

Caribou response to oil and gas activities: do regeneration and activity levels matter?



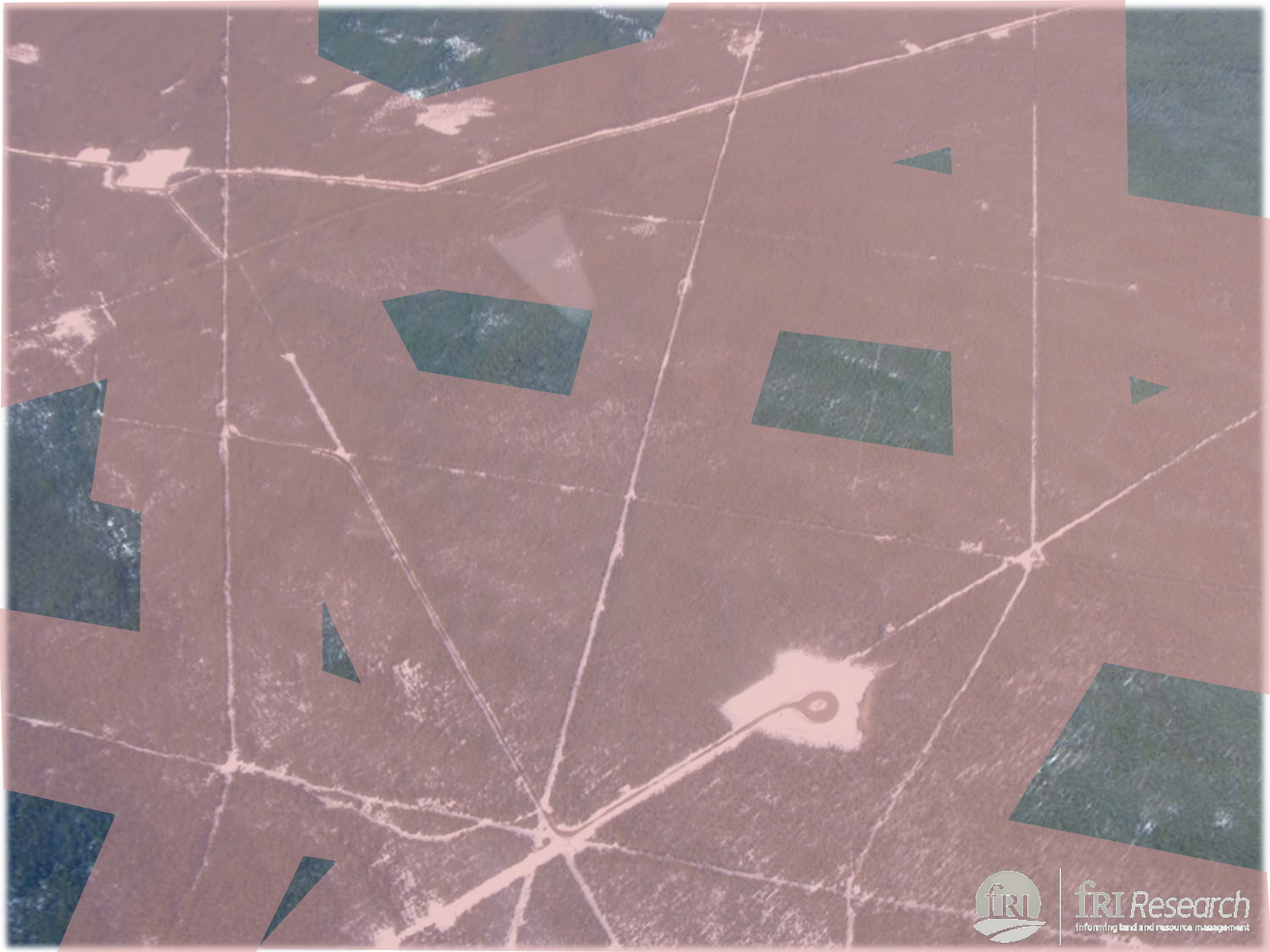
November, 2016
Laura Finnegan, Doug MacNearney,
Karine Pigeon, Gord Stenhouse



