A burning question:

How ABMI products were utilized to understand the impact of wildfire on woodland caribou.

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CMU CARIBOU MONITORING UNIT

My story with ABMI

Three projects:

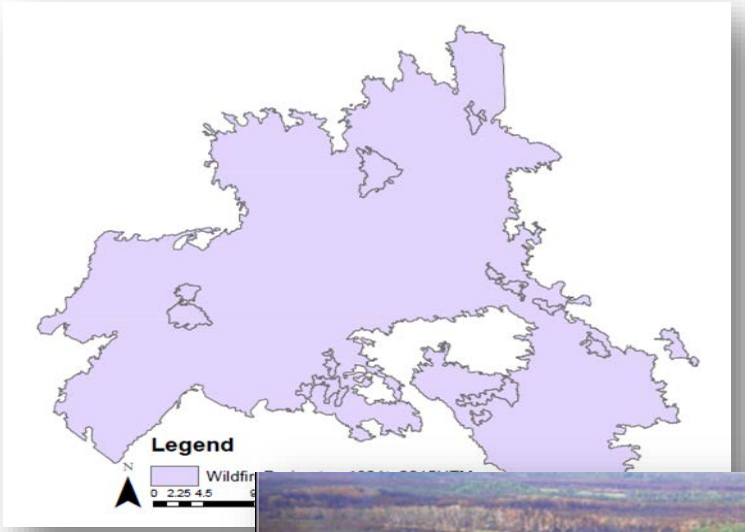
1. Woodland caribou use of burned landscapes

2. Post-fire regeneration of linear features

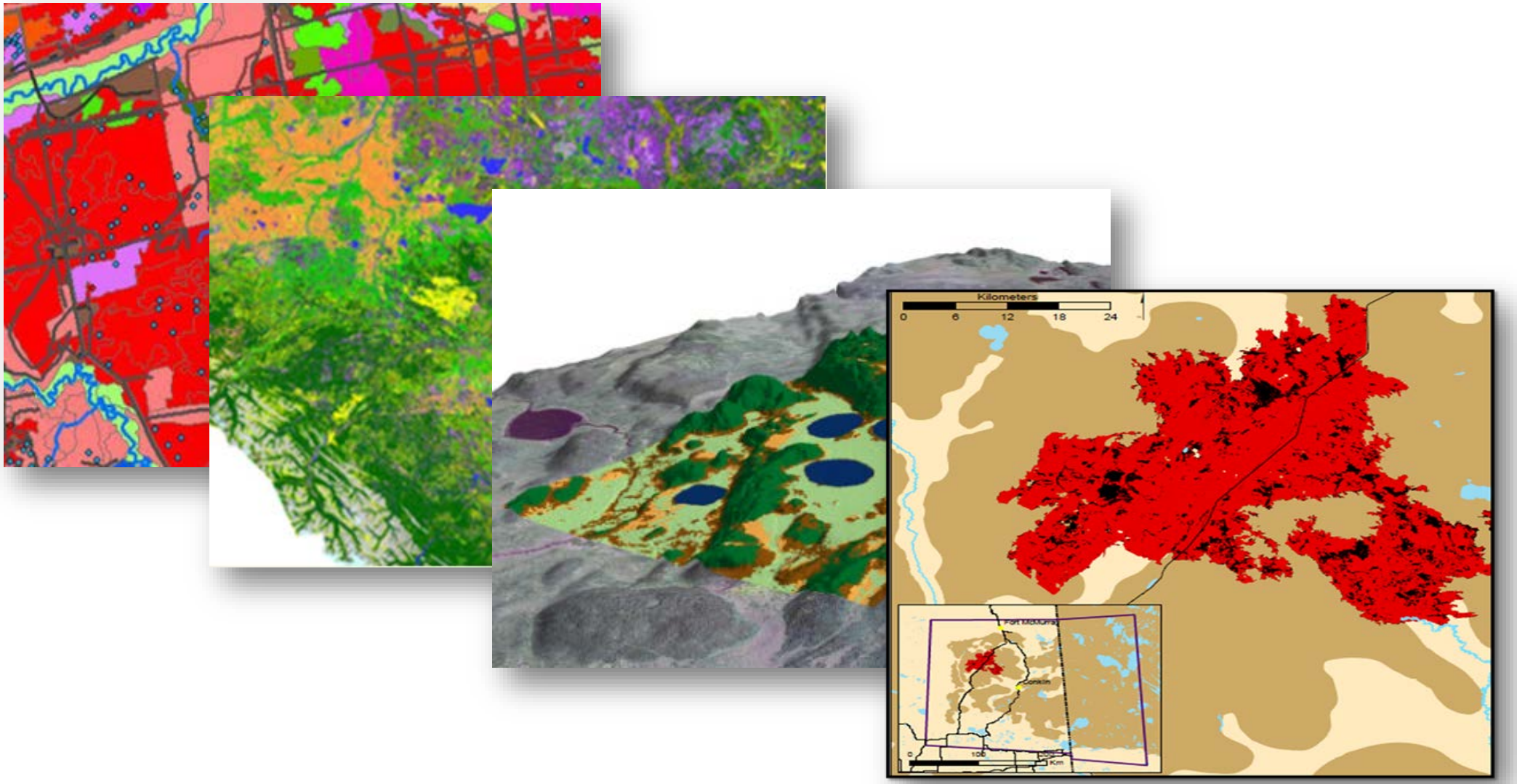
3. Scavenging dynamics in the boreal forest of Yukon, Canada

