

Several other species of shorebirds were trapped with projected nets and banded, incidental to our main effort, as follows: Golden Plover 243, Bar-tailed Godwit 100, Sharp-tailed Sandpiper 45, Rock Sandpiper 68, Red Phalarope 18, Pectoral Sandpiper 8, Baird's Sandpiper 3, Ruff 2, Sanderling 1, and Polynesian Tattler 1.

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WARBLER RETURNS FROM SOUTHEASTERN MASSACHUSETTS

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Long-term ecological research at permanent study areas provides unique opportunities for studies of individual birds and species. Farner (1955) pointed out that the use of banding data relative to concepts of population dynamics is in its infancy and that "there is a great need for intensive sustained programs concentrating on individual species or groups of species with carefully integrated field studies to establish the plausibility of the calculations". Stamm (1966) emphasized the need for information on bird population abundance, dynamics, and movements for correlation with the work of virologists studying arboviruses in which birds play a role.

Unfortunately, few long-continuing studies have been undertaken in this country. For the past ten years the Encephalitis Field Station (formerly the Taunton Field Station) has been capturing birds as part of a surveillance program of two arthropod-borne viruses, Eastern Encephalitis (EE) and Western Encephalitis (WE). Although the main emphasis is on these viruses, nevertheless, information on many phases of bird life has also been obtained.

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Middleton's (1958) extensive banding of Catbirds in Pennsylvania produced return percentages that varied from 3.8 per cent for immature birds to 12.4 per cent for adults, with an average of 5.6 per cent for all groups. This study was based upon breeding birds obtained over a period of 15 years from water-drip and baited thrush traps in an area of 4 to 5 acres of ideal Catbird habitat, i.e. a rural home with much shrubbery and many thickets.

Blake (1953) in his analysis of return rates from all species obtained at Lincoln, Massachusetts, separated "breeders" from "pure breeders". "Breeders" included species continually present during the winter or migration as well as during the breeding season (i.e. permanent residents), whereas species present only during the summer were designated "pure breeders". His returns showed a rate of 2.2 per cent for immature "pure breeders", contrasted with 4.0 per cent for "breeders". Adult rates were 12.8 per cent for "pure breeders" and 10.2 per cent for "breeders". Overall return rates for all ages were 5.9 per cent for "pure breeders" and 6.7 percent for "breeders".

McClure (1962), in his summary of White-crowned Sparrow trapping results over a period of ten years, found that the percentage of returnees at the Hart Park location in California increased from 5 per cent returns the first winter to 60 per cent the third winter. He drew no conclusions as to whether this was a result of an increasing proportion of banded birds in the population or their greater familiarity with the feed locations at these permanent stationary traps.

Suthers (1965) summarized returns of both resident species and seasonal residents coming to baited trip-step traps at a rural residence in Michigan and found that the rates of return varied from 34 per cent for Tufted Titmice (permanent residents) to 16.3 per cent for Tree Sparrows (winter residents) and 1.5 per cent for Song Sparrows (summer residents). Mason (1962) obtained a rate of 27 per cent returns on Brown Thrashers, which are summer residents at Arcadia Wildlife Sanctuary in Northampton, Massachusetts.

Other than Blake's (1957) rate of return (0.86 per cent) for unspecified warblers, references for warbler returns are scarce. Schwartz (1964) studied the Northern Waterthrush in Venezuela and indicated that individuals of this species consistently return to the same winter territories, but he does not give the percentage of banded birds which returned in subsequent years. In a 3-year study of the Ovenbird, Hann (1937) had a 52.4 per cent return of males, 54.5 per cent return of females and a 1.5 per cent return of young birds. Hann's results differed greatly from Blake's, but are based upon entirely different methods.

The Encephalitis Field Station now has seven years' data on banded warblers in two breeding areas where netting has been carried on throughout the spring, summer and fall. Seven years of routine mist-netting operations have shown a rate of return on warblers several times greater than the 0.86 per cent return Blake (1957) reported, and in fact, approximating that shown for other wild birds.

