USDA Natural Resources Conservation Service
U.S. DEPARTMENT OF AGRICULTURE

Emerging findings on the effects of cover crops on grassland birds

Conservation Outcomes Webinar Series

FARM PRODUCTION AND CONSERVATION
FSA | NRCS | RMA | Business Center

Outline

- What is a **cover crop**?
- What do **cover crops** do?
- Recent CEAP Research on **cover crops** and **birds**

Iowa breeding birds
2019-2021

Tennessee breeding and
non-breeding birds
2021-2022

What is a **cover crop**?

USDA United States Department of Agriculture

Conservation Practice Standard Overview

Cover Crop (340)

Cover crop is growing a crop of grass, small grain, or legumes primarily for seasonal protection and soil improvement.

Practice Information

Cover and green manure crops are grown on land where seasonal or long-term benefits of a cover crop are needed.

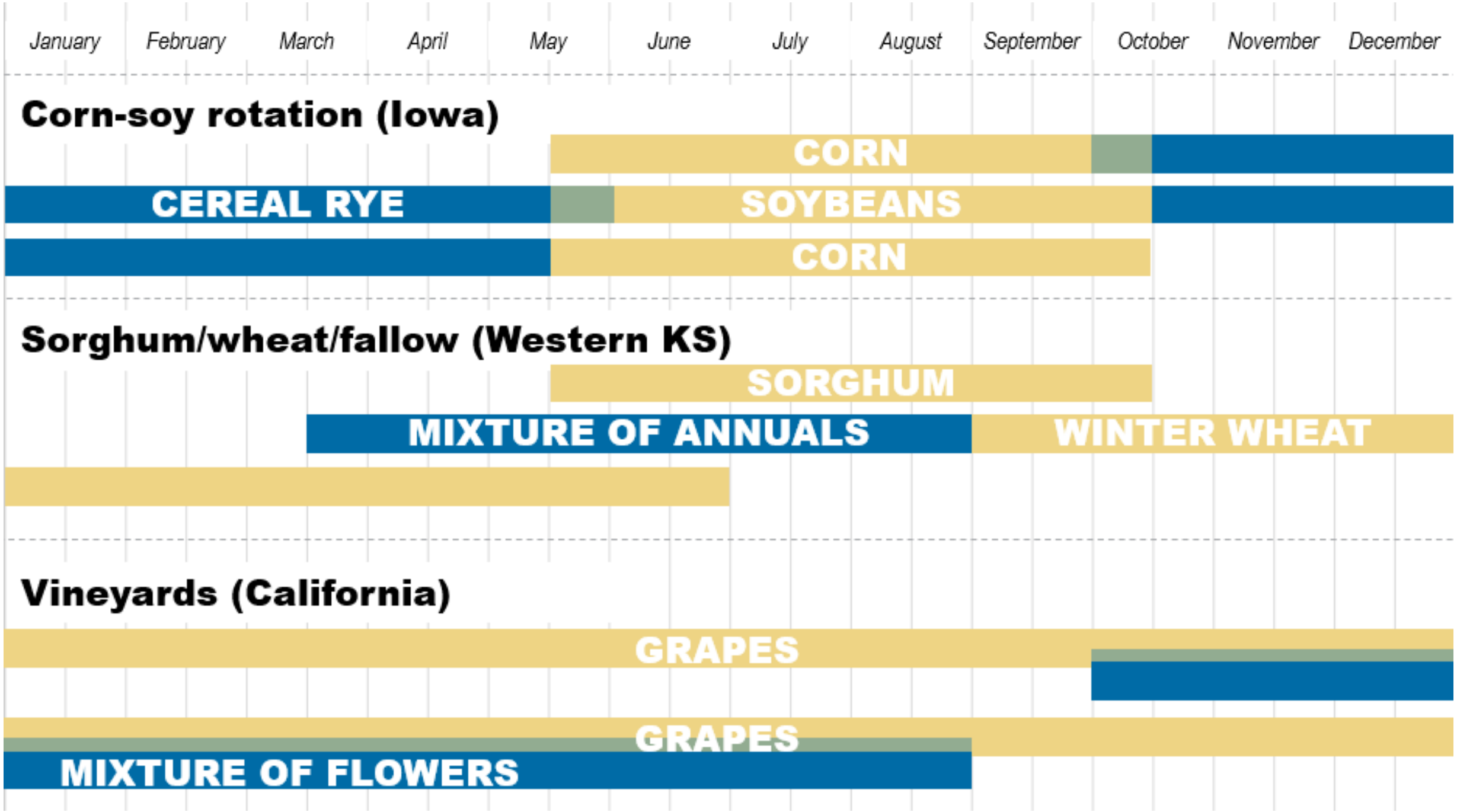
This practice is used to control erosion, add fertility and organic material to the soil, improve soil tilth, increase infiltration and aeration of the soil, and improve overall soil health. The practice is also used to increase populations of bees for pollination purposes. Cover and green manure crops have beneficial effects on water quantity and quality. Cover crops have a filtering effect on movement of sediment, pathogens, and dissolved and sediment-attached pollutants.

Operation and maintenance of cover crops include: controlling weeds by mowing or by using other pest management techniques, and managing for the efficient use of soil moisture by selecting water-efficient plant species and terminating the cover crop before excessive transpiration. Use of the cover crop as a green manure crop to cycle nutrients will impact when to terminate the cover to match release of nutrient with uptake by following cash crop.

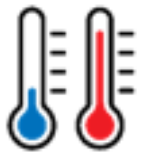
Common Associated Practices

Cover Crop (340) is commonly applied with practices such as Conservation Crop Rotation (328); Residue and Tillage Management, No Till (329); Residue and Tillage Management, Reduced Till (345); Nutrient Management (590), and Integrated Pest Management (595).

For further information, contact your local NRCS field office.


January
February
March
April
May
June
July
August
September
October
November
December
Corn-soy rotation (Iowa)
CORN
CEREAL RYE
SOYBEANS
CORN
Sorghum/wheat/fallow (Western KS)
SORGHUM
MIXTURE OF ANNUALS
WINTER WHEAT
Vineyards (California)
GRAPES
GRAPES
MIXTURE OF FLOWERS

Cover crop considerations



Growing conditions

Termination methods

Species and mixes

Termination timing

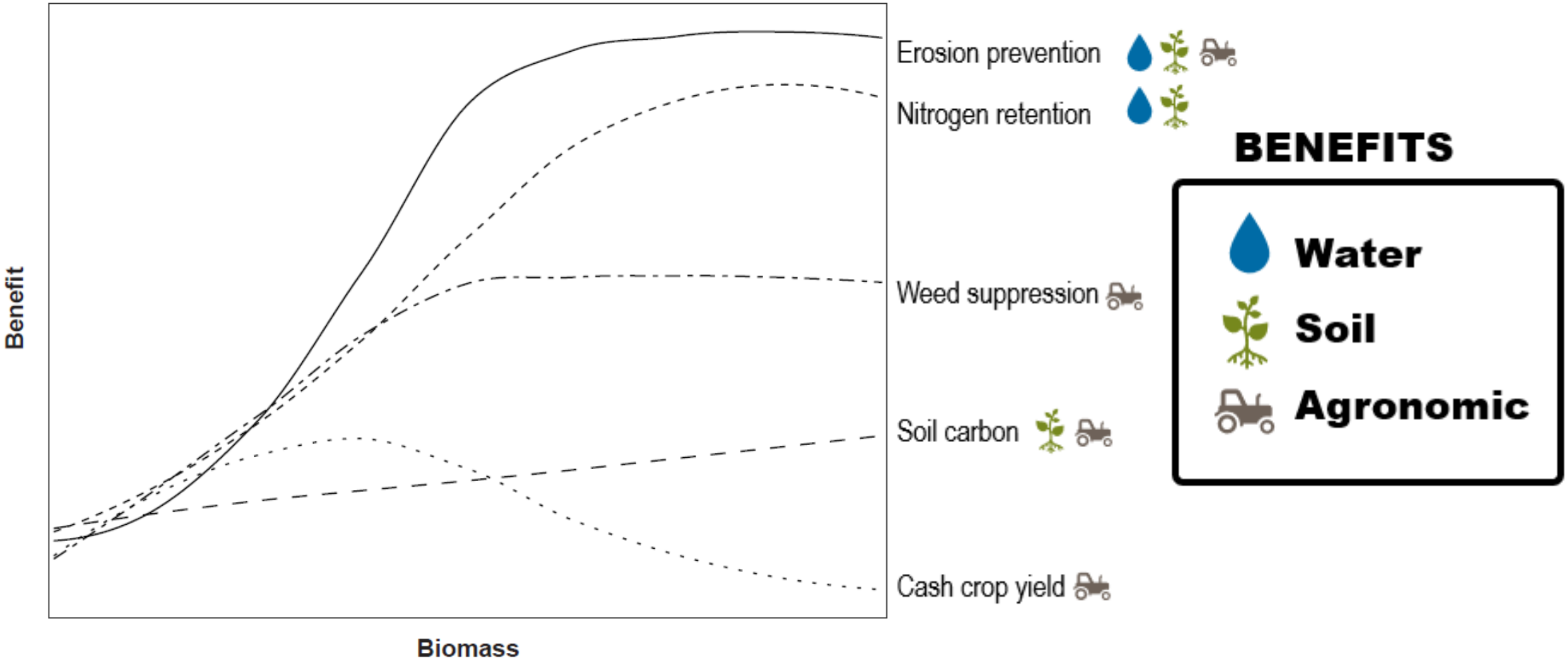
Cash cropping system

Livestock integration

What do **cover crops** do?

Figure 2

Conceptual diagram of how various environmental benefits accrue in relation to cover crop biomass, partially based on data from Finney et al. (2016) as well as literature review.



Source: Cates et al. (2018). What do we know about cover crop efficacy in the North Central United States? *Journal of Soil and Water Conservation, 73(6), 153A-157A. doi:10.2489/jswc.73.6.153A*

What about **wildlife**?

Do they use it?

If yes, what's the impact, of that use?

- Survival
- Reproduction
- Population constrains

What about **wildlife?**

Use axis

No use

Agriculture, Ecosystems and Environment 252 (2018) 42–50

Contents lists available at ScienceDirect

Agriculture, Ecosystems and Environment

journal homepage: www.elsevier.com/locate/agee

Research Paper

Use of cover crop fields by migratory and resident birds

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[b] The Nature Conservancy, Illinois Chapter, Peoria, IL, 61602 USA

ARTICLE INFO

Keywords:
Cover crop
Eastern meadowlark
Sitagwint
Spring migration
Cereal rye
Migratory
Grassland

ABSTRACT

Cover crops, established between the growing seasons of primary crops to improve soil and water quality, have become increasingly popular in the Midwest region of the United States; however, the impact on migratory and resident birds is largely unknown. We conducted avian surveys on four field types in east central Illinois in the spring of 2015 and 2016: maize (*Zea mays* L.) stubble with cover crop, maize stubble only, soybean [*Glycine max* (L.) Merr.] stubble with cover crop, and soybean stubble only. For each field type, we calculated relative bird abundance and the Avian Conservation Significance value (ACS). Relative bird abundance was greater in cover crop fields than non-cover crop fields, with the maize fields planted with cover crops providing the greatest value (nearly twice the number of individuals and twice the species compared with non-cover crop soybean fields). The most common species were Red-winged Blackbird (*Agelaius phoeniceus*), Common Grackle (*Quiscalus quiscula*), and American Robin (*Turdus migratorius*). ACS values were most influenced by the Eastern Meadowlark (*Sturnella magna*), a species of high conservation concern. Many agricultural landscapes lack habitat in the spring and cover crop fields may be important areas to provide shelter and forage for birds. While we documented greater use of these fields more research is needed to understand why birds use these fields; more explicitly are birds finding cover, foraging, or attempting to breed in cover crop fields? As the amount of cover crop area increases, the value of these fields for migratory and resident bird use may increase. While habitat for wildlife is a secondary consideration when planting cover crops, my research suggests the use of cereal rye and later termination of cover crops benefits birds. Cover crops will not replace natural habitats for birds, but the widespread use of cover crops may benefit some bird populations.

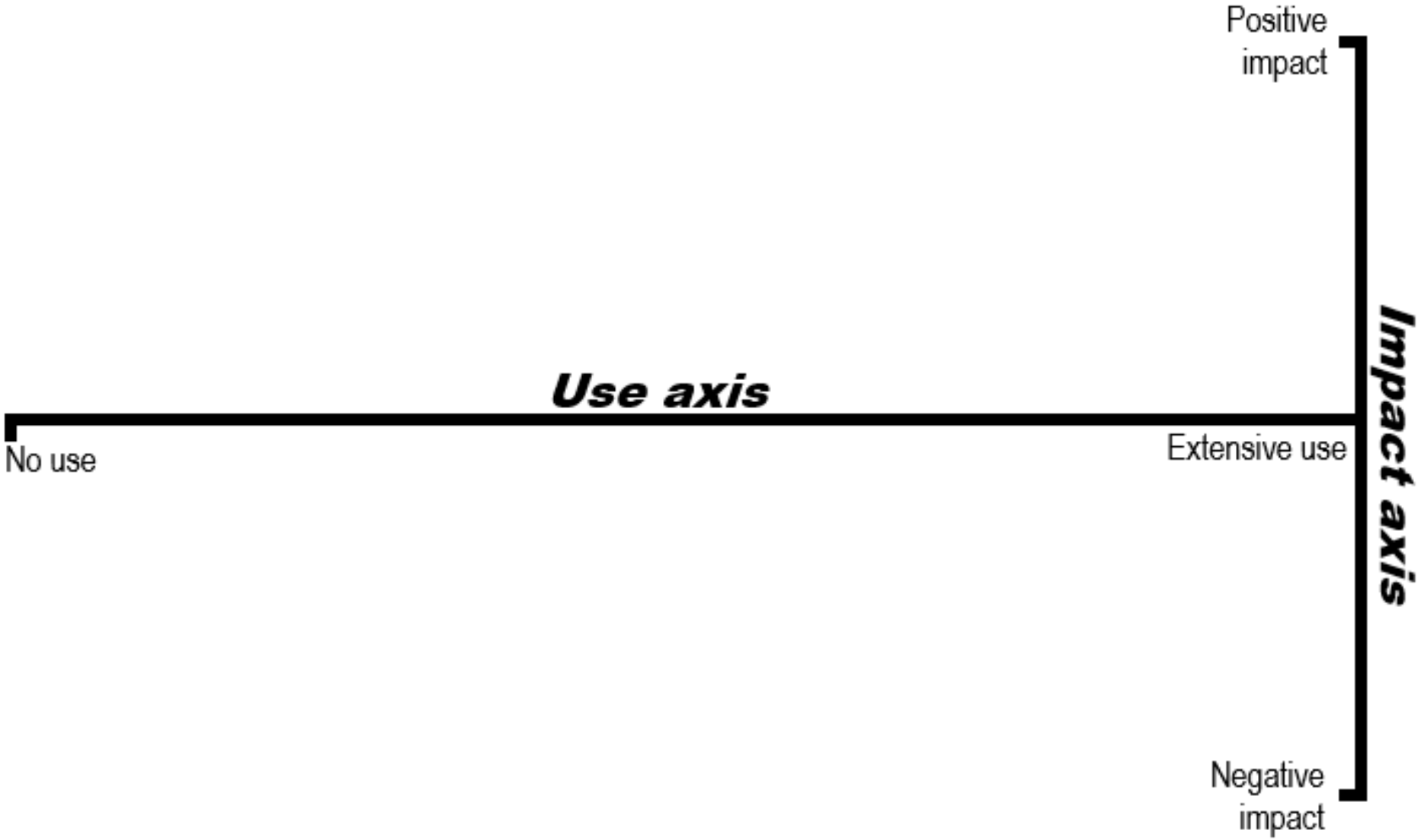
1. Introduction

Modernization of agricultural practices has led to dramatic changes in the landscape. Today, less than 1% of the historical 24.2 million hectares of grassland in the Corn Belt states of Iowa, Illinois, and Indiana remain (Samson and Knopf, 1994). As a consequence of this habitat loss, many species have experienced drastic population declines across taxa, such as mammals and amphibians (Mankin and Warner, 1999; Stuart et al., 2004). Also, many breeding bird populations that reside in agricultural landscapes have exhibited long-term declines (Herkert, 1995; Walk et al., 2010; Warner, 1994). Additionally, many migratory birds that pass through similar landscapes during migration are declining (Brown et al., 2001; Skagen, 2006; Stodola et al., 2014). In these landscapes where agriculture is the predominant land cover, effective conservation of wildlife will only be accomplished by implementing agricultural practices that benefit wildlife populations.

