

8 December 2023

Mosha Cote
Research Liaison
Nunavut Research Institute
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RE: Scientific Research License # 03 009 23R-M

Dear Mr. Cote,

Please accept this 2023 Annual Summary Report for the Nunavut Research Institute scientific research license # 03 009 23R-M. There are no changes to the study area, or research methods associated with this research license. I would like to request renewal of this license so that we can continue to collect multi-year permafrost data as described in NPC File No.: 148271, 149952, and NIRB File No.: 16YN040.

Tentative 2024 schedule:

1) April–October 2024: 3 personnel (Greg Oldenborger, A.-M. LeBlanc, B. Faucher) from the Geological Survey of Canada, Ottawa for approximately 10–20 days for data collection and instrument maintenance in the Rankin Inlet area.

Best Regards,
Greg Oldenborger
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Nunavut Scientific Research License # 03 009 23R-M: 2023 Annual Summary

The Kivalliq region of Nunavut is undergoing significant infrastructure development associated with natural resources, transportation, energy, and community infrastructure. Information on permafrost is required to ensure resilience to a warming climate. Measurements of ground temperature and observations of ground ice conditions are critical for permafrost characterization, but are sparse in the Kivalliq region of Nunavut.

In the summer of 2016, the Geological Survey of Canada and the Canada-Nunavut Geoscience Office initiated a multi-year research study on permafrost for the western coast of Hudson Bay with focus on the Rankin Inlet area. Research has involved: 1) landscape observations and examination of surficial geological materials, 2) installation of permanent boreholes to record long-term permafrost temperatures in the Hamlet of Rankin Inlet for developed and undeveloped land use, 3) installation of several shallow permafrost monitoring stations, 4) collection of permafrost cores and geophysical data to detect ground ice, 5) observations and measurements of water level changes, and 6) collection of satellite remote sensing data to monitor ground subsidence associated with thawing.

Fieldwork in 2023 consisted of a visit to Rankin Inlet from April 21–29 by a team of three scientists for data collection, instrument maintenance, and repairs at existing sites. With the assistance of the Kangiqliniq Hunters and Trappers Organization and a local guide, new geophysical surveys were conducted over several lakes. The geophysical data collected were measurements of electrical conductivity of the ground acquired using a series of temporary wire loop transmitters laid out on the ice surface. The data are currently being analyzed to better understand permafrost and groundwater conditions below and between lakes. This new information will be incorporated in the development of the regional ground ice map and summary of the permafrost knowledge for the Kivalliq region. Results to date include: 1) measured increases in both ground temperature and seasonal thaw depth over the last 50 years, 2) observed changes to lake shorelines and drainage quantified and linked to thawing permafrost, 3) mapping of seasonal ground subsidence, and 4) identification and characterization of thaw sensitive ground. Additional details can be found in the project publications provided as a separate list.