



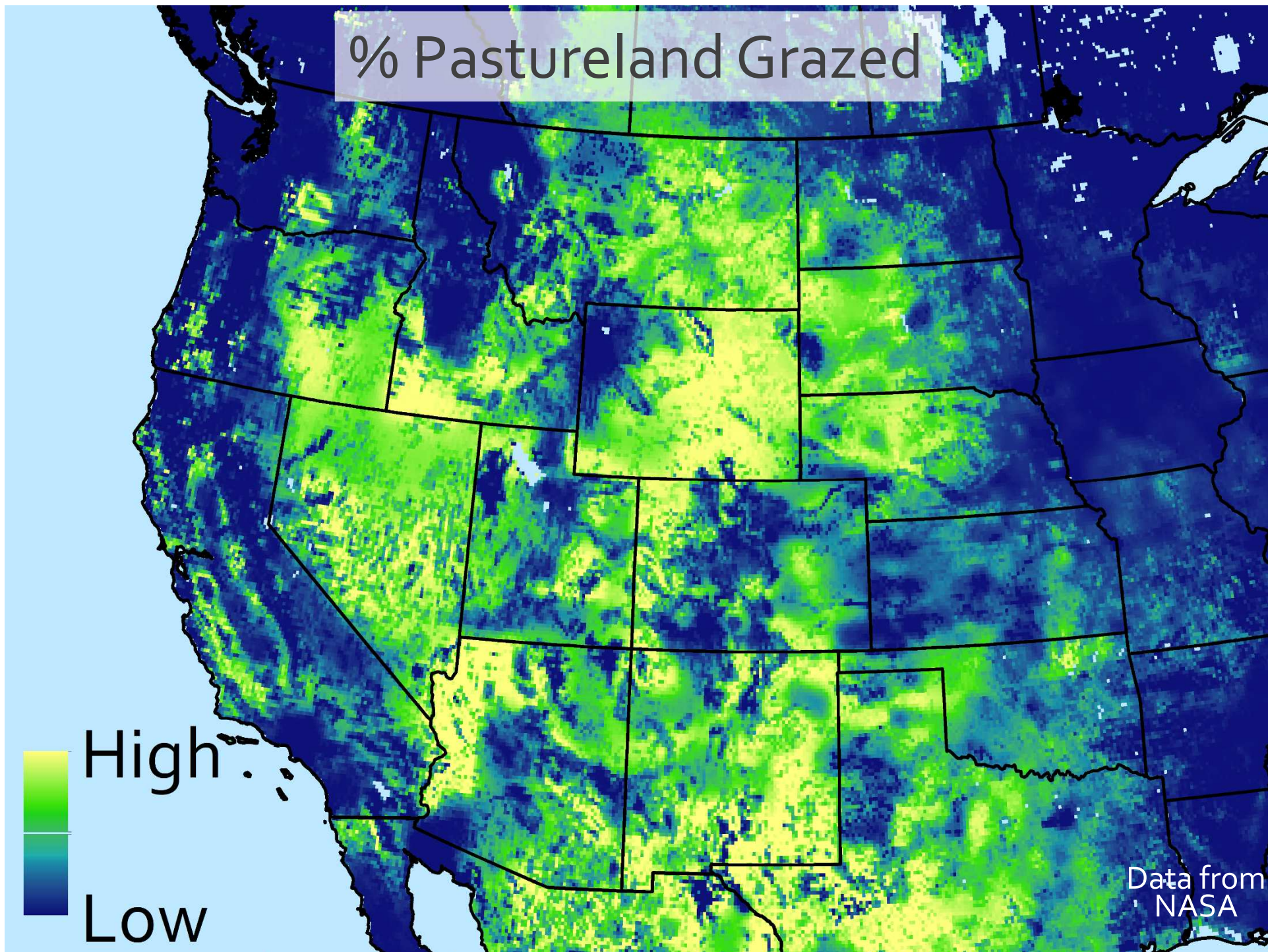
Effects of Grazing Management on the Ecology of Sharp-tailed Grouse

Megan Milligan and Lance McNew

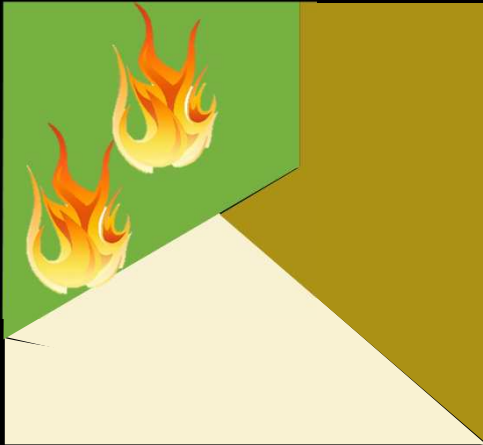
% Pastureland Grazed

High
Low

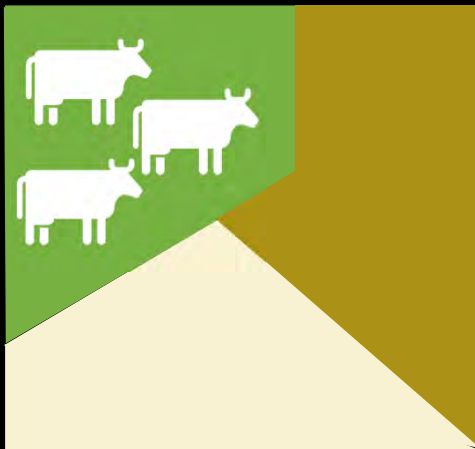
Data from
NASA



Patch-burn grazing




Year 1



E-998

***Patch Burning:
Integrating Fire and Grazing
to Promote Heterogeneity***



September 2007

*Department of Natural Resource Ecology and Management
Oklahoma Cooperative Extension Service
Oklahoma State University*

Heterogeneity is good and re-coupling fire & grazing can improve habitat for GPCH, LPCH, others...

