

QuickNotes

Science Summaries from fRI Research

Cut vs. Fire: a comparative study of the temporal effects of timber harvest and wildfire on ecological indicators of the boreal forest

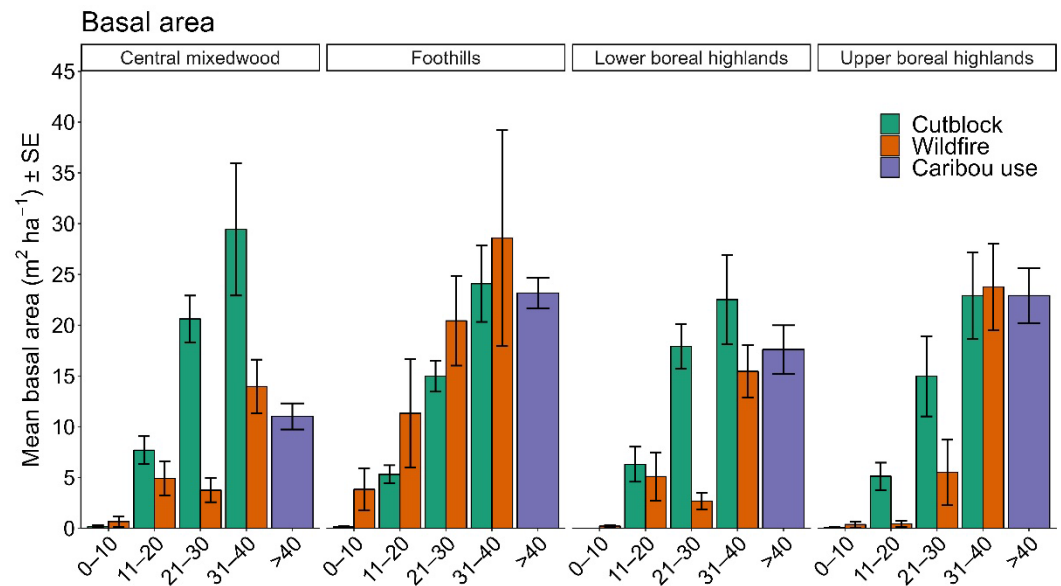
Dr. Ian Best, University of Northern British Columbia

A consequence of both timber harvesting and wildfire is the conversion of old forest to early seral stands, which has contributed to habitat loss for threatened species like caribou. Though both disturbance types can greatly influence stand structure and vegetation communities, remnant biological legacies and post-disturbance successional patterns may be different.

We collected field vegetation data from forest stands affected by timber harvesting and wildfire, as well as stands with documented caribou use in boreal and montane forests of Alberta. Our goal was to compare the recovery trajectory of ecological indicators of timber, biodiversity, and wildlife habitat between timber harvest and wildfire.

Key Findings

- Basal area, stems per hectare, and quadratic mean diameter – indicators of timber – recovered quicker in harvest sites than wildfire sites.
- With greater time since disturbance, there were no differences in timber indicators among harvest, wildfire, and caribou use sites.



