



NIRB Application for Screening #126452

Ecology and demography of killer whales in the eastern Canadian Arctic

Application Type: New

Project Type: Scientific Research

Application Date: Tuesday, May 12, 2026

Period of operation: from 2026-07-10 to 2029-10-26

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DETAILS

Non-technical project proposal description

English: Title: Ecology and demography of killer whales in the eastern Canadian Arctic Who: Fisheries and Oceans Canada What: Our killer whale field research program has been ongoing since 2009, developed in consultation with Inuit communities about their growing concerns about increasing killer whale presence around their communities. Our planned research program over the upcoming three years (2026-2029) is a continuation of this long-term project, with specific objectives regarding killer whale demographics and predator impacts. Core field work methods including satellite tagging, biopsy, and photo-identification will be used, as well as newer methods including drone recordings of behaviour, body composition, and group composition.[1] Satellite tag deployment: Killer whales will be slowly approached by boat to within 10 m. Satellite tags will be deployed onto the dorsal fin using crossbows, using metal darts to anchor the tag below the skin. Tags will transmit location and dive data up to 300 times daily as the whale surfaces to satellites. Tags using this technique typically last several weeks on killer whales, but have lasted for up to ~120 days. Telemetry data will be used to better understand killer whale distribution and migration patterns.[2] Biopsy: Skin and blubber biopsies will be collected using crossbows or an airgun to fire sterile stainless steel biopsies near the saddle patch (just behind the dorsal fin). Biopsied skin and blubber will be frozen for genetic and chemical analyses (e.g., stable isotopes and fatty acids). Genetics analyses will provide information on killer whale group and population structure, as well as evidence of gene expression in response to local adaptation to Arctic conditions. The microchemistry analyses will provide information on both diet and distribution.[3] Photo-identification: Killer whales will be photographed using digital SLR cameras. Individual killer whales have unique natural features (dorsal fin shape and size, scarring, and saddle patch and eye-patch shape) that can be used to identify them. Photo-identification has been used to match killer whale movements between different areas and therefore understand their distribution. Estimates of killer whale abundance will be updated using statistical models that compare the rates of newly identified and re-sighted whales.[4] Acoustic recordings and behavioural observations: Killer whale calls will be recorded using dip hydrophones from the research boat (i.e., not at the seafloor). At the same time, killer whale behavior will also be recorded using drones from a distance of approximately 300-1000 m for up to 30 minutes per session/focal group. Killer whale behaviors will be evaluated and analysed to better understand correlations between behavior and call type, which will be the first step to using passive acoustic recorders to monitor killer whale presence and activity (e.g., predation) in the Canadian Arctic.[5] Aerial photographs: Aerial photographs taken by drones will be analysed to assess killer whale body size and condition. Aerial photographs may also be used to determine reproductive status (e.g., pregnant females) and demographic information (e.g. group composition, pregnancy rates) for comparison among years to assess growth trends. One of the main goals of our Arctic killer whale research has been to develop scientific research capacity in northern communities. Inuit beneficiaries hired to conduct field research receive training in deploying satellite transmitters, biopsying and storing tissues, photography, and data entry. We typically hire up to five local research assistants and rent local equipment (e.g., boats) for our field work, as we work to establish a network of independent, Inuit-led research teams throughout the region. Why: Killer whales are important predators in marine ecosystems worldwide. Increases in killer whale sightings in the eastern Canadian Arctic over the past decades, most likely associated with decreases in sea ice extent and duration, have raised concerns about their ecological impacts on Arctic ecosystems. Killer whales in the eastern Canadian Arctic prey on marine mammals (narwhal, beluga, bowhead whales, and seals). Greater killer whale predation pressure on ecologically, culturally, and economically valuable marine mammal populations could impact their sustainable use for food by Inuit/Northerners. Moreover, our previous research has shown that killer whale presence alone can drastically alter the distribution and movements of prey species. There is therefore growing concern among Inuit communities that increasing killer whale presence in the Arctic may have adverse impacts on Arctic-endemic marine mammals. Several Inuit communities have asked for population assessments to determine whether killer whale populations can be sustainably harvested or culled. To understand how killer whales in the eastern Canadian Arctic impact populations of marine mammals that are harvested by Inuit, we need more information about their population structure, abundance and population trends, and ecology (e.g., distribution, movements, diet, and hunting behaviour) in the region. Where: Admiralty Inlet (Arctic Bay), the Eclipse Sound area (Pond Inlet), and Cumberland Sound (Pangnirtung). Field work will take place in Admiralty Inlet in 2026. When: Generally August, although possibly from July through September when killer whales are seasonally present and weather conditions allow for boat-based field work. Multi-year project (2026-2029).

