

# 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

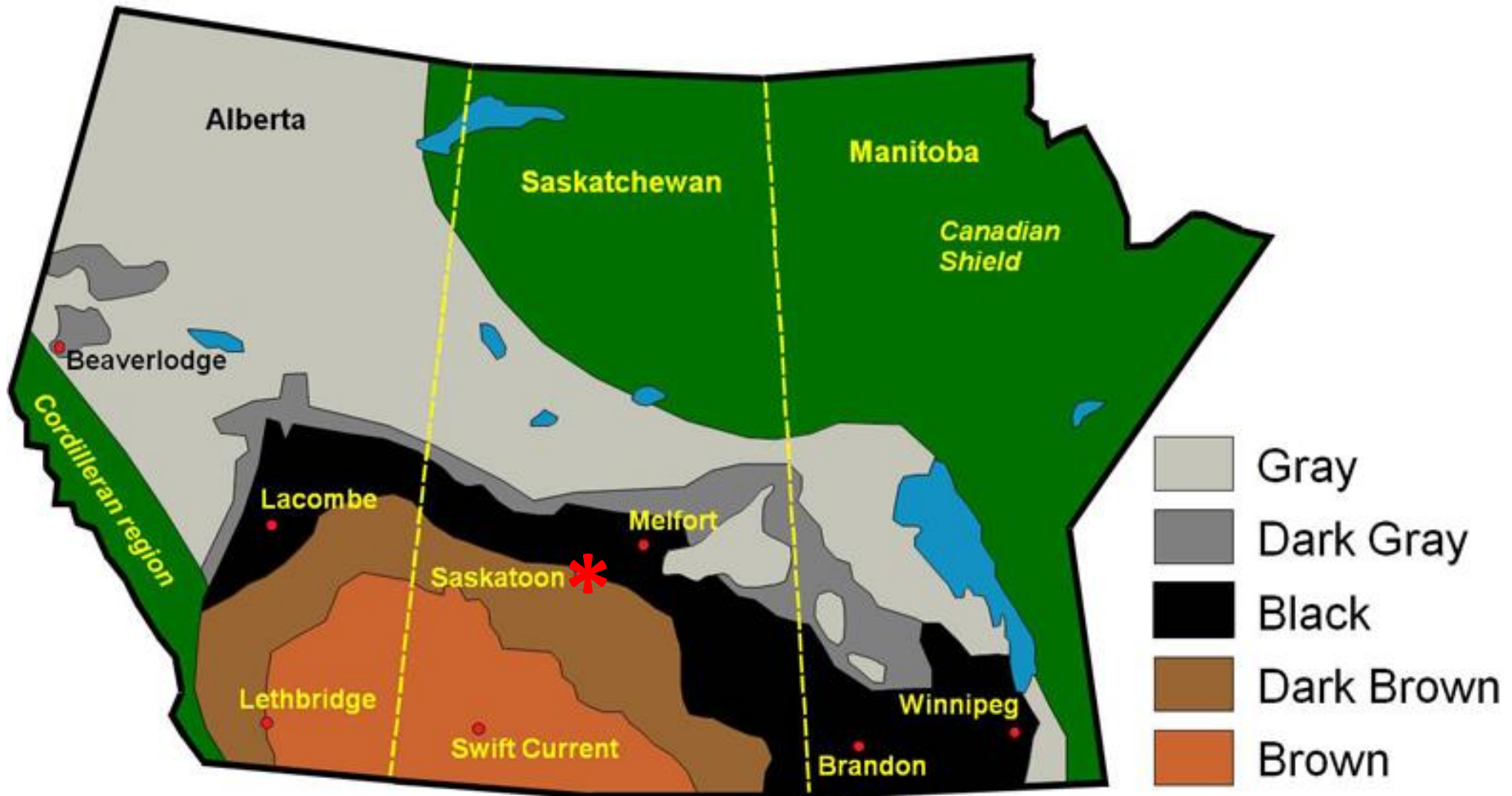
## Ecozones of Canada





# 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

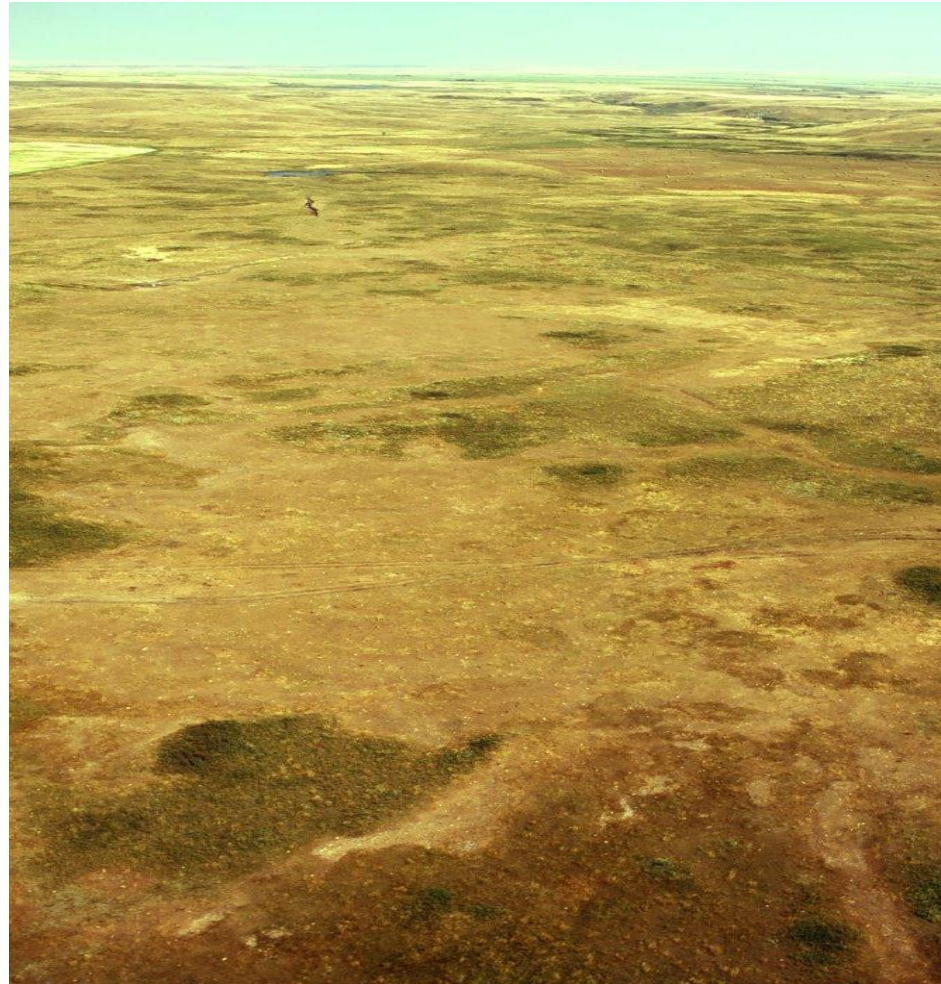
- High moisture deficits ( $P:ET < 1$ ) lead to low/variable production
