

Permafrost Monitoring and Transportation Infrastructure

Assessing the effects of permafrost response to climate warming on transportation infrastructure in Yukon and the Northwest Territories

CONTEXT

Permafrost is widespread in many parts of central Yukon and NWT and extensive and continuous in the north of both territories. Their transportation networks traverse permafrost that is sensitive to climate warming. Little is known of current conditions in this remote terrain or how the ground has responded to recent increases in air temperature. Warming and thawing of permafrost due to climate change results in terrain instability and has already begun to affect the integrity of transportation infrastructure components in some locations.



Photo: Government of Yukon

In response to demand from the public and the mining industry, the NWT and Yukon governments are exploring ways to improve and upgrade roads. Research is required to supply data on permafrost conditions adjacent to and beneath transportation infrastructure and to estimate the vulnerability of permafrost to climate warming at these sites.

OBJECTIVE

To conduct a baseline regional assessment of permafrost thermal regime, vulnerability of transportation infrastructure to changing permafrost conditions and a time frame for permafrost degradation affecting highway embankments.

APPROACH

Six to nine sites along the Dempster Highway, at the Mayo Airport and on the North Canol road will be monitored for deep and near-surface permafrost condition and ground temperature. Additional weather data collected by Yukon Department of Highways and Public Works (HPW) personnel will support the permafrost data collected during the study. Data compilation and management will be done by the Yukon Research Centre's Cold Climate Innovation Program and analysed by Carleton University. The data will be used as a planning tool by HPW and shared with the Government of NWT.

EXPECTED RESULTS

The data collected will determine the predicted effect of climate change over the next 50 years on permafrost conditions at the monitored sites. The results may inform future transportation infrastructure planning, including the development of best practices. The data will be available for use by other researchers.

Significance

Key step in developing a territory-wide program to monitor ground temperatures and climate conditions in those areas where transportation infrastructure is vulnerable to climate change.

Partners

- Highways & Public Works, Government of Yukon
- Government of Northwest Territories

FOR MORE INFO

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Pan-Territorial Adaptation Information Notes
MAR.2015.YT.08
IISN 2291-3904