



An Evaluation of Northern Bobwhite Conservation Research: a Call for Large-Scale Studies

Gomez, L. G., and K. S. Reyna



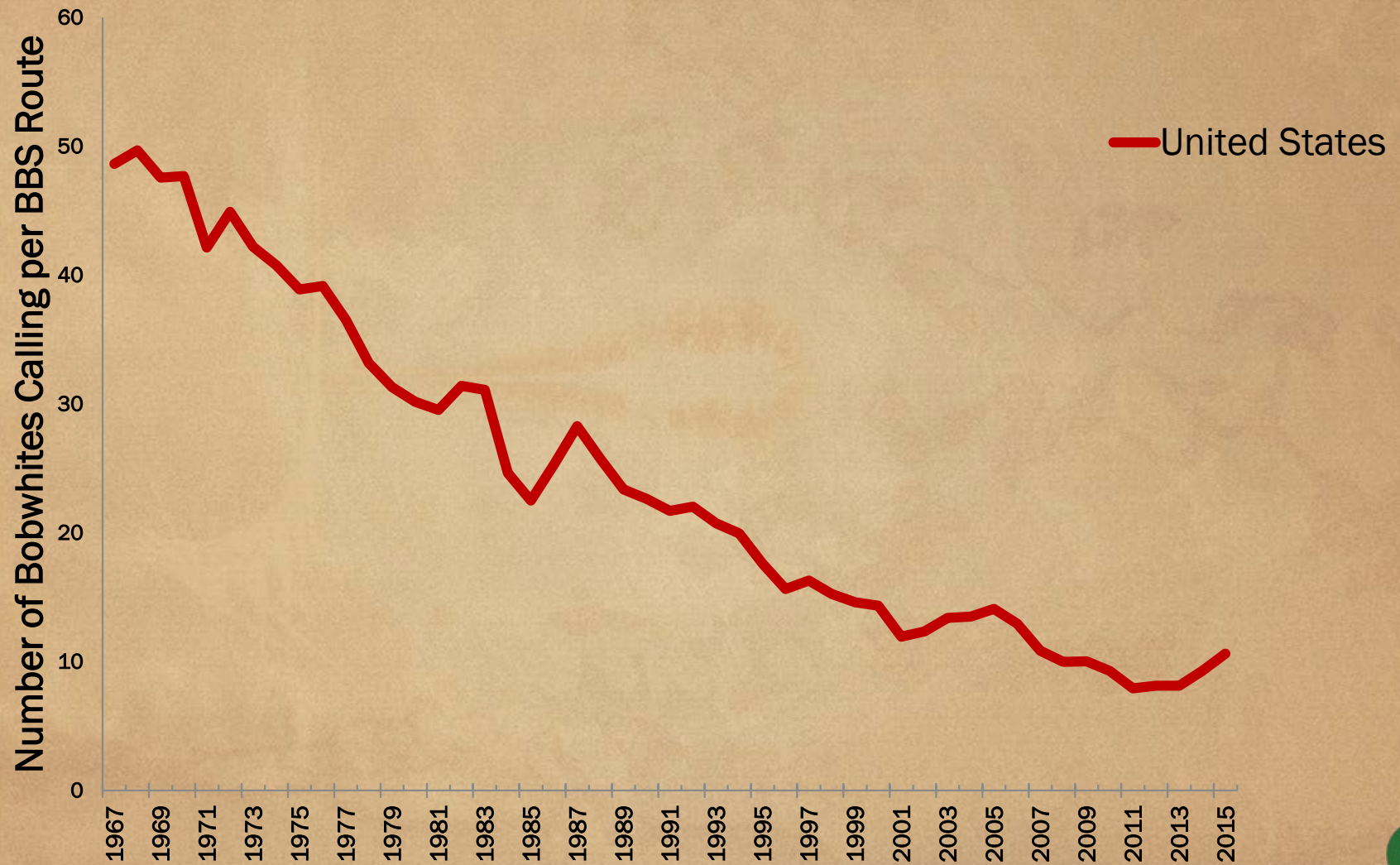
UNT Quail



@QuailProfessor@UNTQuail

TEDx (Saving the Nation, One Quail at a Time)

