

Bird Use of Successional Fields
at Battelle-Darby Creek Metro Park

by

Brad Andres
Department of Zoology
The Ohio State University
Columbus, Ohio 43210

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Metropolitan Park District of Columbus and Franklin County
P.O. Box 29169
Columbus, Ohio 43229

Introduction

In 1976 the Board of Park Commissioners authorized the Metropolitan Park District of Columbus and Franklin County to implement a controlled ecological succession program. The aim of this program is to maintain a high level of habitat diversity within the Metro Parks. Increased habitat diversity creates a more varied wildlife resource and enhances visitors' experience within the parks. Current procedures used in management include mowing, tilling, burning, seeding and manual removal of woody plants. Because of the size and location of Battelle-Darby Creek Metro Park, successional control practices are an important aspect of its management scheme. In order to assess the progress of this program, Metro Parks has begun to collect data on wildlife occurring in these areas. Documentation of bird species using managed fields at Battelle-Darby was initiated by Petit and Petit (1983) who found 10 species of birds on six surveyed grasslands. Nees (1984) evaluated Battelle-Darby for breeding bobolink habitat and suggested management plans to the Metro Parks. The Ohio Breeding Bird Atlas was also conducted in the park and documented several nesting field species (Turner 1985). The purpose of this report is to furnish the Metro Parks Board with further information on the occurrence of birds on managed fields of Battelle-Darby Creek Metro Park.

Study Area and Methods

Battelle-Darby Creek Metro Park is a 2000 acre park located on the southwestern edge of Franklin County, Ohio. The park consists of an array of habitats from riparian woodlands to cropped fields. Six fields in the park were chosen by Metro Parks personnel to be surveyed during the spring of 1987. Plots totaling 74 acres were staked out in these fields to ease coverage and to increase sampling precision. Exact grid layouts of each plot is given in Fig.1. Sizes of plots, which were proportional to field size and varied from 2.62 ac to 25.94 ac, are given in Table 1. Locations of plots within the park are presented in Fig.2.- Fig.4.

The study fields were in varying stages of succession. The Canon plot had a large component of poison ivy, shrubs, and isolated trees. Large stands of teasel were also present. The field was originally seeded in 1970 with red fescue and orchard grass at 30 lbs./ac. Although mowing didn't occur for ten years after seeding, one-third of this area is now mowed every year. The Gardner plot was seeded with 78% 'Viking upright' birdsfoot trefoil and 22% timothy at 18 lbs./ac in 1984. The field is mowed biannually in mid and late summer. Tall, perennial native prairie plants were dense in the restored Prairie plot. This

field was seeded with 60% grasses and 40% forbs in 1982 and has been annually mowed and recently (1986) burned. The GH-1 plot was characterized by alternating rows of dense, tall perennials and sparser, low vegetation. Woody plants were interspersed throughout this plot which is biannually mowed. Seeding occurred in 1978 and consisted of 40% perennial rye grass, 20% orchard grass, 15% red fescue, 10% Kentucky bluegrass, 10% birdsfoot trefoil, and 5% timothy. GH-2, similar to Gardner, was mainly composed of timothy but had more interspersed tall perennials. The GH-3 plot had the least amount of ground cover and had small patches of tall perennials. Mowing occurred annually in these two plots.

Two days a week were needed to complete censuses on all plots. Canon, Gardner, and Prairie plots were surveyed the first day and GH-1, GH-2, and GH-3 were surveyed the second day. Counts were conducted by walking zig-zag through the cells of a plot (an example of the walking pattern is given in Fig.1.). Plots were systematically surveyed from 21 April to 11 June resulting in each plot being surveyed six times. Starting plots were rotated each week. Survey times ranged from 15 minutes to 90 minutes.

Birds found during surveys were identified to species and if possible, age and sex. Cell locations of each individual were recorded and placed on a plot map. Behavioral information on individuals was also collected. Table 2. contains a list of data that were collected during surveys. An example of the field form used is given in Table 3.

