


Northern Bobwhite Population Ecology on Reclaimed Mined Land



David Peters
Master's Candidate
University of Tennessee

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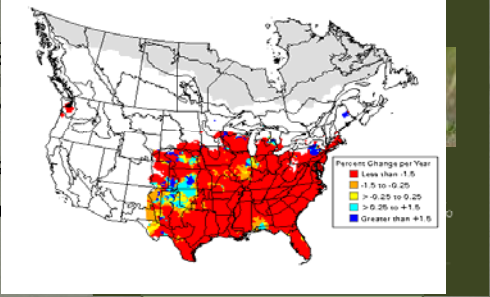
Photo: Courtney Cox

Outline

- Introduction
- Objectives
- Study Site
- Methodology
- Analysis

Population Declines

- Annual regional decline of 4.0%
- 2.9% of counties with declines



Source: Sauer, J. R., J. E. Hines, J. E. Fallon, K. L. Pardieck, D. J. Ziolkowski, Jr., and W. A. Link. 2010. The North American Breeding Bird Survey, Results and Analysis 1966-2000. Version 12.07.2010 USGS Patuxent Wildlife Research Center, Laurel, MD.

Causes of Population Declines

- **Habitat Loss**
 - Increase in clean farming practices
 - Successional advancement from lack of prescribed fires & wildfi
 - Urba
- **Habit**
- **Decli**

Reclaimed Mines

SMCRA (1977)

- Minimize adverse impacts on wildlife populations and unique habitats
- Establishment of large tracts early successional habitat

State	Phase III Released	Phase I Released (2001-2005)	Total
KY	601,783	64,479	666,262
Total	1,389,881	160,148	1,550,030

Including the interim SMCRA program. Source: US OSMRE 10th Anniversary of the Surface Mining Law (http://www.osmre.gov/tenyears.html) and annual reports to Congress.
*As required by states to OSMRE, these figures overestimate total affected areas due to double-counting of areas that were both mined and re-mined under SMCRA.
†Estimated from total Kentucky acres, as proportional to the state-wide distribution of surface coal tonnage.

Reclaimed Mines

SMCRA states that "...introduced species may be used in the revegetation process where desirable and necessary to achieve the approved postmining land use plan..."

Focus:
Prevent Erosion Within First 5 years

Establishment of *Lespedeza cuneata* and other invasive non-natives

Quality of reclaimed mines to Bobwhite?

Research is lacking

- No bobwhite studies conducted on reclaimed mines ←
- Few population ecology studies done in Central Hardwood Conservation Region (Stanford 1972, Roseberry and Klimstra 1984, Burger 1995)
- Measure habitat use and population dynamics of bobwhites in these areas

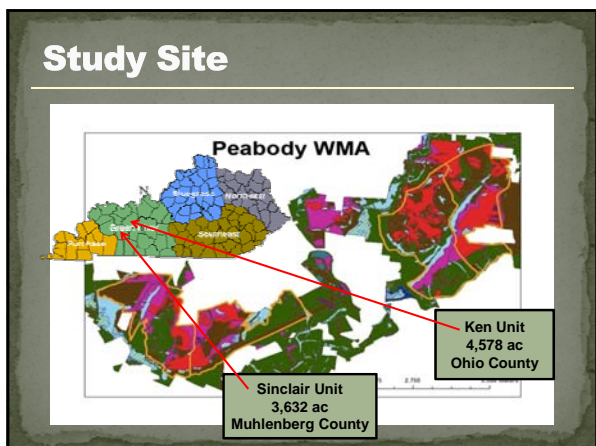
Objectives

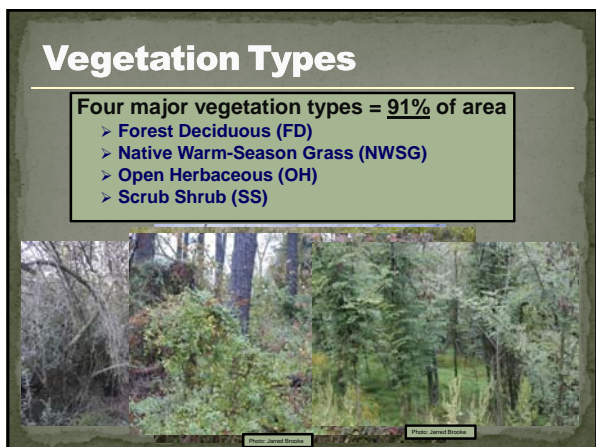
1. Measure fecundity
 - Nest success
 - Nest productivity
2. Analyze survival rates as a function of various habitat characteristics
3. Estimate population densities
4. Perform a life stage analysis (LSA)

Data collection: Fall 2009 – Fall 2013

Hypotheses:

1. H_0 : There will be no change in population density in areas treated for habitat improvement versus untreated areas;
2. H_0 : There will be no difference in survival in areas treated for habitat improvement versus untreated areas;
3. H_0 : There will be no difference in fecundity and recruitment in areas treated for habitat improvement versus untreated areas;





Site Details

Site	Control	Treatment
Ken	2,576 ac	2,001 ac
Sinclair	1,660 ac	1,971 ac

Treatment : ½ of each study site was randomly assigned to receive intensive management treatments

- > Prescribed Fire
- > Disking
- > NWSG Plantings
- > Herbicide Application

Control : other ½ of the site will be minimally disturbed and serve as a control

- > Result of standard reclamation procedures (SMCRA 1977)

The background of the slide shows an industrial facility with several tall smokestacks emitting plumes of smoke or steam into the sky, likely a power plant or refinery.

Treatments

Prescribed Burning



Photo: Eric Williams

Treatments

Disking



Photo: Eric Williams

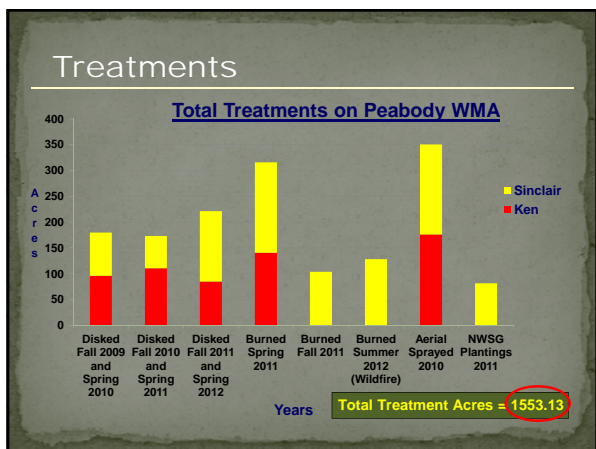
Treatments

NWSG Plantings



Photo: Eric Williams







Trapping

- Stoddard funnel traps (Stoddard 1931)
- Birds double banded
- Fitted with necklace-style collars (<6.5 grams)
- Sex, age, weight and condition is noted
- Goal is 100 birds per site & 50 per unit




The image contains three photographs. The leftmost shows a person in a field setting a wire trap. The middle shows a trap with a bird inside, with red arrows pointing to labels 'Male' and 'Female'. The rightmost shows a bird hanging from the open window of a car.

Telemetry

Telemetry used to monitor movement, habitat use, and survival

- Birds located ≥ 3 times/week
- Broods/Nests located daily
- Homing in on birds from 10-50m
- Time, activity, and vegetation type noted

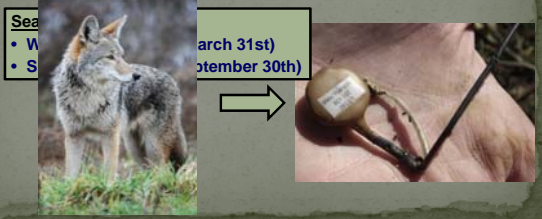


The image contains two photographs of researchers in a field. The left photo shows a person in a cap and dark shirt using binoculars. The right photo shows a person in a yellow shirt using binoculars in a grassy field.

Survival

Survival Estimates

- Assessed through telemetry
- If mortality occurs, determine cause of death (if possible)
- By units, sex, and age (if sample size permits)
- Relate survival to vegetation

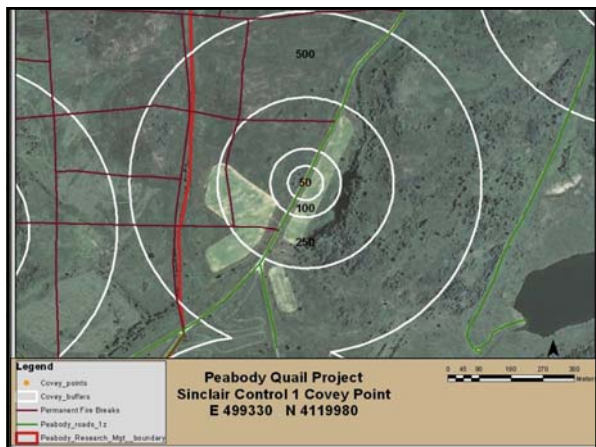


The image contains a diagram. On the left is a photograph of a wolf. On the right is a photograph of a person's neck with a collar. An arrow points from the wolf to the collar. Text next to the arrow includes 'See W S', 'March 31st', and 'September 30th'.

