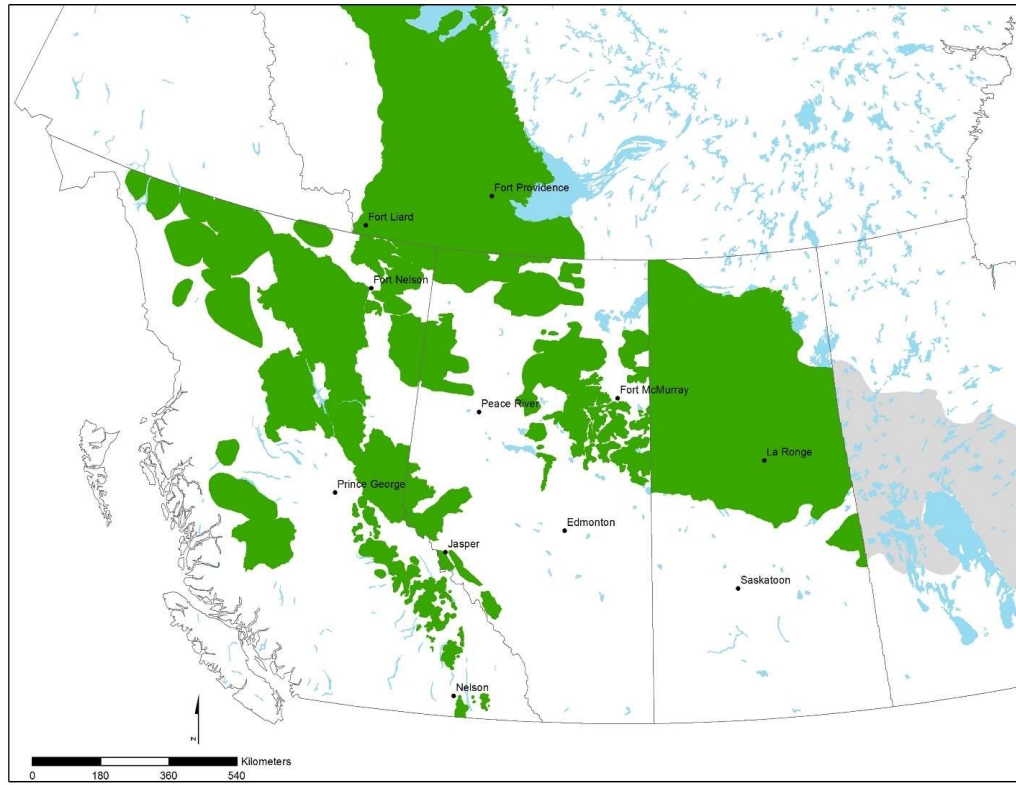
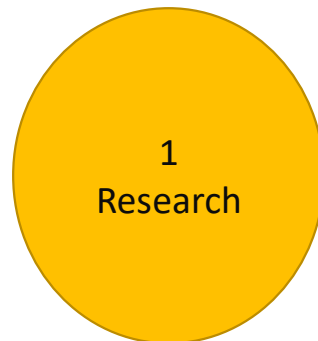




Revelstoke Range planning

Rob Serrouya





CONTRIBUTED PAPER |  Open Access | 

Habitat loss accelerates for the endangered woodland caribou in western Canada

Mariana Nagy-Reis, Melanie Dickie, Anna M. Calvert, Mark Hebblewhite, Dave Hervieux, Dale R. Seip, Sophie L. Gilbert, Oscar Venter, Craig DeMars, Stan Boutin, Robert Serrouya 

First published: 26 April 2021 | <https://doi.org/10.1111/csp2.437> | Citations: 1

Dale Seip is retired.

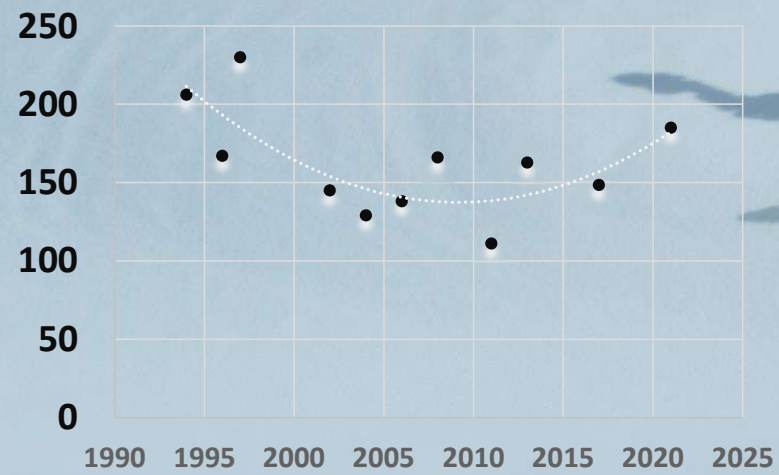
Funding information: Environment and Climate Change Canada; Government of Alberta; Government of British Columbia; University of Montana; Mitacs; NASA, Grant/Award Number: NNX15AW71A

— [Article](#) —

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Columbia North

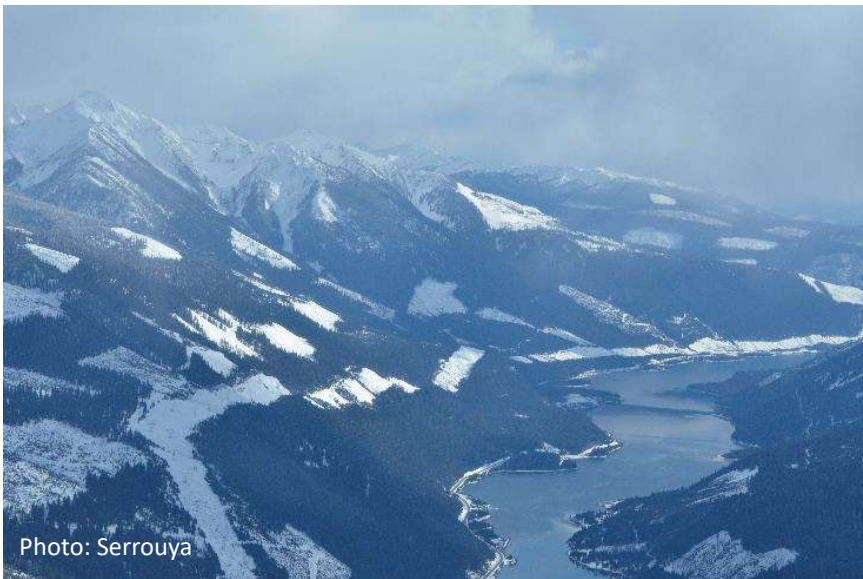


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Background

- **Habitat loss** is one of the leading causes of species endangerment



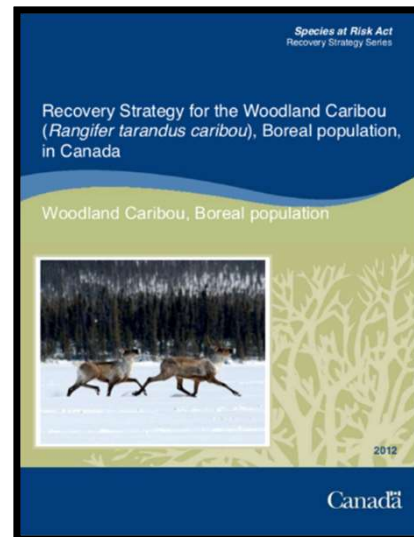
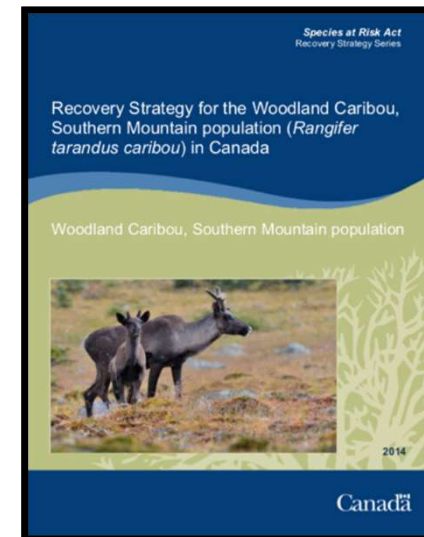
Permanent or temporary
conversion of favorable
environment to an altered state

(Kerr & Cihlar 2004; Venter et al. 2006; IUCN 2020)



Background

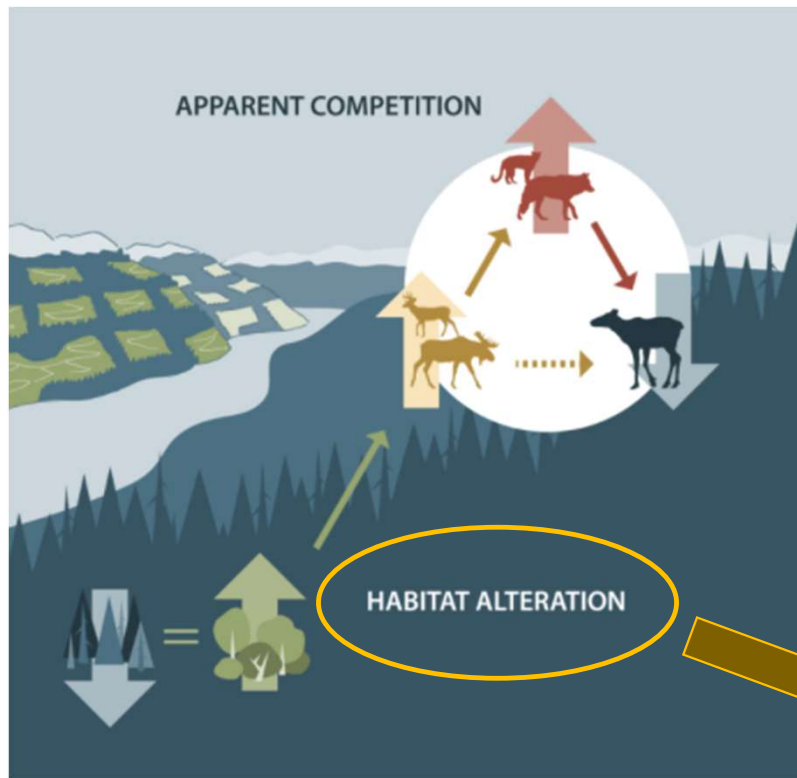
- **Habitat loss** is also a leading factor inhibiting the recovery of endangered species
- Most **species-at-risk legislation** and **recovery planning** focus on habitat conservation and restoration



