

# Annual Weather Station Maintenance Report

**2021**



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

Weather Station Annual Maintenance - 2021, 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 (2021)

	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			✓
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 Nicholsville 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 2021
- Location: N 47° 35' 16.7" W 52° 44' 1.3"
- Elevation: 101.2 m

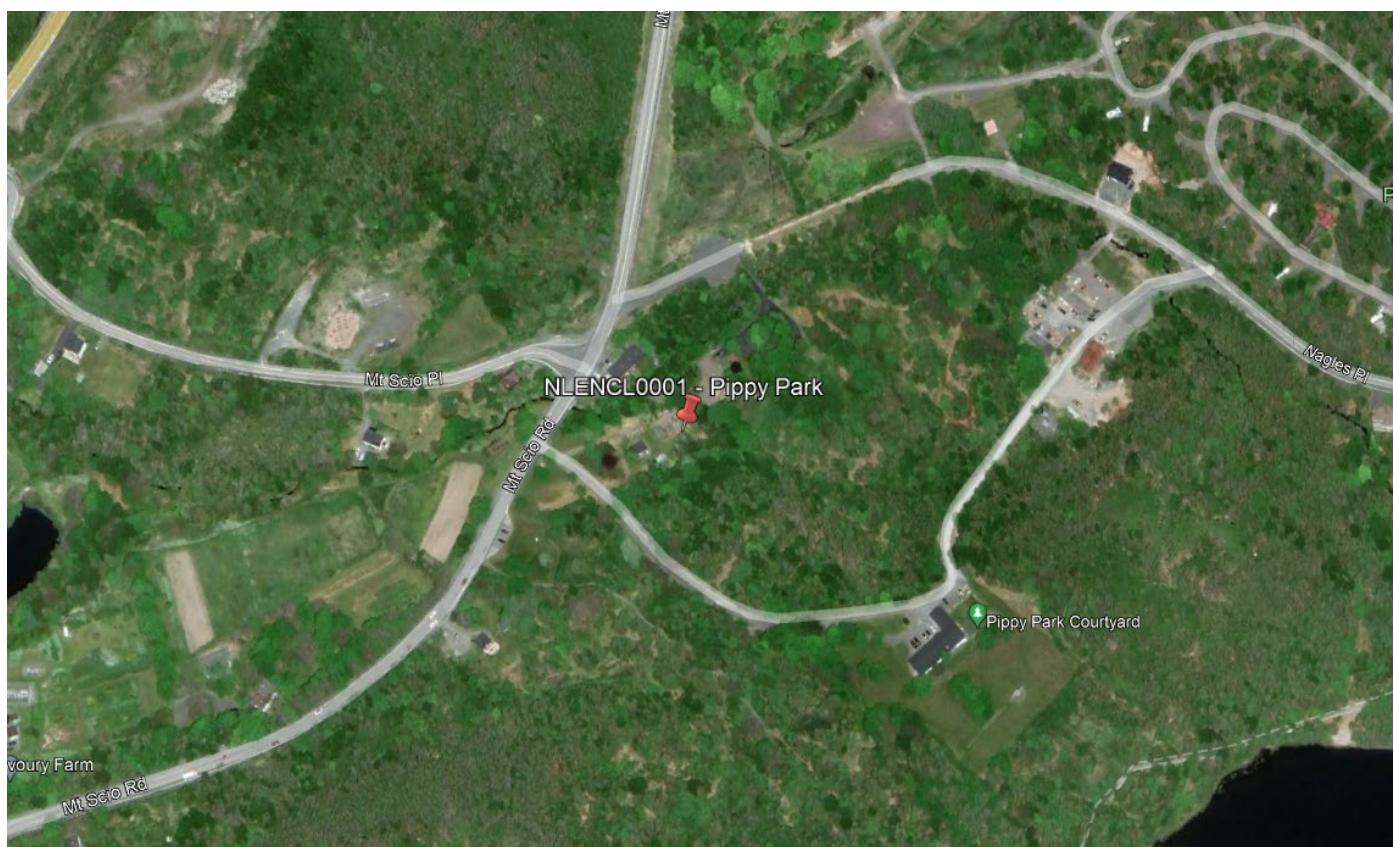


Figure 1: Pippy Park Weather Station Location

Weather Station Annual Maintenance - 2021, Newfoundland and Labrador

*Tasks accomplished:*

- DataLogger:
  - Model: CR1000X
  - Serial: 14253
  - Replaced desiccant
- Anemometer:
  - Model: 05103-10 RM Young
  - Serial: 57031
  - Replaced speed, direction bearings and potentiometer
- Temperature/Relative Humidity:
  - Model: HygroVUE10
  - Serial: E1337
  - Replaced 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
  - Newly installed
- Solar Radiation:
  - Model: SPLite 2
  - Serial: 194492
  - Wiped lens

*Follow-up tasks required:*

- Regular scheduled maintenance
- Install pluvio and alter shield
- Display rain[e] and pluvio data on government website

## 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 8<sup>th</sup>, 2021
- Location: N 48° 58' 29.83" W 56° 2' 4.43"
- Elevation: 88.1 m

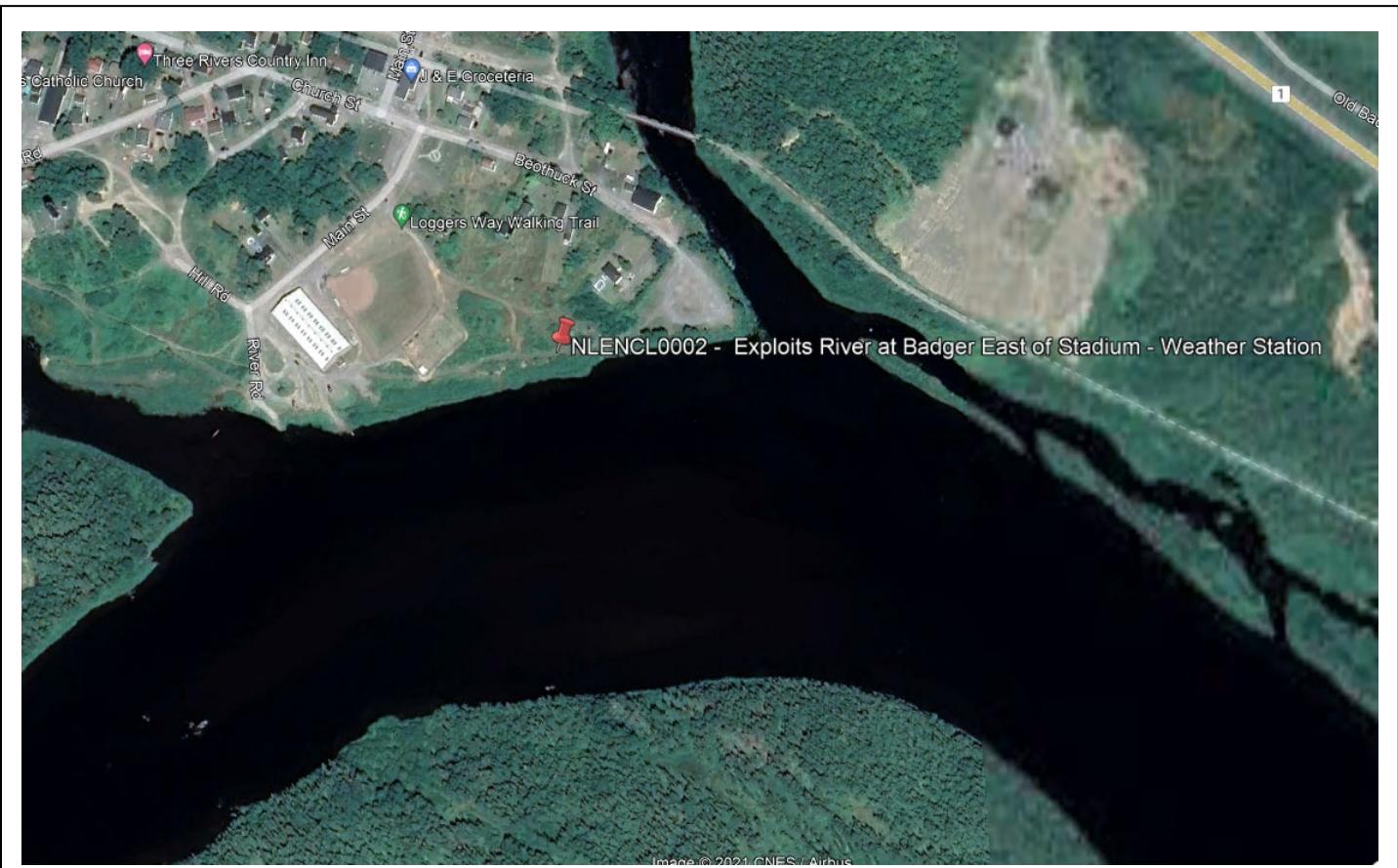


Figure 2: Exploits River at Badger Weather Station Location

*Tasks accomplished:*

- Datalogger:
  - Model: CR1000
  - Serial: 13443
  - Replaced desiccant
  - 12v 100 Ahr AGM Battery changed
- Camera:
  - Model: CC640
  - Cleaned enclosure and lens, replaced desiccant
- Anemometer:
  - Model: RM Young 05103-10-L
  - Serial: 58072
  - Replaced speed, direction bearings and potentiometer
- 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
  - Checked transducer for pitting and replaced
- Barometric Pressure:
  - Model: Young 61205V
  - Serial: BP05005
- Precipitation
  - Model: Texas Electronics TE525WS
  - Serial: 44701-1007
  - Cleared funnel and bucket portion of the unit of debris
- Solar Radiation
  - Model: Kipp & Zonen SP LITE Pyranometer
  - Serial: 080135
  - Cleaned lens
- Solar Panel
  - Model: 50W SW Energy Panel w/ SunSaver
  - Replaced old solar panel as it was not supplying enough charge

*Follow-up tasks required:*

- Regular scheduled maintenance
- Replace platform for tipping bucket with concrete anchor
- New camera to be installed with new mount that allows staff to work on camera from ground level and avoid ladder work in close vicinity to overhead power lines.

