

A Brief Tour of Canada's Rangeland and Pasture Resources

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Welcome to Canada



Outline

- **Abbreviated overview of Canadian range and pasture resources**
 - **Virtual tour of the diversity of major rangelands present across Western Canada**
- **Growing threats to Canadian rangelands**
- **Ongoing research around environmental goods and services provided by Canadian rangelands**

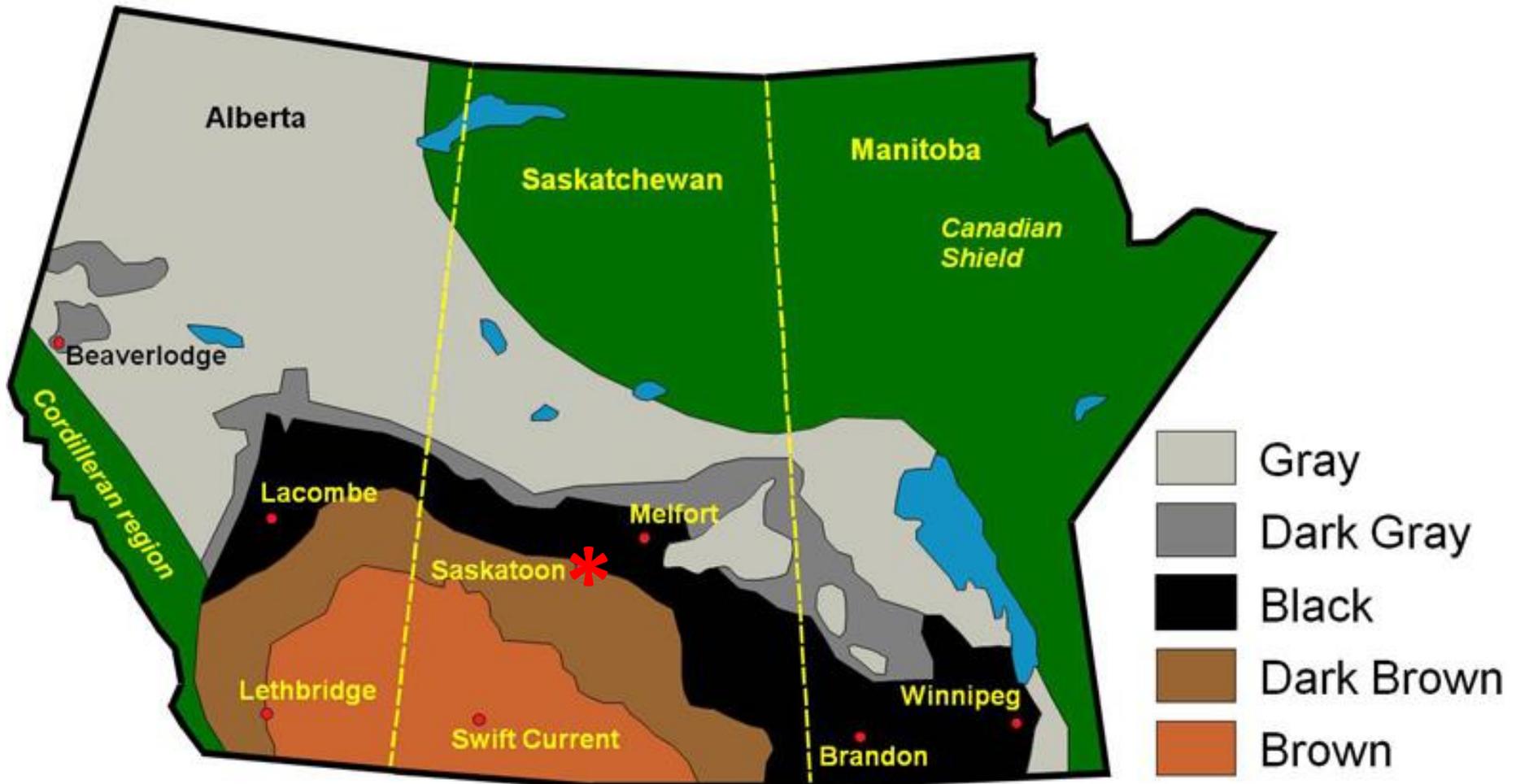
Canada's Diverse Environments

Ecozones of Canada



Soils Reflect Climate & Growth...