- Significant native grasslands remain supporting livestock grazing





# “Blow-out” Range-Types

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





# Sandhills

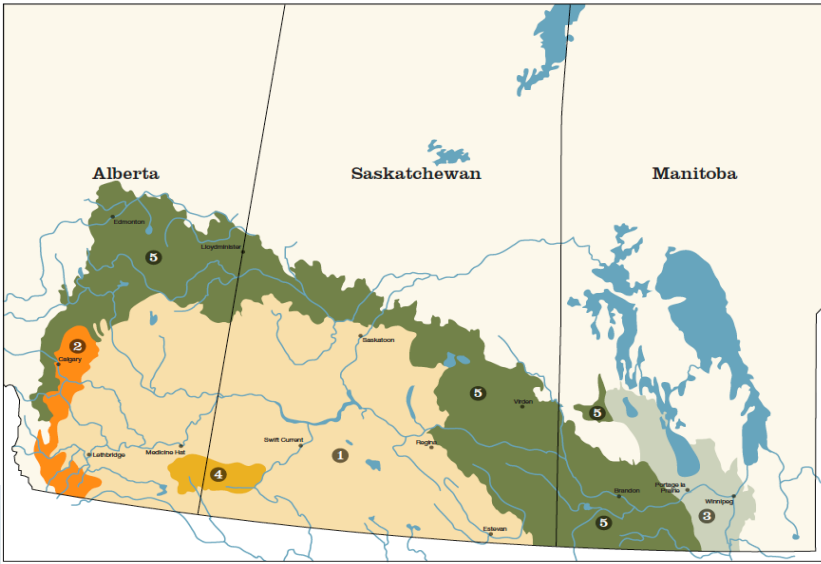
- Unique range sites, sensitive to disturbance
- Found in pockets across the prairie provinces