1. Caribou use of fire

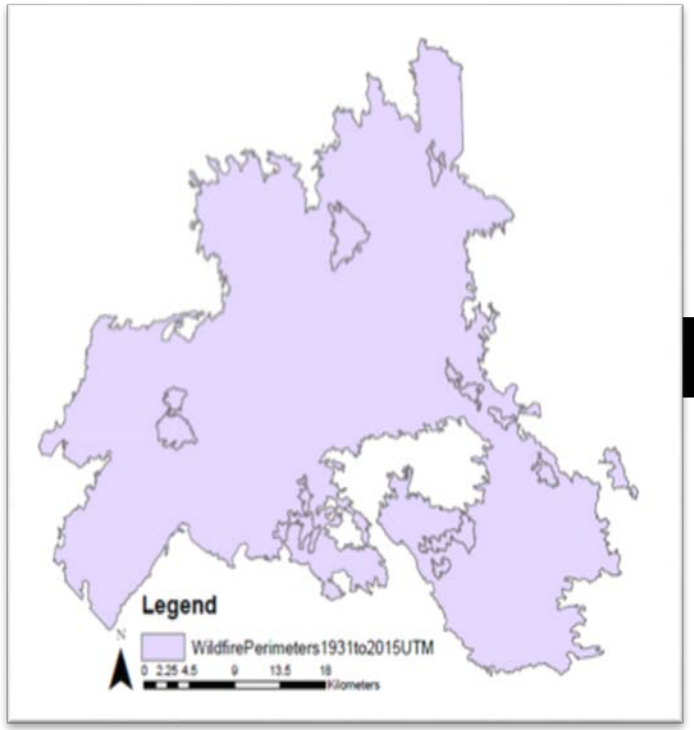
- Listed as threatened under SARA
- 65% undisturbed habitat
  - ➢**Burns** within the last 40 years
- Use of fire residuals during calving season (Skatter et al. 2017)
- 203 cows collared 6 caribou ranges in northeastern Alberta
- SSF analysis



Step Selection Analysis



Mapping Fires



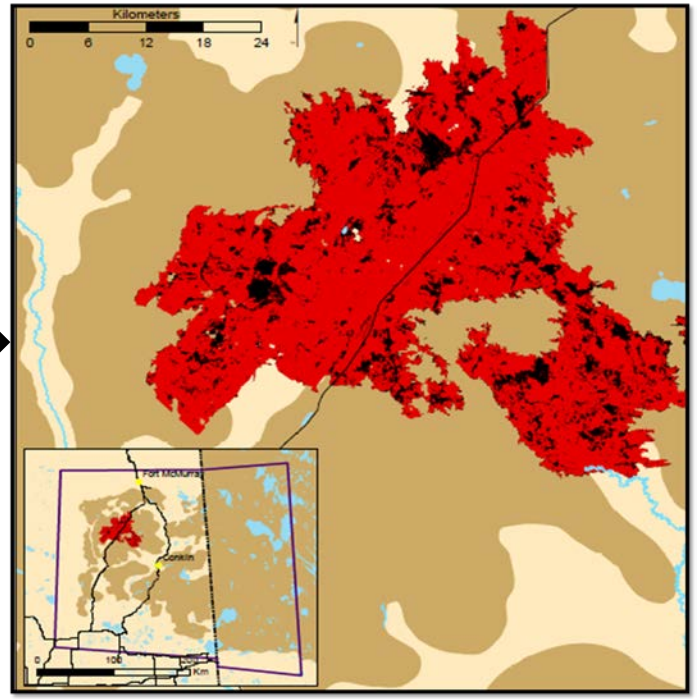
Generate an NBR image for each scene, pre- and post-fire:

$$NBR = (R_4 - R_7) / (R_4 + R_7);$$

Generate the differenced (or delta) NBR:

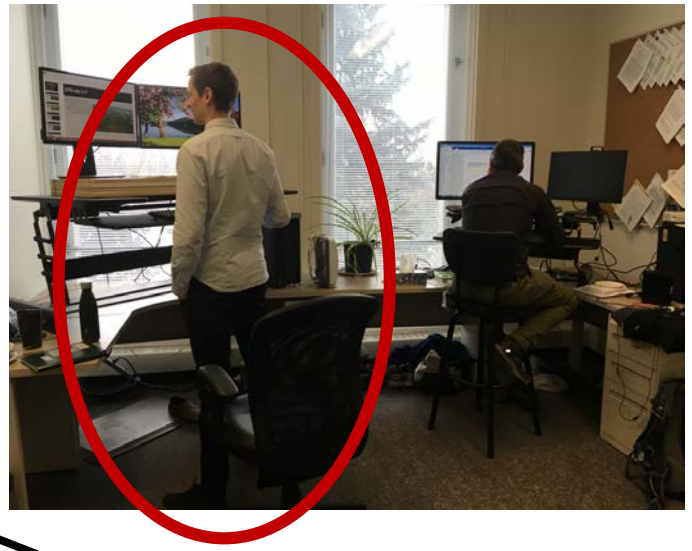
$$dNBR = NBR_{prefire} - NBR_{postfire}$$

Key and Benson 2006



Key and Benson, 2006

Mapping Fires



Google Earth Engine

Search places and datasets...

Help konkolic@ualberta.ca

Scripts Docs Assets

Filter scripts... NEW

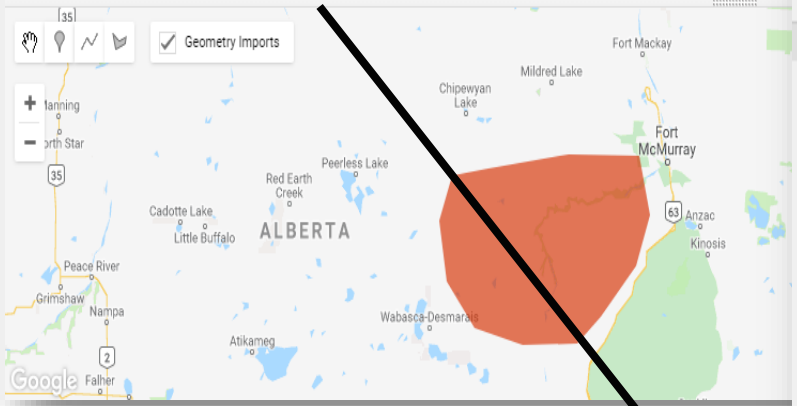
- Owner (1)
  - users/konkolic/default
    - Extra
    - Extraction
    - Tile Extraction
- Writer
  - No accessible repositories.
- Reader
  - No accessible repositories.
- Examples
  - Image

Extraction * Get Link Save Run Reset

Inspector Console Tasks

Use print(...) to write to this console.

```
Imports (1 entry)
  var geometry: Polygon, 12 vertices
1  //get landsat 8 image collection
2  //set geometry varible by drawing bounding box
3  //set date range (you may need to change to Landsat 4, 5, or 7 depending on dates)
4  var LS = ee.ImageCollection('LANDSAT/LM2_L1T')
5    .filterDate('1983-6-15', '1983-08-31')
6    .filterBounds(geometry);
7
8
9  //add Normalized difference burn ratio here
10 //var addNBR = function(image) {
11  //return image.addBands(image.expression(
12      //'(NIR - SWIR) / (NIR + SWIR)', {
13        //'SWIR': image.select(['B7']),
14        //'NIR': image.select(['B4'])
```



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ALPHA Landcover Layer

- ABMI's Predictive Landcover Layer
- Needed a layer that predicted landcover regardless of burn
- Strong predictive power of caribou habitat
- Provincial and other organizations not as appropriate