## 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 6<sup>th</sup>, 2021
- Location: N 48° 58' 58.21" W 57° 45' 38.04"
- Elevation: 7.6 m

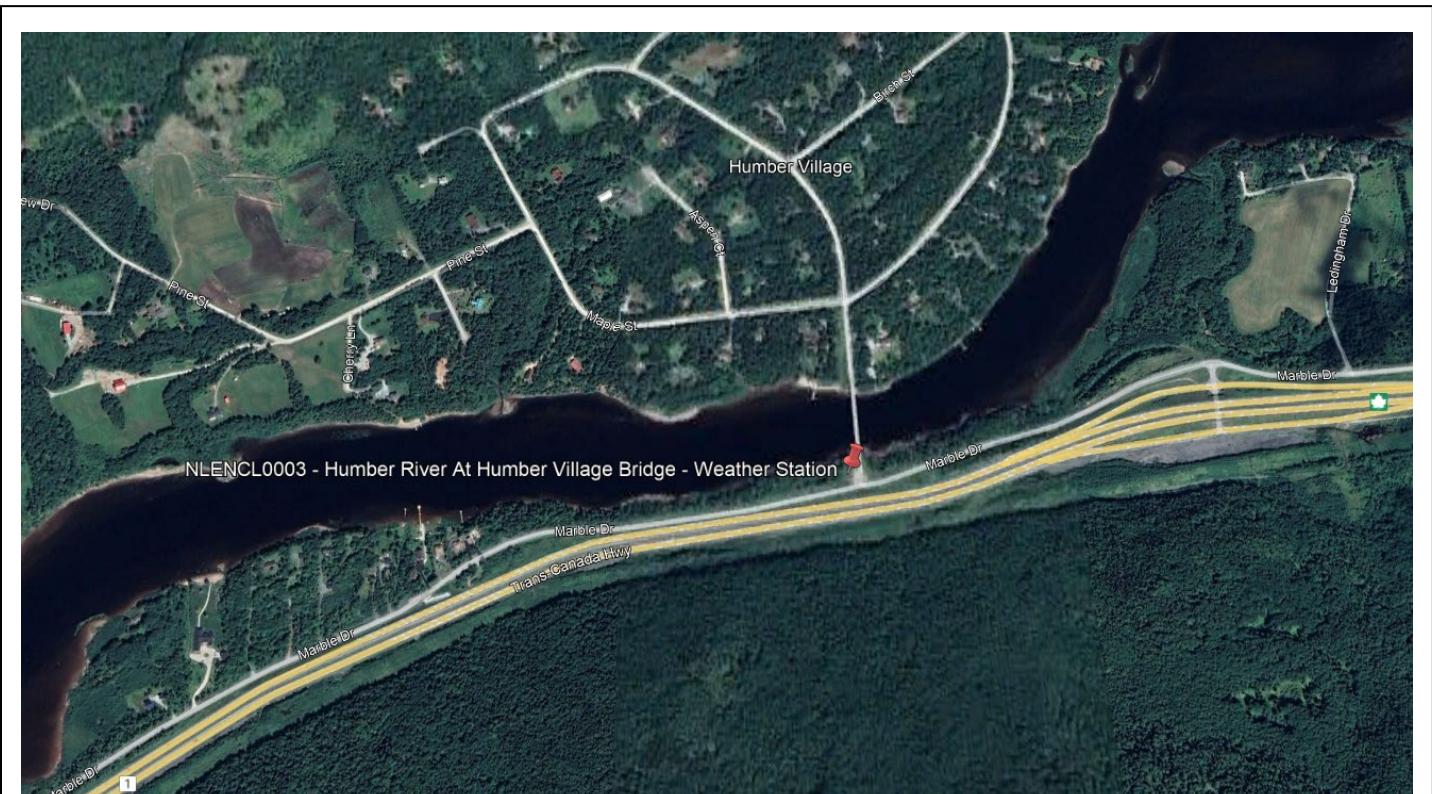


Figure 3: Humber River at Humber Village Bridge Weather Station Location

*Tasks accomplished:*

- Datalogger:
  - Model: CR1000
  - Serial: 22355
  - Replaced desiccant
  - 12v 100 Ahr AGM battery changed
- Camera:
  - Model: CC640
  - Serial: 01511
  - Cleaned enclosure window and lens, replaced desiccant
- Anemometer:
  - Model: RM Young 05103-10
  - Serial: 130198
  - Replaced speed, direction bearings and potentiometer
- 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 SR50 transducer due to pitting and peeling
- Barometric Pressure:
  - Model: 61205V
  - Serial: BP05888
- Precipitation
  - Model: TE525WS Texas Electronics
  - Serial: 49063-109
  - Cleared funnel and bucket portion of the unit of debris
- Solar Radiation
  - Model: Kipp & Zonen SP LITE Pyranometer
  - Serial: 080395
  - Cleaned lens

*Follow-up tasks required:*

- Create insulated box for battery in hut
- Landscape grounds by clearing unwanted vegetation
- Regular scheduled maintenance

## 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: Oct. 4<sup>th</sup> 2021
- Location: N 53° 20' 15.95" W 60° 11' 21.44"
- Elevation: 1.2 m

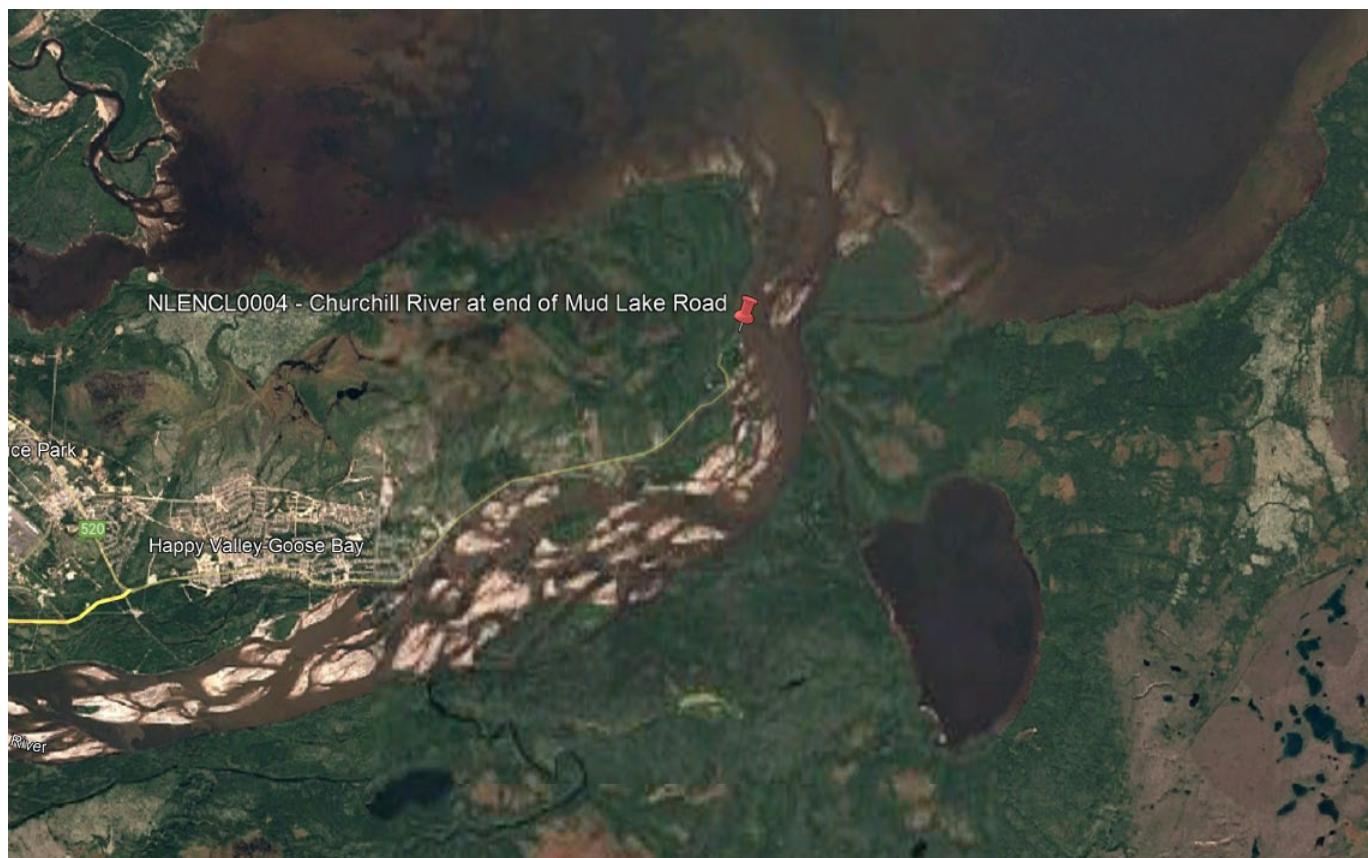


Figure 4: Churchill River at end of Mud Lake Road Weather Station Location

*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
- Create contingency plan to move station back from the shore

