Eastern Redcedar Removal Benefits Grassland Birds

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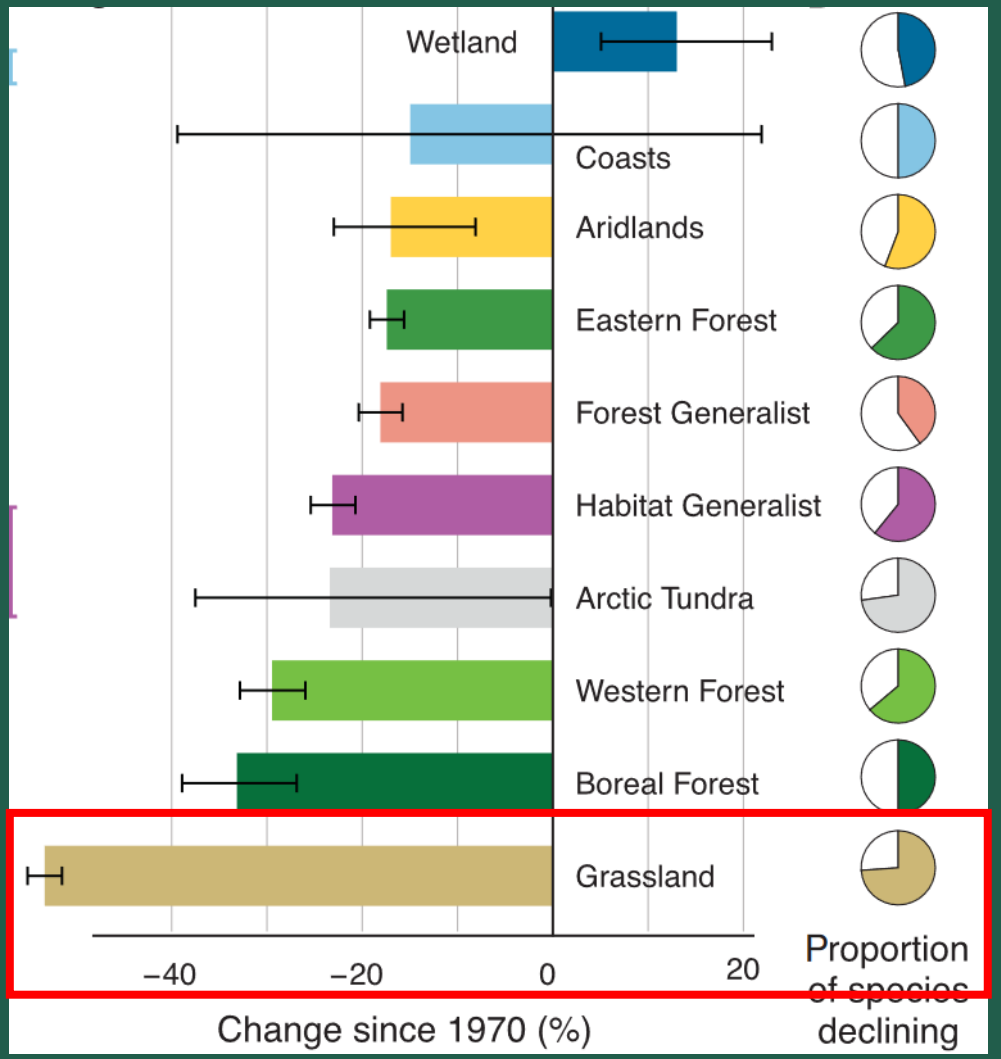
NEBRASKA COOPERATIVE FISH & WILDLIFE RESEARCH UNIT

UNIVERSITY of NEBRASKA LINCOLN

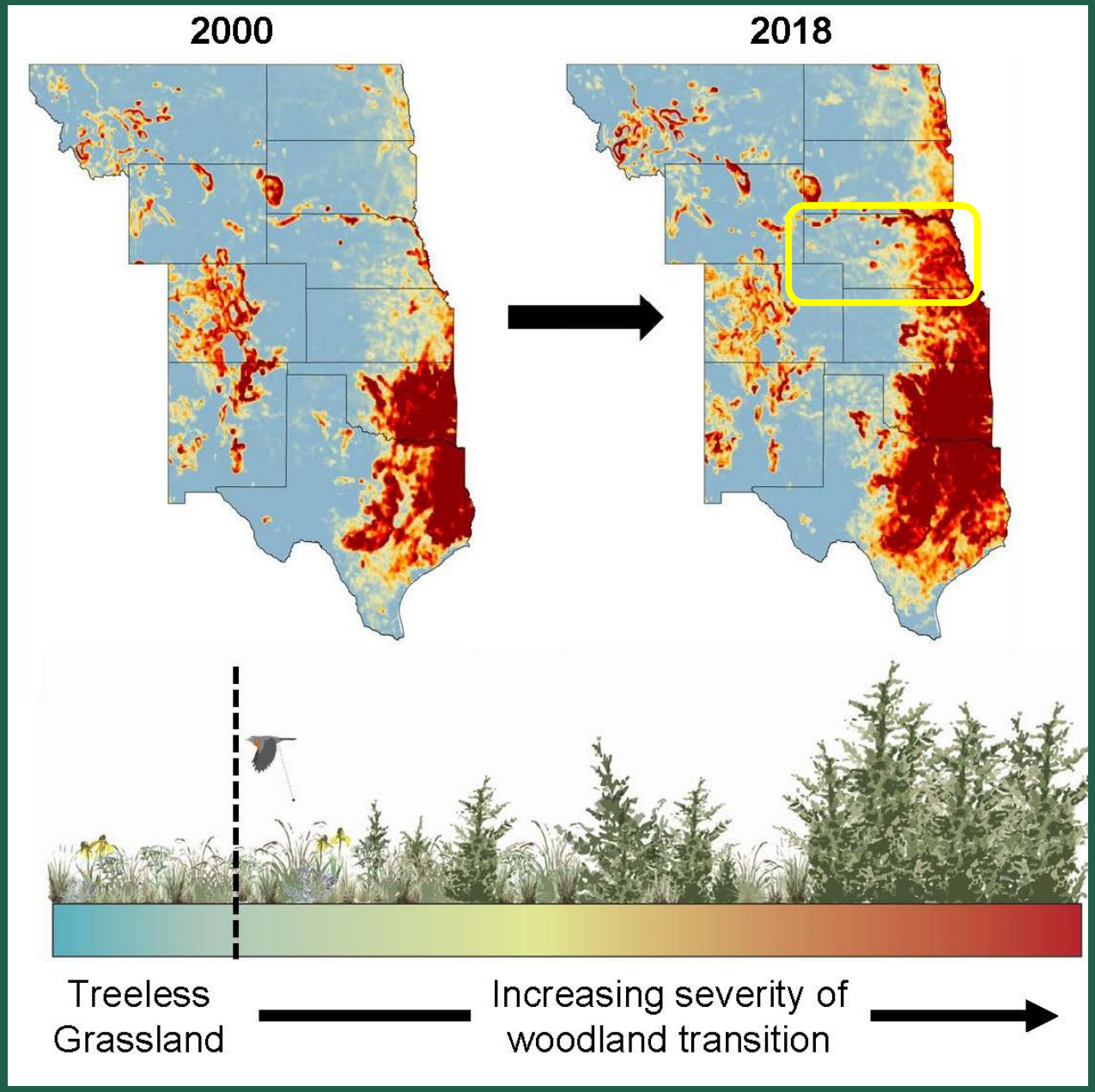
USGS science for a changing world

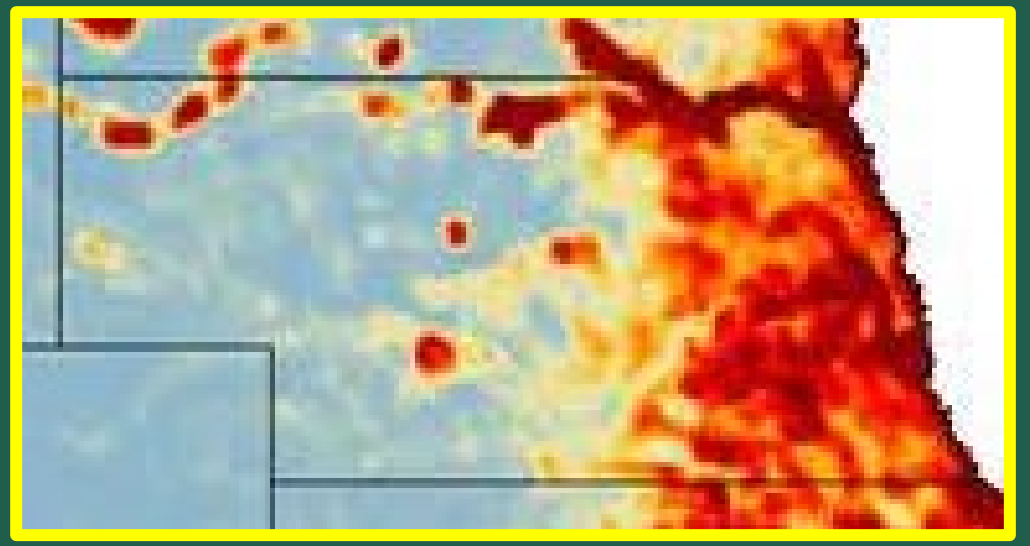
RAINWATER BASIN JOINT VENTURE ESTABLISHED 1992

