Demande de la CNER faisant l’objet d’un examen préalable #125286

Biodiversity and microhabitat associations of terrestrial arthropods on Axel Heiberg Island, Nunavut, in the High Arctic

Type de demande :	New
Type de projet:	Scientific Research
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DÉTAILS

Description non technique de la proposition de projet

Anglais: To Whom It May Concern: My name is Anthony Zerafa, and I am a Biology Master’s student at McGill University in Montréal, Québec, Canada. I previously visited Nunavut in 2016 when I spent 6 weeks on Cornwallis Island and Axel Heiberg Island as part of a McGill University undergraduate program intended to train students in Arctic field science. The proposed undertaking is a scientific research project with the goal of monitoring communities of terrestrial arthropods (insects, spiders, and springtails) on Axel Heiberg Island in Nunavut. Arthropods are the dominant animal group found in terrestrial Arctic ecosystems, which makes them ideal study organisms for monitoring Arctic environmental change. The High Arctic locality of Axel Heiberg Island may yield valuable information on the current composition of High Arctic arthropod communities, because the terrain is a mosaic of highly variable “microhabitats” that differ in plant cover and soil moisture. However, arthropod communities on Axel Heiberg Island have never previously been subject to any dedicated study. To address this significant gap in our knowledge of High Arctic ecosystems, I propose to survey arthropod communities on Axel Heiberg Island as the foundational step for a long-term monitoring program. Located approximately at coordinates 79º26’N 90º46’W in western-central Axel Heiberg Island, the McGill Arctic Research Station (MARS) will serve as a basecamp for research activities. MARS is only accessible by air, with aircraft operating out of the Polar Continental Shelf Program (PCSP) in Resolute. Logistical support for my 2018 project is included in the PCSP logistics request form that was filled out by Dr. Wayne Pollard (Director, MARS) under “MARS baseline studies”. With the exception of the seasonally occupied MARS, Axel Heiberg Island is uninhabited. The nearest settlement to MARS is the Eureka research base on Ellesmere Island, approximately 111km to the northeast. The nearest Inuit community to MARS is Grise Fiord on Ellesmere Island, approximately 382km to the southeast. In order to gain a complete picture of arthropod community compositions over time, fieldwork will take place over the entire duration of MARS’ summer operational period (from the start of July to the end of August). Although the current proposed project will not take more than two summer field seasons, it is the goal of this applicant to turn the project into a long-term monitoring program that will occur annually over many years. This project entails a thorough study of microhabitats with their associated arthropod communities on Axel Heiberg Island. I propose to catalogue every microhabitat that can be identified within the enclosed basin next to MARS, where Colour Lake is located. A hyperspectral camera (possibly mounted on an aerial drone) can reveal differences in terrain cover more easily than the naked eye, and therefore this is the most objective method for mapping the microhabitats within the study area. Once microhabitats in the study area are identified, I will place a transect of yellow pitfall traps (small yellow dishes, about 18cm in diameter each) within each microhabitat to collect flying and ground-dwelling arthropods. At the location where each pitfall trap is placed, I will also take a soil sample for the extraction of soil-dwelling arthropods. Such thorough collecting across the entire season will provide a complete picture of the arthropod communities that are established on Axel Heiberg Island, as well as the microhabitats with which they are associated. This dedicated survey will also lay the foundations for future arthropod monitoring on Axel Heiberg Island. Climate change has in recent history driven significant and rapid changes to the Arctic environment, and continues to alter Arctic ecosystems at an unprecedented rate. The effects of this rapid environmental change are however not well understood, as there remain significant gaps in our basic understanding of the natural history of Arctic ecosystems. Because they are abundant in Arctic ecosystems, arthropods make for ideal study organisms for detecting Arctic environmental change. The understudied arthropod communities on Axel Heiberg Island provide an excellent opportunity to fill a gap in our understanding of High Arctic ecosystems, and the establishment of a long-term monitoring program can then be used to detect environmental change over time. But in order for a monitoring program to successfully detect changes to these Arctic ecosystems over time, we must already have a basic understanding of the arthropod communities that are already naturalised on the island. Because even this baseline information is currently lacking, intensive surveying is therefore the first step for the program.

Français: According to the instructions sent to me by Natasha Lear (Environmental Administrator, NIRB), a French translation of my description is only necessary if the affected community includes the City of Iqaluit. I have copied and pasted her instructions here: Please include a non-technical summary description of the proposed project in English and in the applicable languages of all potentially-affected communities: Inuktitut (Kivalliq, North/South Baffin, Eastern Kitikmeot), Inuinnaqtun (Cambridge Bay, Kugluktuk, Bay Chimo and Bathurst Inlet) and French (City of Iqaluit).

