Mechanisms underlying nest predation near energy development:
A test of the mesopredator release hypothesis

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Habitat alteration

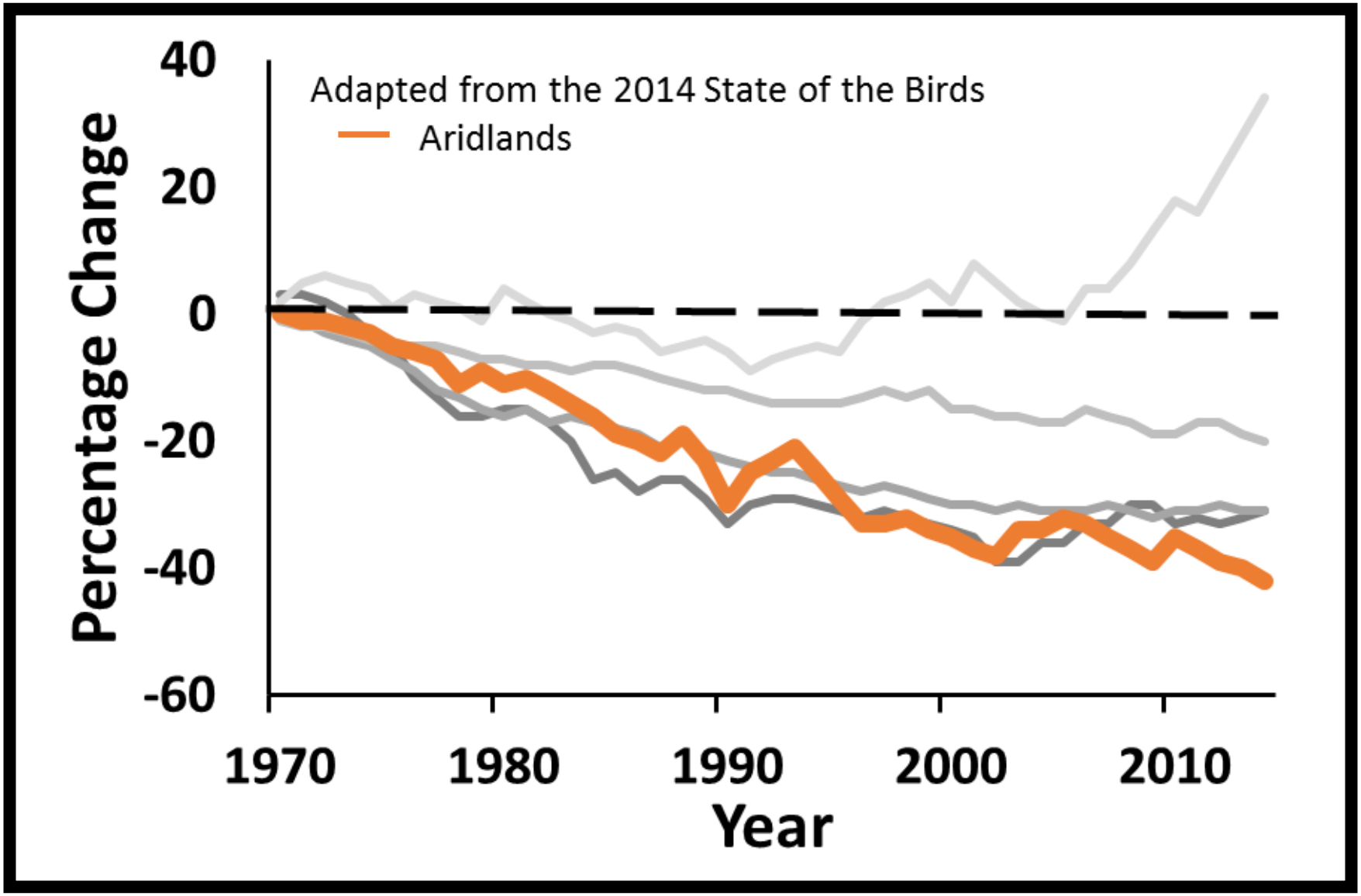
Accelerated Natural Gas Production

Kerr 2010

Wildlife and Energy Development

Northrup and Wittemyer 2013

Shrubland birds are on the decline



Sagebrush-obligate songbirds = species of greatest conservation need

Brewer's Sparrow

Sagebrush Sparrow

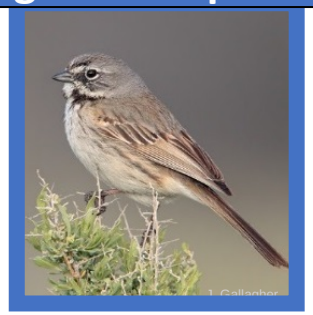
Sage Thrasher

Sauer et al 2013

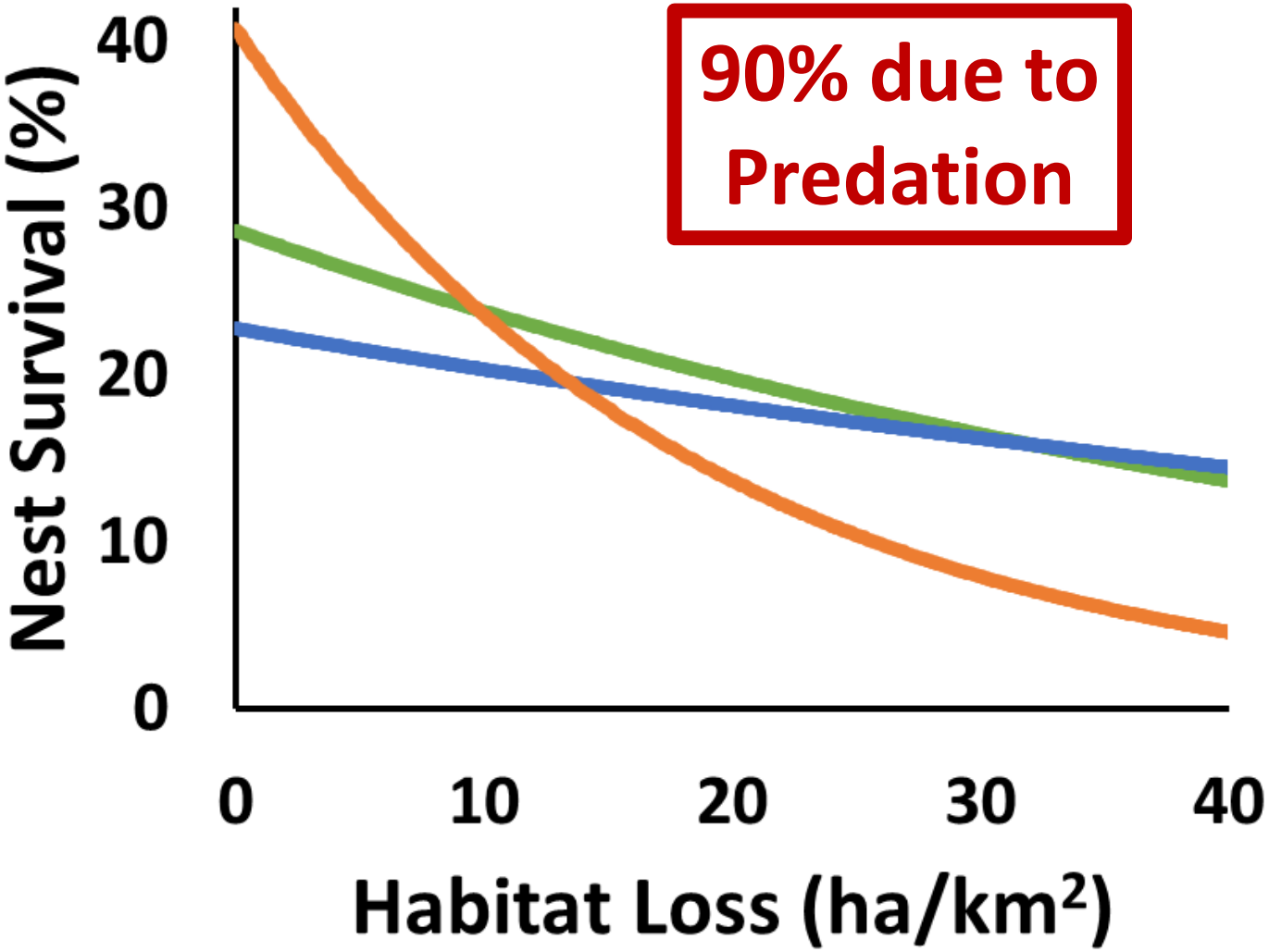
Nest Success ⬇ with Habitat Loss

Brewer's Sparrow

Sagebrush Sparrow



Sage Thrasher



Adapted from M. Gilbert thesis 2010

Nest Predator Identification

Rodents = 80% of nest predation events

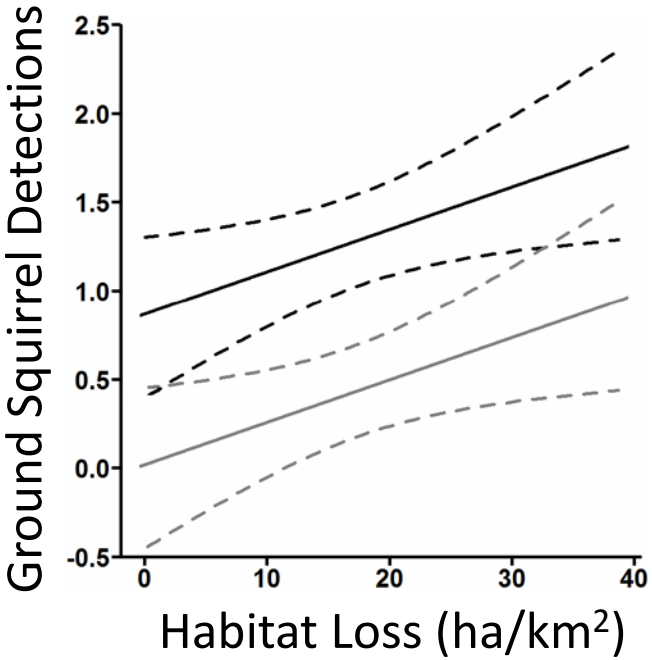
Hethcoat and Chalfoun 2015

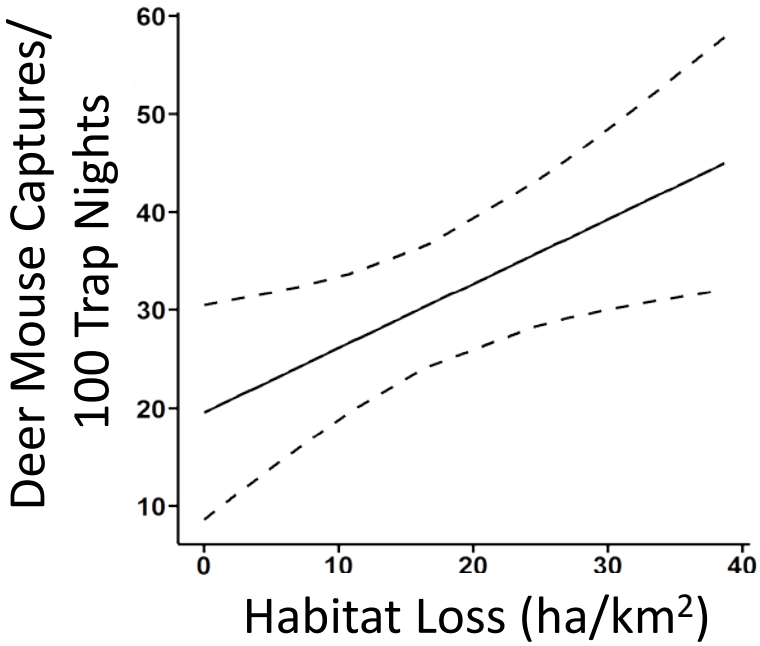
WARNING:

This footage is gruesome!!