Results

Seven species of grassland birds (abbreviations defined in Table 4.) were found on at least one plot on more than 50% of the surveys and are considered "regular". An additional five species found on the Canon plot are considered edge species. Table 5. shows the mean number of individuals of regular species occurring on each plot. In order to compare abundance between plots, mean densities (with SE) were calculated for all regular species (Table 5.). If a species was observed on <50% of plot surveys then it is considered "transient" in the plot. These species, presented in Table 7., may be either woodland and edge infiltrators or migrants. Two of these birds, willow flycatcher and Henslow's sparrow, appeared during the last two weeks of censusing and may have bred in the fields. Breeding status of regularly occurring species is determined according to the Ohio Breeding Bird Atlas (Turner 1985) and is presented in Table 8. First nest dates are also presented in this table. A complete list of species observed at Battelle-Darby Creek Metro Park during the spring of 1987 is given in Table 9.

Overall, the field sparrow was the most abundant species (averaging 4.03 birds/survey) followed by the red-winged blackbird (averaging 3.60 birds/survey). Song sparrows (2.84 birds/survey) and American goldfinches (2.42 birds/survey) were also important components of the grassland avifauna. Phenology of birds occurring in field plots is presented in Figure 5. The increase in numbers observed during early June reflects the fledging of young in these areas.

Several species of high interest to Metro Parks were observed during surveys. Three pairs of bobolinks were found on plots GH-1 and GH-2. Nesting was confirmed for two of the three pairs. During mid to late July a flock of molting adults and juveniles bobolinks in excess of 40 individuals congregated on GH-1 (M. Albin pers.com.). A lone male grasshopper sparrow was found through the period on the Canon plot. No females or nests were discovered however. A singing male Henslow's sparrow was discovered on the last day of censusing, 11 June on GH-3. A return visit on 16 June revealed two singing males and one additional bird. Although one male remained until mid-July, no nesting evidence was found.

Species abundance and composition varied markedly between plots. The small, 2.62 acre Prairie plot had the highest density with a mean of 3.054 ± 1.000 birds/ac where red-winged blackbirds accounted for 60% of the total bird abundance. Red-wings were probably attracted to the thick, stemmy cover this plot provided. Due to the small size and monotone habitat, this plot ranked third in numbers of birds seen and species diversity.

The Canon plot had the next highest density (1.817 ± 0.369 birds/ac). However, the large size of this plot lead to a high mean number of birds observed (42.65 birds/survey). Diversity was also high (9 regular species) on this plot. Incidence of species considered as "edge" is probably due to patches of woody stems in this plot. An eastern bluebird pair nesting in a nest box fledged at least three young and had a second clutch of 4 eggs on 9 June. A red-tailed hawk was often seen in the vicinity and probably used this field as a hunting site. One case of brown-headed cowbird parasitism on a field sparrow nest was noted. The host field sparrow abandoned the nest before hatch.

The Gardner plot was the least productive of all the plots with a mean density of 0.458 ± 0.164 birds/ac. The only regularly occurring species was the red-winged blackbird. Low structural diversity and species composition of the vegetation may have made this field unappealing to birds.

Plot GH-1 ranked third in overall density (1.208 ± 0.212), second in mean number of birds observed (31.34 birds/survey), and second in species diversity (6 regular species). All of the six regular species can be considered grassland species. This was probably due to the presence of mown grass strips that created a more open habitat. Of greatest interest was the nesting of a pair of bobolinks in this field.

A pair of bobolinks also nested in plot GH-2. Overall mean density (0.508 ± 0.133) and species diversity (3) was low. The plot also did not provide the plant diversity to host large numbers of birds.

GH-3 also had a low mean density (0.701 ± 0.302) and species diversity (2). Of interest was the appearance of Henslow's sparrows on 11 June. The sparse litter layer and interspersed tall perennials of this field appear to be prime habitat for these birds.

Species found during my surveys complement those found by Petit and Petit (1983). There appears to be no overlap in the areas they surveyed with those I surveyed. However, to the degree that they can be compared, densities found in both studies seem to be similar. The higher densities I found for song and field sparrows may be attributed to their earlier nesting cycle. The former study was conducted from 16 June - 25 July. From our combined studies it appears that breeding bird use of grasslands extends for four months.

