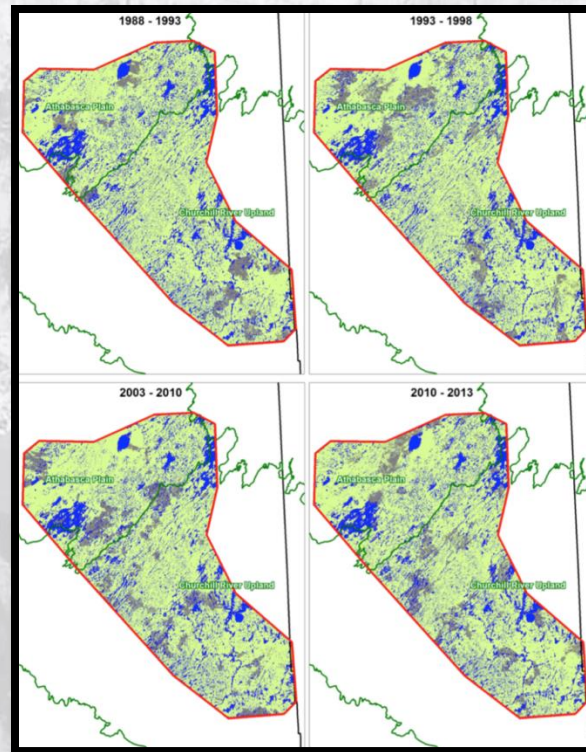


Using Landsat imagery to backcast fire and post-fire residuals in the Boreal Shield of Saskatchewan:

Implications for woodland caribou management



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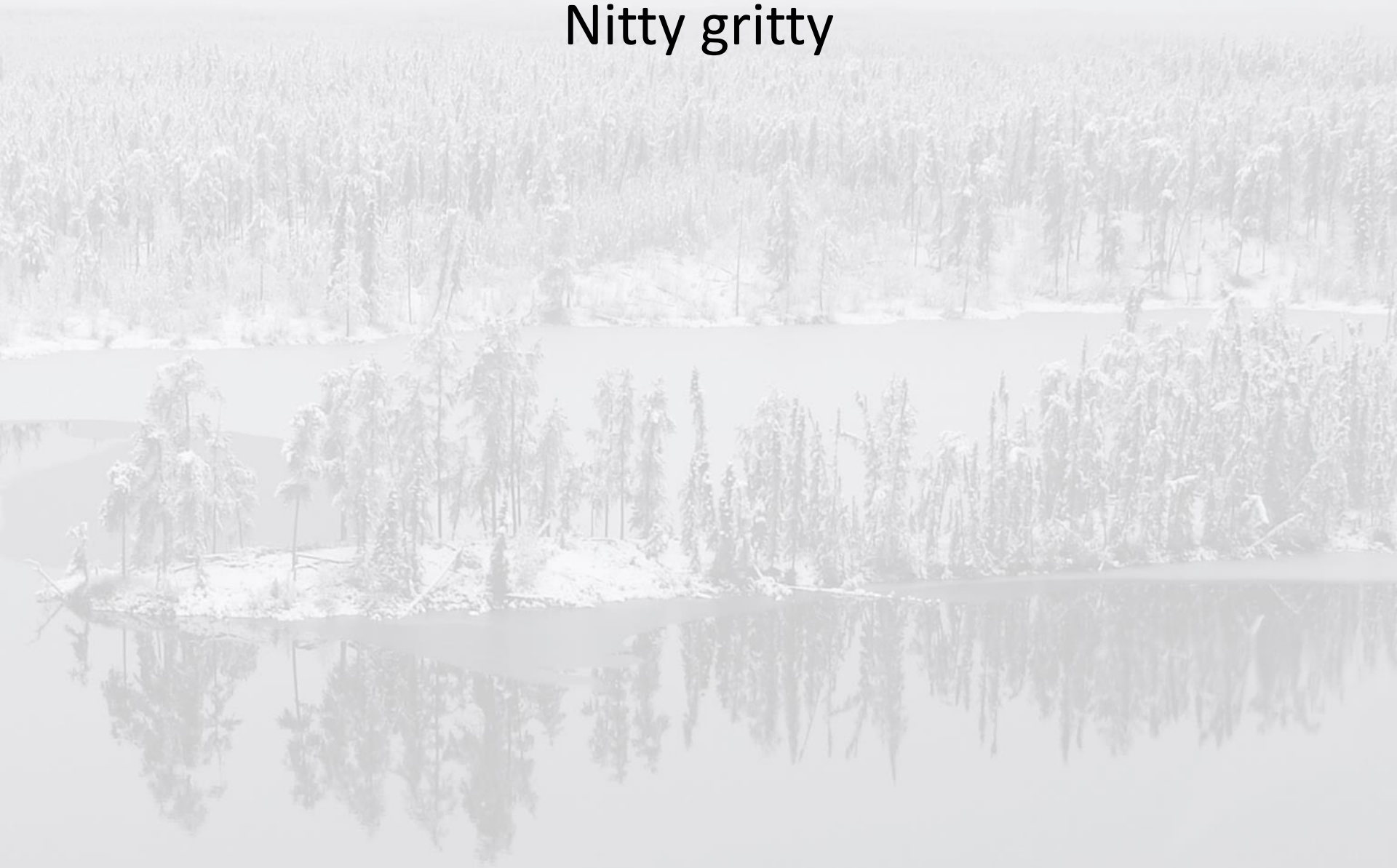
SMA Environmental Forum
October 18-20, 2016 – Saskatoon, Saskatchewan

Acknowledgements



**Saskatchewan
Ministry of
Environment**

Nitty gritty



Nitty gritty

1.

