

# MOOSE, CARIBOU & FIRE

## Have we got it right yet?

### BACKGROUND

Boreal populations of woodland caribou are federally listed as Threatened due to population declines throughout their distribution. The main cause of decline is believed to be increasing predation resulting from landscape disturbance within caribou range and climate change. Disturbance is thought to increase predation because it increases the extent of young forests, resulting in population increases of other ungulate species (e.g. moose), which subsequently leads to population increases of predators that opportunistically prey on caribou. Because of this hypothesized effect, management of woodland

caribou has been guided by disturbance thresholds within caribou range. These thresholds take into account both human-caused disturbances, such as cut blocks and well pads, and natural disturbances, such as forest fire. A key assumption in this framework is that all disturbances create favourable conditions for other ungulate species. This assumption, however, has rarely been tested in western boreal forests and may not hold as ungulate response may be influenced by disturbance type, age, and/or the land cover type in which the disturbance occurs.

### THE STUDY

A recent analysis tested this assumption using GPS radio-collar data from 112 individual moose distributed among three study areas situated in northeastern Alberta, northwestern Saskatchewan and northeastern British Columbia. All three study areas encompassed portions of recognized woodland caribou ranges. The analysis specifically focused on moose response to fires (or burned areas) and responses were evaluated at multiple spatial scales. Moose showed low use of burns at all scales of analysis and during all seasons, regardless of time since fire. For example, out of 98 moose monitored during the summer season (July – November), 86 had burned areas ( $\leq 25$  years post-fire) within their summer home ranges, yet 71 of these individuals had

no GPS locations within burns. Burned peatlands were particularly avoided by moose. At a larger scale, moose did not situate their seasonal home ranges to take advantage of burned areas. To determine if these behavioural findings scaled up to population changes, the analysis further evaluated whether the extent of burned areas influenced moose densities within 24 moose survey units in Alberta and 17 in northeast British Columbia ( $n = 17$ ). When considering all burns  $\leq 40$  years old – a threshold used by the federal recovery strategy for quantifying burns in caribou range, results suggest no effect of burns on estimated moose densities, even after accounting for the effects of other land cover types within survey units (Fig. 1).



## IMPLICATIONS

These findings suggest that forest fires have minimal impact on moose populations within western boreal forests, which calls into question the prevailing hypothesis linking fires to caribou population declines. Further research is necessary to understand the mechanisms by which fires affect caribou populations and the relative importance of fire effects. By refining our understanding of how disturbance affects caribou populations, such research will inform assessments of caribou habitat quality, which in turn should guide the collaborative management actions required for mitigating disturbances within caribou range.

**Understanding how human disturbance and fires contribute to woodland caribou is important when it is applied to prioritizing management strategies.**

### figure 1 Moose Density

The effect of burns  $\leq 40$  years old on the estimated density of moose (with standard error bars where available) in survey units situated in northern Alberta (n = 24) and northeastern British Columbia (n = 17), Canada. Units were surveyed between 1993 and 2015 in Alberta and between 2010 and 2016 in British Columbia.

