



## Outline

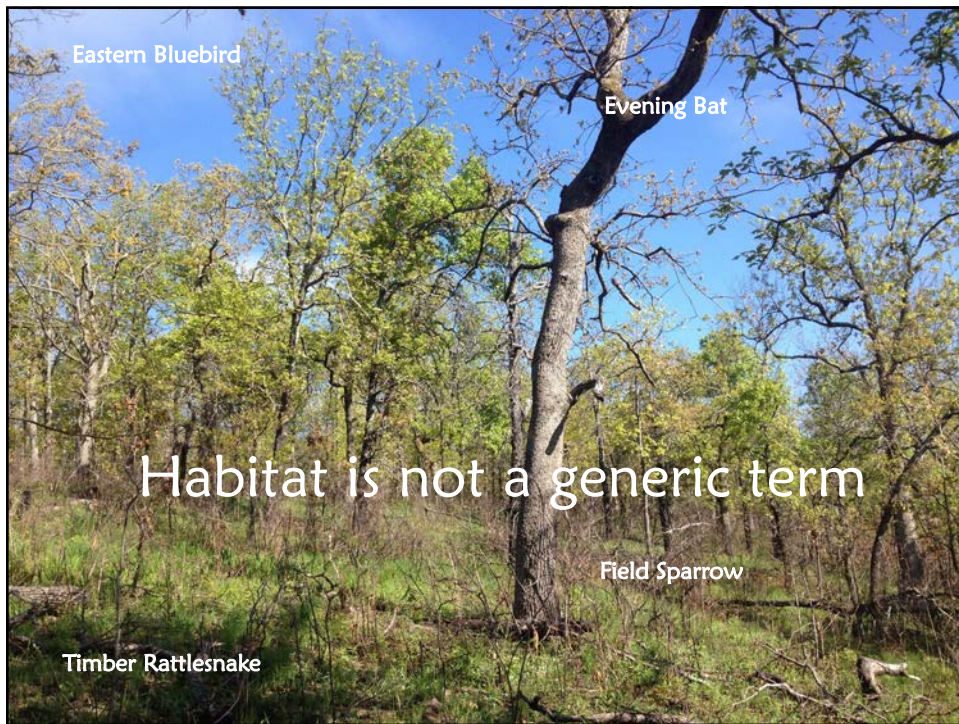
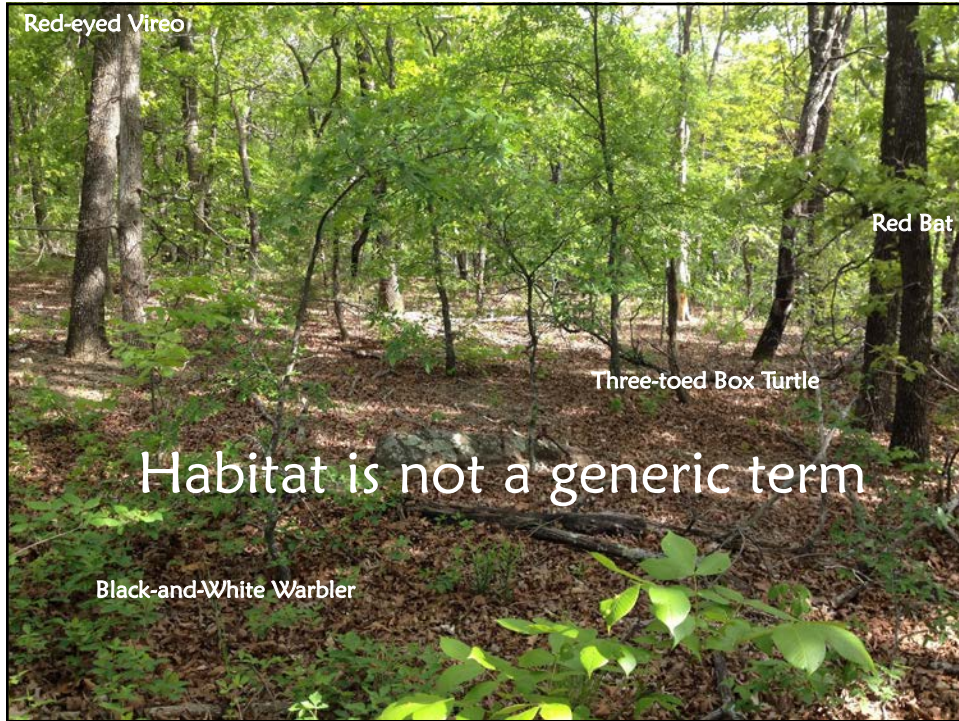
What is bobwhite habitat?

