

Addressing soil health and nutrient management can benefit birds

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USDA SARE - OUR FARMS, OUR FUTURE 2018 CONFERENCE

APRIL 4TH, 2018

Agricultural History

Increased land in row crops

- Current ~60%

Decrease in small grains

Removal of hedgerows & fence lines

Increase in chemical use

Soil disturbance

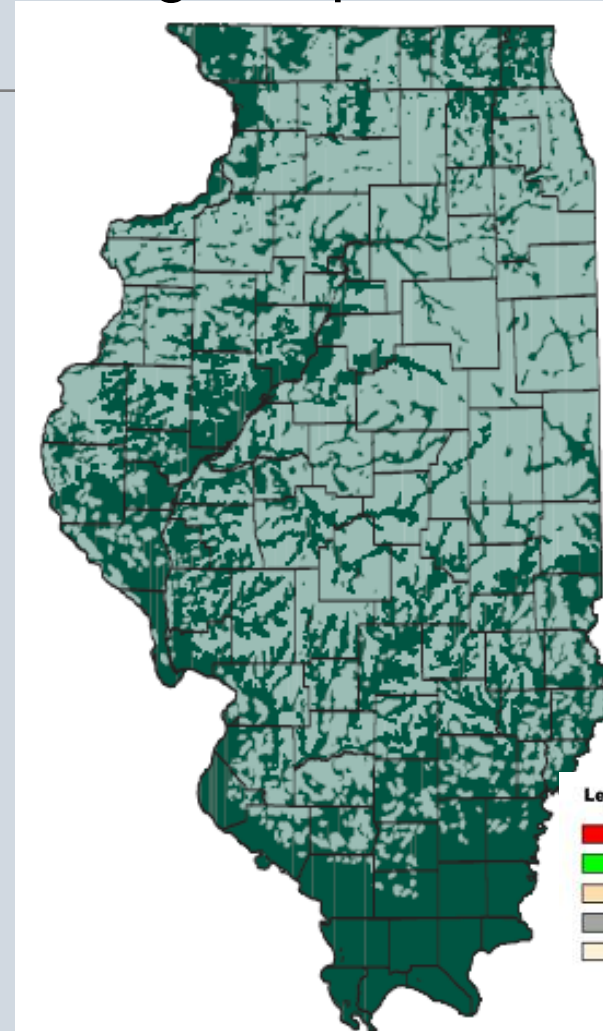
- Soil erosion



Water Quality

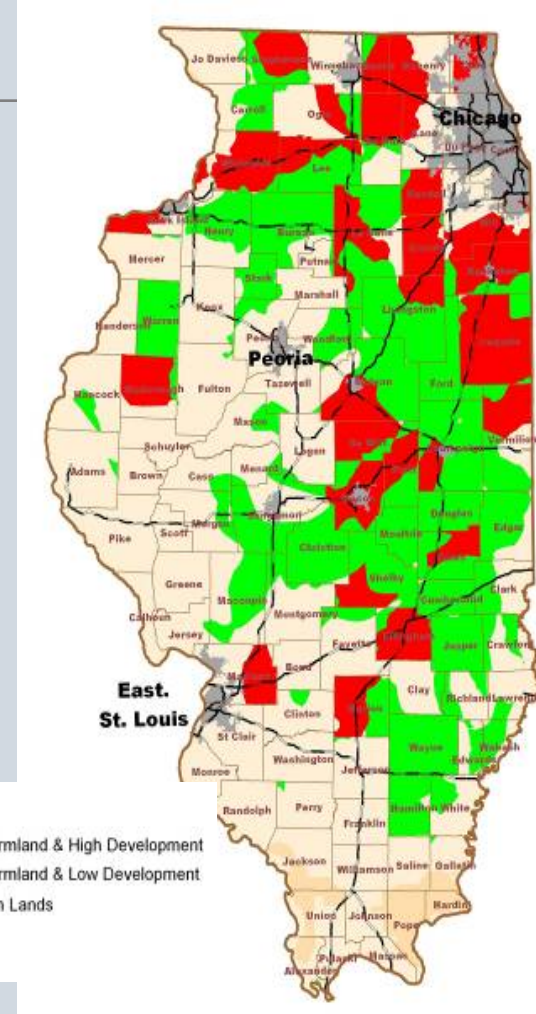
Wildlife population declines

Tallgrass prairie-1820



Anderson (1970)

Current arable land



American Farmland Trust (2006)

Cover Crops

What is a cover crop?