Few agricultural practices exist that truly benefit wildlife species (but see Shengfa and Xiubin, 2017 for a review pertaining to Europe) and the ones that have been shown to be beneficial are those that try to replicate or emulate more natural habitat. They emulate more natural habitats through changes in tillage practices or through the addition of non-tillable ground that provides more suitable habitat for foraging and nesting. No-till fields for example, where the ground is not tilled post-harvest and the next crop is planted directly into the previous crops' stubble, support more bird species, greater nest density, and greater nest success than tilled fields for songbirds and waterfowl (Basore et al., 1986; Duebbert and Kantrud, 1987; Higgins, 1977; VanBeek et al., 2014). Presumably because these fields offer some areas for safe nesting and roosting in comparison to traditional practices. Even reduced or minimum tillage, where grain stubble is left standing until spring then plowed, can increase bird abundance and the number of productive territories (Flickinger and Pendleton, 1994; Martin and Forsyth, 2003). Aside from changes in tillage practices, adding additional habitat can be beneficial. For example, grass waterways, which are channels that transport water off fields, have been shown to support greater abundance of birds and species richness compared to surrounding fields

Source: Wilcoxen et al. (2018). Use of cover crop fields by migratory and resident birds. Agriculture, Ecosystems & Environment, 252, 42-50. doi:https://doi.org/10.1016/j.agee.2017.09.039

What about **wildlife?**



What about **wildlife?**

Use axis

No use

2023 PRAIRIE NATURALIST 55:107–123

Ring-necked Pheasant Brood Habitat Selection and Movements in an Intensive Agricultural Landscape

Alixandra Godar[1,2], Adela Piernicky[1,3], David Haukos[4*], and Jeff Prendergast[5]

Abstract – Management of row crops can greatly influence wildlife populations in an agriculturally intensive landscape. Many upland gamebird populations, including Phasianus colchicus L. (Ring-necked Pheasant; hereafter pheasant) are experiencing contemporary population declines in such landscapes throughout the Midwest United States. Reduced availability of quality brood habitat may be a factor in these declines. Alternative practices, such as spring cover crops, may increase brood survival and benefit local pheasant populations. Our objectives were to follow radio-tagged females and assess pheasant brood 1) movements among available habitat patches within landscapes including spring cover crops and Conservation Reserve Program (CRP) fields, 2) relative use of available cover types within a landscape, 3) selection of vegetation structure, vegetation composition, and invertebrate community structure by brood-rearing hens in landscapes dominated by row-crop agriculture, and 4) survival rates. Broods were found primarily in grassy areas (native grass, pasture, train track right-of-way, and grass strips) and spring cover crop fields even though cover crops were the least common cover type in all study areas. Brood movements were limited with broods staying near nest locations for 30 days after hatch. Though movements were small, broods were found in multiple cover types, averaging 2.8 out of 6 available cover types. There was no difference between used and random locations for invertebrate metrics including total counts, biomass, and richness; order-specific biomass; and order-specific counts. Visual obstruction and vegetation composition were similar between used and random locations. Across our study sites, we found little support for point-site selection (i.e., within-patch 4th order selection) but significant support for patch-site selection by female pheasants attending broods. Spring cover crops (<5%) and CRP (<15%) comprised a small percentage of the landscape area, but were selected by females attending broods as each contained approximately 25% of brood locations. Apparent survival of pheasant broods was low compared to other studies. Female pheasants selected for spring cover crops and CRP when attending broods, both are alternatives to current row-crop farming practices. As pheasants continue to respond to changes in western Kansas landscapes, homogeneity of cover types found in agricultural landscapes can be detrimental if practices continue to shift from quality pheasant habitat but can be advantageous if practices shift towards favorable management practices.

Introduction

Abundance of many upland gamebird populations across the United States are declining in response to several factors such as invasive plants, declining habitat quality, disease, increasing intensity of row-crop agriculture, and contaminants (Doxon and Carroll 2010, Flake et al. 2012, Rodgers 1999). Within upland gamebirds, *Phasianus colchicus* L. (Ring-necked Pheasant; hereafter pheasant) occupy a unique niche in agriculturally dominated landscapes. Ironically, as a naturalized species, the pheasant is arguably the most recog-

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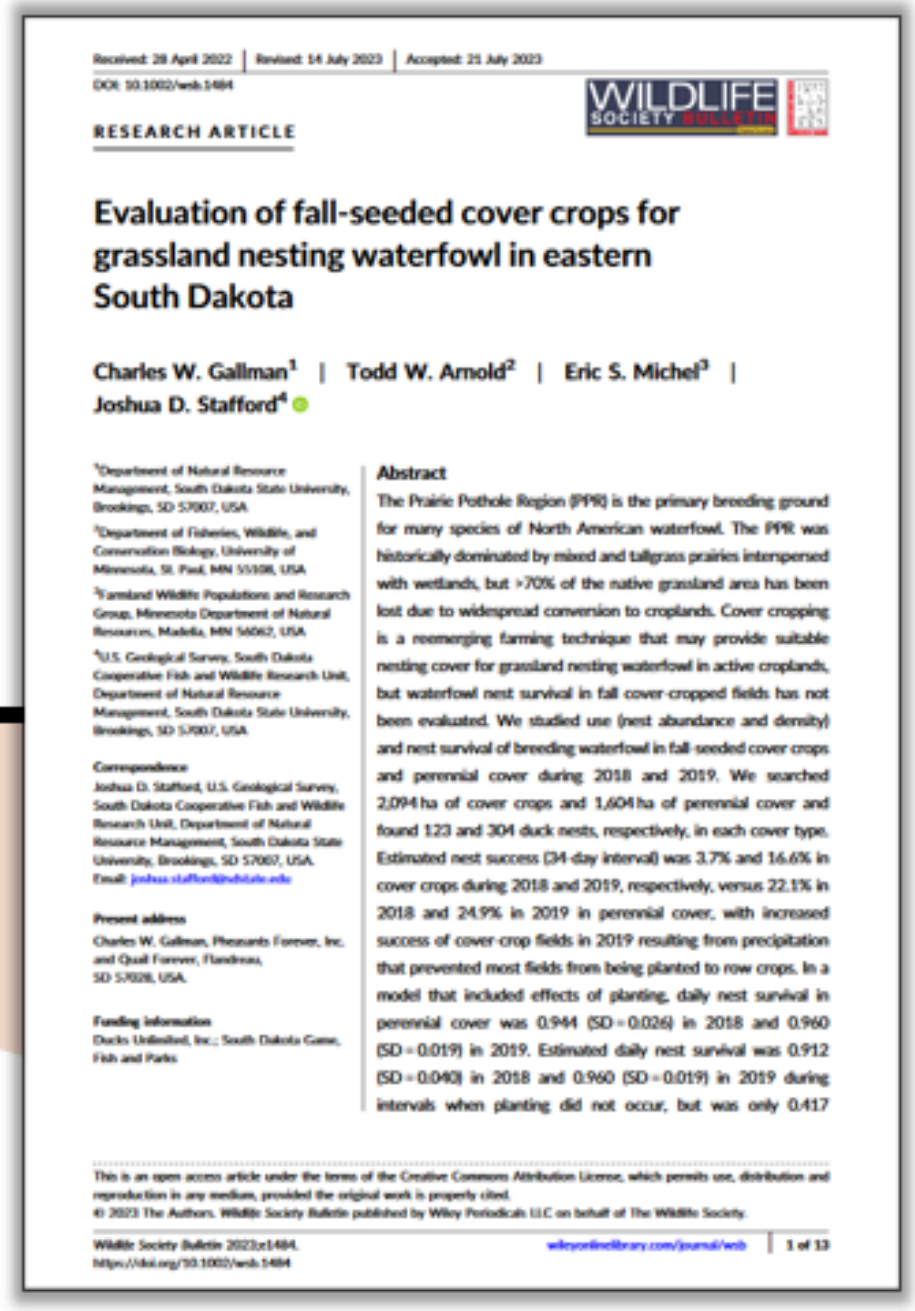
Associate Editor: Don Wolfe, George Miksch Sutton Avian Research Center

Source: Godar et al. (2023). Ring-necked Pheasant Brood Habitat Selection and Movements in an Intensive Agricultural Landscape. Prairie Naturalist, 55, 107-123.

What about **wildlife?**

Use axis

No use



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WILDLIFE SOCIETY BULLETIN

RESEARCH ARTICLE

Evaluation of fall-seeded cover crops for grassland nesting waterfowl in eastern South Dakota

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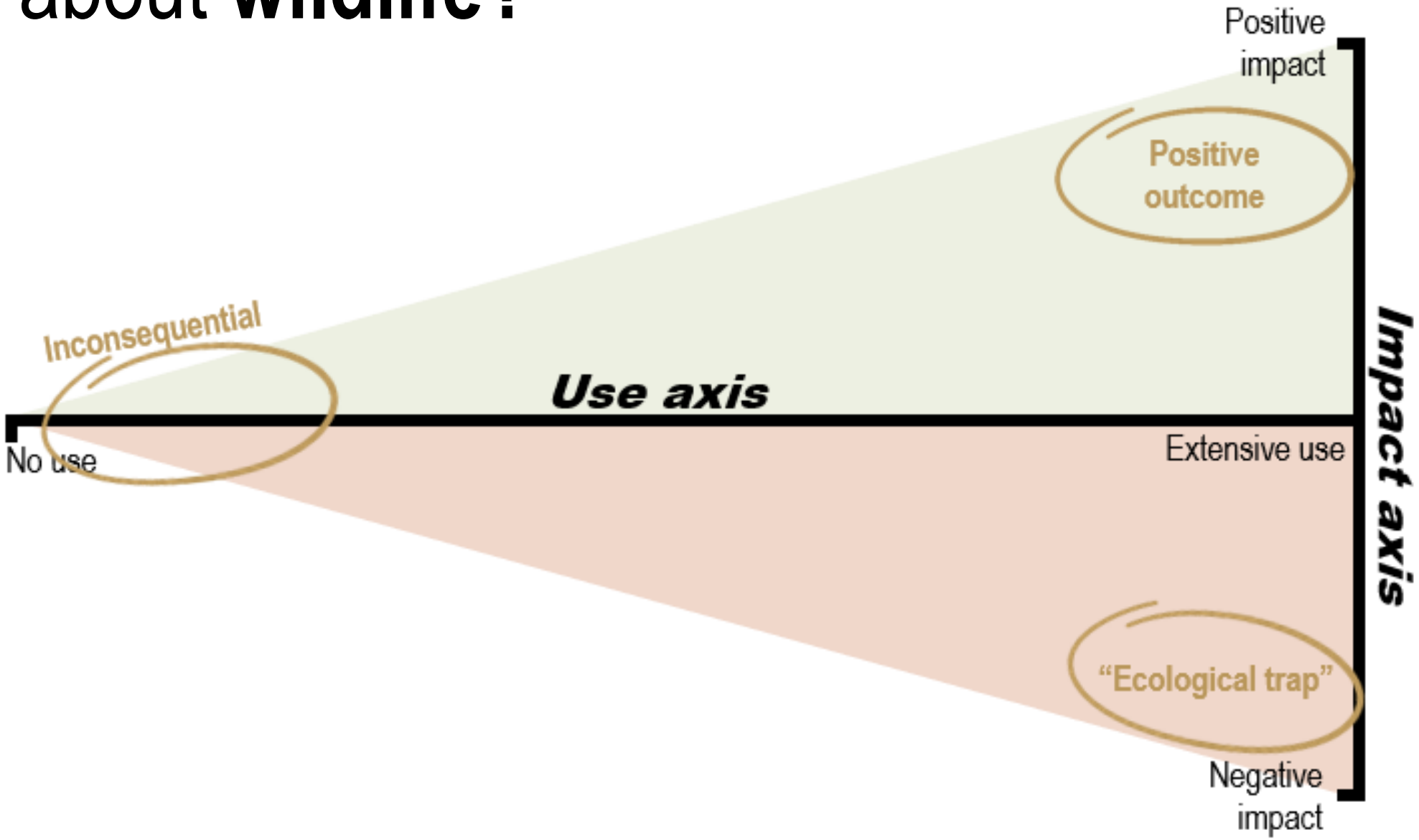
Funding information
Ducks Unlimited, Inc.; South Dakota Game, Fish and Parks

Abstract

The Prairie Pothole Region (PPR) is the primary breeding ground for many species of North American waterfowl. The PPR was historically dominated by mixed and tallgrass prairies interspersed with wetlands, but >70% of the native grassland area has been lost due to widespread conversion to croplands. Cover cropping is a reemerging farming technique that may provide suitable nesting cover for grassland nesting waterfowl in active croplands, but waterfowl nest survival in fall cover-cropped fields has not been evaluated. We studied use (nest abundance and density) and nest survival of breeding waterfowl in fall-seeded cover crops and perennial cover during 2018 and 2019. We searched 2,094 ha of cover crops and 1,604 ha of perennial cover and found 123 and 304 duck nests, respectively, in each cover type. Estimated nest success (34-day interval) was 3.7% and 16.6% in cover crops during 2018 and 2019, respectively, versus 22.1% in 2018 and 24.9% in 2019 in perennial cover, with increased success of cover-crop fields in 2019 resulting from precipitation that prevented most fields from being planted to row crops. In a model that included effects of planting, daily nest survival in perennial cover was 0.944 (SD = 0.026) in 2018 and 0.960 (SD = 0.019) in 2019. Estimated daily nest survival was 0.912 (SD = 0.040) in 2018 and 0.960 (SD = 0.019) in 2019 during intervals when planting did not occur, but was only 0.417

Source: Gallman et al. (2023). Evaluation of fall-seeded cover crops for grassland nesting waterfowl in eastern South Dakota. Wildlife Society Bulletin, e1484. doi:https://doi.org/10.1002/wsb.1484

What about **wildlife?**



Recent CEAP Research

Acknowledgements

Students Taylor (Shirley) Ballard and Megan “Maggie” Figura led field work

Funding and in-kind support

USDA Natural Resources Conservation Service
U.S. DEPARTMENT OF AGRICULTURE

USGS science for a changing world

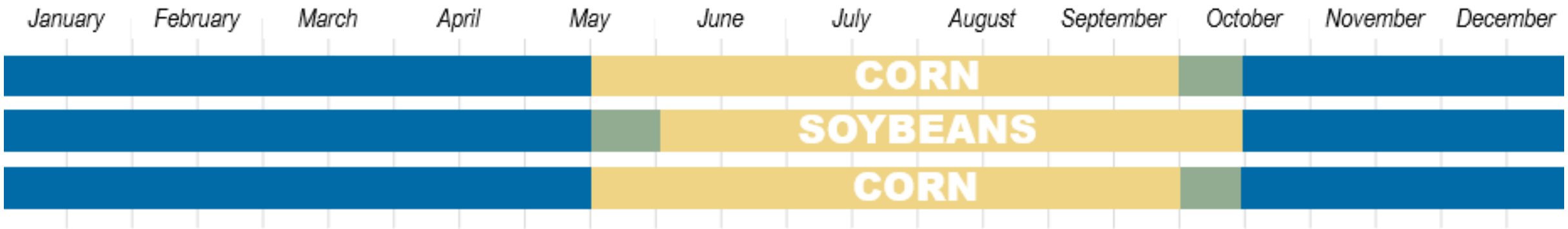
IOWA STATE UNIVERSITY

SOUTH DAKOTA STATE UNIVERSITY
Department of Natural Resource Management

Dr. Joshua Stafford

Lots of research technicians

Cover crops in Iowa



Growing conditions
Late fall (little) and early spring.

Species and mixes
Cereal rye.

