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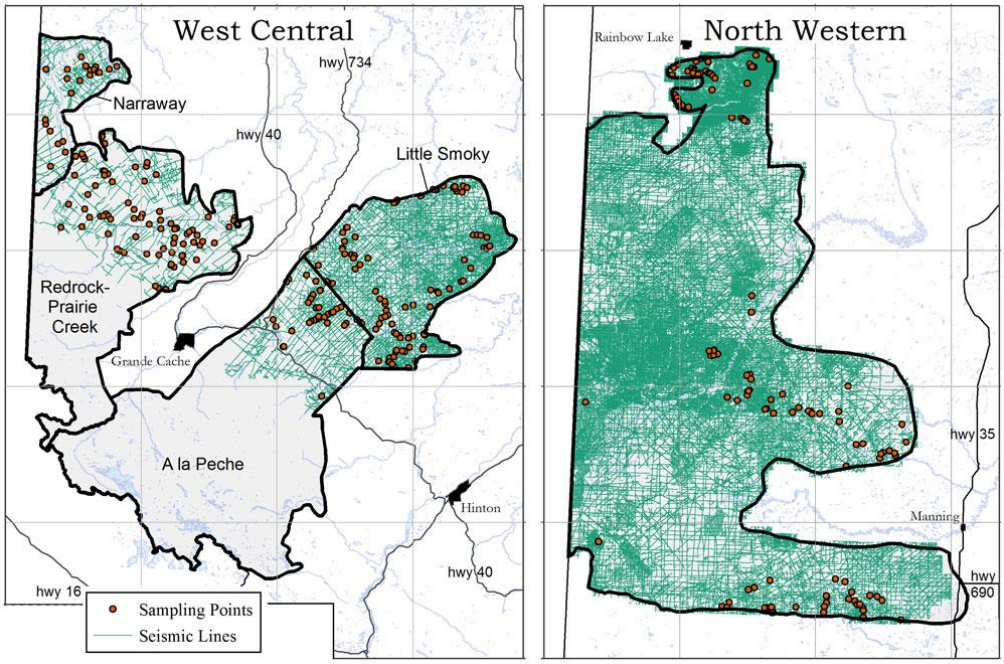
LAURA FINNEGAN

# VEGETATION GROWTH ON SEISMIC LINES IN WEST-CENTRAL AND NORTH-WESTERN ALBERTA

Seismic lines are slow to recover naturally, and many seismic lines need to be restored to contribute towards caribou recovery. Caribou predators use seismic lines to travel throughout caribou ranges. To date, seismic line prioritization efforts have focused on vegetation height, however, the species of vegetation growing on seismic lines might also affect caribou by attracting moose, deer, and elk, and predators like bears and wolves.

In the summers of 2014 and 2015, we visited 351 seismic lines in west-central and northwestern Alberta and recorded information on wildlife forage, human use, and regeneration height which we used to:

1. Compare wildlife forage on seismic lines, seismic line edges, and intact forest stands
2. Model and map wildlife forage, vegetation growth and vegetation structure on seismic in relation to a range of variables describing terrain, habitat, and soil wetness and nutrients.




## WILDLIFE FORAGE ON SEISMIC LINES AND SEISMIC LINE EDGES

Generally, disturbance-tolerant forbs and graminoids were more likely to occur and were more abundant on seismic lines: dwarf shrubs along seismic line edges, and larger shrubs on seismic lines and along seismic line edges.

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Tel.: (780) 865 – 8311, Email: lfinnegan@friresearch.ca or visit cp.friresearch.ca

However, there were a lot of variation between the north-western and west-central regions which we could not link to motorized human use.

Overall, patterns of vegetation growth on seismic lines were similar to those of harvest blocks, which require reforestation and silviculture. Because vegetation composition on seismic remained different from that of the adjacent stand, even when regeneration was high, it is likely that restoration will be needed to re-establish natural patterns of succession on seismic lines.