- Crop planted after main cash crop that is terminated before the next year's cash crop

Types

- Legumes, grasses, small grains, non-legume broadleaves

Benefits

- Source of N → can increase yield
- N scavenger → improve water quality
- Improve soil quality (SOM)
- Weed suppressant
- Grazing/foraging
- Decrease erosion

Tillage Radish



Cassandra Wilcoxen

Gulf Hypoxia Action Plan 2008

for Reducing, Mitigating, and Controlling Hypoxia
in the Northern Gulf of Mexico and Improving
Water Quality in the Mississippi River Basin



Mississippi River
Gulf of Mexico
Watershed Nutrient
Task Force



ILLINOIS
NUTRIENT LOSS
REDUCTION STRATEGY



Illinois
Department of
Agriculture

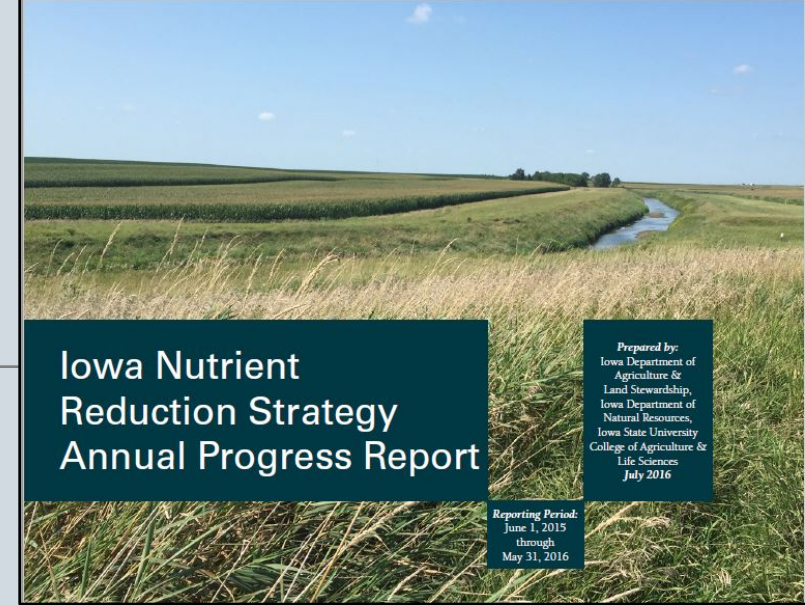


Indiana's State Nutrient Reduction Strategy



A framework to reduce nutrients
entering Indiana's waters

Version 3 – October 2015



Iowa Nutrient Reduction Strategy Annual Progress Report

Prepared by:
Iowa Department of
Agriculture &
Land Stewardship,
Iowa Department of
Natural Resources,
Iowa State University
College of Agriculture &
Life Sciences
July 2016