## 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 6<sup>th</sup>, 2021
- Location: N 49° 16' 28.30" W 56° 51' 5.80"
- Elevation: 119.8 m

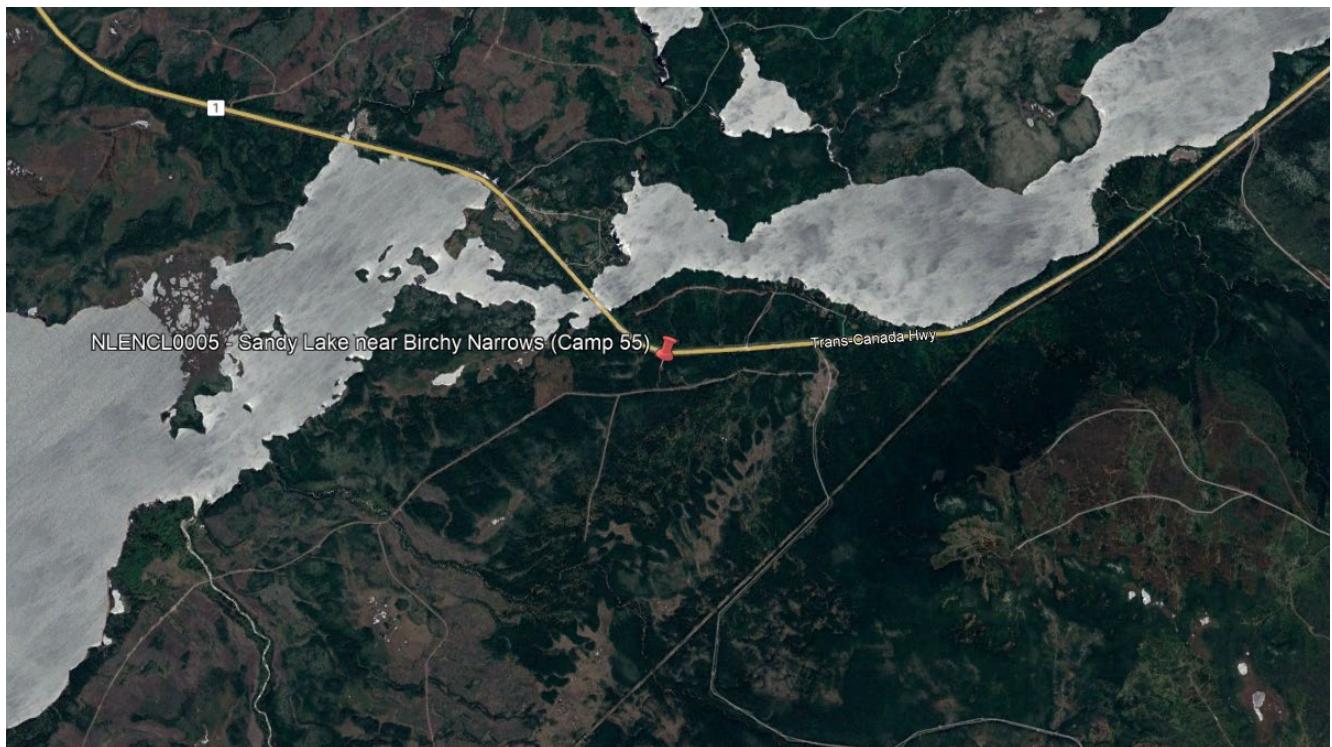


Figure 5: Sandy Lake near Birchy Narrows (Camp 55) Snow Monitoring Station Location

*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, direction bearings and potentiometer
- Temperature/Relative Humidity:
  - Model: HygroVUE10
  - Newly installed and programmed.
- Snow Depth Sensor:
  - Model: Sonic Ranger SR50A
  - Serial: 2999
  - Replaced SR50 transducer due to pitting and peeling
- 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:
  - Wind turbine installed on site for extra energy bank

*Follow-up tasks required:*

- Regular scheduled maintenance
- Mark location for Pluvio installation
- Landscape grounds by clearing unwanted vegetation
- 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 construction 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: October 5<sup>th</sup>, 2021
- 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, direction bearings and potentiometer
- 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
  - Checked transducer for pitting or peeling
- 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
  - Installed snowfall adapter
- Solar Radiation
  - Model: Kipp & Zonen SP LITE2 Pyranometer
  - Serial: 136646
  - Cleaned lens

***Follow-up tasks required:***

- Regular scheduled maintenance
- Replace batteries

## 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 7<sup>th</sup>, 2021
- Location: N 49° 37' 6.24" W 57° 17' 41.20"
- Elevation: 302.4 m

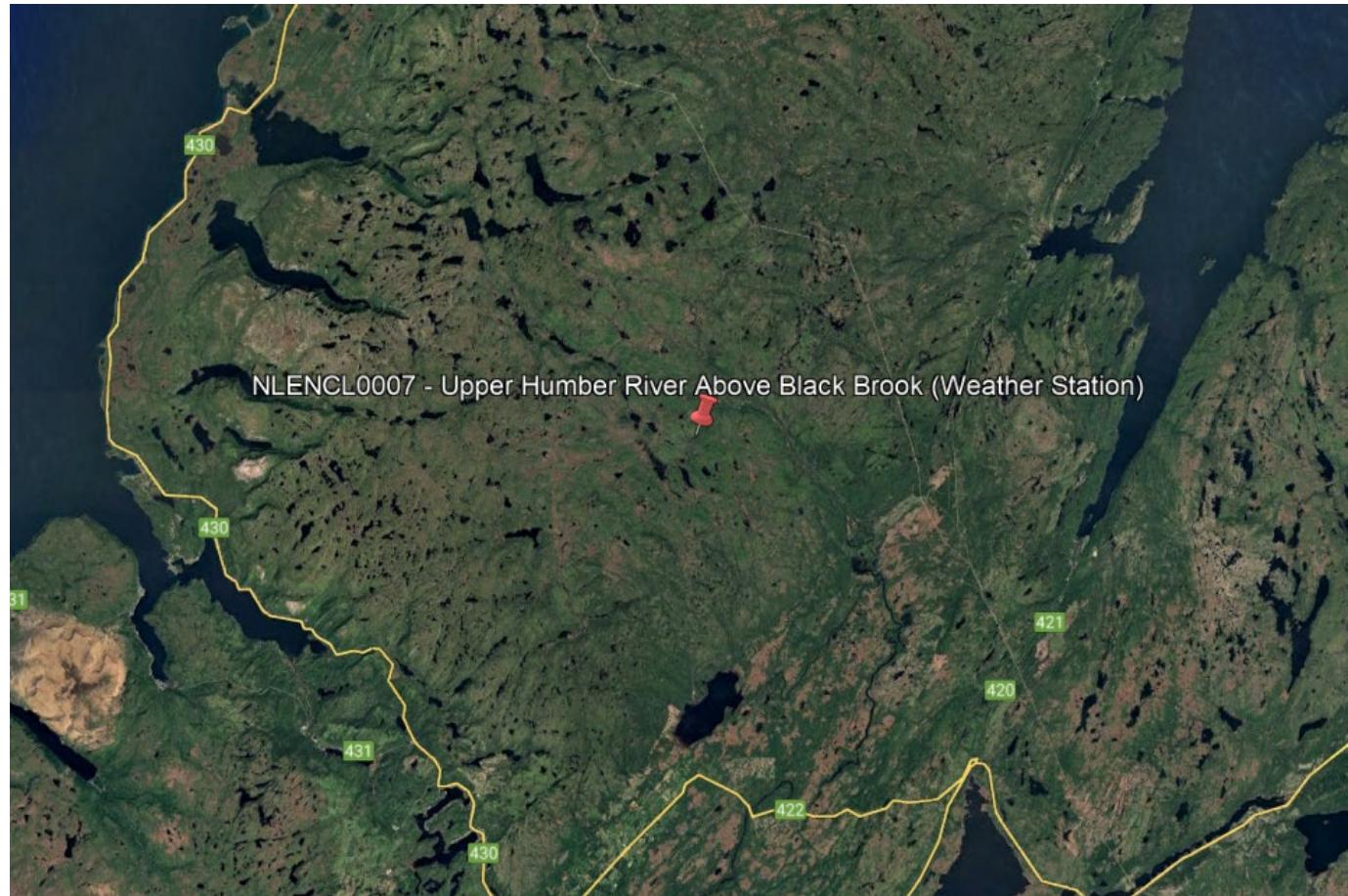


Figure 7: Upper Humber River above Black Brook Snow Monitoring Station Location

*Tasks accomplished:*

- Datalogger:
  - Model: CR1000
  - Replaced desiccant
- Anemometer:
  - Model: 05103AP-10-L RM Young Wind Monitor Alpine Version
  - Serial: 98399
  - Replaced speed, direction bearings and potentiometer
- Temperature/Relative Humidity:
  - Model: HygroVUE10
  - Newly installed and programmed
- Snow Depth Sensor:
  - Model: Sonic Ranger SR50A
  - Serial: 1670
  - Replaced SR50 transducer due to pitting and peeling
- 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
  - Sensor was uninstalled earlier in the summer and sent back to CampbellSci for repairs. Sensor was then reinstalled in October and has been working correctly.

