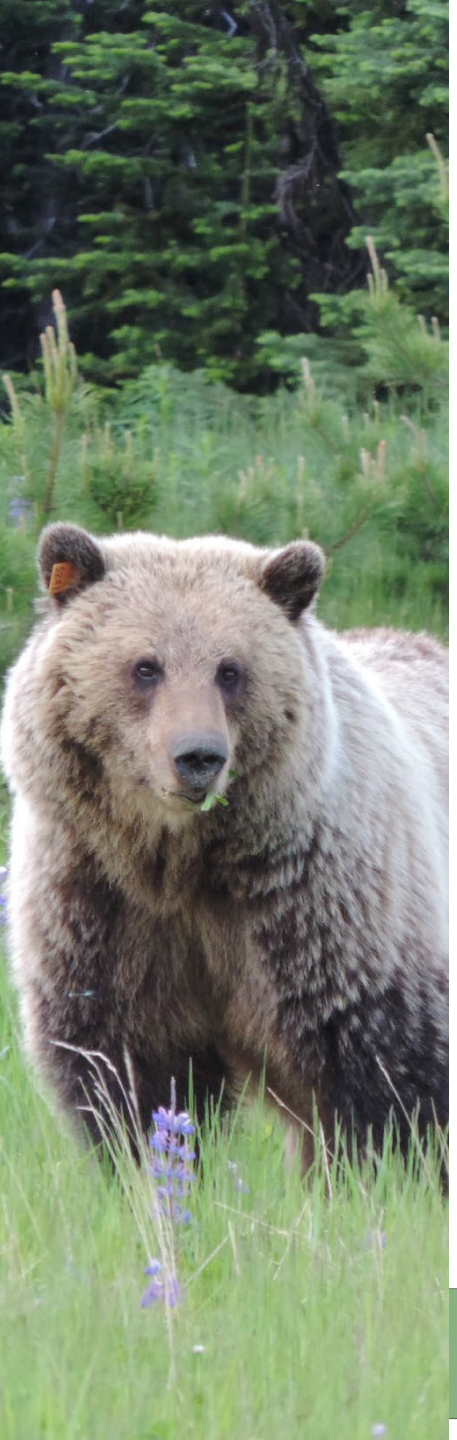


Grizzly-PAW: Grizzly Population Assessment in yelloWhead: Integrated Approaches Toward Conserving Grizzly Bears On A Human-Dominated Landscape Of Western Alberta.