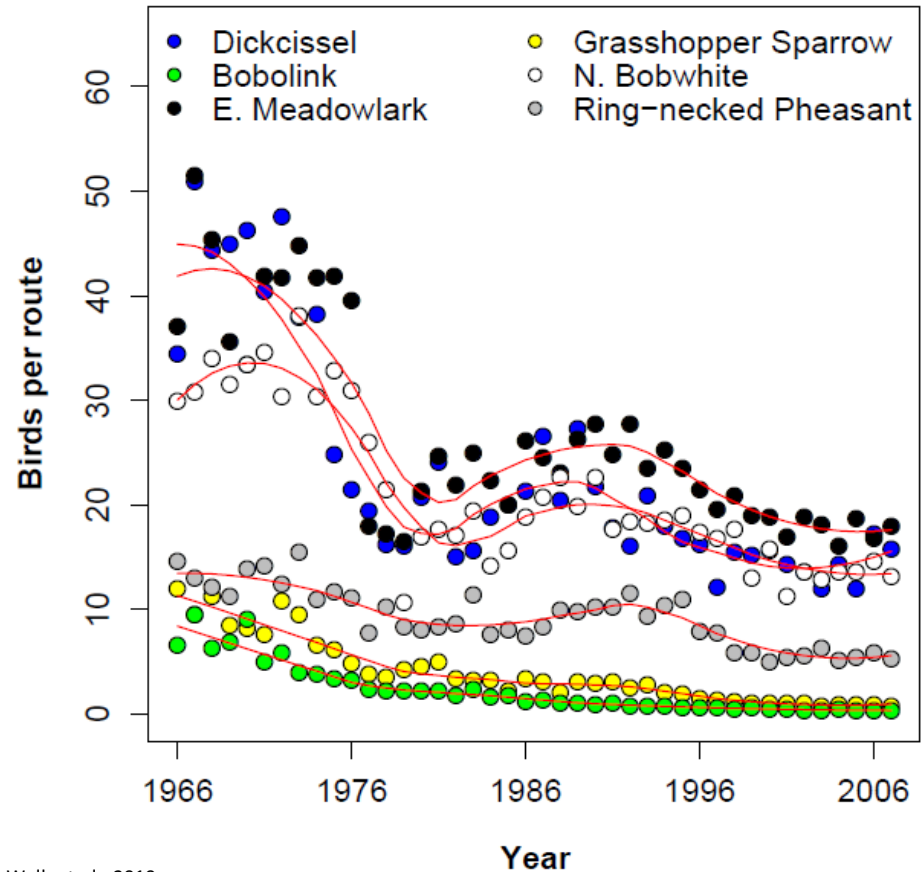
Reporting Period:
June 1, 2015
through
May 31, 2016

Wisconsin's Nutrient Reduction Strategy

November 2013



Resident Birds



Walk et al., 2010



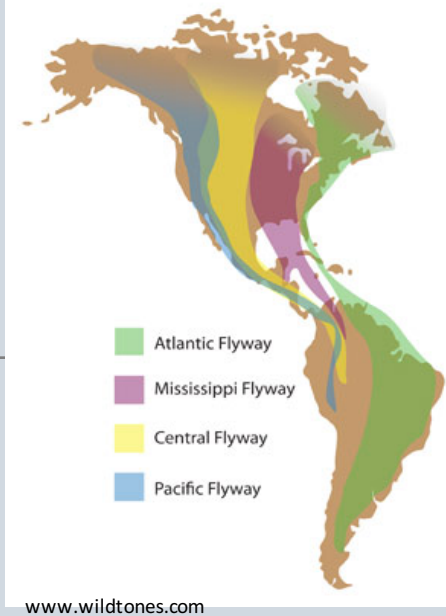
Migratory Birds



32

T. SCOTT SILLETT
AND RICHARD T. HOLMES

Long-Term Demographic Trends, Limiting Factors, and the Strength of Density Dependence in a Breeding Population of a Migratory Songbird



www.wildtones.com

Journal of Animal Ecology 2002
71, 296–308

Variation in survivorship of a migratory songbird throughout its annual cycle

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Summary

1. Demographic data from both breeding and non-breeding periods are needed to manage populations of migratory birds, many of which are declining in abundance and are of conservation concern. Although habitat associations, and to a lesser extent, reproductive biology, are known for many migratory species, few studies have measured survival rates of these birds at different parts of their annual cycle.

