

# Complexities of grizzly bear ecology: Climate, disturbances, foods & bears



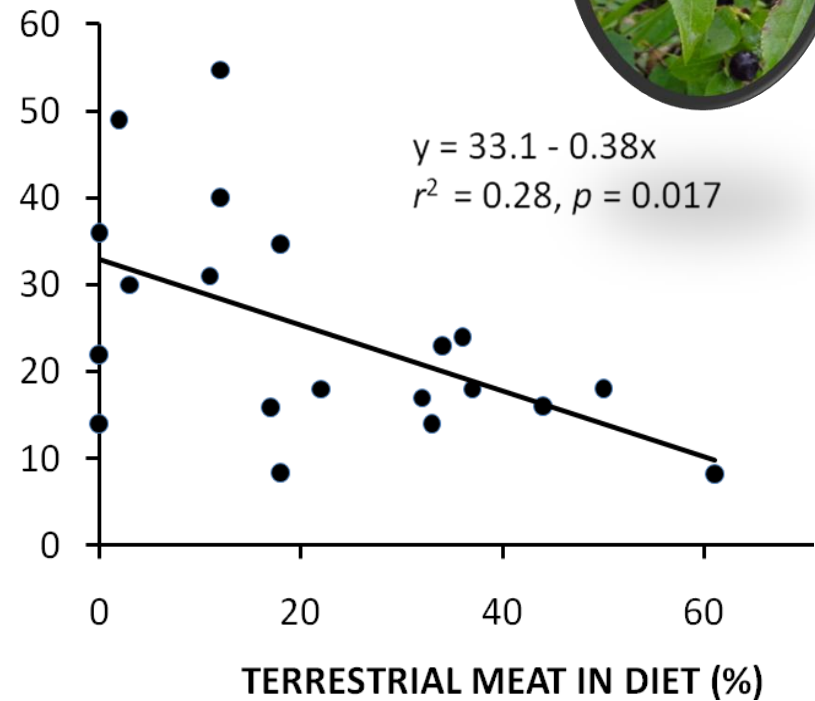
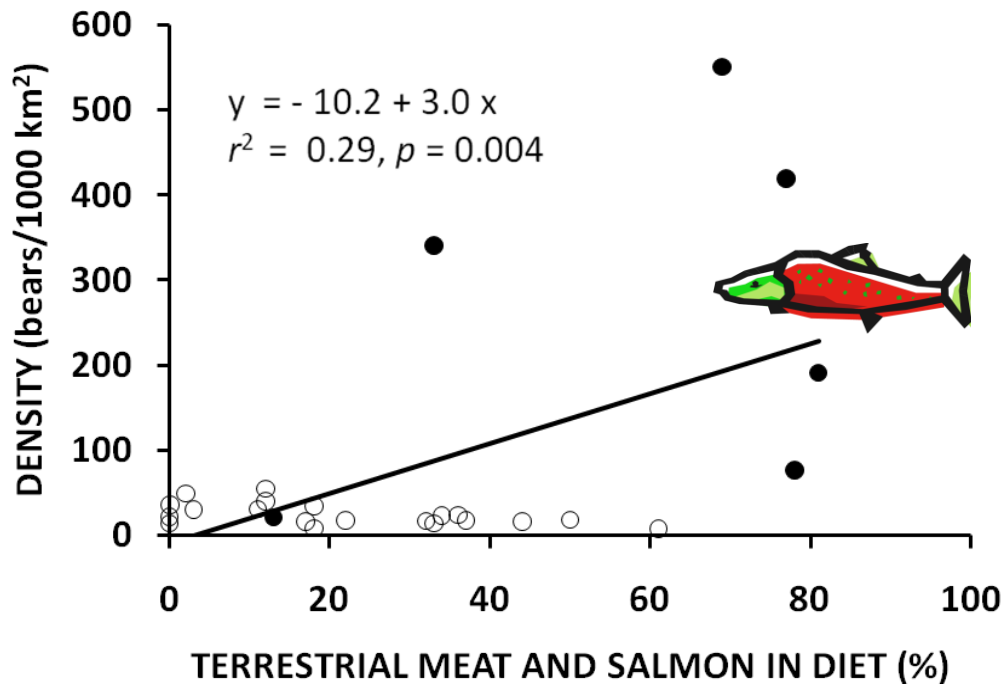
**Scott Nielsen**

*Photo by:  
Emily Court*

**FRI Annual General Meeting, Edmonton, 04-October-2011**

Department of Renewable Resources, University of Alberta, [scottn@ualberta.ca](mailto:scottn@ualberta.ca)

# A regional perspective: bottom-up limitations?





1



2

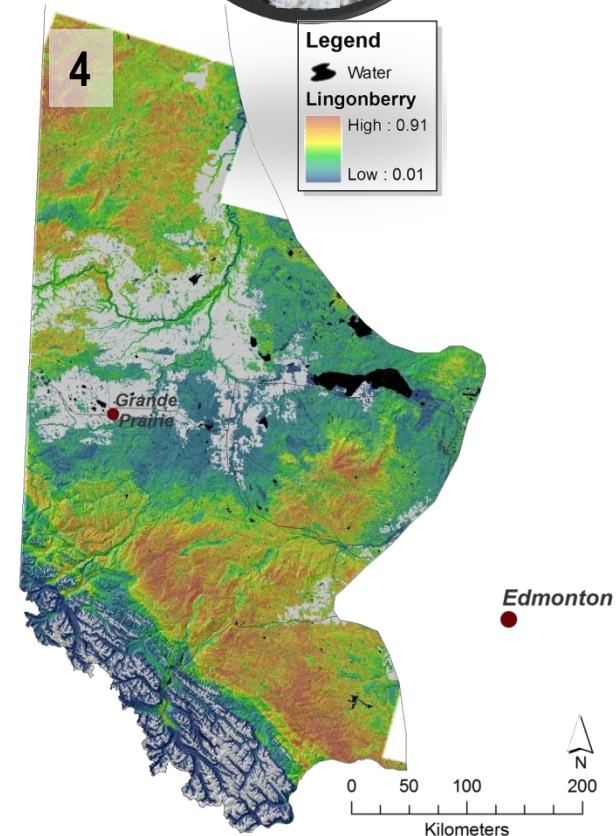
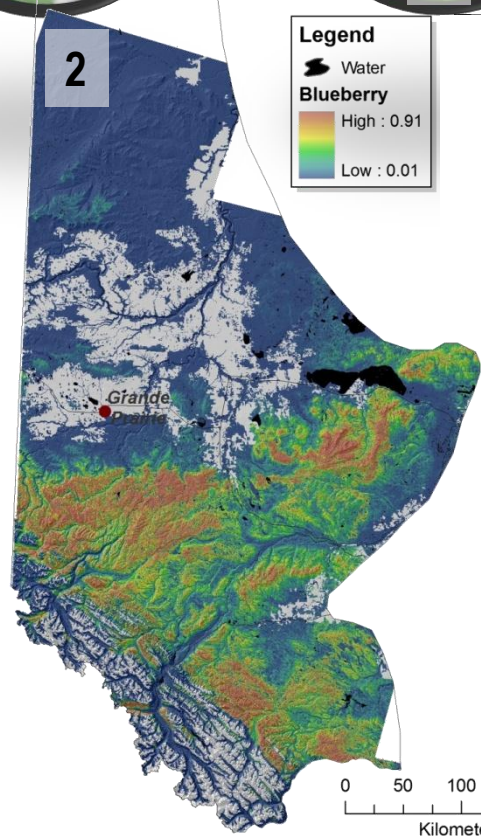
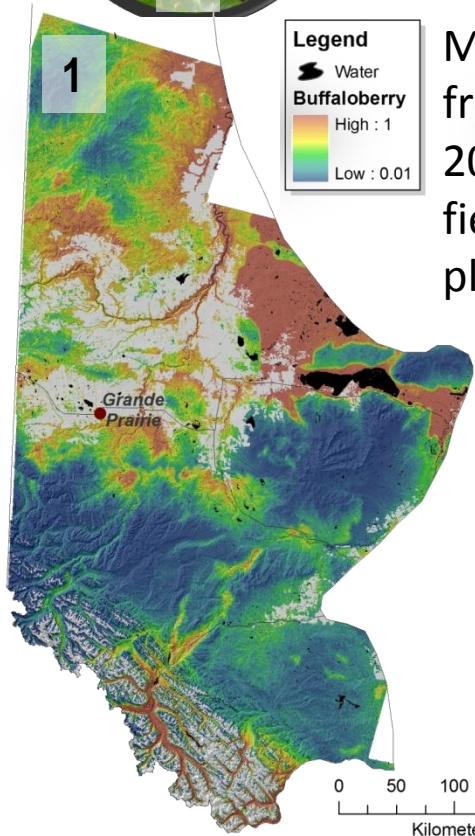