Annual General Meeting – 3

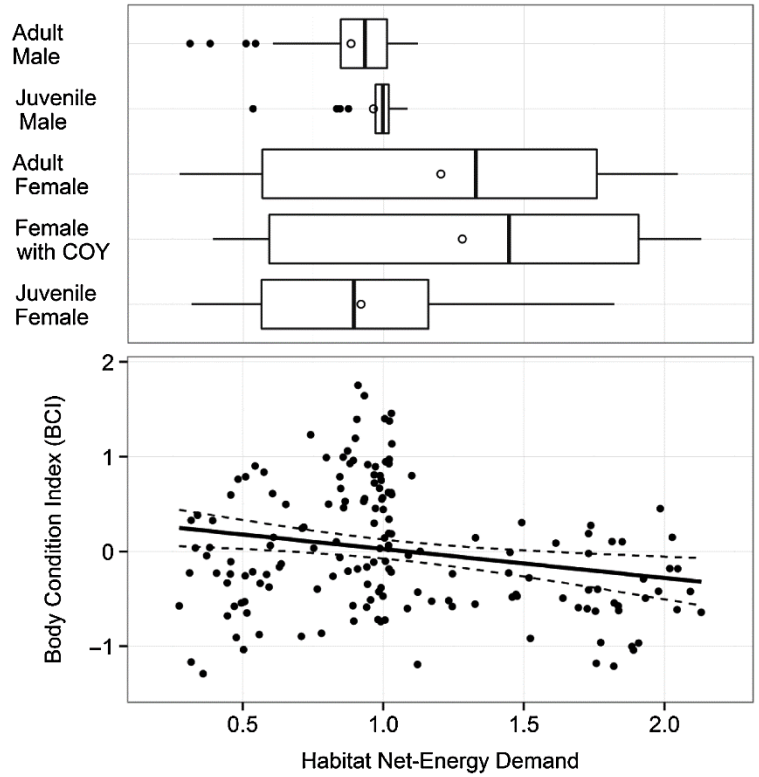
Dr. Mathieu Bourbonnais

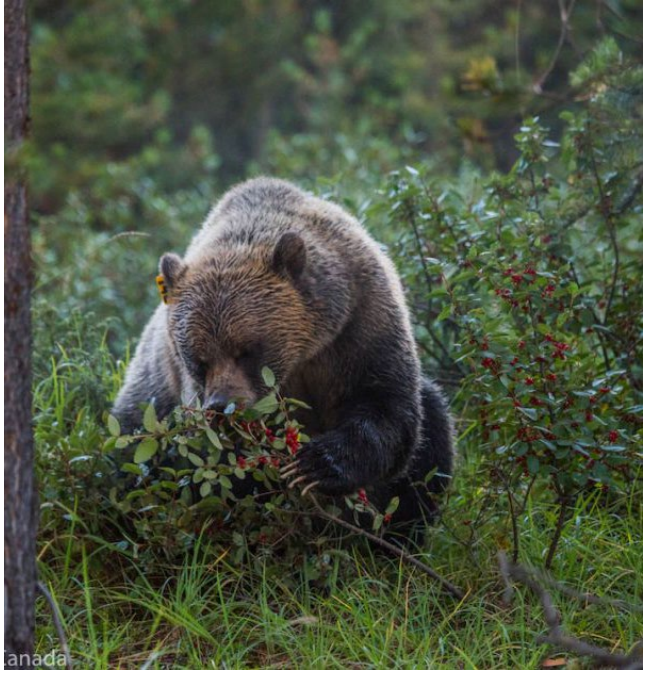
Calgary, Alberta. Oct 17, 2019

Body condition influences the movement behaviour of a threatened large carnivore

Introduction

- Landscape influence on physiological condition (Bourbonnais et al. 2014)
- Body condition index (Cattet et al. 2002)