3billionbirds.org

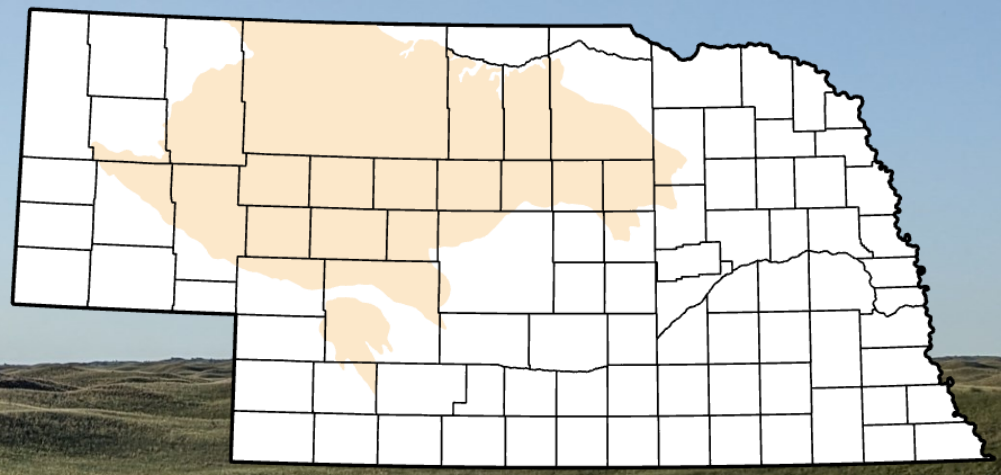


Rosenberg et al 2019





Rangelands.app
Twidwell et al 2022

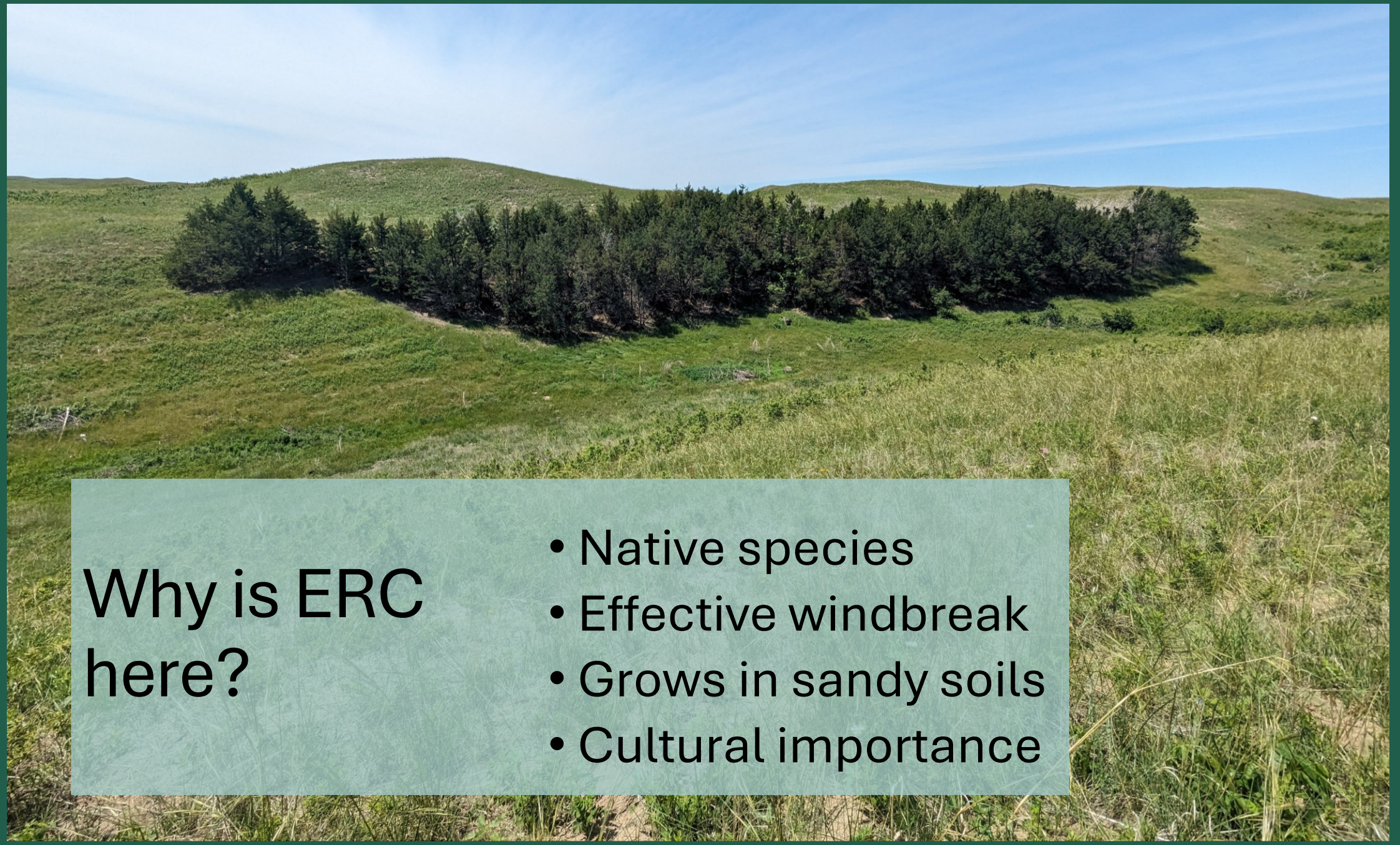


Sandhills Ecoregion

- Largest remaining intact grassland
- Mostly privately owned
- Ranching community

Eastern Redcedar (ERC)

- ERC is encroaching grasslands
  - Lack of fire
  - Increased CO_2
  - Seed source (1 adult = millions of seeds)
- ERC reduces rangeland productivity
- Government & Non-Profit organization cost share programs incentivize removal and stop spread



Why is ERC here?

- Native species
- Effective windbreak
- Grows in sandy soils
- Cultural importance

How to manage ERC?

- Fire!
- Lopping, mowing
- Extra consideration around seed source

How to manage ERC at larger densities?

ERC mechanical treatment

Research Objective

- Determine efficacy of ERC mechanical treatments in restoring grassland wildlife

HAPPY CATTLE

HAPPY

LAND OWNERS

WILDLIFE?

Why birds

- Populations in decline in Great Plains
- Easy and cost effective to observe at large scales
- Each species diverse in habitat requirements

- *EX. High abundance of grasshopper sparrow indicates open areas of diverse grass structure and low densities of woody species*

