Efficient monitoring of wildlife responses to seismic line restoration in the Algar Habitat Restoration Program

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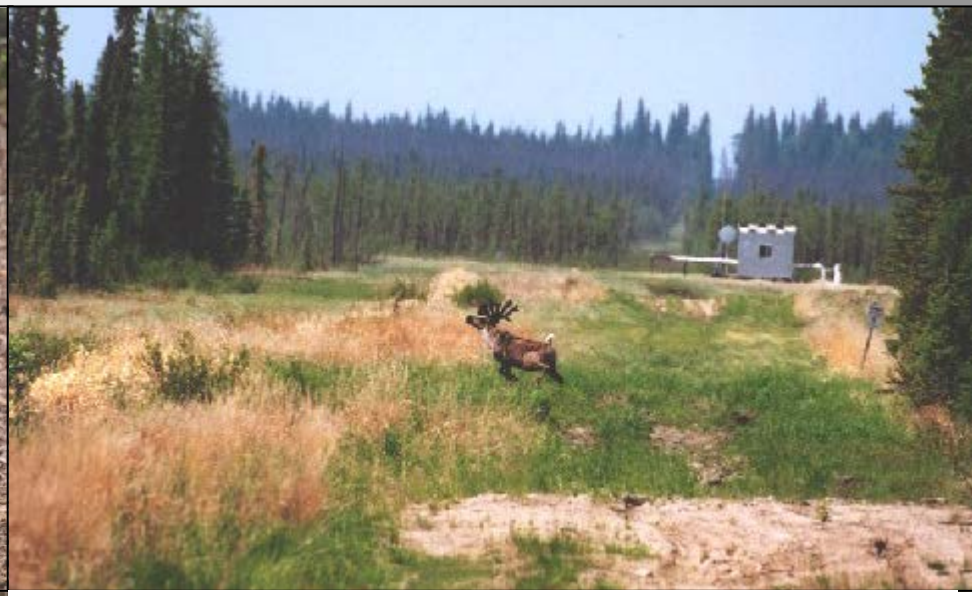
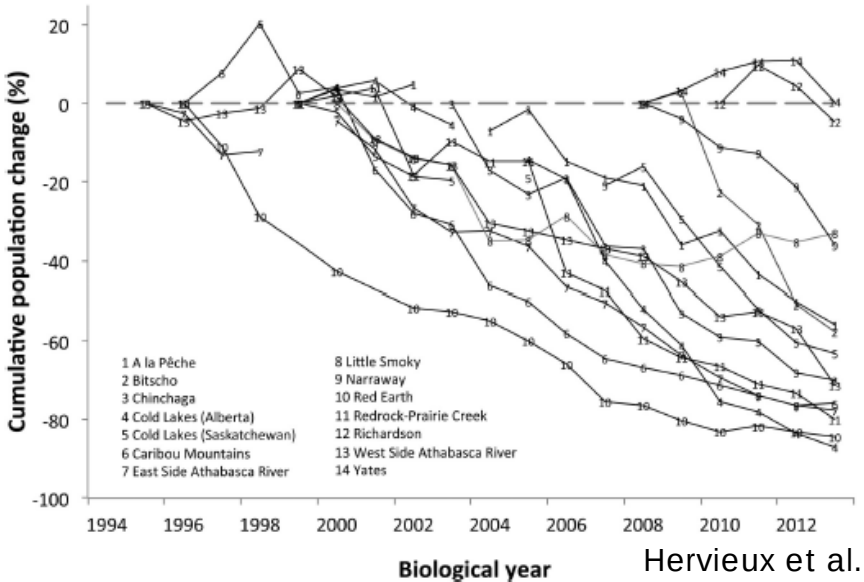
PTAC Ecological Issues Forum
24 November 2016

The Caribou Problem





Hervieux et al. 2013

Will restoring seismic lines recover caribou?

- Extensive and persistent
- Increase predator efficiency
- Fragment wildlife habitat
- ***But*** only one of many cumulative effects

Why focus on seismic?

Determining Sustainable Levels of Cumulative Effects for Boreal Caribou *Sorensen et al.* (JOURNAL OF WILDLIFE MANAGEMENT 72(4):900–905; 2008)

"… sustainable caribou populations at a maximum of 61% of the range within 250 m of industrial development …"

" Because linear features represent >90% of the industrial footprint in most ranges … need to be substantially reduced or restored to stabilize declining populations "

Faster and farther: wolf movement on linear features and implications for hunting behaviour *Journal of Applied Ecology* 2016

Dickie et al.

"… mitigation strategies such as silviculture and linear deactivation should prioritize conventional seismic lines and pipelines, as they were selected by wolves and increased travelling speed"

