

## Project Overview

Type of application: **New**

Proponent name:	Comte Jérôme
Company:	INRS

### Schedule:

Start Date:	2020-09-01
End Date:	2023-03-31
Operation Type:	Annual

### Project Description:

Global warming is causing large-scale transformations in the Arctic, including rapid reduction in the extent of permafrost, which can threaten drinking water supplies. Increasing transfers of dissolved organic matter (DOM) from permafrost to surface waters results in the 'browning' of water, which can indirectly contribute to the prevalence of cyanobacteria, changes in the nutritional quality of aquatic food resources, and toxin production. Furthermore, contaminants and pathogens trapped in thawing soils are now released to water sources. To insure drinking water safety, chlorine is typically used to inactivate pathogens. However, the practice of chlorinating water has both biomedical and belief-based problems; it can generate unwanted disinfection by-products (DBPs) when DOM is elevated in water, and northern communities have differing understandings of how to ensure purity of water. This transdisciplinary project aims to investigate and measure emerging risks from compounds and microorganisms released from permafrost thawing using a community-based participatory water quality sampling program. This project represents a unique capacity-building opportunity allowing the implementation of a water quality monitoring program that will be executed by Northerners and serve as a direct conduit for knowledge dissemination. Specifically, the project aims (1) engage and work with local communities to undertake a drinking water quality monitoring program; (2) characterize the link between DOM properties and DBP formation and the microbial communities in sources of drinking water for indigenous communities, and (3) investigate the fate of microbial communities and chemical contaminants across water purification procedures, delivery and storage. Aquatic ecosystems used by the communities of Pond Inlet and Resolute Bay as drinking water supplies will be sampled. Communities will be invited to participate in sampling and to inform where we survey and blend both ecological and traditional knowledge on water and climate change. Site visits will include measuring basic limnological properties (e.g. temperature, oxygen, pH) of drinking water sources, along with sampling for the measurement of DOM properties, microbial communities and chemical properties (DBPs, cyanotoxins, chlorine demand, contaminants). Water samples will also be collected at other natural sources of high traditional values, as well as at water treatment facilities (after chlorination), in holding tanks and at the tap. This project addresses one of the most important issues for northern communities: access to safe drinking water. This research will help characterize the environmental conditions that may lead to water quality issues, to better predict future changes in drinking water quality in a warming climate. Previous studies have mainly investigated fecal pollution of water by humans or animals in drinking water sources or in household cisterns. This project expands the scope of water quality to also consider Indigenous sciences, knowledge, lived experience, practices and policy preferences. This project will ensure Indigenous access, ownership, and control over data and information that will strengthen their autonomy in the monitoring of water quality. We foresee that the water quality metrics generated through this project will serve to develop new guidelines for water treatment strategies, implement northern community science initiatives, and inform on the accessibility to potable drinking water in the North.

### Personnel:

Persons:	3
Days:	14

## Project Map

### List of all project geometries:

ID	Geometry	Location Name
6362	point	Pond Inlet
6363	point	Resolute Bay
6365	point	Cambridge Bay

### Planning Regions:

Qikiqtani

Kivalliq

**Affected Areas and Land Types**

Municipal

Settlement Area

North Baffin Planning Region

**Project Land Use and Authorizations**

**Project Land Use**

Scientific Research

**Licensing Agencies**

NWB: Approval to Use Water/Deposit Water Without a Licence

NRI: Scientific Research Licence

**Other Licensing Requirements**

No data found.

**Material Use**

**Equipment**

Type	Quantity	Size	Use
No records found.			

**Fuel Use**

Type	Container(s)	Capacity	UOM	Use
No records found.				

**Hazardous Material and Chemical Use**

Type	Container(s)	Capacity	UOM	Use
No records found.				

**Water Consumption**

Daily Amount (m <sup>3</sup> )	Retrieval Method	Retrieval Location
0.035	Fill containers from municipal facilities	drinking water sources

**Waste and Impacts**

**Environmental Impacts**

There is no associated environmental impact with the proposed research. Similarly, the research will generate minimal waste (tubes, pipette tips) that will be brought back to Quebec.

**Waste Management**

Waste Type	Quantity Generated	Treatment Method	Disposal Method
No data found.			