The Bobwhite Decline



Historical Management Efforts



LOCAL

Measures of Success

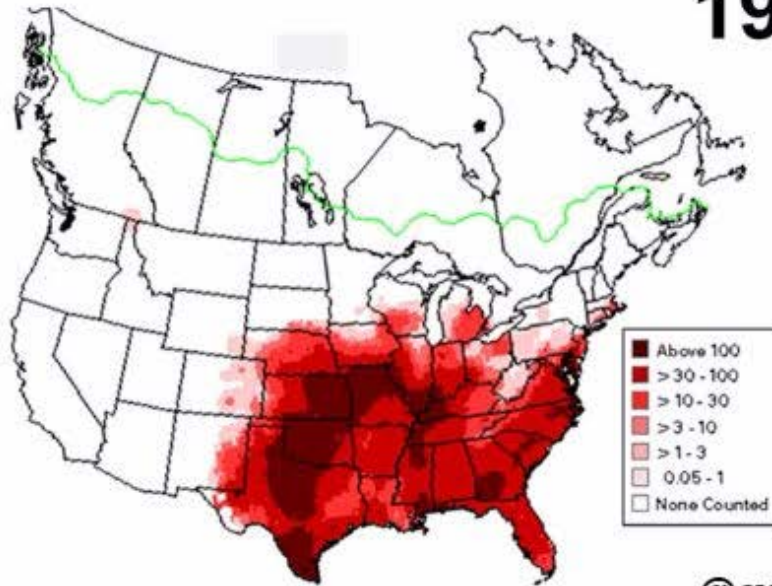
- Covey Flushes/hr



The Bobwhite Decline

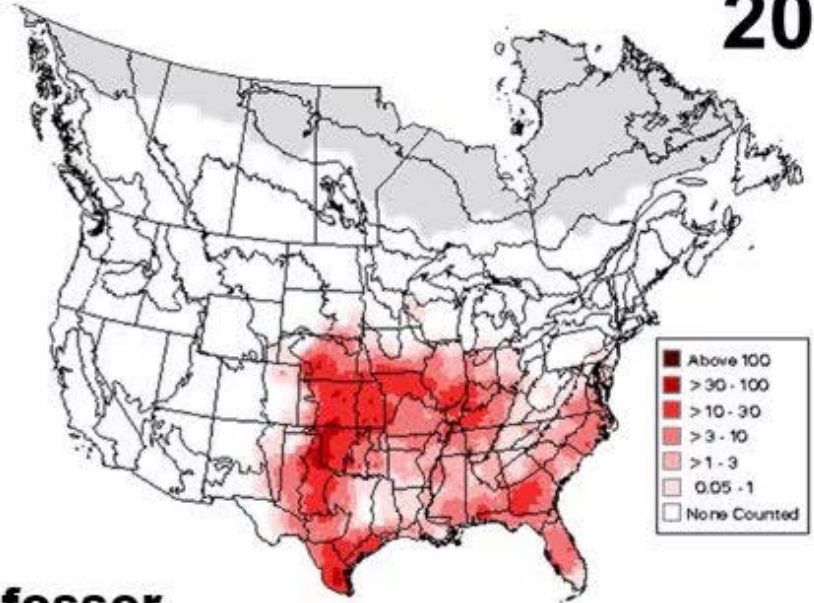
Northern Bobwhite Abundance

1996



Northern Bobwhite Abundance

2015



@quailprofessor

Grassland Decline



AN EVALUATION OF NORTHERN BOBWHITE CONSERVATION RESEARCH: A CALL FOR LARGE-SCALE STUDIES

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Large scale *problem*



Large scale *response*

Two Decades of Bobwhite Research

Call-to-action: Brennan, 1991

Wildl. Soc. Bull. 19:544–555, 1991

HOW CAN WE REVERSE THE NORTHERN BOBWHITE POPULATION DECLINE?

LEONARD A. BRENNAN, *Department of Wildlife and Fisheries, Mississippi State University, P.O. Drawer LW, Mississippi State, MS 39762*

Northern bobwhite (*Colinus virginianus*) populations have been declining at an alarming rate during the past 3 decades. Every broad-scale population index of bobwhites indicates a significant downward trend. Trends from Christmas Bird Count (CBC) data (Fig. 1, Table 1) and Breeding Bird Survey (BBS) data (Droege and Sauer 1990) indicate that bobwhite populations have undergone significant declines in 77% of the states within their geographic range. Especially troubling is the fact that the most precipitous declines in bobwhite populations have occurred in the southern region of the United States (Fig. 1B, Table 1). The slope from the regression analysis of the southeastern region CBC data (Fig. 1B) is steeper than the slope from the midwest and northern region data pooled ($P < 0.05$, 2-sample F -test; Fig. 1C). This is quite unexpected because the southern U.S. is the center of the bobwhite's geographic range (Rosene 1969, Gutiérrez et al. 1983) and has historically been

likely will continue to decline and the tradition of hunting wild bobwhite coveys will largely be a thing of the past. Therefore, my purpose in this paper is to outline a research and management manifesto for the northern bobwhite in the 1990's. My objectives are to (1) describe the probable causes for the northern bobwhite population decline, (2) outline the research agenda that will be required to solve northern bobwhite habitat management problems, and (3) describe some strategies that extension services and private interest groups can use to educate the public about bobwhite habitat and population management techniques.

WHY THE DECLINE?

There are several probable reasons why the bobwhite is declining over a broad portion of its geographic range. Clean-farming practices and silvicultural systems that maximize basal area are 2 of the most likely causes of habitat

We would expect to see an increase in landscape-scale research.



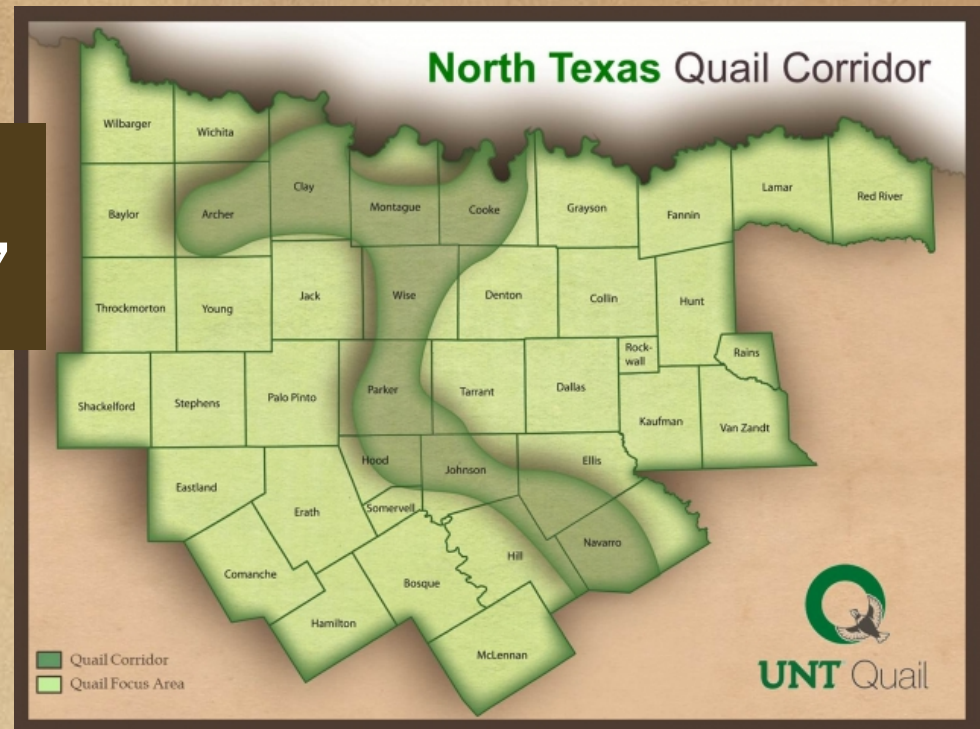
The Landscape-Scale

- **Landscape-scale:**
 - ~1,000,000 ha (2.4 mil acres) (Sands et al. 2012)



Modern Management Efforts

Emphasis on
“Landscape-Scale”



Does Research Relate To Management?



