

Terrain Analysis in Nunavut

Using radar satellite images to assess climate change risks inherent with land development in Nunavut communities

CONTEXT

Permafrost is ground that has been frozen for more than two years. In Nunavut, permafrost is under all of the land. The warming temperatures associated with climate change will affect the stability of the permafrost and therefore affect infrastructure in Nunavut. Currently, there are few resources available to assist developers building on unstable permafrost. This project enables the Government of Nunavut's Department of Community and Government Services and the Hamlets of Nunavut to acquire knowledge about site conditions of lands chosen for future development by conducting a terrain analysis in six communities.

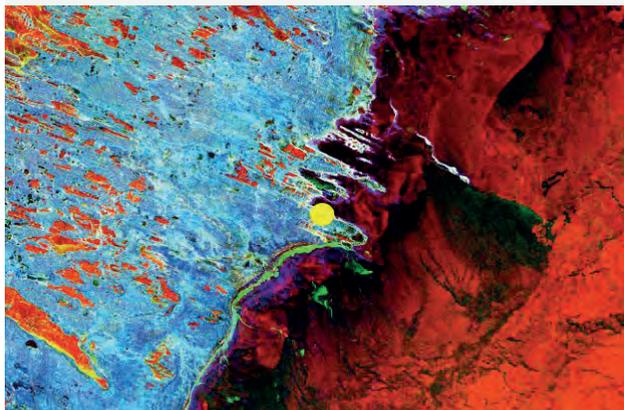


Photo: 3V Geomatics Arviat (yellow dot) is imaged as ice forms during the fall and early winter. Blue is from the bright ground during September. Green or yellow show areas where ice is beginning to form on Hudson Bay and lakes in October. Red areas show ice formed in December.

OBJECTIVE

Information from this project will be used by planners and engineers to assist the selected communities in the decision-making process of selecting lands for future development. Community members are encouraged to

participate in the planning process by contributing their knowledge towards the development of their community's plans. By identifying and distinguishing lands that are more susceptible to the negative impacts of climate change (flooding, landslides and the shifting of land), communities will be better equipped to minimize the costs associated with the failure of foundations of buildings and infrastructure.

APPROACH

This project monitors the shifting of permafrost by assessing the soil, permafrost and drainage conditions of the selected lands. The following monitoring methods are being used: radar satellite images, digital elevation models, optical images, site visits and local knowledge. Based on the data and information obtained, the studied terrains are ranked based on their suitability for future development. The communities of Arviat, Baker Lake, Kimmirut, Gjoa Haven, Cape Dorset and Kugluktuk were chosen based on their need for this information as well as the ability to build off previous work.

EXPECTED RESULTS

This project will provide communities with tools and policies to assist in better land management. Information will be integrated into the municipal community plans. The results from this project will aid in reducing the costs, damages, and losses associated with the failure of foundations of buildings and infrastructure in Nunavut. Aside from the communities benefiting, the territorial and federal governments, which have made considerable investments in the communities, will also benefit financially.

Significance

Terrain analysis provides information that enables communities to make better adaptation decisions when planning for new infrastructure developments in permafrost regions.

Partners

- Community and Government Services, Government of Nunavut
- Hamlets of Arviat, Baker Lake, Kimmirut, Gjoa Haven, Cape Dorset and Kugluktuk
- Aboriginal Affairs and Northern Development Canada

FOR MORE INFO

Senior Manager

Planning and Lands
Department of Community and
Government Services,
Government of Nunavut

p. (867) 982-7651
f. (867) 975-7742

P.O. Box 1000, Stn 1360,
Kugluktuk, NU, X0B 0E0

www.cgs.gov.nu.ca

Pan-Territorial Information Notes
MAR.2015.NU.06
ISSN 2291-3904