Major soil zones of the Prairie Region



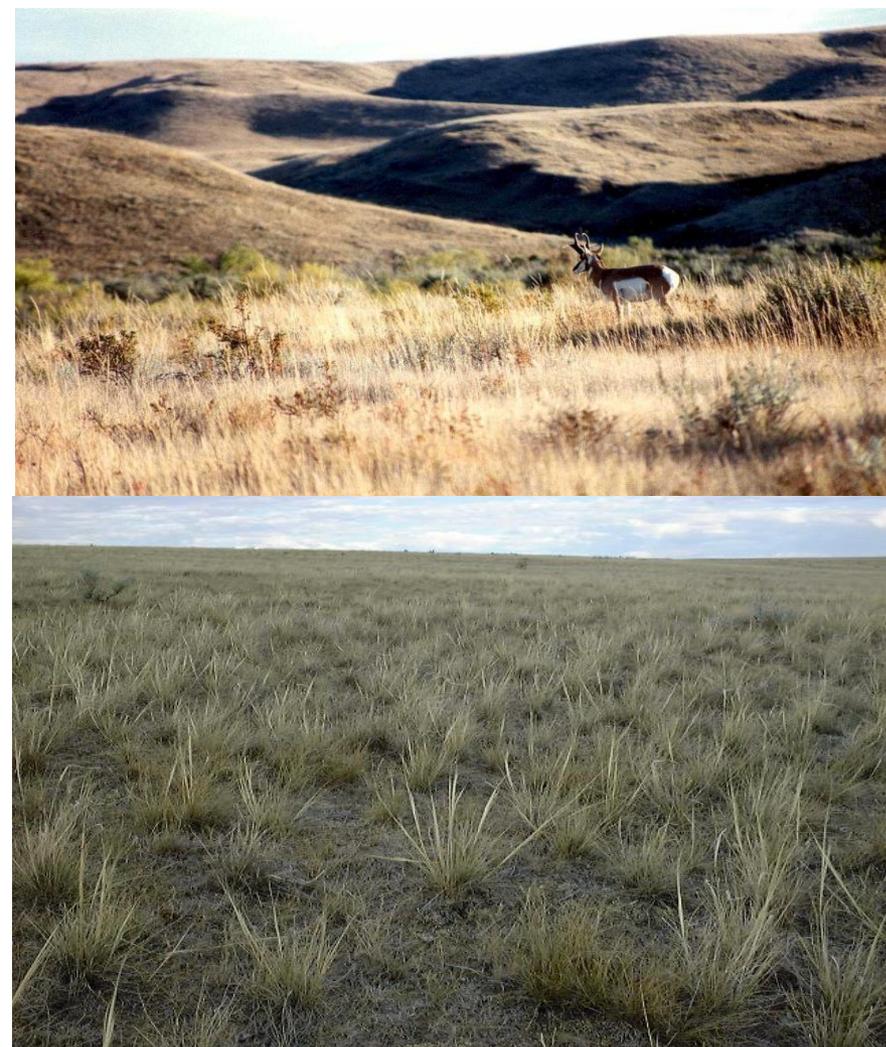
Tallgrass Prairie

- High rainfall & production potential
- Largely converted to annual cropland
- Floristically biodiverse