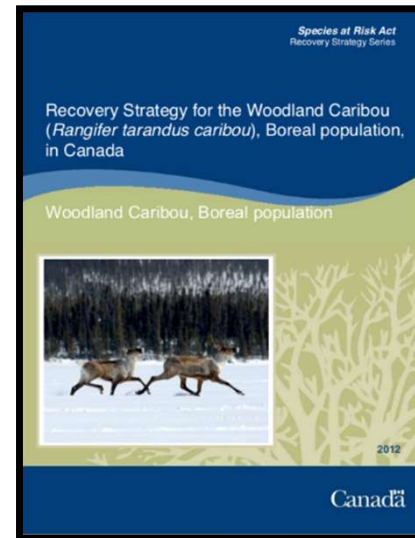
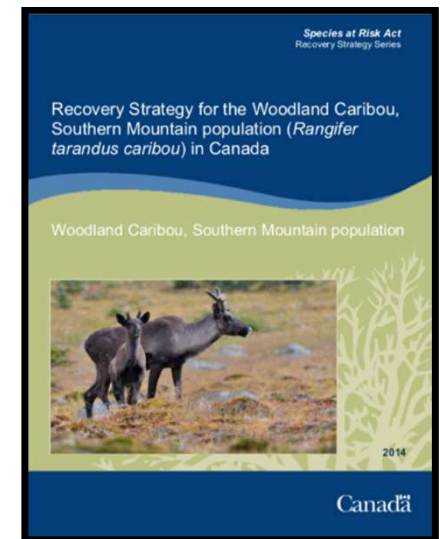
(Kerr & Deguise 2004; Adamowicz 2016)



Background



(Environment Canada 2012a, 2012b, 2014)

