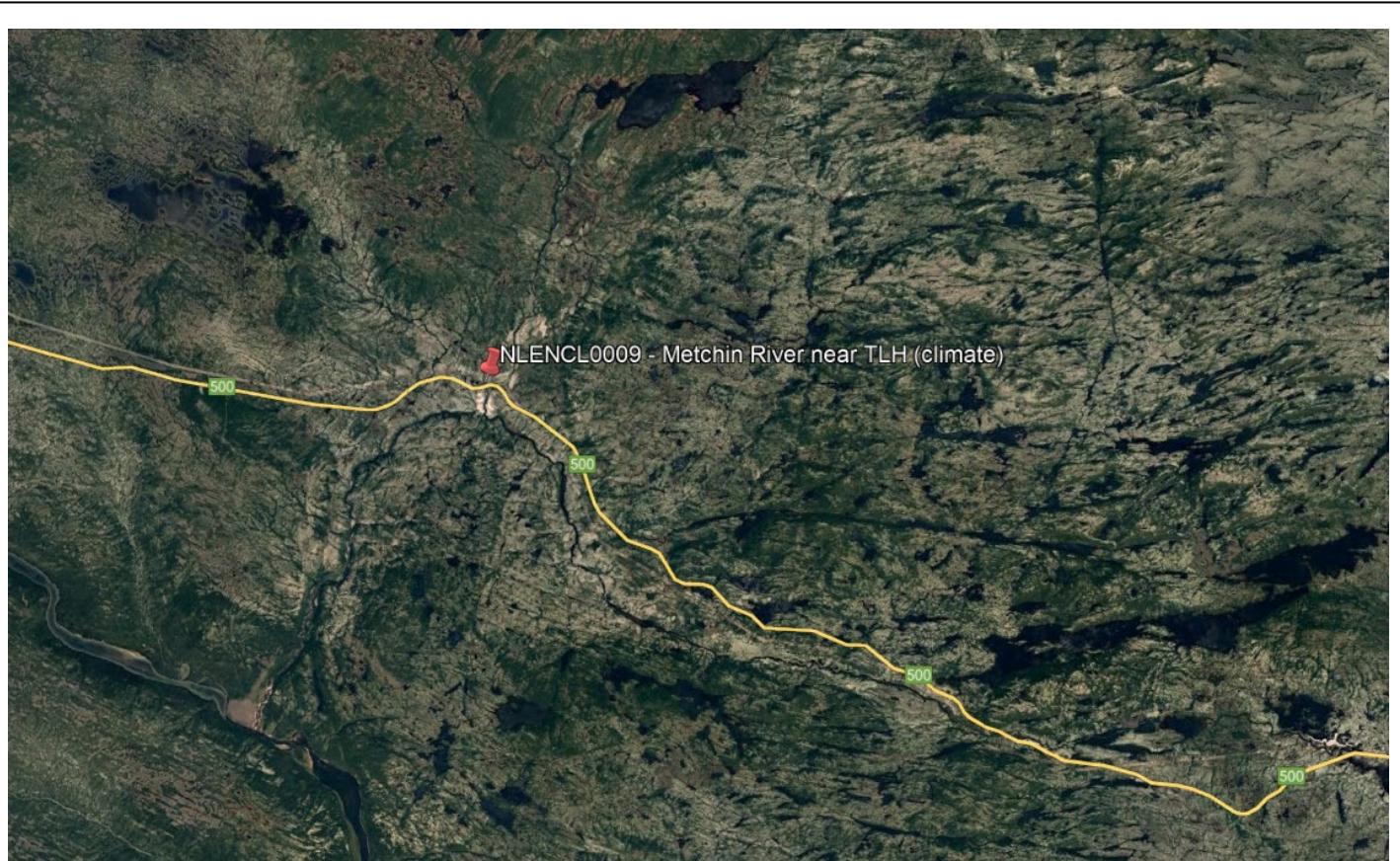


Figure 9: Metchin River near TLH Snow Monitoring Station Location

*Tasks accomplished:*

- Datalogger:
  - Model: CR1000
  - Replaced desiccant and indicator card
- Anemometer
  - Model: 05103AP-10-L RM Young Alpine Version
  - Serial: 152871
  - Replaced speed bearings
- Temperature/Relative Humidity:
  - Model: HygroVUE10
  - Serial: E3384
  - Replaced CS215 with new HygroVUE10, CS215 chips are no longer available
- Snow Depth Sensor:
  - Model: Sonic Ranger SR50A
  - Serial: 9171
  - Replaced transducer due to pitting and peeling of surface foil
- Barometric Pressure:
  - Model: CS106
  - Serial: N2250424
  - This sensor is not field serviceable nor can it be field calibrated.
- Precipitation:
  - Model: TB4-L
  - Cleared funnel and bucket portion of the unit of debris
- Solar Radiation:
  - Model: Kipp & Zonen SP LITE2 Pyranometer
  - Serial: 173211
  - Cleaned lens
- Compound:
  - Adjusted battery connections for better power distribution across battery bank

*Follow-up tasks required:*

- Resolve wind gust reporting issue
- Regular scheduled maintenance

## Exploits below Noel Paul's Brook MET

### Station Details:

- Station Identification: NLENCL0010
- Station Installed: November 2020
- Parameters measured every fifteen minutes and transmitted every hour:
  - Air Temperature
  - Relative Humidity
  - Atmospheric Pressure
  - Dew Point Temperature
  - Precipitation
  - Wind Speed
  - Wind Direction
  - Snow Depth
  - Solar Radiation
  - Sunshine Hours
- Site Selection Rationale: Selected with consultation from Environment Canada and for use in flood forecasting models.
- Date Visited: June 22<sup>nd</sup>, 2022
- Location: N 48° 50' 40.8" W 56° 16' 9.9"
- Elevation: 125.6 m



Figure 10: Exploits below Noel Paul's Brook MET

*Tasks accomplished:*

- Datalogger:
  - Model: CR1000X
  - Serial: 7468
  - Replaced desiccant
- Snow Depth Sensor:
  - Model: SR50A-EE Sonic Ranger
  - Serial: 11430
  - Replaced transducer due to pitting and peeling of surface foil
- Precipitation:
  - Model: TR-525-M-10-CA Texas Electronics
  - Serial: 77405-818
  - Cleared funnel and bucket of any debris
- Temperature/Relative Humidity:
  - Model: CS215
  - Serial: E21317
  - Swapped out RH chip for precalibrated one from CampbellSci
- Anemometer:
  - Model: 05103AP-10-L RM Young Alpine Version
  - Changed speed bearings
- Barometric Pressure:
  - Mode: CS106 Barometric Pressure Sensor
- Solar Radiation:
  - Model: SP Lite2 Pyranometer
  - Wiped lens
- GPS Antenna:
  - Model: Trimble GPS Antenna P/N 57861-20
  - Serial: 3480213
- Soil Moisture:
  - Model: Stevens HydraProbe
  - Serial: 253665
  - Newly installed
- Camera:
  - Model: NuPoint Fixed Sight Satellite Camera System
  - Serial: 13000464
  - Newly installed

