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FINAL REPORT

Bird Populations of Shelterbelt Habitats in Lake County, South Dakota

The project examined the importance of shelterbelts as breeding for birds. We censused bird populations during the critical summer breeding season. We were especially interested in how many neotropical migrant bird species depend on shelterbelts as breeding habitat. We studied shelterbelts of different sizes to explore whether species preferentially use larger areas. We will monitor breeding activity to determine if shelterbelts are critical resources for maintaining or stabilizing non-game bird populations in South Dakota.

We conducted our survey in Lake County, South Dakota. The most abundant habitat is agricultural land. Shelterbelts represent a significant percentage of the woodland habitat in this region of South Dakota and may be critical to the reproductive success of many birds in this area. These narrow plots of trees were planted over the last 50 years through programs administered by the Soil Conservation Service. There is concern that the number of shelterbelts in the prairie regions is declining because of farmers seeking to place more land into crop production and the quality of habitat is diminishing as existing shelterbelts senesce. We felt it was important to document the use of these critical habitat areas by breeding birds. The project had two main objectives:

(1) To determine the species composition and abundance of birds breeding in shelterbelt habitats in Lake County. We plan to census shelterbelts of various sizes to examine the association between habitat size and species composition.

(2) To search for nests in shelterbelt habitats and monitor the reproductive success of the breeding populations.

METHODS:

Study Areas

We selected 10 shelterbelts in Lake County for censusing. Wooded areas may vary in size, so we selected only narrow shelterbelts (about 20 m in width). Eight of the shelterbelts we were able to use were at least 500 m long. The other two areas were about 300 m long. We considered these latter areas to be small shelterbelts and the other eight areas to be large shelterbelts. Census points were established no closer than 50 m to the end of a shelterbelt. Each point was at least 150 m from other points in the same shelterbelt. With this protocol, the large shelterbelts contained 3 census points and the small shelterbelts contained two points.

Shelterbelt census methods

We censused using the point count method (Ralph, et. al 1992). The observer stood at the census point and recorded all bird species seen or heard inside the shelterbelt within 50 m of the census point during a five minute period. All censuses were done between 6 a.m. and 10 a.m. CDT. All censuses were done in June and the first week of July. This is the most active period for breeding birds in east central South Dakota and is after most

migratory birds have left the area for more northerly breeding grounds. Six shelterbelts were censused 4 times, three were censused three times, and one shelterbelt was censused twice. As we walked through shelterbelts, we attempted to locate nests by visual search. However, in only one shelterbelt did we map and check nests. We will continue this work in future years to get better estimates of breeding success.

RESULTS:

We completed 97 point counts in the 10 shelterbelts during the summer of 1997. We recorded 454 observations of 34 different species (Table 1). The species richness of individual shelterbelts ranged from 23 species to 10 species. There were 14 species of birds that were recorded at 10% or more of the census points. House Wren and Common Grackle were easily the most frequently observed species, followed by Mourning Dove and Song Sparrow. The general agreement between frequency and count indicates that birds with the greatest number of individuals also were spread throughout the habitat. Birds may be perceiving shelterbelts as a very homogenous environment.

Comparison with Previous Breeding Bird Records

We searched the South Dakota Breeding Bird Atlas (Peterson 1995) for birds that have been reported to breed, or could reasonably be expected to breed, in shelterbelt habitat in east central South Dakota. In order to be included in this list, a significant fraction (around 25%) of the documented observations had to have been made in the manmade habitat category. The species must also have breeding records in Lake County or the surrounding area. Using these criteria, we compiled a list of 43 species that we believed would be likely to be found breeding in shelterbelts in Lake County. These species are listed below along with the frequency in which it was observed to use manmade habitats including shelterbelts (number of reports in manmade habitat / total reports that listed a habitat category).

