



Annual Weather Station Maintenance Report

2019



Government of Newfoundland & Labrador
Department of Municipal Affairs and Environment
Water Resources Management Division

Prepared by:

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Overview

The Department of Municipal Affairs and Environment's 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 Environmental Scientists within WRMD.

Automated Weather Stations in Operation (2019)

	Camera	Snow Monitoring	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		✓	✓
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 downloaded three times daily:
 - Air Temperature
 - Relative Humidity
 - Precipitation
 - Wind Speed
 - Wind Direction
- 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: Not visited in 2019
- Location: N 47° 35' 16.7" W 52° 44' 1.3"
- Elevation: 332 ft

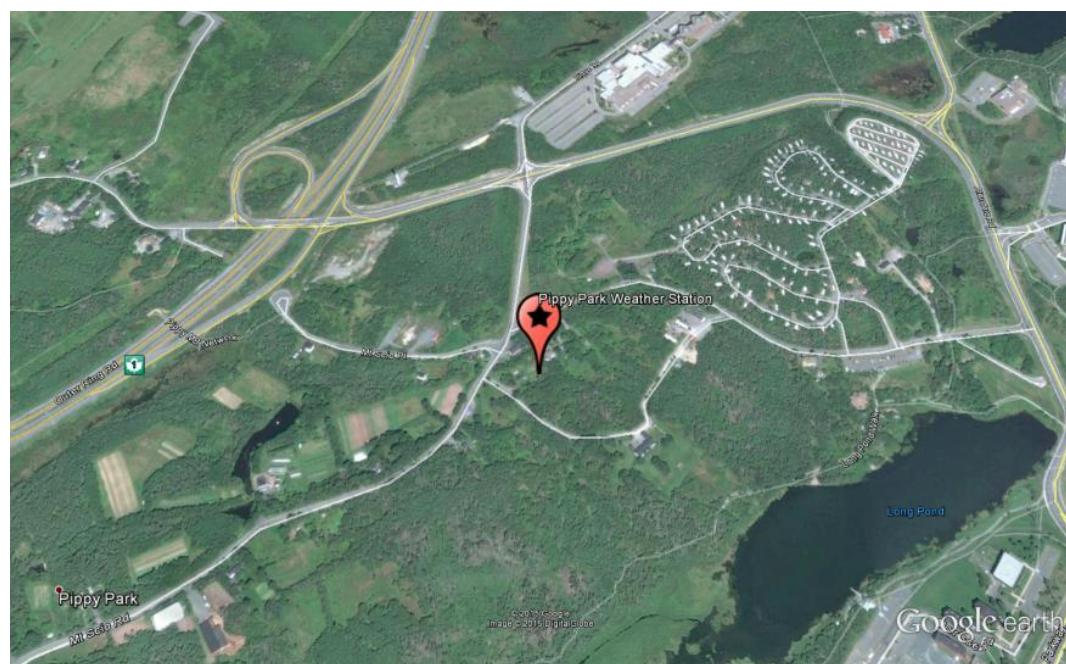


Figure 1: Pippy Park Weather Station Location

Tasks accomplished:

- Site currently disassembled

Follow-up tasks required:

- Install new equipment at this site after winter season

Exploits River at Badger East of Stadium

Station Details:

- Station Identification: NLENCL0002
- Station Installed: September 2008
- 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: 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 23rd, 2019
- Location: N 48° 58' 29.83" W 56° 2' 4.43"
- Elevation: 289 ft

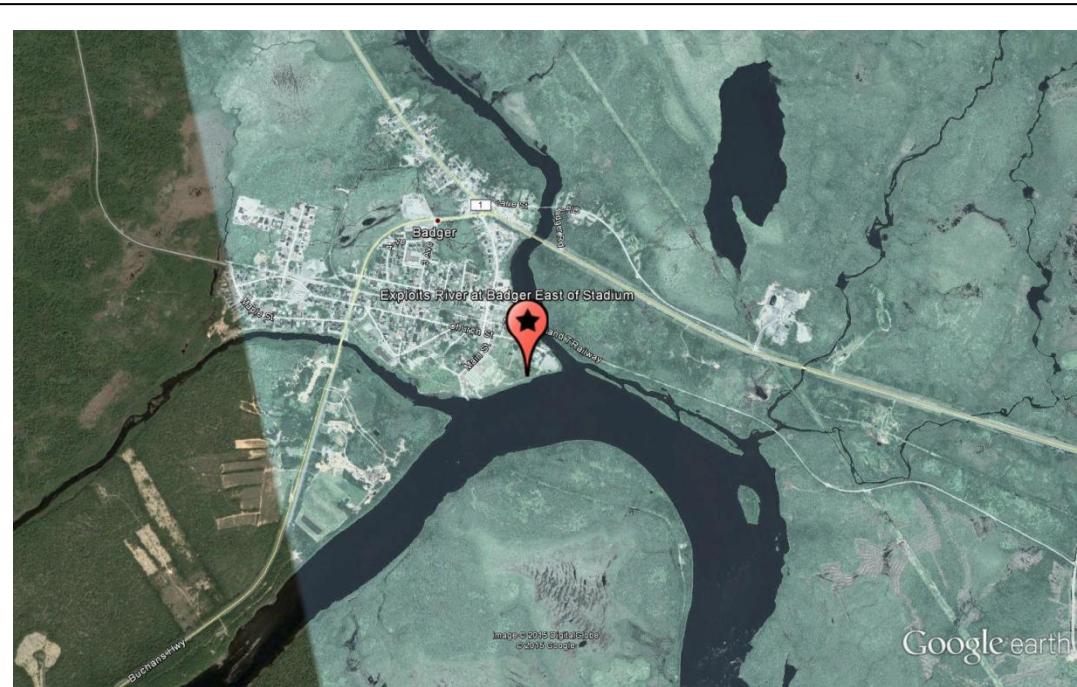


Figure 2: Exploits River at Badger Weather Station Location

Tasks accomplished:

- Datalogger:
 - Model: CR1000
 - Serial: 13443
 - Replaced desiccant
- Camera:
 - Model: CC640
 - Cleaned enclosure and lens, replaced desiccant
- Anemometer:
 - Model: RM Young 05103-10-L
 - Serial: 58072
 - Replaced potentiometer, both sets of bearings, calibrated
- Temperature/Relative Humidity:
 - Model: HMP45C
 - Serial: C3046
 - Sensor chip was in good working order – no need to be replaced
 - Chip was calibrated using Vaisala relative humidity calibration salts
- Snow Depth Sensor:
 - Model: SR50A Sonic Ranger
 - Serial: 31665
 - Replaced SR50 transducer due to pitting and peeling
- Barometric Pressure:
 - Model: Young 61205V
 - Serial: BP05005
 - Model 61205V barometer requires no regular maintenance
- 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
- Compound
 - Measurements and drawings for Metadata