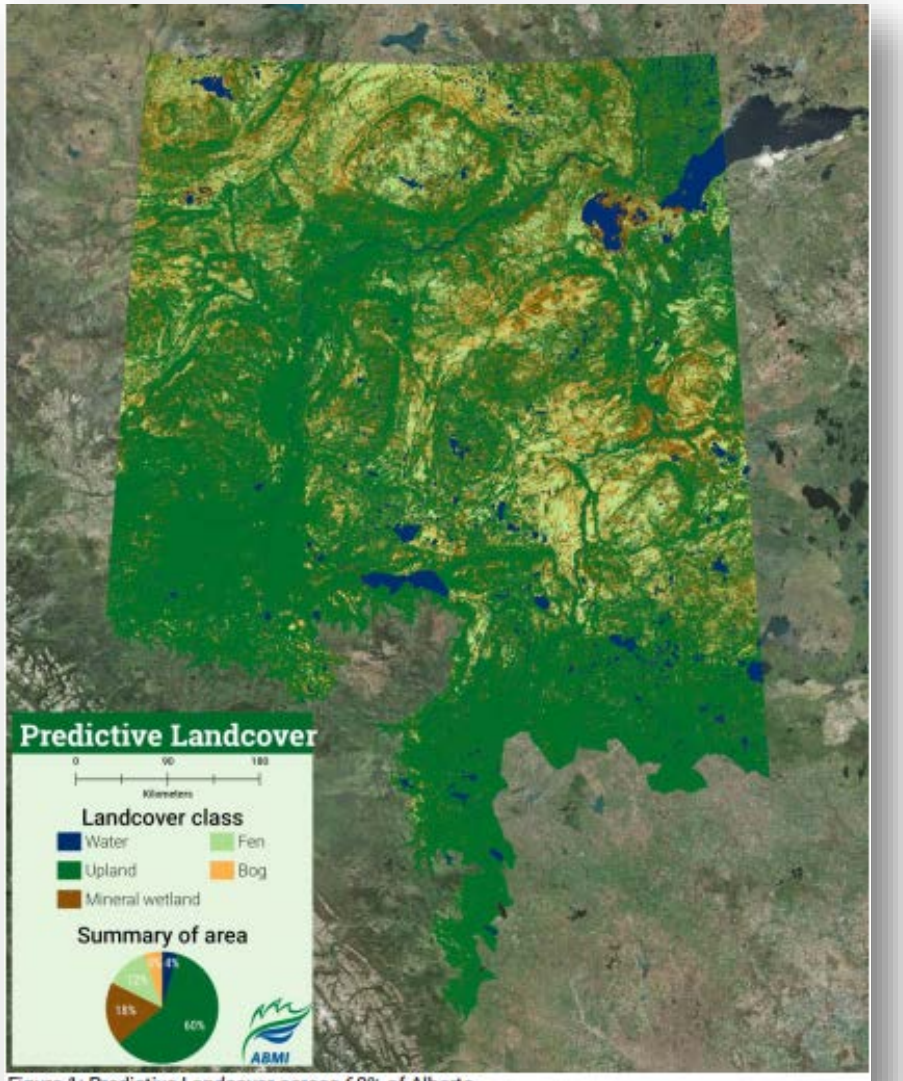

Figure 1: Predictive Landcover across 60% of Alberta.

Hird, J., DeLancey, E.R., McDermid, G.J., and Kariyeva, J. 2017. "Google Earth Engine, Open-Access Satellite Data, and Machine Learning in Support of Large-Area Probabilistic Wetland Mapping." *Remote Sensing*, Vol. 9(No.12): pp. 1315.