*Follow-up tasks required:*

- Regular scheduled maintenance
- Adjust zoom on NuPoint satellite imaging system
- Resolve wind gust reporting issue

## Mud Lake Road MET

### *Station Details:*

- Station Identification: NLENCL0011
- Station Installed: October 2020
- Parameters measured every fifteen minutes and transmitted every hour:
  - Air Temperature
  - Relative Humidity
  - Atmospheric Pressure
  - Dew Point Temperature
  - Precipitation
  - Soil Moisture
  - Wind Speed
  - Wind Direction
  - Snow Depth
  - Solar Radiation
  - Sunshine Hours
- Site Selection Rationale: NLENCL0004 needed to be moved as the coastline is deteriorating. This is a relocated site with mostly new equipment. Selected with consultation from Environment Canada and for use in flood forecasting models.
- Date Visited: September 19<sup>th</sup>, 2022
- Location: N 53° 20' 6.9" W 60° 11' 23.5"
- Elevation: 0 m

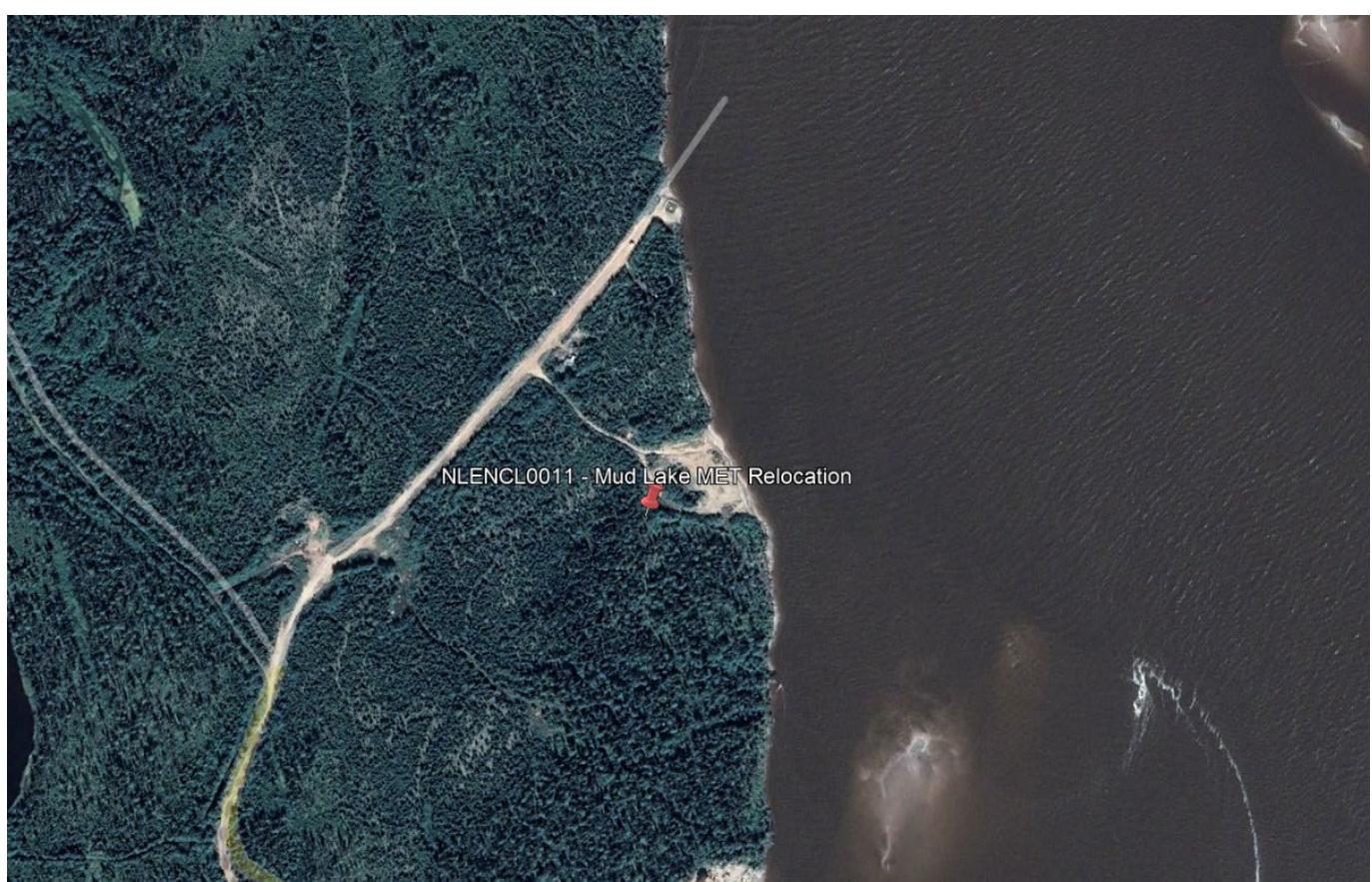


Figure 11: Mud Lake Road MET

*Tasks accomplished:*

- Datalogger:
  - Model: CR1000X
  - Serial: 19389
  - Changed desiccant
- Snow Depth Sensor:
  - Model: SR50A-EE Sonic Ranger
  - Serial: 12504
  - Replaced transducer due to pitting and peeling of surface foil
- Precipitation:
  - Model: TE525WS Texas Electronics
  - Serial: 79341-319
  - Cleared funnel and bucket of any debris
- Temperature/Relative Humidity:
  - Model: HygroVUE10
  - Serial: E1342
  - Swapped RH chip for precalibrated one from CampbellSci
- Anemometer:
  - Model: 05108-45-L40
  - Serial: 175874
  - Changed speed bearings
- Barometric Pressure:
  - Mode: CS106 Barometric Pressure Sensor
  - Serial: J4430010
- Solar Radiation:
  - Model: SP Lite2 Pyranometer
  - Serial: 205096
  - Wiped lens
- Soil Moisture:
  - Model: Stevens Hydra-Probe II
  - Serial: 253660
- Communication:
  - Model: Microhard 4GMini
- Antenna:
  - Model: C2444 9dB Yagi Antenna
- Solar Panel:
  - Model: SLP050-12C1D2 – 50 Watt 12 Volt with Mount & Regulator

*Follow-up tasks required:*

- Regular scheduled maintenance

## Vale LH1 MET

### Station Details:

- Station Identification: NLENCL0012
- Station Installed: November 2020
- Parameters measured every fifteen minutes and transmitted every hour:
  - Air Temperature
  - Relative Humidity
  - Atmospheric Pressure
  - Dew Point Temperature
  - Precipitation
  - Wind Speed
  - Wind Direction
- Site Selection Rationale: This station was installed in partnership with Vale Long Harbour. Vale required MET data from on site and we have the infrastructure in place already to host their data.
- Date Visited: Not maintained in 2022 – tower was taken down by wind in early 2022 – waiting on repairs by Vale
- Location: N 47° 25' 27" W 53° 45' 57.7"
- Elevation: 163.1 m



