

# Wyoming's songbirds of the sagebrush sea

## Ecology, behavior, and conservation challenges

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14 July 2023





# What is the WY Cooperative Fish and Wildlife Research Unit?



# We wear many “hats”

*“...to conduct research on natural resource issues, educate students destined to work in the field of natural resources, and provide technical assistance to our cooperators...”*



- Provides salary, training, support

# We wear many “hats”



UNIVERSITY  
OF WYOMING  
*New Thinking*



- Member of the faculty
- Advise graduate students
- Provides space, resources



# We wear many “hats”



- Project collaborators
- Funding

# Wyoming's 130 Wildlife Species of Greatest Conservation Need

- 56 Birds  
(88% non-game)



- 45 Mammals  
(96% non-game)



- 29 Herpetofauna











Brewer's  
Sparrow



Sagebrush  
Sparrow



Sage  
Thrasher











Sage thrasher  
nest



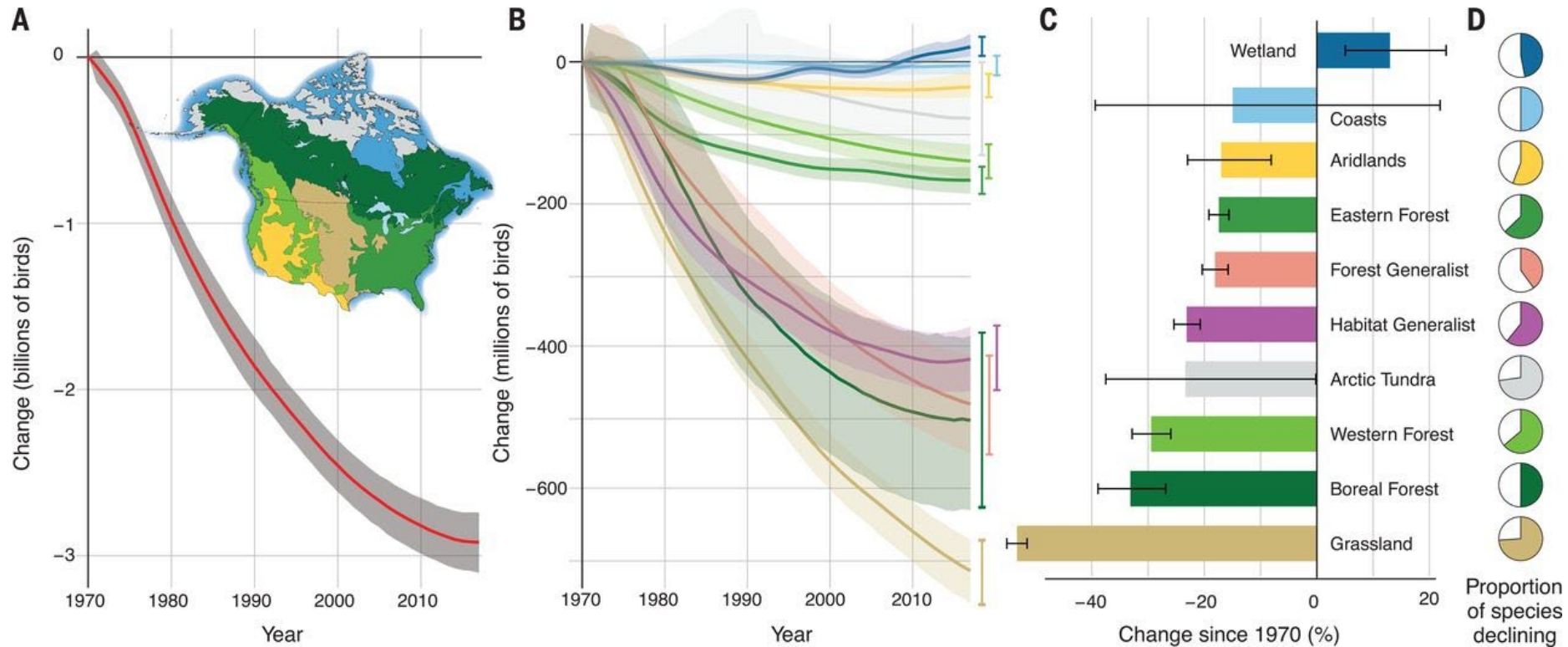
# Why care about songbirds??

