

**Deployment of environmental instrumentation in Greiner Lake watershed,
Cambridge Bay, Victoria Island
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Annual Report for 2017

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Because of logistic and organizational reasons, from the plans presented in last year's annual report, only the moving of the Université de Sherbrooke weather station from its prior location on the Waterlake Road outside Cambridge Bay, to the new location on the northern shore of Fourth Lake in the CHARS ERA, could be accomplished in 2017.

None of the scientific field instruments deployed in 2016 were functional in 2017 anymore. The cables of the weather station and the upland eddy covariance tower, damaged by arctic foxes, could not be replaced in 2017. The ADAPT permafrost station was not functional, due to a faulty battery. The deployment of the wetland eddy covariance tower was not continued in 2017. The sensors of the two river gauging stations were not deployed anymore, and the stations were not brought online in 2017. Similarly, the deployment of the automated soil gas flux chamber system was not attempted (Figure 1).

Université de Sherbrooke weather station

After sustaining cable damage from arctic foxes, and stopping remote transmission, in April 2017 the weather station has been disassembled and placed in storage. On May 20, 2017, a field team led by Alexandre Langlois and Daniel Kramer transported the weather station on the northern shore of Fourth Lake, and installed it at 69.176417°, -104.378694° (Figure 2).

To avoid further cable damage from arctic foxes, metallic armour has been placed around the cables closer to the ground (Figure 3). The metallic armour has been sealed on both ends with duct seal, but additional drainage holes have been drilled in the metallic conduit.

In order for Campbell Scientific to be able to remotely access the station for data download and maintenance, the logger software has been updated on the weather station. The two solar panels powering the weather station have been oriented to SW, and SE respectively.

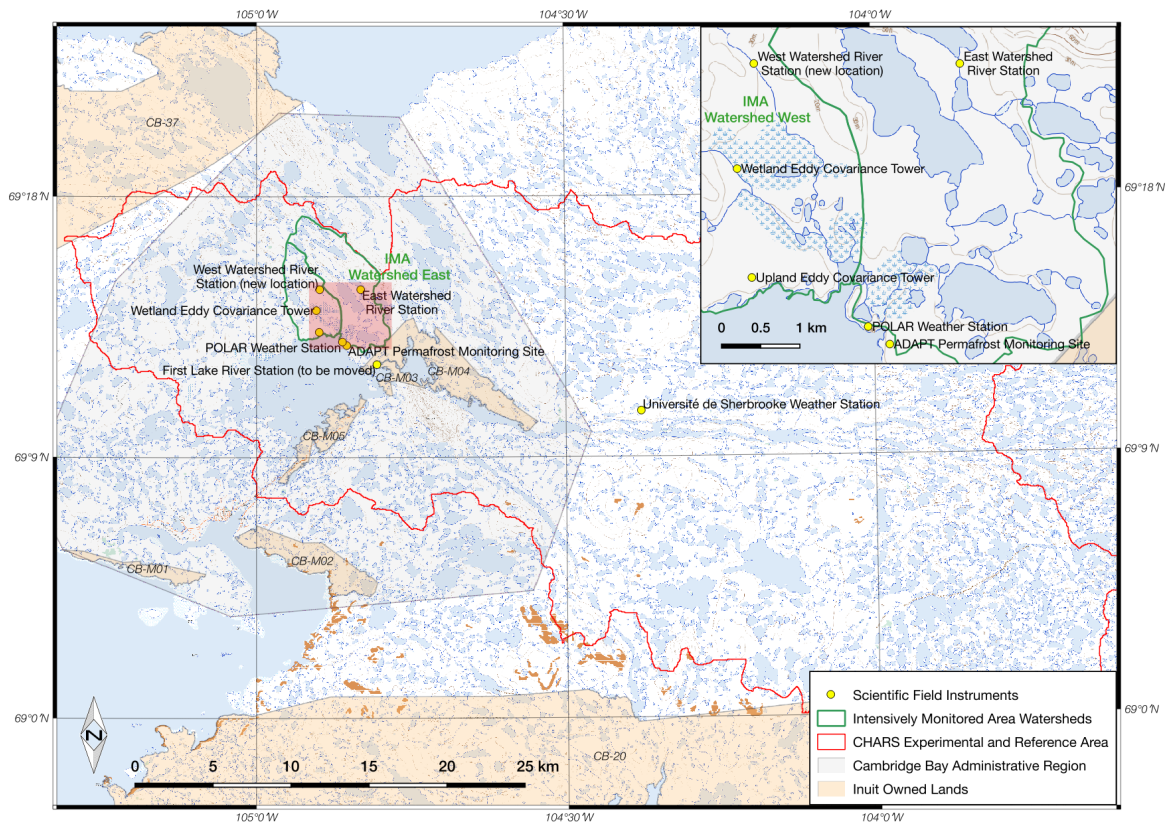


Figure 1. Scientific Field Instruments in the CHARS ERA and IMA



Figure 2. Université de Sherbrooke weather station on the northern shore of Fourth Lake



Figure 3. Soil temperature sensor cable, protected by metallic armour and rocks from arctic fox damage

The following sensors have been installed on the weather station:

- R.M. Young Wind Monitor, for measuring wind speed and direction
- CNR4 Net Radiometer, for measuring radiation
- HC2-S3-L temperature and humidity sensor
- SI-111 Infrared Radiometer
- SR50A Sonic Ranging Sensor, for measuring snow depth
- Two thermocouples, for measuring soil temperature

Plans for 2018

The following installation and maintenance activities are proposed for the field season 2018:

- Replacement of the damaged sensor and power cables, the armouring of all cables of the POLAR weather station, as well as bringing the station online. This maintenance work will be performed as soon as the replacement cables will be received, in April. Later in the season, in July or August, a Campbell Scientific representative will arrive in Cambridge Bay, performing maintenance and calibration work on the sensors of the weather station.
- Redeployment of sensor of the east watershed station, and bringing this station online shortly after ice melt. The sensor cables will have been armoured by Campbell Scientific, in order to avoid the severe cable damage that occurred at other instrument systems in the IMA.
- Moving the First Lake river gauging station from its present location to the new site proposed in 2017, in the west watershed (69.203492, -104.805418), along a small stream similar the one in the east watershed (Figure 1). This work will be performed as early as possible after ice melt. The cables of this river gauging station too will be replaced with armoured ones.
- Assessment of the damage, replacement, and armouring of the cables of the upland eddy covariance tower. If feasible in time for 2018's field season, after installation of the new Smartflux board processor, which will make the sonic anemometer compatible with the logger and the rest of the instruments, this eddy covariance tower will be made fully functional.
- Continuation of the installation of the wetland eddy covariance tower after protecting all its cables by metallic armour, in order to avoid the extensive damage that occurred at the upland eddy covariance tower. Making this eddy covariance tower fully functional.
- Repairing the damage of the ADAPT permafrost monitoring station, and continuing operating it.
- Installation and operation of the automated soil CO₂ chamber system in the IMA.