

# New wildfire early warning system could prevent spring blazes

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Credit: C.W. Bater

Researchers at the University of British Columbia have developed a new early warning system to predict when and where human-caused wildfires are most likely to occur in the spring.

Using satellite images of vegetation, the researchers can forecast where wildfire risk peaks in boreal forests by tracking moisture in fuel sources like leaves.

"Moisture is a critical factor in human-caused fires," said Paul Pickell, a postdoctoral fellow in the faculty of forestry at UBC. "By tracking greening vegetation, which is a reliable proxy for moisture content, we can predict the risk of a human-caused wildfire with 10-day accuracy by the end of March."

The spring burning window—between snow melting and plants sprouting new greenery—is the riskiest time for human-caused wildfires in northern boreal forests as found in Alberta and British Columbia. It is also the most dangerous time of the year for loss of property and infrastructure.

The system was developed and tested for nearly 400,000 square kilometres of forested land in Alberta, where more than two-thirds of human-caused wildfires occur during the spring burning window.

The researchers began by working backwards: they first matched the timing of human-caused wildfires between 2000 and 2014 with seasonal vegetation growth and calculated a greenness index. They then used [satellite data](#) to predict when plants would begin to produce new leaves again as a marker of peak fire risk.

To test the system, the researchers simulated satellite data and then compared it to the known date of vegetation greening. The predicted "greening date" was then checked against a network of remote cameras that were installed in the forests for the purpose of observing vegetation greening on the ground.

"For example, we found that the conditions were just right in the spring of 2016 to allow the Fort McMurray fire to spread rapidly to the surrounding leafless vegetation," said Pickell.

The Fort McMurray fire that ignited in May 2016 was the costliest

natural disaster in Canadian history, resulting in an estimated \$3.58 billion of insurable damages and the evacuation of approximately 88,000 residents. The risk of human-caused wildfires is expected to increase in northern forests as the climate becomes warmer and drier and more people move into formerly remote regions.

"This could be a really cost-effective tool for wildfire managers to help them determine where they should deploy their firefighting resources, and the [early warning](#) may be available for most forests before the start of the fire season," said Pickell.

The early warning system could be used by [wildfire](#) managers across North America, Europe and Russia using open-access satellite observations of the Earth.

The study was published today in *Scientific Reports*, an open-source journal from the publishers of *Nature*.

**More information:** Paul D. Pickell et al. An early warning system to forecast the close of the spring burning window from satellite-observed greenness, *Scientific Reports* (2017). [DOI: 10.1038/s41598-017-14730-0](https://doi.org/10.1038/s41598-017-14730-0)

Provided by University of British Columbia

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