

COASTAL RESTORATION NUNAVUT FINAL REPORT

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Coastal Restoration Nunavut:

Final Report

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Acknowledgements

The Coastal Restoration Nunavut (CRN) project contains the collective knowledge of nearly 200 Inuit Elders, harvesters, and other coastal resource users. We refer to the contributors as knowledge holders in recognition of their expertise and lived experience. We recognize and thank all of them for their invaluable contributions to the project and to the continued mobilization of traditional and local knowledge within the Territory. We would also like to thank each HTA manager for assistance in coordinating field work, interviews and meetings and thank each HTA for their contributions to the project, the Government of Nunavut for in-kind and funding support and thank DFO for funding through the Coastal Restoration Fund.

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Executive Summary

The Coastal Restoration Nunavut (CRN) project draws on Inuit Qaujimajatuqangit (IQ) to document and address the health and condition of marine species and their habitats. The objective of the research project is to identify and implement physical interventions to mitigate the stressors impacting aquatic species in each of Nunavut's 25 communities. Under the Oceans Protection Plan (OPP), the Government of Canada has identified coastal restoration as a key priority to address threats to aquatic ecosystems and marine biodiversity loss. "Coastal restoration" is defined as the action of returning something to its former condition; improving its current condition; or protecting it from further or future harm. "Coastal" refers to any area where marine and terrestrial processes meet and interact.

This final report documents the activities undertaken by the CRN research team from November 1, 2017 to October 31, 2022; it highlights the findings and lessons learned by the CRN team. Elders, hunters and other community members shared their knowledge on the health and condition of coastal ecosystems and identified restoration needs within their communities. It is important to note that the Covid-19 pandemic, which began in March 2020 and imposed travel restrictions to and within the territory, meant the Nunavut-based team members were unable to complete site visits before the close of the project in four of the twenty-five communities (Rankin Inlet, Kimmirut, Pond Inlet and Arctic Bay). In each of the communities that were visited, team members held participatory mapping workshops with the Hunters and Trappers Association, Hamlet staff, Elders, and other resource users requesting to document their shared knowledge on coastal health and changing coastal conditions. The data collected over the course of the project represent a snapshot in time and are not a comprehensive inventory of all the coastal issues or priorities within a community. This report provides a summary of the key deliverables of the Coastal Restoration Nunavut project and provides links to reports and webpages on the project website (coastalnunavut.ca) for more details on project deliverables.

Key deliverables highlighted in this report include:

- Completion of 25 community profiles
- Development of a project website in four languages (Inuktitut, Inuinnaqtun, English, French)
- Completion of participatory mapping exercises in 21 communities
- Interactive online mapping of key issues and priorities for restoration in 21 communities
- Completion of three technical reports analyzing key issues affecting coastal aquatic ecosystems and changing coastal conditions in the Kivalliq, Kitikmeot and Qikiqtaaluk regions of Nunavut
- Completion of nine restoration plans and their community-led implementation:

The report concludes with an overview of feedback provided by representatives from five of the communities that implemented restoration projects, sharing the value of the Coastal Restoration Nunavut project, along with insights on ongoing needs and opportunities.

1.0 Introduction

Under the Oceans Protection Plan (OPP)¹, the Government of Canada has identified coastal restoration as a key priority to address threats to aquatic ecosystems and marine biodiversity loss. Established in 2017-2018, the Coastal Restoration Fund (CRF) is a five-year grants and contributions program focusing on projects that (a) address the impacts of historical development; (b) mitigate the results of increased marine shipping; (c) contribute to the recovery of species that are considered threatened, endangered or at risk; and (d) build local capacity to restore and maintain coastal habitats². In this context, “Coastal restoration” is defined as the action of returning something to its former condition; improving its current condition; or protecting it from further or future harm. “Coastal” refers to any area where marine and terrestrial processes meet and interact.

The Coastal Restoration Nunavut (CRN) project draws on Inuit Qaujimagatuqangit (IQ) to document and address the health and condition of marine species and their habitats³. In collaboration with communities and the Government of Nunavut, the objective of the research project is to conduct feasibility studies to identify and where possible, mitigate the stressors impacting aquatic species in Nunavut’s 25 communities. The project is committed to implementing at least three physical interventions identified as priorities by communities, one in each administrative region within the territory. The project also aims to strengthen capacity at the community level via local training on data collection; to document IQ; and to support each community in environmental restoration and stewardship initiatives.

The project builds on the successful baseline and monitoring programs developed and delivered by the Government of Nunavut, such as the Nunavut Coastal Resource Inventory (NCRI) and the Nunavut Community Aquatic Monitoring Program (N-CAMP).

Nunavut has three administrative regions (Figure 1) - Kitikmeot (Cambridge Bay, Gjoa Haven, Kugaaruk, Kugluktuk, Taloyoak); Kivalliq (Arviat, Baker Lake, Chesterfield Inlet, Coral Harbour, Nauyasat, Rankin Inlet, Whale Cove); and Qikiqtaaluk (Arctic Bay, Kinngait, Clyde River, Grise Fiord, Sanirajak, Iqaluit, Igloolik, Kimmirut, Pangnirtung, Pond Inlet, Qikiqtarjuaq, Resolute, Sanikiluaq).

¹ <https://tc.canada.ca/en/initiatives/oceans-protection-plan>

² <https://www.dfo-mpo.gc.ca/ae-ve/evaluations/20-21/crf-frc-eng.html>

³ For further information visit <https://www.coastalnunavut.ca/>

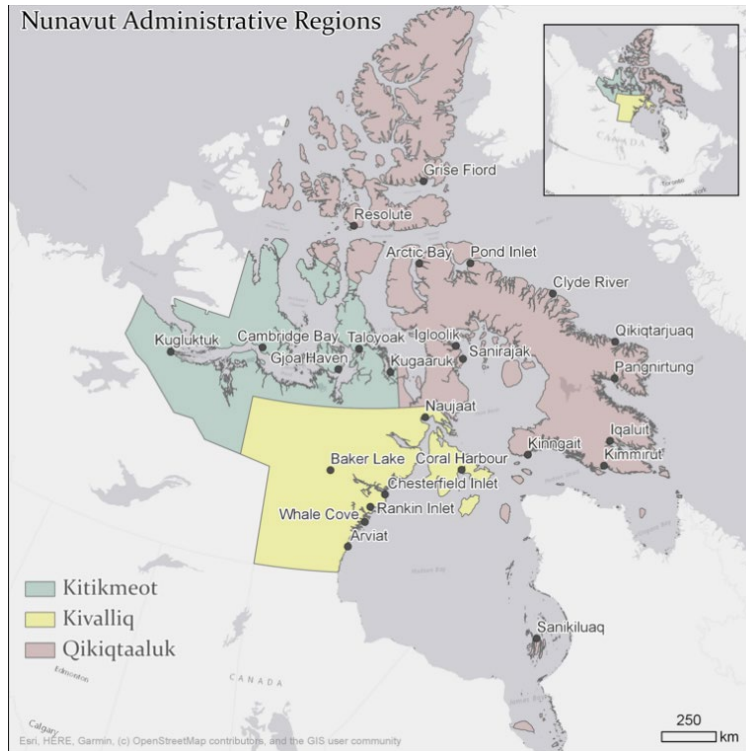


Figure 1. The three administrative regions of Nunavut

2.0 Background & Approach

Coastal Restoration Nunavut (CRN) is a 5-year project aimed at identifying and mitigating the stressors impacting coastal fisheries, communities, and coastlines in Nunavut. Building capacity at the local level via targeted training and employment, documenting Inuit knowledge and supporting community-led ecological restoration and stewardship initiatives, CRN completed its work in September 2022, six months after the expected termination date of the project due to impacts arising from COVID-19.