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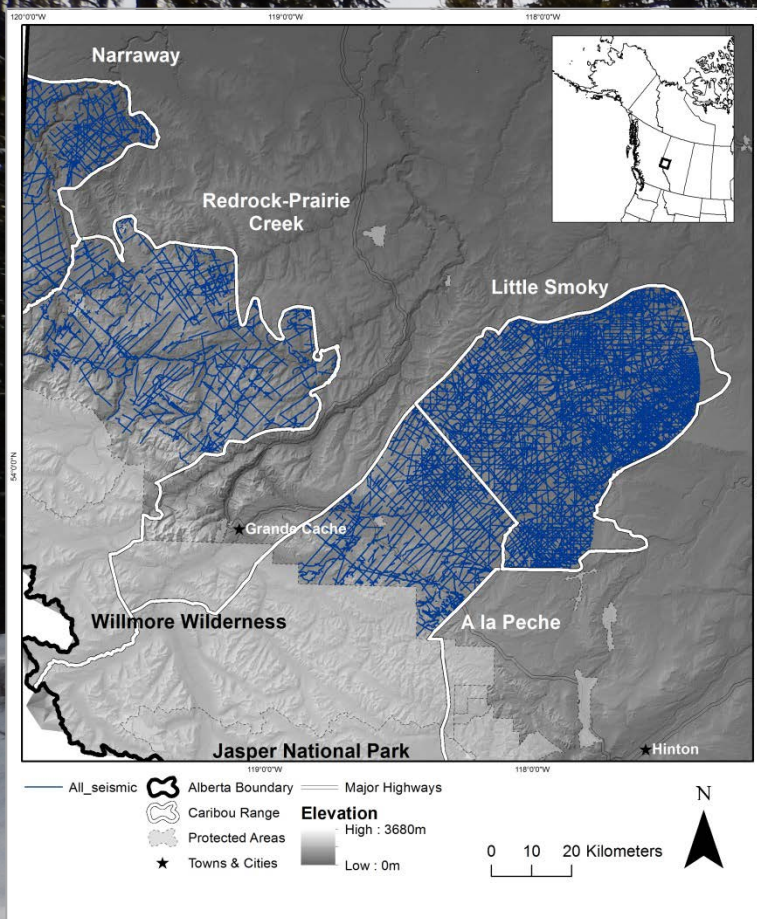
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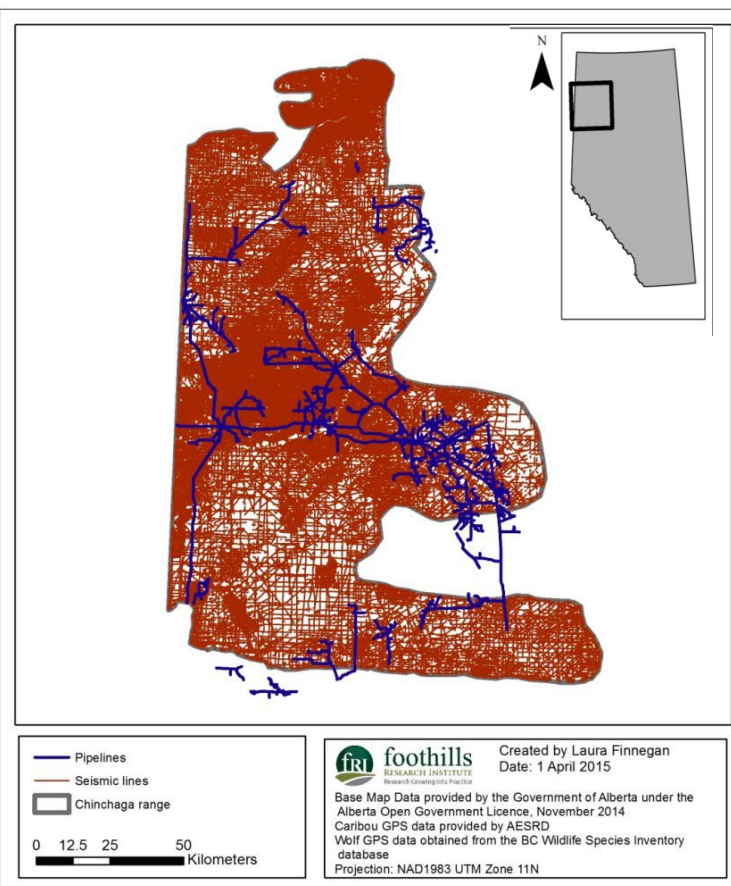
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15,588km seismic lines
1.4km/km²

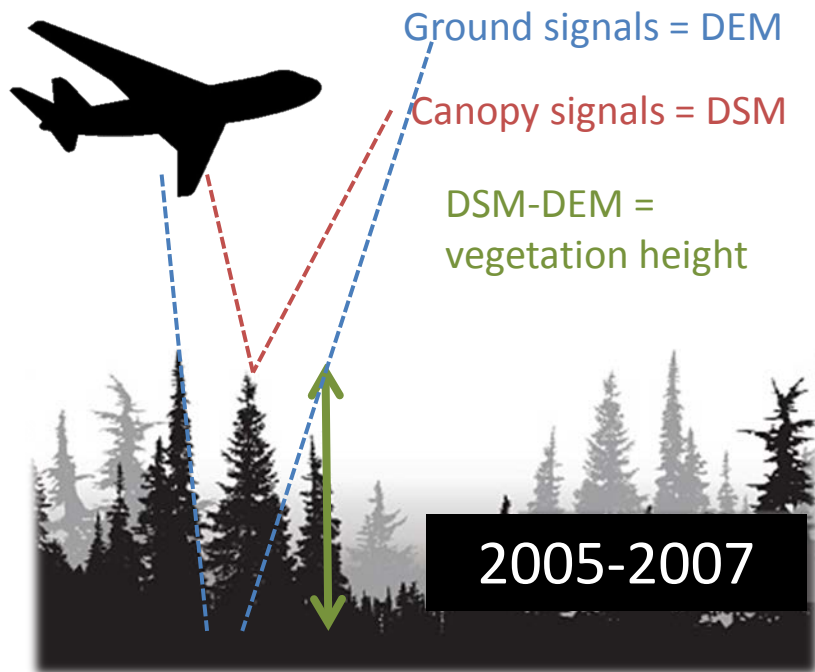


60,648km seismic lines
3.5km/km²

A photograph of a winter forest scene. The ground is covered in a thick layer of snow, with several tracks visible in the foreground. Tall, dark evergreen trees stand in the background, some with snow on their branches. The sky is overcast and grey.

1. How to caribou and their predators
respond to seismic lines at different stages
of regeneration

2. Is there a regeneration stage when these
features can be turned 'off'?



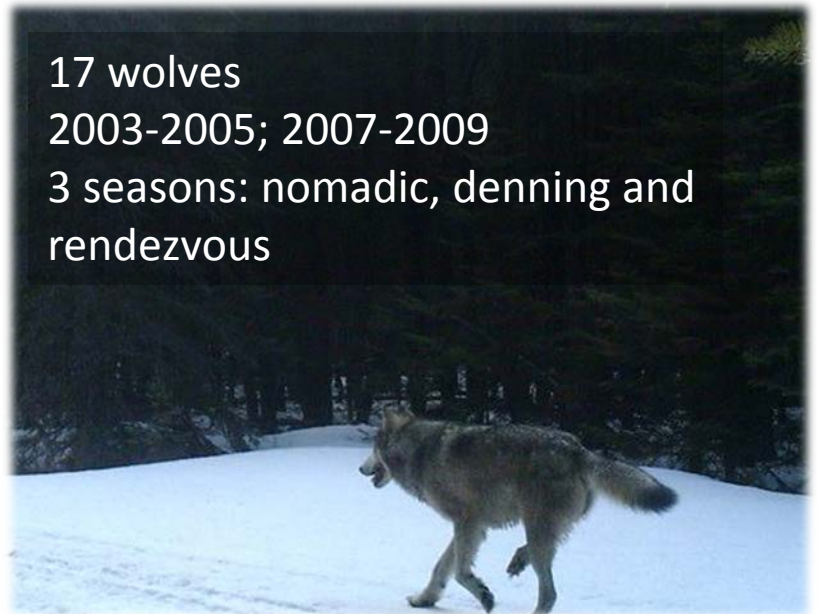
3-11 caribou/herd/year
2003-2009
5 Seasons: spring, summer, fall,
early winter, late winter

