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Establishment of Native Warm-season Grasses within the Southern Piedmont: Responses of Early Successional Birds

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Establishment of Native Warm-season Grasses within the Southern Piedmont: Responses of Early Successional Birds

Private landowners key to grassland habitat in the Southeast

Southeastern grasslands have undergone centuries of modification including exclusion of fire, intensive grazing, and the introduction of cultivated, exotic, sod-forming grasses. These modifications have resulted in increased densities of hardwood trees and shrubs, changes in herbaceous species composition, and loss of native grasses. Native warm-season grasses (NWSG), such as switchgrass, big bluestem, little bluestem, Indiangrass, and eastern gammagrass, have been nearly removed from the southeastern United States.

A mosaic of cultivated pastureland, cropland, pine plantations, and mixed pine-hardwood forests has replaced the grassland and grassland savanna habitats that were present in the Southeast at the time of European colonization. Currently, most southeastern pastures are planted in exotic cool- and warm-season grass species such as fescue, bermuda, and bahia.

Several bird species are closely associated with the structure of the native bunchgrasses, forbs, and legumes that formed the understory of the longleaf pine forests. During spring and summer (breeding season), this bunchgrass, forb, and legume (early successional) community supports populations of birds such as the northern bobwhite, Bachman's sparrow, loggerhead shrike, eastern meadowlark, indigo bunting, and eastern kingbird. During the winter months, early successional habitat in the Southeast supports a whole new group of birds such as the Henslow's sparrow, savannah sparrow, vesper sparrow, swamp sparrow, and white-throated sparrow (fig. 1). Many of these species have experienced severe population declines due in part to lack of quality habitat for breeding and over-winter survival.

University of Georgia researchers evaluate the effects of native grass restoration on bird communities

Fire has been the most common land management technique for maintaining early successional habitat in the Southeast, but historic changes to the seed bank and plant community may mean that restoration through planting is required to improve wildlife habitat. University of Georgia (UGA) researchers investigated the impact of restoration of NWSG on bird communities during the summer and winter. Grasses were planted within an open agricultural setting (old-field sites) and in forest openings (former food plots) in a forest-dominated landscape (fig. 2). Characteristics of restoration sites were compared to those kept under traditional management of annual mowing and periodic burning (3–5 year cycle). A mixture of big bluestem, little bluestem,

Figure 1 A white-throated sparrow captured on restoration area

Figure 2 Measuring height and visual obstruction to compare vegetation structure with pasture grasses

Indiangrass, and switchgrass was planted to replace vegetation dominated by Johnsongrass, fescue, and bahia. Bird communities were monitored using mist netting. Bird abundance (birds/100 mist net hours) and richness (number of bird species) were measured, as were vegetation characteristics.

Grasses were successfully established creating vegetation structure different than in exotic grass pastures

Native warm-season grasses were successfully established in the old field and forest opening sites. By the end of the second season, planted restoration sites had more than 50 percent native grass cover. The sites planted with native grasses had more native grass cover, taller grass, and higher vegetation density than exotic grass pastures. Native grass sites also had less shrub cover than the exotic grass pastures. Planted sites had tall, distinct bunches of grass. Grass in control sites was low to the ground and dense, forming a thick, ground-level mat of vegetation. Although planted and unplanted sites had a similar number of woody species throughout the study, the preparation required to establish native grasses effectively reduced woody vegetation in planted sites to far below that in the exotic pastures.

Native grass restoration sites supported more species of birds in greater numbers during the winter

The Southeast provides breeding and over-wintering habitat for birds associated with early successional habitat. In fact, there are more grassland obligate bird species in the Southeast during the winter than the breeding season. It is important that these birds have access to early successional grassland habitat year-round to maintain viable populations.

Many of the birds that winter in the Southeast are short-distance migrants, meaning they only fly as far as necessary to find food resources to get them through the winter. Winter bird abundance can vary dramatically from year to year because of this migration pattern and the influence of cyclical weather patterns. Even with these large yearly changes in total numbers, there are some notable differences in bird abundance between areas that have been restored with native grasses and those that have not.

Agricultural fields—Winter bird abundance in native grass, old-field sites was twice as great as in exotic grass pastures. Grassland obligate sparrows were two to three times more common in native grass sites. The bird community in native grass sites was more diverse. Swamp sparrows and vesper sparrows were found only within the open landscape, and both species were much more common in the native grass old-field sites.

Forest openings—Bird community differences between planted and unplanted openings were even more pronounced. The winter bird abundance in native grass forest openings was more than double that in the exotic grass forest openings. There were even larger differences in sparrow capture rates. In two years, only three sparrows were captured in the exotic grass forest openings, while 58 sparrows were captured in the native grass forest openings. Bird species richness was consistently greater in the openings planted with native grasses.

Breeding birds respond less strongly to native grass restoration

During the breeding season, areas of restored native grasses did not provide the same benefits observed during the winter. In Georgia, the bird species richness did not vary dramatically between areas of native grass and exotic grass in the forest openings or agricultural old-field sites. Although the native grass and exotic grass areas supported different types of birds, the areas had about the same number of species. In the agricultural, old-field landscape, the native grass sites supported 15 species of birds while the exotic grass sites supported 16. The number of species detected was higher in the forested landscape, likely due to the edge between field and forest. The native grass forest openings supported 20 types of birds while the exotic grass openings supported 21.

Management recommendations

UGA researchers determined that native grass restoration provided benefits to both breeding and wintering communities of grassland birds. Management for birds generally focuses on breeding season habitat requirements, but researchers' data indicate that habitat manipulation for wintering birds has much positive conservation value. In the forest dominated landscape of the Southeast, early successional habitat is in short supply (fig. 3). The remaining habitat should be managed to maximize utility for breeding and wintering grassland birds. Land managers on both private and public lands should work to maintain patches of native warm-season grasses in the landscape (fig. 4). No single management prescription will provide habitat for all

declining grassland-associated species. Diverse landscape-level management of grassland resources is recommended for providing habitat for a variety of declining species.

To facilitate the implementation of these management recommendations on public and private lands, the following steps should be taken:

1. Develop local seed sources through the U.S. Department of Agriculture Natural Resources Conservation Service, Plant Materials Program. Currently, local seed sources are lacking in most of the Southeast.
2. Encourage landowners to plant road sides, logging decks, fallow fields, and field borders in native grasses.
3. Develop workshops on NWSG establishment for landowners. The workshops should explain establishment techniques to help landowners avoid potential problems with restoration.

Cautionary note: This restoration project occurred in areas with little bermudagrass. Spot application of herbicide was needed during the first and second growing seasons to control Johnsongrass, fescue, and bermudagrass. This study examined the immediate impacts of restoration. Further information on the long-term benefits of restoration is needed. It is certain that restored patches of native warm-season grasses will require continual management with fire, weed sweeps, and/or mowing to maintain their long-term benefits to wildlife. Work should proceed outside of the bird nesting and deer fawning seasons.

Figure 3 Early successional habitat

Figure 4 Maintain native warm-season grasses in the landscape