

Breeding Bird Community Responses to a Small Shrubland-to-Prairie Restoration

Thomas V. Lerczak
Illinois Nature Preserves Commission
17500 E. CR 1950N
P.O. Box 590
Havana, Illinois 62644

ABSTRACT

Fifteen-minute point counts were used to sample bird communities within and adjacent to a 6-ha site at the 169-ha Revis Hill Prairie Nature Preserve, in Mason County, central Illinois. In 1994 and 1995, the study site was dominated by shrublands (primarily *Maclura pomifera*, *Crataegus* spp., *Cornus* spp., and *Gleditsia triacanthos*) surrounded by second-growth woodland. Counts were repeated in 2001 and 2002 after 3 ha of shrubland had been restored to tallgrass prairie (dominated by *Andropogon gerardi*, *Sorghastrum nutans*, and *Solidago canadensis*). For all years, 43 bird species were recorded and categorized as grassland (5), shrubland (12), or woodland (26) species. The Brown-headed Cowbird (*Molothrus ater*) was the most numerous species. An Index of Similarity comparing bird communities among all years ranged from 0.70 to 0.80, indicating a consistent similarity among pre- and post-restoration bird communities, both of which were dominated by birds characterized as woodland and shrubland species. Birds detected by sight alone indicated few species, other than the American Goldfinch (*Carduelis tristis*) and Common Yellowthroat (*Geothlypis trichas*), actually seemed to use the prairie restoration. Because true grassland birds tend to require large blocks of habitat, this small prairie restoration provides inadequate grassland breeding habitat. Resource managers should consider such effects during the planning phases of small restoration projects, especially if their goals are to serve more than botanical interests.

INTRODUCTION

Planning for restoration management of altered natural communities typically emphasizes mature community types such as tallgrass prairie or closed-canopy forest (Schwartz 1997, Askins 1998). Probably because vegetation characteristics are important defining factors used in classifying natural communities (White 1978), the ecological condition of the plant community alone is often used to determine the "value" of a particular site. Transitory or disturbed communities such as shrublands are typically not viewed by resource managers or the public as valuable (Bowler 1992) and are often the first habitat types to be removed during restoration projects.

Shrublands, however, provide essential habitats for an assemblage of bird species not found in or much less common in grasslands or forests. And many shrubland species

have been declining in recent years, mostly due to habitat losses (Askins 1998, Pardieck and Sauer 2000). The purpose of this study was to document changes in the bird community of a 6-ha shrubland and adjacent woodlands after 3 ha of shrublands were restored to tallgrass prairie.

STUDY AREA AND METHODS

This study was conducted within and adjacent to a 6-ha site located within the 169-ha Revis Hill Prairie Nature Preserve, Mason County, Illinois (Section 26, T20N R7W of the 3rd PM). In 1994 and 1995, when the initial bird surveys were made, the 6-ha shrubland site was mostly surrounded by young to mature second-growth timber, with a 50-ha pasture adjacent to the northeast corner of the study area beyond a narrow line of trees. Shrublands were dominated by honey locust (*Gleditsia triacanthos*), Osage orange (*Maclura pomifera*), hawthorn (*Crataegus* spp.), and dogwood (*Cornus* spp.). Ground-cover was mostly a mixture of cool-season grasses and Canada goldenrod (*Solidago canadensis*).

By 2001, about 3 ha of shrubland within the original study site had been restored to tallgrass prairie dominated by big bluestem (*Andropogon gerardi*), Indian grass (*Sorghastrum nutans*), and Canada goldenrod (*S. canadensis*). Other prairie forbs were also present to a lesser degree, and some woody re-invasion was beginning to occur.

Between 20 May and 18 June in 1994, 1995, 2001, and 2002 on four sample dates per year, 15-minute point counts were conducted between 0600 and 0655 at two locations, separated from each other by about 200 m, within the 6-ha study area. Birds were recorded from an unlimited distance (Gibbons et al. 1996), except in the direction of the other point-count location, where birds detected beyond 100 m were not recorded.

Bird counts from both point-count locations were summed for each species on each sample date. Because the bird community as a whole was the unit of interest, an Index of Similarity, defined as such in Bond (1957), was used to compare bird communities among years; these calculations used only the maximum count for each species from each of four sample dates for each year. Maximum counts were used under the assumption that this number provided an index to the actual number of breeding individuals for a species on the site.

RESULTS AND DISCUSSION

Forty-three species were recorded over the entire study and categorized as grassland (5), shrubland (12), or woodland (26) species based on habitat preferences described in Ehrlich et al. (1988) (Table 1). Four species were only present in pre-restoration surveys (Table 1). Ten species were only present in post-restoration surveys (Table 1). Even so, the number of individuals and species recorded were quite similar in the pre- and post-restoration study areas.

