



## **NIRB Application for Screening #125803**

### **Lake sediment geochemistry survey**

**Application Type:** New

**Project Type:** Scientific Research

**Application Date:** 4/20/2023 2:00:45 PM

**Period of operation:** from 0001-01-01 to 0001-01-01

**Proposed Authorization:** from 0001-01-01 to 0001-01-01

**Project Proponent:** Stephen Day  
Geological Survey of Canada (NRCan)  
601 Booth St  
Ottawa Ontario K1A 0E8  
Canada  
Phone Number:: 343-549-6255, Fax Number::



## Activities

Location	Activity Type	Land Status	Site history	Site archaeological or paleontological value	Proximity to the nearest communities and any protected areas
Freshwater lakes west of Chesterfield and Rankin Inlets (NTS 55J, K, 55N, 55O)	Scientific/International Polar Year Research	Inuit Owned Surface Lands	No lake sediment and water surveys have been carried out within the boundaries of the survey area by the Geological Survey of Canada. A lake sediment and water survey was carried out by the Geological Survey of Canada on adjoining map NTS map sheets 55M and 65O in 1976, south of Baker Lake.	The helicopter will only land on lakes, at airports and at two cache locations. Archeological sites will be avoided.	The Hamlets of Chesterfield Inlet and Rankin Inlet are located proximal to the survey area. Iqalugaarjuup Nunanga Territorial Park falls within the boundaries of the survey area but only two samples at the edge of the park are proposed.

## Community Involvement & Regional Benefits

Community	Name	Organization	Date Contacted
Cambridge Bay	Mr. Jorgan Aitaok	Nunavut Tunngavik Incorporated	2023-02-10
Rankin Inlet	Mr. Luis Manzo	Kivalliq Inuit Association	2023-02-10
Rankin Inlet	Mr. Andre Aokaut	Kangiqliniq Hunters & Trappers Organization	2023-02-10
Rankin Inlet	Mayor Harry Towtongie	Hamlet of Rankin Inlet	2023-02-10
Arviat	Ms. Nicole Issakiark	Arviat Hunters and Trappers Organization	2023-02-10
Arviat	Mr. Joe Savikataaq	Hamlet of Arviat	2023-02-10
Arviat	Mr. Steve England	Hamlet of Arviat	2023-02-10
Chesterfield Inlet	Mr. Tony Amauyak	Hamlet of Chesterfield Inlet	2023-02-10
Chesterfield Inlet	Mr. John Ivey	Hamlet of Chesterfield Inlet	2023-02-10
Chesterfield Inlet	Mr. Harry Aggark	Aqigiq Hunters and Trappers Organization	2023-02-10
Chesterfield Inlet	Ms. Janice Aggark	Aqigiq Hunters and Trappers Organization	2023-03-01
Baker Lake	Mr. Richard Awksawnee	Hamlet of Baker Lake	2023-02-10
Baker Lake	Mr. Sheldon Dory	Hamlet of Baker Lake	2023-02-10
Baker Lake	Mr. Brian Pudnak	Baker Lake Hunters and Trappers Organization	2023-02-10



# Authorizations

Indicate the areas in which the project is located:

Kivalliq

## Authorizations

Regulatory Authority	Authorization Description	Current Status	Date Issued / Applied	Expiry Date
Nunavut Research Institute	Scientific research license application; Physical/Natural Science Research	Applied, Decision Pending		
Kivalliq Inuit Association	Application to Access Inuit Owned land and Water Use	Not Yet Applied		
Indigenous and Northern Affairs Canada	CIRNAC Land Use Application	Not Yet Applied		
Nunavut Water Board	Authorization to Water without a License	Not Yet Applied		

## Project transportation types

Transportation Type	Proposed Use	Length of Use
Air	Helicopter	

## Project accomodation types

Community

# Material Use

Equipment to be used (including drills, pumps, aircraft, vehicles, etc)

Equipment Type	Quantity	Size - Dimensions	Proposed Use
Bell Long Ranger 206-L4	1	Length 39 ft 8 in	Equipped with floats for landing on water to collect samples of lake mud and water. Sampling crew will fly from lake to lake within survey area along pre-planned traverses that will loop from the community to the farthest point in the survey area and back.

