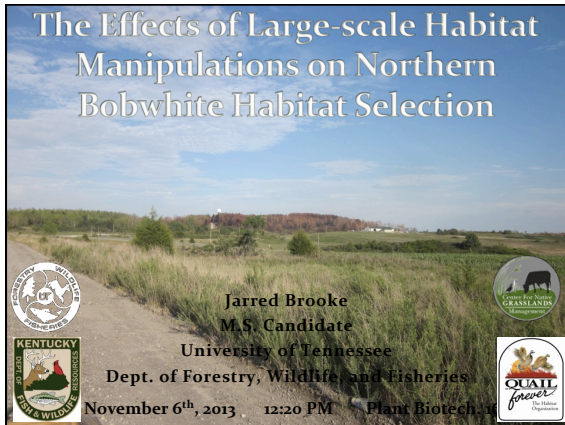



The Effects of Large-scale Habitat Manipulations on Northern Bobwhite Habitat Selection



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University of Tennessee  
Dept. of Forestry, Wildlife, and Fisheries

November 6<sup>th</sup>, 2013 12:20 PM Plant Biotech 1



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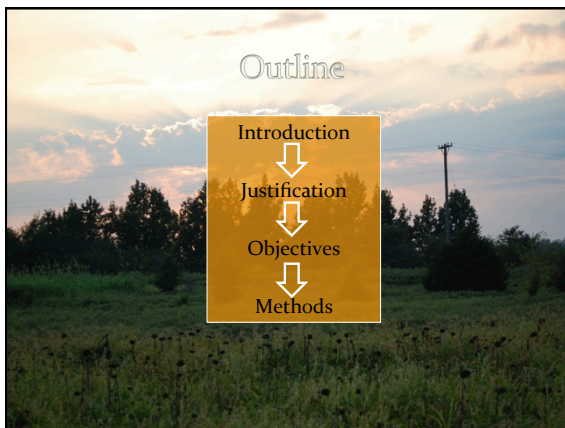
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Outline



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graph TD; A[Introduction] --> B[Justification]; B --> C[Objectives]; C --> D[Methods];
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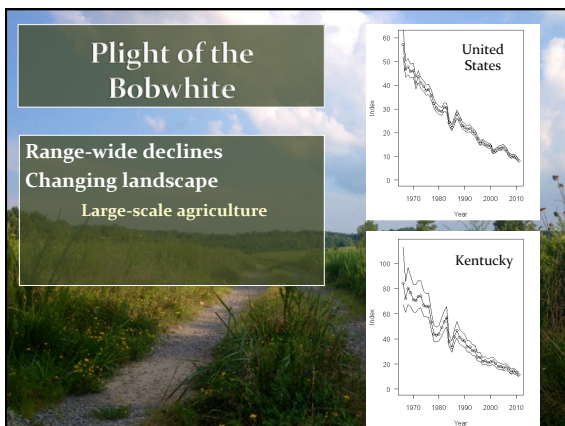
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Plight of the Bobwhite

Range-wide declines  
Changing landscape  
Large-scale agriculture



United States

Kentucky

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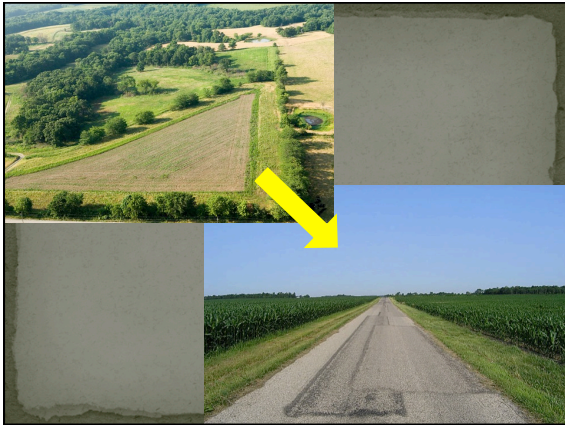
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**Plight of the Bobwhite**

Range-wide declines  
Changing landscape  
Large-scale agriculture  
Conversion of pastures

The image contains two line graphs. The top graph is titled "United States" and shows the population of Bobwhites from 1970 to 2010. The y-axis is labeled "Number" and ranges from 0 to 60. The x-axis is labeled "Year" and ranges from 1970 to 2010. The population starts at approximately 60 in 1970 and shows a steady decline to about 10 by 2010. The bottom graph is titled "Kentucky" and shows the population of Bobwhites from 1970 to 2010. The y-axis is labeled "Number" and ranges from 0 to 100. The x-axis is labeled "Year" and ranges from 1970 to 2010. The population starts at approximately 100 in 1970 and shows a steady decline to about 20 by 2010. Both graphs show a similar pattern of decline with some minor fluctuations.