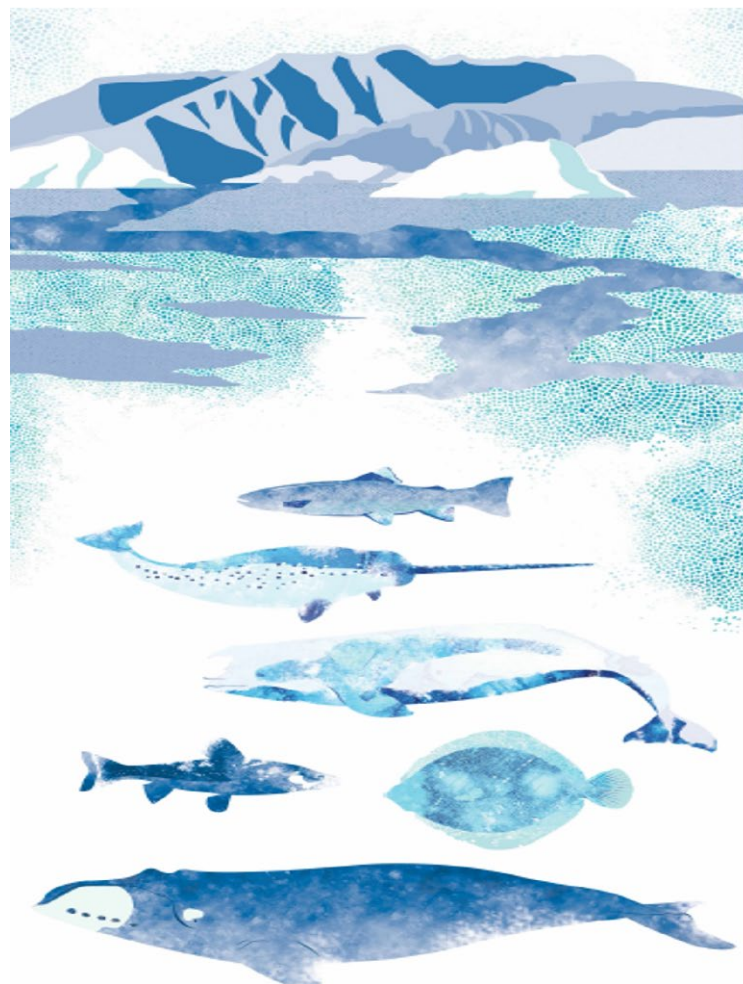
Led by Dr. Lucia Fanning of [Dalhousie University's Marine Affairs Program](#), in partnership with the Fisheries and Sealing Division, Government of Nunavut, and funded by Fisheries and Oceans Canada under the [Oceans Protection Plan's Coastal Restoration Fund](#), CRN drew on Inuit Qaujimajatuqangit (IQ) to document and address the health and condition of marine species and their habitats in Nunavut.

Despite travel restrictions arising from COVID-19, which began in March 2020, the CRN team traveled physically to twenty-one of the twenty-five communities in the territory to facilitate participatory mapping workshops and engagement sessions in collaboration with local Hunters and Trappers Associations (HTAs)⁴. However, for the

⁴ As guaranteed in the Nunavut Agreement (1993), HTAs have powers and functions related to the regulation of harvesting practices and techniques of its members, the allocation and enforcement of community basic needs levels and adjusted basic needs levels among members, and the management of harvesting among its membership. Membership is open to all Inuit

communities that could not be visited in person, participatory mapping was not able to be done. Nonetheless, the team was able to learn about the coastal restoration needs of each region and to support the development of community-led coastal restoration plans. These plans included physical rehabilitations to fix an urgent issue, support to enhance local stewardship initiatives, or conduct further research to understand the accelerated changes experienced by the many marine species living in Arctic waterways.

3.0 Project Highlights



- *Completed*
25 Community Profiles
- *Set up a project website to share research findings in*
4 Languages
(Inuktitut, Inuinnaqtun, English, & French)
- *Done mapping sessions in*
21 Communities
- *Developed an interactive*
ONLINE Map
of community-identified coastal issues
- *Generated*
3 Technical Regional Reports
analyzing coastal issues and priorities
- *Completed*
9 Detailed Restoration Plans
- *Supported*
9 Community-Led Restoration Projects
- *Supported*
3 External Funding Applications
- *Co-developed and carried out with partner communities*
2 Community-Led Monitoring Programs

Figure 2. Project Highlights

3.1 Community profiles

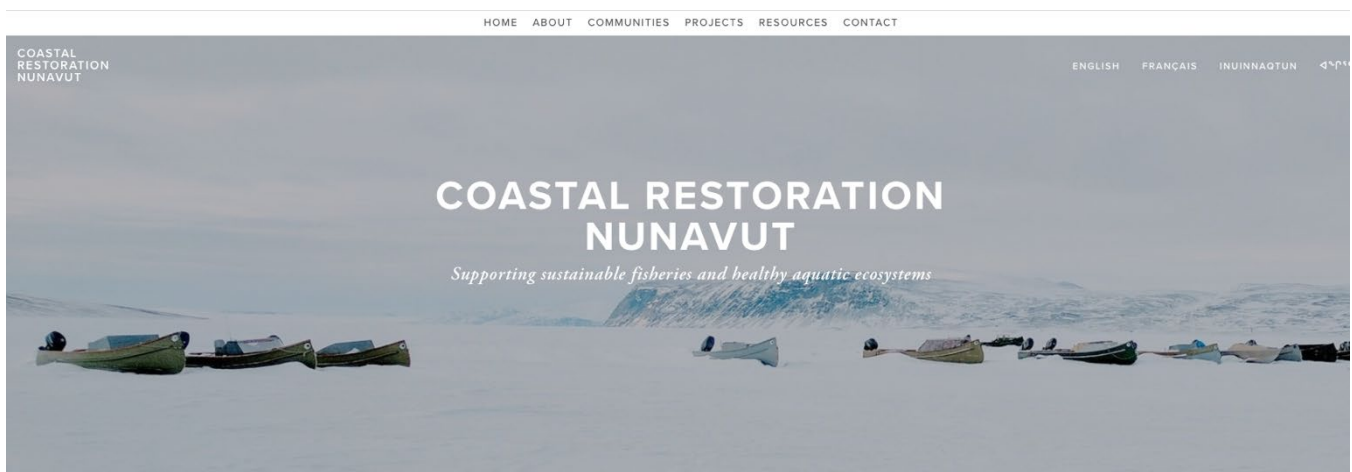
Community profiles for each of the twenty-five communities were provided as annexes to the Year 3 and Year 4 Annual Reports to DFO. Each profile consists of a brief background, short literature review summary, and for the

residents in a given community. HTAs must be consulted on any research related to their powers and functions. Members (Elders, youth, harvesters and other local resource users) hold expert knowledge of the Arctic environment both past and present.

21 communities that were visited, the community participatory map developed following the community mapping sessions conducted by the research team. Attributes and field notes were also included to describe key map features. If mentioned by the community, coastal restoration issues and priorities for each site are noted.


3.2 CRN website

Immediately following project approval and funding, the CRN project website was developed; photo documentation was submitted as Annex 11 of the Year 1 Annual report to DFO. The website, coastalnunavut.ca, continued to be updated and maintained throughout the life of the project, allowing for the knowledge gained to be shared and accessible to rights holders, communities, government, and other interested parties. By accessing the website, viewers can toggle between the different pages in each of the four official languages of Nunavut (Figure 3). The available webpages (in English) and partner attributions are captured in Figure 4 while Figure 5 highlights funding from DFO.



We work directly with communities to protect our oceans, rivers and lakes, and the many marine species who call them home.

Figure 3. Screen shot of current homepage of the CRN website



ABOUT

Learn about our project, partners, and our territory-wide restoration efforts.

[Learn more →](#)

COMMUNITIES

Inuit Elders, youth and resource users map damaged and vulnerable coastal areas.

[Explore the communities →](#)

PROJECTS

Residents restore degraded coastal areas to protect or enhance fish & fish habitat.

[Explore the projects →](#)

RESOURCES

Check out our publications, newsletters, reports, funding database and other resources.

[Read here →](#)

CONTACT

Questions or comments? Send us an [email](#). We always look forward to hearing from you.

