

## NIRB Application for Screening #125252

### Climate - terrestrial biodiversity investigation in tundra vegetation along an Arctic longitudinal gradient

**Application Type:** New  
**Project Type:** Scientific Research  
**Application Date:** 1/24/2018 6:54:55 PM  
**Period of operation:** from 0001-01-01 to 0001-01-01  
**Proposed Authorization:** from 0001-01-01 to 0001-01-01  
**Project Proponent:** Masaki UCHIDA  
 National Institute of Polar Research  
 Midori-cho 10-3  
 Tachikawa-shi Tokyo 190-8518  
 JAPAN  
 Phone Number:: +81-42-512-0744, Fax Number::

## DETAILS

### Non-technical project proposal description

**English:** We would like to conduct a biodiversity study next summer near Cambridge Bay (from the end of August to middle of September, with about two people). Our main objective is to clarify plant biodiversity and microorganism biodiversity living in the tundra ecosystem. In addition, we also would like to clarify relationships between plant biodiversity, diversity of soil microorganisms and environmental factors such as carbon dioxide flux from soil surface, soil carbon and nitrogen content. As for investigation of the plant and soil biodiversity in a small specific area, we plan to use non-destructive and non-disruptive methods. The vegetation survey will be undertaken for 50-70 quadrants (1m(=39.4inches) x 1m(=39.4inches)). A small (about 20 cm or 8 inches by 20 cm or 8 inches sample size) amount of vegetation will be cropped in each quadrat to quantify the living plants per area. As for the investigation of soil microorganisms, we plan to collect small amount of soil sample using a metal cylinder (5 cm or 2 inches in diameter by 5 cm or 2 inches in depth) from the plant cropped area, in addition, we plan to collect about two spoonfuls soil using a clean plastic spoon and putting into a clean plastic tube in each quadrat (The volume is about 2 -3 ml per quadrat). A non-destructive and non-disruptive equipment will be used to measure the carbon dioxide fluxes from the soil surface. We will place a plastic chamber (20 cm or 8 inches in diameter and 15 cm or 6 inches in height) with a carbon dioxide sensor on a soil surface for ten or so minutes to determine carbon dioxide flux from soil surface. As a result, we would like to clarify how many plant and soil microorganisms are living in the area and to clarify relationships between plant species, plant biomass (the total quantity (= weight) of plants in a particular area), the carbon dioxide fluxes from the soil surface and diversity of soil microorganisms. We are setting the research points along a north to south latitudinal gradient in the eastern Canadian Arctic (which include Salluit (62oN) and Kuujuaupik (55oN)). Pond Inlet (72oN) will be additional research place next summer. Cambridge Bay is the most suitable place along a west to east longitudinal gradient investigation, because of its geographical location and scientific logistical support. Our Canadian collaborator Dr. Johann Wagner of Polar Knowledge Canada has worked in this region and has maintained a good relationship with the community of Cambridge Bay. We have been discussing with him our intention of a very low impact on the soil and vegetation. We would like to report to the community and other Nunavut organizations about our scientific surveys and findings by e-mail after the expedition. In addition, if we have a chance, we would like to visit Cambridge Bay in 2019 and be available to the community to share our findings.

**French:** N/A

**Inuktitut:** N/A

**Inuinnaqtun:** Havagiyumayavut uumayuvaluit aalatqikni naunaiyaqni auyanguqmikpan. Tapkuanut naunaiyainiq nauhimayunik nunalu uumayuvaluit aalatqikni mikiyuni taihimayut inaitni, parnaktugut atuqni huguqtigilaittut ulapihautaungittutlu pityuhit. Tamna nauhimayut naunaiyaqni havagiyauniat tapkununga 50-70 h aktilanga (1m hitamauya qni 1m). Tamna mikiyuq (mikhaani 20 cm tamnaluniit 8 insit tamnaluniit 8 insit naunaiyagaq aktilanga) aktilaq nauhimayut amuqhagauniat atuni aktilangani quadrat naunaiyaqnuumayut nauhimayut atuni inaini. Taphumunga naunaiyaqniqmun nunami mikkataannuit uumayuvaluit, parnaktavut katitigini mikait aktilat nunat naunaiyagakhat atuqhugit haviit kaivyagiktut (5 cm tamnaluniit 2 insit kaivyagiknia tamnaluniit 5 cm tamnaluniit 2 insit ilutunia) talvanga nauhimayuq aviktaunia inaa, ilagiplugulu, parnaktavut katitigini tapkuninga malguknik alluut tatamayuuq nuna atuqhugu halumayuq haviungittuq alluut iluqaqhugulu halumayumun haviungittuq napayuq atuniqlugit hitamauya qni (Tamna aktilanga mikhaanittuq 2 -3 ml per quadrat). Ahiguqtigilaittut ulapihalaittuqlu hanalgut atuqtauniaq uuktugaqniut tapkuat carbon dioxide katitta qnit nunap qanganit. Iliniaqtavut haviungittuq puugiya (20 cm tamnaluniit 8 insit kaivyagiknianik tamnaluniit 15 cm tamnaluniit 6 insit puqtunia) piquahunilu carbon dioxide naunaiqtutai nunap qanganit tapkununga qullit avataaniluniit

minitsit naunaiqninut carbon dioxide katittaqnit nunap qanganit. Parnaktavut malguk pingahutluniit naunaiyaiyit pulaqniat talvunga Kanatamiuni Quttiktuq Ukiurtartuq Naunaiyaivik (CHARS) havaginiaqtailu ublukkut aularniq maniqami naunaiyainiq mikhaanut atauhiq havaguhiqmik. Atuqniagavut akhaluut tamnaluniit haantaq maniqamungauyami.