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- Birding is a multi-billion dollar component of the U.S. economy
- Tourism is one of WY's main sources of revenue
- Birds eat a LOT of bugs!



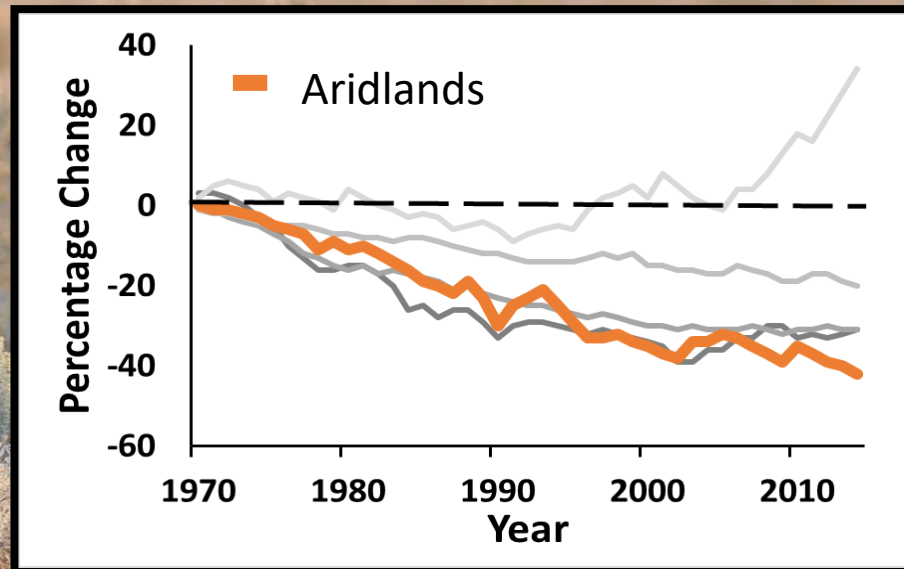
# Nearly 3 billion birds lost in North America since 1970



Rosenberg et al. (2019), *Science*



# Population declines of aridland birds:



(Adapted from NABCI's 2014 State of the Birds Report)