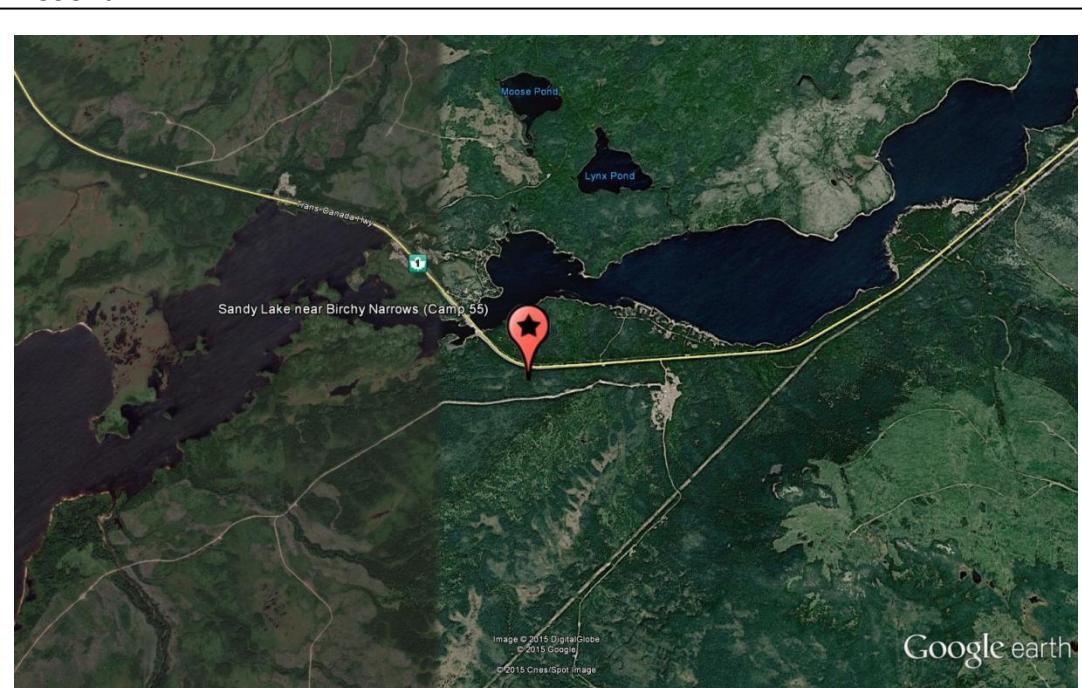
Follow-up tasks required:

- Regular scheduled maintenance
- Landscape snow depth pad
- Replace platform for tipping bucket
- Check battery voltage over the course of the year and see if it needs replacing
- New camera to be installed

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 (TI)
 - Snow Water Equivalent (K)
 - Soil Moisture
 - Solar Radiation
 - Sunshine Hours
- Site Selection Rationale: Snow monitoring involves determining the extent of snow cover (SE) and its snow water equivalent (SWE). SWE is a measurement of both the depth of snow and its density. It represents the depth of water that would result if the entire snow cover melted at once. 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 communities of Deer Lake and Steady Brook in the Humber River Basin.
- Date Visited: July 23rd-24th 2019
- Location: N 49° 16' 28.30" W 56° 51' 5.80"
- Elevation: 393 ft



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 potentiometer, both sets of bearings, calibrated
- Temperature/Relative Humidity:
 - Model: HC-S3
 - Serial: 61468628
 - Swapped sensor head for an already calibrated one from CampbellSci - note: this is an old sensor that is no longer manufactured and cannot be field calibrated
 - Adjusted datalogger programming to offset primary air temperature value from differently rated HC-S3 sensor chip
 - Added new redundant 109 Temp probe for QA/QC against HC-S3
- Snow Depth Sensor:
 - Model: Sonic Ranger SR50A
 - Serial: 2999
 - Replaced SR50 transducer due to pitting and peeling
- Barometric Pressure:
 - Model: Young 61302V
 - Serial: BPA1405
 - Checked the QDP Hydro Vent hydrophobic filter. 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
- Compound
 - Landscaped snow depth pad
 - Removed fallen trees on driving path
 - Measurements and drawings for Metadata

Weather Station Annual Maintenance - 2019, Newfoundland and Labrador

- Snow Water Equivalent:
 - Model: CS725
 - The CS725 was removed and sent back to CampbellSci to be reviewed. Connector has failed allowing water to get into the detector. New connected designed and replaced at no charge. Internal PCB will require replacement.

Follow-up tasks required:

- Regular scheduled maintenance
- Reinstall CS725 after maintenance is complete
- Remove more fallen trees

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: 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 24th, 2019
- Location: N 48° 58' 58.21" W 57° 45' 38.04"
- Elevation: 25 ft