20 07/01
23 2:31

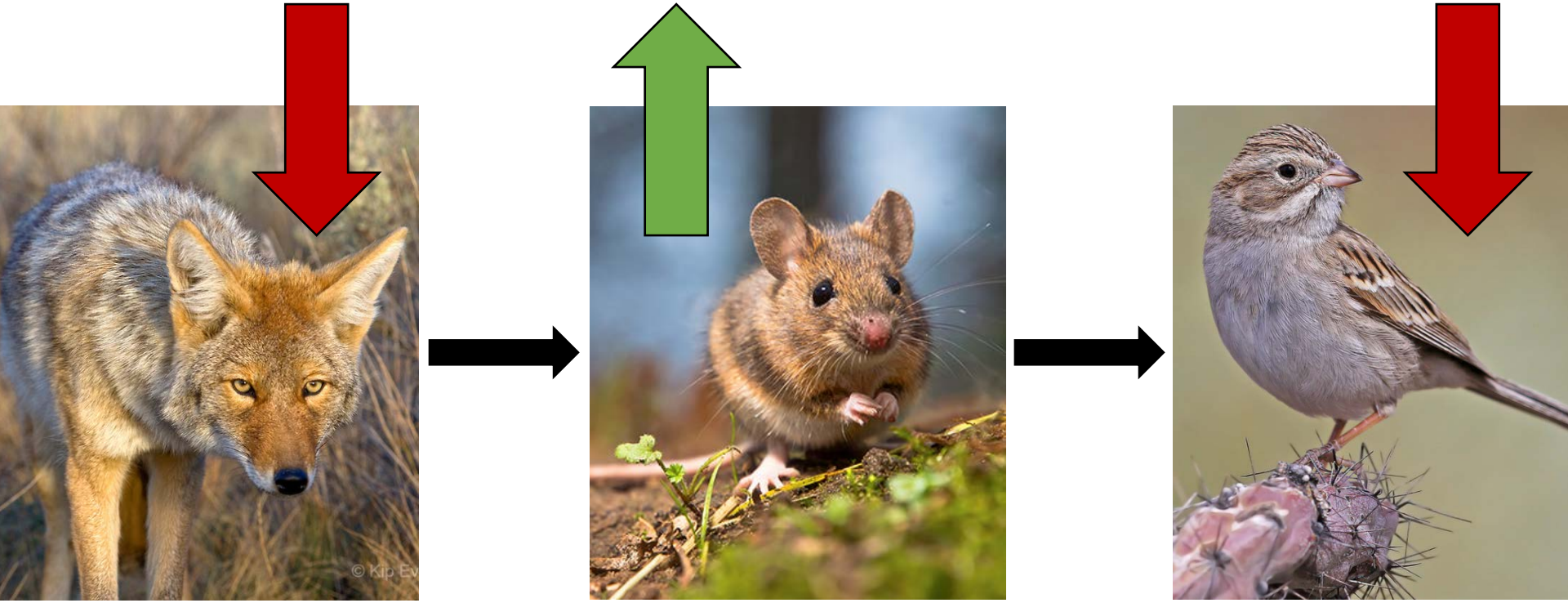
Relative Abundance of Rodents ⬆





Hethcoat and Chalfoun 2015

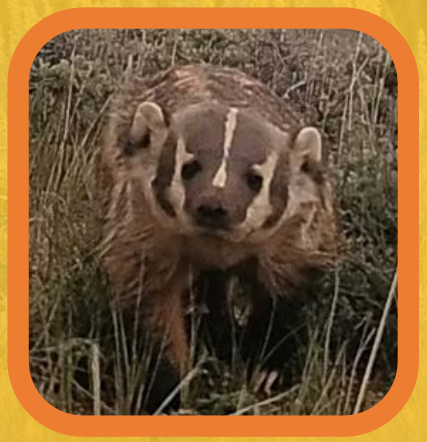
Mesopredator Release



Crooks and Soule 1999

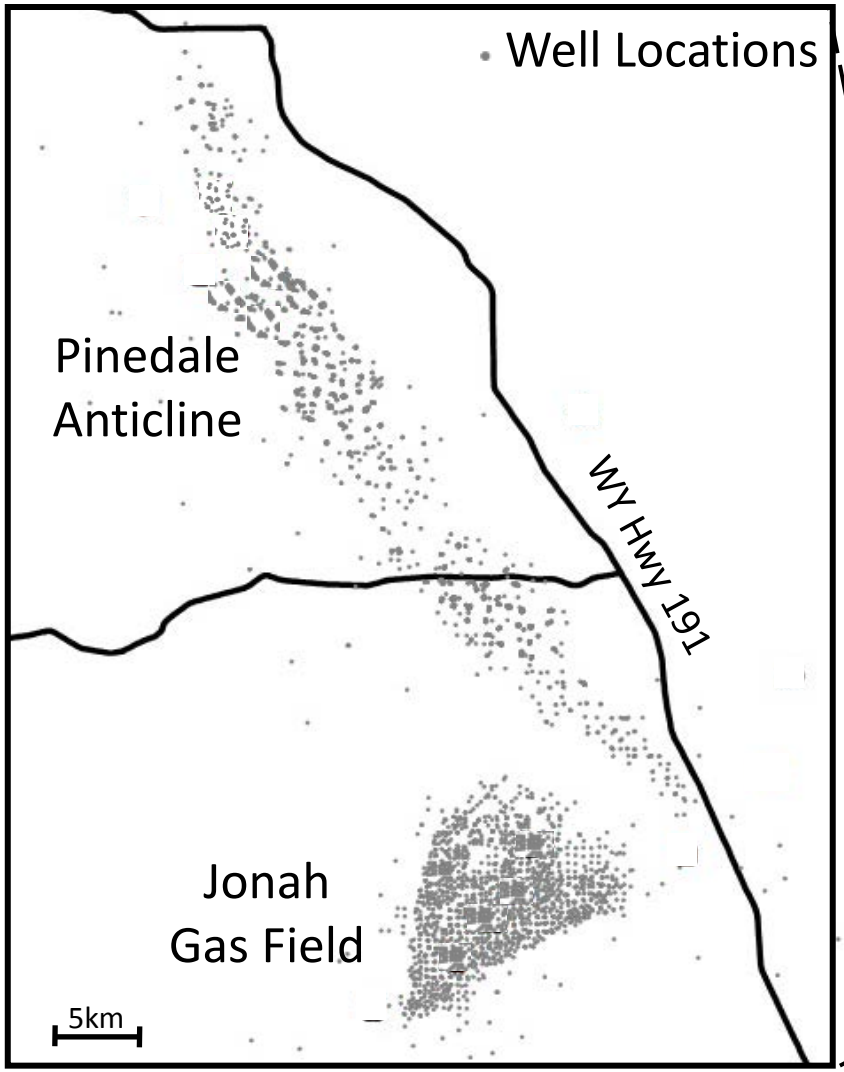
Is a mesopredator release driving rodent abundance near natural gas development?

