



Longspurs, grasslands and birds at the edge of their  
range in the Great Plains

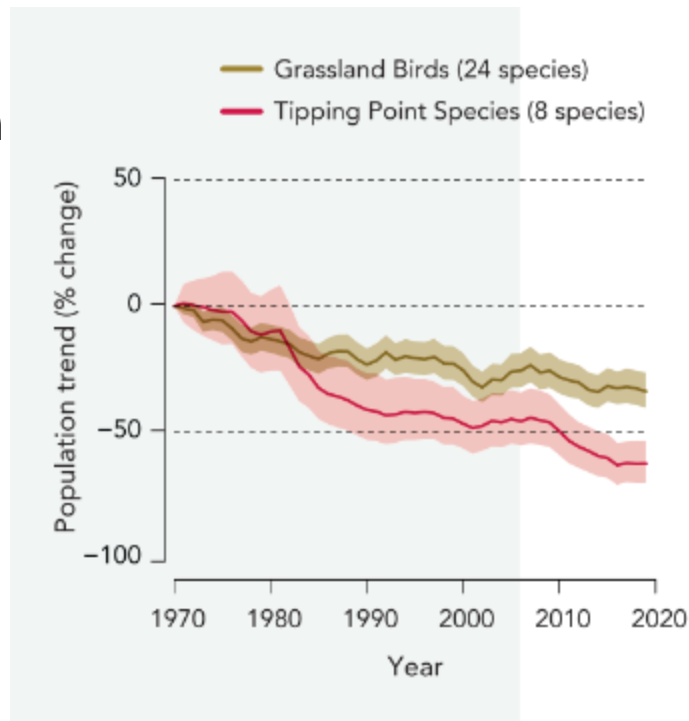
STEPHEN BRENNER – AUDUBON GREAT PLAINS

# Threats to grasslands and grassland birds

## Largest habitat loss and declines in Bird species in North America

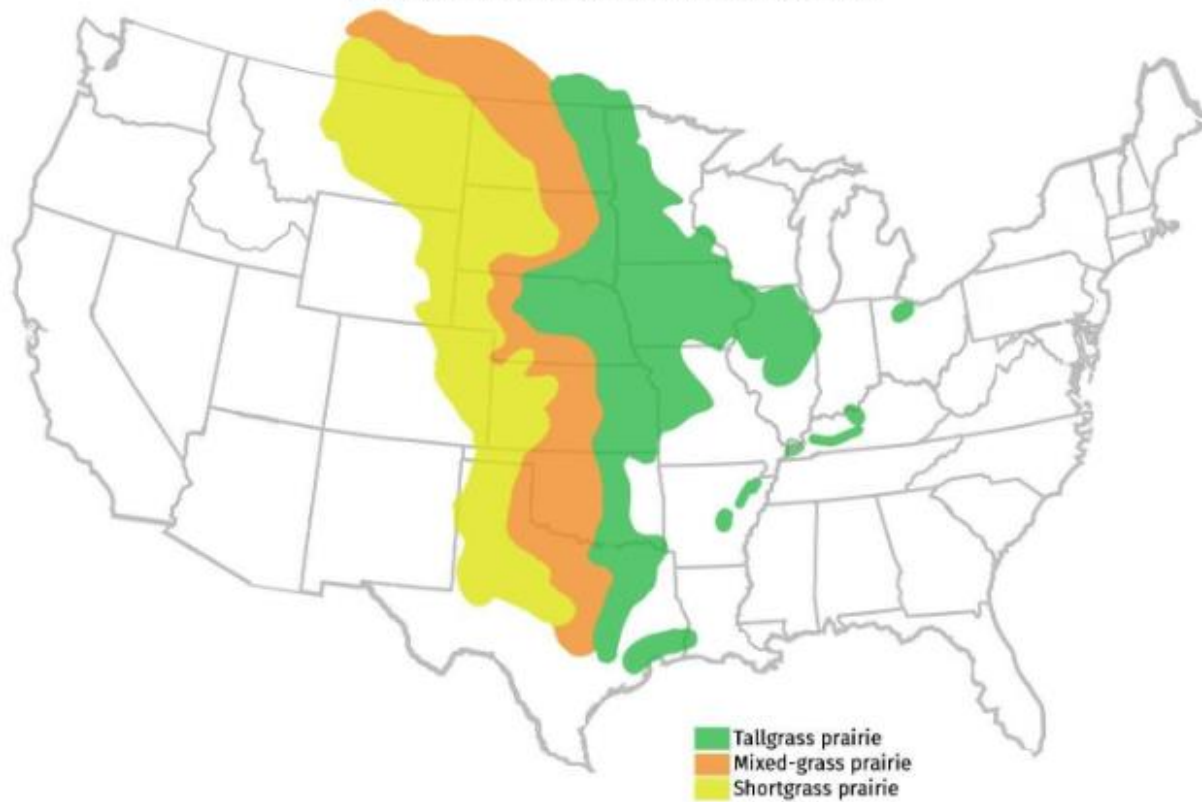
Loss of > 60% grassland

~40% population declines  
since 1960s



Source: State of Birds 2022

## HISTORIC RANGE OF THE PRAIRIE





### **Thick-billed Longspur (TBLO)**

- 'Short-grass', bare ground
- Tier 1 in Nebraska, declining range-wide



### **Chestnut-collared Longspur (CCLO)**

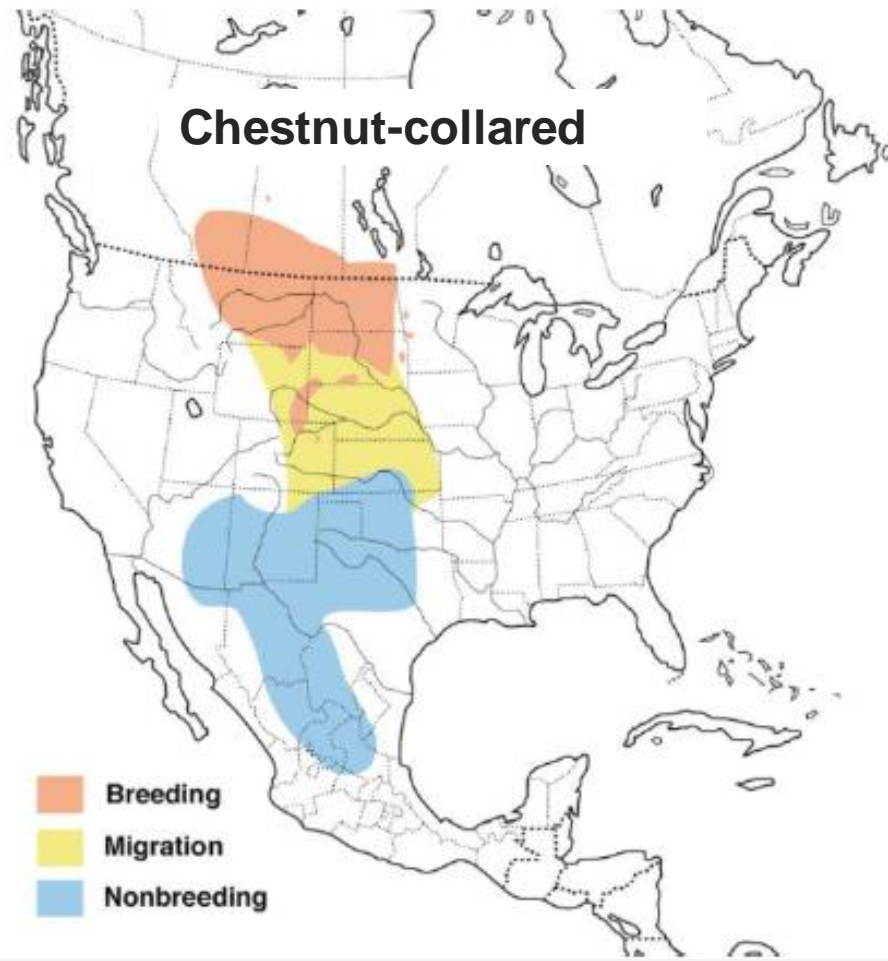
- Mixed-grass, more vegetation
- Tier 1 in Nebraska, vulnerable range-wide



## Thick-billed



## Chestnut-collared



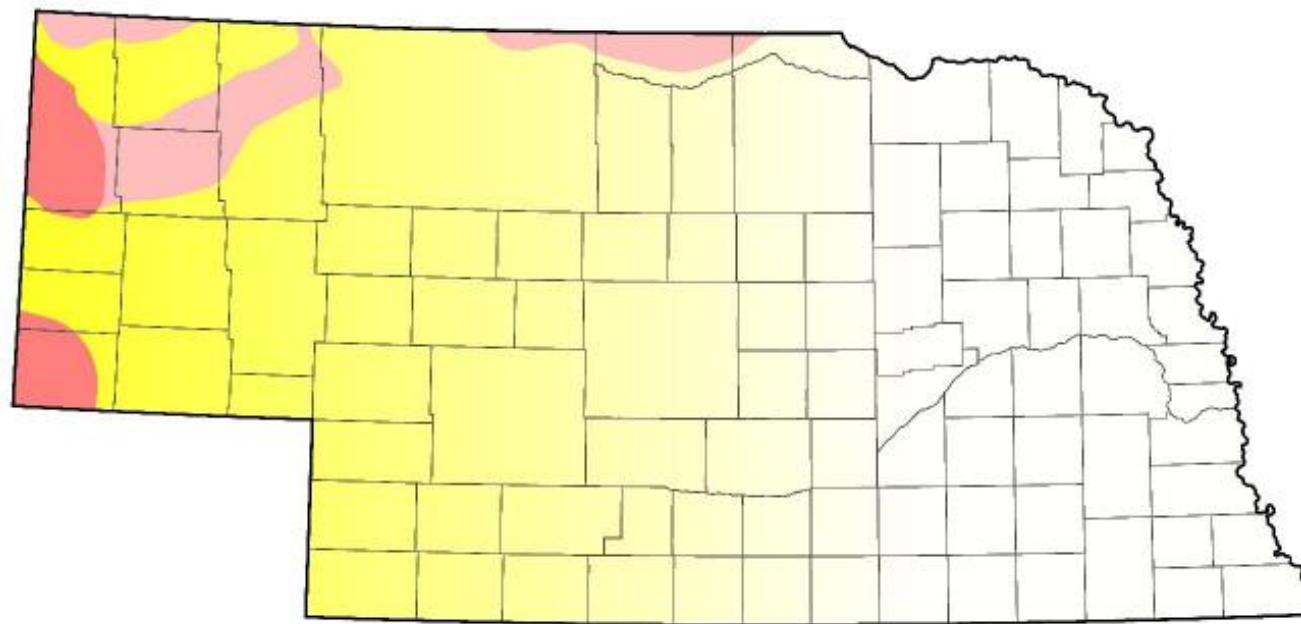


Figure 16. Chestnut-collared Longspur range in Nebraska (Silcock and Jorgensen 2022).



Figure 15. Range of the Thick-billed Longspur in Nebraska. Red shaded areas indicate breeding range and yellow shaded areas show where the species is observed during migration. Map from Silcock and Jorgensen (2022).

