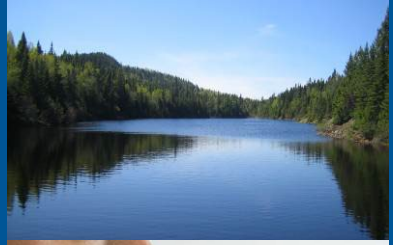
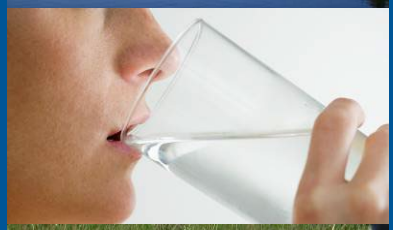






Annual Weather Station Maintenance Report

2023

Newfoundland Labrador

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

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 (2023)

	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		✓	✓
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			✓
Marathon-Gold 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	✓		
Churchill River at End of Mud Lake Road	✓		

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
  - Snow Water Equivalent
- Site Selection Rationale: Pilot weather station test site, verified that this 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 2023
- 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 - 2023, Newfoundland and Labrador

Tasks accomplished:

- Datalogger:
  - Model: CR1000X
  - Serial: 14253
  - Changed desiccant and humidity indicator card
- Anemometer:
  - Model: 05103-10 RM Young
  - Serial: 57031
  - Replaced speed bearings, potentiometer, and vertical shaft bearings
- Temperature/Relative Humidity:
  - Model: HygroVUE10
  - Serial: E1337
  - Replaced temp/RH chip
- Barometric Pressure:
  - Model: CS106
  - Serial: BP06403
- Snow Water Equivalent:
  - Fluidless Snow Pillow 5
  - Newly installed
- Heated Precipitation:
  - H3 rain[e] Heated Tipping Bucket
  - Cleaned funnel and bucket of debris
- Solar Radiation:
  - Model: SPLite 2
  - Serial: 194492
  - Wiped lens
- Soil Moisture:
  - Model: STEVENS HydraProbe
  - Newly installed
- Site:
  - Area cleared of vegetation
  - Gravel fill laid out to level site
  - Site footprint expanded
  - Pluvio base installed on concrete base

Follow-up tasks required:

- Regular scheduled maintenance
- Install multiple other precipitation methods
  - Pluvio, ARG314, and BC Standpipe

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 daytime
- 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: July 5th, 2023
- Location: N 48° 58' 29.83" W 56° 2' 4.43"
- Elevation: 88.1 m

Figure 2: Exploits River at Badger Weather Station Location

Weather Station Annual Maintenance - 2023, Newfoundland and Labrador

Tasks accomplished:

- Datalogger:
    - Model: CR1000
    - Serial: 13443
    - Changed desiccant and humidity indicator card
- Camera:
    - Model: CC5MPX
    - Adjusted view of CC5MPX
- Anemometer:
    - Model: RM Young 05103-10-L
    - Serial: 58072
    - Replaced speed bearings, potentiometer, and vertical shaft bearings
- Temperature/Relative Humidity:
    - Model: HygroVUE10
    - Serial: E3899
    - Newly installed, replaced HMP45C
- 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 bucket and funnel of any debris
- Solar Radiation:
    - Model: Kipp & Zonen SP LITE Pyranometer
    - Serial: 080135
    - Cleaned lens
- Solar Panel:
    - Model: 50W SW Energy Panel w/ SunSaver
- Site:
    - Cleared vegetation blocking staff gauge in river

Follow-up tasks required:

- Regular scheduled maintenance
- Installation of TX325 CS2 GOES Transmitter to replace soon to be obsolete CS1 GOES Transmitter
- Purchase and installation of 52202 heated tipping bucket

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 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: Weather information collected at this site is used for flood forecast monitoring of communities along the Humber River.
- Date Visited: July 25th, 2023
- Location: N 48° 58' 58.21" W 57° 45' 38.04"
- Elevation: 7.6 m