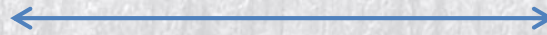
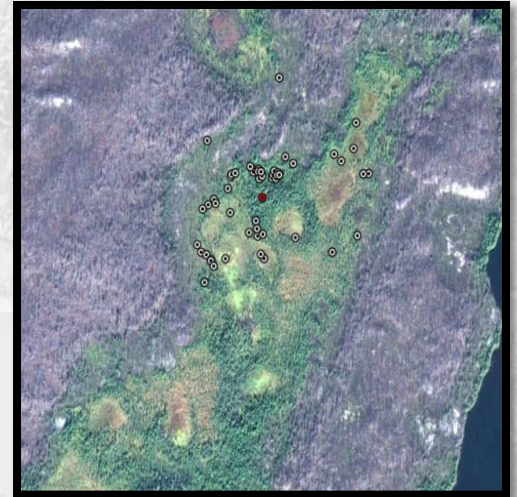


Nitty gritty

1.



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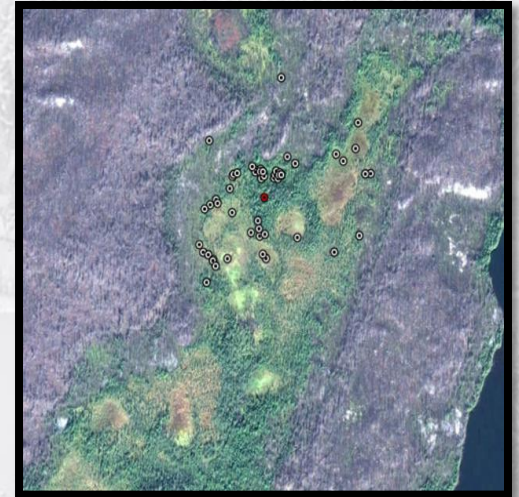


Nitty gritty

1.



2.



SK1
Population
trend....

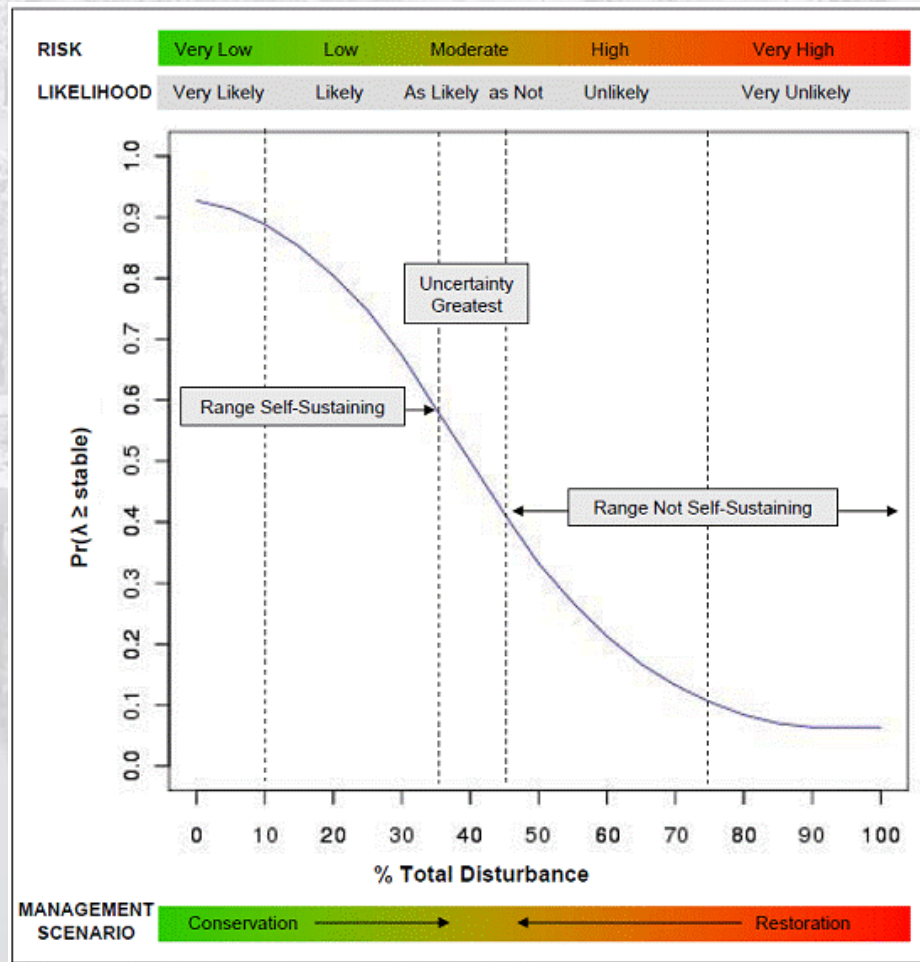
3.



