

WatKAN: CREATING A WATER KNOWLEDGE APPLICATION NETWORK TO ADDRESS CHALLENGES RELATED TO PERMAFROST THAW

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WHY DID WE DEVELOP WatKAN?

Unprecedented climate warming and industrial expansion in the North have led to permafrost thaw, landcover change, and streamflow changes. These changes introduce considerable uncertainty regarding the future availability of northern water resources. Industry, communities and governments lack the knowledge and predictive tools needed for rigorous, science-based decision making on water resource and ecosystem planning and management, water and land permit approval and environmental impact assessment.

The Water Knowledge Application Network (*WatKAN*) was created to improve the understanding of and ability to predict the impacts of permafrost thaw on the shared water resources in the North. This network builds capacity and predictive tools that predict the rate and pattern of permafrost thaw and resulting changes in landcover and water supply, in order to enable sound management decisions informed by the best available evidence on water resources in the Boreal region.



WHAT IS WatKAN?

WatKAN is a regional consortium of industry, provincial, territorial and federal government agencies, NGOs, First Nations and other communities and stakeholders who collaborate to improve the understanding of and ability to predict the impacts of permafrost thaw on their shared water resources. This network was developed in partnership with the British Columbia and Northwest Territories governments to mobilize knowledge about water resources in the Northeastern British Columbia and adjacent southern Northwest Territories regions.

WHAT DID WatKAN DO?

WatKAN built capacity for professionals, technicians and students in communication, technical knowledge and predictive modelling.

WatKAN transformed the Cold Regions Hydrological Model (CRHM) and RAVEN, two predictive modelling tools, into accessible and easy to use tools for government agencies, industry and local communities. These tools have been used in scenario planning to predict the impacts of a changing climate on streamflow and other water resources; this will inform infrastructure planning and impact mitigation actions to reduce environmental impact and costs.

WHAT IS WatKAN'S IMPACT?

WatKAN's activities have not only increased predictive capacity but also the ability of water resource managers to diagnose the impacts of changes to hydrological inputs (rainfall, snowmelt) and changes to the water flow and storage processes resulting from changes to the landscape, whether driven by warming (e.g. regional permafrost thaw) or by direct human disturbance (e.g. seismic lines, drill pads, ferry crossings, highways, runways). The new models have also provided new knowledge on how these human activities can be implemented with a minimum of impact.

WatKAN's new predictive tools, coupled with interactive training on their application, are key to incorporating science-based management into northern community resource and economic development. This is increasingly important as pressures on water resources increase throughout the Boreal region, and eventually affect all diverse water uses including potable water supply, hydro-electric generation, bulk water exports, industrial water use, recreation, and wastewater treatment.

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