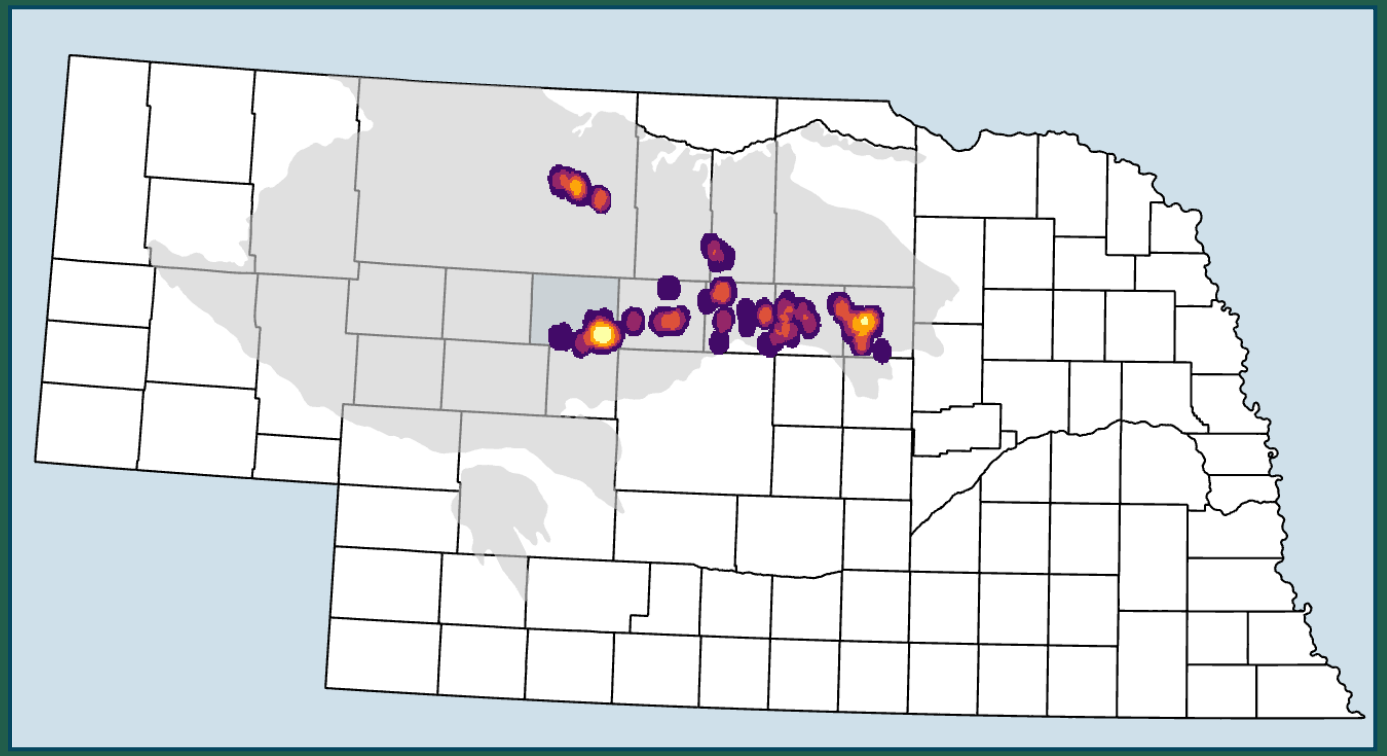
Research Design

Sandhills Ecoregion

- ☑ 2024
- ☑ 2025
- ☐ 2026

Peak Breeding Season

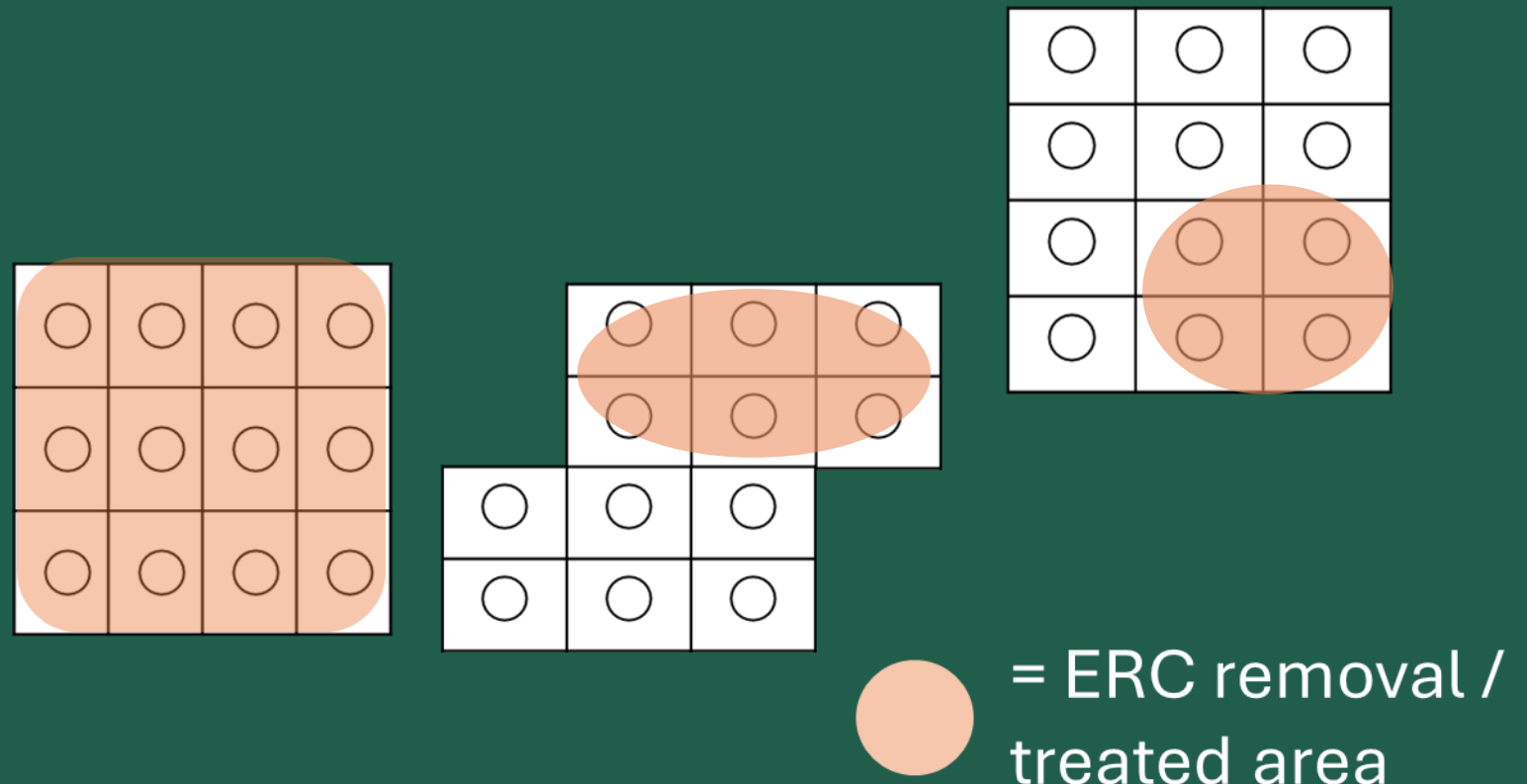
May 27 – July 7



Research Design

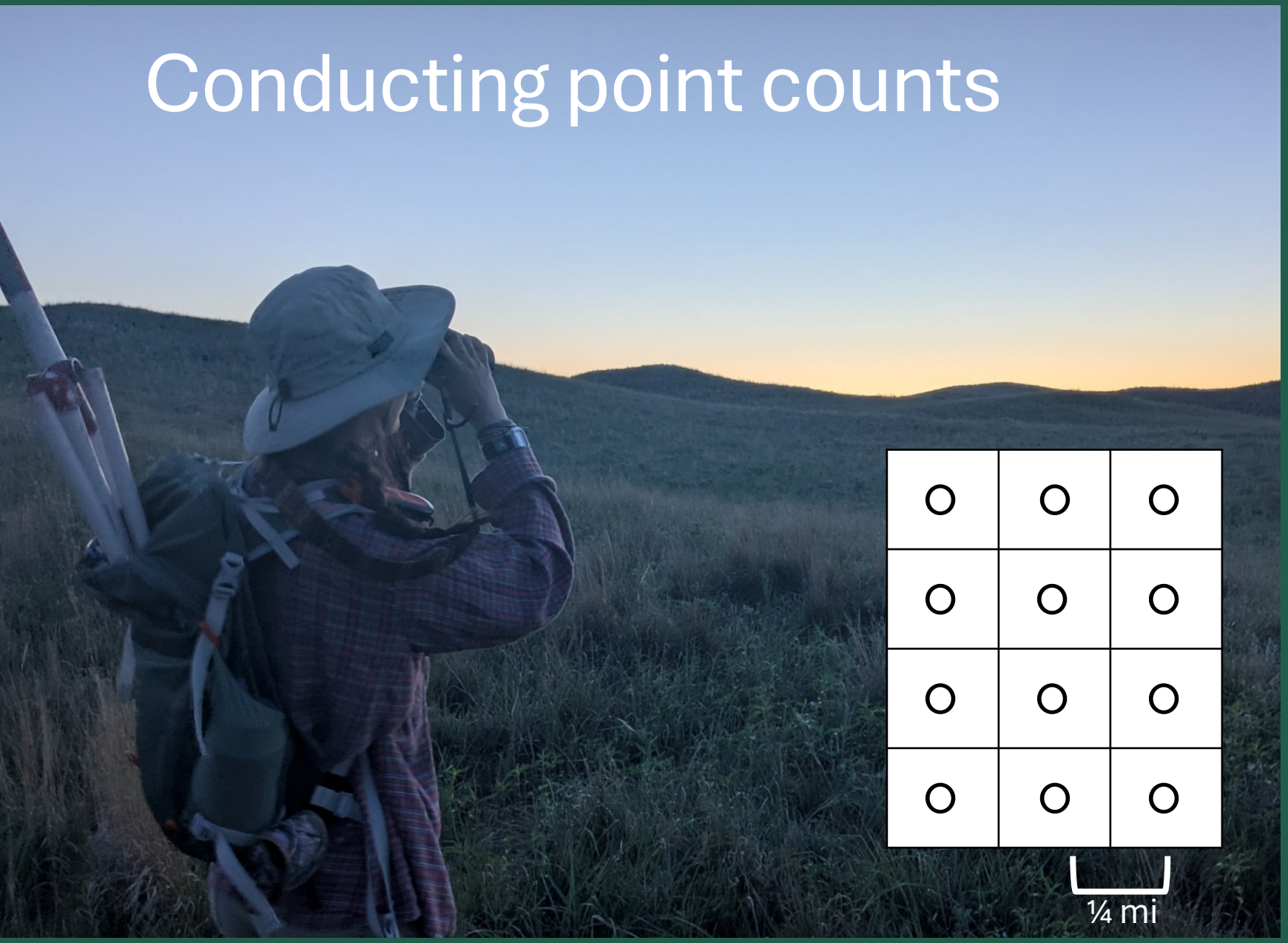
Survey Grids

12 points/ observer/ morning



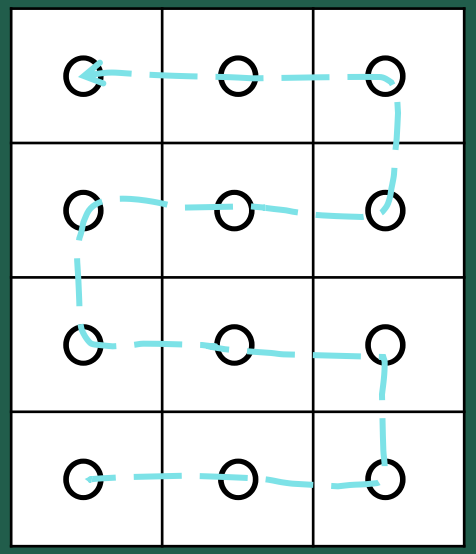
Example survey grids to capture ERC treatment and neighboring landscape characteristics and management activity.

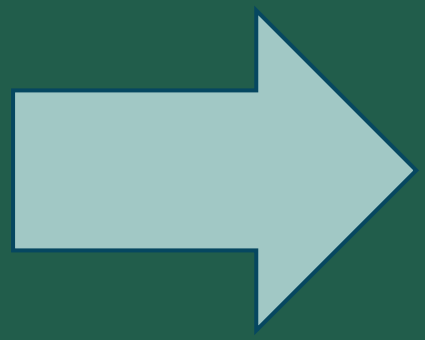
Conducting point counts



- 5 minutes
- All taxa and distances
- Weather restrictions

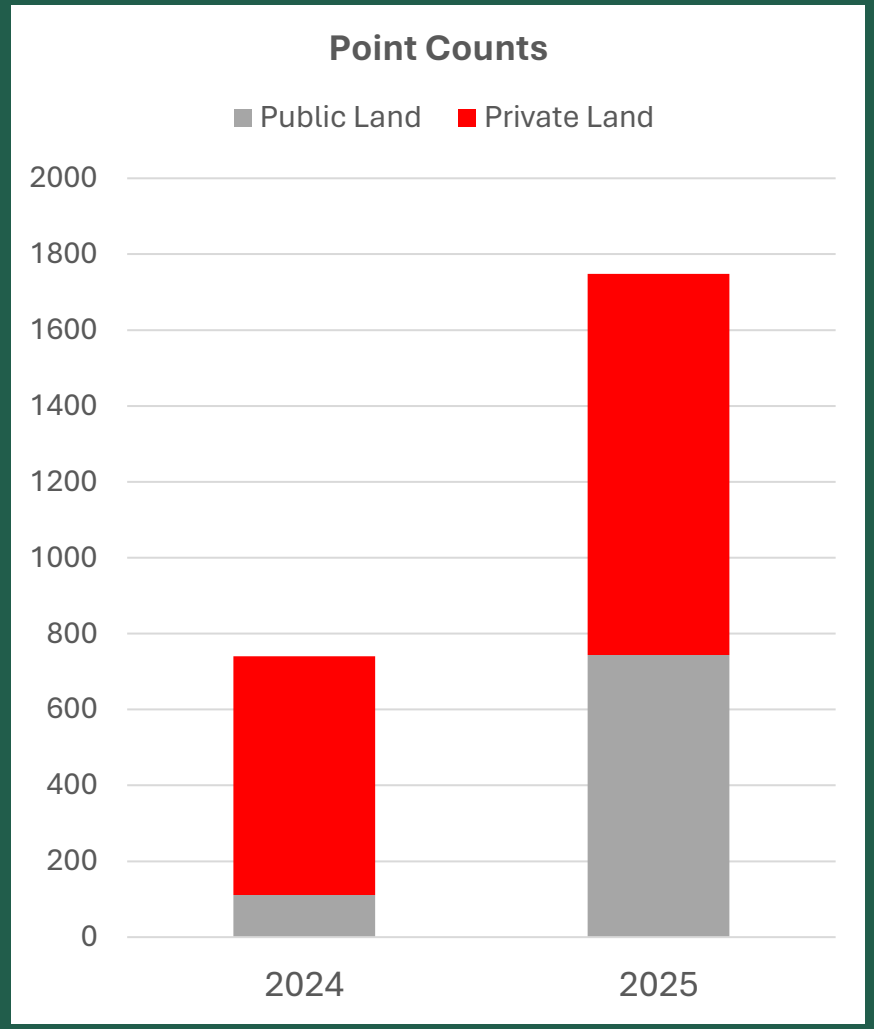
ERC Rapid Vulnerability Assessment





I	I	D
I	D	E
R	R	E
D	D	W

Collected Data



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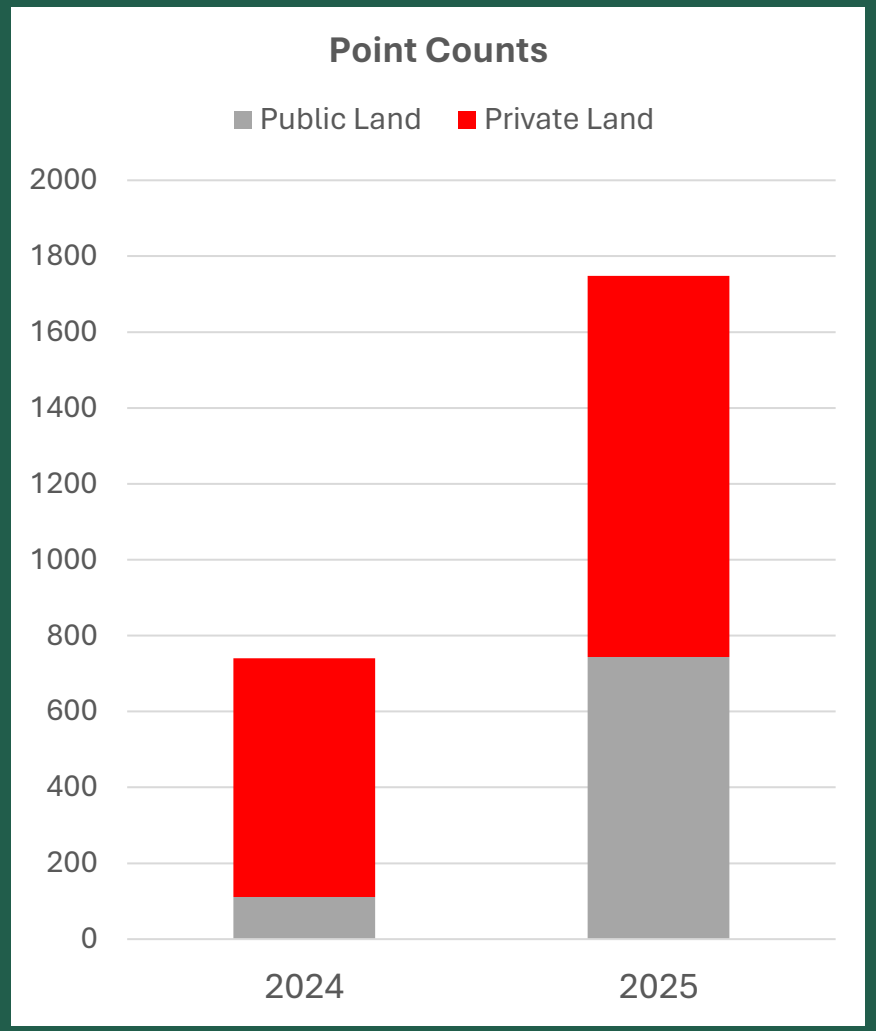

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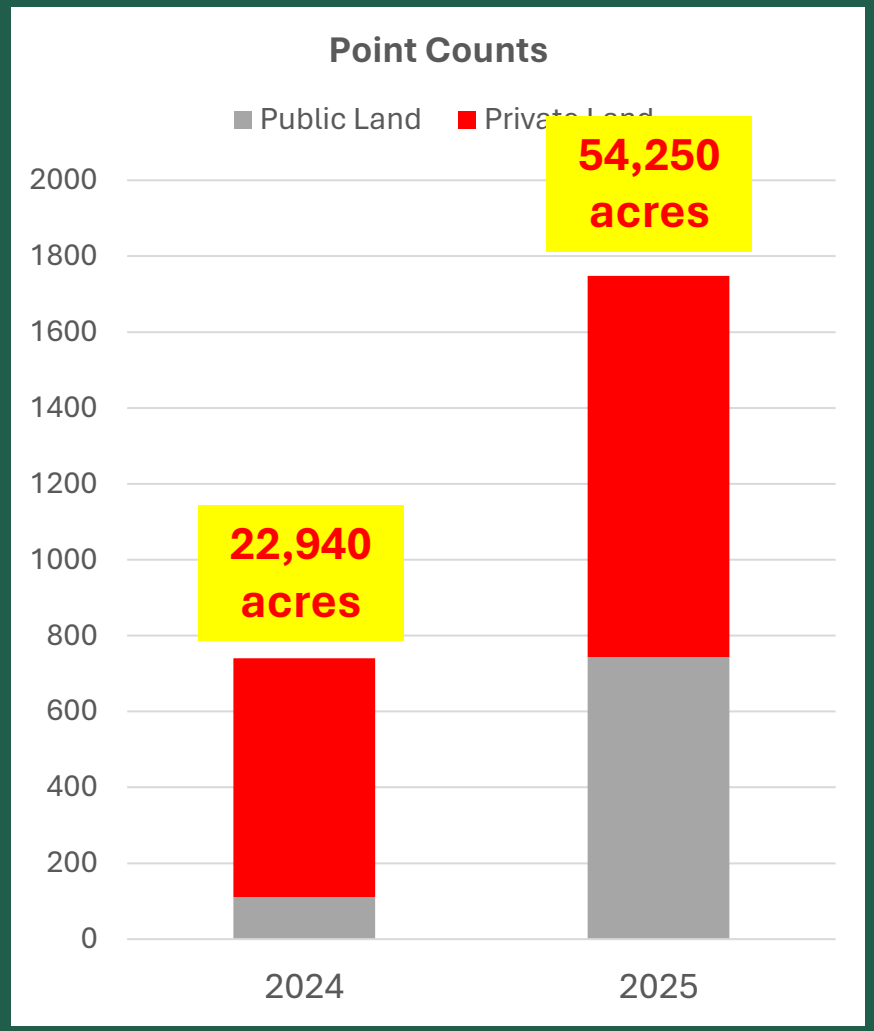

77,000
TOTAL ACRES SURVEYED, MAJORITY PRIVATE LANDS

1,000+
MILES WALKED DURING THE SURVEY

x34 Private Landowners

GRASSLAND BIRD AND EASTERN REDCEDAR RESEARCH

2025 PROJECT UPDATE

PROJECT GOAL

Evaluate the effectiveness of Eastern Redcedar (ERC) removal on restoring grassland wildlife in the Sandhills.

REASON FOR RESEARCH

The Sandhills Ecoregion retains the largest intact grasslands in the Great Plains. Yet, like the rest of Great Plains, Sandhills are at risk of invasion of woody stemmed plants, such as the Eastern Redcedar (ERC). One mature ERC will spread millions of seeds as far as 200 yards. This has led to an estimated $18 million dollar loss of grassland production a year in the state. Many stewards and government programs promote mechanical removal of ERC to reduce the spread. We know this improves grass production, but we don't fully know how ERC removal affects wildlife. Currently, 7.5 million acres in the Sandhills are still considered vulnerable to woody encroachment.