The Index of Similarity (Whittaker 1952, Bond 1957) comparing all years ranged from 0.70 to 0.80 (Table 2), indicating a consistent similarity of bird communities among years. In fact, counts of common species such as the Tufted Titmouse, Northern Cardinal,

and Indigo Bunting varied little among years (Table 1). Ability to detect birds visually at the woodland interface improved from pre- to post-restoration surveys, and this could have resulted in more species or individuals counted in some cases (Table 1). It should be considered that this study suffers from small sample sizes and lack of replication.

Many true grassland birds (those species rarely found in other habitats) require large areas of habitat (e.g., 75 ha for the Henslow's Sparrow [*Ammodramus henslowii*])(Herkert 1994, Walk and Warner 1999), and actually may avoid small grasslands, especially those with wooded boundaries or brushy areas within the grasslands (O'Leary and Nyberg 2000). Kobal et al. (1999), however, provided evidence that plant species composition of grasslands is also a factor in habitat choice. Species requiring large contiguous prairie habitats were not counted during pre- or post-restoration surveys.

Askins (1998) and Robinson et al. (1999) reported that many shrubland birds, in contrast, occupy both large and small areas of suitable habitat. Though not discernable from data presented in Table 1, during pre-restoration surveys, a variety of shrubland species were often sighted using shrubland habitats throughout the 3-ha focus area. This may be contrasted with post-restoration surveys, where few species, except for the Common Yellowthroat and American Goldfinch, were seen actually using the restored tallgrass prairie habitats; most individuals observed in post-restoration surveys were in woodland edge habitats (i.e., shrubland-like) along the prairie margins or flying across the prairie en route to woodland edges.

During the planning phases of small restoration projects, resource managers should consider that true grassland birds will not likely be attracted to small prairie habitats. Restoring small shrubland areas, in contrast, can serve both botanical and avian interests.

ACKNOWLEDGMENTS

Thanks to the Illinois Department of Natural Resources (IDNR), who are the owners of Revis Hill Prairie Nature Preserve, and the Illinois Nature Preserves Commission for permission to conduct this study. William McClain of the IDNR identified plants at the prairie restoration, and William McClain, Patti Reilly of the IDNR, and Charlene Falco assisted with the plant surveys (not included with this report). A special thanks to Charlene Falco of the Volunteer Stewardship Network in 1994 for bringing the prairie restoration to my attention.

LITERATURE CITED

- Askins, R.A. 1998. Restoring forest disturbances to sustain populations of shrubland birds. *Restoration and Management Notes* 16:166-173.
- Bond, R.R. 1957. Ecological distribution of breeding birds in the upland forests of southern Wisconsin. *Ecological Monographs* 27:351-384.
- Bowler, P.A. 1992. II. Shrublands. In defense of disturbed land. *Restoration and Management Notes* 10:144-149.
- Ehrlich, P.R., D.S. Dobkin, and D. Wheye. 1988. *The birder's handbook: a field guide to the natural history of North American Birds*. Simon and Schuster, Inc., New York. 785 pp.
- Gibbons, D.W., D.A. Hill, and W.J. Sutherland. 1996. Birds. Pages 227-259 in W.J. Sutherland, editor. *Ecological census techniques: a handbook*. Cambridge University Press, New York. 336 pp.
- Kobal, S.N., N.F. Payne, and D.R. Ludwig. 1999. Habitat/area relationships, abundances, and composition of bird communities in 3 grassland types. *Transactions of the Illinois State Academy of Science* 92:109-131.
- Herkert, J.R. 1994. The effects of habitat fragmentation on midwestern grassland bird communities. *Ecological Applications* 4:461-471.
- O'Leary, C.H., and D.W. Nyberg. 2000. Treelines between fields reduce the density of grassland birds. *Natural Areas Journal* 20:243-249.
- Pardieck, K.L. and J.R. Sauer. 2000. The 1995-1999 summary of the North American breeding bird survey. *Bird Populations* 5:30-48.
- Robinson, S.K., E.J. Heske, and J.D. Brawn. Factors affecting the nesting success of edge and shrubland birds. Federal Aid Project No. W-125-R. Final Report submitted to the Illinois Department of Natural Resources, Springfield, Illinois.
- Schwartz, M.W. , editor. 1997. *Conservation in highly fragmented landscapes*. Chapman and Hall, New York. 436 pp.
- Walk, J.W., and R.E. Warner. 1999. Effects of habitat area on the occurrence of grassland birds in Illinois. *American Midland Naturalist* 141:339-344.
- White, J. 1978. Illinois natural areas inventory technical report, volume 1: survey methods and reports. Illinois Natural Areas Inventory, Urbana.
- Whittaker, R.H. 1952. A study of summer foliage insect communities in the Great Smokey Mountains. *Ecological Monographs* 22:1-44.