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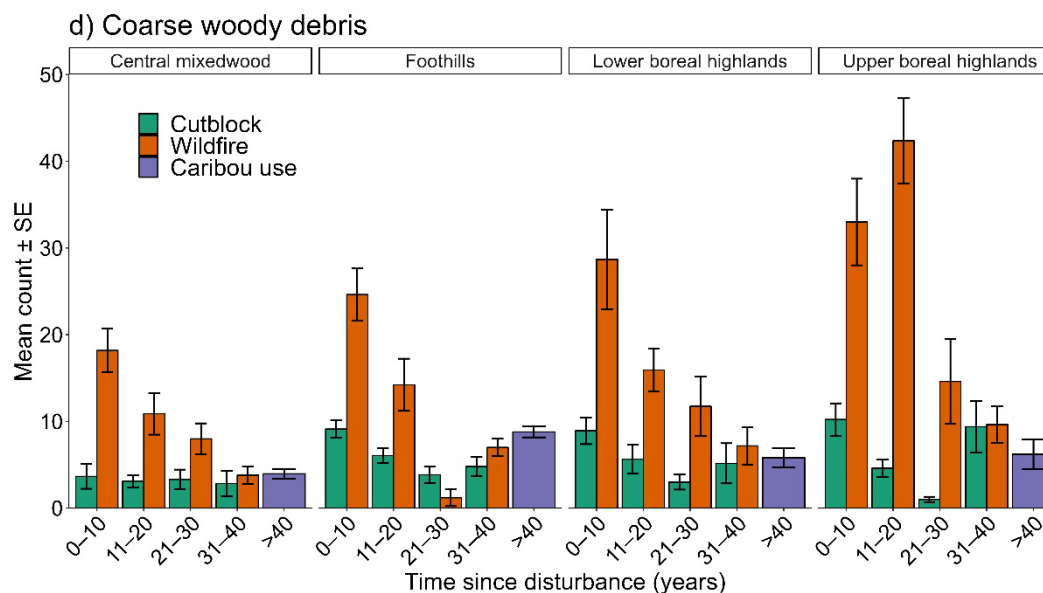
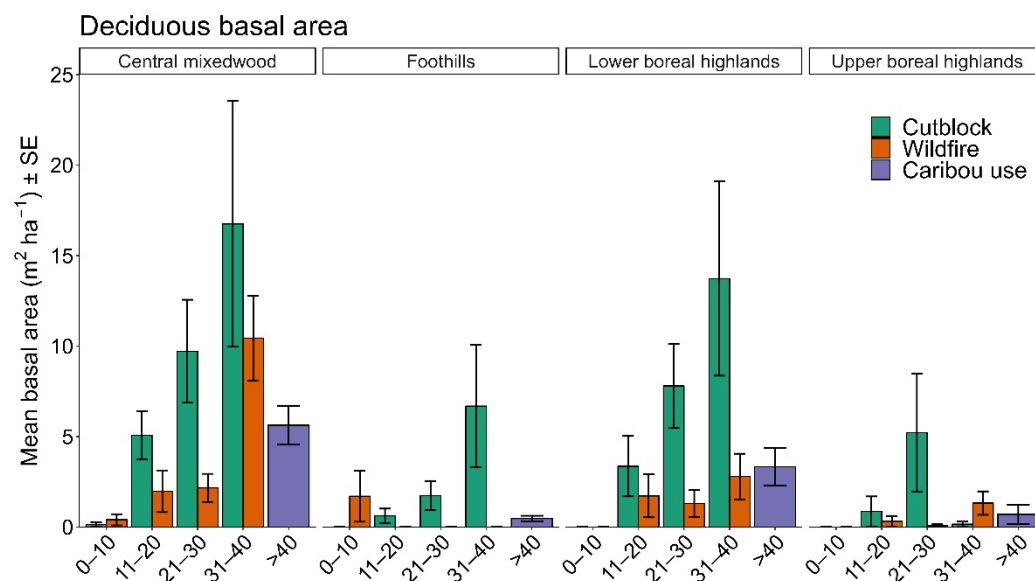
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- Basal area of deciduous trees was generally greater in harvest sites compared to wildfire and caribou use sites.
- Coarse woody debris – a biodiversity indicator – was greatest in young wildfire sites, but declined over time to not differ from wildfire and caribou use sites.
- Caribou forage lichens were most abundant in older caribou use sites; saplings and shrubs foraged by moose were more abundant in early disturbance sites.
- Shrubs foraged by bears were most abundant in harvest sites.

Methods

We collected field data from 251 timber harvested and 264 burned stands (0–40 years since disturbance), as well as 256 older forest stands used by caribou (> 40 years since disturbance) during 2021 and 2022. Field data included metrics of stand attributes coarse woody debris, and abundance of forage for caribou, moose and bears. These metrics represented ecological indicators for timber supply, biodiversity, and wildlife habitat.

We used generalized linear models to investigate the relationship between these ecological indicators and disturbance type. We also factored time since disturbance into our models and accounted for regional differences between natural subregions.