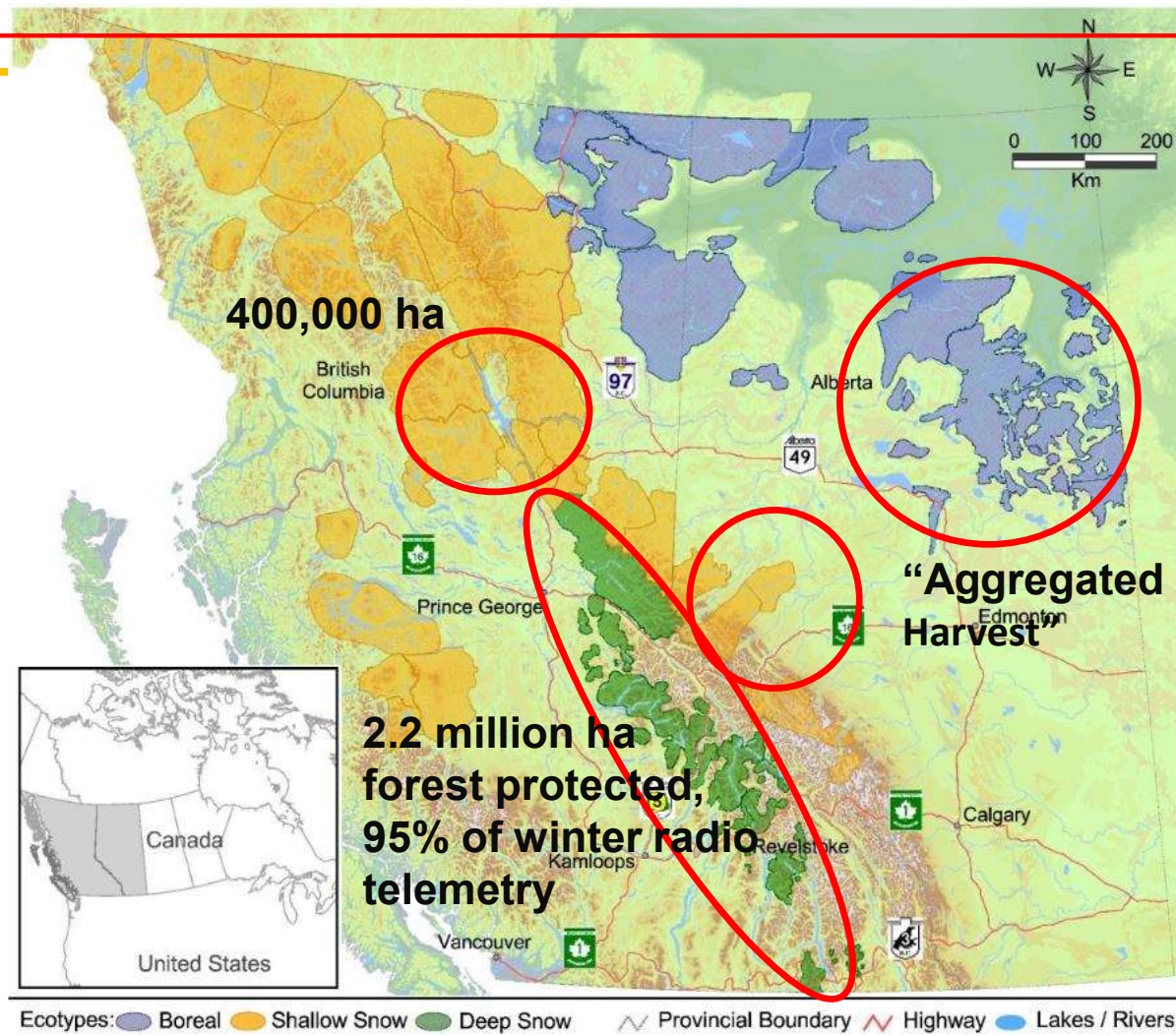


Long-term conservation
and restoration of habitat

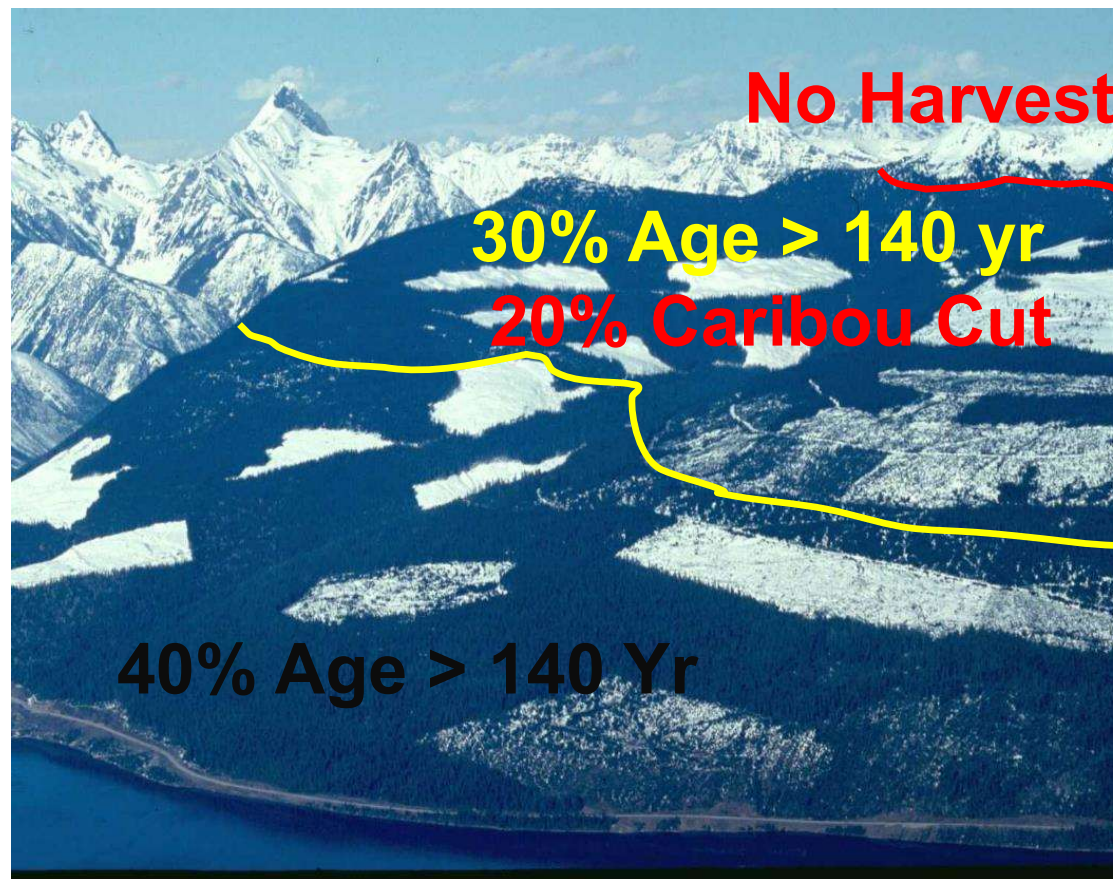


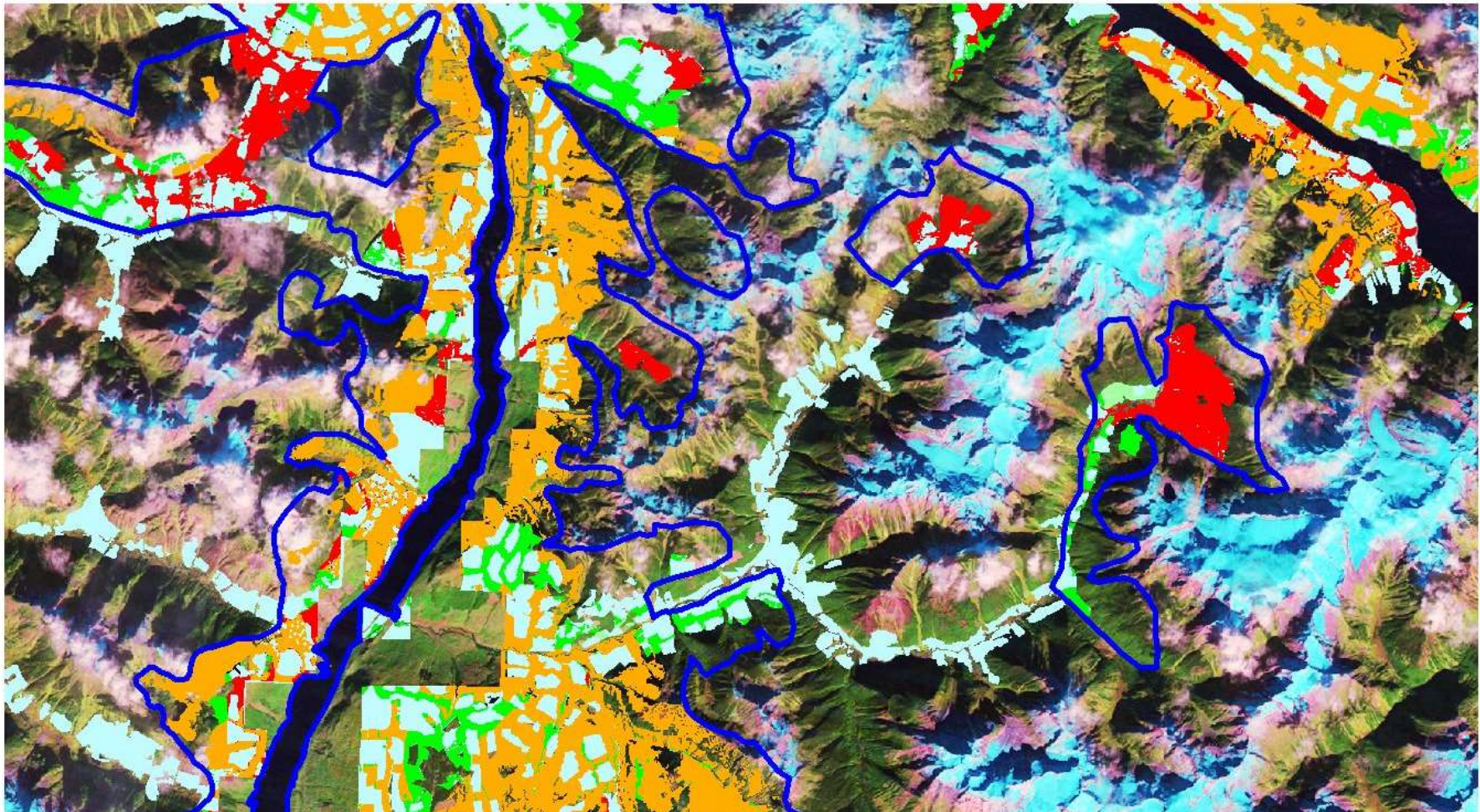


Habitat protection



Land use Planning Strategies - Deep snow





**But, have these policies moved the
needle?**

Photo: Serrouya



**But, have these policies moved the
needle?**

**And.... Is this information really
news?**

The difference between:

State vs Rate

And

Gross Loss vs Net Change

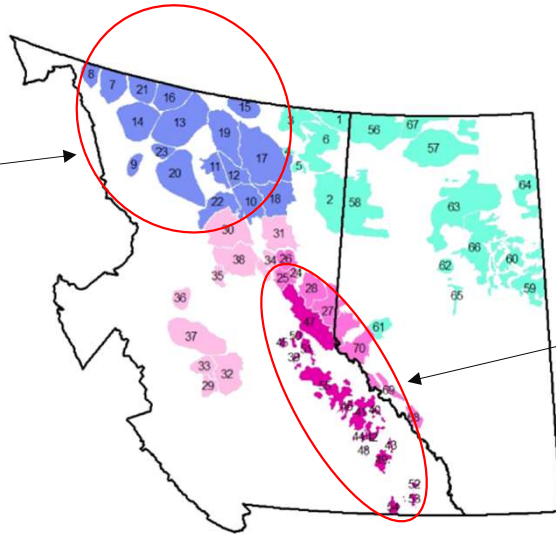
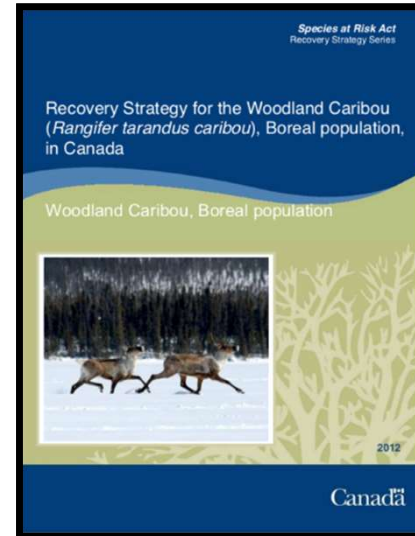
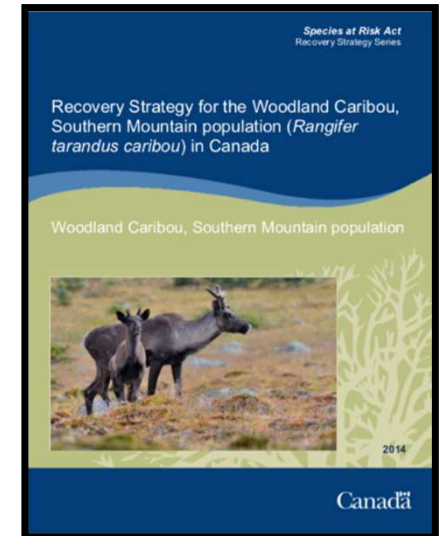
Photo: Serrouya



Objectives

- Evaluate whether changes in caribou habitat are on a trend to meet recovery goals and objectives
 - Does net caribou habitat loss show a decreasing trend over time?

Special concern



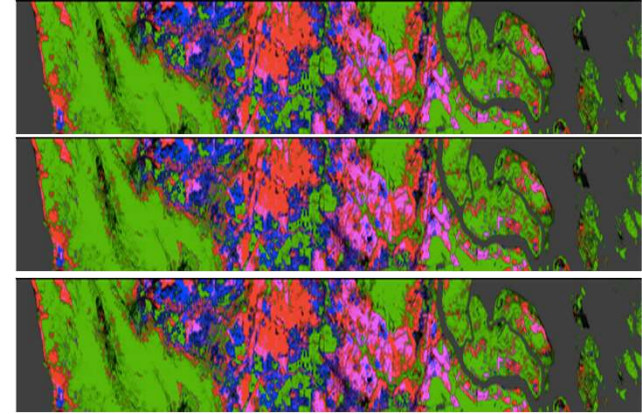
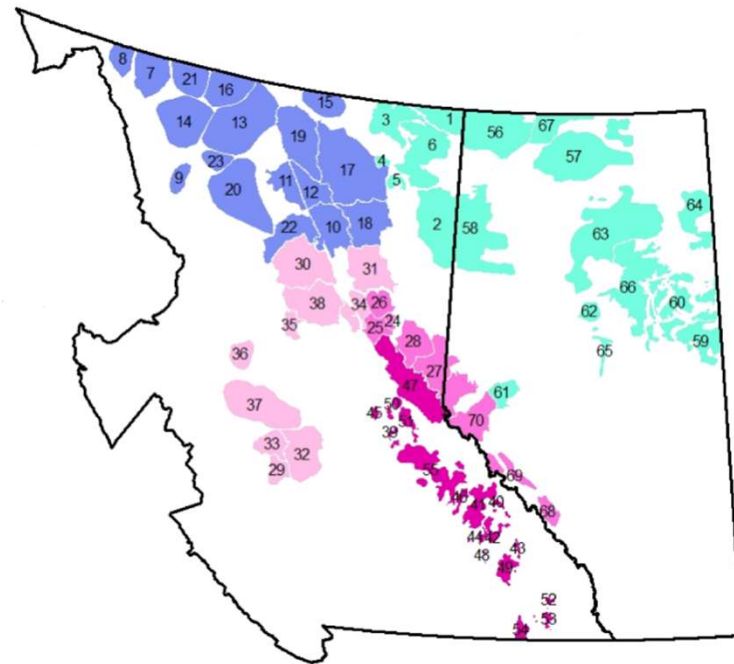
COSEWIC 2014:
Endangered...but still
not ratified by Federal
Government