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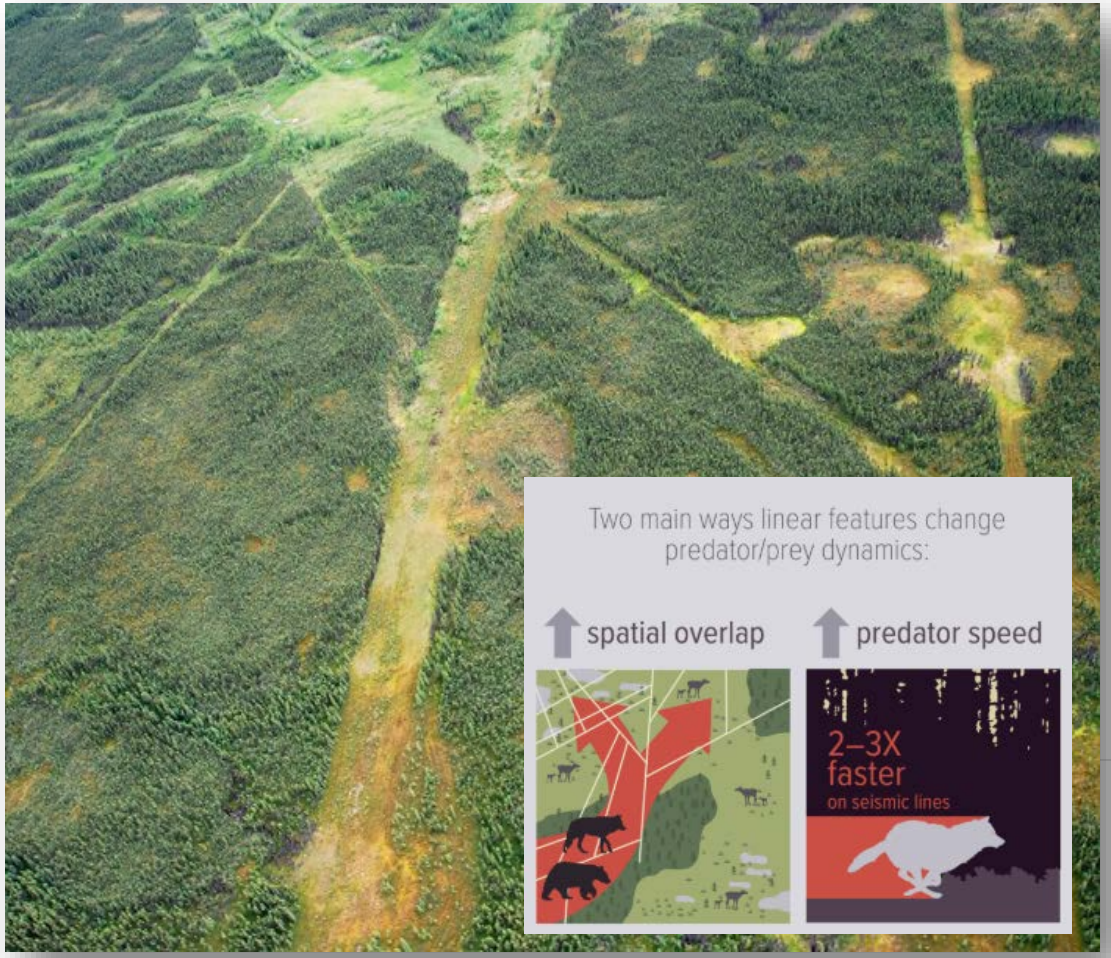
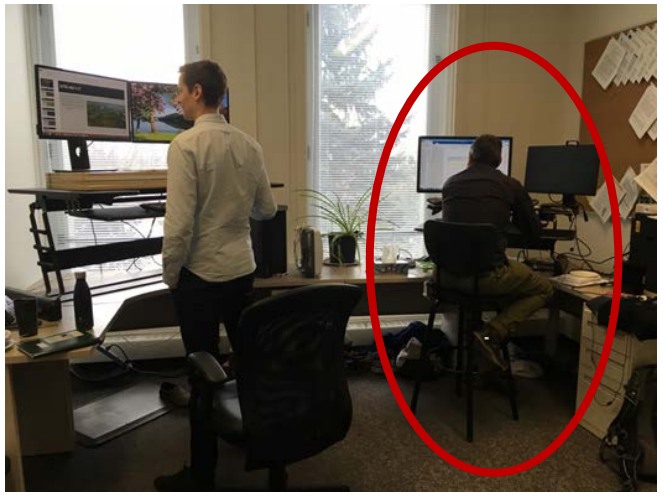
2. Linear feature regeneration

- Areas reaching densities as high as 10 km per km^2 (Lee and Boutin, 2006)
- Increased wolf use and movement on lines (Dickie et al., 2018)
- Reclamation is expensive, but evidence of regeneration after fires (Filicetti and Nielsen, 2018)



