

**NIRB Application for Screening #125226**

## Connecting Snow Melt to River Discharge in the Kitikmeot Region and Northwest Territories

<b>Application Type:</b>	New
<b>Project Type:</b>	Scientific Research
<b>Application Date:</b>	12/18/2017 1:33:31 PM
<b>Period of operation:</b>	from 0001-01-01 to 0001-01-01
<b>Proposed Authorization:</b>	from 0001-01-01 to 0001-01-01
<b>Project Proponent:</b>	Kristina Brown 606 - 189 National Ave Vancouver BC V6A 4L8 Canada Phone Number:: 508-514-0486, Fax Number::

## DETAILS

### Non-technical project proposal description

English: An increase in temperatures, increased frequency of extreme weather events, and shifts in the timing of freeze-thaw conditions will directly impact the Arctic hydrological cycle. In particular, changes to the timing of snow accumulation and subsequent melt on land will influence the delivery of freshwater to river systems and, ultimately, to the ocean. This project is motivated by a need to better characterize and quantify the impacts of changing snow conditions on river discharge within the Kitikmeot Region and Northwest Territories in order to better understand freshwater contributions to the ocean under a changing climate. This project composes Aspect 4 (Hydrology) of a multi-disciplinary cryospheric monitoring network project lead by Dr. Alex Langlois, Université de Sherbrooke, entitled “Development of a multi-scale cryosphere monitoring network for the Kitikmeot region and Northwest territories using in-situ measurements, modeling and remote sensing”, funded by Polar Knowledge Canada. There are three main objectives to this study: (1) to investigate the geochemical characteristics of winter snow cover and spring snow melt; (2) use observed geochemical values to determine snow melt contributions to spring flow of the Coppermine River and Freshwater Creek, the major river systems associated with the snow sampling sites; and (3) use model outputs to predict the impact of future changes in snow cover to freshwater export to the marine system. Field sampling for the hydrology study will be carried out in collaboration with community and research partners working within the Coppermine River and Freshwater Creek. Weekly river sampling in the spring (snow and ice cover) will be carried out using snowmobiles and no permanent infrastructure will be erected. Once the snow and ice have cleared from the river, water sampling will continue with the use of small boats (operated by local community partners) or directly from the stream-side. River water samples collected are non-destructive and no restoration plans are required. In conjunction with snow sampling that will be carried out by Dr. Langlois’ team, water samples for the determination of snow melt and river geochemistry will be collected from the Coppermine River starting in March until the end of summer and from Freshwater Creek from ice break up (June) until freeze-up (October). Coppermine River sampling will be conducted in collaboration with the Kugluktuk Hunters and Trappers Organization. Results from this project will be shared with the communities of Kugluktuk and Cambridge Bay, as facilitated through local contacts such as the Kugluktuk HTO, Cambridge Bay HTO, and CHARS. Results from the cryospheric monitoring network study will be communicated through pamphlets and posters, and will contribute to the development of a community based-monitoring program of weather observations. Aspect 4 (Hydrology) of the cryospheric monitoring network project has been discussed with the Kugluktuk HTO, who supplied a letter of support for our initial project proposal.

French: Not required.

[illegible]