Figure 12: Vale LH1 MET

Weather Station Annual Maintenance - 2022, Newfoundland and Labrador

*Tasks accomplished:*

- Datalogger:
  - Model: CR1000X
  - Serial: 15039
- Precipitation:
  - Model: 52202-L RM Young Heated Rain and Snow Gauge
- Temperature/Relative Humidity:
  - Model: HygroVUE10
- Anemometer:
  - Model: RMY86000 Ultrasonic Anemometer
- Barometric Pressure:
  - Model: CS106 Barometric Pressure Sensor
  - Serial: S1050162
- Communication:
  - Model: Microhard 4GMini
  - Serial: 012-1254949
- Compound:
  - AC/DC 24v Converter connected to AC power and backup 12v battery bank

*Follow-up tasks required:*

- Regular scheduled maintenance
- Purchase wind alter shield for heated precipitation gauge
- Install alter shield
- Reinstall sensors once tower has been repaired by Vale

## Vale LH2 MET

### Station Details:

- Station Identification: NLENCL0013
- Station Installed: May 2022
- Parameters measured every fifteen minutes and transmitted every hour:
  - Air Temperature
  - Relative Humidity
  - Atmospheric Pressure
  - Dew Point Temperature
  - Precipitation
  - Wind Speed
  - Wind Direction
- Site Selection Rationale: This station was installed in partnership with Vale Long Harbour. They required MET data from the community and we have the infrastructure in place already to host their data.
- Date Visited: May 29<sup>th</sup>, 2022
- Location: N 47° 25' 27" W 53° 45' 57.7"
- Elevation: 163.1 m



Figure 12: Vale LH2 MET

**Tasks accomplished:**

- Datalogger:
  - Model: CR1000X
  - Serial: 15038
  - Newly installed
- Precipitation:
  - Model: 52202-L RM Young Heated Rain and Snow Gauge
  - Newly installed
- Temperature/Relative Humidity:
  - Model: HygroVUE10
  - Serial: E1692
  - Newly installed
- Anemometer:
  - Model: 05108-45
  - Newly installed
- Barometric Pressure:
  - Model: CS106 Barometric Pressure Sensor
  - Newly installed
- Communication:
  - Model: Microhard 4GMini
  - Newly installed
- Compound:
  - AC/DC 24v Converter connected to AC power and backup 12v battery bank
  - Newly installed

*Follow-up tasks required:*

- Regular scheduled maintenance

## Waterford River at Kilbride

### *Station Details:*

- Station Identification: NF02ZM0009
- Station Installed: July 21<sup>st</sup> 2015
- Image taken and transmitted every hour during the day time
- Site Selection Rationale: Provides essential information for visual image of changing water levels in this urban stream.
- Date Visited: Throughout 2022
- Location: N 47° 31' 44.44" W 52° 44' 41.04"
- Elevation: 32.9 m

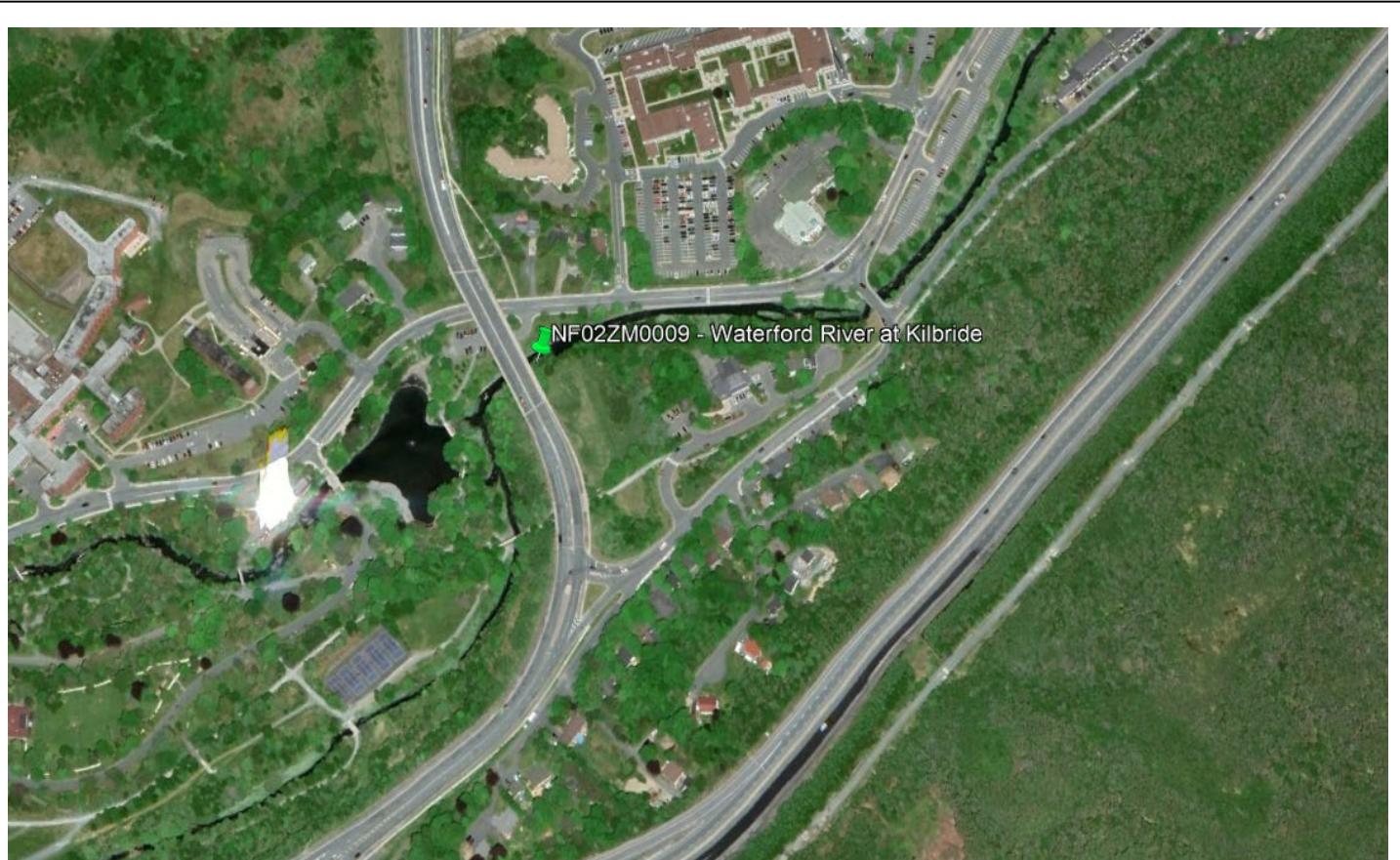


Figure 13: Waterford River at Kilbride Camera Station Location

Weather Station Annual Maintenance - 2022, Newfoundland and Labrador

*Tasks accomplished:*

- Datalogger:
  - Model: CR800
  - Replaced desiccant and indicator card
  - Power cycled station
- Camera:
  - Model: CC5MPX
  - Swapped damaged CC5MPX with new CC5MPX
  - New camera no longer has fish-eye lens
- Compound:
  - Purchased replacement trickle charger for 12v battery