*Follow-up tasks required:*

- Mark location for Pluvio installation
- Landscape grounds by clearing unwanted vegetation
- 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: October 6<sup>th</sup>, 2021
- Location: N 53° 21' 35.23" W 65° 33' 41.27"
- Elevation: 542.8 m

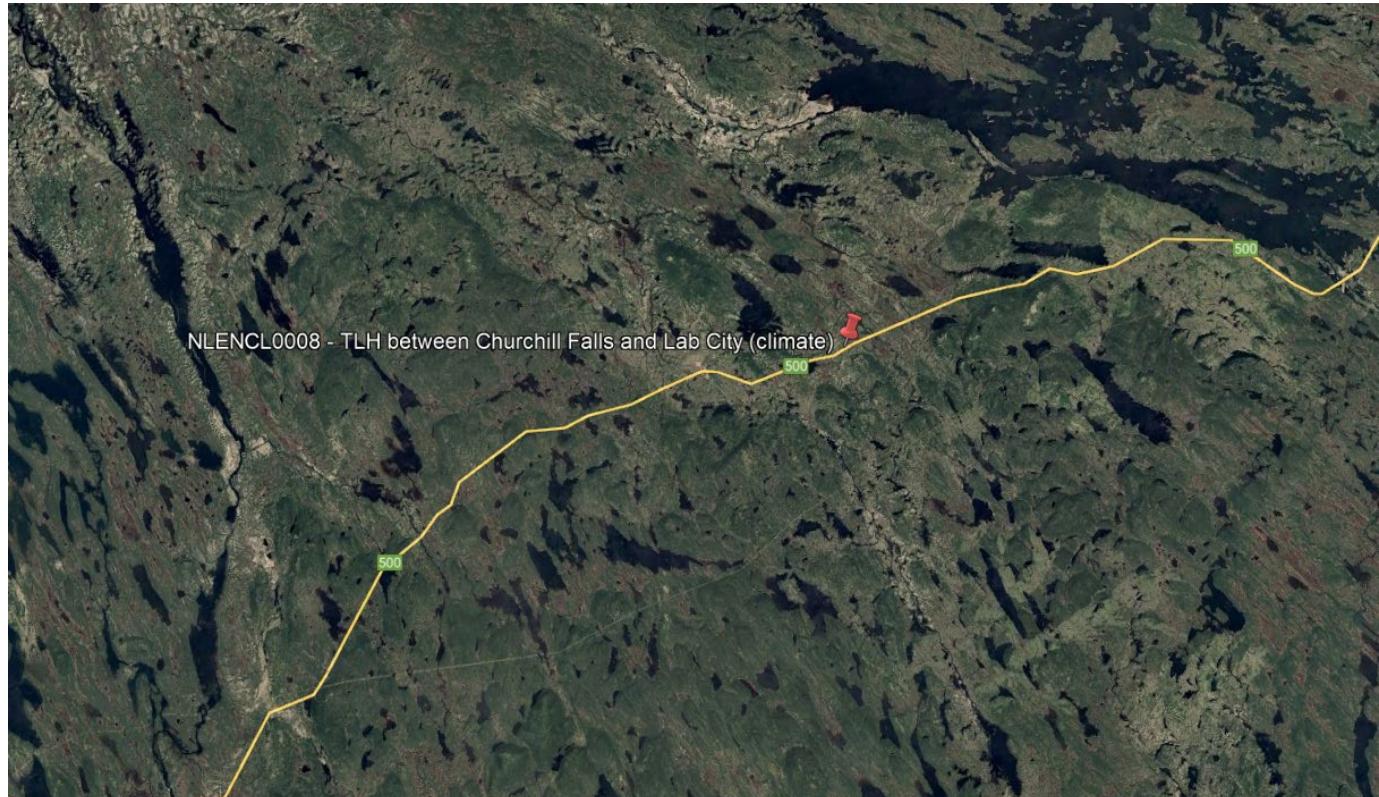


Figure 8: TLH between Churchill Falls and Lab City Snow Monitoring Station Location

*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: CS215-L
  - Serial: E18210
  - Replaced old CS215 chip with new already calibrated chip
- Snow Depth Sensor:
  - Model: Sonic Ranger SR50A
  - Serial: 9170
  - Replaced transducer due to pitting and peeling
- 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
  - Aimed EON CS2 GOES Antenna toward correct satellite
- Compound:
  - Changed batteries
  - Fastened grounding nut to foot of tower
  - Wind turbine installed on site for extra energy 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: Oct. 7<sup>th</sup>, 2021
- Location: N 53° 26' 10.12" W 63° 14' 1.38"
- Elevation: 329.8 m

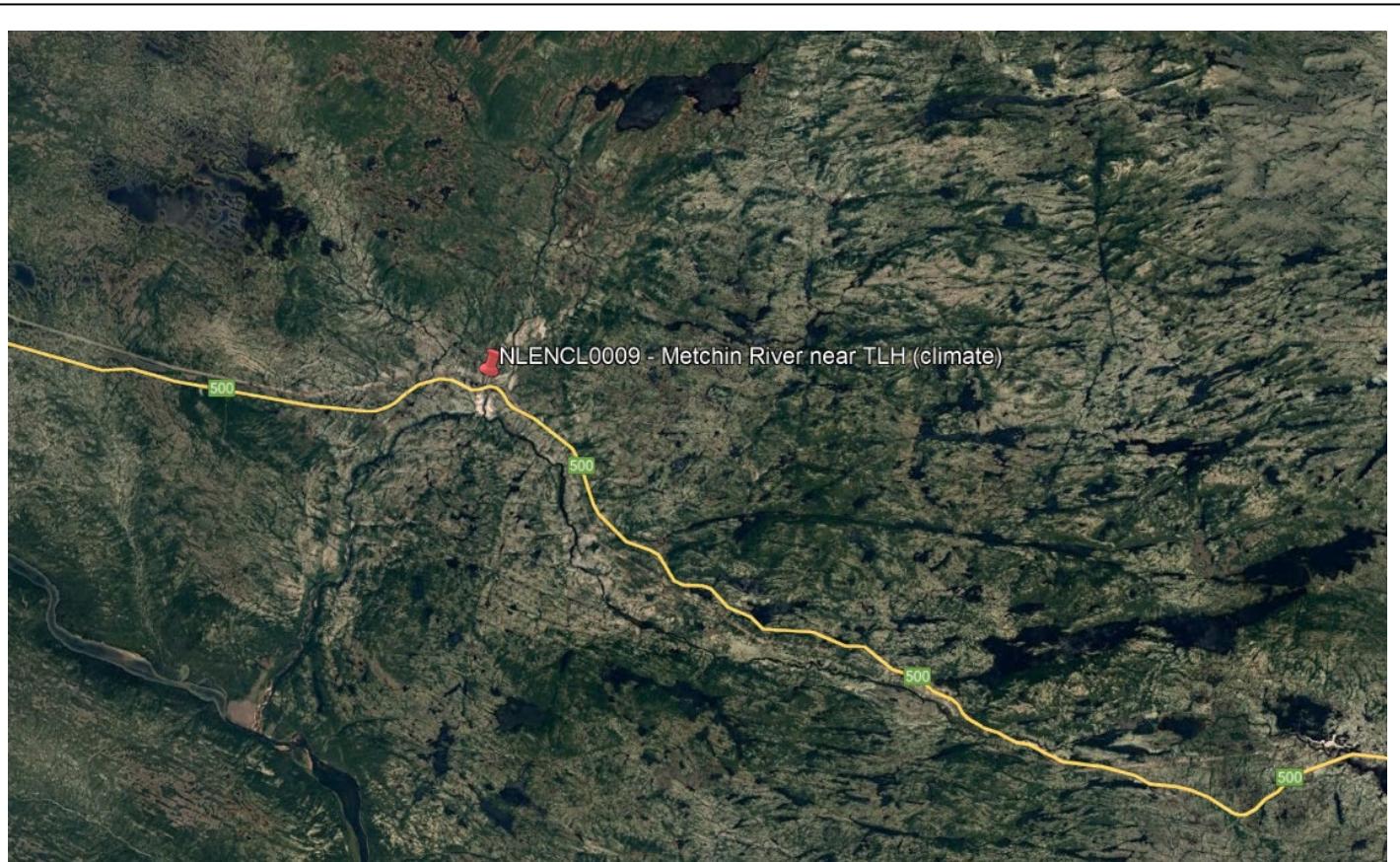


Figure 9: Metchin River near TLH Snow Monitoring Station Location

*Tasks accomplished:*

- Datalogger:
  - Model: CR1000
  - Replaced desiccant and indicator card
- Anemometer
  - Model: 05103AP-10-L RM Young Alpine Version
  - Serial: 152871
  - Replaced speed, direction bearings and potentiometer
- Temperature/Relative Humidity:
  - Model: CS215-L
  - Serial: E18487
  - Replaced old CS215 chip with new already calibrated chip
- Snow Depth Sensor:
  - Model: Sonic Ranger SR50A
  - Serial: 9171
  - Replaced transducer due to pitting and peeling
- 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