Science



Management

- Management practices – based on science
- Does the science address chief management concerns?

Scoping Two Decades of Bobwhite Research



139 articles from 1996–2015

3 scale-rankings:

Ranch-level: $\leq 5,000$ ha (12k acres) *

Landscape-level: $> 5,000$ and $\leq 1,000,000$ ha

Region-level: $> 1,000,000$ ha

* A less conservative definition than referred to in literature.

✚ Studies suggest impact on quail decline

Two Decades of Bobwhite Research

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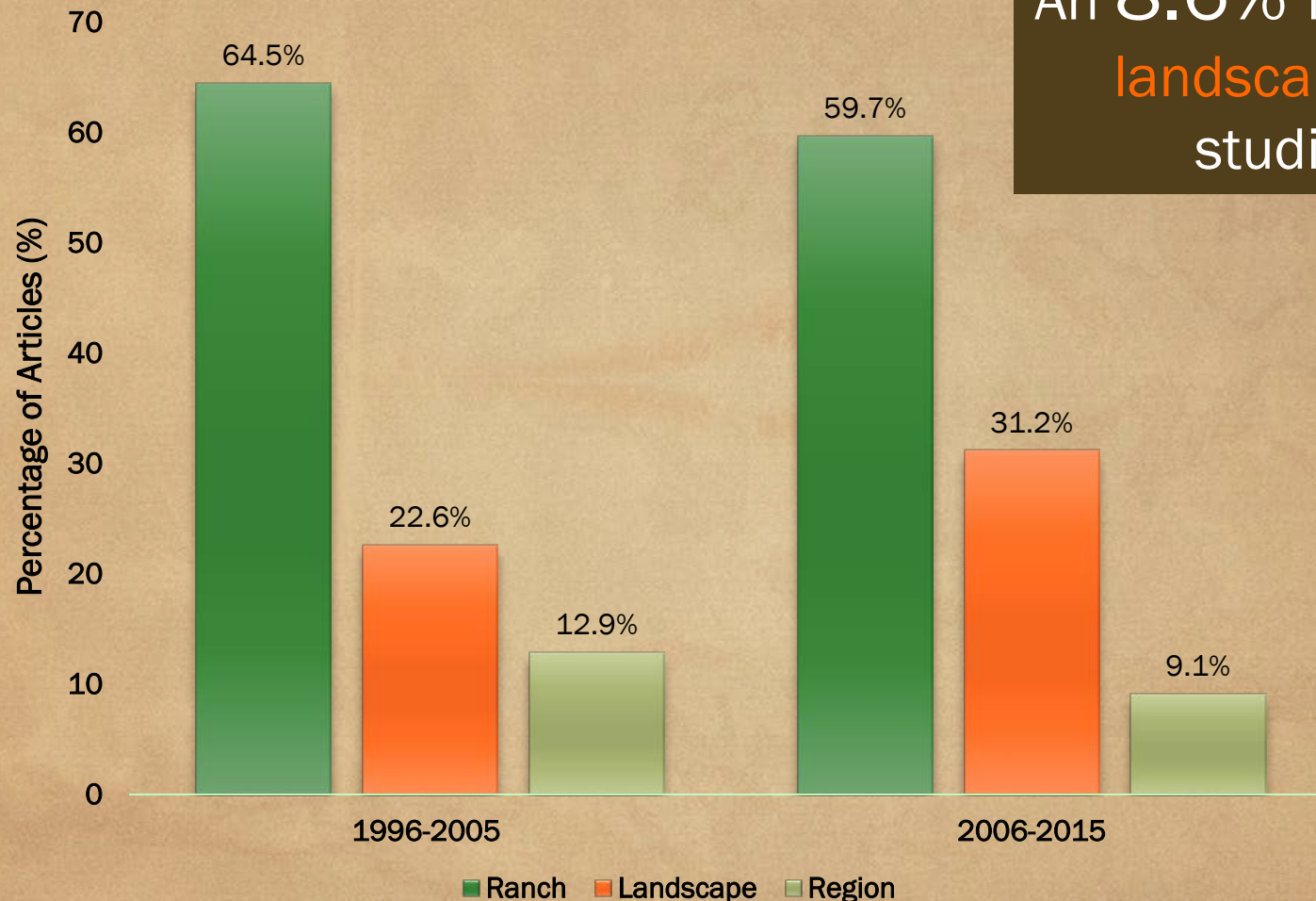
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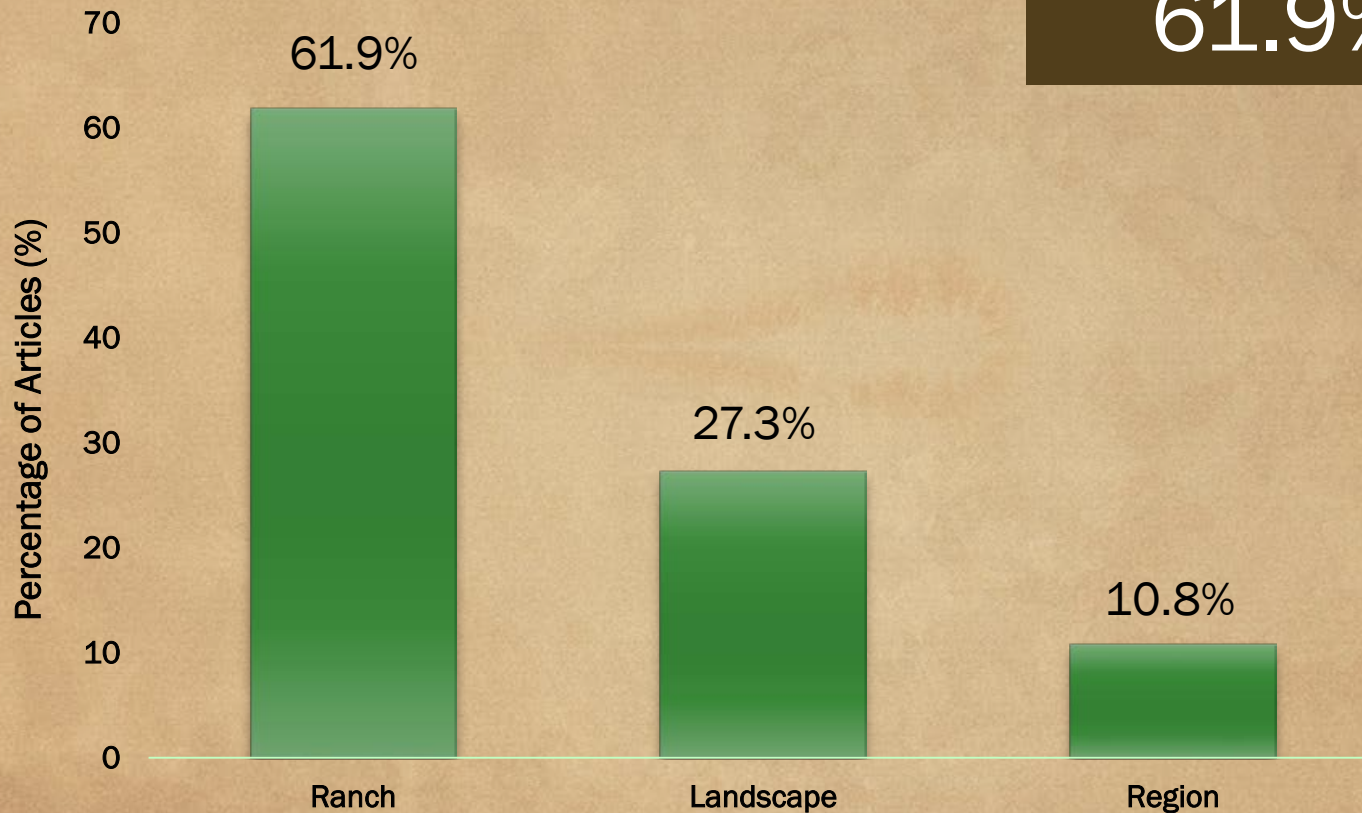
Two Decades of Bobwhite Research

