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Unlocking the secrets of climate change

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Deh Cho - Research being conducted in the Deh Cho is helping to improve the understanding of how a warming climate could affect water resources across Canada.

Canada's cold regions, including places in northern latitudes or high altitudes, are closely linked with the rest of Canada. Changes in cold regions could affect water resources across the country, said Bill Quinton, an associate professor at Wilfrid Laurier University's department of geography and environmental studies.

Since 1999, Quinton has been conducting research at Scotty Creek. The research site is located approximately 50 kilometres south of Checkpoint and a further 10 kilometres into the bush off of Highway 7.



Bill Quinton stands with a weather station, a piece of equipment that he's using to study the hydrology around Scotty Creek. - photo courtesy of Bill Quinton

Quinton, along with other researchers, is conducting studies to help understand the hydrology of the area. This includes looking at how much water runs off, how much water reaches the creek and when. All of this shows how much water is available, said Quinton, who is a faculty member of the Cold Regions Research Centre.

"There's a lot we don't understand," said Quinton.

Gaps in the knowledge about cold regions' hydrological processes limits the ability to predict how changes, such as a warming climate, will affect Canada's fresh water resources, Quinton said.

The way to understand and predict the changes is to get into the field and increase the understanding of how the processes work, he said.

"If we know how, we can predict how the system is going to change if things warm up," he said.

The area around Scotty Creek is an ideal study location because it has discontinuous permafrost.

"It's very sensitive to warming," he said.

Changes are already occurring in the Scotty Creek area.

In a recent study that examined aerial photographs and satellite imagery, Quinton found that the area occupied by permafrost has declined dramatically over the past 50 years.

In some locations the permafrost has declined by up to 30 per cent.

The change is affecting how much water the land can hold.

Because permafrost is already saturated in water it can't absorb more. When permafrost melts, the area turns into a bog which stores most of the water it receives and produces little runoff, Quinton said.

The change could mean that the amount of water in the region's streams will decline. Quinton admits, however, that there's a possibility the decrease could be compensated for by increased rainfall.

"It's very tough to study climate change," Quinton said.

There are many different variables to look at but nailing down one thing at a time does reduce the overall uncertainty, he said. To that end, Quinton is part of the Improved Processes and Parameterization for Prediction in Cold Regions Research Network or IP3.

The IP3 Research Network is a made up of a group of researchers across Canada who are all studying various aspects of hydrology in cold regions.

Although water availability isn't an immediate issue in the North, Quinton said he thinks it will be.

"My sense is at some point it's going to be an issue here because we all need water," he said.

Having received renewed funding, Quinton expects to continue research at Scotty Creek for the next three years. Quinton plans to share some of his findings with nearby communities including Jean Marie River.

People are noticing changes around the community, said Chief Stan Sanguéz.

"There's a lot of concerns about permafrost," he said.

Along Jean Marie Creek sections of the bank are slipping, something that residents are on blaming instability caused by melting permafrost, Sanguéz said. Water levels in the creek are also lower than in the past, he added.