# Aspen Parkland (Northern Fescue Prairie)

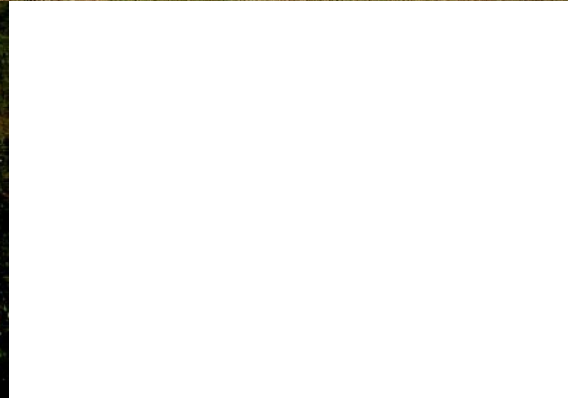
- Ecological 'tension zone' (Mixedgrass Prairie to Boreal Forest)
- >90% is now farmed/developed





# 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

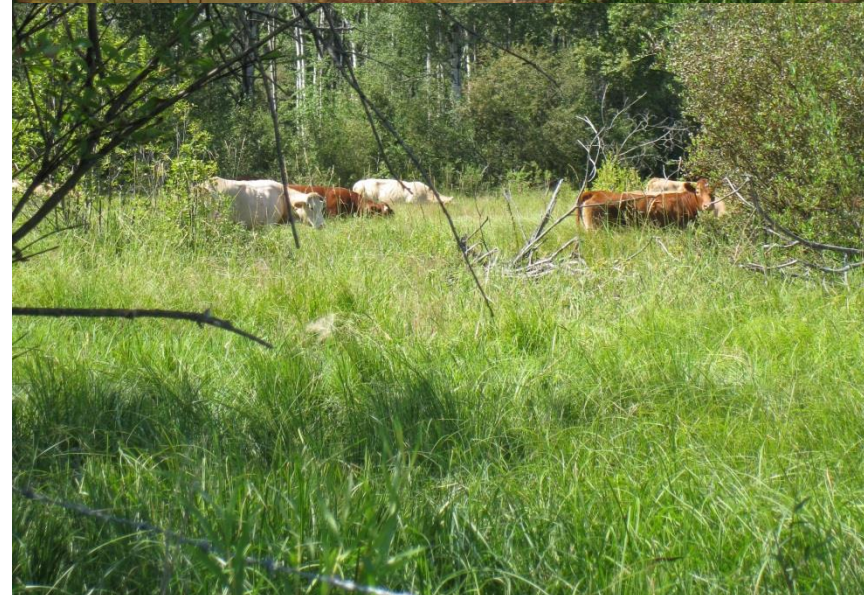
- Unique and important habitat for many ungulates





# 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



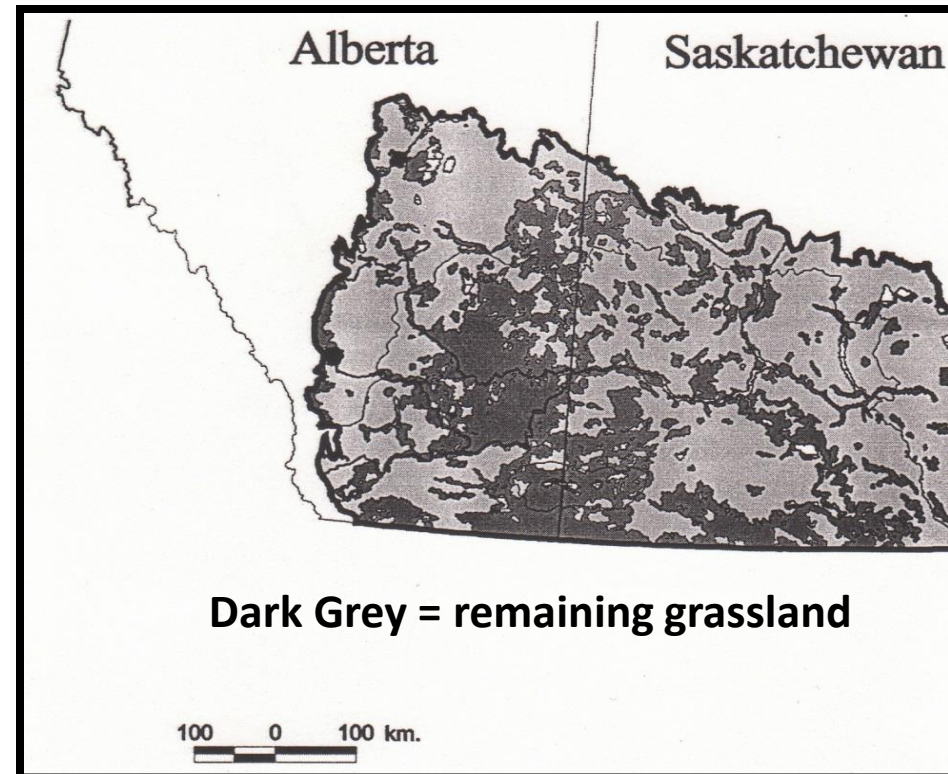
What was once a study site for doctoral studies (Dr. Steven Tannas) ...