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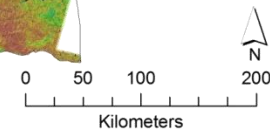
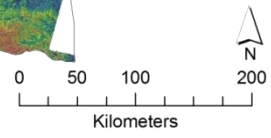
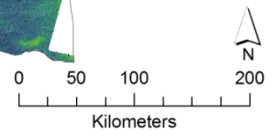
Models from 2000+ field plots



Edmonton

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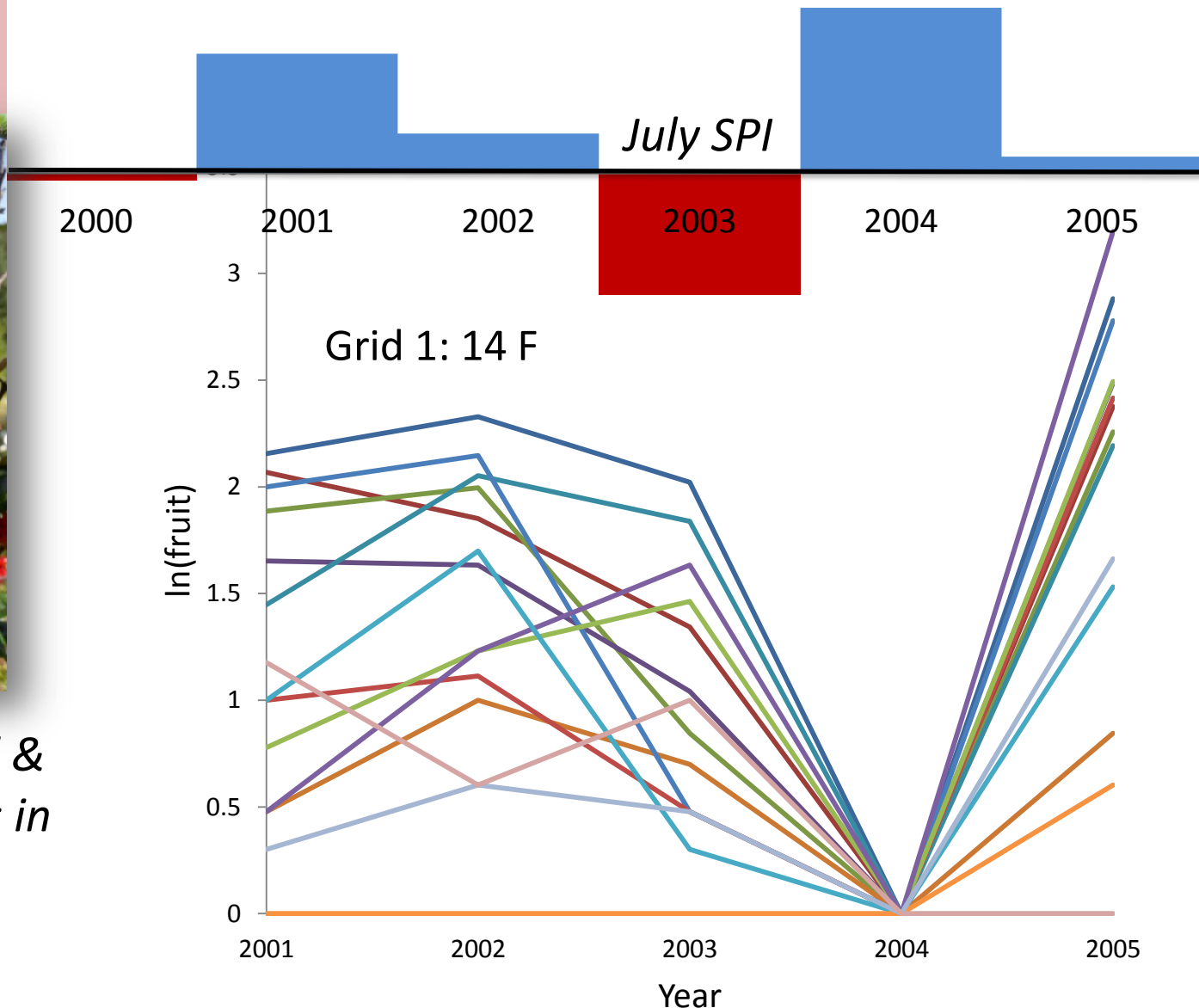
# Pulsed resource dynamics

