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WEATHER SIMULATIONS PREDICT MAJOR LANDSCAPE CHANGE IN 40 TO 60 YEARS FOR WESTERN CANADA DUE TO MORE SEVERE FOREST FIRES UNDER CLIMATE CHANGE. EASTERN CANADA AFFECTED TOO - BUT LATER.

Forest fire simulations extending to the 2040 to 2060 time period predict a major change in the western Canadian landscape as a result of climate change, say a team of researchers working with the Sustainable Forest Management Network. The eastern Canadian landscape, say team members, will also be affected, but the impacts may take longer.

"The western Canadian landscape is particularly vulnerable. Our results, using the best available models, suggest that as global warming continues, the prairie landscape may move significantly further north. The boreal forest will give way to aspen parkland, and aspen parkland will give way to prairie grassland, with forest fires being the catalyst for such changes. This would have a major impact on forestry operations," stated SFM Network Principal Investigator and research team representative Mike Flannigan.

The team tested their projections of future severe fire weather using three approaches. First, present and future fire weather maps were derived from general and regional circulation climate weather data. General Circulation Models suggest the world's weather will be 1.4 to 5.8 degrees Celsius warmer over the next century. Second, the team modelled fire weather 6000 years ago, when the climate was only one degree warmer. The researchers know this from pollen core samples taken from lake bottoms and peatlands across the country: 20 sites in eastern Canada, 25 sites from across western Canada, and 4 sites adjacent to the border in the United States. Third, this information was compared to charcoal abundance at 6000 calendar years (before present) in stratigraphic records typically used as a proxy for past fire activity.

The team conducted two simulations. The first simulation modelled the carbon dioxide level characteristic of the 1960 to 1980 period in Canada, or the 1 x CO_2 scenario that the team used as a benchmark. This recent time period is analogous to the charcoal record from 6000 years ago. A second simulation used the General Circulation Model for a doubling of the carbon dioxide level (2 x CO_2), to simulate an anticipated temperature increase of 1.4 to 5.8 degrees Celsius. At this rate, the computer simulation indicates some major landscape changes due to severe fire activity; however, there may be significant regional variation. Even with climate change, some areas in western Canada will actually see less severe fire weather. This is due to differences in precipitation, wind speed and relative humidity. This is also the reason why the team thinks the eastern part of the country may be spared for a time. "While not yet conclusive," says Flannigan, "the eastern part of the country may just take longer to be affected by severe fire activity. Recent results indicate that significant increases in forest fires may occur over much of eastern Canada by the end of the century. We will have a better idea in the next year or so."

Citation:

Flannigan M, Campbell I, Wotton M, Carcaillet C, Richard P, Bergeron, Y. 2001. **Future fire in Canada's boreal forest: paleoecology results and general circulation model - regional climate model simulations**. *Canadian Journal of Forest Research*, 31(5): 854-864.