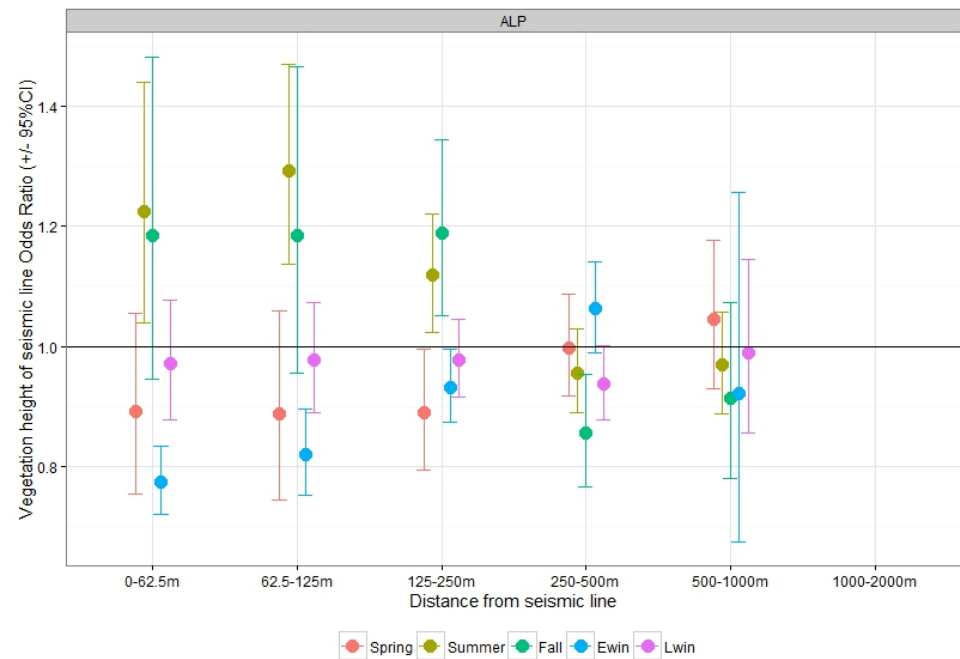


19 grizzly bears
2003-2009
3 seasons: spring, summer and fall



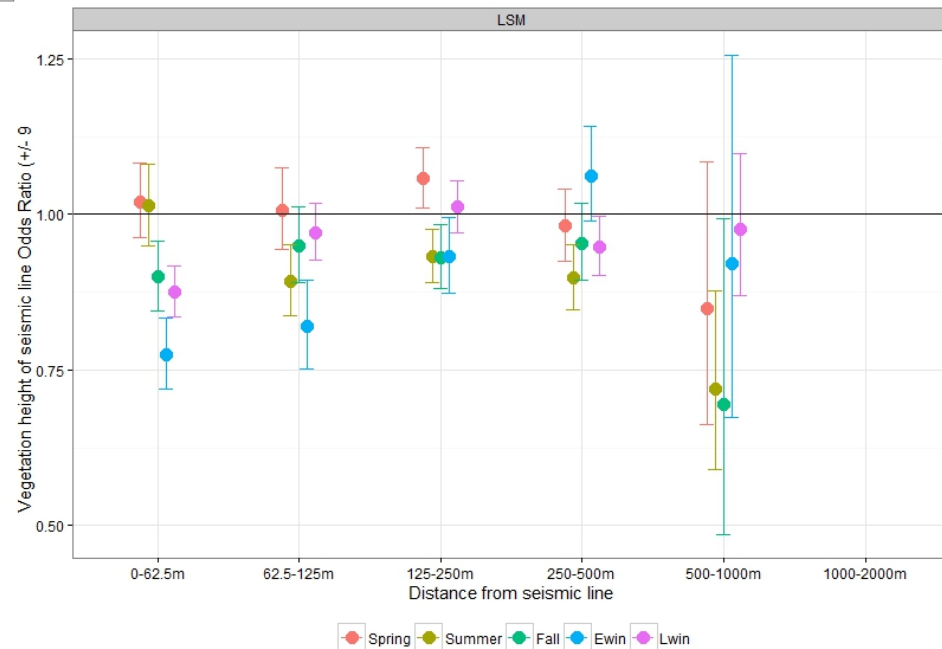
17 wolves
2003-2005; 2007-2009
3 seasons: nomadic, denning and
rendezvous

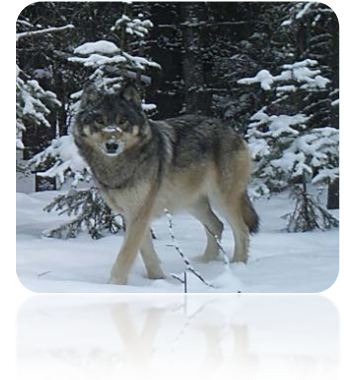
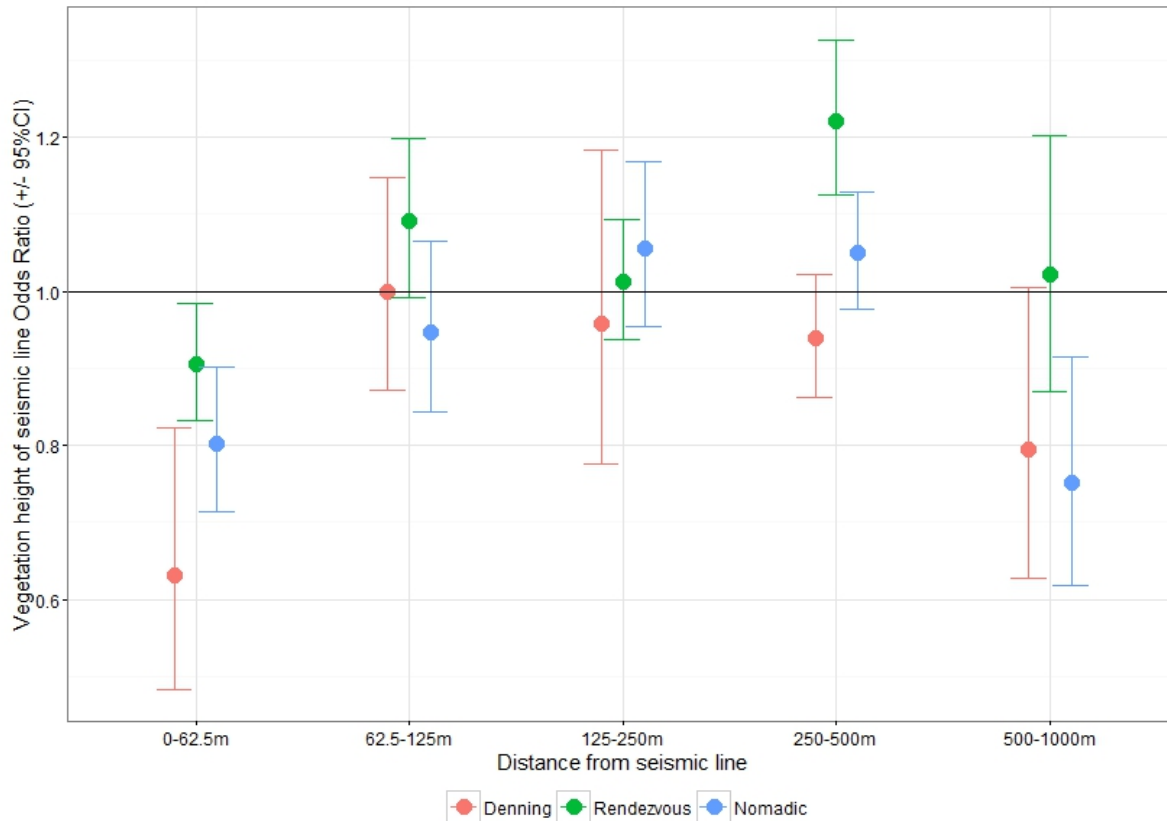