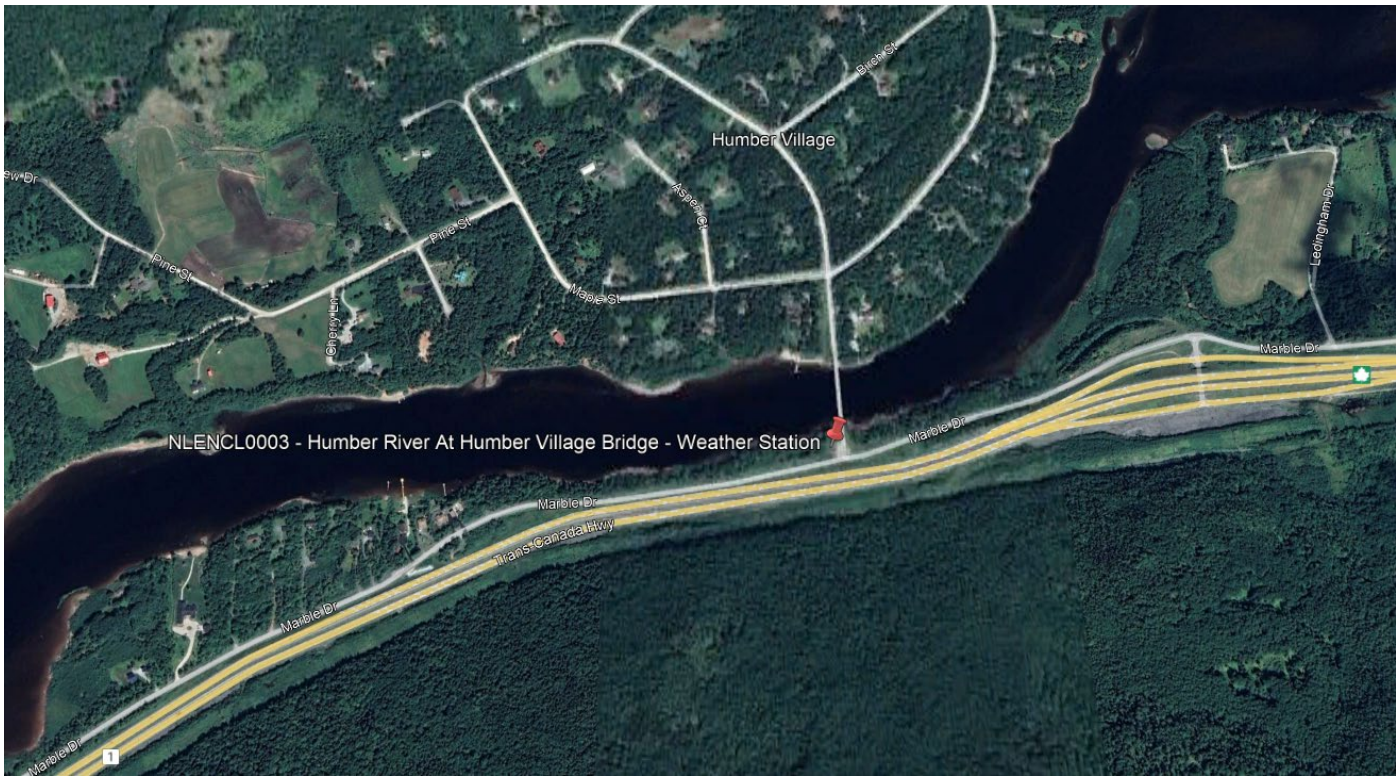

Figure 3: Humber River at Humber Village Bridge Weather Station Location

Weather Station Annual Maintenance - 2023, Newfoundland and Labrador

Tasks accomplished:

- Datalogger:
    - Model: CR1000
    - Serial: 22355
    - Changed desiccant and humidity indicator card
- Camera:
    - Model: CC640
    - Serial: 01511
    - Cleaned enclosure window and lens, replaced desiccant
- Anemometer:
    - Model: RM Young 05103-10
    - Serial: 130198
    - Replaced speed bearings, potentiometer, and vertical shaft bearings
- Temperature/Relative Humidity:
    - Model: HygroVUE10
    - Serial: E3852
    - Newly installed, replaced HMP45C
- 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
    - Replacement installed for faulty sensor
- Solar Radiation:
    - Model: Kipp & Zonen SP LITE Pyranometer
    - Serial: 080395
    - Cleaned lens
- Compound:
    - Cleared vegetation

Follow-up tasks required:

- Regular scheduled maintenance
- Purchase and installation of 52202 heated tipping bucket
- Installation of TX325 CS2 GOES Transmitter to replace soon to be obsolete CS1 GOES Transmitter
- Replace CC640 camera

Sandy Lake near Birchy Narrows (Camp 55)

Station Details:

- Station Identification: NLENCL0005
- Station Installed: November 2010
- Image taken and transmitted every hour during the daytime
- 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 (TI)
    - 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 27th, 2023
- Location: N 49° 16' 28.30" W 56° 51' 5.80"
- Elevation: 119.8 m

Figure 4: Sandy Lake near Birchy Narrows (Camp 55) Snow Monitoring Station Location

Weather Station Annual Maintenance - 2023, Newfoundland and Labrador

Tasks accomplished:

- Datalogger:
    - Model: CR1000
    - Serial: 24833
    - Changed desiccant and humidity indicator card
- 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, potentiometer, and vertical shaft 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 bucket and funnel of any debris
- Solar Radiation:
    - Model: Kipp & Zonen SP LITE Pyranometer
    - Serial: 091169
    - Cleaned lens
- Snow Water Equivalent:
    - Model: CS725
    - Serial: 1015
    - Sent back to CampbellSci for repairs and reinstalled in the summer

Follow-up tasks required:

- Regular scheduled maintenance
- Install concrete base for Pluvio rain gauge
- Installation of TX325 CS2 GOES Transmitter to replace soon to be obsolete CS1 GOES Transmitter
- Replace CC640 camera

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 26th, 2023
- Location: N 53° 14' 43.64" W 60° 46' 42.15"
- Elevation: 11.9 m

Figure 5: Muskrat Falls Weather Station Location

Weather Station Annual Maintenance - 2023, Newfoundland and Labrador

Tasks accomplished:

- Datalogger:
    - Model: CR1000
    - Serial: 56808
    - Changed desiccant and humidity 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, potentiometer, and vertical shaft 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 bucket and funnel of any debris
- Solar Radiation:
    - Model: Kipp & Zonen SP LITE2 Pyranometer
    - Serial: 136646
    - Cleaned lens
- Power Generation:
    - Adjusted new solar panels to face southern sky
    - Replaced batteries

Follow-up tasks required:

- Regular scheduled maintenance
- Mount SunSaver Solar Controller inside enclosure box
- Replace HC2-S3 temp/RH sensor with HygroVUE10 as HC2-S3 is retired

Upper Humber River above Black Brook

Station Details:

- Station Identification: NLENCL0007
- Station Installed: September 30th 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 (TI)
    - 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 26th and October 26th, 2023
- Location: N 49° 37' 6.24" W 57° 17' 41.20"
- Elevation: 302.4 m

Figure 6: Upper Humber River above Black Brook Snow Monitoring Station Location

Weather Station Annual Maintenance - 2023, Newfoundland and Labrador

Tasks accomplished:

- Datalogger:
    - Model: CR1000
    - Replaced faulty datalogger
    - Changed desiccant and humidity indicator card
- Anemometer:
    - Model: 05103AP-10-L RM Young Wind Monitor Alpine Version
    - Serial: 98399
    - Replaced speed bearings, potentiometer, and vertical shaft 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 bucket and funnel of any debris
    - Swapped short cable for appropriate length cable to avoid tension created by snowpack
- Precipitation (Weighing):
    - Model: OTT Pluvio^2 – Weighing Rain Gauge
    - Newly installed
- Solar Radiation:
    - Model: Kipp & Zonen SP LITE Pyranometer
    - Serial: 091168
    - Cleaned lens
- Snow Water Equivalent:
    - Model: CS725
    - The CS725 is not field serviceable
- Compound:
    - Installed alter shield around OTT Pluvio^2 weighing rain gauge
    - Cleared unwanted vegetation
    - Replaced faulty solar controller

Follow-up tasks required:

- Regular scheduled maintenance
- Installation of TX325 CS2 GOES Transmitter to replace soon to be obsolete CS1 GOES Transmitter

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 (TI)
    - 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 28th, 2023
- Location: N 53° 21' 35.23" W 65° 33' 41.27"
- Elevation: 542.8 m

Figure 7: TLH between Churchill Falls and Lab City Snow Monitoring Station Location

Weather Station Annual Maintenance - 2023, Newfoundland and Labrador

Tasks accomplished:

- Datalogger:
    - Model: CR1000
    - Changed desiccant and humidity indicator card
- Anemometer
    - Model: 05103AP-10-L RM Young Alpine Version
    - Serial: 113751
    - Replaced speed, direction bearings and potentiometer
    - Resolved wind gust speed and direction data reporting issue
- Temperature/Relative Humidity:
    - Model: HygroVUE10
    - Serial: E3382
    - Replaced sensor element/cap with new precalibrated one
- Snow Depth Sensor:
    - Model: Sonic Ranger SR50A
    - Serial: 9170
    - Replaced transducer due to pitting and peeling of surface foil
    - Releveled snow depth target platform
- Barometric Pressure:
    - Model: CS106
    - Serial: N2250425
    - This sensor is not field serviceable, nor can it be field calibrated
- Precipitation:
    - Model: TB4-L
    - Cleared bucket and funnel of any 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

Follow-up tasks required:

- Regular scheduled maintenance
- Add gravel fill to site so snow depth target platform does not become unlevel

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 (TI)
    - 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 27th, 2023
- Location: N 53° 26' 10.12" W 63° 14' 1.38"
- Elevation: 329.8 m

Figure 8: Metchin River near TLH Snow Monitoring Station Location

Weather Station Annual Maintenance - 2023, Newfoundland and Labrador

Tasks accomplished:

- Datalogger:
    - Model: CR1000
    - Changed desiccant and humidity indicator card
- Anemometer
    - Model: 05103AP-10-L RM Young Alpine Version
    - Serial: 152871
    - Replaced speed bearings, potentiometer, and vertical shaft bearings
    - Resolved wind gust speed and direction data reporting issue
- Temperature/Relative Humidity:
    - Model: HygroVUE10
    - Serial: E3384
    - Replaced sensor element/cap with new precalibrated one
- 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 bucket and funnel of any debris
- Solar Radiation:
    - Model: Kipp & Zonen SP LITE2 Pyranometer
    - Serial: 173211
    - Cleaned lens