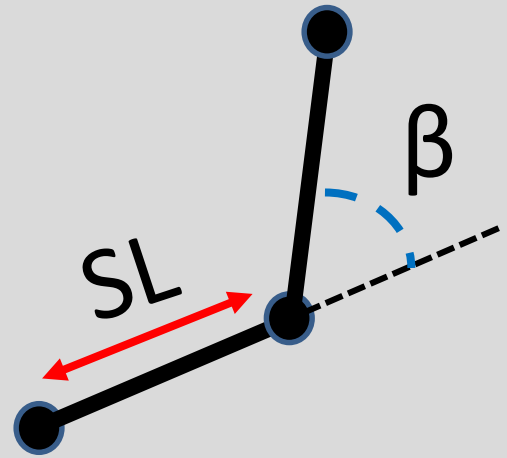


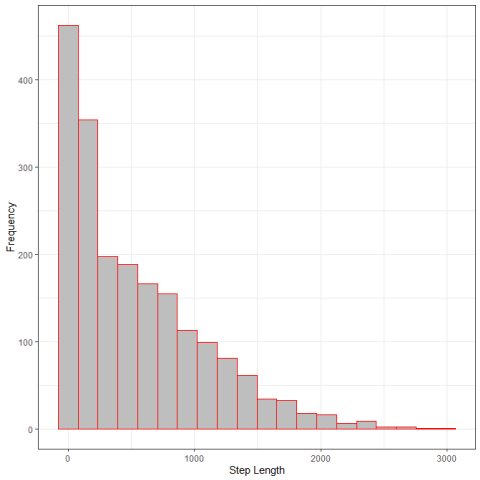


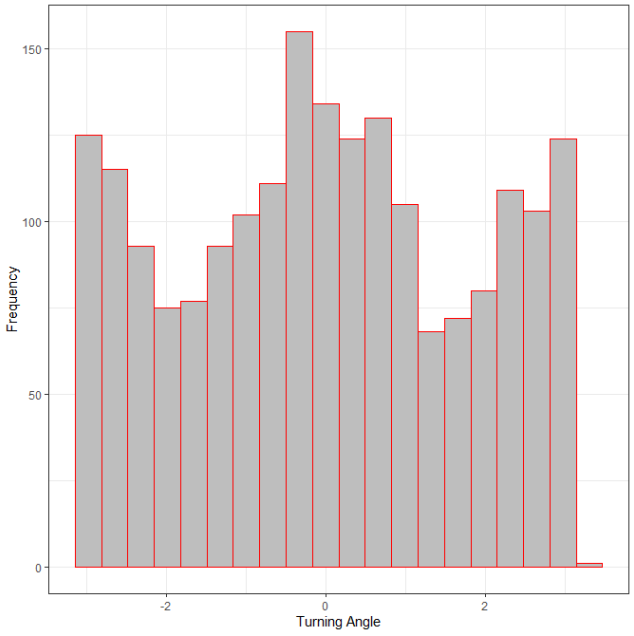
- Movement behaviour as a function of external factors + *internal state* (BCI)
- Predation risk allocation hypothesis (Lima & Bednekoff 1999)
- Hypothesis:
  - Individuals in poorer condition more likely to incur risk, both spatially and temporally, to acquire resources needed to improve their condition.