DATA COLLECTION

One of the most conspicuous wildlife to study are birds, many of which are only found in intact grasslands. A large diversity and abundance of grassland bird species can indicate high quality grassland wildlife habitat that can signify more productive rangelands.

To collect bird data, we stand in place and record all birds we see and hear for a set period of time, a survey method coined "Point Counts". Point counts need to be conducted when birds are at peak activity, which means early mornings, and beautiful sunrises. Points are at least ¼ mile apart. Each student walks around 5 miles a day in a grid pattern recording observations on your pastures to better understand the bird community.

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PRELIMINARY FINDINGS 2024

For our initial analysis, we are focusing on one species of grassland bird, the Grasshopper Sparrow, or GRSP for short. This small brown bird gets its name from its main food source, grasshoppers. GRSP are secretive ground-nesters, often hidden in tufts of grass. If you're lucky, you might spot one singing from a fence. Their signature song is insect-like "buzzzzz" that, once learned, can be reliably heard across many pastures with low cedar densities. While GRSP are rare to see in most grasslands across the country, they are common in the Sandhills where the grazing culture helps maintain the grass structure this species depends on. Because of this, GRSP counts from our surveys provide a useful measure of grassland wildlife response.

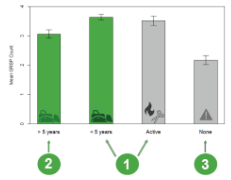
Below are our preliminary results based on reported GRSP averages from point counts we surveyed across different kinds of cedar management. In green, those areas have seen some formal ERC mechanical removal treatment. They are grouped based on how long ago the treatment was completed. Group 1 is over 5 years ago, while group 2 is within the 5-year mark. In gray, these are areas that have not seen a mechanical contract. Yet they are split based on current ERC management. In group 3, these are areas that have reported active lopping, mowing, spot treatments, or prescribed burns. Group 4 are areas that have not had ERC management and may include areas that have adult ERC as working wind breaks.

Three Main Takeaways

1) Recent treatments (within 5 years) are reporting the highest density of GRSP, closely followed by areas of active management. This indicates treatments are promoting grassland wildlife and that wildlife are responding to restoration efforts quickly.

2) Older treatments (over 5 years) report slightly lower numbers of GRSP but reflect higher variation. This shows that after the 5-year mark, the results can be mixed depending on the previous ERC density and historic seed bank, neighboring cedar conditions, and follow-up management.

3) Any management (mechanical or active) reports much higher numbers of GRSP than areas without. Showcasing again that any action is key to preventing ERC from repelling native wildlife.



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2025 FIELD SEASON (Year 2 of 3)

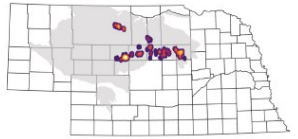

Figure 1. Heat map of student surveyed areas across 2024 and 2025 field seasons

In 2025, we had two active teams of student technicians and were able to double our surveying effort. We have continued to focus our surveys on the southeastern border of the Sandhills as these areas serve as the front lines against westward expansion of eastern redcedar. Despite the short field season (late May to early July), our crews moved frequently. We had one crew based out of Valentine/Halsey and another based on Taylor/Bartlett. We were able to cover a lot more ground this past year in comparison to our three-person field crew in 2024. We are still analyzing last year's data, but we are seeing a similar trend in bird response to treatments.

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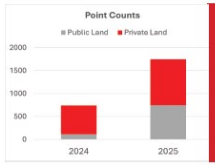
FUTURE DIRECTION IN 2026

Over the past two years, we have completed more than 2,400 point counts, with each point covering roughly 30 acres. This adds up to over 1,000 miles walked and a total of about 77,000 acres surveyed in total. We will continue to prioritize surveying on private land to further support conservation efforts related to ERC removal and keeping grasslands healthy.

Thank you for supporting this research and helping our students build a connection with working lands.



77,000 TOTAL ACRES SURVEYED, MAJORITY PRIVATE LANDS

1,000+ MILES WALKED DURING THE SURVEY

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YOUR CONTRIBUTION

Thank you for your support in this project. Research like this simply would not be possible without landowners like you.

Your support during the 2025 field season has made a real difference in our work on private lands. There is no expectation of participating in this upcoming year's efforts, but we would be grateful to collaborate again. We are especially thankful for the role you play in helping students connect with working landscapes and conservation. Your willingness to open your property provides an opportunity students otherwise wouldn't have to build an appreciation for grasslands. That contribution truly does not go unnoticed.

Thank you again for your trust and partnership. As a token of our gratitude, we've attached a personalized list of the bird species we observed during the survey.

If you have any questions or feedback, please don't hesitate to reach out to Rachel at rrusten2@huskers.unl.edu

You may have seen one of these familiar faces of the 2025 Field Team. Thank you!

Lizzie Weed, Student Technician
Miriam Ganoung, Student Technician
Emily Redding, Student Technician
Carver Hauptman, Student Technician

Paige Wimberly, Student Technician
Kol Tafka, Student Technician
Rachel Rusten, Graduate Student

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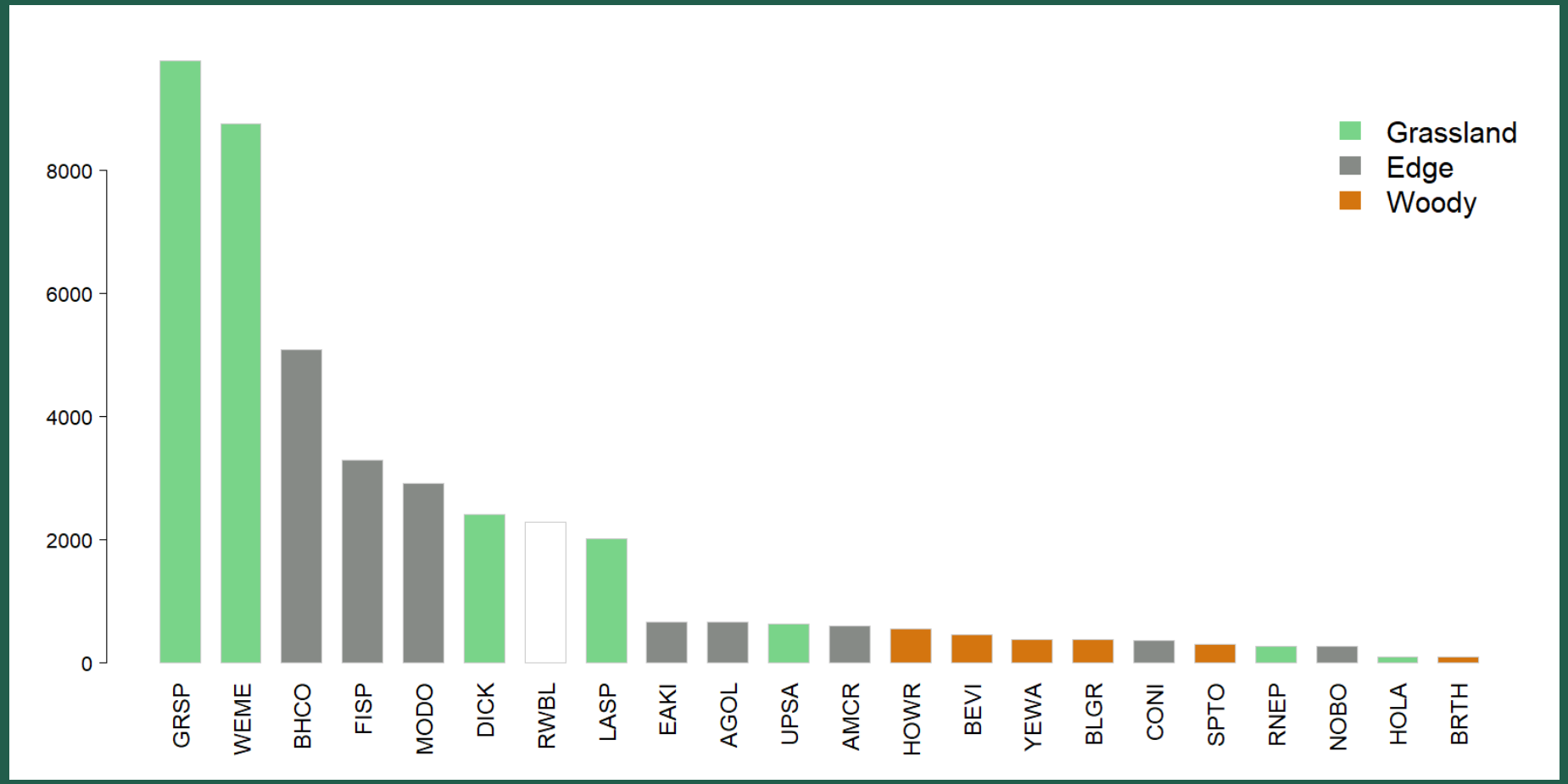
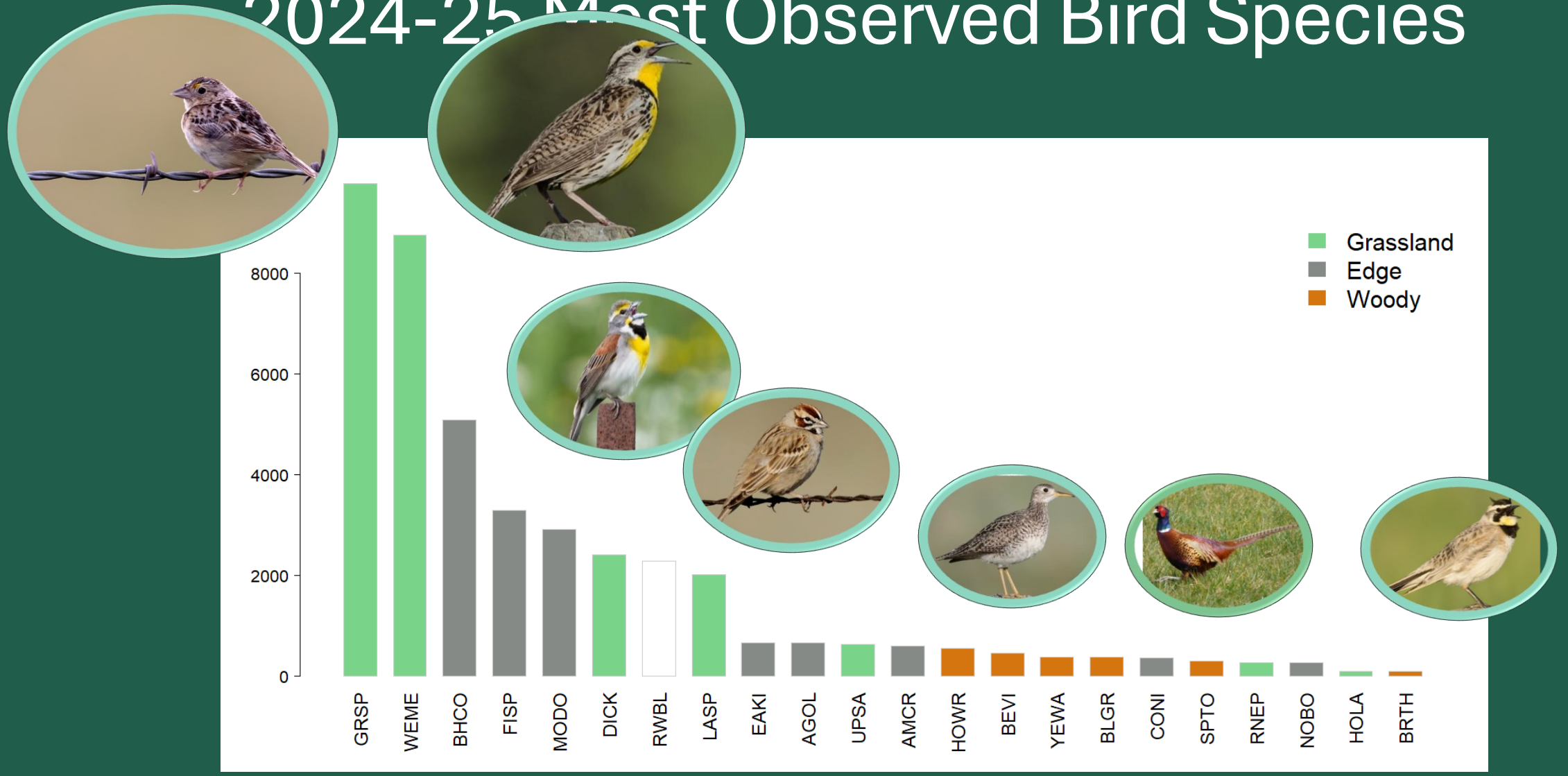
What have we seen?