... 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



Source: [ens.newswire.com](http://ens.newswire.com)



# 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**

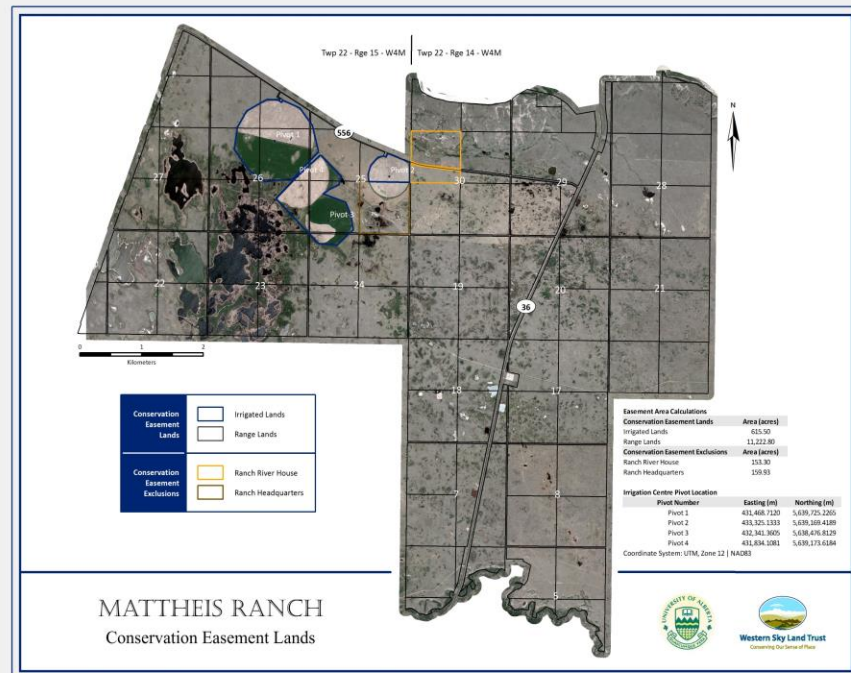
**Conservation organizations can be effective in helping farmers & ranchers achieve conservation objectives**