[Meet the team →](#)



Figure 4: Screen capture of webpages and partner attribution

ABOUT



Grise Fiord, Nunavut

OVERVIEW

The Coastal Restoration Nunavut Project draws on Inuit Qaujimajatuqangit (IQ) to document and address the health and condition of marine species and their habitats. "Coastal restoration" is the action of returning something to its former condition; improving its current condition; or protecting it from further or future harm. "Coastal" refers to any area where marine and terrestrial processes meet and interact. The project is led by the Marine Affairs Program, Dalhousie University in partnership with the Fisheries and Sealing Division, Government of Nunavut. Project funding is provided in full by Fisheries and Oceans Canada.

Figure 5. Screen capture identifying DFO funding

3.3 Participatory mapping sessions and interactive community maps

Under the “[Communities](#)” page, access is provided to the interactive maps showing community-identified issues for the communities that held participatory mapping sessions.

Participatory mapping is an approach combining the tools of modern cartography with participatory methods to record and represent the spatial knowledge of local communities. Elders, youth, harvesters, and other local resource users hold expert knowledge of the Arctic environment both past and present.

In each of the communities, team members held participatory mapping workshops with the Hunters and Trappers Association (HTA), Hamlet staff, Elders, and/or other resource users to document their expert knowledge on coastal health and changing coastal conditions. During mapping workshops held by the research team, participants shared their knowledge by drawing areas of importance or concern on large-scale base maps. Community workshops and meeting discussions sought to learn more about each knowledge holder’s perspectives on the following:

1. What are the coastal restoration priorities and needs in your community?
2. What coastal areas, if any, show historical or potential signs of degradation and/or contamination?
3. How have your social, economic, and cultural activities and practices been impacted by changes to the coastal environment?
4. What should be done to address these impacts?

Observations included the significance of each site, the health and condition of each site and/or species, the coastal changes taking place, and key priorities to address those changes.

The spatial drawings and observations were approved by, and then returned to, each community as a large-scale map. Knowledge holders and board members were compensated during the planning, research and review stages of the interviews. The approved data was also made available in an online interactive map on the CRN website in English and Inuktitut, creating a legacy and an institutional memory of the information collected

Based on the knowledge shared during these workshops, community-driven restoration projects were identified, feasibility studies conducted, and coastal restoration activities funded, following the recommendations presented in the feasibility studies.

All community engagement activities were undertaken following receipt of a multi-year scientific research license No. 05 009 18N-M from the Nunavut Research Institute (NRI) and approval from the Research Ethics Board (REB) at Dalhousie University under file # 2017-4372.

3.4 Comparative assessment among communities in the Kitikmeot, Kivalliq and Qikiqtaaluk Regions

The changes and concerns raised by knowledge holders during the participatory mapping workshops and community engagement sessions were also summarized thematically to better understand the issues relating to development, resource use, and climate change, and to highlight any priority actions needed, as identified by participants. Changes identified occurred within the lifetime of the person describing the event, species, or site.

The data that were shared and presented belong to the communities and the interviewees who provided the information and cannot be used in whole or in part without explicit written permission from CRN and the respective community. Use of the data does not replace legal or ethical obligations for consultation. CRN works in partnership with communities to protect, maintain, document and share the data for the benefit of Nunavummiut.

The shared information was coded and grouped into themes for analysis. Data and results of the analysis from communities grouped together in each of the three regions in Nunavut were then compared. A technical report for each region focused on a comparative assessment of key issues affecting coastal aquatic ecosystems and changing coastal conditions in the region and the three reports are available on the CRN website under the “[Resources](#)” tab. A brief overview of the findings on priorities and changes documented for each of the regions is provided below. It is important to note they represent a snapshot in time and do not infer community consensus. As such, they do not present a comprehensive inventory of all coastal issues within the territory.

3.4.1 Kitikmeot Region

The five communities of the Kitikmeot region were engaged by the CRN research team in the winter of 2019. Key concerns identified by Kitikmeot residents from Cambridge Bay, Gjoa Haven, Kugaaruk, Kugluktuk, and Taloyoak were decreasing water levels, erosion, and species changes. During the CRN workshops, knowledge holders proposed actions for addressing these changes, including the clean-up of contaminated sites, water and fish monitoring, and fisheries management interventions. Figure 6 below illustrates the key priorities based on a number of observations reported by participating knowledge holders in each of the communities while Figure 7 demonstrates the changes observed by these same knowledge holders.

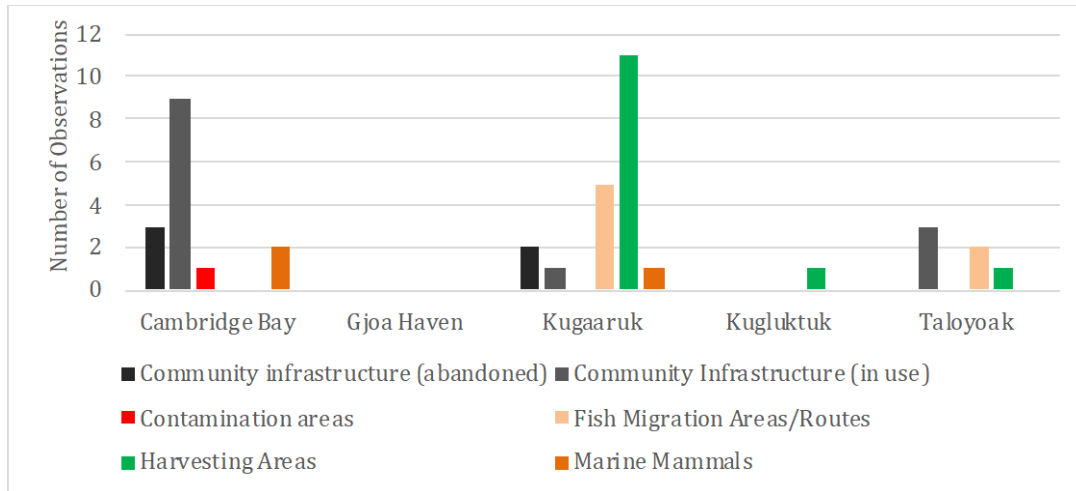


Figure 6. Key priorities identified by knowledge holders in communities in the Kitikmeot region

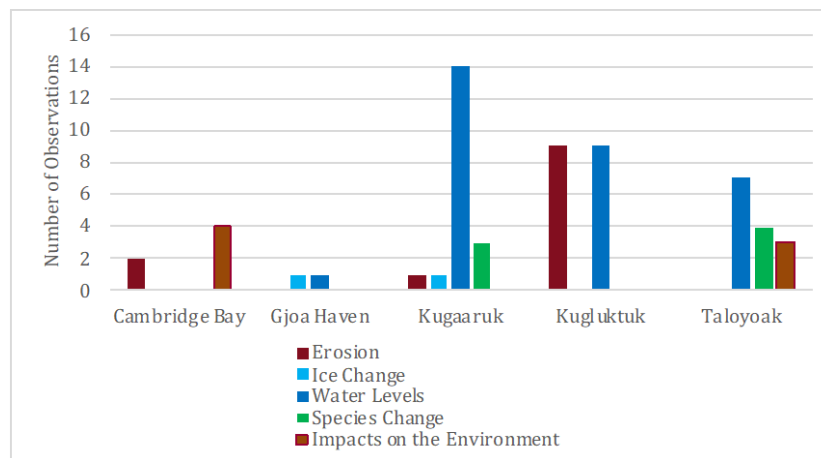


Figure 7. Key changes observed by knowledge holders in communities in the Kitikmeot region

3.4.2 Kivalliq Region

The CRN research team engaged six of the seven Kivalliq communities over the winters of 2018 and 2020⁵. From the perspective of the participating Kivalliq knowledge holders, the most notable environmental and ecological changes, and the top coastal priorities, were related to species population abundance and health, decreasing water levels, and erosion. During the CRN workshops, communities identified important management interventions needed to address char fisheries issues (Whale Cove), explore potential fisheries development, lessen the impact of rockfalls and address access road issues (Coral Harbour), alleviate the impact of sewage and contaminants on the lake and wider watershed (Baker Lake), and assess the potential risks of proposed diamond mining (Naujaat). Figure 8 below illustrates the key priorities based on a number of observations reported by

⁵ It was not possible to obtain information from community members in Rankin Inlet due to Covid-19 restrictions and availability of knowledge holders.

participating knowledge holders in each of the communities while Figure 9 demonstrates the changes observed by these same knowledge holders.