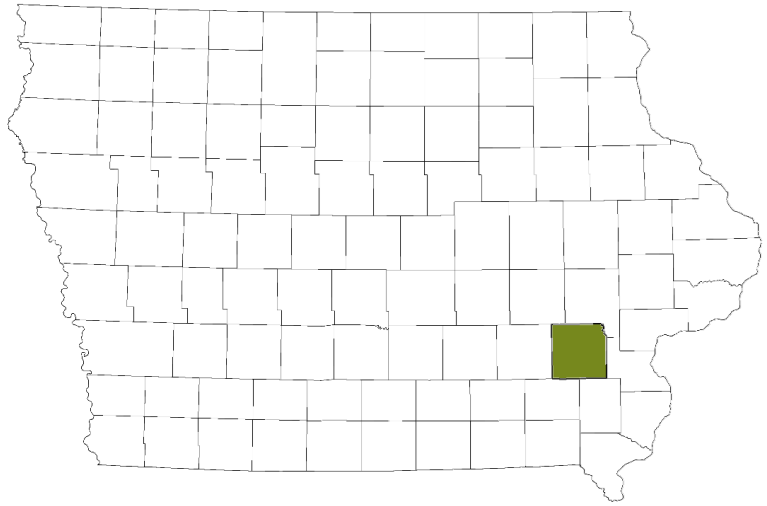
Cash cropping system
Corn and soybeans.

Termination methods
Herbicide

Termination timing
10-14 days before planting corn or
±7 days before/after planting beans.

Livestock integration
Not in our study.

Study area: Washington County, Iowa

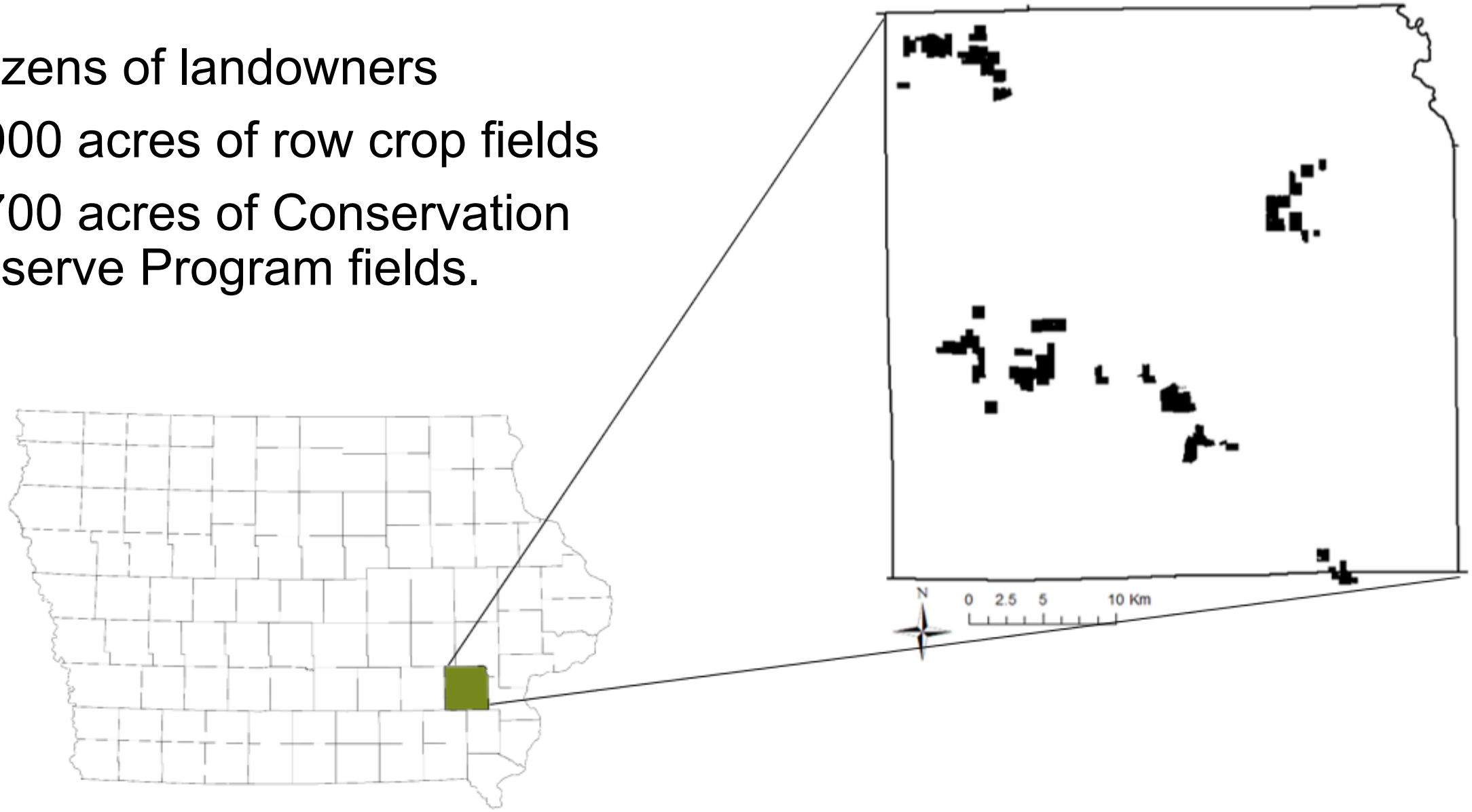


- 365,000 acre county, 215,000 acres of corn and soybeans.
- High conservation adoption, generally.
- Highest cover crop adoption in state.
  - 15% of row crop acres (32,551) NRCS cover crop cost share.
  - 13.9% and 19.8% of row crop acres during 2019 and 2020 had visible cover crops (Shirley 2021)

Photo: Sam Lau

Studv sites

- Dozens of landowners
- 6,000 acres of row crop fields
- 2,700 acres of Conservation Reserve Program fields.



Breeding bird monitoring in Iowa

1. Bird point counts

- Bird use in fields with and without cover crops and grasslands
- Focus on species of greatest conservation need.

Eastern Meadowlark
© Gary Mueller

2. Pheasant roadside surveys

- Landscape-level monitoring of breeding use.
- Broods as a measure of productivity.

Ring-necked pheasant
© Iowa DNR

3. Pheasant nesting

- Nest searching within cover crop fields and grasslands.
- Measures of nest site selection.

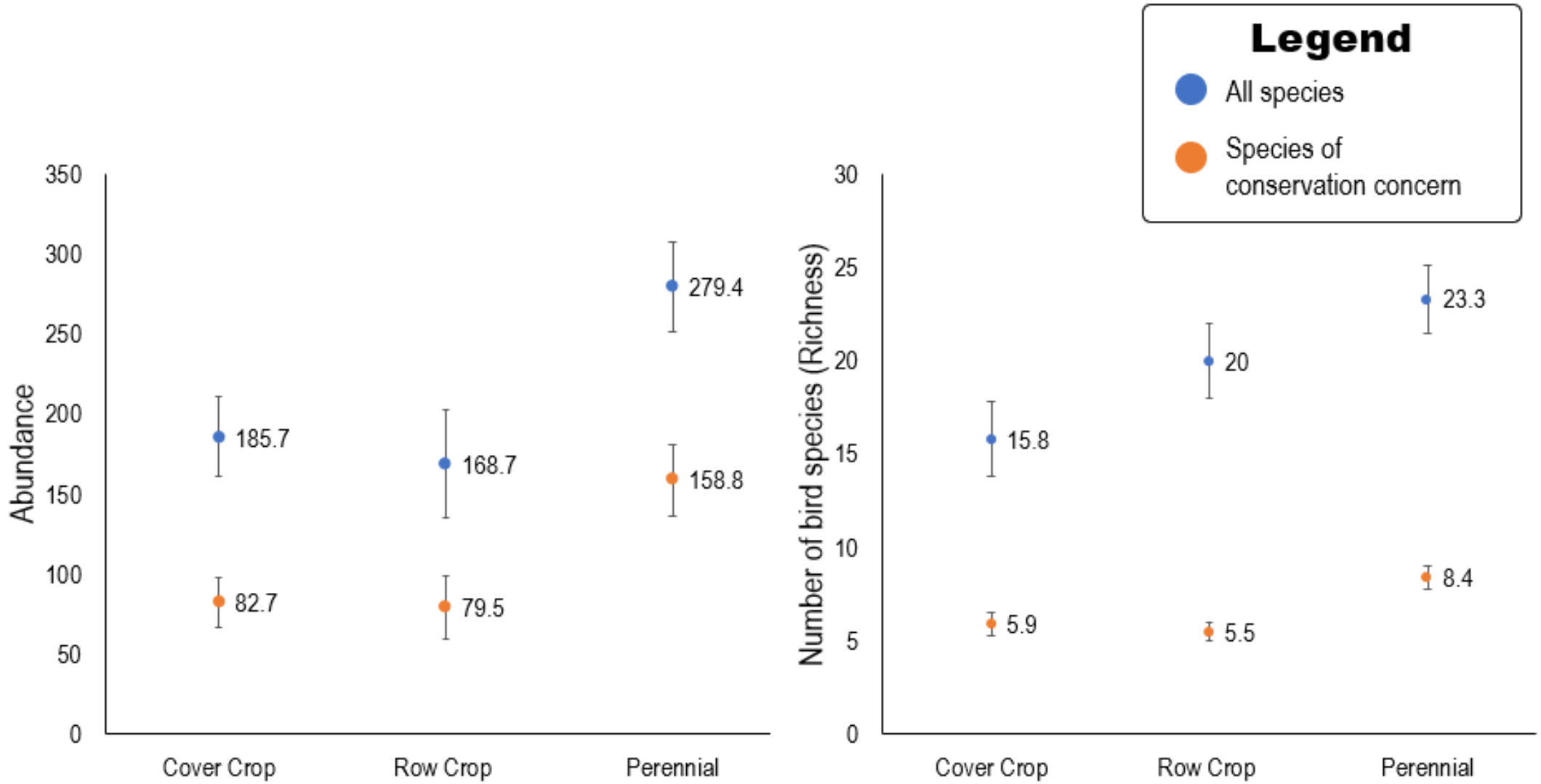
Ring-necked pheasant
© Ashley Wahlberg

1. Bird point counts

- 1 May to 31 July 2021
- Cover crop (12), row crop (4), or perennial (7 grassland) fields.
- 3-6 points per field
- Five-minute standardized bird point count surveys each

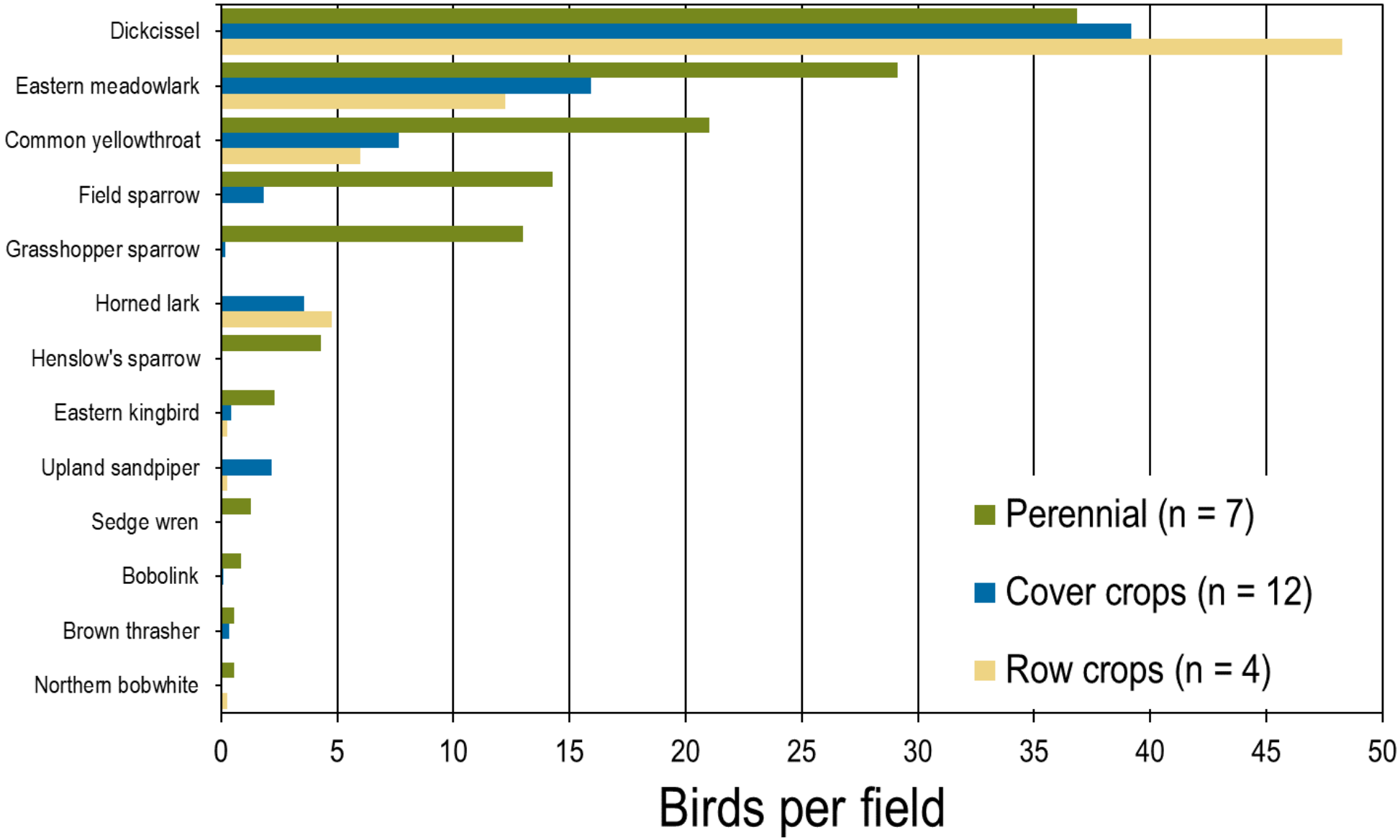
Photo: Maggie Figura

Bird abundance and richness



Source: Figura, M. (2022) Evaluating avian use of cover crops in the Corn Belt. M.S. Thesis, South Dakota State University

Grassland bird abundance



Source: Figura, M. (2022) Evaluating avian use of cover crops in the Corn Belt. M.S. Thesis, South Dakota State University

Key Takeaways

1. Bird point counts

- Diverse bird use, but more aligned with row crop fields than grass fields.