- **Greater Prairie-Chickens**

Tallgrass Prairie

- McNew et al. 2015, Winder et al. , 2017, 2018, others
- Concurrent benefits for other species
 - Songbirds, small mammals,

- **Lesser Prairie-Chickens**

Mixed-grass Prairie

- Lautenbach (2017)... et al., unpublished
- Others...



- Fire is not an accepted management tool in much of the northern Great Plains
 - Sliwinsky et al. 2018



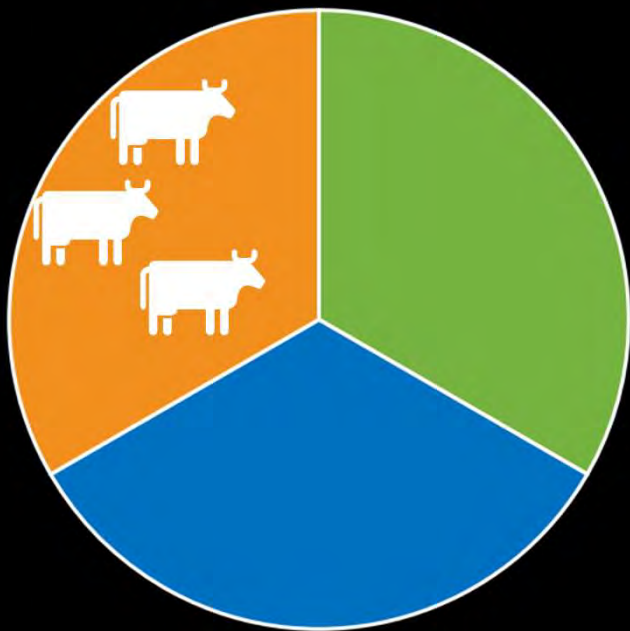
- How can we create/enhance patch-level heterogeneity in Montana grasslands?