STUDY AREA

Bird-banding operation at the Field Station began in 1957 at sites in Raynham, Taunton and Middleboro in Southeastern Massachusetts (see Map I). Since 1960, the ecological field studies have been concentrated at four permanent sites in the vicinity of Pine Swamp, in Raynham, Bristol County, Massachusetts. However, only two of these four study areas, Sites I and IV, have been consistently used for wild bird population studies.

Site I is in a 658-acre fresh-water swamp known as Pine Swamp. It consists largely of red maple (*Acer rubrum*) and white cedar (*Chaemaecyparis thyroides*) as previously described by Anderson and Maxfield (1962).



Map I. Southeastern Massachusetts showing Encephalitis Field Station Study Sites I and IV.

An abandoned railroad bed which crosses the swamp is also netted regularly. This man-made dike, some three feet above the average water level of the swamp, is overgrown with several species of trees

and shrubs that are not found in the wetter parts of the swamp: principally gray birch (*Betula populifolia*), large-tooth aspen (*Populus grandidentata*) and black oak (*Quercus velutina*). In addition to the usual birds of the swamp, the dike attracts a variety of bird life seldom found in the wetter portions of the swamp. The nearest Site I net lane is 150 feet east of the dike. The birds taken along the dike were treated as Site I birds, since individuals of some species were captured regularly at both locations.

Site IV is an upland hillside, located 2 miles from the edge of Pine Swamp. The area was once open fields, abandoned about 35 years ago but still outlined by old stone walls. It is now grown up to a fairly mature forest of hardwoods and softwoods, with hardwoods dominant. Red maple, black oak and white pine (*Pinus strobus*) are the most abundant trees, and together with the less common shagbark hickory (*Carya ovata*) and beech (*Fagus grandifolia*), form a canopy so dense that there is very little undergrowth other than ground pine (*Lycopodium* sp.) and wintergreen (*Gaultheria procumbens*).

METHODS

All captures were made with Japanese nylon mist-nets, 12 m. x 2.4 m. in overall size (1960-1963, NEBBA'S Type A; 1964-1965, NEBBA'S Type F; 1966 NEBBA'S Type H). At Sites I and IV two sets of 8 mist-nets were set at 100-foot intervals along two 1000-foot trails bisected to form a cross. Netting periods consisted of approximately 24 consecutive hours at each site, usually from noon on the first day until noon of the second day. Along the dike the nets were set in a continuous line at approximately 100-foot intervals. Sixteen nets and 24-hour netting periods have been usual, but occasionally extra nets and 48-hour netting periods have been employed.

The birds were banded with U. S. Fish and Wildlife Service bands, and small blood samples were taken from most individuals for subsequent testing for EE and WE virus and antibody (Anderson and Maxfield, 1962; Hayes et al., 1962). Recaptured birds were re-bled at intervals of not less than two weeks.

All birds were aged and sexed whenever possible, using a combination of plumage characteristics, presence of brood patch or cloacal protuberance, skull ossification, and measurements, as well as recapture data.

RESULTS

This report covers the period from May 1960 to October 1966. Results from Sites I and IV have been separated. Tables I and II summarize capture-recapture data on the 1370 warblers of 26 species that were banded at Sites I (swamp and dike) and IV (upland). Seventy-five individuals of 7 species providing 94 returns are listed in Table I. Nineteen species showing no returns have been listed separately in Table II.