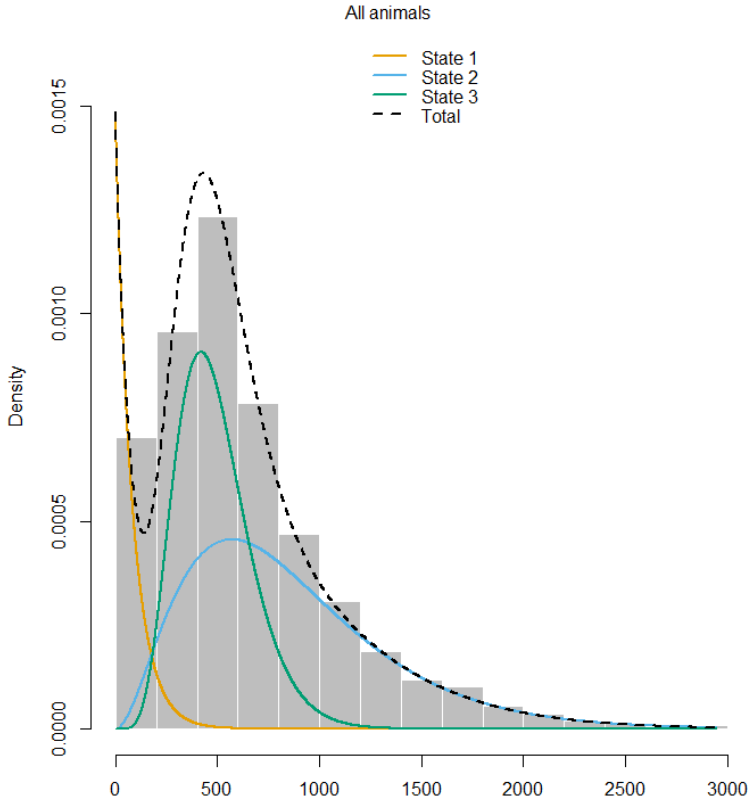
Methods

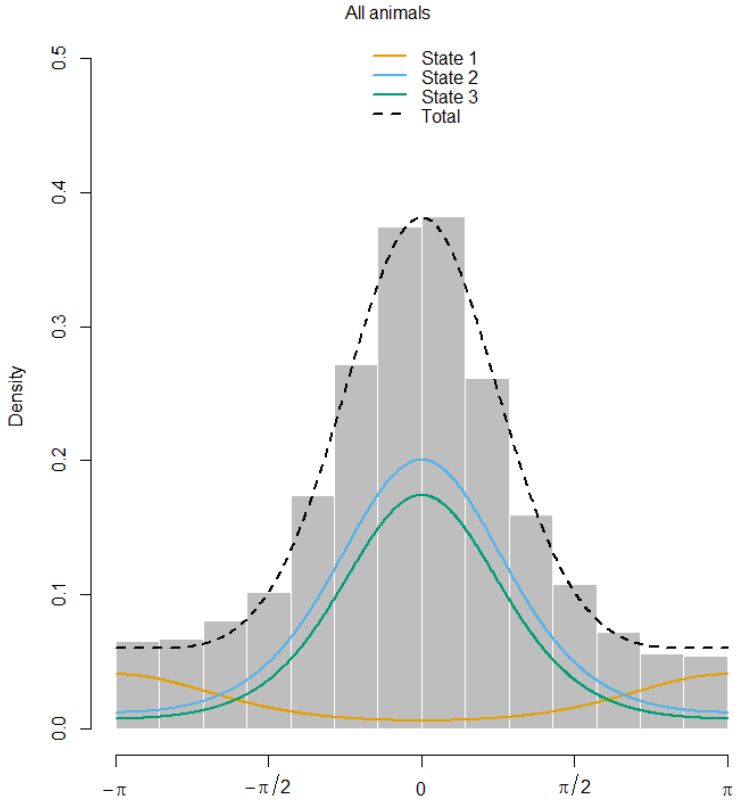
- BCI & GPS data from 60 bears (2009 – 2014).
- Classifying movement behaviour.