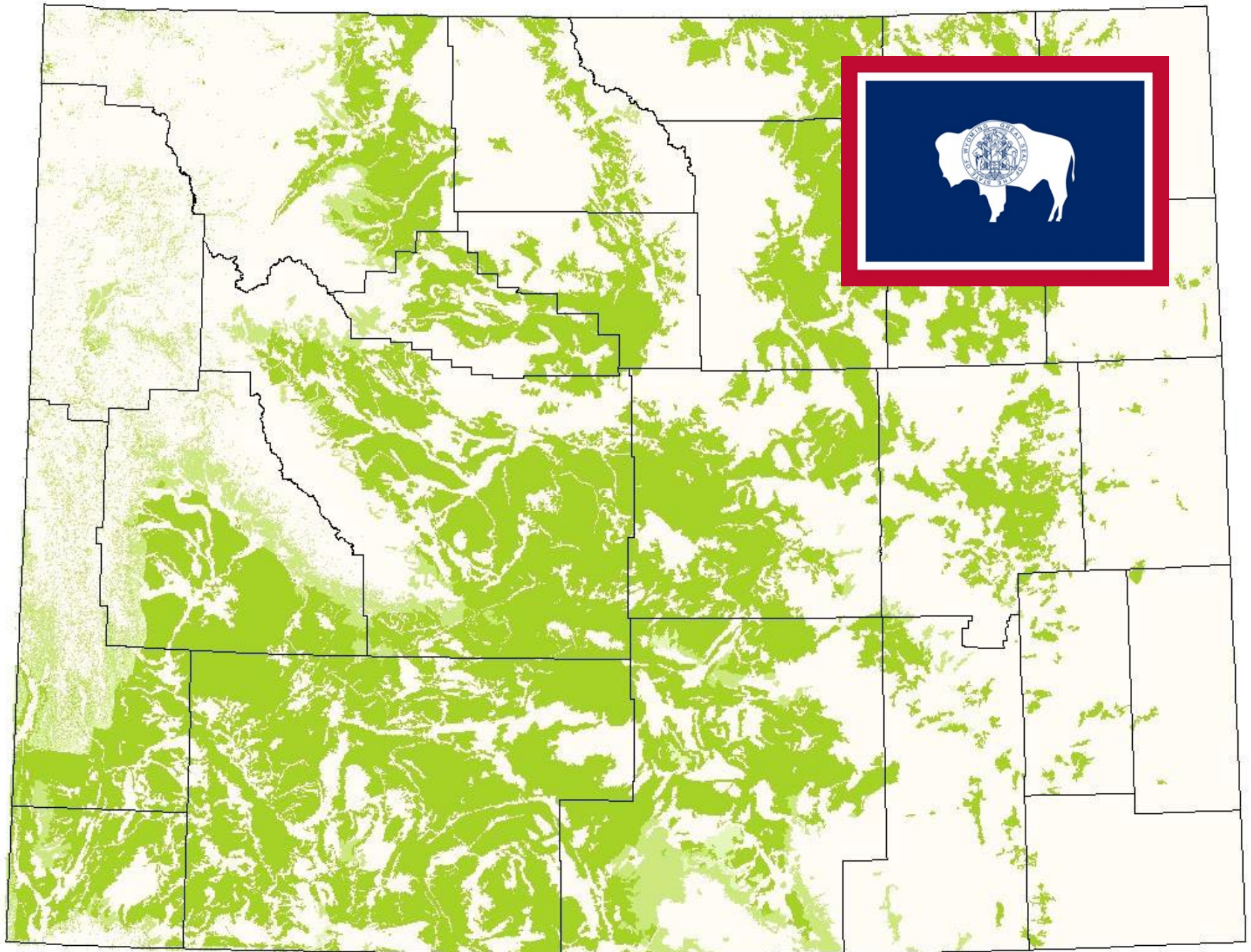


# The sagebrush steppe

- Once covered 63,000,000 ha