Eastern Meadowlark
© Gary Mueller

2. Pheasant roadside surveys

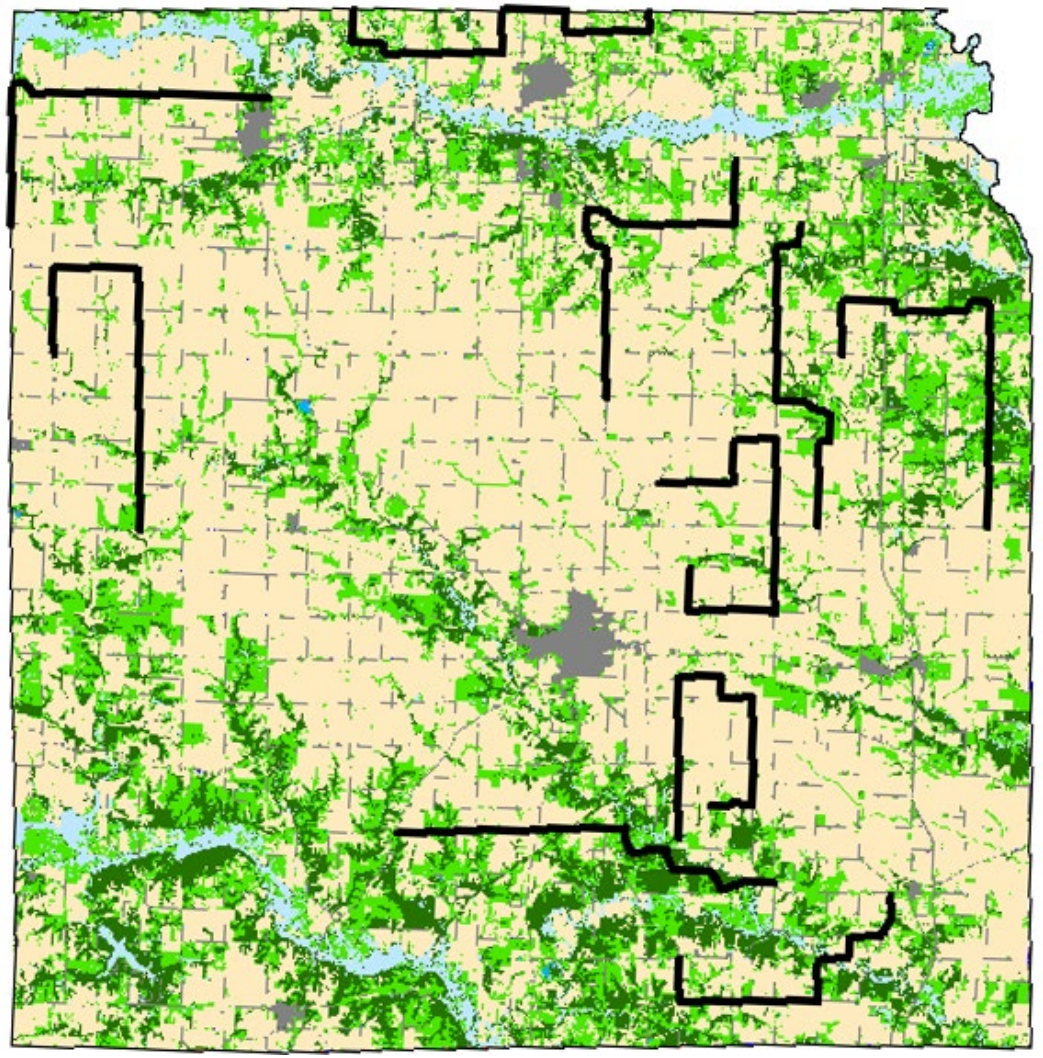
Ring-necked pheasant
© Iowa DNR

3. Pheasant nesting

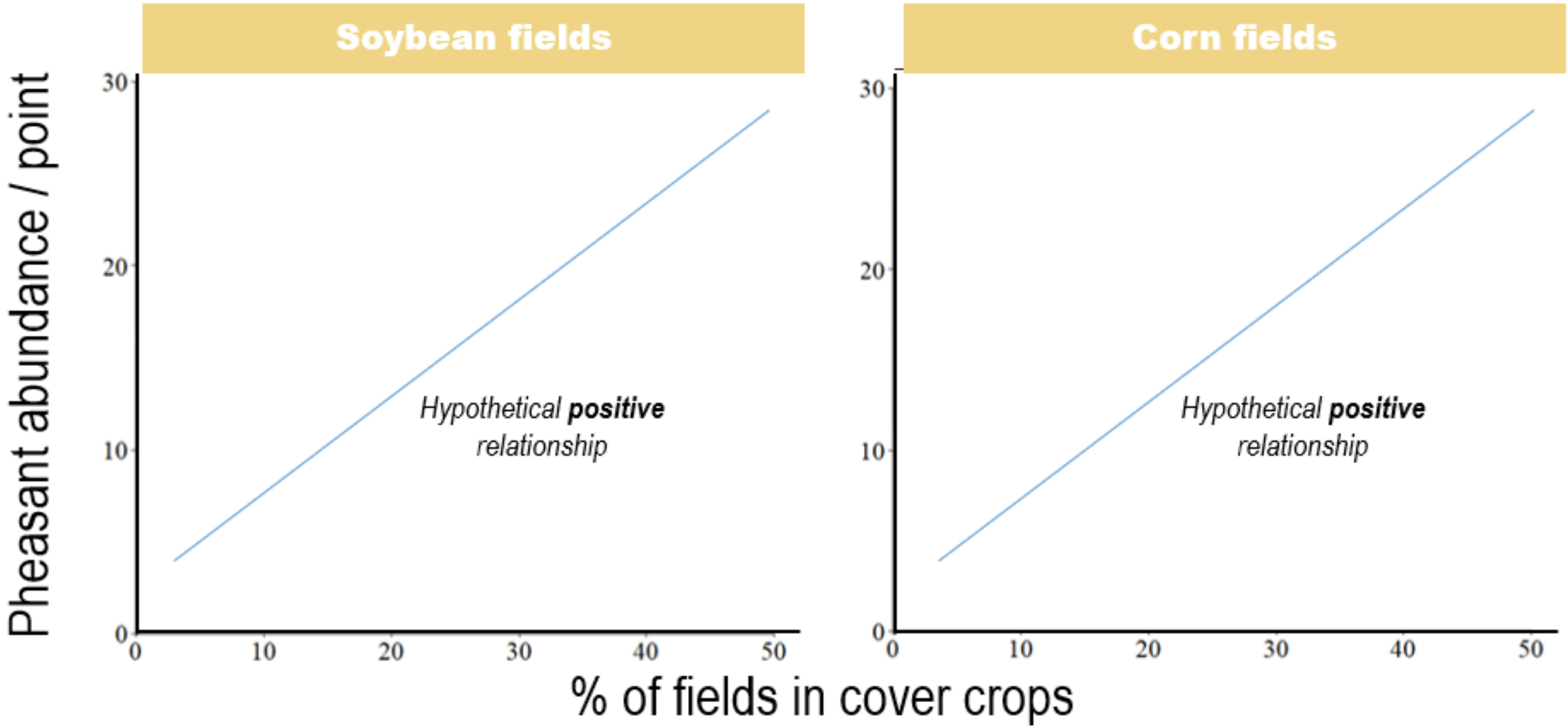
Ring-necked pheasant
© Ashley Wahlberg

2. Pheasant Roadside surveys

- 10 gravel road routes (8 - 11 miles)
- Point count surveys
- Brood surveys
- Mapped cover crops



Source: Shirley, T. (2021) Use of fall-seeded cover crops by ring-necked pheasants in Iowa. M.S. Thesis, Iowa State University



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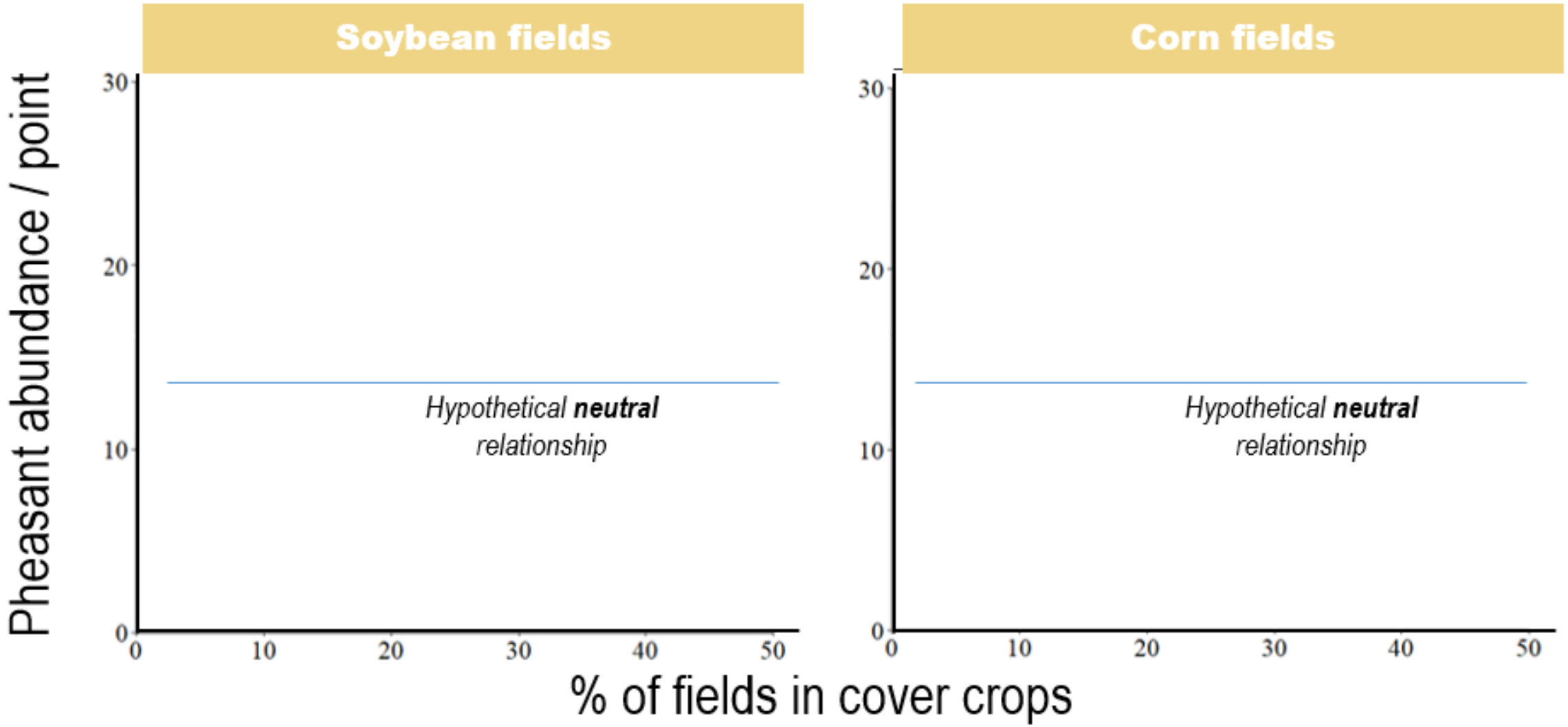

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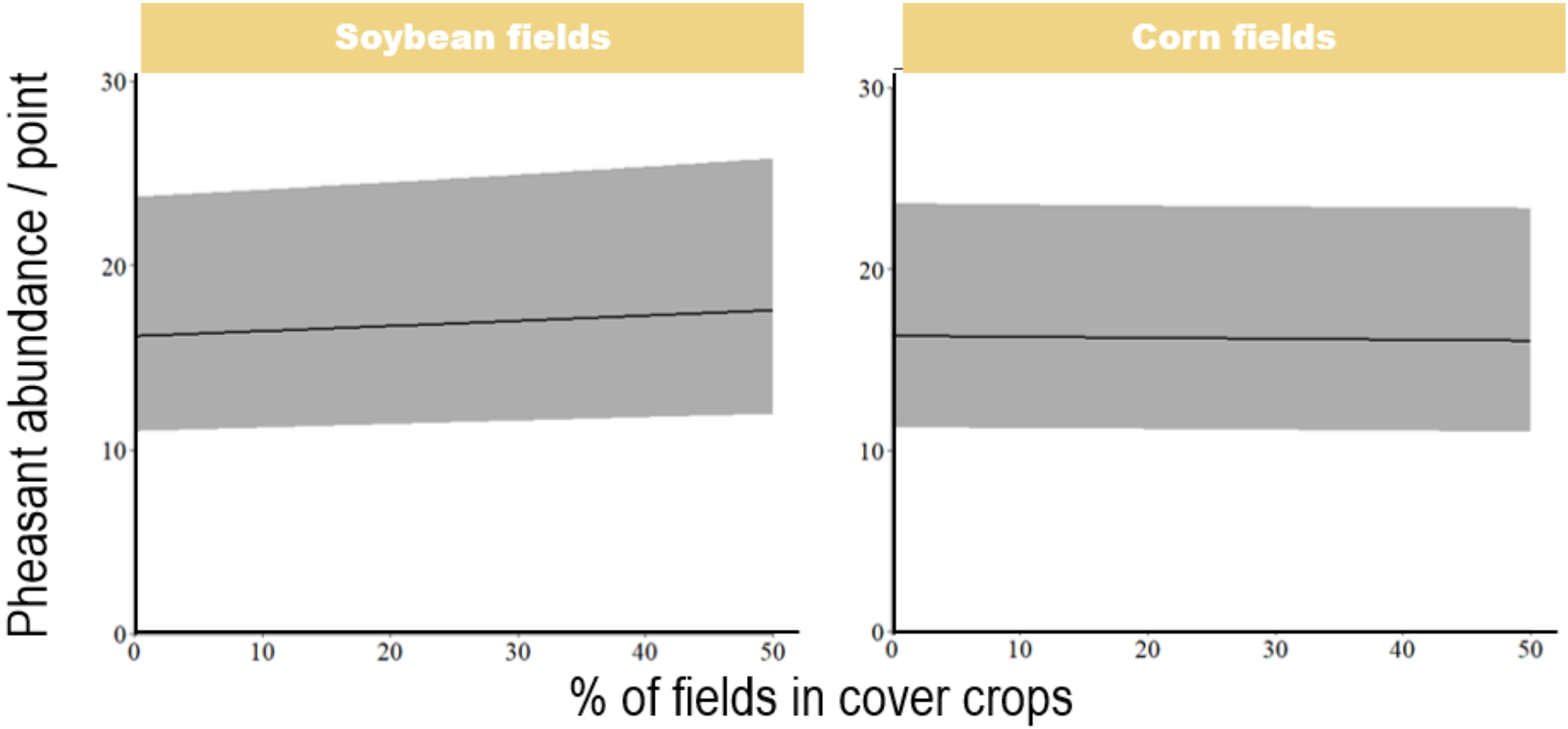

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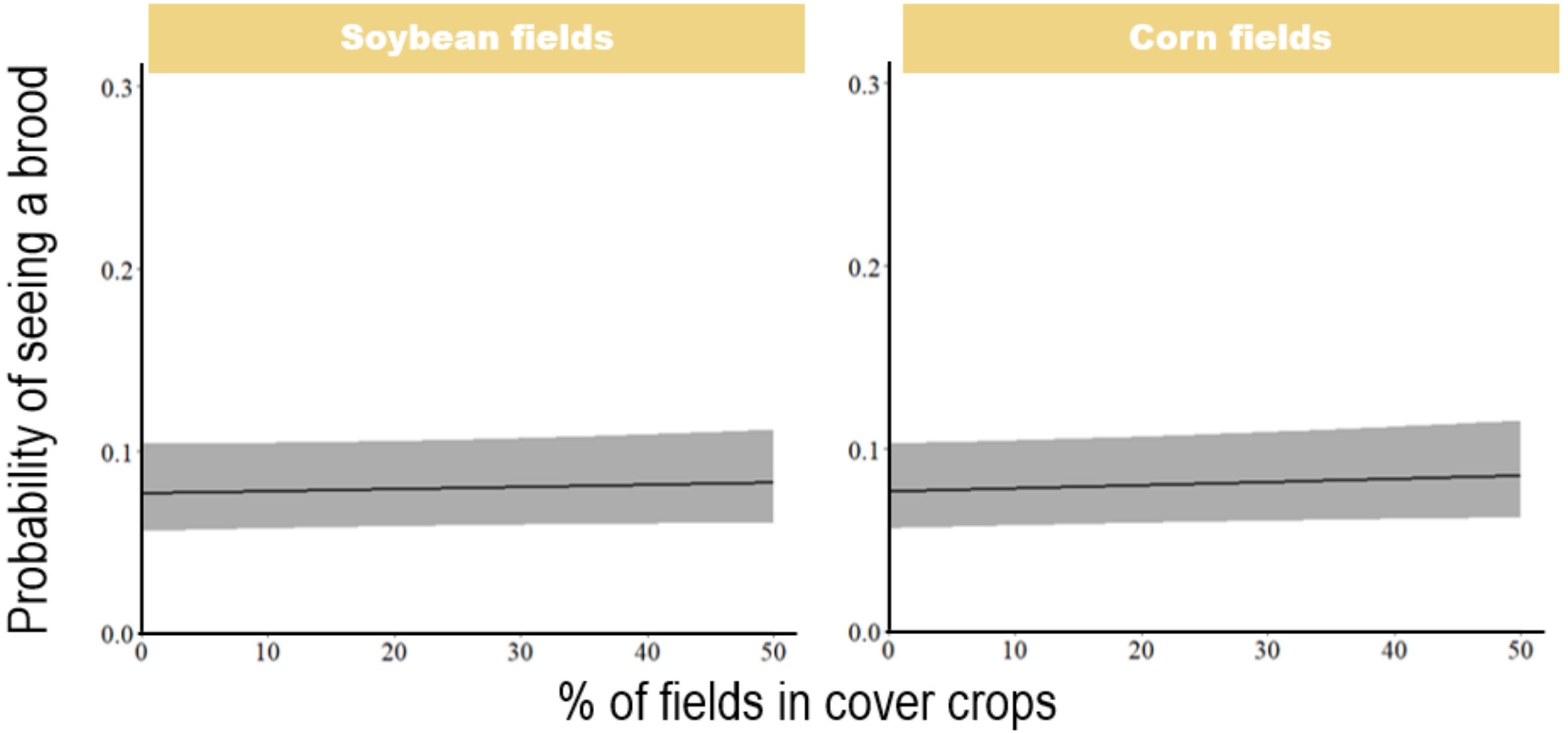


Source: Shirley, T. (2021) Use of fall-seeded cover crops by ring-necked pheasants in Iowa. M.S. Thesis, Iowa State University

Key Takeaways

1. Bird point counts

- Diverse bird use, but more aligned with row crop fields than grass fields.

