Natural Recovery on Low Impact Seismic Lines NE BC

Prepared for: *Research and Effectiveness Monitoring Board (REMB)*

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Overview

- Seismic activity ongoing in NE BC since the 1970s, explosion in early-mid 2000s

- Seismic lines = bad for caribou
  - Except maybe for narrow lines
  - Except maybe for recovered lines

  - *I.e., except maybe for LIS lines*

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Study Question

If LIS is the mitigation tool, is it working?

- Are we cutting sufficiently narrow lines?
- Are mulched LIS lines recovering?

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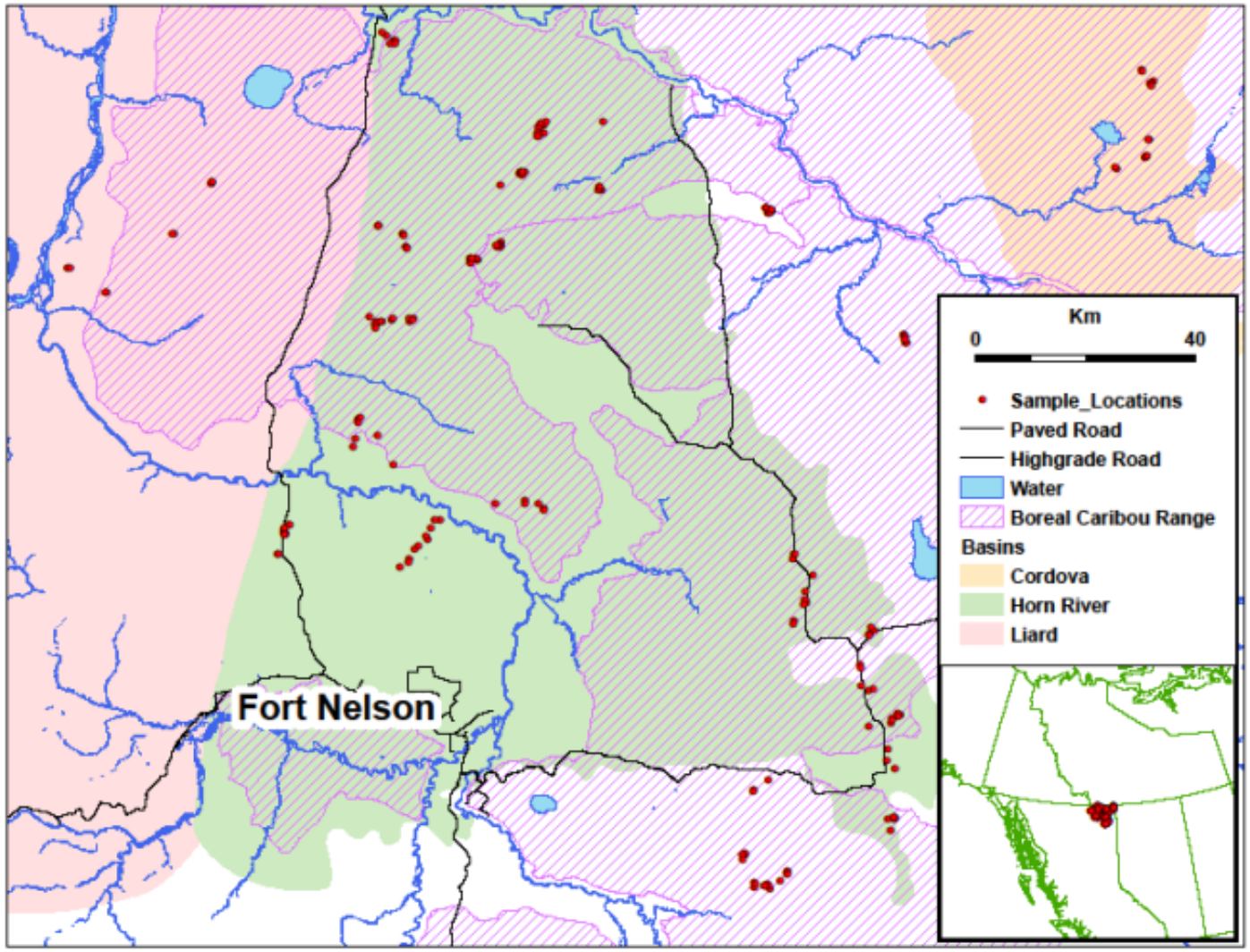
Study Area – Basins & BWC Ranges