## Background - Nebraska

TBLO recently state-listed in State Wildlife Action Plan

Arrival of TBLO Conservation document

**A Thick-billed  
Longspur &  
Chestnut-  
collared  
Longspur  
Conservation  
Strategy for  
Nebraska**





## Background - Nebraska

TBLO recently state-listed in State Wildlife Action Plan

Arrival of TBLO Conservation document: **Synthesize known information and lay the roadmap for conservation efforts**

A Thick-billed  
Longspur &  
Chestnut-  
collared  
Longspur  
Conservation  
Strategy for  
Nebraska





## Nebraska Plan

One main objective of TBLO conservation plan and research projects going forward: “**Evaluate Breeding Distribution**”

*“Develop and maintain testable spatial models showing areas of importance (and opportunity) which incorporate pertinent variables that can be revised as new information is acquired.”*

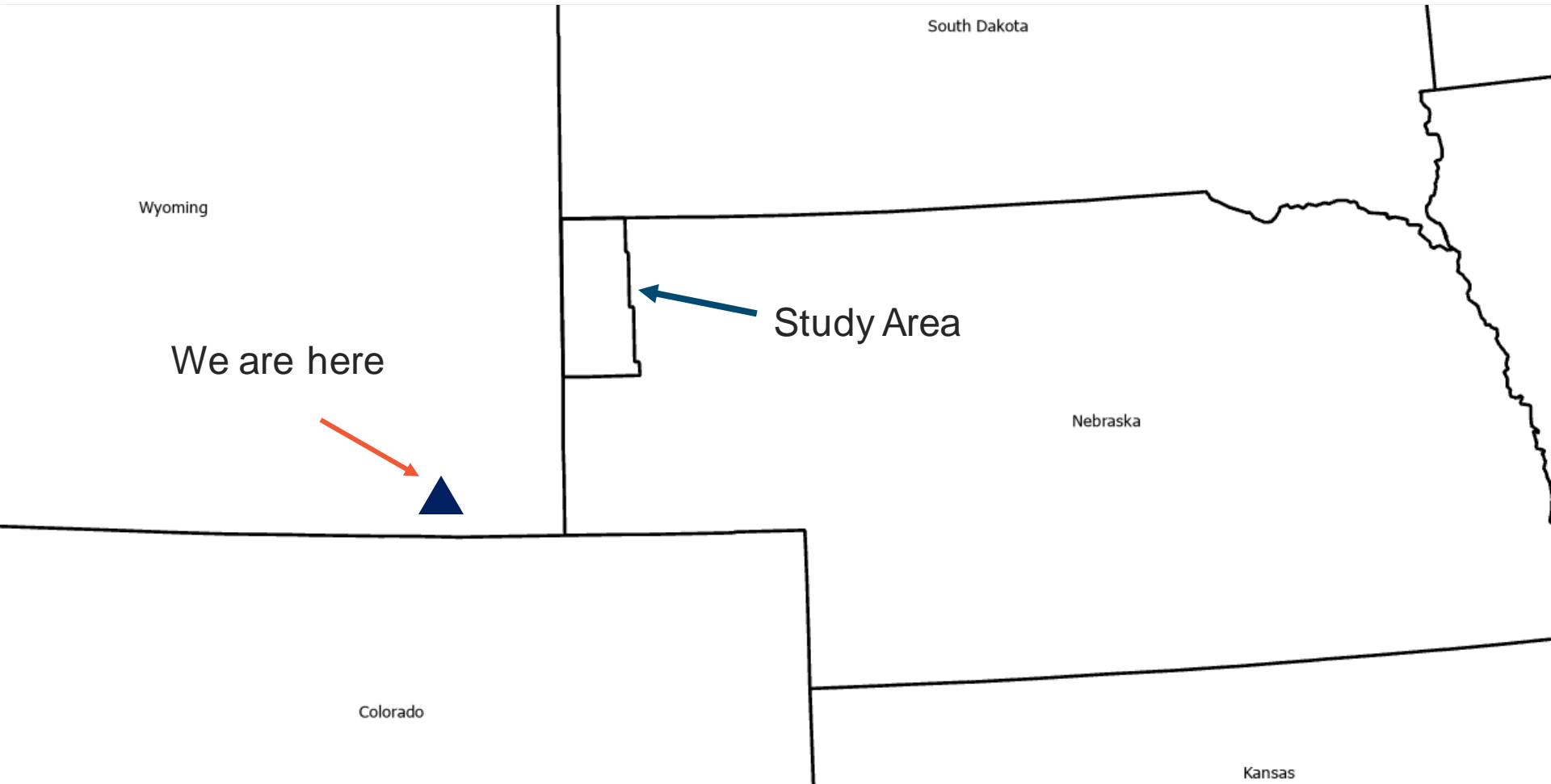


## Nebraska Plan

One main objective of TBLO conservation plan and research projects going forward: **“Evaluate Breeding Distribution”**

*“Develop and maintain testable spatial models showing areas of importance (and opportunity) which incorporate pertinent variables that can be revised as new information is acquired.”*

**First Task: “Evaluate Breeding Distribution”**



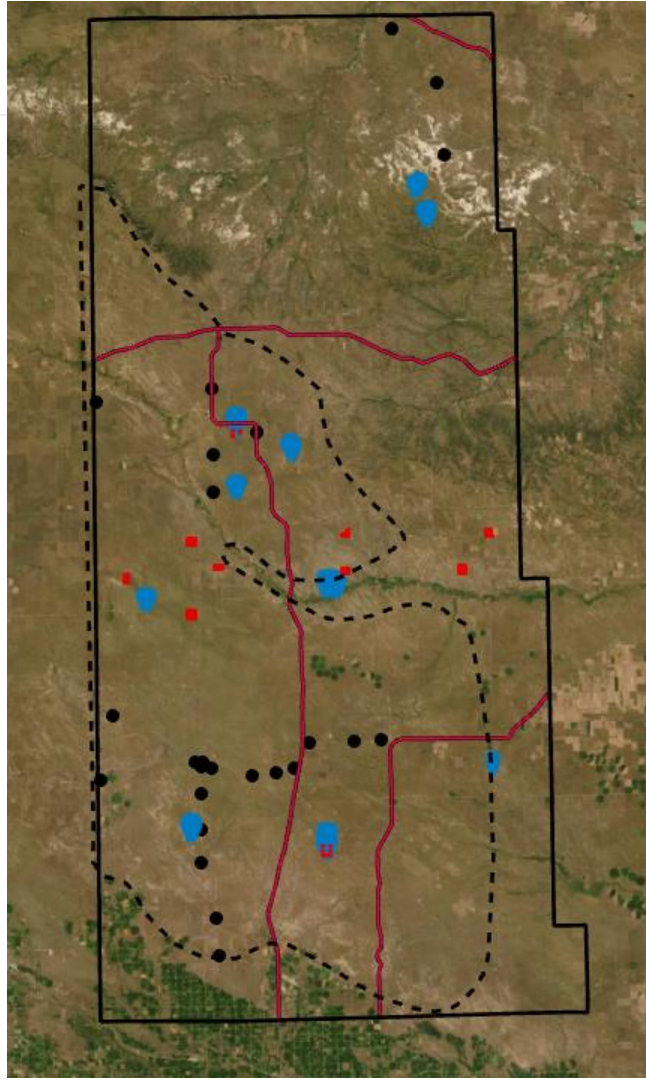
## Distribution Model Data

**Black = 2022**

**Red = 2021**

**Blue = 2020**

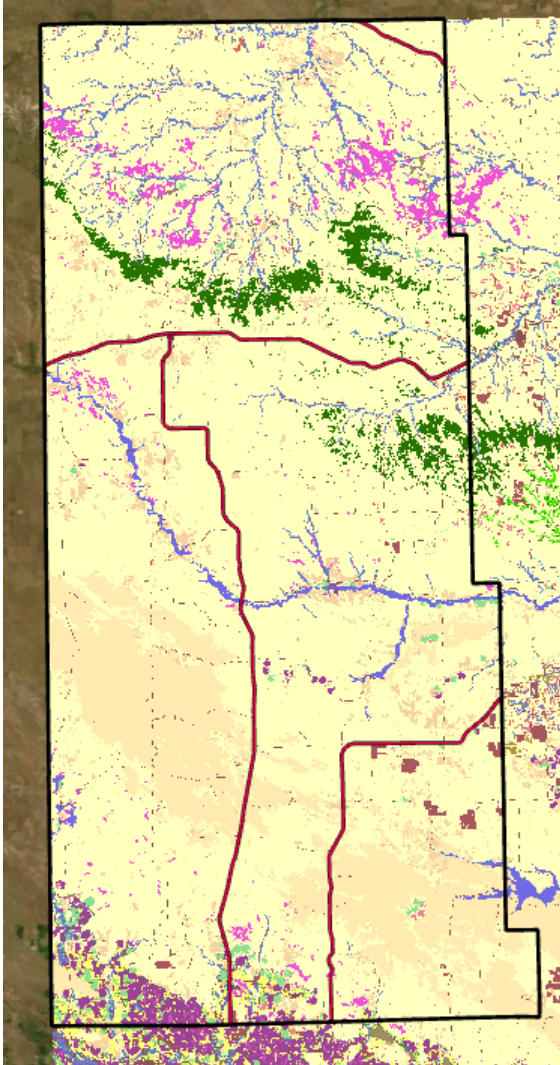
Dashed = Birds of  
Nebraska Online predicted  
TBLO distribution