An 8.6% increase in
landscape-level
studies...



Two Decades of Bobwhite Research

1996-2016



But ranch-level makes up
61.9% overall.

Research Concerns and Scale

There are TWO fundamental questions we have yet to answer:

1. How much **space** does a population need?
2. What **ecological processes** affect population abundance?

Both are influenced by **scale**

How Much Space Does a Quail Need?

Biological Conservation 100 (2001) 65–74

How much habitat is enough?

L. Fahrig *

Ottawa-Carleton Institute of Biology, Carleton University, Ottawa, ON, Canada, K1 S 5B6

- General recommendations from small-scale studies
- Population models offer differing recommendations

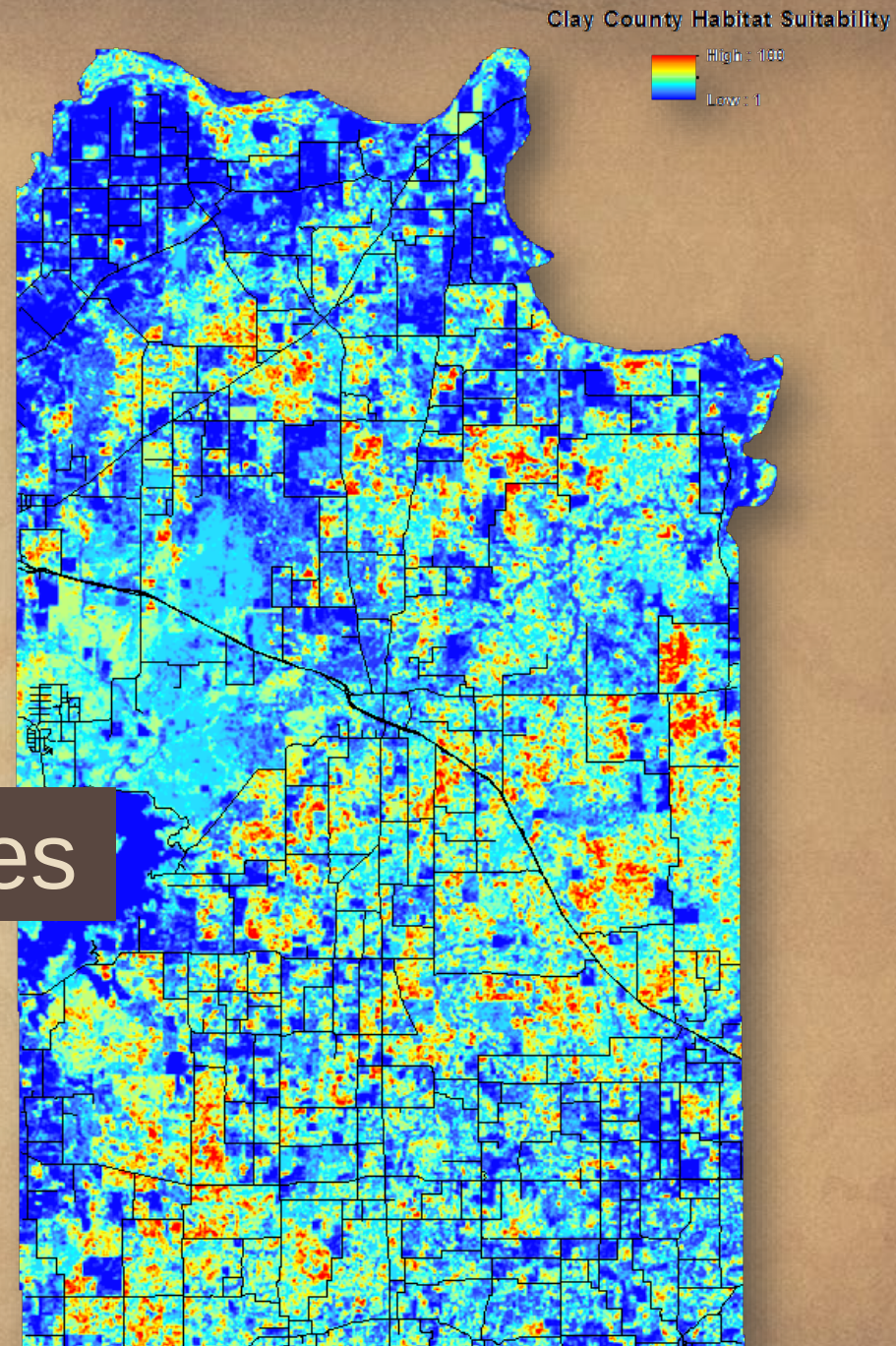
How Much Space Does a Quail Need?

