Permafrost thaw, food security and traditional activities: Impacts on Jean Marie River First Nation

Jean Marie River First Nation (JMRFN), located 127km east of Fort Simpson, is a very active community that has led and participated in many scientific and traditional studies in the past few years. Currently, two primary concerns there are the impacts of climate change on country food supply and the contamination of some of their food by heavy metals. The community has already taken measures to have a better understanding of the local impacts of these two concerns and has also led several climate change studies including two studying the vulnerability of the land to permafrost thawing and its relation to country food supplies. Researchers at Northern Climate ExChange have partnered with JMRFN to help answer questions related to impacts of permafrost thaw on food security and traditional activities of JMRFN.

Project Overview

Thawing Permafrost and Food Security

Permafrost studies led by JMRFN from 2012 to 2014 show that the permafrost present on JMRFN land is warm and close to degradation. Several areas are already experiencing severe degradation processes. With the ground temperature close to 0°C, it is possible that the degradation process will be completed in only a few decades. Our most recent permafrost vulnerability map shows that 50% of the land around JMRFN is vulnerable to permafrost thaw. As permafrost thaws, animals on the land will be impacted and it will become increasingly difficult for community members to access the land using traditional routes. The research team has mapped areas where landscape transformations caused by permafrost thaw are most likely to impact food harvesting and cultural activities.

Tracing the Origin of Mercury Contamination in the Lakes and Fish of the Jean Marie River First Nation Lands

JRMFN knows that the water and the fish of certain lakes, such as Ekali Lake, are contaminated by mercury to a point where it is a concern for human health. A large area made of frozen peatland is surrounding the north shore of Ekali Lake. One of the characteristics of this peaty soil is the potential for it to have high accumulation and concentration of heavy metals, such as mercury (Smieja-Król et al., 2010, Shotyk, 2002). Researchers from NCE, in collaboration with University and private partners are now assisting with work to study permafrost as a potential source of mercury contamination of Ekali Lake. Mercury contamination could, at least partially, come from the currently thawing peat. The community has a pressing need to understand what the source of the mercury contamination is and to locate non-contaminated lakes where it will be safe to go fishing. The focus of the project will be to test permafrost for mercury content and to further explore whether degradation of permafrost provides a pathway for mercury to enter lakes and rivers.

Project Team

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Established: 2012