Eastern Meadowlark
© Gary Mueller

2. Pheasant roadside surveys

- At current adoption rates no change in pheasant abundance or index of productivity.

Ring-necked pheasant
© Iowa DNR

3. Pheasant nesting

Ring-necked pheasant
© Ashley Wahlberg

3. Pheasant nest searching

- Two rounds of nest searching each year
  - May 15- June 15
  - June 16- July 15
- Plots 40 m × 100 m (1 acre)
- Randomly placed searches in each field.
- Stratified by field type.

Photo: Adam Janke

Cover types

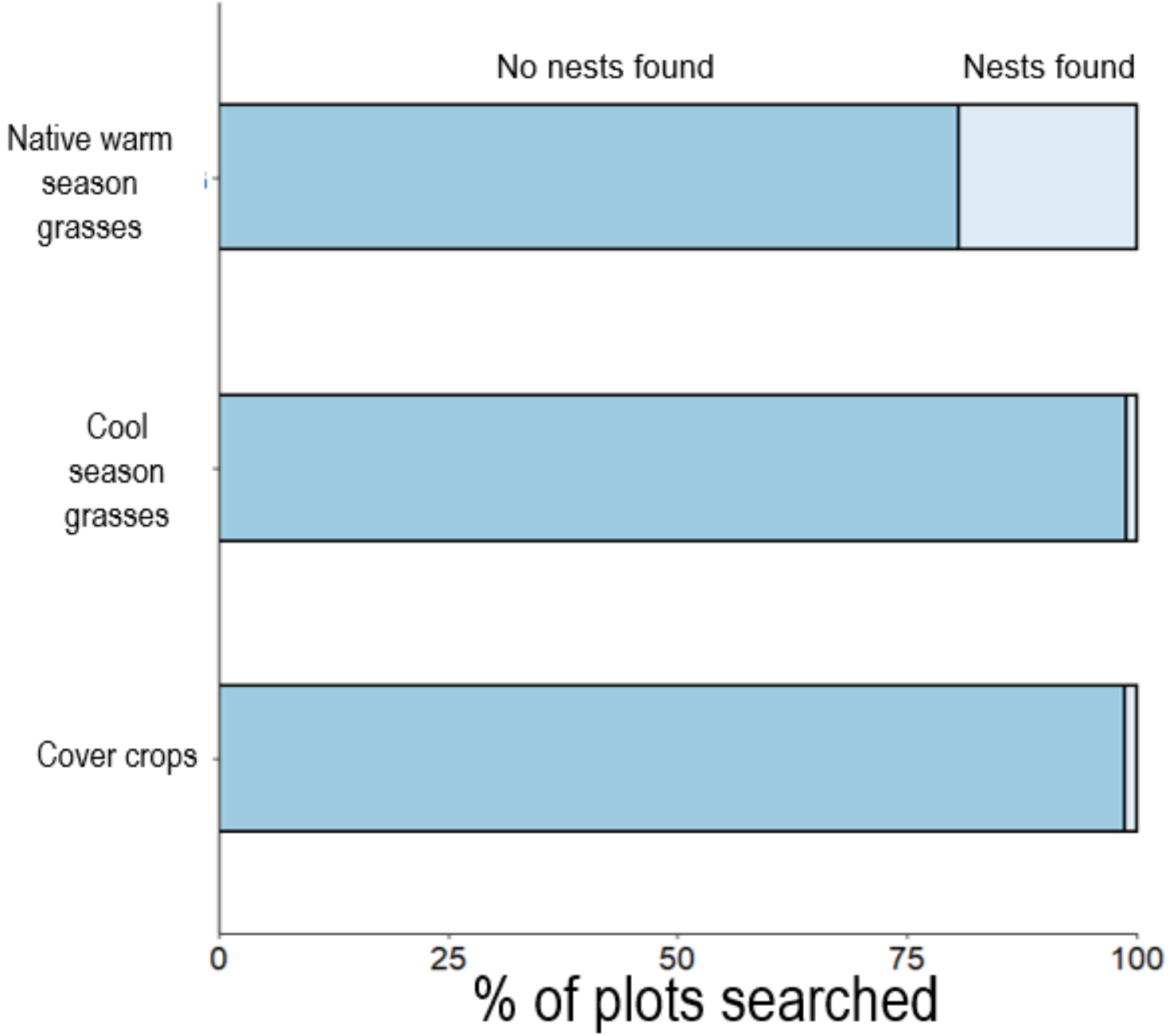
Native warm season grasses
13 fields, 114 plots

Cool season grasses
6 fields, 85 plots

Fall-seeded cover crops
23 fields, 166 plots

Photos: Taylor Shirley

Plot placement



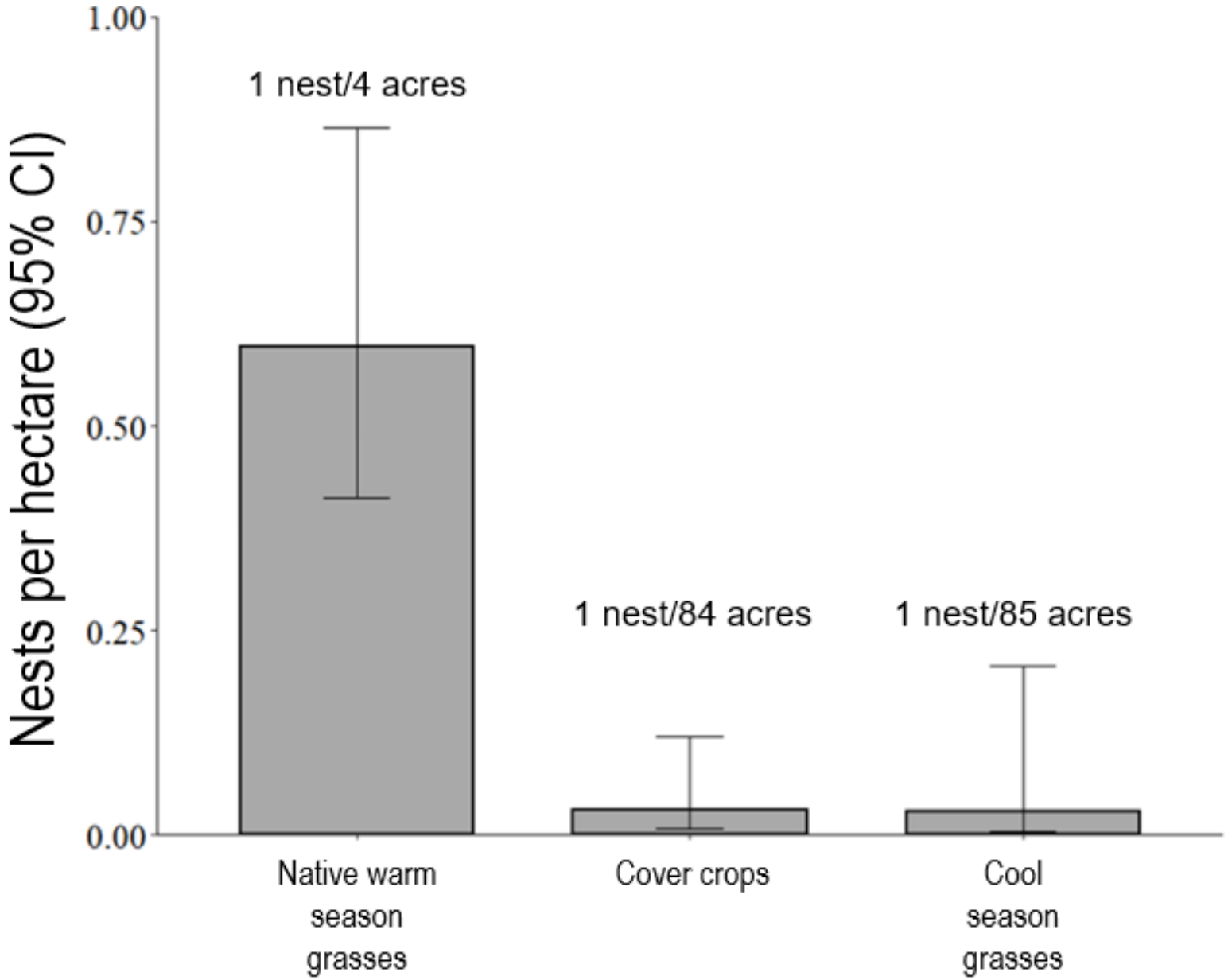
28 nests in 114 plots

1 nest in 85 plots

2 nests in 166 plots

Source: Shirley & Janke (2023). Ring-necked pheasant nest site selection in a landscape with high adoption of fall-seeded cover crops. Wildlife Society Bulletin, 47(1), e1394.

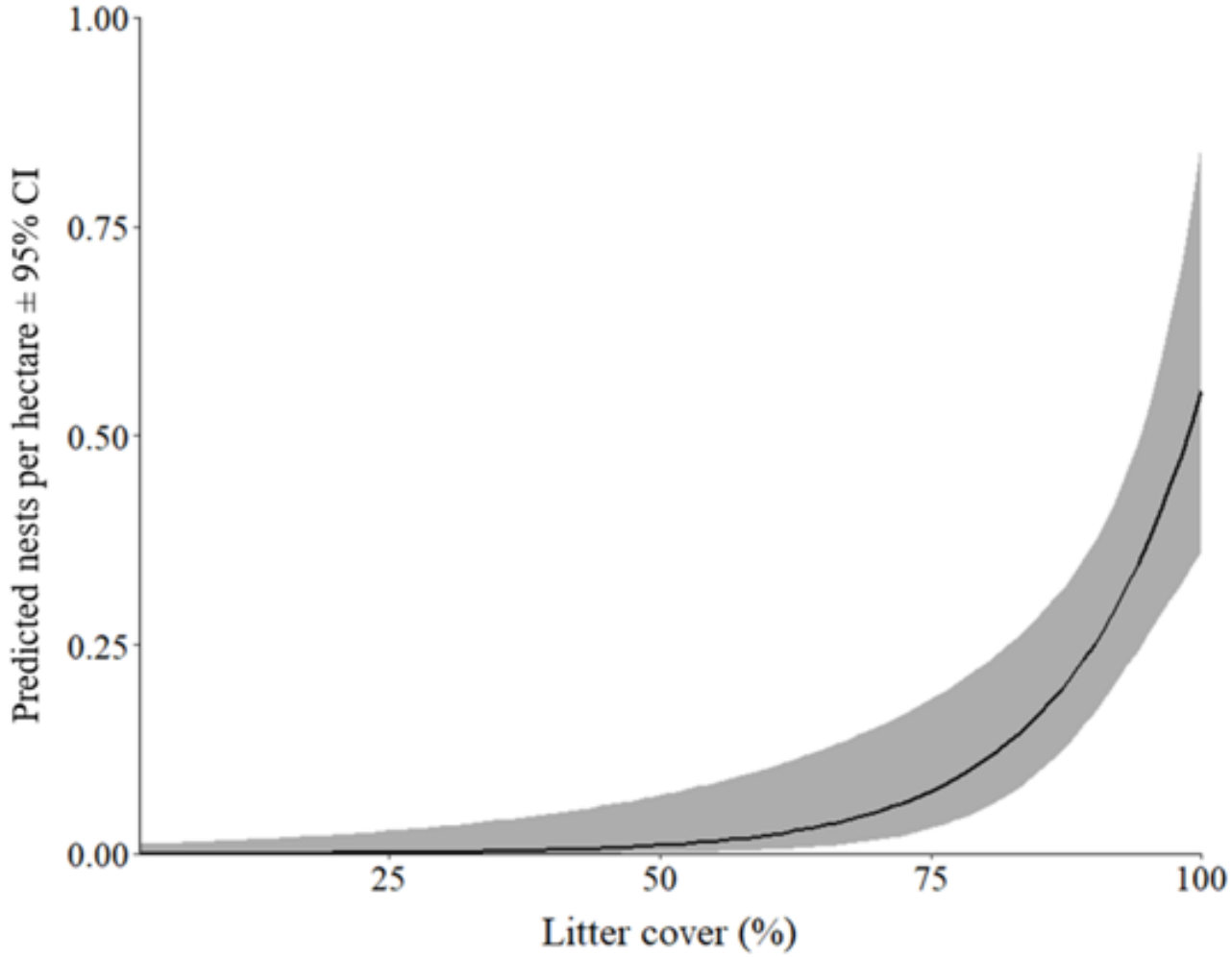
Photos: Taylor Shirley



Source: Shirley & Janke (2023). Ring-necked pheasant nest site selection in a landscape with high adoption of fall-seeded cover crops. Wildlife Society Bulletin, 47(1), e1394.

Nest site selection

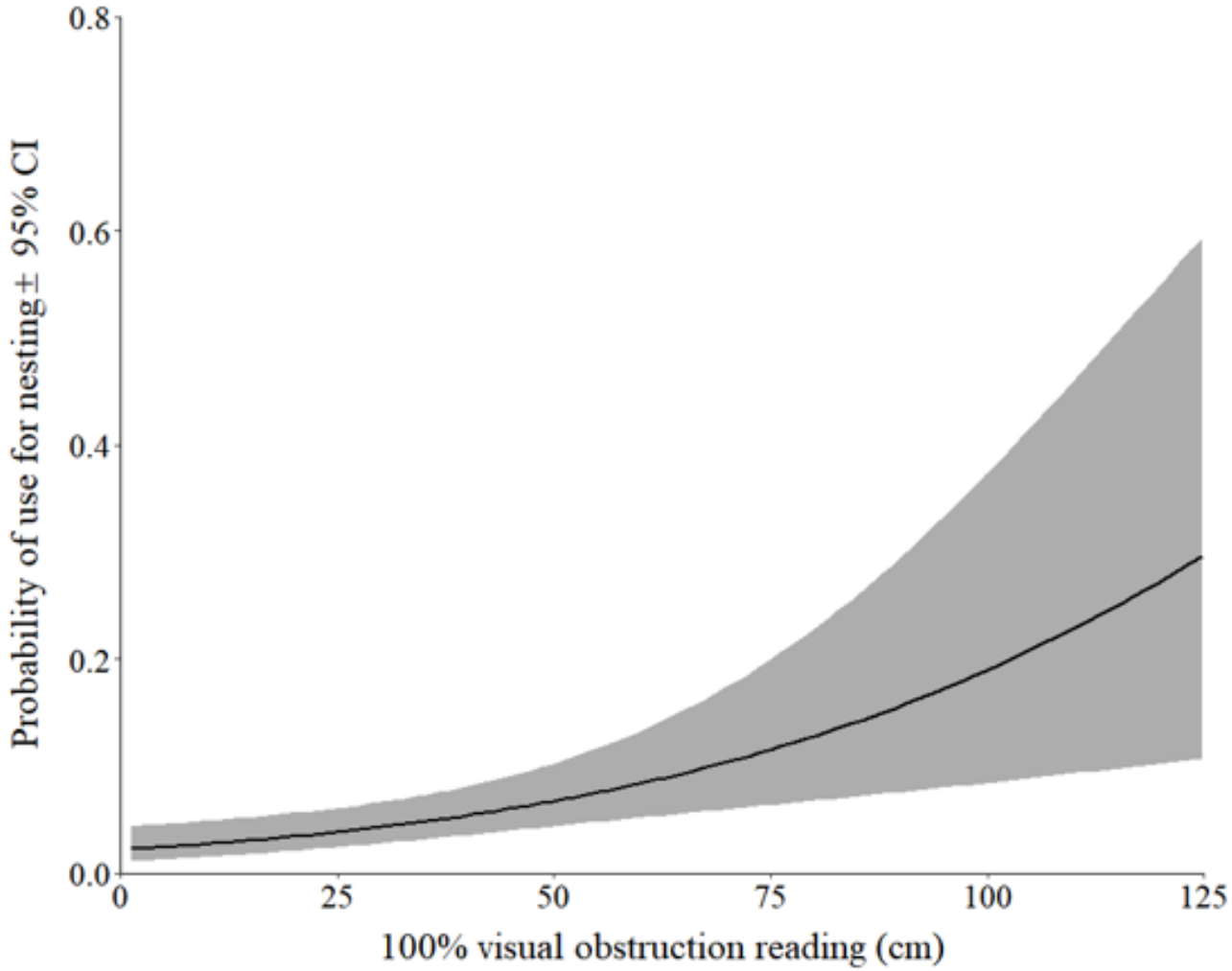
- Selected for sites with high litter
- Important for nest construction
- Low in cover crop and CSG fields.