Discussion

These results indicate that Metro Parks has been successful in creating field habitats that are attractive to avian species. It is clear that an area like the Canon plot, high in vegetative structural complexity and species diversity will appeal to the largest array of species. The complexity found on the Canon plot is due to the presence of patches of woody plants. These patches create habitat for edge species that are absent in the other plots. Despite this high diversity, there is a missing component of the Canon avifauna; true grassland species. What the Canon plot lacks in grassland species is made up for on the GH-1 plot. Walking through this plot it is easy to see why there is a difference in species composition. Unlike Canon, GH-1 is interspersed with woody stems but lacks any dense woody patches. This creates a more open habitat desirable to grassland species. Spot-mapping of individuals show that all of these species prefer the open, grassy areas of the plot. In order to increase density and diversity of true grassland species in this plot the dense bands of tall forbs need to be reduced, perhaps to a width of only 10-12 feet. Creating a less dense and structurally diverse mosaic of grasses and forbs may be the best way to enhance grassland habitats. Nees (1984) suggested that hayfields may

provide suitable habitat for nesting bobolinks. Skinner et al. (1984) suggested that grazing may be the best management procedure to achieve this. They also suggested that grass cover of 10-60% and forb cover of 5-15% would be optimal habitat for species that occur in central Ohio. I therefore suggest that practices be implemented in the management of GH-1 and Gardner plots to increase structural diversity. Maintenance of the current state of the remaining plots should ensure the park of a diverse avifaunal community.

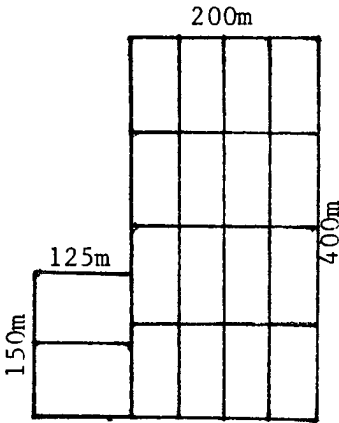
Acknowledgments

I would like to thank Edward Hutchins for permitting me to work on Metro Park land and Mac Albin, Jack McDowell, and Jim Stahl for providing me with information concerning the park's birds and habitats.

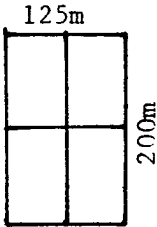
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- Turner, S. 1985. Summary of the 1985 survey of Battelle-Darby Creek Metro Park for the Ohio Breeding Bird Atlas Project. Unpublished report Metropolitan Park District of Columbus and Franklin County, Columbus Ohio.

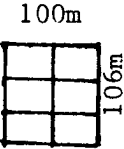
Fig.1. Grid layouts and walking pattern of Batelle-Darby plots.



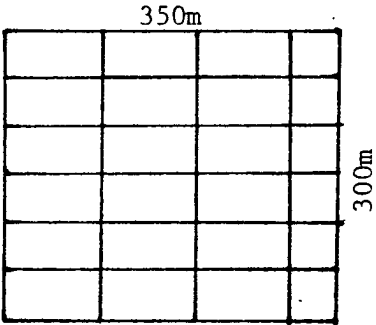
Canon



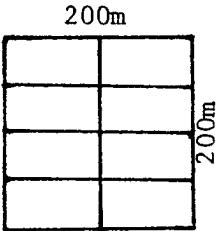
Gardner



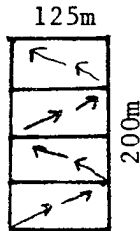
Prairie



GH-1



GH-2



GH-3

*arrows indicate walking pattern

Table 1. Sizes of Battelle-Darby field plots.

Plot	Acres	Hectares
Canon	23.47	9.50
Gardner	6.18	2.50
Prairie	2.62	1.06
GH-1	25.94	10.50
GH-2	9.88	4.00
GH-3	6.18	2.50

Fig.2. Location of Canon and Gardner Batelle-Darby plots.