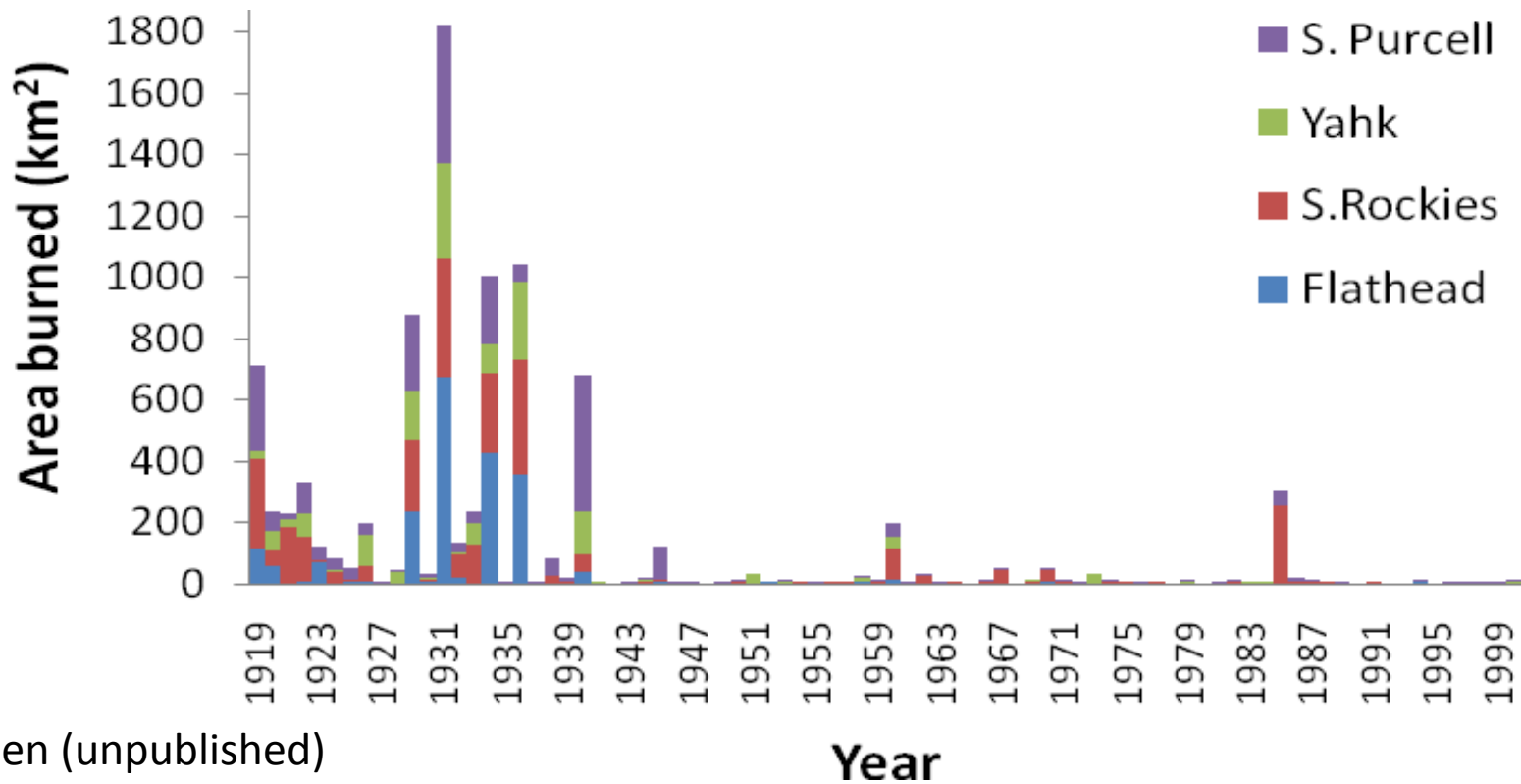
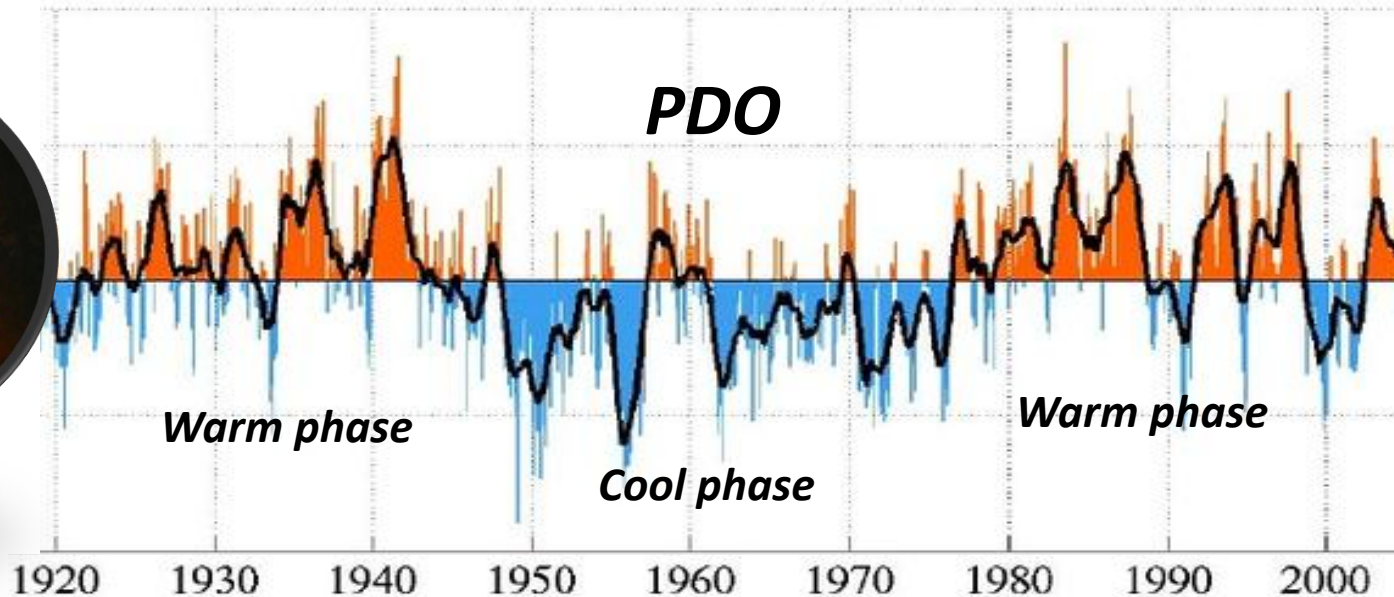
Buffaloberry  
(*Shepherdia canadensis*)



*300+ plants marked & followed for 5-years in Hinton, AB*

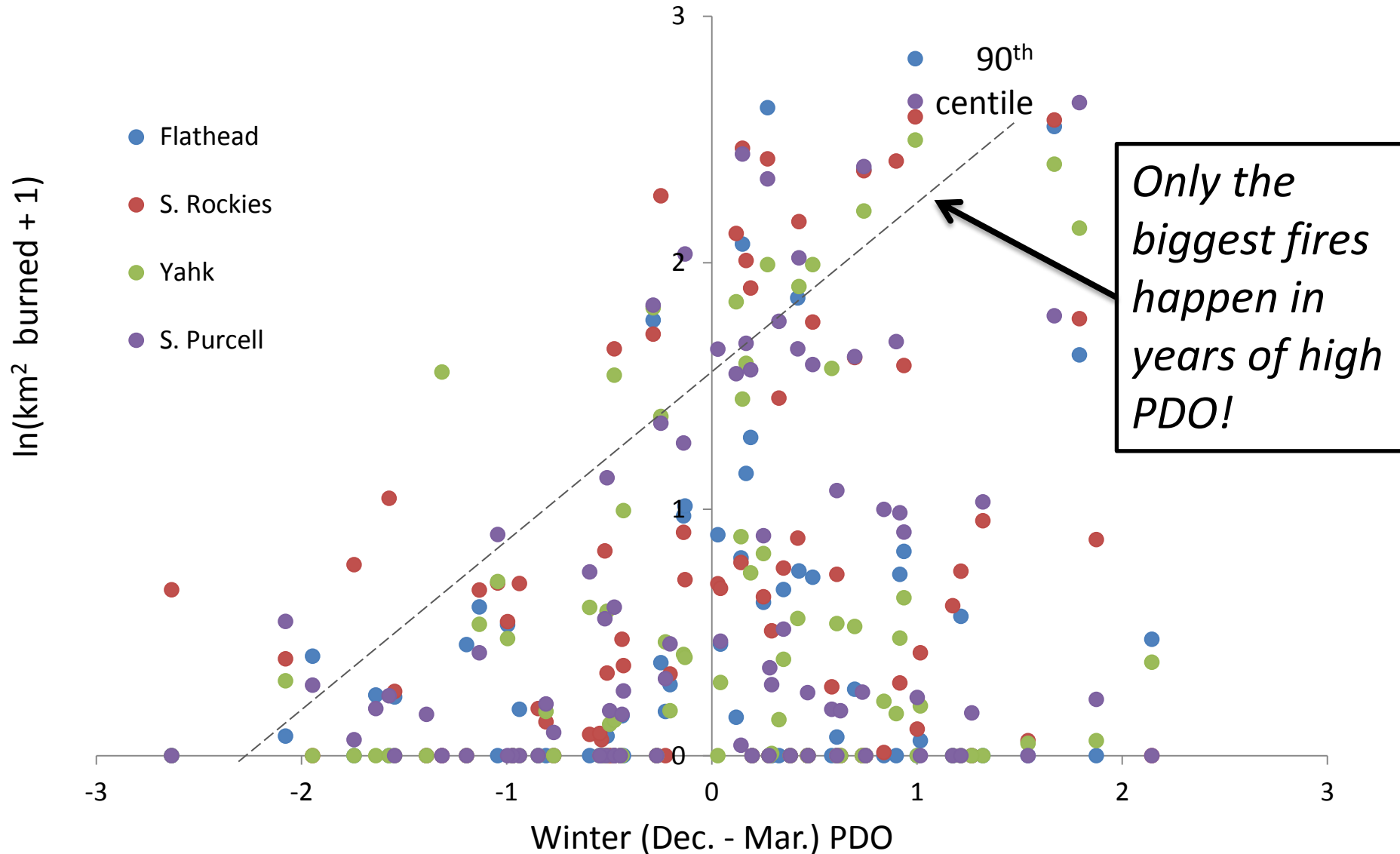
Nielsen (*in prep.*)



