

2019 NON-TECHNICAL ANNUAL REPORT – NRI LICENCE #01-034-16N-M

1. Project Overview

Construction of two marine facility infrastructure projects in Iqaluit have been underway through two open-water seasons, initiating in 2018. Construction of these facilities is ongoing and will continue in 2020. Led by the Government of Nunavut (GN) - Community and Government Services (CGS), ownership and responsibility will transfer to the GN - Economic Development and Transportation (EDT) once operational.

Iqaluit is located on southern Baffin Island, Frobisher Bay, Koojesse Inlet (see Figure 1 in Appendix 1). The marine facility infrastructure projects include the Deep Sea Port (DSP) and the Small Craft Harbour (SCH), which occupy both the western and eastern shores of Koojesse Inlet. Along the western shore is the development of a new DSP, and two of the SCH facilities which are the improvements to the existing causeway, construction of a snowmobile ramp, and a parking area for the causeway. Along the eastern shore, also considered part of the SCH project, there will be improvements to the municipal breakwater and to the Northmart breakwater. Collectively the DSP and SCH Projects are referred to as the Iqaluit Project. Schematics of the DSP and SCH facilities are available on the Nunavut Planning Commission (NPC) or Nunavut Impact Review Board (NIRB) registry.

Iqaluit Project field work, as permitted through the Nunavut Research Institute (NRI) research license (Permit #01-034-16N-M), has been ongoing since 2016 (Table 1-1). The initial field work included the collection of baseline environmental and geotechnical data to support permitting and engineering design. In 2018 and continuing through 2025 the field work includes monitoring and research programs to meet the Offsetting Plan requirements from the *Fisheries Act* Authorizations (FAAs) issued by Fisheries and Oceans Canada – Fish and Fish Habitat Protection Program (DFO-FFHPP) (termed the Iqaluit Project Field Study). Section 4 outlines the field work initiated in 2018 and carrying on through to 2025.

This document provides a summary of the 2019 field activities that were conducted as part of a multi-year program and presents the plans for the 2020 field season. The information presented in this report is preliminary and has not been analyzed in its entirety. Data collected as a part of the field activities for the Offsetting Plan may be shared with interested parties upon request. NRI will be notified of publications resulting from the data collected.

Table 1-1 NRI Research Permit History

Year	Activities	Regulatory requirement for field program
2016	Environmental and geotechnical study to support baseline report for territorial and federal permitting	Nunavut Planning Commission (NPC) Project application, federal regulators (e.g. DFO) Inform engineering from geotechnical study
2017	No field work	--
2018	Pre-construction monitoring and Pilot Study Research Program 1 for the DFO FAA	DFO FAA

Year	Activities	Regulatory requirement for field program
2019	Pilot Study Research Program 1 for the DFO FAA	DFO FAA
2020	Year 1 for Arctic Char diet study (Research Program 1) IQ Program for Research Program 2	DFO FAA
2021	Year 2 for Arctic Char diet study (Research Program 1) Year 1 for Seaweed Habitat Study (Research Program 2) IQ Program for Research Programs 1 and 2	DFO FAA

2. Program Name

Iqaluit Project Field Study.

3. Proponent and Representative Details

Contact information for the proponent and representative are provided in Table 3-1 and for the field team are provided in Table 3-2.

Table 3-1 Proponent and Contact Information

Contact Category	Details
Name of Business / Company	Government of Nunavut – Community and Government Services (CGS)
Name of Proponent	Justin McDonell, Project Manager – Capital Projects Division
Proponent Mailing Address	PO Box 1000, Station 200 Iqaluit, Nunavut X0A 0H0 Phone: 867-975-5441 Email: JMcDonell@GOV.NU.CA
Name of Consultant / Primary Contact	Victoria Burdett-Coutts, Marine Biologist, M.Sc., R.P.Bio.
Consultant Mailing Address	Suite 500 - 4321 Still Creek Drive Burnaby, British Columbia V5C 6S7 Office: 778-945-5501 Mobile: 778-839-2372 Fax: 604-298-1625 Email: Victoria.Coutts@advisian.com