*Follow-up tasks required:*

- Regular scheduled maintenance
- Fix station name in web camera image title

## Exploits River at Badger Steps

### *Station Details:*

- Station Identification: NLENCM0001
- Station Installed: November 2009
- Image taken and transmitted every hour during the day time
- Site Selection Rationale: Snow monitoring provides essential information for flood forecasting, hydropower generation and for climate change adaptation in the province. WRMD provides flood forecasting services, in which snow monitoring has been integrated, for the community of Badger in the Exploits River Basin.
- Date Visited: June 21<sup>st</sup>, 2022
- Location: N 48°56'25.86" W 55°58'42.98"
- Elevation: 100.6 m

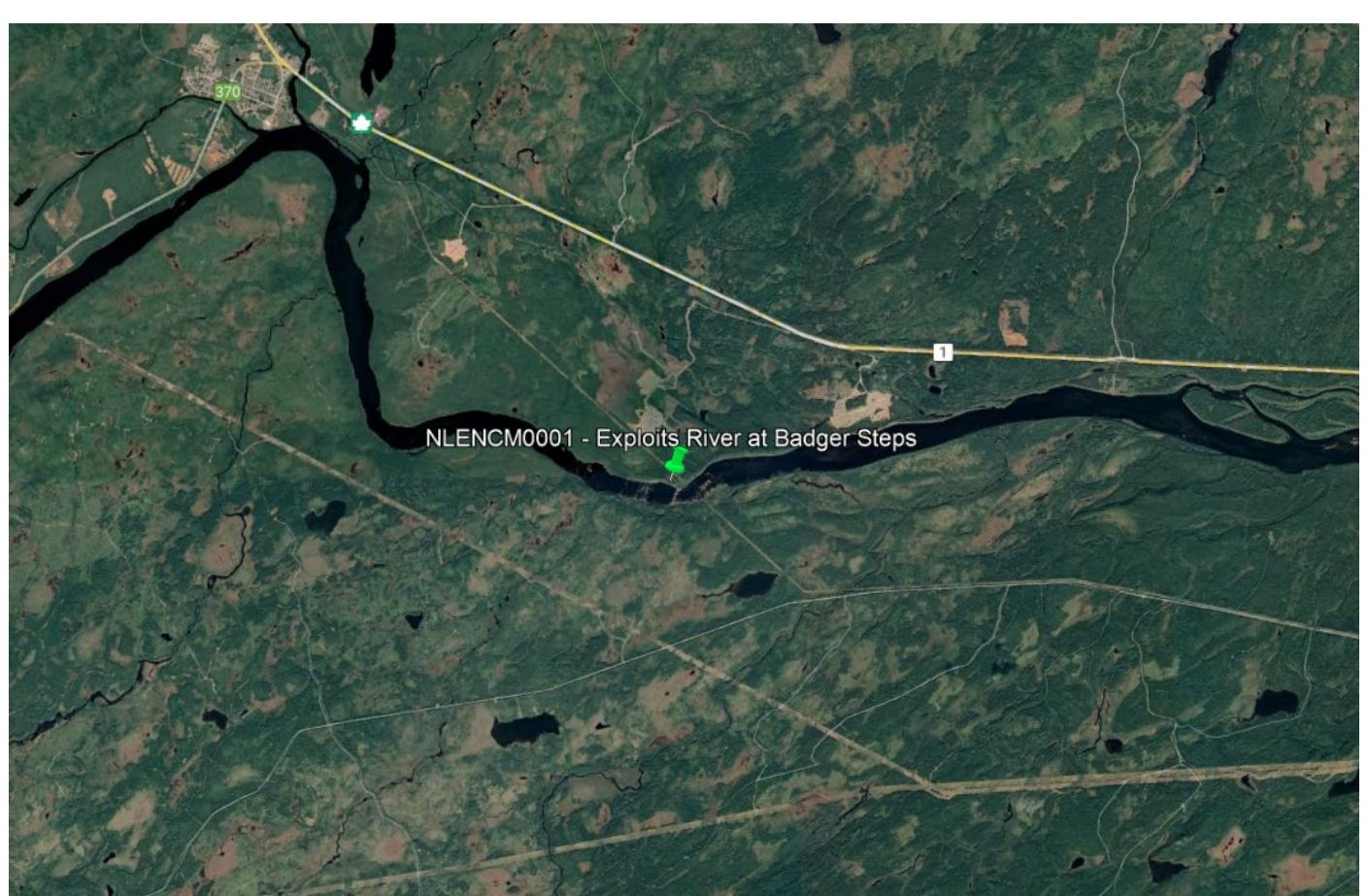


Figure 14: Exploits River at Badger Steps Camera Station Location

Weather Station Annual Maintenance - 2022, Newfoundland and Labrador

*Tasks accomplished:*

- Datalogger:
  - Model: CR1000
  - Replaced desiccant and indicator card
  - Cleared memory of USR drive
- Camera:
  - Model: CC5MPX
  - Wiped camera lens
- Site:
  - Installed insulated battery box around 12v battery for extended longevity in winter

*Follow-up tasks required:*

- Regular scheduled maintenance
- Monitor battery for improvements now that it is insulated

## Steady Brook 470 meters above Confluence to Humber River

### Station Details:

- Station Identification: 02YL012
- Station Installed: June 23<sup>rd</sup> 2015
- Image taken and transmitted every hour during the day time
- Site Selection Rationale: WRMD provides flood forecasting services, in which snow monitoring has been integrated, for the communities of Deer Lake and Steady Brook in the Humber River Basin.
- Date Visited: July 28<sup>th</sup>, 2022
- Location: N 48° 57' 11.59" W 57° 49' 40.02"
- Elevation: 7.3 m

