

Alberta's boreal forest could be dramatically altered by 2100 due to climate change, study says

March 26 2018

Half of Alberta's upland boreal forest is likely to disappear over the next century due to climate change, a new study shows.

The upland [forest](#) will be replaced after wildfire by open woodland or grassland, according to research from University of Alberta biologists, conducted in collaboration with Natural Resources Canada researchers.

"By 2100, at least 50 percent of the boreal upland mixed wood forest could become young deciduous forest and grassland, based on a combination of changes in climate and wildfire," said Diana Stralberg, a recently graduated PhD student in the Department of Biological Sciences.

In this study, researchers examined vegetation change as a function of wildfire disturbance and climate change over a 100-year period. Stralberg simulated wildfire using a model from Natural Resources Canada and used data from the Alberta Biodiversity Monitoring Institute to determine what vegetation might grow back under future climates.

Repeating this cycle over a 100-year period painted a bleak picture—approximately half of Alberta's upland boreal forest would eventually be replaced by young deciduous forest and grasslands. Boreal wetlands were not included due to uncertainty regarding their long-term persistence.

The results may actually be on the conservative side, as they do not take into account human activity, drought, or insects, explained Stralberg, who began the study as a PhD student under the supervision of Professor Erin Bayne. Business as usual

"Our model assumes 'business as usual' in the province, with high carbon emissions and climate change continuing at the current rate. So societal action can still reduce this risk," said Stralberg.

"Although fire is a natural component of this ecosystem, the irreversible loss of old forest could have detrimental effects on many species, including many resident and migratory songbirds. The dry climate of the western boreal region makes it particularly vulnerable to climate change."

As ecosystems are disturbed by [wildfire](#), climate change affects which vegetation types will grow back. Climate change also affects the potential for wildfires to occur through changes in weather. Climate models indicate that [climate](#) conditions that are currently associated with prairies, rather than forests, will dominate the region by the end of the 21st century, making it inhospitable for regrowth of coniferous forest. Meanwhile, existing trees will continue to provide fuel for large fires for several decades.

In order to anticipate and adapt to [climate change](#), land managers must better understand how landscapes are likely to change in the future. And, while not a crystal ball, models like this one make it possible to glimpse into the future and plan for a range of potential outcomes.

The study, "Wildfire-mediated vegetation change in boreal forests of Alberta, Canada," was published in *Ecosphere*.

More information: *Ecosphere* (2018). [DOI: 10.1002/ecs2.2156](https://doi.org/10.1002/ecs2.2156)

Provided by University of Alberta

Citation: Alberta's boreal forest could be dramatically altered by 2100 due to climate change, study says (2018, March 26) retrieved 17 July 2024 from <https://phys.org/news/2018-03-alberta-boreal-forest-due-climate.html>

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