Background

1) The Boreal woodland caribou recovery strategy (RS):

Disturbance threshold: 35% beyond which local populations are predicted to be non-self sustaining.



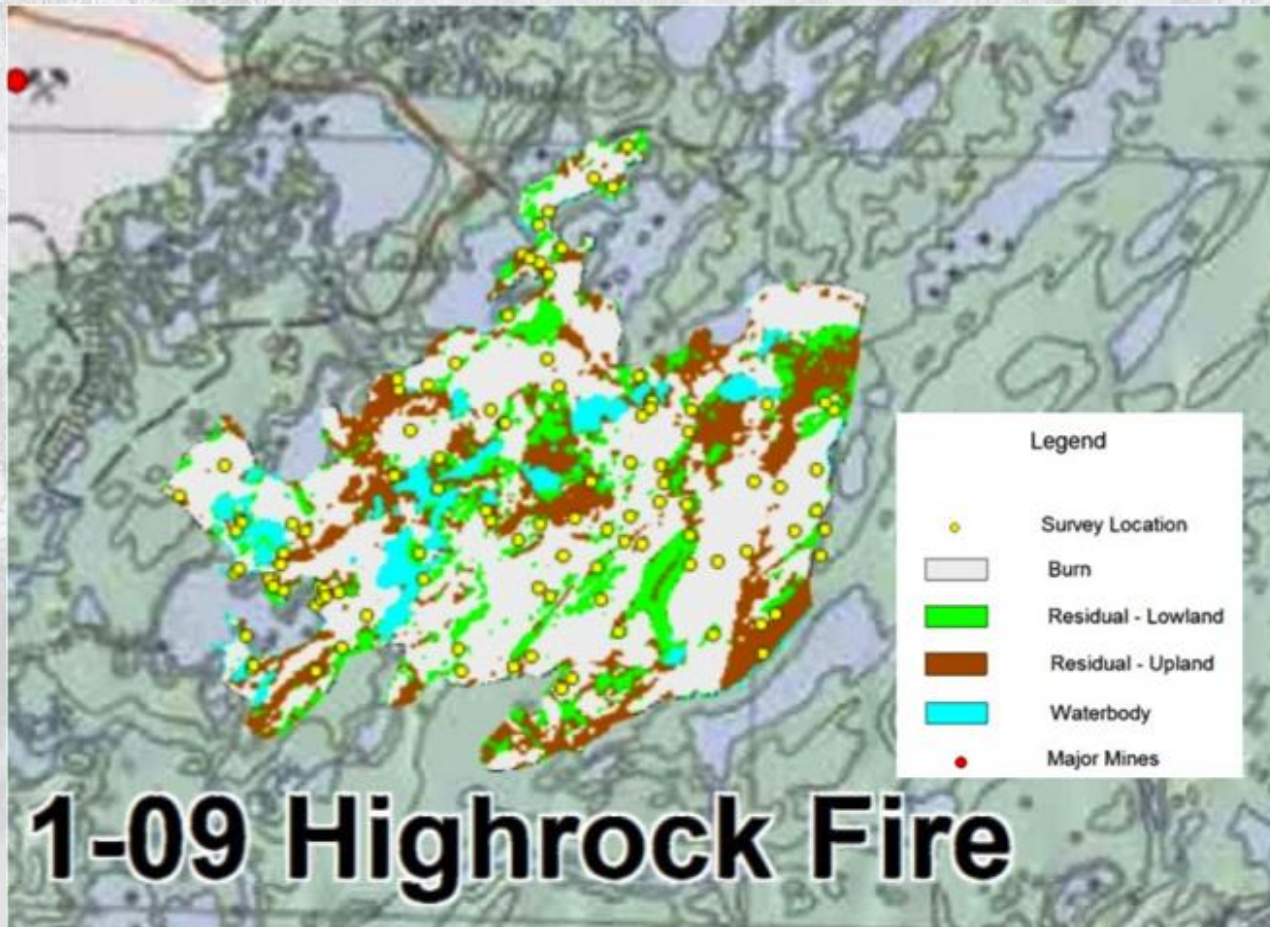
Background

2) Disturbance is quantified as the combined effects of fires <40 years and buffered anthropogenic footprint (visible on Landsat).



Background

3) RS disturbance models assume that all habitats within fire polygons are disturbed as opposed to potential existing habitat.



Objectives

1. introduce and test an approach for more accurate and repeatable delineation of recent past fire events.