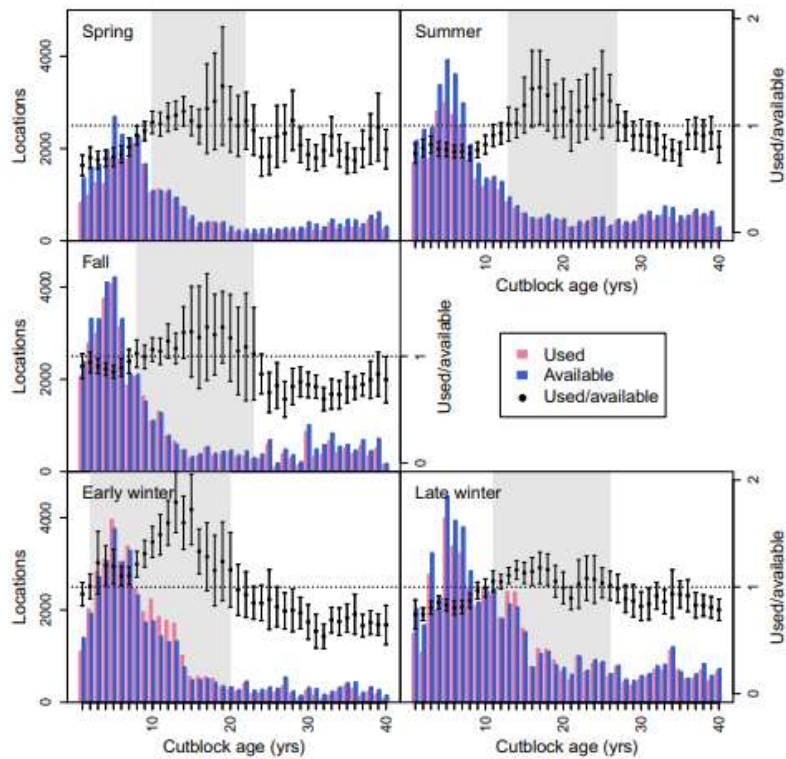
Methods

- **Remotely sensed data** (2000 – 2018)
 - Habitat (gross) loss **2000 to 2018**
 - Habitat (net) change **2000 to 2012**
 - **Habitat GAIN??**
 - Disturbance type (fire and harvest) from Canada Landsat Disturbance dataset
- 72 woodland caribou ranges (AB + BC)

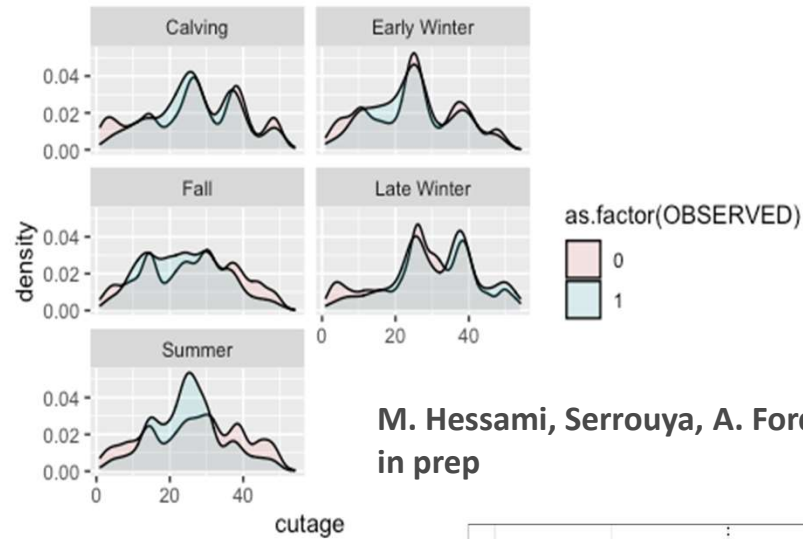
(Hansen et al. 2013; Guindon et al. 2017)



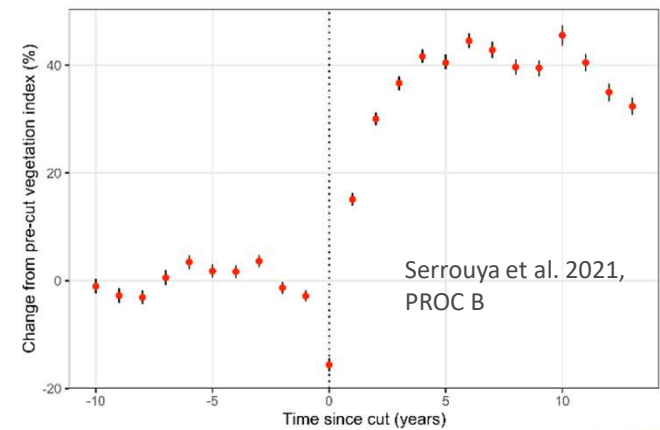
Habitat Gain?



Mumma et al. 2020, For Ecol Management



M. Hessami, Serrouya, A. Ford,
in prep



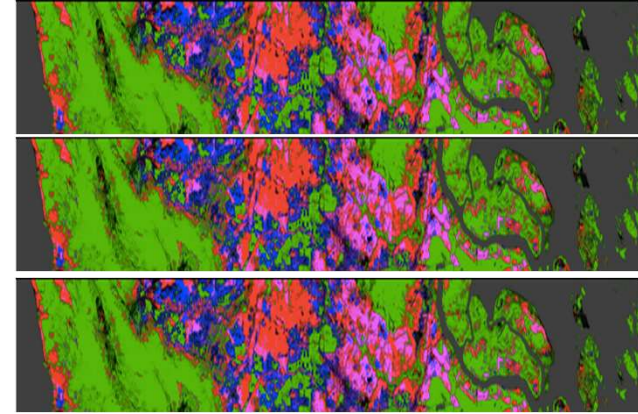
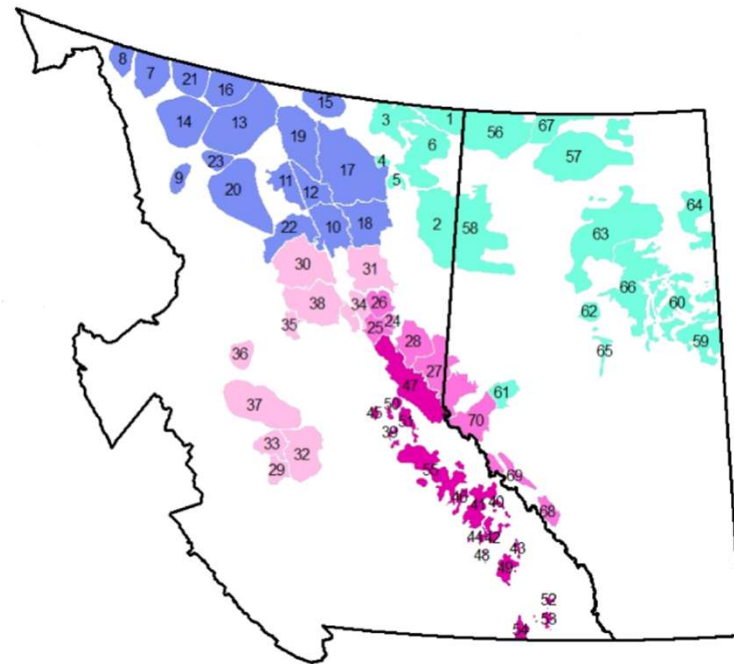
Serrouya et al. 2021,
PROC B