Inuinnaqtun: Hila uunnakpalliyumi, hilaupkalliplunilu amirnaqtumik, aallannguqtaqtullu hikiqviat-mahakviallu ihuilutaulaagtut Ukiuqtaqtumi immakvianut. Taimaatut, aallannguqtaqtuq apitpakviat mahakviallu nunami mihingnaqhilaagtut immaqvianut kuukkanut imaalu, kinguani, taryuqmut. Havaaghat hapkua aullaqtitauvaktut ilitturittiarumaplugit qanuq aghuuqpagiaghait mihingnautit aallannguqtaqtumit aput mahagaangat talvunga kuukkat hanguviinut Qitiqmiuni Aviktuqhimayumi Nunattiamilu qauhittiarumaplugit imariktut hanguviit taryumut uquuhivalliyumi. Hapkua havaaghat atuqpaktut taapkuninnga Aspect 4 (Imaliqiyit) amihuuyut atuqpauhighait hikuinnauyumik munaqhiyut hivuliqtiqahutik Dr. Alex Langlois-mik, Université de Sherbrooke ilihappaallivianit, taiyauvaktut “Hanayut qauyihautighamik hikuinnauyumik qauyihautighamik Qitiqmiuni aviktuqhimayumi Nunattiamilu atuqhutik qauyihagviinut qauyihautainik, aajikkutanngualuqhutik qauyihautighainik ungahiktumillu qauyihautinik”, manighaqtitauplutik talvanngat Ukiuqtaqtumi Qauhimayatuqat Kanatami (Polar Knowledge Canada). Pingahuuyut inilluarumayait hapkuninnga havaaghanit: (1) qauyiharumaplugit nunamiutat hunaqtivaluit haugaangamik aputimit upinngaghamilu mahagaangat: (2) atuqlugit qauhimaliqitait aput mahagaangat immautiviillu talvunga Qurluqtum Kuugaanut Imariktumullu Kuugaayungmut, angiyunullu kuukkanut harvaqtut talvani qauyihaiyunit aputimik; imaalu (3) aajikkutaliuqhimayut atuqlugit qauyihautighat aallannguqtaqtughat hivunighami aputimit imariktut hangupluni taryumiutanut. Nunainnaqmi qauyihaiyut imaliqiyughat aullaqtitauniaqtuq ikayuqtiqarlutik nunallaaqmiunik qauyihaiyinillu havaqatigiingnik havaktut talvani Qurluqtum Kuugaanit Imariktumilu Kuugaayungmi. Aqaguani tamaat 1 week naattaraangat qauyihaivangniat upinngaghami (aputimik hikuplu qaanganit) atuqlutik sikiitunik imaalu aularaaqtughamik iklupalliulaittut. Aputaiqqat hikiuqqallu kuugaq, imaqmik qauyihaivangniat mikiyukkut qayakkut (ikayuqtiqarlutik nunallaaqmiunik) talvanngalluuniit hanianit harvaqtumit. Kuugaqmit qauyihagtaghat katitiqtauuyut ihuilutaunngittut taimaalu utiqtiriyaami ilitqhianut parnaiyautaittuq. Aputimik qauyihaiplutik taapkua Dr. Langlois havaqataitalu, imaqmik imiqtaqpangniat ilittuqhiyuplutik taimaa aputim imautaa kuukkaplu aallatqiingniit qauyiharumaplugit talvanngat Qurluqtum Kuugaanit March-mit ukiaghalihaamut talvanngallu Imariktumik Kuugaayungmit hikiyaliqqat (June-mit) talvunga hikutiliqtumut (October-mut). Qurluqtum Kuugaanit qauyihainahuat havaqatigilugit taapkua Qurluqtum Anguniaqtit Naniriatuqtillu katimayit. Ilitturihimaliqitait hapkuninnga qauyihagtainit takupkaqtitauniaqtut nunallaaqnut Qurluqtumut Iqaluktuuttiaqumullu, talvuuna nunallaaqni havaktiigut taapkua Qurluqtumi HTO-ngat, Iqaluktuuttiam HTO-ngat, CHARS-kullu. Ilihimaliqitait hapkuninnga hikuinnauyumi munaqhiyunik qauyihaiyut naunaqhitiyauniaqut titirakkut naunaitkutakkullu, ikayuutauniaqtuqlu nunallaaqmi munaqhiyunut hilaliqiyunik. Aspect 4 (Imaliqiyit) hikuinnauyumik munaqhiyut havaaghat unipkaaqtahimayut taapkuninnga Qurluqtum HTO-ngat, titiraqhimayut tuniqhihimainnaqhutik havaaghanik hapkuninnga.