- Recommendation for low population often say, "need to increase quantity of bobwhite habitat."
- To what quantity?
 - 800 ha (Guthery et al. 2000)
 - 5000 ha (Twedt et al. 2007)
 - 800-9,600 ha for stable populations (Sands et al. 2012)
 - (2k-23k) acres; however, it could be larger or smaller as numbers are largely based ranch-level parameters

Recommendation

1. Characterize
Habitat on a
Landscape Scale

714k acres



Research Concerns and Scale

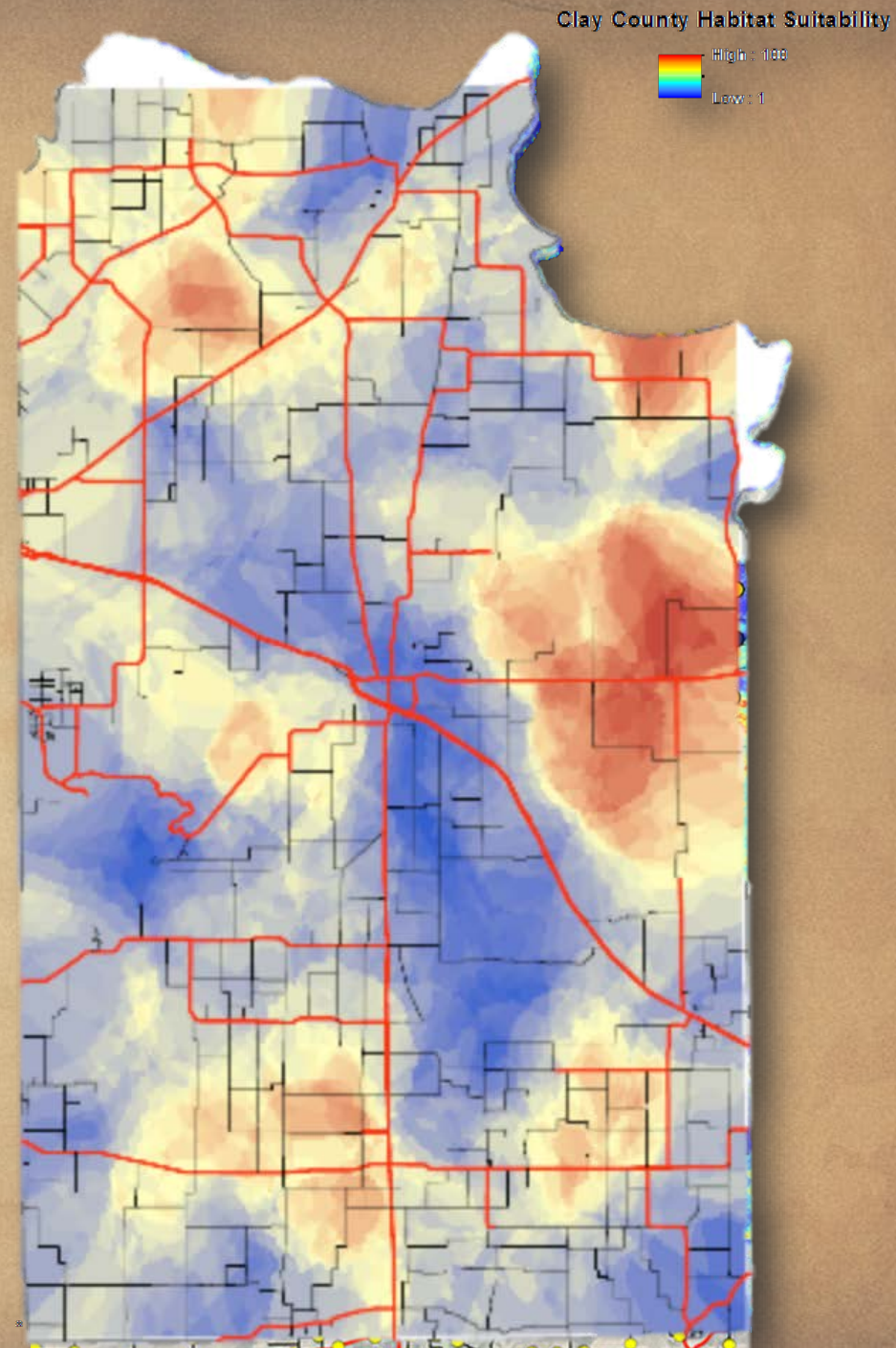
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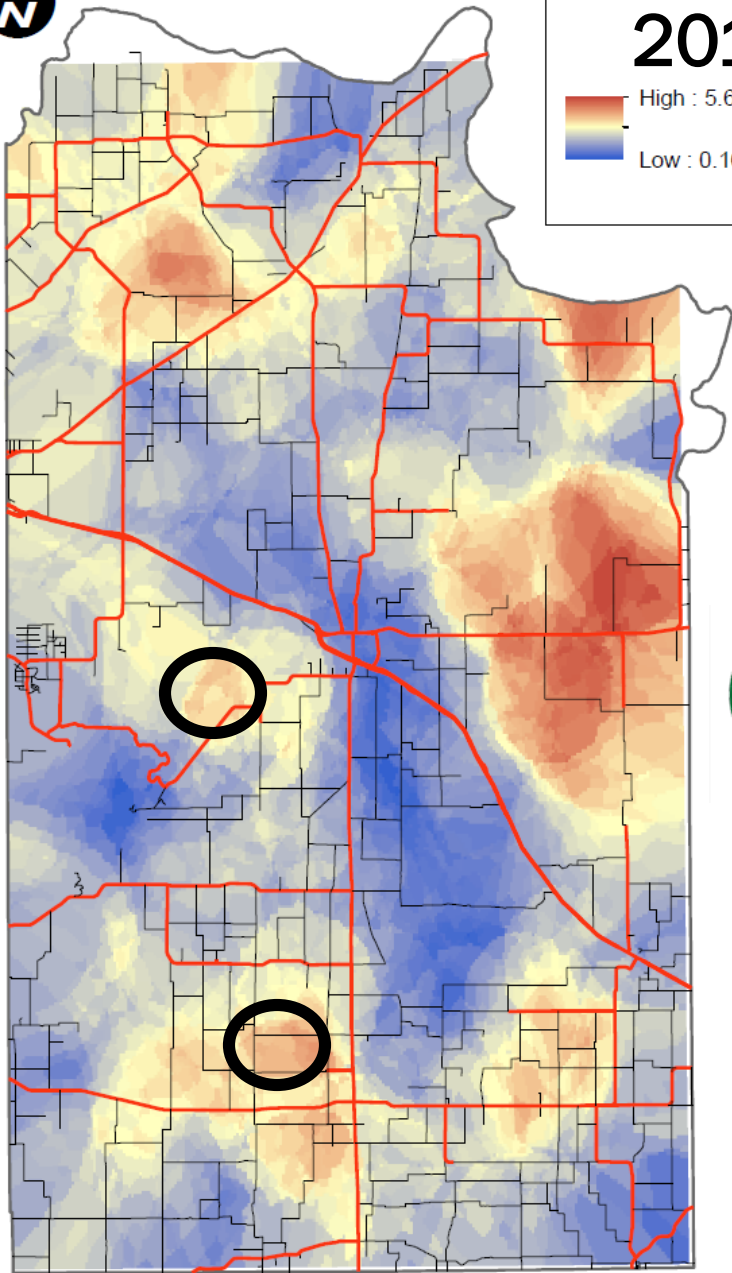
1. Characterize
Habitat on a
Landscape Scale





