



QuickNotes

Science Summaries from fRI Research

Advancing Harvest System and Silvicultural Practices for Improved Woodland Caribou and Fibre Outcomes

The Ways Fire and Forest Harvesting Differ

Both fire and forestry reset the age of a stand, creating an area of young forest. But do the similarities end there? Perhaps with the right methods of harvesting and replanting, a harvested area can emulate some of the ecology of a forest regenerating after wildfire. Maybe there are also ways to reduce the time it takes for a disturbed forest to become like the old forests caribou prefer.

We studied 100s of forest stands in the first 40 years after either fire or forest harvesting, as well as 100s more in older forest with confirmed caribou use. This study is both broad in scope – we went to most Alberta caribou home ranges – and detailed, exploring the fine scale forest attributes that are important to caribou and forest managers.

Key findings

- Timber supply and canopy cover increased faster after harvesting than wildfire. By age 21–30, basal area, QMD, and SPH¹ were equalling or surpassing the old growth caribou use areas. Harvested areas also had more deciduous trees.
- Caribou lichen takes more than 40 years to regrow, so unsurprisingly, it remained low following fire and harvesting, but from 10–40 years post-disturbance, it was higher in wildfire sites than harvested sites. The old forests used by caribou had the most lichen.
- Saplings eaten by moose, and shrubs used by bears, were abundant post-harvest and decreased as the stand re-grew. These plants are sparse or absent in caribou-use sites.
- Immediately after a wildfire, falling dead trees provided lots of CWD², gradually tapering off until CWD matched the lower levels found in harvested and caribou-use areas.

What we measured

- Timber supply: basal area, QMD, SPH
- Stand structure: canopy, coniferous saplings, CWD, soil depth
- Forage: lichen, forbs browsed by caribou, saplings, shrubs, and forbs browsed by moose and bears

What this means

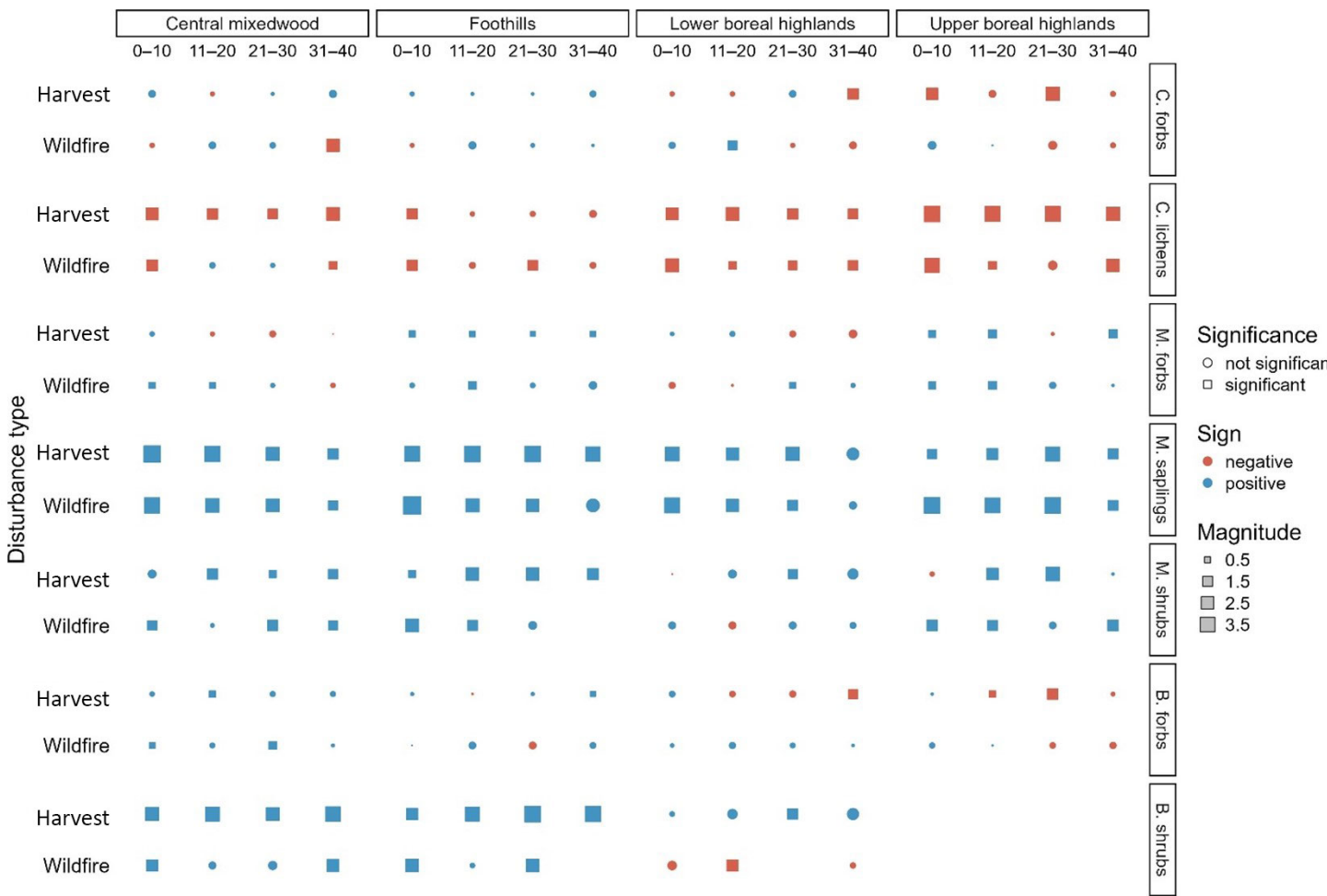
Caribou-use, harvested, and burned sites started out very different from each other. Post-wildfire stands had more similarities to the caribou-use sites than harvested sites: more conifer and fewer deciduous trees, and a faster trajectory of lichen recovery. Some differences, such as the amount of CWD, faded over the four decades following disturbance.

In areas targeted for caribou conservation, forestry practices such as replanting more conifer, controlling deciduous regeneration, and retaining more standing dead trees and coarse woody debris could reduce attractants for moose and bears in the first decades after harvest.

What’s next

We have also looked at the detailed characteristics of caribou-use sites and we modeled³ the potential for disturbed sites to become like those caribou-use sites. The results were delivered in the final report, with summaries to come.

Despite sampling nearly 800 sites, it wouldn’t have been statistically robust to break out the results for every possible combination of variables. We opted to stratify by age class and natural sub-region. Natural sub-regions turned out not to be very predictive of forage and we are currently expanding the analysis to include silvicultural strategies.



Statistical relationships between forage types for caribou (C.), moose (M.), and bear (B.), disturbance type, time since disturbance, and natural sub-region.

¹ QMD: quadratic mean diameter. SPH: stems per hectare. We also looked at the deciduous, coniferous, and total basal area/hectare.

² CWD: coarse woody debris (>10cm diameter), a proxy we’re using for biodiversity. Why? They are micro-habitats for plants, fungi, insects and other animals that perform important ecosystem functions.

³ We used MGM, the mixedwood growth model, to project stand characteristics and forage availability for 100 years.