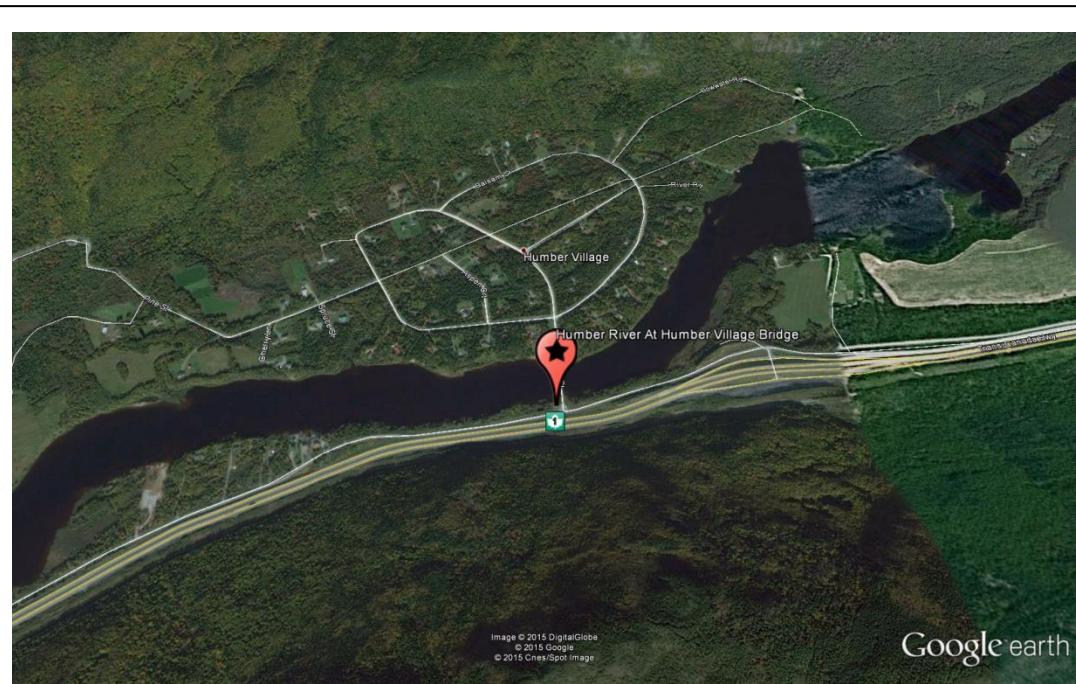


Figure 4: Humber River at Humber Village Bridge Weather Station Location

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 the potentiometer, both sets of bearings, calibrated sensor
- Temperature/Relative Humidity:
 - Model: HMP45C
 - Serial: C1407
 - Calibrated Temperature/Relative Humidity chip
 - Added new redundant 109 Temp probe for QA/QC against HMP45C
- Snow Depth Sensor:
 - Model: Sonic Ranger SR50A
 - Serial: C13213
 - Replaced SR50 transducer due to pitting and peeling
- Barometric Pressure:
 - Model: 61205V
 - Serial: BP05888
 - Model 61205V barometer requires no regular maintenance
- 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
- Compound
 - Landscaped snow depth pad

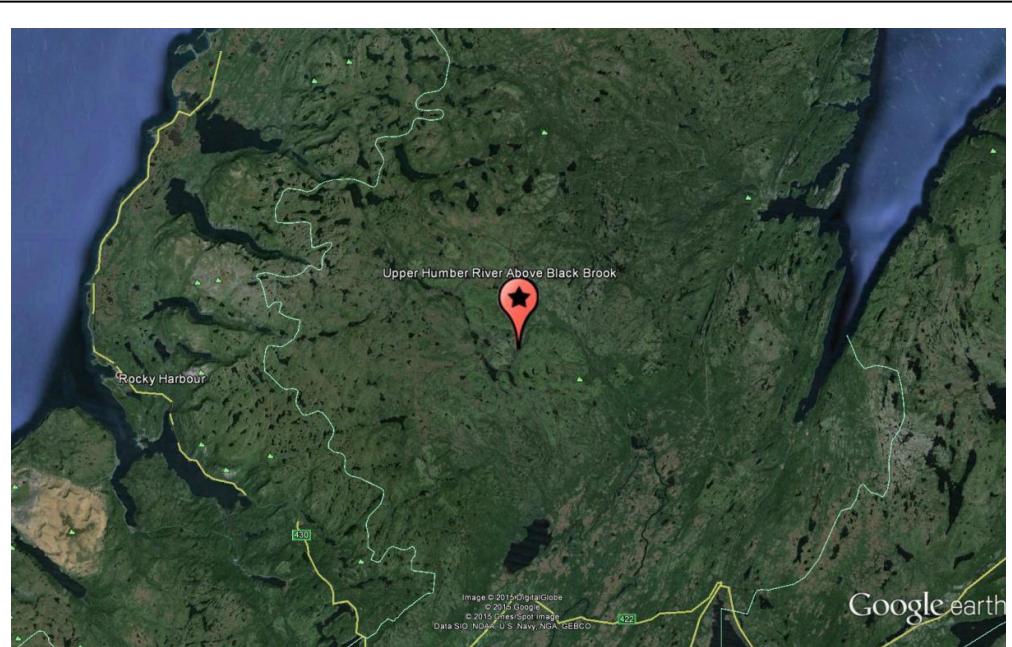
Follow-up tasks required:

- Compound door requires repair
- Regular scheduled maintenance

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: Snow monitoring involves determining the extent of snow cover (SE) and its snow water equivalent (SWE). SWE is a measurement of both the depth of snow and its density. It represents the depth of water that would result if the entire snow cover melted at once. 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, 2019
- Location: N 49° 37' 6.24" W 57° 17' 41.20"
- Elevation: 992 ft



Tasks accomplished:

- Datalogger:
 - Model: CR1000
 - Replaced desiccant
- Anemometer:
 - Model: 05103AP-10-L RM Young Wind Monitor Alpine Version
 - Serial: 98399
 - Replaced potentiometer, replaced bearings, calibrated sensor
- Temperature/Relative Humidity:
 - Model: HC-S3
 - Serial: 6122441
 - Swapped sensor head for an already calibrated one from CampbellSci - note: this is an old sensor that is no longer manufactured
 - Adjusted datalogger programming to offset primary air temperature value from differently rated HC-S3 sensor chip
- Snow Depth Sensor:
 - Model: Sonic Ranger SR50A
 - Serial: 1670
 - Replaced SR50 transducer due to pitting and peeling
- Barometric Pressure:
 - Model: 61302V
 - Serial: BPA140
 - Checked the QDP Hydro Vent hydrophobic filter. 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
 - Radiation calibration ran but returned undesirable results; DJ Snodgrass (CampbellSci) to look into remotely
- Compound
 - Landscape snow depth pad

Follow-up tasks required:

- Regular scheduled maintenance
- Follow up with CS725 remote maintenance

Churchill River at End of Mud Lake Road

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: Snow monitoring provides essential information for flood forecasting, hydropower generation, ice monitoring, wildlife studies, and for climate change adaptation in the province. Captures image of the ice road. Provides weather data to better understand water quality data for the Churchill River.
- Date Visited: Oct. 8th 2019
- Location: N 53° 20' 15.95" W 60° 11' 21.44"
- Elevation: 4 ft