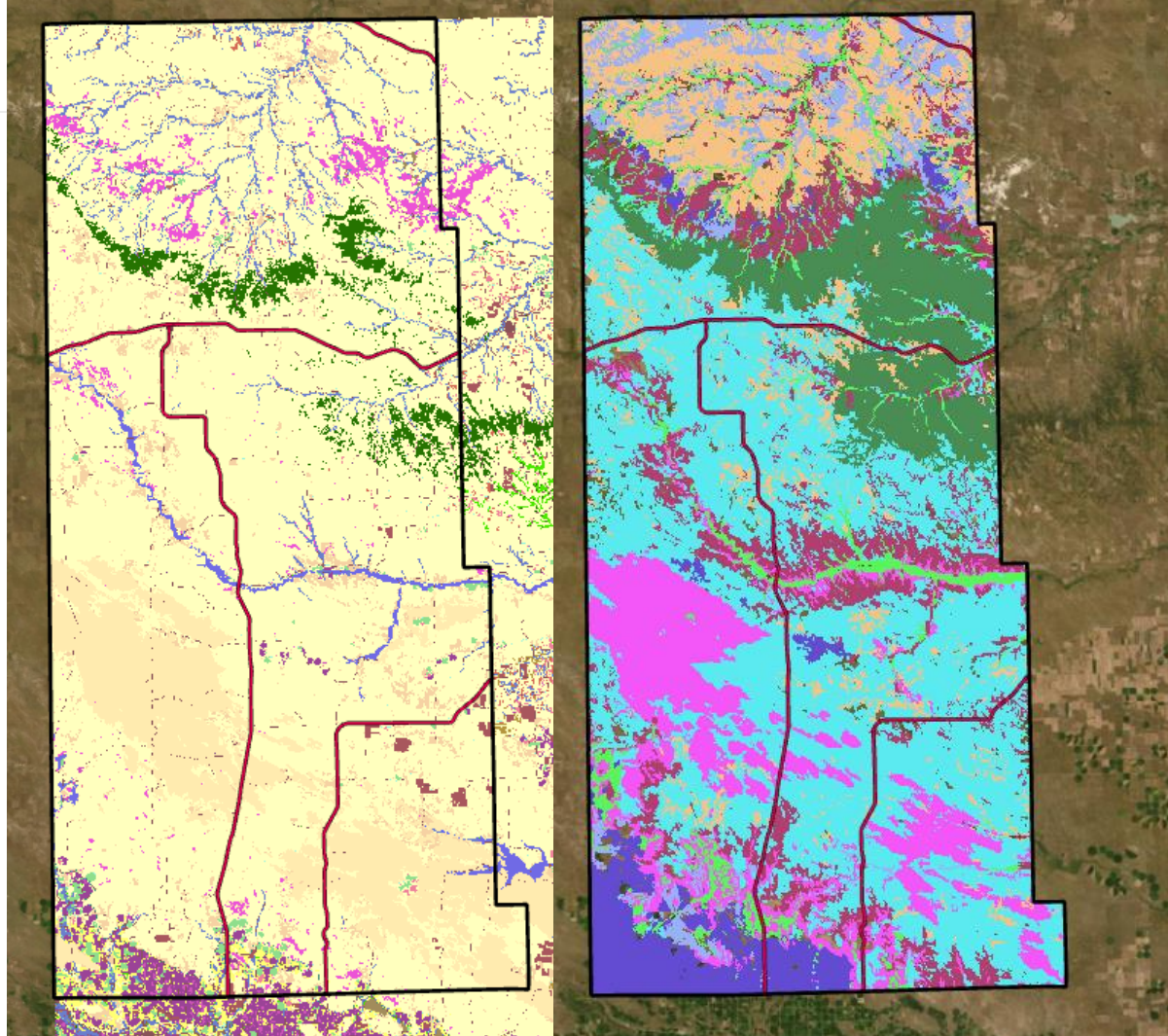




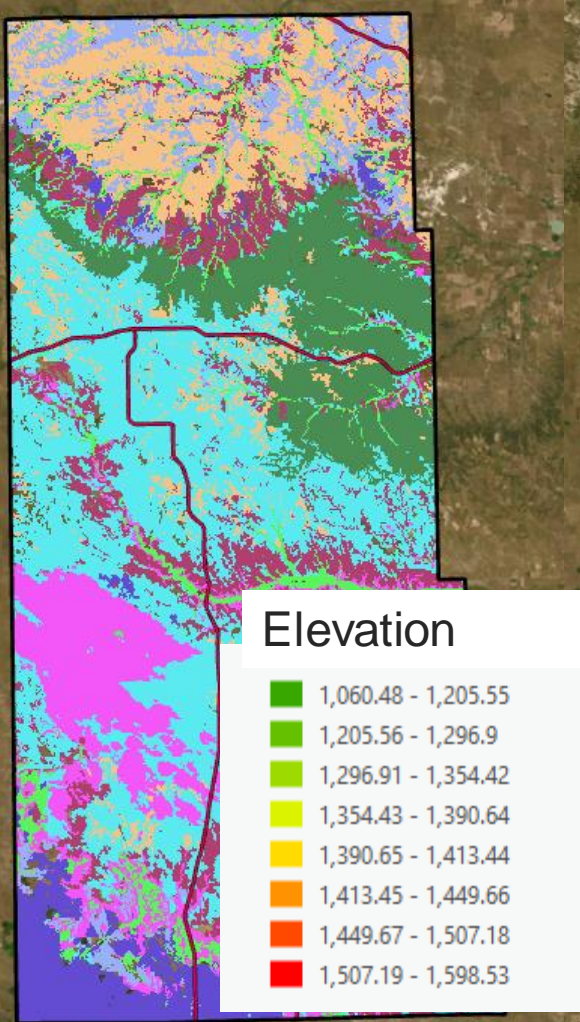
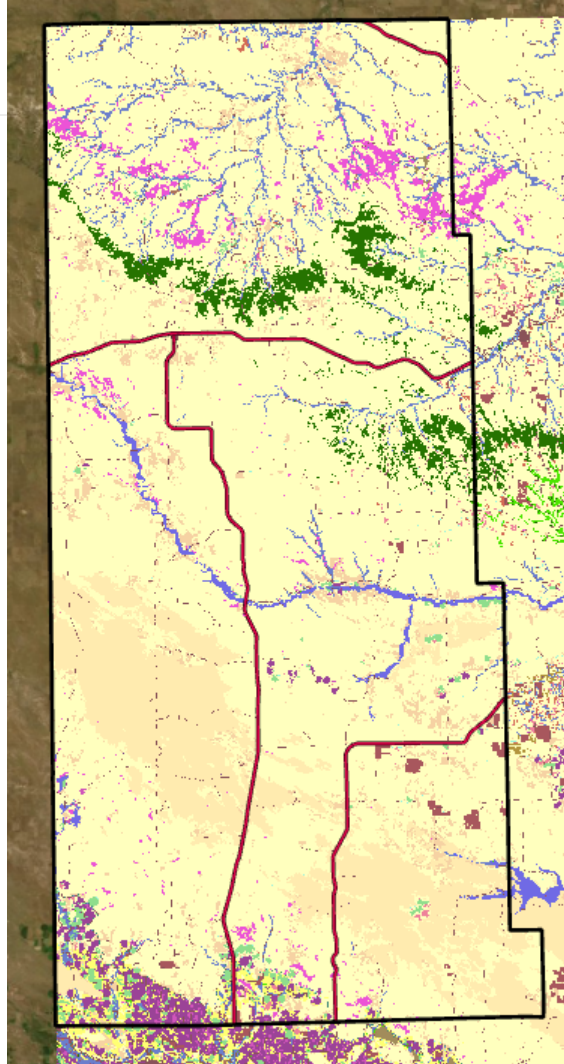
## Landcover

Yellow/beige= grassland  
Green = pine forest

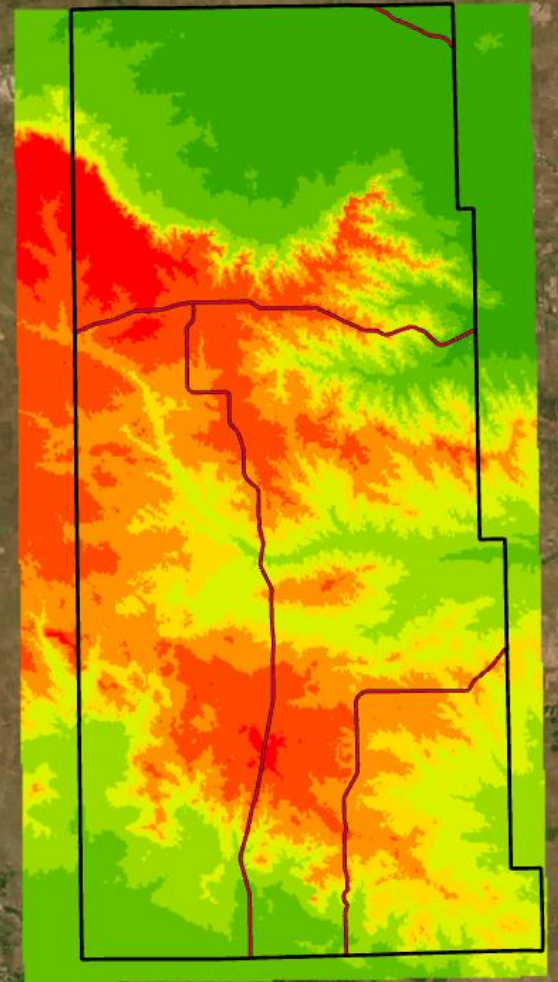
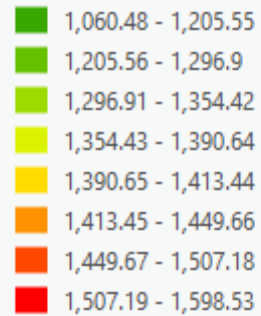








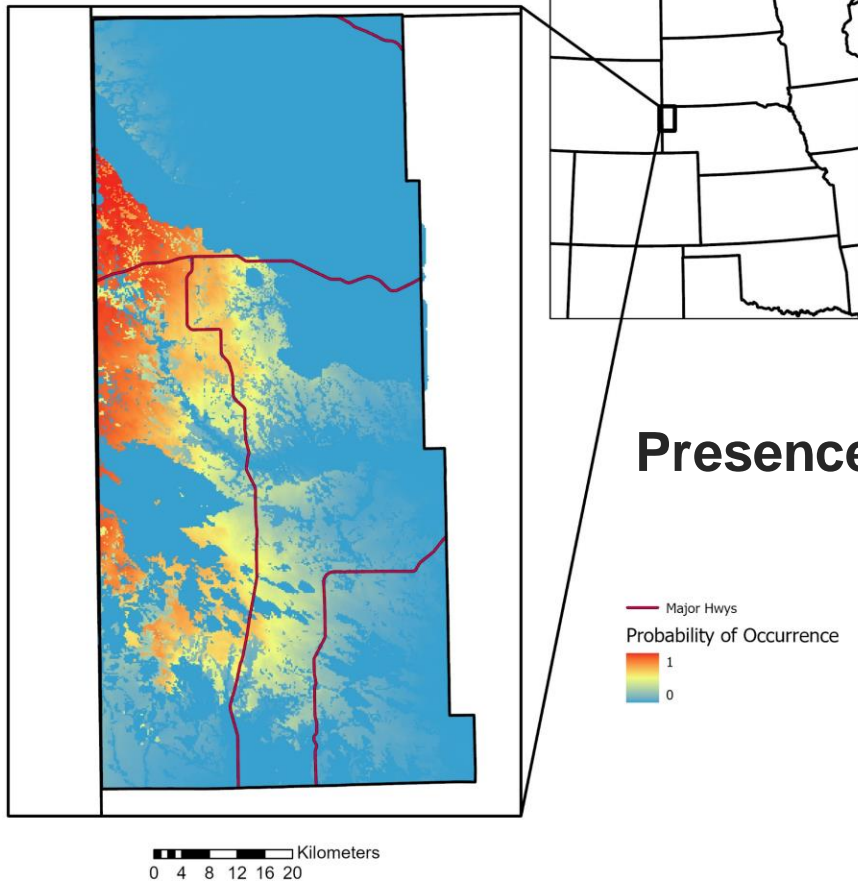
## Elevation



Created Multiple Spatial  
Distribution Models for  
northwest Nebraska

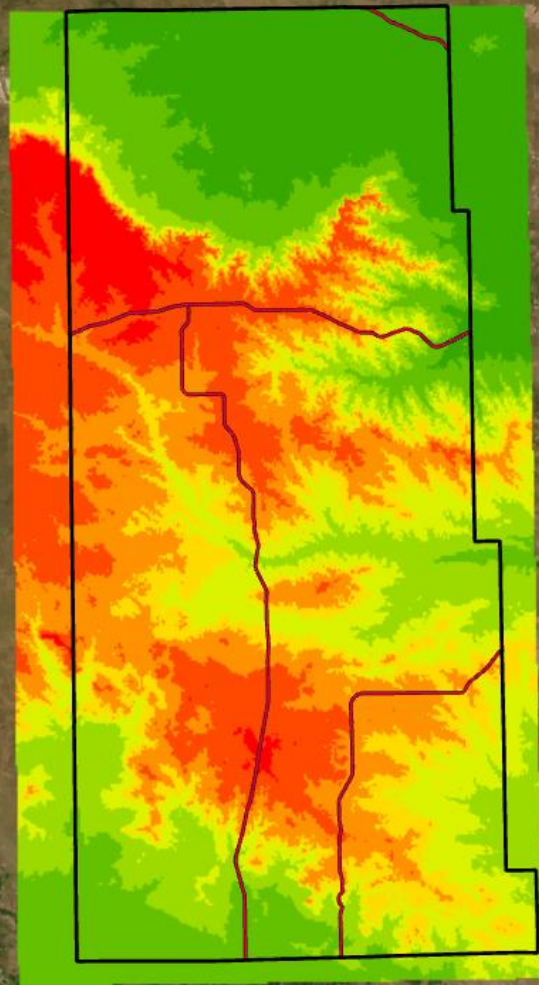
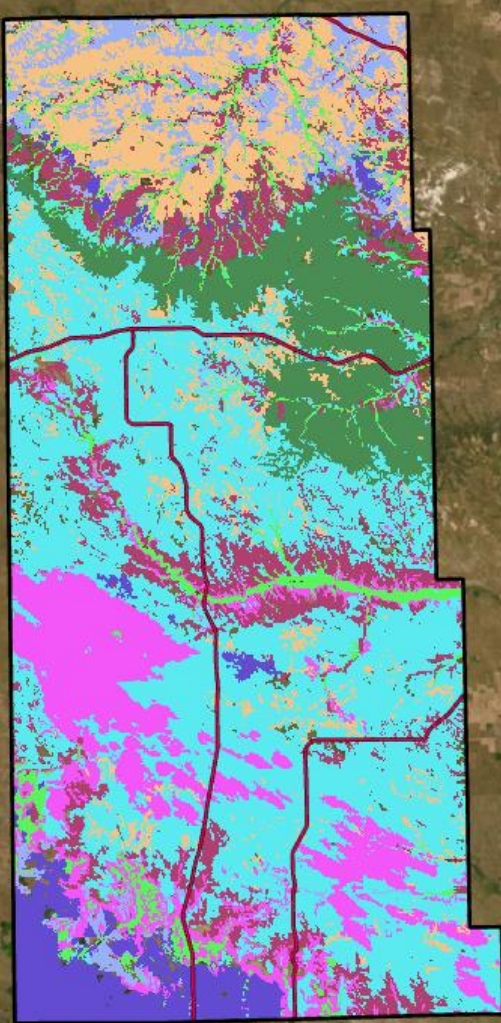
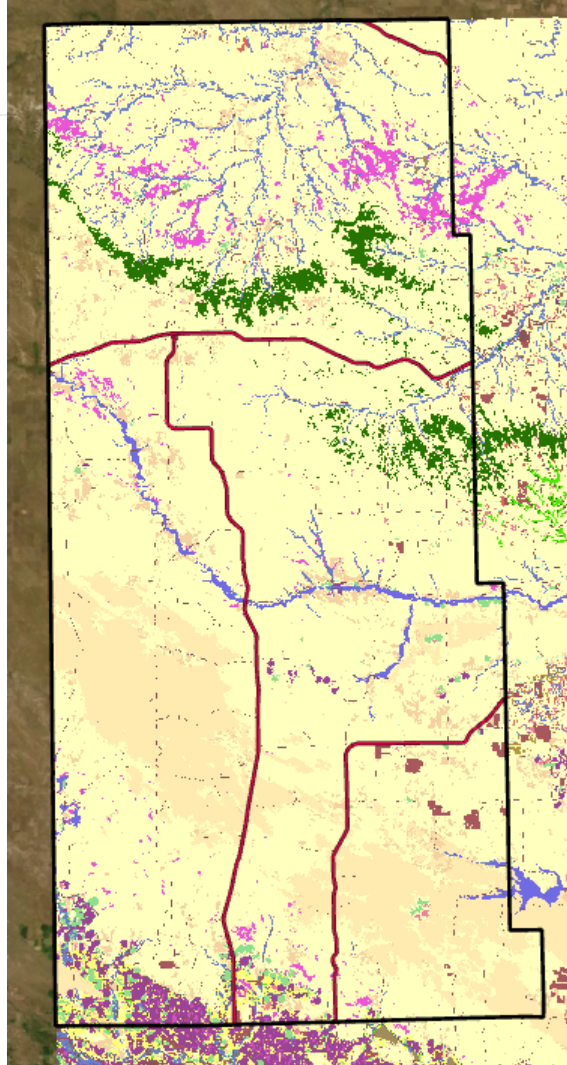
Biggest model effects:

- Soil** (avoid sand)
- Elevation** (higher and flat)



**Presence-Absence**

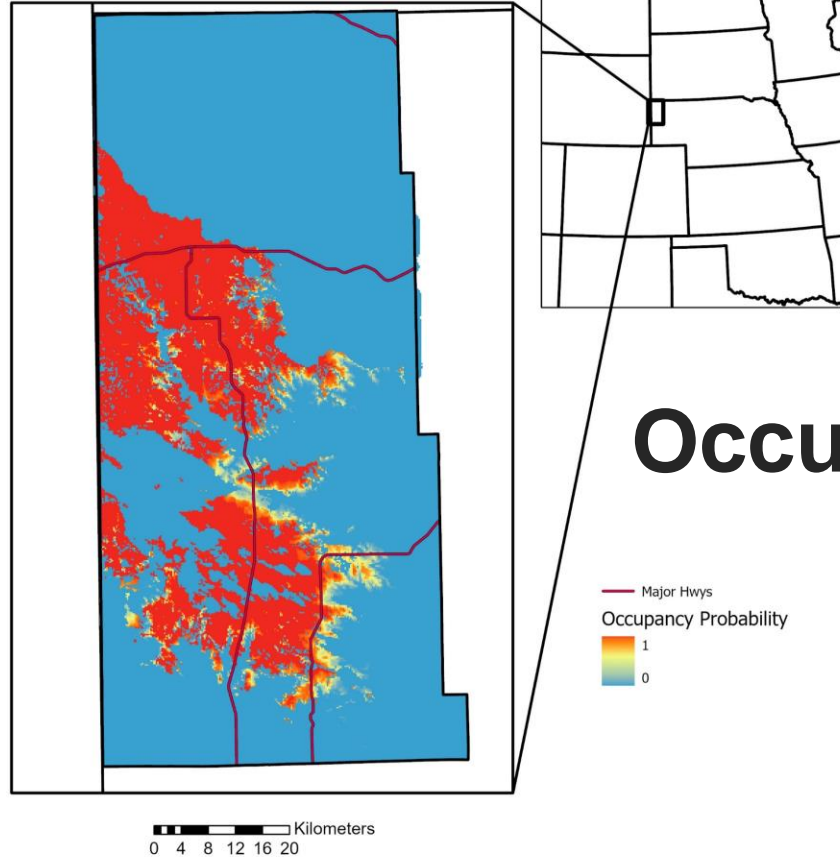






2<sup>nd</sup> Model – Similar  
results

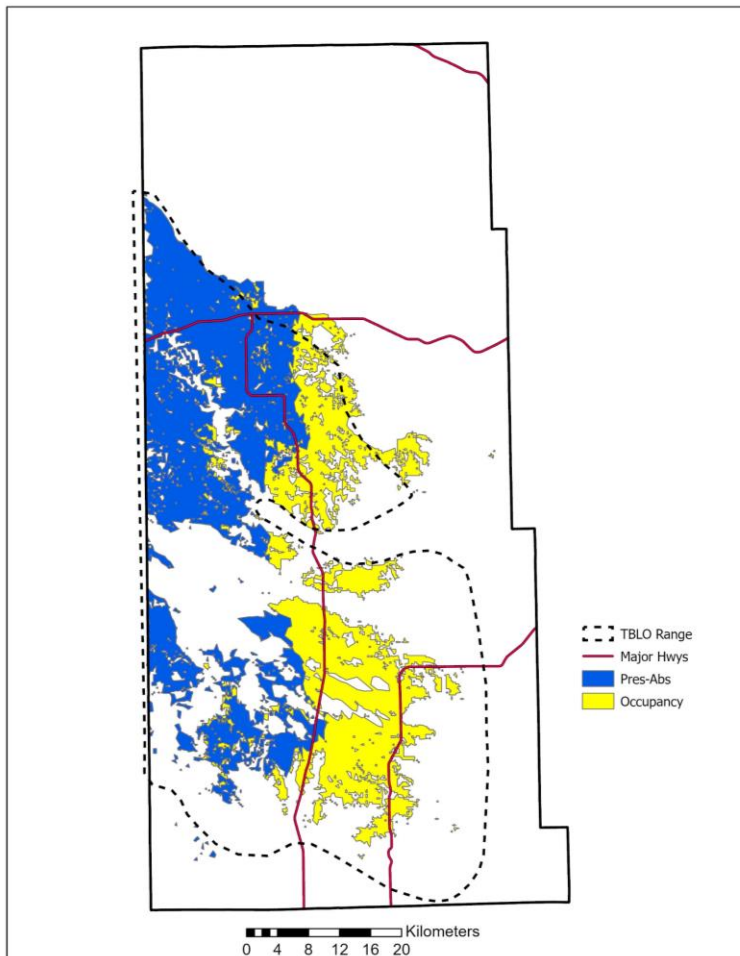
Biggest model effects:  
-**Soil**  
-**Elevation**



# Occupancy

# Combined/Highest-Confidence

**Overlap of both models =**  
highest confidence of NE  
distribution



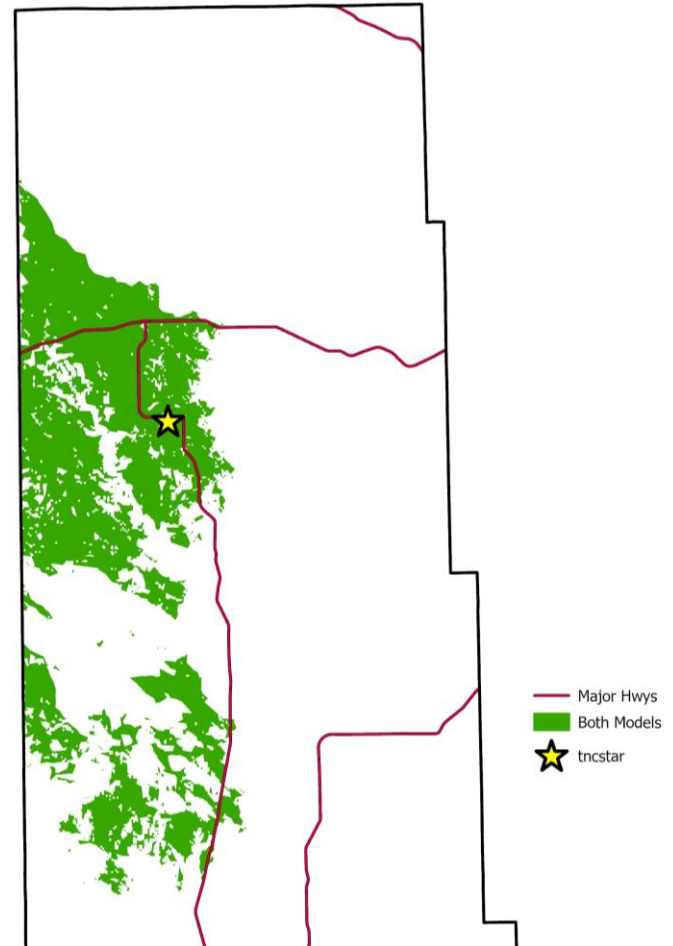
## Use of Distribution Model

Updated range (and population size)  
in the state

Connect landscape features to  
occurrence:

**Edge of Range:** high elevation,  
flat loam soils

Target areas for further research





## **Breeding Project**

**Conservation Working Ranch in  
northwest Nebraska**

**‘Shortish’-grass prairie to some,  
Mixed-grass prairie to others**

**2<sup>nd</sup> phase conservation plan**





## **Objectives**

**Breeding demography – no focal studies in native grasslands of species in Nebraska**

**Nest site characteristics?**





## Nesting/Breeding Results

**5 TBLO nests in 8 territories:**  
*(2 successful, 2 fail, 1 unclear)*

**3 CCLO nests in 4 territories: all fail** *(but likely renesting late)*

**Predation high, TBLO % close to other studies in range**

**Nest dates: 15 May – 23 June**



## **Nesting Results**

**Nest site selection appeared  
different by species**

**TBLO: shorter vegetation and more %  
bare ground**

**CCLO: taller grass, more plant  
coverage**





**Thick-billed**



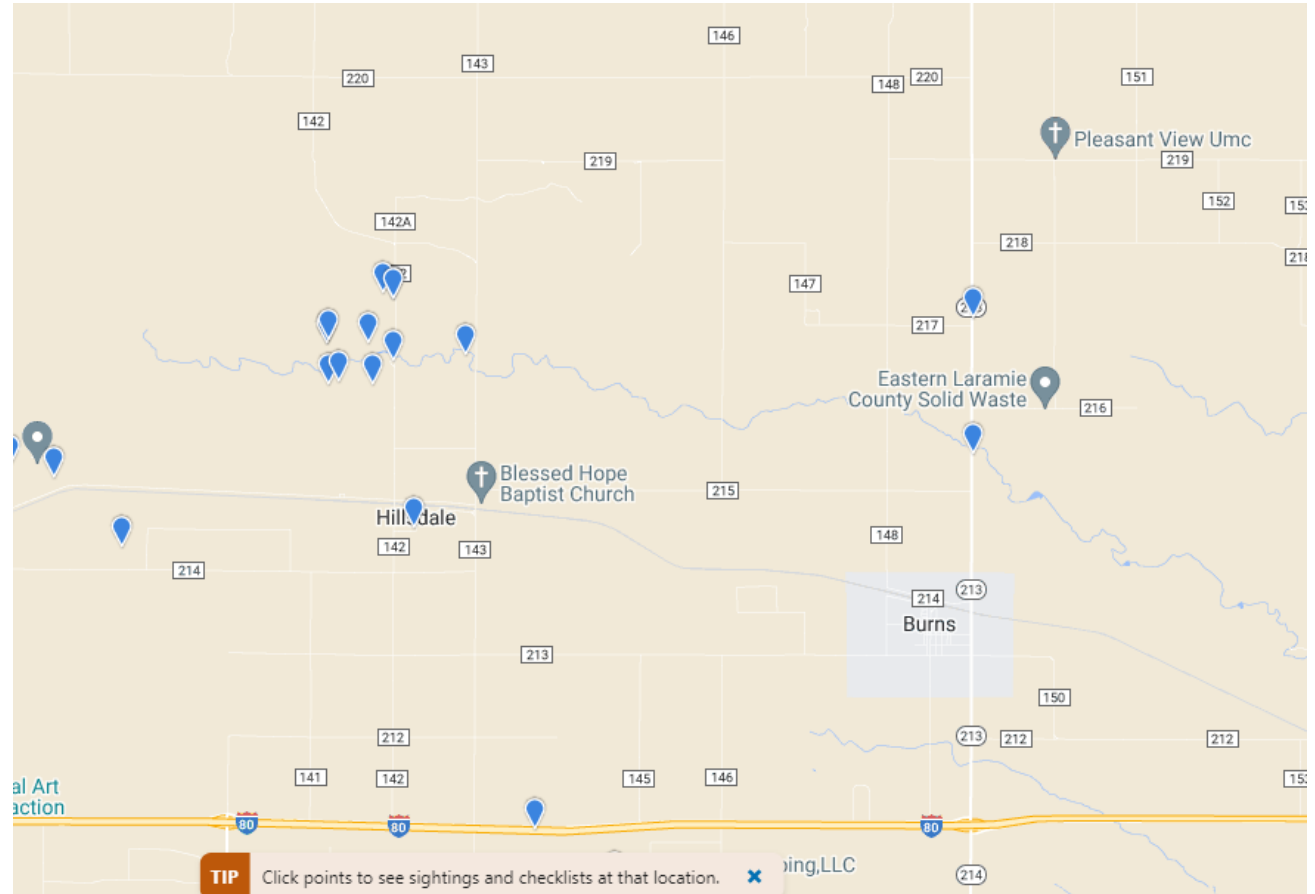
**Chestnut-collared**







# Wyoming!





**Wyoming!**





**Lots of territories, majority  
TBLO**





**Excellent site, active nesting**

## Overview - Longspurs

**Restricted range in Nebraska,  
but breeding ‘colonies’ present  
in right conditions**





## Overview - Longspurs

*Restricted range in Nebraska, but  
breeding 'colonies' present in right  
conditions*

