



NIRB Application for Screening #125471

Diversity of pelagic primary producers in coastal habitats and the potential for harmful blooms in Eastern Canadian Arctic, with a focus near Iqaluit, Nunavut

Application Type: New

Project Type: Scientific Research

Application Date: 5/28/2019 12:23:22 PM

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

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

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DETAILS

Non-technical project proposal description

English: We are a scientist team from Université du Québec à Rimouski (UQAR) led by Professors Michel Gosselin and André Rochon. The team also comprises Kaven Dionne (postdoctoral researcher) and Coralie Voyer (student researcher in 2019); another student researcher might join us in 2020 (to be confirmed). As part of the Coastal Environmental Baseline Program of Fisheries and Oceans Canada, we propose to study the microscopic algae in the water of Frobisher Bay, near Iqaluit, Nunavut, in August 2019 and in September 2020. The objective of our scientific project would be to identify and describe the microscopic algae species present in Frobisher Bay, near Iqaluit. This project would help us to complete an algae species database that would be used to detect the introduction of new or toxic algae species in the Frobisher Bay region and in other ports in the Canadian Arctic. We would sample algae from a boat chartered from Alexander Flaherty (Polar Outfitting, Iqaluit) at different locations in Koojesse, Peterhead and Tarr Inlets (23 locations in total). We would not take any sample from protected areas. At each location, we would sample algae from the water column using 1) a small plankton net (mouth diameter = 0.3 m; height = 0.9 m) and 2) a 5 L bottle followed by filtrations. We would also sample algae from the first few centimeters of sediments at the bottom of the water on an area about 0.04 m² using a small grab sampler. Each year, our sampling campaign would last about 3 to 4 days, mainly depending on weather, and would involve 2 researchers from UQAR and 1 Iqalumiut (beside Alexander Flaherty). Sample collection does not involve tagging or fishing, and any bycatch would be released as soon as possible with minimum stress. Because the samples we would take would be very small, we expect that the impact of our project on the environment would be negligible. The 2 researchers from UQAR would perform laboratory analyses and would be lodged at the Nunavut Research Institute of Iqaluit. We would bring back to UQAR filters with algae on them and sediment pellets to be processed at UQAR for further analyses. Our results would be made available to the public through websites and through a public presentation in Iqaluit at the end of the project. We expect to publish the findings of this work in peer-reviewed scientific journals.

French: Nous sommes une équipe scientifique de l'Université du Québec à Rimouski sous la direction des professeurs Michel Gosselin et André Rochon. L'équipe inclut également Kaven Dionne (chercheur postdoctoral) et Coralie Voyer (chercheure étudiante en 2019); un autre chercheur étudiant se joindra peut-être à l'équipe en 2020 (à confirmer). En tant que participant au Programme sur les Données environnementales côtières de référence de Pêches et Océans Canada, nous proposons d'étudier les algues microscopiques dans l'eau de la baie de Frobisher, près d'Iqaluit, Nunavut, en août 2019 et en septembre 2020. L'objectif de notre projet scientifique serait d'identifier et décrire les espèces d'algues microscopiques présentes dans la baie de Frobisher, près d'Iqaluit. Ce projet aidera à compléter une base de données qui sera utilisée pour détecter l'introduction d'espèces d'algues envahissantes ou toxiques dans la région de la baie de Frobisher et dans les autres ports de l'Arctique canadien. Nous échantillonnerons les algues à partir d'un bateau affrété auprès d'Alexander Flaherty (Polar Outfitting, Iqaluit) à différents sites de Koojesse, Peterhead et Tarr Inlets (23 sites au total). Aucun échantillon ne serait collecté dans une aire protégée. À chaque site, nous échantillonnerons des algues de la colonne d'eau en utilisant 1) un petit filet à plancton (diamètre de l'ouverture = 0,3 m; hauteur = 0,9 m) et 2) une bouteille de 5 L suivie de filtrations. Nous échantillonnerons également des algues dans les premiers centimètres de sédiments au fond de l'eau sur une aire d'environ 0,04 m² en utilisant une petite benne. À chaque année, notre campagne d'échantillonnage durera entre 3 et 4 jours, tout dépendant de la météo, et impliquera 2 chercheurs de l'UQAR et 1 Iqalumiut (en plus d'Alexander Flaherty). La récolte des échantillons n'implique pas la pêche ou le marquage de poisson, et toute prise accessoire serait relâchée dès que possible avec un minimum de stress. Parce que les échantillons seront très petits, nous prévoyons que les impacts environnementaux de notre projet seront négligeables. Les 2 chercheurs de l'UQAR effectueront des analyses en laboratoire et seront logés au Nunavut Research Institute d'Iqaluit. Nous ramènerons à l'UQAR des filtres contenant des algues et des fractions de sédiments afin de procéder à des analyses plus poussées. Nos résultats seront rendus disponibles auprès du public via des sites Internet et via une présentation publique que nous prévoyons donner à Iqaluit à la fin du projet. Nous nous attendons également à publier les résultats de ce travail dans des journaux scientifiques avec comité de lecture.