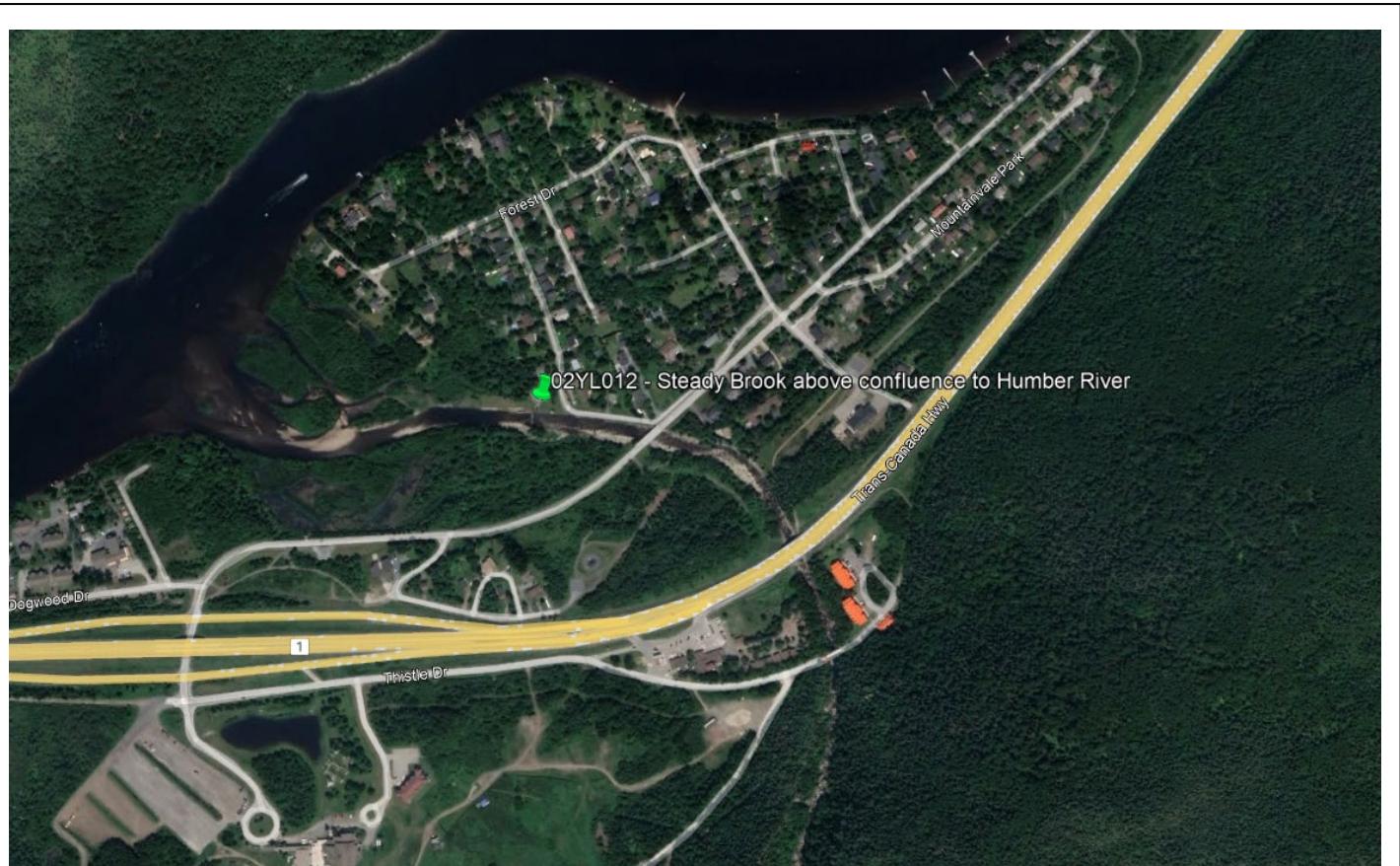


Figure 15: Steady Brook 470 meters above Confluence to Humber River Camera Station Location

Weather Station Annual Maintenance - 2022, Newfoundland and Labrador

*Tasks accomplished:*

- Datalogger:
  - Model: CR800
  - Serial: 28914
  - Replaced desiccant
- Camera:
  - Model: CC5MPX
  - Serial: 1862
  - Wiped camera lens
- Compound:
  - Installed insulated battery box around 12v battery for extended longevity in winter
  - Changed 12v battery
  - Tilted solar panels slightly lower to catch more sun in the winter months

*Follow-up tasks required:*

- Regular scheduled maintenance
- Configure and install new CR1000X and CCFC for imagery of up stream and down stream

## Churchill River at end of Mud Lake Road – Water Level

### Station Details:

- Station Identification: 03OE018
- Station Installed: Oct 24, 2018
- Image taken and transmitted every hour during the day time
- Site Selection Rationale: Selected with consultation from Environment Canada and for use in flood forecasting models.
- Date Visited: September 19<sup>th</sup>, 2022
- Location: N 53°20'5.24" W 60°11'18.18"
- Elevation: 1.2 m

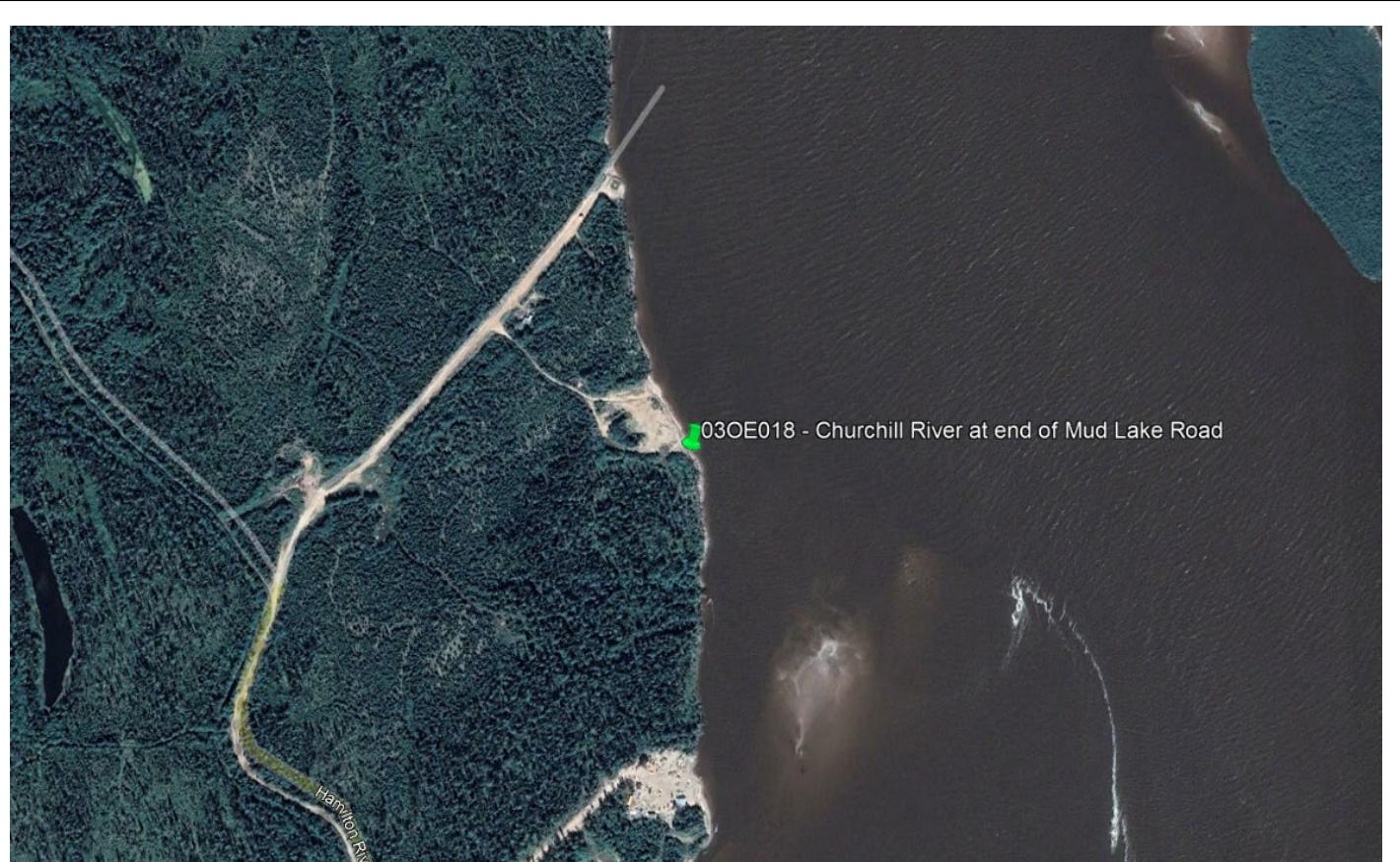


Figure 16: Churchill River at end of Mud Lake Road Camera Station Location

Weather Station Annual Maintenance - 2022, Newfoundland and Labrador

*Tasks accomplished:*

- Datalogger:
  - Model: CR800
  - Serial: 43339
  - Replaced desiccant
- Camera:
  - Model: CCFC
  - Wiped lens
- Compound:
  - Tree had fallen and struck station tower; removed tree and replaced damaged paddle antenna