Methods

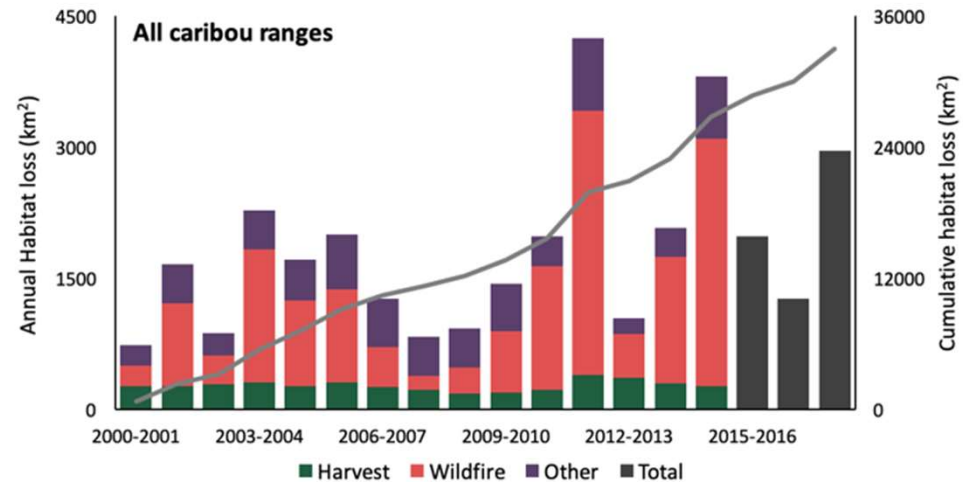
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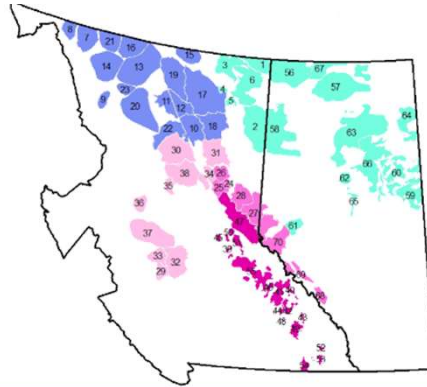
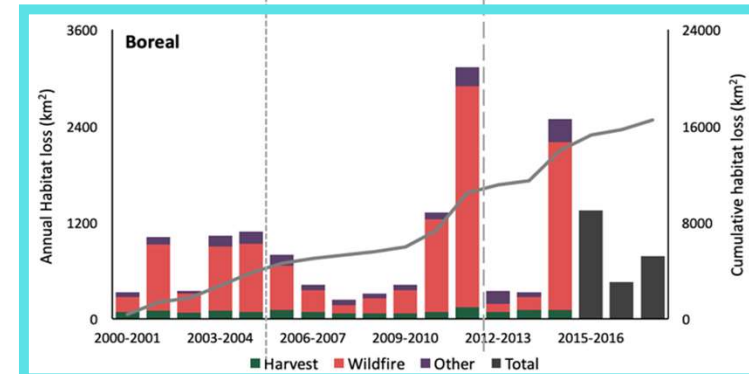
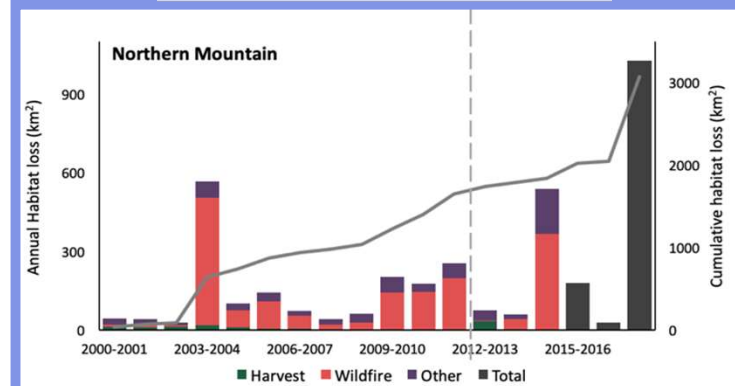
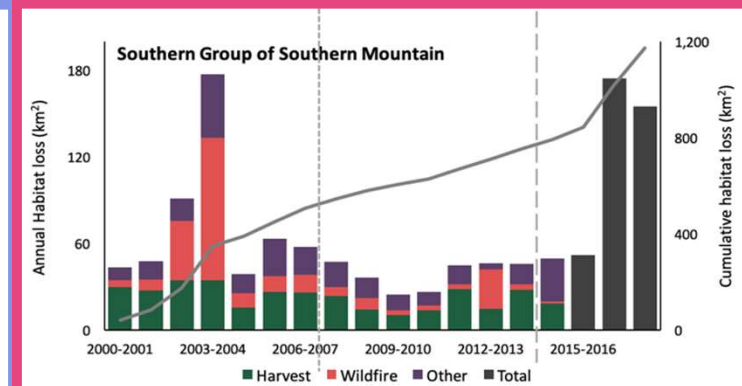
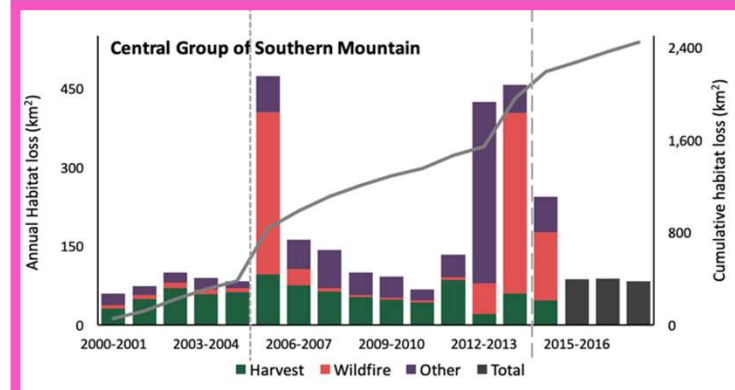
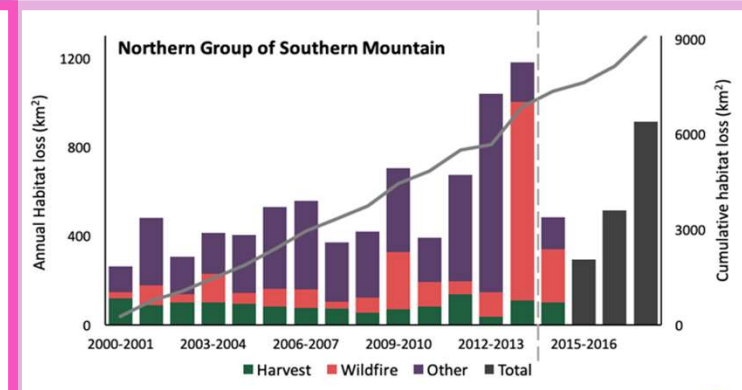
Results – Gross Loss

- **Loss accelerates**
($T = -2.26, p < 0.05$)
- 7 ranges have lost nearly $\frac{1}{4}$ of their habitat since 2000
- Loss in AB was about 2x that of BC



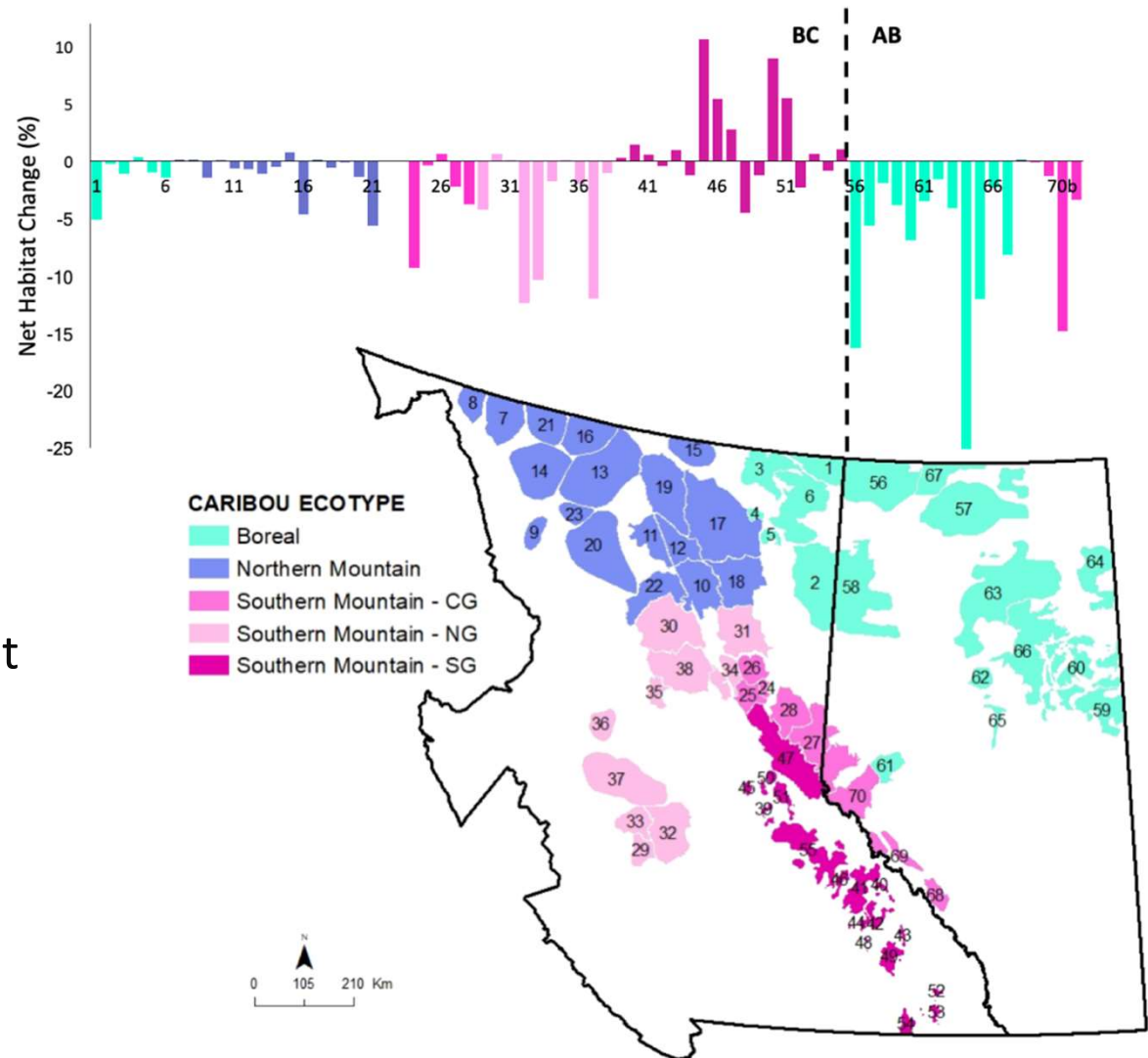
Results – Gross

- **Boreal** and **Northern Mountain** caribou affected most by **forest fire**
- **Southern Mountain** caribou affected more by **forest harvest**



