Agriculture and Permafrost

Effects of changing permafrost conditions on agriculture and agriculture capability classification in Yukon

CONTEXT
Permafrost is susceptible to climate change’s warming trends. Agricultural development, infrastructure and production is impacted by changing permafrost conditions such as excessive wetness, hummocky topography and ground subsidence.

Past and present Yukon farmers have adapted conventional agriculture methods to accommodate for northern specific permafrost conditions. The warming effects of climate change are expected to increase the rate of permafrost decay.

APPRAOCH
Researchers used Geographic Information System (GIS) modeling and local knowledge to identify areas of past and current agriculture development prone to changing permafrost conditions. This analysis helps predict which regions and soil types will be most affected.

Researchers also conducted field visits to compare GIS data with land-based observation and results.

Interviews with farmers were conducted to gather information, timelines and existing management practices within the agriculture community.

This four-year project focused on four distinct agricultural regions: Whitehorse/Southern Lakes, Haines Junction, Dawson and Central Yukon.

RESULTS
- Examined successes and challenges of agriculture production in areas of changing permafrost conditions.
- Summarized existing management practices for agriculture in areas of changing permafrost conditions.
- Suggested permafrost criteria to use with the Land Suitability for Agriculture Rating System.

OBJECTIVE
This project helped to identify challenges to agriculture caused by changing permafrost conditions. Adaptations to conventional agriculture methods were documented and existing management practices summarized.

The project also identified permafrost criteria that can be used in conjunction with the Land Suitability for Agriculture Rating System.

Significance
Knowledge gathered from this project will assist current and future Yukon farmers as they adapt their agriculture operations to changing permafrost conditions.

Partners
- Agriculture Branch, Energy, Mines and Resources, Government of Yukon
- Cryogeographic Consulting
- Agriculture and Agri-Food Canada
- Indigenous and Northern Affairs Canada

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