Table 1. Bird Counts at a shrubland-to-prairie restoration site at Revis Hill Prairie Nature Preserve, Mason Co., Illinois. Two 15-min point counts were conducted on four dates per year between 20 May and 18 June.

Species	Maximum Count Per Year			
	1994	1995	2001	2002
Woodland-Interior-Edge				
Cooper's Hawk (<i>Accipiter cooperii</i>)			1	
Northern Bobwhite (<i>Colinus virginianus</i>)	1	1		3
Mourning Dove (<i>Zenaida macroura</i>)	6	4	2	2
Yellow-billed Cuckoo (<i>Coccyzus americanus</i>)	2	2	3	2
Northern Flicker (<i>Colaptes auratus</i>)	1		1	
Red-bellied Woodpecker (<i>Melanerpes carolinus</i>)	5	4	4	6
Downy Woodpecker (<i>Picoides pubescens</i>)	1	2	2	1
Eastern Wood-Pewee (<i>Contopus virens</i>)			1	2
Great Crested Flycatcher (<i>Myiarchus crinitus</i>)	3	2	5	3
Eastern Kingbird (<i>Tyrannus tyrannus</i>)				2
Red-eyed Vireo (<i>Vireo olivaceus</i>)	3	1	3	3
Yellow-throated Vireo (<i>Vireo flavifrons</i>)				1
Blue Jay (<i>Cyanocitta cristata</i>)	7	7	5	5
American Crow (<i>Corvus brachyrhynchos</i>)	3	2	3	3
Black-capped Chickadee (<i>Poecile atricapilla</i>)	1		1	2
Tufted Titmouse (<i>Baeolophus bicolor</i>)	4	4	4	4
White-breasted Nuthatch (<i>Sitta carolinensis</i>)		1	1	2
Blue-gray Gnatcatcher (<i>Poliptila caerulea</i>)			1	1
American Robin (<i>Turdus migratorius</i>)	1	3		
Wood Thrush (<i>Hylocichla mustelina</i>)	2	1	2	2
Cedar Waxwing (<i>Bombycilla cedrorum</i>)			1	3
Scarlet Tanager (<i>Piranga olivacea</i>)	1		2	2
Northern Cardinal (<i>Cardinalis cardinalis</i>)	4	5	5	5
Rose-breasted Grosbeak (<i>Pheucticus ludovicianus</i>)	1	1	4	1
Baltimore Oriole (<i>Icterus galbula</i>)			2	1
European Starling (<i>Sturnus vulgaris</i>)				1
Number of Species/Individuals	17/46	15/40	21/53	23/57
Shrubland				
Willow Flycatcher (<i>Empidonax traillii</i>)		1		1
White-eyed Vireo (<i>Vireo griseus</i>)		2		
Northern Mockingbird (<i>Mimus polyglottos</i>)	1			
Brown Thrasher (<i>Toxostoma rufum</i>)	1	2		3
Gray Catbird (<i>Dumetella carolinensis</i>)		2	2	
Blue-winged Warbler (<i>Vermivora pinus</i>)				1
Common Yellowthroat (<i>Geothlypis trichas</i>)	5	3	6	6
Yellow-breasted Chat (<i>Icteria virens</i>)			1	
Eastern Towhee (<i>Pipilo erythrophthalmus</i>)	5	3	5	4
Field Sparrow (<i>Spizella pusilla</i>)	5	6	7	5
Indigo Bunting (<i>Passerina cyanea</i>)	6	6	6	8
American Goldfinch (<i>Carduelis tristis</i>)	4	2	5	5
Number of Species/Individuals	7/27	9/27	7/32	8/33
Grassland				
Ring-necked Pheasant (<i>Phasianus colchicus</i>)	4	3	2	1
Dickcissel (<i>Spiza americana</i>)		2		
Eastern Meadowlark (<i>Sturnella magna</i>)	1	2	2	3
Brown-headed Cowbird (<i>Molothrus ater</i>)	10	12	9	8
Red-winged Blackbird (<i>Agelaius phoeniceus</i>)		2	1	2
Number of Species/Individuals	3/15	5/21	4/14	4/14

Table 2. Index of Similarity (Bond 1957) calculated using maximum counts (as shown in Table 1) from four sampling dates per year (values from both point counts summed) for each species for each year.

	1994	1995	2001
1994			
1995	0.78		
2001	0.79	0.73	
2002	0.76	0.70	0.80