**Marginal success nesting,  
multiple nest attempts, overlap  
with CCLO**





## Overview - Longspurs

*Restricted range in Nebraska, but breeding 'colonies' present in right conditions*

*Marginal success nesting, multiple nest attempts, overlap with CCLO*

**Very compatible with grazing**



## Overview - Longspurs

*Restricted range in Nebraska, but breeding 'colonies' present in right conditions*

*Marginal success nesting, multiple nest attempts, overlap with CCLO*

*Very compatible with grazing*

**Not 'build it they will come', perhaps 'maintain and they will stay'**



# Other Projects: Birds on the Edge in Nebraska

# Declines of Black-billed Magpie (*Pica hudsonia*) and Black-capped Chickadee (*Poecile atricapillus*) in the north-central United States following the invasion of West Nile virus

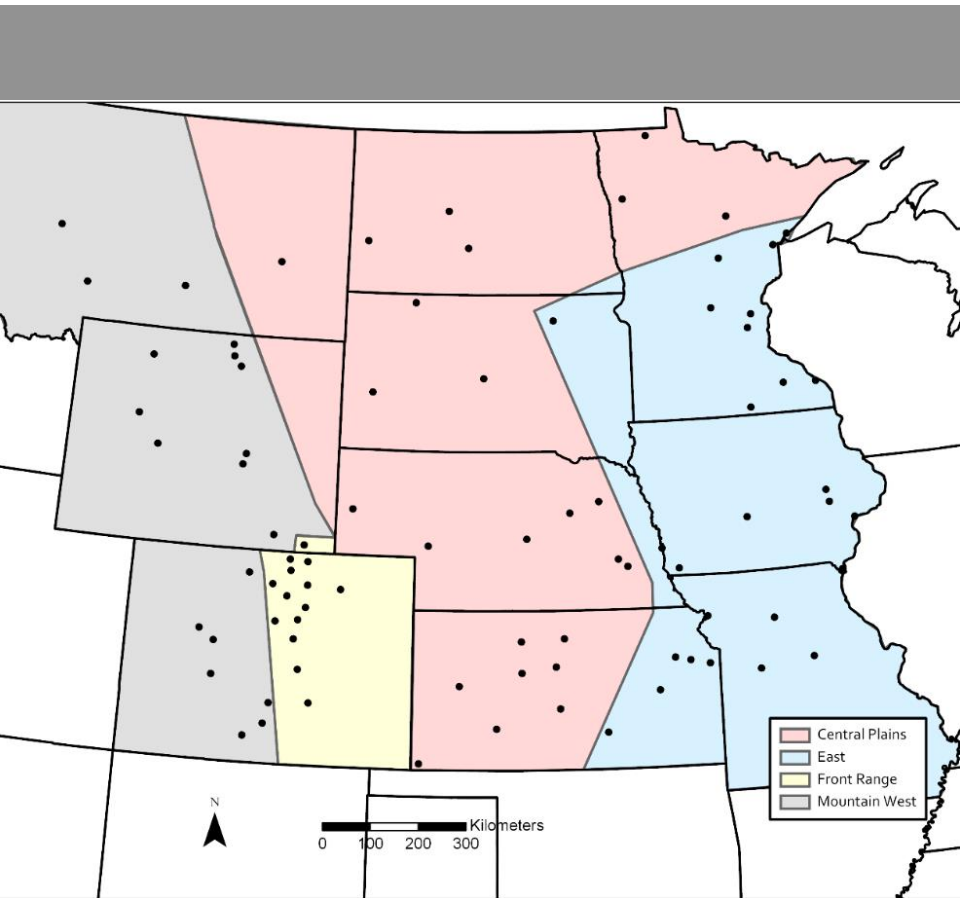
Stephen Brenner and Joel Jorgensen

Nebraska Game and Parks Commission, Nebraska Audubon

*Published in Western North American Naturalist: July 2020, 80:204-214*



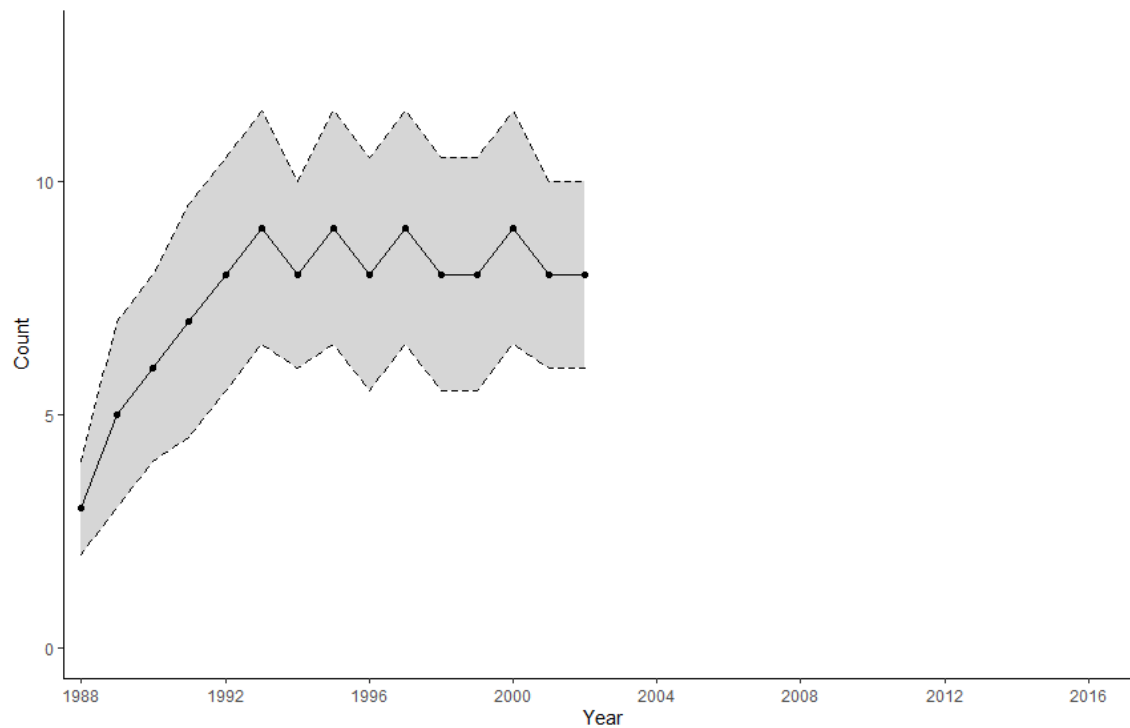




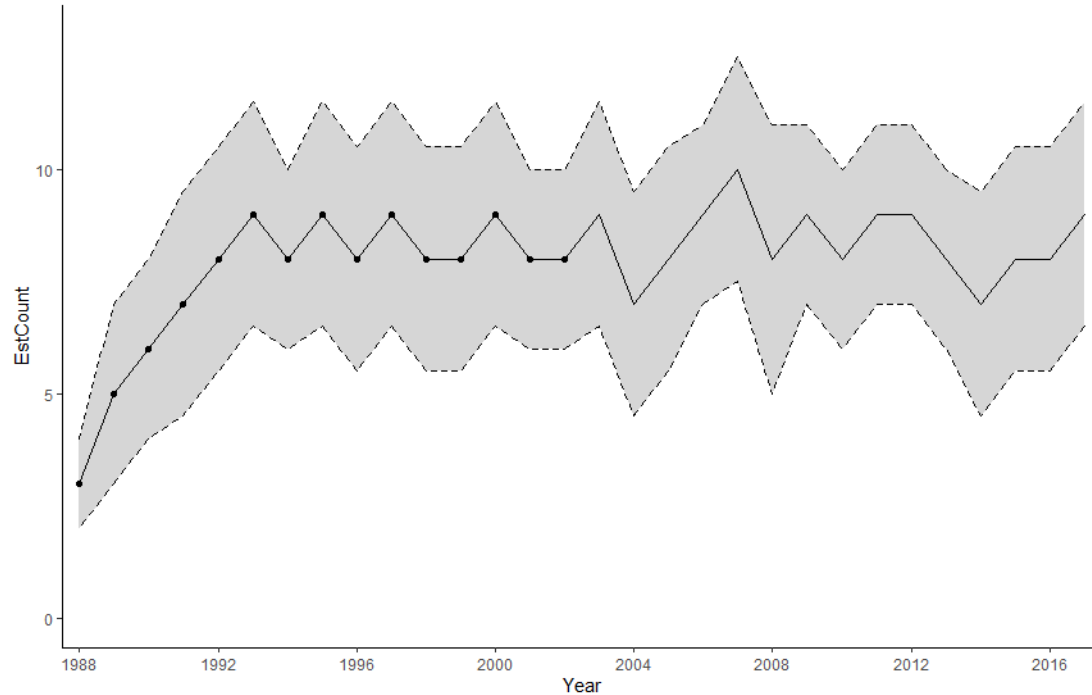
## Modeling Christmas Bird Count (CBC) data

Estimated relative abundance of Black-billed Magpie and Black-capped Chickadee using a Loglinear Hierarchical Bayesian model for years 1988-2017

