NIRB Application for Screening #126202

Movement and genetics of whales in the Canadian Arctic using satellite telemetry, tissue biopsies, and photogrammetry.

Application Type: New

Project Type: Scientific Research

Application Date: Friday, June 20, 2025

Period of operation: from 2025-07-31 to 2025-08-20

Project Proponent:
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DETAILS

Non-technical project proposal description

English: Ongoing environmental and anthropogenic changes in the Canadian Arctic have raised concerns regarding the capacity of marine mammal populations to adapt to these new and expanding stressors. In order to assess and mitigate potential impacts from stressors like climate change and the expansion of high Arctic marine shipping activities, a better understanding of contemporary marine mammal stocks, behaviour, and movements in the Canadian High Arctic is needed.Efforts will focus on narwhal (Monodon monoceros) and beluga whale (Delphinapterus leucas) populations in the Gulf of Boothia and Cumberland Sound, NU during summer and fall. Killer (Orcinus orca) and bowhead (Balaena mysticetus) whales are also known to inhabit these areas in summer and may be opportunistically sampled as part of this research program. This study will use remotely-piloted aircraft (drones) to collect photographs and video to assess population structure (i.e. age, sex), body condition and behaviour of individuals and groups of whales. Photos will contribute to ongoing photo-identification studies and population abundance estimates. Videos will be used to assess dive behaviour and group dynamics. Additionally, drones will be used to collect blow samples for hormone and genetic analysis.We will use remote tissue biopsy sampling methods to assess genetic relationships, hormone levels, and diet of Arctic whales. Biopsy tissue samples will be collected using custom crossbows, air rifles, and drone-deployed methods. GPS satellite tags will be applied to adult whales to monitor summer movements and provide information on dive behaviour. Location and movement data will be used to monitor behaviour, habitat use, and seasonal migrations. Dive information (time spent at the surface vs. at depth) will be used to inform correction factors to improve population estimates derived from recent aerial surveys conducted throughout the Arctic.Methods will employ least-invasive techniques and technologies to minimize stress on whales and achieve project goals. Drone operations will be led by licensed and experienced pilots and will follow approved standard operating procedures for operating drones near marine mammals. Biopsy sampling and tagging will use remote sampling methods and utilize small boats and drones to deploy biopsy darts and tags on the water or from land. Only trained and experienced operators will be responsible for tagging/biopsy efforts. No animals will be captured or handled during this study. Field studies in Cumberland Sound will be based from the community of Pangnirtung and carried out by two Nunavut Beneficiaries hired through the Pangnirtung Hunters and Trappers Association. Research in the Gulf of Boothia will be carried out by two to four Nunavut Beneficiaries hired through the Taloyoak Umaruliriqut Association. Two Fisheries and Oceans (DFO) staff will accompany the Gulf of Boothia field team during the initial onset of the field work in 2025. Work will be based from a local Inuit hunting camp in Lord Mayor Bay (Lat. 69.661422 Long. -92.671292) for a period of 3-4 weeks in summer. Field crews will rent local Inuit-owned cabins for lodging and Inuit-owned small boats (<10 m length) with experienced Inuit boat operators familiar with the local environment and marine mammal behaviour. Crews will operate daily excursions from the base camp when weather permits.Project Schedule:Cumberland Sound: 01-Jun-2025 to 01-Dec-2025Gulf of Boothia:01-Aug-2025 to 01-Nov-2025

French: Déplacements et génétique des baleines dans l'Arctique canadien grâce à la télémétrie par satellite, aux biopsies tissulaires et à la photogrammétrieDescription du projet :Les changements environnementaux et anthropiques en cours dans l'Arctique canadien soulèvent des inquiétudes quant à la capacité des populations de mammifères marins à s'adapter à ces nouveaux facteurs de stress en pleine expansion. Afin d'évaluer et d'atténuer les impacts potentiels de facteurs de stress tels que les changements climatiques et l'expansion du transport maritime dans l'Extrême-Arctique, une meilleure compréhension des stocks, du comportement et des déplacements actuels des mammifères marins dans l'Extrême-Arctique canadien est nécessaire.Les efforts porteront sur les populations de narvals (Monodon monoceros) et de bélugas (Delphinapterus leucas) du golfe de Boothia et de la baie Cumberland, au Nunavut, en été et en automne. L'épaulard (Orcinus orca) et la baleine boréale (Balaena mysticetus) sont également présents dans ces zones en été et pourraient être échantillonnés de manière opportuniste dans le cadre de ce programme de recherche.Cette étude utilisera des drones pour prendre des photos et des vidéos afin d'évaluer la structure de la population (âge, sexe), l'état corporel et le comportement des baleines, qu'elles soient individuelles ou en groupe. Les photos contribueront aux études de photo-identification en cours et aux estimations de l'abondance de la population. Les vidéos serviront à évaluer le comportement de plongée et la dynamique de groupe. De plus, des drones serviront à prélever des échantillons de souffle pour des analyses hormonales et génétiques.Nous utiliserons des méthodes de prélèvement tissulaire par biopsie à distance pour