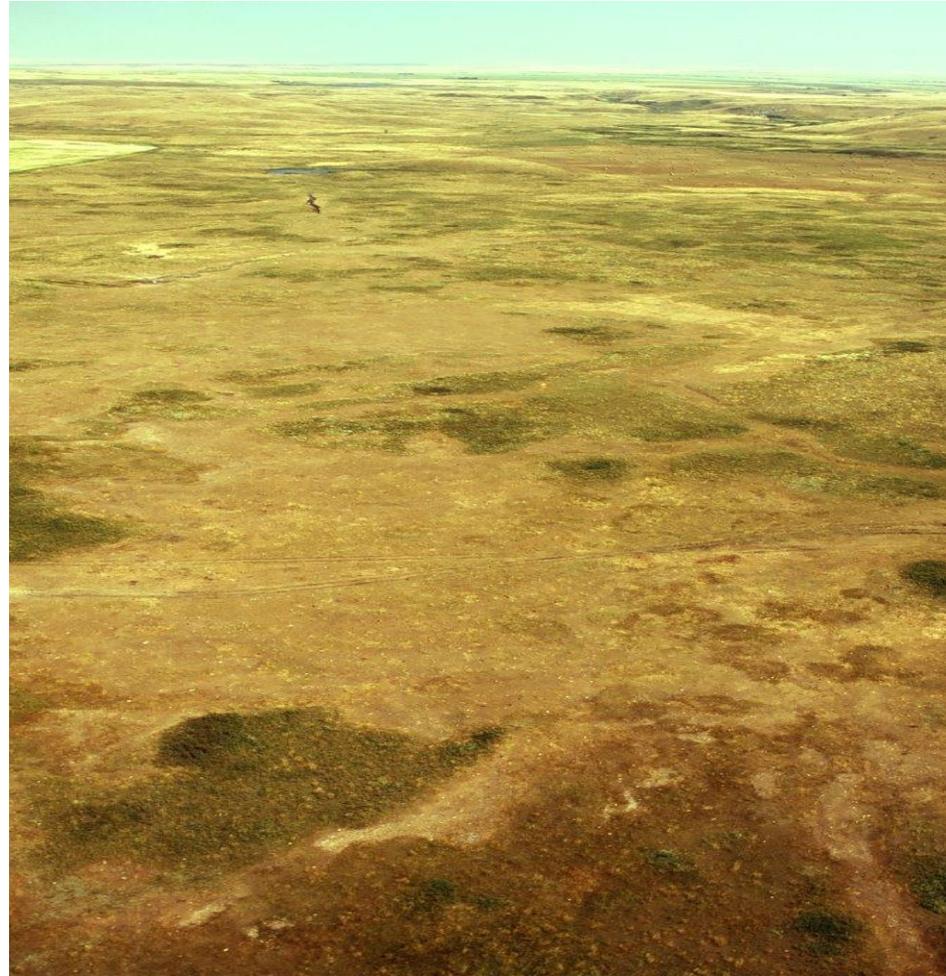
Mixedgrass Prairie

- High moisture deficits ($P:ET < 1$) lead to low/variable production
- Significant native grasslands remain supporting livestock grazing



“Blow-out” Range-Types

- **Mixed grasslands with exposed areas of Solonetzic (salt-affected) hardpan soil and historical surface erosion**



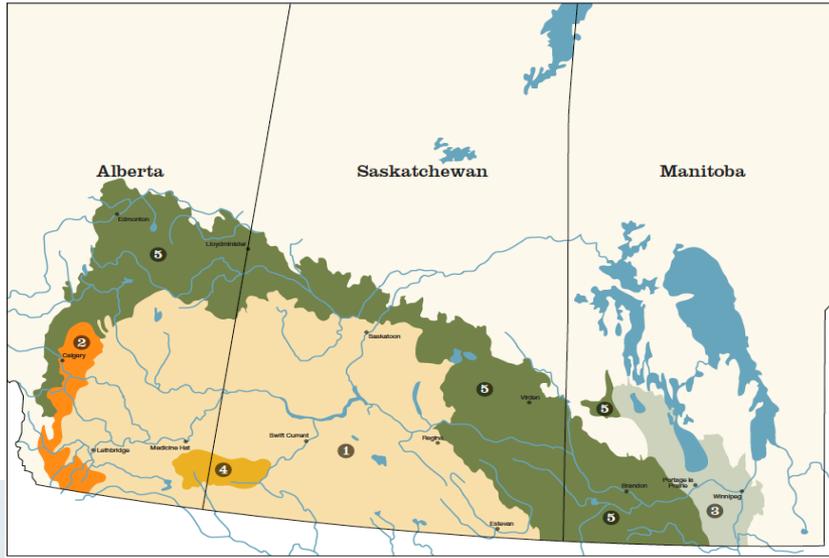
Sandhills

- **Unique range sites, sensitive to disturbance**
- **Found in pockets across the prairie provinces**