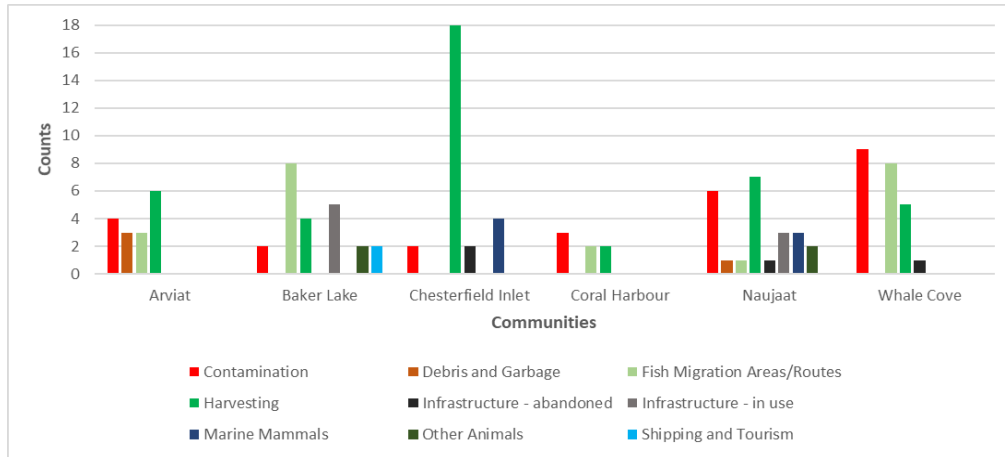


Figure 8. Key priorities identified by knowledge holders in communities in the Kivalliq region

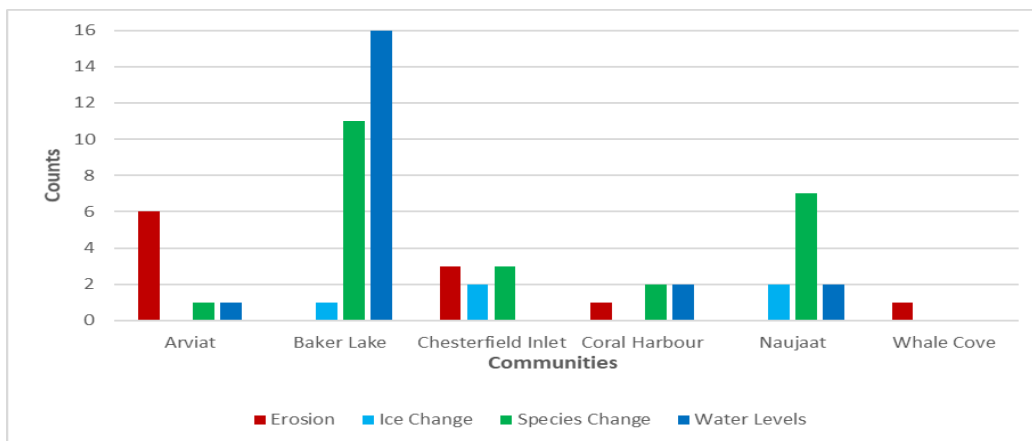


Figure 9. Key changes observed by knowledge holders in communities in the Kivalliq region

3.4.3 Qikiqtaaluk Region

The CRN research team engaged only ten of the 13 Qikiqtaaluk communities due to Covid-19 travel restrictions and the availability of knowledge holders. During the CRN workshops, the changes and coastal issues most often noted were decreasing water levels and changes in ice conditions and species populations. Coastal priorities were identified as infrastructure improvements, the need for environmental and ecological studies, cleanup of various locations, and enforcement of policies and regulations (anchorage regulations for non-local pleasure craft, waste management policies for foreign vessels, and ballast water legislation). The need to improve fish migratory routes was also seen as a priority. Figure 10 below illustrates the key priorities based on a number of observations reported by participating knowledge holders in each of the communities while Figure 11 demonstrates the changes observed by these same knowledge holders.

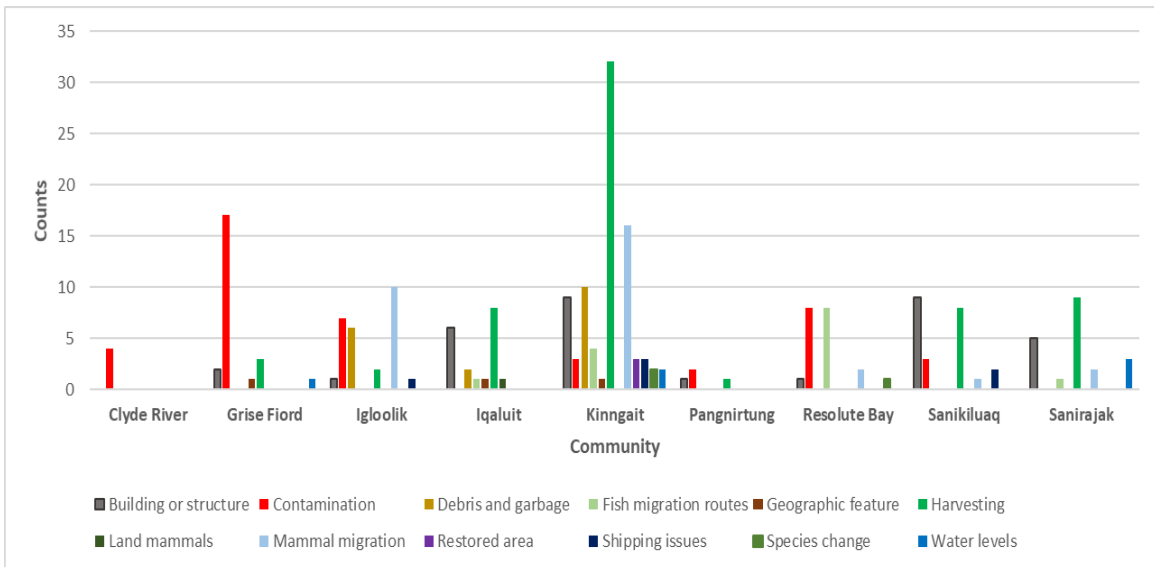


Figure 10. Key priorities identified by knowledge holders in communities in the Qikiqtaaluk region

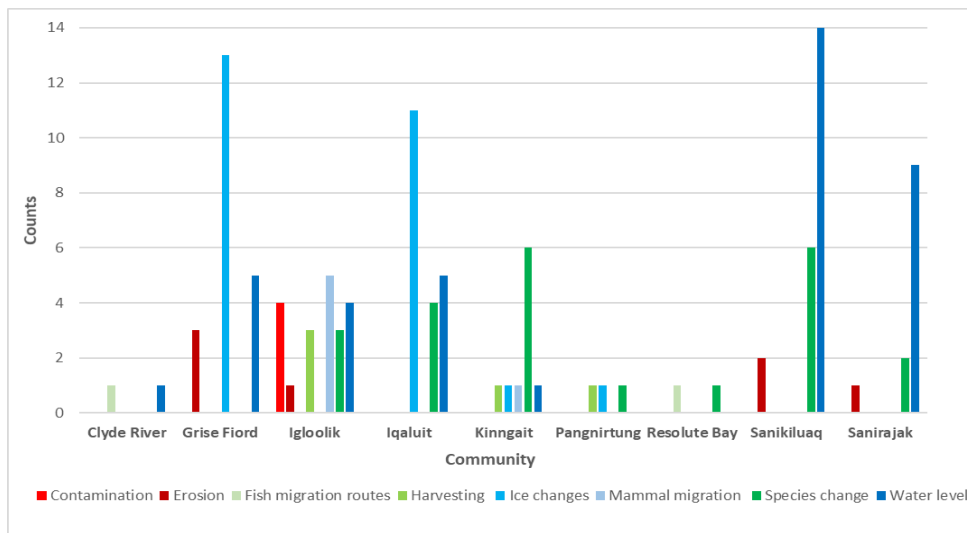


Figure 11. Key changes observed by knowledge holders in communities in the Qikiqtaaluk region

Knowledge holders in communities in the Qikiqtaaluk region were also concerned about human-induced effects on the environment. These included impacts relating to contamination issues, such as sewage lagoon outflows, abandoned barrels, discarded fishing nets, and pollution from previous mining activities. Concerns were also expressed relating to the effects of increased shipping on marine mammals, and limited policies and enforcement to regulate the number of non-local boats in a given area. Research activities, rising cost of goods, and garbage and debris were also impacting the communities.

