

Inuvialuit Traditional Ecological Knowledge (TEK) of Beluga Whale (*Delphinapterus leucas*) in a Changing Climate in Tuktoyaktuk, NT

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This research characterizes Inuvialuit traditional ecological knowledge (TEK) of Beluga whale in Tuktoyaktuk, NT. The research focuses on Inuvialuit TEK of the ecology and behaviour of beluga, hunting techniques, and subsistence food preparation. Data were collected using semi-directed interviews with 17 Inuvialuit beluga harvesters and participant observation. The research shows that Inuvialuit TEK of beluga includes knowledge of beluga, hunting and food preparation skills, and values. This knowledge system is governed by an Inuvialuit ontology, with distinct values regarding human interaction with beluga and the broader ecological system. Inuvialuit are observing rapid changes in the environment, some with implications for beluga hunting and food preparation, but are coping thus far.

RATIONALE

Beluga whale (*Delphinapterus leucas*) were historically one of the most important sources of nutrition for the Inuvialuit of the Mackenzie River Delta region¹. Seasonal harvests of the species remain an important source of nutrition and facet of cultural identity for some modern Inuvialuit^{2,3}. Through continuous interaction with plants and animal species over hundreds of years, Inuvialuit possess extensive bodies of traditional ecological knowledge (TEK) of species like beluga⁴. Despite ongoing scientific studies of beluga in the Inuvialuit Settlement Region (ISR), Inuvialuit being the major stakeholders in management outcomes of the species, and legally mandated inclusion of TEK in co-management structures, there has been little research examining TEK of beluga in the ISR, and only a limited number of studies of TEK of beluga in polar regions more broadly^{5,6}. The need for more equitable inclusion of TEK in management decisions is only made more pressing by the ecological changes observed and predicted to occur under changing climatic conditions⁷.

METHODS

Data Collection

The research was conducted with Inuvialuit living in Tuktoyaktuk, NT, following established community based research methods⁷. A pre-research consultation was conducted through a community visit and participation in the Inuvik Beluga Summit in February 2016. Data were collected with a local Inuvialuit community researcher during a field season between June and August 2016 using ethnographic field methods including semi-structured interviews and participant observation. Interviews were conducted with 17 active and formerly active harvesters, and included open ended questions and participatory mapping. The interview guide was modeled after a similar study conducted in Ulukhaktok, NT (Pearce & Collings, in review).



Figure 1: Location of Tuktoyaktuk, NT, and overview of Kugmallit Bay

RESULTS

TEK THEMES



BELUGA BEHAVIOUR/ECOLOGY

- Observation of beluga is limited to surface behaviour due to turbid water in Kugmallit Bay (Mackenzie River Estuary)
- Beluga have specific migratory and habitat use patterns throughout the year
 - Beluga are highly sensitive to anthropogenic noise



HUNTING TECHNIQUES

- Hunters follow moral and ethical codes
- Hunting techniques are adapted to local conditions
 - Hunting is highly weather dependent



FOOD PREPARATION

- Harvesters typically use beluga for *muktuk* (skin and thin layer of blubber), *uqsuq* (beluga oil rendered from blubber), and *mipku* (dried and salted beluga meat)
 - Muktuk is prepared fresh/raw, cooked, or aged/fermented
- Risk of food-borne illness for fermented muktuk and uqsuq preparation



OBSERVATIONS OF CHANGE

- Harvesters have observed numerous changes in the environment over the last 30-40 years
 - Changes are accelerating



Figure 2: Beluga remains on Hendrickson Island near Tuktoyaktuk



VALUES

- Nutrition and enjoyment outweigh labour intensive process of preparing whale
- Respect for beluga encourages care throughout hunting/preparation processes
 - Beluga remains an important and irreplaceable part of the diet for many