Lots of lines

Cumulative linear km of seismic lines cut in three BWC ranges

Boreal Caribou Herd	Linear Kilometer of Seismic Lines Cut			No. Seismic Programs	Area of Caribou Range (km²)	Proportion of Range Underlain by Hydrocarbon Basin
	Total[a]	2000 – 2004[b]	2005 – 2014[c]			
Maxhamish	17,928	1,456	16,472	26	7,096	0.96 (0.45 Liard; 0.51 Horn River)
Snake-Sahtaneh	36,768	13,278	23,490	53	12,000	0.33 (0.33 Horn River; 0.003 Cordova)
Calendar	5,831	654	5,177	16	4,973	0.49 (0.49 Cordova; 0.008 Horn River)

[a] Includes only those seismic lines cut since the 1999 – 2000 winter operating season

[b] Years during which at least some low-impact seismic (LIS) line preparation methods were reported

[c] Years during which lines were exclusively cut using mulching and hand cutting

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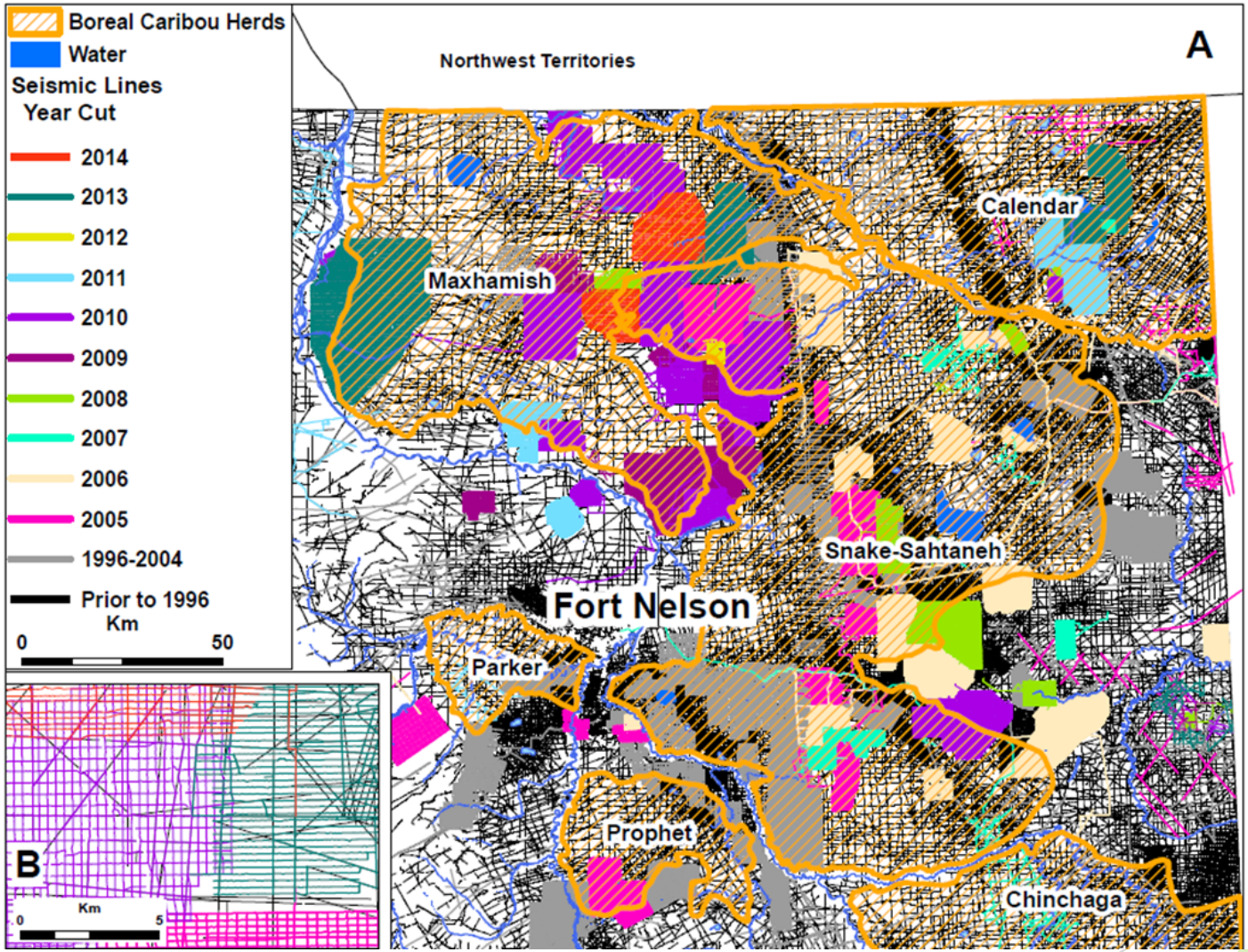
Study Area – Seismic 2005-2014



