

24 December 2020

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RE: Scientific Research License # 03 04 20R-M

Dear Mr. Cote,

Please accept this application for renewal of scientific research license # 03 04 20R-M for the year 2021. I have attached an Annual Summary Report for 2020 that details research activities and findings in English and Inuktitut.

As this is an ongoing project, there are no anticipated substantive changes to the objectives, study locations, or research methods. However, given the global pandemic, research plans for 2021 are on hold. Nevertheless, I would like to request license renewal in the event that work in Nunavut becomes possible in 2021, and to ensure continuity to 2022. Any work would be conducted in strict accordance with public health guidelines and directives issued by Nunavut, the Federal Government, and any applicable local authorities. Possible activities are as follows:

- 1) TBD 2021: 1 personnel from the Canada-Nunavut Geoscience Office, Iqaluit for 1–2 days for retrieval and replacement of data loggers at established sites in the region of Rankin Inlet.
- 2) TBD 2021: 2 personnel from the Geological Survey of Canada, Ottawa for 5–10 days for data collection/observation and instrument maintenance at established sites in the region of Rankin Inlet. Methods and study locations are as described in the original research proposal.

Best Regards,

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Nunavut Scientific Research License # 03 04 20R-M: 2020 Annual Summary

The Kivalliq region of Nunavut is undergoing significant infrastructure development associated with natural resources and community sustainability. Information on permafrost is required to ensure resilience in the face of climate change. 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 started a multi-year research study on permafrost for the western coast of Hudson Bay. Fieldwork has involved: 1) landscape observations and examination of surficial geological materials, 2) installation of two permanent boreholes to record long-term permafrost temperatures in the Hamlet of Rankin Inlet for developed and undeveloped land, 3) installation of several permafrost monitoring stations in the vicinity of Rankin Inlet, 4) collection of permafrost cores and geophysical data to detect ground ice, 5) observations and measurements of lake and water level changes, and 6) collection of satellite remote sensing data to monitor ground subsidence associated with thawing.

For 2020, all fieldwork was cancelled due to the global pandemic. Through contacts in Rankin Inlet and the Arctic College Environment and Technology Program, a previous summer student conducted limited site visits to check on the general state of equipment, and to make observations of the surrounding landscape conditions. Minor site maintenance was performed, but no instrument maintenance or data retrieval was possible. Our sites are equipped with automated data loggers, so data collection should continue uninterrupted (in the absence of disturbance or malfunction).

Given existing data from previous years, a report was prepared to compare modern day ground temperatures (since the start of the project) to historical records. Current ground temperatures and the thickness of the ground surface that thaws seasonally have both increased compared to measurements from 1974–76. Studies were also conducted to integrate satellite observations of ground subsidence with other permafrost data to construct land cover maps and permafrost terrain maps that indicate potential for permafrost degradation.

More detailed reports are publicly available as part of the 2020 Summary of Activities of the Canada-Nunavut Geoscience Office: <http://cngo.ca/summary-of-activities/>