Regulatory context

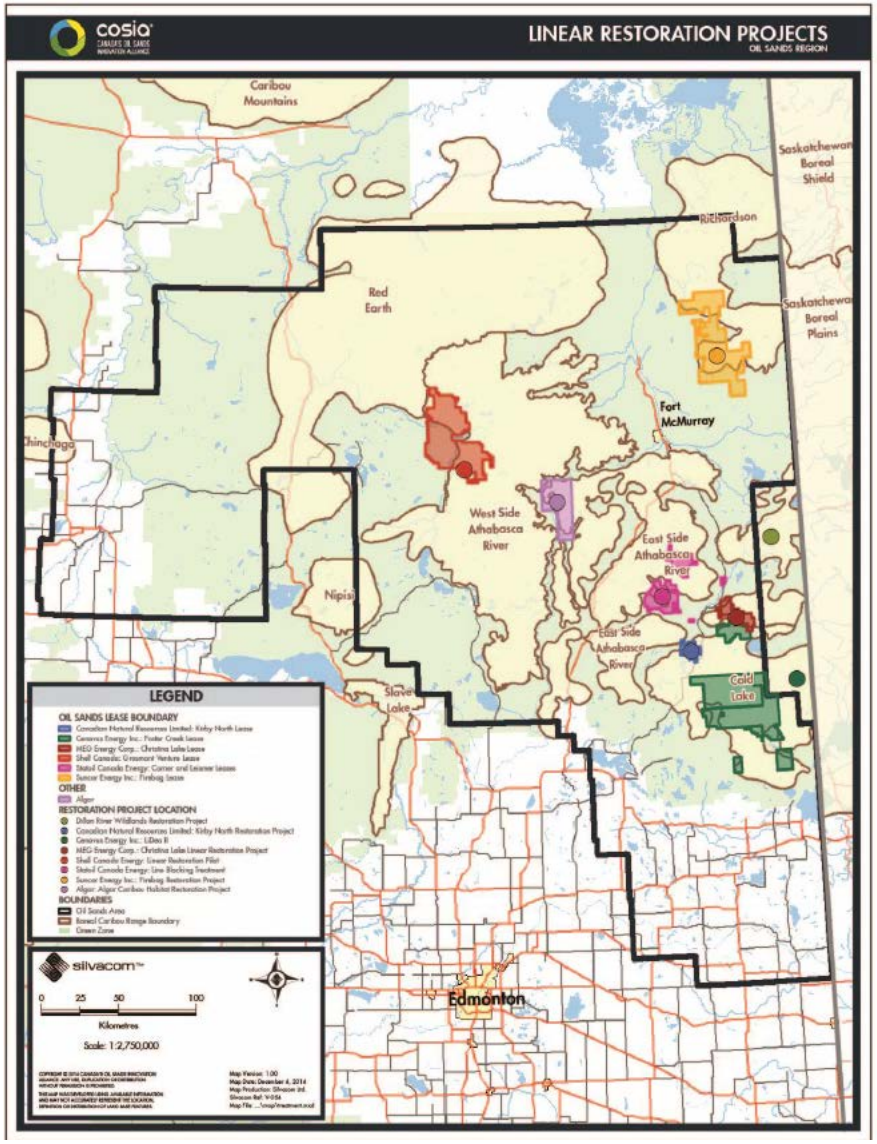
Environment Canada. 2012. Recovery Strategy for the Woodland Caribou (*Rangifer tarandus caribou*), Boreal population, in Canada. *Species at Risk Act* Recovery Strategy Series. Environment Canada, Ottawa. xi + 138pp.

- Critical habitat … "65% undisturbed habitat in a range as the [minimum] disturbance management threshold"

- "application of a 500 m buffer to mapped anthropogenic features best represents the combined effects of increased predation and avoidance on caribou population trends"

- "Undertake coordinated actions to reclaim boreal caribou habitat through restoration efforts (e.g. restore industrial landscape features such as roads, old seismic lines, pipelines …)"

