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Local and Traditional Knowledge in Watershed Governance

Understanding Socio-Ecological Changes in Inuvialuit Fishing Livelihoods and Implications for Food Security: The Role of Local and Traditional Knowledge

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The Mackenzie Delta is an ecologically-rich freshwater environment in Canada's Northwest Territories. It is vulnerable to multiple stressors such as climate change, resource development activities (oil and natural gas) and upstream-downstream linkages related to extraction activities in the southern part of the Mackenzie watershed. Resultant socio-ecological impacts affect fishing livelihoods, which represent a significant component of traditional food systems and ways of life for Inuvialuit.

This research seeks to effectively mobilize Inuvialuit Knowledge to explore the interconnection between socio-ecological changes in the Mackenzie Delta, fishing livelihoods and food security.



The project objectives are to:

- Assess the importance of Inuvialuit fishing livelihoods in the Mackenzie Delta;
- Identify socio-ecological changes related to fish ecology and fish procurement in the Mackenzie Delta, based on Inuvialuit Knowledge;
- Understand the critical impacts of socio-ecological changes on fishing livelihoods and food security.

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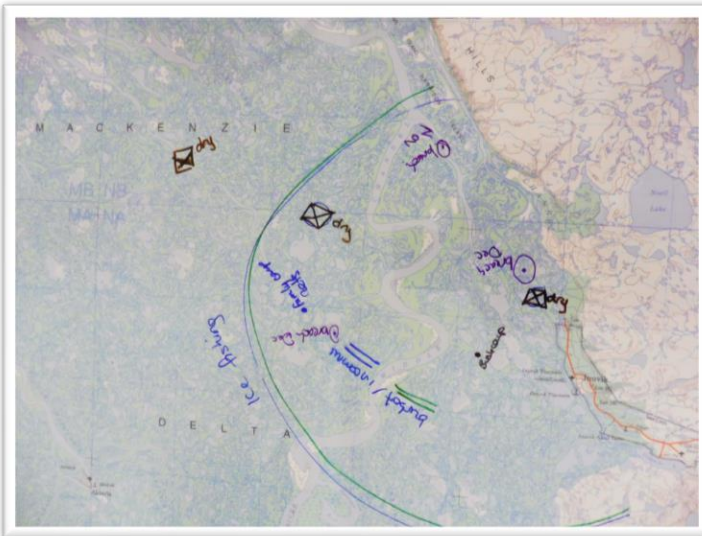
How did we do the research?

We undertook a qualitative, participatory research process, while also drawing on relevant literature and complementary data.

Using an ethnographic approach, we conducted 28 semi-structured interviews with 30 participants in both Inuvik (n=22) and Aklavik (n=8), that included mapping and harvest survey components.

We also analyzed components of the Arctic Borderlands Ecological Knowledge Society (ABEKS) database, which contains longitudinal data from land-users in multiple communities. It provides complementary insights regarding indicators and observations of environmental change, fish harvest levels, and fishing practices.

Participatory mapping with Douglas Esagok



Who was involved and why?

This research was developed in partnership with the Fisheries Joint Management Committee (FJMC) in the Inuvialuit Settlement Region, the western-most Inuit region in Canada.

The interviews were developed and conducted by a researcher from the University of Ottawa and the FJMC's staff. Three fish camps were also organized by the FJMC in winter 2016 and fall 2017.

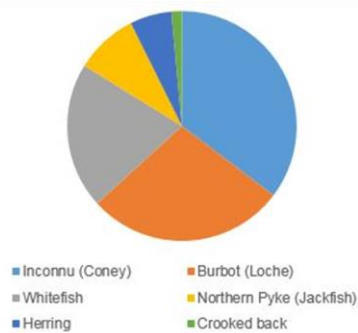
The Hunters and Trappers Committees (HTC) in both Inuvik and Aklavik, and the FJMC helped us to identify and connect with fishers with relevant experience and expertise to participate.



Key Findings

The importance of fishing livelihoods:

Fishing activities are considered as very important by all participants. The interviews highlight some factors of importance that we categorized into two main themes. First, fishing contributes to the traditional food system. Second, it represents an essential part of traditions, which includes traditional knowledge. The importance of fish for subsistence is particularly significant given that the majority of participants declare that more than half of their food consumption comes from harvesting. Only 4 participants estimate their country food consumption to be less than 25%. Based on the ABEKS data, 93% of interviewees go fishing and 80,2% always meet their fish needs. Additionally, all participants share their fishing harvests. The majority, (60% based on the interviews and 70% based on ABEKS data), share with 10 people or less.