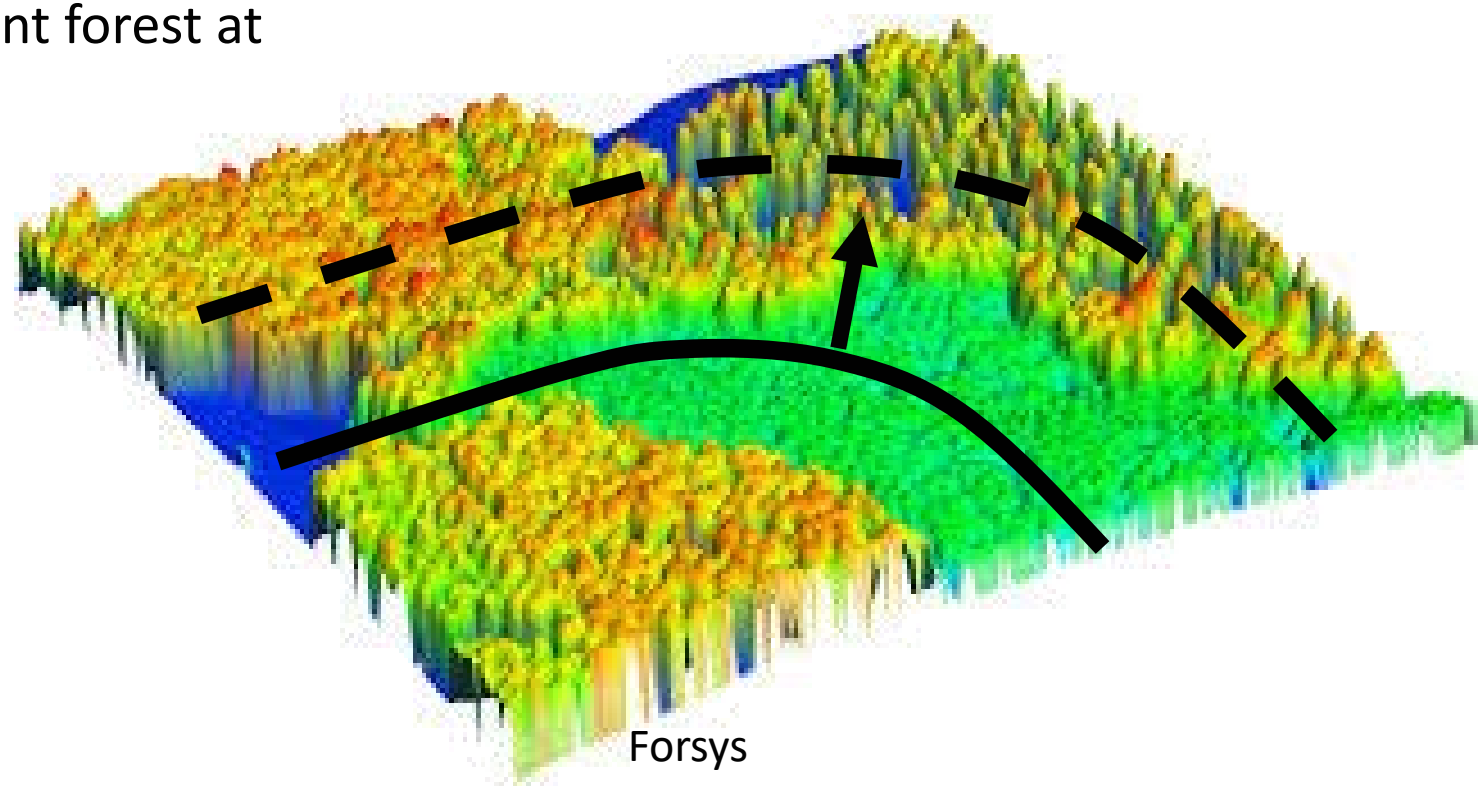
Vegetation Sampling



Goal:

Measure vegetation height on the line and in the adjacent forest at large spatial scale

- LiDAR data
- Least-cost-paths



Forsys

Human footprint

- ABMI's 2016 Wall-to-Wall Human Footprint Layer
- Updated linear footprint including multiple seismic types
- Seismic information and data
- Consistent coverage across northeastern Alberta