2014

High : 5.63889
Low : 0.166667

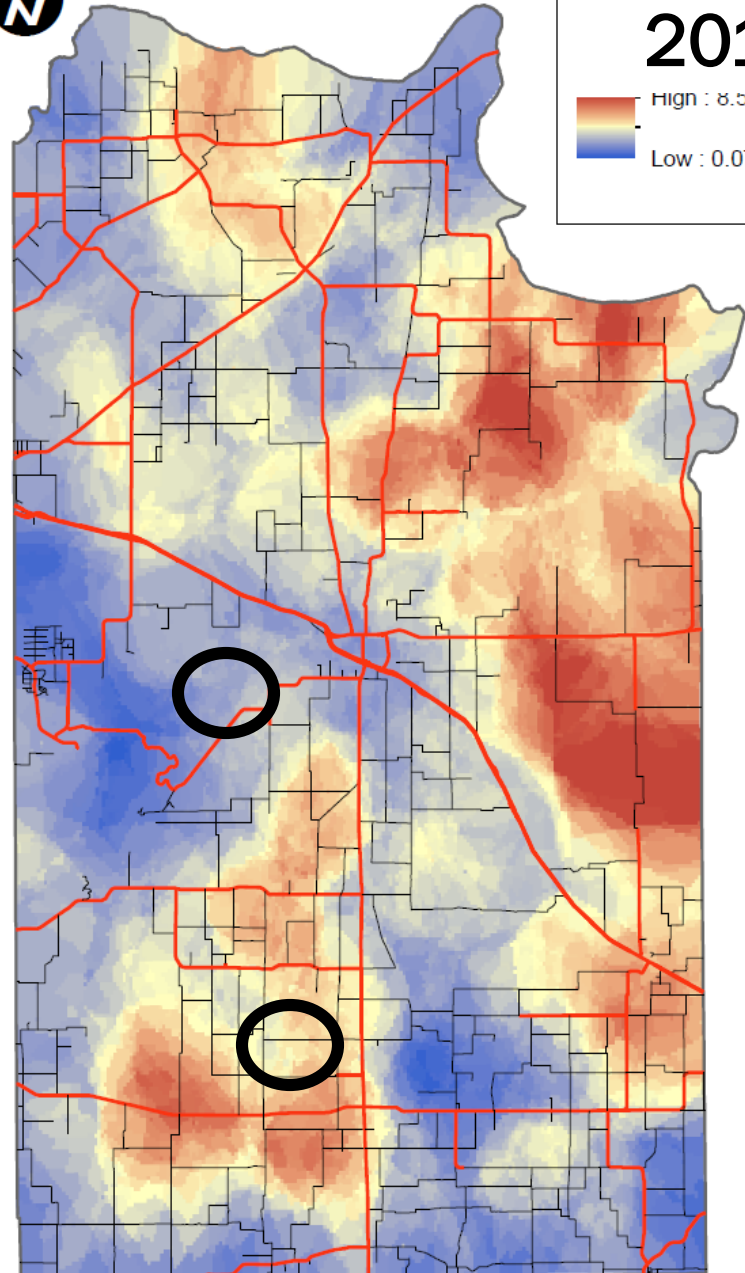


0 4 8 16 24 32 Kilometers



2015

High : 8.56204
Low : 0.0743197



0 4 8 16 24 32 Kilometers

Landscape Genetics

- A novel, valuable tool to improve estimates of viable population sizes and population dynamics
- Take into account landscape features that affect gene flow
- Have been used to successfully inform management
- But only two published studies on bobwhite quail:



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Research Article

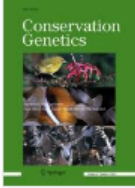
Population genetic structure among bobwhite in an agriculturally modified landscape

Leah K. Berkman

First published online April 2013, Volume 14, [Issue 2](#), pp 323–332

DOI: 10.1002/wil.1234

Cited by (CrossRef)