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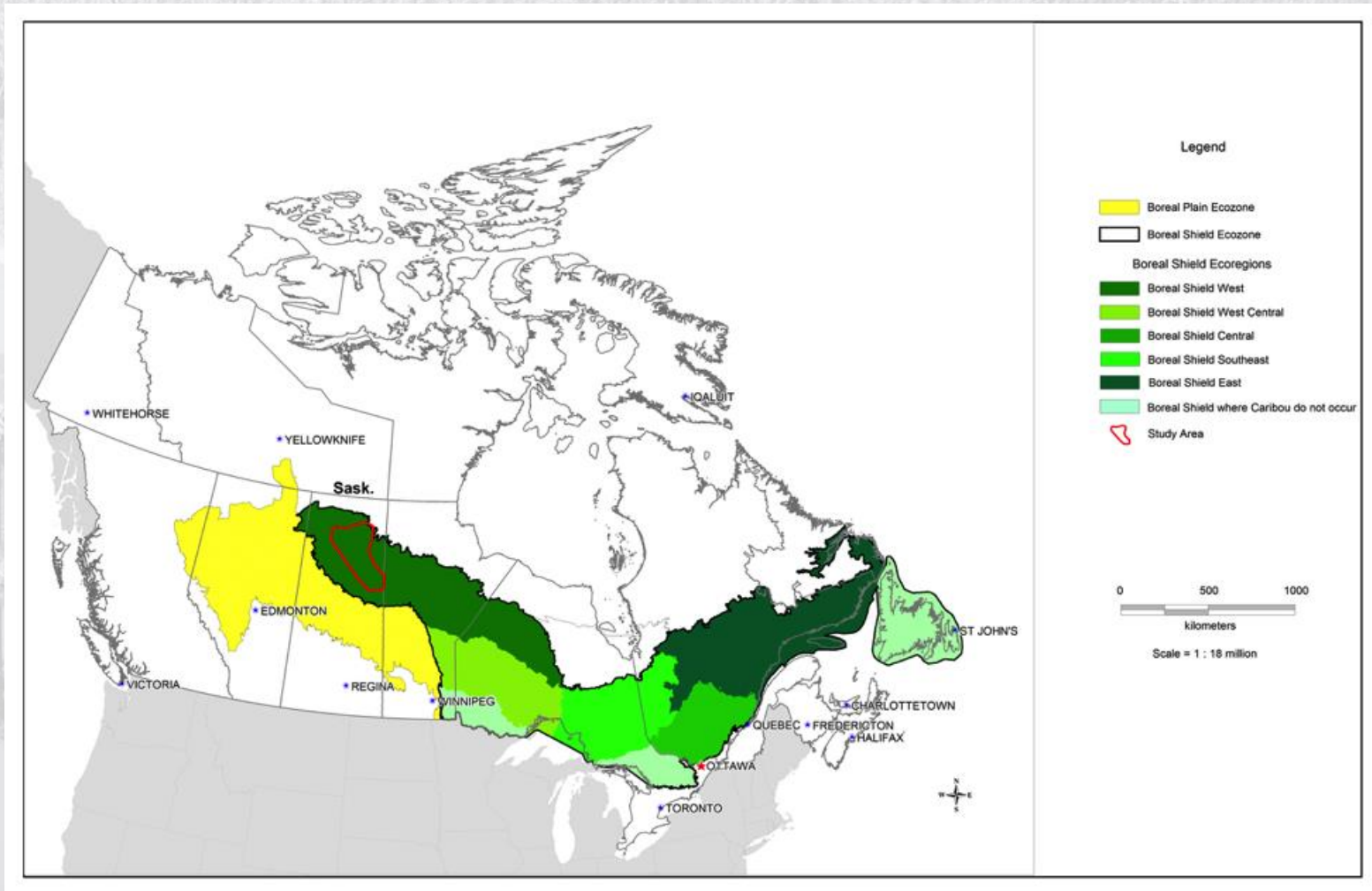
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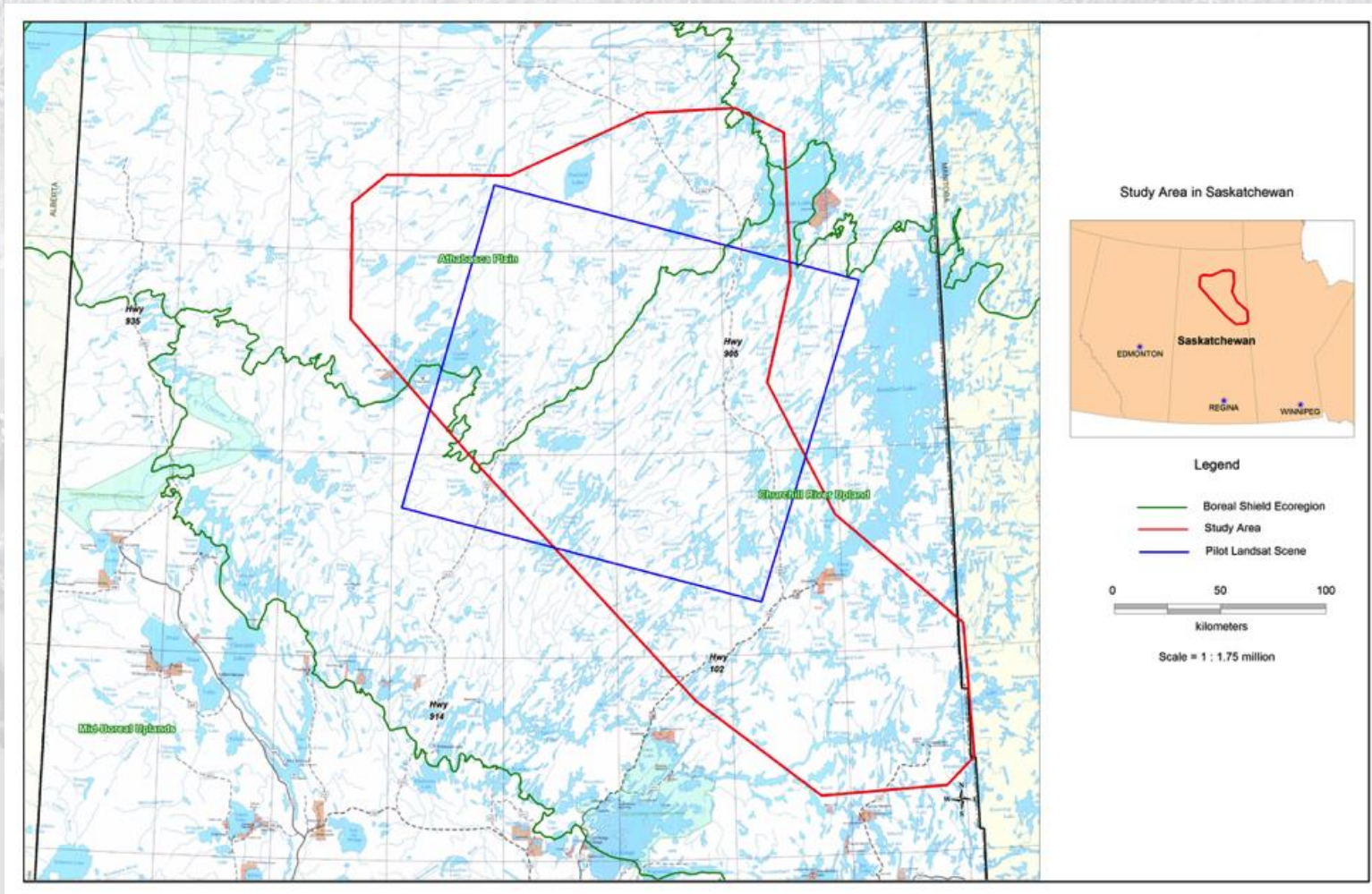
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4. to discuss potential management implications of failing to incorporate post-fire residuals and lakes into the total disturbance model.