Seismic restoration projects

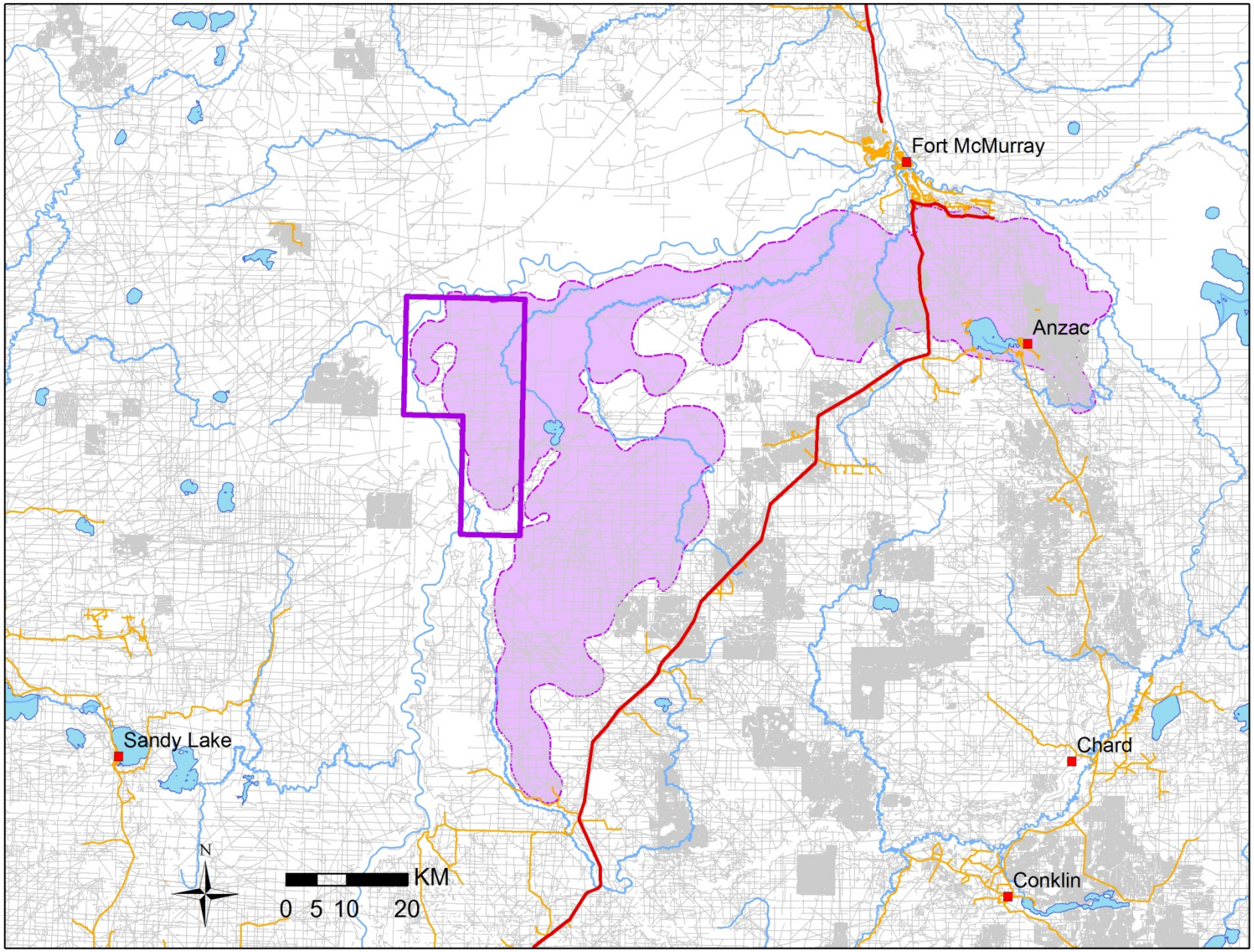


Pyper et al. 2014
COSIA report

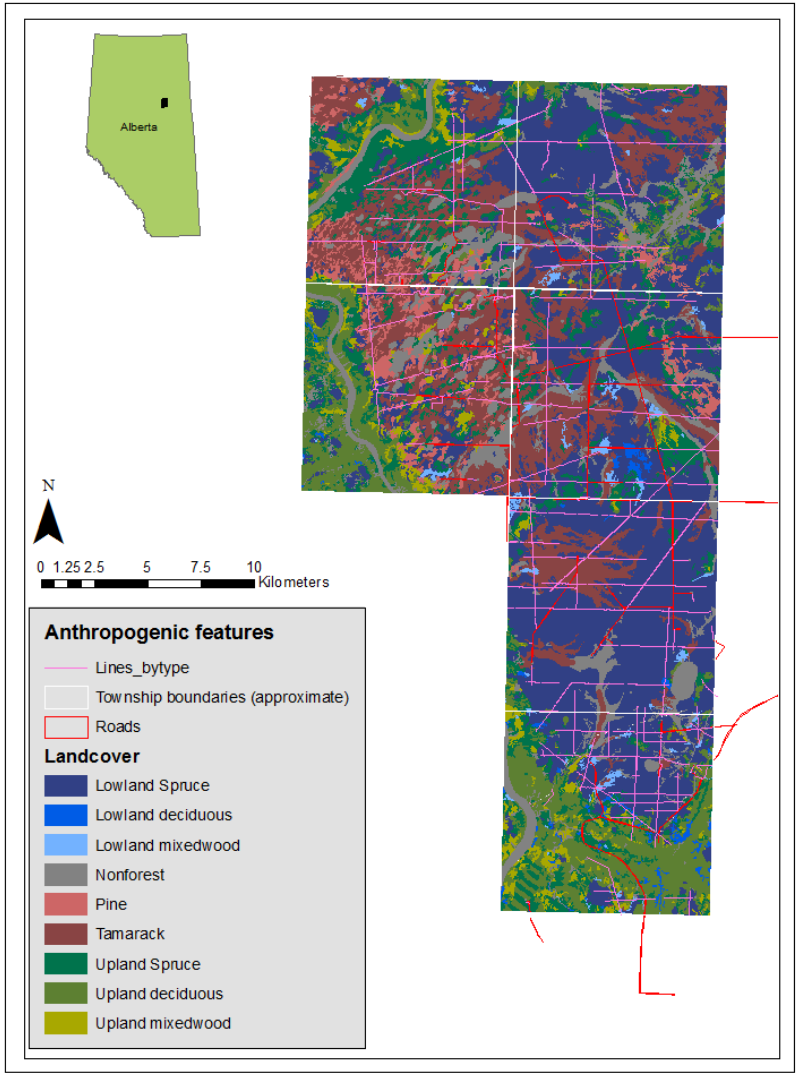
Algar Caribou Habitat Restoration Program

Treatment	Length (km)
Site Preparation & Tree Planting with Coarse Woody Material	148
Natural Regeneration Protection	192
Research Line (No Treatment)	27
Additional Trapper Lines (No Treatment)	19
Total	**387**