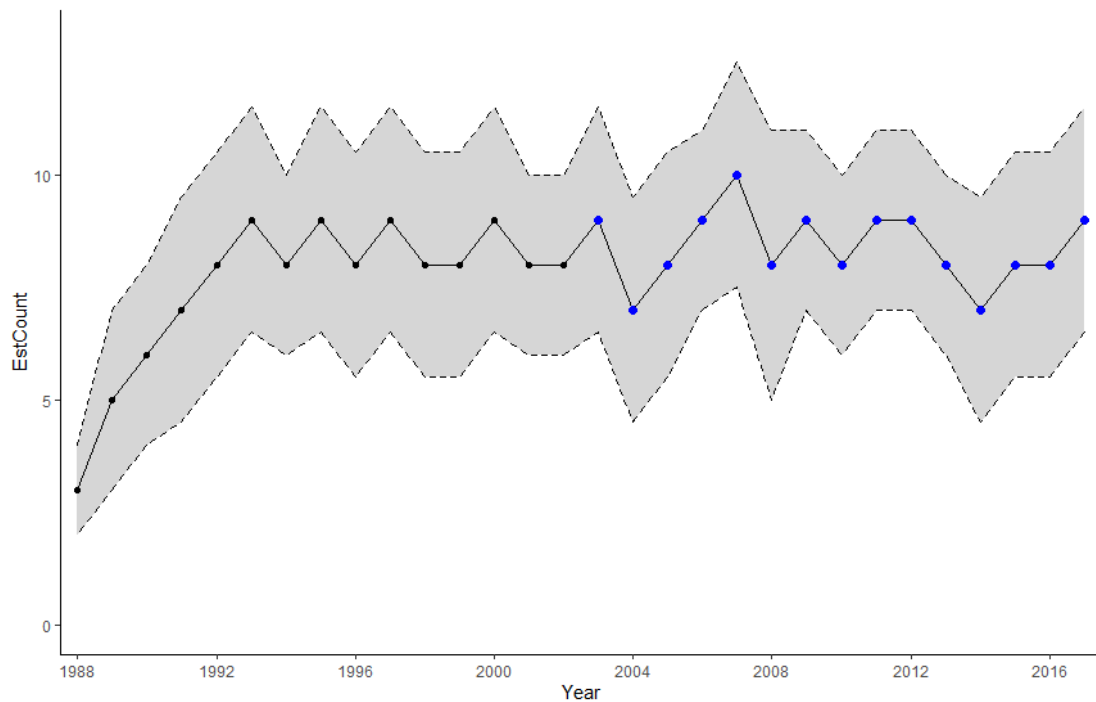
## Actual Counts From Pre-WNV



## Projected range of counts post-WNV given trends from pre-WNV

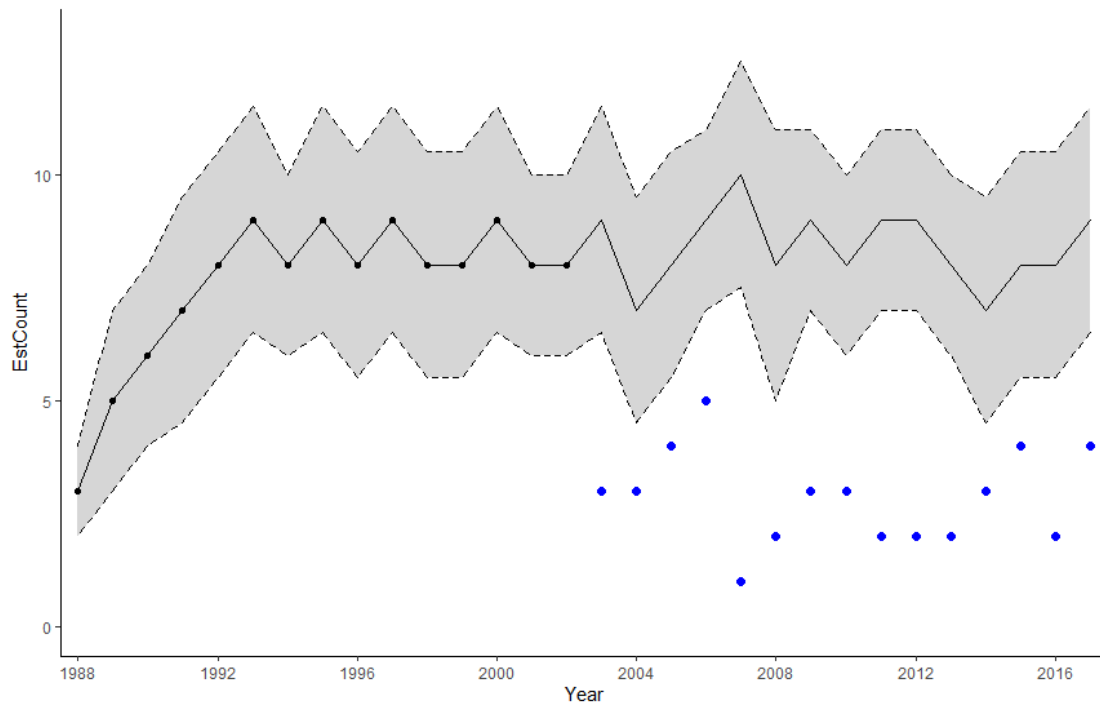


If actual counts (**blue**) post-WNV fall within projected range, likely no WNV impact

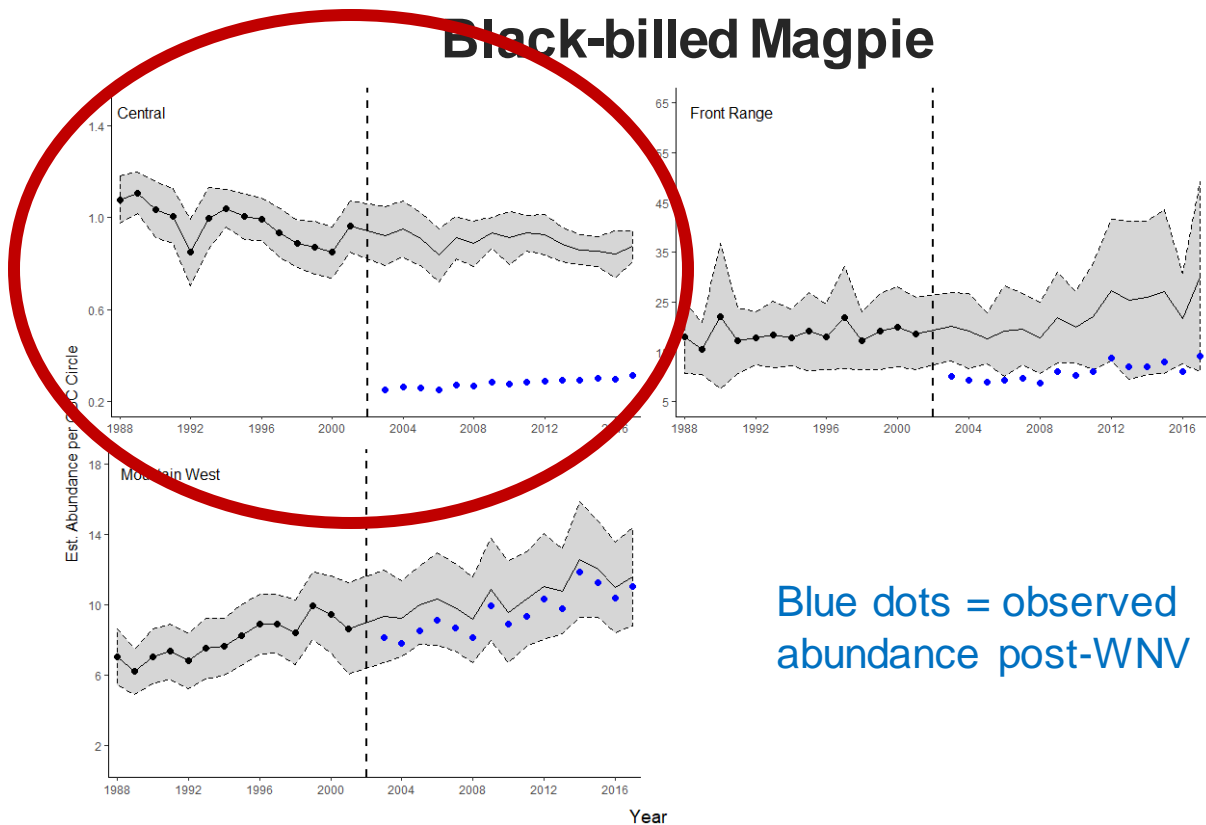




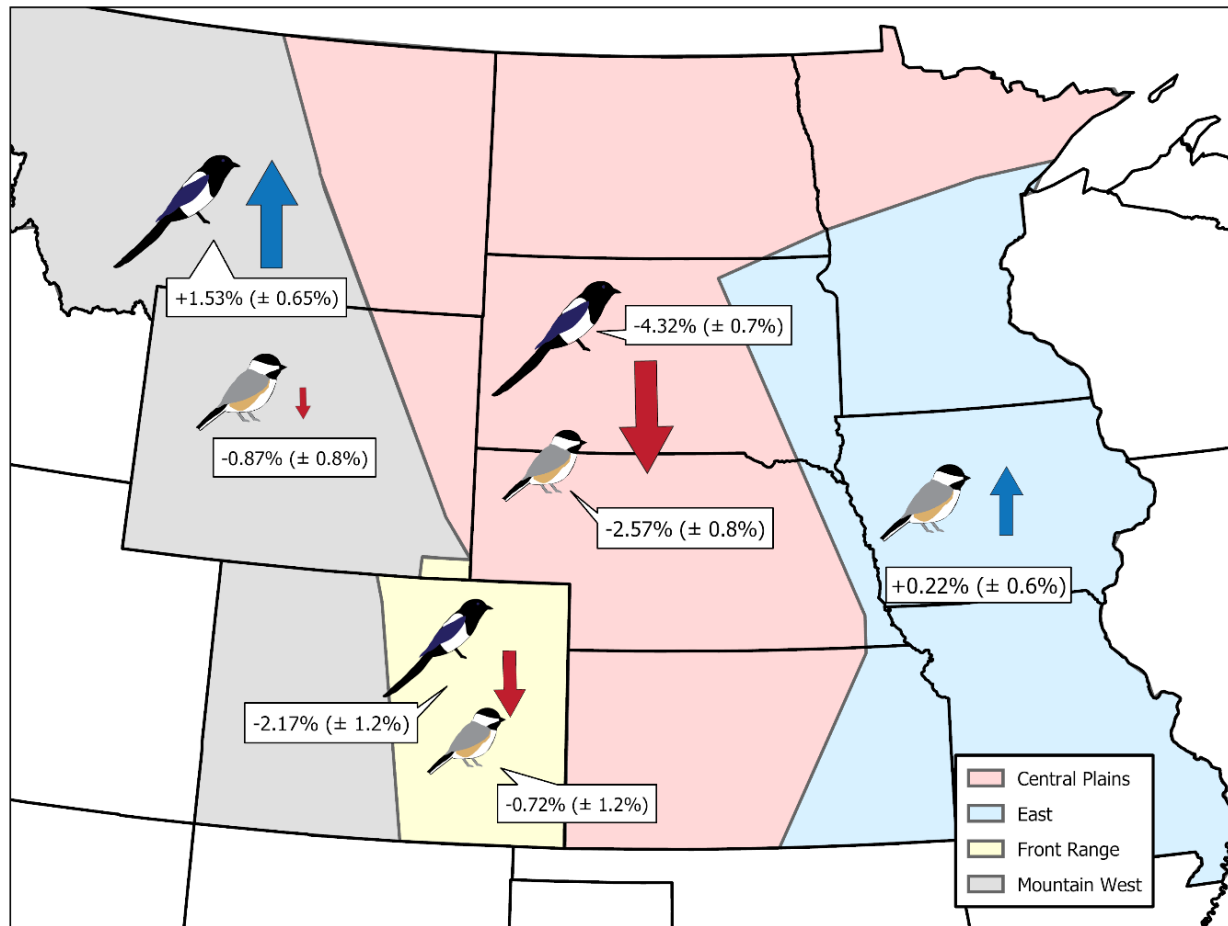
If actual counts (**blue**) post-WNV fall outside projected range,  
likely negative WNV impact



# Black-billed Magpie

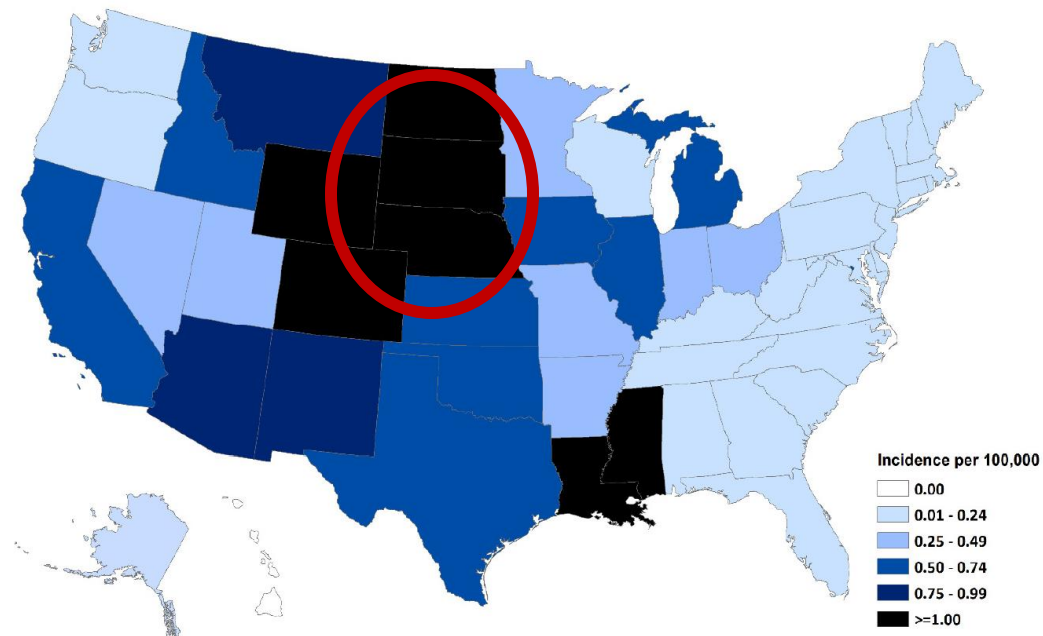


## Annual change winter abundances





**Average annual incidence of West Nile virus neuroinvasive disease reported to CDC by state, 1999-2018**



Source: ArboNET, Arboviral Diseases Branch, Centers for Disease Control and Prevention