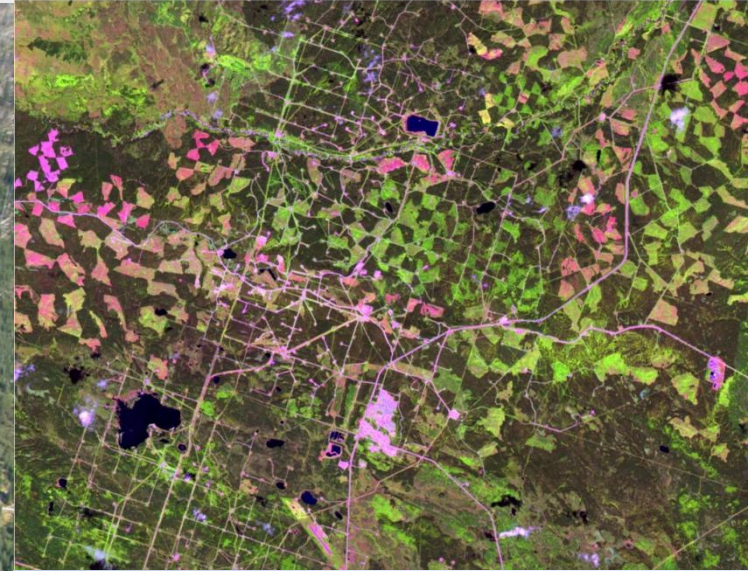


Nielsen (unpublished)

# Climate (PDO) and fire size

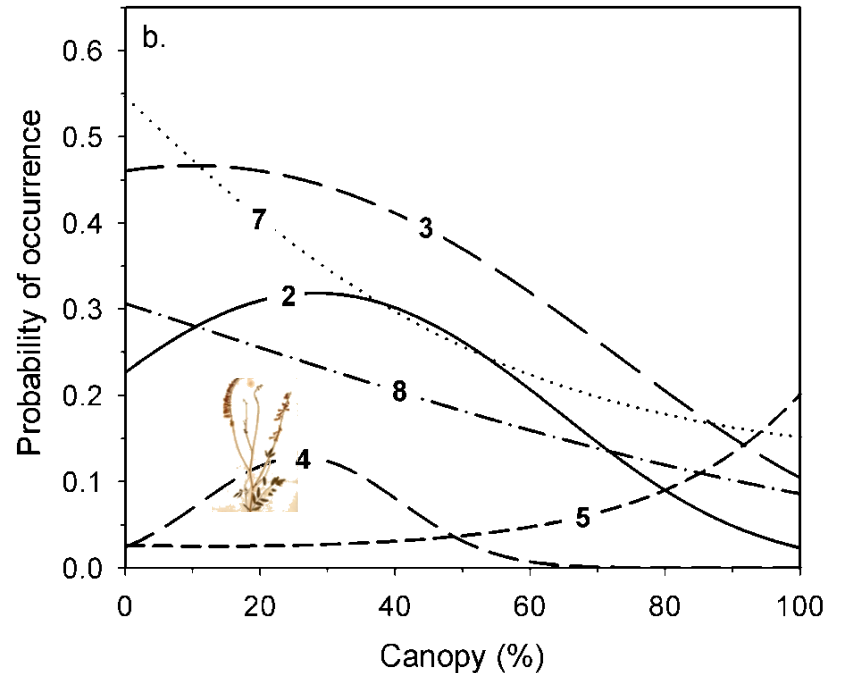
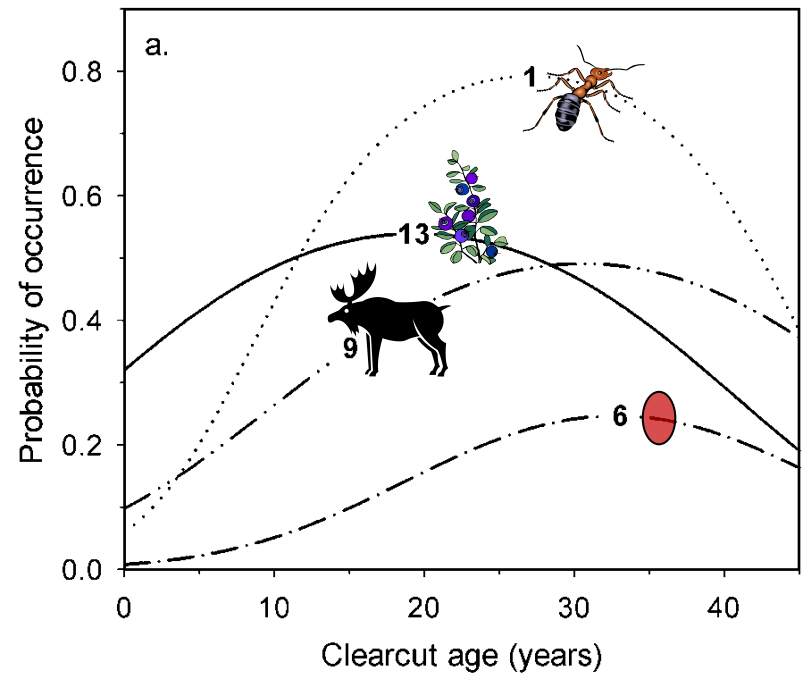


# Natural disturbance-based forestry



- In fire-suppressed landscapes, forest clear-cutting serves an important role (i.e., replacement of fires)
- This creates heterogeneity in stand conditions
- This increases availability of critical food resources

# Responses to forest clear-cutting



## Number and food item:



1-ants

2-*Arctostaphylos uva-ursi*

3-*Equisetum* spp.



4-*Hedysarum* spp.

5-*Heracleum lanatum*



6-*Shepherdia canadensis*

7-*Taraxacum officinale*

8-*Trifolium* spp.