*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 for use in flood forecasting models.
- Date Visited: June 9<sup>th</sup>, 2021
- 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
  - Checked transducer for pitting or peeling
- Precipitation:
  - Model: TR-525-M-10-CA Texas Electronics
  - Serial: 77405-818
  - Cleared funnel and bucket or 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
- Communication:
  - Model: TX321-G GOES Transmitter
- Antenna:
  - Model: 420-70-DIS 402 MHz Yagi Directional Antenna
  - Serial: 17A092633
  - Redirected antenna slightly
- Solar Panel:
  - Model: SLP050-12C1D2 – 50 Watt 12 Volt with Mount & Regulator
  - Serial: 81005012500081
- GPS Antenna:
  - Model: Trimble GPS Antenna P/N 57861-20
  - Serial: 3480213

*Follow-up tasks required:*

- Regular scheduled maintenance
- Install NuPoint Fixed Sight system
- Install soil moisture probe
- Install alter shield for tipping bucket rain gauge

## 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 for use in flood forecasting models.
- Date Visited: Oct. 4<sup>th</sup>, 2021
- Location: N 53° 20' 6.9" W 60° 11' 23.5"
- Elevation: 0 m

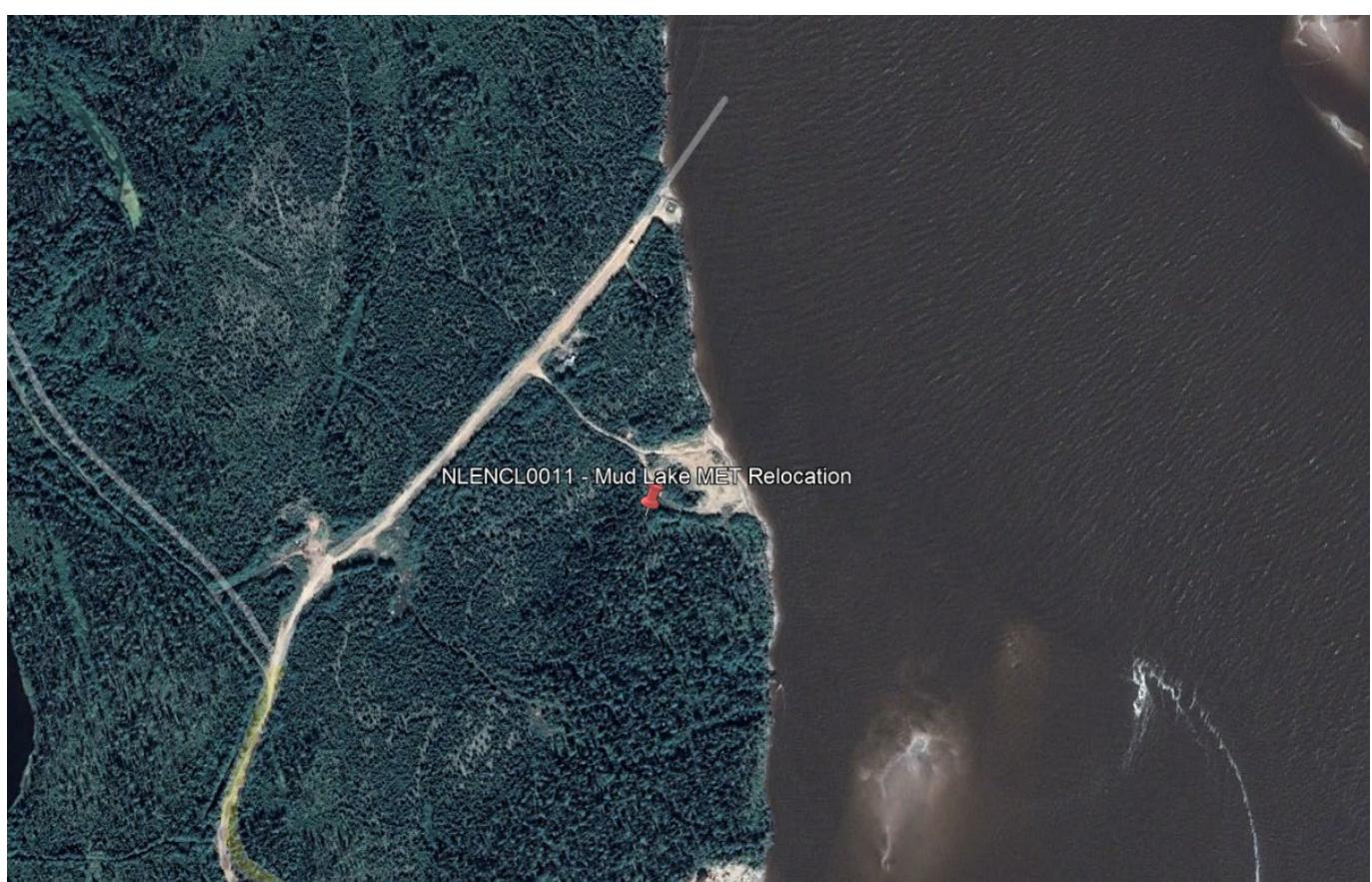


Figure 11: Mud Lake Road MET

*Tasks accomplished:*

- Datalogger:
  - Model: CR1000X
  - Serial: 19389
  - Changed desiccant
- Snow Depth Sensor:
  - Model: SR50A-EE Sonic Ranger
  - Serial: 12504
  - Checked transducer for pitting or peeling
- 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. They required MET data from on site and we have the infrastructure in place already to host their data.
- Date Visited: Not visited in 2021
- Location: N 47° 25' 27" W 53° 45' 57.7"
- Elevation: 163.1 m



Figure 12: Vale LH1 MET

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*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
- Antenna:
  - Model: WIP antenna
- Compound:
  - AC/DC 24v Converter connected to AC power and backup battery bank

*Follow-up tasks required:*

- Regular scheduled maintenance
- Purchase wind alter shield for heated precipitation gauge
- Install alter shield

## 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 2021
- Location: N 47° 31' 44.44" W 52° 44' 41.04"
- Elevation: 32.9 m

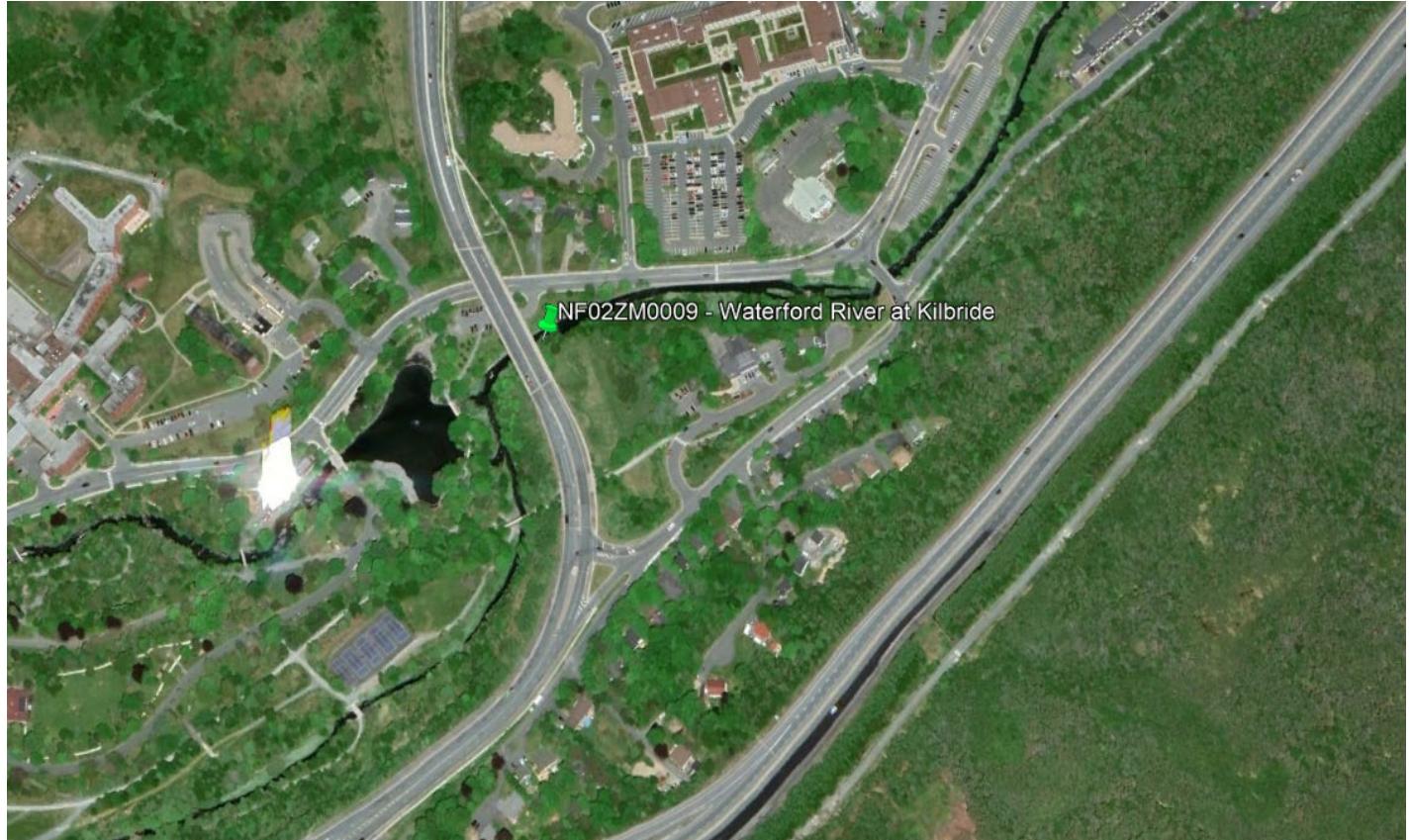


Figure 13: Waterford River at Kilbride Camera Station Location

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*Tasks accomplished:*

- Datalogger:
  - Model: CR800
  - Replaced desiccant and indicator card
  - Power cycled station
- Camera:
  - Model: CC5MPX
  - Cleaned fish eye lens inside and out
- Compound:
  - Hut cleanup after vandalism