Inuktitut: ᑭᓇᑐᐃᓐᓇᕐᔪᑦ ᐊᑦᑐᖅᑕᐅᓂᖃᕐᓂᐊᖅᑐᒧᑦ:ᐋᓐᑕᓂ ᔭᕆᕙᐅᕗᖓ, ᐊᒻᒪᓗ ᐆᒪᔪᓕᕆᓂᕐᒧᑦ ᖁᑦᑎᓂᖅᓴᒥᒃ ᓯᓚᑦᑐᓴᕐᕕᔪᐊᕐᒥ ᐃᓕᓐᓂᐊᖅᑎᐅᓪᓗᖓ ᒥᒻᒥᐅᓪ ᓯᓚᑦᑐᓴᕐᕕᔪᐊᖓᓂ ᒫᓐᑐᕆᐊᓪ, ᑯᐸᑭ, ᑲᓇᑕ. ᓄᓇᕗᒻᒨᓕᐅᖅᓯᒪᔪᖓ 2016-ᖑᑎᓪᓗᒍ 6-ᓂᑦ ᐱᓇᓱᐊᕈᓯᕐᓂᑦ ᒪᕐᕈᓕᕐᑭᕐᒥ ᐊᒻᒪᓗ ᐅᒥᖓᑦ ᓄᓈᓐᓂ ᐃᓚᒥᔭᐅᓪᓗᓂ ᒥᒻᒥᐅᓪ ᓯᓚᑦᑐᓴᕐᕕᔪᐊᖓᑕ ᐊᑦᑎᓂᖅᓴᒥᒃ ᐃᓕᓐᓂᐊᓂᕐᒧᑦ ᐱᓕᕆᐊᖓᒍᑦ ᐃᓕᓐᓂᐊᑎᑦᑎᓇᓱᐊᕌᑦ ᐃᓕᓐᓂᐊᖅᑎᓂ ᐅᑭᐅᖅᑕᖅᑐᐸ ᓄᓇᑐᐃᓐᓇᖓᓂ ᖃᐅᔨᓴᕐᓂᕐᒥᒃ. ᐱᓕᕆᐊᕆᕙᒪᔭᖅ ᖃᐅᔨᓴᕐᓂᕐᒨᖓᕙᖅ ᑎᑭᑦᑎᓇᓱᐊᖅᑐᑎᑦ ᐅᐊᑦᑎᖃᑦᑕᕐᓗᑎᑦ ᖃᐅᔨᓴᕐᓂᒃᑯᑦ ᓄᓇᒥᐅᑕᕐᓂᑦ ᖁᐱᕐᕆᓂᑦ (ᖁᐱᕐᕆᐃᑦ, ᐋᓯᕙᑦ, ᐊᒻᒪᓗ ᐱᓪᓕᕆᐊᑦ) ᐅᒥᖓᑦ ᓄᓈᓐᓂ ᓄᓇᕗᒻᒥ. ᖁᐱᕐᕆᕆᓘᔭᐃᑦ ᐊᒥᓲᓖᖑᖅᑕᐅᒻᒪᑕ ᓄᓇᒦᑦᑐᑎᑦ ᐅᑭᐅᖅᑕᖅᑐᒥ ᓄᓇᕐᒥᓐᓂ ᐃᒪᖏᓐᓂᓗ, ᐱᐅᓛᒪᔭᖅᑐᑎᑦ ᖃᐅᔨᓴᖅᑕᐅᓗᑎᑦ ᑖᒃᑯᐊ ᐆᒪᔪᑦ ᐅᐊᑦᑎᔭᐅᑎᓪᓗᒍ ᐅᑭᐅᖅᑕᖅᑐᒥ ᐊᕙᑎᖓᑕ ᐊᓯᔾᔨᕐᓂᖓ. ᖁᑦᑎᒃᑐᒥ ᐅᒥᖓᑦ ᓄᓈᓐᓂ ᕿᑭᖅᑕᖓᓂ ᑐᑭᓯᐊᕈᑎᖃᕈᓐᓇᕐᒪᑦ ᐱᒻᒪᕆᐅᔪᓂᑦ ᐅᓪᓗᒥᐅᔪᖅ ᖃᓄᐃᑦᑑᓂᖃᕐᓂᕆᓐᓂᑦ ᖁᑦᑎᒃᑐᒥ ᖁᐱᑉᐸᕆᑦ, ᓄᓇᖓ ᐊᔾᔨᒌᙵᕆᑦᑐᑭᓲᔭᐅᓪᓗᑎᑦ ᑲᑎᙵᓚᐅᖅᑐᑦ "ᒥᑭᔪᕐᑏᓄᑦ ᓇᔪᓚᕆᔭᐅᓪᓗᓂ" ᐊᔾᔨᒃᑲᙵᕆᑦᑐᖅ ᐱᑭᖅᑐᓂᑦ ᐃᑉᔪᓪᓗ ᖃᐅᓯᕐᓂᖓᓂᒃ. ᑭᓯᐊᓂᓕ, ᖁᐱᕐᕆᐃᑦ ᐅᒥᖓᑉ ᓄᓈᓐᓂ ᕿᑭᖅᑕᖓᓂ ᖃᐅᔨᓴᖅᑕᐅᓪᓚᕆᓚᐅᖅᓯᒪᙱᒻᒪᑕ. ᑕᒪᓐᓇ ᖃᐅᔨᓴᖅᑕᐅᔪᓐᓇᕐᖁᓪᓗᒍ ᖃᐅᔨᒪᔭᐅᙱᓐᓂᖓᓄᑦ ᖃᐅᔨᒪᓪᓗᑎᒍᑦ ᖁᑦᑎᒃᑐᒥ ᓄᓇᖓ, ᖃᐅᔨᓴᕆᒪᕗᖓ ᖁᐱᕐᕆᓂᑦ ᐅᒥᖓᑉ ᓄᓈᑦᑕ ᕿᑭᖅᑕᖓᓂ ᑐᙵᕕᐅᓗᓂ ᐱᕙᓪᓕᐊᒍᑎᒥᒥᐊᕐᓂᐊᕐᓗᒍ ᐊᑯᓂᐅᔪᖅ ᐅᐊᑦᑎᓂᕐᒧᑦ ᐱᓕᕆᐊᕐᒥᒃ.