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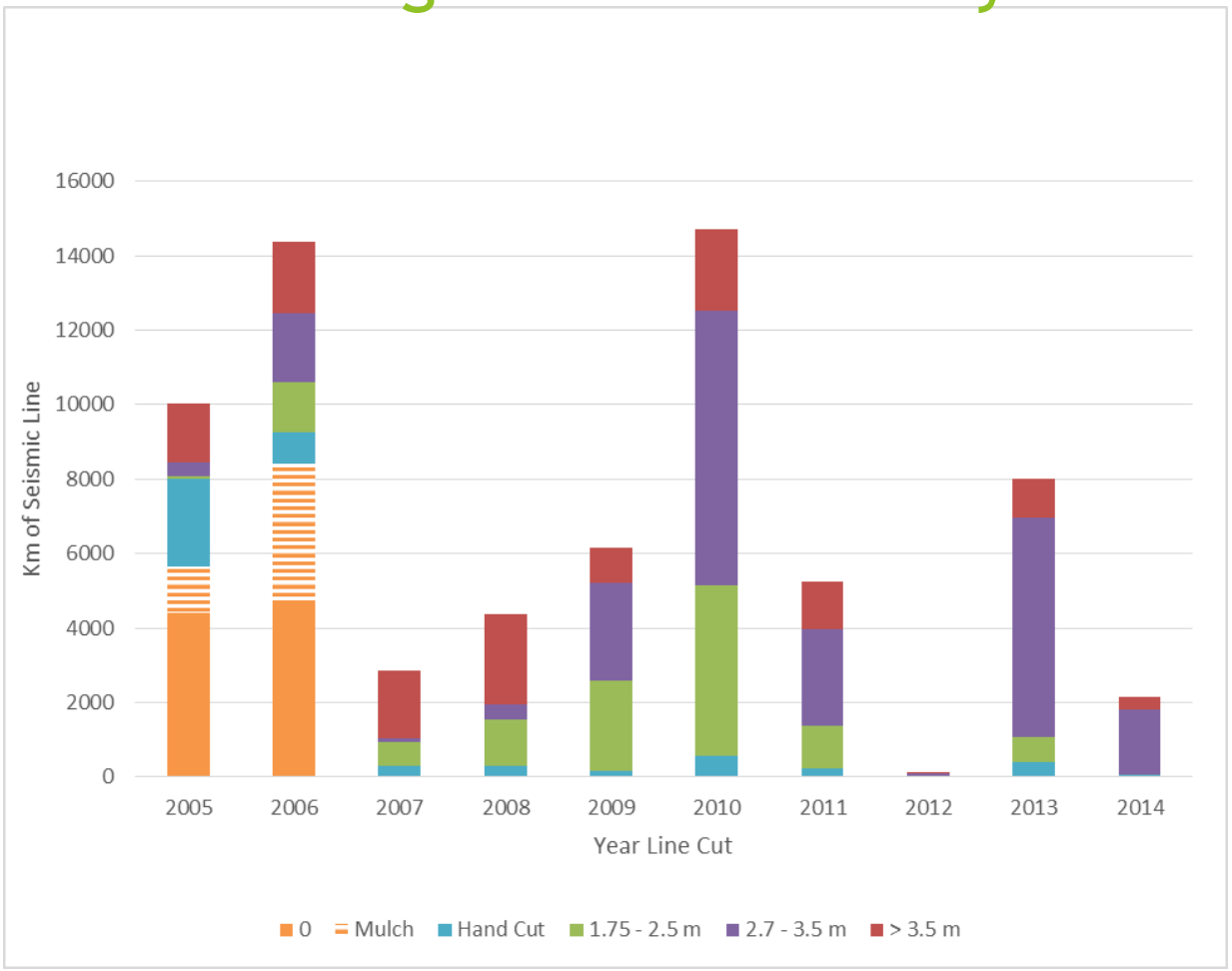
Are we cutting lines sufficiently narrow?