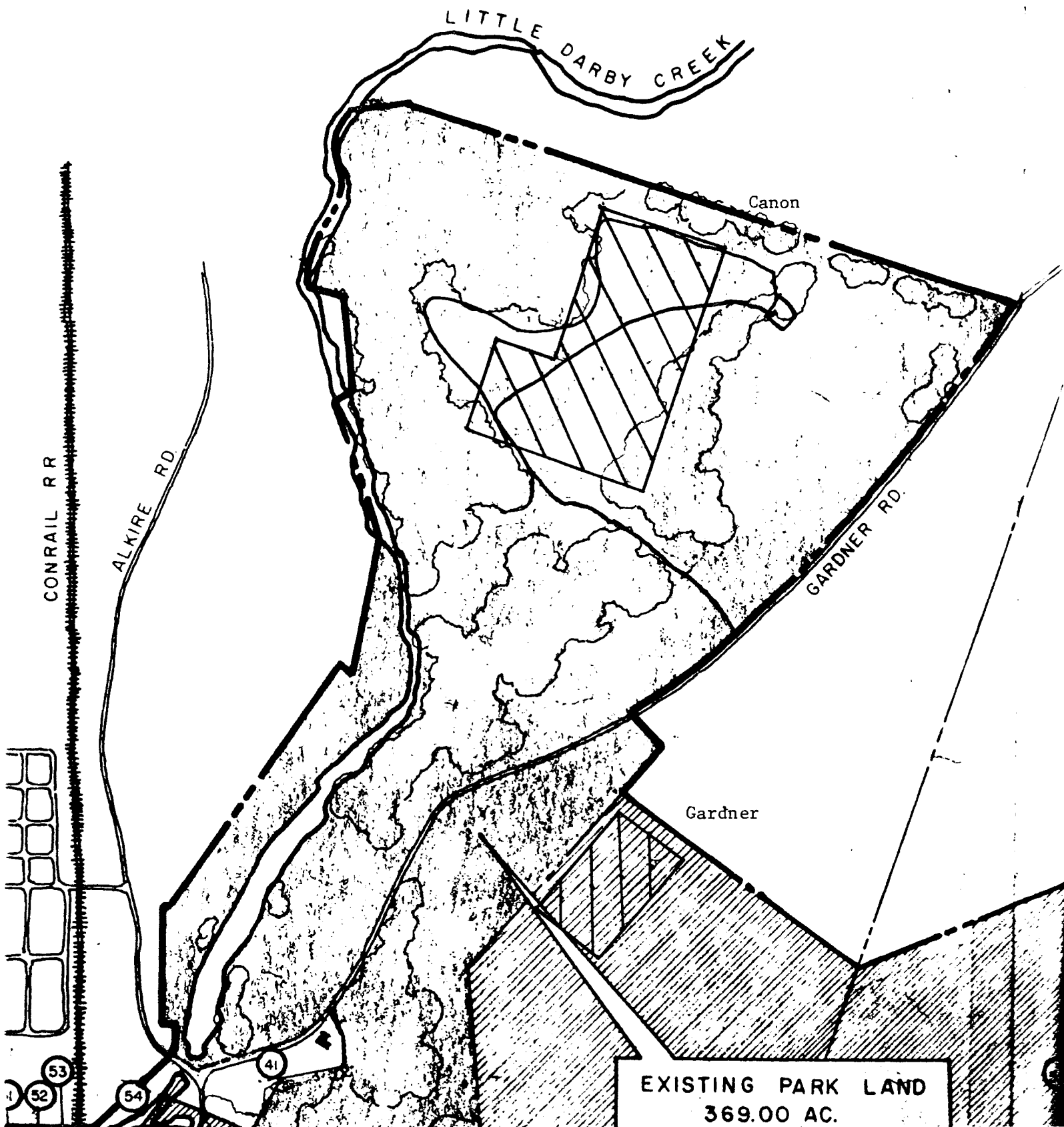


Fig.3. Location of Prairie Batelle-Darby plot.