Fecundity

- Fecundity
 - Estimated by nest success and nest productivity
- Nest success and productivity
 - Nest located through telemetry
 - Nest monitored daily (eggs checked if adult is away from nest)
 - Fate of nest recorded (Abandoned, Destroyed, Hatched)





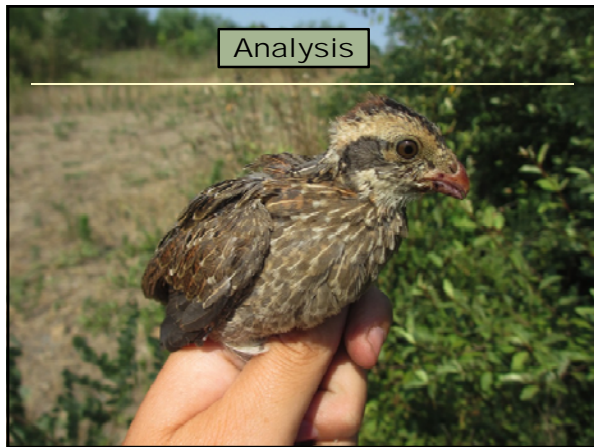
Vegetation Sampling

- Using bird location plus paired random point
 - Subset of birds to run survival model



Vegetation Sampling


Parameter	Summer	Winter	Nesting
Vegetation Type	x	x	x
Woody Stem Density	x	x	x
Visual Obstruction	x	x	x
Distance to Edge	x	x	x
Distance to Bare Ground			x
Litter Depth	x	x	x
Species Composition	x	x	x
Ground Sighting Distance	x		
Nesting Substrate			x



Analysis

Analysis

- Survival**
 - > Hierarchical approach
- Nest survival**
 - > by vegetation type using ANOVA
- Density**
 - > covey census
- LSA**
 - > Linear regression analyses will be run using Program SAS (Proc REG; SAS Institute Inc., Cary, NC)
 - > Parameters will include:
 - > summer survival
 - > winter survival
 - > nest survival



Analysis

Survival Estimates: winter, summer

- Program MARK using known fate models w/ covariates (Kaplan–Meier staggered entry)

Nest survival

- Mayfield estimator (Program MARK if sample size permits) w/ covariates

Covariates

- Macro-habitat vegetation measures
- Micro-habitat vegetation measures

Survival Analysis

Based on 3 scales:

Group

- Categorical variables

Home Range

- ≥ 20 locations, 95% Fixed Kernel

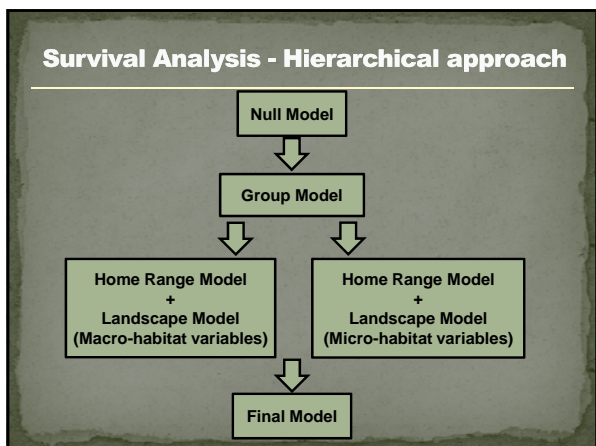
Landscape

- Home Range + 2x average daily movement

Survival Analysis

Variables

Group (5)	Macro-habitat (11)	Micro-habitat (5)
Site	Contagion Index	% NWSG
Sex	Edge Density Forest vs. Open	% Sericea
Age	Edge Density Shrub vs. Open	Presence/Absence of Litter
Group	Core Area of SS, OH, FD, and NWSG	Sight Tube Distance
Year	% of Home Range in SS, OH, FD, and NWSG	Woody Stem Density





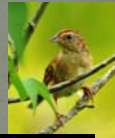
Acknowledgements

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- > Committee:
 1. Patrick Keyser – major professor
 2. Craig Harper
 3. Joseph Clark
 4. John Morgan








Causes of Population Declines

The loss of native grasslands affects more than bobwhite quail. For instance, grassland birds are declining at faster rates than any other community of birds in North America.

http://bringbackbobwhites.org

Conservation Efforts

- Non-migratory species = no federal responsibility
- Efforts must come from region/state level!

- NBCI
 - Restore populations to the density of 1980 through habitat-oriented plans
 - Impact habitat on 81.1 million acres

Northern Bobwhite Conservation Initiative



Dimmick, R.W., M.J. Goffin, and D.F. McKenzie. 2002. The northern bobwhite conservation initiative. Miscellaneous publication of the Southeastern Association of Fish and Wildlife Agencies, South Carolina. 96 pp.

Other Conservation Efforts

- Conservation and interest groups
 - National Bobwhite Technical Committee
 - Quail Unlimited
 - Quail Forever
 - State Agency Initiatives
- USDA Farm Bill programs
 - CRP
 - CP-33
 - CP-38
 - CREP
 - GRP
 - EQIP