Study Area



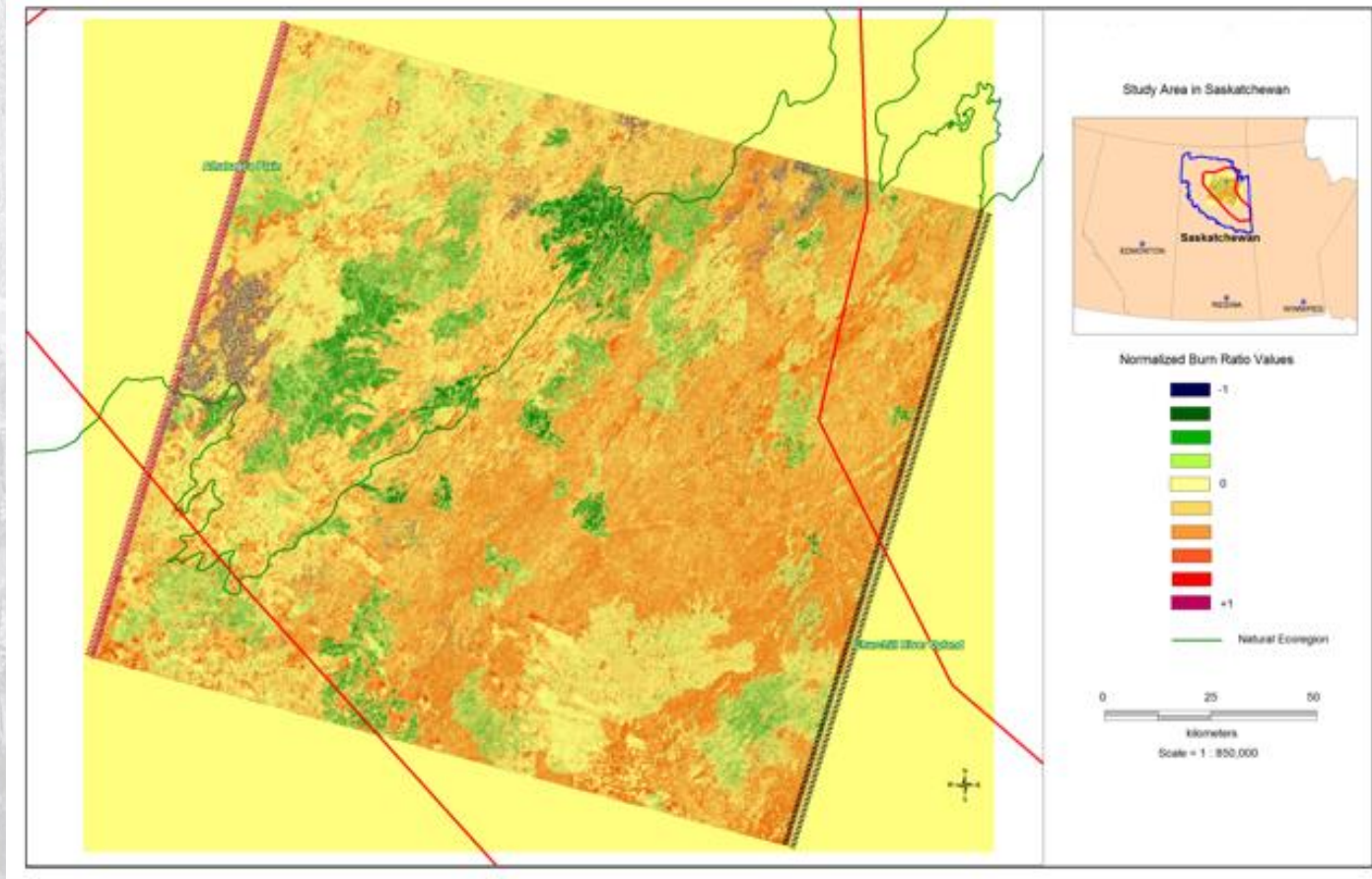
Study Area Location in context of Boreal Shield and Plain Ecozones of Canada.