ᓄᓇᙳᐊᖅᑎᒍᑦ ᓇᓗᓇᐃᒃᑯᑎᕐᒥᑦ ᐅᕙᓃᑦᑐᑦ 79º26′N 90º46′W ᐱᖓᓐᓇᖓᑕ ᕿᑎᐊᓂ ᐅᒥᖓᑦ ᓄᓈᑦᑕ ᕿᑭᖅᑕᖓᓂᒃ, ᒥᒻᒥᐅᓪ ᐅᑭᐅᖅᑕᖅᑐᒥ ᖃᐅᔨᓴᕐᕕᖓ ᑐᑦᑕᕐᕕᒋᒐᔭᖅᑕᕗᑦ ᖃᐅᔨᓴᕐᓂᑎᓐᓂ ᓇᔪᓕᕆᓗᐊᕐᓗᒍ. ᑖᓐᓇ ᒥᒻᒥᐅᓪ ᐅᑭᐅᖅᑕᖅᑐᒥ ᖃᐅᔨᓴᕐᕕᖓ ᐅᐸᒃᓴᐅᒪᓪᓗ ᖃᖓᑕᓲᒃᑯᑦ ᖁᑏᒨᓕᒃᑯᓘᓐᓃᑦ ᑭᓯᐊᓂ, ᖃᐅᓯᐃᑦᑐᒥ ᐊᐅᓪᓚᕕᒃᓴᐅᓪᓗᓂ ᐅᑭᐅᖅᑕᖅᑐᒥ ᓯᖁᕐᔪᐊᖓ ᖃᐅᔨᓴᖅᑕᐅᓗᓂ ᐱᓕᕆᐊᖓᑎᒍᑦ. 2018-ᒥ ᐱᓕᕆᐊᕆᓂᐊᖅᑖᕐᓄᑦ ᐊᐅᓪᓚᕈᑎᒋᒃᑦᑕᓂᐊᖅᑕᒃ ᖃᐅᔨᓴᕐᓂᒧᓪᓗ ᐅᐸᓗᖓᐃᔭᐃᔾᔪᑎᕐᒥᑦ ᑕᐃᒃᑯᑎᒨᓈᖓᓂᐊᖅᑐᑦ ᐅᑭᐅᖅᑕᖅᑐᒥ ᓯᖁᕐᔪᐊᖓ ᖃᐅᔨᓴᖅᑕᐅᓗᓂ ᐱᓕᕆᐊᖓᑎᒍᑦ ᑐᒃᓯᕋᐅᑎ ᑕᒻᒃᑯᓄᖓ ᐃᑲᔫᑕᐅᔪᒪᓪᓗᖓ ᓈᑎᓇᖅᑲᖅᑐᖅ ᓈᑦᑕᐅᓚᐅᖅᓯᒪᔪᖅ ᑖᒃᑕ ᕙᐃᓐ ᐳᓛᑦ (ᑐᑭᒧᐊᑦᑎᑦᑎᕐ ᒥᒻᒥᐅᓪ ᐅᑭᐅᖅᑕᖅᑐᒥ ᖃᐅᔨᓴᕐᕕᖓᓂ) ᑕᐃᒃᑯᑎᒨᓇ ᐊᑐᖅᑐᓂ "ᒥᒻᒥᐅᓪ ᐅᑭᐅᖅᑕᖅᑐᒥ ᖃᐅᔨᓴᕐᕕᐸ ᑐᙵᕕᒋᔭᐅᔪᑦ ᖃᐅᔨᓴᕐᓂᕐᒥᑎᒍᑦ". ᑕᐃᒃᑯᐊᑐᐊᖑᓪᓗᑎᑦ ᒥᒻᒥᐅᓪ ᐅᑭᐅᖅᑕᖅᑐᒥ ᖃᐅᔨᓴᕐᕕᖓᓃᑦᑐᑦ, ᑖᓐᓇ ᐅᒥᖓᐸ ᓄᓈᑦᑕ ᕿᑭᖅᑕᖓ ᓇᔪᖅᑕᐅᙱᑦᑐᖅ ᐃᓄᖕᓄᑦ.ᖃᓂᑖᖅ ᓄᓇᓕᐅᔪᖅ ᒥᒻᒥᐅᓪ ᐅᑭᐅᖅᑕᖅᑐᒥ ᖃᐅᔨᓴᕐᕕᖓᓄᑦ ᔫᓅᑲᐅᕗᖅ ᖃᐅᔨᓴᕐᕕᒃ ᐅᖅᓱᖅᑰᑉ ᕿᑭᖅᑕᖓᓂ, 111 ᑭᓛᒥᑐᕐᑲᓴᒃ ᐅᐊᖓᓇᖓᓂ. ᖃᓂᑖᖅ ᒥᒻᒥᐅᓪ ᐅᑭᐅᖅᑕᖅᑐᒥ ᖃᐅᔨᓴᕐᕕᒻᒧᑦ ᐃᓄᓐᓄᑦ ᓄᓇᓕᕆᔭᖅ ᐅᖅᓱᖅᑰᖑᕗᖅ ᐅᖅᓱᖅᑰᑉ ᕿᑭᖅᑕᖓᓂ, 382 ᑭᓛᒥᑐᕐᑲᓴᓂᑦ ᐅᖓᓯᓐᓂᓕᒃ ᓂᒋᐊᓄᑦ. ᖃᐅᔨᔪᓐᓇᖁᓪᓗᑕ ᖃᓄᐃᑦᑐᓪᓚᑦᑖᖑᒻᒪᖔᑕ ᖁᐱᕐᕆᐃᑦ ᖃᓄᐃᓕᖓᓂᕆᑕ ᐊᓂᒍᖅᐸᓪᓕᐊᑎᓪᓗᒍ, ᓄᓇᑐᐃᓐᓇᕐᒥ ᖃᐅᔨᓴᖃᔭᖅᑐᒍᑦ ᑕᒪᐃᓐᓂᓕᒫᖅ ᒥᒻᒥᐅᓪ ᐅᑭᐅᖅᑕᖅᑐᒥ ᖃᐅᔨᓴᕐᕕᖓᑕ ᐊᐅᔭᒃᑯᑦ ᐊᐅᓚᓂᕆᕙᑦᑕᖓᓂ (ᐱᒋᐊᖅᑎᓪᓗᒍ ᔪᓚᐃ ᑎᑭᓪᓗᒍ ᐃᓱᓕᑉᐸᑦ ᐋᒡᒌᓯ).