

# A BURNING QUESTION . . .

## How woodland caribou use post-fire landscapes in northeastern Alberta

### FIRES AND LICHEN

Woodland caribou avoid predation by being uniquely adapted to low-productivity peatlands, which act as spatial refugia from wolves. By “hiding” in these lowland systems caribou are spatially separated from other prey species and subsequently their predators. This strategy often requires caribou to eat lichen as their primary source of energy. When forest fires burn across the landscape they often destroy much of the preferred terrestrial lichen and reset succession, generating landscapes favoured by moose and white-tailed deer. Consequently, caribou are thought to avoid burned landscapes due to an absence of food and potentially high predator densities.

### A CHANGING WORLD

The federal recovery strategy for woodland caribou states that areas burned by wildfire in the last 40 years are disturbed habitat. Yet, detailed research about the relationship between post-fire forest regeneration and caribou habitat selection in areas of high anthropogenic disturbance is lacking. Additionally, fires have been mapped using coarse polygons, with no consideration of unburned residual forest patches as viable habitat.

**The successful conservation of woodland caribou will take an unprecedented collaboration between many stakeholders, it is fundamental that we have precise and accurate information for defining critical habitat so that we can make appropriate land use choices that all stakeholders can agree upon.**

### figure 1 Defining critical habitat

A question framework to help inform the decisions for defining critical habitat by the federal recovery plan.



# THIS STUDY

To examine the effects of forest fires on woodland caribou, we collected GPS location data on five caribou ranges in northeastern Alberta. We used high-resolution imagery to map wild fires that have burned in the past 40 years. Using caribou locations and updated mapping we assessed fine-scale habitat selection using an Integrated Step Selection Analysis<sup>2</sup> to examine whether caribou were selecting or avoiding burned areas within their home range.

## RESULTS

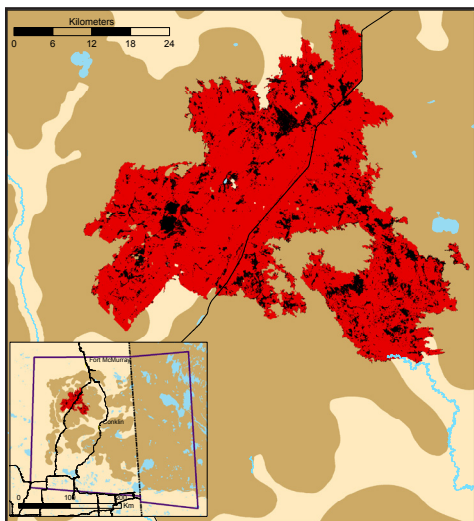
Our updated fire mapping shows that previously delineated fire boundaries contain a large percentage of unburned residual patches within the burn complex, which may be suitable habitat for caribou. Preliminary habitat selection results suggest that caribou are avoiding burned landscapes, including both the burn complex and these residual patches. This avoidance can persist for up to 30 years post-fire, presumably until the forest is old enough to support lichen.

## WHY?

Currently, both the burn complex and unburned residuals are considered disturbed habitat and cannot be included in the federal recovery strategy's 65% undisturbed habitat threshold. This understanding originates from only a few studies, which lack focus on woodland caribou and mostly overlook residuals. This research will further explore these relationships to fully understand the effects of fire on the behavior and survival of caribou, and inform habitat management goals.

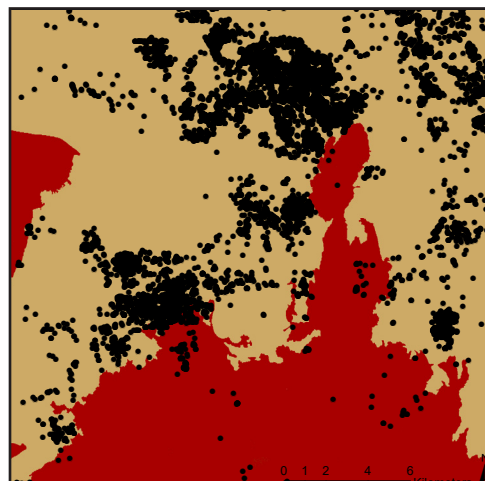
**figure 2 Mapped forest fire**

using the Normalized Burn Ratio in the ESAR caribou range of Alberta.  
RED: Burn complex | BLACK: Unburned residual patch



**figure 3 Caribou GPS locations (black)**

along the outer edge of a fire (red) in the ESAR caribou range of Alberta.



# PROJECT SUPPORTERS

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<sup>1</sup> Key, C. H., & Benson, N. C. (1999). The Normalized Burn Ratio (NBR): A Landsat TM radiometric measure of burn severity. United States Geological Survey

<sup>2</sup> Avgar, T., Potts, J.R., Lewis, M.A. and Boyce, M.S., 2016. Integrated step selection analysis: bridging the gap between resource selection and animal movement. Methods in Ecology and Evolution.