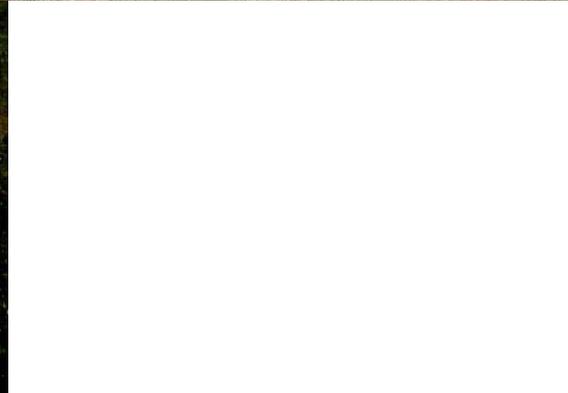
Aspen Parkland (Northern Fescue Prairie)

- Ecological 'tension zone' (Mixedgrass Prairie to Boreal Forest)
- >90% is now farmed/developed



Foothills Fescue (Mountain Fescue)

- Transition from MGP into moister areas next to the Rocky Mtns
- Productive native bunchgrasses provide highly valued dormant season (i.e. winter) grazing



Montane

- Savannah-like mosaic of forest and grassland
- Very biodiverse, with high land use



British Columbia/Yukon Grasslands

- Intermittently distributed in valley bottoms and upper south-facing slopes of Cordilleran forests
- Critical as livestock and wildlife range



Boreal Forest

- Vast deciduous, coniferous & mixed wood forests
- Used by cattle and wildlife



Arctic & Subarctic Tundra

- Short growing season, low temps/nutrients, low production
- Important habitat for vast herds of wildlife



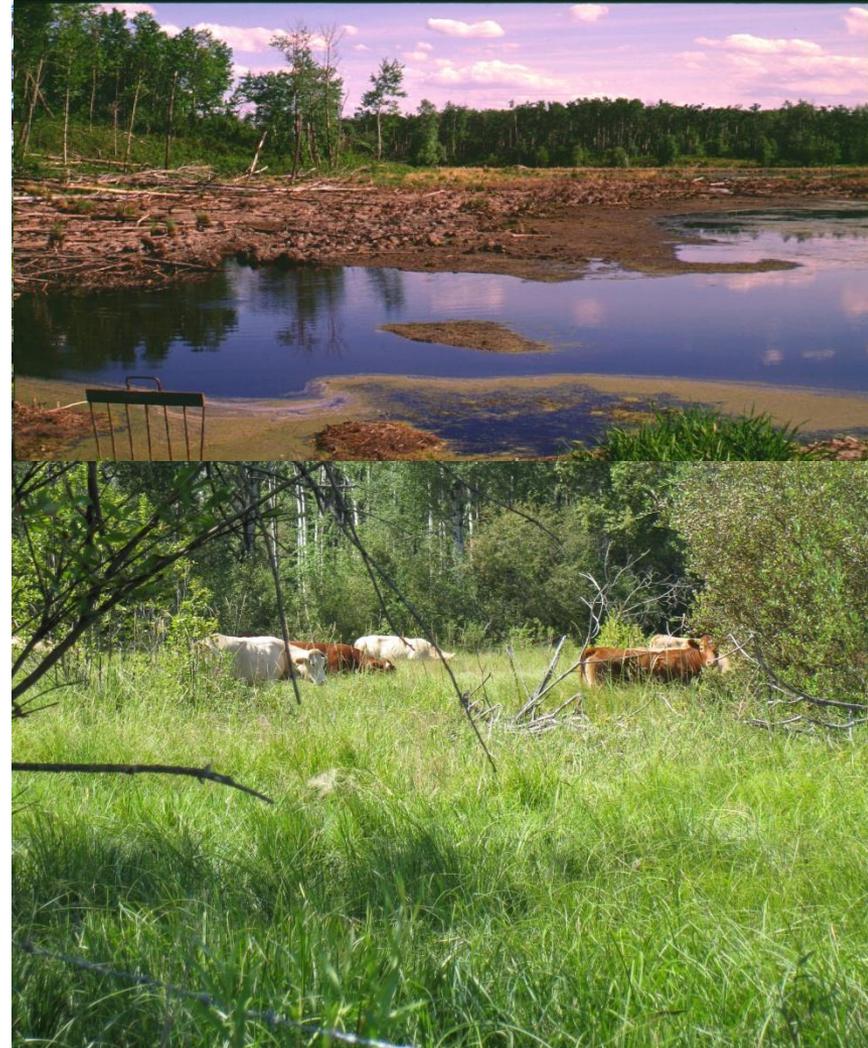
River Valleys

- Unique and important habitat for many ungulates



Lentic Riparian Areas

- Found in all regions (4% in Prairies; >10% in Boreal)
- Disproportionate grazing (quantity and quality)