Both interviews and ABEKS data list inconnu (coney), burbot (loche) and whitefish as the most important freshwater species for subsistence. Figure 1 shows the distribution of fish species that contribute most to participants' subsistence.

Figure 1: Importance of fish species for Inuvialuit diets

Main socio-ecological changes related to fish quality:

When asked about specific information about individual species, there are several areas of concern. Table 1 below summarizes recurrent socio-ecological changes related to fish quality. However, some participants declared that these changes are variable from year to year.

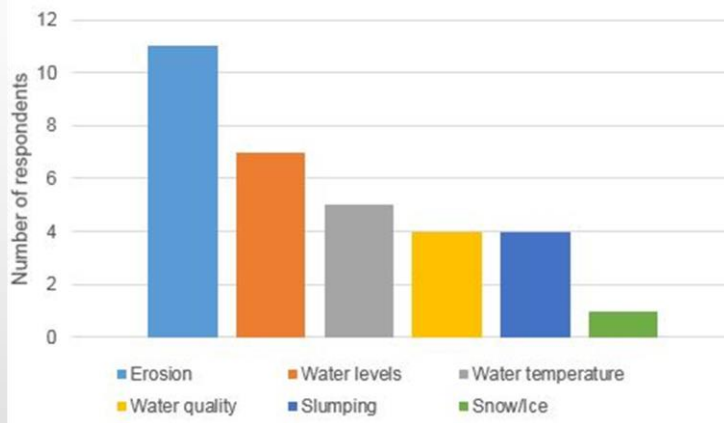
Table 1: Inuvialuit Knowledge indicators of change in fisheries

Theme	Indicator	Observation	Livelihoods impacts
Fish quality	Flesh texture	Softer flesh, particularly in whitefish during the summertime	Preference for fish from the Ocean during the summertime
	Fish appearance	Smaller and skinnier burbot (loche)	N/A
		Increase of scars and lumps, particularly in inconnu (coney)	Not edible
	Livers	Discoloured or black spots in livers, particularly in burbot (loche)	Not edible
Parasites & worms	More fish with higher parasite loads, particularly in inconnu (coney)	Not edible	
Fish population	New species	New observations of Chum Salmon in the Delta	Additional species for consumption
	Less fish	Fewer whitefish Fewer burbot (loche)	Change of fishing practices or locations

Main socio-ecological changes related to fishing conditions:

These themes resonate with the results presented when Figure 2 presents the most commonly observed environmental changes related to fishing conditions, including erosion, lower water levels, warmer water temperature, dirtier water, and slumping. These changes are unanimously attributed to climate change.

Figure 2: Distribution of socio-ecological changes related to fishing conditions



The interviews included three questions addressing areas of concern about fishing conditions, fish quality, and research needs. There are several common themes that were mentioned by participants that highlight and summarize well the results presented. However, three themes appear to be predominant: declining water quality, decreasing population of fish and the increasing population of otters and beavers, which wasn't mentioned before. Beavers impact freshwater habitat, as their dams affect fish mobility, travel access, water levels, and water quality.



These changes and subsequent concerns can affect individuals in many ways. When asked about what these changes mean for them and their community, participants identified two main themes: challenges related to knowledge transmission and food security.

'That is one thing that we have been arguing for a long time that researchers coming in, doing their work, taking away what they've learned and never ever coming back to a consultation with us about their findings. Because it is us after all that, you know, we contribute to these interviews. And we are here, we're eating the fish, we're drinking the water, we want to know if everything is safe yet, you know. Because we are seeing a lot of...really high levels of cancer.'

Douglas Esagak

Inuvialuit fishing livelihoods are complex, dynamic and ever-changing systems that must be discussed from a holistic perspective.

Participants indicated that fishing livelihoods are essential contributors to the Inuvialuit food system, as well as to cultural practices around harvesting and food procurement.

The changes discussed combined with related concerns require Inuvialuit to adapt their fishing practices and livelihood strategies, challenging fishing livelihoods as a way of life.

Inuvialuit Knowledge plays a key role in both understanding these challenges and building adaptive capacities.

'Interview Elders before they're gone...I mean Elders, not 60 years olds...(Laughs)...Before the other ones are gone or before they can't remember. (...) Yes. That is the only answer that I have. it is: interview the Elders. Get it down on tape, because sometimes they put it on paper and they hear that person wrong and write the wrong...the wrong sentence... It is not them. But if they hear it on tape, they know it is them speaking'

Clara Day

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