

A 20-year Record of Migratory Bird Movements in the Black River Swamp of South Carolina

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Introduction

For over 26 years Evelyn Dabbs has operated a bird banding station at her home on the Black River Swamp, 12 miles east of Sumter, South Carolina. Dabbs and others have banded birds continuously at the site on the eastern edge of the swamp just north of U.S. Highway 378 since 1976. The effort started modestly, out of an interest in merely documenting the local avian fauna near her home and establishing a record of the migrant species using the Black River corridor, but it soon expanded into a major project that included the education of school children and local residents about the biology of birds and the importance of preserving habitat to maintain bird diversity.

While carrying out Evelyn's pet objective of education, the banders were collecting a great deal of valuable data on the composition and dynamics of the local avian community and on migratory movements of birds through this part of the South Carolina Low Country. This paper summarizes the nearly 14,000 banding records reported at the Black River Swamp from 1980-2000. Emphasis is on the phenology and species composition of the spring (March – May) and fall (August – November) migration along the Black River corridor and, albeit briefly, the species composition and population dynamics of the summer and winter birds at the site. The fall and spring migratory data represent the 20-year banding records of Dabbs, Glover, and Mowbray. All records included in the report are a part of the permanent data base for the Black River Swamp site at the USFWS Migratory Bird Banding Laboratory in Laurel, Maryland. All species are listed in the order of the American Ornithologists' Union Check-list of North American Birds (Am. Ornithol. Union 1998), and names follow the Identification Guide to North American Birds (Pyle 1997).

Study Area and Methods.

The approximately 1 km long study site is on a slight bluff overlooking the eastern portion of the Black River Swamp. The eastern portion of the site

consists of flat, agricultural fields dissected by a network of tree-dominated hedgerows and shrubby drainage ditches. The portion of the study site directly adjacent to the river has mature upland hardwood forest on the well-drained areas and mature bottomland hardwood forest on the floodplain. The upland forest forms a narrow band, 100 to 200 m in width, extending parallel with the river. The elevational drop from the top of the bluff to the floodplain averages 5-10 m. The bottomland hardwood forest represents the dominant forest of the entire Black River floodplain and is more than 3 km wide at the study site.

The mist nets at the banding site were located on the slopes of the bluff in the upland forest and in an adjacent east-west oriented hedgerow. Nets were sometimes also set up in hedgerows and shrubby drainage areas to the east, in the cultivated fields. The mist nets used at the site were standard 2.1 x 13 m and 2.1 x 9 m, 4-tier, 30 mm mesh nets. All were placed within mature forest or hedgerows in narrowly cleared lanes 1-1.5 m in width. During the period reported in this study, 6 to 24 nets operated at any one time, and the nets were open each banding date from 2-10 hours. The days of operation varied, but over the 20-year period the operation adequately spanned the entire spring and fall migrations. The daily banding records have been consolidated, for space and convenience of reporting, into five, 6-day (or in a few cases 7-day) periods per month. The number of birds reported for each period represents all the birds captured during those days throughout the entire 20 years of data collection but does not represent a consistent banding effort. Some dates represent significantly more or less banding effort than others, thus making the use of this data inappropriate as a basis either for direct comparisons with other banding stations, or for descriptions of temporal changes in the occurrence or absolute abundance of species at this banding station. The importance of this data to the ornithological literature is in its documentation of the diversity of the avian species that occur in this part of the South Carolina Low Country during spring and fall migration, the relative abundance of the different species during these periods, and the long-term phenological record of their occurrence.

During the period 1980-2000, three intensive studies were conducted during the fall migration (August - November). In the fall of 1991, Glover banded daily. Glover and Dabbs banded several days each week throughout the entire fall of 1990 (Glover and Dabbs 1991). In 1999 Mowbray banded several days each week throughout the fall. The data collected during these more intensive studies is included in this report.

Results

During the 20 years of banding at the Black River Swamp reported in this paper, nearly 14,000 individual birds representing 105 different species were banded. The 105 species include birds considered permanent residents, summer residents, winter visitors, and spring and fall transients, based on the date(s) of their occurrence and the length of stay at the site. Although the banding data for the summer months of June and July and winter months of December, January,

and February are not included here, they are available and can be inferred from the discussion of the breeding and wintering birds here.

