

Examining Changes in Vegetation Structure Through Time in a Restored Tallgrass Prairie and Implications for Avian Diversity

Principal Investigator: Diane M. Debinski
Student Investigator: Brian F.M. Olechnowski (Ph.D.)
Collaborators: Pauline Drobney, Karen-Viste Sparkman
Duration: May 2007 to June 2009
Funding Source(s): Iowa DNR Small Wildlife Grants Program
Iowa Science Foundation
Iowa DNR State Wildlife Grants Program (SWG)

Goals and Objectives:

- 1. Inventory, survey and monitor avian diversity at approximately 120 restored grassland and savannah areas at Neal Smith National Wildlife Refuge
 - 2. Examine how individual grassland bird species respond to the amount of time a prairie restoration has been out of crop rotation, and study how avian community composition shifts through these successional stages on a large-scale restoration of a tallgrass prairie
 - 3. Measure differences in vegetation structure through the stages of restoration and examine how this may influence avian community composition
 - 4. Correlate the abundance of sensitive avian and savannah species to habitat variables and determine which variables are most important in predicting the presence of these species in restored areas
 - 5. Propose management implications and suggestions to the U.S. Fish and Wildlife Service via presentations and an annual report to refuge managers and biologists
-

Introduction:

This project was initiated through grants from the Iowa DNR Small Wildlife Grants Program and the Iowa Science Foundation. The work was expanded via funding from Iowa DNR SWG funding.

Progress:

We have examined how the structure of restored grassland habitat changes through time and how diversity and community composition of grassland birds respond to these changes. Our study was conducted at Neal Smith National Wildlife Refuge, a large-scale prairie restoration in central Iowa. Vegetation composition and structure were measured at 42 restored grassland plots throughout the refuge in 2007 and again in 2008. Birds were surveyed at these locations from 1994-2008. However, due to the anomalous climate in 2008, bird data from 2008 were not included in the temporal trends analysis. Sites were categorized into five temporal categories (out of crop rotation for 1 year, 2 years, 3 years, 4-6 years, and >6 years). In the initial phases of restoration, species such as Horned Larks, Red-winged Blackbirds, and Killdeer were abundant. Other species such as Common Yellowthroats and Dickcissels were more common in established restored sites. Henslow's Sparrows only appeared at survey points that were out of crop rotation for >6 years. Diversity peaked in survey points that were 2-3 years out of crop rotation and points that were >6 years out of rotation. Community composition drastically shifted through the chronosequence of prairie plantings. Changes in diversity and shifts in community composition are likely correlated with forb cover, grass cover, density of vegetation, vegetation height, and litter depth; however, these connections need to be explored further by continuing to measure vegetation characteristics each year at the refuge. Our results suggest that managing for restorations >6 yr in age will provide habitat for the bird species that are most dependent on tallgrass prairie.

Future Plans:

1. The Breeding Bird Survey will be used as baseline data for comparing trends in the greater agricultural landscape in Iowa and at Neal Smith National Wildlife Refuge.
2. We will examine temporal trends in abundance for grassland and forest bird species utilizing the refuge for foraging and nesting. Bird abundance trends will be analyzed as a function of a) overall number of restored acres of grassland habitat, b) number of restored grassland habitat acres by age class, and c) number of acres of forested habitat throughout the refuge.