



NIRB Application for Screening #125881

The B.I.G. (Before It's Gone) Expedition

Application Type: New

Project Type: Scientific Research

Application Date: 2/6/2024 12:13:02 PM

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

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

Project Proponent: Felicity Aston
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DETAILS

Non-technical project proposal description

English: The B.I.G. (Before It's Gone) Expedition A 5-woman ski expedition from Borden Island to Isachsen on Ellef Rignes Island across the Prince Gustaf Adolf Sea, camping on sea ice and collecting small-volume surface snow, surface ice and water samples, as well as data for two citizen science studies. The expedition route is approximately 150km and is expected to take 10 days of ski travel. While acknowledging the impact our presence will have, the design of the expedition is intended to ensure minimal possible negative impact to environment, wildlife and people. Date of Expedition: 10th April – 22nd April 2024 Fieldwork to be undertaken: • Sampling At five locations along the expedition route across the Prince Gustaf Adolf Sea the expedition will collect surface snow, surface ice and (where possible) water samples in 500ml containers. No motorized or power tools are used to collect the samples – only a scoop, an ice axe and a hand augur. Weather and snow conditions will be recorded at each sample location. • Data collection for citizen science studies At regular intervals throughout the expedition snow characteristics will be recorded and contributed to the Snow Scope platform to an open access, citizen science database. Data will also be gathered for the citizen science Globe Observer platform, an open access database recording Arctic cloud cover. Analysis: The snow, ice and water samples collected by the expedition team will be analysed at the University of Colorado in the US and at the National Oceanography Centre in the UK. The samples will be analysed for black carbon, microplastic and heavy metal content to explore the distribution by the atmosphere across the Arctic region of these materials generated in northern Europe and North America. Similar expedition projects have been completed in Svalbard, Greenland and Iceland. Output: • Dr Ulyana Horodyskyj Pena will be analysing samples for black carbon and the results will form part of a dataset she is compiling from remote regions across the world including K2 and Antarctica. The dataset will be made freely available online. Dr Horodyskyj Pena intends to use this dataset to generate published literature and it is hoped others working in this area of scientific investigations may also use this data in published literature. • Felicity Aston will be analysing the samples for microplastic and heavy metal content as part of her PhD studies at the University of Southampton. Her PhD project seeks to answer two questions: a) What are the source regions of microplastic and lead contaminants deposited via the atmosphere across the Arctic and what are the possible routes of transport from North America and Northern Europe? and b) What can be discovered about the cycling and incorporation of atmospheric deposition within sea ice? The results will be published as part of her thesis and associated literature. The results will be made freely available online and efforts are being made to identify ways in which any results and data may be shared usefully within Nunavut specifically

French: L'Expédition B.I.G. (Before It's Gone / Avant qu'il ne soit trop tard) C'est une expédition à ski de cinq femmes qui partira de l'île Borden jusqu'à Isachsen sur l'île Ellef Ringnes en traversant la mer du Prince-Gustave-Adolf. L'expédition campera sur la banquise et collectera des échantillons, en petite quantité, de neige superficielle, de glace en surface et d'eau, ainsi que des données pour deux études de science citoyenne. Le parcours de l'expédition est d'environ 150 km et devrait prendre 10 jours de voyage à ski. Tout en reconnaissant l'impact de notre présence, la conception de l'expédition vise à minimiser autant que possible les impacts négatifs sur l'environnement, la faune et les personnes. Date de l'expédition : 10 avril – 22 avril 2024 Travaux sur le terrain à réaliser : • Échantillonnage À cinq endroits le long du parcours de l'expédition à travers la mer du Prince-Gustave-Adolf, l'expédition collectera de la neige superficielle, de la glace en surface et (si possible) des échantillons d'eau dans des récipients de 500 ml. Aucun outil motorisé ou électrique n'est utilisé pour collecter les échantillons, seulement une pelle, une pioche à glace et une tarière manuelle. Les conditions météorologiques et de neige seront enregistrées à chaque emplacement d'échantillonnage. • Collecte de données pour des études de science citoyenne À intervalles réguliers tout au long de l'expédition, les caractéristiques de la neige seront enregistrées et contribueront à la plateforme Snow Scope, une base de données de science citoyenne en accès libre. Des données seront également recueillies pour la plateforme Globe Observer, une base de données en accès libre, enregistrant la couverture nuageuse arctique. Analyse : • Les échantillons de neige, de glace et d'eau collectés par l'équipe de l'expédition seront analysés à l'Université du Colorado aux États-Unis et au Centre National d'Océanographie au Royaume-Uni. Les échantillons seront analysés pour déterminer la présence de carbone noir, de microplastiques et de métaux lourds afin d'explorer leur distribution dans l'atmosphère à travers la région arctique, provenant de l'Europe du Nord et de l'Amérique du Nord. Des

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Operations Phase: from 2024-04-10 to 2024-04-22

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Closure Phase: from 2024-04-10 to 2024-04-22
Post-Closure Phase: from 2024-04-10 to 2024-04-22

Activities

Location	Activity Type	Land Status	Site history	Site archaeological or paleontological value	Proximity to the nearest communities and any protected areas
Ideal site of first sampling location. Low-volume surface snow and surface ice samples will be collected from sea ice at 5 randomly selected points across an area not more than 50m ²	Sampling sites	Marine	Sea Ice - history not known	None	Approx. 500km
Ideal site of second sampling location. Low-volume surface snow and surface ice samples will be collected from sea ice at 5 randomly selected points across an area not more than 50m ²	Sampling sites	Marine	Sea Ice - history not known	None	Approx. 500km
Ideal site of third sampling location. Low-volume surface snow and surface ice samples will be collected from sea ice at 5 randomly selected points across an area not more than 50m ²	Sampling sites	Marine	Sea Ice - history not known	None	Approx. 500km
Ideal site of fourth sampling	Sampling sites	Marine	Sea Ice - history not known	None	Approx. 500km

location. Low-volume surface snow and surface ice samples will be collected from sea ice at 5 randomly selected points across an area not more than 50m2					
Ideal site of fifth sampling location. Low-volume surface snow and surface ice samples will be collected from sea ice at 5 randomly selected points across an area not more than 50m2	Sampling sites	Marine	Sea Ice - history not known	None	Approx. 500km
Pick up by Twin Otter from the airstrip at Isachsen.	Airstrip use or construction	Crown	Former mine - abandoned	None	Approx. 500km

Community Involvement & Regional Benefits

Community	Name	Organization	Date Contacted
Information is not available			

Authorizations

Indicate the areas in which the project is located:

Authorizations

Regulatory Authority	Authorization Description	Current Status	Date Issued / Applied	Expiry Date
Government of Nunavut, Nunavut Research Institute	Physical Natural Sciences Research Application	Applied, Decision Pending	2023-12-08	

Project transportation types

Transportation Type	Proposed Use	Length of Use
Air	Chartered Twin Otter flights to and from Resolute Bay from start and end of ski journey	
Water	Ski expedition over sea ice	

Project accomodation types

Temporary Camp

Material Use

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

Equipment Type	Quantity	Size - Dimensions	Proposed Use
Skis and sleds	5 sets	sleds (L 171.5cm, W 60cm, H 25cm); each ski between 170-195cm long and 15cm wide.	The expedition will travel on skis and tow expedition sledges carrying all their supplies and camping equipment.
Camping equipment	100kg	N/A	The 5-woman team will camp on the ice in two 4-man tents. Everything is as lightweight as possible and is transported in expedition sledges by ski.
Scientific equipment	5 x 77 liter boxes	Each box L 60cm, W 40cm, H 40cm	All scientific sampling equipment is manual. The equipment includes stainless steel bottles, polypropylene tubs, stainless steel sampling tools and tyvek clean-suits.
Twin Otter Aircraft DHC-6	2	Length 15.77m, Width 19.8m, Height 5.9m	Two Twin Otter Aircraft will be used to transport the expedition team and equipment from Resolute Bay to the expedition start point. One of these aircraft will collect the team, its equipment and scientific samples from the expedition endpoint at the end of the expedition for return to Resolute Bay.

Detail Fuel and Hazardous Material Use

Detail fuel material use:	Fuel Type	Number of containers	Container Capacity	Total Amount	Units	Proposed Use
Other	fuel	25	1	25	Liters	Liquid stove fuel for camping stoves used by the expedition.

