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## Rapid permafrost thaw expected in N.W.T., Yukon after heat wave, experts warn

Both territories are at the extremities of a 'heat dome' covering the Pacific Northwest

[Anna Desmarais](#) • CBC News • Posted: Jun 30, 2021 3:41 PM CT | Last Updated: June 30



Permafrost slumps captured in an aerial shot near Fort Simpson, N.W.T. (Submitted by ENR-Forest Management)

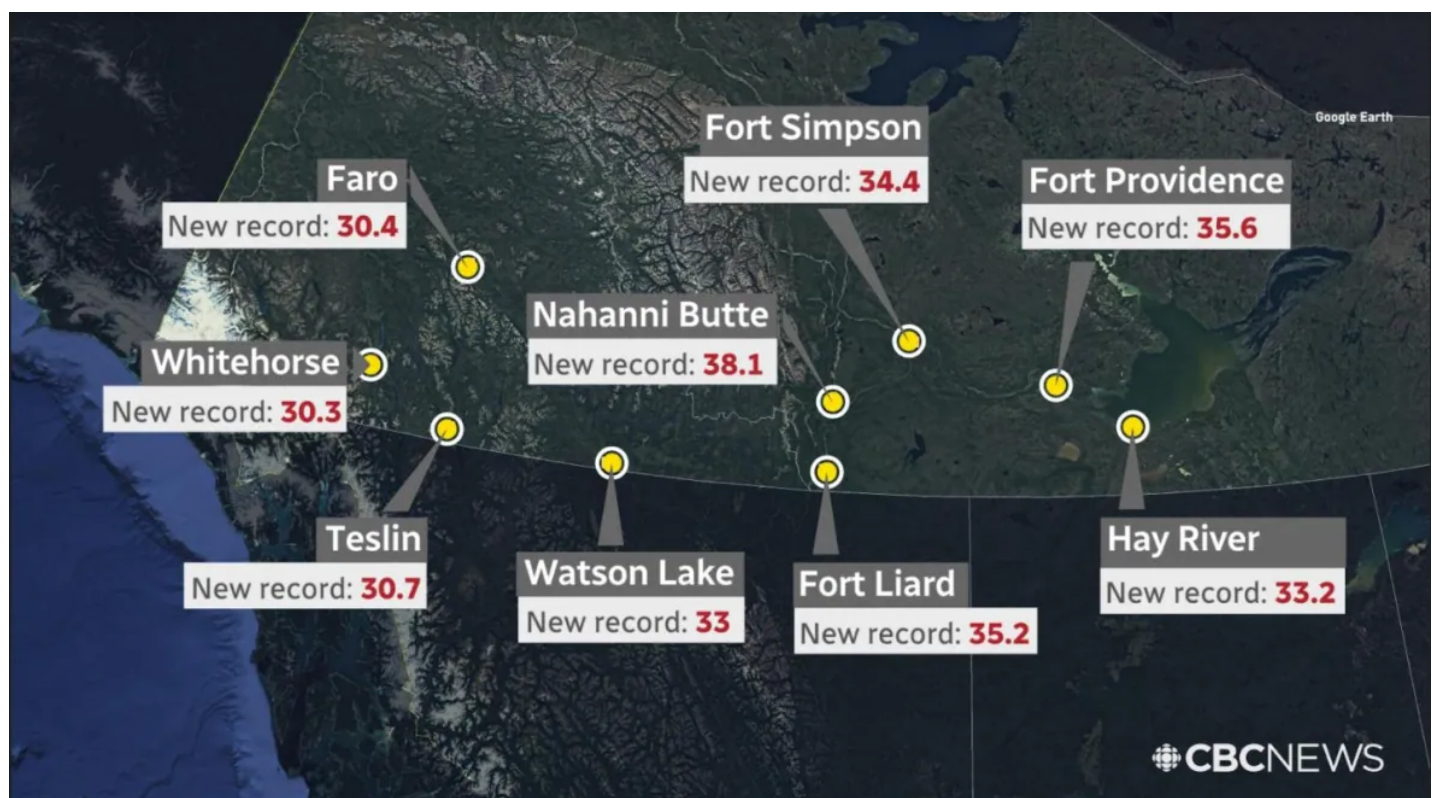
The heat wave sweeping through the N.W.T. and Yukon could have a major impact on permafrost thaw in both territories, experts warn.