Generally were further from seismic lines

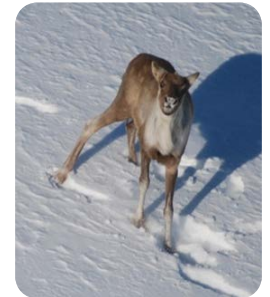
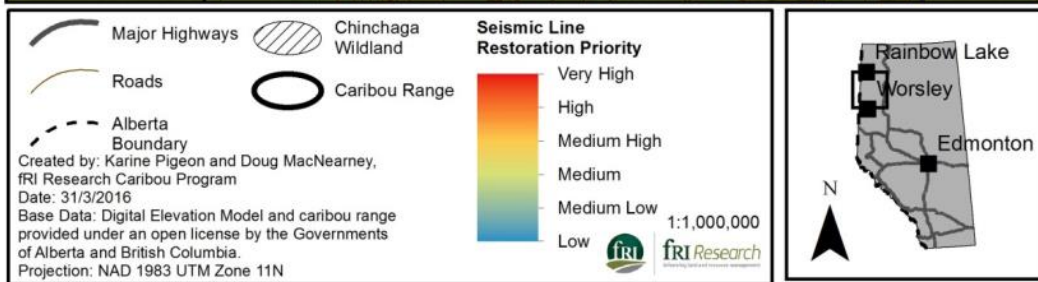
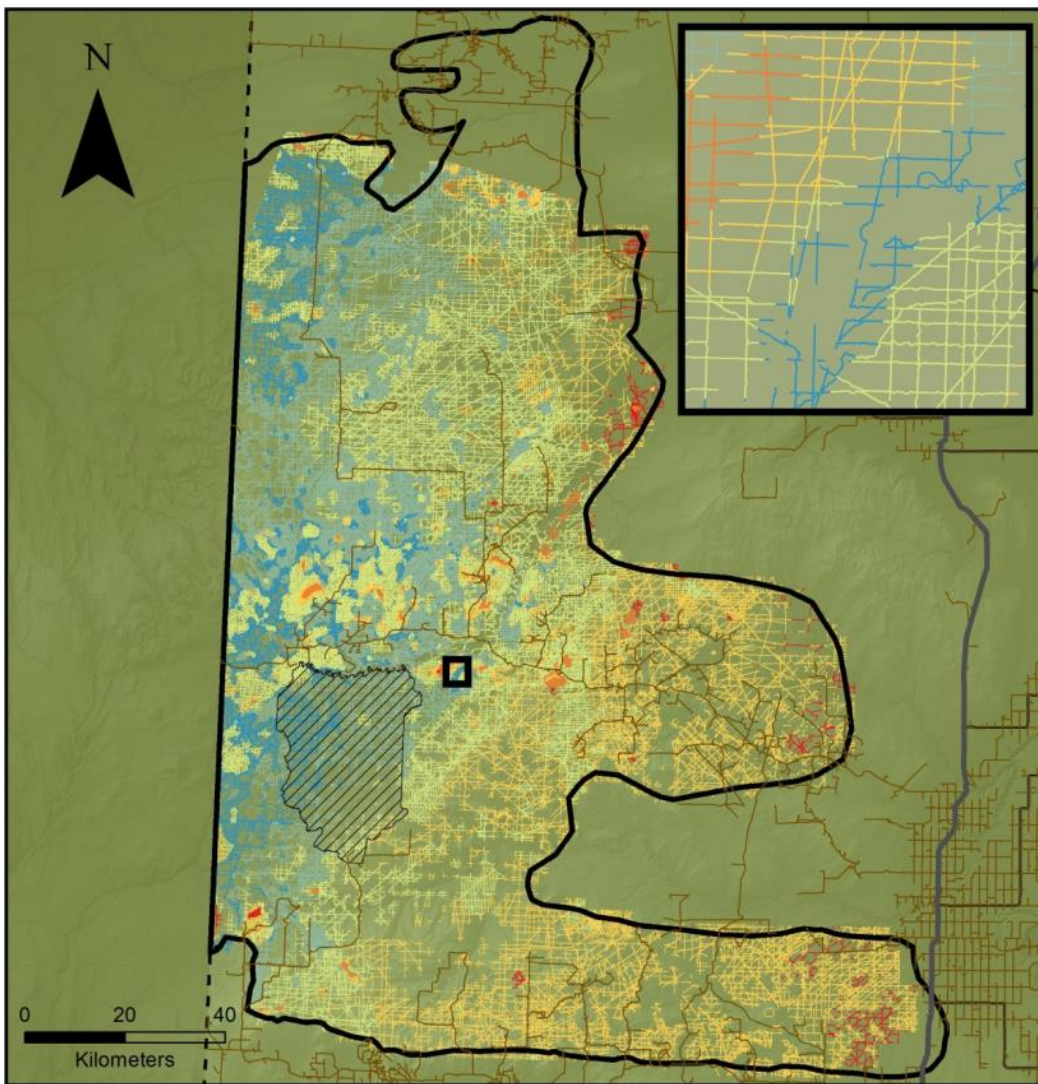
But when they were close to seismic lines...