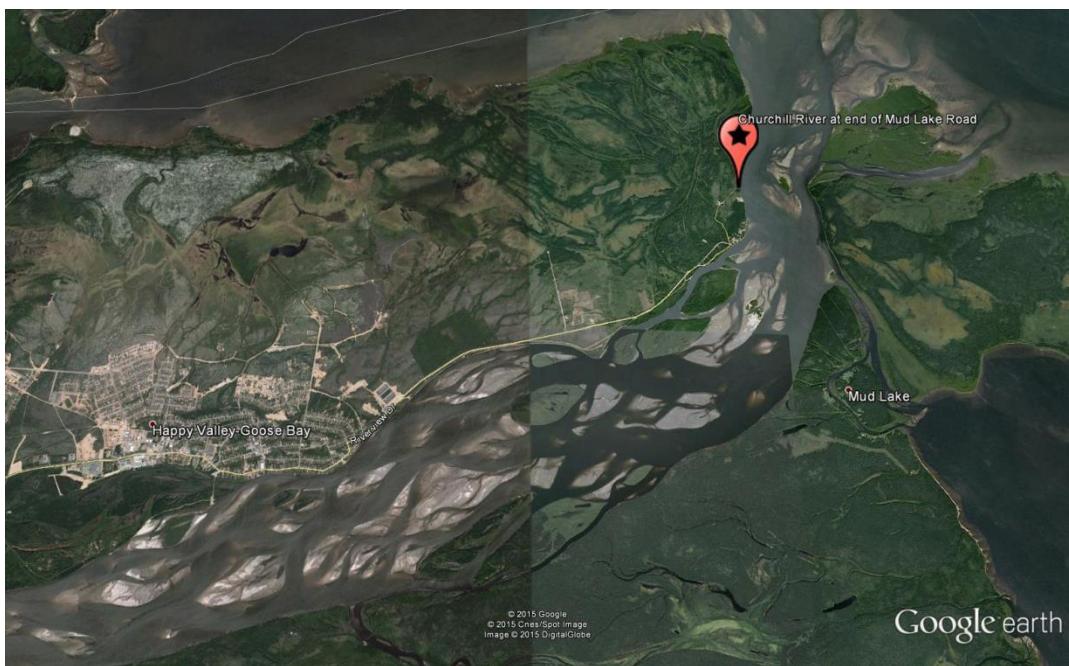


Figure 6: Churchill River at end of Mud Lake Road Weather Station Location

Tasks accomplished:

- Datalogger:
 - Model: CR1000
 - Serial: 29931
 - Replaced desiccant and indicator card
- Camera:
 - Model: CC640
 - Serial: AAW-TZ49
 - Cleaned enclosure window, lens and replaced desiccant
- Anemometer:
 - Model: 05103AP-10-L RM Young Alpine Version
 - Serial: 127033
 - Replaced potentiometer, replaced bearings, calibrated sensor
- Temperature/Relative Humidity:
 - Model: CS215
 - Serial: E17154
 - Replaced old CS215 chip with new already calibrated chip
 - Checked humidity values against Vaisala salts
- Snow Depth Sensor:
 - Model: Sonic Ranger SR50A
 - Serial: 3000
 - Transducer foil still in good quality
- Barometric Pressure:
 - Model: 61302V
 - Serial: BPA1406
 - Checked the QDP Hydro Vent hydrophobic filter. The 61302V is not field serviceable nor can it be field calibrated
- Precipitation
 - Model: Texas Electronics TE-525WS
 - Serial: 43229-210
 - Cleared funnel and bucket portion of the unit of debris
- Solar Radiation
 - Model: Kipp & Zonen SP LITE Pyranometer
 - Serial: 091170
 - Cleaned lens
- Compound
 - Landscaped snow depth pad
 - Re-vulcanized antenna connection

Follow-up tasks required:

- Station to be relocated due to erosion

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: Oct. 9th 2019
- Location: N 53° 14' 43.64" W 60° 46' 42.15"
- Elevation: 39 ft

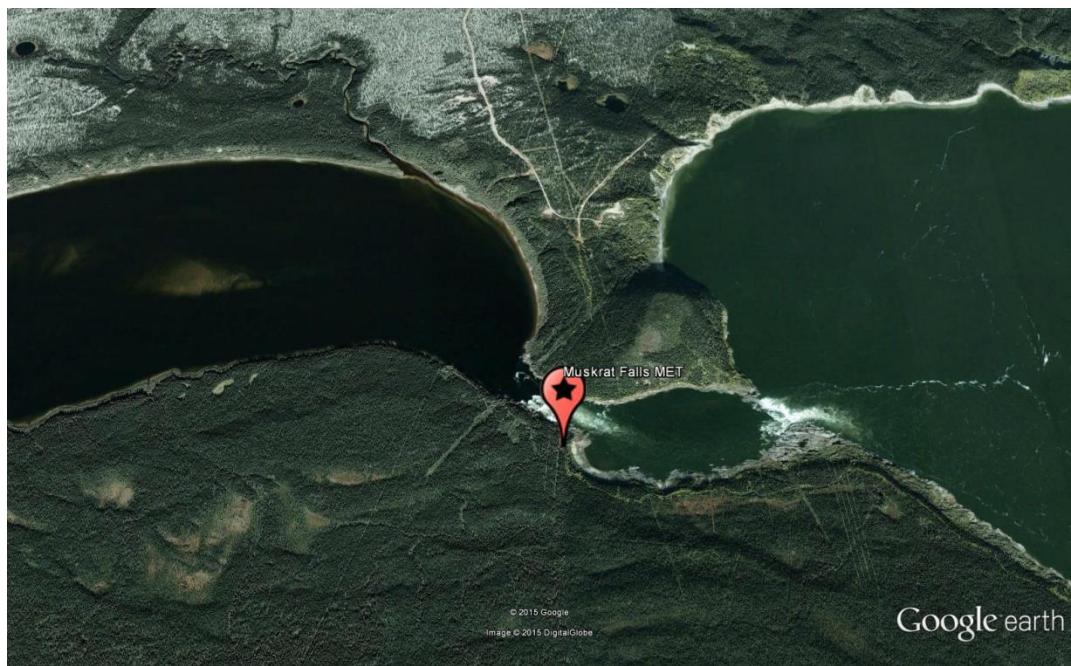


Figure 7: Muskrat Falls Weather Station Location

Tasks accomplished:

- Datalogger:
 - Model: CR1000
 - Serial: 56808
 - Replaced desiccant and indicator card
- Cameras:
 - Model: CC5MPX
 - Serial: 01317, 01314
 - Cleaned lens
- Anemometer:
 - Model: 05130AP-10-L RM Young Alpine
 - Serial: 98398
 - Replaced potentiometer, replaced bearings, calibrated sensor
- Temperature/Relative Humidity:
 - Model: HC2-S3-L
 - Serial: 61081111
 - Replaced sensor head with new one, already calibrated
- Snow Depth Sensor:
 - Model: Sonic Ranger SR50A
 - Serial: 4013
 - Replaced transducer due to pitting and peeling
- Barometric Pressure:
 - Model: CS106
 - Serial: J1660083
 - Checked the QDP Hydro Vent hydrophobic filter. 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
- Humidex/Wind Chill:
 - Model: BlackGlobe
 - This sensor is not field serviceable nor can it be field calibrated

