



Non-Technical Summary Qikiqtaaluk Corporation April 23 2021 Title: Science and Indigenous partnerships in action: mobilizing Indigenous knowledge and building capacity to participate in research during the implementation of an ecosystem approach to fisheries resource assessments Lead Researcher's Name and Affiliation: Dr. Scott Grant, Marine Institute Research Questions During this study, the RV Ludy Pudluk, a newly constructed purpose-built fisheries research vessel owned by the Qikiqtaaluk Corporation, and community supplied support vessels from the four study communities of Kinngait, Sanikiluaq, Sanirajak, and Igloolik will work in concert in waters adjacent to each community to determine the fishery potential of marine resources. Sharing of knowledge and capacity building among Indigenous community members and researchers from the Fisheries and Marine Institute of Memorial University will occur during data collection associated with ecosystem-based resource assessments and development of a variety of fishing gears designed to meet the needs of Nunavut small boat harvesters. Specific questions that this study will seek to answer: 1. What is the inshore fisheries potential around the four study communities? 2. Where are benthic invertebrates such as shellfish, clams, and whelks located around these communities? 3. What are the life-history characteristics of species of interest that occur in waters adjacent to these communities? 4. What are the conditions of the seafloor and seafloor bottom type around these communities? 5. Can the surveyed areas potentially support increased subsistence harvest of species of interest or do they have the potential to be commercially harvested areas? 6. Are there any new edible species present that can be harvested? 7. How can Inuit, academia and Inuit Organizations work together to develop inshore fisheries in Nunavut? Objectives and Rationale There is increasing pressure to utilize Arctic marine resources to minimize food insecurity through increased subsistence harvesting of new and existing species and where suitable numbers of harvestable species occur there is interest in commercial development. To contribute to sustainable Arctic marine ecosystems, exploratory fisheries need to consider a comprehensive research strategy that includes Indigenous traditional ecological knowledge (TEK) and building capacity to participate in research activities that foster community-based management of renewable resources. Lack of community capacity to participate in Nunavut research activities limits community partnerships in new emerging fishery initiatives and reduces the ability to extend scientific research. Timeline and Location The first study will take place over a 7 to 8-week period between July and October 2021 in Kinngait and Sanikiluaq. The second study will take place over a 7 to 8-week between July to October 2022 in Sanirajak and Igloolik. Timing of the studies will depend on ice-out. Annually as data is analyzed, underwater video of the seabed and animals that occur there will be delivered to HTOs within each year of the study. Meetings/presentations outlining results of the previous year's research will take place every second year in each community (i.e., two communities will be studied for 3.5 weeks in each year and we will return to those communities to continue studies every second year. Specifically, communities studied in 2021-2022 will be returned to in 2023-2024 and communities studied in 2022/2023 will be returned to in 2024 and 2025 with financial assistance from QC and different funding programs. Methods This project utilizes state-of-the-art technologies (e.g., multibeam echosounder, acoustic Doppler current profiler, multiparameter sonde [records water depth, temperature, salinity, conductivity, pH, dissolved oxygen, dissolved organic matter, turbidity, and chlorophyll a], georeferenced 4K high-definition underwater video, fishing gear designed to meet the needs Nunavut small boat harvesters, and an ecosystem approach to resource assessments. Impacts Our project will not involve human or animal experimentation, tissue or data. The project activities will include monitoring the inshore marine environment with various types of equipment. This equipment will interact with the environment such

as towed video sled and scallop, clam, and sea cucumber dredges. It is notable, that the lower component of the towed video sled has an arched design that allows vertical structures that extend up to 30 cm above the seabed to pass under the sled with no or minimal damage. This also allows the sled to easily pass over large rocks. The sample area of bottom contact gear will remain small and the impact to the environment limited. We will also be using remote monitoring equipment wherever possible to avoid any physical impact on the marine environment. We will also use underwater video to determine the effects of towed fishing gear on the seabed and animals that live there.