*Follow-up tasks required:*

- Regular scheduled maintenance
- Monitor connectivity to station to ensure paddle antenna has the reach to support this stations location

## Churchill River below Traverspine River

### *Station Details:*

- Station Identification: 03OE019
- Station Installed: Sept 23, 2018
- Image taken and transmitted every hour during the day time
- Site Selection Rationale: Selected with consultation from Environment Canada and for use in flood forecasting models.
- Date Visited: Not visited in 2022
- Location: N 53°17'28.20" W 60°13'16.49"
- Elevation: 1.2 m

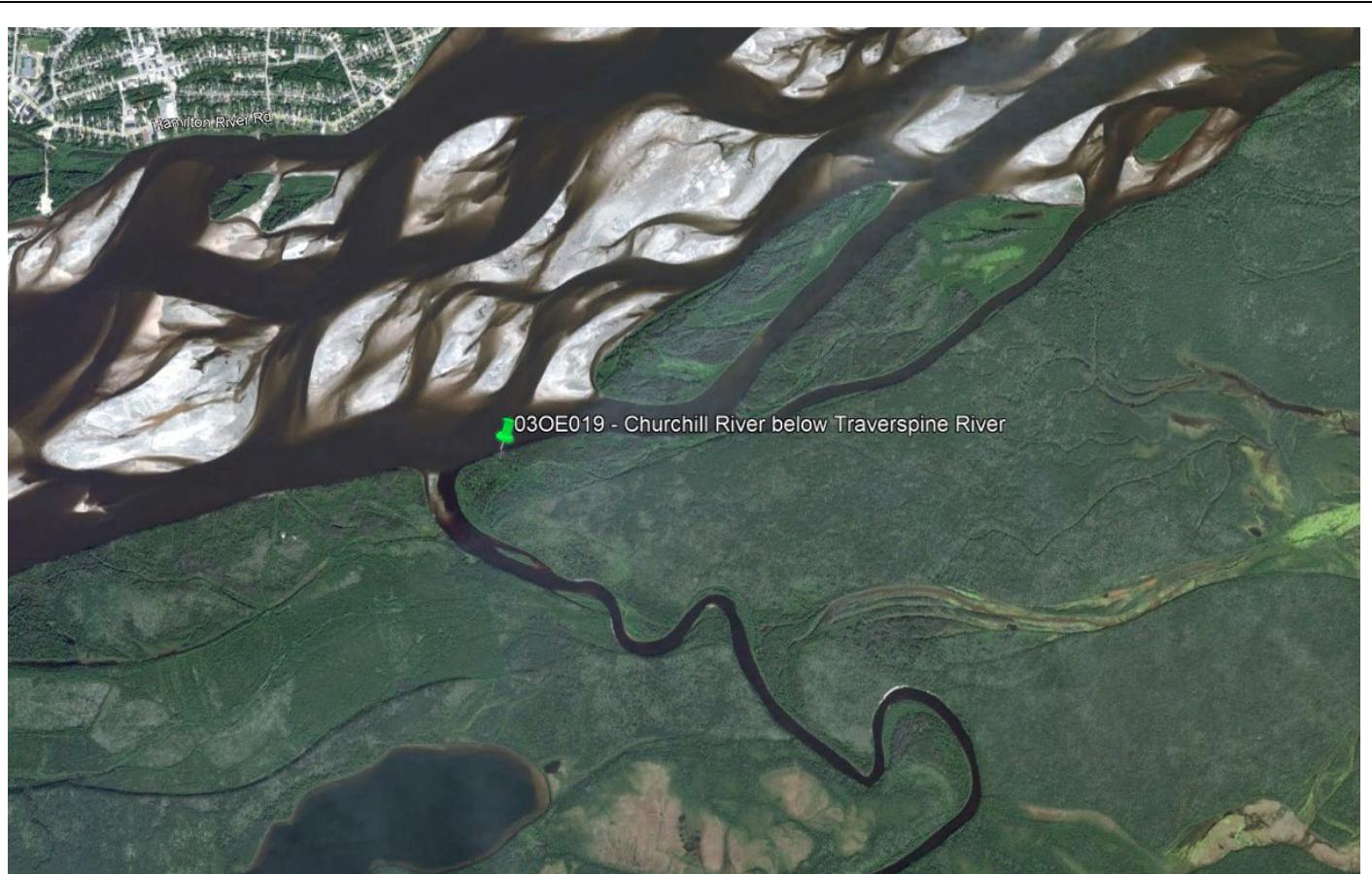


Figure 17: Churchill River below Traverspine River Camera Station Location

### *Tasks accomplished:*

- Site not visited

### *Follow-up tasks required:*

- Regular scheduled maintenance

## Goose River at Bridge

### Station Details:

- Station Identification: NLENHM0001
- Station Installed: Sept 23, 2018
- Image taken and transmitted every hour during the day time
- Site Selection Rationale: Selected for use in flood forecasting models.
- Date Visited: September 20<sup>th</sup>, 2022
- Location: N 53°23'35.07" W 60°25'12.05"
- Elevation: 1.2 m



Figure 18: Goose River at Bridge

Weather Station Annual Maintenance - 2022, Newfoundland and Labrador

*Tasks accomplished:*

- Datalogger:
  - Model: CR800
  - Serial: 43340
  - Replaced desiccant
- Camera:
  - Model: CCFC
  - Wiped lens

*Follow-up tasks required:*

- Regular scheduled maintenance

## Mud Lake at Mud Lake

### *Station Details:*

- Station Identification: 03OE017
- Station Installed: Sept 23, 2018
- Image taken and transmitted every hour during the day time
- Site Selection Rationale: Selected with consultation from Environment Canada and for use in flood forecasting models.
- Date Visited: Not visited in 2022
- Location: N 53°18'14.10" W 60°10'2.37"
- Elevation: 1.2 m