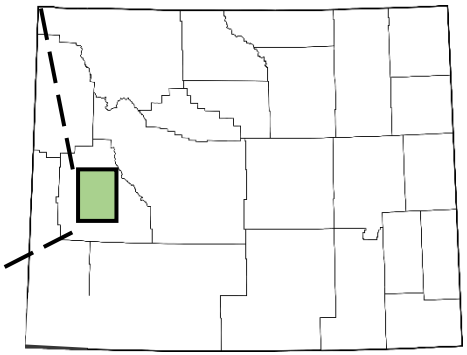
Apex Predator Detections



Rodent Perceived Predation Risk

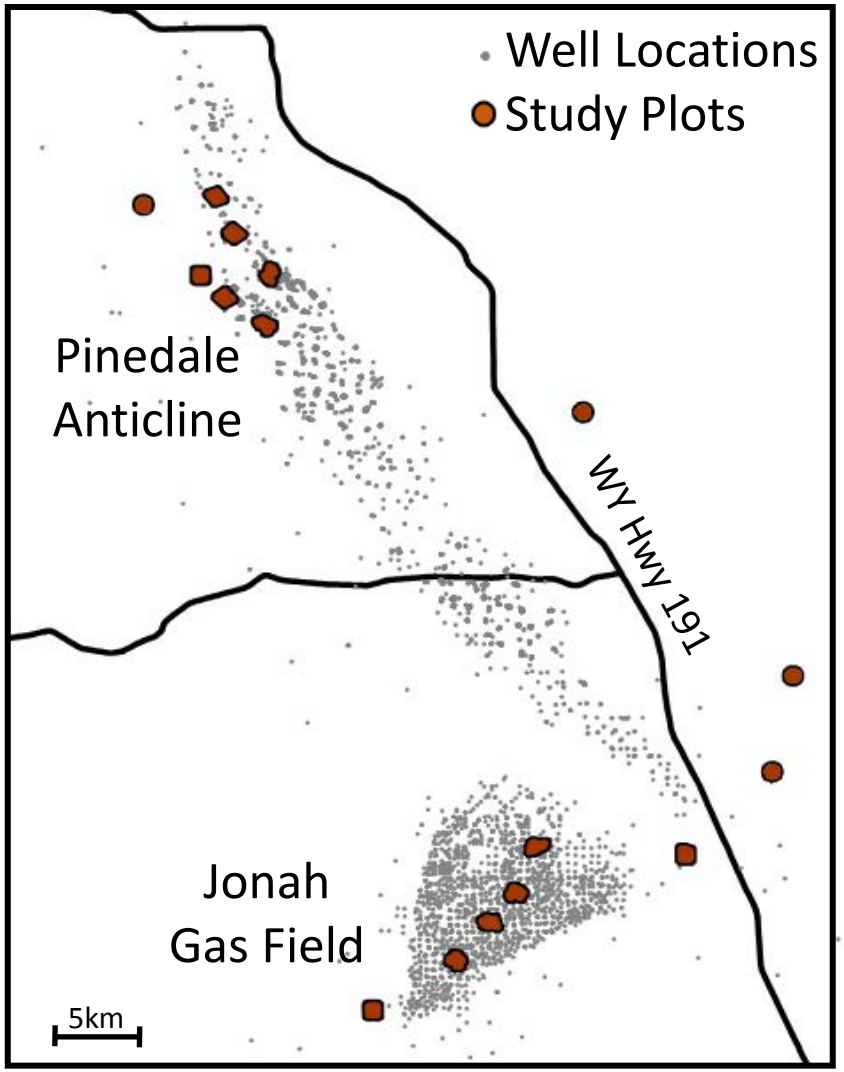
Study Area



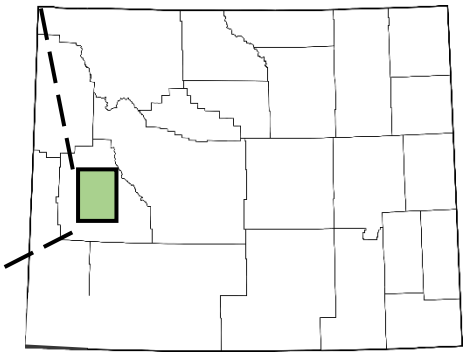


- Upper Green River Basin, western Wyoming
- 2 natural gas fields: Pinedale Anticline and Jonah Field

Study Area



- Upper Green River Basin, western Wyoming
- 2 natural gas fields: Pinedale Anticline and Jonah Field
- Sixteen 25-hectare study plots