3.5 Community-Led Restoration Plans and Projects

A key component of the CRN project was to complement the sharing of knowledge acquired during community engagement sessions with the actual implementation of community-prioritized and community-led restoration projects, based on their eligibility for DFO-CRF funding, urgency and level of the priority, site accessibility and cost. By documenting knowledge on coastal habitat health, habitat fragmentation, fish health, traditional knowledge and science, the project endeavored to collect baseline and complete feasibility studies on potential restoration projects, thereby contributing to the development of a near-term coastal restoration plan for Nunavut. However, by also including funding for the implementation of economically-feasible, small-scale projects in the design process, this methodology ensured that communities received tangible benefits from the project while creating a physical legacy of the Coastal Restoration Fund. Building capacity at the local level so activities can be self-sustaining was an additional project objective. Table 1 illustrates the performance of the CRN project in terms of aquatic habitat restored, partners and organizations involved over the life of the project, coastal plans implemented and capacity building. The table does not adequately capture improvements to the sustainability of local fisheries and the food sovereignty of the communities as a result of the 9 coastal interventions as well as the improved awareness and knowledge that was shared by all partners, particularly the role of Inuit Qaujimagatuqangit (IQ), in coastal restoration. Furthermore, the development of the community profiles and interactive maps may inform future projects and priorities based on CRN outputs and results.

Table 1. Performance of CRN Project based on DFO provided indicators

Performance Measure	Planned	Actual
Areas of aquatic habitat restored (sq metres/km)		100m ²
# of partners engaged and involved in the project (the Recipient and DFO must not be counted as partners):		53
# of Indigenous governments and organizations involved in the project		5
# of coastal plans established or implemented		9
# of endangered/threatened species involved		0
# of jobs created		32
# of people trained		20

Initially, the CRN project committed to implementing at least three restoration projects over its 5-year funding period based on the priorities identified during the participatory mapping sessions and subsequent feasibility studies. However, at the completion of the project, nine detailed restoration plans were developed and approved by the selected communities, resulting in the implementation and completion of nine [projects](#) spanning all three regions in the territory (Figure 12). A brief description of each of these projects is provided below.

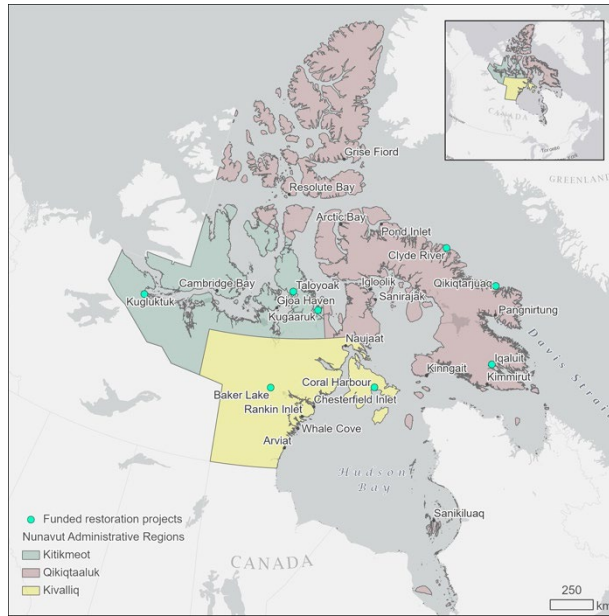


Figure 12. Location of communities with CRN-funded restoration projects

3.5.1 Kitikmeot Region: Net Exchange for Kugluktuk, Taloyoak and Kugaaruk

Based on a previously successful net exchange program in the 1990s that involved fishers exchanging old nets for nets of a larger mesh size, the community of Kugluktuk requested assistance with a similar community-wide net exchange. The community identified the need for strategic fishing methods to support the subsistence char fishery, which is mostly fished by gill net. This exchange of nets was deemed to support the long-term sustainability of the fishery, limiting stock exploitation by allowing more fish to escape nets and helping minimise capture of juveniles and undersized fish (Figure 13).

Due to COVID-19 restrictions, all monitoring efforts in Kugluktuk were put on hold and the funds were used to expand the net exchange program to two other communities (Taloyoak and Kugaaruk) following requests from those communities. Procurement, vendor selection and purchase requisition quotes for new nets were solicited from the respective communities in early Fall 2020. Purchase orders were completed for all three communities by December 2020. Gill nets were purchased locally in Taloyoak and Kugaaruk but nets were unavailable for local purchase in Kugluktuk. A trusted southern vendor was selected as the supplier for Kugluktuk, and all three HTAs received gill nets by Winter 2021. Gill nets were distributed to participating HTA members by the respective HTA in each community. To assist with a future stand-alone monitoring program (which is not eligible under the CRF criteria), a joint application was submitted to Polar Knowledge Canada by the CRN project team on behalf of the Taloyoak and Kugaaruk HTO boards. The application was successful and both communities received \$150,000 each over three years (2021-2024).



Figure 13. Healthy Arctic char caught by appropriately-sized gill nets.

3.5.2 Qikiqtaaluk Region: Clyde River Restoration on Migratory Corridor for Arctic Char

The community of Clyde River is a small hamlet located on the northern shore of Patricia Bay, Baffin Island in the Qikiqtaaluk Region of Nunavut. The mouth of the Clyde River enters the bay to the east of the community. Infrastructure associated with former mining activity in the area included a road, consisting of boulders and rocky material (rip rap), that crossed the river approximately 2,000 metres upriver from its mouth. The road reduced water depth and allowed traffic to cross.

The abandoned crossing remained in the river, restricting natural flows and increasing water velocities which negatively impacted the run of Arctic char. Local residents stated that returning char were challenged by the high velocities and remained below the obstruction until lower flows occurred. A remediation plan was carried out, removing the remaining obstruction within the river and returning the flows to a more natural condition.

To allow a measure of success related to a more natural upstream migration, a monitoring plan was developed by the Clyde River HTA with the assistance of biologists from Amec Foster Wheeler and the Government of Nunavut. Plan development included a review of monitoring objectives and available monitoring options based on the various life stages of Arctic char. Discussions concluded that juvenile abundance was the most likely measure of remediation success and with limited access to a majority of the river, a counting-type option was preferred by the HTA. It was decided that a counting fence structure that could numerate juvenile Arctic char as they migrated to and from the marine environment was the preferred option (Figure 14). This option includes a video system

component that would reduce the need for containing and handling fish as they migrated. Capacity building of local hunters who were trained to carry out the monitoring ensured the long-term sustainability of the project, which was completed in 2020.



Figure 14. Clyde River restoration showing counting fence structure for video monitoring.

3.5.3 Qikiqtaaluk Region: Habitat Restoration in Qikiqtarjuaq

Some coastal areas around Qikiqtarjuaq are degraded, impacting the mobility and harvesting patterns of the community. At a CRN-hosted board meeting in August 2021, the community requested support to improve the shoreline habitat for target species and the health of the wider ecosystem, which in turn would improve access to key harvesting sites, cultural activities and subsistence food sources. The Nattivak HTA identified several sites used by hunters and trappers around the Qikiqtarjuaq area that were deemed a priority for restoration. The proposed location of each site was such that removal of debris needed to be done manually. Given the timing of the proposed activities and associated costs, it was agreed that five sites would be possible to conduct restoration activities (Figure 15). Given the needs of the community and the availability of members as well as accessibility to the sites, it was recommended that the project be implemented in September 2021 by members of the HTA. The month of September is part of the open-water, ice-free season, so boating is safe with low risk of ice formation and/or ice-related hazards.

Prior to beginning work, the following best management practices (BMP) and other measures applicable to the proposed work were identified:

- 1) For safety concerns, at least two boats with a minimum of three members each would be available at any one site and any one time
- 2) All debris collected will be incinerated at the site prior to leaving and no introduced material (e.g., project signage) should be brought to the site to minimize any additional environmental impact.