Linear Km of LIS lines cut between 2005 and 2014 in NE BC, by line width

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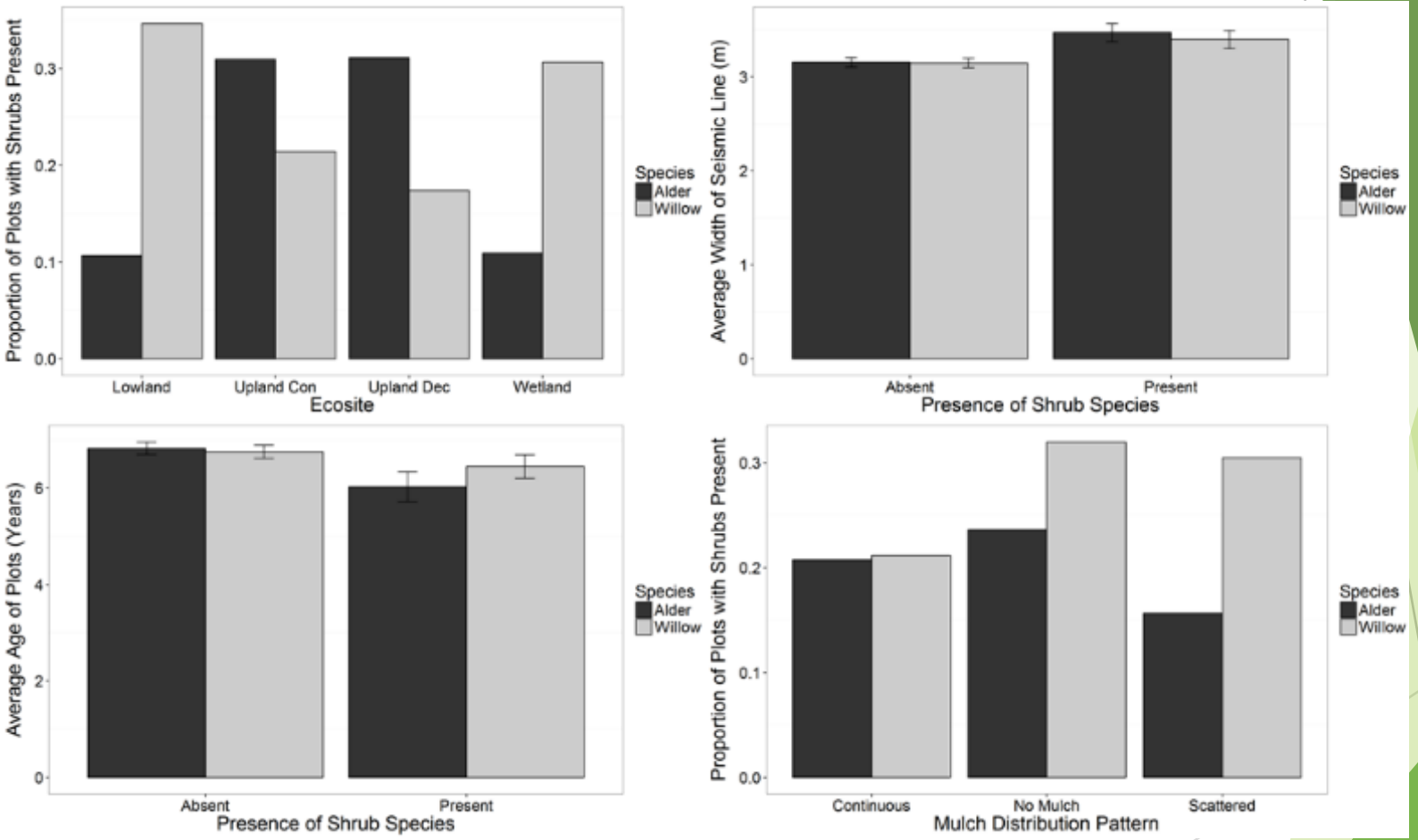
What about line recovery?