Journal of Animal Ecology 2014, **83**, 176–184

doi: 10.1111/1365-2656.12135

When and where does mortality occur in migratory birds? Direct evidence from long-term satellite tracking of raptors

Raymond H. G. Klaassen^{1,2,3*}, Mikael Hake¹, Roine Strandberg¹, Ben J. Koks², Christiane Trierweiler^{2,4}, Klaus-Michael Exo⁴, Franz Bairlein⁴ and Thomas Alerstam¹

Spring Avian Cover Crop Surveys

Questions

- What birds are using cover crops during spring migration?
- Are more species and individuals using cover crop fields compared to control fields?
- Are more birds of conservation concern using cover crop fields?



Study Area & Methods

Walking point counts

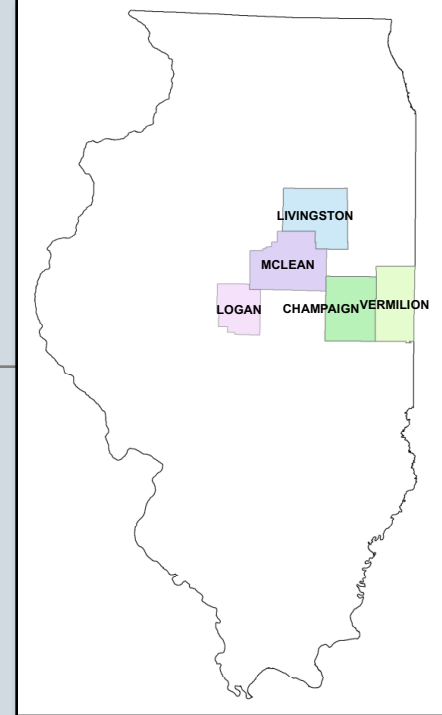
4 field types:



Corn
Corn + cover crop



Soybean
Soybean + cover crop





**Red-winged
Blackbird
27.7%**



**Common Grackle
10.2%**

**American
Robin
9.9%**



**Vesper Sparrow
5.6%**

6339 individuals detected
53 species
14 species = 90%

**Eastern
Meadowlark
4.4%**



**American Golden-
Plover 3%**



Corn

28 species
2.2 birds/100 meters

Soybean

23 species
2.4 birds/100 meters

Bird Density & Species Richness

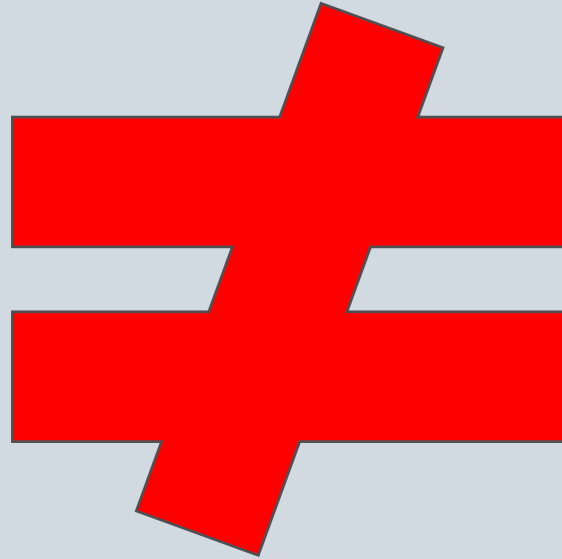
Corn + Cover Crop

44 species
4.4 birds/100 meters

Soybean + Cover Crop

34 species
3.0 birds/100 meters

Birds of Conservation Concern



Avian Conservation Significance values (ACS)

Partners in Flight (PIF) * density

Corn



ACS = 39.44

Soybean



ACS = 24.6

Avian Conservation Significance values (ACS)

Corn + Cover Crop



ACS = 57.8

Soybean + Cover Crop



ACS = 44.69

Cover Crop Summary

Greater densities in cover crop fields

Vegetation structure is more robust

Hypotheses

Resident birds:

- Breeding
 - protection from predators & elements
 - foraging

Migratory birds:

- Stopover
 - protection from predators & elements
 - foraging



Cassandra Wilcoxon

Cover Crop Termination

Termination

- Chemical vs mechanical
- Timing

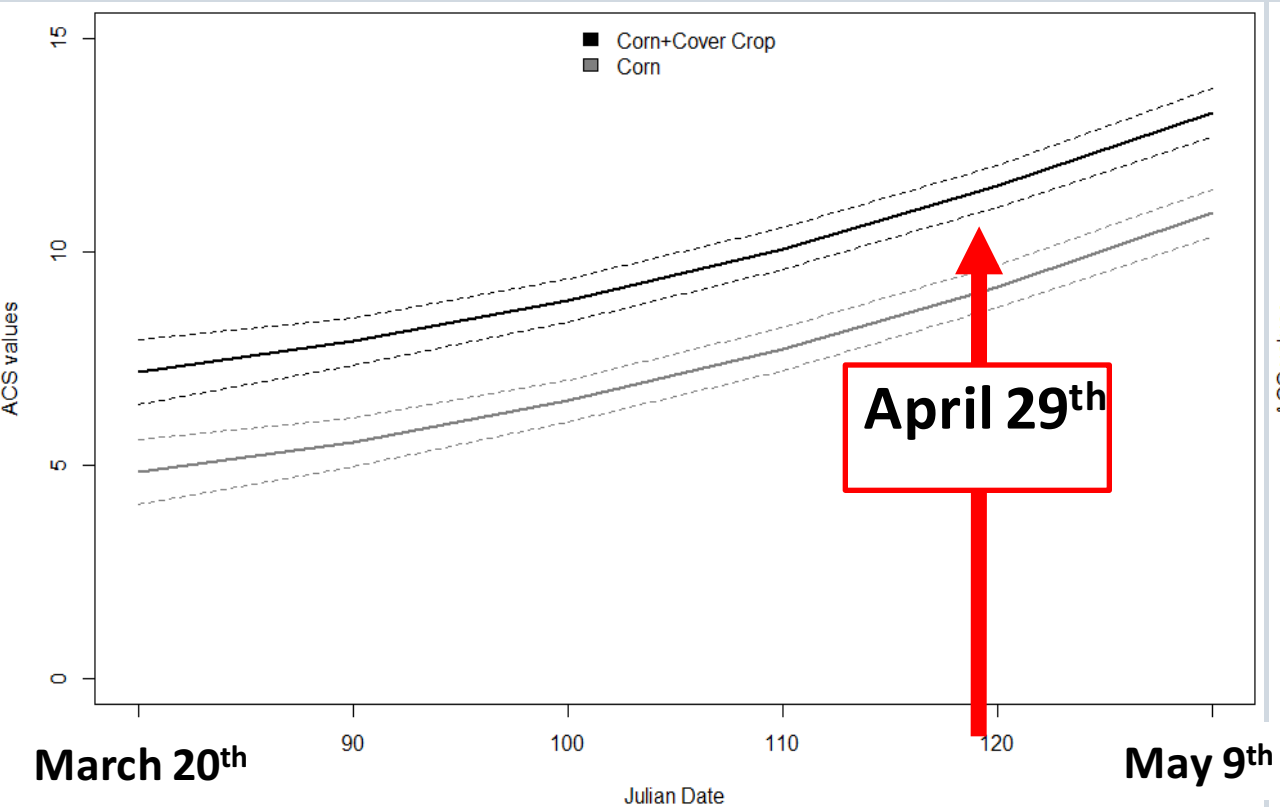


Vs.