9-ungulates (pellets)

10-*Vaccinium caespitosum*

11-*Vaccinium membranaceum*

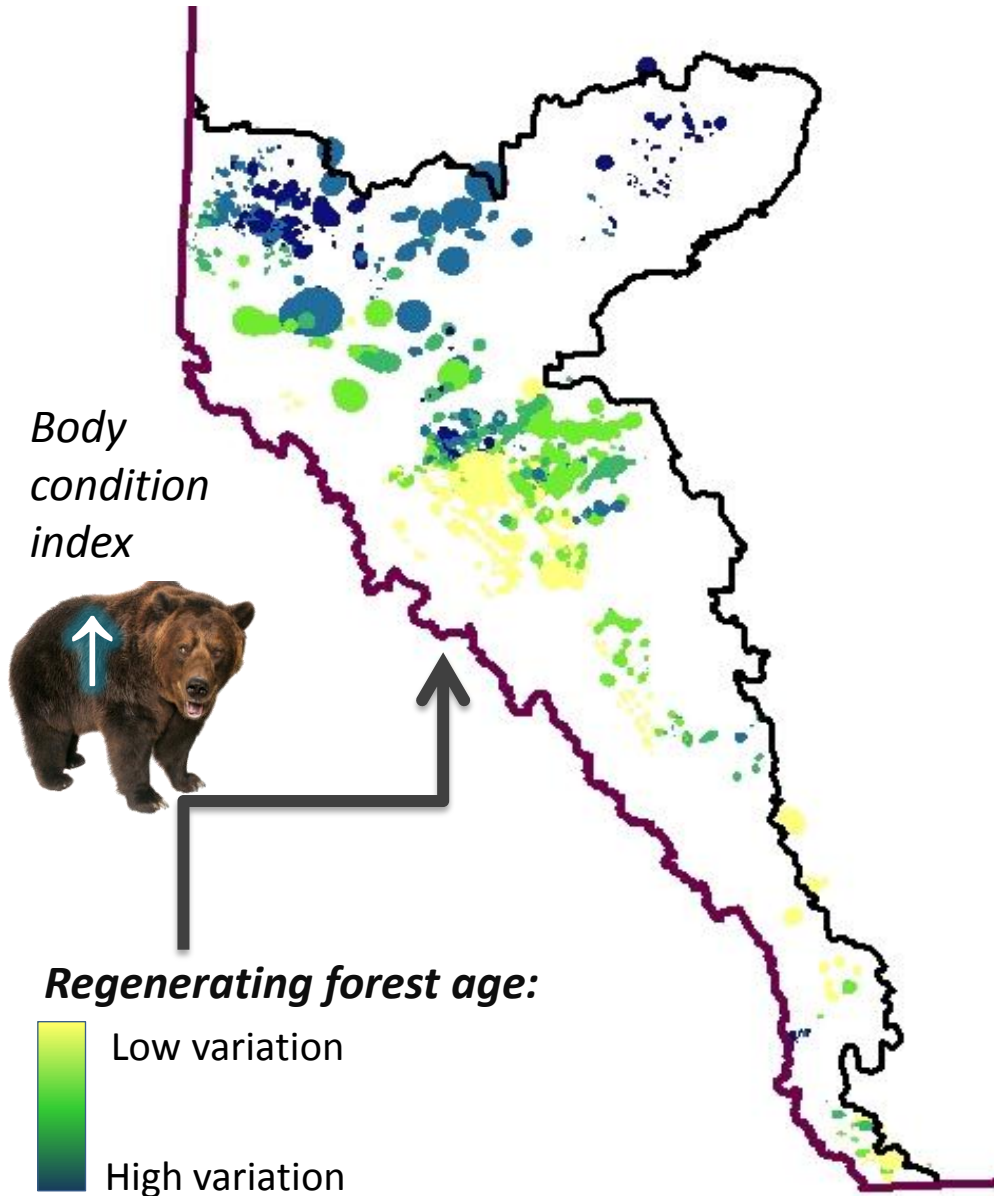
12-*Vaccinium myrtilloides*



13-*Vaccinium vitis-idaea*

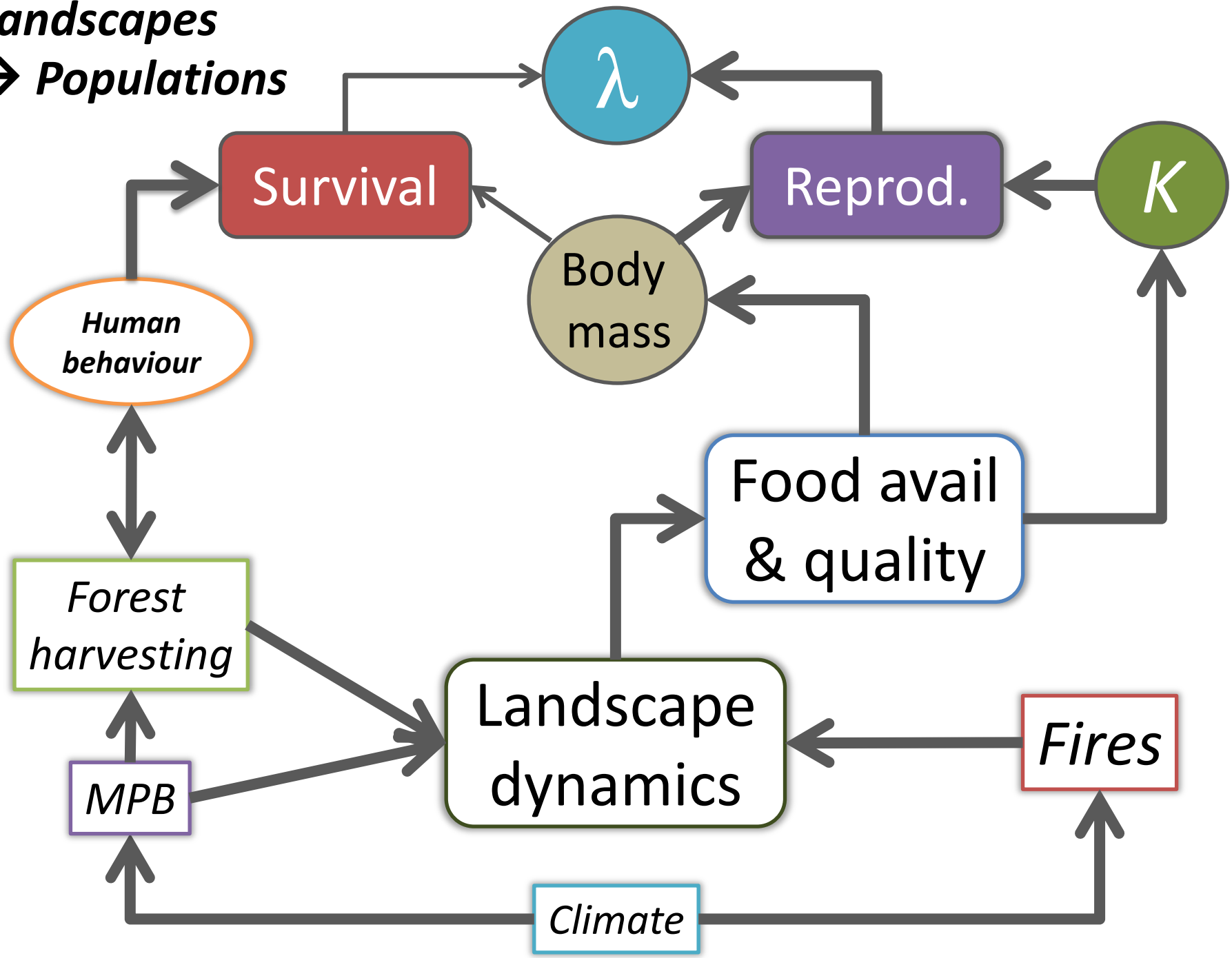


# Forest age heterogeneity & bears



Nielsen et al. (*in prep.*)

