Bird Response to Enhanced Vegetation Diversity in the Spring Run Complex of Northwestern Iowa

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Goals and Objectives:

- Quantify bird use of 4 habitat types that have been or might be established on managed land in the Spring Run Complex.
- Monitor vegetation composition and structure in each habitat.
- Estimate nest success, nestling growth rate, and brood survival of common bird species using each habitat type.
- Measure invertebrate populations in the three habitat types.

Progress:

The Spring Run Wetland Complex of northwest Iowa is one of the largest grassland units in the state. It has been recognized as an official site in the National Audubon Society's Important Bird Areas program. Previous research indicated that increased vegetation diversity could enhance the reproductive success of grassland birds. The Spring Run Study Area includes 24 study fields arranged in a complete block design, six blocks each with four field types: (1) Cool Season - introduced grasses planted before 2000, (2) Warm Season (new) - a mix of native tall-grass species planted since 2000, (3) Warm Season (mature) - a mix of native tall-grass species planted before 2000, and (4) High Diversity - a diverse mixture over 40 species of forbs and native grasses planted since 2000.

The most abundant bird species we encountered during the study were Bobolink (*Dolichonyx oryzivorus*), Common Yellowthroat (*Geothlypis trichas*), Red-winged Blackbird (*Agelaius phoeniceus)*, and Sedge Wren (*Cistothorus platensis*). Bird densities were not consistently higher or lower in any one of the 4 planting types. Bobolink densities, however, were higher in cool-season fields than in any of the other field types. Both vegetation characteristics and food resources were important in explaining grassland bird densities.

High diversity fields had 5 times more native forb species than warm-season fields and nearly 20 times more native forb species than cool-season fields. High diversity fields had 3 times higher plant species richness than cool-season fields and about 1.5 times higher plant species richness than both of the warm-season planting types. Cool-season fields had lower vegetation diversity and lower plant species richness than all 3 of the other planting types. Visual obstruction was lower in the newly planted warm-season fields, but the newer warm-season fields and the high diversity fields both had more variation in visual obstruction among measurements within a field than the other 2 planting types. Aranae (spiders) biomass was highest in cool-season fields. Four additional invertebrate Orders had higher biomass in cool-season fields, but these differences were not statistically significant.

Red-winged Blackbird nest survival was influenced by year, vegetation height/density, and variation in the availability of invertebrate food resources throughout the nesting season. Nest survival was more than twice as high in mature warm-season fields (36%) than in cool-season fields (14%). Red-winged Blackbird nestling size at fledging differed among grassland planting type, but nestling growth rates did not differ either among planting type or between sexes. Mature warm-season fields had smaller nestlings than either cool-season fields or high diversity fields. Male nestlings were larger than females at fledging with regard to mass, wing, and tarsus measurements Nestling baseline stress levels were lower in the warm-season planting type than in either cool-season or high diversity plantings. We found no evidence of differences in baseline stress levels between males and females. More intensive management activity and larger brood sizes were related to increased stress levels.

Conclusions and Recommendations:

Bird density and diversity have been enhanced in the Spring Run Complex. Grassland bird species have distinct habitat requirements and management for grassland birds not a “one size fits all” approach. Instead a variety of planting types and management strategies that would allow for a mosaic of vegetation characteristics are necessary to conserve grassland birds. Given the importance of cool season grass plantings for Bobolinks in our study, consideration must be given to the impact that elimination of these plantings may have on the future of Bobolink populations in Iowa.