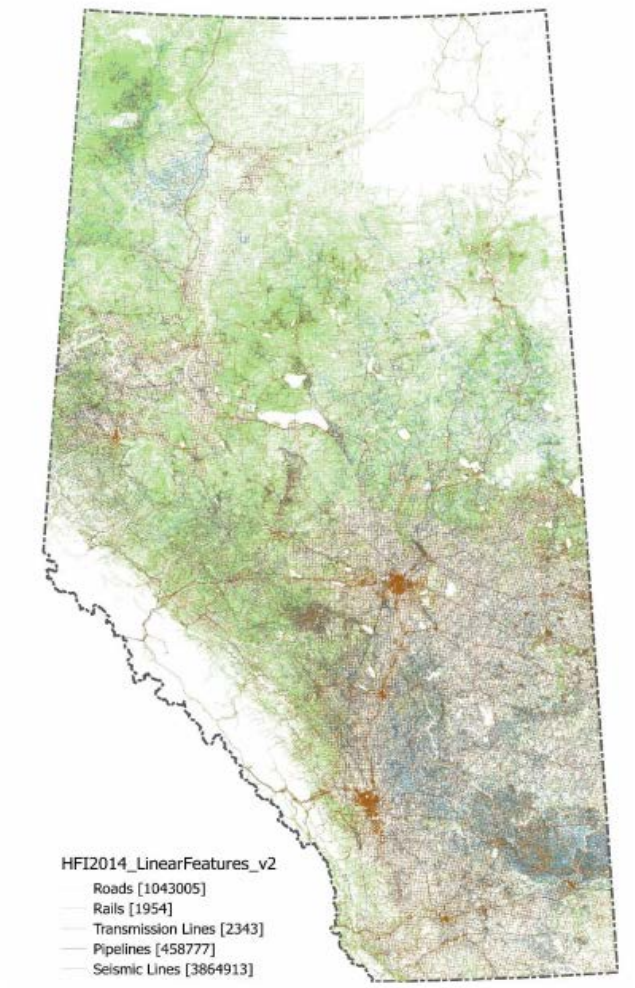


Figure 2: Spatial distribution of 2014 Human Footprint linear features

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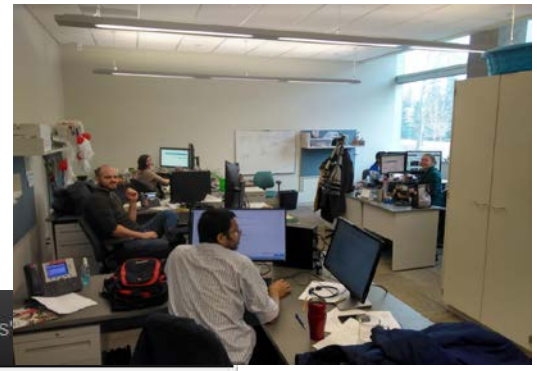
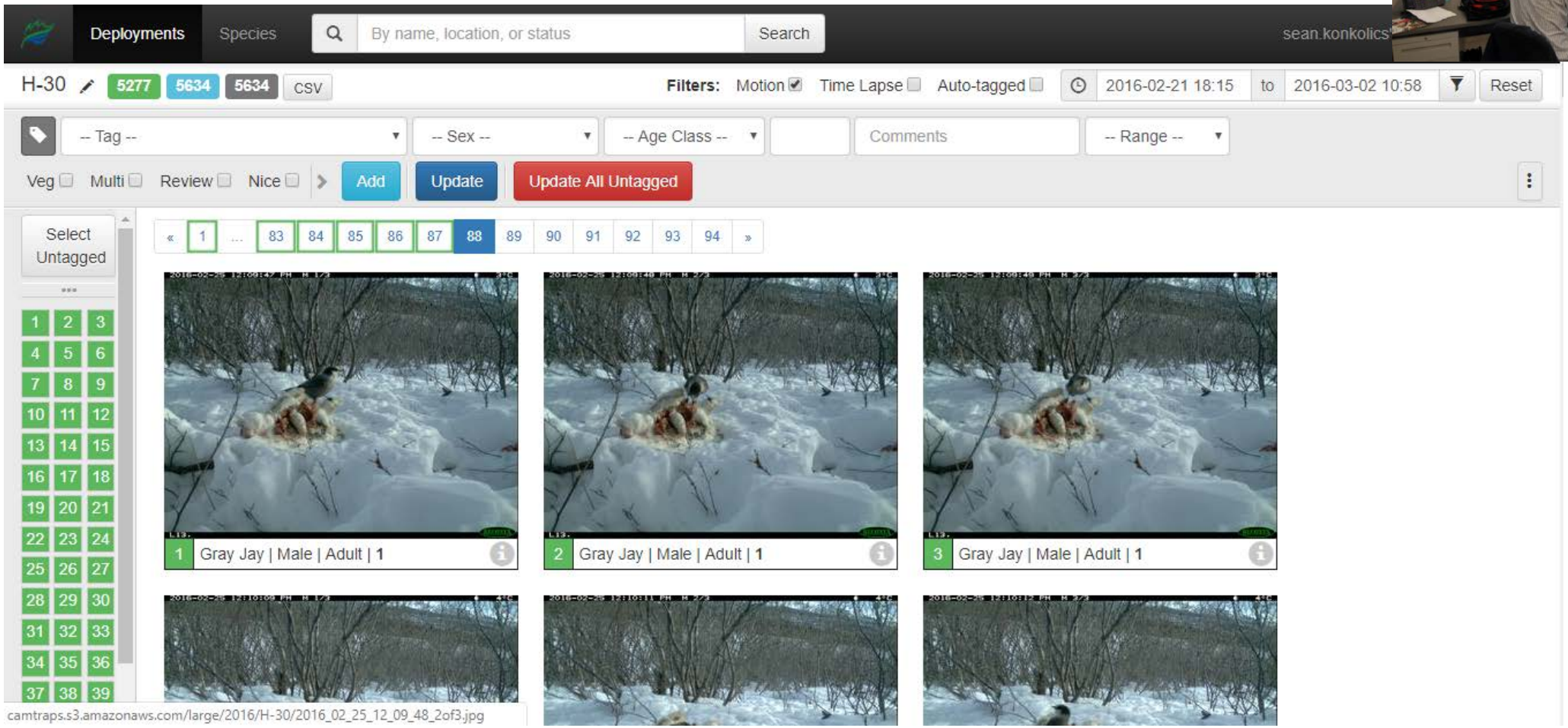
3. Scavenging Dynamics

- Ignoring interactions involving carrion could lead to serious misinterpretations within food-web models (Wilson and Wolkovich 2011, Moleón et al. 2014a)
- Hare-Lynx model system
- Deployed remote cameras on 146 carcasses in the Yukon, Canada
- Assess scavenging communities through time with known predator and prey densities