Methods: Apex Predator Detections

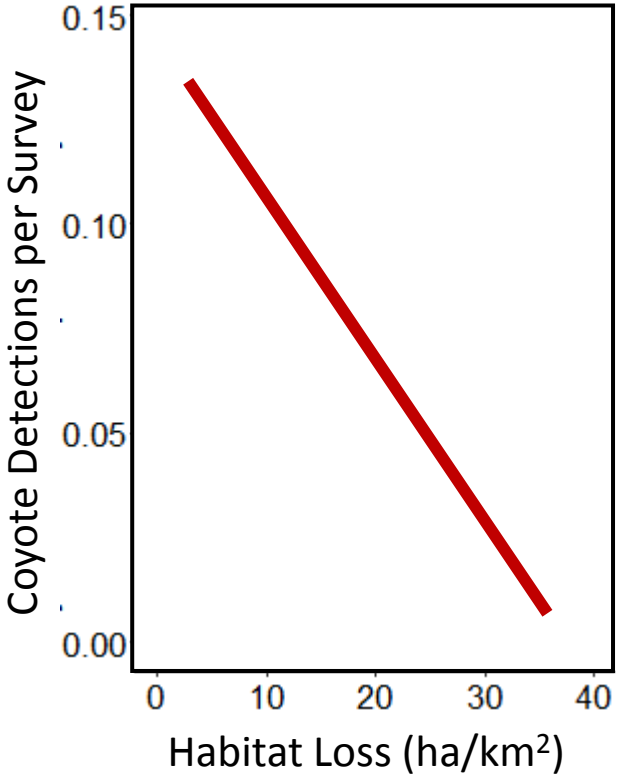
Trail Cameras

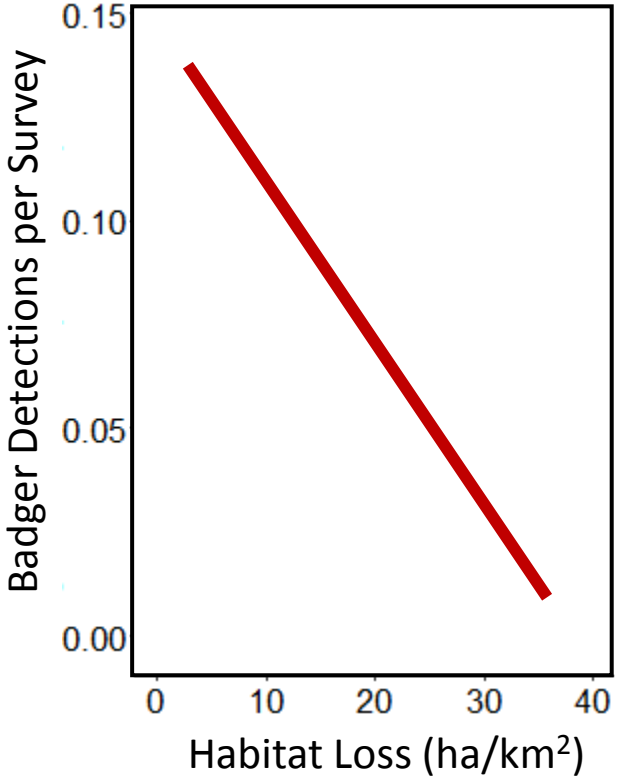
- Coyotes and badgers

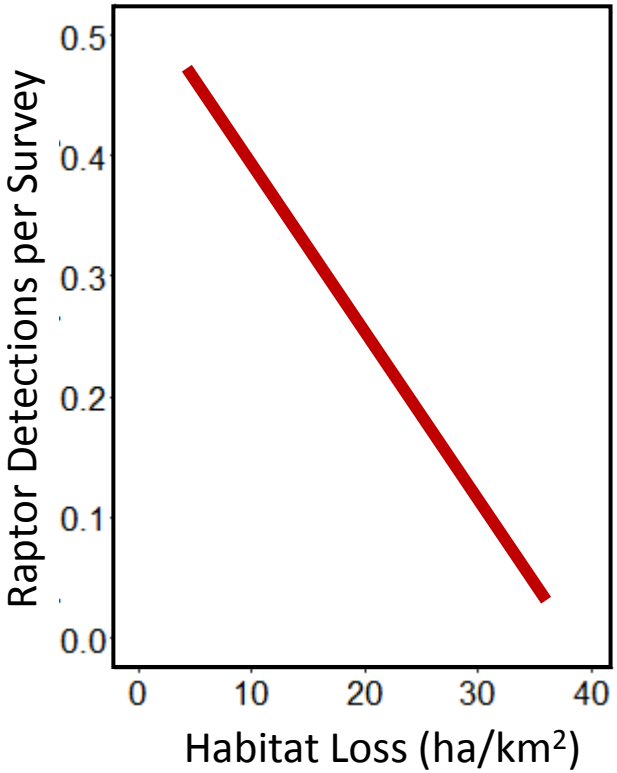
Point Counts

- Raptors

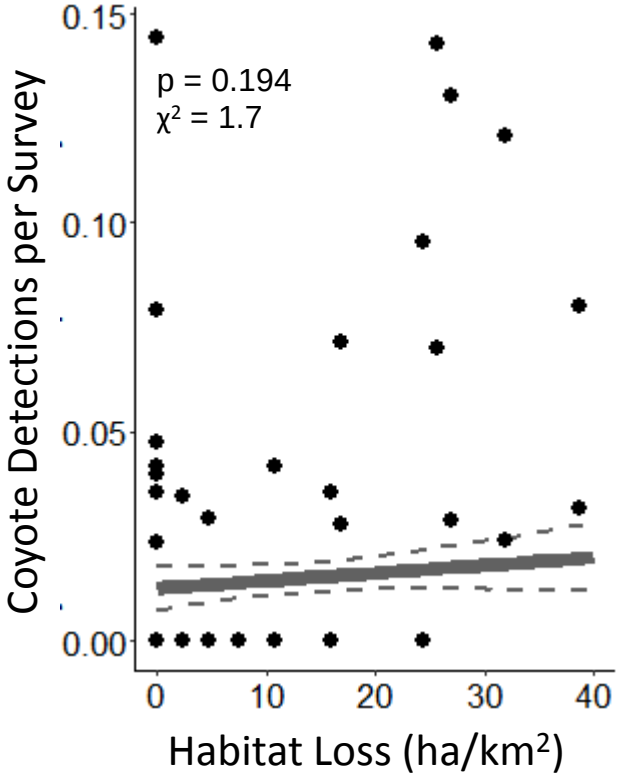
Predict: Decreased Apex Predator Detections