Permanent, Summer (Breeding) and Wintering Bird Communities. The species composition of the summer and winter bird communities at the Black River Swamp consists of a mix of permanent residents and migrants and is typical of the bird communities found during these seasons throughout much of the South Carolina Coastal Plain (Post and Gauthreaux 1989). Common permanent residents at the site include Northern Cardinal, Tufted Titmouse, Carolina Wren, Carolina Chickadee, Red-bellied and Downy Woodpeckers, Eastern Bluebird, Chipping and Field Sparrows, Blue Jay, Brown Thrasher, Mourning Dove, and Loggerhead Shrike (Tables 1, 2 and 3). During the summer several species of migrants join the permanent residents to form a typical breeding bird community consisting of over 50 species. Neotropical migrants that breed in the area, along with the permanent residents, include Yellow-billed Cuckoo, Acadian and Great Crested Flycatchers, Eastern Wood-Pewee, Wood Thrush, Gray Catbird, Red-eyed and White-eyed Vireos, Northern Parula, Prothonotary, Yellow-throated, Prairie, Kentucky, and Hooded Warblers, Louisiana Waterthrush, Summer Tanager, Blue Grosbeak, Indigo and Painted Buntings, and Orchard Oriole. The wintering community, although more dynamic as a result of the sporadic appearance of winter irruptives, is both rich in species and high in individual species abundance. Common migrants that winter at the site include Yellow-bellied Sapsucker, House Wren, Ruby-crowned and Golden-crowned Kinglets, Hermit Thrush, Yellow-rumped and Orange-crowned Warblers, Savannah, Song, Swamp, and White-throated Sparrows, and Dark-eyed Junco. Occasionally these species are joined by large numbers (25-50) of Fox and White-crowned Sparrows, and during cold northern winters when seeds in arctic and boreal regions are scarce a variety of irruptives including Purple Finch, Pine Siskin, and Evening Grosbeak occur at the site and add diversity to the late-winter bird community (Wootton 1996, Dawson 1997, Adkisson 1999).

Fall Migration. Fall migration on the Black River Swamp extends from August - November, with continuous activity throughout the entire 4-month period. Table 1. During fall migration most species have fairly protracted periods of migration, with different aged individuals and sexes migrating at different times. Often adults, presumably failed breeders and nonbreeders, disperse southward before successful breeders and immatures (Rimmer and McFarland 1998, Rising and Flood 1998, Mowbray 1999). This is reflected in the peak of activity, which is also protracted, often extending over a full two-week period. Species diversity (species richness; Krebs 2001) of the migrants is slightly greater in fall than spring, with as many as 100 species in fall and generally fewer than 90 in spring.

In fall, migration begins the first week of August, with increased movement by several species of summer residents. Generally the first species

to begin major migratory activity in the area is Prothonotary Warbler. By the second week of August migration is well under way, with Prothonotary Warbler being joined by several other summer residents, including Yellow-throated and Hooded Warblers, Northern Parula, Summer Tanager, Acadian Flycatcher, and Orchard Oriole. Activity continues to build through August and early September with the addition of more summer residents, including Great Crested Flycatcher, Swainson's Warbler, Wood Thrush, Blue Grosbeak, and Indigo Bunting, and the first appearance of transients, such as Black-and-White Warbler, Worm-eating Warbler, American Redstart and Ovenbird. By mid-September migration is in full-swing, with the continued addition of more transient species, including Veery, Yellow Warbler, Northern Waterthrush, and Scarlet Tanager. Peak migration occurs between September 25 and October 3, when as many as 45 species of migratory birds are regularly recorded. Species commonly banded then include Eastern Wood-Pewee, Veery, Gray-cheeked, Swainson's and Wood Thrushes, Gray Catbird, White-eyed, Red-eyed and Yellow-throated Vireos, Scarlet and Summer Tanagers, Rose-breasted and Blue Grosbeaks, Indigo Bunting, and up to 28 species of warbler. Migration begins to taper off after the first week of October, and the few late migrants (such as the Magnolia Warbler, Black-throated Blue Warbler, and Palm Warbler) begin to decline in numbers. The end of fall migration is marked by the arrival of the first of the winter visitors, Eastern Phoebe and Ruby-crowned Kinglet, and by late October the residents of the Black River Swamp winter bird community begin to arrive in force. This late burst of activity includes White-throated, Chipping and Song Sparrows, Dark-eyed Junco, Yellow-rumped Warbler, Hermit Thrush, and Yellow-bellied Sapsucker.