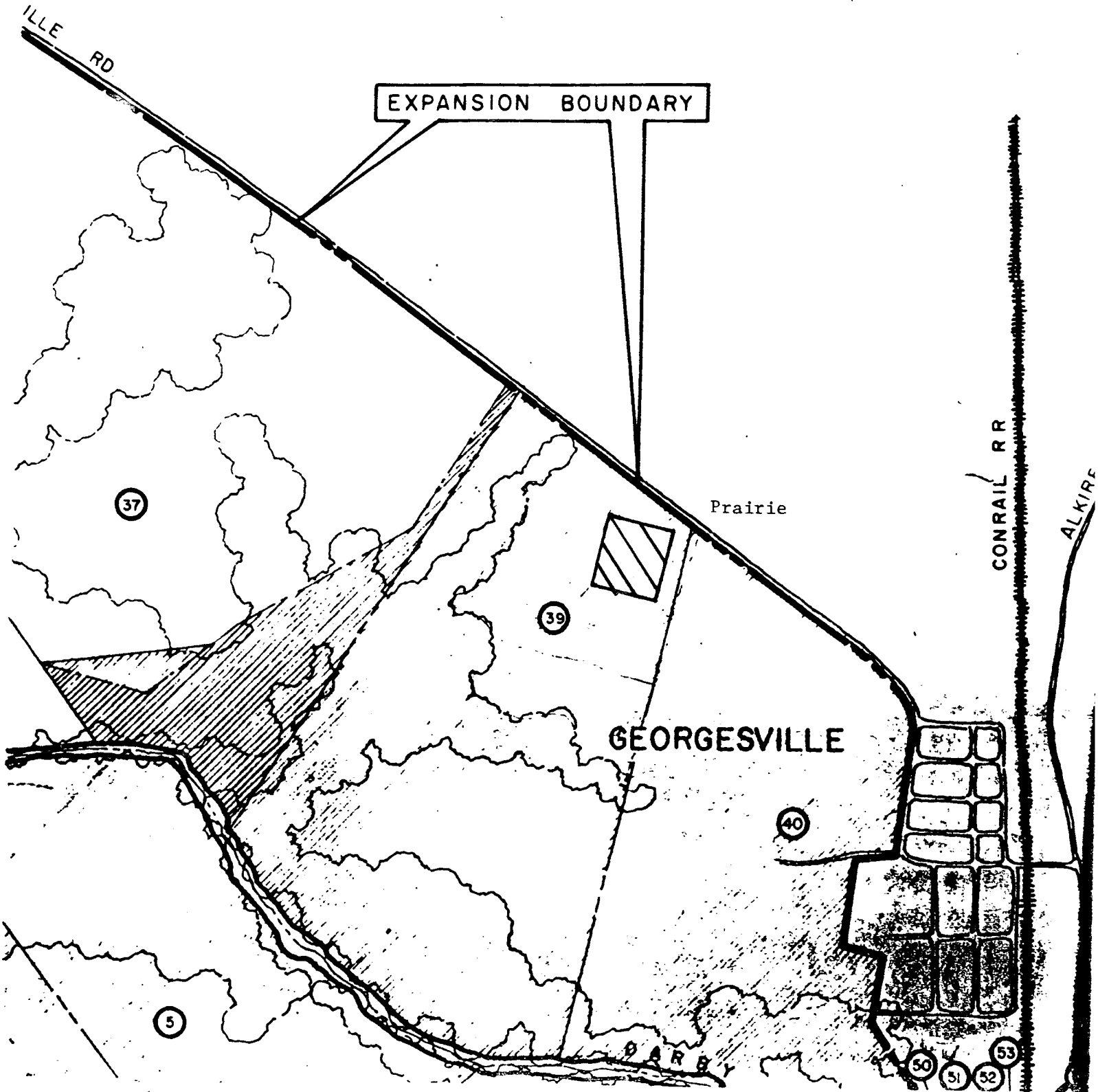


Fig.4. Location of GH-1, GH-2, GH-3 Batelle-Darby plots.