Source: Shirley & Janke (2023). Ring-necked pheasant nest site selection in a landscape with high adoption of fall-seeded cover crops. Wildlife Society Bulletin, 47(1), e1394.

Nest site selection

- Selected for sites with high visual obstruction or vegetation density.
- Important for nest concealment.
- Low in cover crop and CSG fields.



Source: Shirley & Janke (2023). Ring-necked pheasant nest site selection in a landscape with high adoption of fall-seeded cover crops. Wildlife Society Bulletin, 47(1), e1394.

Cover crop nests

- 4 total (plots = 2, accidental = 2)
- Corn the previous year (more crop residue = more litter)
- No successes (but none destroyed by farm equipment)

6/22/2019

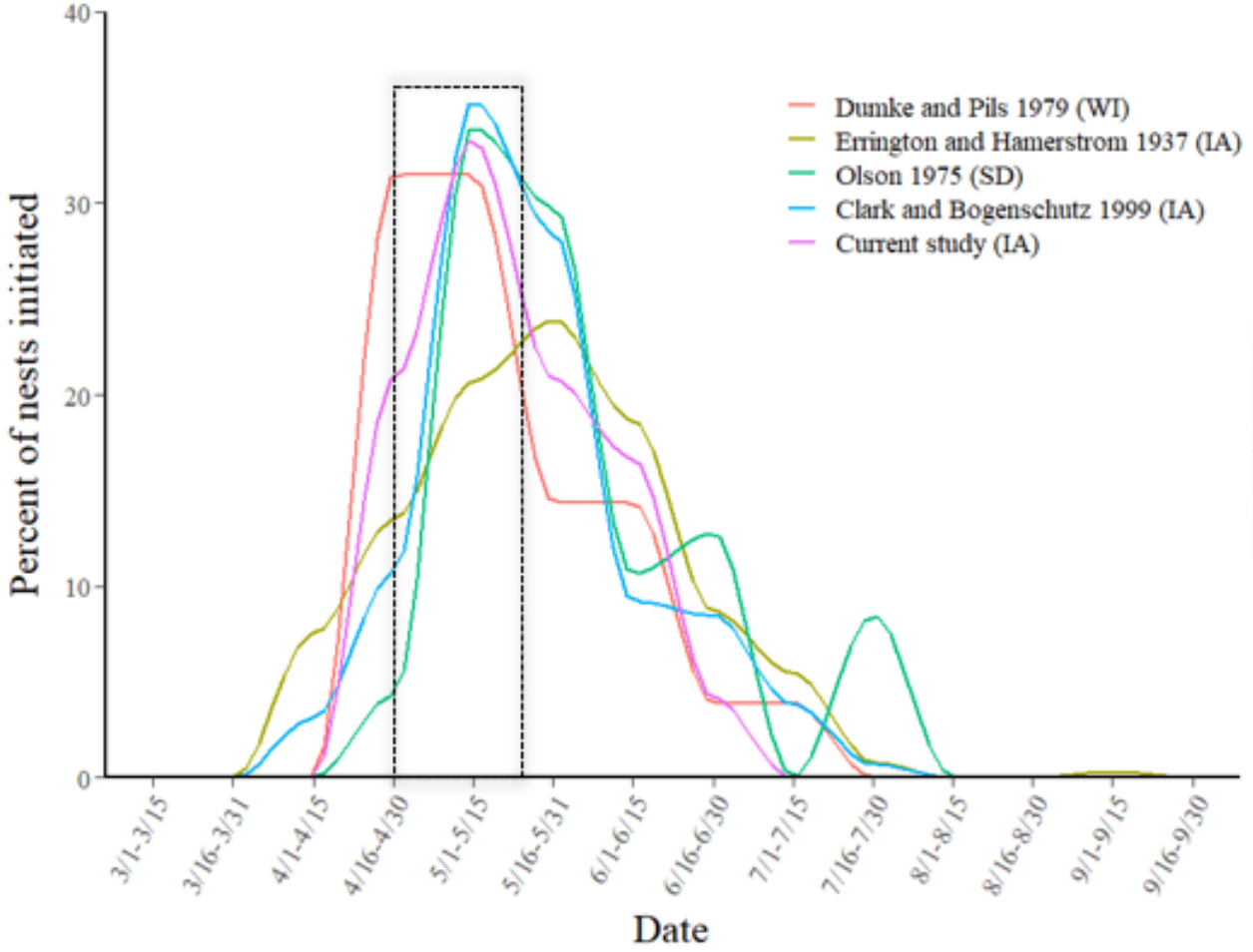
5/12/2020

5/15/2020

6/18/2020

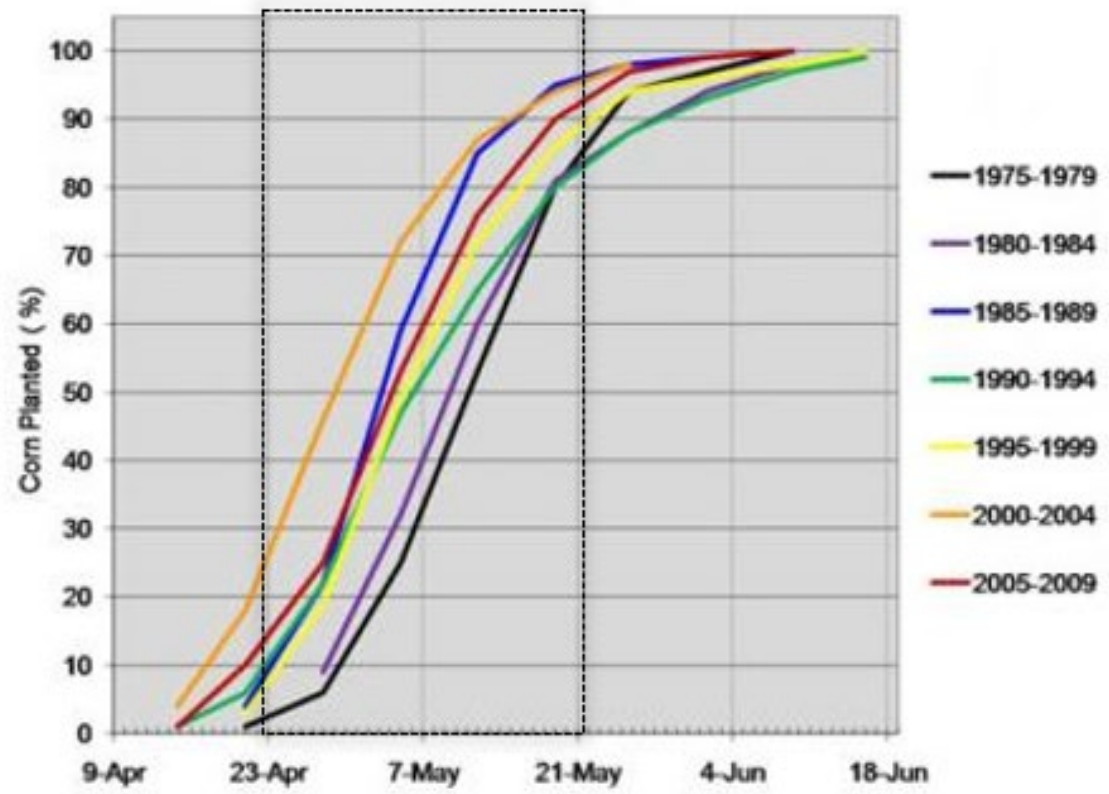
Photos: Taylor Shirley

Pheasant nesting dates



Source: Shirley and Janke (2023) Wildlife Society Bulletin, 47(1), e1394.

Corn planting dates



Source: https://crops.extension.iastate.edu/encyclopedia/planting-date-trends

Key Takeaways

1. Bird point counts

- Diverse bird use, but more aligned with row crop fields than grass fields.

Eastern Meadowlark
© Gary Mueller

2. Pheasant roadside surveys

- At current adoption rates no change in pheasant abundance or index of productivity.

Ring-necked pheasant
© Iowa DNR

3. Pheasant nesting

- Low nest density in cover crop fields.
- Limited nesting resources and high potential conflicts with field operations.

Ring-necked pheasant
© Ashley Wahlberg

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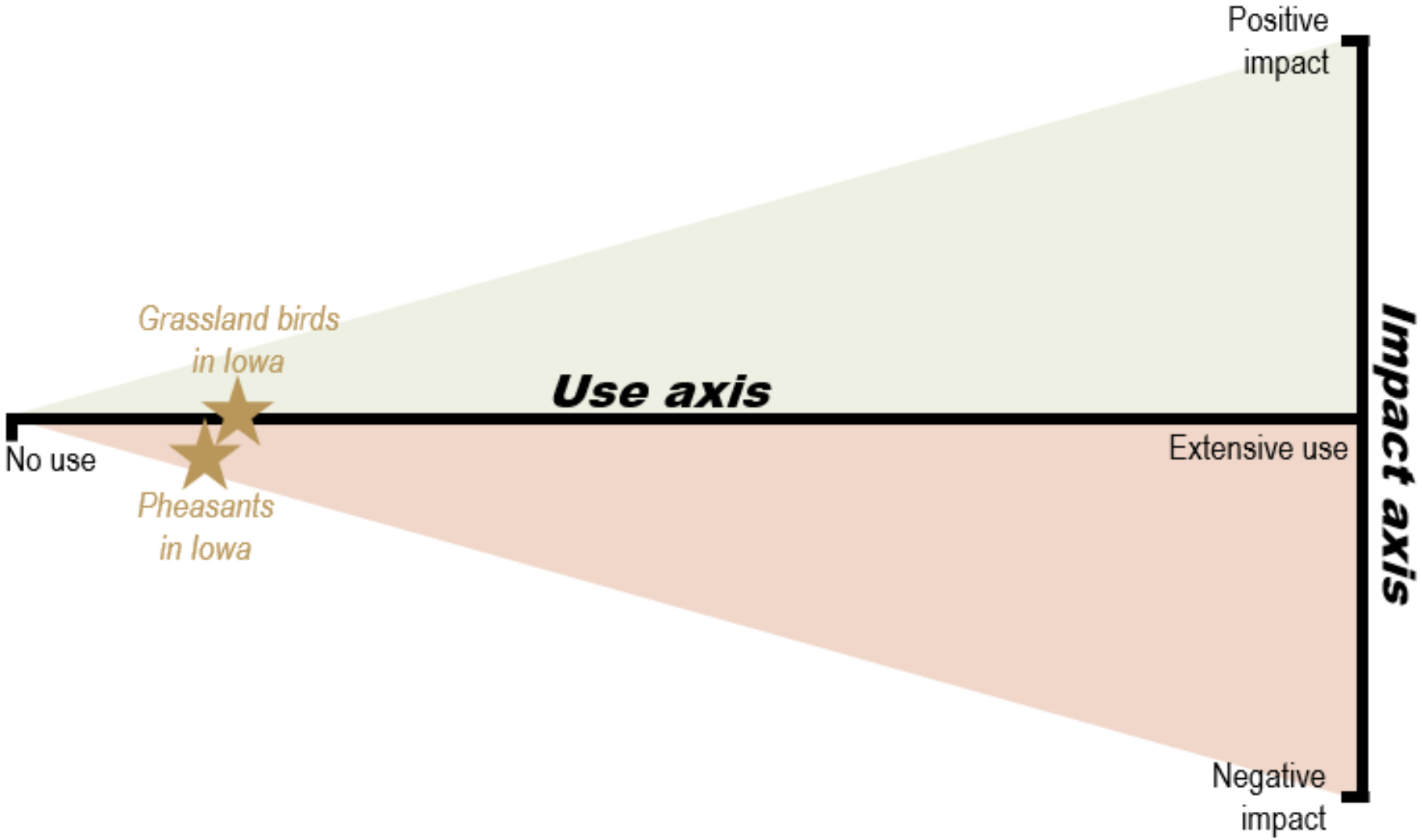


USDA Natural Resources Conservation Service
U.S. DEPARTMENT OF AGRICULTURE

Avian use of agricultural cover crop fields during winter, migration stopover, and the breeding season in Tennessee

David A. Buehler, Brittany Panos and Craig Harper

University of Tennessee

School of Natural Resources

Conservation Outcomes Webinar Series

FARM PRODUCTION AND CONSERVATION
FSA | NRCS | RMA | Business Center

Outline

- For the Tennessee study
  - Objectives
  - Methods
  - Results
    - Vegetation
    - Birds
  - Conclusions and Management Implications

Brittany Panos

University of Tennessee, Knoxville

TRACE: Tennessee Research and Creative Exchange

Masters Theses

Graduate School

5-2024

Evaluation of avian use of agricultural cover crops during the winter, migration stopover, and the breeding season in Tennessee

Brittany Panos

Acknowledgements

- NRCS and the Conservation Effects Assessment Project (CEAP) for funding
- TN- NRCS regional biologists and district conservationists
- UT School of Natural Resources
- Private landowners who allowed access

Background

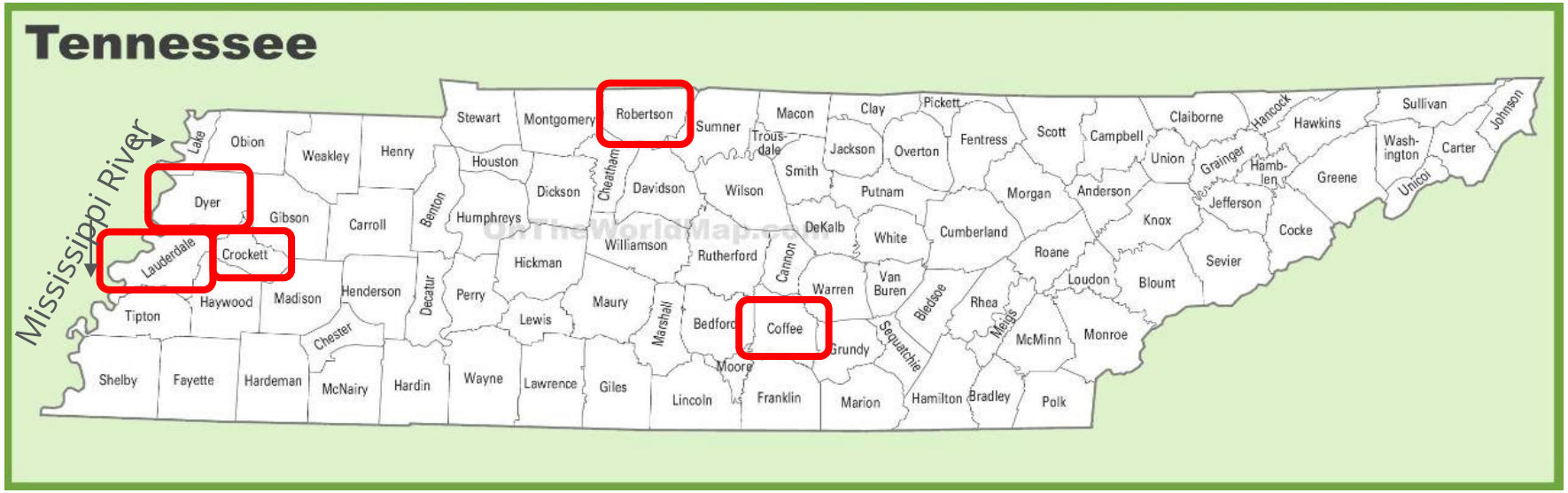
- Implementation of cover crop practice in Tennessee similar to Midwest but
  - Crop types = corn, soybeans and cotton
  - Cover crop species = 5 species grass/forb mix
    - = crimson clover, hairy vetch, Austrian winter pea, daikon radish, triticale, winter wheat
  - Landscape context may differ
  - Climate typical of Mid-South
    - longer growing season and shorter dormant season than Midwest
    - << snow cover
- Largest conservation practice in Tennessee with >100,000 acres enrolled annually since 2019
- Avian use may differ regionally and seasonally

Objectives

- Document establishment, vegetation characteristics and termination of the practice in middle and western Tennessee.
- Document avian use of cover crop fields during winter, migration stopover, and nesting periods.
- Document nesting activity by avian species using cover crop fields.