Several species occur at the site during fall migration that do not during spring migration. These species, which appear to follow a more easterly fall migratory route, include Least Flycatcher, Yellow-bellied Flycatcher, Winter Wren, Philadelphia Vireo, Golden-winged, Canada, Bay-breasted, Blackburnian, Tennessee, Nashville, Connecticut, Mourning, and Chestnut-sided Warblers, and Scarlet Tanager (Rimmer and McFarland 1998, Mowbray 1997, 1999). Several species that pass through the area in both spring and fall appear to be slightly more numerous during fall migration than spring migration, including Blue-winged and Magnolia Warblers. Because of the unequal amount of banding time however, these differences might not be statistically significant.

Spring Migration. Spring migration extends from March – May on the Black River Swamp. Table 2. The overall length of the migratory period is somewhat shorter for most species in spring than in fall, and the peak of activity is also compressed into a shorter period of time (often less than a week). Diversity (species richness) is slightly lower in spring than fall, as several transient species that regularly move through the area in the fall are absent during spring migration.

It is difficult to establish when spring migration begins, as the routine daily movements of the winter visitors are difficult to distinguish from migratory

movements. By early March, however, migration appears to begin with the departure of several species of winter visitors and occasional winter irruptives, including Dark-eyed Junco, American Robin, Song Sparrow, Eastern Phoebe, Purple Finch, Pine Siskin, and Evening Grosbeak. By mid-March several other species begin their departure, and migration is definitively underway. This second wave of departures includes Chipping and White-throated Sparrows, Ruby-crowned Kinglet, and Yellow-rumped Warbler. Migratory activity remains confined primarily to the departure of the winter visitors and irruptives until nearly mid-April and the appearance of the first few species of summer residents and northern transients. The first of these to arrive in the area include Blue-gray Gnatcatcher, Northern Parula, and White-eyed Vireo, but they are closely followed by Prothonotary Warbler, Yellow-throated Warbler, Hooded Warbler, and Red-eyed Vireo. By the third week in April activity rapidly picks up, as more transients begin to appear. By the last week of April peak migration occurs, with as many as 40 species of migrants regularly being recorded. Species routinely banded during this one-week period include Acadian and Great Crested Flycatchers, Veery, Swainson's and Wood Thrushes, Gray Catbird, White-eyed, Red-eyed and Yellow-throated Vireos, Summer Tanager, Rose-breasted and Blue Grosbeaks, Indigo Bunting, Orchard and Northern Orioles, as many as 15 species of warbler, and the last of the departing Chipping and White-throated Sparrows. Spring migration tapers off gradually through May as the final numbers and composition of the summer community becomes established. The activity of birds during this period wanes significantly and does not pick up again until the first migrants begin to move about in late July and early August.

Species Recapture. During the 20-year period of 1980-2000, 381 individuals of 44 species were recaptured at the site, most of these being either permanent residents, breeders, or wintering birds. Few transients were recaptured (Table 3). Most recaptures were of permanent resident and neotropical migrants that breed at the site, including Tufted Titmouse, Carolina Wren, Northern Cardinal, Downy Woodpecker, Carolina Chickadee, Great Crested and Acadian Flycatcher, Orchard Oriole, Prothonotary Warbler, and Wood Thrush. The only wintering species consistently recaptured at the site was White-throated Sparrow.

For migratory species recapture data can be used to establish fidelity of individuals to specific sites. The recapture data for the Black River Swamp suggests that several species of summer residents have a high degree of fidelity to the site and return annually after their initial banding. Species showing a high degree of fidelity include Great Crested Flycatcher, Indigo Bunting, Prothonotary Warbler, and Wood Thrush (all returning annually for up to 4 years). White-throated Sparrow also returns regularly to the Black River Swamp. Recapture data, when gathered over a long period of time, can also be useful in establishing species longevity. In this study several records may be significant in helping to determine the longevity of certain species. Of

particular significance in this regard is the recapture of a Prothonotary Warbler eleven years after its initial banding, a remarkable record for this long-distance migrant. Average life span for this species is 2.44 yr, with a minimum longevity of 4 yr 11 mo, and a previous record longevity for a banded female 8 yr (Petit 1999). Other records of interest include Blue Jay (11 years), Tufted Titmouse (10 years), and the Great Crested Flycatcher (7 years). The 7-year longevity of Great Crested Flycatcher is another example of a fairly long life span for a species that annually migrates from South Carolina to Middle America (Am. Ornithol. Union 1998).

