MAXIMIZING THE IMPACT OF FIELD BORDERS FOR QUAIL AND EARLY-SUCCESSION SONGBIRDS: WHAT'S THE BEST DESIGN FOR IMPLEMENTATION?

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INTRODUCTION

Northern bobwhite (*Colinus virginianus*) and other early-succession bird populations declined during the past half-century, primarily because of changes in land-use that led to habitat loss and degradation. A popular management practice to assist these species is the creation of linear field borders along cropland peripheries and ditch banks. These narrow borders, although shown to increase quail numbers locally, may concentrate quail and songbird nest predators as well as brood parasites. Nonlinear blocks of fallow habitat created in odd corners or unproductive areas of crop fields may be at lower risk of these negative edge effects. Additionally, the creation of field border habitat, including that supported by Farm Bill programs, traditionally has been implemented with little consideration for landscape characteristics surrounding the area of management. Recent research indicates that the creation of additional usable space for quail may have the greatest impact in "suitable" landscapes already high in usable space.

We proposed to determine the effects of field border shape, landscape context, and the interaction of field border shape and landscape context on bobwhite quail and early-succession songbird abundance/density and reproductive success. We initiated a study of bird response to the creation of fallow habitat on 12 farms with linear border habitat (6 in suitable landscapes and 6 in unsuitable landscapes) and 12 farms with nonlinear block habitat (6 in suitable landscapes and 6 in unsuitable landscapes) in the southeastern Coastal Plain of North Carolina. These field border practices are used by the Conservation Reserve Program (i.e., CP33) and the North Carolina Wildlife Resources Commission (i.e., Cooperative Upland Habitat and Restoration Programs I and II) and may be refined based on results of our research.

OBJECTIVES

1. Determine if field border shape (linear border vs. nonlinear block) affects northern bobwhite and early-succession songbird abundance/density and reproductive success.
2. Determine if landscape context (suitable vs. unsuitable) affects northern bobwhite and early-succession songbird abundance/density and reproductive success.
3. Determine if the effects of field border shape on bird abundance/density and reproductive success are influenced by landscape context.

PROGRESS TO DATE

We employed a balanced 2 x 2 factorial treatment combination with landscape suitability and shape of field border as the two main factors. We selected 12 farms in suitable landscapes and 12 in unsuitable landscapes. Secondly, we created fallow linear borders on 12 farms (6 in each landscape suitability class) and fallow blocks on 12 farms (6 in each landscape suitability class). For linear borders, we used PVC pipe to mark off approximately 10-ft wide areas to go fallow at the edge of crop fields. We located linear borders parallel to crop rows when possible to allow room for farm equipment to turn around and to prevent destruction of border habitat. For nonlinear block habitats, we marked off areas to go fallow in the corners or ends of fields. All nonlinear blocks are at least 0.08 ha. Location of fallow areas is based on patterns of waste application as well as advice given by farm managers and other Murphy-Brown personnel. Fallow areas began to come out of crop production during the 2004 growing season as the various crops (e.g., wheat, soybeans, corn) were harvested, and all borders and blocks were delineated and out of production by the 2005 growing season. Acreage of both linear border and nonlinear block fallow habitat is approximately 2-3% of crop acreage on each individual farm.

In 2004, we collected pretreatment data on quail and songbird abundance/density, quail covey abundance/density, songbird nest success and brood parasitism rates, and vegetation characteristics of the proposed border areas. In 2005, we collected data on quail and songbird abundance/density, songbird nest success and brood parasitism rates, real quail nest success, artificial quail nest success, and field border vegetation characteristics. Quail covey abundance/density data for 2005 will be collected in October and November. Note that data on quail and songbird abundance/density as well as covey abundance/density were collected on all 24 farms, while all nest data were collected on a subset (12) of these farms.

Preliminary results suggest minimal effects of field border shape and landscape context. Specifically, quail abundance did not differ among treatment combinations (overall $F_{7,40} = 0.98$, $P = 0.46$). Artificial quail nest success was relatively high (63.89 % ± 7.9), but did not differ among treatment combinations ($F_{3,8} = 0.63$, $P = 0.62$). Indigo bunting/blue grosbeak apparent nest success did not differ between landscapes ($F_{1,10} = 1.34$, $P = 0.27$). Indigo bunting/blue grosbeak nest parasitism rates did not differ between landscapes ($F_{1,10} = 0.37$, $P = 0.56$).

These preliminary results should be treated with caution as they are based on raw data. Additionally, any effects of field border shape are more likely to be seen in 2006 after an additional growing season. Landscape effects may be more evident when we study landscape context at smaller scales and higher resolution.

PRESENTATIONS

Riddle, J, and C. E. Moorman. Quail Management: Field Borders and Surrounding Landscapes. Quail Management Workshop – Edgecombe County Extension Center, Tarboro, NC, February 2005.

Riddle, J., C. E. Moorman, and F. Perkins. Maximizing the Impact of Field Borders for Quail and Early-Succession Songbirds: What's the Best Design for Implementation? 11th Annual Southeast Quail Study Group Meeting. Gilbertsville, KY, August 15, 2005.

PUBLICATIONS

None to date.

PARTICIPATING AGENCIES AND LANDOWNERS

David Cobb, Ph.D., Chief of Wildlife Management Division, North Carolina Wildlife Resources Commission. Dr. Cobb helped us to acquire funding for pretreatment data collection. He is also a member of Jason Riddle's graduate committee.

Terry Sharpe, Agriculture Liaison Biologist, North Carolina Wildlife Resources Commission. Terry is a liaison between the North Carolina Wildlife Resources Commission, Murphy-Brown, LLC, and the investigators of this project. Terry helped us to acquire funding for pretreatment data collection and an additional research vehicle. Terry is a technical consultant on Jason Riddle's graduate committee.

Dawn Williamson, Technical Specialist, Murphy-Brown, LLC. Dawn supervises the land technicians on our study sites. She is the primary liaison between Murphy-Brown, LLC and the investigators of this project. She also played a critical role in GIS information exchange and study site selection.

Kraig Westerbeek, Agronomist, Murphy-Brown LLC. Craig helped provide partial funding for pretreatment data collection. He supervises farming activities on our study sites.

NRCS INVOVLEMENT

Matt Flint, State Biologist-NC. Matt was involved in the initial development of this study, providing insight to NRCS needs regarding refinement of practices.