French: Titre : Écologie et démographie des épaulards dans l'est de l'Arctique canadien
Qui : Pêches et Océans Canada
Quoi : Notre programme de recherche sur les épaulards est en cours depuis 2009. Il a été élaboré en collaboration avec les communautés inuites, qui exprimaient des préoccupations croissantes concernant l'augmentation de la présence d'épaulards dans l'arctique canadien est. Le programme de recherche prévu pour les trois prochaines années (2026 2029) constitue la poursuite de ce projet à long terme, avec des objectifs précis portant sur la démographie des épaulards et leurs impacts en tant que prédateurs. Les méthodes de terrain principales — balises satellites, biopsies et photo identification — seront maintenues, et de nouvelles approches seront ajoutées, notamment l'utilisation de drones pour documenter le comportement, la composition corporelle et la composition des groupes.

[1] Balises satellites Les épaulards seront approchés lentement en bateau jusqu'à environ 10 m. Les balises satellites seront fixées sur la nageoire dorsale à l'aide d'arbalètes, avec des fléchettes métalliques ancrées sous la peau. Les balises transmettront jusqu'à 300 fois par jour des données de localisation et de plongée lorsque l'épaulard remonte à la surface. Ces balises demeurent généralement en place plusieurs semaines, parfois jusqu'à environ 120 jours. Les données télémétriques serviront à mieux comprendre la répartition et les migrations des épaulards.

[2] Biopsies Des échantillons de peau et de lard seront prélevés à l'aide d'arbalètes ou d'un fusil à air comprimé tirant des pointes stériles en acier inoxydable près de la tache gris pâle (derrière la nageoire dorsale). Les échantillons seront congelés pour des analyses génétiques et chimiques (p. ex., isotopes stables et acides gras). Les analyses génétiques fourniront de l'information sur la structure des groupes et des populations, ainsi que sur l'expression génétique liée à l'adaptation aux conditions arctiques. Les analyses microchimiques permettront d'obtenir de l'information sur le régime alimentaire et la répartition.

[3] Photo identification Les épaulards seront photographiés à l'aide d'appareils photo numériques reflex. Chaque individu possède des caractéristiques naturelles uniques (forme et taille de la nageoire dorsale, cicatrices, forme de la tache dorsale et de la tache oculaire) permettant de l'identifier. La photo identification permet de suivre les déplacements des épaulards entre différentes régions et d'améliorer notre compréhension de leur répartition. Les estimations d'abondance seront mises à jour à l'aide de modèles statistiques comparant les taux de nouvelles identifications et de réobservations.

[4] Enregistrements acoustiques et observations comportementales Les vocalisations des épaulards seront enregistrées à l'aide d'hydrophones suspendus depuis le bateau de recherche (et non depuis le fond marin). Parallèlement, leur comportement sera filmé par drone à une distance d'environ 300 à 1 000 m, pendant jusqu'à 30 minutes par séance ou groupe focal. Les comportements seront analysés afin de mieux comprendre les liens entre les types de vocalisations et les comportements observés. Il s'agit d'une première étape vers l'utilisation d'enregistreurs acoustiques passifs pour surveiller la présence et l'activité des épaulards (p. ex., prédation) dans l'Arctique canadien.

[5] Photographies aériennes Les images aériennes captées par drone seront analysées pour évaluer la taille corporelle et l'état de condition des épaulards. Elles pourront aussi servir à déterminer le statut reproducteur (p. ex., femelles gestantes) et d'autres paramètres démographiques (p. ex., composition des groupes, taux de gestation) afin de comparer les tendances d'une année à l'autre.

Un des objectifs principaux de notre programme de recherche sur les épaulards de l'Arctique est de renforcer la capacité scientifique au sein des communautés nordiques. Les bénéficiaires inuits embauchés pour le travail de terrain reçoivent une formation sur la pose de balises satellites, la collecte et l'entreposage des biopsies, la photographie et la saisie de données. Nous embauchons généralement jusqu'à cinq assistants de recherche locaux et louons de l'équipement local (p. ex., bateaux), dans le but d'établir un réseau d'équipes de recherche indépendantes dirigées par des Inuits dans toute la région.