Study Site Selection

- Total of 5 counties – 2 in Middle TN, 3 in Western TN
- ~40 cover crop + ~20 non-cover crop (control) fields per region per year
- Non-cover crop fields were row crop fields left fallow after crop harvest
- Both field types had spring burn down with herbicides followed by no-till planting of row crops



Study Methods

LINE-TRANSECT BIRD SURVEYS

VEGETATION SURVEYS

BREEDING ACTIVITY SURVEYS

Vegetation Analyses

- Two-way analysis of variance (ANOVAs) in R (R Core Team, 2013)
  - Compare cover crop vs. non-cover crop field vegetation

Vegetation Parameters

Average height (cm)
Percent vegetation cover
Percent bare ground
Vertical variance
Horizontal variance

Avian Analyses-
Cover Crop vs. Non-cover Crop Fields

- Species accumulation curves
  - Total number of species detected
- Occupancy models
  - Occupancy = probability a given species will be present in a given field
- Species richness models
  - Number of species detected/field-visit
- Conservation value models
  - Partner's In Flight (PIF)

Single Species Occupancy Models

American pipit
American robin
Barn swallow
Dickcissel
Eastern meadowlark
Field sparrow
Indigo bunting
Killdeer
Northern bobwhite
Red-winged blackbird
Savannah sparrow
Vesper sparrow
Wilson's snipe
Wild turkey

Results- Establishment and Termination

COUNTY	ESTABLISHMENT DATE		TERMINATION DATE	
	2021	2022	021	2022
COFFEE	15-Oct	20-Oct	25-Apr	30-Apr
CROCKETT	20-Oct	20-Oct	20-Apr	25-Apr
LAUDERDALE	30-Oct	20-Oct	20-Apr	25-Apr
ROBERTSON	20-Oct	20-Oct	25-Apr	25-Apr

Seed mix = crimson clover, hairy vetch, Austrian winter pea, daikon radish, triticale, and winter wheat
Aerial or ground seeding

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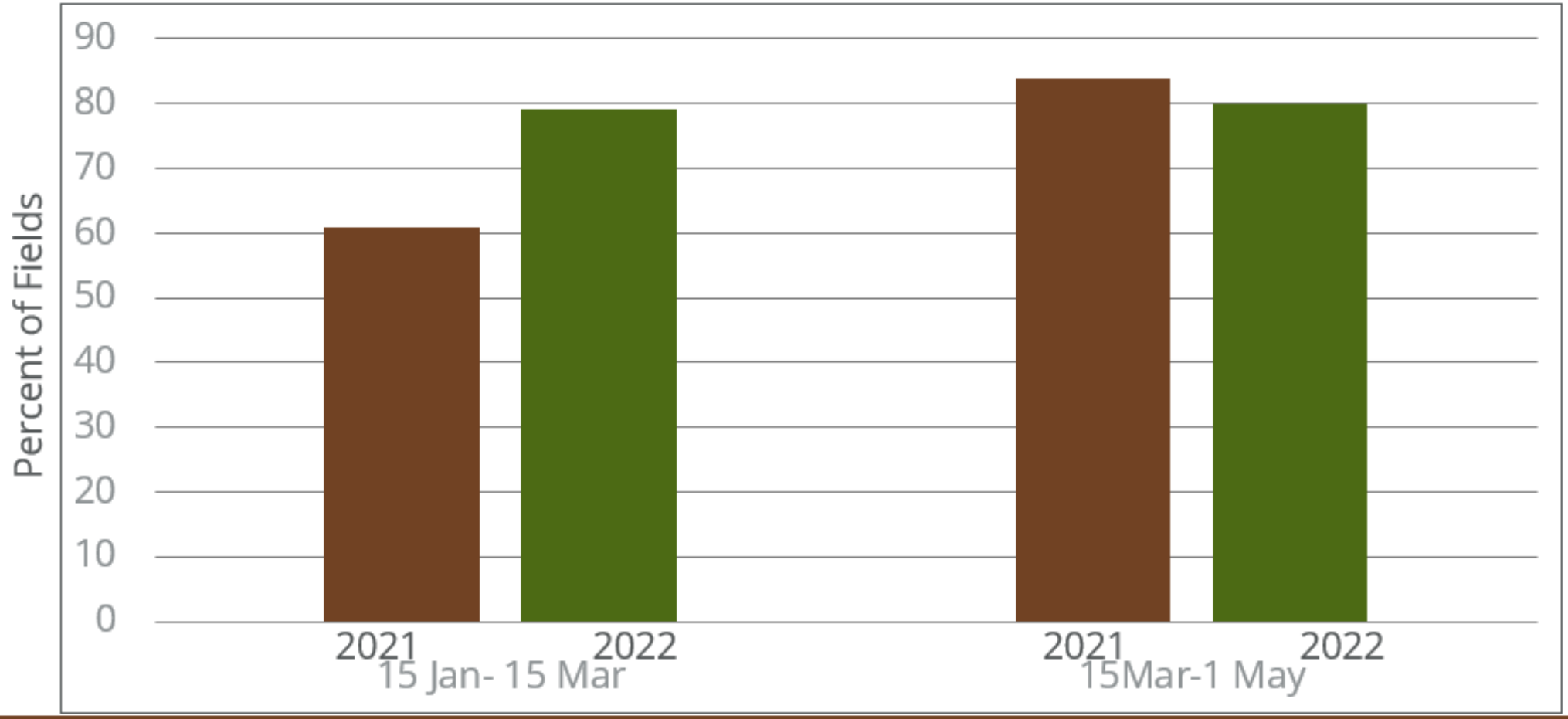
Establishment Success in Cover Crop Fields