- 3) Equipment and gear used during the restoration will result in minimum impact to the environment while not compromising safety measures for the workers.

Harvesters travelled by boat to various locations to remove debris and other barriers to fish and marine habitat. Work began in September 2021, but many areas still require restoration.



Figure 15. Lines showing actual locations of Qikiqtarjuaq fish passage restoration sites

3.5.4 Qikiqtaaluk Region: Winter Harvesting Improvements in Iqaluit

At a meeting held with the Amaruq HTA in March 2021, board members highlighted the importance of the subsistence winter fishery and the need to train youth to set nets safely and sustainably. Ghost nets, from lost, discarded or abandoned nets, are a major issue. Ghost nets increase fish morbidity and remove viable fish as a food resource. Habitat degradation is also tied to ghost nets, adding debris and garbage to waterways and fish habitat. Trash, fish and birds get trapped and tangled in the nets, which are difficult if not impossible to retrieve once they get loose. The quick retrieval of set nets is key to sustainable fishing practices.

The Amaruq HTA wants to reduce the number of ghost nets in Iqaluit waters by providing nets with built-in retrieval mechanisms and training members how to use them. Ice crawlers are used to set fishing nets in the lake during the winter, where they are lowered through a hole in the ice (the hole is chiseled using an ice auger), then attached to a rope and made to crawl under the ice running the entire length of the net and pulled through another hole in the ice at the other end of the net. A locator device guarantees retrieval of each net, significantly reducing the likelihood of ghost nets during the winter fishery.

3.5.5 Kivalliq Region: Coral Harbour Restoration on Canyon River

Coral Harbour requested support for removing boulders from a rockslide that was blocking movement of fish on the Canyon River. Knowledge holders reported that it was difficult for fish to get upstream to spawn in the two lakes furthest away from the coast, resulting in fewer fish in these lakes, where commercial fishing for Arctic char, as well as year-round subsistence fishing, is carried out. The rockslide also made it difficult for fishers to access

fishing sites on the lakes. A river enhancement project was proposed to provide adequate passage to the lakes where fish habitat has been most affected.

Restoration of the river began in spring 2020. Six harvesters from the Aiviq HTA travelled by snowmobile to the site, which is approximately 150 km from the community, transporting all equipment by qamutik (a sled designed for travel on snow and ice). Boulders were removed manually using drills and hammers (Figure 16).

Further restoration work took place in March 2021. Six members from the HTO travelled to the site and spent four days continuing restoration work, which included boulder removal and general maintenance. It is expected that additional work will be needed to fully clear the rockfall but the community is pleased with the progress made to date.



Figure 16. Community members clearing rockfall on Canyon River

3.5.6 Kivalliq Region: Baker Lake Historical Vessel Monitoring

Baker Lake is the only non-coastal community in Nunavut, established approximately 300 km inland at the mouth of the Thelon River. In 2010, Agnico Eagle imposed the first mine in the territory on this small hamlet of 2000 residents, built just 86 km north of the community.

At a CRN-hosted board meeting in February 2020, the Qamani'tuaq Hunters and Trappers Organization (Baker Lake HTO) shared concerns about the impacts of marine traffic on the Thelon River ecosystem. Identified stressors included shipping-related contaminants, noise, grey water, bilge water, ballast water, and speed, among others. According to local knowledge (Inuit Qaujimagatuqangit, or IQ), marine mammal, seal and crab populations began decreasing in the 1960s due to a surge in non-local marine traffic, as resupply vessels became permanent fixtures in Baker Lake waters from then onwards. HTO members also attributed the absence of returning arctic char to the persistent levels of marine traffic throughout Hudson Bay. Similar community concerns are echoed in the Agnico Eagle Shipping Consultation Report (2019). As a result, the HTO was keen to

develop a monitoring plan for sea traffic, informed by both automatic information system (AIS)⁶ data and local knowledge (IQ).

Using spatial analysis of historical (2017, 2018, 2019) third-party spatial data (ExactEarth) from the Baker Lake Basin, the CRN research team input the raw AIS data (.cvs) into a geographic information system (GIS) to visualize historical vessel positions and shipping routes throughout the area of interest (Figure 17). The monitoring plan that was developed enabled the community to explore how satellite AIS data might be better mobilized to support Inuit-led monitoring, reporting, enforcement, and compliance of marine traffic in the Baker Lake Basin.

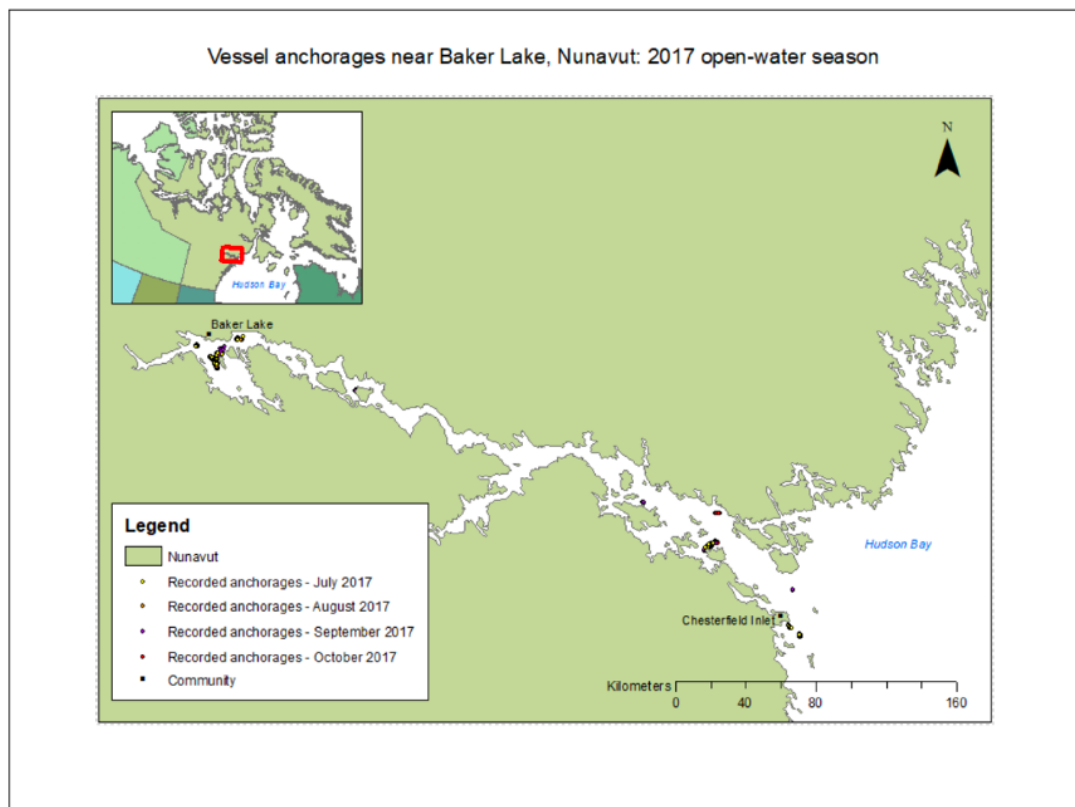


Figure 17. Vessel anchorage at Baker Lake: 2017 open-water season

3.5.7 Kivalliq Region: Habitat Restoration in Baker Lake

Some coastal areas in the Kivalliq region are degraded, impacting the mobility and harvesting patterns and the community of Baker Lake is no exception. Following engagement with the community in the Fall of 2021, the community requested support to improve the shoreline habitat for target species and the health of the wider ecosystem, which in turn would improve access to key harvesting sites, cultural activities and subsistence food sources. This project request followed the success of the restoration project undertaken by the community of Qikiqtarjuaq community earlier in September 2021 and the Qamani'tuaq HTO determined its members could

⁶ An AIS transmits vessel location, identity, course and speed information via ground stations and satellite. Ships broadcast their position with AIS to avoid collisions with other ships.

complete a similar project within a week, weather permitting. However, due to Covid-19 restrictions, the project could not be implemented in Year 5 of the CRN project so a request was made to DFO for an extension into the 2022/23 fiscal year, which was subsequently approved by DFO in February 2022.