[illegible]

Operations Phase: from 2019-08-01 to 2020-09-30

Activities

Location	Activity Type	Land Status	Site history	Site archaeological or paleontological value	Proximity to the nearest communities and any protected areas
Koojesse Inlet sampling area	Scientific/International Polar Year Research	Marine	N/A	N/A	Koojesse Inlet is located near Iqaluit, Nunavut.
Peterhead Inlet sampling area	Scientific/International Polar Year Research	Marine	N/A	N/A	Peterhead Inlet is located near Iqaluit, Nunavut.
Tarr Inlet sampling area	Scientific/International Polar Year Research	Marine	N/A	N/A	Tarr Inlet is located near Apex and Iqaluit, Nunavut.

Community Involvement & Regional Benefits

Community	Name	Organization	Date Contacted
Iqaluit	Mosha Côté	Nunavut Research Institute	2019-04-10
Iqaluit	Rick Armstrong	Nunavut Research Institute	2019-02-18
Iqaluit	Jamal Shirley	Nunavut Research Institute	2019-04-30
Iqaluit	Alexander Flaherty	Polar Outfitting	2019-05-11
Iqaluit	Zoya Martin	Fisheries and Oceans Canada	2019-04-30
Iqaluit	Noah Alokie	Hunters and Trappers Association	2019-04-30

Authorizations

Indicate the areas in which the project is located:

South Baffin

Authorizations

Regulatory Authority	Authorization Description	Current Status	Date Issued / Applied	Expiry Date
Nunavut Research Institute	SCIENTIFIC RESEARCH LICENCE - Physical / Natural Sciences RESEARCH	Applied, Decision Pending		
Fisheries and Oceans Canada	LICENCE TO FISH FOR SCIENTIFIC PURPOSES IN THE WATERS OF THE NORTHWEST TERRITORIES, YUKON NORTH SLOPE, AND NUNAVUT TERRITORY	Not Yet Applied		

Project transportation types

Transportation Type	Proposed Use	Length of Use
Water	Chartered boat (owner: Alexander Flaherty, Polar Outfitting, Iqaluit, Nunavut)	
Land	Pick-up (locally rented)	

Project accomodation types

Community

Material Use

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

Equipment Type	Quantity	Size - Dimensions	Proposed Use
Pick-up (locally rented)	1	N/A	To carry equipment to the boat and to the Nunavut Research Institute
Boat (locally chartered)	1	N/A	To reach the stations in Koojesse, Peterhead and Tarr inlets.
CTD device	1	65 cm height	To measure water temperature and salinity.
Secchi disk	1	30 cm width	To measure water transparency.
Phytoplankton net (20 µm mesh)	1	100 cm height	To collect phytoplankton samples.
Niskin bottle	1	64 cm height	To collect phytoplankton samples.
Grab sampler	1	21 cm height; 17 width X 21.5 cm length	To collect surface sediment samples

Detail Fuel and Hazardous Material Use

Detail fuel material use:	Fuel Type	Number of containers	Container Capacity	Total Amount	Units	Proposed Use
Formaldehyde	hazardous	1	0.1	0.1	Liters	Phytoplankton preservative

Water Consumption

Daily amount (m3)	Proposed water retrieval methods	Proposed water retrieval location
0	N/A	N/A

Waste

Waste Management

Project Activity	Type of Waste	Projected Amount Generated	Method of Disposal	Additional treatment procedures
Scientific/International Polar Year Research	Combustible wastes	1 kg	We will bring back any garbage to the Nunavut Research Institute in Iqaluit for proper disposal through the local sanitary service.	N/A

Environmental Impacts:

This project will improve our capacity to survey, detect and mitigate introductions of new or harmful microscopic algae species in the Frobisher Bay region and in other future ports with high shipping activity. Data collected during this project will contribute to the creation of a comprehensive database containing information on the current and historical distribution of microscopic algae species in the Canadian Arctic, especially in Frobisher Bay. This database will help in determining the status (i.e. native or invasive, new to the region) and the potential origin of novel microscopic algae species in Frobisher Bay.