TABLE 1. WARBLER SPECIES RETURNING AT RAYNHAM, 1960-1966, AND RETURN RATE FOR EACH SPECIES

Species	Site	Number Banded Each Year							Total Each Site	1960-1965 Total	Number Individ. Birds Returning	% Birds* Returning At Least Once	
		1960	1961	1962	1963	1964	1965	1966					
Warbler, Black & White	I	3	3	8	7	4	0	1	26	143	113	6	5.3
	Dike IV	0	8	12	15	7	10	25	77				
Warbler, Blackpoll	I	0	17	17	58	0	6	0	98	271	222	2	.9
	Dike IV	0	2	16	24	8	16	49	115				
Ovenbird	I	11	3	5	4	9	0	3	35	207	187	17	9.1
	Dike IV	0	3	13	4	4	2	6	32				
Waterthrush, Northern	I	11	3	5	3	4	3	1	30	205	202	12	5.9
	Dike IV	17	34	49	41	19	13	2	175				
Yellowthroat	I	2	1	1	2	0	0	0	6	272	179	30	16.6
	Dike IV	6	23	31	41	27	45	93	266				
Warbler, Canada	I	6	7	3	5	9	4	2	36	101	86	7	8.1
	Dike IV	1	6	22	5	9	6	13	62				
Redstart, American	I	1	4	1	2	4	0	0	12	44	36	1	2.8
	Dike IV	1	7	3	4	2	3	7	27				
Total Warblers		115	148	238	253	141	130	218	1243	1243	1025	75	7.3

*1966 Bandings not figured in return percentage

TABLE 2. WARBLERS BANDED AT RAYNHAM WITHOUT RETURNS, 1960-1966

Species	1960 Site #	1961 Site #	1962 Site #	1963 Site #	1964 Site #	1965 Site #	1966 Site #	Total Banded
Warbler, Worm-eating	IV 1		DK 1				DK 2	1
Warbler, Blue-winged								3
Warbler, Brewster's					DK 1			1
Warbler, Nashville		DK 1		DK 2	1		DK 8	13
Warbler, Yellow				DK 1	DK 1		DK 2	4
Warbler, Magnolia			DK 3		DK 3	DK 1	DK 2	9
Warbler, Cape May		I 1				IV 1		1
Warbler, Black-throated Blue		I 1	I 2	I 1	DK 11	DK 6	DK 8	4
Warbler, Myrtle		I 2	IV 2	DK 5				45
Warbler, Black-throated Green	I 1							1
Warbler, Blackburnian			DK 1					2
Warbler, Chestnut-sided			IV 1					11
Warbler, Bay-breasted		DK 1	DK 3	DK 2	DK 2	DK 1	DK 2	1
Warbler, Prairie				I 1	DK 1		DK 4	9
Warbler, Palm			DK 3	DK 1	DK 1	DK 1	DK 2	4
Warbler, Kentucky						I 1	DK 1	1
Warbler, Connecticut			DK 1	DK 1	DK 6			9
Chat, Yellow-breasted			DK 1			DK 1		2
Warbler, Wilson's			DK 1			DK 1	DK 4	6
# -- Number Banded	I --	Site I	IV --	Site IV	DK --	Dike		127

TABLE 3. WARBLER RETURNS FROM SITE I AND THE DIKE (INITIAL DATE FOR EACH INDIVIDUAL IS DATE OF BANDING)

Species	Bird #	Age	Sex	1960	1961	1962	1963	1964	1965	1966
Warbler, Black & White	1	A	M		5/24	6/5				
	2	A	F			8/8		8/19		
	3	I	F				7/23		8/25	
Warbler, Blackpoll	1	I	U			9/18	9/20			
	2	I	U			9/25	9/24			
Ovenbird	1	A	F				6/25	6/23		
Waterthrush, Northern	1	A	M		5/31	6/4	5/7			
	2	A	M	5/31	5/31					
	3	A	M	5/31	5/1					
	4	A	M	8/8	7/24	5/31	5/8	6/10		
	5	A	M		5/16	8/9		5/27	6/1	
	6	I	M		6/5	5/24				
	7	A	M		7/11					
	8	I	U			6/5	8/8		6/18	6/23
	9	A	M			8/2	8/7			
	10	A	M				5/18	6/2*		
	11	A	M				6/5	6/3		
	12	I	F					7/16	5/26*	6/7
Yellowthroat	1	A	M		5/23					
	2	A	F	7/28	5/25					5/24
	3	A	M		6/1	5/17				
	4	A	M		7/10					
	5	A	M			5/16	5/15			
	6	A	M			5/24	5/27			
	7	A	M			5/25				
	8	A	M			5/31			5/18	5/23
	9	A	M			6/1	5/21	6/4	7/15	
	10	A	M			7/19	5/28		5/11	5/16