## American Woodcock

‘The outsiders’ – GPS tracking in Nebraska

## Woodcock research in Nebraska?

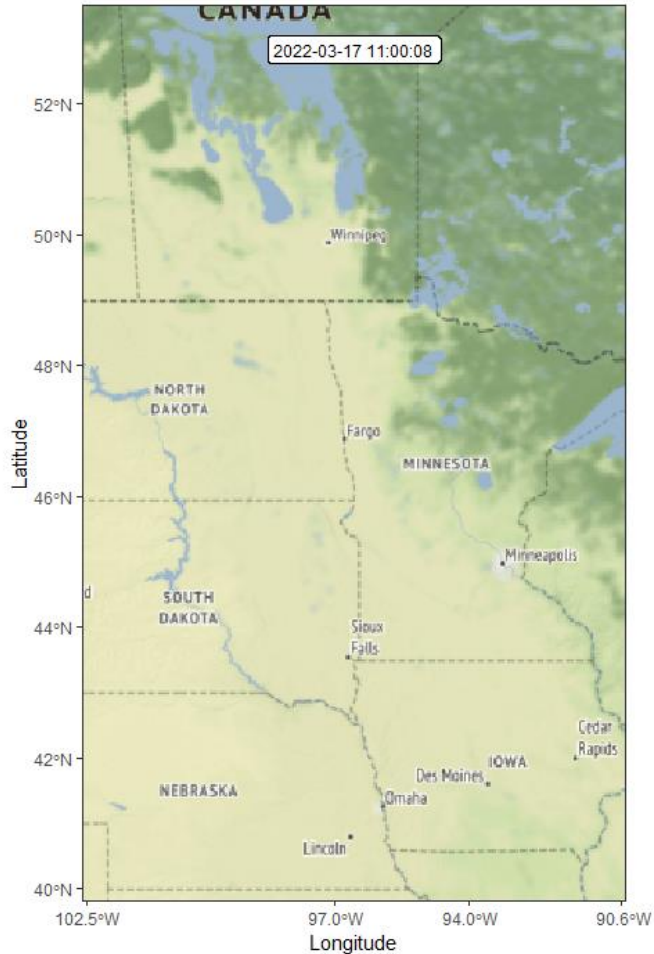
Eastern and central North America core of range

- Moving into Great Plains, Woodcock are often 'left-out' of range-wide surveys/population considerations
- Early-successional forest obligate in the prairies?



**Fig. 1.** Woodcock management regions, breeding range, and Singing-ground Survey coverage.





## Stopover, Migration and habitat selection in Nebraska

**Sites in Great Plains serve as ‘ephemeral breeding grounds’**

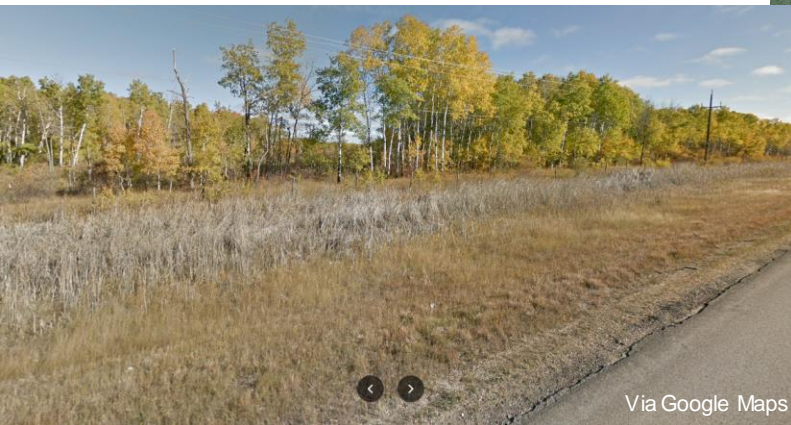
**Limited summer holdovers, limited successful breeding**

**Majority ‘western’ migration, breeding, and wintering**

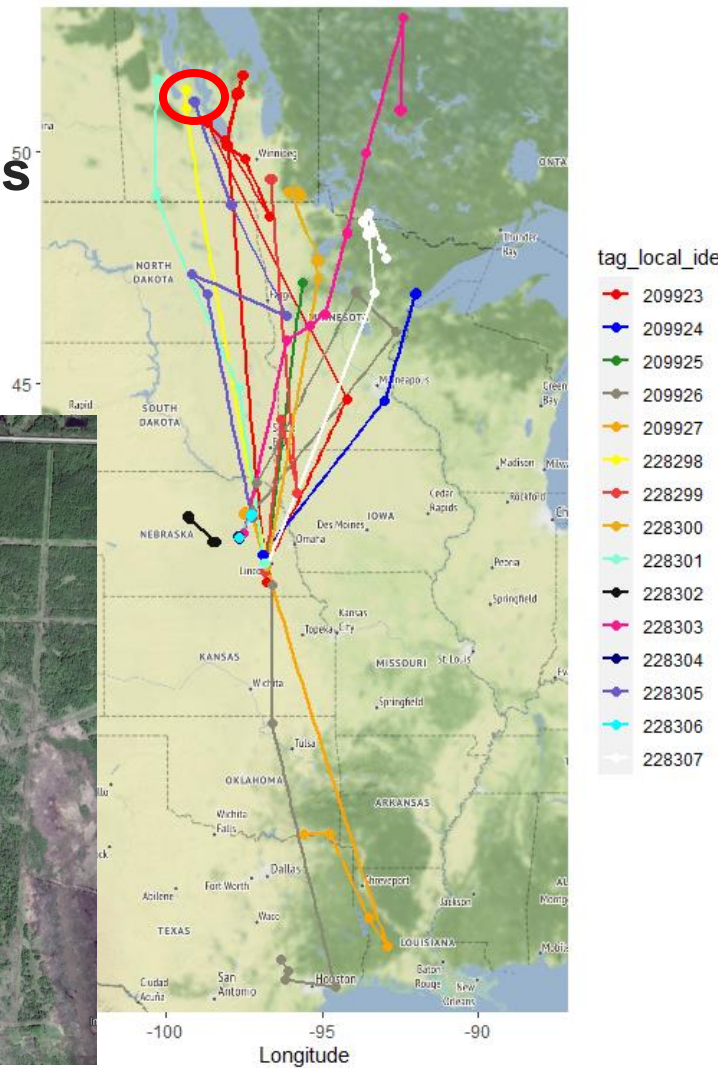
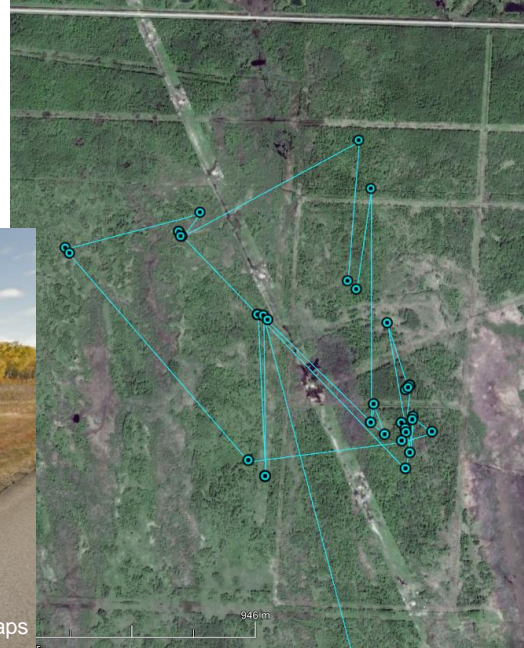
*Brenner and Jorgensen 2023; Wader Study (1) and Journal of Canadian Zoology (2)*

# Forest Bird – Standard issue for north migrants

**Migratory/Northern Birds:** Remain within relatively condensed home ranges (i.e. 1km<sup>2</sup>) and in ‘typical’ habitat: moist forests and forested openings/shrubby clearings



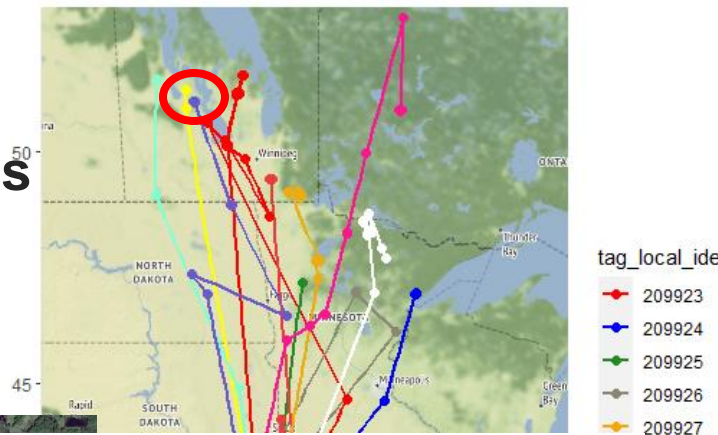
Via Google Maps



## Forest Bird – Standard issue for north migrants

**Migratory/Northern Birds: Remain within relatively condensed home**

We collected data on site-level forest structure at 1,709 woodcock locations that we incorporated into the following ground data summary. Collectively, migrant and wintering woodcock were found in forested cover at 91.15% of diurnal locations with the remainder found in potential roost fields, residential backyards, and in scrub-shrub. The proportion