Hormay rest-rotation



Year 1

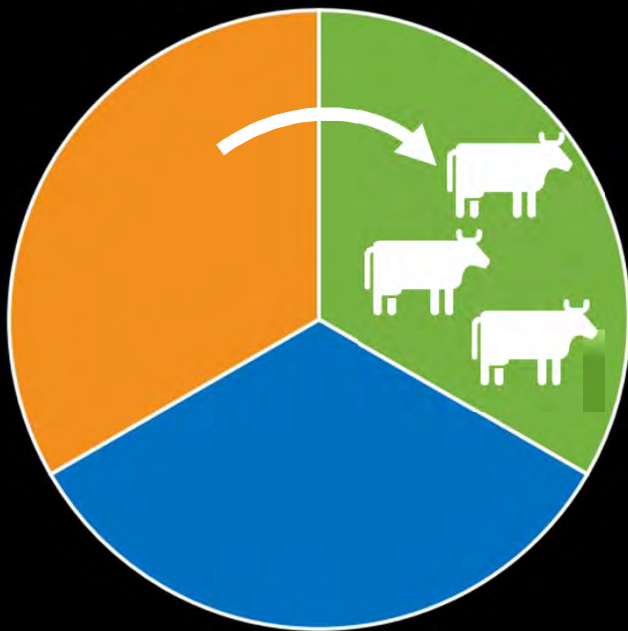
Hormay rest-rotation



Year 1



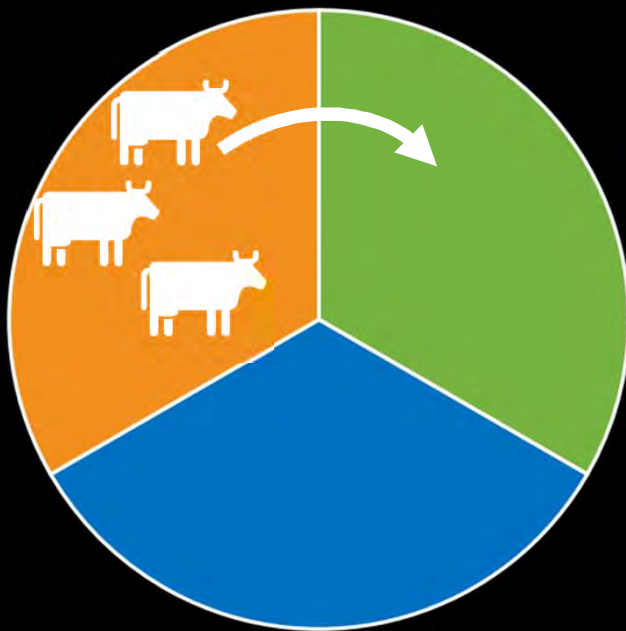
Hormay rest-rotation



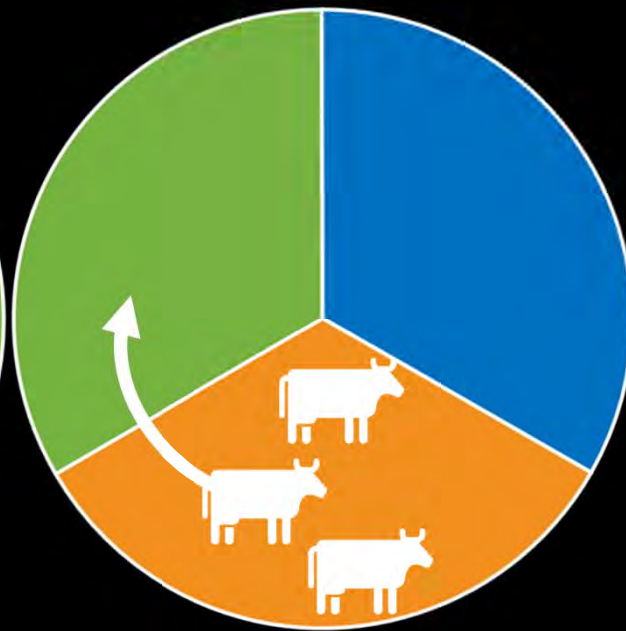
Year 1



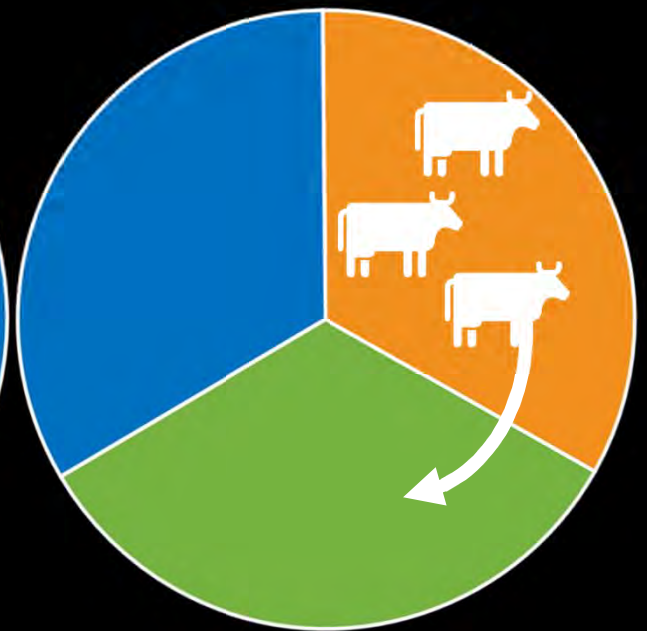
Hormay rest-rotation



Year 1



Year 2



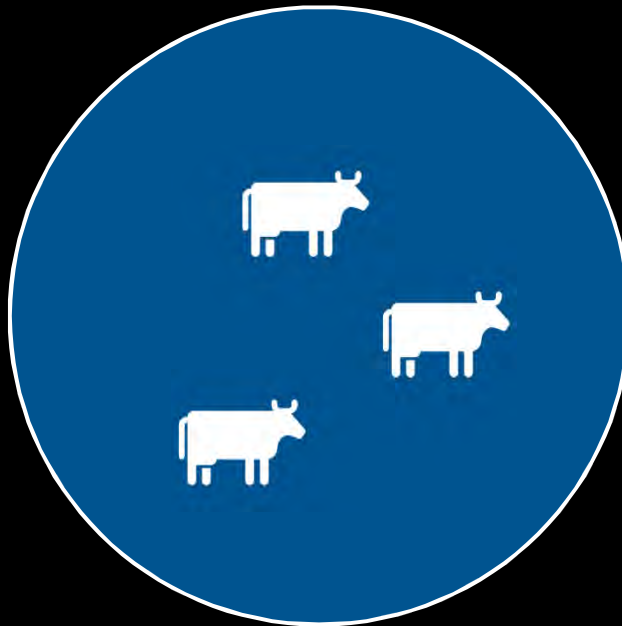
Year 3



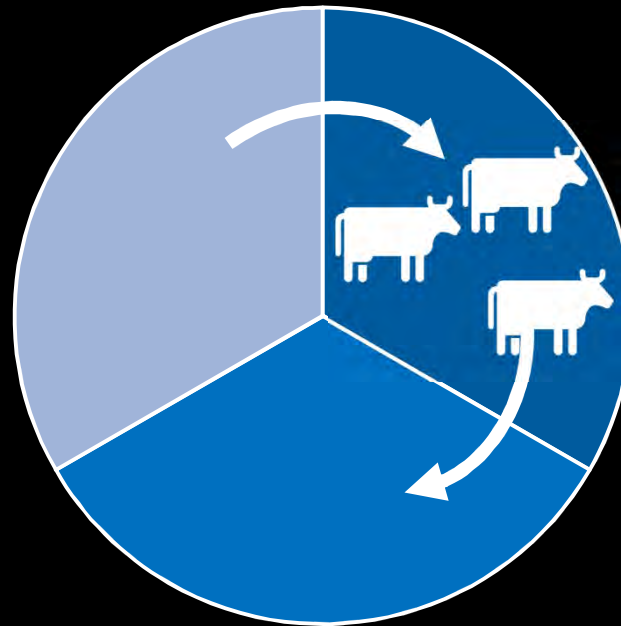
Hormay rest-rotation



Season-
long