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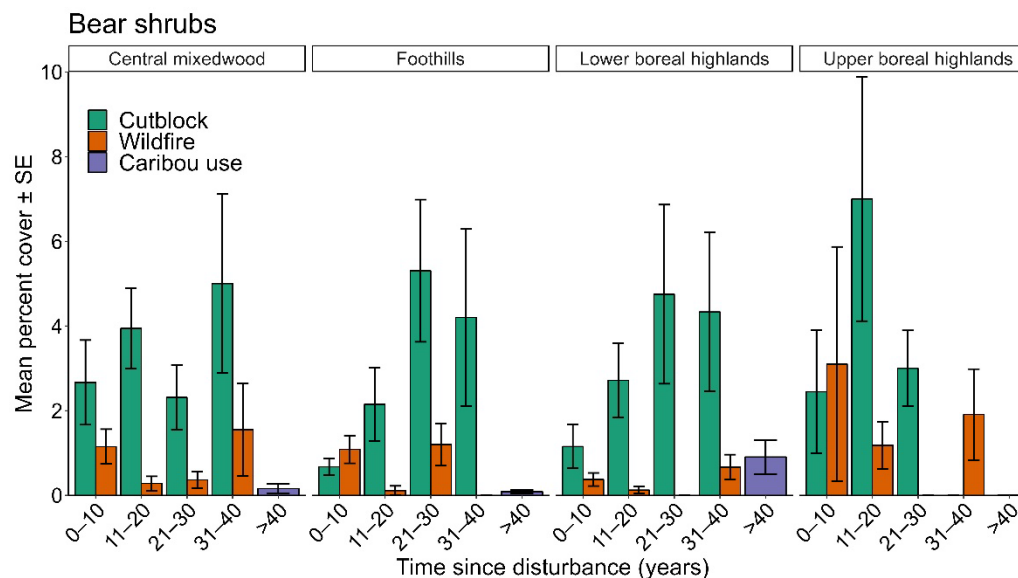
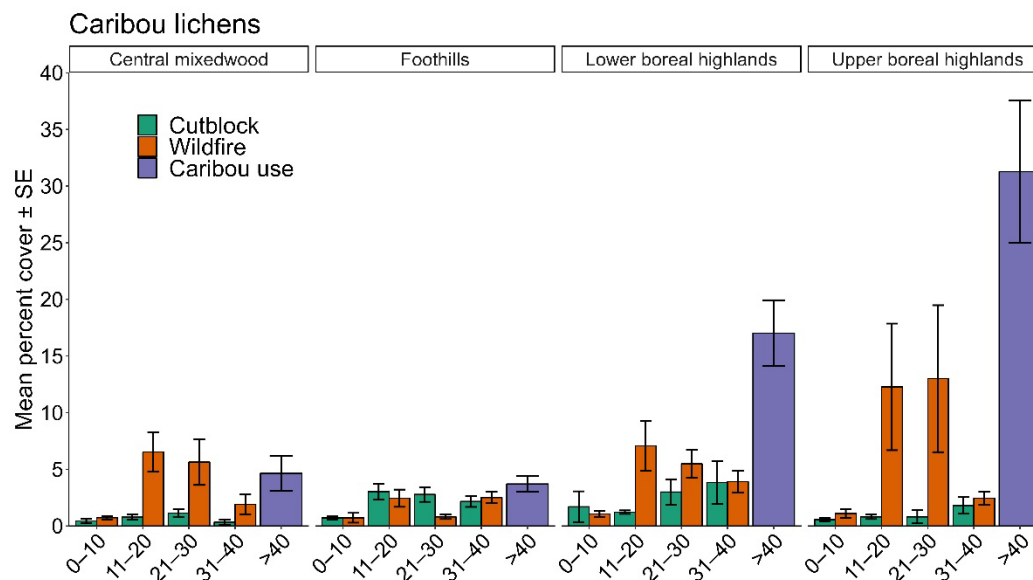


Conclusions

Our results suggest that timber harvesting may result in quicker tree growth and development of timber products, whereas wildfire leads to more coarse woody debris, an indicator of biodiversity. Moreover, timber harvesting is less beneficial for the development of caribou habitat. Management that better emulates wildfire, including the retention of coarse woody debris, could help maintain habitat for caribou, and biodiversity in general.

Read the full paper here:

<https://link.springer.com/article/10.1007/s10980-024-01882-4>



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