



## **NIRB Application for Screening #125492**

### **The effect of warming on aquatic invertebrates in the Kitikmeot**

**Application Type:** New

**Project Type:** Scientific Research

**Application Date:** 11/19/2019 3:58:55 PM

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

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

**Project Proponent:** Michelle Tseng  
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Canada  
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## DETAILS

### Non-technical project proposal description

- English: Who: Michelle Tseng, Aquatic and Insect Ecologist, University of British Columbia What: Researchers are currently studying the health of lakes, ponds, streams, and rivers in the Kitikmeot Region. This ongoing project is a collaboration between several universities, the Ministry of Environment (Government of Canada), and POLAR Knowledge Canada. I am joining this group of researchers to study in particular, whether increased water temperature in lakes and ponds is changing the health of small aquatic animals called zooplankton. In summer 2020, I propose to take 100 live zooplankton from each of 10 lakes. This amount is less than 0.01% of a typical lake zooplankton population. I will employ one local guide through the Ekaluktutiak Hunters and Trappers Association, and one local high school student. We will travel to these lakes by truck or ATV. At the Canadian High Arctic Research Station (CHARS), I (and the guide or student if they are interested), will measure the respiration rate (breathing rate) of live individual zooplankton held at different temperatures. I am testing the idea that zooplankton collected from warmer lakes will be able to maintain normal breathing rates at warmer temperatures, compared to zooplankton collected from cooler lakes. Why: Zooplankton are important components of healthy aquatic environments. They filter water and they are food for larger insects and for fish such as lake trout and Arctic char. Without zooplankton, lakes would become cloudy with algae, and fish would become malnourished or unable to survive at all. This study will give us information about how tolerant zooplankton are to warmer water temperatures, and also how quickly they may be able to adapt to changing temperatures. This study is part of a three-year study that will also investigate (a) whether zooplankton collected at different times of the year show different responses to warmer temperatures, and (b) whether differences in the ability of zooplankton to withstand warmer temperatures are due their environment, or to specific genes. Together this information will allow us to make more accurate predictions for whether important fish like trout and char will still have enough high-quality food to grow and thrive as climate change continues. Where: I propose to sample zooplankton from a subset of the lakes being currently being studied by the lake research group. All sites will be within a three-hour ATV or truck ride from CHARS. We will depart from CHARS in the morning and return by late afternoon each day. When: I plan to consult with the community from June 23 to June 30, 2020. Pending positive feedback from the community, we will sample lakes from July 1 to July 7, 2020. If the community would like me to change my proposed research, I will postpone lake sampling until the suggested changes have been integrated.
- French: In our instruction letter we were asked to provide the Non-technical Project Summary in English and Inuinnaqtun
- Inuktitut: In our instruction letter we were asked to provide the Non-technical Project Summary in English and Inuinnaqtun
- Inuinnaqtun: Please see the attached document.

### Personnel

Personnel on site: 3

Days on site: 7

Total Person days: 21

Operations Phase: from 2020-06-14 to 2020-06-28

## Activities

Location	Activity Type	Land Status	Site history	Site archaeological or paleontological value	Proximity to the nearest communities and any protected areas
Tseng (UBC) Kitikmeot aquatic invertebrate health	Sampling sites	Municipal	We propose to study the zooplankton within a subset of the lakes currently being investigated by Prof. Milla Rautio and colleagues. The plants and animals living in these lakes, and the environmental features (temperature, dissolved oxygen, pH, etc) have been documented by Dr. Rautio's group. Pending the outcome of community consultation, we are proposing to conduct assays on live zooplankton from a subset of these lakes.	N/A	Within 2-3 hr ATV ride of the Canadian High Arctic Research Station

## Community Involvement & Regional Benefits

Community	Name	Organization	Date Contacted
Cambridge Bay	Beverly Makasagak	Ekaluktutiak Hunters and Trappers Association	2019-08-20

# Authorizations

Indicate the areas in which the project is located:

Kitikmeot

## Authorizations

Regulatory Authority	Authorization Description	Current Status	Date Issued / Applied	Expiry Date
Nunavut Research Institute	We will apply for a research license from the Nunavut Research Institute	Not Yet Applied		

## Project transportation types

Transportation Type	Proposed Use	Length of Use
Water	We will sample lakes and ponds using either a) an inflatable zodiac powered by a 2.5 h.p. outboard motor, or b) a manually-powered inflatable kayak	
Land	We will travel by truck or ATV	

## Project accomodation types

Community

## Material Use

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

Equipment Type	Quantity	Size - Dimensions	Proposed Use
ATV or Truck	2	regular	To travel to lakes within a 3 hour drive of Cambridge Bay
Zodiac or inflatable kayak	1	6 ft	To sample zooplankton from lakes

## Detail Fuel and Hazardous Material Use

Detail fuel material use:	Fuel Type	Number of containers	Container Capacity	Total Amount	Units	Proposed Use
Gasoline	fuel	2	20	40	Liters	For the ATV and 2.5 hp outboard motor (if not provided by CHARS)

## 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
Researching	Greywater	25L/day	Canadian High Arctic Research Station showers	n/a
Researching	Sewage (human waste)	1L/day	Canadian High Arctic Research Station toilets	n/a

## Environmental Impacts:

We anticipate that the collection of 100 zooplankton per lake will not result in any damage (temporary or permanent) to any of the sites. We will attempt to collect zooplankton from the shore. When that is not possible, our first option will be to use our inflatable kayak. If it is too windy for the inflatable kayak we will use the zodiac and 2.5 hp outboard motor. We will thoroughly rinse any water device we use with clean water.