grazing



Summer
rotation





Space use



Space use



Survival



Space use



Nest ecology



Survival

- Grazing system
- Stocking rate
- Stocking density during nesting



Nest habitat



Nest habitat



Landcover and
fragmentation



Nest habitat

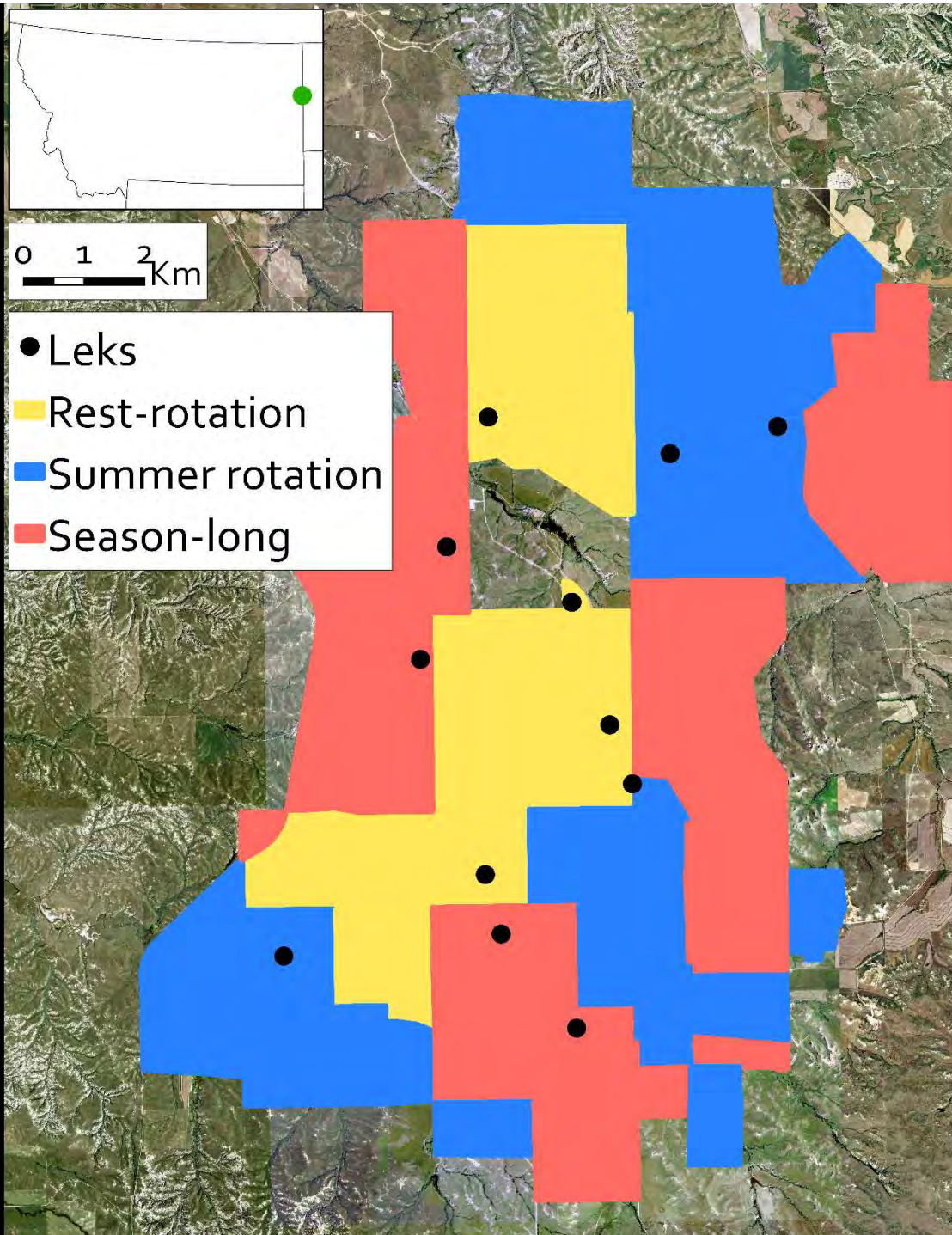


Landcover and
fragmentation



Anthropogenic
disturbance





Space use

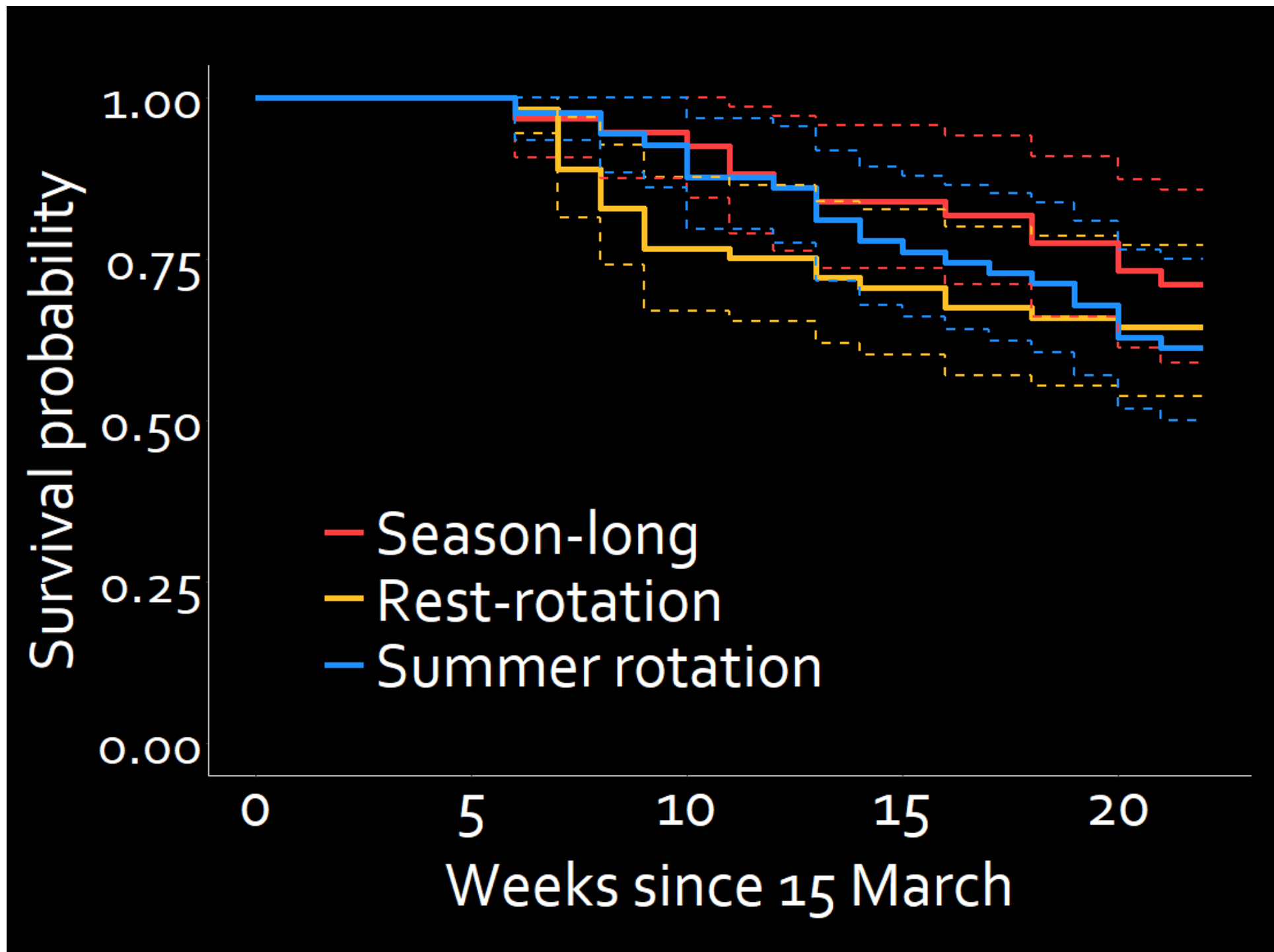
No effects of grazing system on:

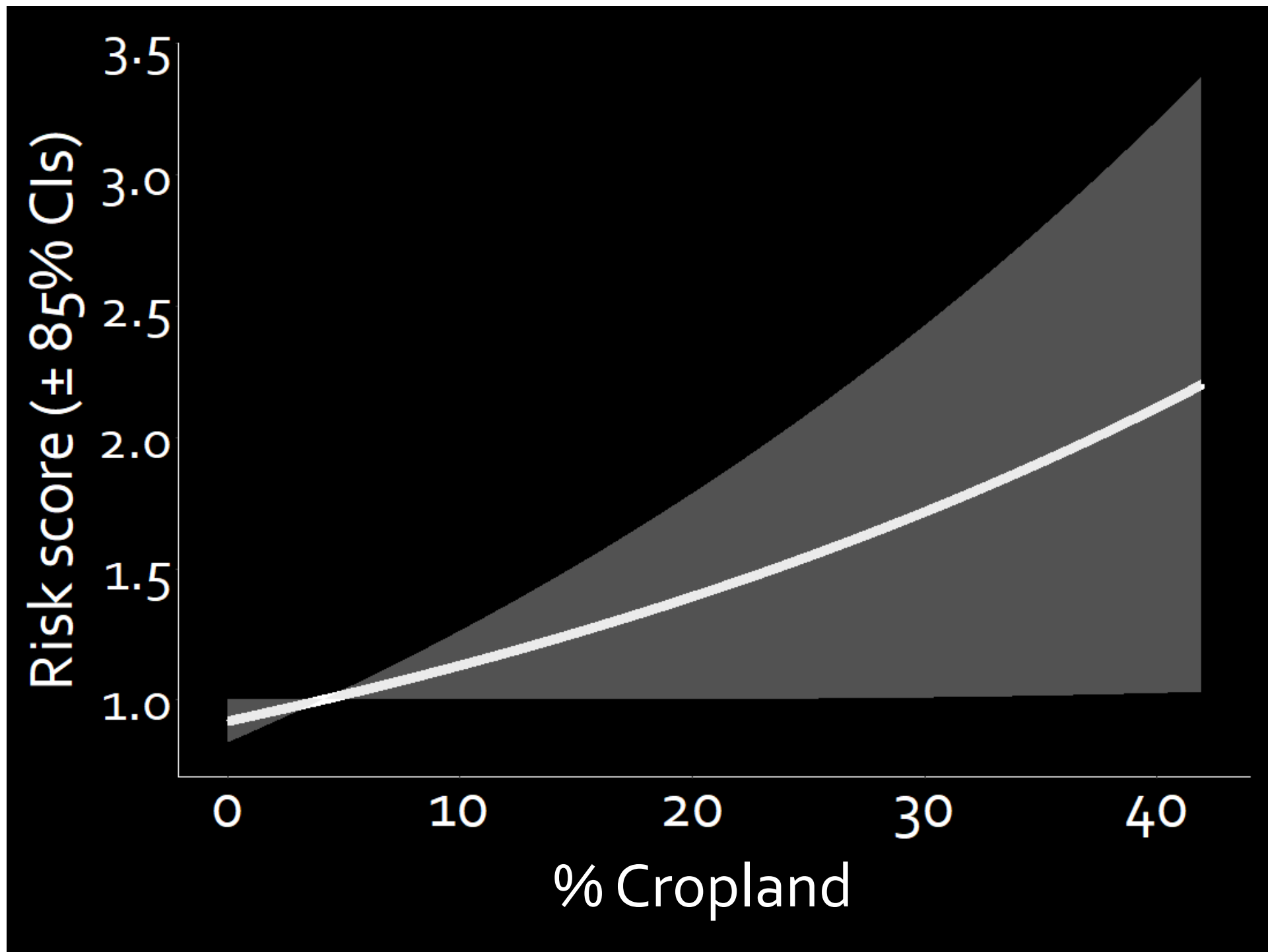
- Home range size
- 2nd order habitat selection
- 3rd order habitat selection
- 2nd order selection driven by native grassland coverage

High individual variation in space use and habitat selection

Adult survival







Nesting ecology



Nest site selection

Rel. prob. of selection
($\pm 85\%$ CIs)