**Data Management** The project is expected to generate new intellectual property. The data gathered from this research will be shared through presentations and reports with the communities impacted as well as at conferences and meetings. The data sets will remain property of the Marine Institute and Qikiqtaaluk Corporation. There are no patents involved in the project so far and QC has a corporate lawyer to ensure all practices are beneficial.

**Nunavut Residents** A total of five Inuit from each of the study communities will actively join the research efforts and be trained on the equipment and research operations. Two Inuit from Kinngait and Sanikiluaq will fly to Newfoundland and Labrador to join the RV Ludy Pudluk while it transits North. In addition, two community vessels will work in tandem with the RV Ludy Pudluk to increase efficiency. In addition, the Hunters and Trappers Organizations (HTOs) in each of the four communities have been consulted with by Qikiqtaaluk Corporation and the Marine Institute. The HTAs decide the community members who will be involved in this research project based on experience.

**Information Dissemination** The first study will take place between July to October 2021 in Kinngait and Sanikiluaq. The second study will take place between July to October 2022 in Sanirajak and Igloolik. Reports and information dissemination will follow immediately following the studies. The results from the studies will be shared through publications in 2022 to 2025. Presentations at conferences will take place starting in 2022 as well. Annually as data is analyzed, underwater video will be delivered to HTOs within each year of the study. Meetings/presentations will take place every second year in each community (i.e., two communities will be studied for three weeks in each year and we will return to those communities to continue studies every second year. Specifically, communities studied in 2021-2022 will be returned to in 2023-2024 and communities studied in 2022/2023 will be returned to in 2024 and 2025. The results of this work will impact many issues such as food security and climate change. For this reason, information will be made available upon request to the Government of Nunavut and the Government of Canada, Inuit organizations and community members as required.

ᐅᐃᐱᐅᐅ: Résumé non technique Société Qikiqtaaluk 23 avril 2021 Titre : Science et partenariats autochtones en action : mobilisation des connaissances autochtones et renforcement des capacités pour participer à la recherche lors de la mise en œuvre d'une approche écosystémique des évaluations des ressources halieutiques Chercheur principal Nom et affiliation : Dr. Scott Grant, Institut marin Questions de recherche Au cours de cette étude, le RV Ludy Pudluk, un navire de recherche halieutique nouvellement construit à cet effet appartenant à la Qikiqtaaluk Corporation, et des navires de soutien fournis par la communauté des quatre communautés d'étude de Kinngait, Sanikiluaq, Sanirajak et Igloolik travailleront de concert dans les eaux adjacentes. à chaque communauté pour déterminer le potentiel halieutique des ressources marines. Le partage des connaissances et le renforcement des capacités entre les membres des communautés autochtones et les chercheurs du Fisheries and Marine Institute de l'Université Memorial auront lieu lors de la collecte de données associées aux évaluations des ressources écosystémiques et au développement d'une variété d'engins de pêche conçus pour répondre aux besoins des petits bateaux du Nunavut moissonneuses-batteuses. Questions spécifiques auxquelles cette étude cherchera à répondre : 1. Quelles sont les pêches côtières potentielles autour des quatre communautés étudiées? 2. Où se trouvent les invertébrés benthiques tels que les coquillages, les palourdes et les bulots autour de ces communautés ? 3. Quelles sont les