Where are opportunities to create habitat?

What scale do bobwhite respond?

Who are the winners and losers?

How do we apply this?



Are bobwhite grassland birds?



Bobwhite are shrub obligates

Are bobwhite grassland birds?



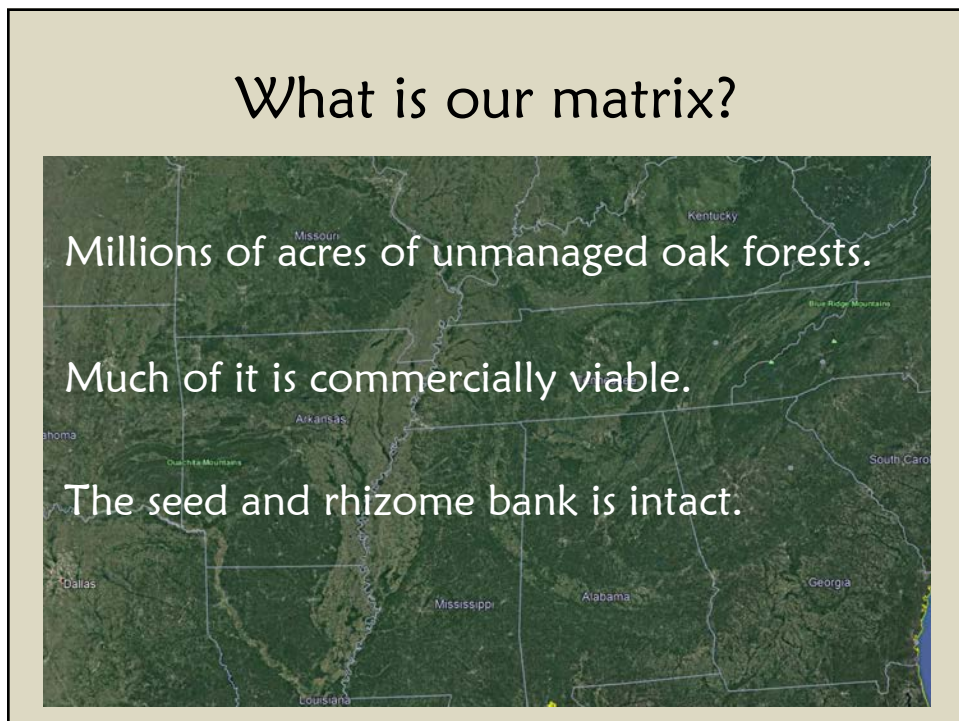
Bobwhite are shrub obligates

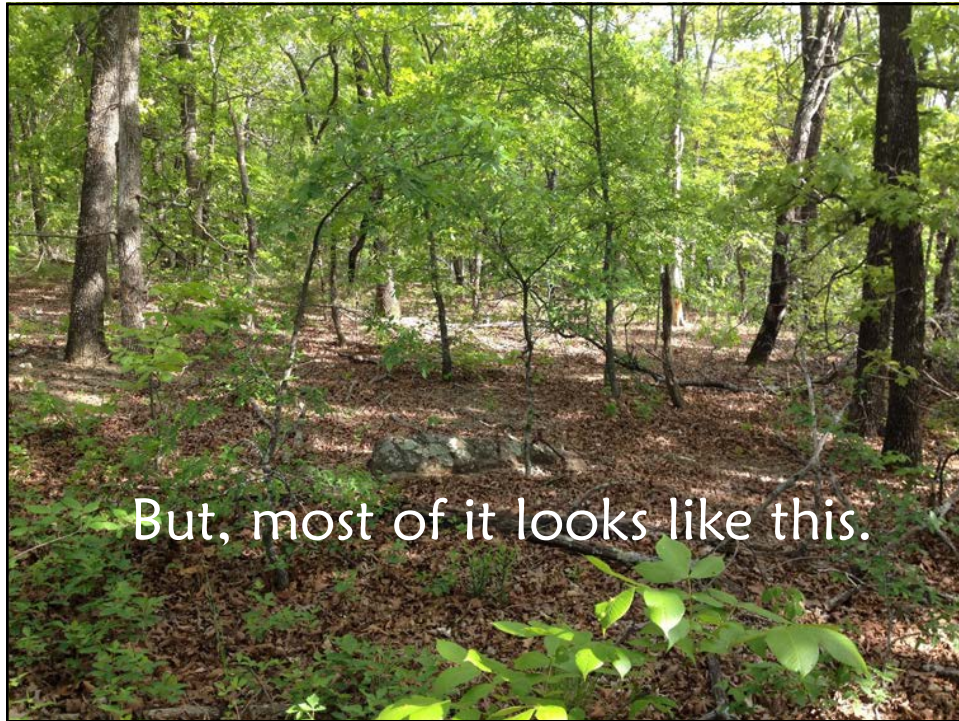
Are bobwhite early successional species?