## Detail Fuel and Hazardous Material Use

Detail fuel material use:	Fuel Type	Number of containers	Container Capacity	Total Amount	Units	Proposed Use
Aviation fuel	fuel	136	205	27880	Liters	96 drums of fuel for LR206-L4 based in Rankin Inlet. 40 drums of Jet-A for LR206-L4 based in Chesterfield Inlet. 18-sealed drum cache located approximately 80 nautical miles NNW of Rankin Inlet to enhance flexibility, ensure safety

## Water Consumption

Daily amount (m3)	Proposed water retrieval methods	Proposed water retrieval location
0	Tap	Hotel

# Waste

## Waste Management

Project Activity	Type of Waste	Projected Amount Generated	Method of Disposal	Additional treatment procedures
Waste disposal	Sewage (human waste)	225 kg	Municipal waste treatment	None

### Environmental Impacts:

The predicted environmental effects of this undertaking are mainly related to the noise made by the helicopter. Noise can affect both human health and wildlife, but the effects on both will be mitigated by avoiding residential areas of the communities, parks, and sensitive areas where wildlife might be affected. These areas will be identified prior to the commencement of operations and will be based on consultations with local sources of knowledge. The flight path of the helicopter can be adjusted at any time to mitigate human health risks and wildlife disturbance from noise. Flights to and from the airport at Rankin Inlet or Chesterfield Inlet will not commence before 8 a.m. and will cease by 7 pm at the latest.

# **Additional Information**

**SECTION A1: Project Info**

**SECTION A2: Allweather Road**

**SECTION A3: Winter Road**

**SECTION B1: Project Info**

**SECTION B2: Exploration Activity**

**SECTION B3: Geosciences**

**SECTION B4: Drilling**

**SECTION B5: Stripping**

**SECTION B6: Underground Activity**

**SECTION B7: Waste Rock**

**SECTION B8: Stockpiles**

**SECTION B9: Mine Development**

**SECTION B10: Geology**

**SECTION B11: Mine**

**SECTION B12: Mill**

**SECTION C1: Pits**

**SECTION D1: Facility**

**SECTION D2: Facility Construction**

**SECTION D3: Facility Operation**

**SECTION D4: Vessel Use**

**SECTION E1: Offshore Survey**

**SECTION E2: Nearshore Survey**

**SECTION E3: Vessel Use**

## **SECTION F1: Site Cleanup**

## **SECTION G1: Well Authorization**

## **SECTION G2: Onland Exploration**

## **SECTION G3: Offshore Exploration**

## **SECTION G4: Rig**

## **SECTION H1: Vessel Use**

## **SECTION H2: Disposal At Sea**

## **SECTION I1: Municipal Development**

### **Description of Existing Environment: Physical Environment**

The proposed area of the lake sediment and water survey is approximately 18,000 km<sup>2</sup>, between 62.5°N and 64°N and 91°W and 94°W. This area falls within the Maguse River Uplands ecoregion covering the uplands south of Chesterfield Inlet and extending as far south as Churchill and includes much of the northwest coast of Hudson Bay. The mean annual precipitation ranges 250-400 mm with more than 400 mm occurring south of Arviat. Temperature and precipitation increase to the south of the ecoregion. The region is associated with areas of continuous permafrost with medium ice content and with Turbic Cryosolic soils. Unfrozen Organic (Mesisol) and Regosolic soils also occur in this ecoregion. Crystalline Archean massive rocks form broad, sloping uplands and lowlands. Hummocky bedrock outcrops covered with discontinuous acidic, sandy, granitic tills are dominant. Prominent fluvioglacial ridges (eskers) also occur. Wetlands make up 25-50% of the land area and are characteristically lowland low- and high-centred polygon fens.

### **Description of Existing Environment: Biological Environment**

The Maguse River upland ecoregion is classified as having a low arctic ecoclimate. Coastal climate is moderated by the open waters of Hudson Bay during the late summer and early fall prior to freeze-up when damp foggy weather is common. It is characterized by a cover of shrub tundra vegetation. Dwarf birch, willow, and alder occur on warm, dry sites; poorly drained sites are dominated by willow, sphagnum moss, and sedge. Wildlife includes barren-ground caribou, arctic fox, weasel, arctic ground squirrel, and lemming. Bird species include willow ptarmigan, snowy owl, and rough-legged hawk. Waterfowl, particularly sea ducks, snow geese, swans, Canada geese and shorebirds are common in the coastal areas. White (beluga) whale and seals inhabit coastal waters. The Barren Ground population of caribou is considered a Species at Risk.