Given the needs of the community and the availability of members as well as accessibility to the sites, it was recommended that the project be implemented after ice break-up in the late Spring of 2022, when boating is safe with low risk of ice reformation and/or ice-related hazards.

The advisor, in collaboration and consultation with the Qamani'tuaq Hunters and Trappers Association (HTA), designed a habitat restoration plan for Baker Lake, mirroring the approach adopted by Qikiqtarjuaq. The HTA identified several sites used by hunters and trappers around the Baker Lake area that were deemed a priority for restoration (Figure 18). The proposed location of each site was such that removal of debris needed to be done manually. The Board indicated four boats would be required for a period of five days. It was also determined that 12 HTA members would be needed to carry out the manual work of removing debris. Similar to the approach adopted in Qikiqtarjuaq, the following best management practices (BMP) and other measures applicable to the work were identified:

- 1) For safety concerns, at least two boats with a minimum of three members each would be available at any one site and any one time
- 2) All debris collected will be incinerated at the site prior to leaving and no introduced material (e.g. project signage) should be brought to the site to minimize any additional environmental impact.
- 3) Equipment and gear used during the restoration will result in minimum impact to the environment while not compromising safety measures for the workers.

The project was completed in June 2022.

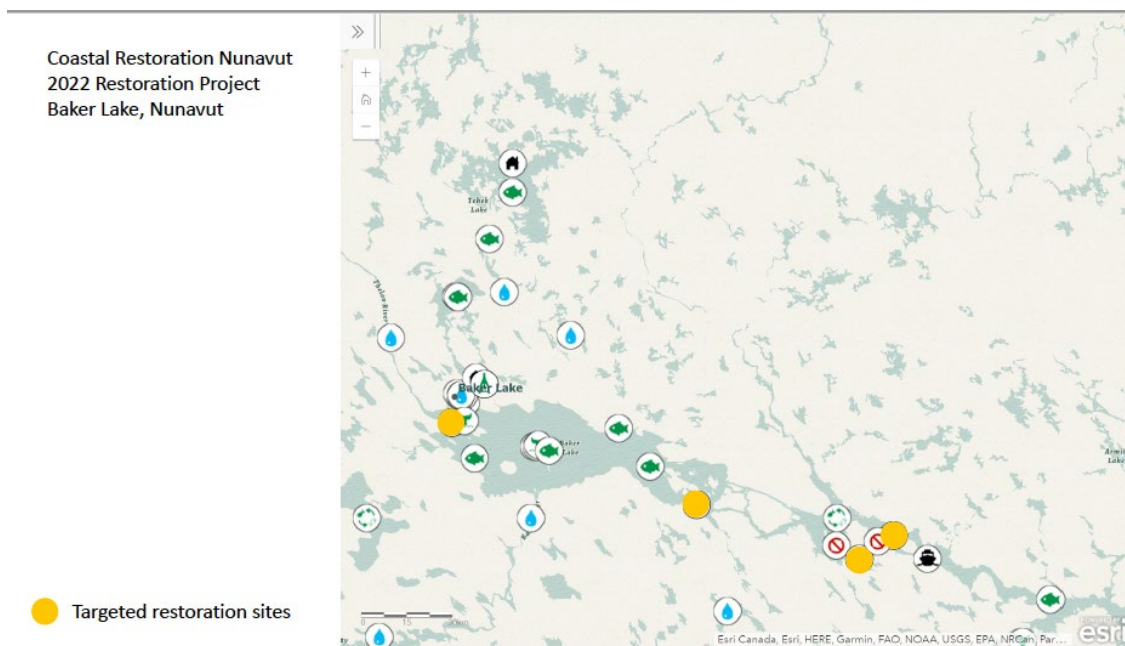


Figure 18. Location sites for Baker Lake Habitat Restoration

4.0 Feedback and Lessons Learned from Communities Undertaking Restoration Projects

Feedback from communities participating in the CRN project, specifically those who undertook restoration projects, is an important component of this report. Lessons learned will be shared with rights holders, communities, GN, DFO, the Nunavut Wildlife Management Board, regional Inuit associations, non-governmental organizations working in Nunavut and any other interested stakeholders.

In December 2021, taking advantage of a brief but serendipitous window in the Covid-19 pandemic in Nunavut, CRN hosted a two-day meeting in Iqaluit with representatives from communities with CRN-funded restoration projects. Invitations were extended to all communities with a funded restoration project. Knowledge holders from Baker Lake (Timothy Evviuk), Clyde River (Steven Aipellee), Coral Harbour (Darcy Nakoolak), Iqaluit (Kallai Ipeelie), and Qikiqtarjuaq (Loasie Alikatuktuk) attended the meeting either in person or via teleconference. However due to poor weather conditions and availability, knowledge holders from the Kitikmeot region (Kugluktuk, Taloyoak and Kugaaruk) were unable to participate.

The objectives of the meeting were to share the results of our data collection and analysis, to get feedback from communities about their experiences with the CRN project, and to identify needs and opportunities for future work with, and by, communities. Participants were provided with the following questions to be used as a guide for the discussions. However, no attempt was made to limit the discussion to these issues.

- What are barriers to funding/reporting
- What are ongoing funding needs/gaps
- What are ongoing coastal restoration needs
- Restoration: What worked/What didn't
- How to improve community-based research
- How to improve restoration work
- What are capacity gaps/needs/strengths

4.1 Barriers and Ongoing Funding Needs

In terms of barriers for communities to participate in DFO-funded projects, much of the discussion centered around the need for streamlined funding processes (advertisement, application, reporting and/or payment). Communities stressed the lack of in-house capacity to develop funding proposals and suggested even when such capacity can be provided, the reporting requirements and delayed provision of funding in terms of reimbursement are not feasible for communities who lack the upfront funds needed to undertake projects. Participants commended Dalhousie University for fronting the costs of their CRN restoration projects, despite delays in the provision of funds from DFO to Dalhousie University and for the assistance of the CRN Project in sharing potential funding sources and developing external proposals for community submission.

Knowledge holders from all represented communities stressed the need for ongoing financial support for community-led monitoring and intervention projects that address climate change, species change, increased

commercial shipping and other environmental issues in Nunavut communities. The ineligibility of stand-alone monitoring projects by the Coastal Restoration Fund was strongly lamented and members urged DFO to reconsider this criterion. Additionally, community representatives from both the Kivalliq and Qikiqtaaluk regions highlighted the need for community-based monitors to collect baseline data and document the impacts of marine shipping in Nunavut waters. Concerns included oil spills, contaminants and pollutants entering the freshwater supply (especially potable water supply) and the overall health and quality of water, fish and aquatic species.

Funding for projects to locate and remove ghost nets from lakes, to clean up lakes in general, and to conduct community-led species monitoring, including birds were also deemed essential. Participants returned to the need for more monitoring as harvesters are encountering new species in Nunavut waters. They noted that communities would like identification of new and/or invasive species and their impacts on local species and ecosystems. More monitoring is needed as waters warm and, for instance, as killer whales and salmon migrate north.

Associated with the call for community-led monitoring was the lack of communication of results back to communities when third-party entities conduct monitoring. It was noted that while mining companies may be doing monitoring and clean-up, it was not clear whether all results were being communicated and to whom. This led to a lack of trust in the reporting even when results may be shared and the call for more objective monitoring studies to build trust in the reported findings.

4.2 Ongoing Coastal Restoration Needs

In terms of ongoing coastal restoration needs, knowledge holders highlighted a number of issues in need of addressing. Key among these was the need to mitigate physical obstructions along the migratory routes of fish, much like the communities of Clyde River and Coral Harbour sought funding and support from the CRN project to help clear the rockfall at Canyon River and the abandoned road crossing in Clyde River. All remaining communities that had representatives present mentioned they would like similar projects in their communities. It was noted that projects of this type directly meet the regional coastal restoration priorities identified by DFO that relate to: restoration of free passage for anadromous fish species, including arctic char; restoration of historically impacted areas; and, utilizing traditional knowledge and science to establish strategic restoration plans. Additionally, this work would contribute to meeting DFO's national coastal restoration priorities of physical habitat improvements for estuaries, coastal watersheds and nearshore rearing areas and restoration of key habitats and migratory corridors for arctic char.