Follow-up tasks required:

- Regular scheduled maintenance

Exploits below Noel Paul's Brook MET

Station Details:

- Station Identification: NLENCL0010
- Station Installed: November 2020
- Image taken and transmitted once a day at 9:00 AM NST
- 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: July 6th, 2023
- Location: N 48° 50' 40.8" W 56° 16' 9.9"
- Elevation: 125.6 m

Figure 9: Exploits below Noel Paul's Brook MET Station Location

Weather Station Annual Maintenance - 2023, Newfoundland and Labrador

Tasks accomplished:

- Datalogger:
  - Model: CR1000X
  - Serial: 7468
  - Changed desiccant and humidity indicator card
- 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 temp/RH chip for precalibrated one
- Anemometer:
  - Model: 05103AP-10-L RM Young Alpine Version
  - Replaced speed bearings, potentiometer, and vertical shaft bearings
  - Resolved wind gust speed and direction data reporting issue
- Barometric Pressure:
  - Mode: CS106 Barometric Pressure Sensor
  - This sensor is not field serviceable, nor can it be field calibrated
- Solar Radiation:
  - Model: SP Lite2 Pyranometer
  - Wiped lens
- GPS Antenna:
  - Model: Trimble GPS Antenna P/N 57861-20
  - Serial: 3480213
- Camera:
  - Model: NuPoint Fixed Sight Satellite Camera System
  - Serial: 13000464

Follow-up tasks required:

- Regular scheduled maintenance
- Adjust zoom on NuPoint satellite imaging system

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 19th, 2022
- Location: N 53° 20' 6.9" W 60° 11' 23.5"
- Elevation: 0 m