**Landscapes**  
→ **Populations**

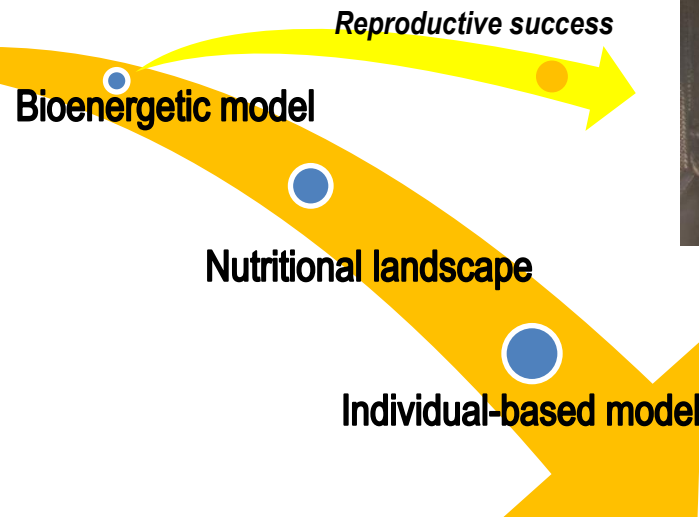


# LINKING INDIVIDUAL BIOENERGETICS TO GRIZZLY BEAR POPULATIONS

Claudia Lopez  
PhD candidate



*Goal: Understand how population-level effects emerge from individual bioenergetic balances and behaviours*



**Major research question:** How does the nutritional landscape (spatial structure & dynamics) affect growth, reproduction, population density and demography of bears in Alberta?