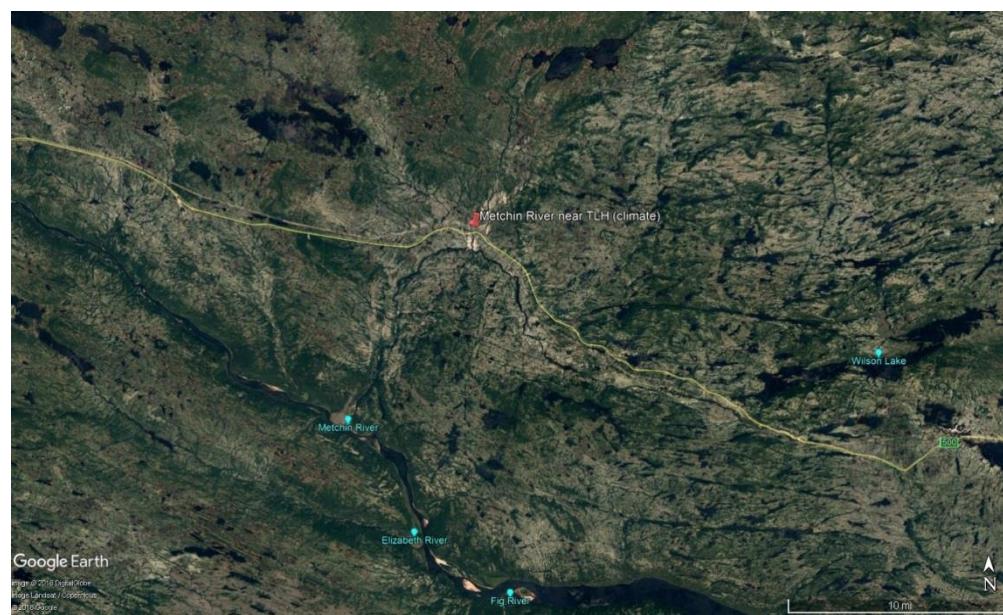
Follow-up tasks required:

- Regular scheduled maintenance
- Fix programming issues (baro pressure and air temp sensors)

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: Snow monitoring involves determining the extent of snow cover (SE) and its snow water equivalent (SWE). SWE is a measurement of both the depth of snow and its density. It represents the depth of water that would result if the entire snow cover melted at once. WRMD provides flood forecasting services, in which snow monitoring has been integrated, for the Churchill River Basin.
- Date Visited: Oct. 11th 2019
- Location: N 53° 26' 10.12" W 63° 14' 1.38"
- Elevation: 1082 ft



Tasks accomplished:

- Datalogger:
 - Model: CR1000
 - Serial:
 - Replaced desiccant and indicator card
- Anemometer
 - Model: 05103AP-10-L RM Young Alpine Version
 - Serial: 152871
 - Replaced potentiometer, replaced bearings, calibrated sensor
- Temperature/Relative Humidity:
 - Model: CS215-L
 - Serial:
 - 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
 - Updated distance to ground variable to reflect movement of snow depth pads
- Barometric Pressure:
 - Model: CS106
 - Serial:
 - Checked the QDP Hydro Vent hydrophobic filter. This sensor is not field serviceable nor can it be field calibrated.
- Precipitation:
 - Model: TB4-L
 - Serial:
 - Cleared funnel and bucket portion of the unit of debris
- Solar Radiation:
 - Model: Kipp & Zonen SP LITE2 Pyranometer
 - Serial:
 - Cleaned lens
- Compound:
 - Landscaped snow depth pad

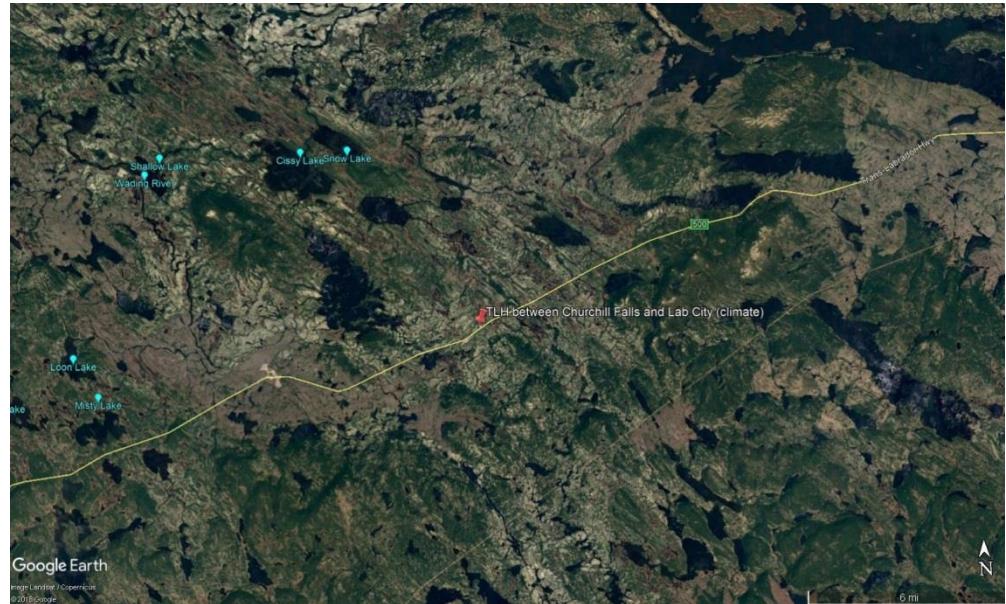
Follow-up tasks required:

- Resolve wind gust programming issue
- Regular scheduled maintenance
- Check battery voltage over the course of the year and see if it needs replacing

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 (T1)
 - Snow Water Equivalent (K)
 - Solar Radiation
 - Sunshine Hours
- Site Selection Rationale: Snow monitoring involves determining the extent of snow cover (SE) and its snow water equivalent (SWE). SWE is a measurement of both the depth of snow and its density. It represents the depth of water that would result if the entire snow cover melted at once. WRMD provides flood forecasting services, in which snow monitoring has been integrated, for the Churchill River Basin.
- Date Visited: Oct. 10th 2019
- Location: N 53° 21' 35.23" W 65° 33' 41.27"
- Elevation: 1781 ft



Tasks accomplished:

- Datalogger:
 - Model: CR1000
 - Serial:
 - Replaced desiccant and indicator card
- Anemometer
 - Model: 05103AP-10-L RM Young Alpine Version
 - Serial: 113751
 - Replaced potentiometer, replaced bearings, calibrated sensor
- Temperature/Relative Humidity:
 - Model: CS215-L
 - Serial:
 - Replaced old CS215 chip with new already calibrated chip
- Snow Depth Sensor:
 - Model: Sonic Ranger SR50A
 - Serial:
 - Replaced transducer due to pitting and peeling
 - Updated distance to ground variable to reflect movement of snow depth pads
- Barometric Pressure:
 - Model: CS106
 - Serial:
 - Checked the QDP Hydro Vent hydrophobic filter. This sensor is not field serviceable nor can it be field calibrated.
- Precipitation:
 - Model: TB4-L
 - Serial:
 - Cleared funnel and bucket portion of the unit of debris
- Solar Radiation:
 - Model: Kipp & Zonen SP LITE2 Pyranometer
 - Serial:
 - Cleaned lens
- Communication:
 - Model: FTS EON2 CS2 Goes Antenna
 - Serial:
 - Replaced old Yagi directional antenna with new omnidirectional FTS antenna
- Compound:
 - Landscaped snow depth pad