- Only 1% remains pristine

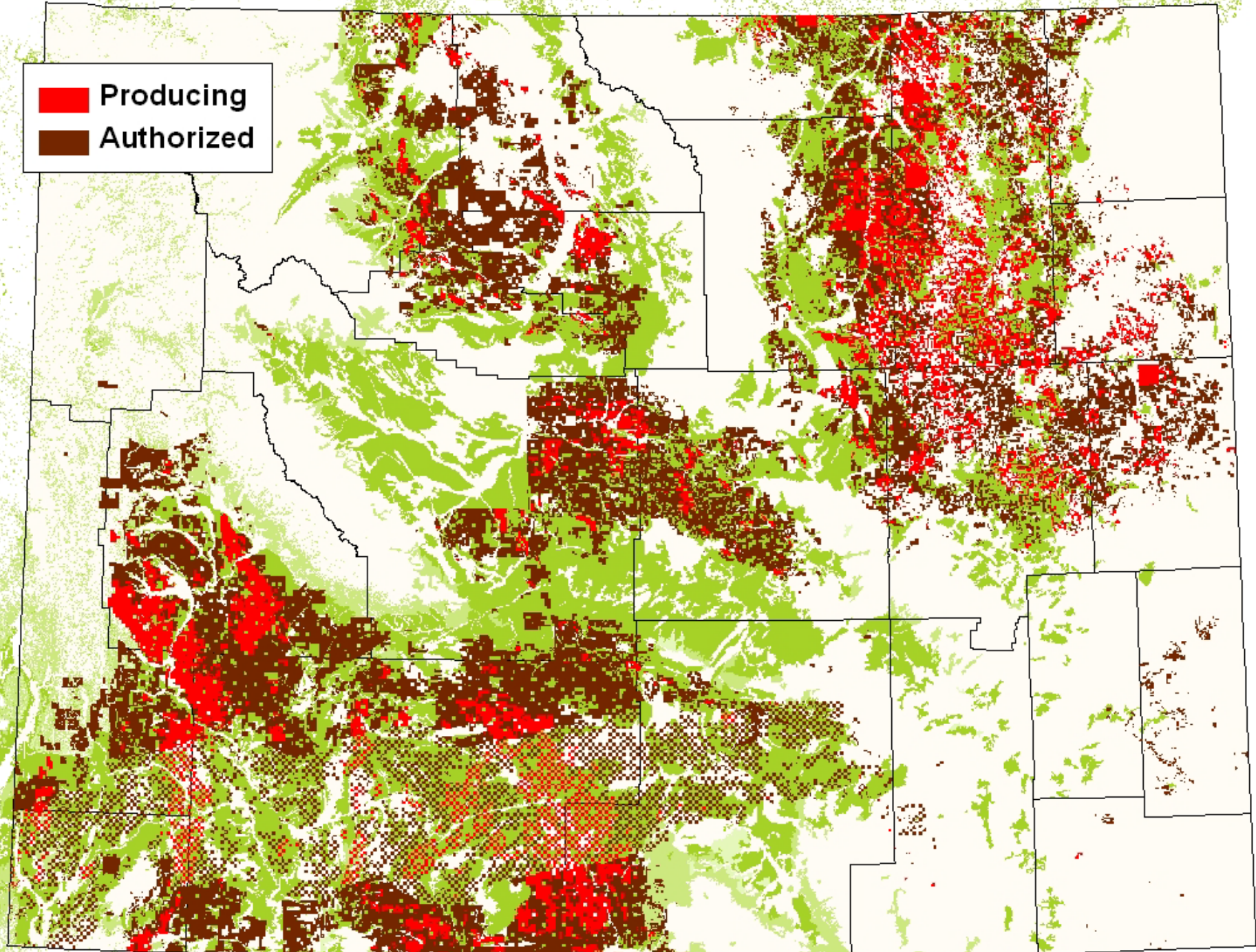
Paige & Ritter (1999)