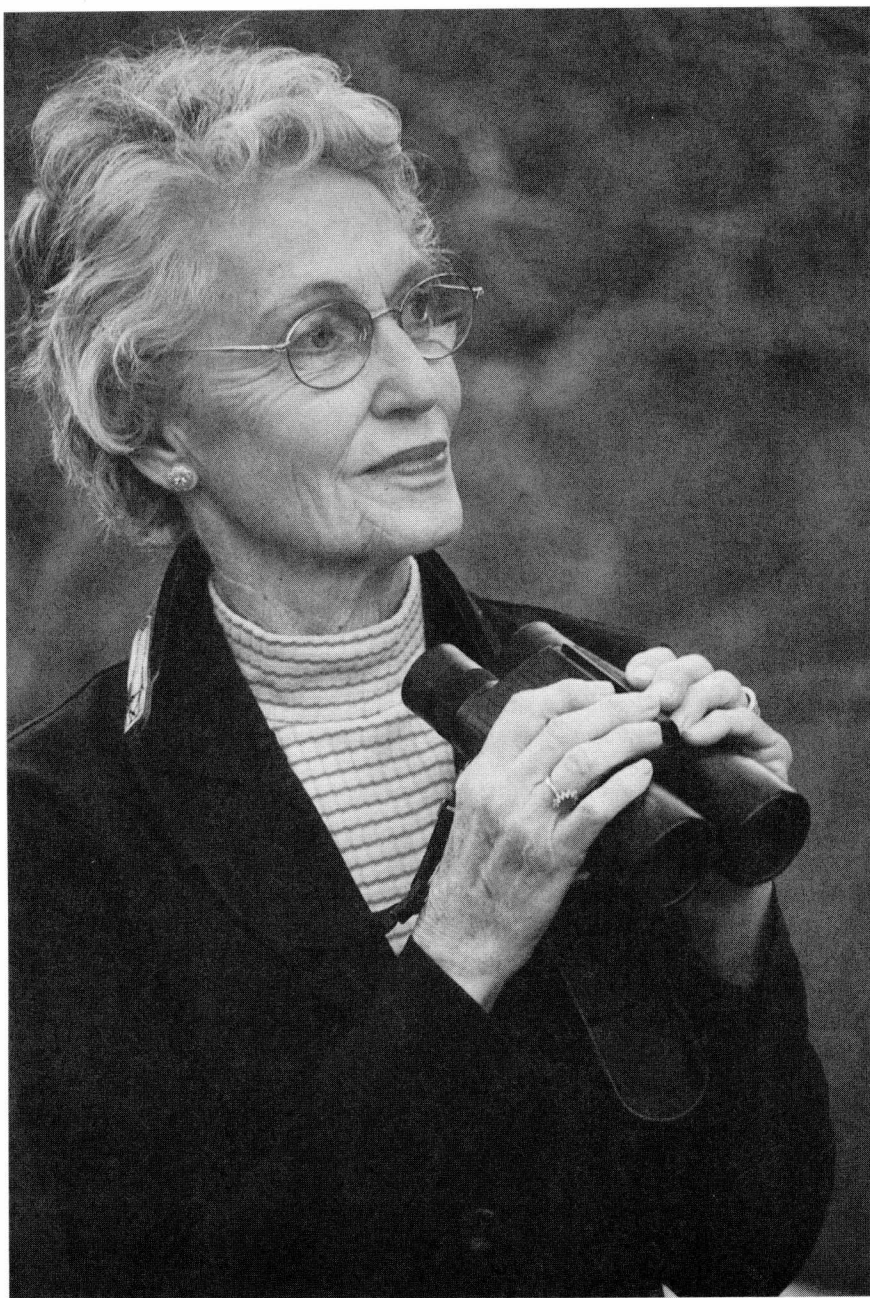
Although recapture data can also be used to determine annual survival rates, no conclusions regarding survival can be drawn from our data, as banding effort over the years was inconsistent.

A Special Note

During the 20-year period of 1980-2000, Dabbs gave banding demonstrations and presentations to 270 groups of school-aged children and 70 groups of adults (6,366 individuals) from throughout South Carolina. In addition to the banding demonstrations and presentations, Dabbs and her family made their facilities available for extended periods of time (1-2 full days) for Audubon groups and college and university classes. During the period 42 Audubon groups and 14 university classes from North and South Carolina (a total of 1,678 individuals) visited the site for one- to two-day field experiences. Thus, over the 20-year period a total of 8,044 individuals enjoyed the Black River Swamp while being treated to a bird banding demonstration and presentation on the biology of birds. From all of us who have had the opportunity to participate in one or more of these special visits, a hearty expression of our thanks and appreciation to Evelyn and her husband (Tommy), their entire family, and the lengthy list of volunteers who over the years have given so freely of their time.