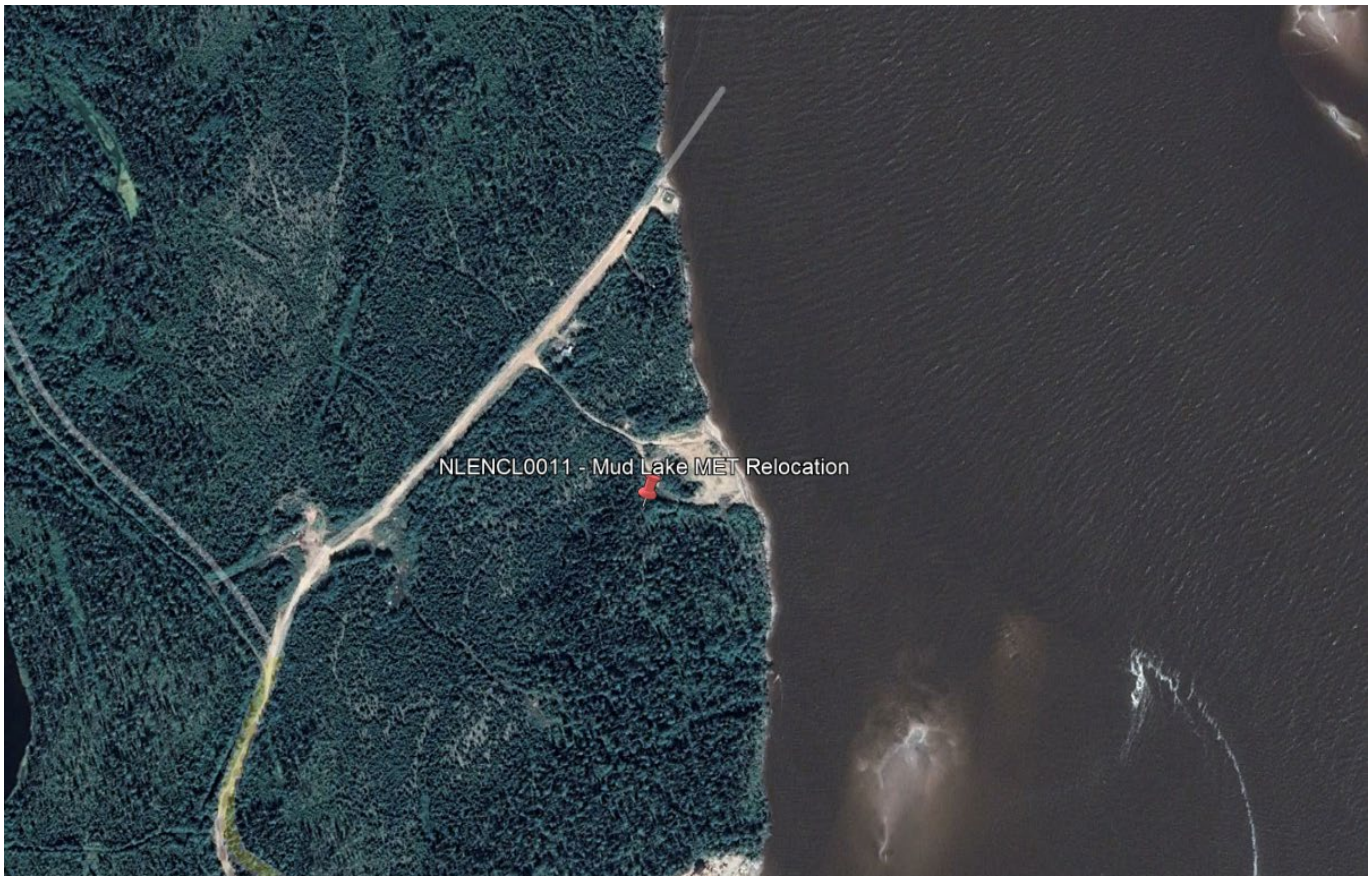

Figure 10: Mud Lake Road MET Station Location

Weather Station Annual Maintenance - 2023, Newfoundland and Labrador

Tasks accomplished:

- Datalogger:
  - Model: CR1000X
  - Serial: 19389
  - Changed desiccant and humidity indicator card
- 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, potentiometer, and vertical shaft bearings
- Barometric Pressure:
  - Mode: CS106 Barometric Pressure Sensor
  - Serial: J4430010
  - This sensor is not field serviceable, nor can it be field calibrated
- 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
- Install of Fluidless Snow Pillow 5 for snow water equivalent measurement

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 2023 – tower was taken down by wind in early 2022 – waiting on repairs
- Location: N 47° 25' 27" W 53° 45' 57.7"
- Elevation: 163.1 m

Figure 11: Vale LH1 MET Station Location

Weather Station Annual Maintenance - 2023, 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:
  - Mode: CS106 Barometric Pressure Sensor
  - Serial: S1050162
  - This sensor is not field serviceable, nor can it be field calibrated
- Communication:
  - Model: Microhard 4GMini
  - Serial: 012-1254949

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: June 9th & December 6th, 2023
- Location: N 47° 25' 49.23" W 53° 49' 14.36"
- Elevation: 5 m

Figure 12: Vale LH2 MET Station Location

Weather Station Annual Maintenance - 2023, Newfoundland and Labrador

Tasks accomplished:

- Datalogger:
    - Model: CR1000X
    - Serial: 15038
    - Changed desiccant and humidity indicator card
- Precipitation:
    - Model: 52202-L RM Young Heated Rain and Snow Gauge
    - Cleared funnel and bucket of any debris
    - Check to ensure bucket was level while tower is vertical
- Temperature/Relative Humidity:
    - Model: CS215
    - HygroVUE10 replaced due to ionic build up on PCB board
- Anemometer:
    - Model: 05108-45
    - Changed speed bearings
- Barometric Pressure:
    - Mode: CS106 Barometric Pressure Sensor
    - This sensor is not field serviceable, nor can it be field calibrated
- Communication:
    - Model: Microhard 4GMini

Follow-up tasks required:

- Regular scheduled maintenance
- Replace CS215 with repaired HygroVUE10
- Determine how to keep temperature/RH sensor protected from ionic buildup

Marathon-Gold MET

Station Details:

- Station Identification: NLENCL0014
- Station Installed: June 2023
- 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: This station was installed in partnership with Marathon-Gold Mining. They require MET data from on site, and we have the infrastructure in place to host their data.
- Date Visited: June 1st, 2023
- Location: N 48° 20' 45.80" W 57° 9' 7.04"
- Elevation: 342 m

Figure 13: Marathon-Gold MET Station Location

Weather Station Annual Maintenance - 2023, Newfoundland and Labrador

Tasks accomplished:

- Datalogger:
  - Model: CR1000X
  - Serial: 43543
  - Newly installed
- Snow Depth Sensor:
  - Model: SnowVUE10
  - Serial: 10293
  - Newly installed
- Precipitation:
  - Model: ARG314
  - Serial: 223812
  - Newly installed
- Temperature/Relative Humidity:
  - Model: HygroVUE10
  - Serial: E3851
  - Newly installed
- Anemometer:
  - Model: 05108-45-L40
  - Serial: 195560
  - Newly installed
- Barometric Pressure:
  - Mode: BaroVUE10
  - Serial: 1771
  - Newly installed
- Solar Radiation:
  - Model: SP Lite2 Pyranometer
  - Serial: 222279
  - Newly installed
- Soil Moisture:
  - Model: Stevens Hydra-Probe II
  - Serial: 281213
  - Newly installed
- Antenna:
  - Model: C2444 9dB Yagi Antenna
  - Newly installed

Follow-up tasks required:

- Regular scheduled maintenance
- Install of Fluidless Snow Pillow 5 for snow water equivalent measurement

Waterford River at Kilbride

Station Details:

- Station Identification: NF02ZM0009
- Station Installed: July 21st 2015
- Image taken and transmitted every hour during the daytime
- Site Selection Rationale: Provides essential information for visual image of changing water levels in this urban stream.
- Date Visited: Throughout 2023
- Location: N 47° 31' 44.44" W 52° 44' 41.04"
- Elevation: 32.9 m

Figure 14: Waterford River at Kilbride Camera Station Location

Weather Station Annual Maintenance - 2023, Newfoundland and Labrador

Tasks accomplished:

- Datalogger:
  - Model: CR800
  - Changed desiccant and humidity indicator card
  - Power cycled station
- Camera:
  - Model: CC5MPX
  - CC5MPX I/O port corroded likely due to road salt from overpass above
  - Camera sent back to manufacturer for repairs

Follow-up tasks required:

- Regular scheduled maintenance
- Fix station name in web camera image banner
- Reinstall repaired CC5MPX camera

Exploits River at Badger Steps

Station Details:

- Station Identification: NLENCM0001
- Station Installed: November 2009
- Image taken and transmitted every hour during the daytime
- 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: July 5th, 2023
- Location: N 48°56'25.86" W 55°58'42.98"
- Elevation: 100.6 m

Figure 15: Exploits River at Badger Steps Camera Station Location

Weather Station Annual Maintenance - 2023, Newfoundland and Labrador

Tasks accomplished:

- Datalogger:
  - Model: CR1000
  - Replaced desiccant and humidity indicator card
  - Cleared memory of USR drive
- Camera:
  - Model: CC5MPX
  - Wiped camera lens
- Compound:
  - Replaced battery

Follow-up tasks required:

- Regular scheduled maintenance
- Monitor battery levels and determine excessive draining issue

Steady Brook 470 meters above Confluence to Humber River

Station Details:

- Station Identification: 02YL012
- Station Installed: June 23rd 2015
- Image taken and transmitted every hour during the daytime
- 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 25th and October 26th, 2023
- Location: N 48° 57' 11.59" W 57° 49' 40.02"
- Elevation: 7.3 m

Figure 16: Steady Brook 470 meters above Confluence to Humber River Camera Station Location

Weather Station Annual Maintenance - 2023, Newfoundland and Labrador

Tasks accomplished:

- Datalogger:
  - Model: CR1000X
  - Serial: 43548
  - Changed desiccant and humidity indicator card
- Camera:
  - Model: 2 x CC5MPX
  - Serial: 2507/2508
  - Newly installed double camera system for up- and downstream views
- Compound:
  - Replaced AGM battery with Lithium as test
  - Lithium battery did not perform as expected, AGM replaced

Follow-up tasks required:

- Regular scheduled maintenance
- Monitor battery usage of double camera system

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 daytime
- Site Selection Rationale: Selected with consultation from Environment Canada and for use in flood forecasting models.
- Date Visited: September 25th, 2023
- Location: N 53°20'5.24" W 60°11'18.18”
- Elevation: 1.2 m

Figure 17: Churchill River at end of Mud Lake Road Camera Station Location

Weather Station Annual Maintenance - 2023, Newfoundland and Labrador

Tasks accomplished:

- Datalogger:
  - Model: CR800
  - Serial: 28914
  - Changed desiccant and humidity indicator card
  - Replaced datalogger with previous CR800 from Steady Brook
- Camera:
  - Model: CCFC
  - Wiped lens

Follow-up tasks required:

- Regular scheduled maintenance
- Monitor connectivity to station

Churchill River below Traverspine River

Station Details:

- Station Identification: 03OE019
- Station Installed: Sept 23, 2018
- Image taken and transmitted every hour during the daytime
- Site Selection Rationale: Selected with consultation from Environment Canada and for use in flood forecasting models.
- Date Visited: Not visited in 2023
- Location: N 53°17'28.20" W 60°13'16.49"
- Elevation: 1.2 m

Figure 18: 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 daytime
- Site Selection Rationale: Selected for use in flood forecasting models.
- Date Visited: September 26th, 2023
- Location: N 53°23'35.07" W 60°25'12.05"
- Elevation: 1.2 m

Figure 19: Goose River at Bridge Camera Station Location

Weather Station Annual Maintenance - 2023, Newfoundland and Labrador

Tasks accomplished:

- Datalogger:
    - Model: CR800
    - Serial: 43340
    - Changed desiccant and humidity indicator card
    - Uploaded new programming to transmit battery voltage level
- 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 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: Not visited in 2023
- Location: N 53°18'14.10" W 60°10'2.37"
- Elevation: 1.2 m