 Producing  
 Authorized





# How does natural gas development influence nesting sagebrush songbirds?

2008 – present, Sublette County





# Breeding densities of both sparrows decreased with well density



# Nest survival decreased with development

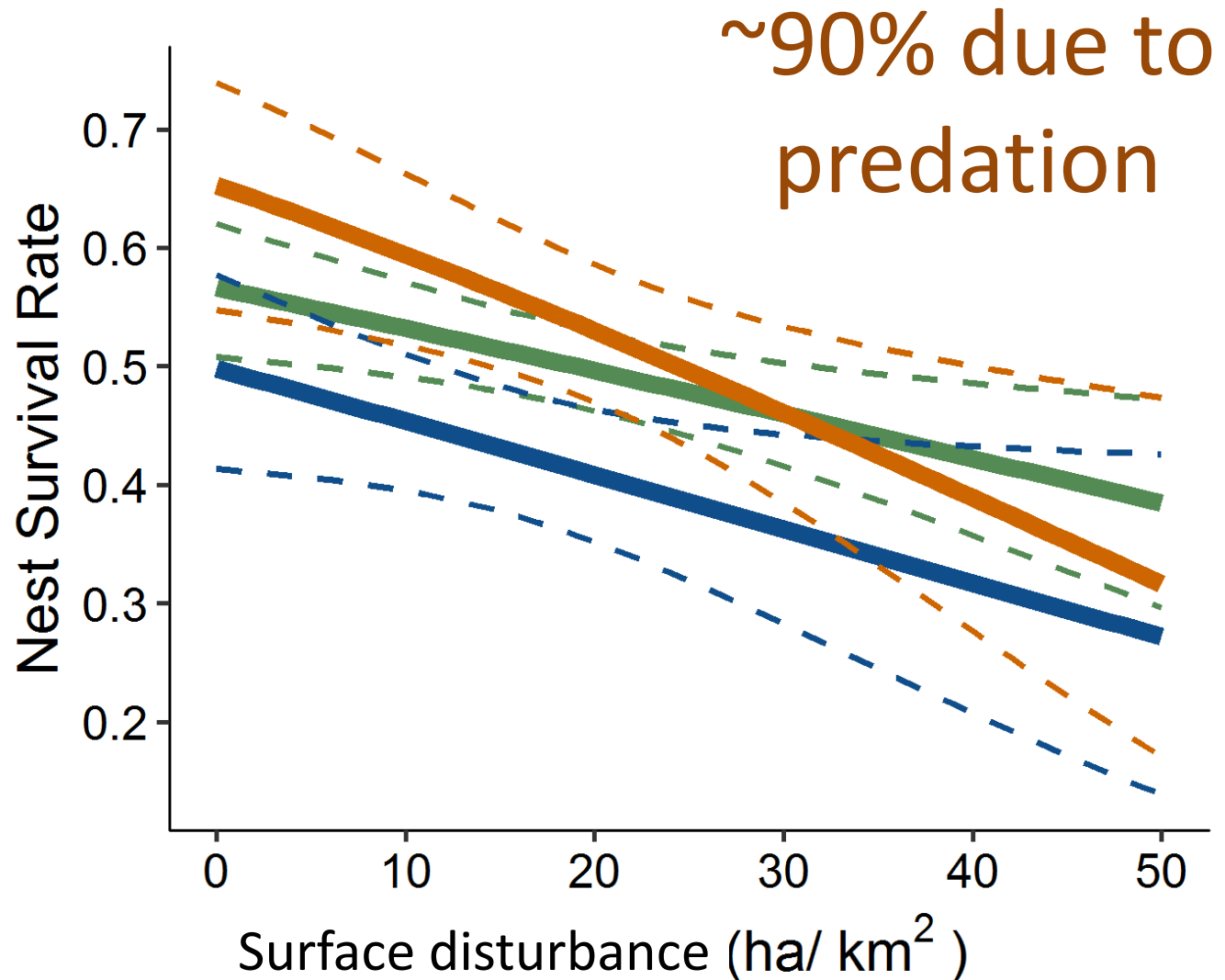
Brewer's Sparrow



Sagebrush Sparrow