Instructions for Authors

www.carolinabirdclub.org/thechat.html



Evelyn Dabbs continues to band birds at her home on the Black River Swamp after more than 25 years. Photo by Bob Wood.

Table 1. Fall Migration. All birds banded at the Black River Swamp from 1980-2000, during the months August-November. Daily banding records for each month consolidated into 5, 6-day periods

Species	August					September					October					November				
	1-4	7-12	13-18	19-24	25-31	1-6	7-12	13-18	19-24	25-30	1-6	7-12	13-18	19-24	25-31	1-6	7-12	13-18	19-24	25-30
Mourning Dove		1	1				1		2			1	2							
Yellow-billed Cuckoo		1		2	1	4		2	2		8		2							
Red-bellied Woodpecker		2	4		1	5	2	6	2	3	6	5	6	2					2	
Yellow-bellied Sapsucker											1	9	7	6	2	2	1			3
Downy Woodpecker	4	2	1	8	1	1	6	5	5	2	12	4	3							
Hairy Woodpecker		1									1		1							
Northern Flicker						2						1	1	2	2	1	1			
Eastern Wood Peewee		2		2	2	3	8	5	10	6	15	7	2							
Yellow-bellied Flycatcher	1	1		3	2	2	6	2	3		1									
Acadian Flycatcher	7	13	17	17	5	14	22	14	14	5	2		1	1						
Least Flycatcher						1														
Eastern Kingbird	4	1							1											
Eastern Phoebe				2			1	3	1	5	7	10	20	14	7	3		1	15	4
Great Crested Flycatcher		6	4	1	2	6	1	1	2					1						
Loggerhead Shrike												1			1					1
White-eyed Vireo	2	3	3	3		15	22	33	31	11	12	5	2							
Blue-headed (Solitary) Vireo													1	6		1	1			
Yellow-throated Vireo		5		3		3					1									
Philadelphia Vireo						1		1	1	2										
Red-eyed Vireo	2	9	7	9	4	23	29	24	21	22	21	8	14		1					
Blue Jay		2	5	1	2	1	2	2	2	1	3	10	4	2						
Carolina Chickadee	8	20	4	5	2	2	6	8	8	5	9	3	8	1		1		1		
Tufted Titmouse	10	27	10	6	4	12	14	11	33	38	46	38	33	60	3	20		5		
White-breasted Nuthatch	1	9	1			4	3	5	3	4	2	1	1	1						
Carolina Wren	18	20	10	18	5	8	4	9	6	7	10	6	10	1	3				3	
House Wren								1		2	3	2	3		1					
Winter Wren												1	1			2	2			
Golden-crowned Kinglet													3	7	6	5	3			
Ruby-crowned Kinglet						1				3	5	10	30	44	38	35	24	3	8	10
Blue-gray Gnatcatcher	1	2	1		1															
Eastern Bluebird		3		2		1			1			1	2							
Veery			1	9	63	52	29	34	10	7	1									
Gray-cheeked Thrush							3	5	15	22	7	5	2							
Swainson's Thrush		3	1			1	7	12	21	30	37	25	28	4						
Hermit Thrush											1	3	7	4	4	1	2	41	2	
Wood Thrush	1	3	5	8	2	10	7	8	5	17	16	20	8	8						
American Robin															4					
Gray Catbird	1			1	1			4	6	13	24	8	14	5	2					
Northern Mockingbird		2	4	4		5	3	5	8	2	11	3	3	4				2		
Brown Thrasher		1	2	2		2	4	3	10	23	7	17	3					1		
Cedar Waxwing																				
Blue-winged Warbler			1		1	4	6	5	9	2	2									
Golden-winged Warbler								2	3	1	1									
Tennessee Warbler	1						6	6	14	17	13	5	5							
Orange-crowned Warbler																	1			
Nashville Warbler						1		1	1											
Northern Parula	4	25	3	6	4	32	47	26	32	23	11	3	1							
Yellow Warbler		2	1	2	1	1	1	3												
Chestnut-sided Warbler					1	3	2	3	4	3	3	1								