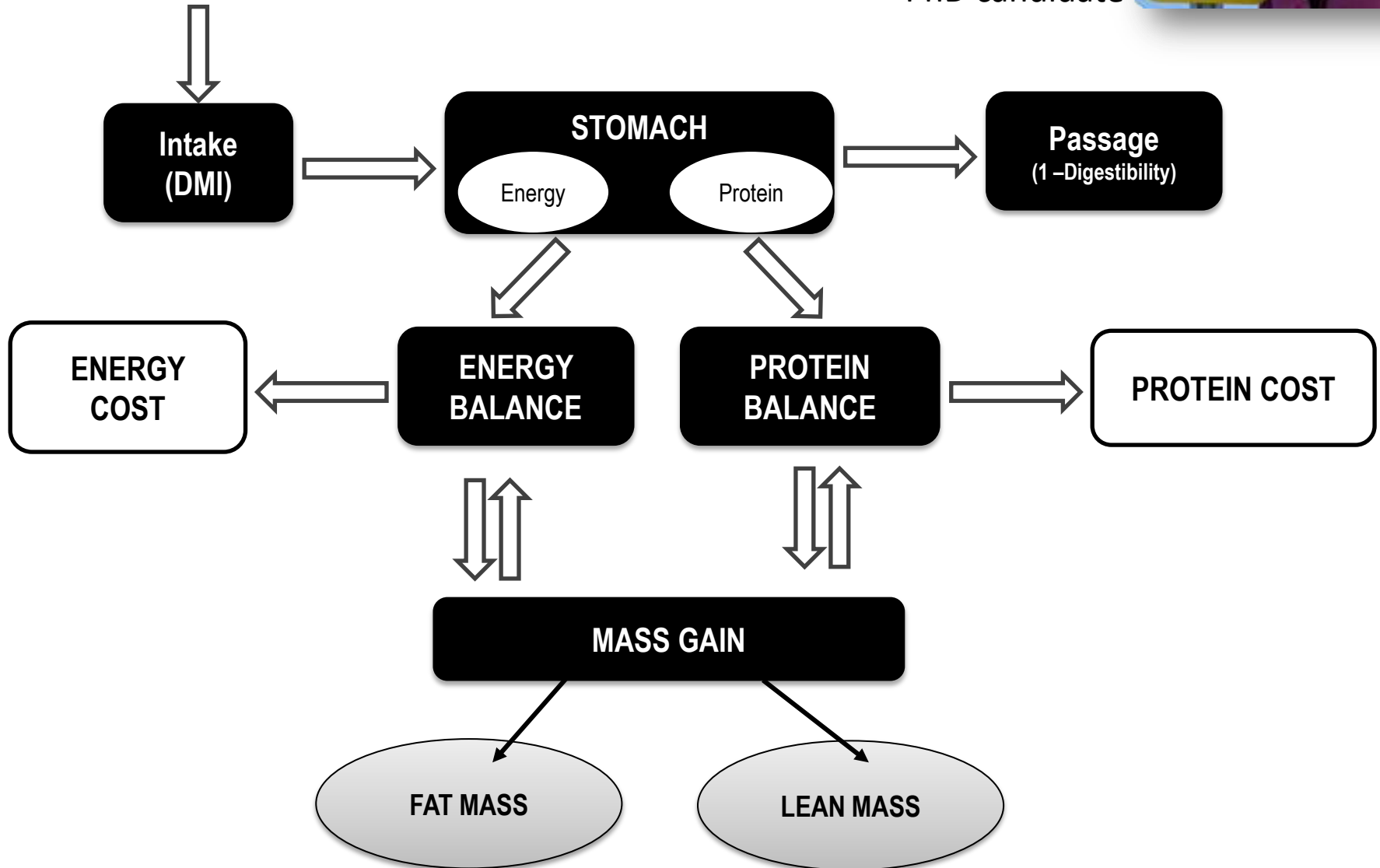


*In collaboration with the Bear Center, Washington State University*

Food avail  
& quality

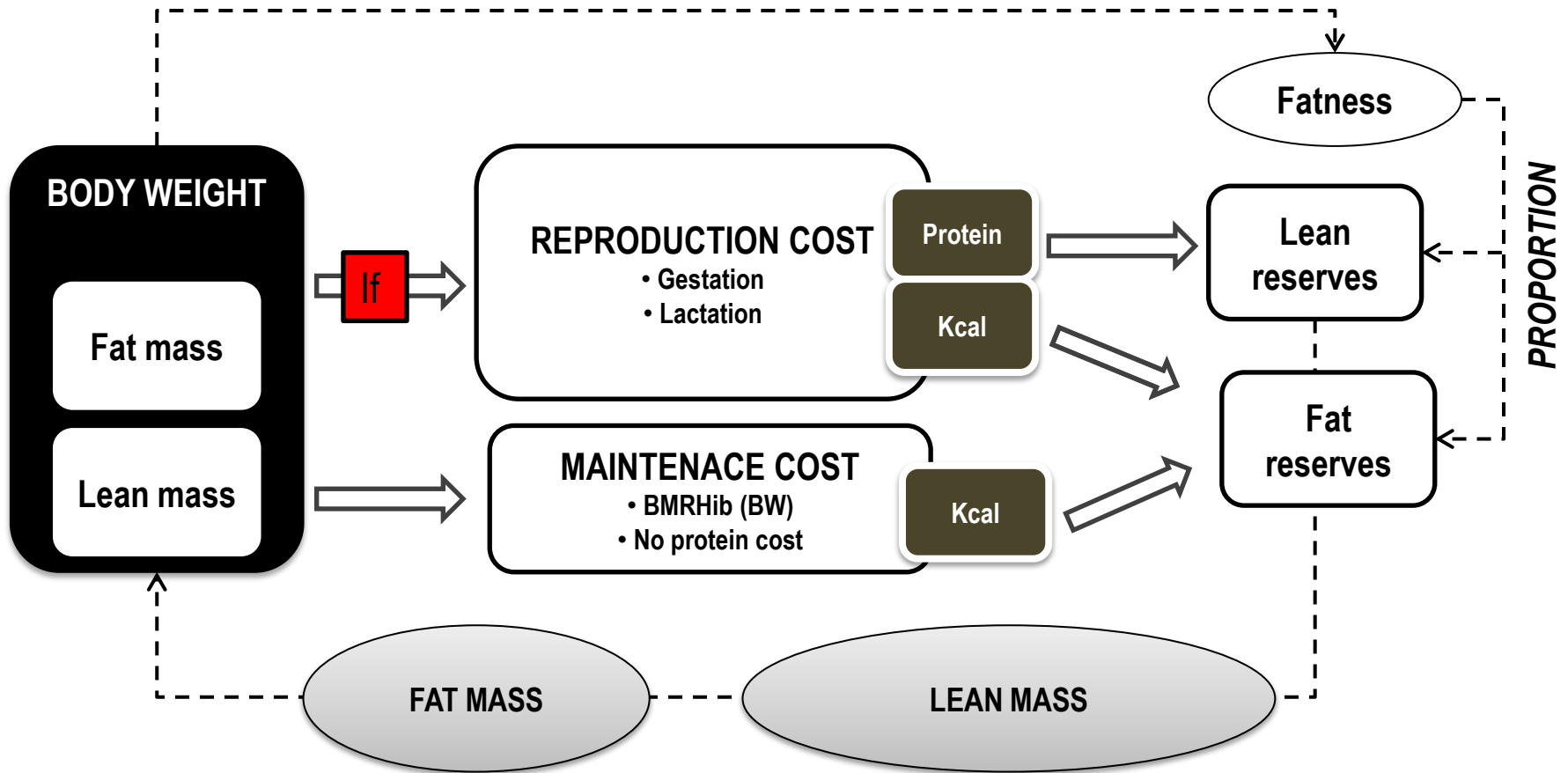
# Energy balance model

Claudia Lopez  
PhD candidate

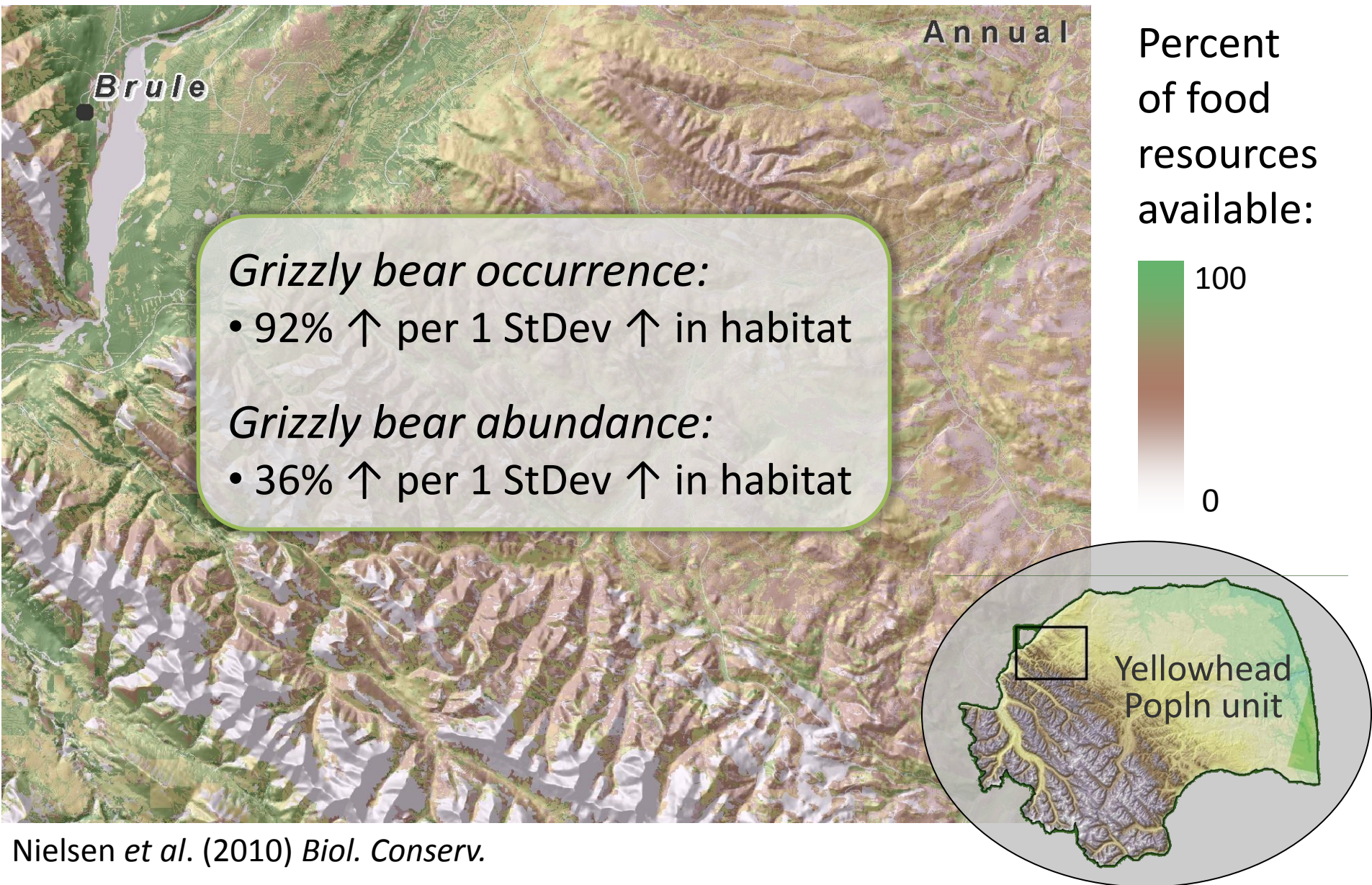


# Hibernation-reproduction model

Claudia Lopez  
PhD candidate



# How do we define availability?

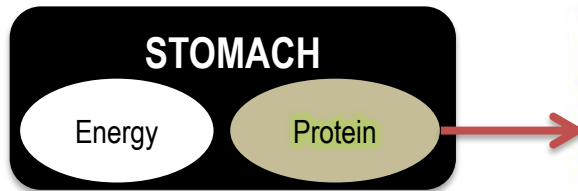


# How do we define quality?

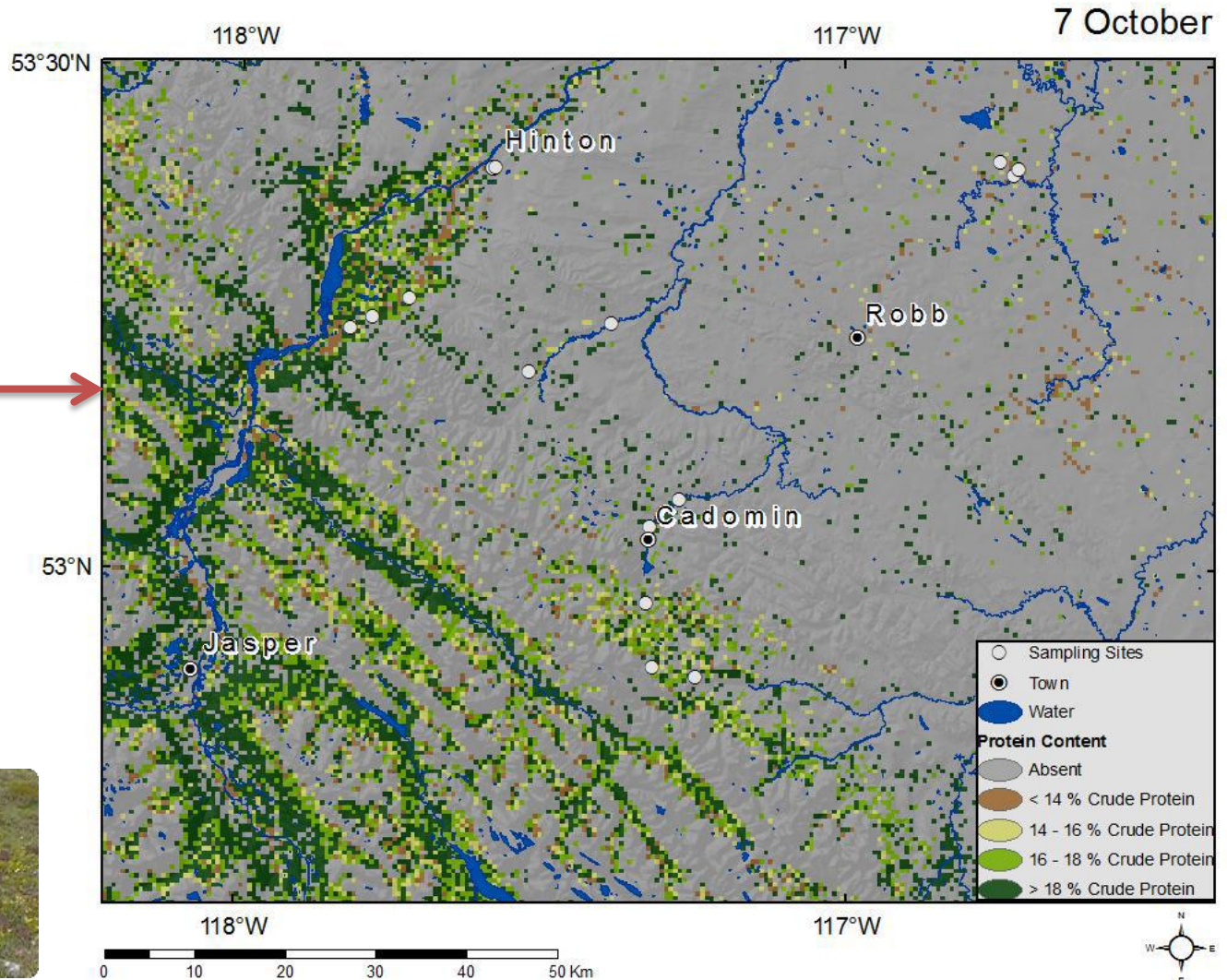


Sean Coogan  
MSc candidate

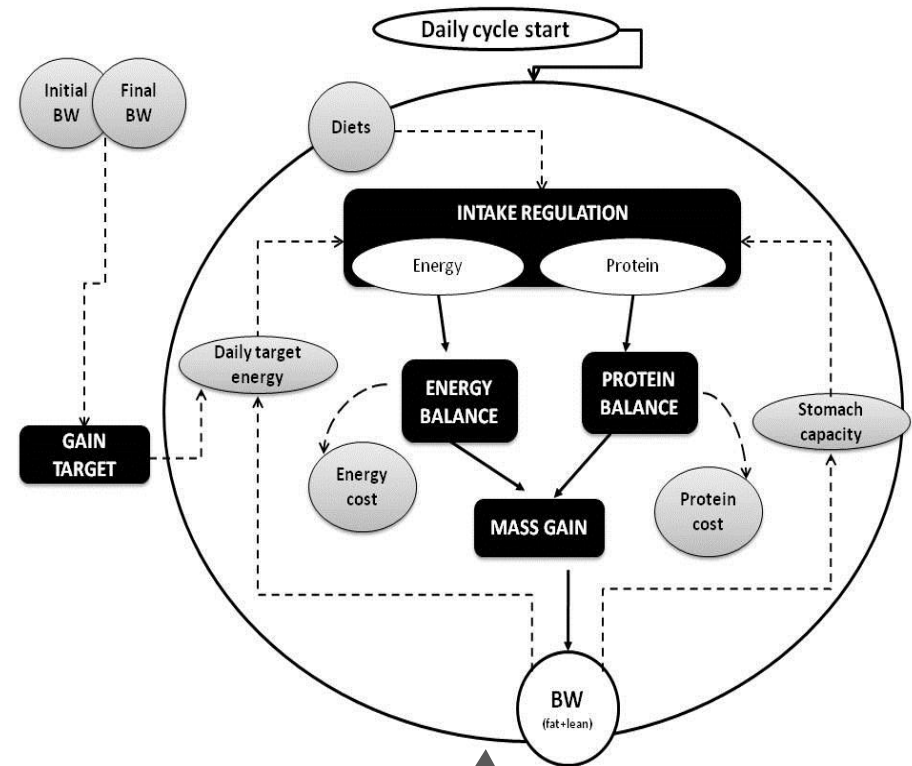
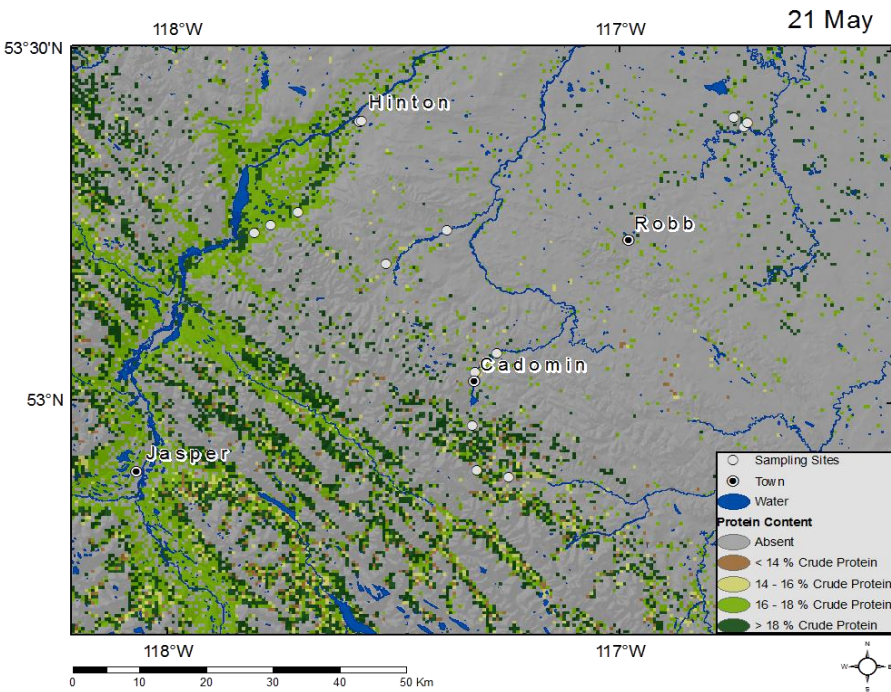
Dynamic (14-day) crude protein landscape model for alpine sweetvetch (*Hedysarum alpinum*)



Alpine sweetvetch root



# Landscapes → populations



Relating landscape change & management practices to bear health & populations







Dr. Scott E. Nielsen  
Assistant Professor  
Conservation Biology

## Applied Conservation Ecology Lab

Lab researchers working on grizzly bears:

<http://www.ace-lab.org>



People. Discovery. Innovation.



**foothills RESEARCH INSTITUTE**  
*research growing into practice.*



**Scott Nielsen**  
Lab director &  
researcher



**Claudia Lopez**  
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**Sean Coogan**  
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**Sarah Rovang**  
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**Courtney Hughes**  
PhD candidate