Table 3-2 *Iqaluit Offset Plan Field Program Research Team*

Name	Title
Victoria Burdett-Coutts	Senior Marine Scientist, Offset Project Manager
Diane Pinto	Community Engagement and Indigenous Knowledge Facilitator
Cameron Knight	Field Technician
Petra Stastny	Field Technician
Keila Stark	Graduate Student University of British Columbia (UBC)
Dr. Mary O'Connor	Graduate Advisor at UBC

4. Field Program

4.1 Program Scope

The Iqaluit Project Field Study consists of a Monitoring Program (MP) and a Research Program (RP). Within the research program, two questions will be addressed, hereafter referred to as RP1 and RP2.

The goal of the MP is to assess the performance of the rip rap boulder which forms the shoreline protection for the facilities in terms of how it functions as fish habitat.

The goal of the RPs is to contribute to the biological knowledge base for subjects to which there is little known at a localized level, that are important to the Inuit and to the scientific community. The topics addressed will be accomplished through a collaboration of science and Inuit Qaujimajatuqangit (IQ).

4.1.1 Monitoring Program

The goal of the MP is to confirm the ability of the rip rap boulder shoreline protection component of the facilities to function as fish habitat. Rocks provide multi-dimensional habitat where marine organisms can find refuge in the spaces between them or as attachment substrate for marine algae. Furthermore, it will provide foraging habitat for migratory fish including Arctic char.

The MP initiated in 2018 with a pre-construction survey (described in the 2018 NRI submission [Advisian 2019]). The MP will continue following the completion of construction of the Iqaluit Project in 2021. Monitoring events will be conducted over three periods over five years post construction from 2021 to 2025.

4.1.2 Research Program

The RPs will be undertaken as a collaboration between CGS, Advisian and UBC. RP1 seeks to understand the diet and habitat preferences of Arctic char and RP2 to understand the biomass and biodiversity of the seaweed bed in Koojesse Inlet. Both RPs are composed of a scientific study, where a graduate student will be onboarded at UBC and complemented by an IQ study and meetings with the Amaruq Hunters and Trappers Association (HTA). The IQ component will be facilitated by Advisian.

4.1.2.1 Research Program 1

The focus of RP1 is to investigate the trophic ecology and habitat requirements of anadromous Arctic char in Koojesse Inlet.

Scientific Study

A pilot study was conducted for RP1 in the open-water seasons of 2018 and 2019, with nine fish and four fish purchased from local harvesters in the respective years. The pilot study was designed to be composed of 15 fish, so the final specimen will be included in the 2020 season. The purpose of the pilot program was to obtain preliminary information on the diet of Arctic char and to address any logistical constraints to the sampling or shipping protocol.

Year 1 of a two-year field program for RP1 will initiate in July 2020. A graduate student initiated their study at UBC in September 2019 and will be in Iqaluit in the second to third week of July in 2020 and 2021. Representatives of the Amaruq HTA have been engaged to confirm that the timing planned is appropriate for peak season of Arctic char harvesting.

Diets of Arctic char will be assessed using a multi-pronged approach; analysis of stomach contents through deoxyribonucleic acid (DNA) barcoding for gut contents and lipid/fatty acid analysis of muscle tissue. The biochemical analyses may also be conducted on the primary prey organism of Arctic char species.

A minimum of 60 fish will be collected per year. Fish will be purchased from local harvesters. Primary prey species will be collected from the pelagic or benthic environment north of the causeway (western shore of Koojesse Inlet). In the laboratory technicians will collect biological data from each fish (length, weight, sex, maturity status) and collect biological materials (otoliths, section of white muscle, stomach). The biological material was preserved in an appropriate manner for the analysis required and shipped to Vancouver, BC for processing.

