

NPC 150867: Coastal Baseline Inventory: Benthic community composition and food web structure in waters adjacent to Qikiqtarjuaq, NU 2025.

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Proposal Status: Conformity Determination Issued

[Overview Documents](#)

[Project Overview](#)

Type of application: New

Proponent name:

Tracey Loewen

Proponent company:

Fisheries And Oceans Canada

Project Description:

The project will use a bottom trawling, traps and baited cameras to collect baseline data on benthic habitats and species (fishes and invertebrates) near Qikiqtarjuaq. All work will be completed off of a vessel-based platform. The collected data will allow assessments of current and potential impacts of climate change on the benthic community. The bottom trawl is an efficient gear for catching Greenland Halibut, sculpins and shrimp, the traps will target shrimp and benthic invertebrates (e.g. whelk), and the camera will collect data on urchins, crabs and other species that are not susceptible to the trawl, as well as data on habitat characteristics (e.g. bottom material, roughness) and effects of sampling equipment on habitats. The combination of sampling gear creates an excellent opportunity to observe any new species in the area that may be expanding because of climate change. Tissue samples will be taken from all species encountered for stable isotope analysis to determine food web structure and linkages. Fish stomachs will be examined to determine their diets, which will be compared with the results of the stable isotope analyses. The objectives of the project are to 1) determine which benthic fish and invertebrate species are currently present near Qikiqtarjuaq; 2) quantify fish diets and food web structure and dynamics; 3) quantify habitat characteristics and conditions, and assess impacts of sampling gears on habitats. Sampling would occur during the open water season (August or September) using a contracted research or fishing vessel; sampling would require approximately 7 days each year (vessel with 24 hour operations capacity). Reports on fish and invertebrate species encountered will be provided each year within a month following fieldwork. Specimens collected will be shipped to Winnipeg for diet and stable isotope

analyses during the winter following collection. A report on the diet and food web analyses will be provided at the conclusion of the project (after 3 or 4 years of sampling) and will include consideration of year-to-year variability in the results. These baseline data on the benthic community and food web interaction will capture the current conditions at Qikitarjuaq and allow examinations of the effects of climate change or human development activities on benthic habitats and communities. Data on potential commercial species, such as Greenland Halibut and Northern Shrimp, will also be available to the community to support fishery development. Three years of sampling is considered the minimum to account for year-to-year variation in catches and environmental conditions when analyzing the data, four years would improve that consideration of year-to-year variation. Similar trawling surveys, but without traps and baited cameras, were conducted near Qikiqtarjauq in 2017-2019. Data from those surveys will be combined with the proposed work. Some specimens from those earlier years have been used for stable isotope analyses, but not stomach content analyses. The addition of the trap collections and baited camera observations will help put the trawling results in context regarding habitat structure and conditions. Methods: Bottom trawling, deployment of traps and a baited camera system, CTD casts, and zooplankton tows will be conducted using a vessel based platform. Two people from the Nattivak HTA will be contracted as members of the science crew during the survey. Bottom trawls will be run for 15 min bottom contact; 6-8 trawls can be completed in one day. At the end of each day a string of fish and invertebrate traps (4 traps) will be deployed; the traps will be retrieved ~12 h later, at the start of the next morning. At each sampling station a baited camera will be deployed to characterize the sea floor and record observations of species that are not caught in the trawl and traps, a CTD cast will be conducted to obtain a vertical profile of the water column, and a vertical zooplankton net tow will collect samples of the local zooplankton community. This sampling program will be coordinated with other coastal monitoring programs to minimize overlap in sampling and to provide as much complementary sampling as possible (i.e. collect additional samples that would aid other projects. Stable isotope analyses involve chemical sampling and use of an isotope analyzer in the lab. Two members of the science crew will be contracted through the Nattivak HTA. These crew members will be trained in use of the bottom trawl, fish traps, baited camera, zooplankton net, CTD and processing of the sample catch. Deliverables: •Map of sampling locations showing dominant species in the catches/observations. •Annual report to the Nattivak HTA on sampling activities, catches and food web and genetic analyses. •Annual DFO Technical Reports describing the fieldwork completed and data. •Primary publication describing the benthic community and food web at Qikiqtarjuaq. •Primary publication comparing benthic communities and food webs among Nunavut communities.

[Project Schedule](#)

Start Date:

2025-08-31

End Date:

2026-10-31

[Project Map](#)

List of project geometries:

Id

Geometry

Location Name

[18291](#)

polygon

1220

NPC Planning regions:

No Approved Plan

[Project Land Use and Authorizations](#)

Project Land Use:

Scientific Research

Scientific Research

Licensing Agencies:

Government of Canada - Fisheries and Oceans Canada

[Material Use](#)

Equipment:

Type

Quantity

Type

Use

Research Vessel

1

30.4 m

The research vessel proposed to do this work is the Patrick and William. The vessel selected has A-frame and winch capacities. It has the capacity to trawl (trawling net and warp), as well as longlining equipment (groundline and float lines). The vessel has a covered deck space and indoor lab area to accommodate science work. It has all safety certifications and standards as per Transport Canada regulations.

Fuel Use:

Type

Container

Capacity

Use

Diesel

1

21000

The fuel tanks of the vessel is capable of storing enough fuel to sustain operations for up to 60 days.