# **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**

**Miscellaneous Project Information**

**Identification of Impacts and Proposed Mitigation Measures**

**Cumulative Effects**

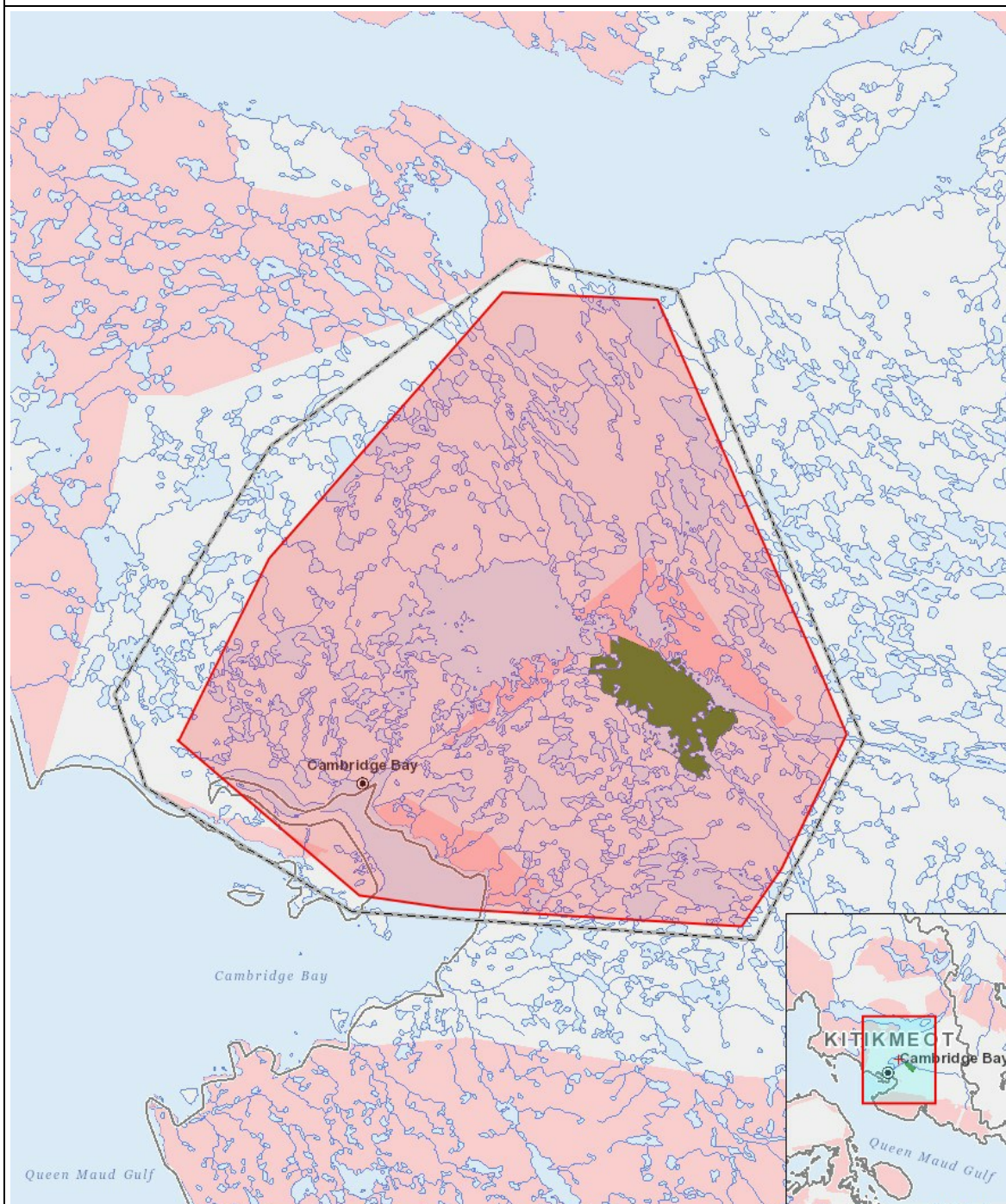
# Impacts

## 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>																										
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<b>Operation</b>																										
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<b>Decommissioning</b>																										
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(P = Positive, N = Negative and non-mitigatable, M = Negative and mitigatable, U = Unknown)

## Project Location



## List of Project Geometries

1	polygon	Tseng (UBC) Kitikmeot aquatic invertebrate health
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