ᒫᓐᓇᐅᔪᖅ ᖃᐅᔨᓴᕐᓂᕆᒍᒪᔭᕗᑦ ᒪᕐᑮᔾᔮᙱᒃᑲᓗᐊᖅᑎᓪᓗᒥᒃ ᐊᐅᔭᒃᑯᑦ ᖃᐅᔨᓴᕐᓇᒥ, ᑖᔅᓯᒪᐸ ᐱᓇᓱᐊᖅᑰᑉ ᐱᔭᕇᕋᓱᐊᕐᓂᐊᖅᑕᖓ ᐱᓕᕆᐊᖅ ᐊᑯᓂᐅᔪᑦ ᐅᐊᑦᑎᓂᕐᒧᑦ ᐱᓕᕆᐊᓕᐅᕐᓗᖓ ᐊᕿᒍᑕᒦᑦ ᑲᒪᒋᖃᑦᑕᕐᓗᒍ ᐊᒥᓱᓄᑦ ᐅᑭᐅᓄᑦ.ᑖᓐᓇ ᐱᓕᕆᐊᖅ ᖃᐅᔨᓴᕆᐊᖃᕐᓇᒪᕆᖕᓂᐊᕐᒪᑦ ᒥᑭᔪᓄᑦ ᓇᔪᖅᑕᐅᔫᓂᑦ ᐊᓯᖏᓪᓗ ᖁᐱᕐᕆᐃᑦ ᖃᐅᔨᓴᖅᑕᐅᓗᑎᑦ ᐅᒥᖓᐸ ᓄᓇᖓᑕ ᕿᑭᖅᑕᖓᓂ. ᓇᓗᓇᐃᒃᑯᓯᖅᓯᐃᕐᑕᕈᒪᕗᖓ ᑎᑎᕋᕐᓗᒥᑦ ᑕᒪᐃᓐᓂᓖᑦ ᒥᑭᔪᓄᑦ ᓇᔪᖅᑕᐅᔫᑦ ᓇᓗᓇᐃᖃᒃᓴᐅᓚᔭᖅᑐᑦ ᑕᐃᑲᓂ ᖃᓂᒥᔭᕐᓗᓂ ᒥᒻᒥᐅᓪ ᐅᑭᐅᖅᑕᖅᑐᒥ ᖃᐅᔨᓴᕐᕕᖓᓂ, ᐊᒥᐊᓕᒃ ᑕᓯᖅ ᑕᐅᕙᓃᑦᑐᓂ. ᐊᔾᔨᓕᐅᕆᔪᐊᓐᓇᑦᑎᐊᖅᑐᒥᒃ ᐊᔾᔨᓕᐅᕈᑎᒥᒃ ᐊᑐᕐᓗᓂ (ᔫᕐᓗᖃᐃᓗ ᖃᖓᑕᑎᓚᐅᔪᓐᓇᖅᑐᒧᑦ ᐃᓕᓗᒍ) ᑕᑯᒃᓴᐅᑎᑦᑎᒍᓐᓇᕋᔭᖅᑐᑦ ᐊᔾᔨᒥᙵᕆᑦᑑᓂᕆᓐᓂ ᓄᓇᒥ ᐱᔭᕆᐊᕿᓐᓂᖅᓴᐅᓚᔭᕐᓚᑕ ᕿᒥᕐᕈᐊᑐᐃᓐᓇᕋᓱᐊᙳᕆᓪᓗᒍ ᐃᔾᔨᓐᓄᒃ, ᐊᒻᒪᓗ ᑕᐃᒪᐃᒃᑯᒪ ᐱᓇᓱᐊᓚᖅᑲᕐᓗᖓ ᖃᐅᔨᓴᕐᓂᕆᓚᔭᖅᑕᓚ ᓄᓇᙳᐊᓕᐅᕐᓗᒥᑦ ᒥᑭᔪᓄᑦ ᖁᐱᕐᕆᓄᑦ ᓇᔪᖅᑕᐅᔫᑦ ᖃᐅᔨᓴᕐᕕᒋᔭᓐᓂᒃ.ᖁᐱᕐᕆᓄᑦ ᓇᔪᓕᕆᔭᐅᔪᑦ ᖃᐅᔨᓴᕐᕕᒻᒥ ᓇᓗᓇᐃᖅᑕᐅᓚᐅᖅᑎᓪᓗᒥᑦ, ᖁᖅᓱᖅᑐᓂᑦ ᓇᓗᓇᐃᒃᑯᓯᖅᓯᕋᔭᖅᑕᕋ ᖁᐱᕐᕆᓄᑦ ᓄᐊᑦᑎᕝᒃ (ᒥᑭᔪᑦ ᖁᖅᓱᖅᑐᑦ ᒪᒃᑲᐅᔭᑦ, 18 ᓯᐊᓐᑕᒦᑕᓂᑦ ᑐᑭᒧᑦ ᑕᑭᓂᓖᑦ ᐊᑐᓂ) ᑕᐃᑲᓂ ᖁᐱᕐᕆᓄᑦ ᓇᔪᓕᕆᔭᐅᔪᕐᒥᓐᓅᕐᓗᒥᑦ ᖃᐅᒪᔭᕈᓘᔭᕐᓂᑦ ᓄᓇᒦᑉᐸᑦᑐᓂᓪᓗ ᖁᐱᕐᕆᓂᑦ ᓄᐊᑦᑎᕐᑲᑦᑕᕋᔭᕋᒪ. ᑕᐃᑲᓂ ᐃᓂᖕᒥᑦ ᐊᑐᓂ ᖁᐱᕐᕈᕐᕕᐅᔪᓂᑦ ᐃᓕᓯᕕᒥᔭᓐᓂᑦ, ᐃᑉᔪᖓᓂ ᓄᐊᑦᑎᕐᑲᑦᑕᕋᔭᖅᑐᖓ ᖃᐅᔨᓵᕐᓗᒥᑦ ᖁᐱᕐᕆᐃᑦ ᐃᑉᔪᓃᓯᑦ. ᓄᐊᑦᑎᑦᑎᐊᕐᑲᑦᑕᕐᓗᓂ ᖃᐅᔨᓴᕐᓇᐅᑎᓪᓗᒍ ᐊᐅᔭᓕᒫᖅ ᖃᐅᔨᔪᓇᑎᑦᑎᑦᑎᐊᕋᔭᖅᑐᑦ ᖁᐱᕐᕆᐃᑦ ᖃᓄᐃᑦᑑᓂᖓᓐᓂ ᐅᒥᖓᑦ ᓄᓇᖓᑕ ᕿᑭᖅᑕᖓᓂ, ᐊᒻᒪᓗᑦᑕᐅᖅ ᖁᐱᕐᕆᐃᑦ ᓇᔪᖓᕐᒥᑦ ᖃᐅᔨᔭᐅᓗᑎᑦ ᑐᕿᖓᓂᕐᑲᕐᓚᑕ. ᑕᒪᓐᓇ ᐱᓕᕆᐊᕐᑲᐃᓐᓇᕐᓗᓂ ᖃᐅᔨᓴᕐᓂᖅ ᑐᙵᕕᓕᐅᕆᑕᐅᔪᓐᓇᕋᔭᕐᒥᔪᖅ ᓯᕗᓂᒃᓴᒥ ᖁᐱᕐᕆᐃᑦ ᖃᐅᔨᓴᖅᑕᐅᓂᒃᓴᖏᓐᓂ ᐅᒥᖓᒃ ᓄᓇᖓᑕ ᕿᑭᖅᑕᖓᓂ.ᓯᓚᐸ ᐊᓯᕗᕐᔨᕐᓂᖓ ᒫᓇᒫᕈᒃ ᐊᒃᓱᒪᓇᐊᒍᒃ ᓱᑲᑦᑐᒥᓪᓗ ᐊᓯᔾᔨᓯᒪᔪᖅ ᐅᑭᐅᖅᑕᖅᑐᐸ ᐊᕙᑎᖓᓂᒃ, ᐊᒻᒪᓗ ᐊᓯᔾᔨᕐᒥᓇᐅᔭᙳᐊᖅᑐᓂ ᐅᑭᐅᖅᑕᖅᑐᒥ ᐆᒪᔪᐃᑦ ᓇᔪᒐᕐᒥᓂᑦ ᑕᐃᒪᐃᑦᑐᖃᓪᓗᐅᖅᓯᒪᙱᑦᑐᒥᒃ ᓱᑲᑦᑐᒥᒃ. ᐊᑦᑐᐃᓂᖃᕐᓂᕐᒥᑦ ᑕᒪᒃᑯᐊ ᓱᑲᑦᑐᒥᒃ ᐊᕙᑎᒥ ᐊᓯᔾᔨᕐᓂᐅᔪᓄᑦ ᑭᓯᐊᓂᓕ ᑐᑭᓯᒪᓕᕆᐅᓗᐊᖏᓗᙱᒪᓪᓚᑦ, ᖃᐅᔨᒪᔭᐅᙱᓗᐊᕐᓂᑎᓐᓄᑦ ᑐᑭᓯᒪᑐᐃᓐᓇᕐᓗᒍ ᖃᓄᐃᓕᐅᖅᑕᕐᓂᑯᓇᔭᖓ ᐅᑭᐅᖅᑕᖅᑐᒥ ᓄᓇᖓᑕ. ᐊᒥᓲᓂᕆᓐᓄᑦ ᐅᑭᐅᖅᑕᖅᑐᒥ ᓄᓇᖓᓂ, ᑖᒃᑯᐊ ᖁᐱᕐᕆᐃᑦ ᖃᐅᔨᓴᕐᓗᒥᑦ ᓈᒻᒪᑦᑎᐊᖃᔭᖅᑐᑦ ᐆᒪᔪᐃᑦ ᖃᐅᔨᓗᓂ ᐅᑭᐅᖅᑕᖅᑐᐸ ᐊᕙᑎᖓᑕ ᐊᓯᔾᔨᕐᓂᖓᓂᒃ.ᖃᐅᔨᓴᖅᑕᐅᓯᒪᙱᑦᑐᑦ ᖁᐱᕐᕆᐃᑦ ᐅᒥᖓᐸ ᓄᓈᑦᑕ ᕿᑭᖅᑕᖓᓂ ᐱᐅᔪᒻᒪᓇᐊᒍᒃᑯᑦ ᐱᕕᖃᖅᑎᑦᑎᒍᑕᐅᕗᖅ ᖃᐅᔨᒪᔭᐅᓕᕐᓗᑎᑦ ᑐᑭᓯᐅᒪᓂᖃᓕᕐᓗᑕ ᖁᑦᑎᒃᑐᑉ ᓄᓇᖓ ᐊᔾᔨᒌᙵᕆᓂᖅᑲᕐᓂ, ᐊᒻᒪᓗ ᐋᖅᑮᓗᑕ ᐊᑯᓂᐅᔪᓄᑦ ᐅᐊᑦᑎᓂᕐᒧᑦ ᐱᓕᕆᐊᕐᒥᒃ ᐊᑐᖅᑕᐅᔪᓐᓇᓕᖅᑐᑦ ᖃᐅᔨᔭᐅᓗᓂ ᐊᕙᑎᐸ ᐊᓯᔾᔨᕐᓂᖓᓂᒃ ᐊᓂᒍᖅᐸᓪᓕᐊᑎᓪᓗᒍ. ᑭᓯᐊᓂᓕ ᐅᐊᑦᑎᓂᕐᒧᑦ ᐱᓕᕆᐊᖅ ᑲᔪᓯᓂᖃᑦᑎᐊᕈᓐᓇᖁᓪᓗᒍ ᐊᓯᔾᔨᕐᓂᐅᔪᓂᑦ ᖃᐅᔨᔪᓐᓇᕐᓗᑎᑦ ᑖᒃᑯᓄᖓ ᐅᑭᐅᖅᑕᖅᑐᒥ ᓄᓇᕐᒥᓐᓄᑦ ᐊᓂᒍᖅᐸᓪᓕᐊᑎᓪᓗᒍ, ᑐᑭᓯᐅᒪᓂᖄᕐᔪᒥᐊᖅᑐᒍᑦ ᖁᐱᕐᕆᓂᑦ ᕿᑭᖅᑕᒥᒦᖅᑐᓂᑦ. ᑕᒪᓐᓇ ᑐᑭᓯᒥᐊᕈᑎᐅᔪᖅ ᑐᙵᕕᖓ ᐱᑕᖃᙱᓗᐊᕐᓂᖓᓄᑦ, ᖃᐅᔨᓴᖅᑕᓪᓕᒪᓂᒥᐊᖅᐳᒧᑦ ᐱᒋᐊᕈᑎᒥᔭᐅᓗᓂ ᐱᓕᕆᐊᕐᒧᑦ.