évaluer les relations génétiques, les taux hormonaux et le régime alimentaire des baleines de l'Arctique. Des échantillons de tissus biopsiques seront prélevés à l'aide d'arbalètes personnalisées, de carabines à air comprimé et de drones. Des balises GPS seront placées sur les baleines adultes afin de suivre leurs déplacements estivaux et de fournir des renseignements sur leur comportement de plongée. Les données de localisation et de déplacement serviront à surveiller le comportement, l'utilisation de l'habitat et les migrations saisonnières. Les données de plongée (temps passé en surface et en profondeur) serviront à déterminer les facteurs de correction afin d'améliorer les estimations de population issues de récents relevés aériens menés dans l'Arctique.Les méthodes utiliseront les techniques et technologies les moins invasives pour minimiser le stress des baleines et atteindre les objectifs du projet. Les opérations de drones seront dirigées par des pilotes agréés et expérimentés et suivront les procédures opérationnelles normalisées approuvées pour l'utilisation de drones à proximité des mammifères marins. L'échantillonnage et le marquage des biopsies se feront à l'aide de méthodes d'échantillonnage à distance et de petites embarcations et de drones pour déployer des fléchettes et des étiquettes de biopsie sur l'eau ou depuis la terre ferme. Seuls des opérateurs formés et expérimentés seront responsables des activités de marquage et de biopsie. Aucun animal ne sera capturé ni manipulé au cours de cette étude.Les études de terrain dans la baie Cumberland seront menées dans la communauté de Pangnirtung par deux bénéficiaires du Nunavut embauchés par l'intermédiaire de l'Association des chasseurs et trappeurs de Pangnirtung. Les recherches dans le golfe de Boothia seront menées par deux à quatre bénéficiaires du Nunavut embauchés par l'intermédiaire de l'Association Taloyoak Umaruliririgut. Deux employés de Pêches et Océans Canada (MPO) accompagneront l'équipe de terrain du golfe de Boothia lors du début des travaux sur le terrain en 2025. Les travaux se dérouleront depuis un camp de chasse inuit local dans la baie Lord Mayor (lat. 69.661422 Long. -92.671292) pendant une période de 3 à 4 semaines en été. Les équipes de terrain loueront des chalets appartenant à des Inuits locaux pour l'hébergement et de petites embarcations appartenant à des Inuits (< 10 m de longueur) avec des conducteurs inuits expérimentés connaissant bien l'environnement local et le comportement des mammifères marins. Les équipages organiseront des excursions quotidiennes au départ du camp de base lorsque les conditions météorologiques le permettront.Calendrier du projet :Baie Cumberland : du 1er juin 2025 au 1er décembre 2025Golfe de Boothia : du 1er août 2025 au 1er novembre 2025

Inuktitut: see attached document

Personnel

Personnel on site: 4

Days on site: 21

Total Person days: 84

Operations Phase: from 2025-07-31 to 2025-08-20

Activities

Location	Activity Type	Land Status	Site history	Site archaeological or paleontological value	Proximity to the nearest communities and any protected areas
Cumberland Sound Marine Study Area	Marine Based Activities	Marine	n/a	n/a	Work will be marine-based only. Day trips from Pangnirtung by boat.
Gulf of Boothia Marine Study Area	Marine Based Activities	Marine	n/a	n/a	~50 km northeast of Taloyoak, NU. Marine-based research using small boats.
Lord Mayor Bay Hunting Camp	Camp	Crown	Established hunting camp for Taloyoak community members.	n/a	~50 km northeast of Taloyoak.