Water Consumption

Daily amount (m3)	Proposed water retrieval methods	Proposed water retrieval location
0	Melting snow to create water using small fluid-fuel camping stoves.	Collecting snow in immediate locality of each temporary camp location

Waste

Waste Management

Project Activity	Type of Waste	Projected Amount Generated	Method of Disposal	Additional treatment procedures
Camp	Greywater	6 Litres	Into snow and/or ice away from camp/areas of activity.	None
Camp	Non-Combustible wastes	4 x 20-25 gallon trash bags	All food packaging and other refuse will be returned to Resolute for proper disposal.	Refuse items will be separated with recycling in mind.
Camp	Sewage (human waste)	36kg	All paper to be returned to Resolute Bay for proper disposal.	None

Environmental Impacts:

Please see Environmental Impact Assessment in documents section for full list of potential impacts and mitigation measures. :- Noise – Plane engine noise , Emissions – aviation fuel, Disturbance to snow cover – caused by plane on landing and taking off Number and duration of flights reduced to minimum possible. Pick up landing will take place on existing air strip in order to reduce disruption to pristine or fragile ground or vulnerable ground flora. Drop off landing to be on fast ice if possible to prevent any disruption to snow cover on land or any underlying flora. :- Disturbance to snow cover – caused by ski tracks, Disturbance to fauna – by smell, noise or physical presence of ski team Efforts will be made to avoid unnecessary noise while travelling and to reduce physical disturbance to ground cover by, for example, skiing in single file where possible. The route taken by the ski expedition will be restricted wherever possible to sea ice to avoid disturbance to snow cover on land. Extra care will be taken to minimise disturbance when travelling on snow on land – for example, by sticking to thick snow cover. :- Camp noise (particularly stoves and tent fabric) and people, Emissions – from fuel used in camping stoves, Waste Disposal Any unnecessary noise or disturbance to snow cover when camping will be avoided. Storage and preparation of food has been planned to reduce aroma as far as possible by, for example, using dehydrated meals prepared in sealed packaging. Food will not be discarded (deliberately or accidentally). Instead, waste will be sealed and carried with the expedition. Grey water will be reduced as much as possible and will be sufficiently buried if unavoidable. Human waste will be sufficiently buried. If camping on land care will be taken to minimise any impact to any flora by, for example, pitching tents on thick snow cover and finding appropriate locations for human waste.

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

Pack ice in the Prince Gustav Adolf Sea is a mix of multiyear, second-year, and first-year ice types. Ice remains landfast for more than half the year, and summertime ice concentration is high (7–9 tenths). In a typical year, less than 20% of the old ice and 50% of the first-year ice melt. There are large interannual fluctuations in ice coverage and some suggestion of a decadal cycle. The average ice thickness in late winter is 3.4 m but subregional means reach 5.5 m. The pack is a mix of two populations, one consisting largely of multiyear ice imported from the zone of heavy ridging along the periphery of the Beaufort gyre and the other consisting of a mix of relatively undeformed first-year, second-year, and multiyear icetypes that grow and age within the sea. The drift of ice through the Prince Gustav Adolf Sea is controlled in the present climate by the formation of stable ice bridges across connecting channels. The drift is episodic.

Description of Existing Environment: Biological Environment

The Prince Gustav Adolf Sea is not proximate to any areas of special protection or designated environmental areas. It does not contain any habitats or migration routes that are protected or designated but wildlife and marine vegetation are present. The pack ice of the Prince Gustav Adolf Sea is both habitat and potential migration route so appropriate measures will be taken to minimise as much as possible any impact of our presence.

Description of Existing Environment: Socio-economic Environment

The Prince Gustav Adolf Sea is a remote area that receives little human traffic and is approx 500km from the nearest communities. Aside for the airstrip that will be used for our extraction at Isachsen there is very little socioeconomic factors.

Miscellaneous Project Information

None added

Identification of Impacts and Proposed Mitigation Measures

Please see the Environmental Impact document included within the documents section for full details of potential impacts and mitigation measures.

Cumulative Effects

The expedition is of such a small scale and scope that it should not significantly add to or instigate any

cumulative environmental impacts.