Personnel

Personnel on site: 5
Days on site: 62
Total Person days: 310
Operations Phase: from 2018-07-01 to 2018-09-01

Activités

Activités

Emplacement	Type d'activité	Statut des terres	Historique du site	Site à valeur archéologique ou paléontologique	Proximité des collectivités les plus proches et de toute zone protégée
western-central Axel Heiberg Island	Scientific/International Polar Year Research	Crown	Expedition Fjord on Axel Heiberg Island is located within a polar desert climate, with the surrounding landscape and conditions providing an invaluable opportunity to examine terrestrial processes in a cold, dry environment. The scientific activities based out of the McGill Arctic Research Station (M.A.R.S.) are extremely broad in scope, representing physical, biological, and technological investigations (Pollard et al., 2009).	There are no known archaeological sites in western-central Axel Heiberg Island. The area is however potentially of interest to palaeontologists.	Axel Heiberg Island is uninhabited, except for the seasonally occupied McGill Arctic Research Station. The closest human settlement is the Eureka research base on Ellesmere Island. The closest Inuit community is Grise Fiord on Ellesmere Island.
McGill Arctic Research Station (principal study area)	Scientific/International Polar Year Research	Crown	From McGill website: The McGill Arctic Research Station (MARS) is located 8km inland at Expedition Fjord, Nunavut, on Central Axel Heiberg Island in the Canadian High Arctic (approximately 79º26'N, 90º46'W). Established in 1960, MARS is one of the longest-operating seasonal field research facilities in the high Arctic. The station consists of a small research hut, a cook house, and two temporary structures. MARS can comfortably accommodate up to twelve persons.	There are no known archaeological sites in western-central Axel Heiberg Island. The area is however potentially of interest to palaeontologists.	Axel Heiberg Island is uninhabited, except for the seasonally occupied McGill Arctic Research Station. The closest human settlement is the Eureka research base on Ellesmere Island. The closest Inuit community is Grise Fiord on Ellesmere Island.

Engagement de la collectivité et avantages pour la région

Collectivité	Nom	Organisme	Date de la prise de contact

Information is not available

Autorisations

Indiquez les zones dans lesquelles le projet est situé

Autorisations

Organisme de régulation	Description des autorisations	État actuel	Date de l'émission/de la demande	Date d'échéance
Institut de recherche du Nunavut	The following instructions were provided to me by Mosha Côté (Manager, Research Liaison, Nunavut Research Institute): You will need an NRI Land, Marine and Freshwater License. To obtain the necessary authorizations for this, please visit the Nunavut Planning Commissions website at www.npc.nunavut.ca and create an account and submit your project proposal. Once a conformity determination for land use is released, they (The NPC) will then send your proposal to the Nunavut Impact Review Board for possible screening. After about 45 days from when you first submitted your proposal, they (The NIRB) will then distribute a positive screening decision, which will then allow me to distribute your license.	Applied, Decision Pending		

Project transportation types

Transportation Type	Quantité	Utilisation proposée	Length of Use
Air	0	Air transportation to the McGill Arctic Research Station (MARS) on Axel Heiberg Island is supported by de Havilland Canada DHC-6 Twin Otter aircraft of Kenn Borek Air Ltd. operating out of the Polar Continental Shelf Program (PCSP) in Resolute Bay. Logistical support for my project is included in the logistics request form submitted to the PCSP by Dr.	

		Wayne Pollard (Director, MARS) under MARS baseline studies.	

Project accomodation types

Permanent Camp

Utilisation de matériel

Équipement à utiliser (y compris les perceuses, les pompes, les aéronefs, les véhicules, etc.)