Are bobwhite early successional species?

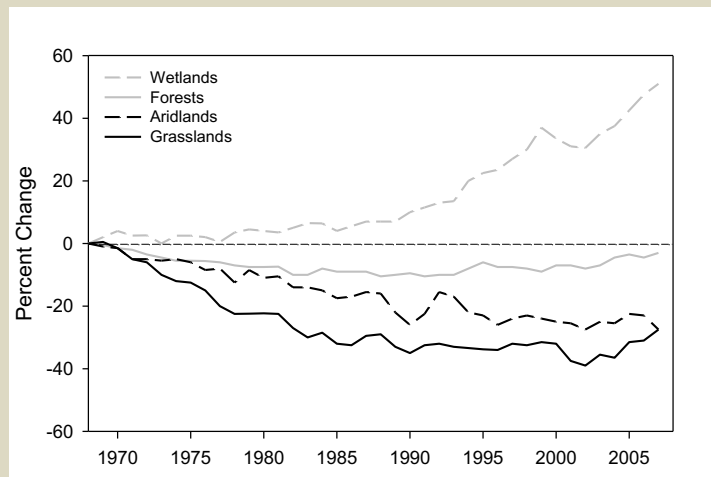






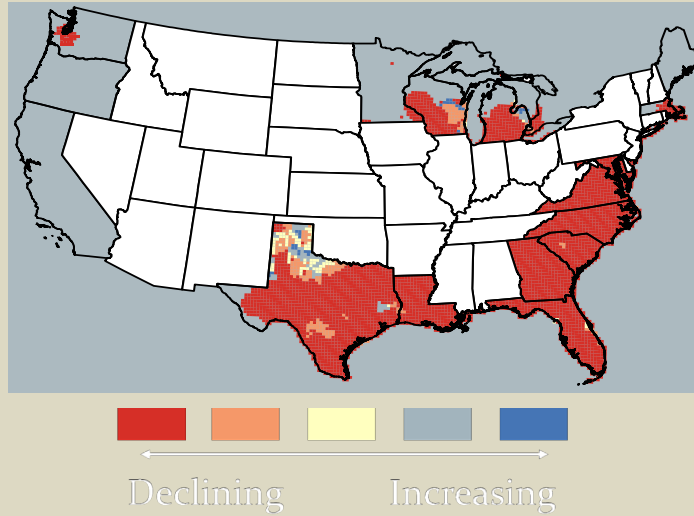


## What should our priority be?



North American Bird Conservation Initiative, U.S. Committee, 2009

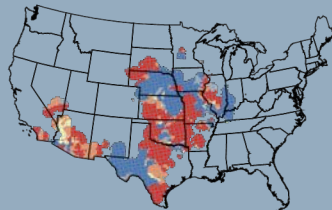
## Decline of the 'Fire Bird'



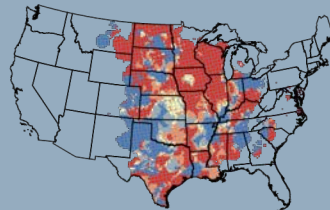
Sauer et al. (2011)