A second important restoration gap that was identified was the need to address habitat degradation along the shoreline and rivers as these have significant negative impacts on the health and sustainability of the fisheries. This was of growing concern given the dependence of communities on subsistence fishing for food sovereignty and for maintaining a healthy population of both fish and people.

Yet another identified restoration project that was suggested as a priority related to identifying the location of ghost nets and having a process in place for their removal. It was noted that this would contribute to removing unwanted debris as well as improving harvesting and providing for better fisheries management.

Lastly, among the key priorities for restoration, knowledge holders noted the declining water levels in many of the rivers and lakes, which is impacting both accessibility to harvesting areas and the survivability of many marine species. Community representatives identified the need for restoration projects that first explored different

options for mitigating the declining water levels, recognizing the global contributions to and impacts of climate change may diminish potential options, followed by implementation of those that are feasible, like the approach adopted by the CRN project.

4.3 Lessons Learned from Restoration Projects

The representative from the Qikiqtaaluk region noted that the Clyde River project has been a success to date as evidenced by the bigger-sized fish returning to and being caught in the lakes. It was noted that efforts are underway to assess the remaining blockage of the road and it is expected that all of the rock in the river as a result of the old road will be removed. Issues that led to a delay in removing the remaining rock were related to equipment failure and the lack of communication from industry to the hamlet and HTA. However, aided by the intervention of the CRN project team, this has since been resolved. The knowledge holder from Qikiqtarjuaq also reported that the habitat restoration project there worked very well given the time and resources allocated. However, he would like to see more restoration done as despite identifying multiple sites in need of restoring, the CRN project was only able to facilitate clean-up at five locations and many more sites need to be restored in the area.

Similarly, the representative from the Kivalliq region noted the success of the Canyon River restoration project, citing the importance of conducting the work in the Spring and the weather and equipment failure risks associated with conducting work in the Fall and Winter. While more of the rockfall needs to be removed, he noted that drill bits provided by the CRN project for breaking the rock may need to be replaced and voiced his concern specifically about accessing funds for replacement parts and more generally, about the loss of funds for additional restoration needs when the Coastal Restoration Fund ends. The participant from Baker Lake also noted the value of the analysis of historical vessel monitoring in the Baker Lake area and its contribution in raising awareness and informing policy-level decisions and guidelines. He stressed the negative consequences that would arise for the community if drinking water and fishing are threatened from spills as a result of an accident at the mine or from shipping. To minimize this risk, he noted the need for ongoing funding to track increased vessel movements as well as for water quality monitoring. While not specifically a responsibility of DFO, he noted the need for better communication and awareness regarding protocols to be followed in the event of a spill, including for example, knowing who has the key to the clean-up cache, who is responsible for training the community auxiliary unit and how often is training undertaken. As a member of the HTA, he was concerned that he did not know the answer to these questions, given their potential to affect the fisheries.

4.4 Recommendations

To address the remaining guiding questions and to re-emphasize the importance of ongoing coastal restoration efforts, participants offered a number of recommendations, some of which relate directly to DFO while others are directed to other levels of government, Inuit associations and non-governmental organizations working in Nunavut.

4.4.1 Coastal Restoration Recommendations

- Train DFO project officers to be knowledgeable about conditions in the North and to understand challenges and setbacks in carrying out restoration projects can be quite different from the “south”;
- Maintain an inventory of coastal restoration needs and priorities in each community and/or region;

- Update the inventory annually or every 5 years at most;
- Develop a survey to support communities in collecting their own data for the inventory;
- Identify a Nunavut-based organization to host the digital inventory and GIS (online data layers and mapping data) that the CRN project and other projects in Nunavut have collected;
- Create a Northern network of organizations and communities doing restoration work, or with restoration needs, along with a sharing portal, to reduce duplication of efforts and maximize capacity, and increase the impact and long-term sustainability of restoration work;
- Expand eligibility to include shoreline and ghost net cleanups as well as stand-alone monitoring projects;
- Work more closely with Transport Canada to allow for increased monitoring of marine shipping and partnered research on the cumulative effects of ship noise and increased ship traffic in Nunavut waters and provide marine search and rescue training to members in the community.

4.4.2 Funding Recommendations

- Make the coastal restoration fund a core funding program at DFO;
- Simplify the application and reporting process so more Indigenous and community-based organizations can access the funding without impacting existing capacity. Lengthy application and reporting requirements as well as the legal requirements for grant and contribution agreements were significant barriers for community organizations to qualify as applicants;
- Be transparent, provide open and two-way communication throughout the funding process, specifying how much communities are eligible to receive and exactly how funds can and cannot be spent;
- Address community concern about missing out on funding opportunities due to not being specific enough on a funding call and provide support at every stage of the project in order to meet financial and reporting requirements;
- Introduce advances for lump sum payments to funding recipients;
- Offer free training or additional funding for accounting and reporting;
- Provide more outreach from funding sources to the HTAs to help with early identification of potential funding opportunities for needed projects;
- Prioritize targeted outreach to Indigenous and community-based organizations;
- Expand eligibility to include territorial governments as funding recipients as building capacity and the responsibility to support communities are key objectives of the territorial government departments.

5.0 Conclusion

This final report presents the key findings of the CRN project which began in November 2017 and sunset in October 2022. As a community-driven project, an underlying principle was involving the Hunters and Trappers Association

(HTA) of each community at every stage of the process. Community consultations ensured that the project provided a platform for participation by Hamlets, partners and stakeholders. During the life of the project, CRN supported 21 participatory mapping sessions, implemented nine restoration projects, and developed a multilingual website for sharing project results. Knowledge holders shared their knowledge on topics relating to coastal restoration priorities, ecological and habitat changes, and impacts on their social, economic, and cultural activities and practices. Community members also identified approaches that could help address these impacts.

The most noted change, and hence a key coastal priority was the decrease in water levels, which has impacted the migratory routes of key species such as Arctic char and limited community access to key fishing sites. There were no specific responses to the issue of decreasing water levels, which is most likely a systematic impact of climate change, and beyond the control of the communities. However, knowledge holders identified key actions that could still allow access to key fishing sites and maintain important migratory routes. These interventions included:

1. The cleanup of contaminated sites, focusing on rockfalls, debris and garbage;
2. Environmental research and monitoring on water quality and fish health; and
3. Management interventions that lead to an improvement in the sustainability of the fisheries.

Other interventions that could positively influence the continuation of social, economic, and cultural activities and practices were environmental research, specifically on water quality and fish contamination from mining activities, and river restoration projects and programs.

Knowledge holders were also concerned about human-induced effects on the environment. Key issues raised included coastal and river pollution from garbage and ghost nets, disturbance of key habitats and migration routes and by the current placement (and limited) anchorage sites for cruise ships and other non-local pleasure craft given the increased visitation to communities as a result of a warming climate. Communities expressed concerns over ship-source discharges in Nunavut waters and the lack of knowledge regarding rules and regulations governing shipping activities in the territory⁷. Discharges may be intentional (part of regular operations) or unintentional (such as oil spills.) Communities requested increased monitoring of marine shipping and partnered research on the cumulative effects of ship noise and increased ship traffic in Nunavut waters. Communities also expressed interest in additional marine search and rescue training.

Despite the challenges that arose due to the Covid-19 pandemic, the CRN project delivered on its objectives and feedback from community members considered it to be a success and model for future projects in Nunavut. All of the restoration projects undertaken as a result of the CRN Project addressed priorities identified by the communities and have resulted in long-lasting benefit. However, many needs still exist in each of the three regions (the Kitikmeot, Kivalliq and Qikiqtaaluk) and more funding is needed to support Nunavut communities and the long-term health and sustainability of fisheries and aquatic habitats.

⁷ To address this gap in knowledge, the CRN Project team developed an online technical report entitled “Addressing community concerns around increased vessel traffic in Nunavut: A review of policy mechanisms within regional, national, and international jurisdictions”. It is available on the project website under the “[Resources](#)” tab.



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Coastal Restoration Nunavut

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