0.6
0.4
0.2

0

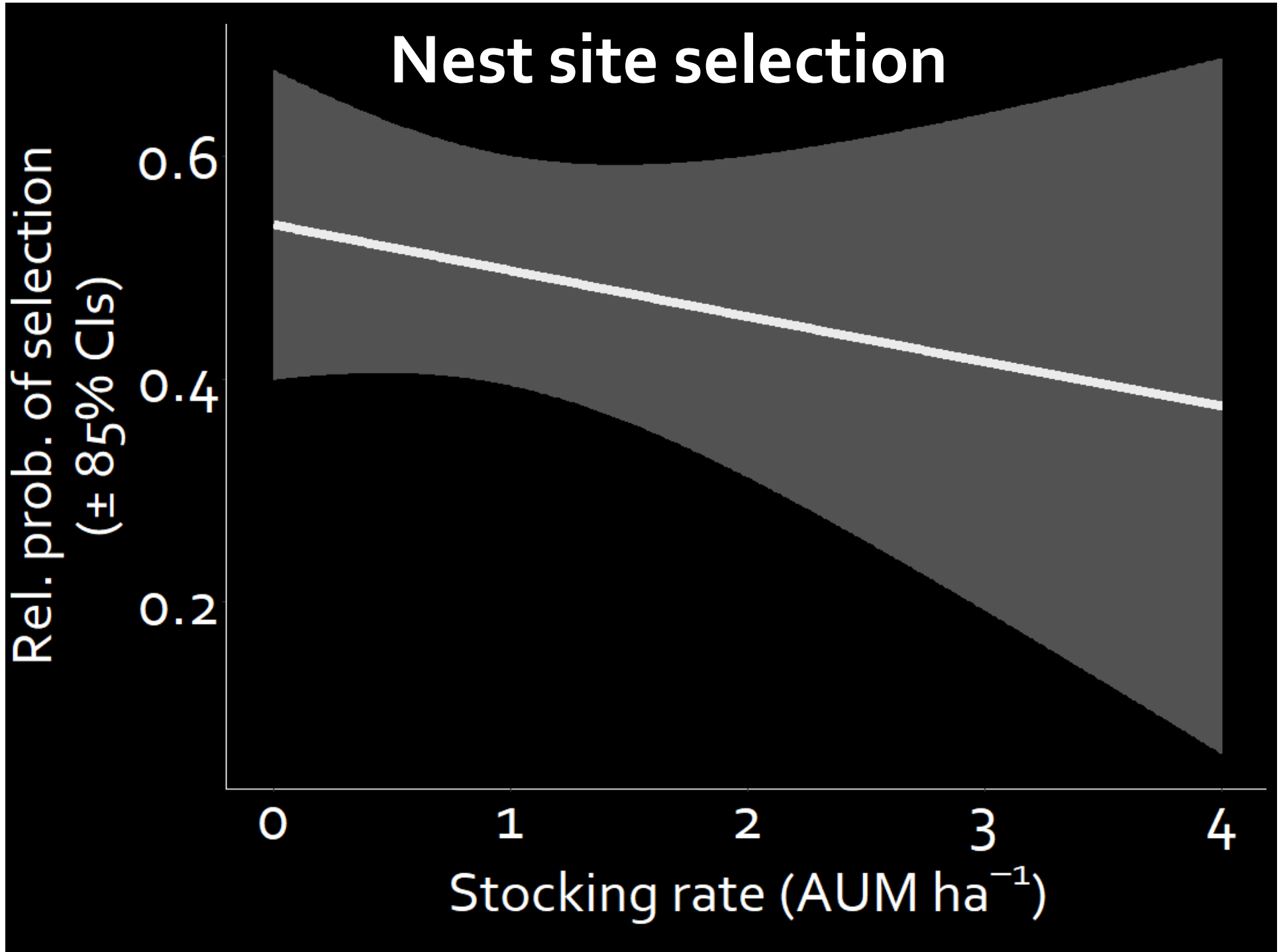
1

2

3

4

Stocking rate (AUM ha⁻¹)



Nest survival – Grazing system

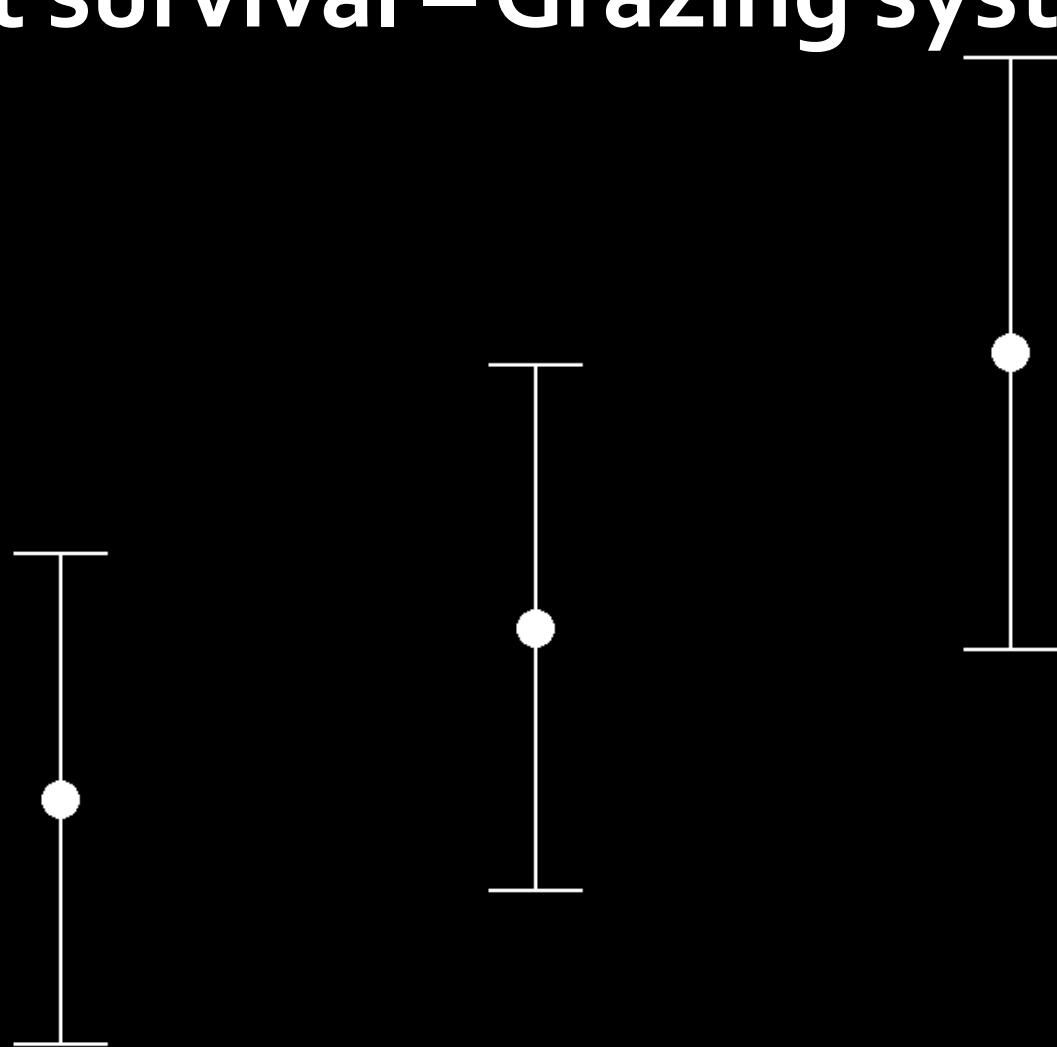
Overall nest survival
(\pm 85% CIs)