## It's not just about quail

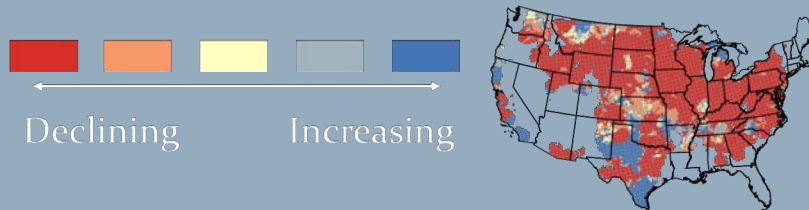
Bell's Vireo



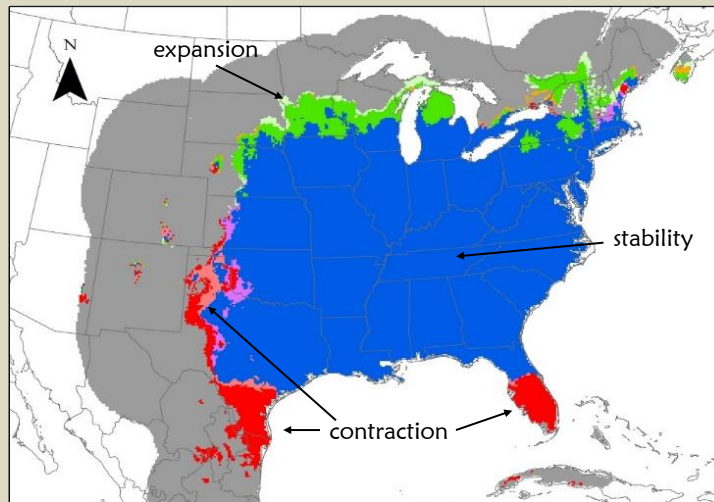
Dicksissel



Grasshopper Sparrow



Don't put all your eggs in one basket.  
(Potential bobwhite distribution in 2070)



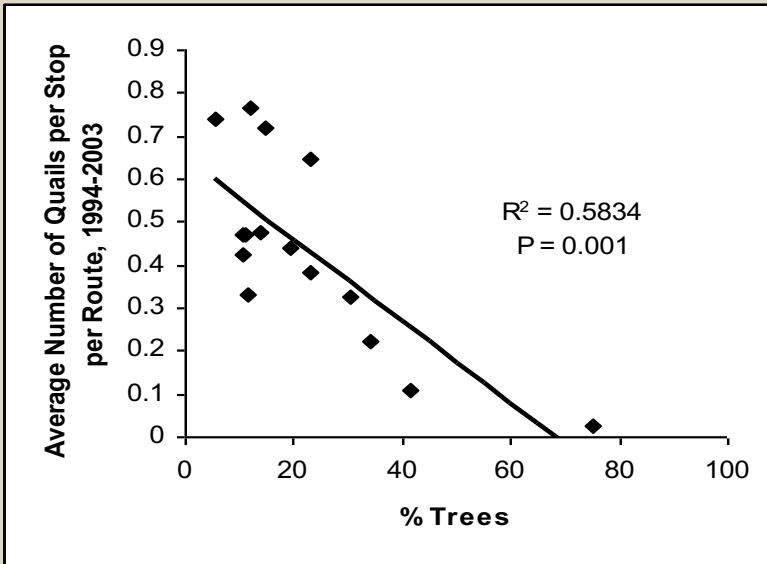
Tanner et al. 2017

How do we create bobwhite habitat in a forest matrix?

What scale is needed?

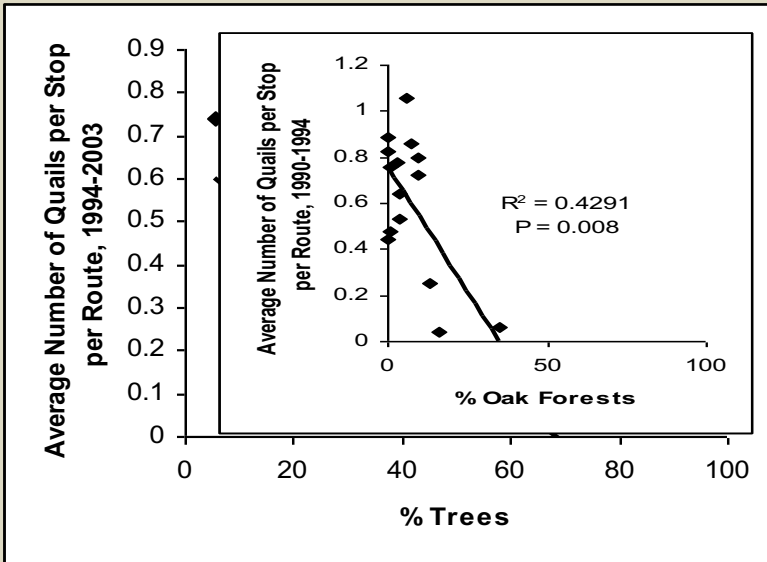
Can bobwhite be an umbrella?