Follow-up tasks required:

- Resolve wind gust programming issue
- Regular scheduled maintenance
- Check battery voltage over the course of the year and see if it needs replacing
- Still experiencing drop out of transmissions during winter months – need to aim antenna

Waterford River at Kilbride

Station Details:

- Station Identification: NF02ZM0009
- Station Installed: July 21st 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: Summer 2019
- Location: N 47° 31' 44.44" W 52° 44' 41.04"
- Elevation: 108 ft

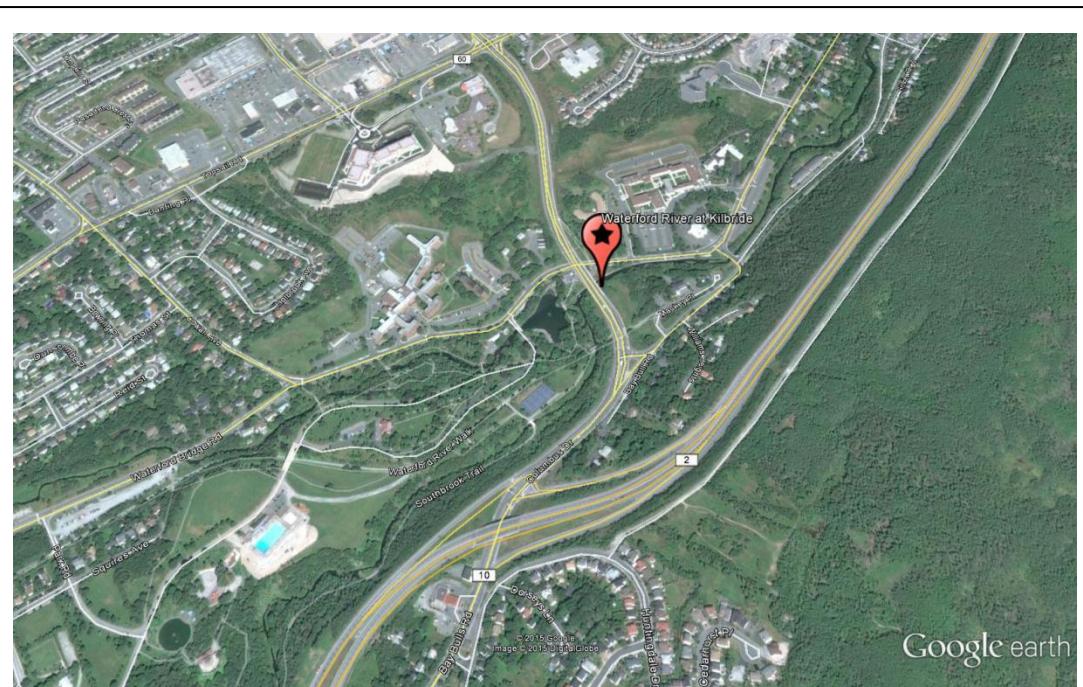


Figure 10: Waterford River at Kilbride Camera Station Location

Tasks accomplished:

- Datalogger:
 - Model: CR800
 - Replaced desiccant and indicator card
 - Power cycled station
- Camera:
 - Cleaned lens inside and out

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: July 22nd, 2019
- Location: N 48°56'25.86" W 55°58'42.98"
- Elevation: 330 ft

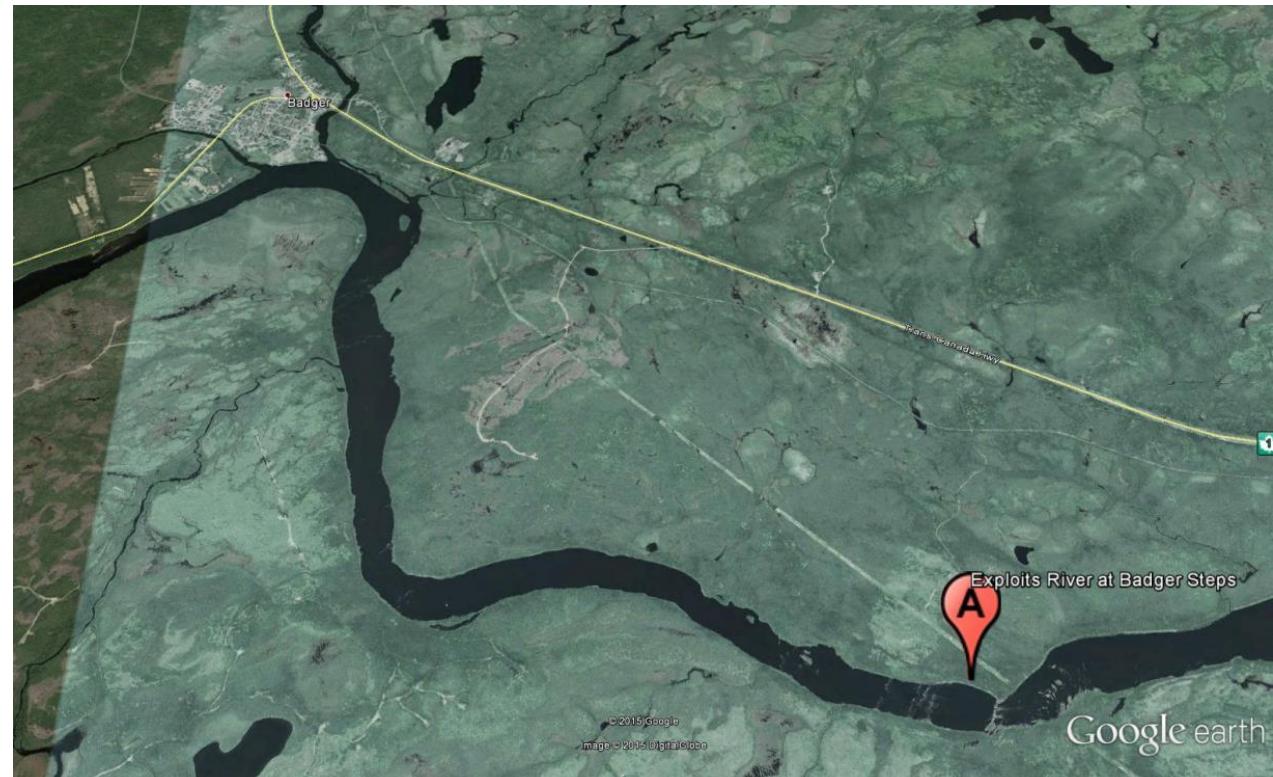


Figure 11: Exploits River at Badger Steps Camera Station Location

Tasks accomplished:

- Datalogger:
 - Model: CR1000
 - Replaced desiccant
- Camera:
 - Model: CC640
 - Replaced desiccant, cleaned lens and window of enclosure
 - Refocus camera
- Site:
 - Cleared fallen trees out of road

Follow-up tasks required:

- Regular scheduled maintenance
- New camera to be installed

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 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 24th 2019
- Location: N 48° 57' 11.59" W 57° 49' 40.02"
- Elevation: 24 ft

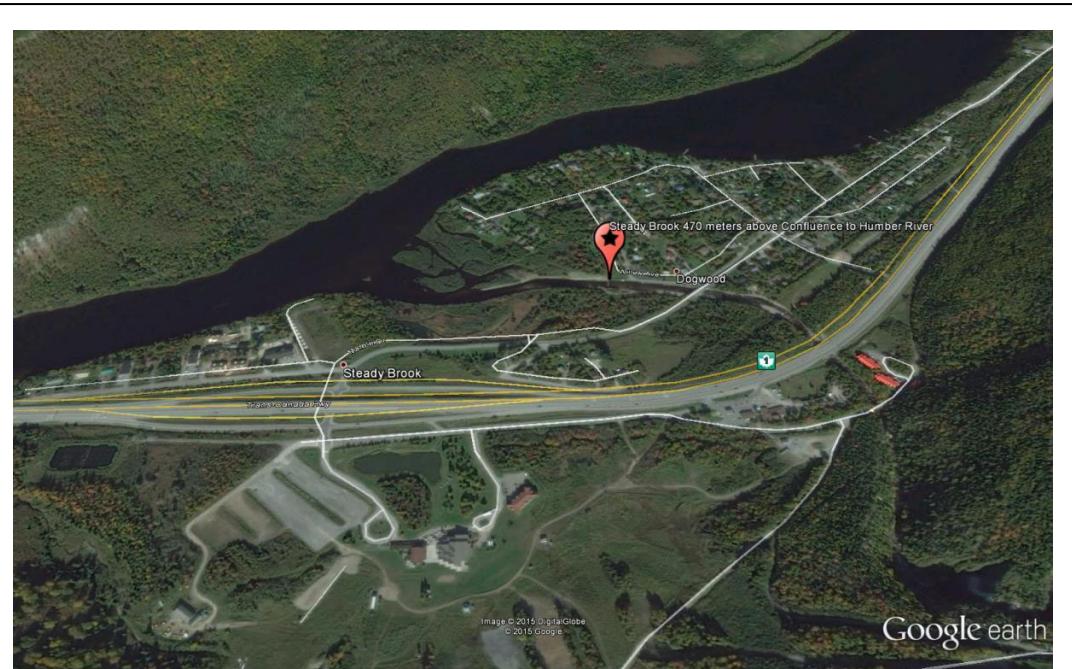


Figure 12: Steady Brook 470 meters above Confluence to Humber River Camera Station Location

Tasks accomplished:

- Datalogger:
 - Model: CR800
 - Replaced desiccant
- Camera:
 - Model: CC5MPX
 - Serial: 1862
 - Cleaned lens

Follow-up tasks required:

- Regular scheduled maintenance

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: Oct. 8th & Oct. 11th 2019
- Location: N 53°20'5.24" W 60°11'18.18"
- Elevation: 4 ft

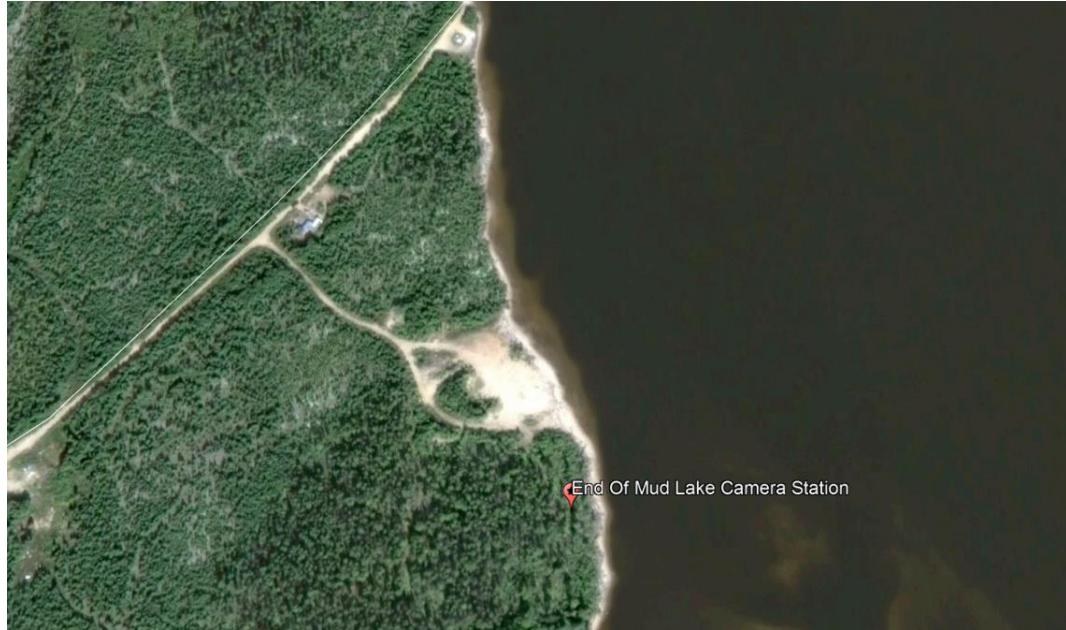


Figure 13: Churchill River at end of Mud Lake Road Camera Station Location

Tasks accomplished:

- Datalogger:
 - Model: CR800
 - Replaced desiccant
- Camera:
 - Model: CCFC
 - Serial:

Follow-up tasks required:

- Regular scheduled maintenance
- Resolve camera communication issues

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 2019
- Location: N 53°17'28.20" W 60°13'16.49"
- Elevation: 4 ft



Figure 14: 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: Oct. 7th-8th, 2019
- Location: N 53°23'35.07" W 60°25'12.05"
- Elevation: 4 ft



Figure 15: Mud Lake at Mud Lake Camera Station Location

Tasks accomplished:

- Datalogger:
 - Model: CR800
 - Replaced desiccant
 - Remounted
- Camera:
 - Model: CCFC
 - Serial:
 - Remounted
- Radar Level Sensor:
 - Remounted
 - Survey the elevation of RLS

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 for use in flood forecasting models.
- Date Visited: Site not visited in 2019
- Location: N 53°18'14.10" W 60°10'2.37"
- Elevation: 4 ft