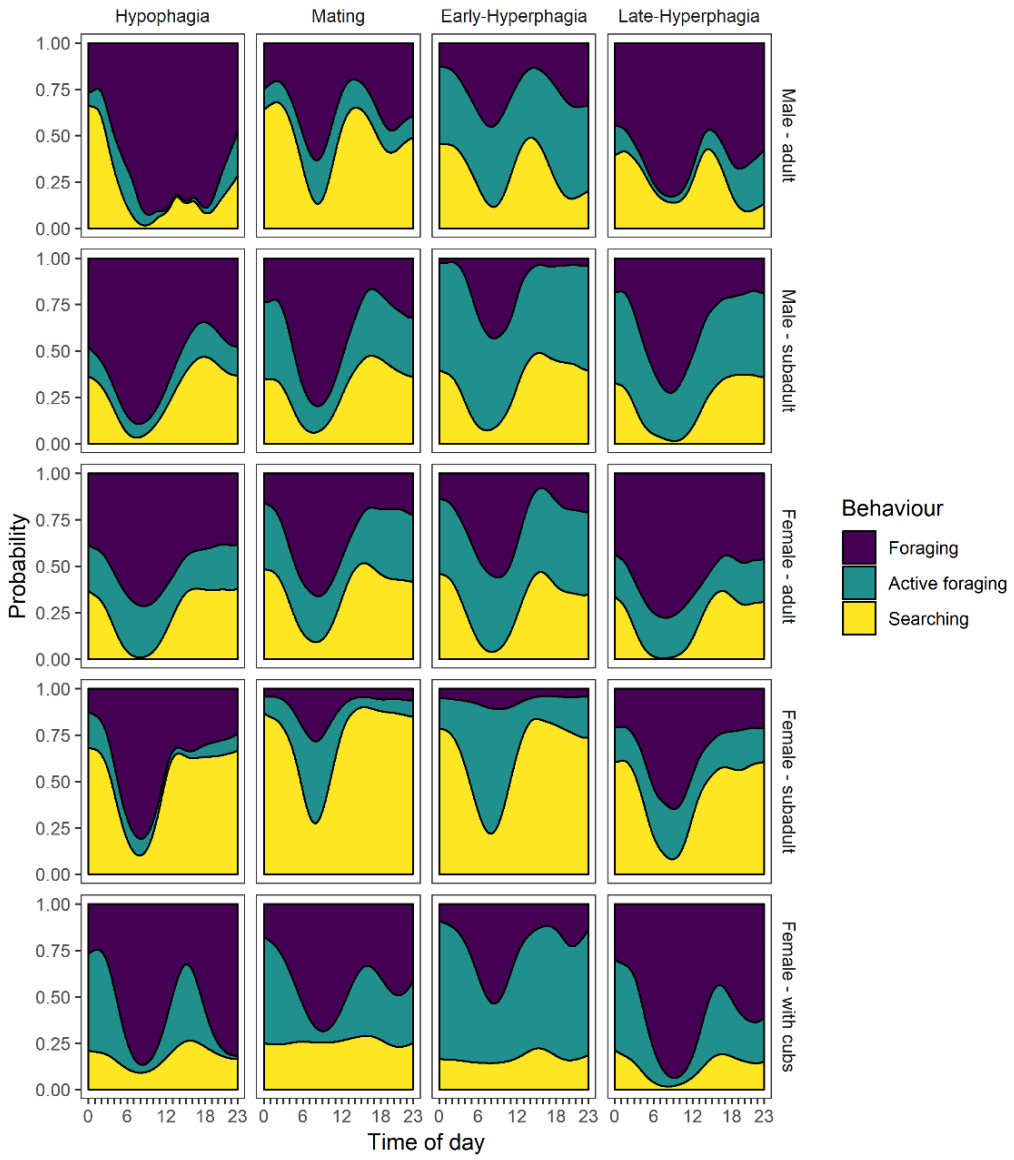


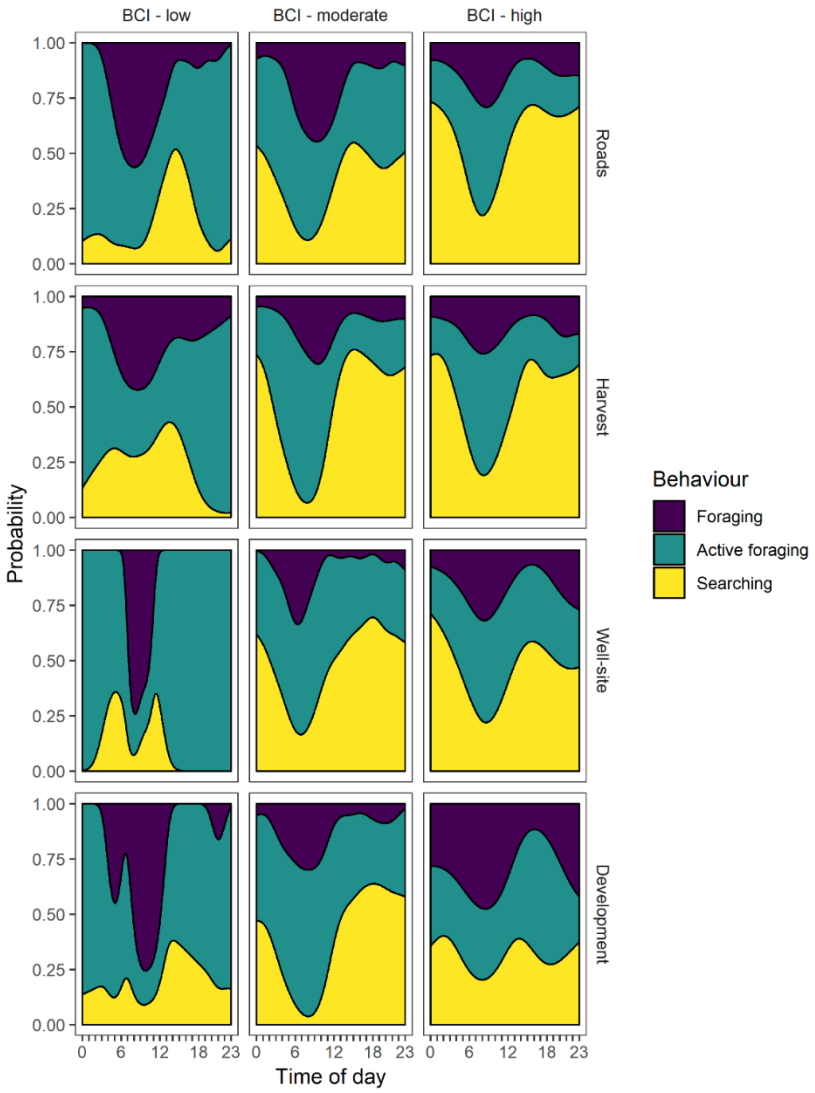


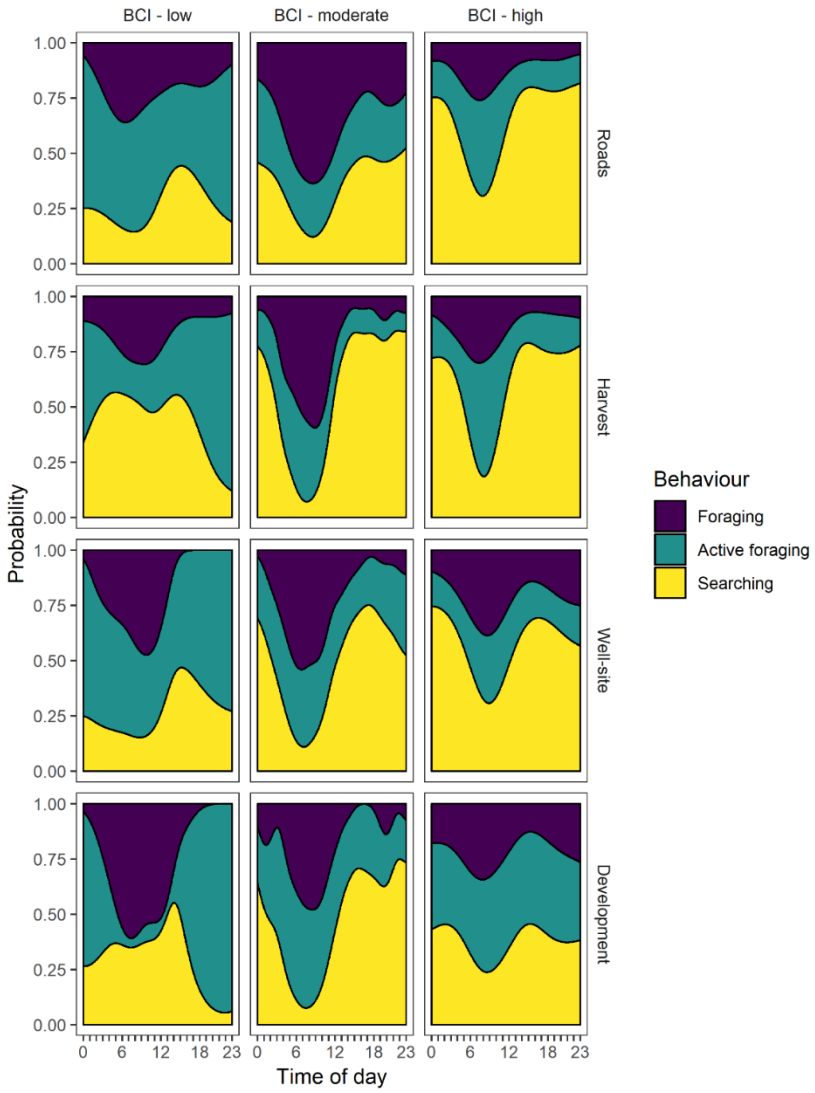

All animals
State 1
State 2
State 3
Total
Density
0.0000
0.0005
0.0010
0.0015
0
500
1000
1500
2000
2500
3000
step length