caractéristiques du cycle biologique des espèces d'intérêt présentes dans les eaux adjacentes à ces communautés?4.Quelles sont les conditions du fond marin et du type de fond marin autour de ces communautés ?5.Les zones étudiées peuvent-elles potentiellement soutenir une récolte de subsistance accrue d'espèces d'intérêt ou ont-elles le potentiel d'être des zones de récolte commerciale?6.Y a-t-il de nouvelles espèces comestibles présentes qui peuvent être récoltées? 7.Comment les Inuits, les universités et les organisations inuites peuvent-ils travailler ensemble pour développer les pêches côtières au Nunavut?Objectifs et justificationIl y a une pression croissante pour utiliser les ressources marines de l'Arctique afin de minimiser l'insécurité alimentaire grâce à une récolte de subsistance accrue d'espèces nouvelles et existantes et là où un nombre approprié d'espèces exploitables se produit, il y a un intérêt pour le développement commercial. Pour contribuer à la durabilité des écosystèmes marins de l'Arctique, les pêches exploratoires doivent envisager une stratégie de recherche globale qui inclut les connaissances écologiques traditionnelles autochtones (CET) et le renforcement des capacités pour participer à des activités de recherche qui favorisent la gestion communautaire des ressources renouvelables. Le manque de capacité communautaire à participer aux activités de recherche du Nunavut limite les partenariats communautaires dans les nouvelles initiatives de pêche émergentes et réduit la capacité d'étendre la recherche scientifique.Chronologie et emplacementLa première étude se déroulera sur une période de 7 à 8 semaines entre juillet et octobre 2021 à Kinngait et Sanikiluaq. La deuxième étude se déroulera sur 7 à 8 semaines entre juillet et octobre 2022 à Sanirajak et Igloodik. Le calendrier des études dépendra du dégel.Chaque année, au fur et à mesure que les données sont analysées, une vidéo sous-marine des fonds marins et des animaux qui s'y trouvent sera livrée aux HTO chaque année de l'étude. Des réunions / présentations décrivant les résultats de la recherche de l'année précédente auront lieu tous les deux ans dans chaque communauté (c'est-à-dire que deux communautés seront étudiées pendant 3,5 semaines chaque année et nous retournerons dans ces communautés pour poursuivre les études tous les deux ans. Plus précisément, les communautés étudiées en 2021-2022 seront remises en 2023-2024 et les communautés étudiées en 2022/2023 seront remises en 2024 et 2025 avec l'aide financière du Québec et différents programmes de financement. MéthodesCe projet utilise des technologies de pointe (par exemple, un échosondeur multifaisceaux, un profileur de courant Doppler acoustique, une sonde multiparamétrique [enregistre la profondeur de l'eau, la température, la salinité, la conductivité, le pH, l'oxygène dissous, la matière organique dissoute, la turbidité et la chlorophylle a] , une vidéo sous-marine géoréférencée 4K haute définition, des engins de pêche conçus pour répondre aux besoins des pêcheurs de petits bateaux du Nunavut et une approche écosystémique des évaluations des ressources.ImpactsNotre projet n'impliquera pas d'expérimentation humaine ou animale, de tissus ou de données. Les activités du projet comprendront la surveillance du milieu marin côtier avec divers types d'équipements. Cet équipement interagira avec l'environnement, comme le traîneau vidéo remorqué et les dragues à pétoncles, palourdes et concombres de mer. Il est à noter que le composant inférieur du traîneau vidéo remorqué a une conception arquée qui permet aux structures verticales qui s'étendent jusqu'à 30 cm au-dessus du fond marin de passer sous le traîneau avec peu ou pas de dommages. Cela permet également au traîneau de passer facilement sur de gros rochers. La zone d'échantillonnage des engins de contact inférieurs restera petite et l'impact sur l'environnement limité. Nous utiliserons également des équipements de surveillance à distance dans la mesure du possible pour éviter tout impact physique sur l'environnement marin.Gestion de donnéesLe projet devrait générer une nouvelle propriété intellectuelle. Les données recueillies à partir de cette recherche seront partagées par le biais de présentations et de rapports avec les communautés touchées ainsi que lors de conférences et de réunions. Les ensembles de données resteront la propriété du Marine Institute et de la Qikiqtaaluk Corporation. Il n'y a pas de brevets impliqués dans le projet jusqu'à présent et QC a un avocat d'entreprise pour s'assurer que toutes les pratiques

[illegible]

[illegible]