Hazardous Material and Chemical Use:

Type

Container

Capacity

Use

Oil and Lubrication products

5

5

Engine Oil and lubrication products will be used and stored to support the proper function of the vessel's engine.

Water Consumption:

Daily Amount (m²)

Retrieval Method

Retrieval Location

3

Vessel is equipped with advanced water makers, capable of producing fresh potable water from seawater. This ensures a continuous supply of drinking water and fresh water for other needs, such as showers and laundry, for the duration of the survey.

Desalination of seawater to freshwater onboard the vessel. Vessel is equipped with advanced water makers, capable of producing fresh potable water from seawater. This ensures a continuous supply of drinking water and fresh water for other needs, such as showers and laundry, for the duration of the survey.

Waste and Impacts

Environmental Impacts:

General Environmental Impacts of vessel work

(<https://doi.org/10.1016/j.ocecoaman.2023.106936>) in Arctic Environments include: 1.)

Impact of Water Bodies: a. Antifouling paint pollution: Releases copper ions, microplastics, etc., into the water and will negatively impact marine life's growth and survival, such as inhibiting reproduction, growth and causing deformities; b. Oil spill: Pollution of coasts and beaches affects animal health, reproductive cycle, mobility, and possibly causing their death, etc. c. NIS: Leading to the loss of Arctic biodiversity, local extinction, and decline in species richness, etc., d. Wastewater discharge: Pollution of waters, depletion of dissolved oxygen in water, red tides, etc., will cause unnecessary environmental toxicological impacts in the Arctic. Proposed Mitigation measures: the vessel will follow all guidelines provided by Transport Canada to minimize impacts to water bodies. This includes ensuring oil is stored properly and safely while on the vessel, minimizing risks of causing oil spills by following standard operating procedures to reduce risks of accidents. The vessel ballast water will only be exchanged in specific ballast water exchange zones designated by maritime guidelines and the federal Canadian Government. Discharge of wastewater will occur in designated areas. The captain and crew will be familiar with all safety procedures and maritime governance rules to reduce impacts to water bodies. 2. Impact of air

emissions: a. Air pollution SO_x: Cause acid rain and seawater acidification, etc., NO_x: Generate acid rain and soot, lead to ocean eutrophication, etc., O₃: Cause animal health damage, environmental damage, and other problems, PM: Air pollution etc., BC: Reduce the albedo of Arctic ice and snow and accelerate Arctic climate warming, VOC: Potentially increased probability of cancer, deformities, and genetic mutations in Arctic organisms. b. Radiative forcing: Produce warming and cooling effects on a wide range of temporal and spatial scales, and the climate impact of these components is largely dependent on the location and timing of emissions. Proposed Mitigation measures: The vessel will maintain proper functions of vessel engine and muffler, and all other mechanical aspects of the vessel to ensure that air pollution is minimized. The vessel will follow Standard Operating procedures to reduce accidental occurrences that would increase air pollution. The vessel captain and crew will know maritime regulations for the region and ensure that the standard of operation is maintained in accordance with the rules. 3. Impact on animal survival: a. Noise pollution: Masking Arctic animal communications, altering behavior patterns, and potentially causing temporary and permanent hearing loss to animals in surrounding waters, Light pollution: Interferes with directional discrimination of marine animals and induces bird strikes, Collisions with marine animals: Causing injury or even death to marine mammals, Influence animal behavior: Causing vigilance, escape, and decreased vocalisation in arctic mammals. Proposed Mitigation measures: The vessel will follow DFO and Nunavut guidelines to maintain distance of 100 meters, stay clear and move away from marine mammals. Vessels will also slow their speed if they do encounter a marine mammal while transiting an area to ensure that the marine mammal can move away from the noise and avoid a collision strike. Areas with high concentrations of marine mammals will be abandoned and no fishing equipment will be placed in the water during their presence in the region. Light pollution will be minimized by reducing lights during evening work events.

Waste Management:

Waste Type

Quantity Generated

Treatment Method

Disposal Method

Greywater

246 liters per day per person

No additional treatment procedures are identified.

Greywater will be released back into the marine environment in designated areas/zones where this is allowed. All marine transport laws will be followed. Greywater will include cleaning and rinsing of the vessel deck after sampling procedures are completed.

Hazardous waste

1-2% of the heavy fuel oil burned in a vessel's main engine and generators ends up as sludge

No additional treatment procedures will occur.

All oil and lubricant products used will be stored safely in appropriate containers and disposed of when the vessel reaches the home port. Disposal at the port will follow provincial and federal guidelines for safe disposal.

Non-Combustible wastes

1.4-2.3 Kg per person per day.

No additional treatment procedures will occur.

All non-combustible waste will be stored on board the vessel and disposed when the vessel reaches a port. Disposal at the port will follow provincial, territorial and federal guidelines for safe disposal.

Overburden (organic soil, waste material, tailings)

60-80 Kg per tow

No additional treatment procedures will occur.

Overburden (organic waste products from trawling and food) will be released back into the marine environment in designated areas/zones where this is allowed. All marine transport laws will be followed.

Sewage (human waste)

30 liters per person per day

no other treatment procedures are identified.

Sewage will be stored in a holding tank and released into the marine environment in designated areas where this is allowed. All marine transport laws will be followed regarding waste and dumping of waste.