- Age
- Orientation
- Forest type (upland or lowland
- Mulch
- Width

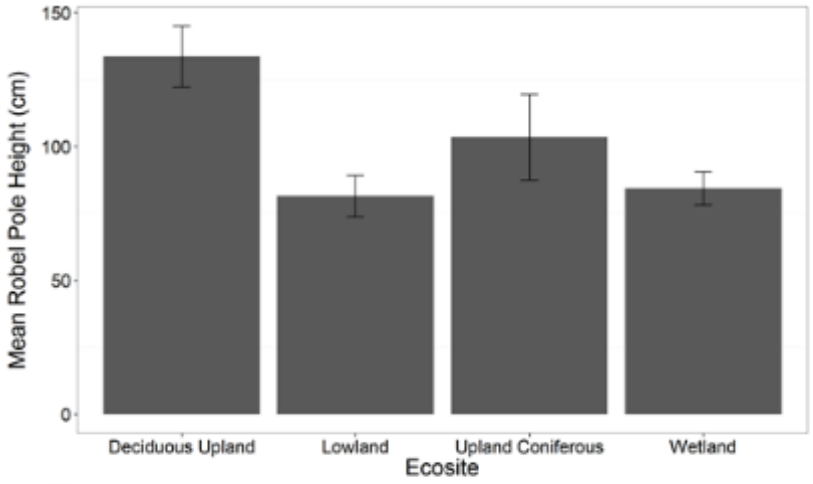
- Immediate vs long term recovery

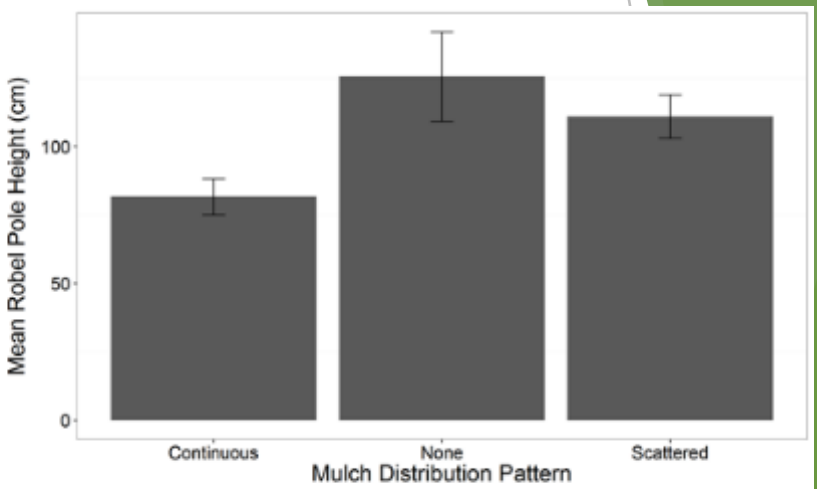
- n = 188 LIS lines

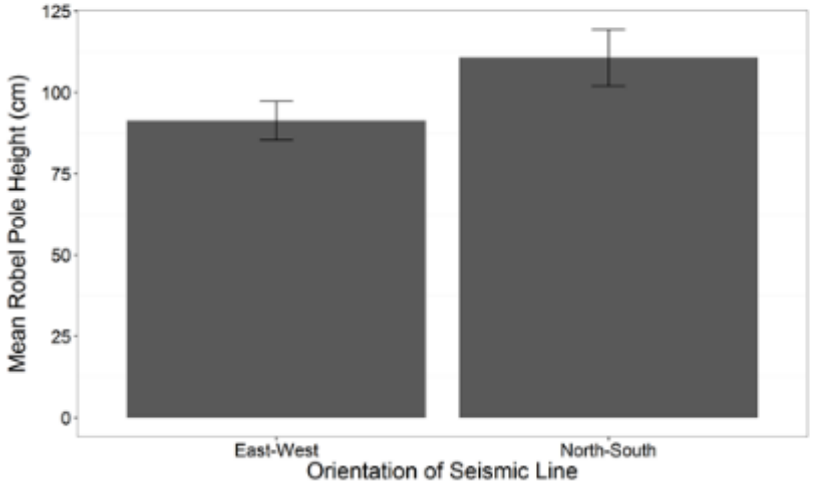