Sage Thrasher



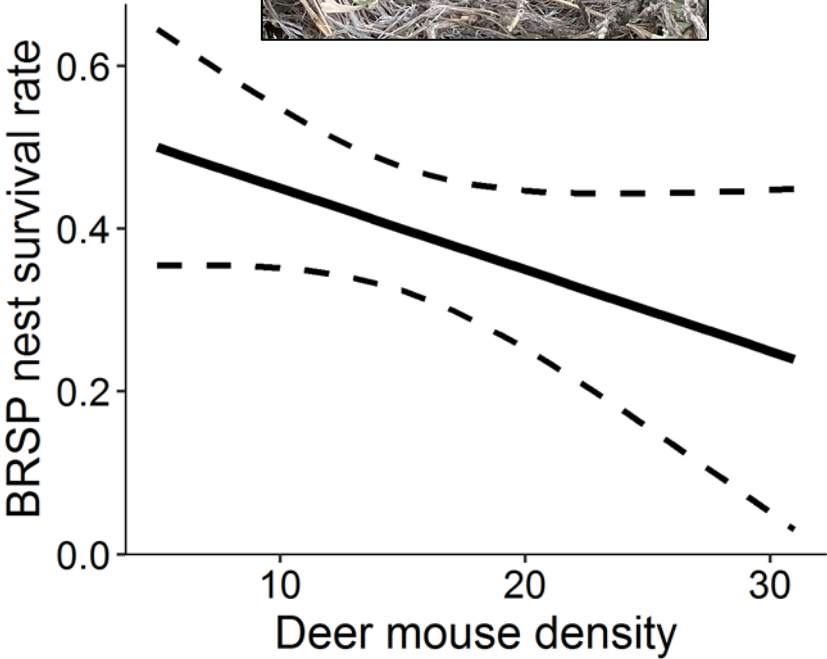
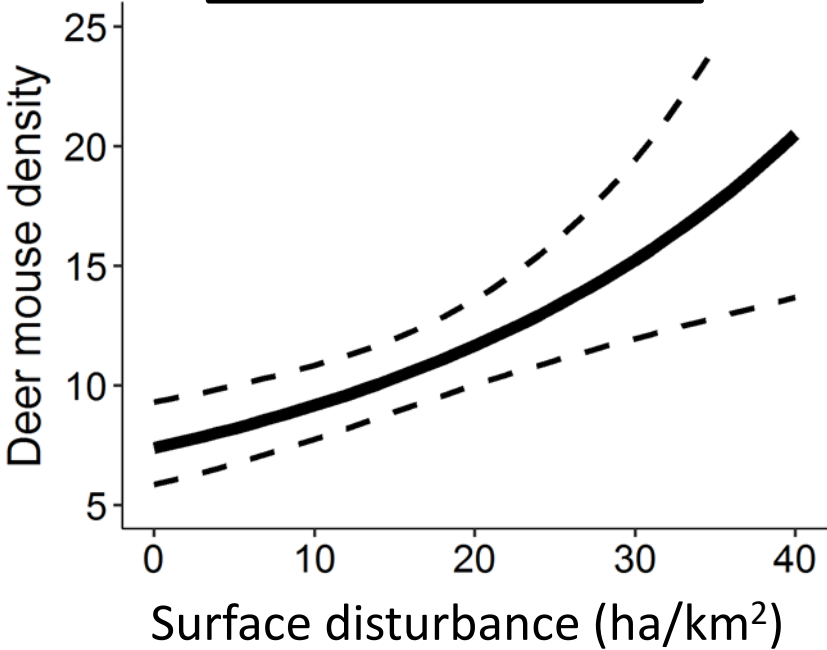




2012/07/02 01:34:19



# Rodents (primary nest predators) increased in abundance with surface disturbance, which decreased nest survival





*Why* were rodent nest predators more abundant in areas with more development?