Community Involvement & Regional Benefits

Community	Name	Organization	Date Contacted
Taloyoak	Jimmy Ullikatalik	Taloyoak Umaruliriqut Assoc.	2024-11-01
Pangnirtung	Mark Kilabuk	Pangnirtung HTA	2025-02-01

Authorizations

Indicate the areas in which the project is located:

Authorizations

Regulatory Authority	Authorization Description	Current Status	Date Issued / Applied	Expiry Date
Fisheries and Oceans Canada	License to Fish for Scientific Purposes # S-25/26-1015-NU	Active	2025-05-28	2025-12-31
Nunavut Water Board	Water Use/Disposal without a license. Application submitted 2025-04-17.	Applied, Decision Pending		
Fisheries and Oceans Canada	Canadian Marine Mammals Regulations: Sec. 38 Authorization to Disturb a Marine Mammal. Application submitted 2025-04-22.	Applied, Decision Pending		
Fisheries and Oceans Canada	Animal Use Protocol - Unmanned Aerial Vehicles (drones) Photogrammetry. AUP-2025-16.	Active	2025-04-30	2025-12-31
Fisheries and Oceans Canada	Animal Use Protocol - Blow Collection from Arctic Whales. AUP-2025-14.	Active	2025-04-30	2025-12-31
Fisheries and Oceans Canada	Animal Use Protocol - Tagging and Biopsy Methods. AUP-2025-12.	Active	2025-04-30	2025-12-31

Project transportation types

Transportation Type	Proposed Use	Length of Use
Water	Use of small boats to transport gear and personnel to site and to conduct marine-based research.	

Project accomodation types

Temporary Camp

Other,

Material Use

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

Equipment Type	Quantity	Size - Dimensions	Proposed Use
Boat	1	<30'	Cumberland Sound: Used to search for whales and conduct drone-based photogrammetry and tagging and biopsy sampling activities.
Boat	2-3	<30'	Gulf of Boothia: Used to transport field gear and personnel from Middle Lake (Taloyoak) to Lord Mayor Bay. Boats will be use in Lord Mayor Bay to search for whales and conduct drone-based photogrammetry and tagging and biopsy sampling activities.
Drone	1	n/a	Gulf of Boothia and Cumberland Sound: Small drones will be used to record imagery and videography of whales, biopsy whales, and to monitor whales post tagging/biopsy collection.Various models of DJI drones will be used including: Mini SE, Mini 3, Mini 4 Pro, Mavic 3, Mavic 2, Inspire, Phantom 4 Pro, and Matrice 300.
Crossbow/Air Rifle	2	n/a	Gulf of Boothia and Cumberland Sound: Custom designed crossbows and air rifles will be used for projecting tag and biopsy bolts/darts.
ATV	1	n/a	Gulf of Boothia: ATV will be used to transport gear and haul boats over designated portages along the chain of lakes from Middle Lake to Lord Mayor Bay during camp setup and demobilization.

Detail Fuel and Hazardous Material Use

Detail fuel material use:	Fuel Type	Number of containers	Container Capacity	Total Amount	Units	Proposed Use
Gasoline	fuel	10	205	2050	Liters	Gulf of Boothia: fuel used for boat operation

						and general camp use (generator).
Gasoline	fuel	10	205	2050	Liters	Cumberland Sound: Gasoline will be used in small boats to locate and sample whales. No fuel will be stored or used on land.
Other	fuel	4	4	16	Liters	Gulf of Boothia: Naphtha used for cooking/heat source in camp

Water Consumption

Daily amount (m3)	Proposed water retrieval methods	Proposed water retrieval location
0	We will hand fill portable water jugs.	local surface waters <100m from camp.

Waste

Waste Management

Project Activity	Type of Waste	Projected Amount Generated	Method of Disposal	Additional treatment procedures
Camp	Greywater	~100 L	shallow pit >50 m from local surface waters	pit will be filled in following project completion
Camp	Sewage (human waste)	~20L	composting toilets on-site in Lord Mayor Bay camp	Toilets are maintained >100 m from local surface waters

Environmental Impacts:

Research in Cumberland Sound will be conducted by daily boat excursions from Pangnirtung when weather permits and whales are reported in the sound. Environmental impacts will be limited to typical operation of a small vessel in a marine environment and are considered negligible. Similarly, research in the Gulf of Boothia will be largely marine-based requiring the operation of small, gasoline powered vessels. Environmental impacts associated with these activities are considered negligible. Environmental impacts associated with the temporary field camp in Lord Mayor Bay will be mitigated by setting up within the footprint of an existing Inuit hunting camp. All garbage/waste produced during the program will be removed at the end of the program and returned to Taloyoak for proper disposal.

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 Lord Mayor Bay temporary research camp will be set up within the footprint of an existing Inuit hunting camp.