Pourquoi : Les épaulards sont des prédateurs importants dans les écosystèmes marins du monde entier. L'augmentation des observations d'épaulards dans l'est de l'Arctique canadien au cours des dernières décennies — probablement liée à la diminution de l'étendue et de la durée de la glace de mer — a suscité des préoccupations quant à leurs impacts écologiques. Dans cette région, les épaulards se nourrissent de mammifères marins (narvals, bélugas, baleines boréales et phoques). Une pression de prédation accrue sur ces espèces, qui ont une grande importance écologique, culturelle et économique, pourrait affecter leur disponibilité pour l'alimentation des Inuits et des résidents du Nord. De plus, nos recherches antérieures ont montré que la simple présence d'épaulards peut modifier de façon marquée la répartition et les déplacements de leurs proies. Ainsi, plusieurs communautés inuites expriment des inquiétudes quant aux effets potentiellement négatifs d'une présence accrue d'épaulards sur les mammifères marins endémiques de l'Arctique. Certaines ont demandé des évaluations de population afin de déterminer si les épaulards pourraient être récoltés ou contrôlés de manière durable. Pour comprendre comment les épaulards de l'est de l'Arctique canadien influencent les populations de mammifères marins récoltées par les Inuits, nous devons mieux connaître leur structure de

Activities

Location	Activity Type	Land Status	Site history	Site archaeological or paleontological value	Proximity to the nearest communities and any protected areas
polygon encloses area of boat-based field work	Scientific/International Polar Year Research	Marine	n/a	n/a	within 0 to 200 km of Ikpiarjuk/Arctic Bay
location of field camp (at or near Kakiak)	Camp	Inuit Owned Surface Lands	site has a long history of use by Inuit (hunting, seasonal occupancy)	n/a -- but in current use by Inuit as hunting camp	approx 70 km from Arctic Bay

Community Involvement & Regional Benefits

Community	Name	Organization	Date Contacted
Arctic Bay	Bianca Amaaq, Manager Ikajutit HTA	Ikajutit HTA	2025-11-30

Authorizations

Indicate the areas in which the project is located:

North Baffin

Authorizations

Regulatory Authority	Authorization Description	Current Status	Date Issued / Applied	Expiry Date
Fisheries and Oceans Canada	Federal government department License to Fish for Scientific Purposes Authorization to disturb a marine mammal (drone)	Applied, Decision Pending		

Project transportation types

Transportation Type	Proposed Use	Length of Use
Water	local boats 18-27 feet	
Land	just at camp, walking around camp and to and from boats	

Project accommodation types

Temporary Camp

Material Use

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

Equipment Type	Quantity	Size - Dimensions	Proposed Use
longhouse canvas tent	2	10x12	camp kitchen/meeting place and equipment storage
personal camping tents	5	6x6	each person sleeps in their own personal tent/space
generator	1	honda 2000	run electronics in camp (eg laptops, battery charging)
boat	2	TBD	Two boats will be required for access to killer whales and deployment of tags, biopsies, and hydrophones. Boats are either contracted through the local Hunters and Trappers Organizations or Inuit owned outfitters (if available).
crossbow	2	35.5 inches	Two crossbows used for deploying satellite tags and biopsy darts.
Drone	2	12x9.5x3.3 inches	Drones will be used to assess killer whale hunting behavior, numbers, group composition, and individual body condition.
Hydrophone	2-4	530mm x 60 mm	Hydrophones will be deployed to collect and record underwater noise, shipping, and vocalizations from marine mammals, with primary goals to assess killer whale vocal behavior while hunting, as well prey response.

Detail Fuel and Hazardous Material Use

Detail fuel material use:	Fuel Type	Number of containers	Container Capacity	Total Amount	Units	Proposed Use
Gasoline	fuel	4	206	824	Liters	boat fuel, generator fuel
Propane	fuel	5	20	100	Lbs	primarily to run cooking stoves
Other	fuel	12	4	48	Liters	naphta to run stoves

Water Consumption

Daily amount (m3)	Proposed water retrieval	Proposed water retrieval
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	methods	location
1	most likely from a stream or river near camp; when possible, marine ice	there is a stream close to camp location and a larger river a bit farther away; sea ice if possible

Waste

Waste Management

Project Activity	Type of Waste	Projected Amount Generated	Method of Disposal	Additional treatment procedures
Camp	Greywater	<1 m ³	Greywater will be disposed in a sump hole at least 30 m away from the high water mark and sleeping areas.	none
Camp	Non-Combustible wastes	1 m ³	will be packed up and disposed of in Arctic Bay	none
Camp	Sewage (human waste)	0.5 m ³	Sewage will be buried in compostable bags in a sump hole at least 30 m away from the high water mark and sleeping areas.	none

Environmental Impacts:

No adverse effects are expected based on this project. We will prevent potential fuel spills by storing all liquid fuels in a temporary berm located at least 30m above the high water mark. All liquid fuel transfer will be done within this berm using appropriate nozzles/funnels; and a spill kit will be readily available. Unused fuel and empty containers to be removed from site at the end of the program. The environmental impacts of the camp will be minimal. We will use the most durable surfaces when travelling, resting or re-filling water containers to avoid soil compaction/vegetation trampling. Biodegradable soap will be used (only when necessary) for dishwashing and bathing. The use of the motorboat and generator will be kept to a minimum to minimize noise and air pollution.