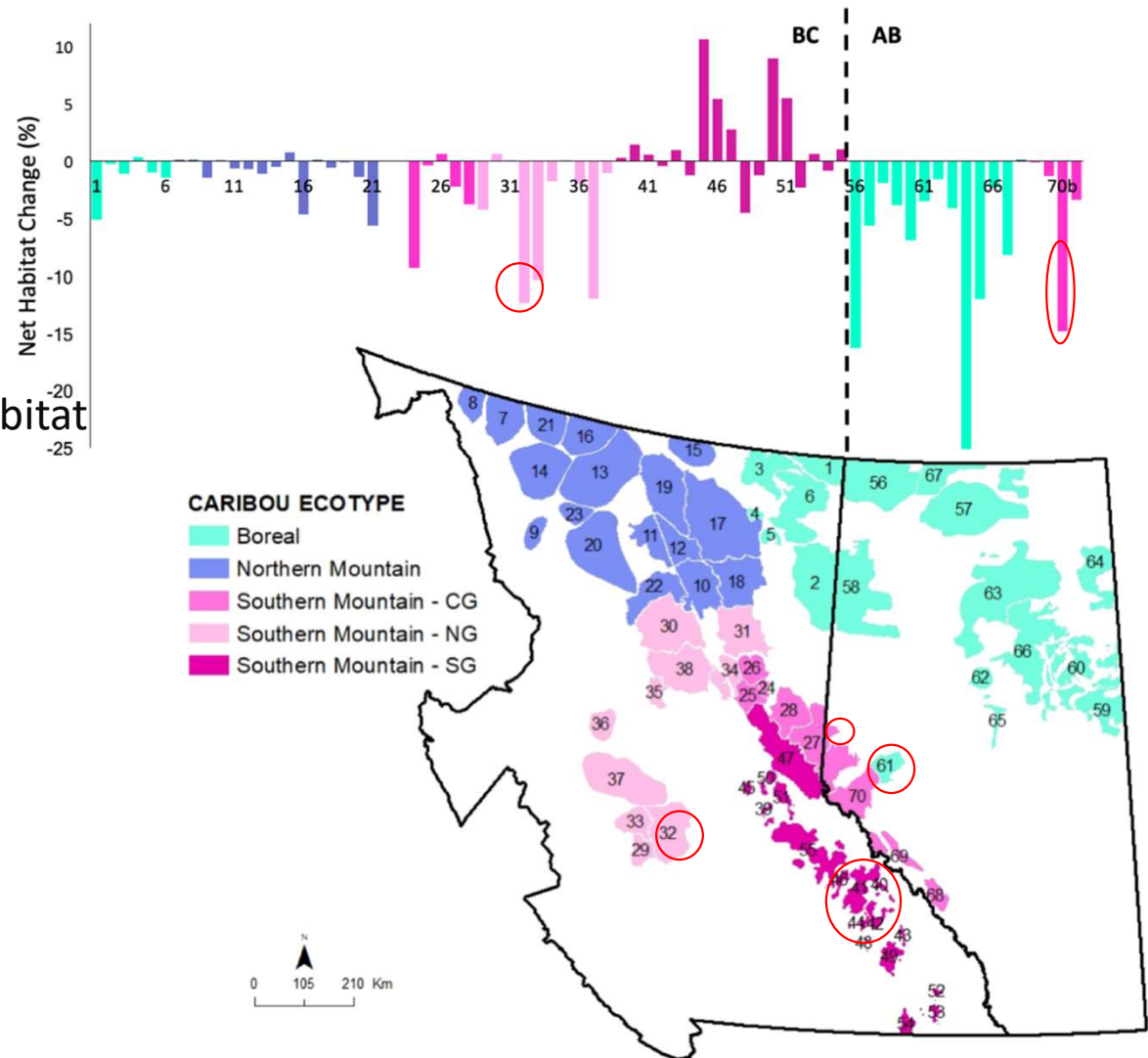
Results - Net change 2000 to 2012

- Annual habitat loss over 2x the gain
- Loss > gain in ~60% of the caribou ranges
- No net habitat increase in AB
- **Boreal caribou** in AB: highest habitat loss and poorest net change
- **Southern Mountain** caribou in BC: most net habitat gain



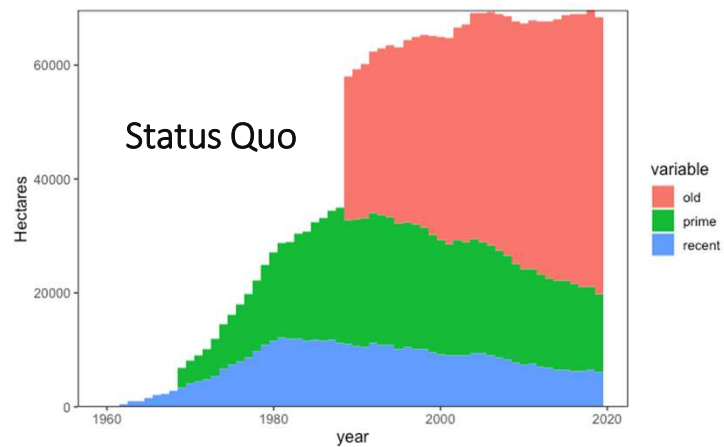
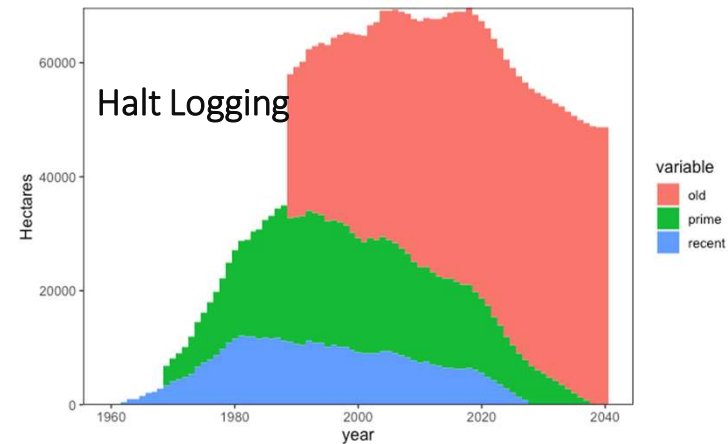
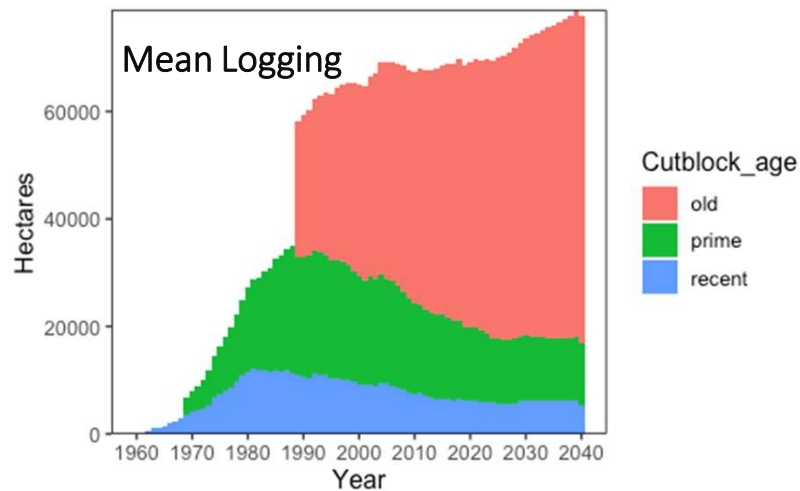
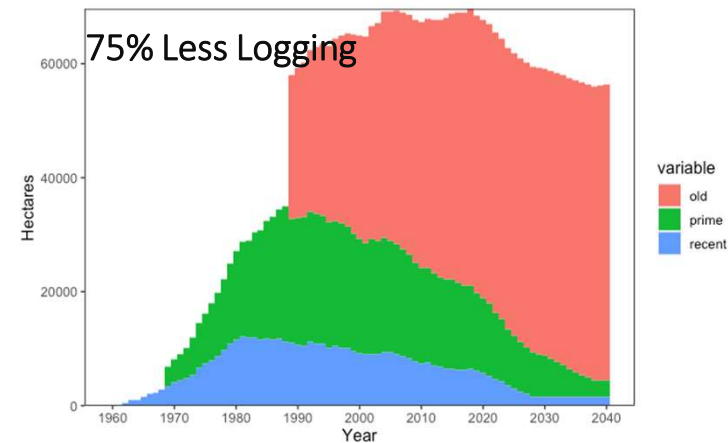
Results - Net change 2000 to 2012

- Narraway AB: 10 x loss vs gain
- Little Smoky: 2 x loss vs gain, 70% of habitat loss is forestry
- Itcha-Ilgachuz:
 - 1,479 km² Lost
 - 300 km² Gained
 - 700 km² Lost since 2012
 - 90% population decline since 2000
- Revelstoke complex:
 - 198 km² Lost
 - 269 km² Gained



Gain > Loss – Reduction in Moose habitat

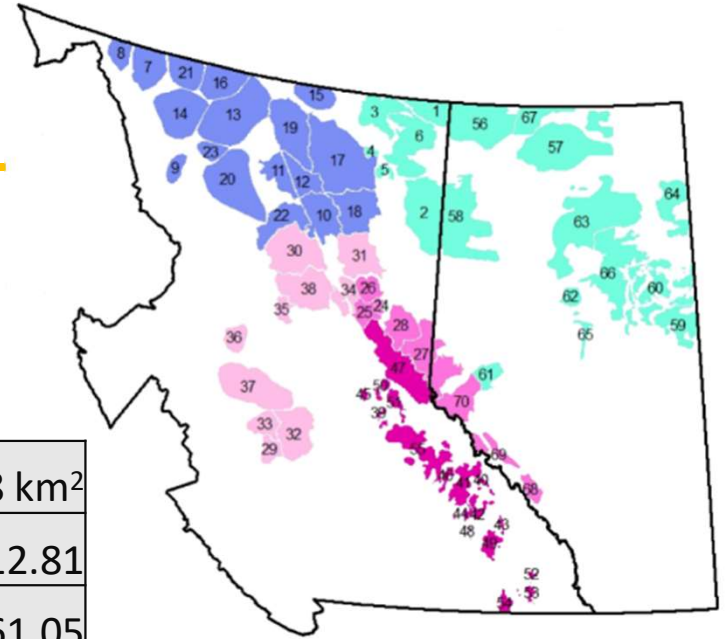
Mateen Hessami,
Adam Ford, UBC
Okanagan



Zoom in to the Revy complex

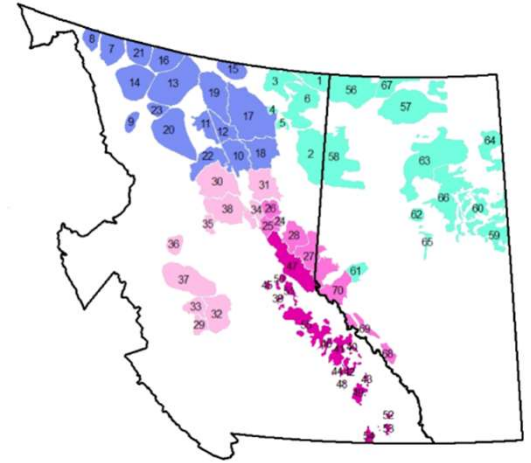
- Habitat loss trends, 1st half vs second half