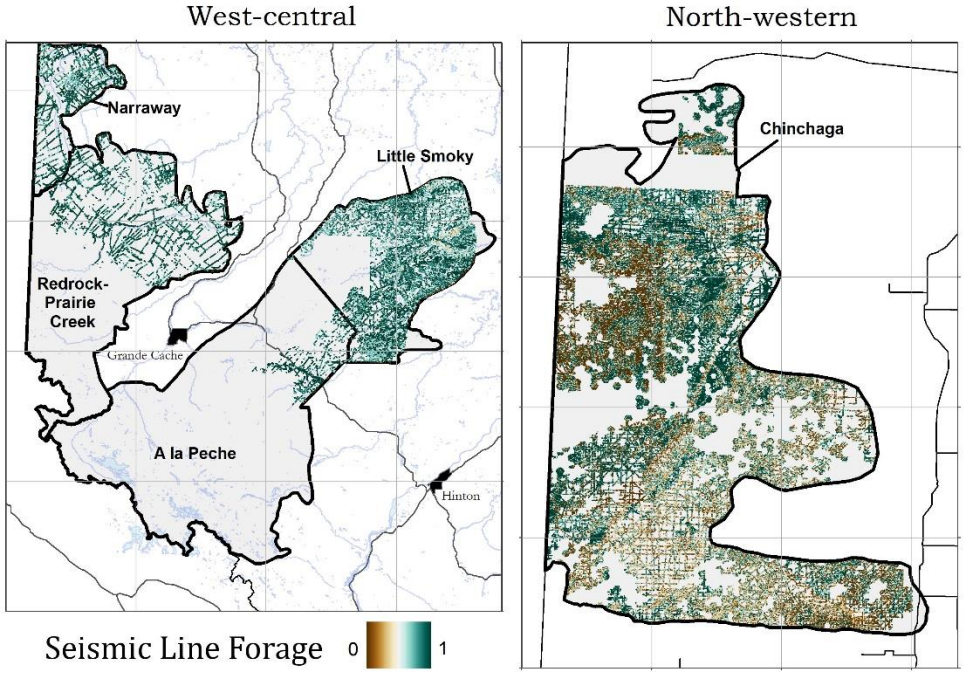

## MODELLING AND MAPPING VEGETATION ON SEISMIC LINES

We found that:

- Wet seismic lines and those adjacent to more open forest stands had more wildlife forage
- In west-central, wet seismic lines had lower vegetation height and less ground cover. In north-western, seismic lines at higher elevations had lower vegetation height and lower lateral cover.
- Our models of vegetation growth predicted 1–2m growth in vegetation height on seismic lines between 2007 and 2015, but external validation indicated this likely wasn't accurate.

## IDENTIFYING PRIORITY SEISMIC LINES FOR RESTORATION

Because models of vegetation growth did not validate well, we used our models of occurrence and abundance of wildlife forage to inform priorities for seismic line restoration. We multiplied the models of abundance and occurrence for each taxa, and then combined the results from all taxa into a maximum abundance-given-occurrence on seismic lines. We predicted that 7,799 km (95%) of seismic lines in west-central, and 21,762 km (48%) of seismic lines in north-western, had high abundance-given-occurrence of wildlife forage likely attractive to moose, deer, elk, and bears.

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## APPLICATIONS AND FURTHER WORK

Our study demonstrated that seismic lines are not recovering naturally—even seismic lines with high regeneration had vegetation different to the adjacent forest stand. Seismic lines also contain abundant wildlife forage species that likely makes them attractive to caribou predators as a source of food and as movement corridors.

By modelling vegetation in relation to GIS variables we identified 7,799 km west-central,and 21,762 km in north-western Alberta, of seismic lines where restoration efforts could help decrease the overlap between caribou, other ungulates, and their predators. Targeting restoration to change vegetation composition, as well as vegetation height and structure, will likely provide greater benefits to caribou than either alone. Because our models of vegetation growth did not validate well, alternate approaches (e.g., using UAVs) are required to update LiDAR data and provide accurate information on the current condition of vegetation growth seismic lines across caribou ranges in Alberta.

Further information is contained in the following papers:

Laura Finnegan, Karine E. Pigeon, Doug MacNearney. "Predicting patterns of vegetation recovery on seismic lines: Informing restoration based on understory species composition and growth." *Forest Ecology and Management*. Volume 446, 2019. 175-192. DOI: 10.1016/j.foreco.2019.05.026

Laura Finnegan, Doug MacNearney, Karine E. Pigeon. "Divergent patterns of understory forage growth after seismic line exploration: Implications for caribou habitat restoration." *Forest Ecology and Management*. Volume 409, 2018. 634-652. DOI: 10.1016/j.foreco.2017.12.010

## ACKNOWLEDGEMENTS

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