Swainson's Hawk -	manmade 112/245	
Red-tailed Hawk -	manmade 83/243	
American Kestrel -	manmade 76/176	
Mourning Dove -	manmade 203/366	
Black-billed Cuckoo -	manmade 53/113	
Eastern Screech Owl -	manmade 29/72	
Great Horned Owl -	manmade 73/163	
Red-headed Woodpecker -	manmade 89/175	
Downy Woodpecker -	manmade 74/151	
Hairy Woodpecker -	manmade 39/124	
Northern Flicker -	manmade 127/280	
Eastern Wood-Pewee -	manmade 23/58	No record in Lake County
Willow Flycatcher -	manmade 61/135	
Least Flycatcher -	manmade 23/52	
Great-crested Flycatcher -	manmade 12/64	No record in Lake County
Western Kingbird -	manmade 175/294	
Eastern Kingbird -	manmade 194/349	
Blue Jay -	manmade 97/207	
American Crow -	manmade 57/133	
Black-capped Chickadee -	manmade 65/184	
White-breasted Nuthatch -	manmade 21/82	
House Wren -	manmade 154/287	
Eastern Bluebird -	manmade 48/105	

American Robin -	manmade 184/305	
Gray Catbird -	manmade 54/127	
Brown Thrasher -	manmade 147/290	
Cedar Waxwing -	manmade 37/72	
Loggerhead Shrike -	manmade 71/139	
European Starling -	manmade 138/203	
Warbling Vireo -	manmade 89/187	
Yellow Warbler	manmade 102/260	
Common Yellowthroat	manmade 102/316	
Northern Cardinal -	manmade 10/23	
Rose-breasted Grosbeak -	manmade 15/58	No record in Lake County
Indigo Bunting -	manmade 19/62	
Chipping Sparrow -	manmade 76/126	
Field Sparrow -	manmade 17/104	
Song Sparrow -	manmade 53/186	
Red-winged Blackbird	manmade 151/370;	
Common Grackle -	manmade 196/327;	
Brown-headed Cowbird -	manmade 156/374;	
Orchard Oriole -	manmade 156/289;	
Baltimore Oriole -	manmade 104/213;	
American Goldfinch -	manmade 141/293;	

Of the 43 species on this list of potential shelterbelt breeding birds in Lake County, 31 species (72%) were observed at least one time in our study. The observations of Rose-breasted Grosbeak and Great Crested Flycatcher are new breeding bird records for Lake County. The 12 species that were not observed during the study are listed below.

Eastern Screech Owl
Great Horned Owl
Eastern Wood-Pewee
Willow Flycatcher
Western Kingbird
White-breasted Nuthatch
Eastern Bluebird
Loggerhead Shrike
Yellow Warbler
Northern Cardinal
Indigo Bunting
Field Sparrow

Because of our own and other bird sightings in the area, we are confident that several of these unrecorded species are actually using shelterbelts as breeding habitat in Lake County. Eastern Screech Owl, Great Horned Owl, and White-breasted Nuthatch are common birds in Lake County all year. Willow Flycatcher, Western Kingbird, and Yellow Warbler are also are frequent nesters in the area and are likely to be counted after further censusing.

Other birds not observed are seen only in certain areas and habitats in eastern South Dakota. These species are Eastern Bluebird and Northern Cardinal. Populations of Eastern Wood-Pewee and Loggerhead Shrike are declining and their absence from the census indicates that there is reason to be concerned about their breeding status in east central South Dakota. Indigo Bunting and Field Sparrow are birds that are more likely to nest in more disturbed or agricultural habitats.

We observed two special interest species listed by the South Dakota Breeding Bird Atlas:

Swainson's Hawk - nest located
House Finch

Effect of Shelterbelt Size

The shelterbelt with the lowest species richness (10 species) was one of the small shelterbelts, but the other small area had 21 species, so any relationship between diversity and size of shelterbelt is difficult to determine with this sample size. It was more difficult than we anticipated to find small shelterbelts that were in good condition and yet not too close to dwellings. We hope to study the influence of shelterbelt size in subsequent years. However, we have noted that the narrow nature of shelterbelts may be what limits diversity, not the overall length of the area. With their characteristic shape, shelterbelts are completely edge habitat, and the length of the habitat may not affect the edge-tolerant species. Whereas birds that require deep woods will not find suitable nesting habitat in shelterbelts regardless of the length of the belt.

Nest Searches

One shelterbelt was searched for nests (FM shelterbelt in Table 1). Nests were seen for Northern Oriole (1 nestling) and Swainson's Hawk (too high to observe). Parents bringing food to the nest were observed for cavity nesting birds: two Starling nests, two House Wren nests, and one Northern Flicker nest. At another place in the shelterbelt, a wren was feeding fledglings. Agitated behavior by one or more adults was observed for several species, but nest could not be located. These included species like Song Sparrow and Common Yellowthroat where nests are often difficult to locate. From confirmed and probable evidence, we estimate that this small shelterbelt contained the following numbers of nests: 4 House Wren; 3 Song Sparrow; 2 Starling; 2 Common Yellowthroat; 1 Northern Oriole; 1 Northern Flicker; 1 Black-capped Chickadee; 1 Swainson's Hawk; 1 Eastern Kingbird; and 1 Blue Jay. These are most likely conservative estimates.