**Personnel**

Personnel on site: 3

Days on site: 7

Total Person days: 21

Operations Phase: from 2018-09-09 to 2018-09-16

## Activities

### Activities

Location	Activity Type	Land Status	Site history	Site archaeological or paleontological value	Proximity to the nearest communities and any protected areas
Biodiversity investigation for vegetation and soil microorganisms	Scientific/International Polar Year Research	Municipal	Unknown	Unknown	Cambridge Bay

### Community Involvement & Regional Benefits

Community	Name	Organization	Date Contacted
Cambridge Bay	Dr. Johann Wagner	Polar Knowledge Canada	2018-01-04

## Authorizations

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

Kitikmeot

### Authorizations

Regulatory Authority	Authorization Description	Current Status	Date Issued / Applied	Expiry Date
Government of Nunavut, Department of Environment	2018-02-15	Active		
Nunavut Research Institute	2018-02-15	Active		

### Project transportation types

Transportation Type	Quantity	Proposed Use	Length of Use
Water	0	By a boat	
Land	0	By a car and/or an ATV	

### Project accommodation types

Community

## Material Use

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

Equipment Type	Quantity	Size - Dimensions	Proposed Use
Vehicle	1	200 x 80 x 70 inches	In order to go and back to the CHARS and study sites
Tape measure	2	0.8 x 39.4 inches	In order to set line transect
Scissors	2	2 x 6 inches	In order to cut plants
Frame	1	39.4 x 39.4 inches	In order to measure plant coverage
Carbon dioxide flux measurement	1	7.9 x 7.9 inches	In order to measure carbon dioxide flux from soil surface
Metal cylinder	2	2 inches in diameter and 2 inches in height	In order to collect soil samples
Spoon	5	0.8 inches in width x 1.6 inches in length with 4 inches handle	In order to collect soil samples
ATV	2	82 x 48 x 61 inches	In order to transport between study site and the station
Boat	1	16 feet	In order to pass a lake
Scoop	2	2 x 80 inches	In order to collect soil samples

### Detail Fuel and Hazardous Material Use

Detail fuel material use:	Fuel Type	Number of containers	Container Capacity	Total Amount	Units	Proposed Use
Information is not available						

### Water Consumption

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

## Waste

### Waste Management

Project Activity	Type of Waste	Projected Amount Generated	Method of Disposal	Additional treatment procedures
Information is not available				

### Environmental Impacts:

As for investigation of the plant and soil biodiversity in a small specific area, we plan to use non-destructive and non-disruptive methods. The vegetation survey will be undertaken for 50-70 quadrants (1 square meter (39 square inches)). A small (about 20cm (=8 inches) by 20cm (=8inches) sample size) amount of vegetation will be cropped in each quadrat to quantify the living plants per area. As for the investigation of soil microorganisms, we plan to collect small amount of soil sample using a metal cylinder (5cm(= 2inches) in diameter by 5 cm(=2inches) in depth) from the plant cropped area, in addition, we plan to collect about two spoonfuls soil using a clean plastic spoon and putting into a clean plastic tube in each quadrat (The volume is about 2 -3 ml per quadrat). A non-destructive and non-disruptive equipment will be used to measure the carbon dioxide fluxes from the soil surface. We will place a plastic chamber (20 cm(=8inches) in diameter and 15 cm(=6 inches) in height) with a carbon dioxide sensor on a soil surface for ten or so minutes to determine carbon dioxide flux from soil surface. We will recover original condition after sampling as much as possible.

## **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 research will take place in the Greiner Lake watershed, north of Cambridge Bay. The physical environment consists tundra, lakes and streams. Our research will have little to no impact on the physical environment.

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

The land areas where the research will take place have a tundra vegetation dominated by purple saxifrage, mountain avens and sedges in the drier sites, and sedges, grasses and willows in moister areas and wetlands. Common wildlife species here are muskoxen, arctic hare and arctic foxes, as well as many nesting birds. Freshwater vertebrate species are represented by arctic char, lake trout, least ciscoes and sticklebacks. Our project will have little to no impact on the biological environment.

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

The site of our project is around the hamlet of Cambridge Bay in the Kitikmeot region of Nunavut. The bedrock in this area consists of Cambrian limestone. There are no archaeological or culturally significant sites nearby. The nearby areas are used by locals from Cambridge Bay for subsistence harvesting and fishing, although the precise locations of the river stations are rarely accessed. Our project will not have any negative impacts on the socioeconomic environment.

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

Our project won't have any negative impacts on the physical, biological or socioeconomic environment. It will have however a positive impact on the employment opportunities in Cambridge Bay, by guides and summer students hired by our partners Polar Knowledge Canada. The project will also have a positive impact on the general advancement of knowledge of the area, which is beneficial both for Cambridge Bay and Nunavut.

### **Cumulative Effects**

Since our sampling will conduct once per one plot. I think that there will be no cumulative effects.

## Impacts

## Identification of Environmental Impacts

[illegible]