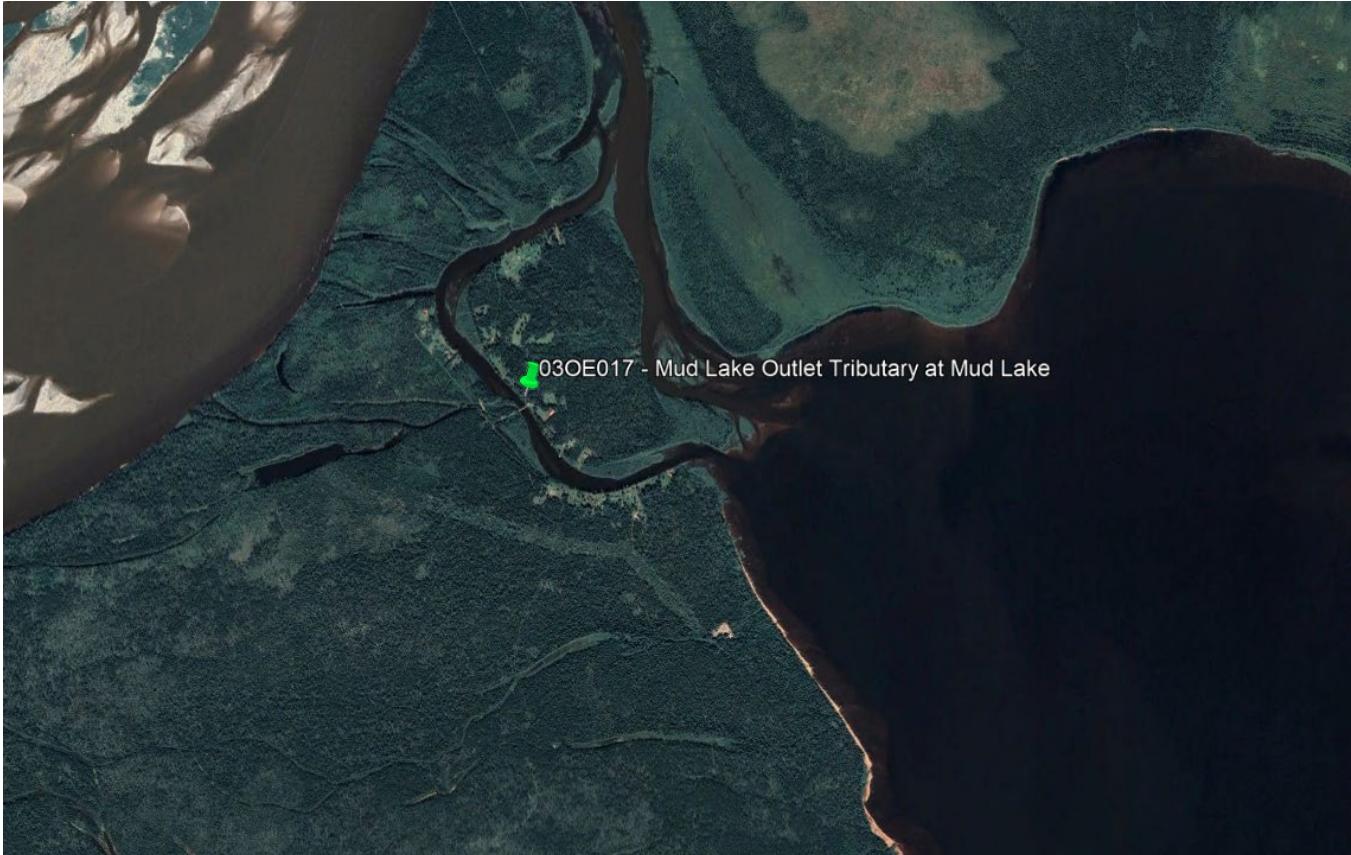


Figure 19: Mud Lake at Mud Lake Camera Station Location

### *Tasks accomplished:*

- Camera:
  - Model: NuPoint Fixed Sight Satellite Camera System
  - Serial: 13000468

### *Follow-up tasks required:*

- Regular scheduled maintenance

## Churchill Falls above Grizzle Rapids

### *Station Details:*

- Station Identification: 03OE013
- Station Installed: July 3<sup>rd</sup> 2019
- Image taken and transmitted once a day at 10:30 AM NST
- Site Selection Rationale: Selected with consultation from Environment Canada and for use in flood forecasting models.
- Date Visited: September 21<sup>st</sup>, 2022
- Location: N 52°58'12.22" W 61°26'43.48"
- Elevation: 62.5 m



Figure 20: Churchill River above Grizzle Rapids Camera Station Location

### *Tasks accomplished:*

- Camera:
  - Model: NuPoint Fixed Sight Satellite Camera System
  - Serial: 14000078
  - System replaced with functional unit

### *Follow-up tasks required:*

- Regular scheduled maintenance
- Send old unit back to NuPoint Systems for repairs and testing

## Exploits River at Bishop's Falls Trestle

### *Station Details:*

- Station Identification: NLENHM0003
- Station Installed: Sept 9 - 10, 2019
- Image taken and transmitted every hour during the day time
- Parameters measured every fifteen minutes and transmitted every hour:
  - Distance from Bridge to Water
- Site Selection Rationale: Selected with consultation from Environment Canada and for use in flood forecasting models.
- Date Visited: June 21<sup>st</sup>, 2022
- Location: N 49° 0'29.50" W 55°29'23.80"
- Elevation: 36.0 m