Shrub Cover - Presence



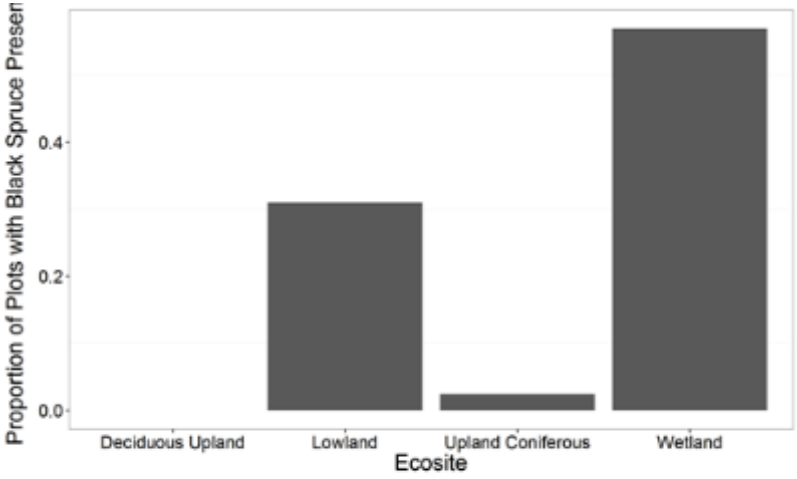
Shrub Cover – Height and Density

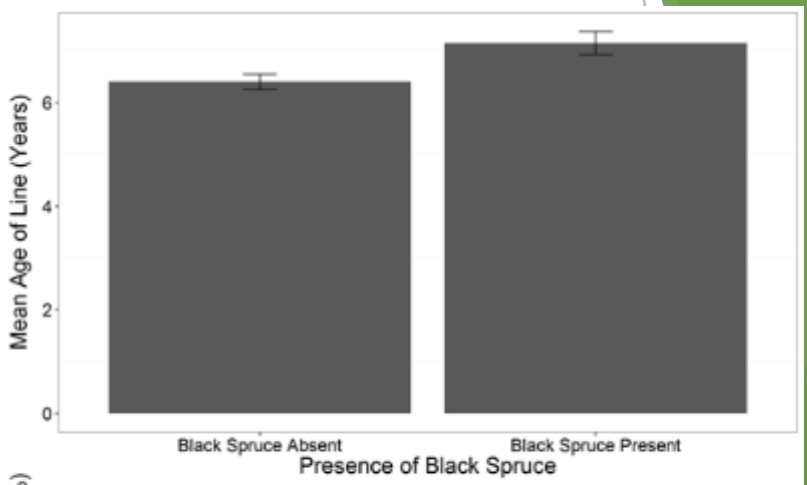


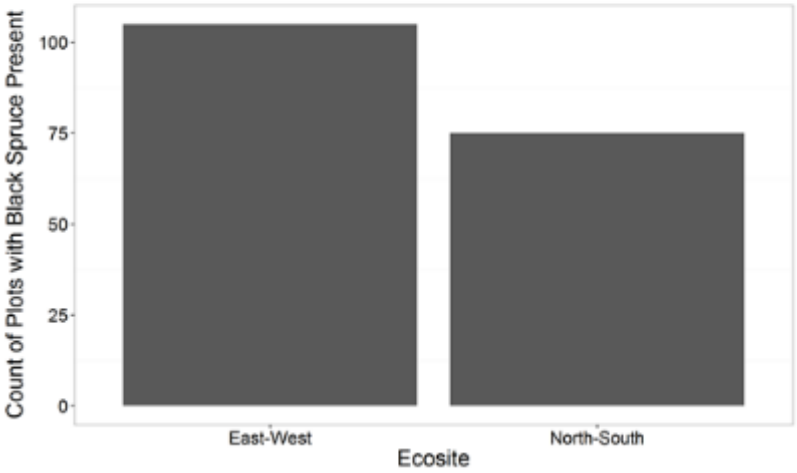


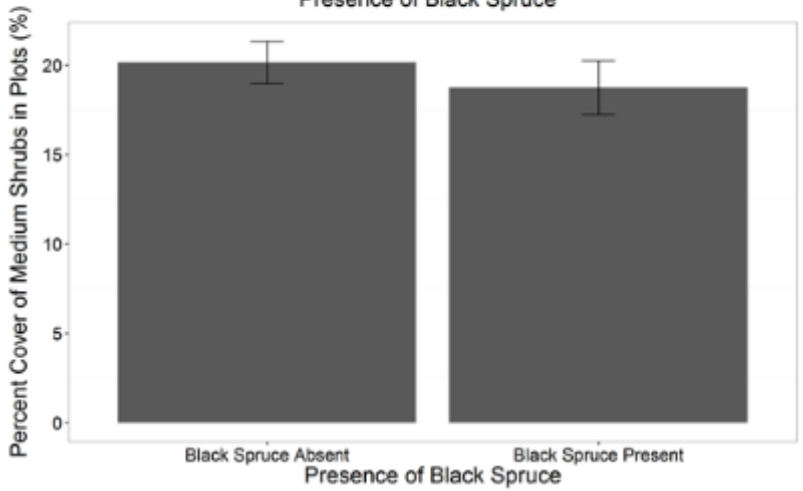


Black Spruce - Presence