Species	August					September					October					November					
	1-6	7-12	13-18	19-24	25-31	1-6	7-12	13-18	19-24	25-30	1-6	7-12	13-18	19-24	25-31	1-6	7-12	13-18	19-24	25-30	
Magnolia Warbler						3	2	13	11	24	30	32	24	2							
Cape May Warbler							3	2	2	1	2			1							
Black-throated Blue Warbler						4	2	8	26	12	52	52	57	19							
Yellow-rumped Warbler													13	41	28	13	12	4	39	4	
Blackburnian Warbler			1		1								1								
Yellow-throated Warbler	2	5	2	4				2					1					1			
Pine Warbler						1					4		3	2			1				
Prairie Warbler				1				4			1										
Palm Warbler									4	7	22	10	20	11	9						
Bay-breasted Warbler					2				1												
Blackpoll Warbler							1				1										
Cerulean Warbler	1										1										
Black-and-white Warbler		2	4	5	3	7	20	12	15	11	20	7	12	6	1						1
American Redstart		2	2	12	2	5	9	30	44	38	65	25	33	5							
Prothonotary Warbler	51	144	35	50	21	7	4	1			16										
Worm-eating Warbler			6	3	3	4	7	2	1	3											
Swainson's Warbler		1		1			5		1												
Ovenbird				4	1	4	5	8	12	17	14	15	3								
Northern Waterthrush		1		2	2	16	28	43	56	13	12	3	3	1							
Louisiana Waterthrush	1	1	4	2	1																
Kentucky Warbler	1	1	2	2	4	5	3	2	1	1											
Connecticut Warbler								1													
Mourning Warbler						1															
Common Yellowthroat		1				7	14	34	32	51	59	20	19	5	1						
Hooded Warbler		7	3	5	4	6	11	10	12	4	12	2	3	2							
Canada Warbler						1	2		2												
Yellow-breasted Chat				1		2	2	1		1	2	2	1								
Eastern Towhee	1											1	1	2	1						
Summer Tanager	1	17	9	7	9	7	5	1	10	13	4	1	1							3	
Scarlet Tanager			2		2		1		1	7	23	19	6	1							
Chipping Sparrow																					
Field Sparrow														6	2	2	2	6	6	2	
Savannah Sparrow																2	2			5	
Fox Sparrow																					
Song Sparrow													3	19	16	3	2				1
Lincoln Sparrow										1											
Swamp Sparrow																					
White-throated Sparrow													3	4	4		2				
Dark-eyed Junco													3	17	19	22	2	2	32	8	
Northern Cardinal													1	1	3	3	8	3	30	12	
Rose-breasted Grosbeak	41	43	22	24	6	11	16	21	34	35	34	59	108	48	22	4	1	4	25	4	
Blue Grosbeak		2	1	4	2	2	1	2	7	12	13	15	5	2							
Indigo Bunting	3	4	2	3		3	2	7	5	42	44	31	11	3	1						
Painted Bunting				1																	
Orchard Oriole		4	13																		
Northern (Baltimore) Oriole																					
Purple Finch													1	2							2
Pine Siskin																1					
American Goldfinch			1				2	1			2	1		2							4
Evening Grosbeak																	1	3	12		

Table 2. Spring Migration. All birds banded at the Black River Swamp from 1980-2000, during the months of March-May. Daily banding records for each month consolidated into 5, 6-day periods.

Species	March					April					May				
	1-6	7-12	13-18	19-24	25-31	1-6	7-12	13-18	19-24	25-30	1-6	7-12	13-18	19-24	25-31
Mourning Dove	1								1		1				
Yellow-billed Cuckoo											1				
Red-bellied Woodpecker				2				2		5	1	6	4	2	
Yellow-bellied Sapsucker	1			1					1						
Downy Woodpecker			1	2	2			2	3	3	10	7	5	4	1
Hairy Woodpecker			1			1					1				
Northern Flicker				2	1	2									
Eastern Wood Peewee												2	1		
Yellow-bellied Flycatcher													2		
Acadian Flycatcher									2	16	32	20	29	8	3
Least Flycatcher															
Eastern Kingbird															
Eastern Phoebe	2		1	3											
Great Crested Flycatcher								1	2	8	24	5	17	6	5
Loggerhead Shrike															
White-eyed Vireo					1	2	2		5	4	3	1	6	2	
Blue-headed (Solitary) Vireo									1		1				
Yellow-throated Vireo					1					2	4		3	1	
Philadelphia Vireo															
Red-eyed Vireo							2	16	9	18	41	17	17	21	2
Blue Jay	1						1	3					1		1
Carolina Chickadee	3	3	2	3	2	1	4	1	3	2	1	5	3		1
Tufted Titmouse	12	6	20	3	1		2	1	5	8	5	4	8	7	6
White-breasted Nuthatch	1	2	1						4	1	4	2	2	2	
Carolina Wren		1		2	2	2	4	1	8	6	3	7	6	6	1
House Wren															
Winter Wren									1						
Golden-crowned Kinglet						2									
Ruby-crowned Kinglet	3		1	9	8	14	4	1	2	1					
Blue-gray Gnatcatcher				1		5	1	2	2			2	1		
Eastern Bluebird	1							1	2		1	1			8
Veery									5	30	19	8	3		2
Gray-cheeked Thrush											1	1		1	
Swainson's Thrush									2	6	7	5		1	
Hermit Thrush						3				1					
Wood Thrush						2		13	23	28	30	19	17	22	7
American Robin	4	5	3	9	1	5						3			
Gray Catbird								5	27	25	34	12	1	2	
Northern Mockingbird				4	1				1	4	1	1	1		
Brown Thrasher			1	2			3	4	1	11	1	6	3	7	
Cedar Waxwing								14	1	1					
Blue-winged Warbler								1			3	1	1		
Golden-winged Warbler															
Tennessee Warbler															
Orange-crowned Warbler															
Nashville Warbler															
Northern Parula		1		2		2	4	4	9	13	15	6	11	1	1
Yellow Warbler									2	2	1				1
Chestnut-sided Warbler															