Operations Phase: from 2018-02-18 to 2019-02-17

## Activities

### Activities

Location	Activity Type	Land Status	Site history	Site archaeological or paleontological value	Proximity to the nearest communities and any protected areas
Freshwater Creek Sampling Site	Sampling sites	Municipal	River sampling location next to the Water Survey of Canada water gauge station.	unknown	Within the community of Cambridge Bay
Coppermine River Sampling Site	Sampling sites	Municipal	River sampling location near to the community of Kugluktuk, chosen through collaboration with the Kugluktuk HTO. This site has been used by the Kugluktuk HTO to collect river water samples as part of previous projects conducted from 2014-2016. The site was chosen so as not to interfere with local uses of the river, but also be safely accessible by the community sampler at different times throughout the year.	unknown	The sampling site is located about 9.5 km from the community of Kugluktuk.

### Community Involvement & Regional Benefits

Community	Name	Organization	Date Contacted
Kugluktuk	Amanda Dumond	Kugluktuk Hunters and Trappers' Organization	2017-04-07
Kugluktuk	Larry Adjun	Kugluktuk Hunters and Trappers' Organization	2017-04-07
Cambridge Bay	Donald McLennan	POLAR	2016-12-12

## Authorizations

### Indicate the areas in which the project is located

Kitikmeot

### Authorizations

Regulatory Authority	Authorization Description	Current Status	Date Issued / Applied	Expiry Date
Information is not available				

### Project transportation types

Transportation Type	Quantity	Proposed Use	Length of Use
Water	0	Lund Aluminum	

		Boat (Coppermine River)	
Land	0	Snowmobile (snow), ATV (no-snow) to both Coppermine River and Freshwater Creek sites	

**Project accomodation types**

Other,

## Material Use

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

Equipment Type	Quantity	Size - Dimensions	Proposed Use
snowmobile	1	NA	access to sampling site
ATV	2	NA	access to sampling site
aluminum boat	1	18ft	access to sampling site (open water)
River Geochemistry Sampling Kit	1	6.5x7.5x1.5 inches	Sampling kit used to collect water for the determination of river geochemistry, includes: plastic syringe, plastic filter, sampling bottles, gloves. 1 used per site/per visit. All contents will return to lab post collection.

### Detail Fuel and Hazardous Material Use

Detail fuel material use:	Fuel Type	Number of containers	Container Capacity	Total Amount	Units	Proposed Use
Gasoline	fuel	1	20	20	Liters	boat operation

### Water Consumption

Daily amount (m3)	Proposed water retrieval methods	Proposed water retrieval location
0	500mL of river water sampled by hand, using a 50mL syringe from each location (Coppermine River and Freshwater Creek). Water is only collected on sampling days (<15 times at each site over the year)	Sampling locations in the Coppermine River and Freshwater Creek (see map)

## Waste

### Waste Management

Project Activity	Type of Waste	Projected Amount Generated	Method of Disposal	Additional treatment procedures
Sampling sites	Other, sampling material plastic waste (50mL syringe)	1x 50mL syringe per sample	All plastic waste will be sent south for recycling.	None needed.

### Environmental Impacts:

No negative environmental impacts are anticipated from this project. River sampling in the spring (snow and ice cover present) will be carried out by accessing the sites via snowmobile and no permanent infrastructure will be erected. Once the snow and ice have cleared from the rivers, water sampling will continue with the use of small boats (operated by local community partners in Kugluktuk) or directly from the stream-side (Freshwater Creek). The samples collected are non-destructive, generate no waste to remain on-site, and no restoration plans are required.

## **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**

**Description of Existing Environment: Biological Environment**

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

**Identification of Impacts and Proposed Mitigation Measures**

**Cumulative Effects**

## Impacts

## Identification of Environmental Impacts

Construction																									
-		-	-	-	-	-	-	-	-	-	-	-	-		-	-	-	-	-		-	-	-	-	-
Operation																									
Sampling sites		-	-	-	-	U	-	-	-	-	-	-	-		-	-	-	U	-		P	-	-	-	-
Decommissioning																									
-		-	-	-	-	-	-	-	-	-	-	-	-		-	-	-	-	-		-	-	-	-	-

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