Figure 3: Harvester prepares muktuk on the beach

Climatic Changes and Impacts on Beluga Harvesting Activities

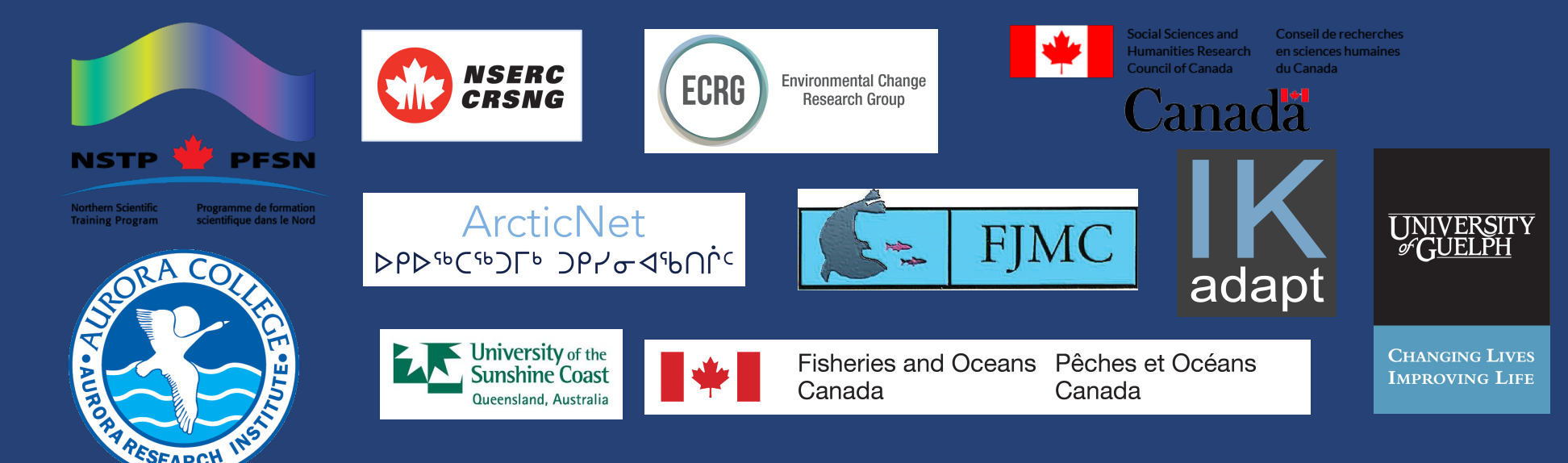
Observed Environmental Changes	Experienced and Potential Impacts
Sea Ice	
Earlier Spring Breakup	Beluga Arrival Timing
Less Ice	Rougher Water
Wind	
Stronger Wind	Fewer Hunting Opportunities
Shifting Wind	Greater Risk on Hunting Trips
Temperature	
More Extreme Heat	Greater Risk for Food Prep
More Warm Days	Fewer Hunting Opportunities
Weather Stability	
Faster Change	Greater Risk on Hunting Trips
More Frequent Change	Greater Risk for Food Prep

SUMMARY

The research findings demonstrate that Inuvialuit in Tuktoyaktuk possess nuanced understandings of beluga whale, particularly regarding effective hunting techniques and proper food preparation procedures. The research corroborates similar studies conducted elsewhere, while highlighting important location-specific details. The importance of Inuvialuit values around beluga and their use emerged as a prominent theme of TEK. The research also reveals a number of climatic changes that Inuvialuit are experiencing through beluga harvesting activities, including changes in sea ice dynamics, wind, temperature, and the frequency and magnitude of weather events. Harvesters seem to be coping thus far with these changes, but expected ongoing change may begin to challenge harvesting activities. This research intends to contribute to the improved visibility and inclusion of Inuvialuit TEK of beluga in the academic literature and in co-management structures that better reflects the knowledge, values, and ontology of Inuvialuit stakeholders.

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REFERENCES

- ¹Usher, P. J. (2002). Inuvialuit Use of the Beaufort. *Arctic*, 55, 18-28.
²Kendrick, A. (2013). Canadian Inuit sustainable use and management of Arctic species. *International Journal of Environmental Studies*, 70(3), 414-428.
³Harwood, L. A., Iacozza, J., Auld, J. C., Norton, P., & Loseito, L. (2014). Belugas in the Mackenzie River estuary, NT, Canada: Habitat use and hot spots in the Tasiuq Niyutait Marine Protected Area. *Ocean & Coastal Management*, 100, 128-136.
⁴Hernes, F., Johay, C., & Folger, C. (2000). Rediscovery of Traditional Ecological Knowledge as Adaptive Management. *Ecological Applications*, 10(5), 1251-1262.
⁵Bretton-Honeymann, K., Furgal, C. M. & Hammill, M. O. (2016). Systematic Review and Critique of the Contributions of Traditional Ecological Knowledge of Beluga Whales in the Marine Mammal Literature. *Arctic*, 69(1), 37-46.
⁶Huntington, H.P., Communities of Buckland, Elim, Koyuk, Point Lay, & Shaktoolik. (1999). Traditional Knowledge of the Ecology of Beluga Whales (*Delphinapterus leucas*) in the Eastern Chukchi and Northern Bering Seas, Alaska.
⁷Pearce, T. D., Ford, J. D., Laidler, G. J., Smit, B., Duerden, F., Allarut, M., ... Wandel, J. (2009). Community collaboration and climate change research in the Canadian Arctic. *Polar Research*, 28(1), 10-27.