Silvacom 2015


Fort McMurray
Anzac
Sandy Lake
Chard
Conklin
N
KM
0 5 10 20

The Algar Landscape



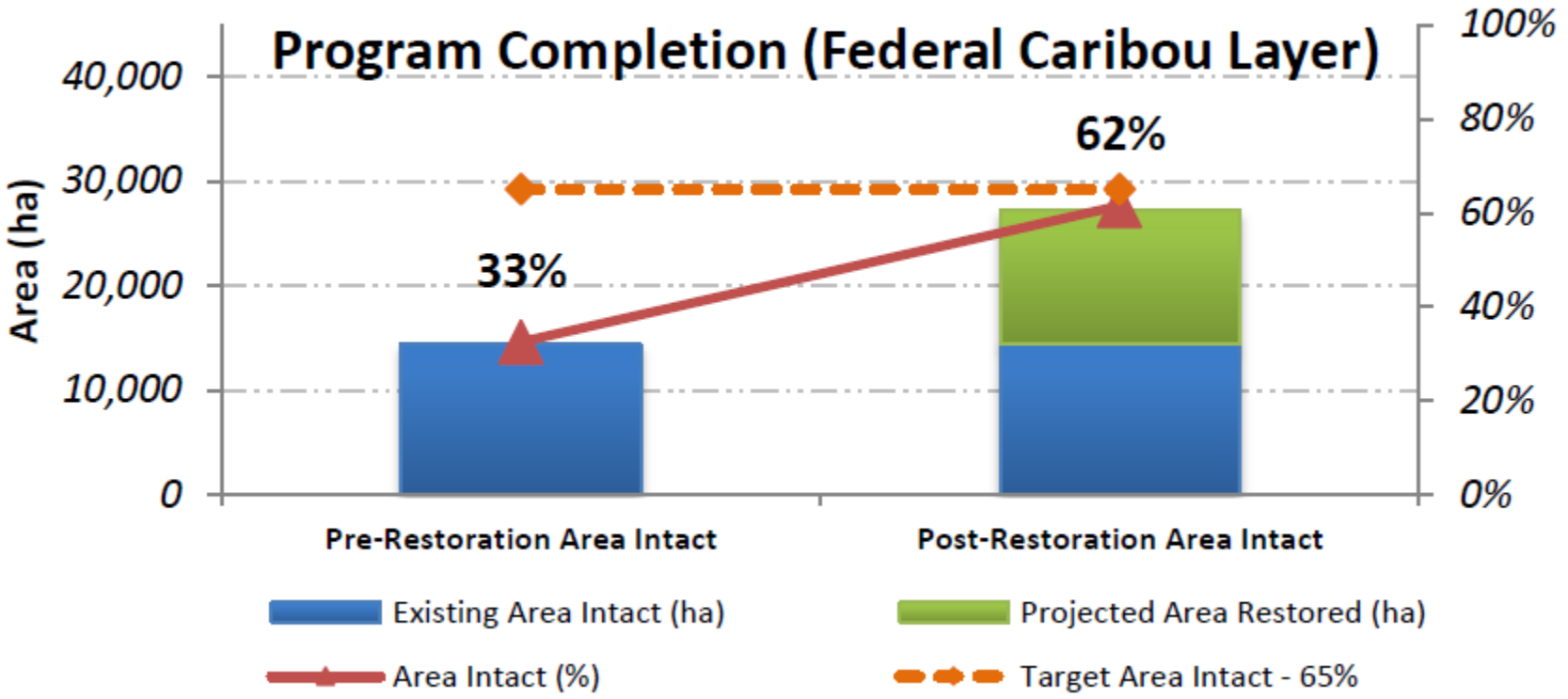
Restoration Treatments

Treatment (mounded, planted, CWD)

Natural Regeneration

Control
(similar to treated lines)

Will treatments lead to caribou recovery?



Silvacom 2015

Measuring Restoration Effectiveness

Two primary questions:

1. ***Do treatments reduce use of lines by caribou predators?***
   (i.e. restore caribou functional habitat)

2. ***Do treated areas have similar mammal community composition as expected under "reference" conditions?***
   (i.e. restore wildlife habitat more broadly)

→ Proposed **Camera Trap** Monitoring Program

- Pilot sampling (2016-17)
- Recommendations for full implementation (2017 →)

Target Species and Hypotheses

- **Caribou Predators:**

- *Use treated < control*
- *Decline in use over time*

Target Species and Hypotheses

- **Caribou Predators:**

- *Use treated < control*
- *Decline in use over time*

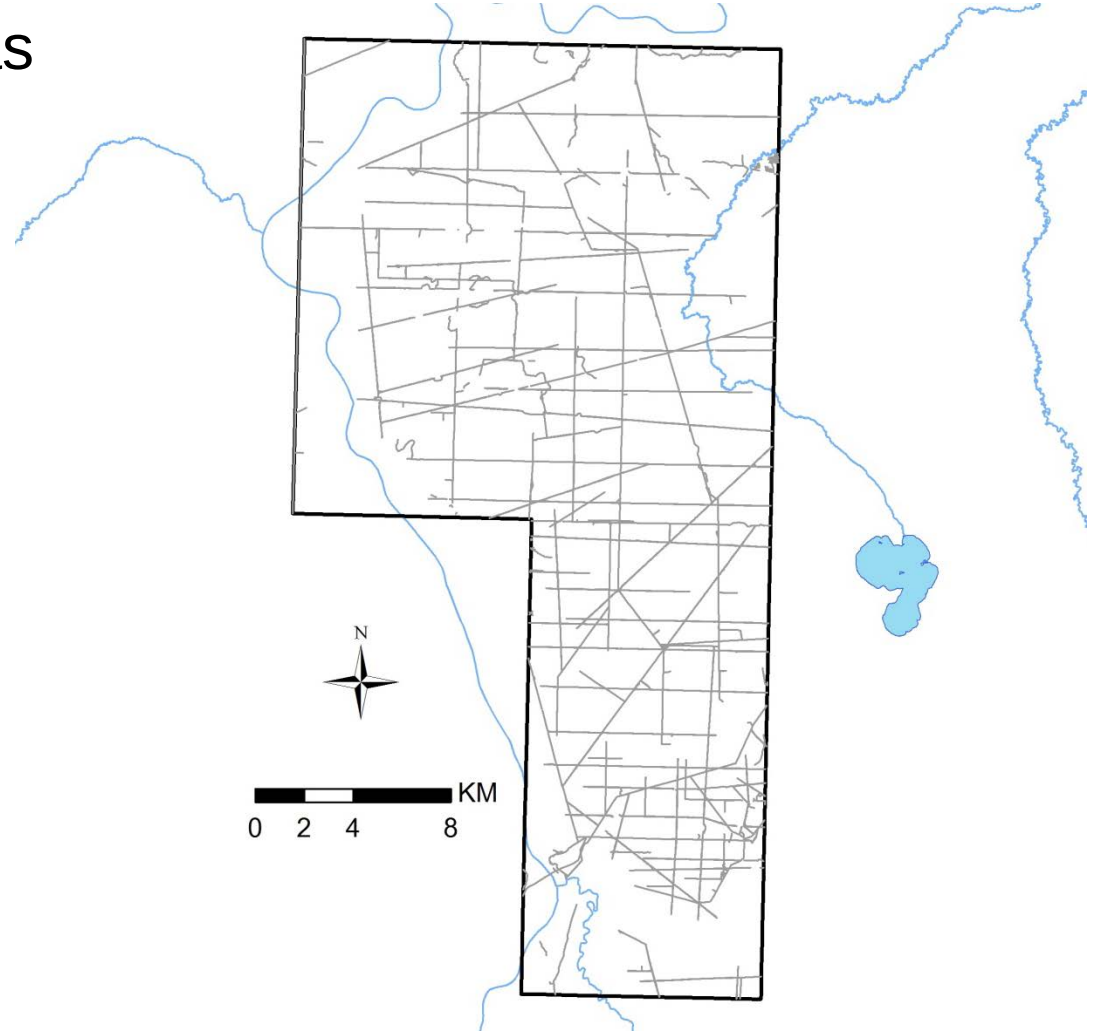
- **Caribou & Competitors:**

- *Use treated ~ reference*
(some more, some less than controls)
- *Caribou increase over time*