### Forest Cover Negatively Associated with Bobwhite



Courtesy Fuhlendorf et al.

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Courtesy Fuhlendorf et al.

## Objectives

Determine the factors affecting bobwhite occupancy.

Determine the scale at which bobwhite respond.

Evaluate bird community associated with bobwhite.



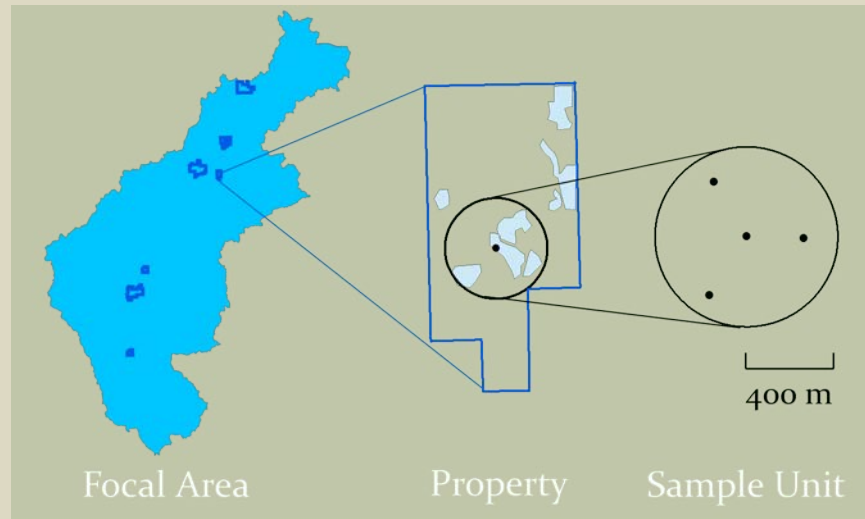
## Study Areas

Central Hardwood and Cross-Timber focal areas

Oak/hickory dominated forests

Full range between closed canopy and open grassland

## Study Design



## Methods

Call counts/point counts

Occupancy modeling

Vegetation type classification

Fine scale vegetation measurements

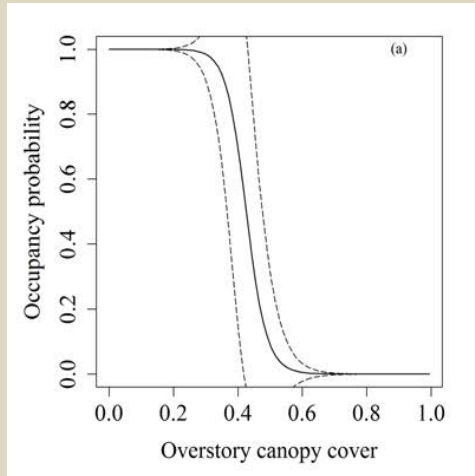
- % Canopy Cover/Basal Area
- % Shrub Cover
- % Cover of plant functional groups
- Visual Obstruction
- Etc.

## Vegetation Relationships

Bobwhite occupancy driven by canopy cover.

Threshold between 40-60%.

Must reach <40% to guarantee occupancy.



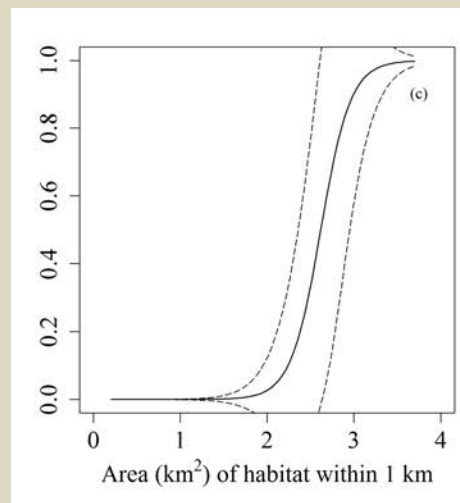
## Landscape Scale

Within 1 km radius (3.1 km<sup>2</sup>), nearly the entire area must be habitat to guarantee occupancy.