**Conservation
Genetics**

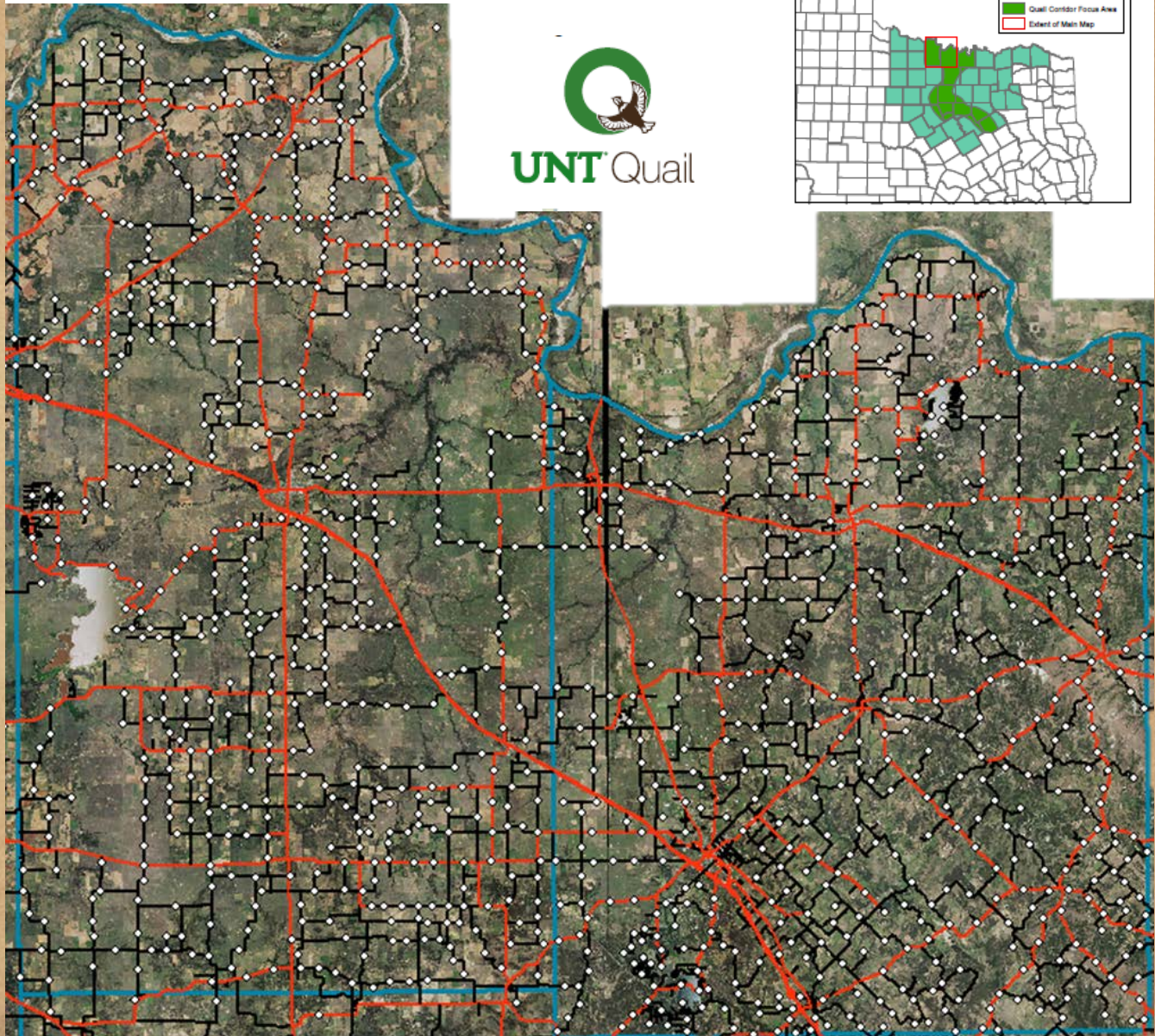
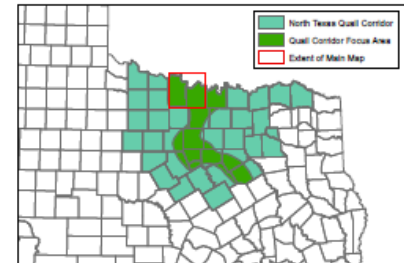
April 2013, Volume 14, [Issue 2](#), pp 323–332

Resistance is futile: effects of landscape features on gene flow of the northern bobwhite

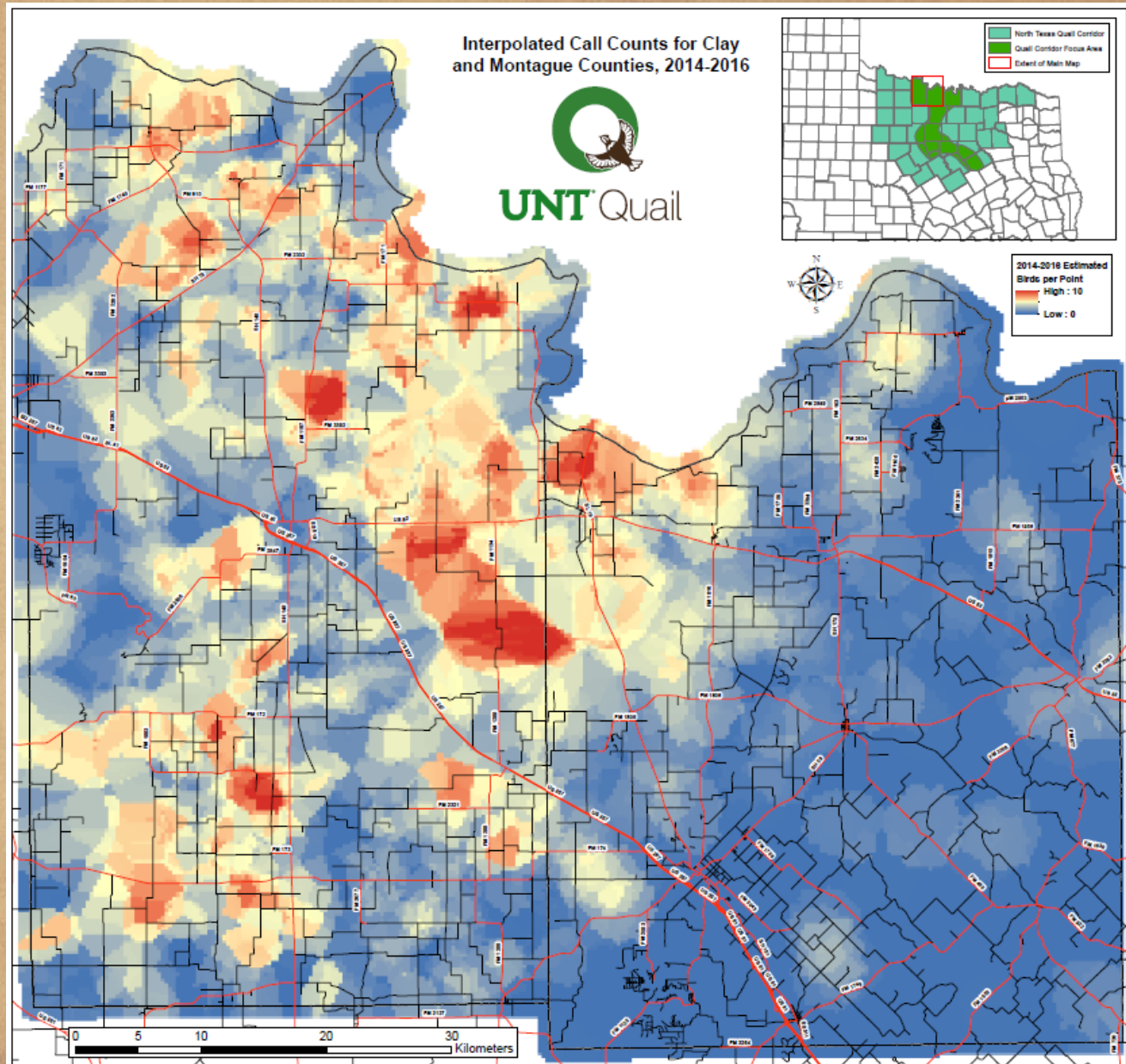
Authors [Authors and affiliations](#)