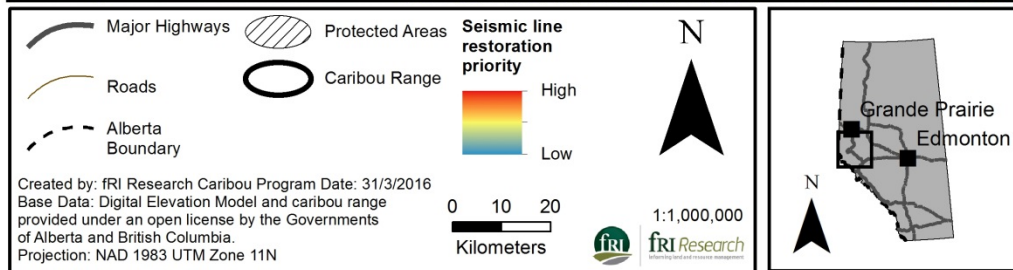
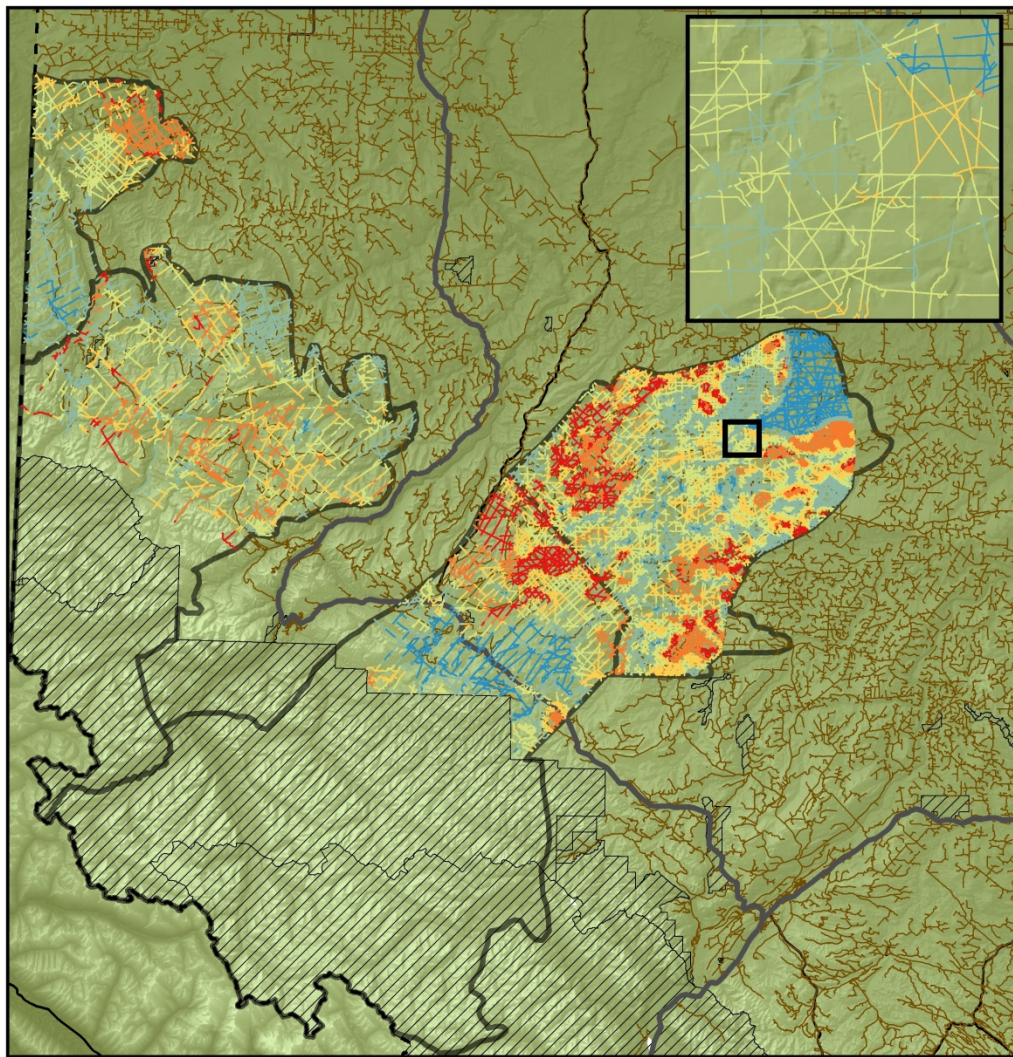
Generally were closer to seismic lines

But when they were close to seismic lines...



Wolf RSF			
Caribou RSF		High (0.25-0.58)	Very High (0.59-2.38)
	High (0.52-0.67)	1 km (0.002%)	15 km (0.02%)
	Very High (0.68-1.94)	0 km -	< 1 km (0.001%)





	High	Very High
ALP	180km (7.7%)	397km (17%)
LSM	1022km (10.8%)	829km (8.8%)
RPC	332km (12.8%)	94km (3.6%)
NAR	213km (17.3%)	33km (2.6%)