# It was *not* because the predators of rodents avoided developed areas..

Trail cameras:  
Mesocarnivores



Point counts:  
Raptors and corvids







**Reclaimed  
(re-seeded)  
areas, around  
well pads/  
pipelines, very  
different in  
structure and  
composition**

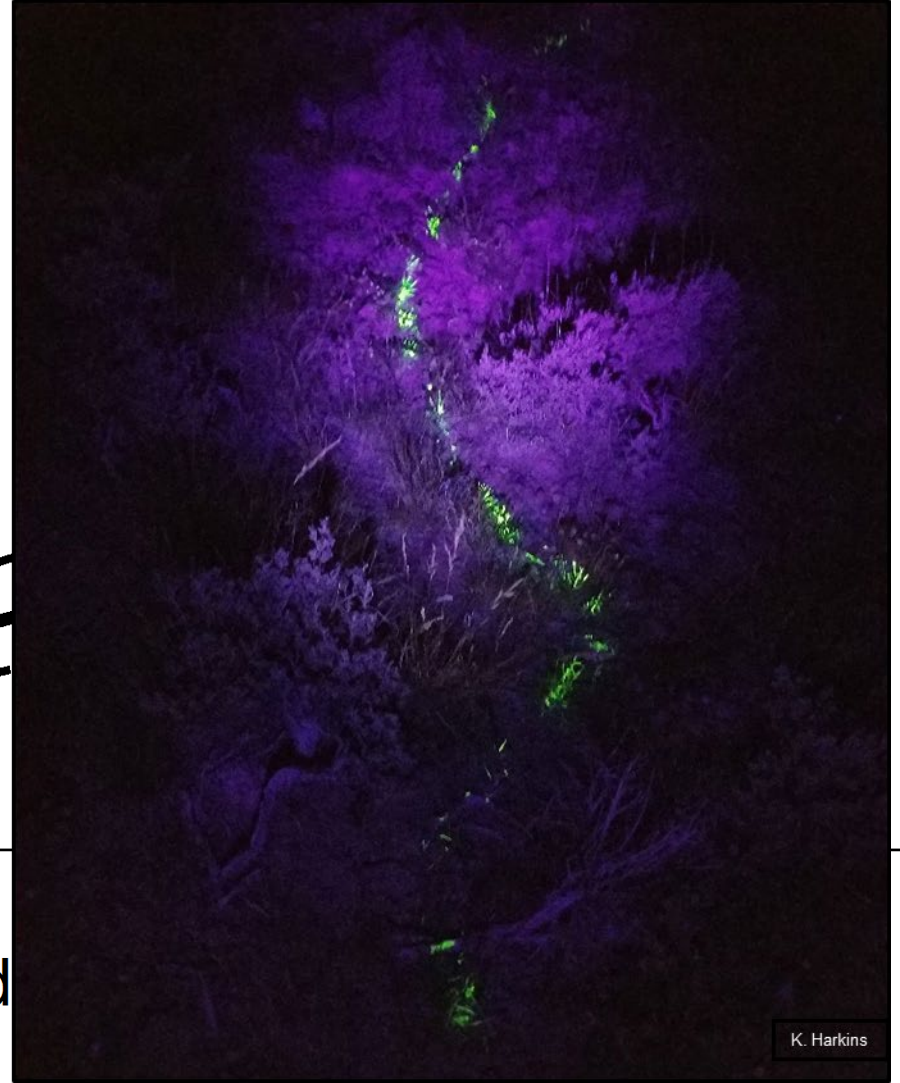


Reclaimed areas prevalent within gas fields





# Mouse abundance increased with reclaimed area



Sanders and Chalfoun (2018), *Biological Conservation*



# Mechanistic pathway of development effects on songbird populations

Natural gas development



Surface disturbance/re-seeding



More rodent nest predators



Increased nest predation



Fewer offspring produced





**Do songbirds recognize that areas with a lot of surface disturbance are less safe for nesting?**

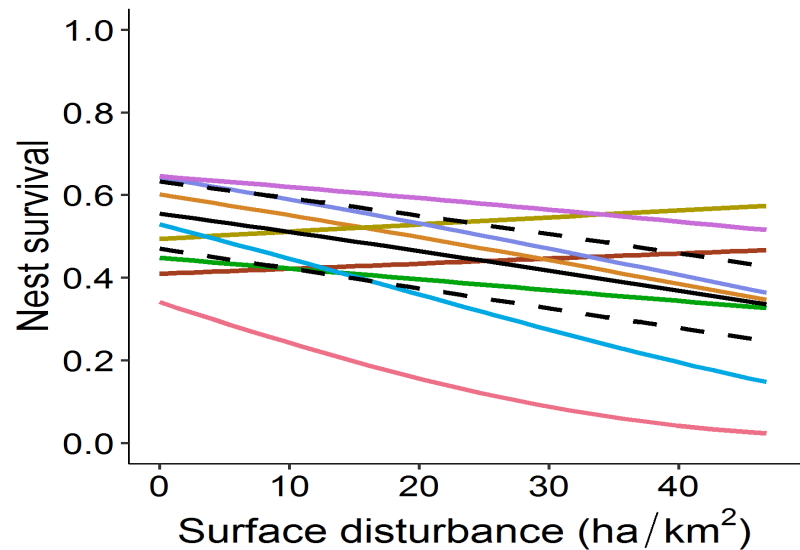
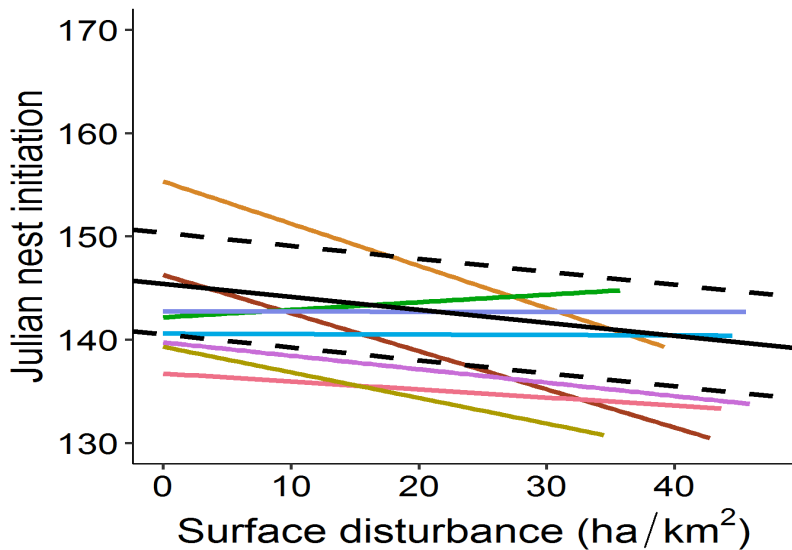