- **Other Mammals:**

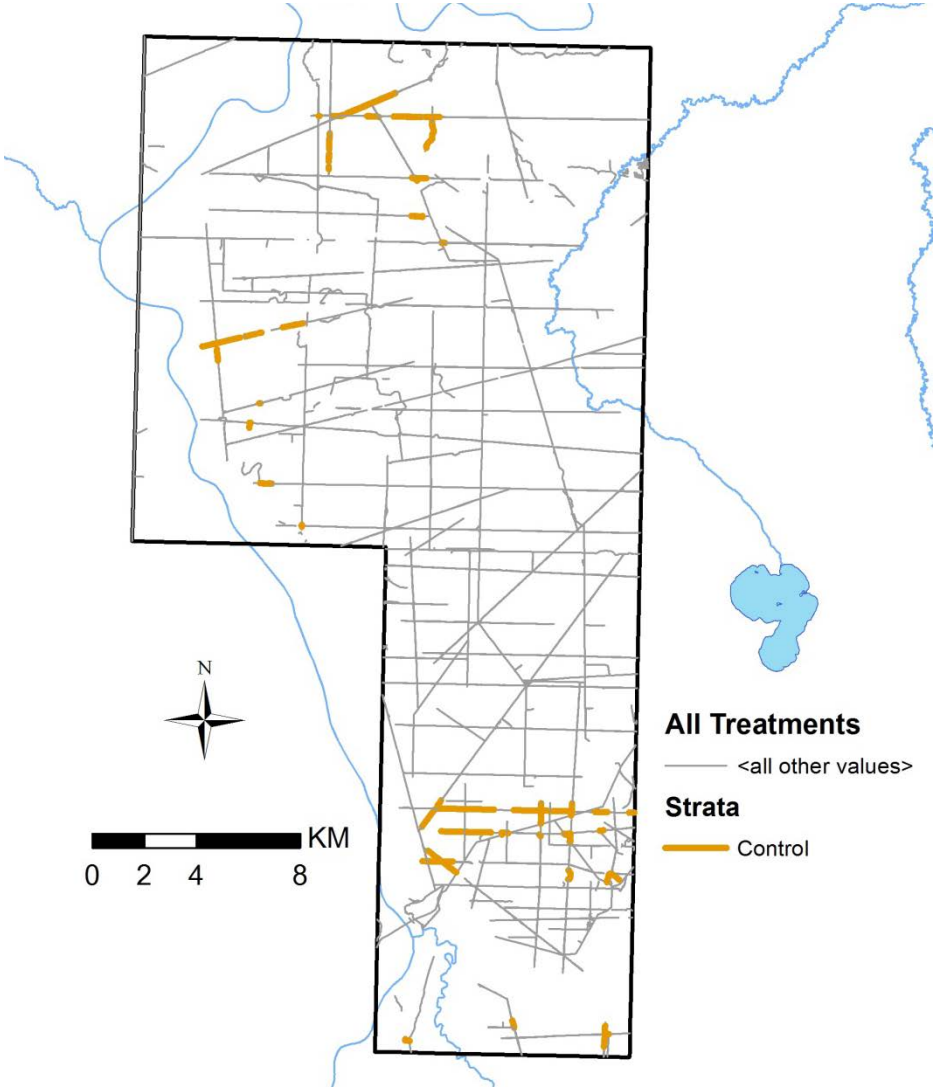
Sampling Framework

- Line segments as sampling units



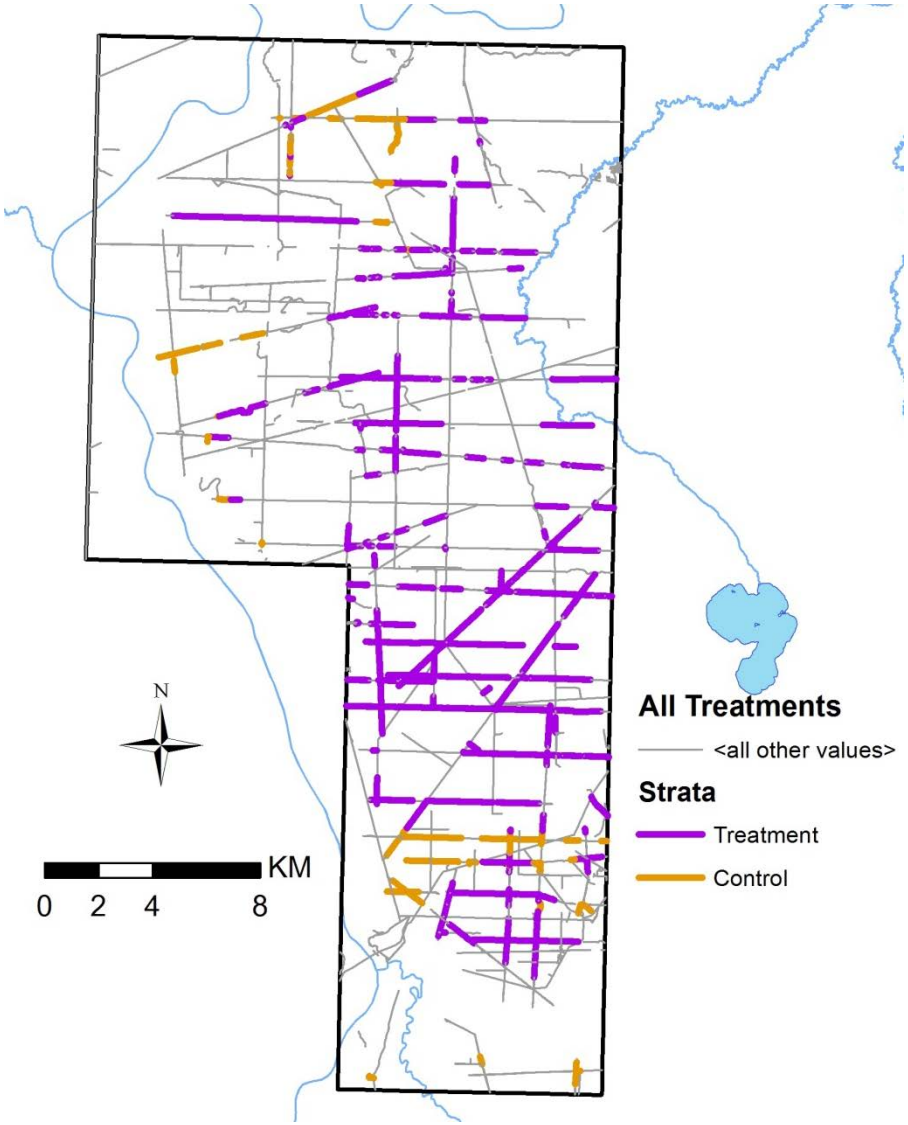
Sampling Framework

- Line segments as sampling units
