

Northern Bobwhite Response to Management in Fulton County, Arkansas

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Introduction

- Population declines of Northern Bobwhite (*Colinus virginianus*) throughout its range prompted the development of the National Bobwhite Conservation Initiative.
- The Arkansas Game and Fish Commission developed a Strategic Quail Management Plan, focusing on habitat recovery to restore quail populations and the associated avian community to historical levels.
- Because 90% of Arkansas is privately owned, management practices target these lands.
- Specific management practices include fencing, strip disking, thinning woodlands, prescribed burning, edge development, and reestablishment of native warm-season grasses.
- Study hypothesis: Management should improve habitat quality, resulting in smaller home ranges for quail.

Objectives

- Assess effects of management on the Northern Bobwhite population.
- Determine which management techniques are most effective by studying movements and home ranges of bobwhite.
- Test prediction: Smaller home range indicates better habitat quality

Methods

- Trapped quail using call-back technique
- Quail banded and outfitted with 5-g radio-transmitters
- Tracked by homing
- GPS coordinates taken at encounter sites
- Used ≥ 35 locations for home range analysis
- Locations plotted using ArcView 3.3 (Fig. 1)
- Home ranges determined by 95% kernel analysis (Fig. 2)
- Home ranges were categorized according to management
 - Managed* refers to prescribed burned, disked, or fenced areas
 - Burned* refers to prescribed burned areas



Figure 1. GPS locations of one quail's home range.

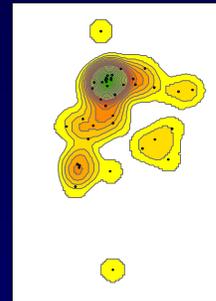


Figure 2. Home range estimate based on 95% kernel analysis of bobwhite locations shown in Fig. 1.

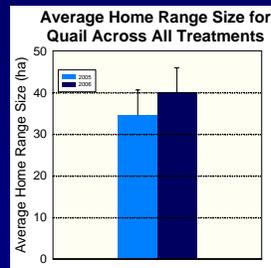


Figure 3. Overall mean home range sizes of quail in 2005 and 2006. Error bars depict SE.

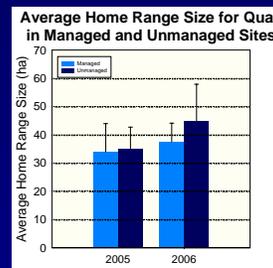


Figure 4. Mean home range sizes for quail in managed and unmanaged sites in 2005 and 2006. Error bars depict SE.

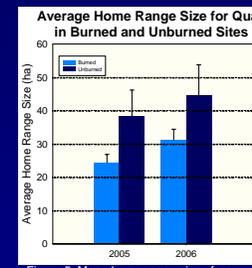


Figure 5. Mean home range sizes for quail in burned and unburned sites in 2005 and 2006. Error bars depict SE.



Burned area



Unburned area

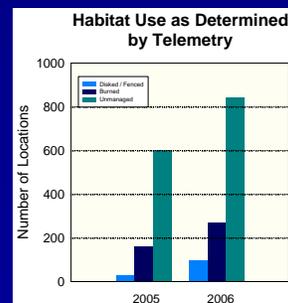


Figure 6. Number of locations / treatment type in 2005 and 2006.



Disked strip



Fenced area

2005 Results

- Radio-tagged 24 quail
 - Obtained ≥ 35 locations for 19 quail
- Overall average home range size was 34.60 ha (Fig. 3)
- Average home range size for quail that did not use managed areas was 35.17 ha (Fig. 4; $n = 10$)
- Average home range size for quail that used managed areas was 33.96 ha (Fig. 4; $n = 9$)
- Average home range size for quail that did not use burned areas was 38.22 ha (Fig. 5; $n = 14$)
- Average home range size for quail that used burned areas was 24.46 ha (Fig. 5; $n = 5$)
- 787 total locations (Fig. 6)
 - 189 locations in managed areas
 - 160 locations in burned areas
 - 598 locations in unburned, unmanaged areas

2006 Results

- Radio-tagged 47 quail
 - Obtained ≥ 35 locations for 28 quail
- 1205 total locations (Fig. 4)
 - 363 locations in managed areas
 - 268 locations in burned areas
 - 842 locations in unburned, unmanaged areas
- Overall average home range size was 39.90 ha (Fig. 1)
- Average home range size for quail that did not use managed areas was 44.92 ha (Fig. 2; $n = 9$)
- Average home range size for quail that used managed areas was 37.52 ha (Fig. 2; $n = 19$)
- Average home range size for quail that did not use burned areas was 44.68 ha (Fig. 3; $n = 18$)
- Average home range size for quail that used burned areas was 31.30 ha (Fig. 3; $n = 10$)

Discussion

- Current management practices may be beneficial to quail populations.
- Prescribed burning seems to be the most effective practice (Fig. 5).
- Fencing may become more beneficial in the future as vegetation matures within those areas.
- With further analyses, the importance of strip disking may become more apparent.
- 2005 seemed to be a better reproductive year for quail than 2006. Because more birds were brood-rearing in 2005 than in 2006, average home range size may have been influenced.
- Analyses comparing use by bobwhite and availability of habitat are continuing.



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