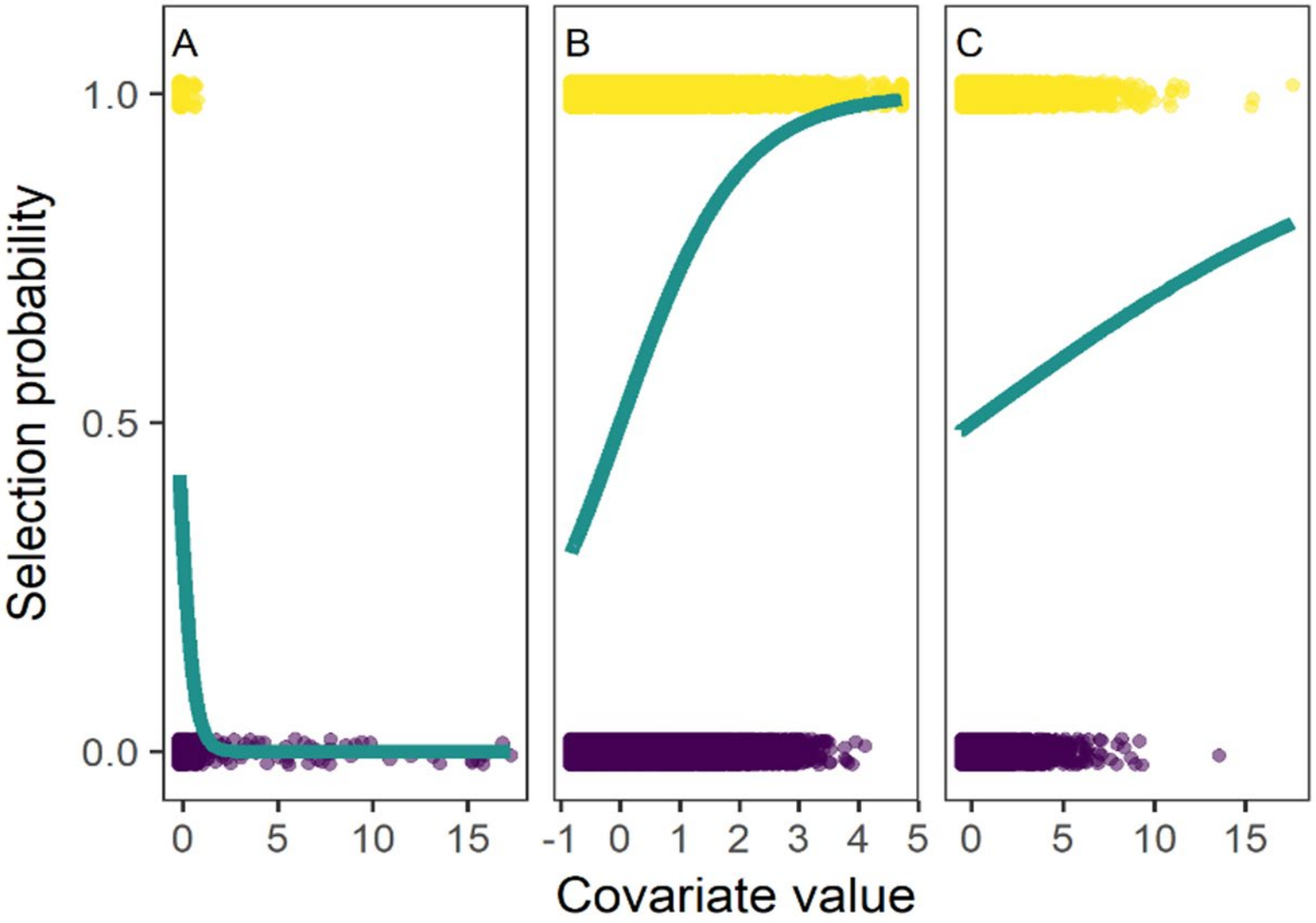

All animals
State 1
State 2
State 3
Total
Density
0.0
0.1
0.2
0.3
0.4
0.5
−π
−π/2
0
π/2
π
turning angle (radians)