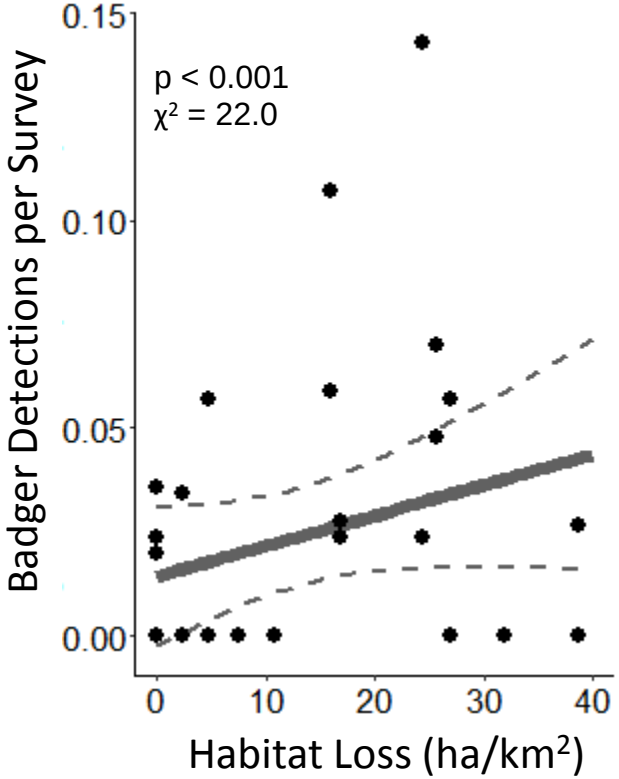


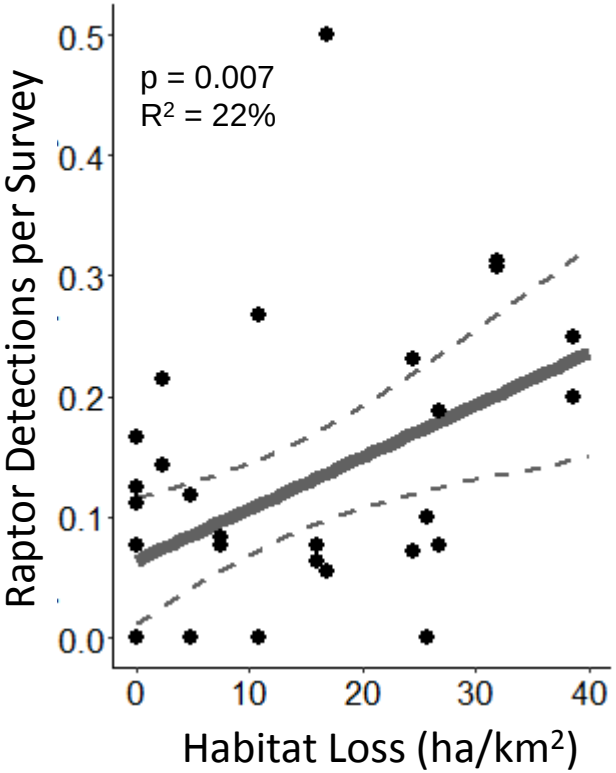




Result: Increased Apex Predator Detections







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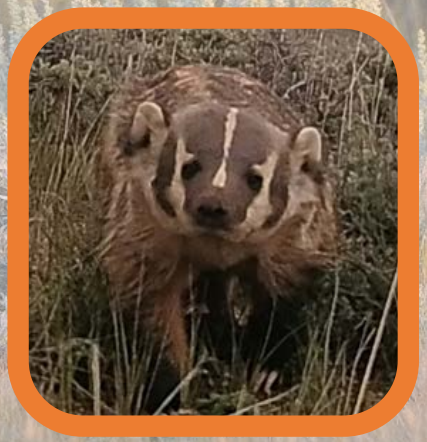
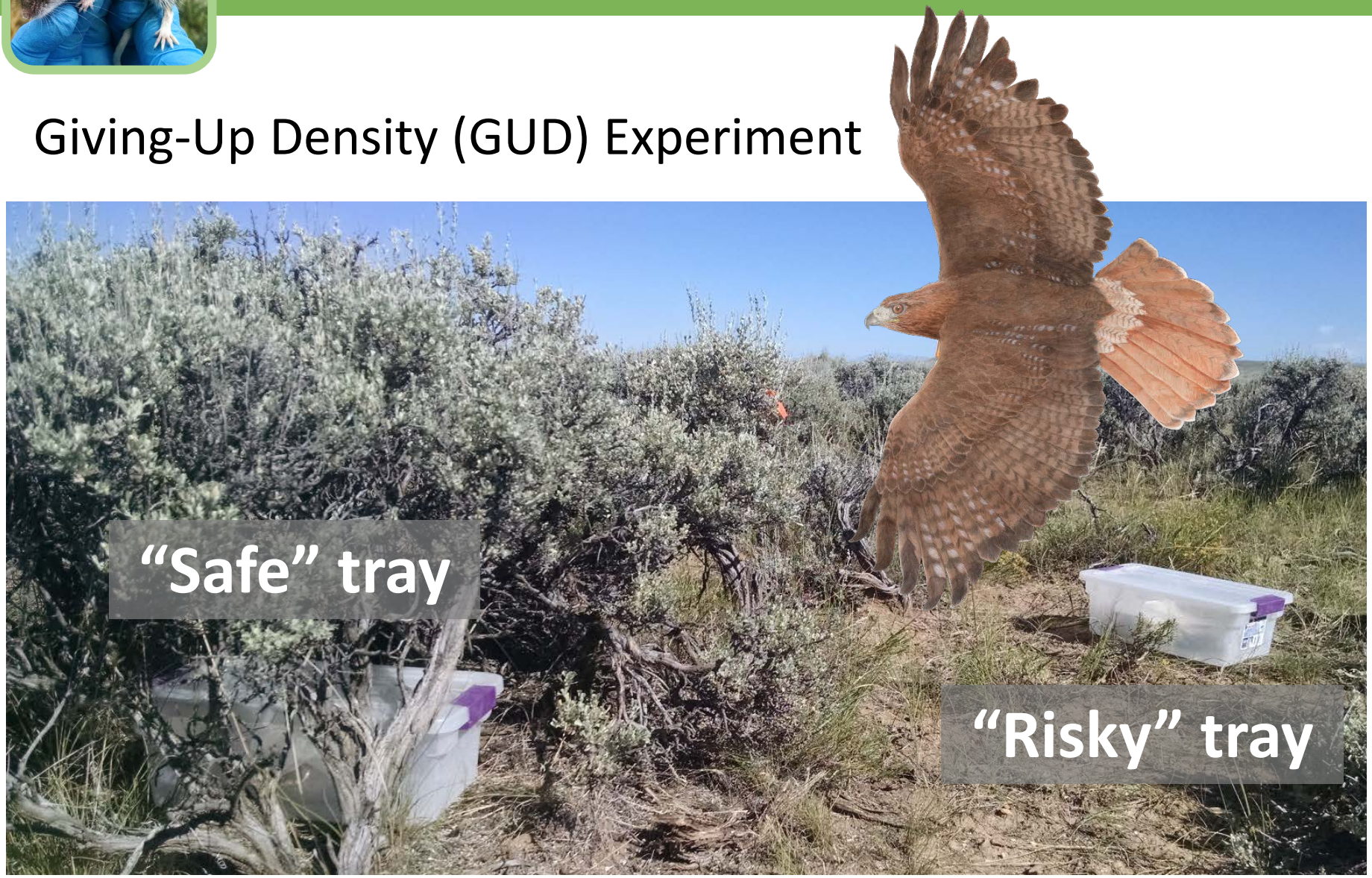
Apex Predator Detections