SubPop	2000 - 2009 km ²	2010 - 2018 km ²
Central Rockies	9.97	12.81
Columbia North	96.26	61.05
Columbia South	22.84	26.20
Duncan	4.30	7.97
Frisby-Boulder	16.68	5.30
Groundhog	8.47	25.33
Monashee	10.26	1.92
Nakusp	70.77	23.18

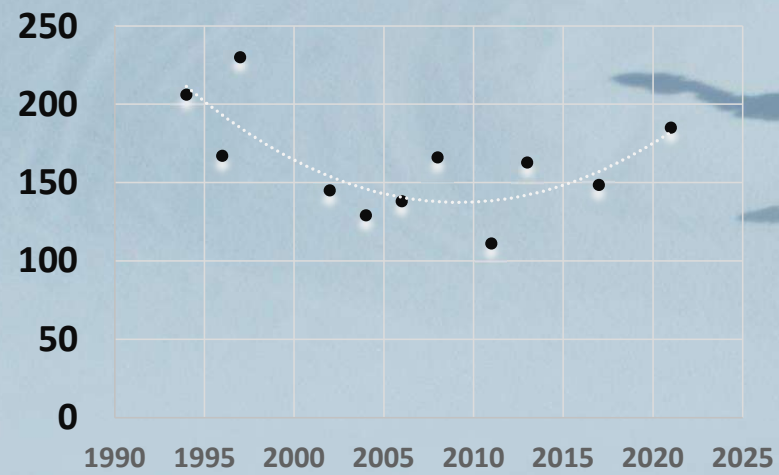


How do we reverse these habitat trends?

- Interactive map...



Columbia North



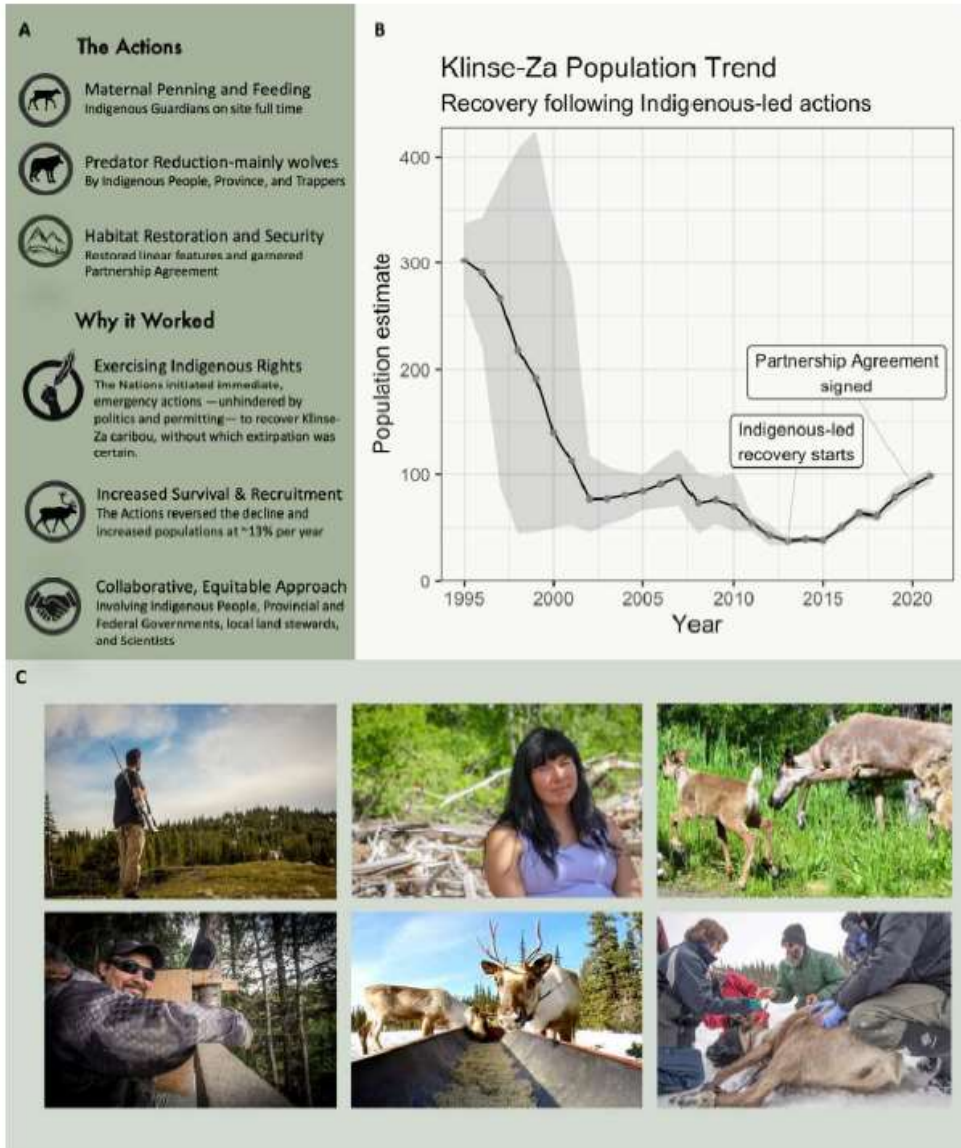
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Indigenous-led conservation: pathways to recovery for the nearly extirpated Klinse-Za mountain caribou

Journal:	<i>Ecological Applications</i>
Manuscript ID	EAP20-0883.R2
Wiley - Manuscript type:	Articles
Date Submitted by the Author:	n/a
Complete List of Authors:	Lamb, Clayton; The University of British Columbia Faculty of Science, Biology Willson, Roland; West Moberly First Nations Richter, Carmen; Saulteau First Nations Owens-Beek, Naomi; Saulteau First Nations Napoleon, Julian; Saulteau First Nations Muir, Bruce; West Moberly First Nations McNay, R. Scott; Wildlife Infometrics Lavis, Estelle; Saulteau First Nations Hebblewhite, Mark; University of Montana, Wildlife Biology Program Giguere, Line; Wildlife Infometrics, Inc Dokkie, Tamara; West Moberly First Nations Boutin, Stan; University of Alberta Ford, Adam; The University of British Columbia Faculty of Science, Biology