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

This project involves collecting samples in Koojesse, Peterhead and Tarr inlets, near Iqaluit. Work will be done from a small boat chartered from Alexander Flaherty (Polar Outfitting). During each sampling day, the boat will be leaving from and coming back to Iqaluit's port. We will collect phytoplankton samples from the water column using a small phytoplankton net and a 5L Niskin bottle, and sediment samples at the bottom using a small grab sampler. Sediments will be collected up to a depth of 50 m. Tides in the region have a 10 m range, and we will adapt our work hours depending on their cycles for travel safety. Peterhead Inlet is next to Sylvia Grinnell Territorial Park and near Qaummaarviit Territorial Park. However, we will not take any sample from protected areas. Our collaboration with Alexander Flaherty from Polar Outfitting and a Iqalummiuq to be hired through contract to the Amaruq HTA will help us to avoid disturbance of local activities and environment.

Description of Existing Environment: Biological Environment

During our project, we will collect microscopic algae, mainly diatoms and dinoflagellates, from the water column and from bottom sediments in Koojesse, Peterhead and Tarr inlets near Iqaluit, Nunavut. The species we will collect are at the basis of the local marine foodweb. The size of our samples will be negligible compared to their concentration in the water and sediments (e.g., million of cells per liter). The main fish species present in the sampling region are Arctic Char, Atlantic Cod, Arctic Sculpin, Capelin and Leatherfin Lump sucker. The main invertebrate species present in the sampling region are Clams, Whelk, Arctic Moonsnail, Barnacle, Crayfish and Deep Sea Kind Crab. The main mammal species present in the sampling region are Ringed Seal and Belugas. We note that we are not planning to collect any animal during our project. Any bycatch will be released as soon as possible with minimum stress. We also note that we will not interfere with any Species at Risk Act (SARA) listed species or their habitats. That is, there is a very low likely-hood of harm or encounters with a SARA species. Our collaboration with Alexander Flaherty from Polar Outfitting and a Iqalummiuq to be hired through contract to the Amaruq HTA will also help us to avoid disturbance of animals.

Description of Existing Environment: Socio-economic Environment

Sampling locations in Koojesse, Peterhead and Tarr inlets will be near Iqaluit and Apex, Nunavut. Iqaluit is the capital of Nunavut and is a fast growing city. The inner part of Frobisher Bay near Iqaluit is an area that is affected by shipping activity, which will increase in the future when the deep sea port, currently in development, will become operational. There are fishing and touristic activities in the region. We will confirm with the Amaruq Hunters and Trappers Association whether our sampling locations would interfere with these practices. Our collaboration with Alexander Flaherty from Polar Outfitting and a Iqalummiuq to be hired through contract to the Amaruq HTA will also help us to avoid disturbance with fishing and tourism. Our project will bring socioeconomic benefits to Iqaluit. First, the comprehensive database of microscopic algae species will help to prevent and detect the invasion of harmful algae in Frobisher Bay. This will help the local population to detect algal bloom and prevent human intoxications due to the consumption of contaminated molluscs and fish. Also, the scientific team (2 personnel from Université du Québec à Rimouski) will be staying and working at the Nunavut Research Institute and purchasing food at local restaurants. The sampling will also necessitate to hire a Iqalummiuq through contract to the Amaruq HTA, and to charter a boat from Alexander Flaherty, owner of Polar Outfitting. Since we will be staying in Iqaluit, we will have the chance to discuss our

project with the local population.

Miscellaneous Project Information

For laboratory spills at the Nunavut Research Institute laboratory, Material Data Safety Sheets will be on hand for proper clean up and disposal instructions. On the boat, formaldehyde will be used as far as possible from the water. In case of spilling of formaldehyde, we will stop the leak with vermiculite and absorbing paper (diapers). The waste will be brought back to Université du Québec à Rimouski for proper disposal.

Identification of Impacts and Proposed Mitigation Measures

Sediments and microscopic algae samples will be collected onto filters, and into glass and plastic containers and transported South to Université du Québec à Rimouski for species identification and analysis of toxins. Because the samples we will take will be very small at each location (about 1.5 L for microalgae samples; the first few centimeters on an area of 0.365 m² for sediments), the impact of our project on the environment will be negligible. We will also be working with Alexander Flaherty (owner of Polar Outfitting) and another Iqalumiut that will help us to select our sampling sites to prevent negative impact on the environment. Any bycatch will be released as soon as possible with minimum stress. We will not work in areas that are habitats for species under the Species at Risk Act. A Summary Harvest Report will be returned to DFO upon completion of activities.

