

# Food Security Vulnerability Assessment Related to Permafrost Degradation in the Jean Marie River First Nation



Figure 2.4.: Youth of JMR on the field a- A Youth assisting Fabrice Calmels to drill permafrost; b- Four watching a permafrost core freshly drilled.



Figure 2.5. Children of JMR School on the field with Fabrice Calmels

Prepared by:  
Margaret Ireland – The Jean Marie River First Nation



Dr. Fabrice Calmels – Yukon College



Cyrielle Laurent – Watertight Solutions Ltd.



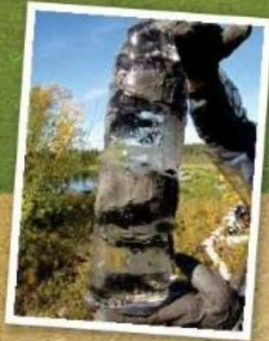
Prepared for:  
Aboriginal Affairs and Northern Development Canada



# Permafrost in the Jean Marie River First Nation Lands

## What is permafrost?

Permafrost is soil or rock that remains at or below 0°C (32°F) for at least two consecutive years. It occurs in regions where the climate is cold enough, mainly at an average air temperature of -2°C or colder. The photo below shows a sample of permafrost with large ice lenses.



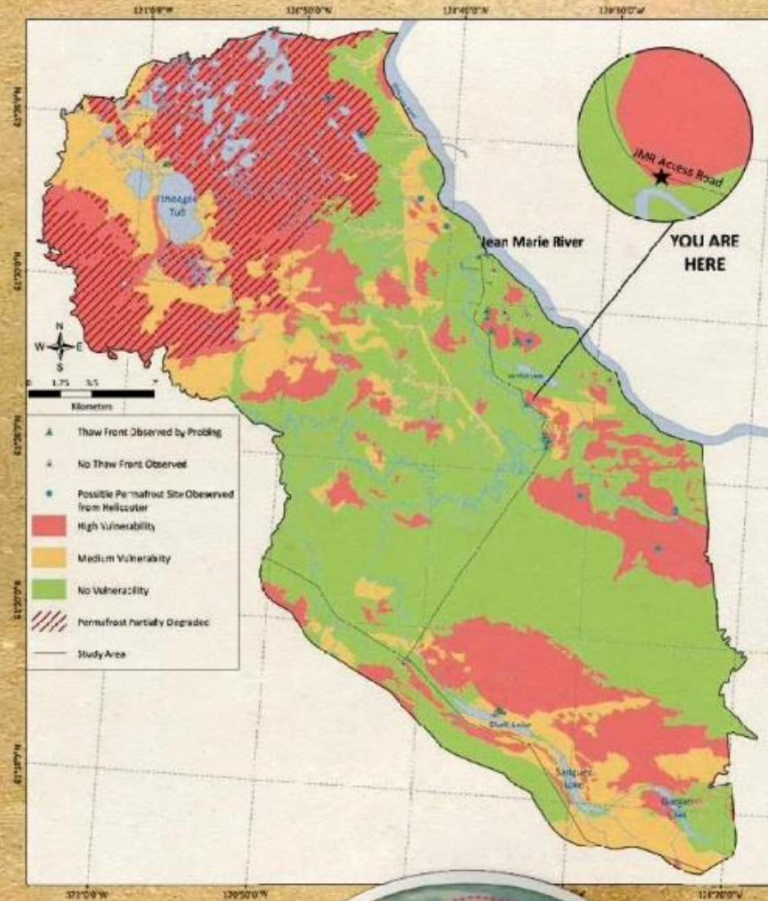
## Permafrost and the JMR access road

Permafrost thaw can cause significant damage to roads such as cracks, pot holes, and sinkholes. Roads built on or in close proximity to permafrost areas need to be monitored and fixed up on a regular basis if the permafrost underneath is thawing. As indicated on the map, the research we conducted indicates that a highly vulnerable permafrost patch is under our access road at this location.

## Key Climate Change Concerns

Our community's key concern regarding permafrost thaw due to climate change is being able to create and maintain a more sustainable and healthy community. Our specific concerns are:

- Food security and safety;
- Access to, and supply of, cultural resources such as traditional medicines;
- Travel safety;
- Water quality and exposure to diseases, illnesses, and contaminants associated with permafrost degradation; and,
- Negative impacts to the health of plants and animals



## Where do we find permafrost in JMR?

In Jean Marie River First Nation's traditional territory, permafrost is found in patches of different size as shown on the map. Here, permafrost forms small mounds, called palsas, which can range between 1 and 10 metres high. Where permafrost is present, the vegetation is usually made of lichens, labrador tea, and black spruce. When permafrost thaws, different plants may start to grow in the area. Photos of 2012 and 2015 illustrate the growth of tall grass and sedges growing rapidly beside a palsa as the melted water from the permafrost is being released into the environment. The third photo shows a large palsa which has melted and been replaced by a pond.

With climate warming, our Elders and land users have seen important changes occurring on our land as permafrost thaws. The map indicates two levels of vulnerability to permafrost thaw. The high vulnerability areas in red shows where the most severe changes are happening or may happen in the future, the medium vulnerability in orange indicates areas where changes should be less significant.



2012



2015



Remains of frozen mound

Possible limits of frozen mound before permafrost thawing process