Both territories are at the extremities of a "heat dome" — a mass of hot air settling over the Pacific Northwest. It's brought record-breaking temperatures across the region, setting new Canada-wide records in Lytton, B.C. several days in a row.

- [\*\*N.W.T., Yukon break summer temperature records as heat dome lingers\*\*](#)
- [\*\*For 3rd straight day, B.C. village smashes record for highest Canadian temperature at 49.6 C\*\*](#)

"We have kind of a double whammy," said Bill Quinton, a permafrost researcher at Wilfred Laurier University, who has been studying permafrost in the N.W.T. since the 1980s, mostly in the southwestern Dehcho region.

"We started off the summer with lots of moisture and now we have the heat wave. So we anticipate this is going to be one of our large permafrost [thawing] years."



These are the highest record-breaking temperatures seen in N.W.T. and Yukon communities as of Monday, June 28. (CBC )



Permafrost is ground that remains below zero degrees for two years or more. Scientists are still trying to understand just [how much carbon dioxide thawing permafrost will release into the atmosphere](#), and nearby water.

Thaw also causes the ground to weaken, causing shifts, cracking and instability in structures above.

## Heat speeds up melt of first permafrost layer

The N.W.T.'s season started very wet, with a really fast snow melt, Quinton said, with most of the water ending up in the landscape.

When that happens, there is more ground thaw — and even more permafrost thaw.

Fabrice Calmels, research chair of permafrost and geoscience at Yukon University, said these temperatures could speed up the thaw of the first active layer of soil.

That layer could then detach itself from a thicker, permanent layer underneath and slide into nearby rivers.



Fabrice Calmels, research chair of permafrost and geoscience at Yukon University, said there are no measures the territories could take at a regional level to slow permafrost melt. (Submitted by Yukon College/Yukon Research Centre)

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"You may have some small landslides on slopes," he said. "When permafrost melts, it changes hydrology, it changes vegetation. It's a very complicated process."

With these kinds of temperatures comes an elevated risk of wildfires, Calmels continued.

If that happens, it will burn away some of the vegetation that anchors the ground for permafrost, causing even more thaw.

There are 13 active forest fires in Yukon and nine in the N.W.T. as of Wednesday morning.

Mike Francie, a spokesperson for Yukon Wildland Fire Management, said there's an "increased risk of ignition" throughout central Yukon as thundershowers are expected in the forecast.

## 'Perfect storm' for flooding conditions

In Yukon, flood warnings have been issued in the Southern Lakes region as water levels rose 10 centimetres or more in 24 hours.

Officials there warned the warm temperatures triggered a rapid melt of the remaining record snowpack.







Water creeps towards a home on Marsh Lake, Yukon. The Southern Lakes region says they're in "emergency mode" as this year's heatwave triggered a rapid snowpack melt. (Vincent Bonnay/Radio-Canada)

"You almost get a perfect storm ... in terms of flooding conditions," Quinton said. "So we have to watch out for these kinds of things going forward."

Permafrost thaw could also explain some of the heavier-than-normal water flows in the Mackenzie and Liard rivers that led to historic levels of flooding last month in the N.W.T., Quinton said.

- [\*\*Yukon Southern Lakes residents in 'emergency mode' as water levels rise\*\*](#)
- [\*\*N.W.T. will pay all housing repair costs for flood victims without insurance\*\*](#)

Hundreds in communities across the territory were forced to evacuate their homes, with some still unable to return.

## More heat waves expected

Quinton said he doesn't know yet what long term effects the heat wave will have on the landscape and water, but it's something they're actively studying.

More of these heat waves should be expected in the future, he continued, because it is "on par" with what we know about how climate change brings on more extreme weather events.

In order to respond to these challenges, Quinton said it's possible some might have to change the way they interact with the land.



The partial draining of a lake due to permafrost melt in the N.W.T. (NWT Geological Survey)

"There are new hazards that we have to be aware of," He said. "Our past experiences on the land don't necessarily apply when things are changing so fast."

Calmels said there are some changes that can be made at a micro-level, like where and how roads and structures are built, but nothing that can be applied at a territorial level.

"Even if you were going to grow vegetation to regenerate permafrost ... there's no guarantee that you would get results," he said.

*With files from Laureen Laboret*

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