Operations Phase: from 2021-08-01 to 2024-10-01

ΛϵηΔη↳▷σΔ<sup>96</sup>▷<sup>c</sup>

ᐱᓯ	ᖃᓄᐃᑦᑐᓯᑦ ᐱᑦᓕᓕᐅᖃᑦᓂᐅᑦᐅᑦ	ᓯᓪᓴᑦ ᓄᐱᖃᑦᐅᑦ	ᑐᔨᐅᒫᓗᓗᓗᓗᓗᓗᓗ ᐅᐅᑦᐅᑦᐅᑦᐅᑦᐅᑦᐅᑦ	ᐃᑦᔨᑦᓂᑦᖃᑦᐅᑦᐅᑦᐅᑦᐅᑦ ᐃᓄᓄᑦ ᐱᔨᑦᓂᑦᐅᑦᐅᑦᐅᑦᐅᑦ ᑕᐃᑦᓯᒫᓂᑐᖃᐅᑦᖃᑐᖃ	ᖃᓂᓄᓂᖃᑦᑭᖃ ᓄᐱᑦᓯᓗᓗᓗᓗᓗᓗᓗ ᐅᒫᒫᓗᓗ ᔨᑐᓯᓇᓯᐅᑦᐅᑦ ᓯᐱᓄᑦ
Kinngait	Marine Based Activities	Marine	N/A	Within the 12 m Nunavut settlement area	Kinngait
Igloolik	Marine Based Activities	Marine	N/A	Within the 12 m Nunavut Settlement Area	Igloolik
Hall Beach	Marine Based Activities	Marine	N/A	Within the 12 m Nunavut Settlement Area	Hall Beach
sanikiluaq	Marine Based Activities	Marine	N/A	Within the 12 m Nunavut Settlement Area	Sanikiluaq

[illegible]

ᓄᓇ ᑦᓴᖅ	ᐱᑏᑦ	ᑲᐣᖃᐱᖅᑎᑦᑦᓴᖅ	ᖅᑲᖅᓴᐣ ᐣᖅᑎᑕᐅᓇᐅᓚᐱᐱᑦᓴᓂᖅ
Pᓇᖅᓴᐱᑦ	Annie Suvega	Aiviq Hunters and Trappers	2020-01-15
ᖅᓂᖅᓴᖅ	Sam Arnardjuaq	Hall Beach Hunters and Trappers	2020-08-11
ᐱᖅᓴᓂᖅ	Michelline Ammaq	Igloodik Hunters and Trappers	2021-01-13
ᖅᓂᓴᐣᐱᖅ	Lucassie	Sanikiluaq Hunters and Trappers	2020-10-29



## ᓇᓂᓕᓂᓐ ᓂᓂᓐ ᓂᓂᓐᓂᓐᓂᓐ

ᓇᓂᓐᓂᓐ ᓂᓂᓐᓂᓐᓂᓐᓂᓐ ᓂᓂᓐᓂᓐᓂᓐ:

South Baffin

## ᓇᓂᓐᓂᓐ ᓂᓂᓐ ᓂᓂᓐᓂᓐᓂᓐ

ᓂᓂᓐᓂᓐᓂᓐ ᓂᓂᓐᓂᓐᓂᓐᓂᓐ ᓂᓂᓐᓂᓐᓂᓐᓂᓐ ᓂᓂᓐᓂᓐᓂᓐᓂᓐ ᓂᓂᓐᓂᓐᓂᓐᓂᓐ ᓂᓂᓐᓂᓐᓂᓐᓂᓐ	ᓂᓂᓐᓂᓐᓂᓐᓂᓐ ᓂᓂᓐᓂᓐᓂᓐᓂᓐ ᓂᓂᓐᓂᓐᓂᓐᓂᓐ ᓂᓂᓐᓂᓐᓂᓐᓂᓐ ᓂᓂᓐᓂᓐᓂᓐᓂᓐ	ᓂᓂᓐ ᓂᓂᓐᓂᓐᓂᓐ	ᓂᓂᓐ ᓂᓂᓐᓂᓐ / ᓂᓂᓐᓂᓐᓂᓐᓂᓐ	ᓂᓂᓐᓂᓐᓂᓐ
Hunters and Trappers Associations/Organizations	Letter of Support from Aiviq and Sanikiluaq Hunters and Trappers Associations for research work in 2021 and the future	Active	2021-04-20	2022-04-20
ᓂᓂᓐᓂᓐᓂᓐᓂᓐᓂᓐ	Applied for a License to conduct research in Nunavut	Applied, Decision Pending	2021-04-12	
ᓂᓂᓐ	Currently collaborating with the Government of Nunavut, Fisheries and Sealing Division in the Department of Economic Development and Transportation to submit a proposal to the Chief Medical Office. The objective of this proposal is to propose a guideline and protocol to mitigate risks associated with COVID-19 for research vessels entering Nunavut in 2021 and conducting marine research. This proposal will be submitted as soon	Not Yet Applied		