- **Strata**:
  - **Control** (no treatment)



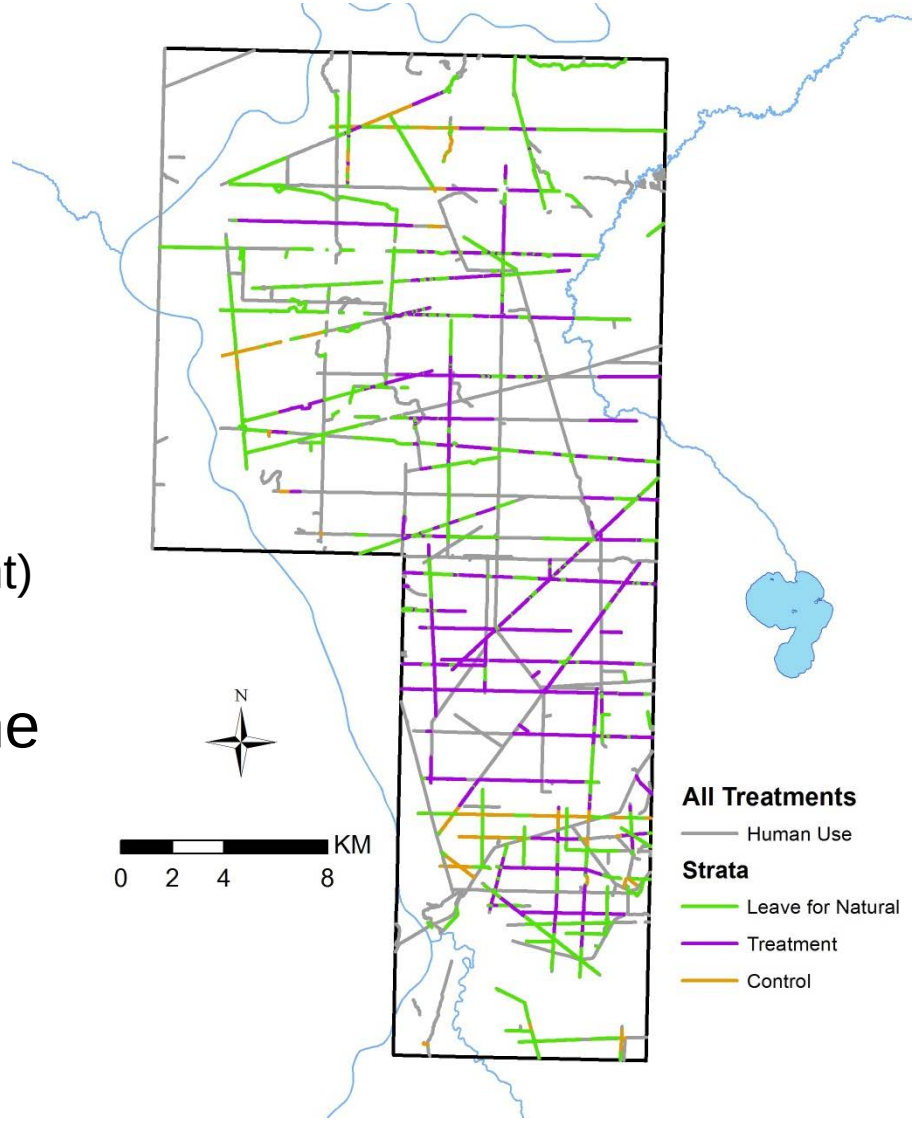
Sampling Framework

- Line segments as sampling units
- **Strata**:
  - **Control** (no treatment)
  - **Treatment**