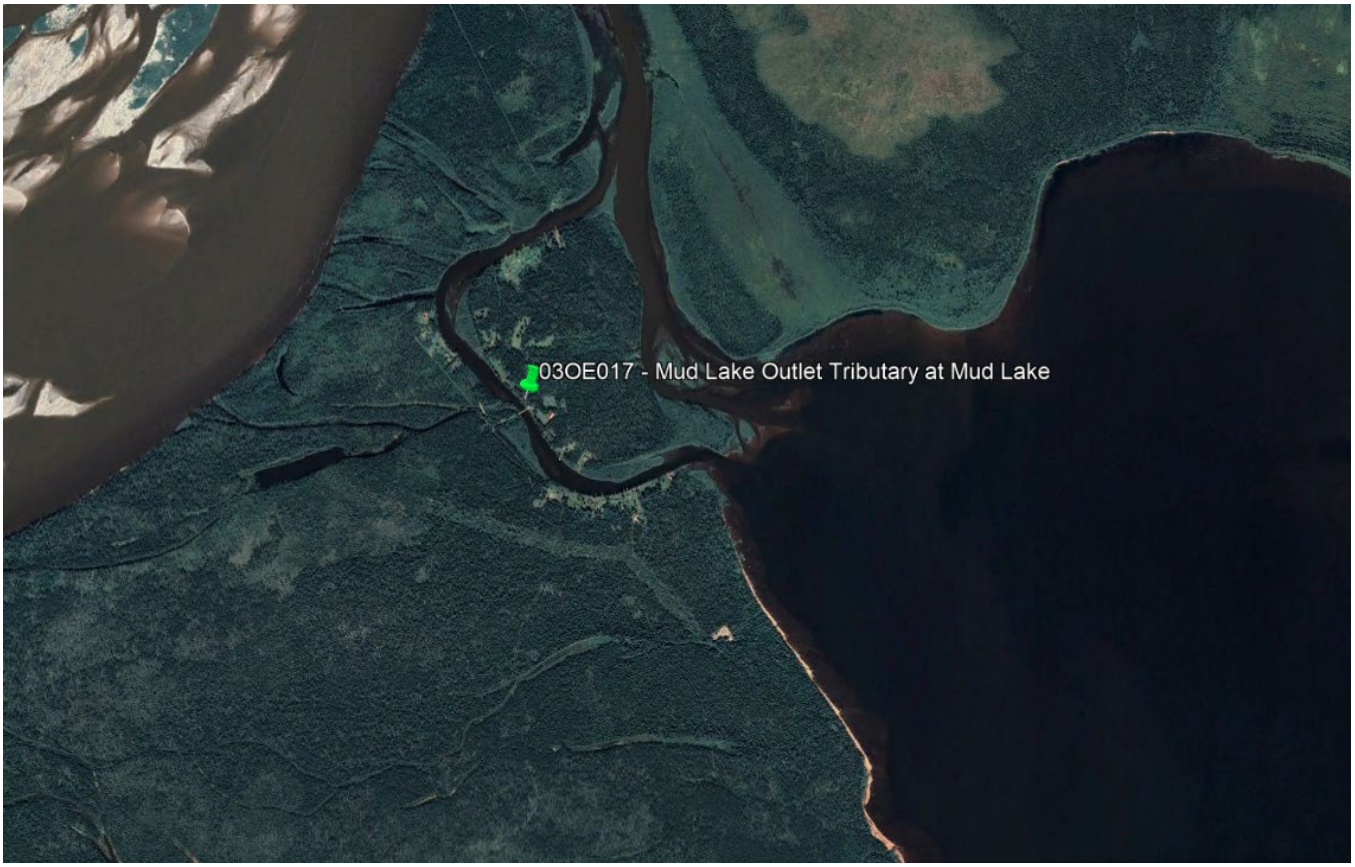

Figure 20: Mud Lake at Mud Lake Camera Station Location

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 3rd 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: Not visited in 2023
- Location: N 52°58'12.22" W 61°26'43.48"
- Elevation: 62.5 m

Figure 21: Churchill River above Grizzle Rapids Camera Station Location

Tasks accomplished:

- Camera:
  - Model: NuPoint Fixed Sight Satellite Camera System
  - Serial: 14000078

Follow-up tasks required:

- Regular scheduled maintenance

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 daytime
- 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 4th, 2023
- Location: N 49° 0'29.50" W 55°29'23.80"
- Elevation: 36.0 m

Figure 22: Exploits River at Bishop's Falls Trestle Camera Station Location

Weather Station Annual Maintenance - 2023, Newfoundland and Labrador

Tasks accomplished:

- Datalogger:
    - Model: CR800
    - Serial: 44026
    - Changed desiccant and humidity indicator card
    - Uploaded new programming to transmit battery voltage level
- Camera:
    - Model: CC5MPX
    - Serial: 01293
    - Lens wiped

Follow-up tasks required:

- Regular scheduled maintenance

Humber River at Nicholsville Bridge

Station Details:

- Station Identification: NLENHM0004
- Station Installed: Sept 10 - 11, 2019
- Image taken and transmitted every hour during the daytime
- 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 27th, 2023
- Location: N 49°11'18.98" W 57°26'52.32"
- Elevation: 30.8 m