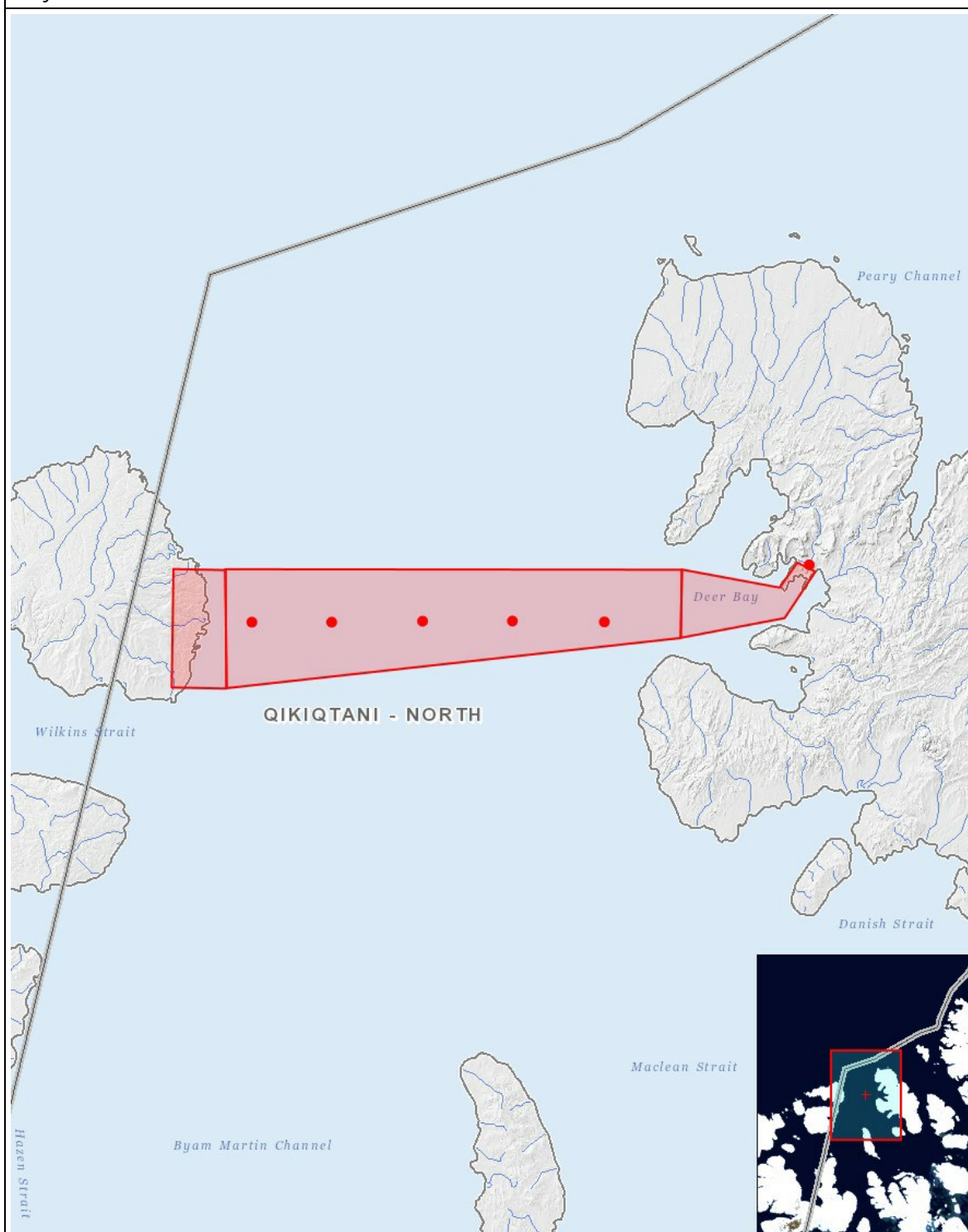
Impacts

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																										
Airstrip use or construction		-	-	-	-	-	-	-	-	-	-	-	N	N		-	-	-	-	-		-	-	-	-	-
Decommissioning																										
-		-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	-	-	-		-	-	-	-	-

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

Project Location



List of Project Geometries

- | | |
|-----------|---|
| 1 polygon | Drop off by ski-fitted Twin Otter will be somewhere in this area. Exact location will be decided by pilot depending on conditions found on the day. |
| 2 polygon | Area within which five sampling locations will be positioned. Exact location will be determined by sea ice conditions encountered, the progress of the ski team, and other logistical factors. |
| 3 polygon | Route of the expedition moving by ski to its endpoint/pick-up location will be within this area. Exact route determined by conditions encountered and logistical factors. |
| 4 point | Ideal site of first sampling location. Low-volume surface snow and surface ice samples will be collected from sea ice at 5 randomly selected points across an area not more than 50m ² |
| | Ideal site of second sampling location. Low-volume surface snow and surface ice |

5 point	samples will be collected from sea ice at 5 randomly selected points across an area not more than 50m ²
6 point	Ideal site of third sampling location. Low-volume surface snow and surface ice samples will be collected from sea ice at 5 randomly selected points across an area not more than 50m ²
7 point	Ideal site of fourth sampling location. Low-volume surface snow and surface ice samples will be collected from sea ice at 5 randomly selected points across an area not more than 50m ²
8 point	Ideal site of fifth sampling location. Low-volume surface snow and surface ice samples will be collected from sea ice at 5 randomly selected points across an area not more than 50m ²
9 point	Pick up by Twin Otter from the airstrip at Isachsen.