- Defined as >75% cover in cover crop species



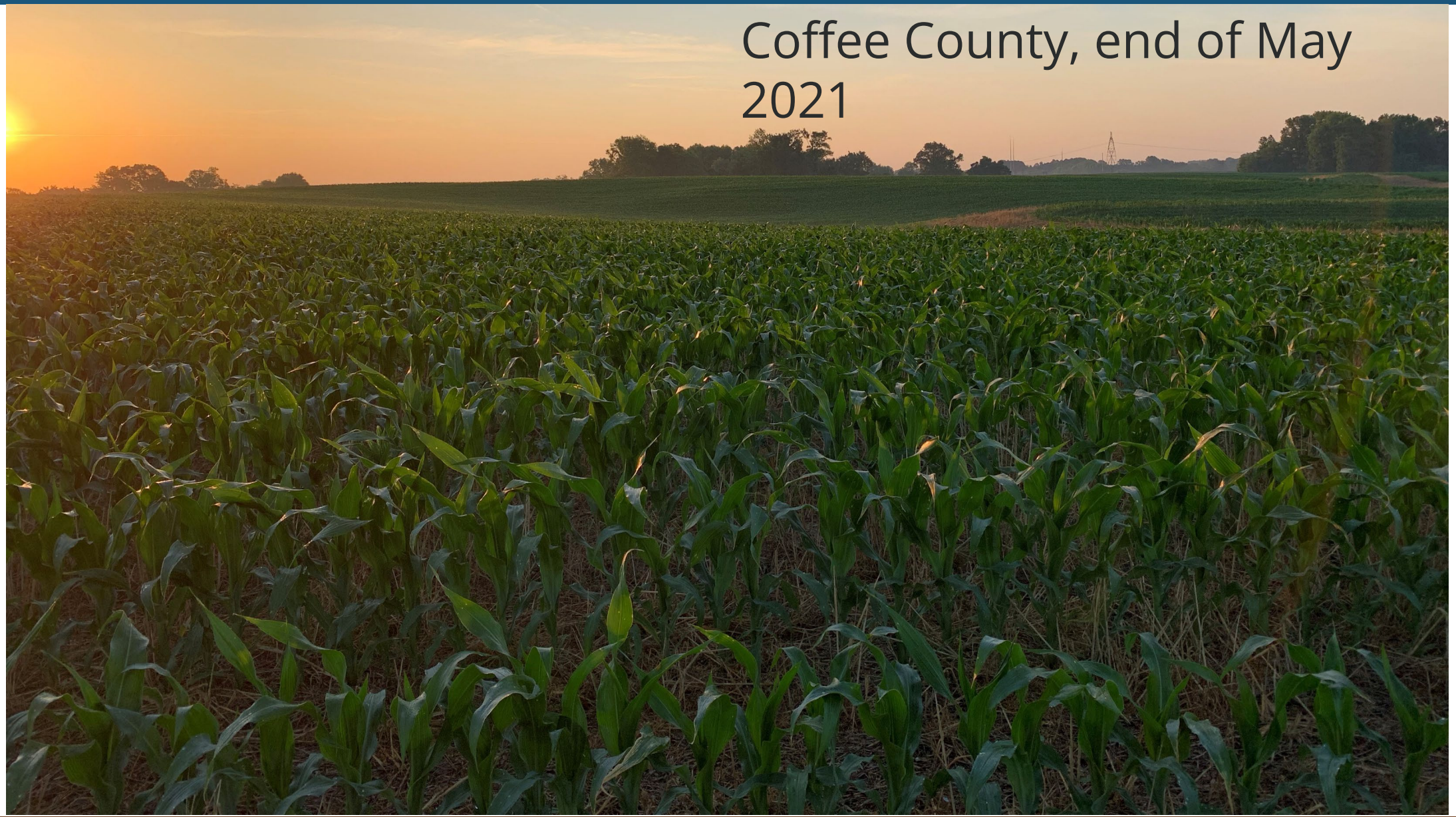

Robertson County, Dec 2020


Coffee County, Jan 2021

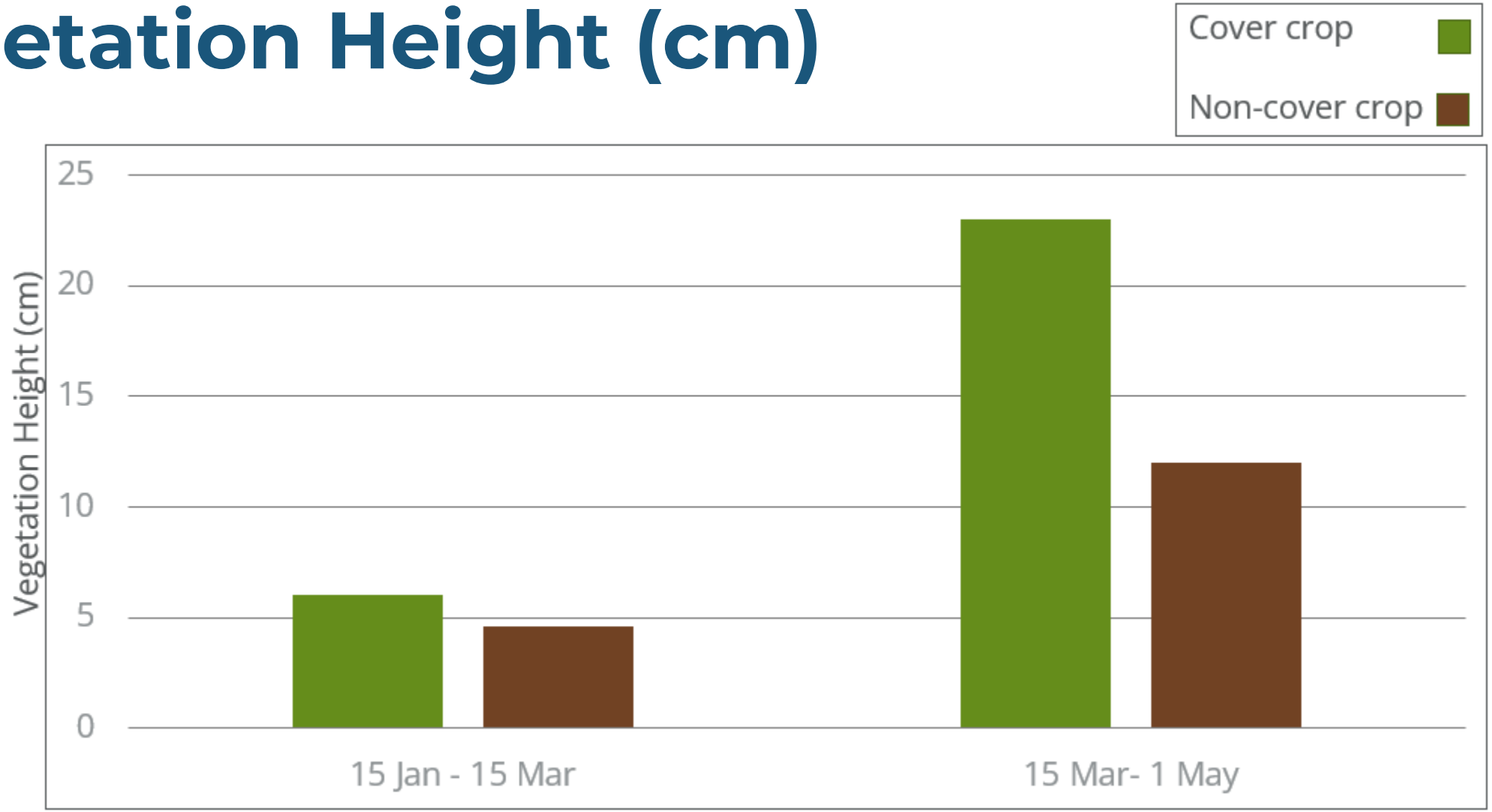

Lauderdale County, Feb 2021


Coffee County, end of Feb 2021

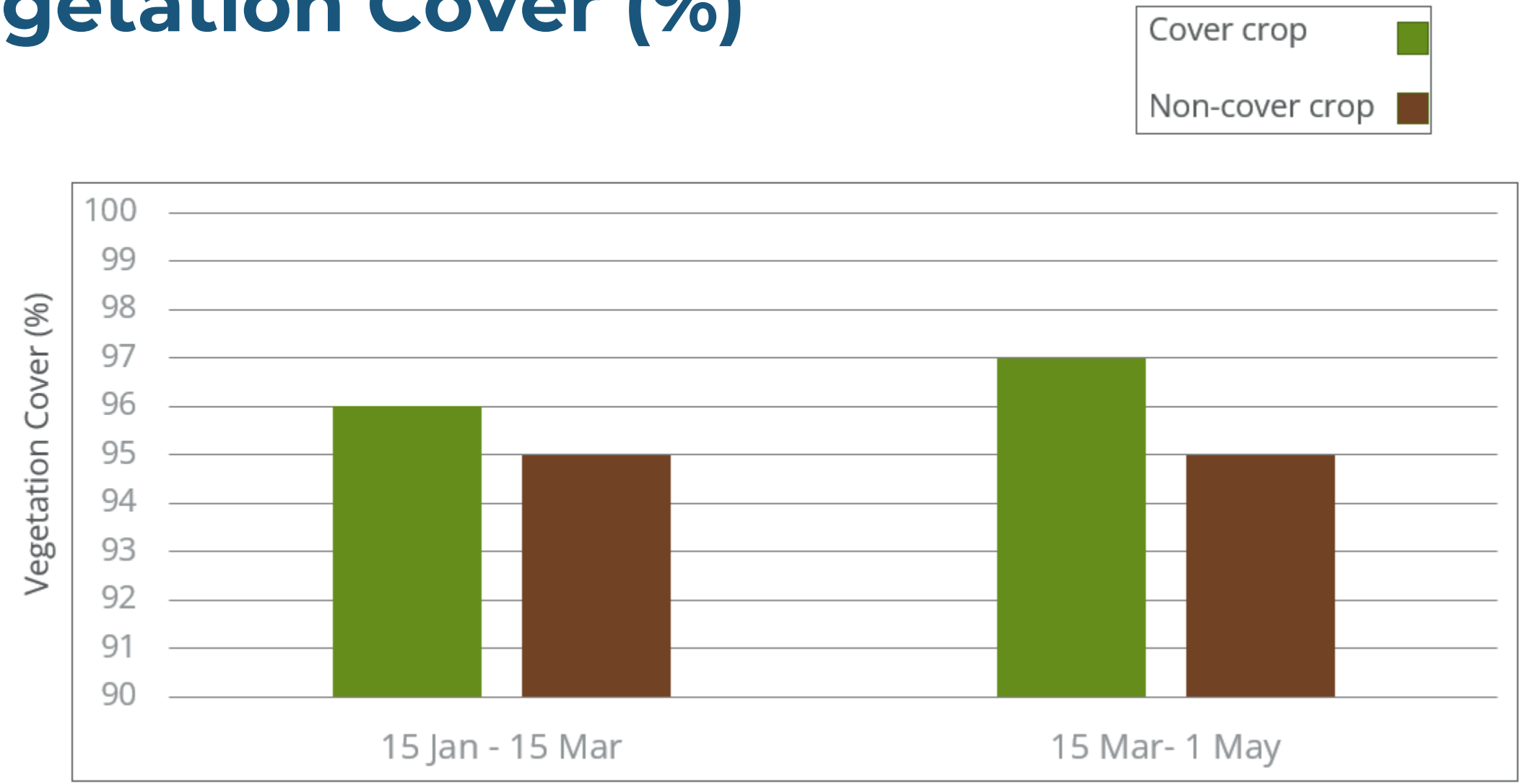

Coffee County, end of April 2021


Coffee County, end of May 2021

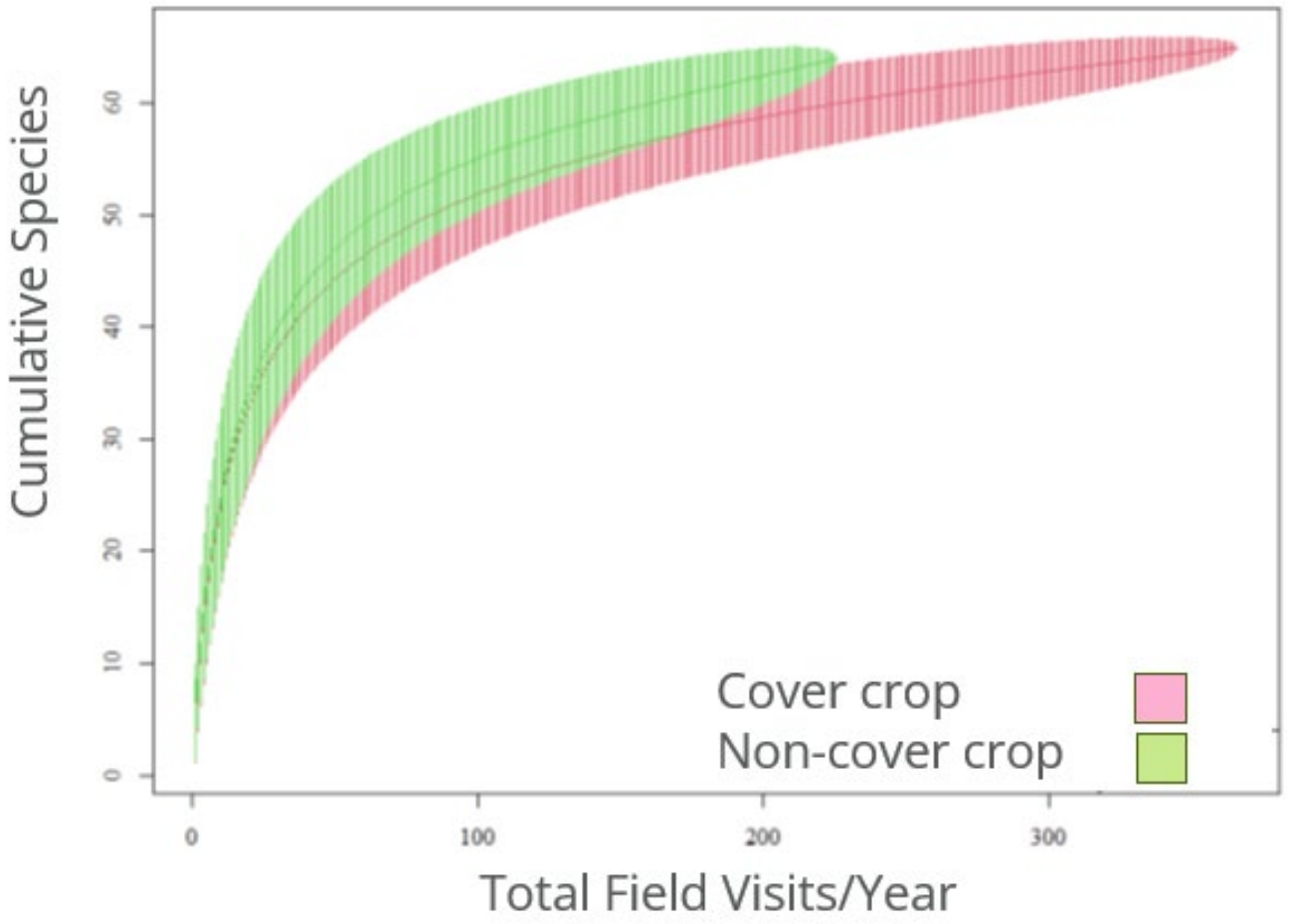
Vegetation Height (cm)



Vegetation Cover (%)



Species Accumulation 2022



Species Accumulation

- Cover crop fields (366 visits)
  - Total: 66 species
  - Year-round: 39 species
  - Wintering: 5 species
  - Migratory: 8 species
  - Breeding: 14 species

- Non-cover crop fields (226 visits)
  - Total: 64 species
  - Year-round: 37 species
  - Wintering: 6 species
  - Migratory: 6 species
  - Breeding: 15 species

Most Common Species by Season- 2022

Cover Crop Fields

- Year-round: 84.5% of total detections
  - Red-winged blackbird: 51.8%
  - Field sparrow: 5.5%
  - Eastern meadowlark: 5.3%
- Wintering: 2.5% of total detections
  - Savannah sparrow: 1.7%
  - Wilson's snipe: 0.5%
  - American pipit: 0.2%
- Migratory: 0.80% of total detections
  - Short-billed dowitcher: 0.4%
  - Vesper sparrow: 0.2%
  - Bobolink: 0.2%
- Breeding: 12.1% of total detections
  - Indigo bunting: 5.7%
  - Dickcissel: 2.2%
  - Barn swallow: 1.6%

Non-cover Crop Fields

- Year-round: 83.1% of total detections
  - Red-winged blackbird: 36.8%
  - European starling: 8.4%
  - Killdeer: 7.9%
- Wintering: 2.4% of total detections
  - American pipit: 0.9%
  - Savannah sparrow: 0.9%
  - Wilson's snipe: 0.2%
- Migratory: 0.6% of total detections
  - Short-billed dowitcher: 0.3%
  - Vesper sparrow: 0.2%
  - Yellow-rumped warbler: 0.1%
- Breeding: 13.9% of total detections
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  - Barn swallow: 1.7%
  - Dickcissel: 1.0%

Most Common Species Year-round- 2022

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Species of Conservation Concern- 2022

Cover Crop Fields

- Northern bobwhite
  - 38 detections
  - Signs of breeding activity (calling) on cover crop fields
- Wild turkey
  - 23 detections
  - No signs of breeding activity
- Loggerhead shrike
  - 1 detection
  - Not detected during breeding season

Non-cover Crop Fields

- Northern bobwhite
  - 16 detections
  - Signs of breeding activity (calling) on cover crop fields
- Wild turkey
  - 16 detections
  - No signs of breeding activity
- Loggerhead shrike
  - No detections

Single Species Occupancy Models

Species	Season	Detections	Occupancy Cover Crop	Occupancy Non-cover Crop	P
Dickcissel	B	430	0.19	0.07	<0.01
Eastern Meadowlark	All	529	0.18	0.13	0.01
Field Sparrow	All	764	0.25	0.20	<0.01
Red-winged Blackbird	All	564	0.28	0.22	0.01
Savannah Sparrow	W + M	477	0.20	0.14	<0.01
American Robin	All	320	0.05	0.07	0.05
Killdeer	All	292	0.04	0.12	<0.01

Species Richness and Partner's In Flight (PIF) Conservation Score 2022

		2022				
	Cover Crop		Non-cover Crop		2021	2022
Response	Means	SE	Means	SE	P	P
Species Richness	2.36	0.06	2.09	0.07	<0.01	<0.01
PIF Score	21.52	0.53	19.05	0.62	<0.01	0.02

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Nesting Activity

- Documented nesting activity for some of the species present during the breeding season
  - Male territorial singing
  - Carrying nest building material

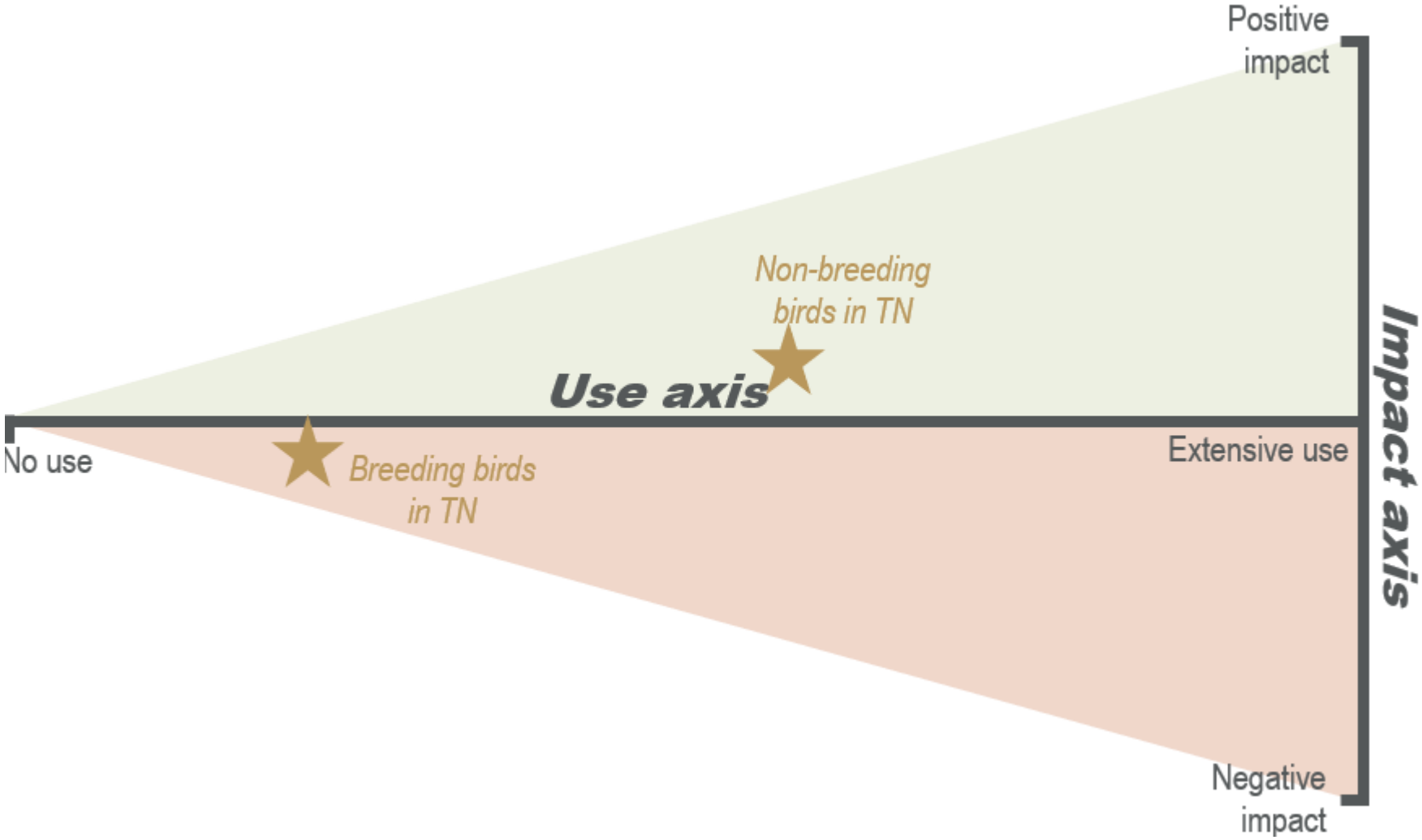
- But no documented successful nesting
  - Nests located that hatched
  - Food carries to nest
  - Documentation of fledglings

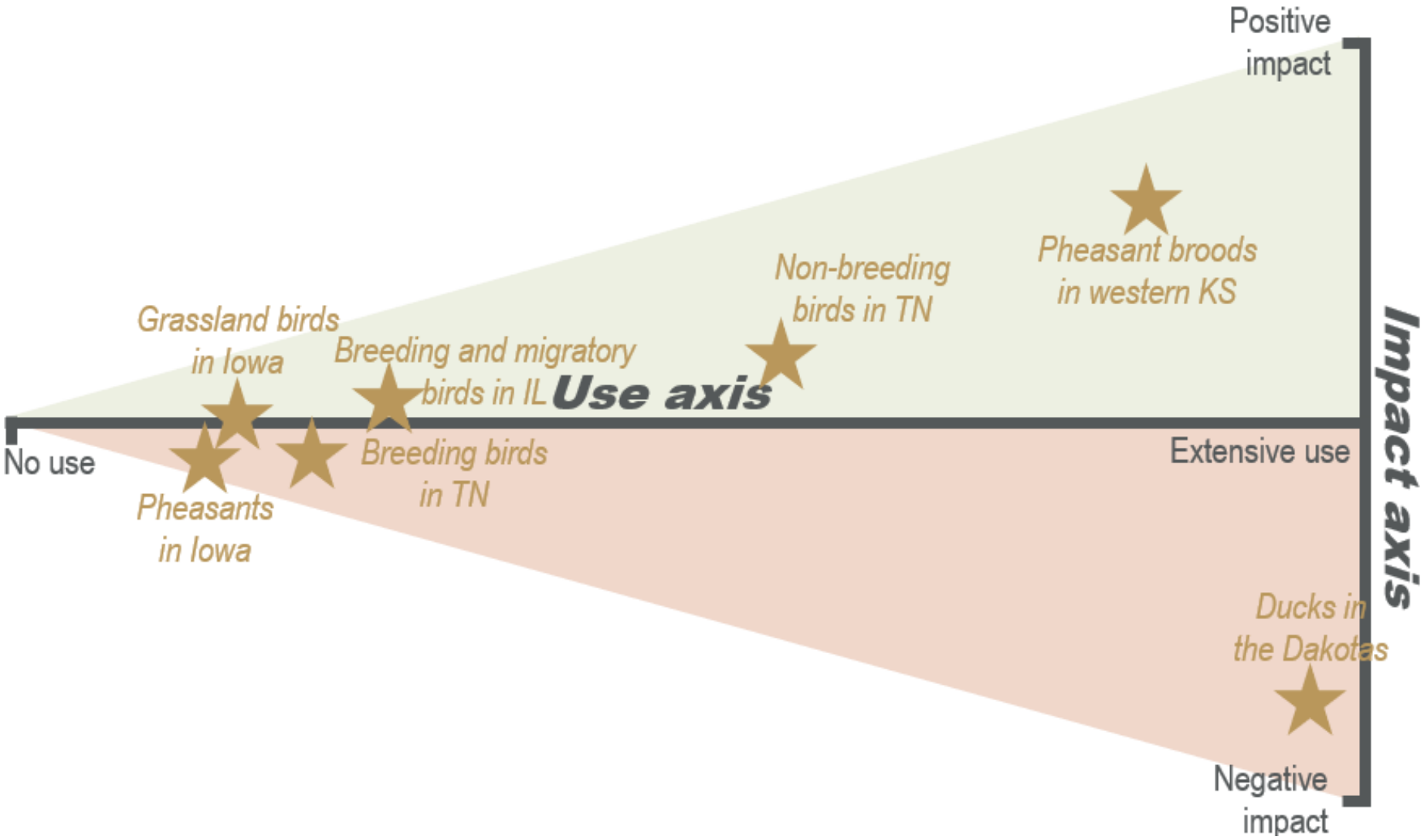
E. Burken photo

Conclusions in Tennessee

- Implementation of cover crop practice successful
- Large diversity of avian species utilizing cover crop fields
- Bird conservation value of cover crop fields was greater (+10%) than in non-cover crop fields
- Use of cover crops early in the breeding season (April) is common by priority grassland bird species, but successful nesting not documented
- Termination date determines amount of nesting activity
  - TN-NRCS Technical Committee considering incentives for earlier termination to discourage early nesting attempts by grassland birds (i.e. April 1 - 15)

What about **wildlife**?




Positive impact
Pheasant broods in western KS
Non-breeding birds in TN
Grassland birds in Iowa
Breeding and migratory birds in IL
Use axis
Impact axis
No use
Extensive use
Breeding birds in TN
Pheasants in Iowa
Ducks in the Dakotas
Negative impact

Questions?

Thank you for attending!