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Ongoing research



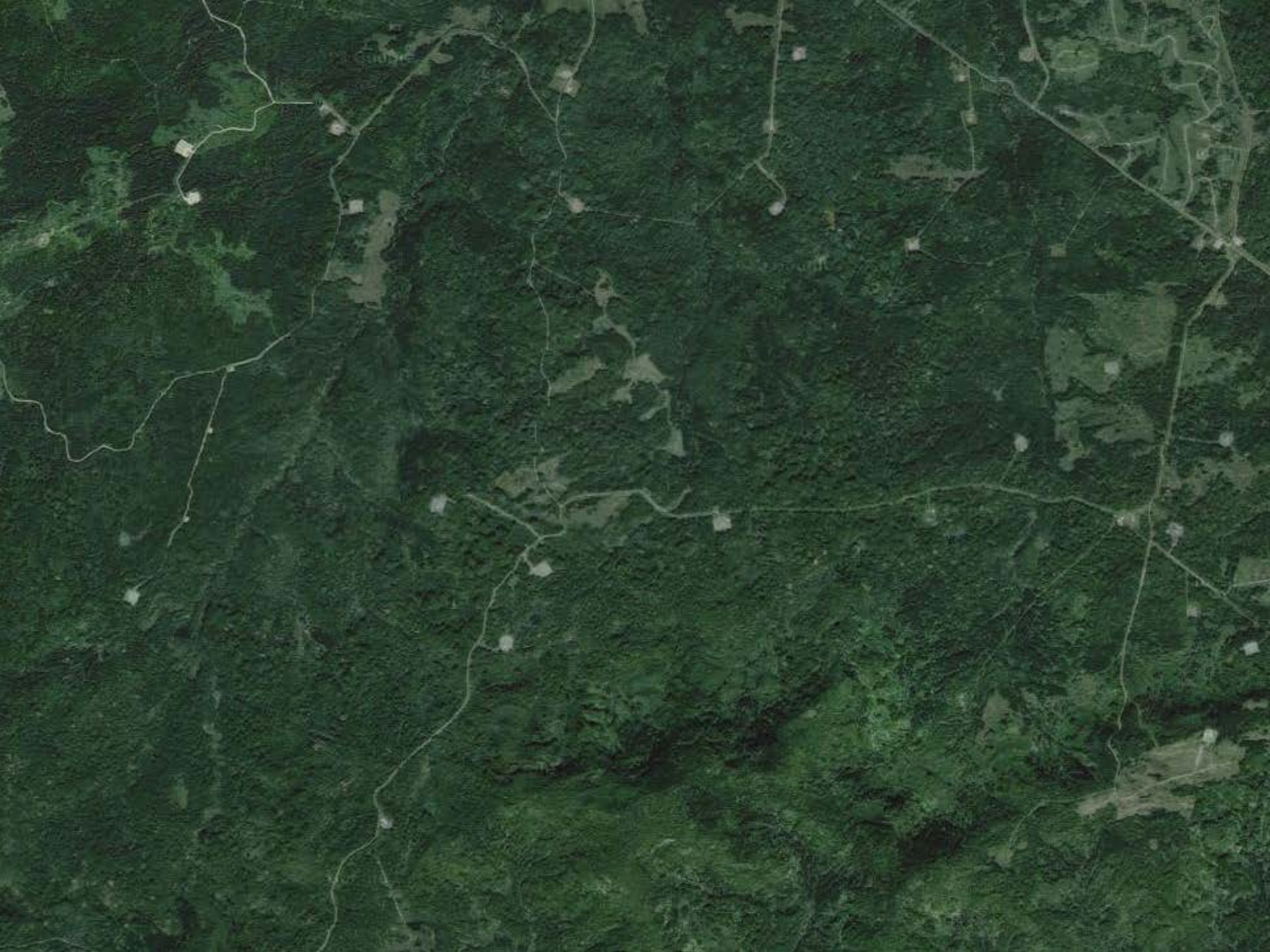
- Trail cameras monitoring wildlife use of seismic lines year round (LSM, ALP, RPC, NAR)
- Distributed on seismic lines with different vegetation heights

Ongoing research



Assess regeneration on linear features

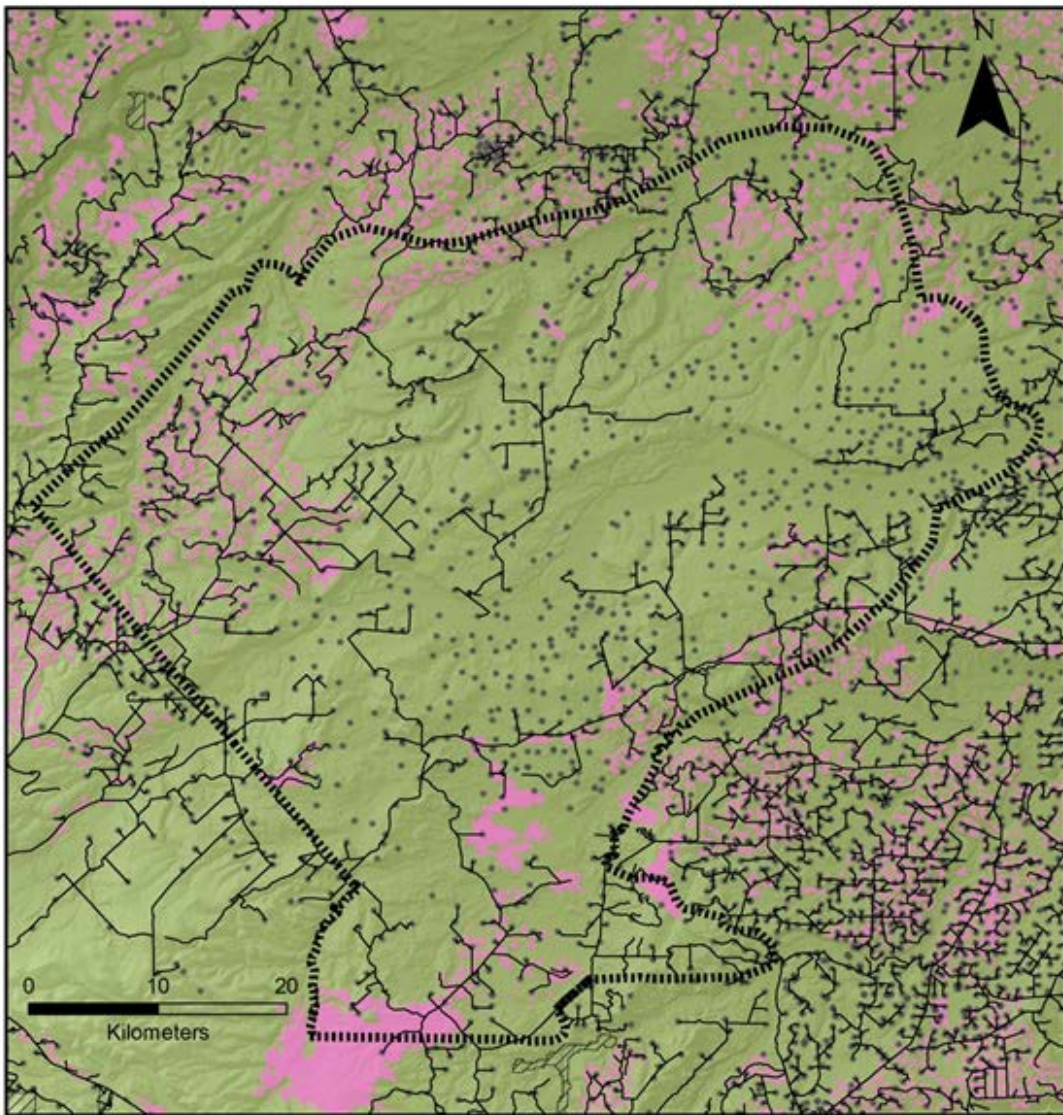
- Field data collected 2013-15, seismic lines and pipelines
- What linear features are on a target towards natural recovery?
- How does understory vegetation differ on linear features
- What linear features are attractive to moose, deer and elk?