- +110 different species
- Scarce Grassland Birds:
  - Long-billed Curlew
  - Lark Bunting
  - Loggerhead Shrike
- Grouse Observations

2024-25 Most Observed Bird Species



2024-25 Most Observed Bird Species



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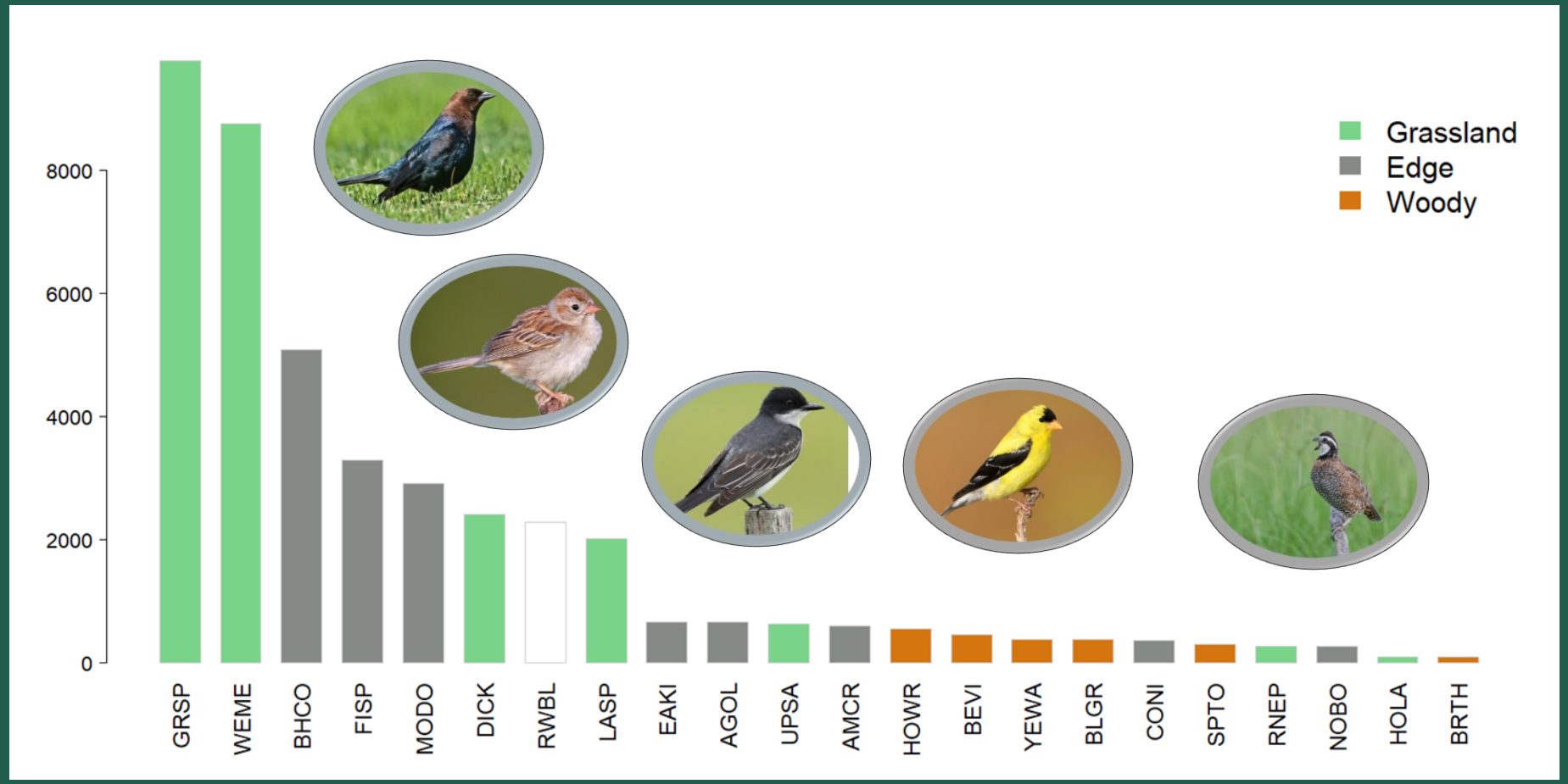

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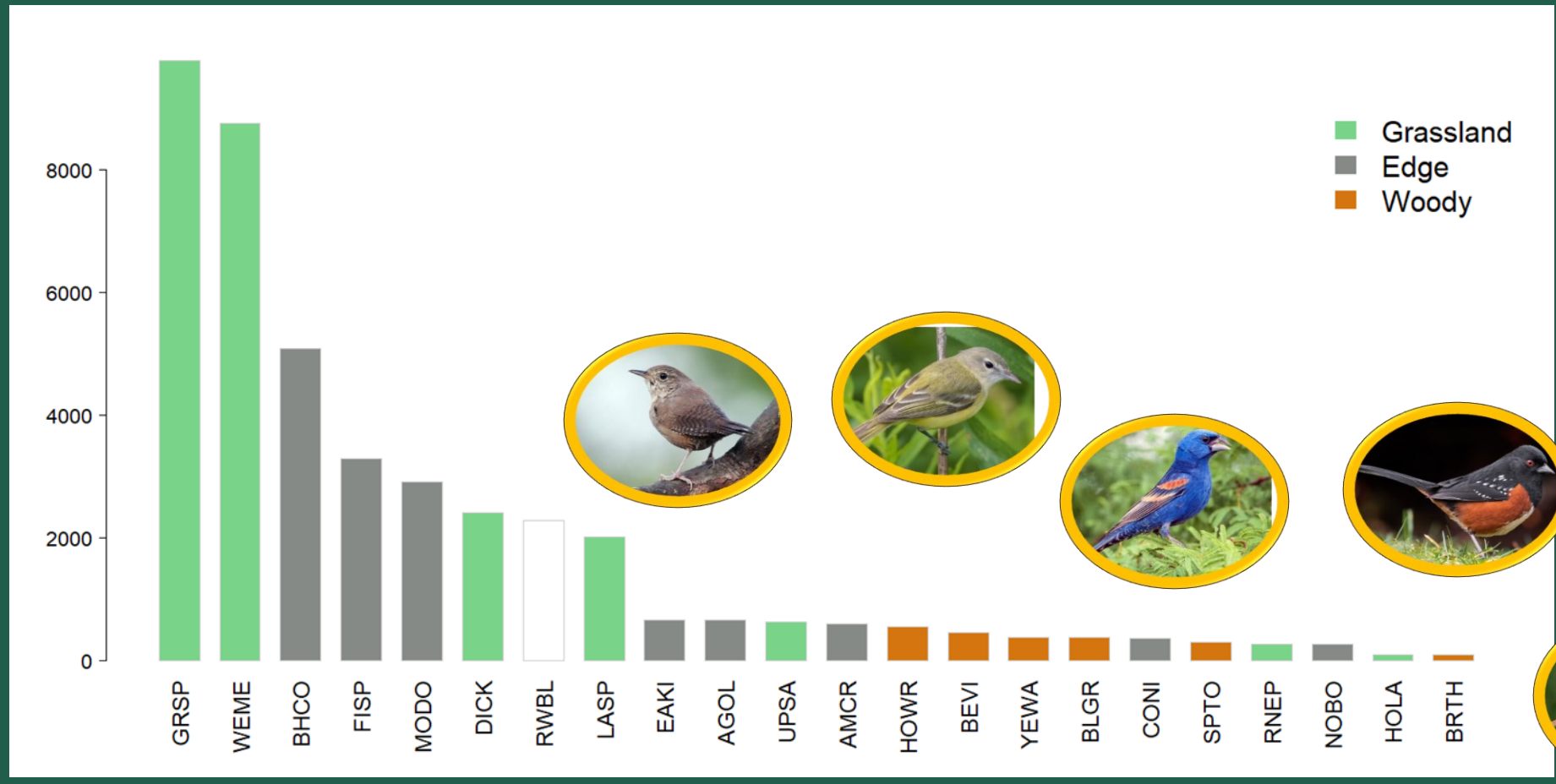
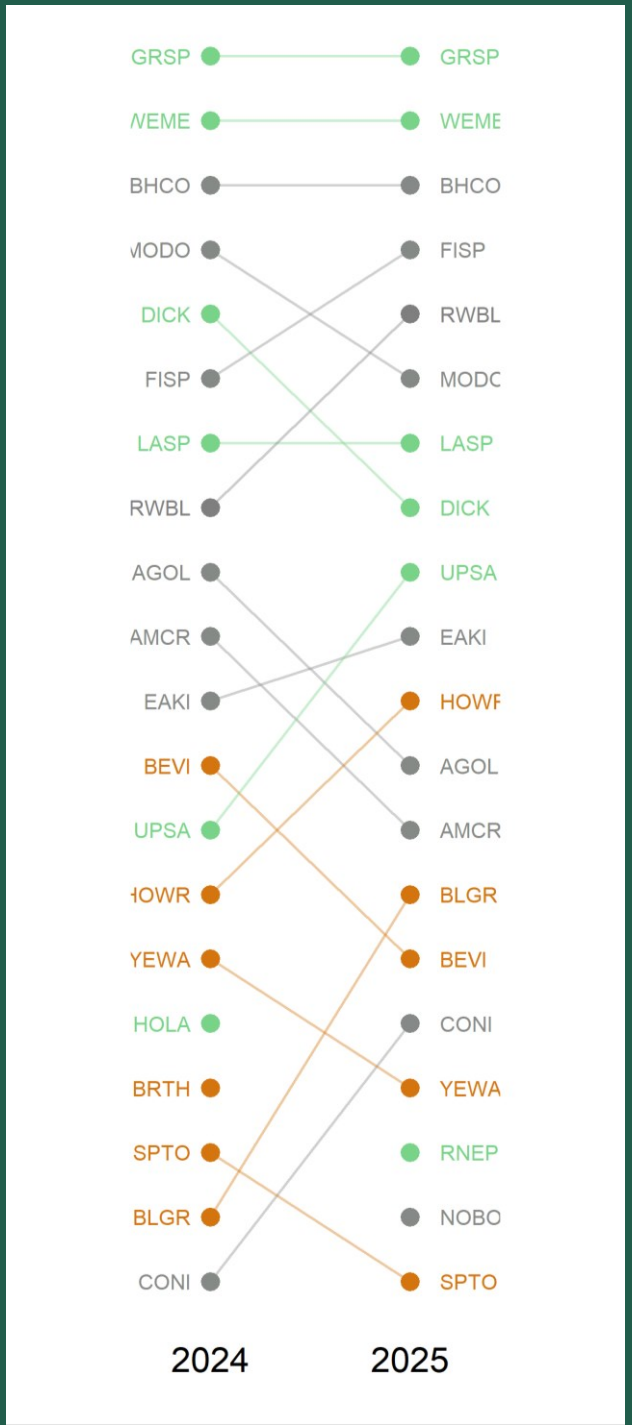


2024 v 2025


GRSP
WEME
BHCO
MODO
DICK
FISP
LASP
RWBL
AGOL
AMCR
EAKI
BEVI
UPSA
HOWR
YEWA
HOLA
BRTH
SPTO
BLGR
CONI
GRSP
WEME
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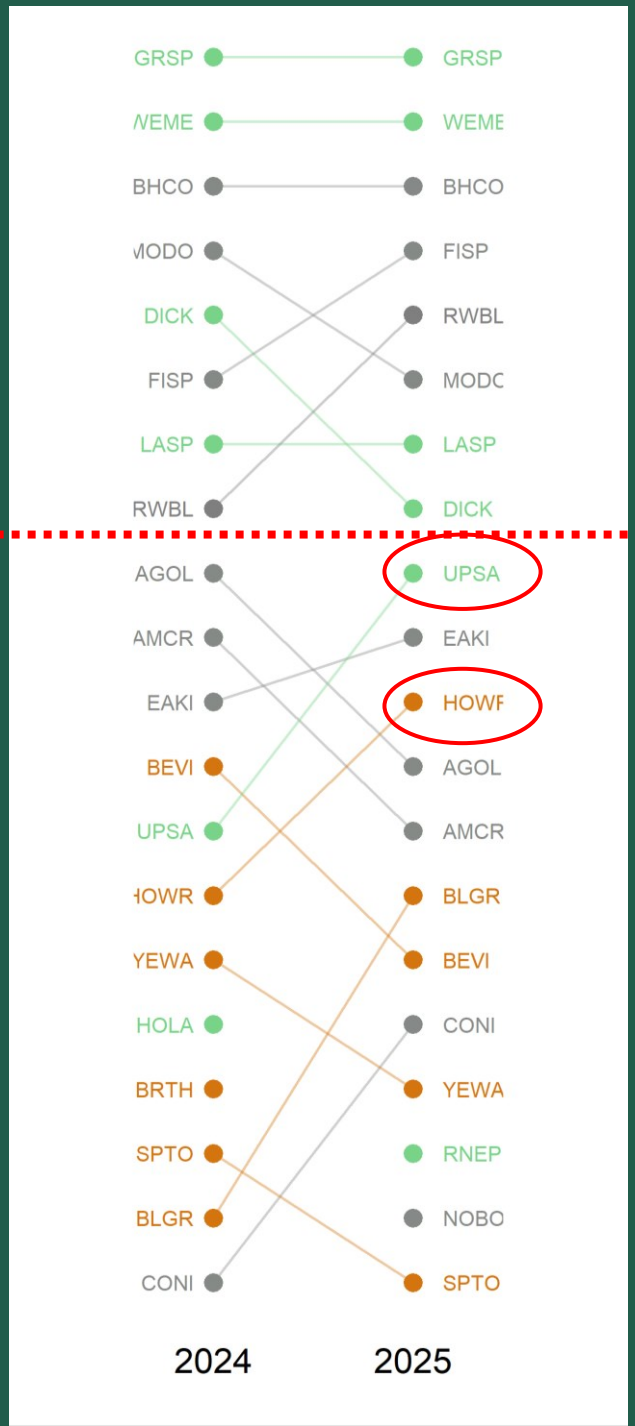
2025