Red Meat Industry an Important Driver of Canadian Agriculture

3.9 M beef cows in W. Canada; large economic driver



19 M ha of native rangeland in W. Canada used by cattle

Introduced Pasture Represents an Important Source of Forage

3.5 M ha of hay/seeded pasture increases carrying capacity and alleviates grazing pressure on native grassland



Wildlife Abundant Across All Regions



Both Private & Public Lands



: Private Lands (6-35% by province)

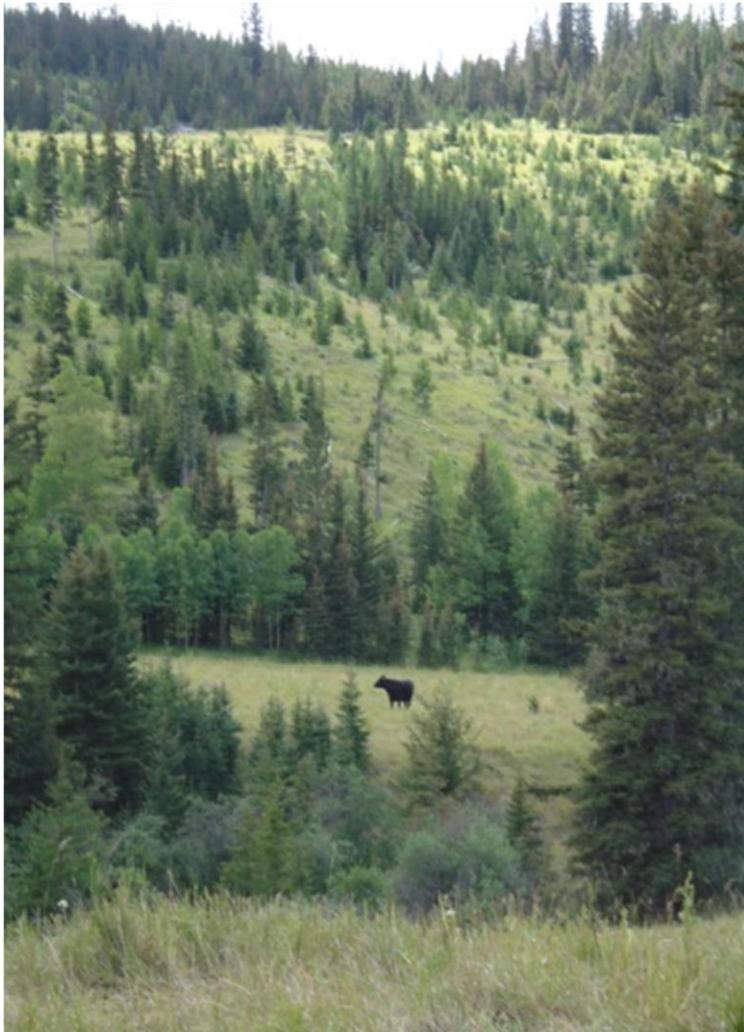
Limited stakeholders involved in management decision making

Public Lands (majority):

Distinct multiple use mandate, necessitating coordinated land use planning



Integrating Land Uses on Public Lands Poses Many Challenges



Feral Horses



Harvestable Wildlife



Cattle



**Species of
Special
Concern**



Threats to Canadian Rangelands are Plentiful ...



: Random camping on public land in the Rocky Mtn Forest Reserve east of Calgary, AB

Managing the human footprint will be significant in the future:



Urban-Industrial Sprawl Leads to Permanent Agricultural Land Loss

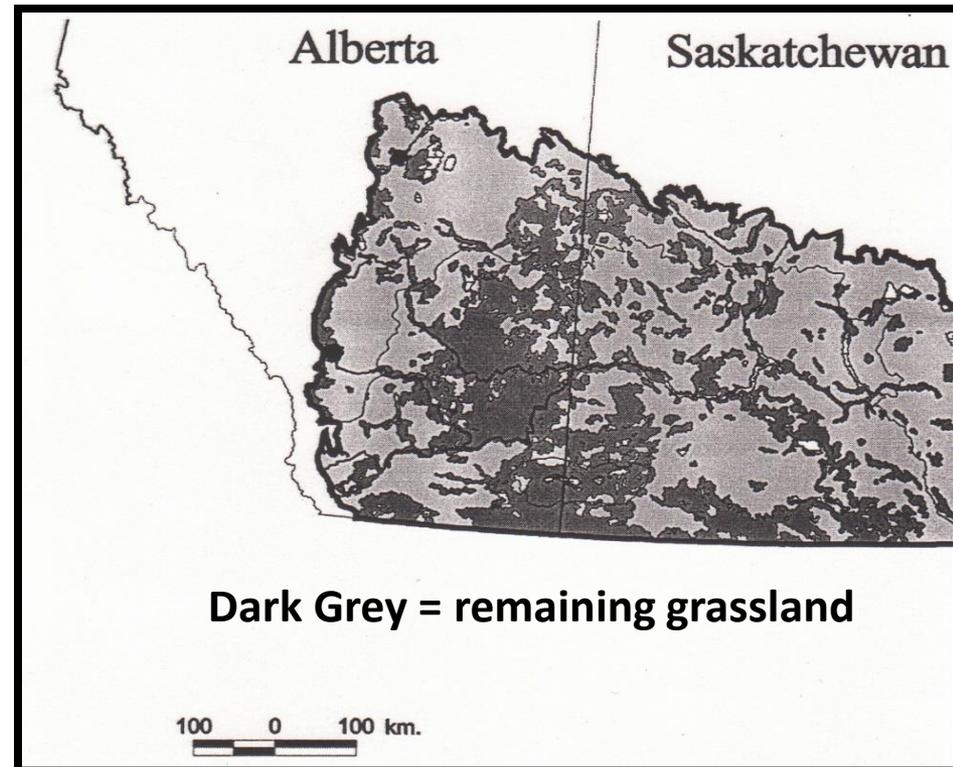


What was once a study site for doctoral studies (Dr. Steven Tannas) ...



... has become suburban housing

Land Use Conversion Continues



Fragmentation of Remaining Rangelands is Significant

Forest harvest



Power-line construction



Wind turbine installation



Oil and gas extraction

Non-Native Plant Invasions

Wide ranging impacts on loss of forage, plant diversity and/or habitat quality

Smooth brome (*Bromus inermis*)



Leafy spurge (*Euphorbia esula*)



Canada thistle (*Cirsium arvense*)



Woody Plant Expansion

Shrub encroachment under fire suppression has reduced grasslands in Alberta's Rocky Mountain Forest Reserve by 58% ...



Severe Wildfire

Western Canada has experienced a steady increase in the frequency, area and severity of wildfires in many wildlands

Granum Wildfire - 1997 (Foothills Fescue)



Kelowna Wildfire - 2003 (Ponderosa Pine)



Credit: YouTube/Jason Edmondson

Ft. McMurray – May 2016
(Boreal Forest)

Climate Change Risk May Be Significant in Northern Grasslands



Previous Climate Change Study Sites

(Western Canadian Prairie Provinces)

Kinsella, AB (Parkland)



Riding Mtn. Nat. Park, MB (Boreal)



PFRA GAP Community Pasture, SK (Mixedgrass)