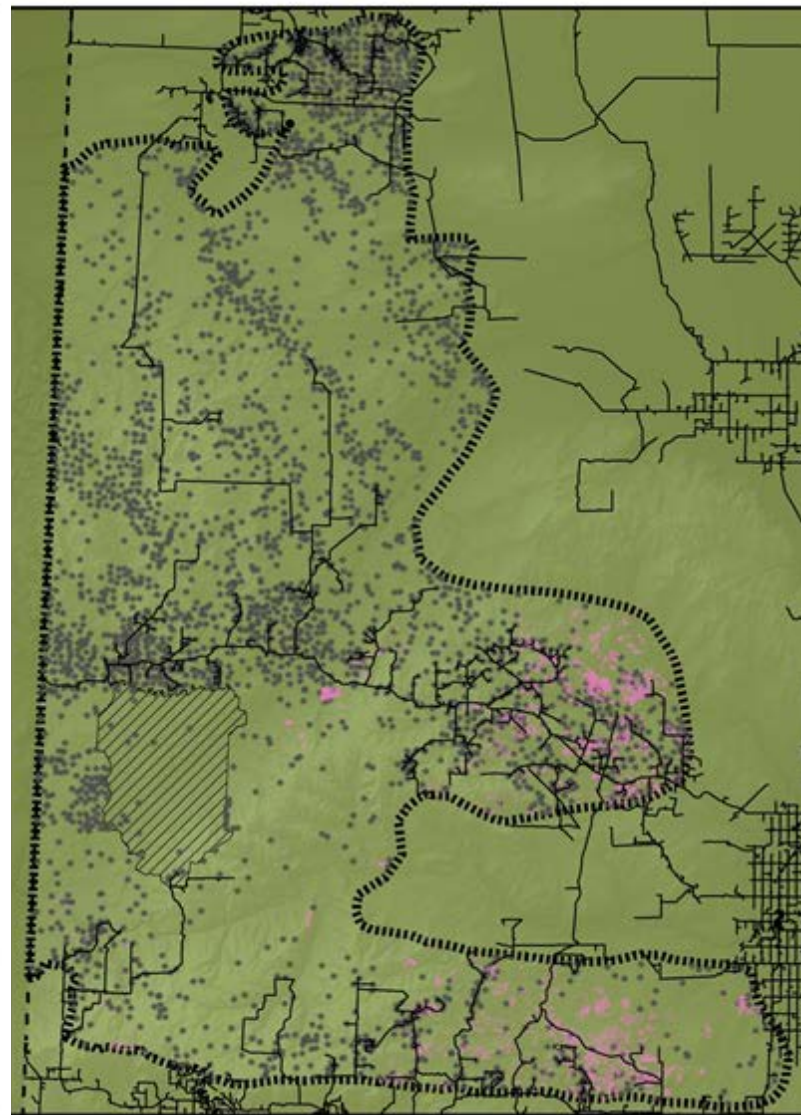
1. Is there a relationship between calving locations and well site activity
2. How do caribou respond to well sites at different stages of activity across different seasons?





- Little Smoky Caribou Range
- Protected areas
- Cut blocks
- Roads
- Well sites
- Elevation**
- High
- Low

Created by the fRI Research Caribou Program; 30/4/2016
 Roads, well sites, Digital Elevation Model, and caribou range
 provided under an open license by the Government of Alberta,
 cut block data provided by fRI Research Caribou Program partners.
 Projection: NAD 1983 UTM Zone 11N 1:400,000



- Chinchaga Caribou Range
- Protected areas
- Cut blocks
- Roads
- Well sites
- Elevation**
- High
- Low

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2000 -2015

Gov. of Alberta, Weyerhaeuser
and Gov. of BC GPS data



0 10 20
Kilometers

-  Little Smoky Caribou Range
-  Protected areas
-  Cut blocks
-  Roads
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- Elevation**
-  High
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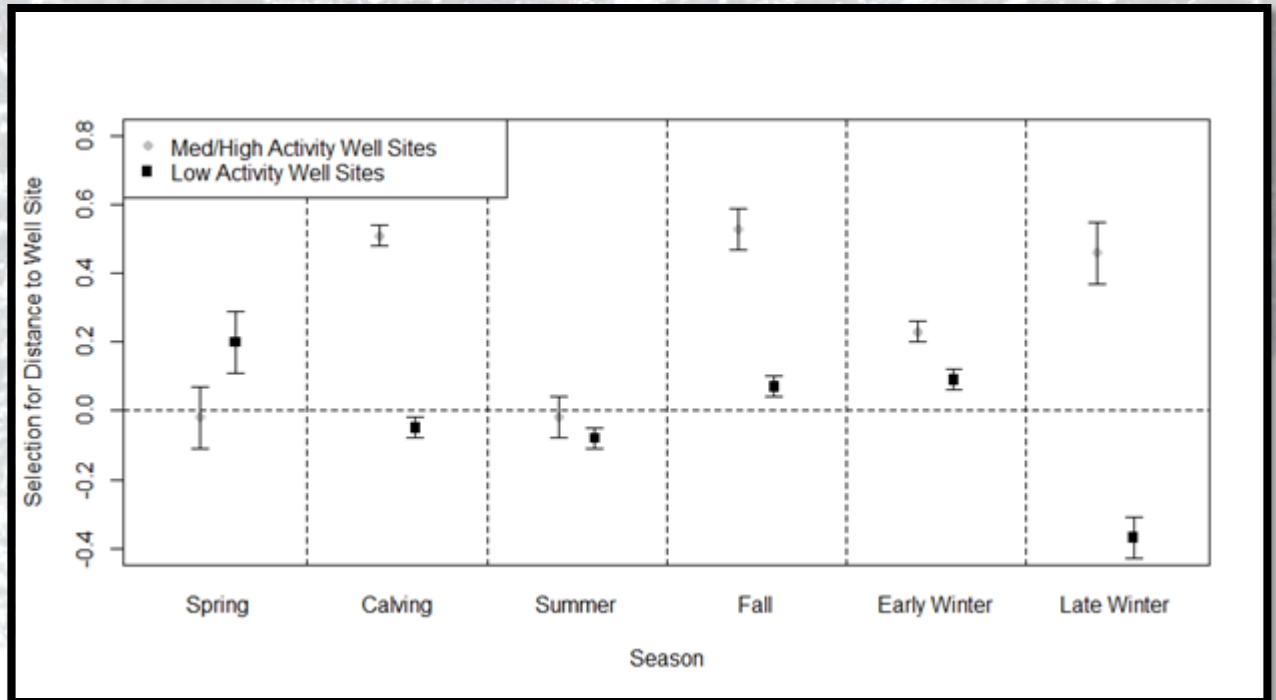
20 40
Kilometers