ABMI's camera program





Capacity and process

- I have downloaded and used many other ABMI products 
- ABMI products are easily accessible 
- Website is easy to use 
- Metadata readily available 

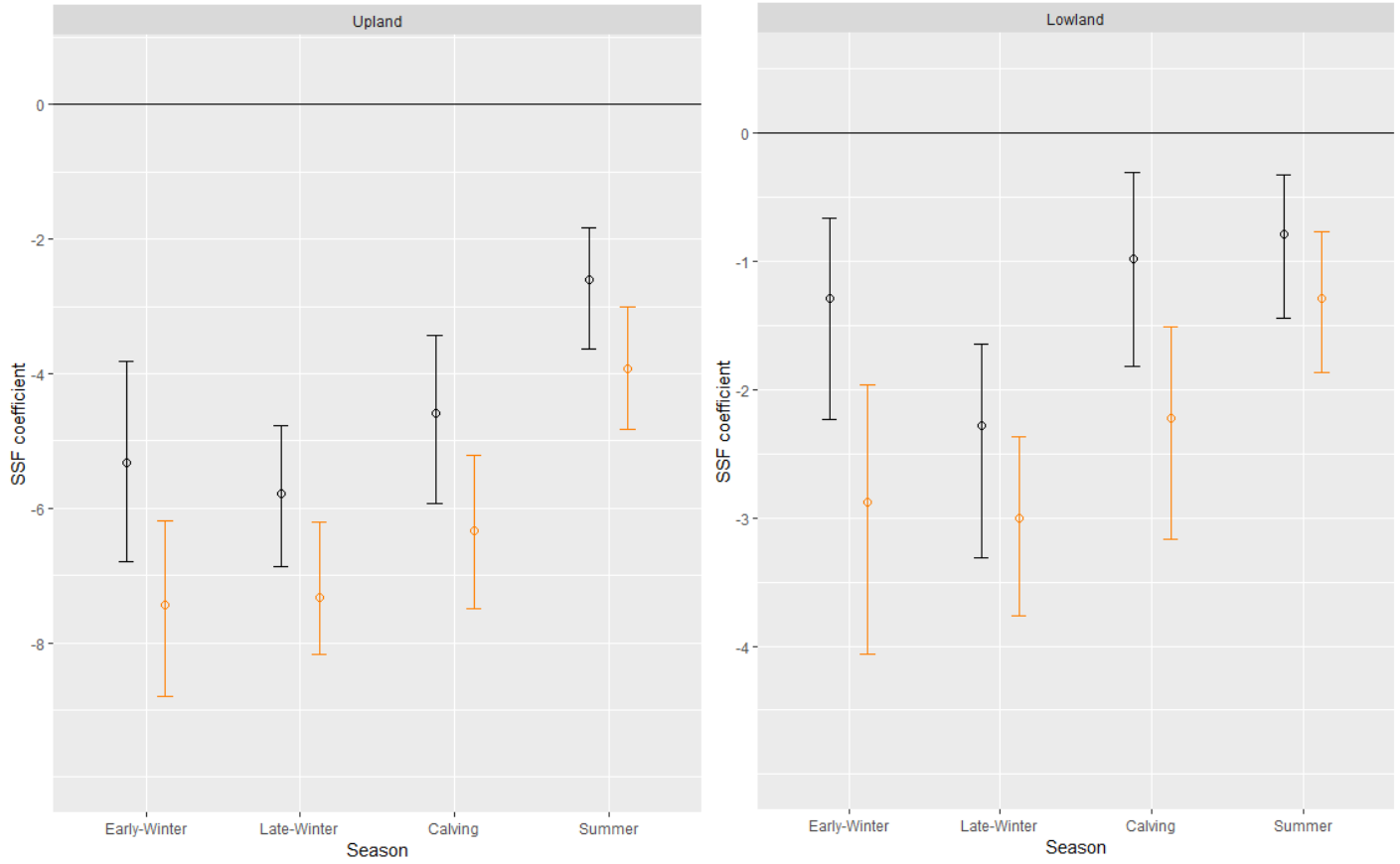
- Personal are excellent and reachable 
- Research capacity 
- ABMI 

Acknowledgements

Thanks:

Mel Dickie
Stan Boutin
Rob Serrouya
Evan DeLancey
Jerome Cranston
Corrina Copp

For more information about our projects, go to **cmu.abmi.ca**


Upland
Lowland
SSF coefficient
0
-2
-4
-6
-8
-1
-3
Early-Winter
Late-Winter
Calving
Summer
Season