Emerging Opportunities: *Environmental Goods & Services*

**Water Purification/Flood
Mitigation**



Carbon/GHG Storage



Pollination



Forage Production



Biodiversity/Habitat



Many Rare & Endangered Species Depend on Rangelands



Sprague's Pipit, by C. Putnam



**Loggerhead Shrike
by R. Knight**



Burrowing Owl by K. Cole



Ord's Kangaroo Rat, by A. Teucher



Swift Fox by T. Ifland

Importance of Private Rangeland Management in Conservation



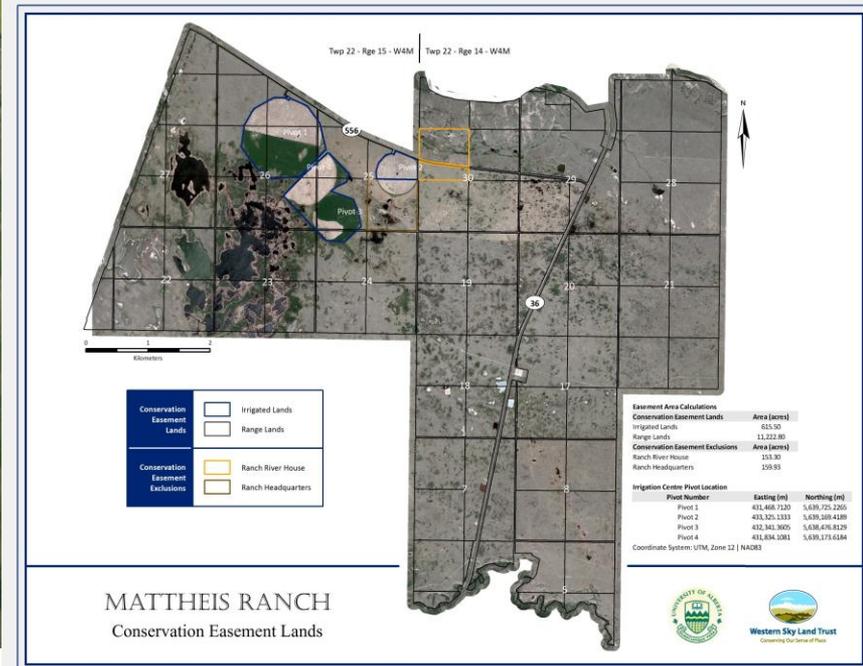
Landowners are our greatest ally in conserving many wildlife species

Conservation organizations can be effective in helping farmers & ranchers achieve conservation objectives



University of Alberta – Mattheis Research Ranch

*Conservation Easement with Western Sky Land Trust
(April 2015)*



Rangeland Research Institute

Organization dedicated to promoting and conducting transformative research and teaching on rangelands, with the ultimate goal of improving rangeland sustainability



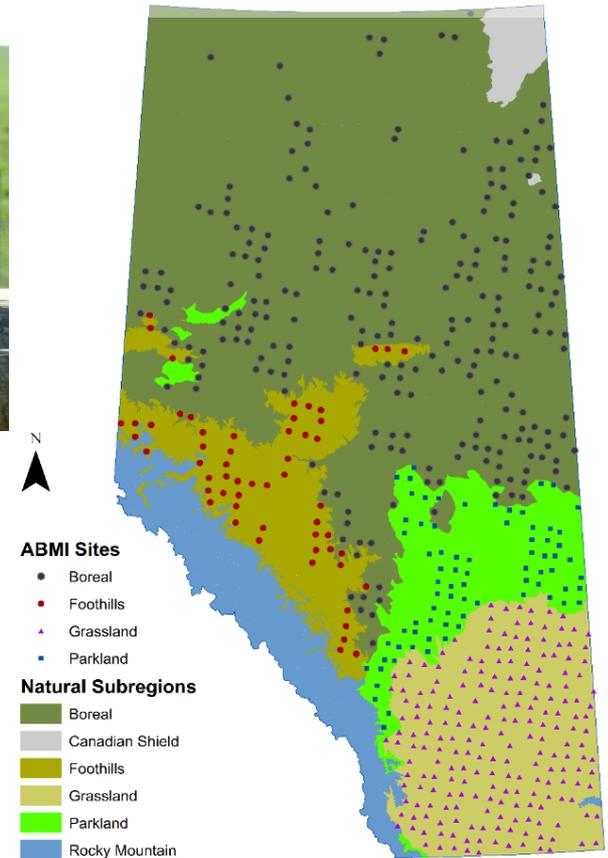
UNIVERSITY OF ALBERTA
**FACULTY OF AGRICULTURAL,
LIFE & ENVIRONMENTAL SCIENCES**
Rangeland Research Institute



‘Beef & Biodiversity’



Goal is to directly link comprehensive biodiversity data with cattle producer management practices at ~200 sites across Alberta



Grassland as Key Habitat for Pollinators

- Work to date has found over 140 bee species
- Bee abundance and diversity were positively related to grassland presence, range health, and forage quality