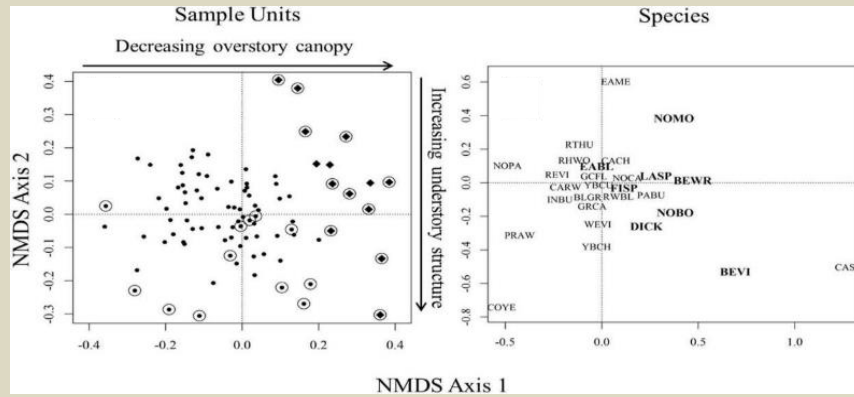
Over 600 acres of habitat before quail have a 50% chance of being present.

Over 700 acres of habitat before quail were always present.

This is occupancy, not abundance.



## Species Associations



Overstory canopy had the biggest effect on the bird community.

Bobwhite presence was a positive predictor for 9 species, 7 of which are priority species.

Field Sparrow, Bell's Vireo, Bewick's Wren, Northern Mockingbird, Eastern Bluebird, Lark Sparrow, Scissor-tailed Flycatcher, and Dickcissel are either shrub obligates or associated with shrub cover.

## Key points

Reducing overstory canopy cover at large scales is critical for bobwhite restoration.

Basal area not as useful a metric for bobwhite restoration.

- Closed vs open grown
- Uneven aged stands
- Mixed species stands

There are thresholds that can be used as restoration targets.

Crosby, A.D., R.D. Elmore, and D.M. Leslie. 2013. Northern Bobwhite Response to Habitat Restoration in Eastern Oklahoma. *Wildlife Society Bulletin* 37:733-740.

## Key Points

Bobwhites can act as an umbrella species for shrubland birds.

Bobwhite habitat restoration can have a positive impact on many declining species.

Game species may have advantages over rare species as conservation umbrellas.

Crosby, A.D., R.D. Elmore, D.M. Leslie, and R.E. Will. 2015. Looking beyond rare species as umbrella species: Northern bobwhite and conservation of grassland and shrubland birds. *Biological Conservation* 186:233-240.

## Fire Management for Bobwhite

### Quail need:

savannah structure

apx. 30% shrub cover (multiple citations)

limited litter and high forb cover

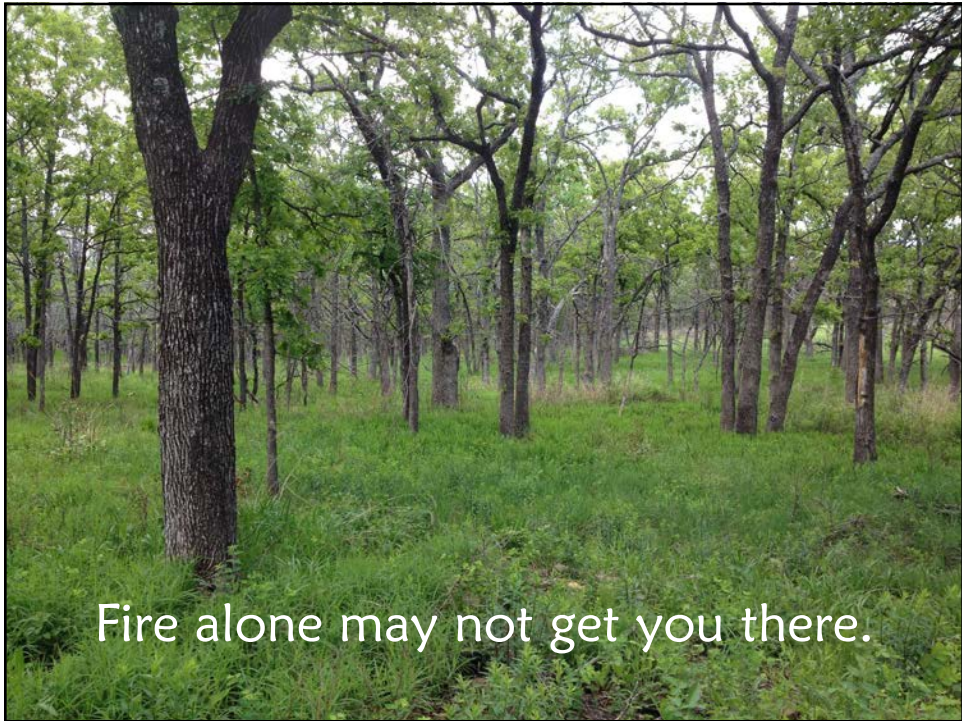
shrubs spaced at about 60m (Hiller et al. 2007)