# 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

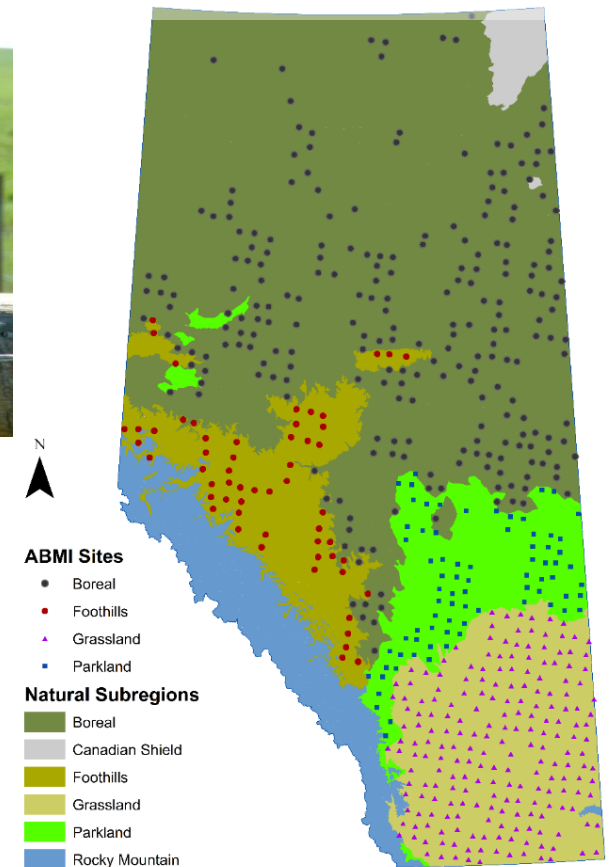




# ‘Beef & Biodiversity’



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

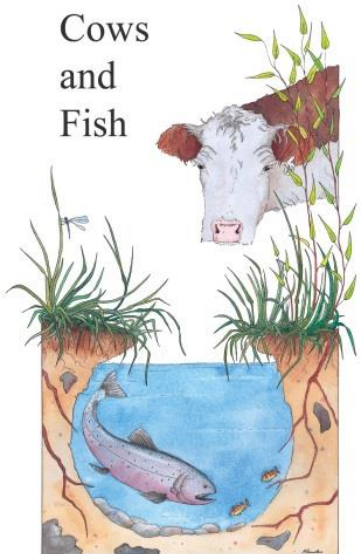




# Water Storage and Purification



Cows  
and  
Fish



**Alberta Riparian  
Management  
Habitat Society**

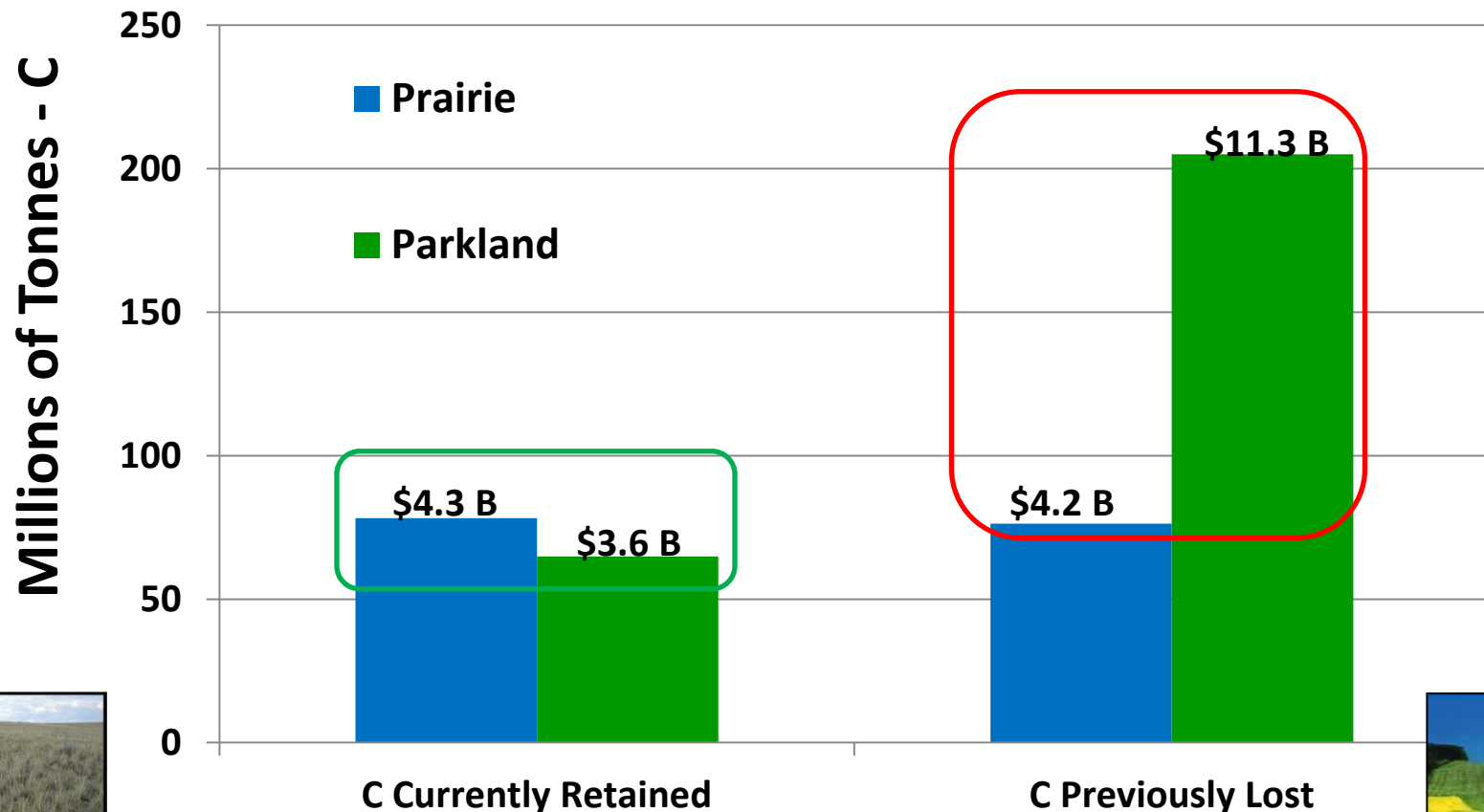




# Carbon Storage & Greenhouse Gas Mitigation

**ALMA**  
Alberta Livestock  
and Meat Agency Ltd.

*Carbon stores derived using ABMI land areas for each land use change and a C-valuation of \$15/t-CO<sub>2</sub>e (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





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*Enjoy the congress!*