Ecoregions/Pilot Scene



Study Area and Pilot Landsat TM Scene in Northern Saskatchewan

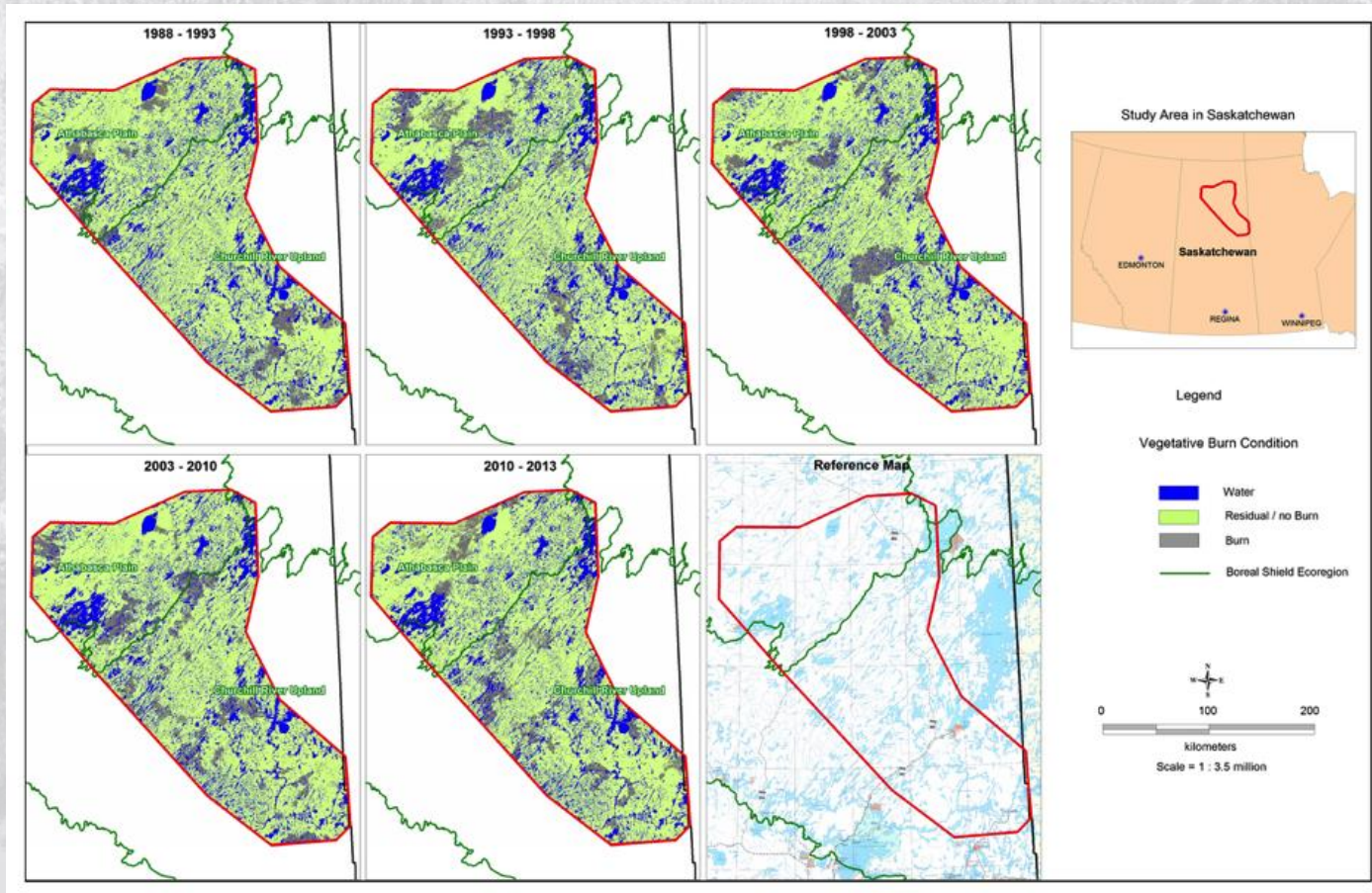
Differenced Normalized Burn Ratio (dNBR) mapping



dNBR analysis with Landsat 5 imagery used to backcast and map fire events and post-fire residuals using 6 pre and post-fire images from 1988 to 2013.

