

# Scientific Research License Application

## Physical / Natural Sciences Research

### 3.1. Plain Language Project Description

#### Project Title

Permafrost and landscape change in southern Victoria Island, Nunavut.

#### Primary Applicant's Name and Affiliation

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#### Background and objectives

This project focuses on studying and tracking changes to permafrost in the Cambridge Bay area and southern Victoria Island. Over time, it has expanded to include other environmental variables, helping us better understand how changes in permafrost and surrounding ecosystems interact and impact the environment. The project involves both short-term research and long-term monitoring, collecting data over several years to track changes in permafrost, lakes, and coastal environments. This long-term dataset will help us understand how permafrost, lakes and coasts are, ultimately helping local communities and the territory to adapt to these interconnected environmental changes. The main objectives of the project are:

- Studying permafrost conditions, such as temperature and ice content.
- Monitoring changes in the landscape, especially along coastlines.
- Examining how permafrost thaw affects nearby lakes and rivers, including water quality.
- Looking at the long-term lake development.
- Investigating the release of carbon from thawing coastal permafrost and its effects on the environment.
- Using DNA techniques to study changes in soil microbes.

#### Justification for the study

As the Arctic continues to change, this project will track shifts in permafrost conditions and landscape evolution, while examining how these changes affects nearby lakes and coastal waters. By working closely with local communities, the research will build a long-term dataset to identify trends and help communities make informed decisions. The findings will contribute to broader efforts to address climate change, support community adaptation, and guide decisions on environmental management and land use at both the territorial and national levels. This research will also provide important insights for long-term planning as the Arctic environment evolves.

### Field Research Schedule

Field research in Cambridge Bay will take place through several visits over the year. In May, a two-week visit will focus on data collection, setting-up equipment, and meetings with local partners. The main fieldwork will take place over two months in July and August, with smaller research groups working in overlapping periods. In the fall, the team will work with local partners for instrument maintenance and recovery of equipment deployed in the water. A final two-week trip in winter will focus on sharing preliminary findings and discussing future plans.

### Research Methods and Community Involvement

In 2025, field research will focus on monitoring environmental changes in the Cambridge Bay area. The research will involve close collaboration with local partners to collect data on permafrost conditions and soil microbes, landscape changes, groundwater movement and water quality. Key activities include using drones, videos, and photos to track changes over time, such as coastal erosion, landslides and land subsidence, as well as conditions in sea ice and coastal waters. Soil and water samples will be collected to study permafrost, changes in microbes as permafrost thaws, groundwater, and the water quality in lakes and rivers. Non-invasive methods will help map features beneath the surface, and sensors will be deployed in the water to monitor water levels, waves, tides, and currents to better understand the factors driving coastal changes around Dease Strait. These instruments will be placed offshore and on the seafloor, with guidance from local partners, and will be recovered in the fall before the ice freezes.

### Sharing Research Results

Research findings will be shared through community presentations, meetings, and workshops with local groups, including the Hunters and Trappers Organization (HTO) and the Hamlet council, during research visits. Meetings with Government of Nunavut departments, such as the Climate Change Secretariat and Community & Government Services, will ensure the findings are used to inform policy and decision-making. Outreach materials, including, comics, infographics, and videos, will help make the results accessible to a broader audience. Preliminary findings will be shared during field visits, with annual updates provided through meetings and online platforms. Data will be made publicly available through online databases or upon request.