Inuit Qaujimajatuqangit

The IQ component will use an ethnographic approach using a mix of related and established methods such as: scoping and research design meetings with the Amaruq HTA; a workshop focused on Arctic char; individual interviews; archival research; and a verification meeting with the Amaruq HTA. The mix of methods helps to cross-check information and increases the overall reliability of study results. The inclusion of IQ will allow for a more robust understanding of Arctic char that is scientifically sound and connected to local experience, values, and priorities. An IQ workshop was conducted in August 2018. The purpose was to integrate first-hand knowledge of local Inuit fishers—who have observed the environment and Arctic char on a continuing basis over decades—with scientific research (described in Advisian [2019]).

Results and Summary

There was no IQ conducted for RP1 in 2019. Laboratory sampling for the four Arctic char collected is currently underway. All four fish were males, with lengths between 480 mm to 700 mm and weights between 1,169 g to 3,653 g (see demonstrative image in Photo 4-1). Laboratory results of the 2018 and 2019 processing is not yet available but may be provided to the NRI or to the Amaruq HTA upon request.



Photo 4-1 One of the Four Fish Processed in the 2019 sampling season

4.1.2.2 Research Program 2

The focus of RP2 is to identify the biodiversity of seaweeds, and species associations with seaweed habitats in Koojesse Inlet.

Scientific Study

The primary field season for RP2 will not occur until 2021 and will be conducted in conjunction with Post Construction Monitoring Year 1 of the MP. Field methodologies are described in the 2018 CGS NRI Summary (Advisian 2019). There will just be one field season for RP2. Seaweed samples will be collected for further identification of seaweed and associated invertebrates.

A drone survey was conducted by Arctic UAV on behalf of CGS on September 30, 2019 targeting low tide. This survey will be repeated in 2020 and will contribute to the habitat mapping exercise to be undertaken by the UBC graduate student. Onboarding of a graduate student for RP2 is planned for September 2020.

Inuit Qaujimajatuqangit

RP2 will incorporate an IQ component consisting of a mix of ethnographic methods. The IQ Workshop was planned for 2019 but will occur in 2020 and is expected to focus on IQ on species diversity of the seaweed beds, whether spatial extent or diversity of the seaweed beds have changed over time, and document what is known about species dependencies on the seaweed.

IQ research in the following years may include individual interviews, field visits by key knowledge holders, archival research, and verification meetings with the Amaruq HTA. Should connections between the research occurring for RP1 be made (e.g. species living on or near rockweed/kelp are diet of Arctic char), these will also be included in the knowledge exchange.

Results and Summary

There are no results to present for 2019.

4.2 Plans for the 2020 Season

- Year 1 of RP1 to purchase and process 60 fish caught in and around the causeway on the western shore of Koojesse Inlet.
- IQ Workshop for RP2 and follow up on laboratory results of RP1 and IQ verification with the Amaruq HTA.

5. References

Advisian. 2019. Iqaluit Marine Infrastructure Project. Permit Summary – Permit No. 01 034 16N-M. Prepared for Government of Nunavut. January 2019. (*Document No. 307071-01148-00-EN-LET-0004, Rev.0*).