Leah K. Berkman , Clayton K. Nielsen, Charlotte L. Roy, Edward J. Heist

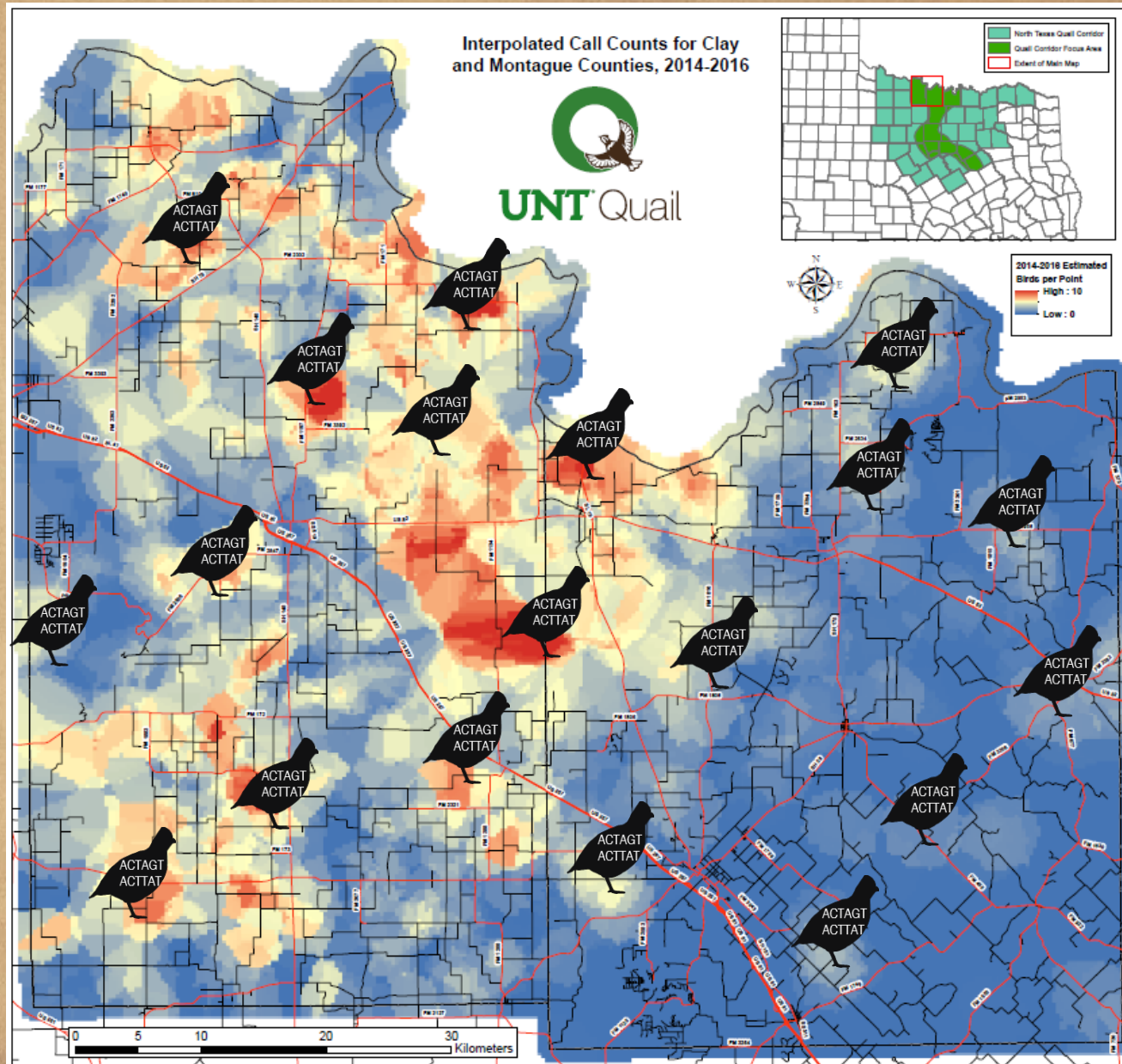
CLAY & MONTAGUE COUNTY QUAIL



CLAY & MONTAGUE COUNTY QUAIL



GOAL: DETERMINE CONNECTIVITY



Parting Words

- In order to make practical and effective recommendations to management, research should be conducted at the same scale at which management is carried out.
- Future research for the conservation of bobwhite quail should strive to focus itself at the **landscape-scale**.

Questions