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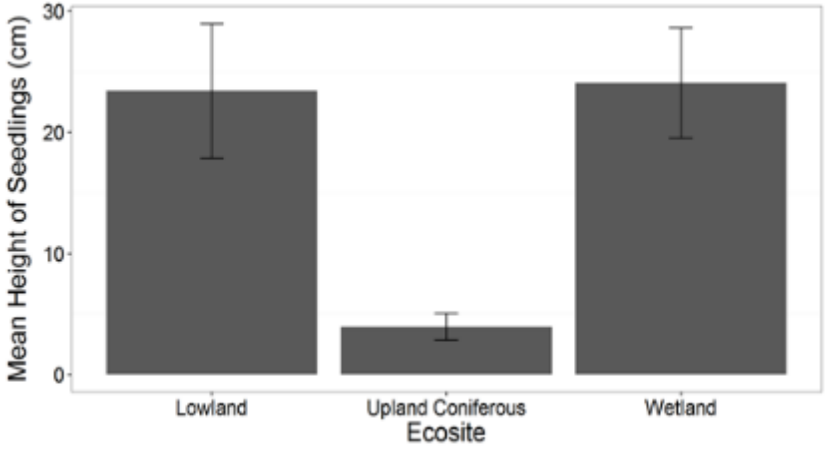
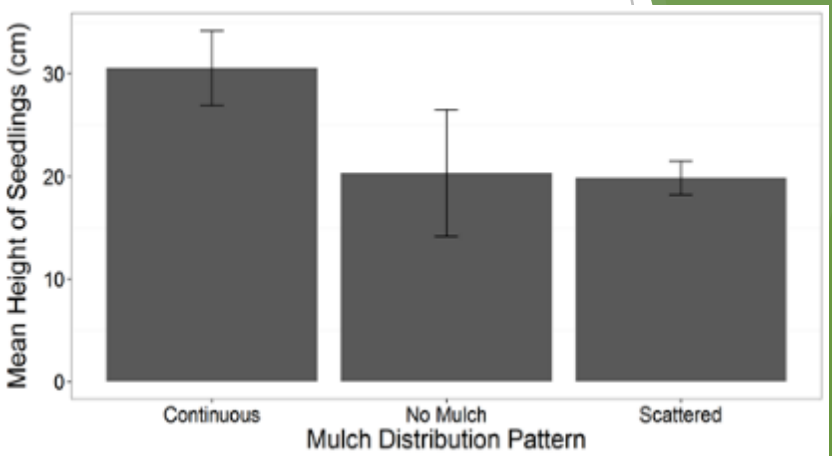
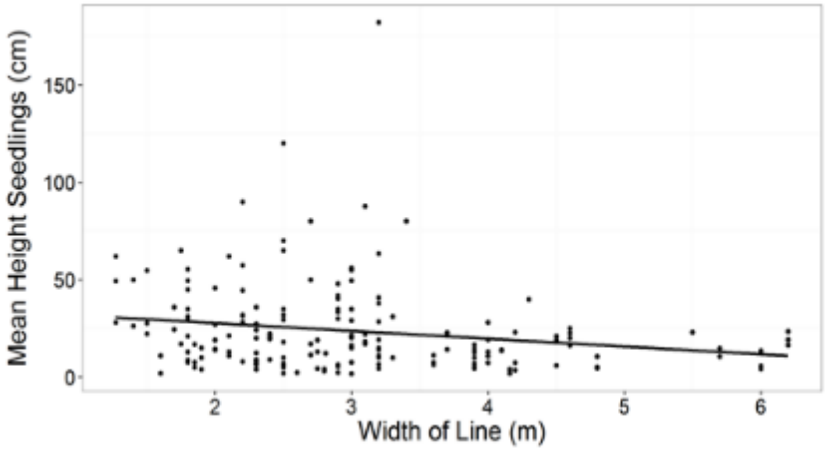
Black Spruce - Height







What about line recovery?