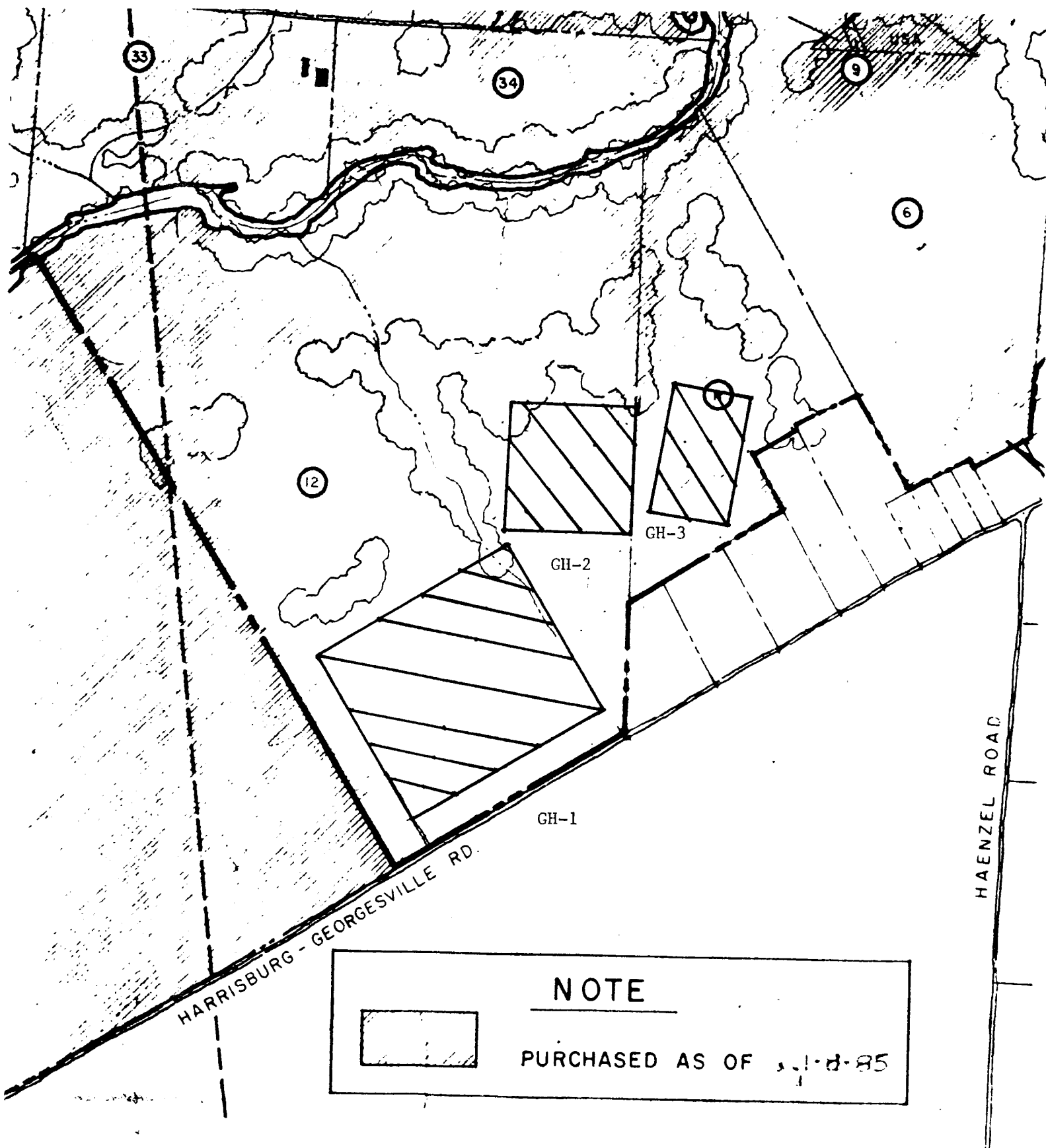


Fig.5. Changes in bird density through time.