### **Description of Existing Environment: Socio-economic Environment**

The Hamlets of Chesterfield Inlet and Rankin Inlet are situated at the eastern edge of the survey area. The Hamlet of Whale Cove is located approximately 50 km south of the survey area. The helicopter used for collecting lake sediment and water samples will be based in either Chesterfield Inlet or Rankin Inlet or both communities. Sample collection will be carried out by a company registered with the Inuit Firms Registry (IFR) and proposals are subject the Inuit Benefit Plan directive. Food and lodging for the sample collection crew, helicopter pilot and Geological Survey of Canada (GSC) employee will be purchased from one or both communities of Chesterfield Inlet and Rankin Inlet. An assistant to the GSC employee will be hired from one or both communities. Local knowledge will be employed to avoid archaeological and culturally significant sites throughout the survey. Palaeontological components of surface and bedrock geology will not be impacted by operations as the helicopter will only be landing on water, airports and one or two fuel cache locations. Effects on subsistence harvesting, tourism, trapping and guiding operations will be minimized by consulting with local authorities in advance of the commencement of survey operations. Daily flight plans will be adjusted as needed. As the survey operations are entirely airborne, local and regional traffic patterns will not be affected. Ongoing consultation with the communities before and during survey operations is designed to avoid negative effects on Human Health, including physical, social, psychological, and spiritual effects.

## **Miscellaneous Project Information**

Emergency Response Plan, Comprehensive Spill Prevention Plan, Wildlife Monitoring and Management Plan (see Project Documents)

## **Identification of Impacts and Proposed Mitigation Measures**

The predicted environmental impacts (physical, biological, socioeconomic) are expected to be minimal. Iqalugaarjuup Nanange Territorial Park is within the survey area, but sampling will take place outside the park boundaries with the possible exception of two sample sites. Noise from the helicopter will be mitigated by avoiding residences and flying 1,000 ft above the land as much as possible, as well as avoiding critical wildlife and bird habitats. Consultation with local sources of knowledge will be an ongoing and daily process throughout the survey in order to avoid critical habitats, including migrating and birthing caribou. Fuel for the helicopter is stored in 205 litre (45 gal.) drums at Rankin Inlet airport and Chesterfield Inlet airport. One or two fuel caches of up to 18 drums will be positioned in strategic locations to ensure safe operations in the event of weather emergency situations or to extend flight distances. The drums will be placed on dry well-drained ground at least 31 m from any watercourse or lake. The CIRNAC engineer will be notified within 30 days of establishing the cache. All fuel caches will be removed during the winter in 2024 at the latest.

## **Cumulative Effects**

Impacts on the physical and biological environments will be localized, of low-magnitude, reversible and fall within the approximately four-week period of the proposed lake sediment and geochemical survey. The cumulative impacts on the physical and biological environments will therefore be minimal. Based on helicopter fuel consumption of 113.6 litres per hour for the approximately 250 hours that the helicopter will fly to collect 1,500 lake sediment and water samples, greenhouse gas emissions will be about 67 metric tons, equivalent to 20 gasoline-powered vehicles driven for one year (Natural Resources Canada Greenhouse Gas Equivalencies Calculator; United States Environmental Protection Agency Greenhouse Gas Equivalencies Calculator).

