

Grassland Bird Response to Agricultural Field Borders



RESEARCH ADVANCES
Forest & Wildlife Research Center



In the Southeast, privately owned rural lands constitute almost 80% of the total land base with timber and agriculture as the primary land uses. Consequently, the health of wildlife populations in the Southeastern United States is largely determined by the land management decisions of private landowners. These privately owned forests and farmlands not only produce food and fiber products to meet growing global markets, they also provide essential habitats for hundreds of wildlife species.

However, increasing demand for food worldwide and advancing technology have resulted in dramatic intensification of agricultural practices and changes in our agricultural systems. Notable changes have included farm consolidation, larger field size, single-crop production, loss of idle non-crop plant communities, conversion of native grasslands to row crops or exotic forage grasses, and wetland loss. All of these factors have contributed to a reduction in overall landscape diversity, leaving fewer places where wildlife exist and thrive.

Agricultural producers are the stewards of some of America's most important natural resources and are often interested in enhancing wildlife habitat value if management practices can be implemented without compromising their agricultural pro-

duction goals. Enhancement of farmlands for grassland birds can be accomplished by incorporating conservation buffers as part of a comprehensive resource management system.

Conservation buffers are practical, cost-effective conservation practices which provide multiple environmental benefits (increased herbicide and nutrient retention, reduced soil erosion) while providing habitat for grassland birds. Conservation buffers are vegetative barriers (grass, shrubs, trees) strategically located within or at the edge of crop fields to protect elements of the natural environment from effects of weather and human activities. Within intensive agricultural production systems, conservation buffers may be the only source of semi-permanent grassland habitat for nesting birds. Idle herbaceous field borders are one type of conservation buffer, but unlike other buffer practices, such as riparian buffers and filter strips, field borders can be deployed around the entire field margin, instead of just along down-slope edges. Field borders are intentionally managed non-crop herbaceous plant communities along crop field edges to provide environmental and wildlife habitat benefits. Field borders are often employed in addition to existing field edge habitats such as fence rows and drainage ditches a

and may vary in species composition or width depending upon the objectives for their establishment.

Field borders may offer opportunities for enhancing farmlands for numerous grassland birds throughout the United States. Scientists in the Forest and Wildlife Research Center have extensively studied the use of field borders to enhance bobwhite quail habitat. However, little information is available on nongame grassland bird use of field borders. If field borders are to be implemented on a nationwide basis to enhance grassland bird habitat within agricultural production systems, as encouraged through many government sponsored conservation programs, information regarding grassland bird use of field border habitats is required. In this study, scientists measured the effects of field borders on populations of breeding and wintering grassland birds and northern bobwhite in the Black Belt prairie of northeastern Mississippi.

The studies were conducted on three privately owned working farms located within the Black Prairie physiographic region in Clay and Lowndes counties, Mississippi. Primary agricultural practices were rowcrop, forage, and livestock production. During early spring 2000, experimental field borders were established along agricultural field margins (fence rows, drainage ditches, access roads, and contour filter strips) on half of each farm. Across these farms an average of 6% of rowcrop field area was converted to field border habitats. This amounted to 1-2% of the land base of each farm.

Producers were paid a monetary incentive similar to those used in common USDA conservation buffer programs at the end of each growing season for land placed into field borders. Furthermore, producers were required not to mow, herbicide, or disk field borders during the duration of the study.

Grassland Songbird Response to Field Border Management

Researchers measured summer and winter abundance and diversity of grassland birds relative to field border management practices during June-July 2002 and February 2002 – 2003.



American Robin

Breeding Season Songbird Response

During breeding season surveys, 53 species of birds (1443 individual birds) were observed on experimental fields. The 6 most abundant species were Red-winged Blackbird (20%), Indigo Bunting (15%), Dickcissel (13%), Mourning Dove (8%), Northern Cardinal (7%), and Common Grackle (6%).

Dickcissel and Indigo Bunting were nearly twice as abundant where field borders were established, regardless of adjacent plant community type or width. Dickcissels and Indigo Buntings have been declining at 4 percent per year and 1.5 percent per year, respectively, during the previous 24 years in the Black Prairie region, so field border habitats may contribute to regional conservation. Although Indigo Buntings are primarily a forest bird, the field borders provided a herbaceous plant community along existing wooded edges making these areas more favorable for foraging, loafing, and nesting sites. Field borders provide vertical and horizontal vegetation complexity and may enhance the suitability of existing linear habitats (ditch banks, fencerows, road edges) for Dickcissels.

Species richness was greater along bordered than non-bordered transects, however diversity did not differ. Overall bird abundance was greater along bordered linear habitats than similar non-

Indigo Bunting





Northern Cardinal

bordered edges. However, addition of field borders along larger patches of grasslands or woodlands did not alter the number of birds using these edges. We speculate that in linear habitats characteristic of modern agricultural landscapes, field borders provided greater plant structure and diversity, thus supporting a greater number of individuals and species. Although our results are based on 1 year of data, we believe that the magnitude of observed field border effects suggests that field borders may increase the abundance of selected species of grassland/shrub birds during the breeding season.