Type d'équipement	Quantité	Taille – Dimensions	Utilisation proposée
de Havilland Canada DHC-6 Twin Otter	1	Length: 15 m; Wingspan: 20 m	Transportation to and from the McGill Arctic Research Station (MARS) is supported by Twin Otter aircraft of Kenn Borek Air Ltd. operating out of the Polar Continental Shelf Program (PCSP) in Resolute. Logistical support for my project is included in the logistics request form submitted to the PCSP by Dr. Wayne Pollard (Director, MARS) under MARS baseline studies.
hand trowel	1	37 cm x 18 cm	Collection of soil samples.
hyperspectral camera	1	11cm x 30cm x 10cm	Hypersprectral imaging of tundra terrain to reveal differences in vegetation cover, in order to classify and define the boundaries of microhabitats on Axel Heiberg Island.
Insect pan	60	18cm diameter	Collection of terrestrial arthropods
Aerial drone	1	45 cm – 50 cm frame size	Hyperspectral imaging of tundra terrain from the air.

Décrivez l'utilisation du carburant et des marchandises dangereuses

Décrivez l'utilisation de carburant :	Type de carburant	Nombre de conteneurs	Capacité du conteneur	Quantité totale	Unités	Utilisation proposée
Aviation fuel	fuel	6	205	1230	Liters	Fuel for aircraft at the McGill Arctic Research Station. There are four (4) fuel storage locations for 205 litre fuel drums: these include one adjacent to the runway to store fuel for aircraft (Jet-A, Jet-B). The number of fuel drums stored adjacent to the aircraft runway fluctuates as a result of fuel caching by PCSP.
Gasoline	fuel	3	205	615	Liters	Fuel for snowmobiles, ATVs, and generators at the McGill Arctic Research Station (note that vehicles are not relevant to the applicant's project). There are four (4) fuel storage locations

						for 205 litre fuel drums: these include one to store fuel for motorized equipment such as snowmobiles, ATVs, and generators (gasoline).
Diesel	fuel	6	205	1230	Liters	Fuel for heat at the McGill Arctic Research Station. There are four (4) fuel storage locations for 205 litre fuel drums: these include three for storing fuel and/or feeder drums to heat buildings (diesel).
Propane	fuel	2	45	90	Kg	Fuel for heating (stove) and cooling (freezer) at the McGill Arctic Research Station. There is one (1) storage area next to the kitchen building.
Propane	fuel	6	9	54	Kg	Fuel for heating (stove) and cooling (freezer) at the McGill Arctic Research Station. There is one (1) storage area next to the kitchen building.
70% ethanol solution	hazardous	9	0.5	4.5	Liters	Preservation of arthropod specimens.

Consommation d'eau

Quantité quotidienne (m3)	Méthodes de récupération de l'eau proposées	Emplacement de récupération de l'eau proposé
0	The McGill Arctic Research Station has a pump to retrieve water from Colour Lake for camp purposes.	Colour Lake is well established as the source of water for camp purposes at the McGill Arctic Research Station (since 1960).

Déchets

Gestion des déchets

Activités du projet	Type des déchets	Quantité prévue	Méthode d'élimination	Procédures de traitement supplémentaires
Scientific/International Polar Year Research	Déchets combustibles	60 pounds	At the McGill Arctic Research Station, there is a SmartAsh Incinerator for processing of combustible wastes.	For additional details, please refer to the attached document NPC Environmental Impacts and Proposed Mitigations.

Scientific/International Polar Year Research	Eaux grises	205 L	At the McGill Arctic Research Station, grey water is disposed of in a sump constructed from a perforated 205 litre barrel buried 50 cm into gravel, which is located > 50 m from any streams or water bodies.	For additional details, please refer to the attached document NPC Environmental Impacts and Proposed Mitigations.
Scientific/International Polar Year Research	Déchets non combustibles	60 pounds	At the McGill Arctic Research Station, all glass, metal, non-burnable waste and incinerated ash is packaged in empty 205 litre fuel drums and removed from camp on the first available aircraft for proper disposal.	For additional details, please refer to the attached document NPC Environmental Impacts and Proposed Mitigations
Scientific/International Polar Year Research	Eaux usées (matières de vidange)	62 pounds	At the McGill Arctic Research Station, there is an Incinolet toilet for solid human waste disposal. Liquid human waste is disposed of in a latrine.	For additional details, please refer to the attached document NPC Environmental Impacts and Proposed Mitigations.

Répercussions environnementales :

This scientific research project involves digging several small depressions into the ground, spread out over a large area, in order to lay down insect pans. Soil from the small depressions will be collected for extraction of soil-dwelling arthropods. The environmental impact of digging these small depressions will be negligible, because each depression will be small and shallow (the minimum size to fit an 18 cm diameter dish), and requiring only a small hand trowel to carry out the task. Furthermore, the same depressions will be re-used every field season as this is a proposed long-term monitoring project. This project involves the collection of a significant number of terrestrial arthropods. Care will be taken to ensure that insect pans are spread out sufficiently (if necessary, modifying the collection protocol) so that they do not have any significant negative impact on local arthropod populations.

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 de l'environnement existant : Environnement physique