Rodent Perceived Predation Risk

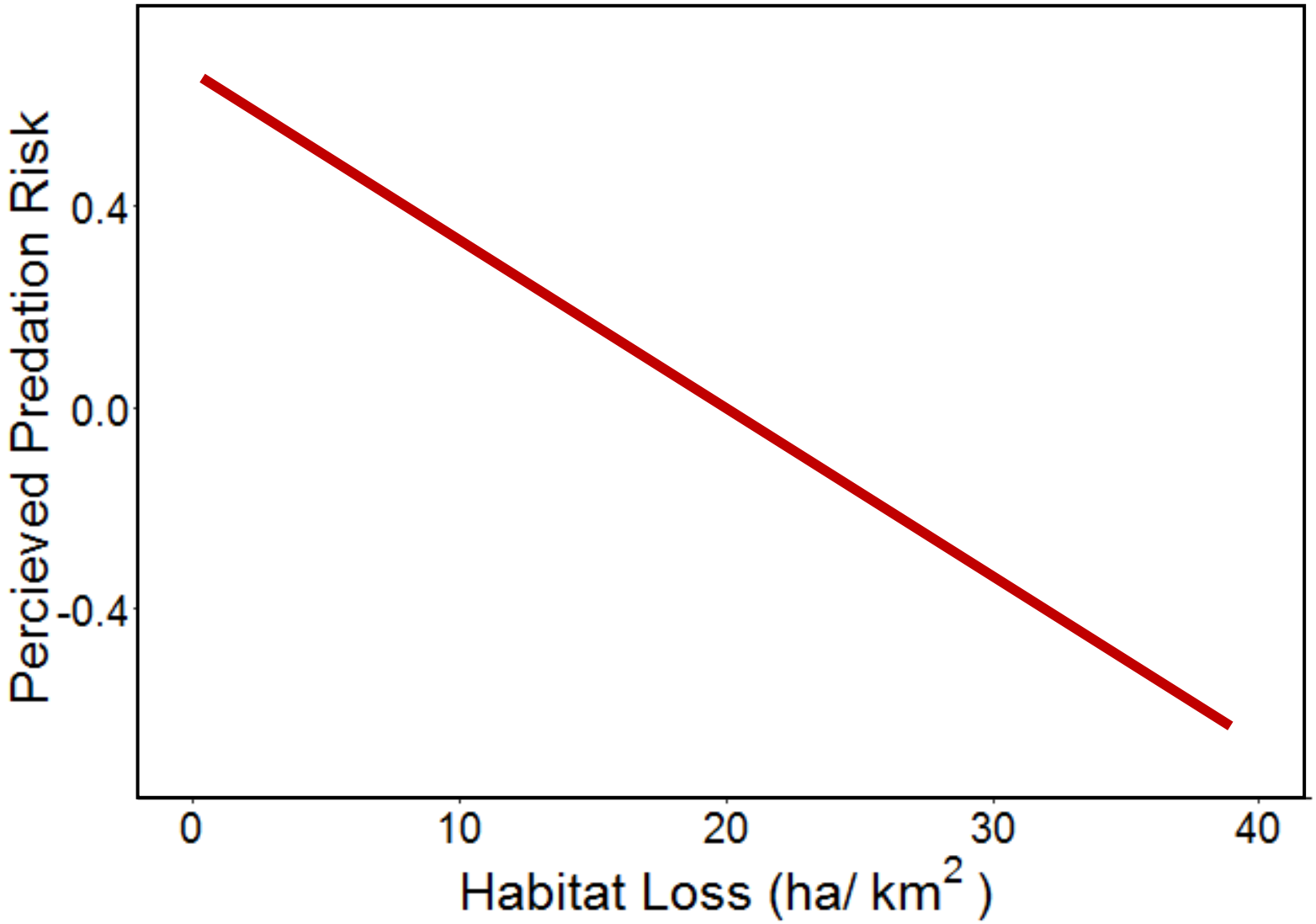
Methods: Perceived Predation Risk

Giving-Up Density (GUD) Experiment



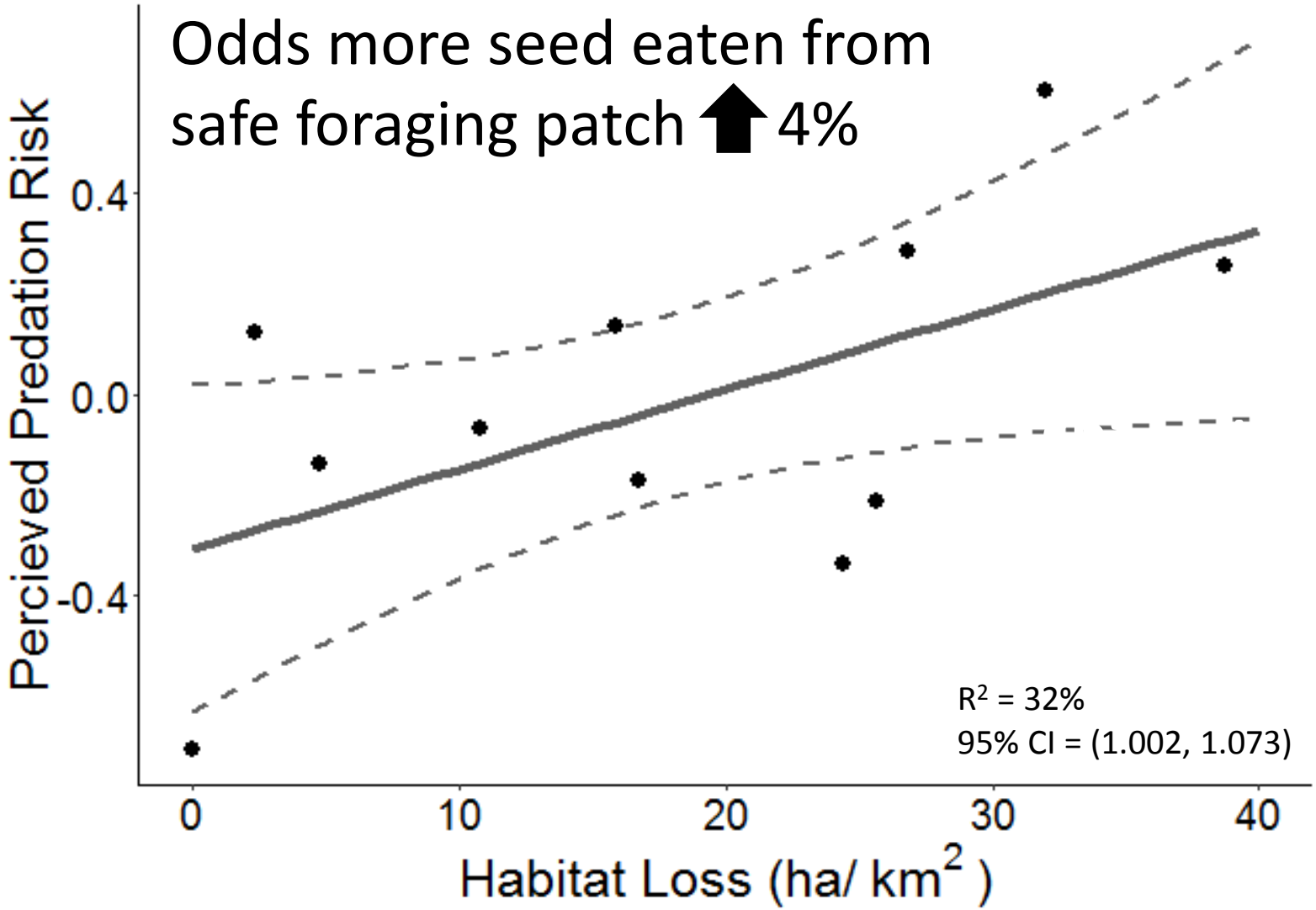
Charnov 1976, Brown 1988

Predict: Lower Perceived Predation Risk

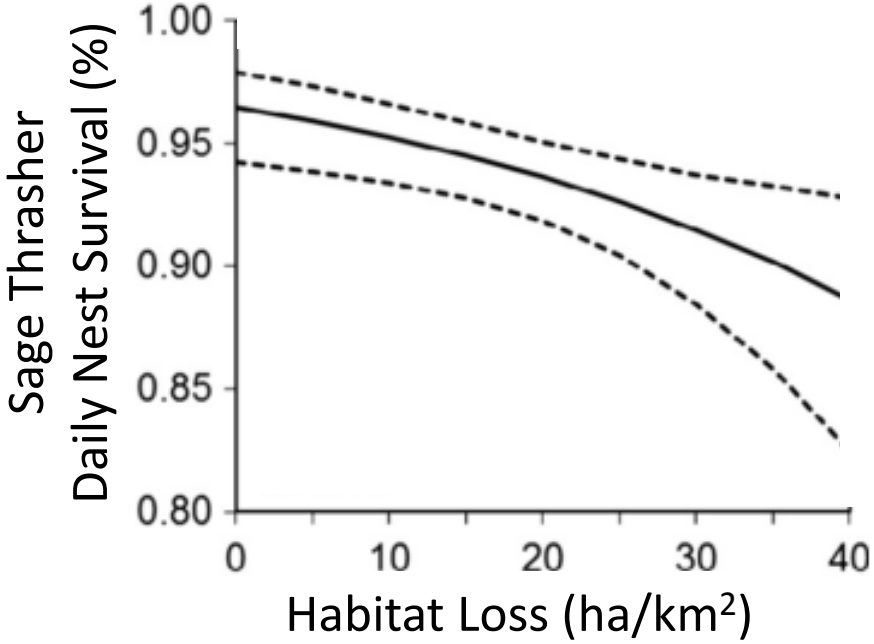


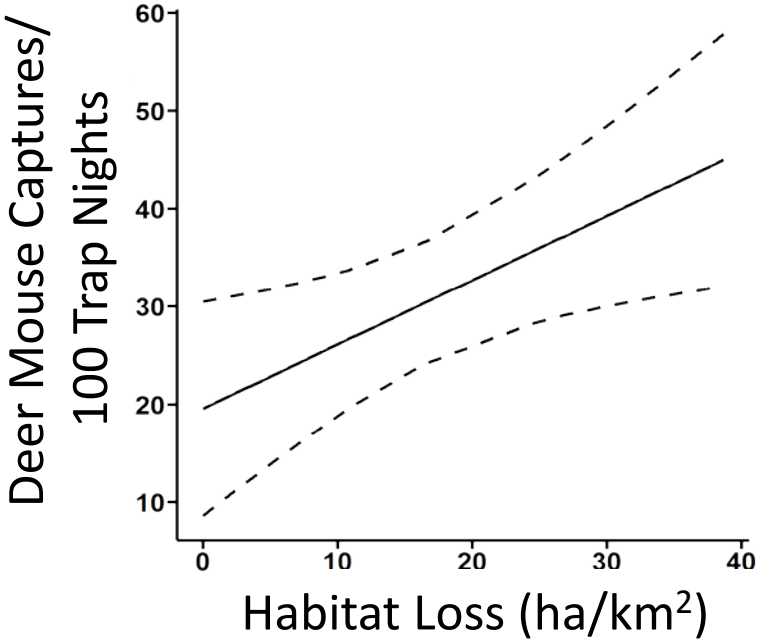
Result: Higher Perceived Predation Risk

Odds more seed eaten from safe foraging patch ⬆ 4%