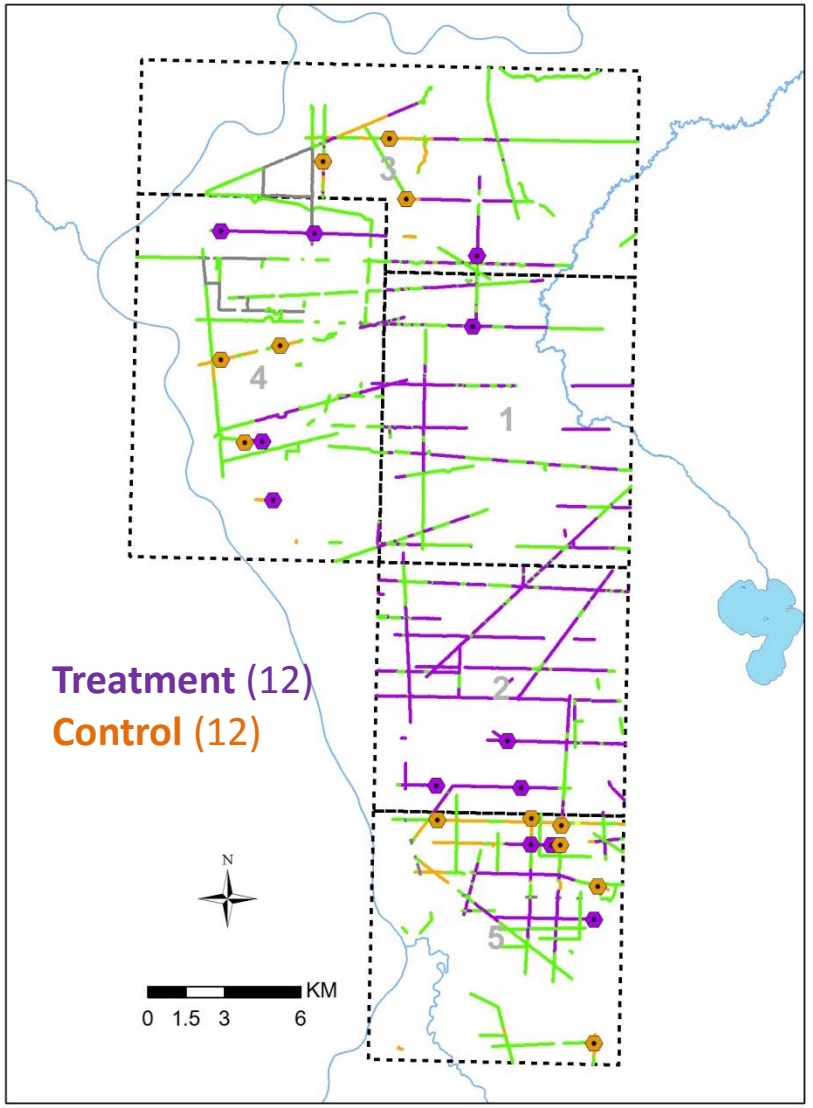


Sampling Framework

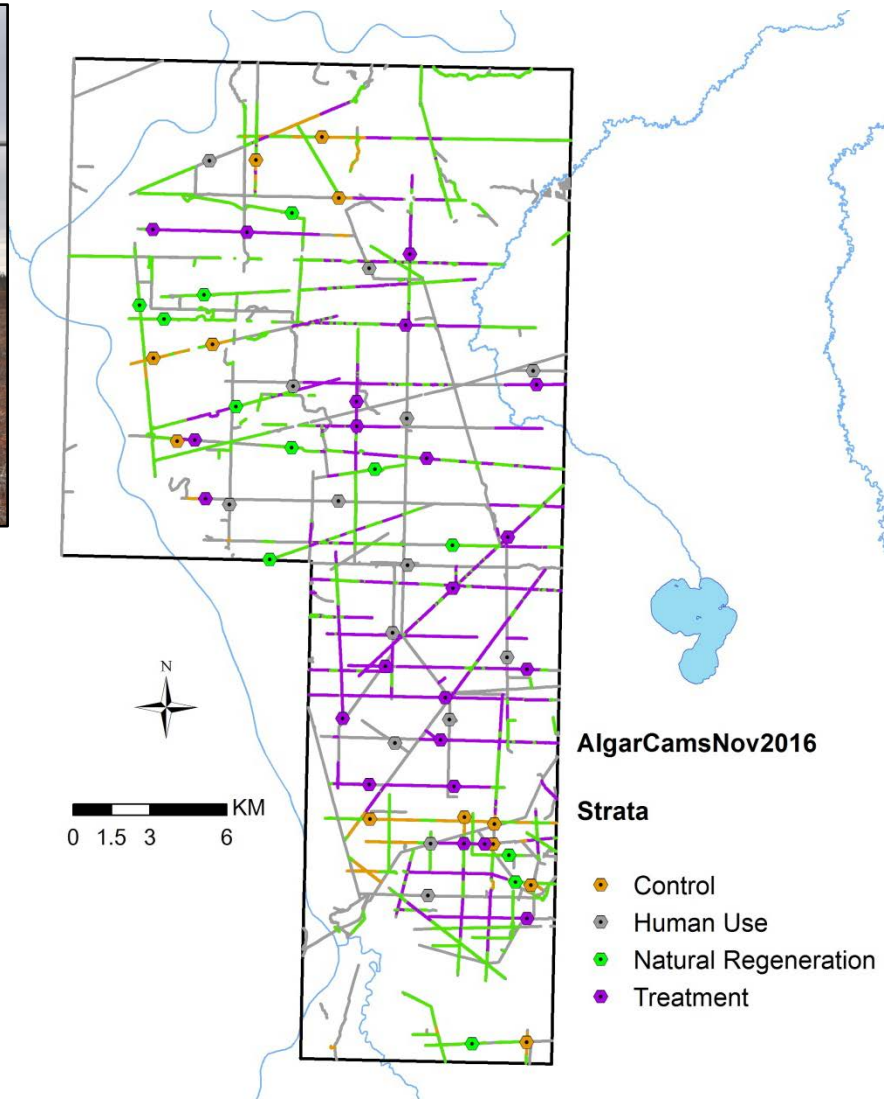
- Line segments as sampling units
- **Strata**:
  - **Control** (no treatment)
  - **Treatment**
  - **Natural Regeneration**
  - **Human Use** (no treatment)
- Random selection of line segments/points for camera deployment