From Pollard et al. (2009): Polar desert conditions characterized by cold, dry winters and cool summers are predominant in the region. The nearest long- term meteorological records are from Eureka, which reveal a mean annual air temperature (MAAT) of negative 19.7 degrees C, mean monthly temperatures of negative 36.1 1 degrees C and positive 5.4 degrees C for January and July, respectively, and minimum air temperatures frequently reaching negative 55 degrees C. Periodic meteorological records are available for Expedition Fjord over the past 47 years, with a more complete record for Colour Lake available since 1992 displaying a MAAT of negative 15.5 degrees C (Andersen et al., 2008). Recent data from a broader network of automatic weather stations for the Expedition Fjord area indicate MAAT's as much 2–3 degrees C cooler than the Colour Lake site depending on setting.Annual precipitation at Eureka consists of approximately 64 mm total, of which 60% falls as snow (Pollard and Bell, 1998). Though long-term precipitation values are not available for Expedition Fjord, it is assumed that the totals are somewhat greater than those measured at Eureka likely due to a rain shadow effect caused by the mountain range on the eastern Axel Heiberg Island that blocks precipitation systems from reaching Ellesmere Island (Edlund and Alt, 1989). Earlier research near Expedition Fjord suggests a mean annual accumulation of 371 mm of water equivalent on the nearby Mueller ice cap (Muller 1963).2.2. Geology: Axel Heiberg Island is situated within the Sverdrup Basin (Hoe ̈n, 1964; Thorsteinsson and Tozier, 1970), a northeasterly striking sedimentary trough covering an area of approximately 3,13,000 km2 (Pollard et al., 1999). Near the head of Expedition Fjord, where the M.A.R.S. camp is located, peaks rise to a maximum of approximately 2000m ASL. Asymmetrical ridges resulting from breached anticlines are characterized by steep scarp faces angled 70–801 and dip slopes of 25–351.Though piercement structures can create somewhat regular and symmetrical slope features, the area is dominated by 'serrated' profiles resulting from gypsum weathering and anhy- drite outcrops along with resistant volcanic sills and dikes. The island is characterized by a series of evaporite diapirs that have been revealed by erosion over the past tens of thousands of years. The diapirs were formed by the upward intrusion of Upper Paleozoic evaporites and often appear as large domed structures cored by rock salt (Stephenson et al., 1992). The Carboniferous evaporites are comprised of an upper anhydrite layer up to 500 m thick with limestone interbeds overlying a lower layer of rock salt (Stephenson et al., 1992).Seven perennial spring sites have been identified on Axel Heiberg Island (Pollard et al., 1999; Andersen et al., 2008). The discharge temperatures are between 4 and +12 1C and flow rates vary from o1 to 30–40 l/s. Discharge is typically mineralized with varying amounts of dissolved salts that depress their freezing temperature. The springs derive their dissolved salts from the underlying evaporates and their location most often can be linked to a nearby diapir.2.3. Permafrost/geomorphologyPermafrost is defined as any ground material that stays below 0 1C for at least two consecutive years (van Everdingen, 2002). The depth of permafrost at the M.A.R.S. camp is estimated to be 400–500 m based on surface temperature and regional heat flow patterns. Approximately 60km from M.A.R.S., the thickness of permafrost observed in an exploration well (oil and gas) was greater than 400m, a value consistent with other exploration wells in the region that revealed permafrost depths 400–600m (Taylor and Judge, 1976). The thin seasonally thawed active layer atop the permafrost typically measures 40–60cm in thickness.Quaternary sediments of fluvial, deltaic, marine, and glacial origins comprise the surficial deposits, with tussock microtopo- graphy dominating lower wet areas and poorly sorted circles and stripes evident at mid-elevations while bedrock dominates higher elevations. Several characteristic permafrost landforms are wide- spread throughout the region, including several small pingos at Middle Fjord, icing blisters and mounds in the Expedition River floodplain, and extensive polygonal terrain and ice wedge development in fluvial and colluvial deposits. Ground ice is also widespread with ice bonded permafrost occurring in unconsoli- dated materials, buried glacier ice occurring in most moraines, and bodies of intrasedimental ice occurring beneath fine-grained marine deposits. Source: Pollard, W., Haltigin, T., Whyte, L., Niederberger, T., Andersen, D., Omelon, C.,Nadeau, J., Ecclestone, M., and Lebeuf, M. 2009. Overview of analogue science activities at the McGill Arctic Research Station, Axel Heiberg Island, Canadian High Arctic. Planetary and Space Science 57: 646-659.

Description de l'environnement existant : Environnement biologique

From my personal observations in 2016: Western-central Axel Heiberg Island is a relatively lush Arctic locality. the terrain comprises a mosaic of diverse microhabitats, differing in vegetation cover. There is a large variety of plant life. Fungi and lichens are abundant. Terrestrial arthropods are the most conspicuous animal group present, especially spiders, true flies and springtails. Common birds include Snow Buntings, Long-tailed Jaegers and Rock Ptarmigans. Common mammals include Arctic hares, Arctic foxes, and ermines.

Description de l’environnement existant : Environnement socio-économique

Axel Heiberg Island is uninhabited, except for the seasonally-occupied McGill Arctic Research Station.

Miscellaneous Project Information

Identification des répercussions et mesures d’atténuation proposées

This project involves digging several small depressions into the ground, spread out over a large area, in order to lay down insect pans. Soil from the small depressions will be collected for extraction of soil-dwelling arthropods. The environmental impact of digging these small depressions will be negligible, because each depression will be small and shallow (the minimum size to fit an 18 cm diameter dish), and requiring only a small hand trowel to carry out the task. Furthermore, the same depressions will be re-used every field season as this is a proposed long-term monitoring project. This project involves the collection of a significant number of terrestrial arthropods. Care will be taken to ensure that insect pans are spread out sufficiently (if necessary, modifying the collection protocol) so that they do not have any significant negative impact on local arthropod populations.

Répercussions cumulatives

Impacts

Identification des répercussions environnementales

Construction																									
-		-	-	-	-	-	-	-	-	-	-	-	-		-	-	-	-	-		-	-	-	-	-
Exploitation																									
Scientific/International Polar Year Research		-	-	-	-	-	-	-	-	-	-	-	-		-	N	-	N	-		-	-	-	-	-
Désaffectation																									
-		-	-	-	-	-	-	-	-	-	-	-	-		-	-	-	-	-		-	-	-	-	-

(P = Positive, N = Négative et non gérable, M = Négative et gérable, U = Inconnue)