2024 v 2025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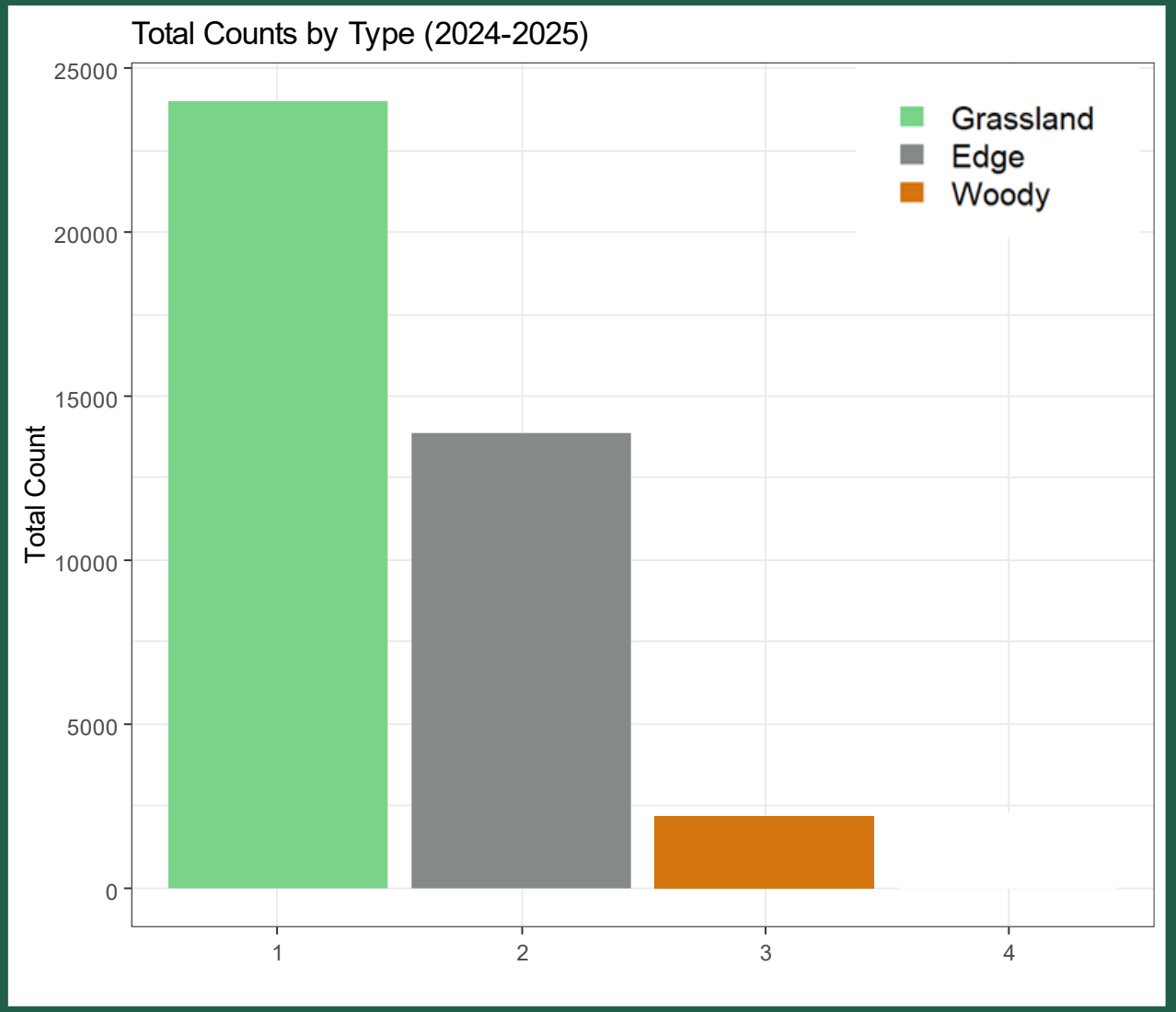
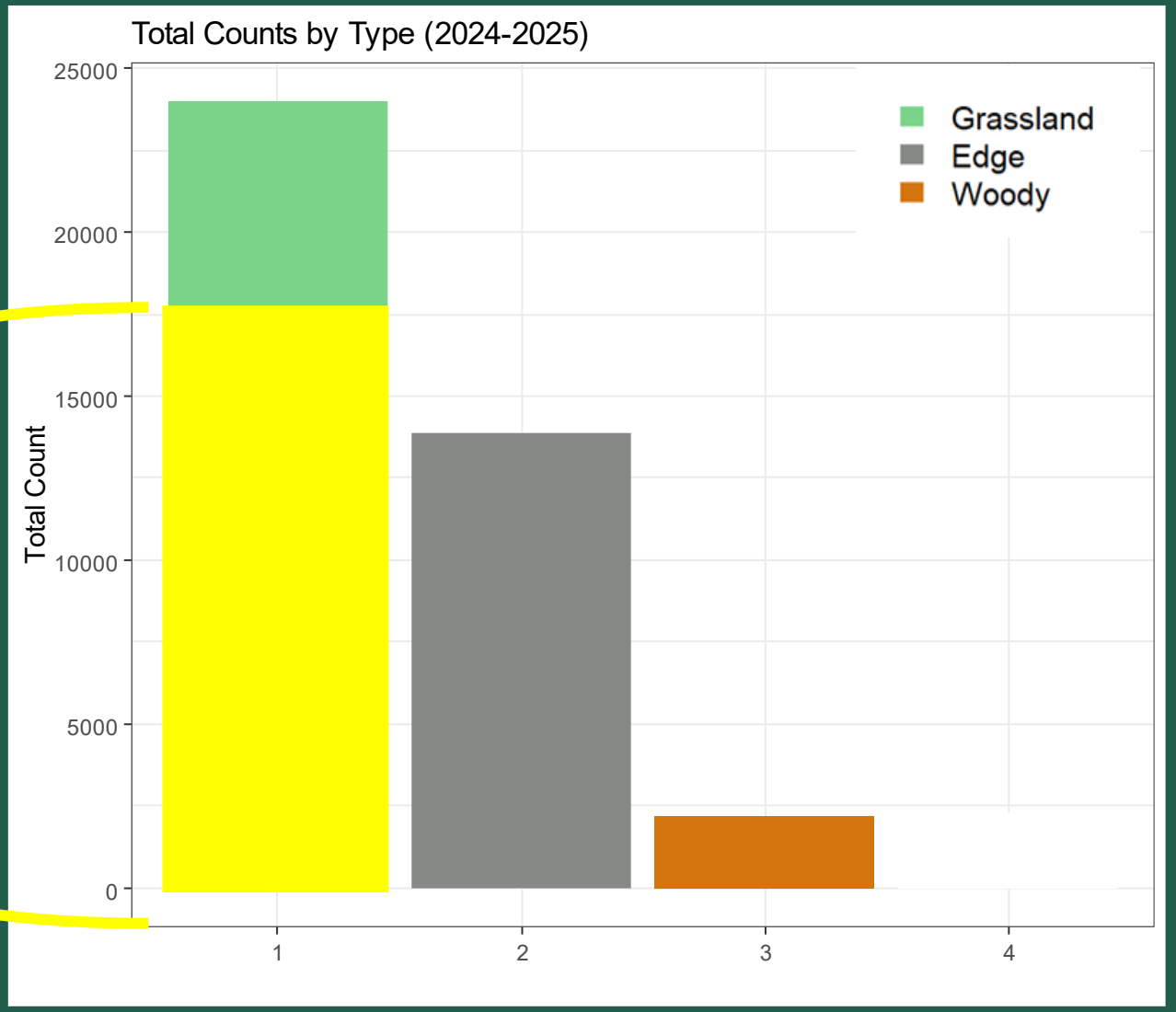

Total Counts by Type (2024-2025)
Total Count
25000
20000
15000
10000
5000
0
1
2
3
4
Grassland
Edge
Woody