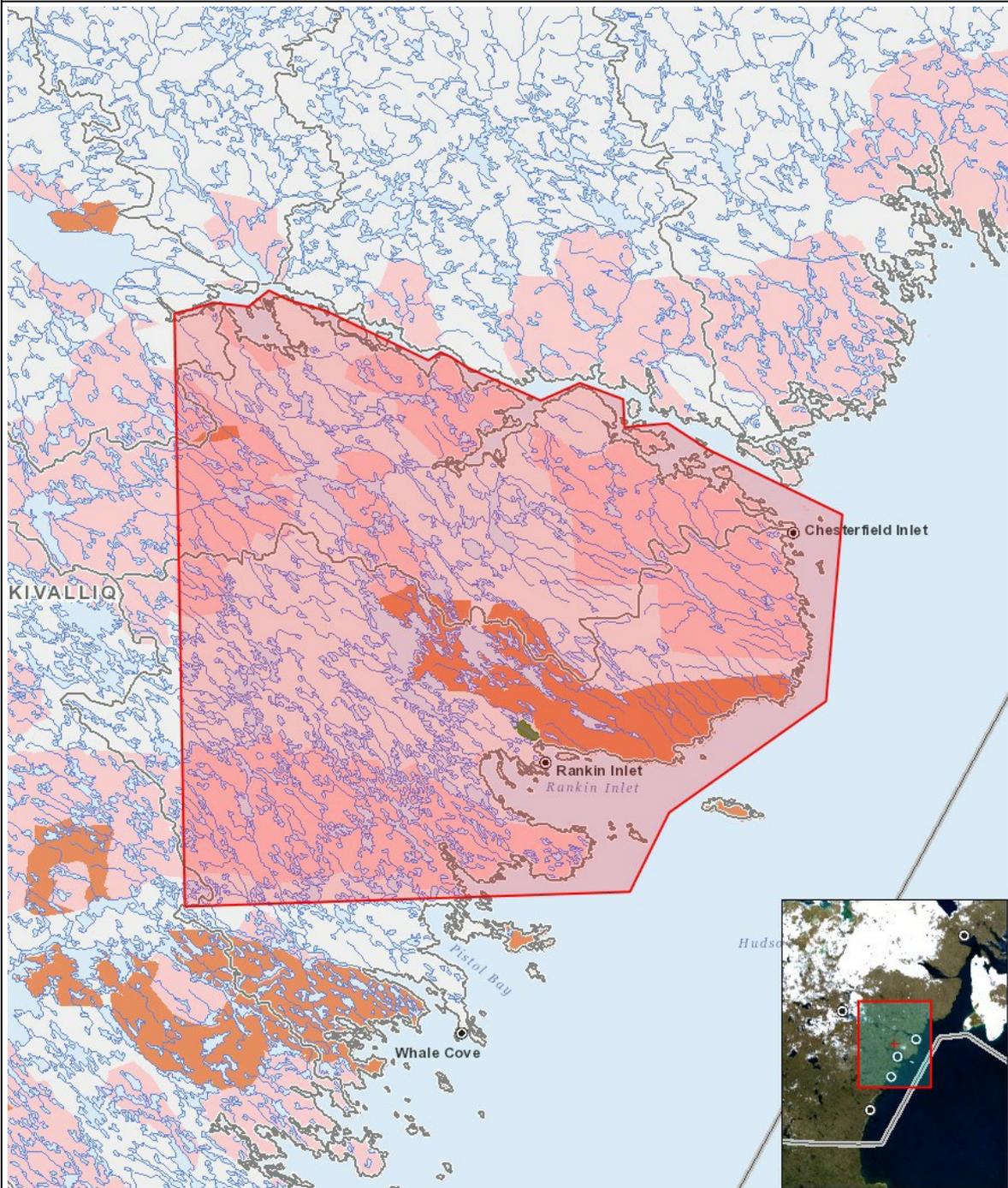
# Impacts

## Identification of Environmental Impacts

	PHYSICAL	Designated environmental areas	Ground stability	Permafrost	Hydrology / Limnology	Water quality	Climate conditions	Eskers and other unique or fragile landscapes	Surface and bedrock geology	Sediment and soil quality	Tidal processes and bathymetry	Air quality	Noise levels	BIOLOGICAL	Vegetation	Wildlife, including habitat and migration patterns	Birds, including habitat and migration patterns	Aquatic species, incl. habitat and migration/spawning	Wildlife protected areas	SOCIO-ECONOMIC	Archaeological and cultural historic sites	Employment	Community wellness	Community infrastructure	Human health
<b>Construction</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<b>Operation</b>																									
Scientific/International Polar Year Research		M	-	-	-	-	-	-	-	-	-	-	-	M	-	M	M	-	M		-	P	-	P	U
<b>Decommissioning</b>																									
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

(P = Positive, N = Negative and non-mitigatable, M = Negative and mitigatable, U = Unknown)

Project Location



List of Project Geometries

- 1 polygon Freshwater lakes west of Chesterfield and Rankin Inlets (NTS 55J, K, 55N, 55O)