Table 3 (Continued)

Species	Bird #	Age	Sex	1960	1961	1962	1963	1964	1965	1966
	11	U	M			9/5	8/8			
	12	A	M				5/15	5/27		
	13	A	F				5/15	7/16	5/11	
	14	A	M				5/21	6/3		
	15	A	M				5/27	5/28		
	16	A	M				5/27			6/22
	17	A	M				5/28	5/19		
	18	A	F				6/13		6/2	
	19	A	M				6/13			5/17
	20	I	F				8/8		6/1	
	21	A	M					5/19	5/11	5/16
	22	A	M					7/16		5/17
	23	A	M						5/11	5/31
	24	A	M						5/18	5/31
	25	A	M						5/25	5/24
	26	A	F						5/26	5/23
	27	A	M						6/1	5/12
	28	A	M						6/8	5/16
	29	I	M						7/14	5/16*
	30	I	M						8/26	5/12
Warbler, Canada	1	A	M	5/17	6/1	6/5		6/23		
	2	A	M	5/18	6/19			8/18	7/7*	
	3	A	M				5/28			
	4	A	M				8/8			
	5	I	F				7/10			6/29
	6	I	M					7/8	6/22	
	7	A	M						7/6	6/17
Redstart, American	1	A	M				8/7	7/9		

*Died

TABLE 4. WARBLER RETURNS FROM SITE IV, RAYNHAM, MASSACHUSETTS. (INITIAL DATE FOR EACH INDIVIDUAL IS DATE OF BANDING)

Species	Bird #	Age	Sex	1960	1961	1962	1963	1964	1965	1966
Warbler, Black & White	1	A	M		6/13	7/10	6/10	7/27		8/18
	2	A	M			7/11	6/25			
	3	A	F				6/11		6/15	
Ovenbird	1	A	U	5/11	6/27					
	2	A	F	5/25			6/10		6/16	6/20
	3	A	M	5/25	6/27					
	4	A	M	5/25	6/13	7/11	6/10	6/15	6/15	6/6
	5	A	M	5/25	6/26					
	6	A	M	5/25	6/14					
	7	A	M	5/26	6/26	7/11				
	8	A	F	6/7	6/27					
	9	I	F	6/22	6/13					
	10	I	M	8/30			6/26	6/30		
	11	A	M	9/15	8/22	7/11	6/10		6/29	6/20
	12	A	M		6/14		6/10			
	13	A	M				7/29			
	14	I	F					7/28		
	15	A	F						6/15	6/15
	16	A	M						6/15	7/6

Tables III and IV give the years of return for individual birds banded at Sites I and IV respectively. The initial date for each bird is the date of banding, subsequent dates being those of returns. Six species of breeding warblers (Black and White Warbler, Ovenbird, Northern Waterthrush, Yellowthroat, Canada Warbler and American Redstart) and one migrant species (Blackpoll Warbler) have provided returns. Table V lists the 20 individuals of 5 species that were 4 years or older at last capture.

Visual observations of warbler abundance in the swamp support the banding records. Northern Waterthrushes and Canada Warblers were the two warbler species seen and netted most frequently, with Black and White Warblers present in lesser numbers. Ovenbirds were heard and netted occasionally during the breeding season. The few Yellowthroats and American Redstarts observed within the swamp were seen during the migration season and were presumably migrants as none were netted during the breeding season.