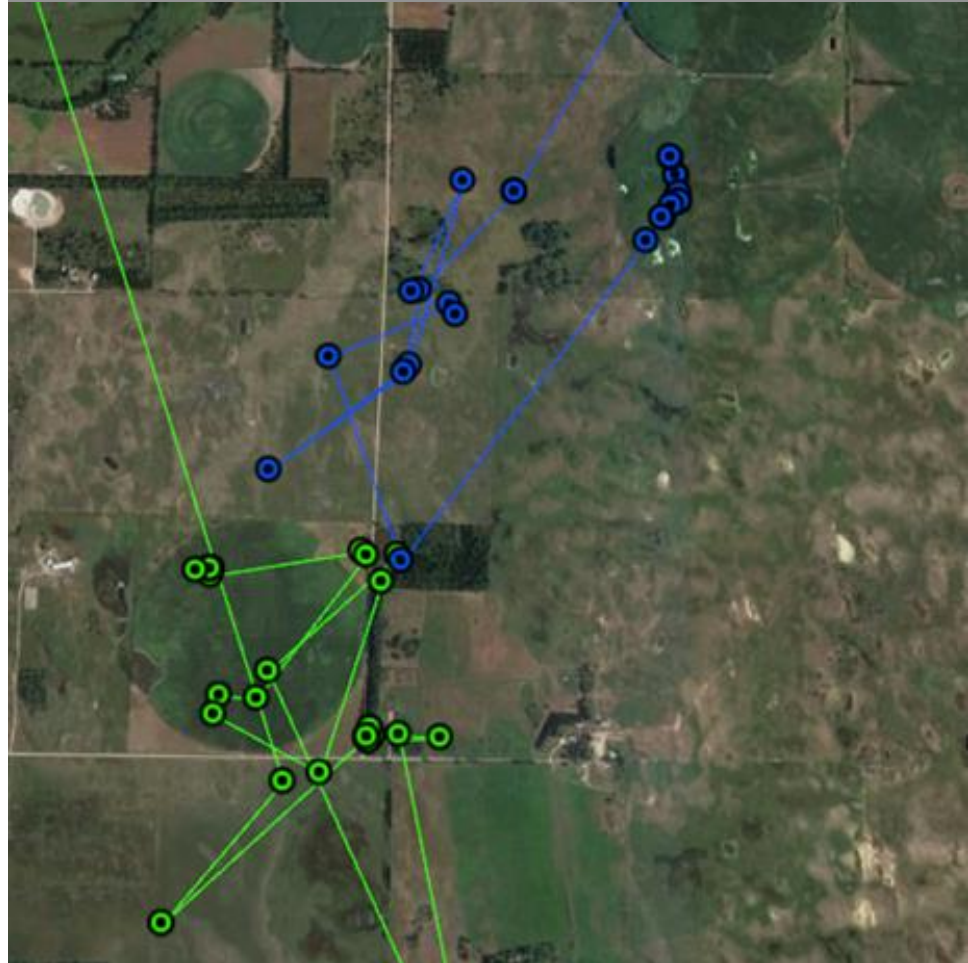




## Forest-bird, prairie lifestyle?

Atypical habitat use: grasslands and **irrigated agricultural fields**

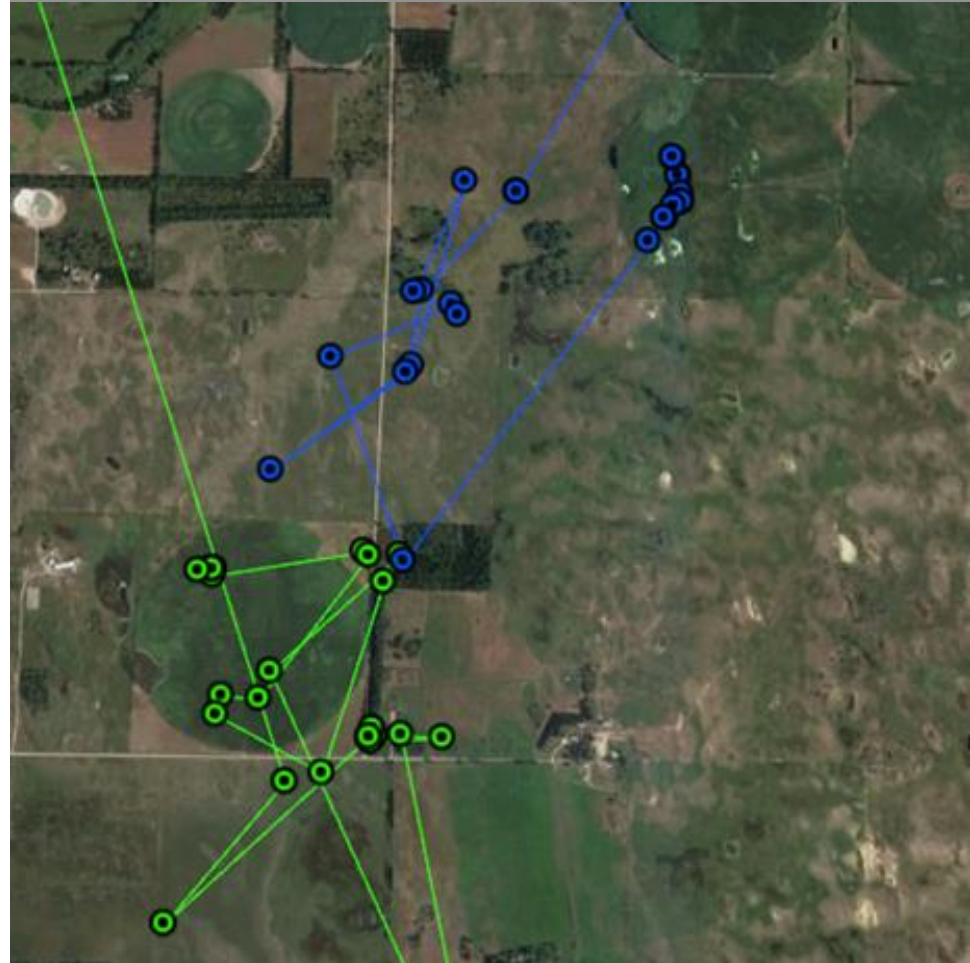
In Nebraska, **46% of diurnal locations** were in irrigated agricultural fields



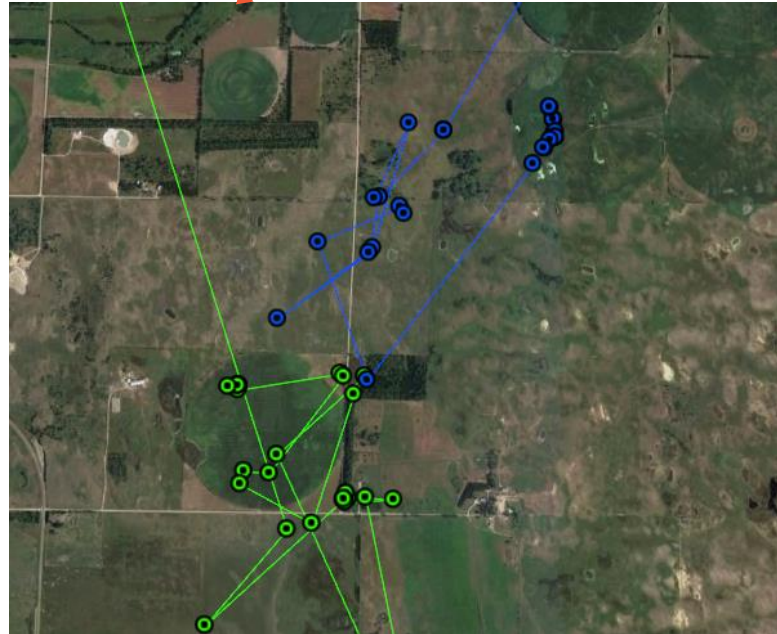
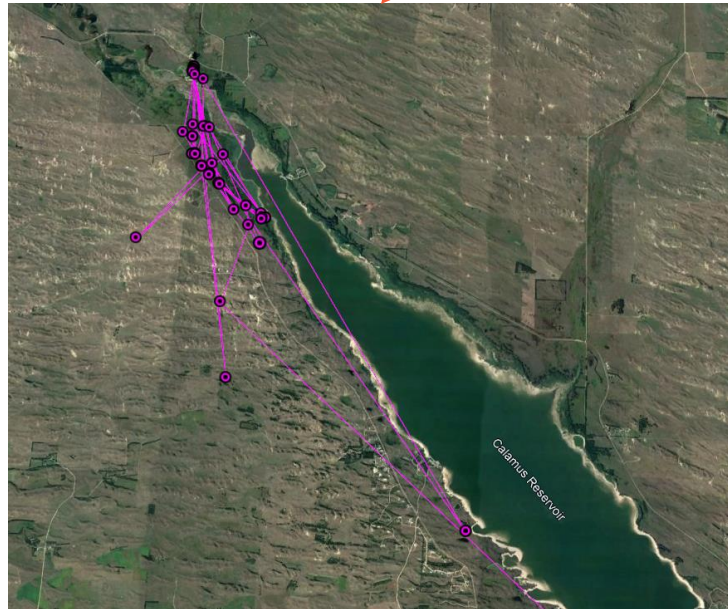
## Forest-bird, prairie lifestyle?

Atypical habitat use: grasslands and **irrigated agricultural fields**

Woody encroachment + human modification to landscape = beneficial to woodcock, likely a signal of **functional shift away from grassland**



## WHAT DOES THIS MEAN FOR GRASSLAND ECOSYSTEMS?





# WHAT DOES THIS MEAN FOR GRASSLAND ECOSYSTEMS?



Thank you so much!

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<https://greatplains.audubon.org>







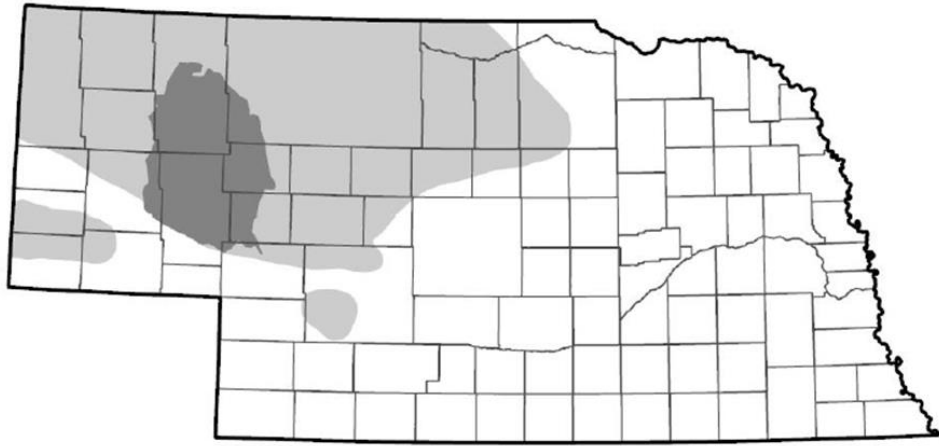
Questions?



## Long-billed Curlew Monitoring

- Long-term monitoring program in core of Nebraska range (Sandhills)
- Completed every ~5 years to track trends



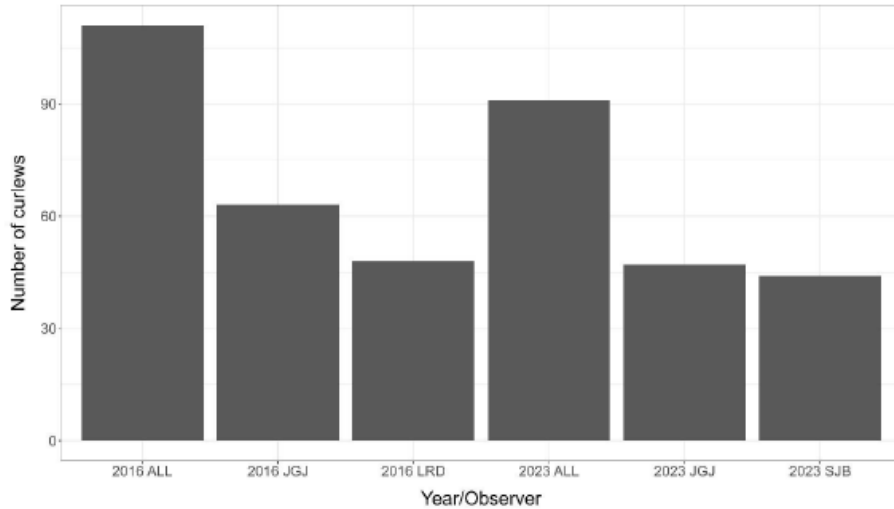


**Figure 1.** The study area (dark gray) within the current Long-billed Curlew breeding range (light gray) in Nebraska (Silcock and Jorgensen 2023).

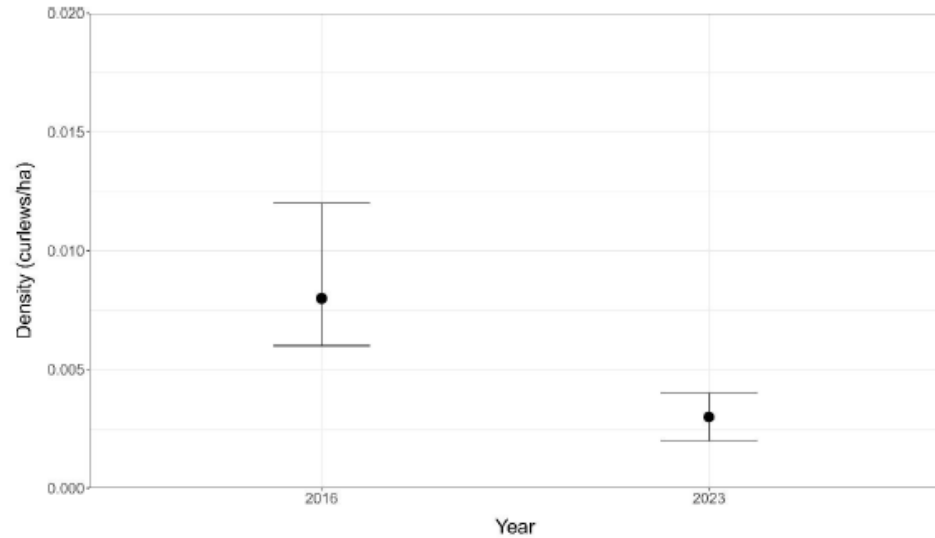
**Study area – highest  
densities in state/core range**

**Sandhills = Largest contiguous  
grassland in N. America**





**Figure 2.** Total number of Long-billed Curlews detected by year by both observers (ALL) and total number detected by observer by year.



**Figure 3.** Long-billed Curlew estimated density in the Sandhills study area by year. Points represent mean density estimate and error bars represent 95% lower and upper confidence limits.

**Declines from 2016...concerning trend,  
or weather?**