	as possible.			
ᐃᓴᓴᐅ	Animal use Protocol approved by the Department of Animal Care Services of Memorial University.	Active	2020-07-07	2023-07-07

### Project transportation types

Transportation Type	Transportation Mode	Length of Use
Water	12m research vessel, the RV Ludy Pudluk	

### Project accomodation types

መርህ ፭

◁ ୨୦୧୬,

◀▷↳♂◀<sup>96</sup>▷<sup>96</sup>

Λ<sup>9</sup>D<sup>c</sup> Δ<sup>6</sup>ΓΔ<sup>5b</sup> ΔD<sup>5b</sup>CΔσD<sup>5b</sup>HΔ<sup>5b</sup> ΔC<sup>5b</sup>FΔNΔ<sup>c</sup> ΔjCΔ<sup>c</sup>, Γ<sup>c</sup>ΔPΔ<sup>c</sup>, <sup>5b</sup>ΔLCΔ<sup>j5b</sup>, ΔFΔ<sup>c</sup> ΔP<sup>5b</sup>Γ<sup>c</sup>Δ

Inuktitut Name English Name	Quantity	Unit / Description	Location / Purpose
40-foot (11.99 m) aluminum hull catamaran research vessel (RV Ludy Pudluk)	1	11.99m	Sailing within the 12m Nunavut Settlement Area in Kinngait, Sanikiluaq, Igloolik, Hall Beach
boom and hydraulic hauler system	1	N/A	Hauling equipment from ocean to vessel
Baited Pots	2	N/A	To collect shrimp, crab, whelk, Atlantic cod, and Greenland cod
Removable A-frame	1	N/A	for mobile fishing gear surveys
scallop and sea cucumber dredge/ mussel rake	1	N/A	Collecting invertebrates
mini-bottom trawl	1	-	Collecting marine invertebrates
underwater camera systems	1	-	Towed video surveys
unmanned aerial vehicles	2	-	remote sensing surveys
longlines and experimental bottom and pelagic gillnets	2	-	Collect fish species
multibeam echosounder system	1	-	Sea bottom mapping
multi-parameter sonde	1	-	To collect oceanographic data

