



Building Capacity to monitor fresh water quality in Pond Inlet- community needs assessment in a changing climate

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Abstract

Access to healthy water is of paramount importance for Mittimatalirmiut. Water is important to keep us alive, sturdy and healthy; and bad water can be harmful for our people- our beloved elders, youth and infants. Water, of course, yields important cultural value to our people since many of us are going out on the land in order to provide our family with fresh water, just as our elders used to and they proudly taught us.

Under the dire and real influence of recent climate change, local people have expressed a common concern that water quality may not be the same as it used to be from observed changes in the water colour and the difference of taste of water during the summer. We fear that it is actually already affecting our people since many of us have complained about stomach problems during summer and the pressing issue of illness, potentially due to uncleanliness of water.

Inspired by the work conducted by the Nunavut Research Institute and their fresh water monitoring program, our community of Pond Inlet has initiated in 2014 a needs assessment project: *Building capacity to monitor fresh water quality in Pond Inlet*, to address the interrelated topic of water use, water quality, stomach illness and climate change. We have used a combination of scientific procedure and local observation and knowledge to explore the importance of the issue.

We have first conducted a survey with Mittimatalirmiut (53 respondents) to document people's water use patterns, preferences, experience of stomach illness and observations on changes in water quality. Amongst other results, we have documented that rivers and icebergs were the two main sources of fresh water used by Mitimatalirmiut during summer and that 30% of the respondents have experienced stomach illness at summer.



We have timely recorded microbiological quality and water chemical conditions throughout the summer (mid-June to early September) on 6 sources of fresh water; four streams/ rivers, one lake and Iceberg water, using a scientific procedure named the Define Substrate Technology. We have documented significant levels of fecal indicator bacteria: Total coliforms, Escherichia Coli and Enterococci in our fresh water. We have also found differences between the microbial loads in the water sources tested. Our river Qilalukat (Salmon creek), which is an important area for summer camping and fishing for Mittimatalirmiut, shown the highest level of fecal indicator bacteria and will thus require more attention in the future. The levels of fecal indicator bacteria were also correlated to the total daily precipitation and water conductivity. The only microbial-free source was our iceberg water.

We have conducted a pilot research on benthic invertebrates during August of last summer. We have developed a sampling and classification protocol for the examination of such invertebrates as indicators of water quality. We have found a diversity of benthic invertebrates including insect larvae and pupa, crustacean (copepods, ostracoda), hydrocarians (water mites), annelids (worms) and collembolae.

Our team has also documented, for the first time in Nunavut, the observations and knowledge of our elders on the topic of fresh water, its cultural relevance and its different uses in the past and historical changes in its quality in relation to pollution and global warming. According to these findings, we have been able to localize the traditional sources of water on the land, to understand the major changes that took place in our environment and to identify the principal manifestations of climate change that have the potential to affect our water quality: earlier melting of snow and glacier, heavier rain, warmer temperature. Importantly, our elders have pointed out **the need to find a new location for our municipal water source** (Water Lake) since this location has never been the first choice of the community at the time of the settlement in the 1970's. Proposition has been made for a new site with deeper, fresher and flowing water and information has been mapped. The feasibility of this idea will require a comparative investigation on the water quality found in this new potential source and the one found in our current Water Lake.

The leadership, knowledge and human capacity gained by our team members during the first year of our project has created personal empowerment that has already brought and will continue to bring benefits to our community. We have shown that with the appropriate support from a team of scientific experts and the necessary equipment, we can become real Inuit researchers and conduct our own reliable, accurate, consistent monitoring of microbiological water quality. We see our experience as a new way of doing research where Inuit are research leaders instead of research assistants, and where academic researchers are assistants instead of leaders.



Throughout this experience we have developed skills for literature review, fund raising, sampling design, logistics, field work, laboratory work, data and statistical analysis, reporting, communication and mentorship. These skills will always stay with us and will have the opportunity to reuse them to help the community to address future challenges.

Over the course of our research activities, we have shared information with our community members and we have come to realize how relevant our work was to them, especially from our elders who expressed their gratefulness for this project and encouraged us to keep going with the monitoring of our environment. Our motivation, seriousness and determination have been rewarded last summer when we received the 2014 Excellence in Water Stewardship Award granted by the Canadian Council of the Federation. We are proud of what we have accomplished yet we are aware that there is a long way to go before we could guarantee safer access to quality water for Mittimatalirmiut. We are willing to take on this challenge and we look forward for expanding our capacity and evolving ourselves in research.