Species	March					April					May				
	1-6	7-12	13-18	19-24	25-31	1-6	7-12	13-18	19-24	25-30	1-6	7-12	13-18	19-24	25-31
Magnolia Warbler										1	1				
Cape May Warbler										1	1				
Black-throated Blue Warbler								3	13	25	45	22	10		4
Yellow-rumped Warbler	3	3	2	47	4	12	6	60	13	16	2				1
Blackburnian Warbler						1	2	3	4	2	3	5	8	1	
Yellow-throated Warbler			1					1		1			1		
Pine Warbler								1							
Prairie Warbler								1	2						
Palm Warbler				2			1	8	1						
Bay-breasted Warbler															
Blackpoll Warbler									1		4		5		
Cerulean Warbler															
Black-and-white Warbler						1		2	5	14	12	2	3		3
American Redstart								1	3	5	9	3	2	2	1
Prothonotary Warbler							3	7	23	15	16	23	37	14	11
Worm-eating Warbler								3	13	6	8	1	1		
Swainson's Warbler								1							
Ovenbird					1	2		4	24	39	72	18	17		
Northern Waterthrush					1			2	14	18	23	16	10	3	1
Louisiana Waterthrush					1			1	4	5	4		8		1
Kentucky Warbler									4	3	4	2	1		
Connecticut Warbler															
Mourning Warbler															
Common Yellowthroat						3		4	11	20	41	15	3	1	
Hooded Warbler							2	4	15	7	7	7	7	3	1
Canada Warbler															
Yellow-breasted Chat								1			2	1			
Eastern Towhee					1	3		1	1		1	1		1	
Summer Tanager								3	3	11	7	10	9	3	
Scarlet Tanager			1								3				
Chipping Sparrow	14	14	33	46	15	53	18	8	10	3					
Field Sparrow	3		6	12	1	3		3	2						
Savannah Sparrow						1	1								
Fox Sparrow	1														
Song Sparrow	3	4	1	8		1									
Lincoln Sparrow											1				
Swamp Sparrow							1				2	3			
White-throated Sparrow	5	31	27	32	18	71	34	41	94	33	19	2			
Dark-eyed Junco	21	6	7	31	1	3		1							
Northern Cardinal		10	4	51	6	17	11	24	19	16	17	11	10	8	
Rose-breasted Grosbeak									1	3	4	4			
Blue Grosbeak								7	25	27	22	11	8	3	1
Indigo Bunting							1	21	47	58	82	34	39	11	5
Painted Bunting										1	2				
Orchard Oriole						1			10	19	21	3	6	1	2
Northern (Baltimore) Oriole									2		2				
Purple Finch															
Pine Siskin	6	18	7	3	9	4	2	11	1	1					
American Goldfinch	53	38	72	54	14	172	16	105	49	26	10	2			
Evening Grosbeak		2	9	6	16	2	8	12	3						

Table 3. Number of recaptures for each species each year after initial banding.