Conclusions

Our results show that shelterbelts are heavily used by resident and migrant birds for breeding. More than 70% of the birds that could be expected were found in our ten shelterbelts. Any activity that decreases the number of shelterbelts is likely to have a negative impact on non-game bird populations in east central South Dakota. Species of concern like Swainson's Hawk use shelterbelts as nesting area and probably provide critical habitat for these birds. Although our data are not conclusive, it appears that the length of shelterbelts is not a critical feature, but rather the age of the shelterbelt and tree species composition may be the factors that influence the use of the habitat by nesting birds.

REFERENCES

Peterson, R.A. 1995. The South Dakota Breeding Bird Atlas. South Dakota Ornithologists' Union. Aberdeen, SD.

Ralph CJ, GR Geupel, P Pyle, TE Martin, DF DeSante. 1992. Field methods for monitoring landbirds. Draft report to USDA Forest Service, Arcata, CA.

Explanation of Table 1

Results from each of the ten shelterbelts are listed separately in the columns and combined totals for all areas are given in the final three columns. Species are listed in rank order of their frequency. Frequency was calculated as the total number of individuals observed divided by the total number of census points sampled (number of points x number of times sampled). The count is the number of shelterbelts where a species was observed at least one time.

Table 1. Relative frequency of bird species.

Summary 97														
	LM	Eb	FM	Hil	LH	Lan	N 81	Pond	Rut	Wlf	Total			
Points/plot	3	3	2	3	3	3	3	3	3	2	28			
Censuses /plot	4	2	4	4	4	4	3	3	3	4	35			
Points sampled/plot	12	6	8	12	12	12	9	9	9	8	97			
											Total	Freq	count	
House Wren	10	6	8	11	9	11	6	8			69	0.71	8	
Common Grackle	9	2	3	10	10	12	4	7	4	8	69	0.71	10	
Mourning Dove	5	5		8	6	8		4	2	2	40	0.41	8	
Song Sparrow	5	2	8	4		6	3	7	4	1	40	0.41	9	
American Goldfinch	3	1	1	4	4	2	4	2	1	3	25	0.26	10	
Eastern Kingbird	7	1	1	2	1	5		1	2	1	21	0.22	9	
Common Yellowthroat	4		4		1	5	3	2	1		20	0.21	7	
Brown-headed Cowbird	3		4	2		2	1	5	2		19	0.20	7	
American Robin	5			2	4		1	5			17	0.18	5	
Blue Jay	2	1		1		4	2		6		16	0.16	6	
Black-capped Chickadee	2	1		1	3	3	1	1			12	0.12	7	
Brown Thrasher	1	1	1			4		2		1	10	0.10	6	
European Starling	7					2		1			10	0.10	3	
Red-winged Blackbird	5	2	1			1	1				10	0.10	5	
Red-headed Woodpecker	3	1				1	2	1			8	0.08	5	
Downy Woodpecker	1	1	1		3				1		7	0.07	5	
Northern Flicker	1				2	1	1		2		7	0.07	5	
Empid Species	1			1	2	2				1	7	0.07	5	
Cedar Waxwing				3	3					1	7	0.07	3	
Red-eyed Vireo	1		1	1	1	2				1	7	0.07	6	
Orchard Oriole	3		1	1		1	1				7	0.07	5	
Baltimore Oriole	4								1		5	0.05	2	
Chipping Sparrow				2	2						4	0.04	2	
Warbling Vireo	1					1				1	3	0.03	3	
American Crow					1		1				2	0.02	2	
Gray Catbird				1		1					2	0.02	2	
House Finch				1	1						2	0.02	2	
House Sparrow	1								1		2	0.02	2	
Swainson's Hawk			1								1	0.01	1	
American Kestrel		1									1	0.01	1	
Black-billed Cuckoo				1							1	0.01	1	
Hairy Woodpecker				1							1	0.01	1	
Great Crested Flycatcher				1							1	0.01	1	
Rose-breasted Grosbeak				1							1	0.01	1	
total species	23	13	13	21	16	20	14	13	12	10				
											454	Total observations		