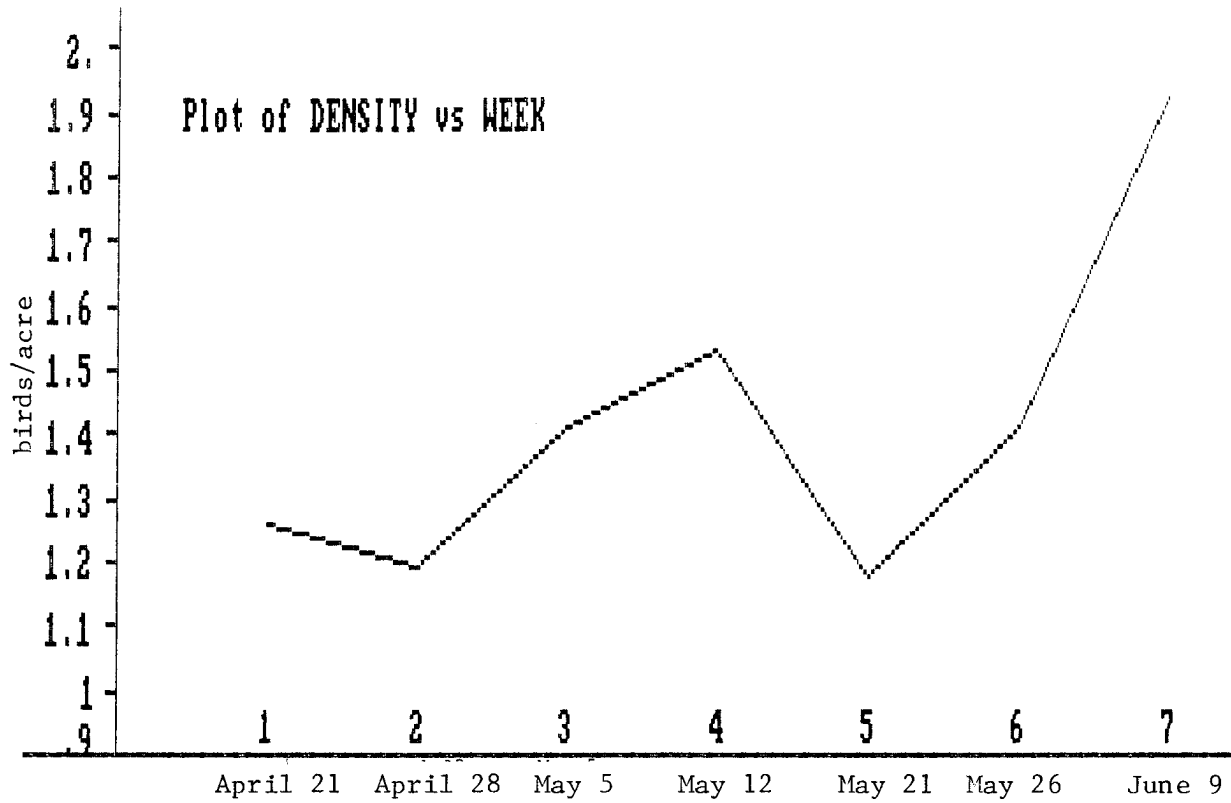


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Table 2. Codes for Battelle-Darby Successional Area Bird Surveys

1. Grid - location in plot denoted by alpha-numeric cell location as displayed on plot maps.

2. Species - unique four letter codes

3. Sex/Age

unknown - undetermined age and sex.

male

female

young

F - fledged

N - nestling

J - independent young

4. Behavior

SS - singing

CS - aerial courtship

NB - nest building

SN - sitting on nest

RR - resting

AG - agonistic

FL - flushed by observer

MB - mobbing

FE - feeding

BR - attending chicks

PE - perching

5. Location

BR - brushpile

GR - grasses

GP - grasses with perennials

TE - teasel

LT - large tree (> 20')

ST - small tree (< 20')

NB - nest box

SH - woody shrub

Table 5. Mean number (birds/plot) of birds observed on Battelle-Darby field plots.

	Canon	Gardner	Plot Location			GH-2	GH-3
			Prairie	GH-1			
FESP	15.5	-	1.67	3.01	0.66	3.33	
RWBL	1.34	2.83	4.83	12.66	-	-	
SOSP	8.66	-	-	7.00	1.35	-	
AMGO	8.33	-	1.50	3.66	-	1.00	
BOBO	-	-	-	2.00	3.00	-	
EAME	-	-	-	3.01	-	-	
EABL	2.49	-	-	-	-	-	
BHCO	1.99	-	-	-	-	-	
NOCA	1.67	-	-	-	-	-	
GRSP	1.34	-	-	-	-	-	
TRSW	0.84	-	-	-	-	-	
GRCA	0.49	-	-	-	-	-	
TOTAL	42.65	2.83	8.00	31.34	5.01	4.33	

Table 6. Mean densities (birds/acre) and variance (SE) of bird species found on 50% or more Battelle-Darby field surveys. Species are listed by increasing abundance.

	Plot Location					
	Canon	Gardner	Prairie	GH-1	GH-2	GH-3
FESP	0.660 (0.100)	- -	0.636 (0.212)	0.116 (0.055)	0.067 (0.032)	0.539 (0.219)
RWBL	0.057 (0.024)	0.458 (0.164)	1.845 (0.423)	0.488 (0.039)	- -	- -
SOSP	0.369 (0.045)	- -	- -	0.270 (0.030)	0.137 (0.037)	- -
AMGO	0.355 (0.067)	- -	0.573 (0.365)	0.141 (0.046)	- -	0.162 (0.083)
BOBO	- -	- -	- -	0.077 (0.022)	0.304 (0.064)	- -
EAME	- -	- -	- -	0.116 (0.020)	- -	- -
EABL	0.106 (0.015)	- -	- -	- -	- -	- -
BHCO	0.085 (0.053)	- -	- -	- -	- -	- -
NOCA	0.071 (0.026)	- -	- -	- -	- -	- -
GRSP	0.057 (0.009)	- -	- -	- -	- -	- -
TRSW	0.036 (0.020)	- -	- -	- -	- -	- -
GRCA	0.021 (0.010)	- -	- -	- -	- -	- -
TOTAL BIRDS	1.817 (0.369)	0.458 (0.164)	3.054 (1.000)	1.208 (0.212)	0.508 (0.133)	0.701 (0.302)

