

CANADA RESEARCH CHAIRS

UNIVERSITY
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CHANGING LIVES
IMPROVING LIFE

MERRITT TURETSKY

Canada Research Chair in Integrative Ecology

ALL EYES NORTH

Is climate change already having a
profound effect on vegetation?



Northern plant species are feeling the heat

Climate change may be difficult to detect within our lifetimes, but that doesn't mean it isn't constantly progressing. Changing climate systems have a profound impact on vegetation...and that's an interesting concept, given vegetation's complex effects on climate change.

Prof. Merritt Turetsky, Canada Research Chair in Integrative Ecology, is an expert in the northward shift of boreal plant species ranges, as a result of changing environmental conditions. She's interested in the ways vegetation affect feedbacks with the earth's climate system, which can include either positive feedbacks that reinforce climate warming or negative feedback mechanisms that could lessen climate change.

"Climate influences where a plant species can live and how it functions," says Turetsky. "But in turn, the way that plants grow and die and decompose influences climate. There's a really interesting feedback system involved here."

Climate influences where a plant species can live and how it functions

Turetsky studies primarily northern wetlands and boreal forests, which have a large abundance of conifer trees. She says the dark needles of conifer trees have a low albedo, meaning they absorb incoming energy from the sun and warm the soil. Northern expansion of conifer trees into the Arctic will have a strong influence on climate, leading to more warming than would be expected from changing greenhouse gas concentrations alone.

Most recently, Turetsky completed a major field campaign in northern Canada and Alaska, studying the impacts of forest fires on ecosystems, their albedo, and how much carbon is stored in vegetation and soils. She says that as the climate warms, the severity and frequency of forest fires is increasing. Northern forests and peatlands have stored carbon from the atmosphere for thousands of years, and today store almost as much carbon as is found in the entire atmosphere. Increased burning will lead to the release of at least some of this stored carbon back to the atmosphere.

If this shift in forest fires results in melting permafrost, it can have great implications not only for ecosystems but also for the infrastructure of northern communities, given that homes and roads are built on top of permafrost.

On a global scale, Turetsky says global climate models currently do not adequately represent some of the feedback mechanisms that her lab investigates. She notes that as a result, we may be severely over- or under predicting the impacts of climate change. She is hopeful that the data and knowledge produced by her studies, and those of her students, will lead to major improvements of regional and global climate models in the next decade.

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By Anna Wassermann



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