

Title: Incorporating uncertainty into projections of woodland caribou habitat: a case study in northwestern Ontario

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Abstract:

The range of woodland caribou (*Rangifer tarandus caribou*) in Ontario has receded northwards considerably over the last century, due in part to the effects of forestry activities. In response to this decline, forest management plans within the range of caribou in Ontario typically schedule their timber harvesting according to a pattern of concentrated areas over time, so as to minimize the disturbance footprint and ensure future habitat connectivity. There remains, however, considerable uncertainty regarding the future response of caribou to this mosaic approach to timber harvesting; in particular, how the interaction between forest management and wildfire – including uncertainties regarding the effects of climate change – will affect future caribou habitat. Here we present a modeling framework that is designed to assess the risk associated with these uncertainties, which we demonstrate using a 10,000 km<sup>2</sup> landscape in the boreal forest of northwestern Ontario. Using a stochastic state-and-transition simulation model, we combine the forest growth and succession assumptions from an existing forest management plan with a range of possible climate change scenarios regarding wildfire, in order to generate estimates of future probability distributions for caribou habitat. Our results highlight the importance of incorporating spatial dynamics and stochasticity into projections of future caribou habitat.