0.5
0.4
0.3

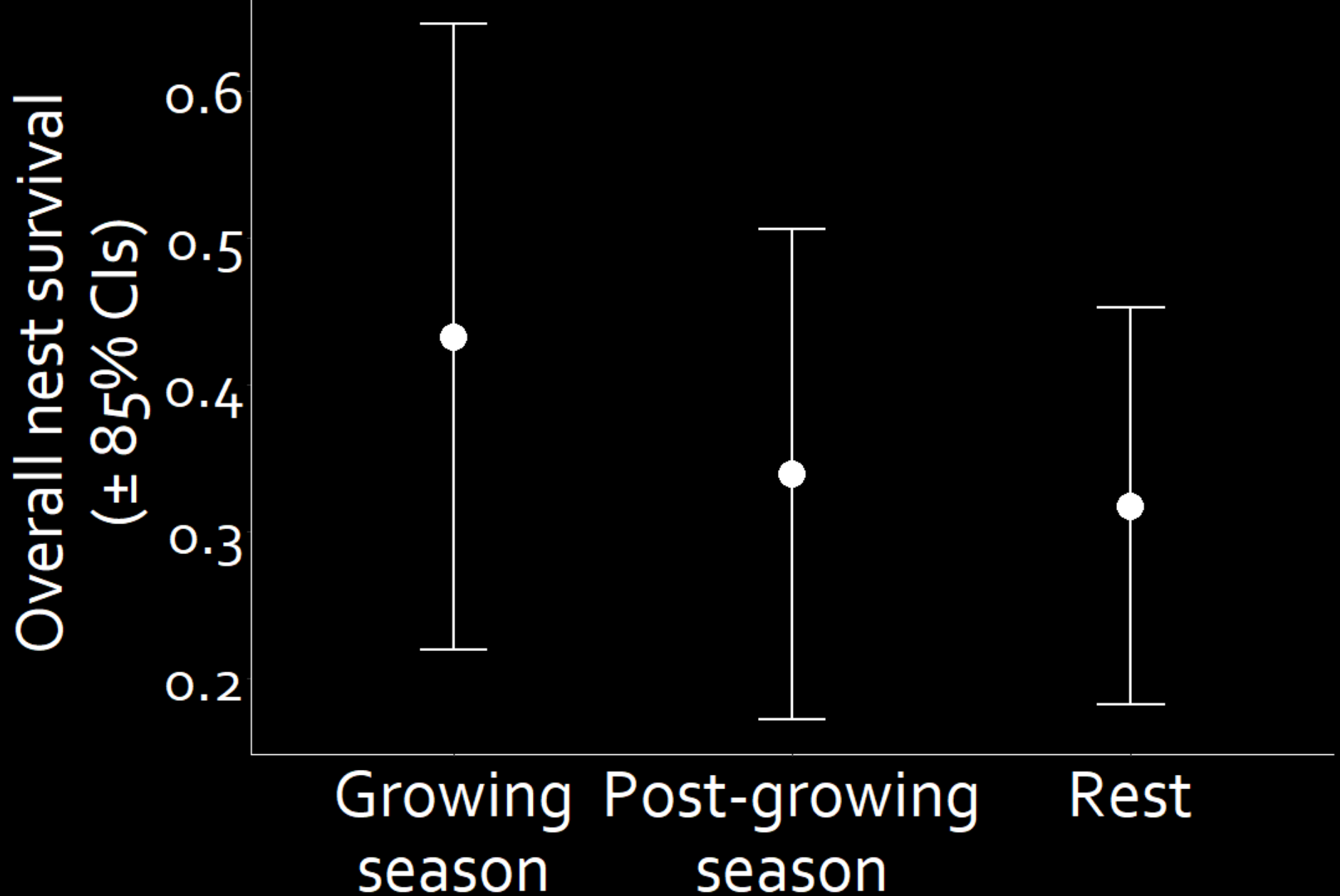
Rest-
rotation

Summer
rotation

Season-
long



Nest survival – Rest-rotation treatments



Rel. prob. of selection
($\pm 85\%$ CIs)

