Adaptation to an ice-free summer by Arctic seabirds – project description (2026 - 2028)

Summary

In red are items that are new for 2026.

Coats Island is an important seabird colony in Nunavut. We propose to conduct research on nesting thick-billed murres and glaucous gulls during the summer (June 20 – August 15). Research activities will include trapping, banding, and observing migratory birds and involve 3-10 people.

General Activities

The site is located on Coats Island (62.94132N, -82.01722W). The camp is supplied by twin otter on tundra tires in June. The base camp consists of 4 small cabins. These structures rest on granite surrounded by vegetation.

In general, the work and camping arrangements and resulting impact on the land are similar to our other years of work here and hence impact will again be low.

Fuel (gasoline, propane) will be stored near the camp well above the ocean high water line on a cliff, in small, 25L gerry cans and 20lb tanks. These materials will be located on a flat location, with a small berm built around them in the event of a fuel spill. All sumps will be located 30m above the high water line, and will be back-filled, mounded, and contoured to match surrounding landscape prior to leaving the camp. Current MSDS will be kept in a central location (the cabin office area) so as to be accessible to all personnel. We keep an Emergency Spill Kit at the camp and have a Spill Contingency Plan in place which has been submitted with past permit applications.

We will use gas to run 2 generators and the ATV, and 100lbs propane to fuel the stove. We will fly into and out of the site by Twin Otter. We will have a total of about 5 flights through the season to mobilizing the field site, resupply and change over crew members, and to demobilize the field site at the end of the season. We will use an ATV after each flight to haul gear from the plane to the cabin. Inuit research assistants may also use the ATV for hunting.

Combustible garbage will be burned in a SmartAsh incinerator – the ash and all non-combustibles (e.g., cans, jars, etc.) will be flown out for proper disposal in Iqaluit. Grey water from washing dishes and clothes is poured into a sump and buried at the end of the field season. The camp has a composting toilet.

Our operation will offer socio-economic benefits to the area. We will again be hiring two or three Inuit assistants to participate in our field work, hopefully through the IFRA program. All of our groceries and some equipment where practical will be purchased in Iqaluit.

Seabird Research

The science team will arrive in mid-June and depart the second week of August. We will use the same science procedures employed for the past 30 years. Observations will be made of adult murres

incubating from concealed locations (blinds) along the cliffs. Defined areas of the colony will be counted daily to determine population trends, again without disturbing the birds.

Future Arctic seas will have longer ice-free periods. We will establish novel genomic and physiological techniques to examine the resilience of Arctic seabirds to a less-icy future. Specifically, we will examine whether particular genes or blood chemistries are associated with the ability of thick-billed murres to cope with environmental change. We will use GPS-depth-camera-accelerometers, stomach temperature tags and satellite tags to track murres at sea in response to changing ice cover. We will measure energy expenditure with doubly-labelled water. We will also determine whether unmanned aerial vehicles can be used to census murres in the Canadian Arctic. As a major cause of biologist mortality in Canada is air/boat accidents, we propose that unmanned aerial vehicles can be used to safely record murre numbers. We will fly vehicles past at varying distances and heights to determine what height and distance can be used to accurately census murre numbers without disturbing the birds. We will measure fish populations using an uncrewed surface vehicle (USV) with hydroacoustics. Finally, chemical pollution is an important component of environmental change in the Arctic. We will measure pollution levels in various tissues from glaucous gulls and murres.

Capture and Banding

Thick billed murres will be captured on their breeding ledges via noose-pole. This technique is commonly used for capturing cliff nesting murres and allows quick capture of targeted individuals, minimizing stress to the captured individual and other individuals in the vicinity. We will place a metal US Fish and Wildlife Service (USFWS) band on the right tarsus. We will also take standard morphological measurements of the individual at the time of capture, including weight, wing chord length, bill length and depth, and tarsus length. Up to 100 birds will be attached with RFID to facilitate individual identification without recapture.

Sampling

A small blood sample (1 ml) will be taken from the brachial vein using a needle and capillary tubes. This blood will be used for DNA sexing of individuals and for physiological analyses. We will also sample 4 covert feathers for stable isotope analysis, to determine diet composition during the previous post-breeding season. We also plan to collect fecal samples from focal birds in an attempt to test whether DNA isolation techniques can determine diet composition and relative abundance of digested prey. We hope to collect up to 20 Thick Billed murre eggs to contribute to our long-term monitoring of contaminants in the North.

Tracking devices

To track adults, we will use small GPS-depth-accelerometer devices (10 grams; less than 2% of body weight) to track movements and diving behaviour of individuals during the breeding season. We will also attach cameras loggers (18 grams; less than 2% of body weight). Units will be affixed to the back of the bird using TESA tape and deployed for 2-7 days. Individuals will be re-captured after this period to retrieve the units. We will also induce birds to swallow AniPill (10 grams; less than 2% of body weight)

stomach loggers to record stomach temperature. We will use the doubly-labelled water method to measure energy expenditure, as occurred at this site in previous years. We will also attach ARGOS satellite transmitters using a subcutaneous anchor to record location during moult. We will use camera traps to record reproductive success. We would like to attach geolocators (2 grams, less than 0.2% of body weight) to 120 murres and chicks to record their distribution post-fledging. These birds will be recaptured the following summer to retrieve the units.

Uncrewed surface vehicle

We will use an uncrewed surface vehicle with hydroacoustics to measure fish populations near the colony. The vehicle will be driven to Churchill to examine post-fledging habitat along the proposed Churchill shipping corridor.

Uncrewed aerial vehicle

We will fly an uncrewed aerial vehicle past the colony at 30 m distant five times over the course of the season to count the murre population.

Measures to avoid dangerous wildlife encounters

Safety is our top priority. Some of our camps have a high density of polar bears so it is critical that every team member has access to a firearm at all times. Everyone on staff has a valid firearms Possession and Acquisition License (PAL). In addition, every member of our staff attends a one-day live-fire workshop in Ottawa. We also ensure that our camp is set up and maintained in a way that does not attract polar bears (i.e., removal of garbage, etc.). Operating safely around polar bears requires much more than firearms training and for that reason we have several staff with significant experience with polar bear-human interactions. We have a detailed Polar Bear Safety Protocol, and we have highly skilled polar bear monitors on site.

Community consultation and involvement

Our research methodology emphasizes close collaboration with local communities. We hire boat captains for work with thick-billed murres and rely extensively on local ecological knowledge for guidance on research protocols – such as where to sample and when. Ultimately, we hope to be able to work together with northern residents to quantify the effects that disease, shipping, and increased predation are having on seabirds, assess the potential for these pressures to intensify with further climatic warming, and identify management options. We've collaborated with the community of Coral Harbour since 1981, and have hired community members both for our Inuit Field Research Assistant program, our Inuit Field Training Program and as bear guards every season. After research is concluded for each season, a report of findings will be submitted to the HTO in Aiviit, and relevant permitting agencies. We met with the community in March 2026 (as occurs annually) to report back findings.