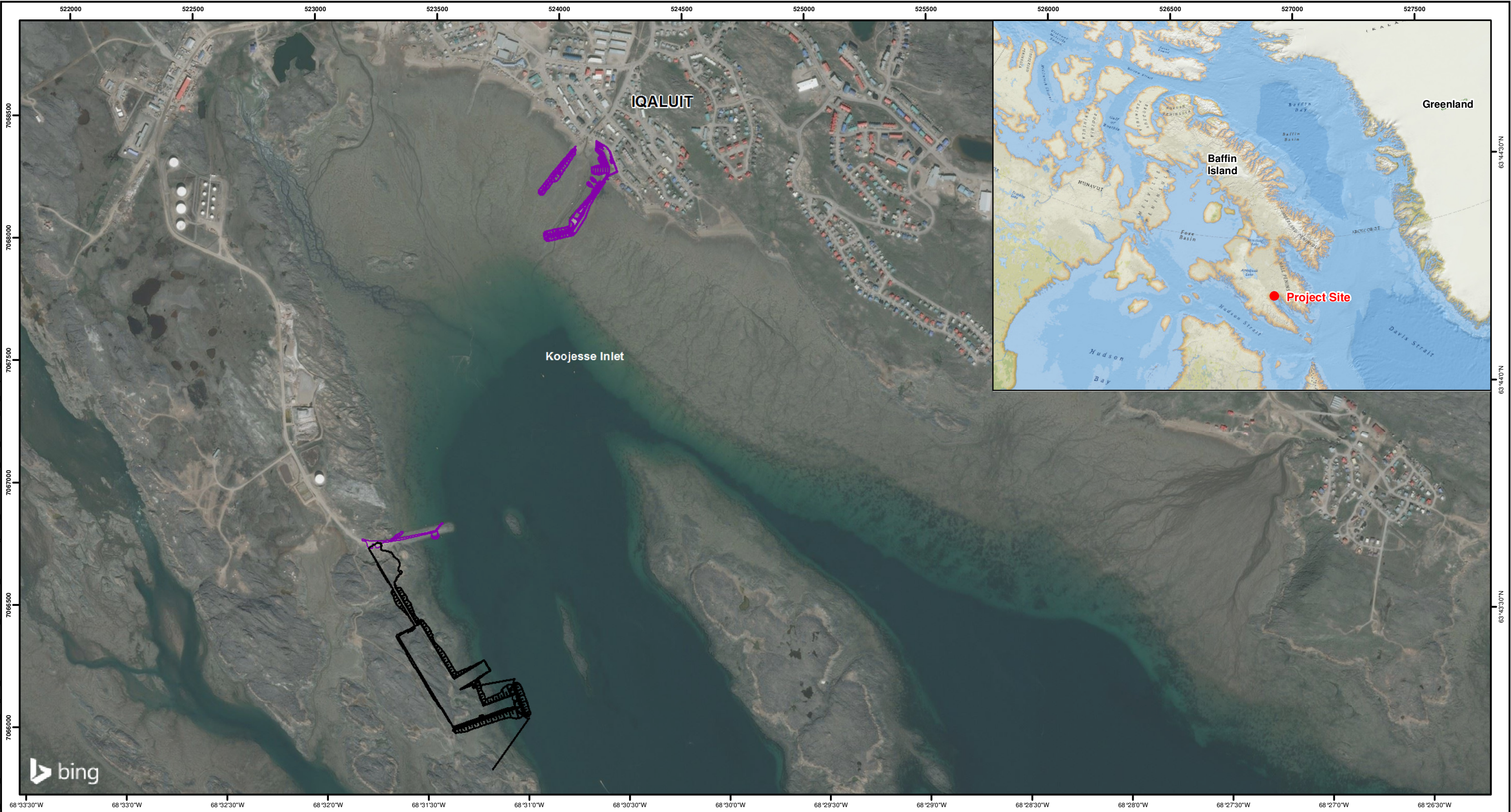
6. Conclusion

We trust that this correspondence provides the necessary details required for our annual summary. To reiterate, any data collected over the course of this program may be available upon request for interested parties. Publications on the subject, as they become available will be provided to the NRI. If you have any questions or require further details contact information for Victoria Burdett-Coutts at Advisian is provided in Table 3-1.



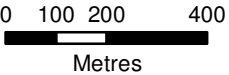
Appendix 1 Figure

FILE LOCATION: U:\YVR\307071\01148_GON_NVMarInfra\10_Eng\16_Geomatics\01_Mxd\NRI_Permit\Figure1_2018-05-31_NRI_Permit_IQ_Project_Location.mxd



Legend

- Proposed DSP Project
- Proposed SCH Project



Note:
Coordinate System: NAD 1983 UTM Zone 19N
Aerial Photo and Basedata from City of Iqaluit, 2016

B SHEET	
OneWay to zero harm	
DATE:	04/06/2018
DRAWN:	Y.M.
EDITED:	K.R.
APPROVED:	XX

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CUSTOMER: Advisian Worley Group		
IQALUIT MARINE INFRASTRUCTURE PROJECT LOCATIONS		
WORLEYPARSONS PROJECT No: 307071-01148	FIG No: 1	REV A