$\Pi \cap \Sigma \cap \Gamma = \emptyset$

<p>ᠢᠰᠤᠨ</p> <p>ᠳᠦ᠋ᠰᠦ᠋ᠢᠰᠦ᠋ᠨᠳᠦ᠋ᠰᠦ᠋ᠨ</p> <p>ᠳᠠᠵᠤᠯᠤᠰᠤᠳᠦ᠋ᠰᠦ᠋ᠨ</p>	<p>ᠰᠦ᠋ᠨᠠᠳᠤᠵᠤᠰᠦ᠋ᠨᠳᠦ᠋ᠰᠦ᠋ᠨ</p> <p>ᠳᠦ᠋ᠰᠦ᠋ᠢᠰᠦ᠋ᠨᠳᠦ᠋ᠰᠦ᠋ᠨ</p>	<p>ᠰᠦ᠋ᠨᠢᠳᠦ᠋ᠰᠦ᠋ᠨ</p> <p>ᠳᠦ᠋ᠰᠦ᠋ᠢᠰᠦ᠋ᠨᠳᠦ᠋ᠰᠦ᠋ᠨ</p>	<p>ᠰᠦ᠋ᠨᠢᠳᠦ᠋ᠰᠦ᠋ᠨ</p> <p>ᠳᠦ᠋ᠰᠦ᠋ᠢᠰᠦ᠋ᠨᠳᠦ᠋ᠰᠦ᠋ᠨ</p>	<p>ᠰᠦ᠋ᠨᠢᠳᠦ᠋ᠰᠦ᠋ᠨ</p> <p>ᠳᠦ᠋ᠰᠦ᠋ᠢᠰᠦ᠋ᠨᠳᠦ᠋ᠰᠦ᠋ᠨ</p>	<p>ᠰᠦ᠋ᠨᠢᠳᠦ᠋ᠰᠦ᠋ᠨ</p> <p>ᠳᠦ᠋ᠰᠦ᠋ᠢᠰᠦ᠋ᠨᠳᠦ᠋ᠰᠦ᠋ᠨ</p>	<p>ᠰᠦ᠋ᠨᠢᠳᠦ᠋ᠰᠦ᠋ᠨ</p> <p>ᠳᠦ᠋ᠰᠦ᠋ᠢᠰᠦ᠋ᠨᠳᠦ᠋ᠰᠦ᠋ᠨ</p>
Information is not available						

ΔL<sup>9b</sup> ΔD<sup>9b</sup> CD<sup>9b</sup> ΔL<sup>9b</sup> ΔD<sup>9b</sup>

၂၁၁ ငါး ခုအတွက်	၂၁၂ ငါး ခုအတွက်	၂၁၃ ငါး ခုအတွက်
၀		

## ᐃᑲᑕᑦ

ᐃᑲᑕᑦ ᑕᑦ ᑕᑦ ᑕᑦ

ᐱᑕᑦ ᐱᑕᑦ ᐱᑕᑦ ᐱᑕᑦ	ᑲᑦ ᐃᑕᑦ ᐃᑕᑦ	ᑲᑦ ᐃᑕᑦ ᐃᑕᑦ	ᑲᑦ ᐃᑕᑦ ᐃᑕᑦ	ᑲᑦ ᐃᑕᑦ ᐃᑕᑦ
Marine Based Activities	ᐃᑕᑦ ᐃᑕᑦ ᐃᑕᑦ	N/A	Engine oils from oil changes to be disposed of in approved facilities in study communities	None
Marine Based Activities	ᐃᑕᑦ ᐃᑕᑦ ᐃᑕᑦ	-	Disposal in open water	-
Marine Based Activities	ᑲᑦ ᐃᑕᑦ ᐃᑕᑦ	Uncertain	Domestic garbage produced will be disposed of in community land-fills	None

ᐃᑕᑦ ᐃᑕᑦ ᐃᑕᑦ ᐃᑕᑦ

Please see Animal Use Protocol form for details on this in the attached documents

# **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

Research vessel operations will be used to conduct inshore surveys. These surveys will provide information on bottom type, fish species abundance and types, oceanographic parameters. RV Ludy Pudluk is a 12 m research vessel. Crew size is 5. Operating between July 2021 to September 2021 in Nunavut. Vessel will travel from Newfoundland and Labrador to Kinngait then Sanikiluaq and back down to Newfoundland. Vessel will call in Nain and then Iqaluit for refuelling purposes. No Ballast water or deck drainage issues. Domestic garbage produced will be disposed of in community landfills. Engine oils from oil changes to be disposed of in approved facilities in study communities. Grey water will be disposed of at sea. The vessel will follow all regulations regarding Waste Management. No ice-breaking will be required. This vessel will not impact any caribou migrations or Inuit harvesting as we are working closely with the Hunters and Trappers Associations of each study community.