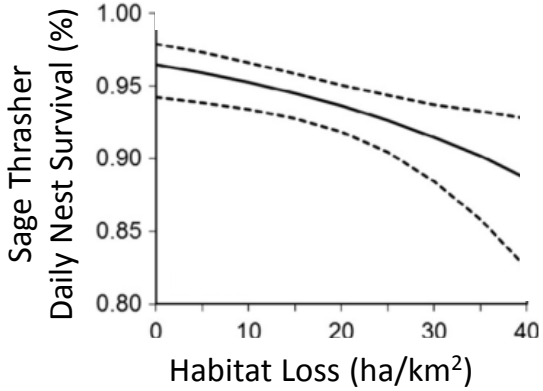
Results Summary

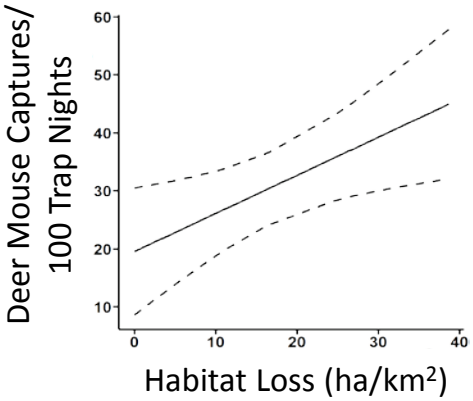


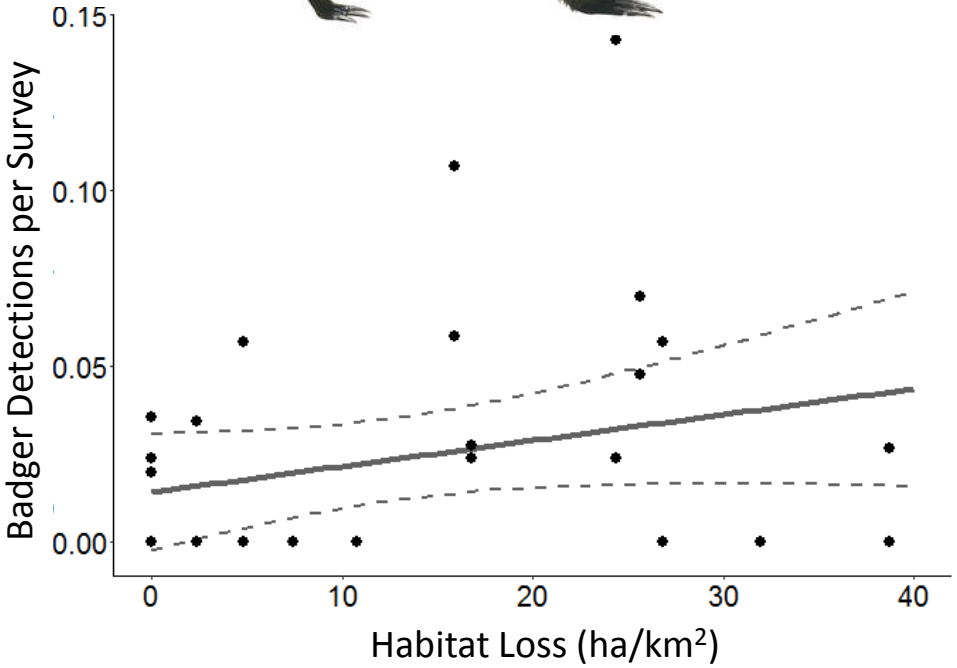


Hethcoat and Chalfoun 2015

Results Summary







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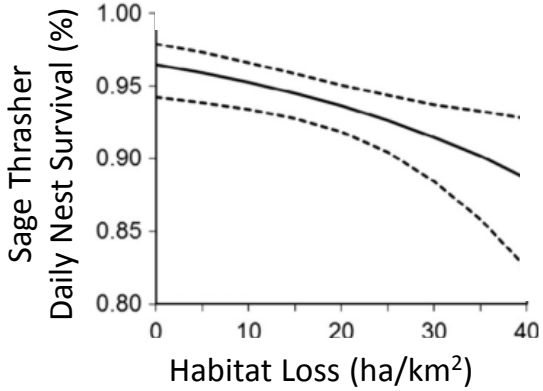

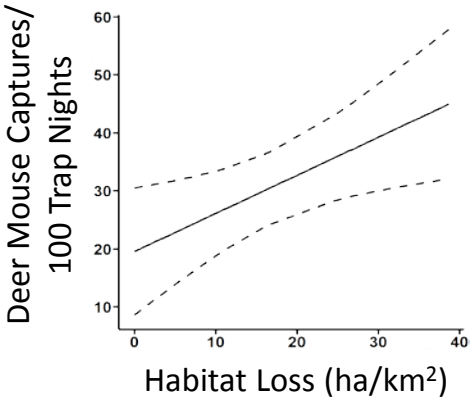

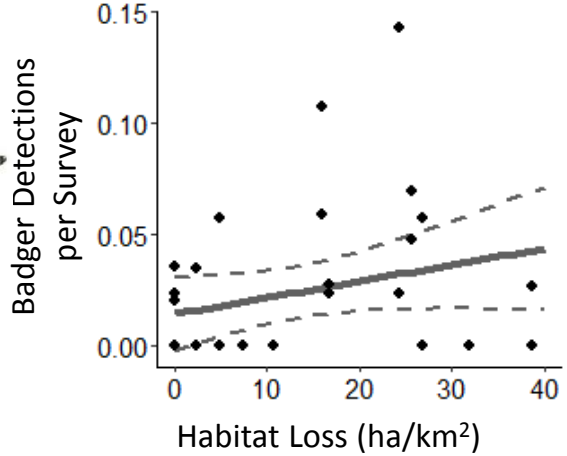

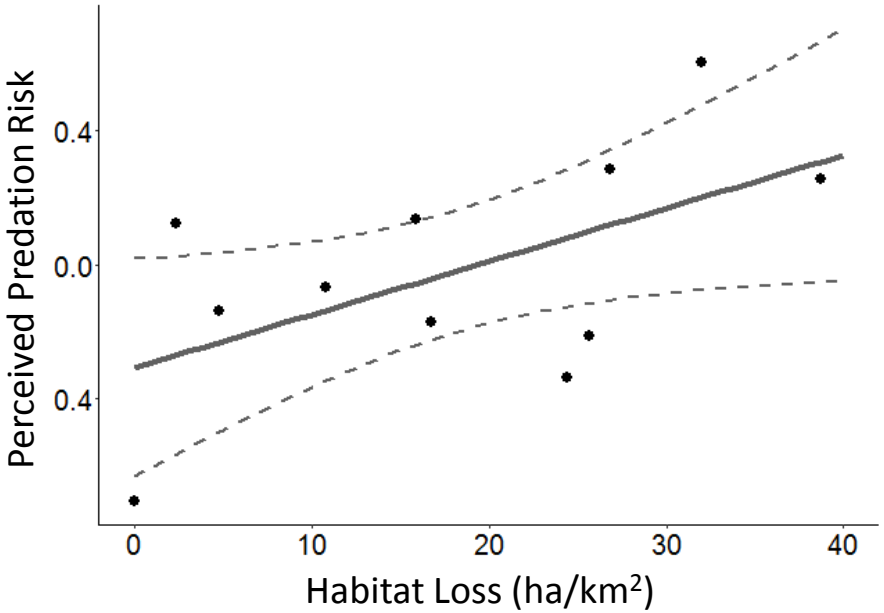

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Future Research Directions

→ Alternative hypotheses: food resource availability

Management Outcomes

→ Mechanistic understanding important for targeted management and conservation

→ Improve understanding of how processes with fitness consequences (predation) are altered by humans

Questions?

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