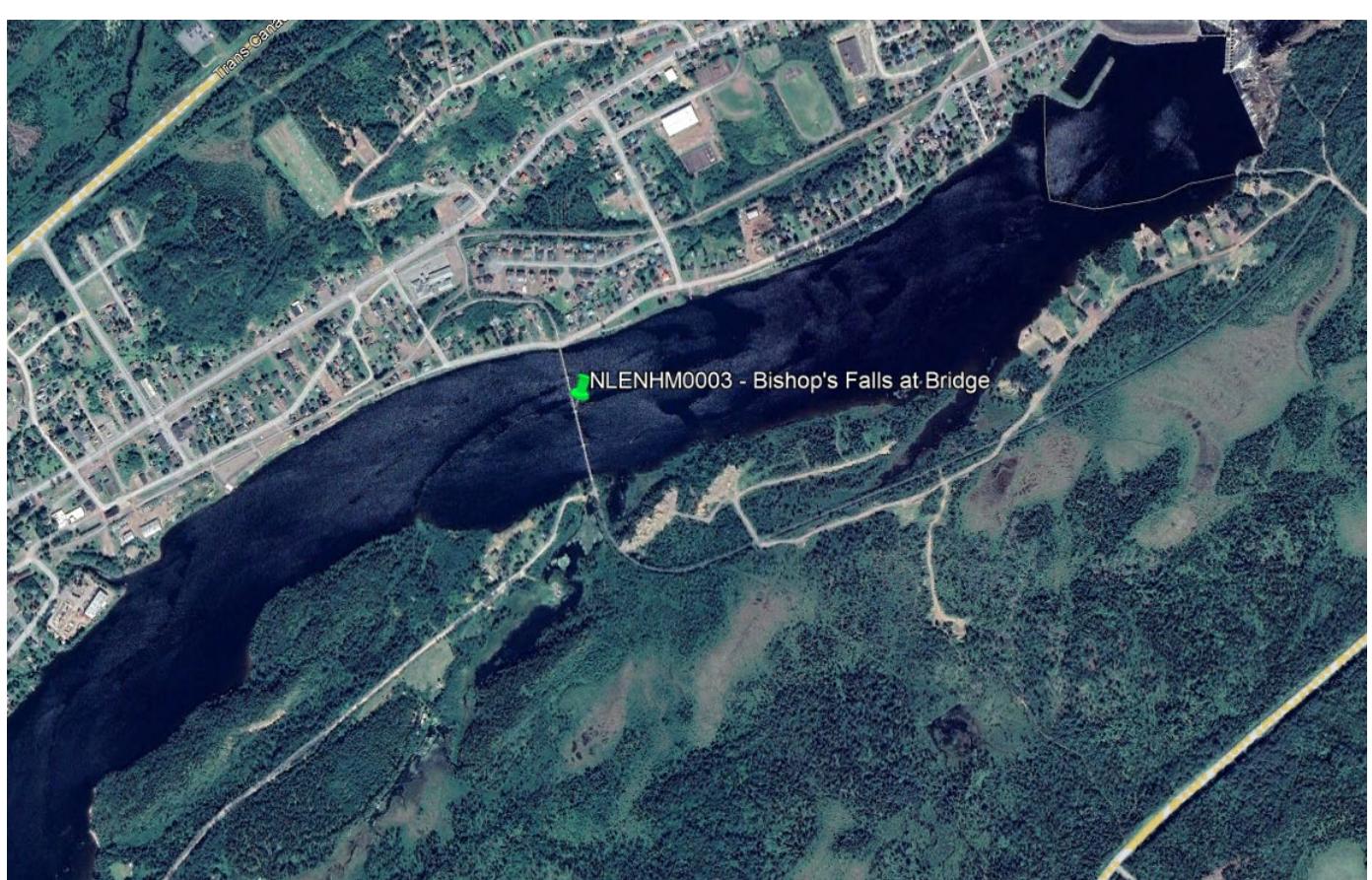


Figure 21: Exploits River at Bishop's Falls Trestle Hydrometric Station Location

Weather Station Annual Maintenance - 2022, Newfoundland and Labrador

*Tasks accomplished:*

- Datalogger:
  - Model: CR800
  - Serial: 44026
  - Replaced desiccant
- Camera:
  - Model: CC5MPX
  - Serial: 01293
  - Lens wiped

*Follow-up tasks required:*

- Regular scheduled maintenance
- Replace camera with CCFC to avoid highly saturated color changing images

## Humber River at Nicholsville Bridge

### Station Details:

- Station Identification: NLENHM0004
- Station Installed: Sept 10 - 11, 2019
- Image taken and transmitted every hour during the day time
- Parameters measured every fifteen minutes and transmitted every hour:
  - Distance from Bridge to Water
- Site Selection Rationale: Selected with consultation from Environment Canada and for use in flood forecasting models.
- Date Visited: July 28<sup>th</sup>, 2022
- Location: N 49°11'18.98" W 57°26'52.32"
- Elevation: 30.8 m

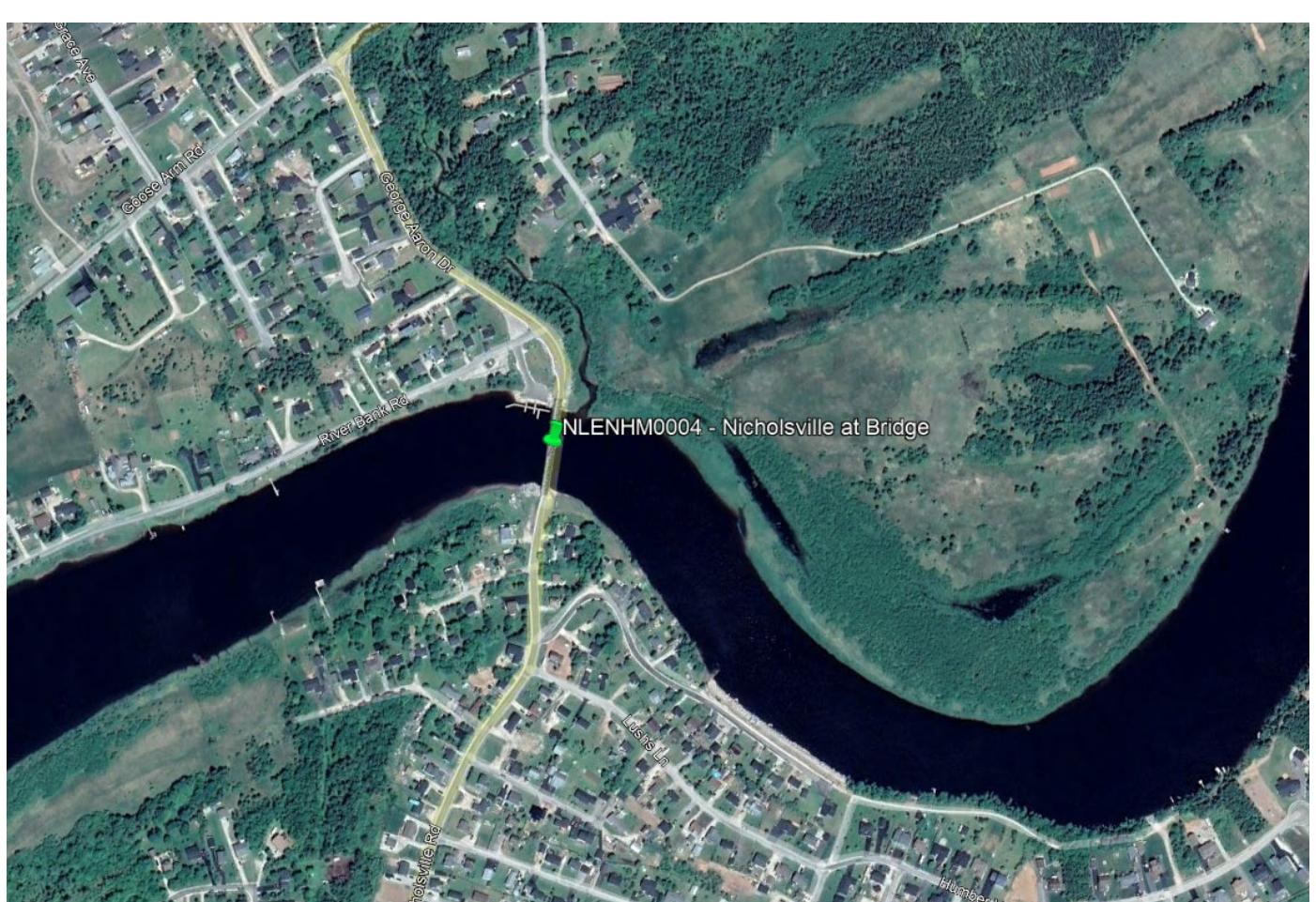


Figure 22: Humber River at Nicholsville Bridge Hydrometric Station Location

Weather Station Annual Maintenance - 2022, Newfoundland and Labrador

*Tasks accomplished:*

- Datalogger:
  - Model: CR800
  - Serial: 44027
  - Replaced desiccant
- Camera:
  - Model: CCFC
  - Lens wiped

*Follow-up tasks required:*

- Regular scheduled maintenance

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The next scheduled annual maintenance trip will be completed by October 2023.