## SECTION H2: Disposal At Sea

## SECTION 11: Municipal Development

[illegible]

Inshore marine coastal areas have the potential to be: breeding, spawning and nursery areas; vii. known migration routes of terrestrial and marine species; viii. marine resources; ix. areas of natural beauty, cultural or historical history; x. Tidal processes and bathymetry in the project area

**ᐱᓪᑦ ᐸᑦᐅᑦ ᖃᓄᐃᑦᑐᓚᕆᐅᓂᖅ: ᐅᐭᔨᖃᑕᖃᓂᖅ**

No known SARA species in these areas

ᐱᓪᓇ ᐱᑦᑎᐅᑦ ᑦᑲᓄᐃᑦ)ᑦᑕᑎᐅᓂᑦᐱ: ᐃᓄᑦᑎᓂᑦᑭᑦᐱᑦᐱᑦᑕᐱᑦᑕᑎᓂᑦᑭᑦᐱᑦᐱᑦ

Potential to conduct surveys in areas of local and domestic traffic area for small vessels in the coastal inshore area

### Miscellaneous Project Information

$\Delta^{\text{fb}} \sigma_{\text{f}}^{\text{fb}} \propto \Delta^{\text{fb}} \sigma_{\text{f}}^{\text{fb}} \propto \Delta^{\text{fb}} \sigma_{\text{f}}^{\text{fb}}$

Given the nature of this study, targeted benthic invertebrates of recreational/subsistence harvesting

potential or commercial potential will need to be collected to establish size selectivity of experimental fishing gear (conservation harvesting=avoid juveniles) and life-history characteristics (e.g., size at sexual maturity). To make sure an excessive number of individuals are not collected a maximum number will be collected for each length-class (e.g., 50 individuals per 10 mm shell-length class). Numbers collected will meet the needs of establishing relevant parameters for both sexes. This study will utilize remote sensing in the form of multibeam echosounder surveys of seabed substrate and related features combined with towed video sled and drop-camera surveys to identify habitats that support the greatest number of individuals (density estimates are derived from video and drop-camera surveys). This information will then guide physical sampling locations and methods (pots and dredges). This strategy will limit the impact on the seabed, benthic communities, and non-targeted species by focusing efforts where remote sensing surveys and underwater video observations indicate species of interest are known to exist. As is outlined above in Replacement, this study will also set collection limits of individuals of each species based on size-class. This study targets benthic marine invertebrate species that can provide a natural source of protein (food security) for Nunavut communities and where numbers merit commercial potential. There is the possibility of inadvertently capturing finfish (vertebrates) in the fishing gears. All finfish species captured will be prioritized with regard to recording species and size and returned to the site of capture as soon as practicable. Holding pans (crab pans) filled with fresh seawater will also be used to transfer fish until they can be measured. Further, all invertebrates captured will be recorded and those not required for laboratory analysis will be returned to the ocean as soon as practicable (generally within 1-5 minutes of capture) at the capture site.

## **Cumulative Effects**

## Impacts

$\mathbf{e} \rightarrow \mathbf{e} \Delta^{\mathfrak{b}} \mathbf{C} \triangleright \sigma^{\mathfrak{b}} \mathbf{r}^{\mathfrak{c}} \quad \mathbf{d} \mathfrak{c} \cap \Gamma \triangleright \mathbf{C} \dot{\sigma}^{\mathfrak{c}} \mathbf{D}^{\mathfrak{c}} \quad \mathbf{d}^{\mathfrak{b}} \mathbf{D}^{\mathfrak{b}} \mathbf{C} \triangleright \mathbf{r}^{\mathfrak{c}} \mathbf{L} \mathfrak{c}$

[illegible]
$$(P = \langle b \rangle \dot{\cup} P \cap \langle a \rangle^c, N = \langle b \rangle \cap P \cup \langle a \rangle^c, M = \langle b \rangle \cap P \cup \langle a \rangle^c, U = \langle b \rangle \cap P \cup \langle a \rangle^c)$$





## List of Project Geometries

1	point	Kinngait
2	point	Igloolik
3	point	Hall Beach
4	point	sanikiluaq