*Follow-up tasks required:*

- Regular scheduled maintenance

## 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 8<sup>th</sup>, 2021
- Location: N 48°56'25.86" W 55°58'42.98"
- Elevation: 100.6 m

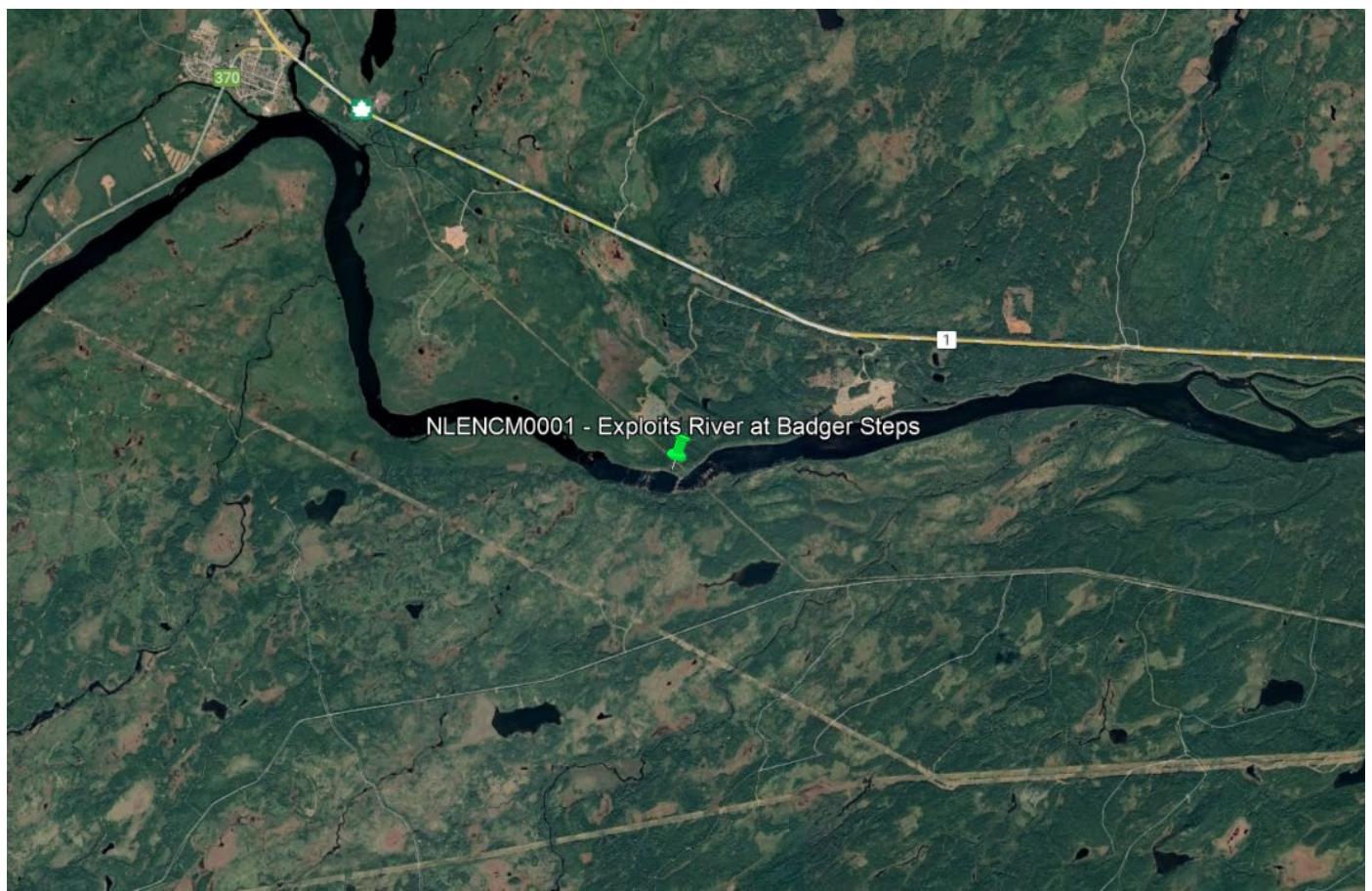


Figure 14: Exploits River at Badger Steps Camera Station Location

*Tasks accomplished:*

- Datalogger:
  - Model: CR1000
  - Replaced desiccant and indicator card
- Camera:
  - Model: CC5MPX
  - Wiped camera lens
- Site:
  - Battery changed
  - Fixed loose connection to battery

*Follow-up tasks required:*

- Regular scheduled maintenance
- Monitor battery, died very quickly after being replaced
- Install insulation around battery in hut

## 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 8<sup>th</sup>, 2021
- Location: N 48° 57' 11.59" W 57° 49' 40.02"
- Elevation: 7.3 m

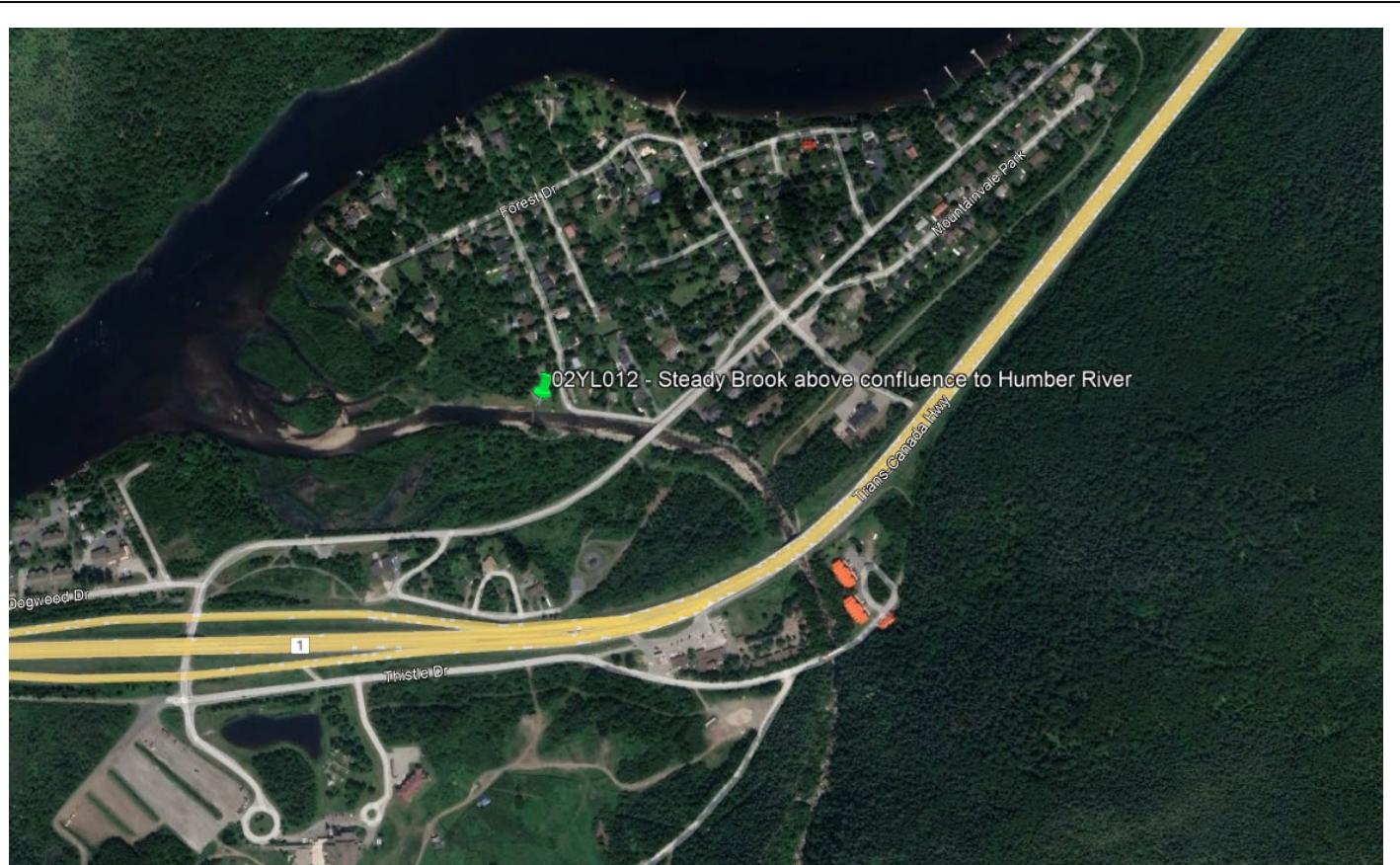


Figure 15: Steady Brook 470 meters above Confluence to Humber River Camera Station Location