Calving

- Further from wells at all activity stages
- **Chinchaga**
 - Treed wetlands & shrub
 - Far from cut blocks
 - Higher densities of seismic lines
- **Little Smoky**
 - Lower densities of anthropogenic disturbance

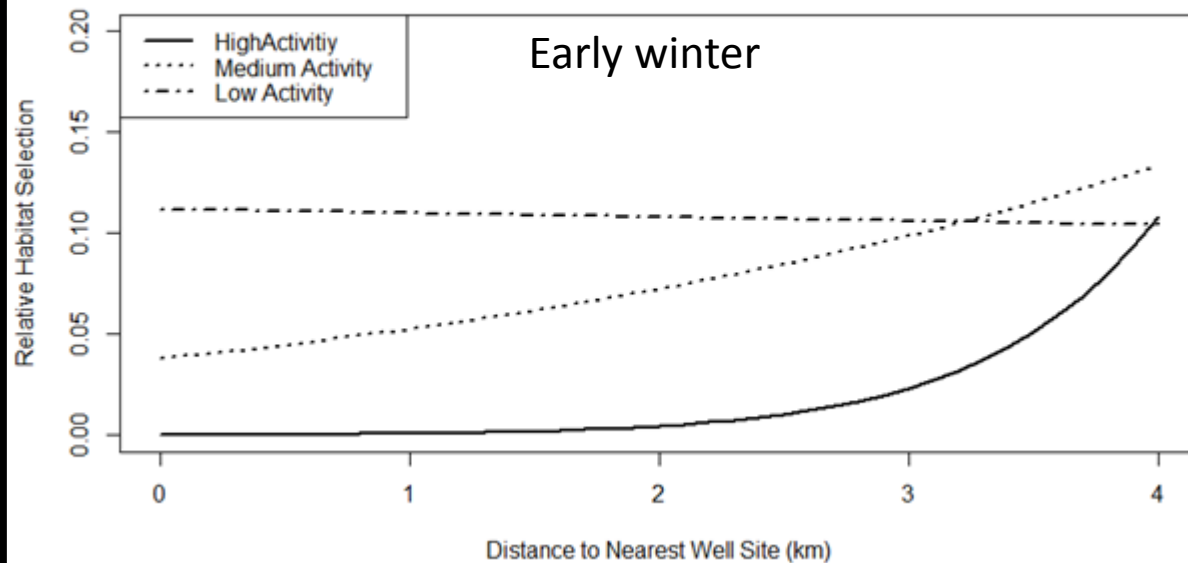
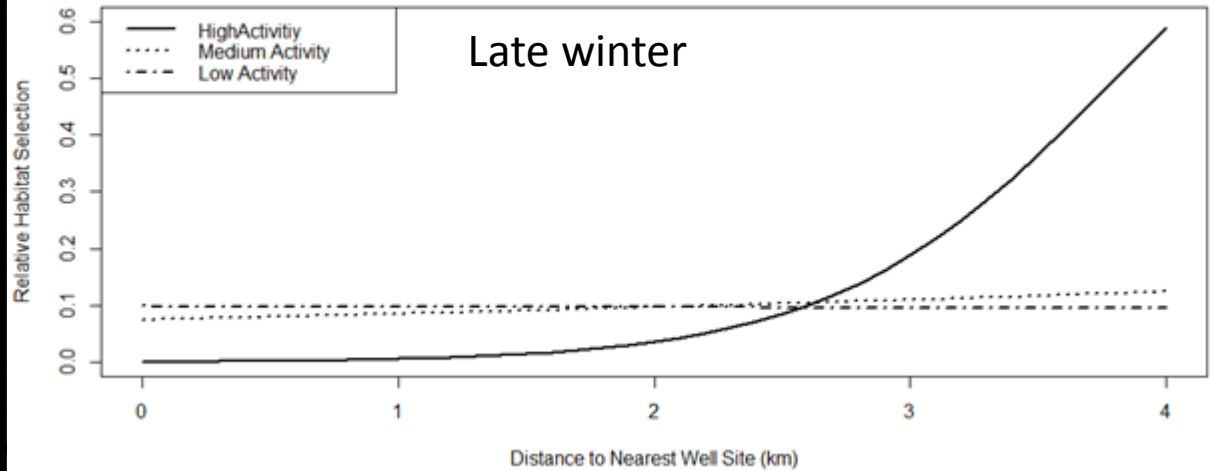
Seasonal response to well sites

Chinchaga



Seasonal response to well sites

Little Smoky



Conclusions

- **Regeneration does affect animal response** – but **variable among species and seasons**
- **Well site activity does affect caribou response**
 - **Calving sites** far from well sites
 - Generally **avoided** well sites with **high activity more** than other activities
 - Avoided well sites with high activity by **up to 3km**

2015. 2. 13



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Best Management Practices

Seismic line restoration: where to focus efforts?

- Reduce predator movement
- Target areas used by predators
- Target areas where caribou and predators overlap

.....other biodiversity or economic values

2015. 2. 13



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Best Management Practices

Well site operations could...

- Consider spatio-temporal distribution of caribou
- Implement mitigation measures at wells when caribou are nearby
- Implement restoration/planting on well sites to accelerate regeneration

2015. 2. 13



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Thanks to

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- Paramount Resources
- Sustainable Forestry Initiative
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