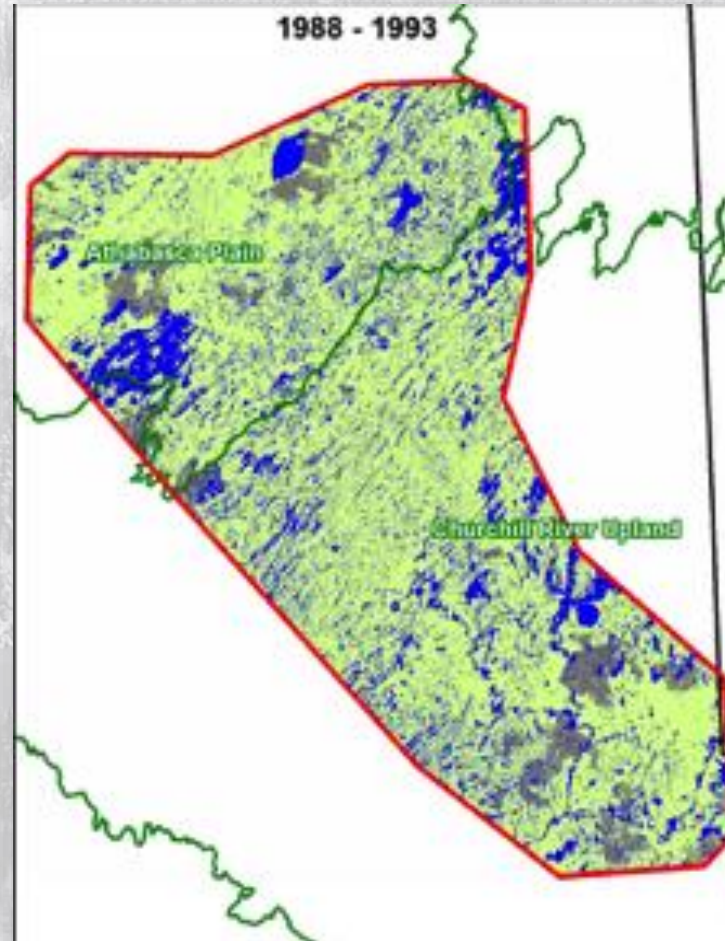
dNBR mapping

- A total of 502 fire events between 1988 and 2013 were analyzed



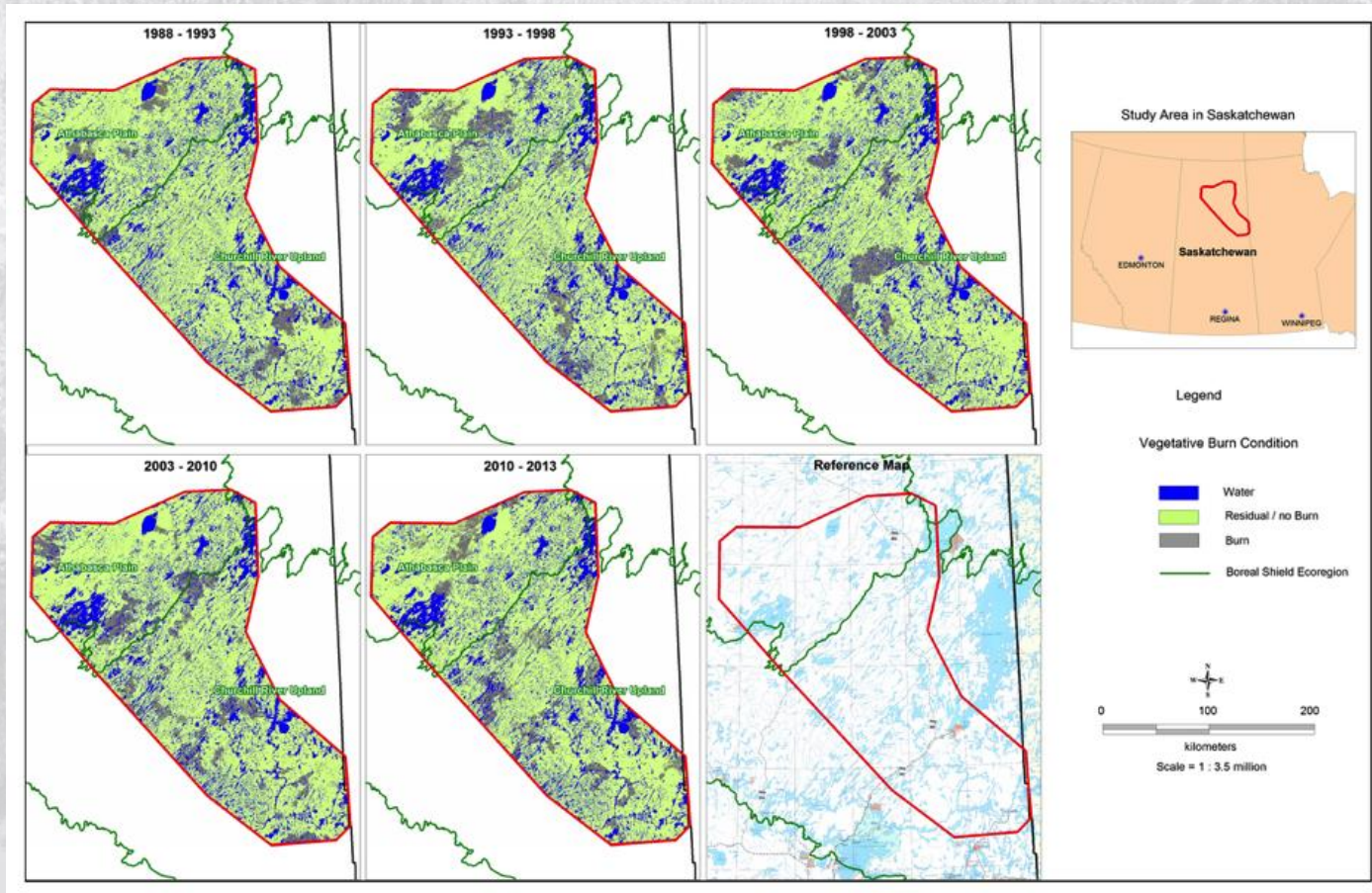
Chronological sequence of vegetative burn condition using dNBR mapping for time periods 1988 to 2013