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*Tasks accomplished:*

- Datalogger:
  - Model: CR800
  - Serial: 28914
  - Replaced desiccant
- Camera:
  - Model: CC5MPX
  - Serial: 1862
  - Wiped camera lens

*Follow-up tasks required:*

- Regular scheduled maintenance
- Replace battery
- Install insulation around battery in hut

## 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 for use in flood forecasting models.
- Date Visited: October 4<sup>th</sup>, 2021
- 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

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*Tasks accomplished:*

- Datalogger:
  - Model: CR800
  - Serial: 43339
  - Replaced desiccant
- Camera:
  - Model: CCFC
  - Wiped lens

*Follow-up tasks required:*

- Regular scheduled maintenance

## 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 for use in flood forecasting models.
- Date Visited: Not visited in 2021
- 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 with consultation from Environment Canada for use in flood forecasting models.
- Date Visited: October 4<sup>th</sup>, 2021
- Location: N 53°23'35.07" W 60°25'12.05"
- Elevation: 1.2 m

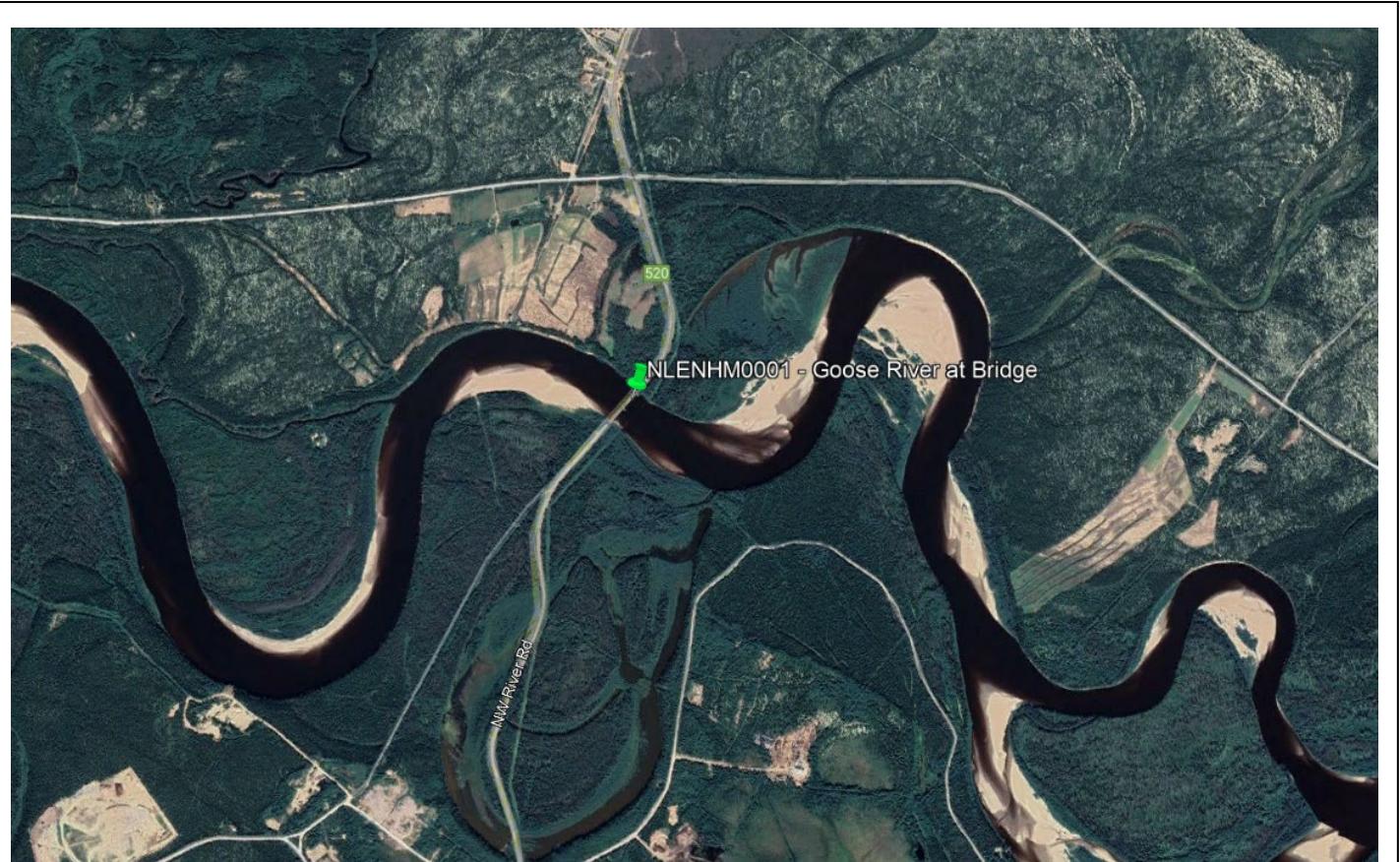


Figure 18: Goose River at Bridge

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*Tasks accomplished:*

- Datalogger:
  - Model: CR800
  - Serial: 43340
  - Replaced desiccant
- Camera:
  - Model: CCFC
  - Wiped lens
  - Remounted to avoid camera drifting due to bridge vibrations

*Follow-up tasks required:*

- Regular scheduled maintenance
- Monitor levels over the year to ensure camera and RLS hasn't become unlevel again

## 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 for use in flood forecasting models.
- Date Visited: Not visited in 2021
- Location: N 53°18'14.10" W 60°10'2.37"
- Elevation: 1.2 m

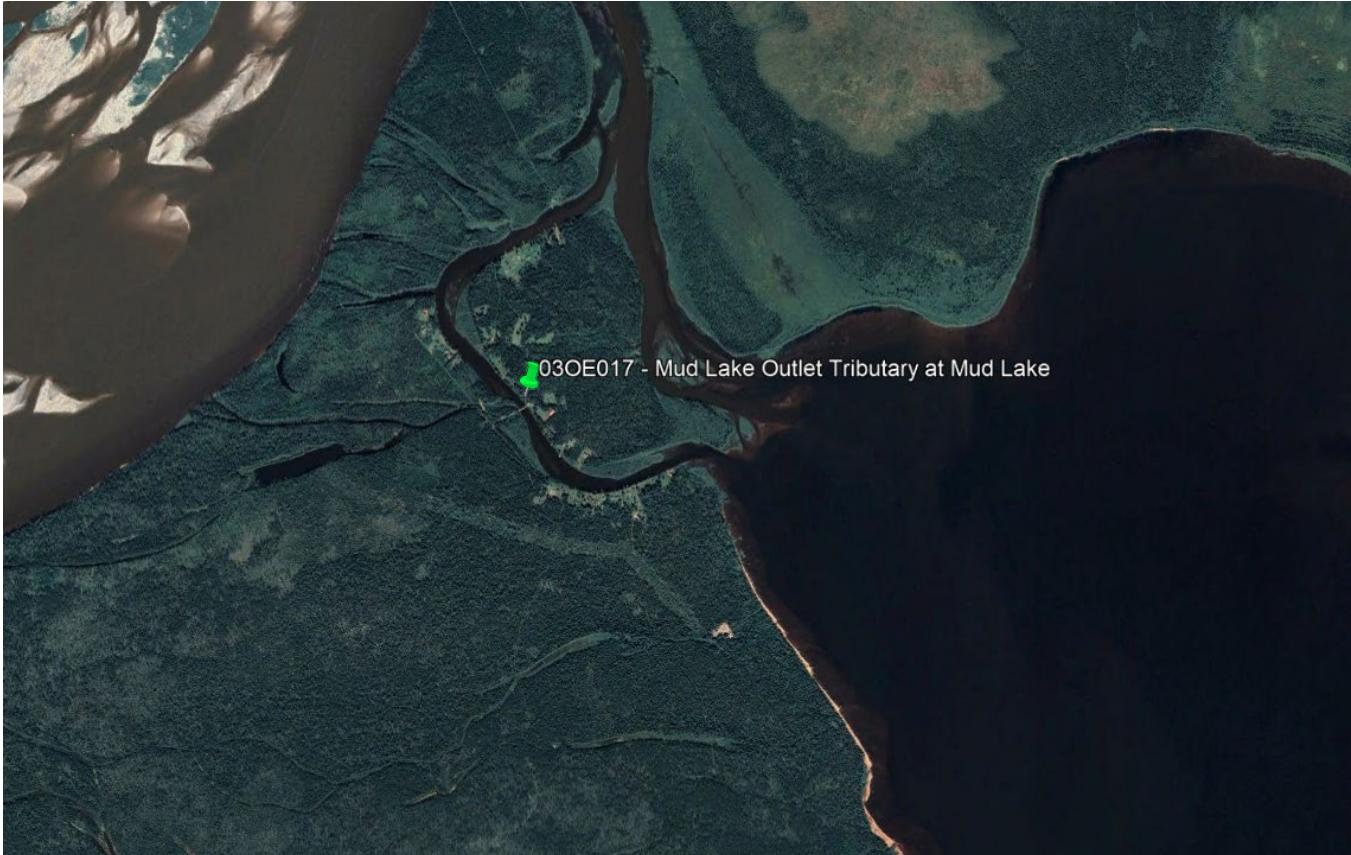


Figure 19: Mud Lake at Mud Lake Camera Station Location

### *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 for use in flood forecasting models.
- Date Visited: May 28<sup>th</sup>, 2021 by Maria Murphy & Brenda Congram
- 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: 13000602
  - Battery replaced