~75%


Total Counts by Type (2024-2025)
Total Count
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20000
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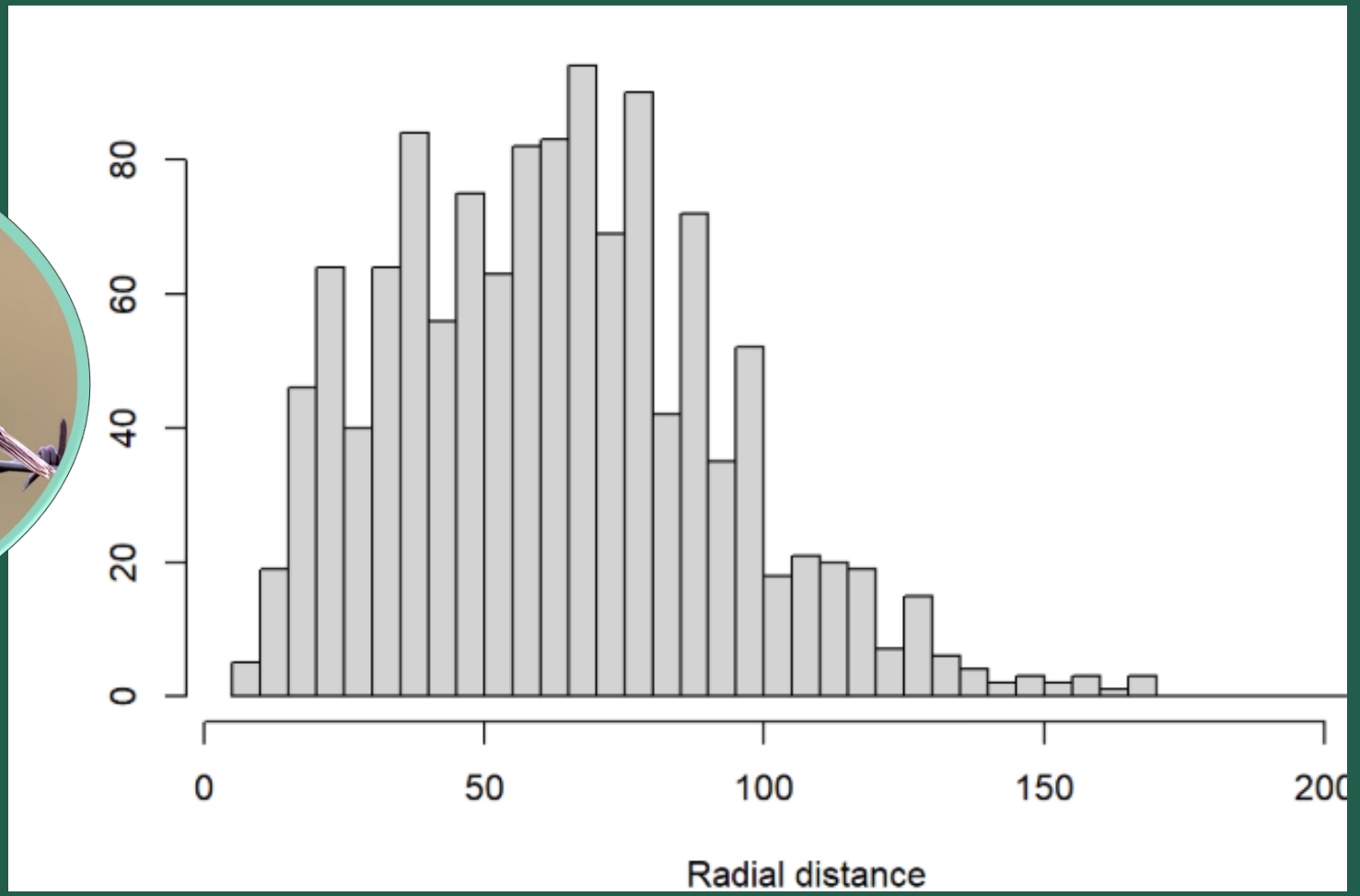
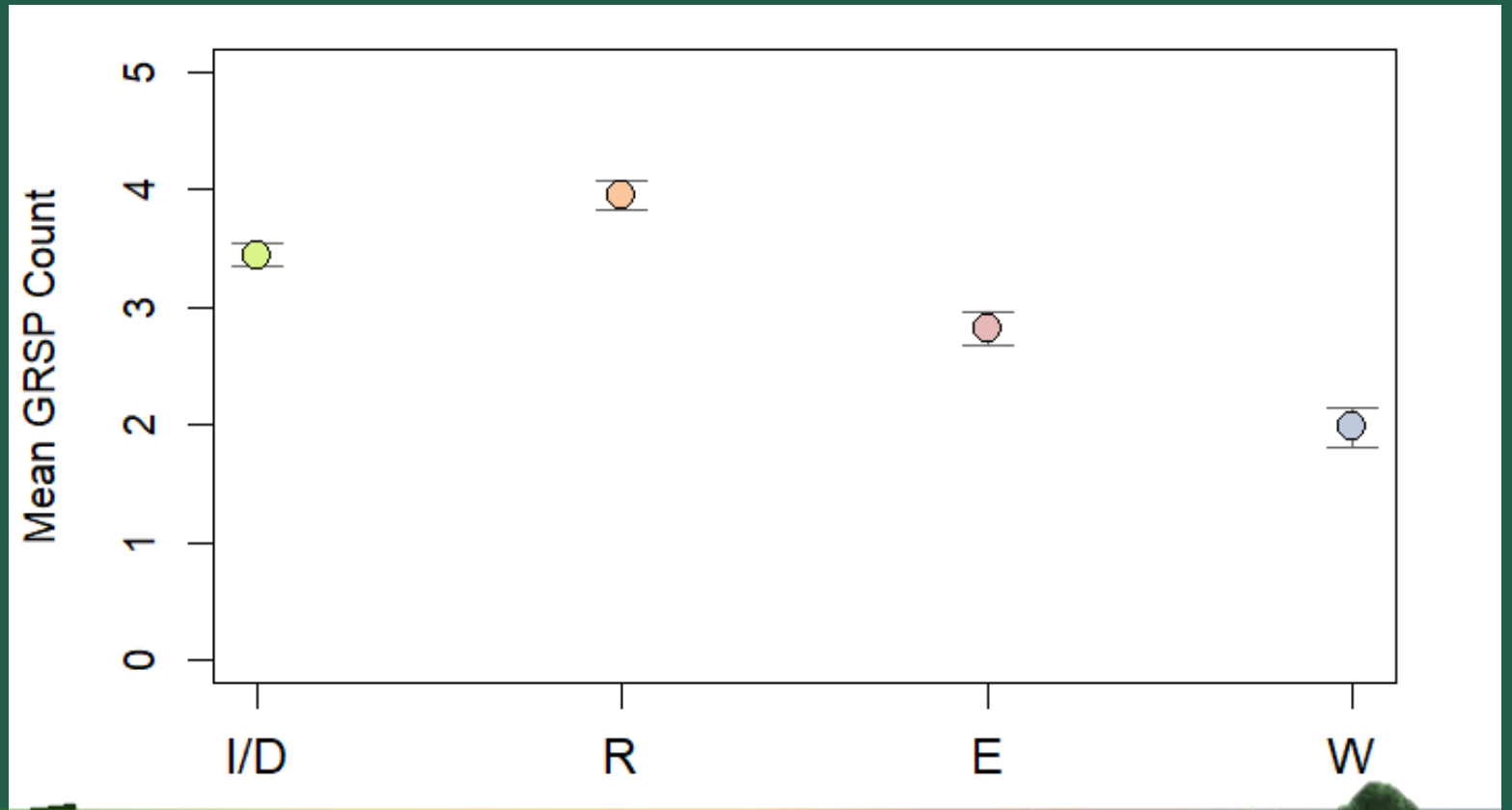
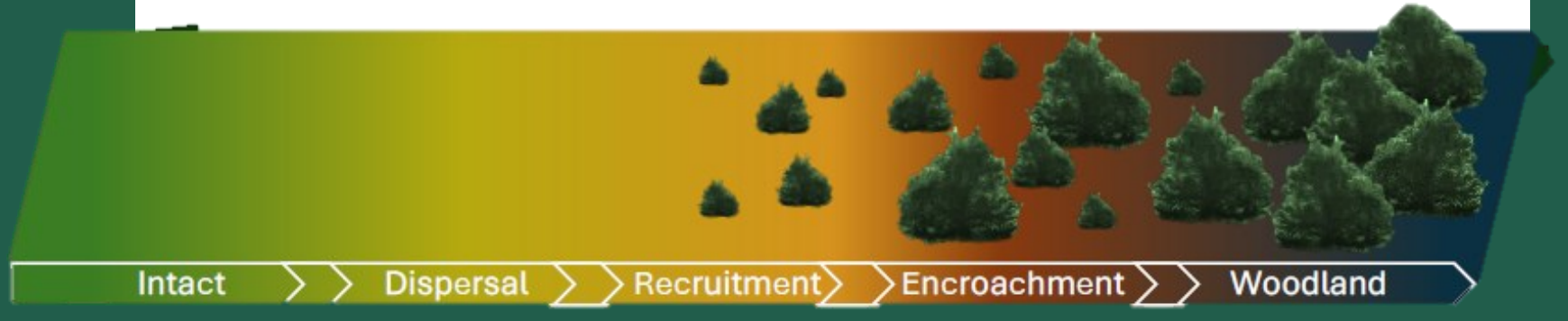
GRSP Detections 2024