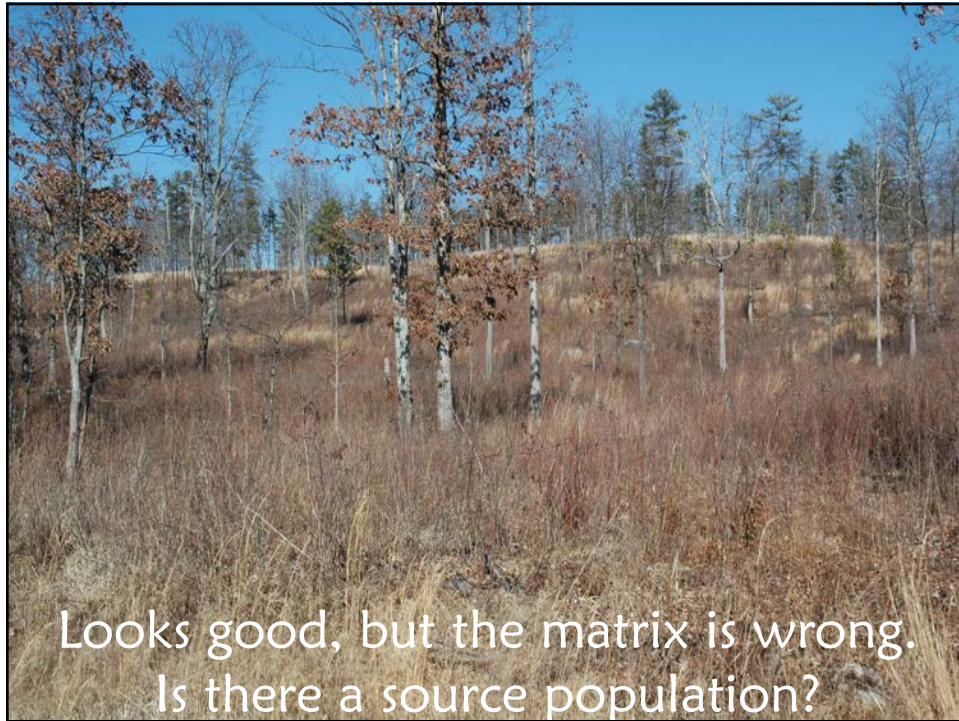
### Management:

2-3 yr fire interval (within 30-50" zone)

Season of burn should be determined by plant management objectives, not nesting concerns.

Size of burn?





## Summary

No one forest condition is inherently better or worse.

Many species that occur in woodland/savannah are in decline.

Fire alone is often impractical to restore oak savannah.

Reducing canopy cover is the biggest factor in bobwhite occupancy.

Scale matters and it is bigger than we thought.

Bobwhite are associated with some species of conservation concern.

Bobwhite restoration not the same as quail hunting restoration.

## For Further Information

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wildlifechairs.okstate.edu

Crosby, A.D., R.D. Elmore, and D.M. Leslie. 2013. Northern Bobwhite Response to Habitat Restoration in Eastern Oklahoma. *Wildlife Society Bulletin* 37:733-740.

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Tanner, E.P., M. Papes, R.D. Elmore, S.D. Fuhlendorf, and C.A. Davis. 2017. Incorporating abundance information and guiding variable selection for climate-based ensemble forecasting of species' distributional shifts. *PLoS ONE* 12:e0184316.