# Sagebrush sparrows preferentially settled in more developed areas with lower nest survival

Season 2008 2009 2011 2012 2014 2015 2016 2017 2018





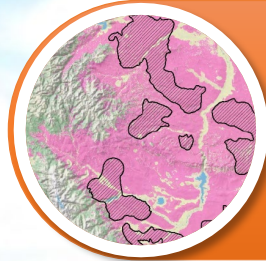
# Management Foci:

- Reduction of initial development footprint (soil disturbance)
- Mitigation of habitats back to those more closely resembling undisturbed sagebrush steppe





# Sage-grouse as an “umbrella species” for sagebrush songbirds?



Overlap with protected areas

Spatial Analysis



Agreement on “best” habitat

Empirical Field Observation



Effects of habitat treatments

Controlled Field Experiment

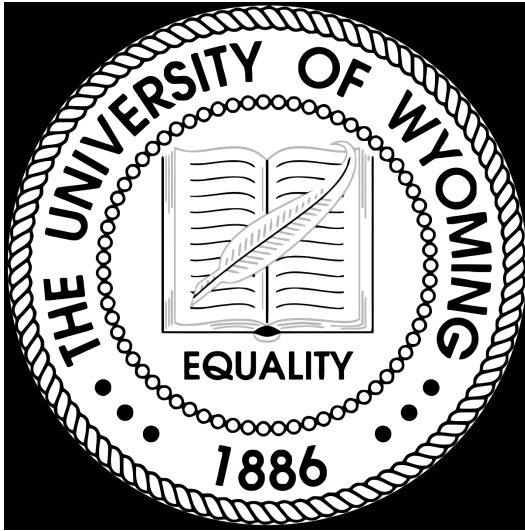
Carlisle et al. (2017), *J. Wildlife Management*; Carlisle et al. (2018), *Ornithological Applications*; Carlisle and Chalfoun (2020), *Avian Conservation & Ecology*; Carlisle et al. (in press), *Animal Conservation*

# Recent expansion of research to the full annual cycle (fledgling survival, adult survival, migratory routes, over-wintering locations)





# Parting Thoughts:



- Strength of Wildlife Biology at UW
- New **WYoBIRD** Initiative (*Bird Initiative for Resilience and Diversity*)

# Acknowledgements:

## Funding:

WLCI (Wyoming Landscape Conservation Initiative); USGS  
Wyoming Game and Fish Department  
Bureau of Land Management  
U.S. Fish and Wildlife Service

## Graduate students:

Michelle Gilbert, Matthew Hethcoat, Lindsey Sanders, Jason Carlisle,  
Emily Shertzer