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

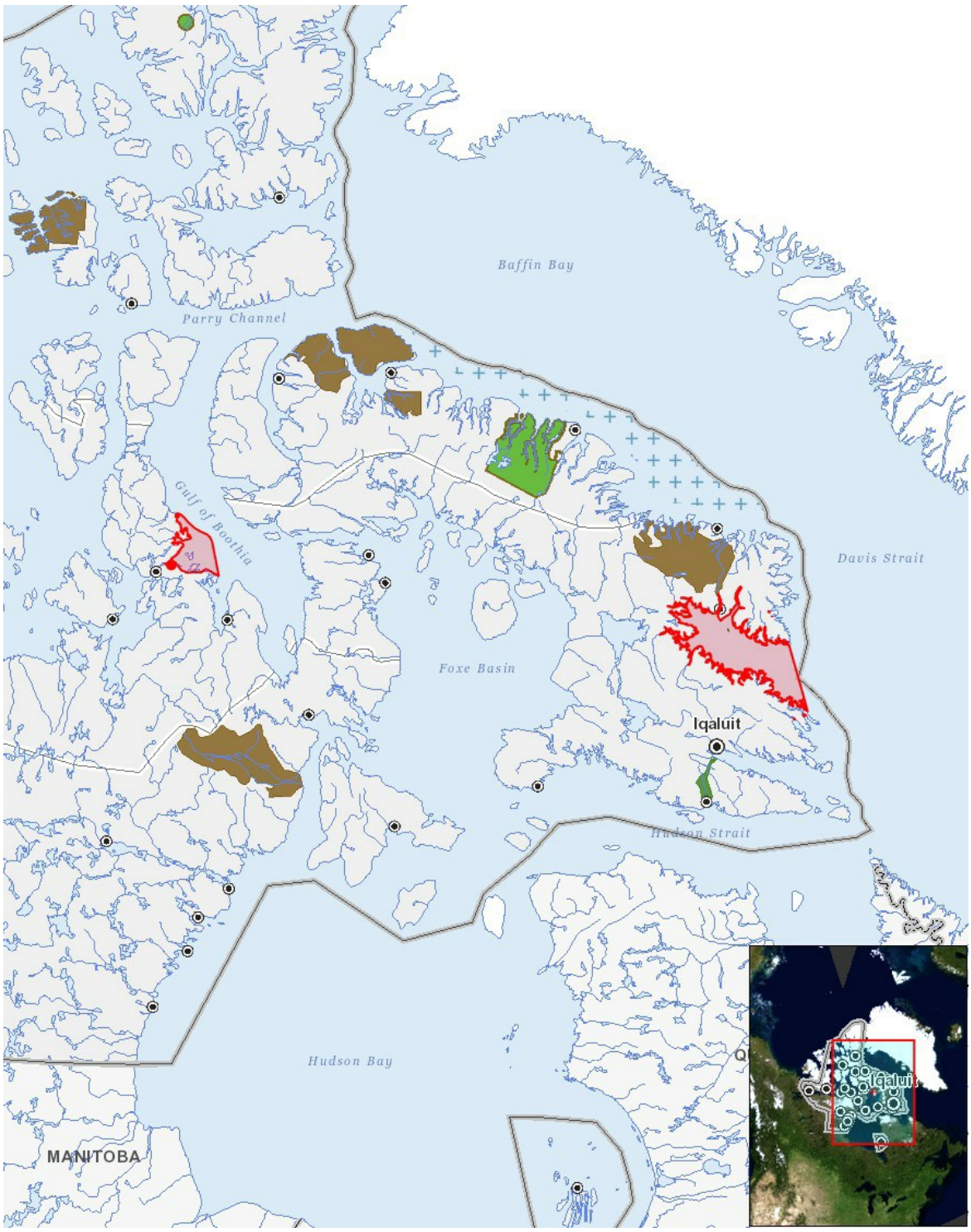
Impacts

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
Construction																									
-		-	-	-	-	-	-	-	-	-	-	-	-		-	-	-	-	-		-	-	-	-	-
Operation																									
Camp		-	-	-	-	-	-	-	-	-	-	-	-		-	-	-	-	-		-	P	-	-	-
Marine Based Activities		-	-	-	-	-	-	-	-	-	-	-	-		-	P	-	P	P		-	P	-	-	-
Decommissioning																									
-		-	-	-	-	-	-	-	-	-	-	-	-		-	-	-	-	-		-	-	-	-	-

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

Project Location



List of Project Geometries

1	polygon	Cumberland Sound Marine Study Area
2	polygon	Gulf of Boothia Marine Study Area
3	point	Lord Mayor Bay Hunting Camp