Wintering Songbird Response

During winter surveys, 71 species of birds were observed on experimental fields. Of the 17,562 individual birds, the 5 most abundant species were Red-winged Blackbird (45%), American Pipit (11%), Song Sparrow (7%), Savannah Sparrow (6%), and American Robin (5%).

Wintering sparrows were one group of birds that seemed particularly responsive to the presence of field borders. Many sparrow species breed on grasslands in the Midwest and winter in agricultural landscapes in the Southeast. Most sparrows are ground foragers and their use of linear habitats often depends on vegetation structure. Collectively, across most adjacent plant communi-

Song Sparrow



ties, we observed greater densities of Song, Field, and Swamp sparrows along bordered transects than non-bordered transects. Song Sparrow and Swamp Sparrow densities were greater where field borders were established along existing grasslands. Whereas the addition of herbaceous field borders adjacent to grasslands may seem redundant, most grasslands within our study farms were monotypic stands of cool-season, exotic forage grasses and provided little vertical structure and few quality food producing plants. Song Sparrow densities were also greater along field borders adjacent to wooded strip habitats than comparable wooded strips without a field border.

After crops were harvested, field border habitats provided suitable cover and food resources for many sparrow species. Field borders in our study were recently established (<3 years old) and consisted primarily of seed producing grasses and forbs coupled with a relatively open understory. This combination likely facilitated ground-based foraging. Additionally, field borders may provide escape cover in close proximity to foraging sites within the crop stubble. Therefore, we believe that field borders may enhance the value of existing grasslands and crop fields by producing additional foraging habitat and providing escape cover in close proximity to waste grain food sources.

Northern Bobwhite Response

Previous studies have demonstrated that field borders may increase foraging efficiency of bobwhite chicks, use of rowcrop fields, breeding season survival, usable space, and local abundance. Although during our study autumn and breeding season bobwhite density at bordered and non-bordered farms were not statistically different, the average autumn density at bordered sites was about 66% greater and the average number of calling males during the breeding season was about 23% greater than non-bordered sites. These relative effect sizes were similar to those from previous field border studies. We evaluated the net effect of field borders on the proportion of the landscape usable by bobwhite by developing a space-use based habitat model constructed from habitat use of radio-marked bobwhite. We applied the habitat

Research conducted by

Philip J. Barbour
L. Wes Burger, Jr.
Rick Hamrick
Mark D. Smith



Mississippi State
UNIVERSITY

For more information
contact:

Bob L. Karr, Interim
Director

Forest & Wildlife
Research Center
Box 9680

Mississippi State, MS
39762

662-325-2696

Fax: 662-325-8726

bkarr@cfr.msstate.edu

www.cfr.msstate.edu

Karen Brasher, editor

Mississippi State University does not discriminate on the basis of race, color, religion, national origin, sex, sexual orientation or group affiliation, age, disability, or veteran status.

suitability model to an agricultural landscape in Clay County, MS and simulated usable space before and after 6% of the row crop was converted to 20' field borders. A 6% change in land use increased usable space for bobwhite by nearly 15%. Thus, a relatively small change in land use, disproportionately alters usable space in the landscape for bobwhite and may elicit an even larger proportional population response.

Summary

Within intensive agricultural landscapes, field borders provide important idle herbaceous cover for grassland and early successional birds. Field borders may provide nesting, foraging, roosting, loafing, and escape cover. During winter, field borders may provide important habitat in southern agricultural systems where most short distance migrants overwinter. Field borders

provide important habitat for many grassland birds due to their greater abundance of food (weed seeds) and more complex vegetation structure compared to non-bordered field margins.

Field borders should be maintained as early successional communities through periodic disturbance (e.g. winter disking) to maintain seed producing plants, vegetation structure, and arthropods for grassland birds.

Resource management systems that support both birds and farm operators are important for maintenance of a diverse farmland bird population. However, implementation of conservation practices rest solely upon farm operators. Only cost-effective farmland conservation practices that accrue multiple environmental benefits while enhancing farmland wildlife will gain widespread acceptance and implementation.

A Guide to Conservation Reserve Program: Northern Bobwhite Quail Habitat Initiative

- Only 9,400 acres of field borders available for enrollment in Mississippi.
- Cropland must be suitably located and adaptable to the establishment of bobwhite quail
- Conservation practice CP33: Habitat Buffers for Upland Birds can be applied around field edges of eligible cropland.
- This is a continuous Conservation Reserve Program practice.
- Field borders must be a minimum of 30' to a maximum of 120' wide
- Incentives include \$100 per acre sign up, 50 percent cost share, 40 percent Practice Incentive Payment, and a soil specific per acre annual rental payment.
- Contact the USDA Farm Service Agency for further information.

Acknowledgements

Information in this publication was adapted from the doctoral research of Mark D. Smith and Philip J. Barbour, working under the direction of Dr. L. Wes Burger, Jr., Department of Wildlife and Fisheries, Forest and Wildlife Research Center, Mississippi State University. This research was supported by the Mississippi Department of Wildlife, Fisheries, and Parks, the USDA Natural Resource Conservation Service's Wildlife Habitat Management Institute, MSU's Forest and Wildlife Research Center, MSU's GeoResources Institute, USDA's Sustainable Agriculture Research and Education and the cooperation of landowners in Lowndes and Clay Counties, MS.