N = 786

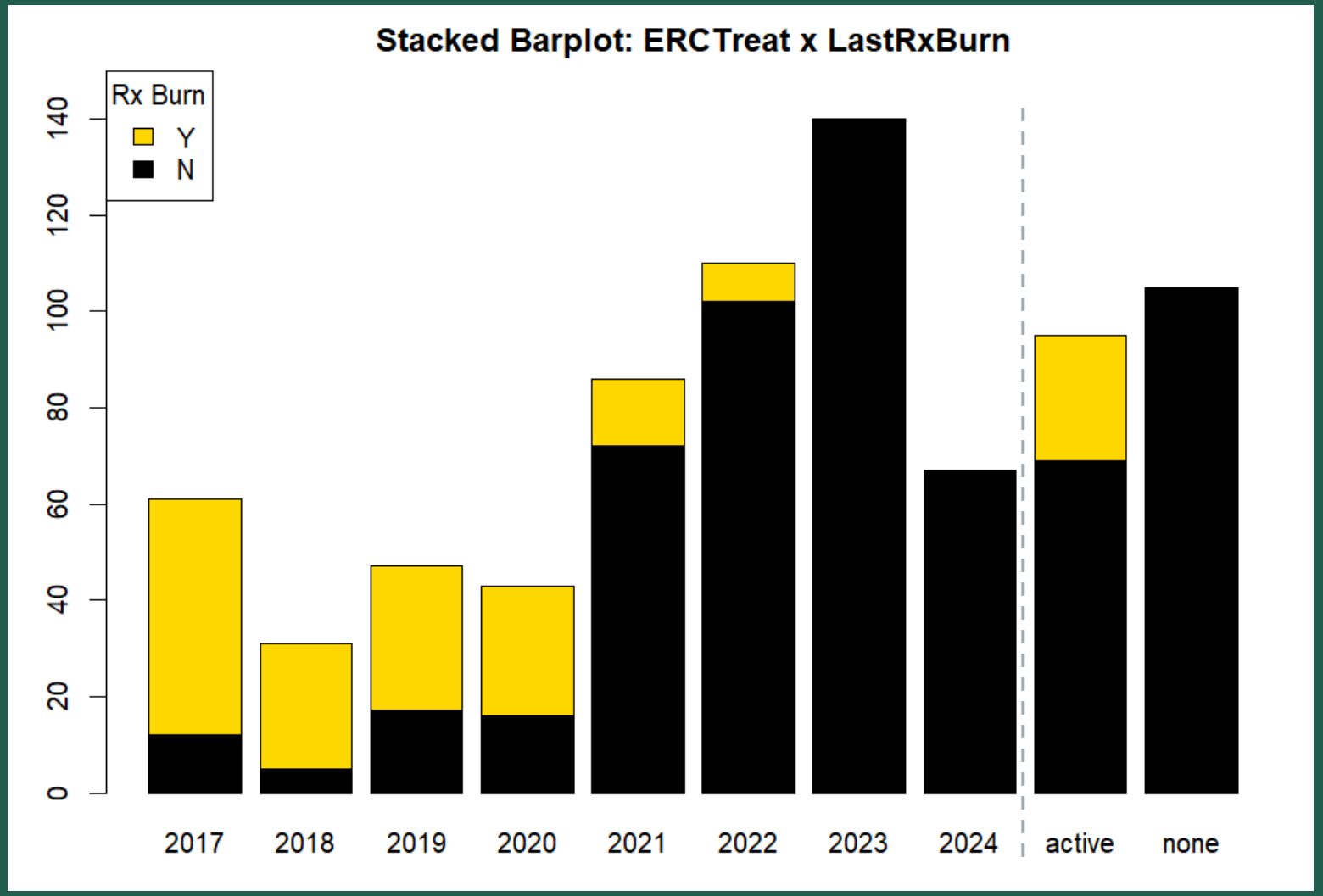
2024 Results GRSP





2024 – timings Rx and cuts

N = 786



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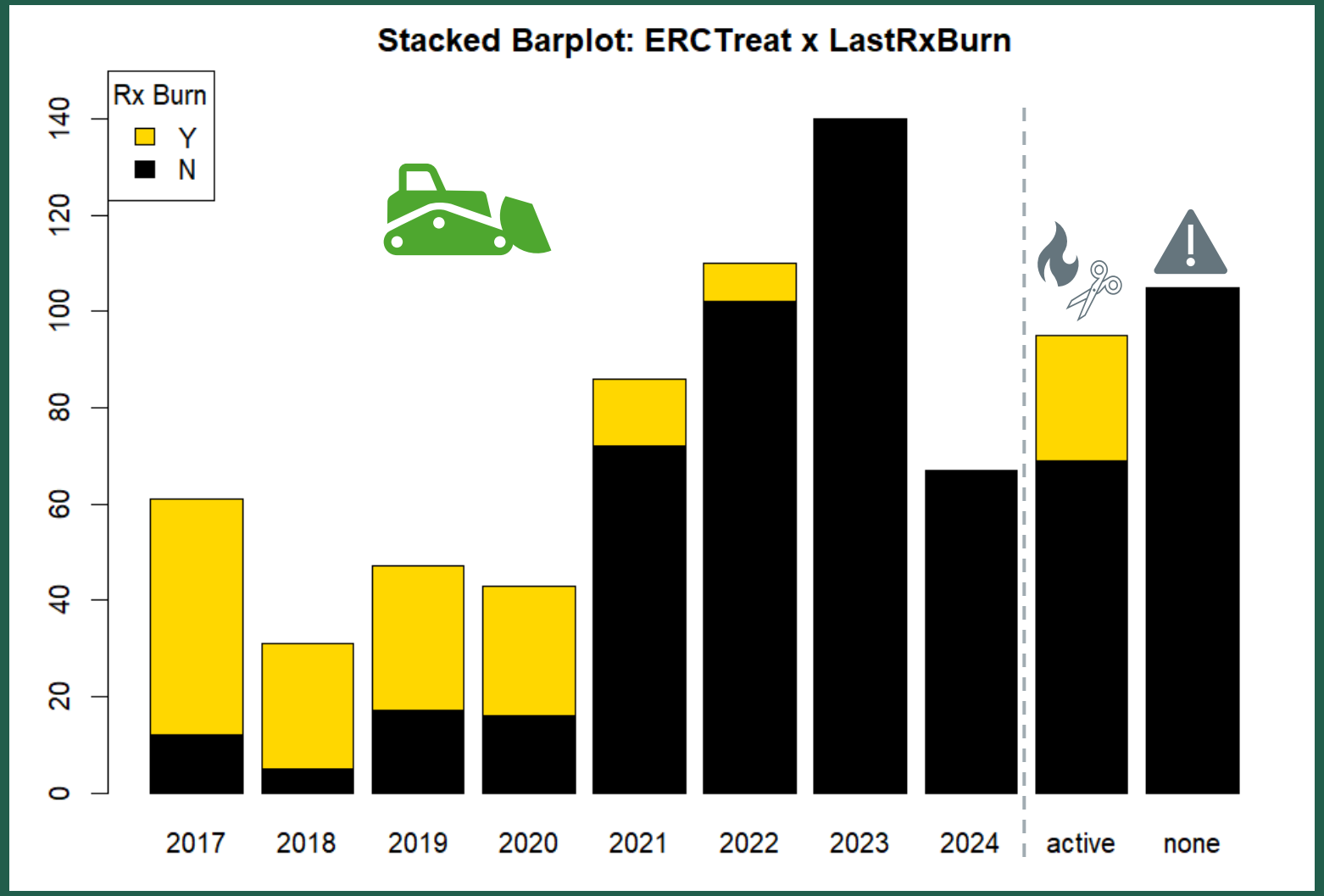
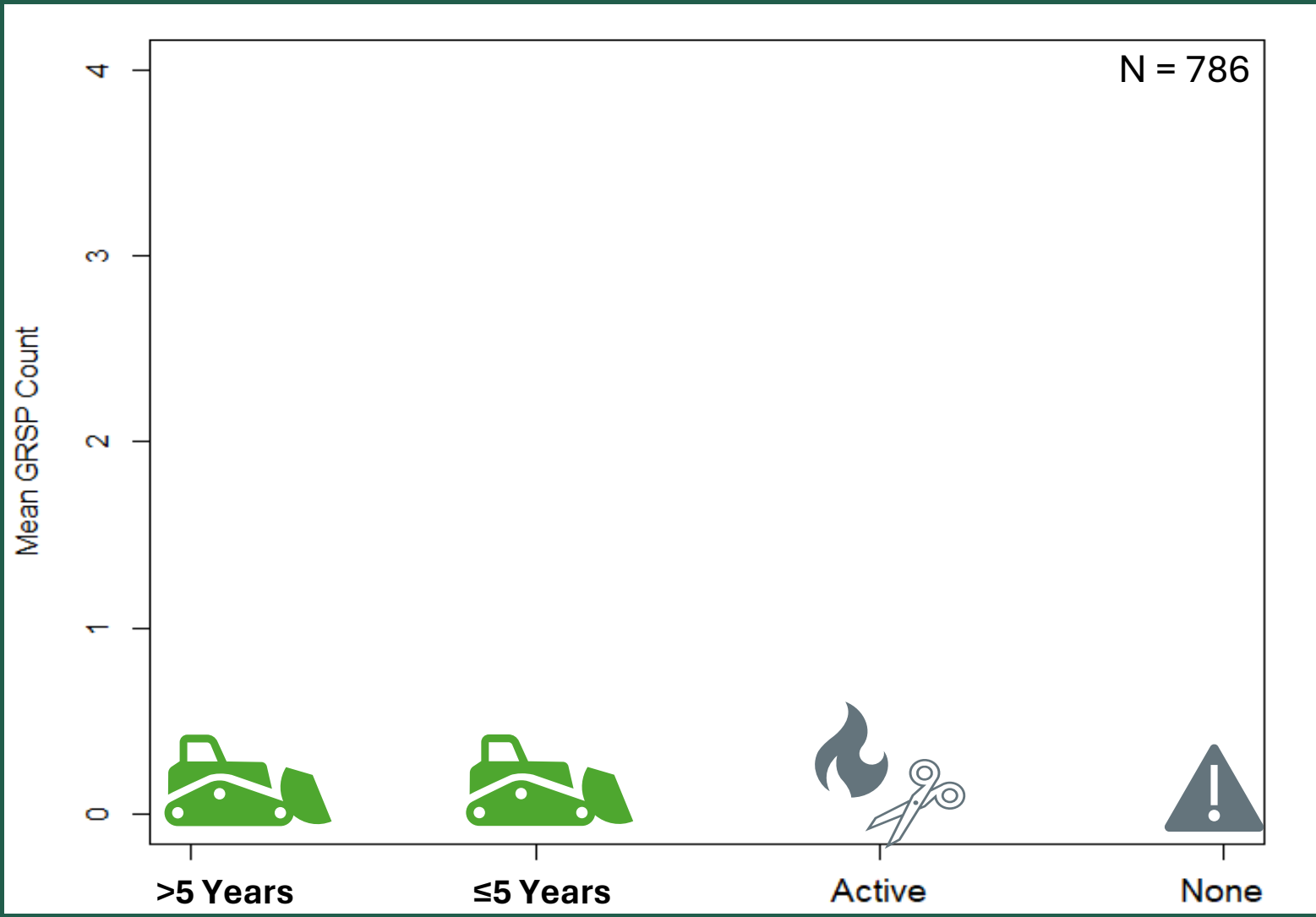


2024 Results GRSP



2024 Results GRSP

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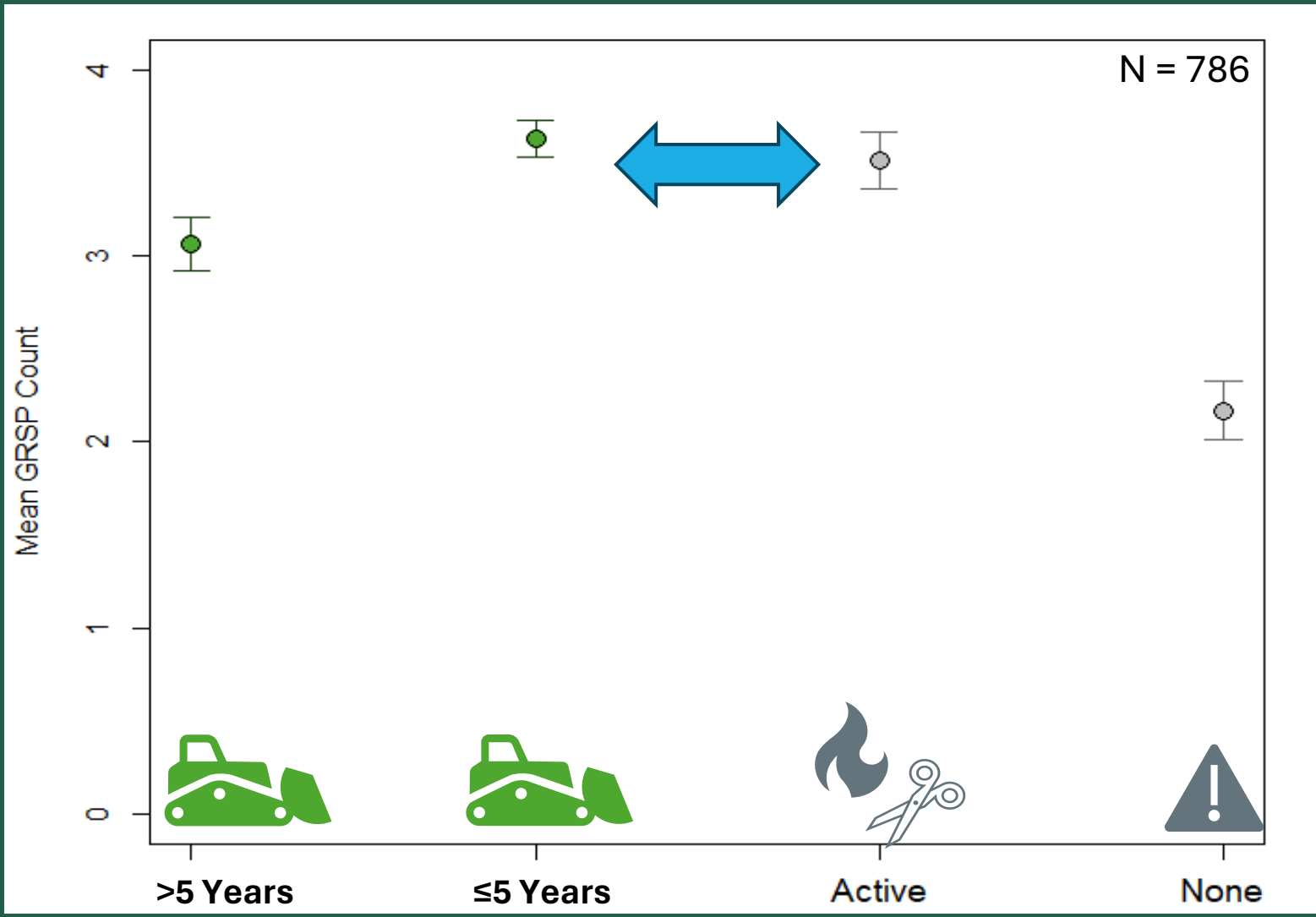
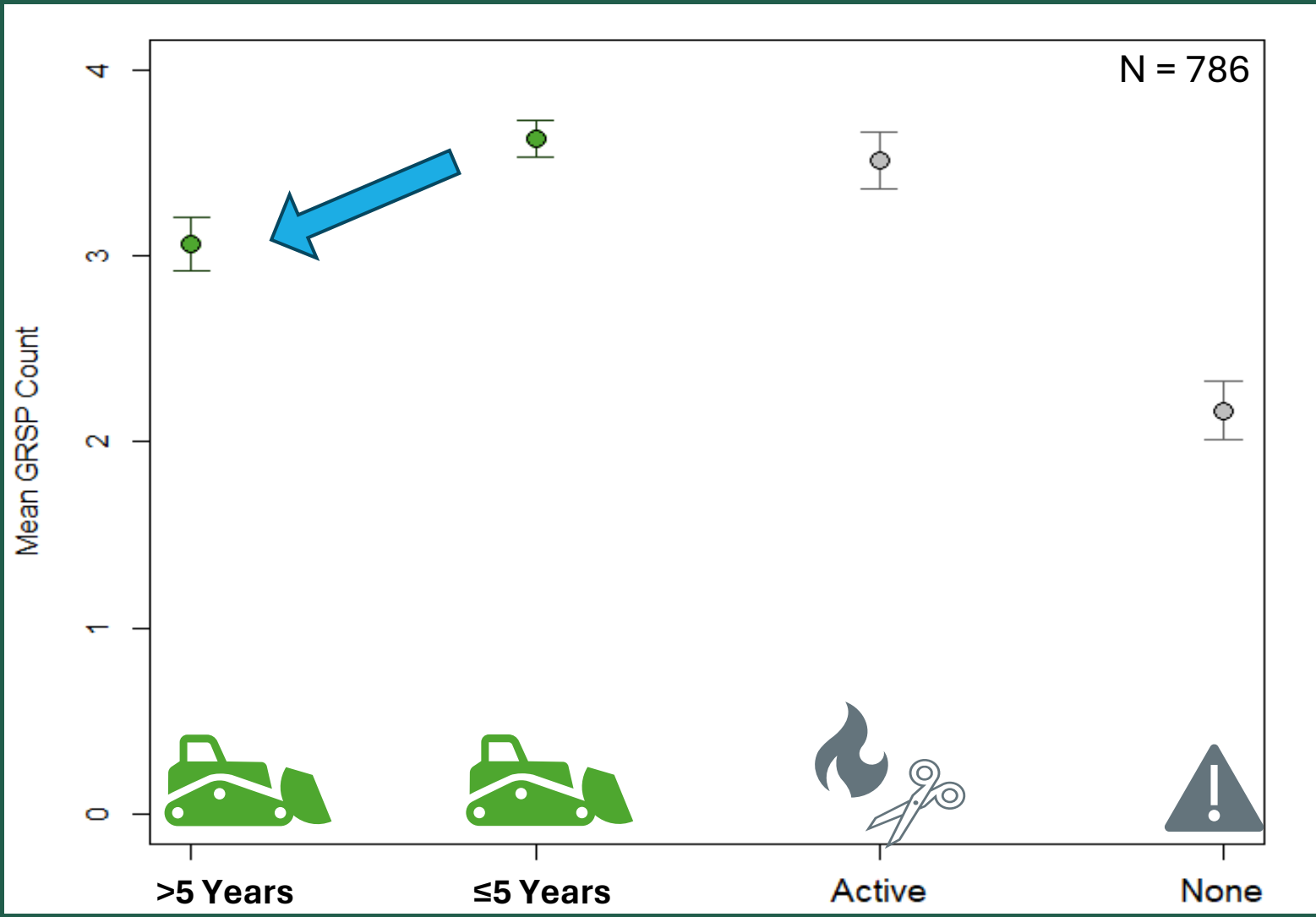


2024 Results GRSP



2024 Results GRSP

What’s Next?

- Complete 2026 field season
- Conduct community level analysis and examine grouse species
- Explore avian species occurrence at multiple scales regarding ERC condition
- Document species richness attracted by ERC slash piles

Acknowledgements

- **Operators and private landowners**
- Field Technicians: Paige Wimberly, Kol Tafka, Miriam Ganoung, Carver Hauptman, Emily Redding, Lizzie Weed and Daniel Whitman

- NE Rainwater Basin Joint Venture: Andy Bishop, Brad Thornton, Roger Grosse, Sadique Radman, Brody Vorderstrasse
- US Fish and Wildlife: Juancarlos Giese, Mel Nenneman, Chad Christiansen, Matt Sprenger
- Forest Service: Greg Wright, Nathan Hanson
- NRCS: Melissa Kayton, Leah Carson
- Pheasant's Forever: Ryan Lodge
- UNL: Larkin Powell, Daniel Uden, Sabrina Russo, Dirac Twidwell
- NE Game and Parks: TJ Walker, Joel Jorgensen, Bryan O'Connor, Scott Wessel


Thank you