



Building capacity to monitor the risk of climate change on water quality and human health: a two years journey expanding community-based leadership in Pond Inlet

Soucie, Timothy A.¹, T. Arreak¹, S.L. Harper², R.C. Jamieson³, L. Truelstrup Hansen³, L. Jolicoeur⁴, J. Shirley⁵, V. L'Hérault^{4,6} and the Elders of Pond Inlet¹

1 Pond Inlet, NU

2 Department of population Medicine, University of Guelph, Guelph, ON

3 Centre for Water Resources Studies, Dalhousie University, Halifax

4 Département de biologie, chimie et géographie, Université du Québec à Rimouski

5 Nunavut Research Institute, Iqaluit

6 ARCTIConnexion, Québec

Abstract

Building local capacity in the field of Arctic Research becomes a priority for many stakeholders: community, educational institutions, academia and leaders. Building capacity is an essential first step towards the development of community-based research endeavors; culturally relevant and grounded in community priorities. Building capacity means opportunity and empowerment for community and, for academia; it is a gateway towards gaining new perspectives and developing trust relationship.

Our community of Mittimatalik is experiencing accelerated environmental changes under global warming and industrial development. Our people are getting more concerned with regards to the quality of our food and water. Many of us have experienced stomach illness recently and we fear that it might relate to the degradation of our environment. Our local leaders and Elders have encouraged us, the young generation, to take action and gain more knowledge to become the next stewards of the environment. We wished to conduct our own research project to study the pressing issue of stomach illness.

With the help of researchers from ARCTIConnexion, Dalhousie University, Université du Québec à Rimouski, University of Guelph, the Nunavut Research Institute and local partners, and funding from Health Canada, we have initiated in 2014 a two-year pilot study where we, the local youth, would lead a research project while receiving an ongoing training in advanced research, and where scientific procedures would harmoniously merged with Inuit knowledge and principles.

Our core research question was to understand the state of our fresh water and see whether or not it poses a risk to people's health to better inform our community and



develop best practices. A related question was to study the impact of climate change on our water.

During 2014, our research activities consisted of addressing Mittimatalirmiut's water use habits through surveys, quantifying indicators of possible fecal contamination (coliforms, *E. coli* and Enterococci), monitoring water parameters, sampling benthic invertebrates and documenting historical knowledge of fresh water among our Elders. A significant number of water samples tested positive for total fecal coliforms, *E. coli* and Enterococci within four streams located in the vicinity of the community and from our water reservoir. Surveys from 53 different households indicated that these sources were actually used by Mittimatalirmiut and 30% of the respondents reported stomach illness. We found the highest density of bacteria during the episodes of heavy rain which reflect observations from our Elders that our summers have become "wetter" in recent years. Elders unanimously recommended a new site as our municipal water reservoir, one that would have deeper and flowing water.

During the summer 2015, we expanded our research to study harmful pathogens in our fresh water through use of DNA-based qPCR procedures, and observations of weather patterns with two HOBO units and stream flow with pigmy meter. We also conducted a health survey with >100 households and ran an Elders camp that brought local students to learn more about historical changes in water quality. We are now running data analyses.

Within this two years journey, five Inuit have developed capacity and leadership skills as young researchers of the North. We hope that this model will inspire youth from other community and researchers to team-up and build more research capacity in the North.