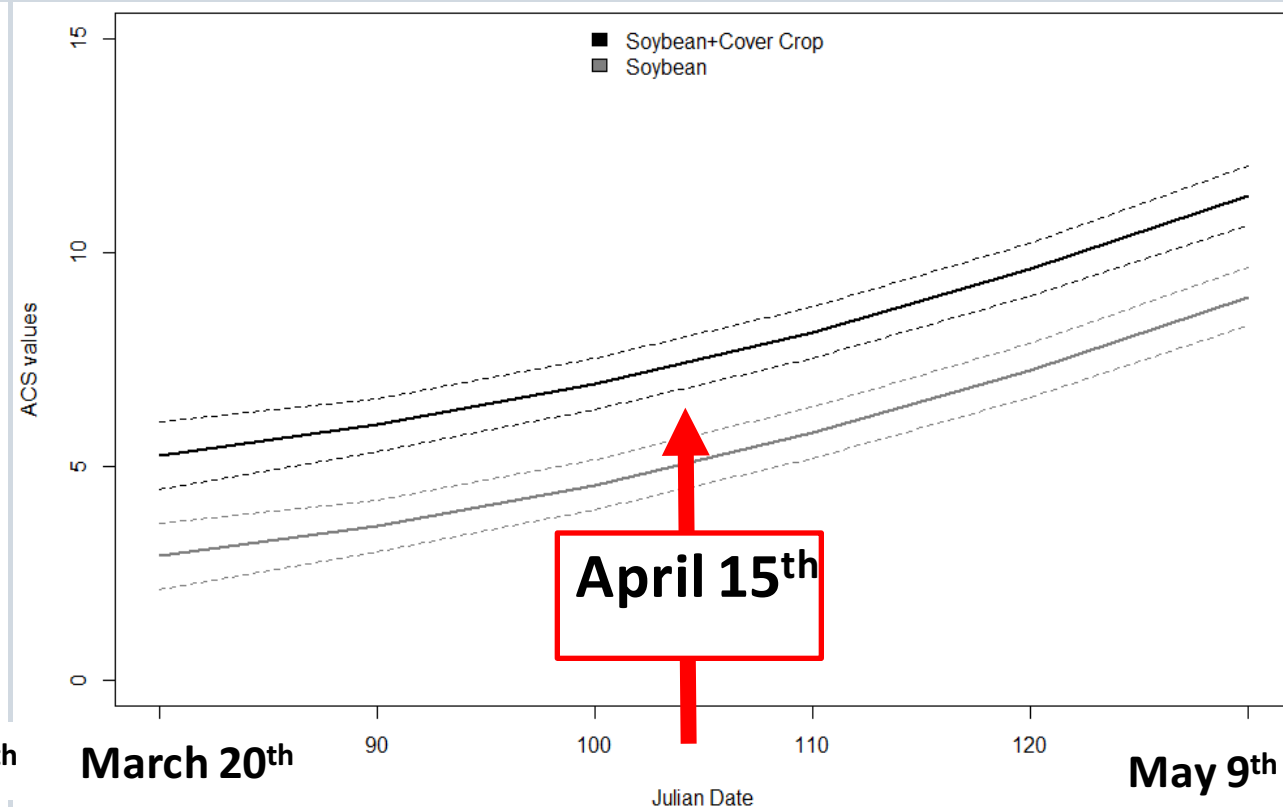


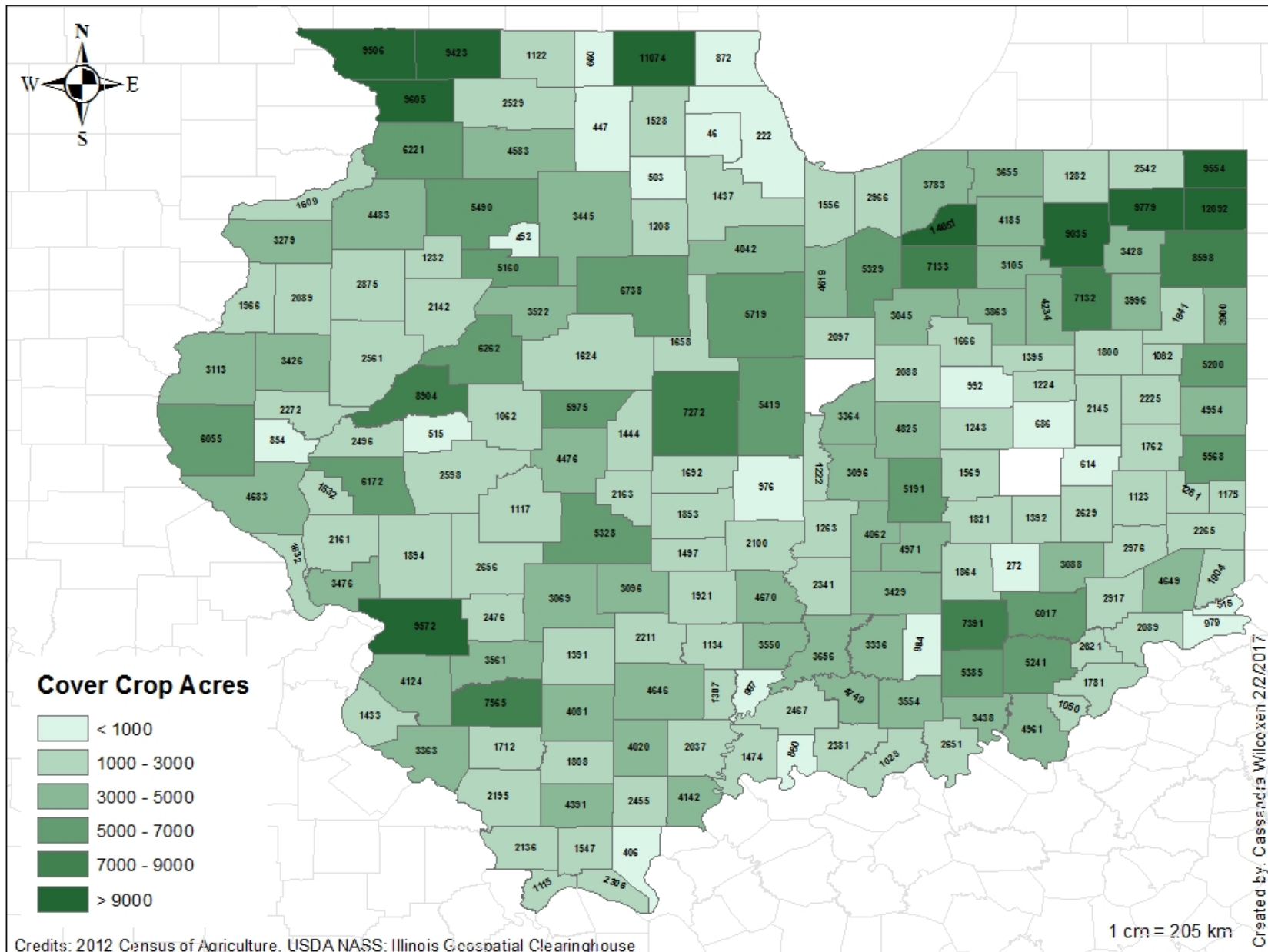
Cover Crop Termination

Corn vs Corn + cover crop



Soybean vs Soybean + cover crop





2012 1.3 million acres planted in Illinois & Indiana (NASS)

Evidence of increased acreage



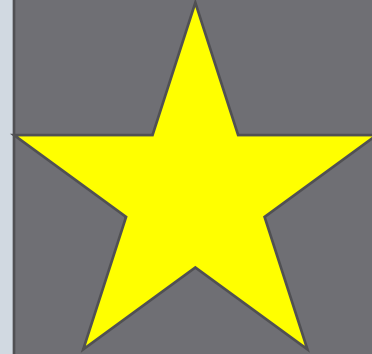
Future Challenges & Opportunities

Termination

- Chemical vs mechanical
- Timing

Recommendations

- delay to early May
 - early breeders
 - later breeders



**More integrated & holistic
approach to soil health**

**Research needs:
Nest success & food
availability in cover crop
fields**

Acknowledgements

McLean County NRCS, Livingston County NRCS, individual farmers

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