Species	Years after initial banding										
	1	2	3	4	5	6	7	8	9	10	11
Red-bellied Woodpecker	3	1	3			1					
Downy Woodpecker	3	3	2	1	1						
Yellow-bellied Sapsucker	1		1								
Northern Flicker	1										
Acadian Flycatcher	4	4		2							
Great Crested Flycatcher	8	4	2	1	1		2				
Eastern Phoebe	1			1							
White-eyed Vireo	2										
Red-eyed Vireo	1	1		1	1						
Blue Jay		2		2							1
Carolina Chickadee	3	7	4	1		1					
Tufted Titmouse	9	8	6	3	1	1	1			3	
White-breasted Nuthatch		2	1								
Brown-headed Nuthatch			1								
Carolina Wren	18	8	4								
Ruby-crowned Kinglet	3	1									
Eastern Bluebird	1										
Veery	1	1									
Hermit Thrush	3										
Wood Thrush	10	4	3	1	2	1					
American Robin	1	1									
Gray Catbird	1		1								
Northern Mockingbird	1	2									

Species	Years after initial banding										
	1	2	3	4	5	6	7	8	9	10	11
Brown Thrasher	2	1	3	2	2						
Northern Parula	2	1				1					
Yellow-throated Warbler				1							
Prothonotary Warbler	18	6	1	1		3					1
Ovenbird	1										
Northern Waterthrush			1								
Hooded Warbler	2										
Summer Tanager	3	1	1		1						
Eastern Towhee	1	1									
Chipping Sparrow	1										
Field Sparrow		1									
Fox Sparrow	2										
Song Sparrow	5	1									
Swamp Sparrow	2										
White-throated Sparrow	21	11	9	7	1						
Dark-eyed Junco	3	2									
Northern Cardinal	16	8	10	2	6	2	2		1		
Blue Grosbeak	2		1								
Indigo Bunting	1	2	2	1							
Orchard Oriole	9	1	3								
American Goldfinch		5	1					1			
Totals	166	90	60	27	16	10	5	1	1	3	2

Literature Cited

- Adkisson, C S. 1999. Pine grosbeak (*Pinicola enucleator*). In Birds of North America, No. 456 (A Poole and F Gill, eds.). Birds of North America, Inc., Philadelphia, PA.
- American Ornithologists' Union. 1998. AOU checklist of North American birds. 7th ed. Washington, DC.
- Dabbs, E V, and L Glover. 1991. Atlantic Flyway review, Region I: Black River Swamp banding station, Sumter, SC. N. Am. Bird Bander.
- Dawson, W R. 1997. Pine siskin (*Carduelis pinus*). In Birds of North America, No. 280 (A Poole and F Gill, eds.). Academy of Natural Sciences, Philadelphia, PA, and American Ornithologists' Union, Washington, DC.
- Krebs, C J. 2001. Ecology: Experimental analysis of distribution and abundance. Addison Wesley Longman, Inc. NY.
- Mowbray, T B. 1997. Swamp sparrow (*Melospiza georgiana*). In Birds of North America, No. 279 (A Poole and F Gill, eds.). Academy of Natural Sciences, Philadelphia, PA, and American Ornithologists' Union, Washington, DC.
- Mowbray, T B. 1999. Scarlet tanager (*Piranga olivacea*). In Birds of North America, No. 479 (A Poole and F Gill, eds.). Birds of North America, Inc., Philadelphia, PA.
- Petit, L J. 1999. Prothonotary warbler (*Protonotaria citrea*). In Birds of North America, No. 408 (A Poole and F Gill, eds.). Birds of North America, Inc., Philadelphia, PA.
- Post, W and S A Gauthreaux, Jr. 1989. Status and distribution of South Carolina birds. Charleston Museum, Charleston, SC.
- Pyle, P. 1997. Identification guide to North American birds. Part 1, Columbidae to Ploceidae. Slate Creek Press. Bolinas, CA.
- Rimmer, C C and K P McFarland. 1998. Tennessee warbler (*Vermivora peregrina*). In Birds of North America, No. 350 (A Poole and F Gill, eds.). Birds of North America, Inc., Philadelphia, PA.
- Rising, J D and N J Flood. 1998. Baltimore oriole (*Icterus galbula*). In Birds of North America, No. 384 (A Poole and F Gill, eds.). Birds of North America, Inc., Philadelphia, PA.
- Sprunt, A, Jr, and E B Chamberlain. 1970. South Carolina birdlife. Univ. of South Carolina Press, Columbia, SC.
- Wootton, J T. 1996. Purple finch (*Carpodacus purpureus*). In Birds of North America, No. 208 (A Poole and F Gill, eds.). Academy of Natural Sciences, Philadelphia, PA, and American Ornithologists' Union, Washington, DC.