- General pattern the same, but trajectory is not

What about line recovery?

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What about line recovery?

- General pattern the same, but trajectory is not

- Width matters
- Orientation matters
- Mulch matters

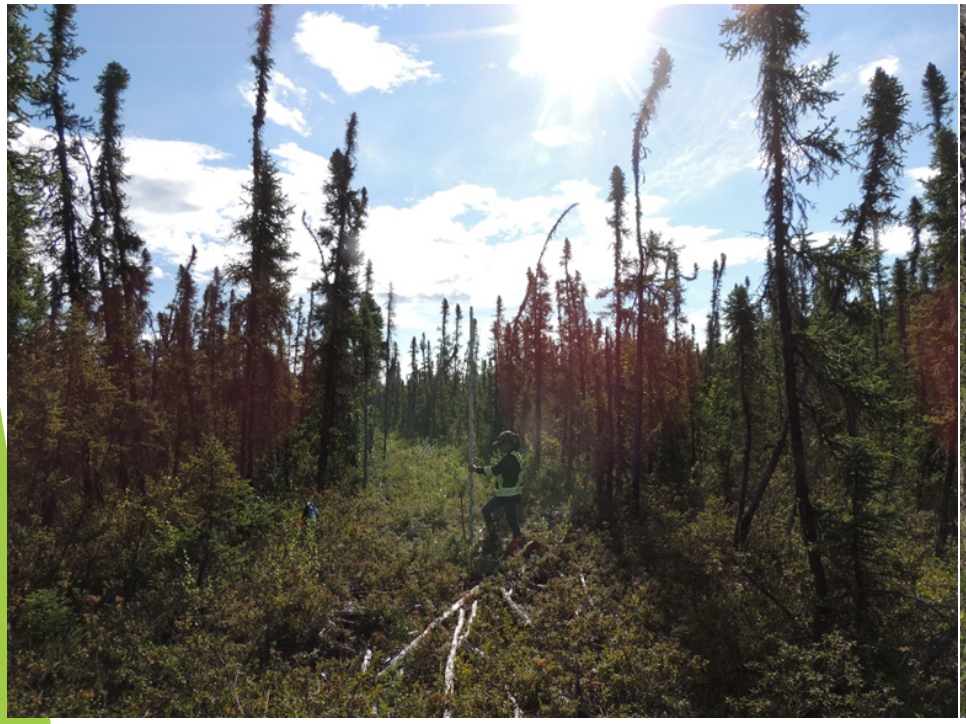
Effect of Width

North-south Orientation, 2010, 2 m wide

North-south Orientation, 2010, 4 m wide

Effect of Orientation

East-West Orientation, 2011, 2 m wide



North-south Orientation, 2011, 2 m wide

Black Spruce

Black Spruce

Boreal Caribou Implementation Plan

- For management, bookkeeping, operations
  - Consider LIS width
  - Consider LIS recovery rate
- Leverage ecology operations
  - Megabins as N-S orientation only, 3D line widths in appropriate direction
  - Manage mulch

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Next Steps To Address Knowledge Gaps

	Conventional Lines in the Parker Caribou Range	LIS Mulched Lines in Northeast BC
Sampled Line Segments	439	188
Line Segments with Established Game Trails	283	30
Percent of Line Segments with Established Game Trails	**64**	**16**

% of Conventional vs. LIS Lines with Established Game Trails

Next Steps To Address Knowledge Gaps

		With Lichen	Without Lichen	
	Number of Lines	86	102	
	Average Line Width	3.00 ± 0.13	3.34 ± 0.09	
Orientation				**Total**
	E-W Lines	51	61	**112**
	N-S Lines	35	41	**76**
	E-W Proportion	0.455357143	0.544642857	
	N-S Proportion	0.460526316	0.539473684	
	Proportion of All Lines	**0.457446809**	**0.542553191**	**Total**
Habitat	Lowland	41	73	**114**
	Upland	61	13	**74**
	Lowland Proportion	0.359649123	0.640350877	
	Upland proportion	0.824324324	0.175675676	