1.00
0.75
0.50
0.25
0.00

0

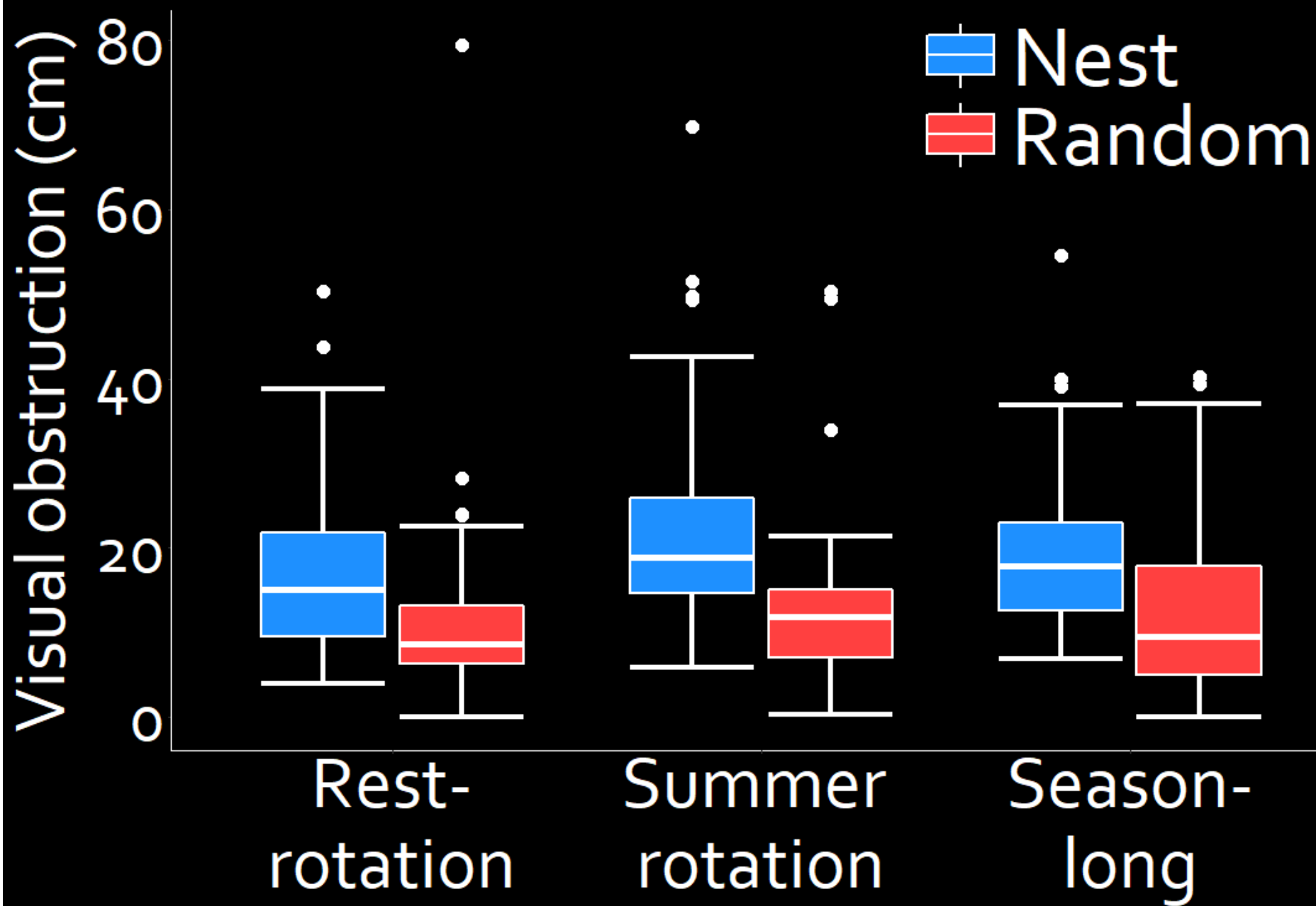
20

40

Nest VOR (cm)



Nest-site







Intact Grasslands,
Plowprint, and New
Plowprint in 2017



1.7 million
acres of
grassland
lost in 2017

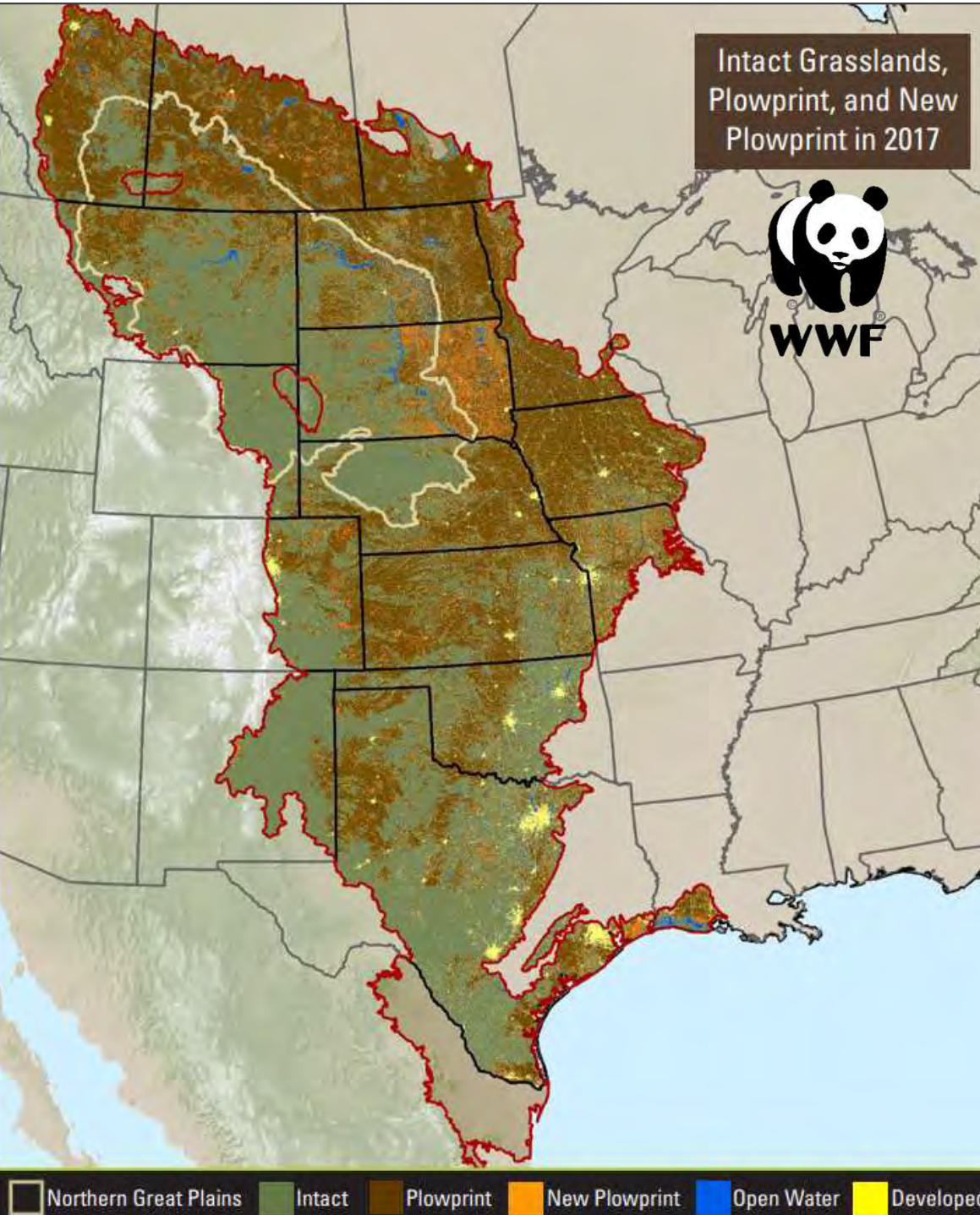




Photo: Leland Red Angus

Acknowledgements



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Questions?