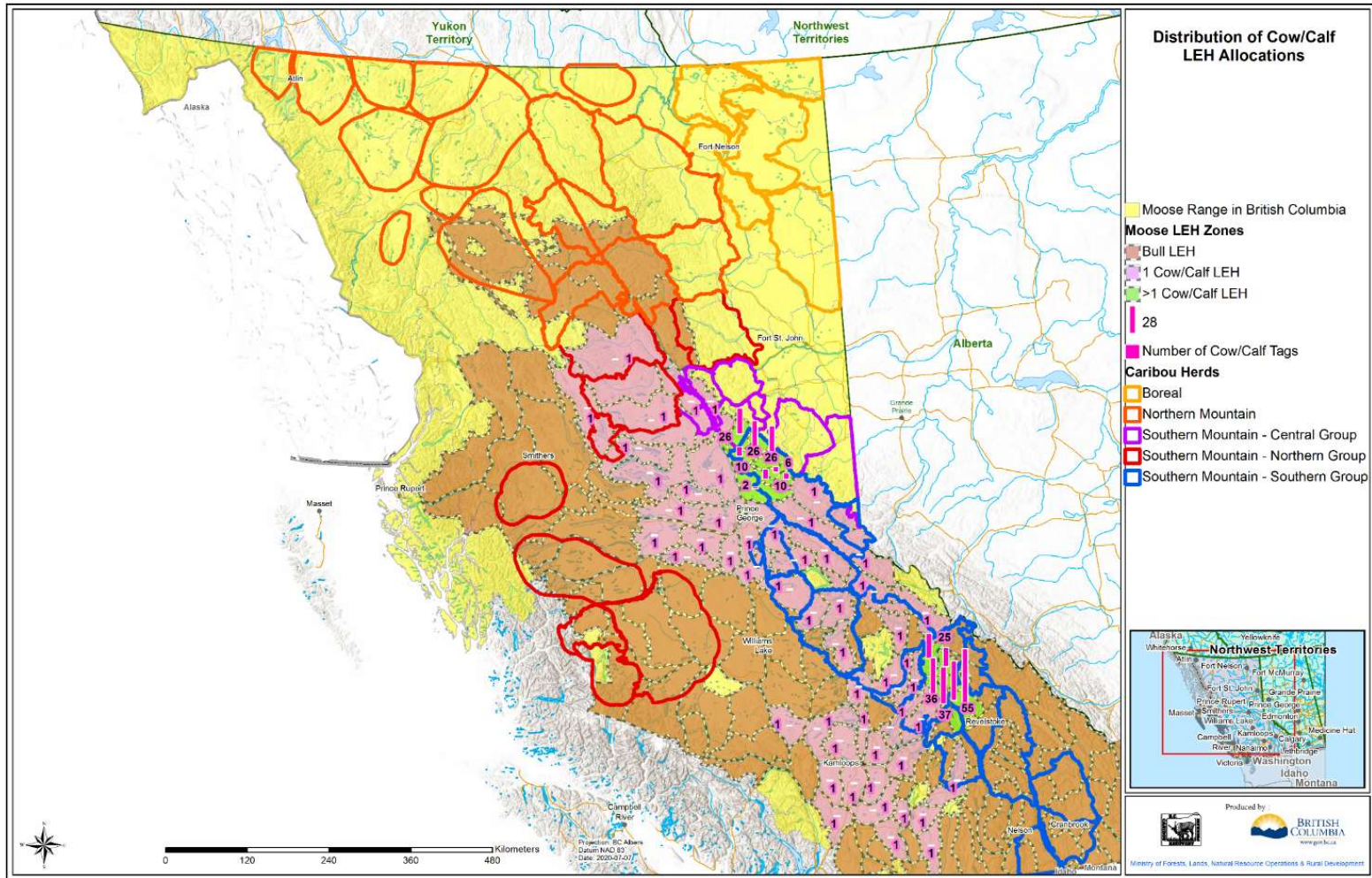


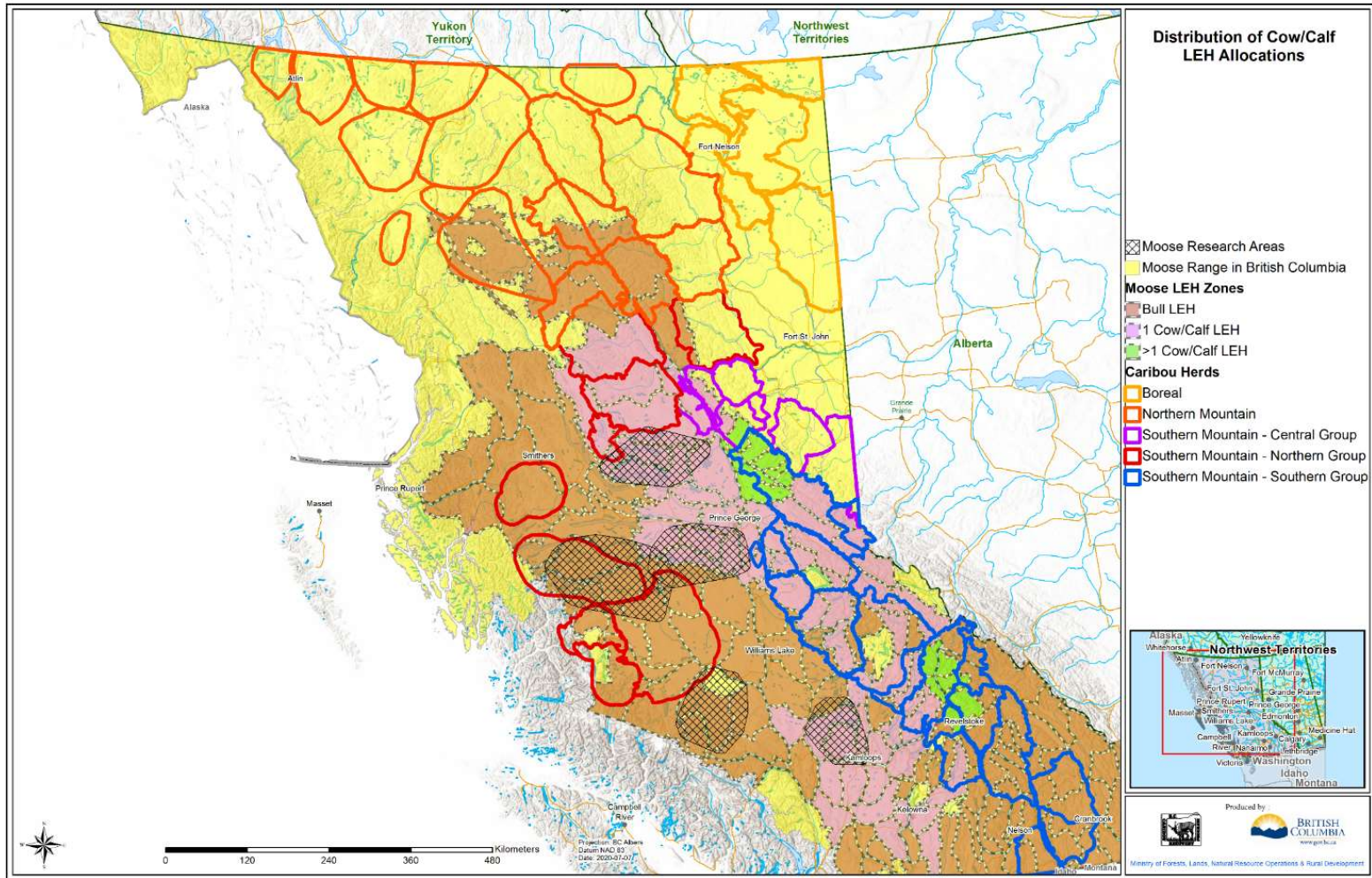


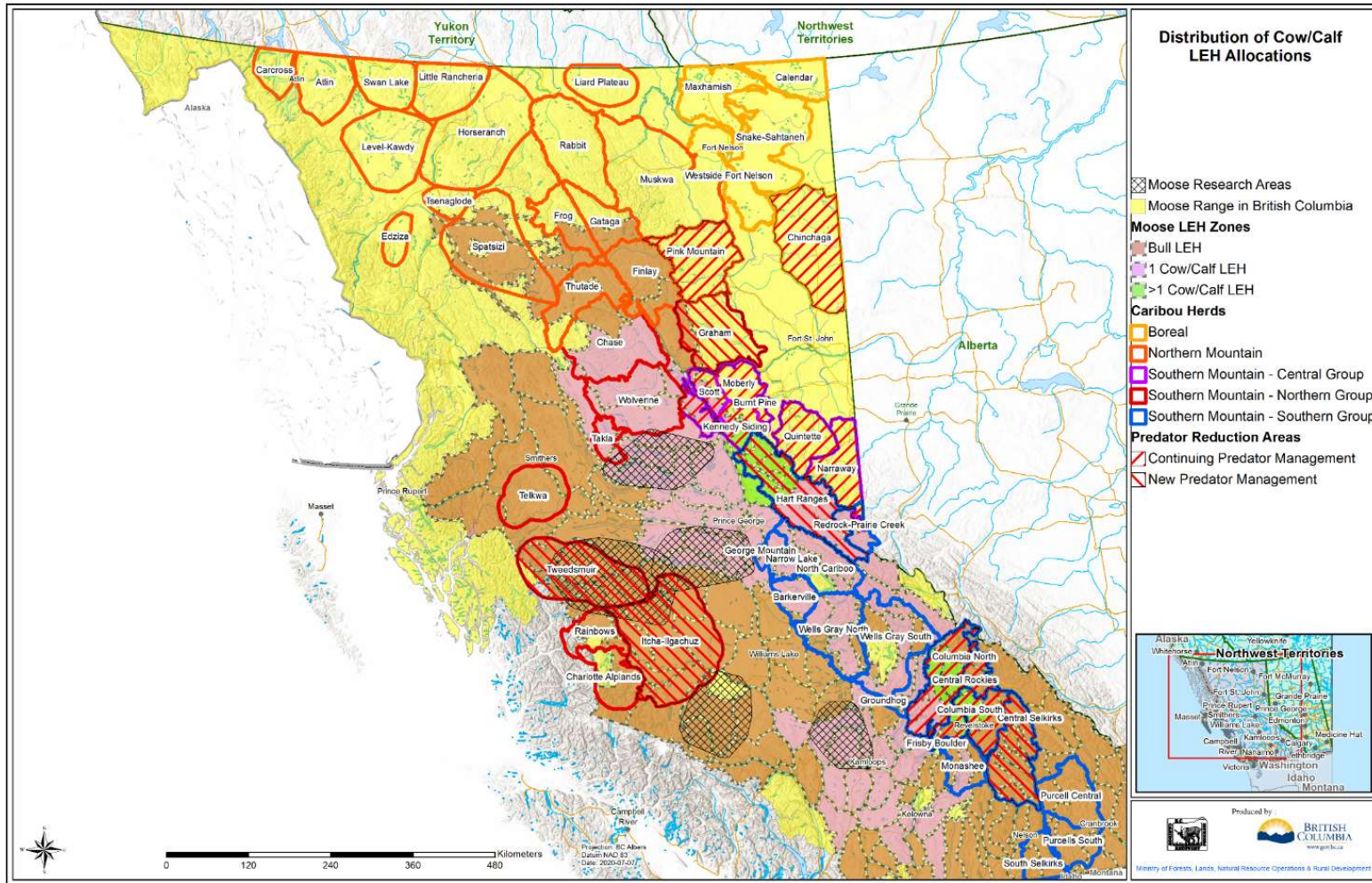


5 cow
moose









Conclusions

 Environment and
Climate Change Canada / Environnement et
Changement climatique Canada

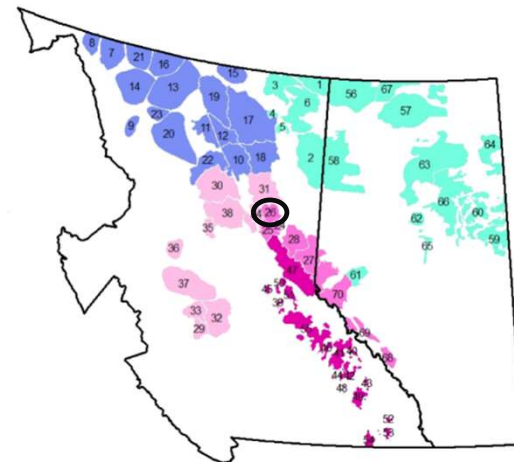
STATEMENT

Government of Canada's Approach to
Addressing the Imminent Threats to the
Recovery of Southern Mountain Caribou



Canada

- Has SARA succeeded?
 - 2014 COSEWIC – not ratified
 - 4 section 80s
- The “least worse” success story:
 - Southern BC, GAR process
 - Revy herds
 - BUT what about post 2012, Pine beetle?
- Partnership Agreement
- Deceleration



The Future



- BC / AB / Fed : commit to annual reporting on NET change
 - We do caribou surveys each March
 - What about habitat surveys?
 - You manage what you measure
- The Elephant in the room: RATE
 - It's tempting to report absolute values
 - [km² protected or length (km) restored]
 - Shift to RATE (Net Change)



Acknowledgements



Cris Gray, Leo DeGroot,
Michael Burwash