Water Storage and Purification



Cows
and
Fish

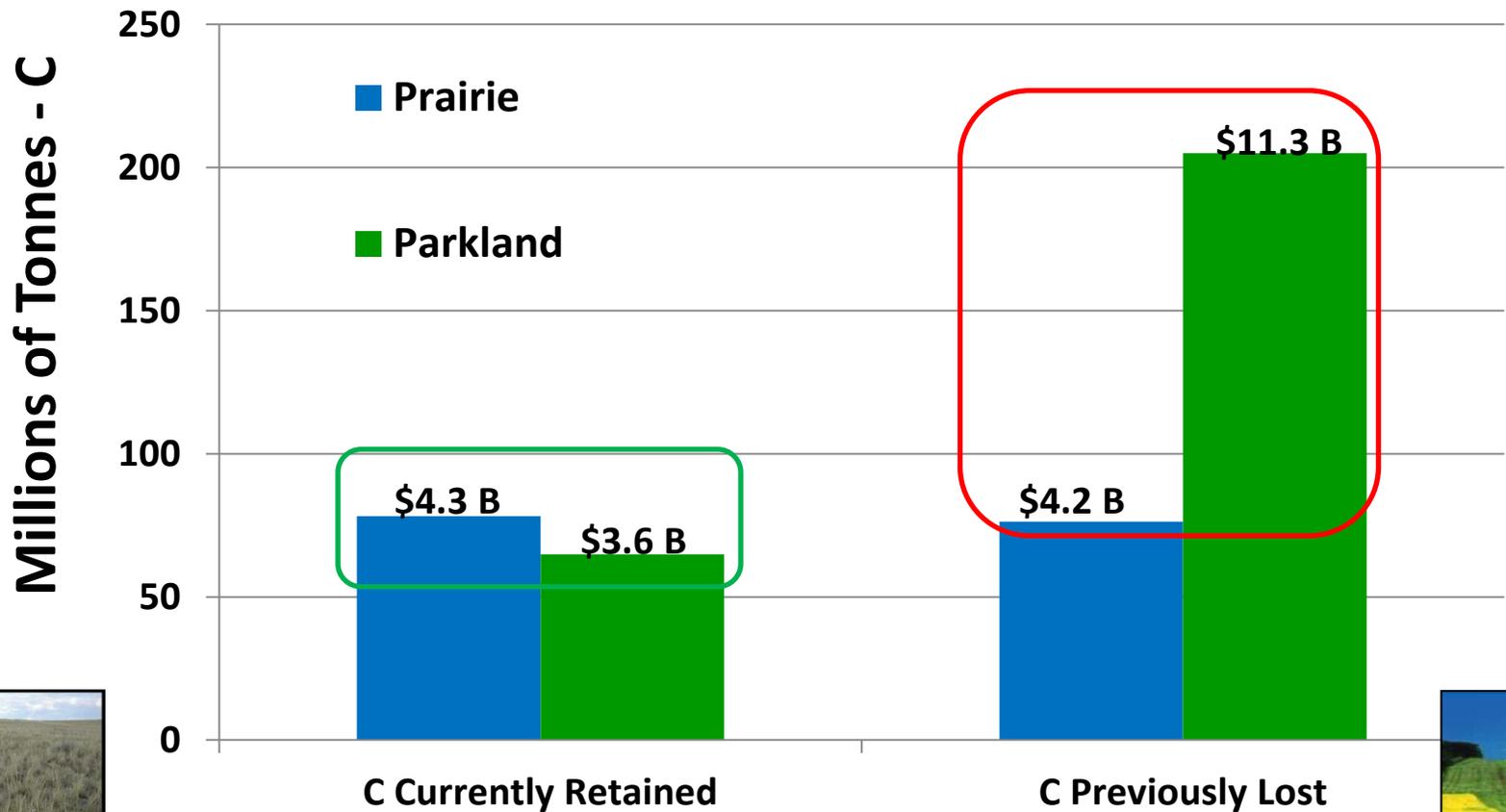


**Alberta Riparian
Management
Habitat Society**

Carbon Storage & Greenhouse Gas Mitigation



Carbon stores derived using ABMI land areas for each land use change and a C-valuation of \$15/t-CO₂e (CCEMC)



Comparison of Grassland VS Cropland



Future Challenge ...

Translating quantitative information on EG&S into novel and effective policy achieving environmental and economic sustainability of rangelands

- **Value added chains:
Verified Sustainable Beef**
- **Canadian Roundtable for
Sustainable Beef**



Acknowledgements

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Enjoy the congress!