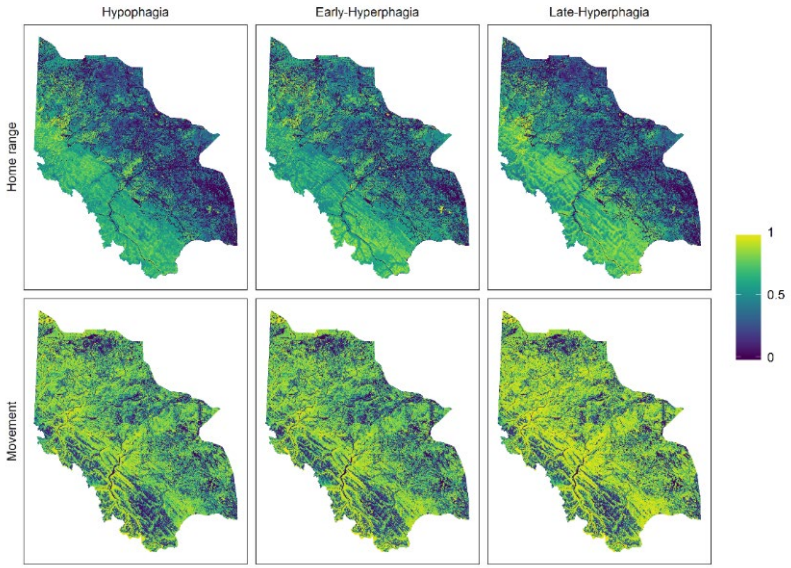
Results

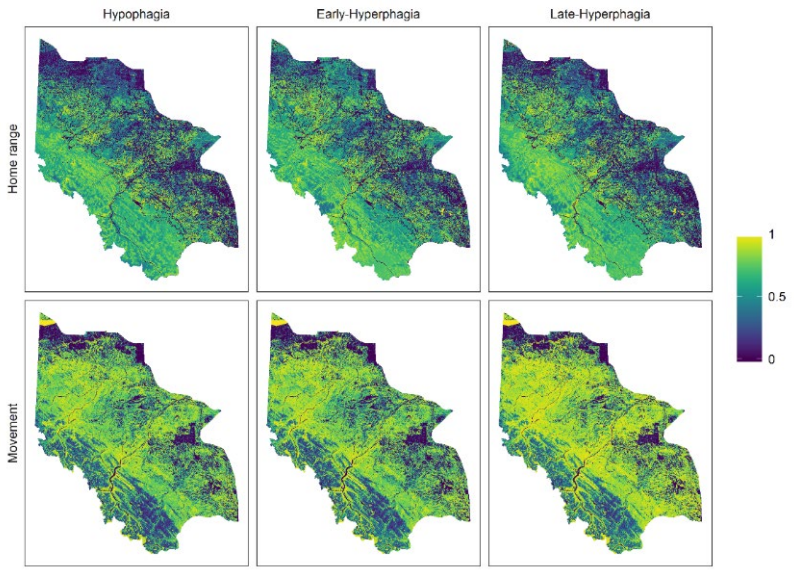

Hypophagia
Mating
Early-Hyperphagia
Late-Hyperphagia
Male - adult
Male - subadult
Female - adult
Female - subadult
Female - with cubs
Probability
1.00
0.75
0.50
0.25
0.00
0
6
12
18
23
Time of day
Behaviour
Foraging
Active foraging
Searching


BCI - low
BCI - moderate
BCI - high
Roads
Harvest
Well-site
Development
Probability
1.00
0.75
0.50
0.25
0.00
0
6
12
18
23
Time of day
Behaviour
Foraging
Active foraging
Searching

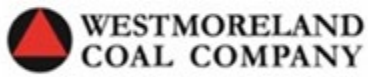
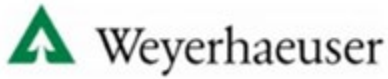

BCI - low
BCI - moderate
BCI - high
Roads
Harvest
Well-site
Development
Probability
1.00
0.75
0.50
0.25
0.00
0
6
12
18
23
Time of day
Behaviour
Foraging
Active foraging
Searching


A
B
C
1.0
0.5
0.0
Selection probability
0
5
10
15
-1
0
1
2
3
4
5
Covariate value


Hypophagia
Early-Hyperphagia
Late-Hyperphagia
Home range
Movement
1
0.5
0


Hypophagia
Early-Hyperphagia
Late-Hyperphagia
Home range
Movement
1
0.5
0

Conclusions

- Bears in poorer condition (BCI) more likely to incur risk for potential gains
- Individuals in better condition will forego these opportunities or spend less time.
- Physiological gains associated with energy budget and energy landscapes (e.g., ungulates)

Thank You for Attending