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

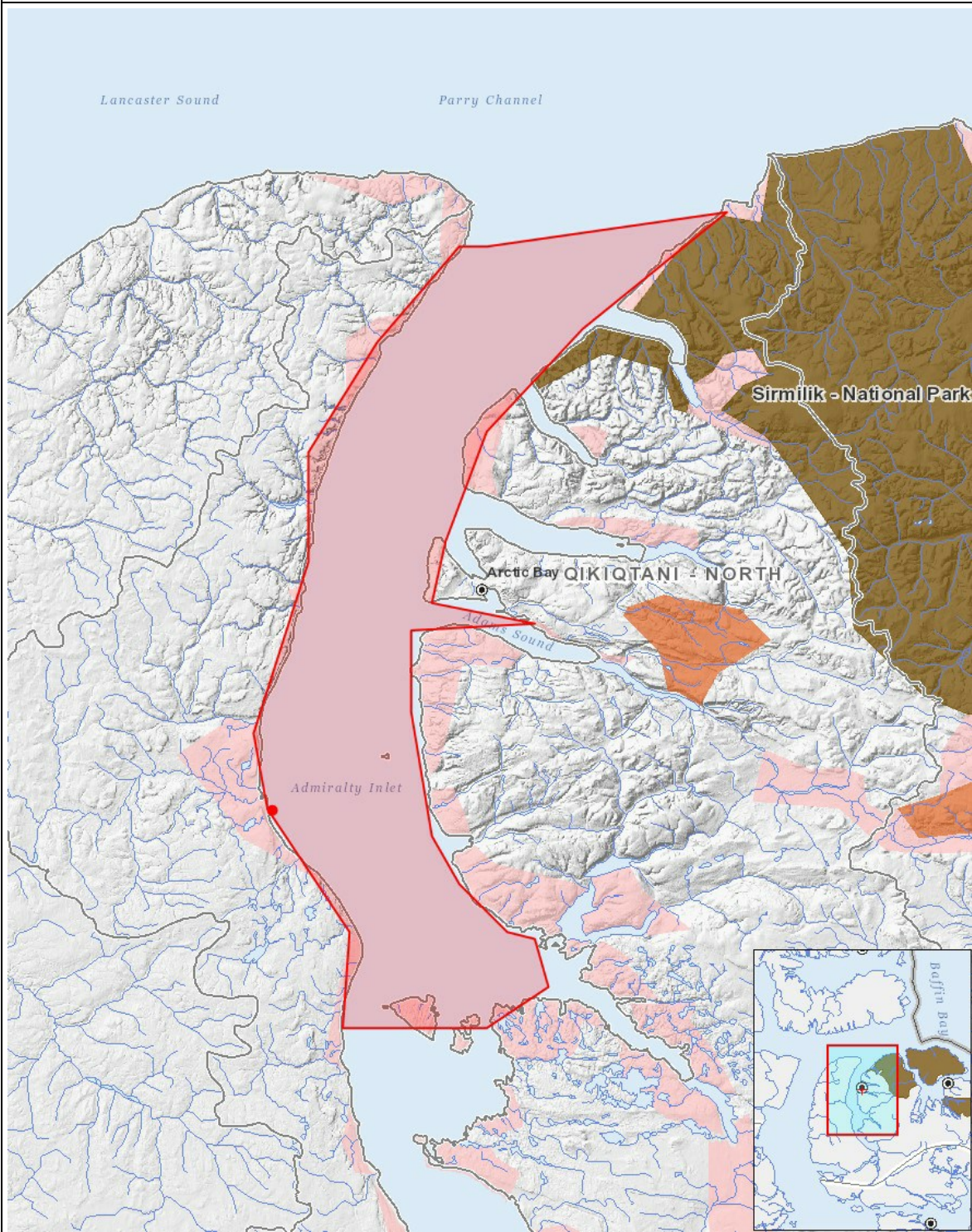
Impacts

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

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

Project Location



List of Project Geometries

- | | | |
|---|---------|--|
| 1 | polygon | polygon encloses area of boat-based field work |
| 2 | point | location of field camp (at or near Kakiak) |