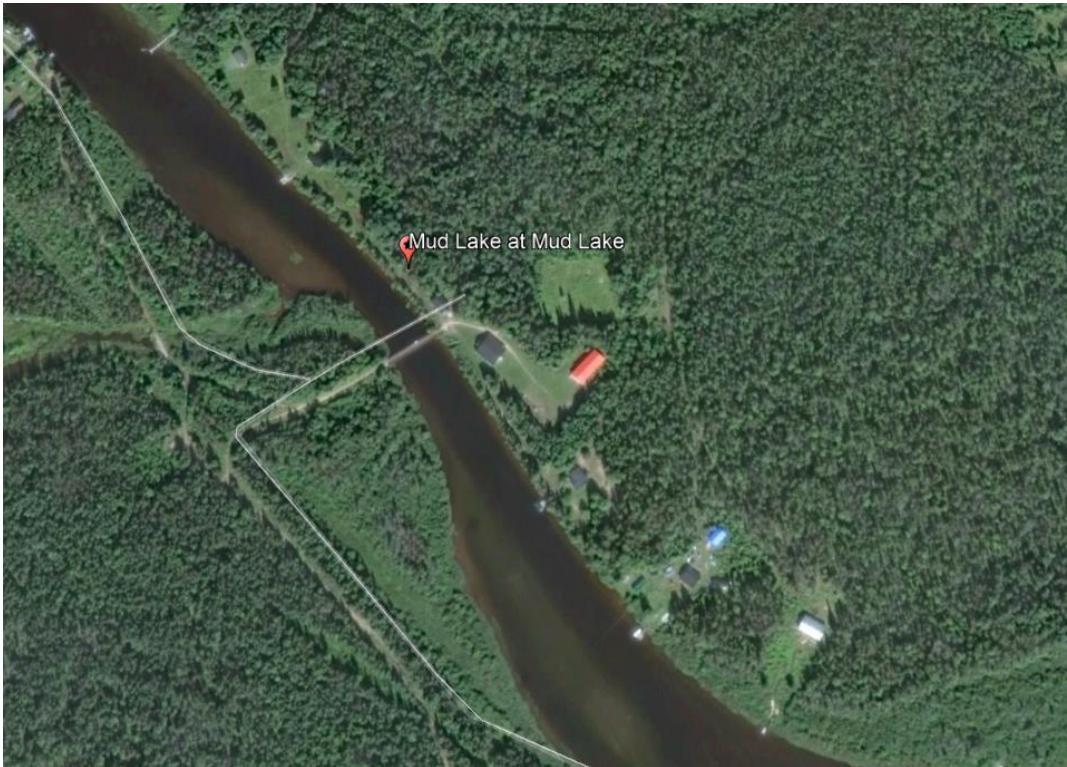


Figure 16: Mud Lake at Mud Lake Camera Station Location

Tasks accomplished:

- Site not visited

Follow-up tasks required:

- Regular scheduled maintenance
- Find better mode of image acquisition – NuPoint Iridium Camera?

Churchill Falls above Grizzle Rapids

Station Details:

- Station Identification: NLENHM0003
- Station Installed: July 3rd 2019
- Image taken and transmitted once a day at 12:00 PM NST
- Site Selection Rationale: Selected with consultation from Environment Canada for use in flood forecasting models.
- Date Visited: July 3rd, 2019 by Maria Murphy and Brenda Congram
- Location: N 52°58'12.22" W 61°26'43.48"
- Elevation: 205 ft



Figure 17: Churchill River above Grizzle Rapids Camera Station Location

Tasks accomplished:

- Camera:
 - Installed NuPoint camera system
- Site:
 - Trees in front of camera landscaped for better view of river

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 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: Sept 10, 2019
- Location: N 49° 0'29.50" W 55°29'23.80"
- Elevation: 118 ft



Figure 18: Exploits River at Bishop's Falls Trestle Hydrometric Station Location

Tasks accomplished:

- Station installed Sept. 10th 2019

Follow-up tasks required:

- Regular scheduled maintenance

Nicholsville at 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: Sept 11, 2019
- Location: N 49°11'18.98" W 57°26'52.32"
- Elevation: 101 ft

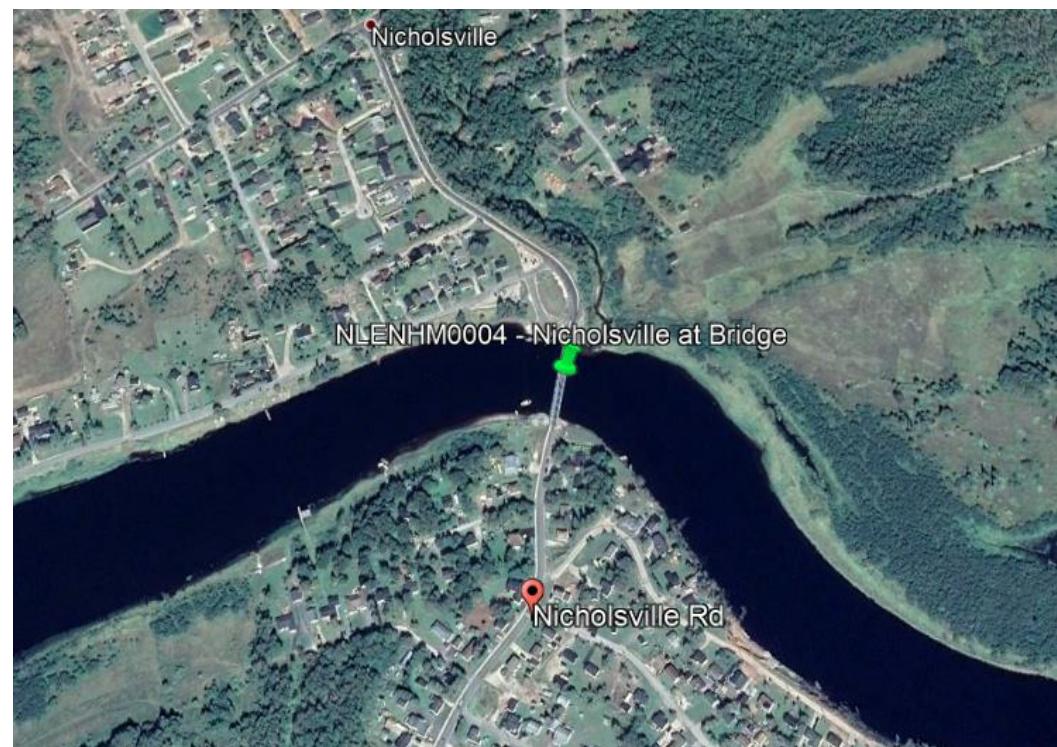


Figure 19: Humber River at Nicholsville Bridge Hydrometric Station Location

Tasks accomplished:

- Station installed Sept. 11th 2019

Follow-up tasks required:

- Regular scheduled maintenance

The next scheduled annual maintenance trip will be completed by October 2020.