dNBR mapping



dNBR mapping

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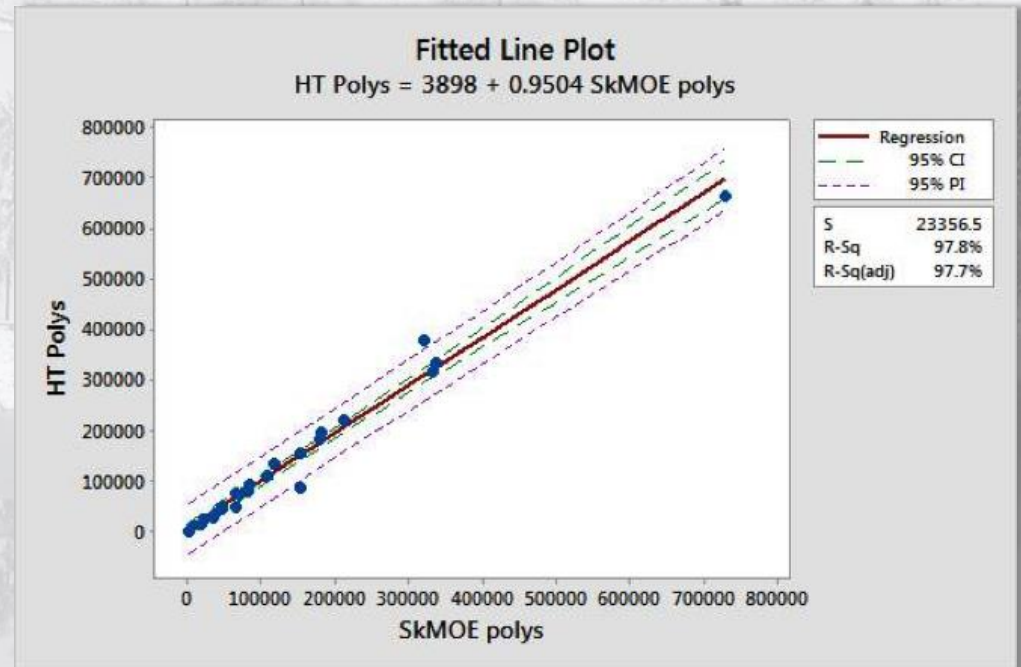


Chronological sequence of vegetative burn condition using dNBR mapping for time periods 1988 to 2013

Results

Strong correlation in polygon boundaries between provincial fire maps and Landsat-derived polygons

A near 1:1 linear relationship



Results

Residuals within fire polygons

Within the 502 fire polygons:

- 23.8% post-fire residuals
- 8.0% water

Therefore approximately 1/3 (31.8%) of the Landsat derived fires were not actually burned.

**THESE RESIDUALS COULD
POTENTIALLY BE HABITAT FOR
CARIBOU**



Conclusions

- dNBR analysis is an accurate, repeatable, and economic method of backcasting fire and mapping residuals
- Provincial fire mapping significantly over-estimates percent fire disturbance
- Post-fire residuals should be incorporated into disturbance management thresholds and range planning
- Post-fire residuals and water bodies may serve as seasonally important habitat for Boreal Shield caribou

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Thank you!