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## Plight of the Bobwhite

Range-wide declines  
Changing landscape  
Large-scale agriculture  
Conversion of pastures  
Succession  
Urbanization

**LOSS OF USABLE SPACE**

Brennan 1991, Burger 2000, Dimmick et al. 2002, Guthery 1997

Year	Population (Millions)
1970	55
1980	45
1990	35
2000	25
2010	10

Year	Population (Millions)
1970	100
1980	80
1990	60
2000	40
2010	20

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## Kentucky's Call to Arms

Objectives

- Augment mine reclamation projects
- Establish Kentucky-based research
- Renovate public wildlife management areas

**ROAD to RECOVERY**  
*The Blueprint for Restoring the Northern Bobwhite in Kentucky*

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## Augment mine reclamation projects Role of Reclaimed Mined Land?

**SMCRA 1977**

- Bond release process
- Regrade land
- Establish vegetation

Large contiguous tracts of land in early succession

> 300,000 acres in Kentucky (Phase III release )

Are reclaimed mined lands quail habitat?

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### Problems with Reclaimed Mined Land

- Poor soil conditions
- Lack of diversity in seedbank
- Clause in SMCRA allows planting of non-native species

Results in > 70% coverage of sericea

Sericea lespedeza  
Tall fescue  
Kentucky bluegrass  
Orchardgrass

Impedes establishment of native vegetation

Holl and Cairns 1994, Groniger et al. 2007

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### Establish Kentucky-based Quail Research

Extensively studied game bird

First study on a reclaimed mine

Multiple aspects of bobwhite ecology

- Habitat selection
- Movement
- Survival
- Fecundity

Tanner et al. 2012, Unger et al. 2012

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### Renovate Public Wildlife Management Areas

Peabody Wildlife Management Area

Intensive habitat management

- Disking
- Prescribed fire
- Permanent firebreaks
- Sericea control

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### Objectives

1. Identify the factors influencing bobwhite habitat selection at multiple scales during the breeding and non-breeding season
2. Identify the factors influencing bobwhite nest-site selection
3. Evaluate the influence of habitat manipulations on habitat and nest-site selection.

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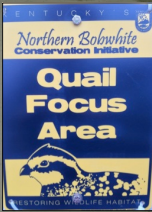

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### Study Area

Peabody WMA - Western Kentucky  
40,000 acres

Study area encompasses 2 quail focus areas  
8200 acres  
4 major vegetation types



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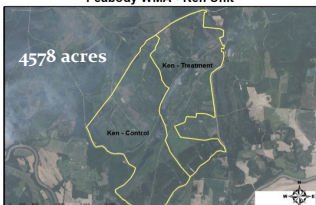

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### Study Area

**Peabody WMA - Sinclair Unit**  
3633 acres

**Peabody WMA - Ken Unit**  
4578 acres

Each Unit is split into a control and treatment areas  
Sinclair Control  
Sinclair Treatment  
Ken Control  
Ken Treatment



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**Open Herbaceous**

Dominant species:  
Sericea lespedeza  
Canada goldenrod  
Japanese brome



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**Native Warm-season Grass**

Dominate Species:  
Big bluestem  
Little bluestem  
Indiangrass  
Switchgrass



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**Shrub Cover**

Dominant species:  
Autumn olive  
Winged sumac  
Black locust  
American plum  
Southern blackberry  
Coralberry



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### Forest

**Overstory**  
Eastern cottonwood  
Red maple  
American sycamore

**Understory**  
Japanese honeysuckle  
*Rubus spp.*



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### Methods

**Trapping**  
Stoddard funnel traps  
Baited with corn and grain sorghum  
>20 traps per area

**Captures**  
Sexed  
Aged  
Weighed  
Double-banded if >90 grams  
Fitted with VHF collar if >120 grams

Stoddard 1931



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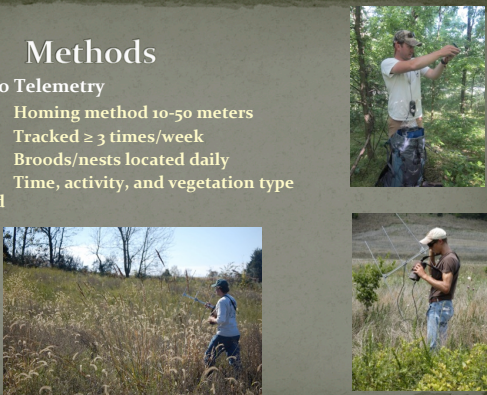
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### Methods

**Radio Telemetry**  
Homing method 10-50 meters  
Tracked  $\geq 3$  times/week  
Broods/nests located daily  
Time, activity, and vegetation type noted



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### Methods

#### Nest Searching and Monitoring

>2 consecutive locations indicates nesting attempt


Monitored daily until nesting attempt is complete

#### Brood Monitoring

Brood-rearing adult tracked daily

Flushed 14<sup>th</sup> day after nest hatch

Flushed every 7 days until 42 days after nest hatch




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### Methods – Vegetation Sampling

Bird-centered vegetation sampling

Random sample of birds used each season (breeding vs. nonbreeding)


10 birds per area (breeding) n=40

5 coveys per area (non-breeding) n=20

1 telemetry location per bird/covey per week

All nest sites

#### Use vs. availability




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### Methods – Vegetation Sampling