Table 7. Numbers of individuals of species recorded on less than 50% of Battelle-Darby field surveys.

	Plot Location					
	Canon	Gardner	Prairie	GH-1	GH-2	GH-3
RTHA	1					
RNPH				1		
NOFL	1					
DOWO	1					
EAKI	2			3		
WIFL	2			2		
BLJA	1					
HOWR	1					
EABL				1	1	
AMRO	1			1		
BRTH	1					
COYE	2		2		1	
INBU	1					
FESP		4				
SOSP		1				
GRSP		1				
HESP						2
SASP	1					
WCSP			2			
EAME	3					1
RWBL					1	1
AMGO					5	

Table 8. Breeding evidence of birds observed on Battelle-Darby field surveys with (date of first nest).

	Breeding Category		
	Possible	Probable	Confirmed
RNPH	X		
EAKI	X		
WIFL		X	
TRSW		X	
EABL			X (4/21)
GRCA		X	
NOCA		X	
FESP			X (4/28)
SOSP			X (4/28)
GRSP		X	
HESP		X	
BOBO			X (5/21)
RWBL			X (5/21)
EAME		X	
BHCO			X (5/5)
AMGO		X	

Table 9. Species List for Battelle-Darby Metro Park, Spring 1987.

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Great Blue Heron	American Robin
Great Egret	Hermit Thrush
Canada Goose	Eastern Bluebird
Mallard	Blue-gray Gnatcatcher
Wood Duck	Ruby-crowned Kinglet
Turkey Vulture	Golden-crowned Kinglet
Sharp-shinned Hawk	Cedar Waxwing
Red-tailed Hawk	European Starling
American Kestrel	Solitary Vireo
Ring-necked Pheasant	Red-eyed Vireo
Northern Bobwhite	White-eyed Vireo
Killdeer	Blue-winged Warbler
American Woodcock	Nashville Warbler
Rock Dove	Tennessee Warbler
Mourning Dove	Yellow Warbler
Yellow-billed Cuckoo	Cape May Warbler
Black-billed Cuckoo	Blackburnian Warbler
Great Horned Owl	Yellow-rumped Warbler
Eastern Screech Owl	Magnolia Warbler
Chimney Swift	Black-throated Green Warbler
Belted Kingfisher	Cerulean Warbler
Northern Flicker	Palm Warbler
Pileated Woodpecker	Ovenbird
Red-bellied Woodpecker	Common Yellowthroat
Red-headed Woodpecker	Yellow-breasted Chat
Yellow-bellied Sapsucker	Bobolink
Hairy Woodpecker	Eastern Meadowlark
Downy Woodpecker	Red-winged Blackbird
Eastern Kingbird	Northern Oriole
Eastern Phoebe	Common Grackle
Eastern Wood-Pewee	Brown-headed Cowbird
Acadian Flycatcher	Scarlet Tanager
Willow Flycatcher	Northern Cardinal
Least Flycatcher	Rose-breasted Grosbeak
Horned Lark	Rufous-sided Towhee
Tree Swallow	Savannah Sparrow
Northern Rough-winged Swallow	Grasshopper Sparrow
Barn Swallow	Vesper Sparrow
Purple Martin	Henslow's Sparrow
Blue Jay	Dark-eyed Junco
American Crow	Chipping Sparrow
Carolina Chickadee	Field Sparrow
Tufted Titmouse	White-crowned Sparrow
White-breasted Nuthatch	White-throated Sparrow
House Wren	Lincoln's Sparrow
Winter Wren	Song Sparrow
Carolina Wren	House Finch
Northern Mockingbird	Purple Finch
Gray Catbird	American Goldfinch
Brown Thrasher	