### *Follow-up tasks required:*

- Regular scheduled maintenance
- Replace damaged camera

## 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 for use in flood forecasting models.
- Date Visited: June 7<sup>th</sup>, 2021
- Location: N 49° 0'29.50" W 55°29'23.80"
- Elevation: 36.0 m

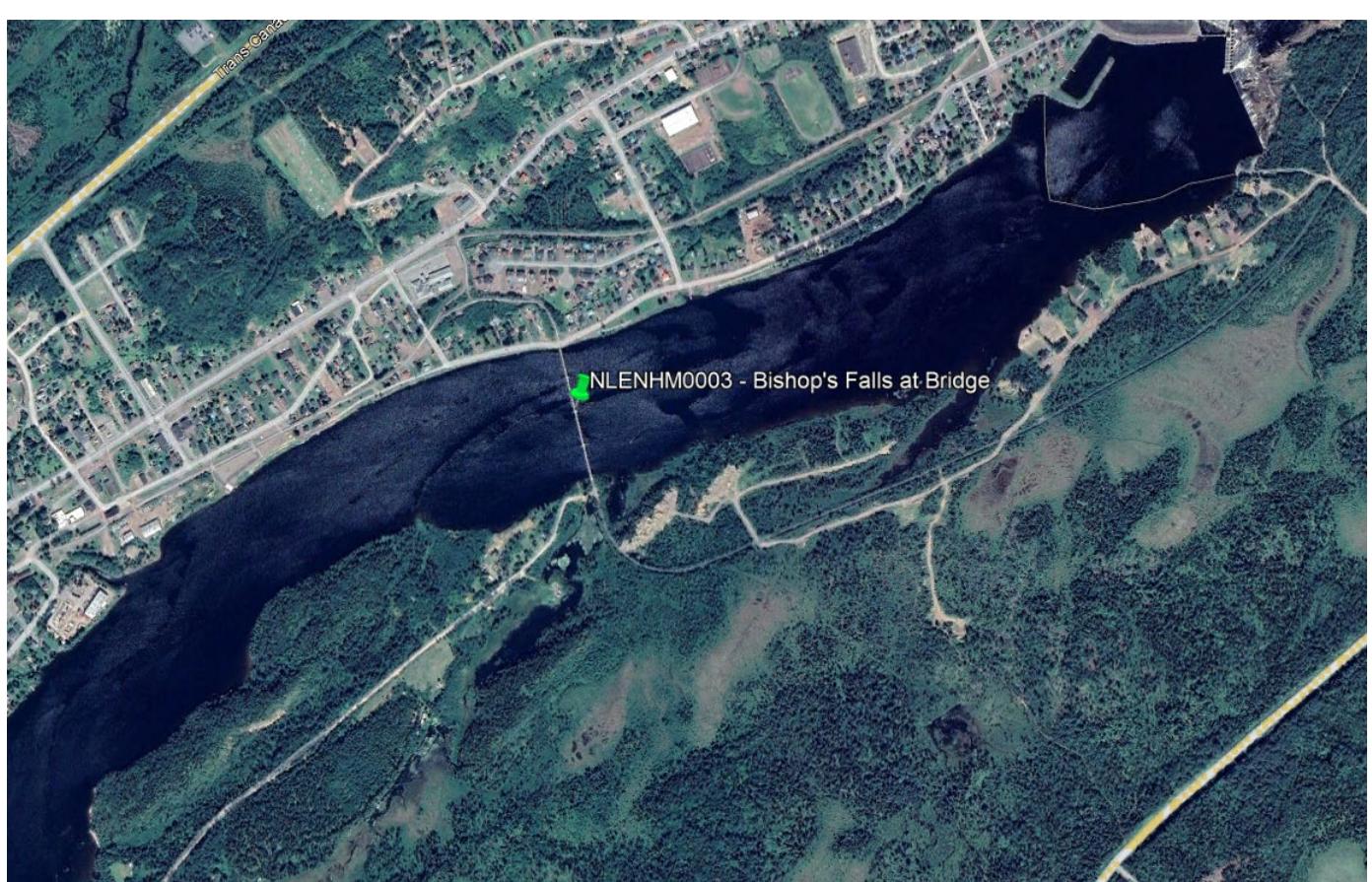


Figure 21: Exploits River at Bishop's Falls Trestle Hydrometric Station Location

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*Tasks accomplished:*

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

*Follow-up tasks required:*

- Regular scheduled maintenance
- Keep an eye on color changing images; possibly too high saturation when sun hits ice in winter

## 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 for use in flood forecasting models.
- Date Visited: July 8<sup>th</sup>, 2021
- Location: N 49°11'18.98" W 57°26'52.32"
- Elevation: 30.8 m

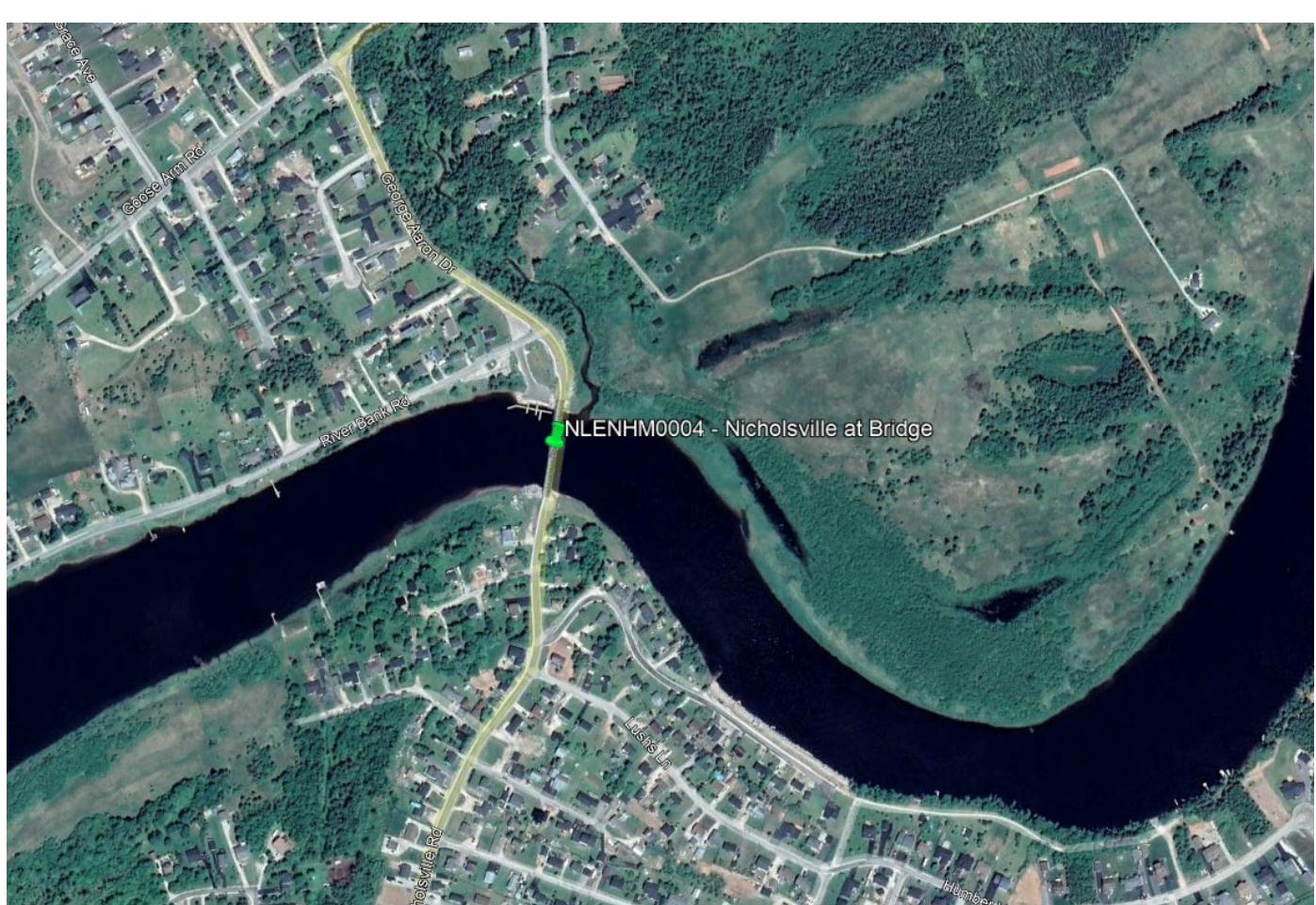


Figure 22: Humber River at Nicholsville Bridge Hydrometric Station Location

Weather Station Annual Maintenance - 2021, 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 2022.