	Breeding	Non-breeding	Nesting
Vegetation type	X	X	X
Species composition	X		X
Ground sight distance	X		
Litter depth	X	X	X
Visual obstruction	X	X	X
Woody stem density	X	X	X
Basal area		X	
Nesting substrate			X
Distance to edge	X		X
Distance to treatment			X
Distance to woody cover		X	




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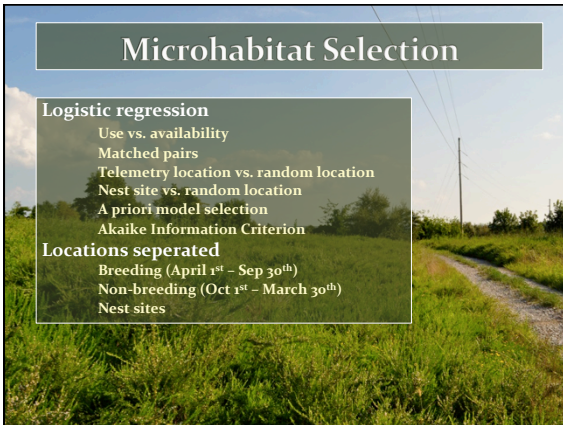
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### Microhabitat Selection

**Logistic regression**  
Use vs. availability  
Matched pairs  
Telemetry location vs. random location  
Nest site vs. random location  
A priori model selection  
Akaike Information Criterion

**Locations separated**  
Breeding (April 1<sup>st</sup> - Sep 30<sup>th</sup>)  
Non-breeding (Oct 1<sup>st</sup> - March 30<sup>th</sup>)  
Nest sites



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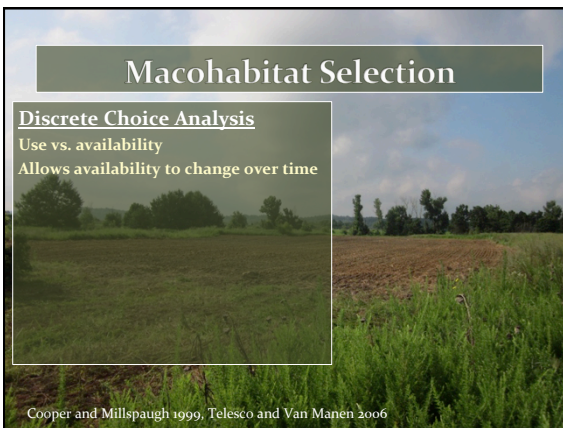
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### Macohabitat Selection

**Discrete Choice Analysis**  
Use vs. availability  
Allows availability to change over time



Cooper and Millsbaugh 1999, Telesco and Van Manen 2006

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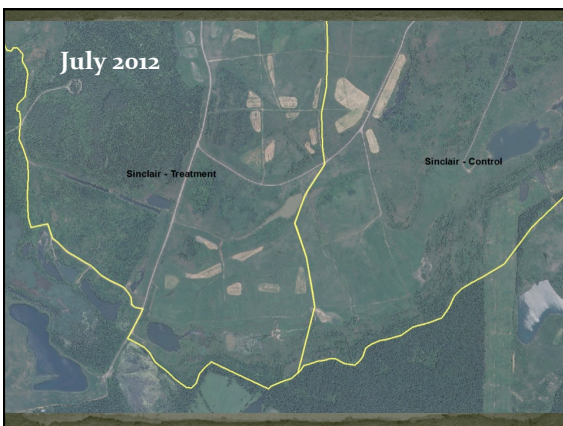
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**Marcohabitat Selection Analysis**

**Discrete Choice Analysis**  
Use vs. availability  
Allows availability to change over time  
Each location is a "choice"  
Availability defined by a choice set



Cooper and Millsbaugh 1999, Telesco and Van Manen 2006

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## Macrohabitat Selection Analysis

**Discrete Choice Analysis**  
 Use vs. availability  
 Allows availability to change over time  
 Each location is a "choice"  
 Availability defined by a choice set  
 A priori model selection  
 Akaike Information Criterion

**Locations separated**  
 Breeding vs. non-breeding  
 Treatment vs. control  
 Nest sites  
 Brood locations

**Variables**  
 Time  
 Date  
 Vegetation type  
 Edge density  
 Distance to treatments  
 Vegetation type size  
 Contagion index  
 Burn history

Cooper and Millsbaugh 1999, Telesco and Van Manen 2006

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## Acknowledgements

- **Committee**
  - Dr. Craig Harper
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  - John Morgan
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- **University of Tennessee**
  - David Peters
  - Ashley Unger and Evan Tanner










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## Pictures

David Peters  
 Cody Rhoden  
 Kyle Servedio

<http://www.flickr.com/photos/baallands/2457375637/sizes/o/in/photostream/>  
<http://salinespringsconservation.files.wordpress.com/2010/02/photo051.jpg>  
<http://www.waynet.org/waynet/spotlight/2006/060710-cornfield.htm>

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