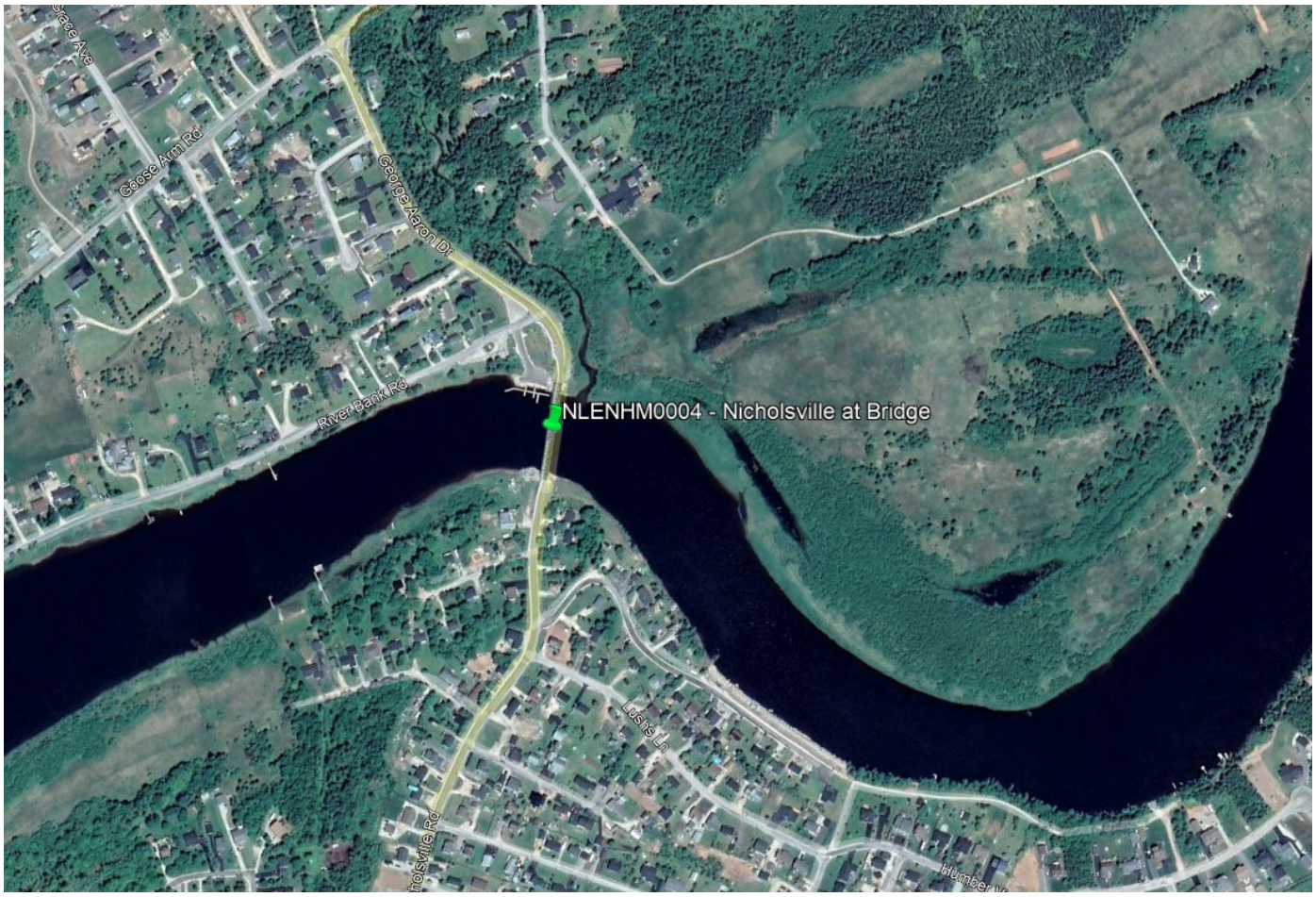

Figure 23: Humber River at Nicholsville Bridge Camera Station Location

Weather Station Annual Maintenance - 2023, Newfoundland and Labrador

Tasks accomplished:

- Datalogger:
    - Model: CR800
    - Serial: 44027
    - Changed desiccant and humidity indicator card
    - Uploaded new programming to transmit battery voltage level
- Camera:
    - Model: CCFC
    - Lens wiped

Follow-up tasks required:

- 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 daytime
- 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. 25th, 2023
- Location: N 53° 20' 15.95" W 60° 11' 21.44"
- Elevation: 1.2 m

Figure 24: Churchill River at end of Mud Lake Road Camera Station Location

Weather Station Annual Maintenance - 2023, Newfoundland and Labrador

Tasks accomplished:

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

Follow-up tasks required:

- Monitor site degradation due to erosion caused by nearby ocean and river processes.
- Move core of site back from shore to keep camera setup

The next scheduled annual maintenance trip will be completed by October 2024.