Cumulative Effects

N/A

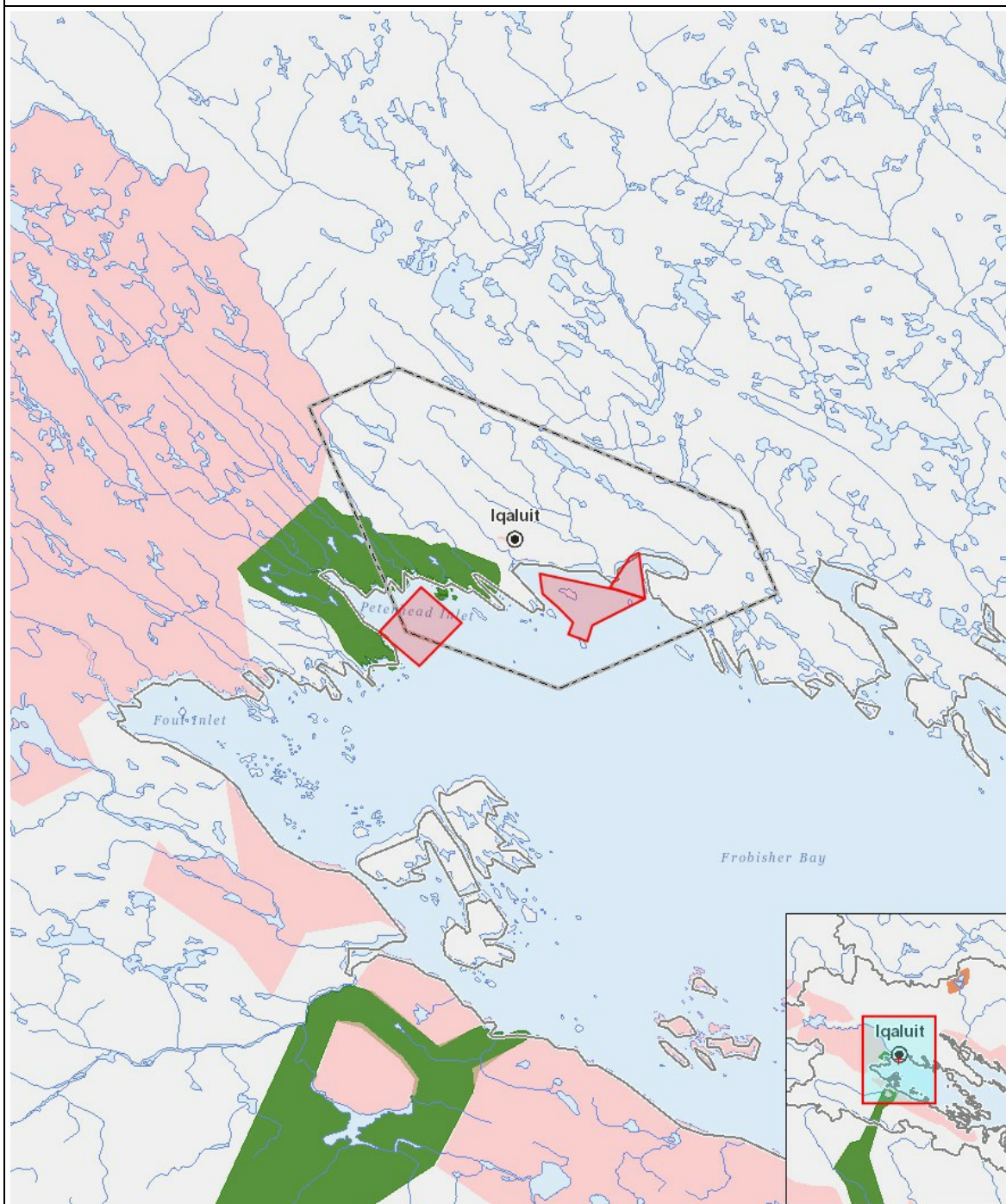
Impacts

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
Construction																										
-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Operation																										
Scientific/International Polar Year Research		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	P	-	-	P	-	-	-	-
Decommissioning																										
-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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

Project Location



List of Project Geometries

- | | | |
|---|---------|-------------------------------|
| 1 | polygon | Koojesse Inlet sampling area |
| 2 | polygon | Peterhead Inlet sampling area |
| 3 | polygon | Tarr Inlet sampling area |