November 2015 Pilot Deployment



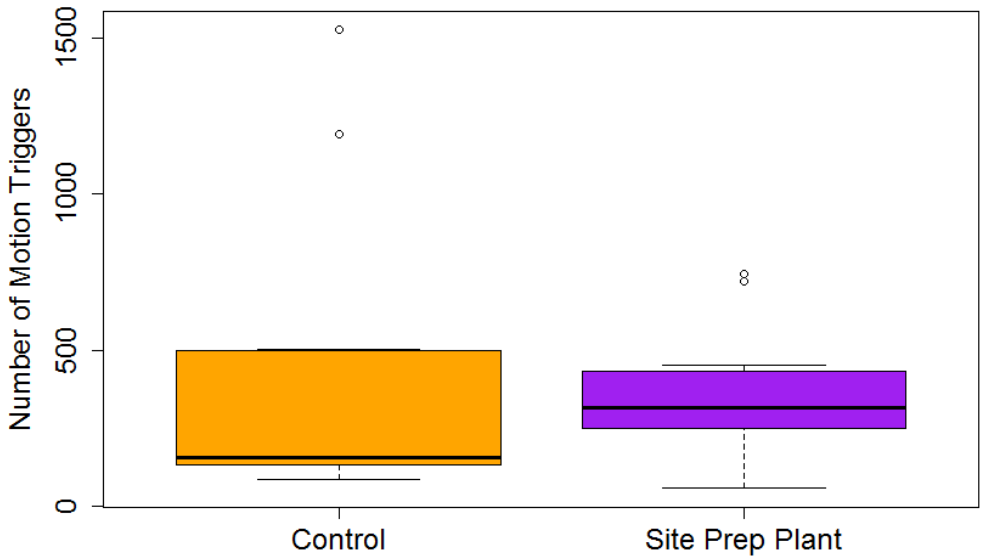
November 2016 Check & Deployment



(Very) ***Preliminary*** **Camera Summary**

- 8,911 trap-days (mean 371 per station)
- ~ 9,000 images (motion triggers)
- Range of mammal species detected on treatments and controls

  (analysis forthcoming!)




2016-02-21 10:44:25 M 1/1 -9°C
TREATMENT 1
RECONYX


2016-11-08 16:32:37
M 1/1
4°C
CONTROL 3
RECONYX


2016-05-18 10:06:48 M 1/1 21°C
CONTROL 11
RECONYX


2015-11-25 19:08:27 M 1/1 -19°C
CONTROL 2
RECONYX


2015-12-22 20:10:52
M 1/1
-14°C
TREATMENT 10
RECONYX


2015-11-15 10:19:33 M 1/1 -6°C


2016-03-02 03:41:04 M 1/1 -19°C
TREATMENT 3
RECONYX


CONTROL 3
2016-06-24 08:54:54 M 1/1 17°C
RECONYX
TREATMENT 5
RECONYX


2016-10-27 12:05:46 M 1/1 0°C
RECONYX
CONTROL 10
RECONYX


2016-06-29 11:49:01 M 1/1 27°C


2016-01-09 10:48:44 M 1/1 -24°C


TREATMENT 7
2016-03-28 04:55:12 M 1/1 -5°C
RECONYX

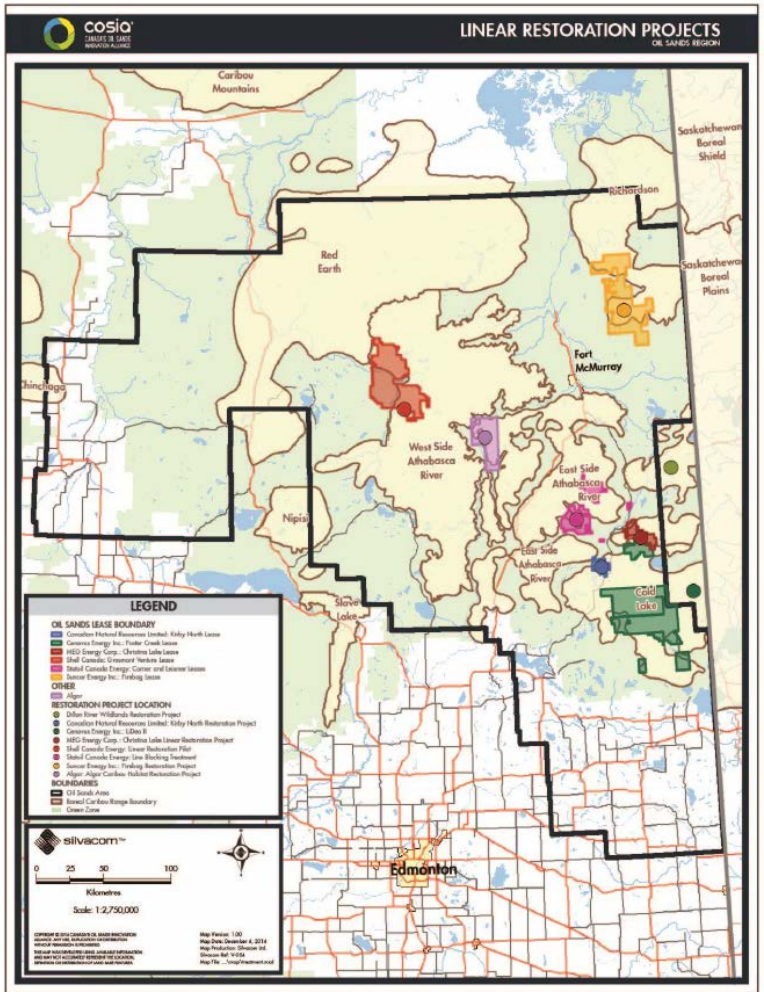

CONTROL 3
2016-09-29 01:56:01 M 1/1 -4°C
RECONYX

CONTROL 5
RECONYX

TREATMENT 5
RECONYX

Next steps

- Analysis of 2016 data
  - Short-term Treatment vs. Control
- Collect 2017 data
- Power analysis to assess sample size
  - Refine monitoring design (as needed)
- Regional comparison/synthesis
  - e.g. LiDEA
- Algar caribou telemetry (GoA)



Thanks to …

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Questions?

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