Yellowthroats were tremendously abundant along the dike during the May migration and were also common breeding birds there, although they were seldom netted in the interior of the swamp. All of the returning Yellowthroats, the American Redstart and the single Ovenbird return from Site I were netted along this dike.

The change to the smaller-meshed Type H nets in 1966 probably contributed to the great increase in recaptures of Yellowthroats along the dike in that year although this change did not appear to affect other species of warblers.

The Ovenbird was the most abundant breeding warbler at Site IV, followed by the Black and White Warbler. A few Black-throated Green Warblers were present but foraged and nested in the upper canopy, generally well above the nets, and were seldom captured. Few other species of warblers were seen at Site IV except during migration. As at Site I, banding results support visual observations.

DISCUSSION

This report deals only with the return rate of banded warblers. It makes no attempt to estimate the total breeding warbler populations from which the returning birds have come, nor to measure the influence of the blood-sampling technique or capture-associated fatalities upon the total population and upon the rate of return. It is believed that in the hands of reasonably expert personnel, the influence of the latter is negligible. Our data shows that bled birds have returned over a period of 7 years, and a similar study of wintering catbirds and thrushes in Panama indicates that recapture rates of bled specimens compare favorably with unbled individuals (Galindo and Mendez, 1965).

Many, if not most, longevity and return studies seem to be based upon returns of colonial breeders or upon birds on wintering territory where the species studied are regularly re-trapped at baited stations. It has been suspected that many individual birds have one of two highly-contradictory reactions to trapping: an aversion that tends

TABLE 5. WARBLERS 4 YEARS OF AGE OR OLDER

Species	Site	Age and Sex at Time of Banding		Date Banded	Last Recapture	Time Elapsed			Minimum Age
		Site	Sex			Yrs.	Mos.	Days	
Black & White Warbler	IV	A	M	June 13, 1961	August 18, 1966	5	2	5	6 years
	IV	A	F	May 25, 1960	June 20, 1966	6	0	26	7 years
	IV	A	M	May 25, 1960	June 21, 1966	6	0	27	7 years
	IV	I	M*	August 30, 1960	June 30, 1964	3	10	0	4 years
	IV	A	M	June 14, 1961	June 29, 1965	4	0	15	5 years
Northern Waterthrush	IV	A	M	June 10, 1963	June 20, 1966	3	0	10	4 years
	I	A	M	May 31, 1960	May 7, 1963	2	11	26	4 years
	I	A	M	August 8, 1960	June 19, 1964	3	10	11	5 years
	I	A	M	May 16, 1961	June 1, 1965	4	0	16	5 years
	I	I	M*	July 11, 1961	June 18, 1965	3	11	7	4 years
Yellowthroat	I	A	M	June 5, 1962	June 23, 1966	4	0	18	5 years
	I	A	F	May 25, 1961	May 24, 1966	5	0	0	6 years
	I	A	M	May 24, 1962	June 22, 1966	4	0	29	5 years
	I	A	M	May 25, 1962	July 15, 1965	3	1	20	4 years
	I	A	M	July 19, 1962	June 23, 1966	3	11	3	5 years
Canada Warbler	I	A	M	June 13, 1963	May 17, 1966	2	11	4	4 years
	I	A	M	May 27, 1963	June 22, 1966	3	0	26	4 years
	I	A	M	May 17, 1960	June 23, 1964	4	1	6	5 years
	I	A	M	May 18, 1960	July 7, 1965	5	1	19	6 years
	I	I	F*	August 15, 1962	June 29, 1966	3	10	14	4 years

*Sex determined in subsequent years

TABLE 6. COMPARISON OF RETURN RATES WITH AGE AT BANDING, ALL SITES, 1960 - 1966

	Adults	Immatures	Unknown	Total Birds
Number of individuals banded, 1960-1965	368	467	282	1117
Number of individuals returning at least once	60	14	1	75
Percentage of birds returning at least once	16.3%	3.0%	0.4%	Ave. 6.7%

TABLE 7. TOTAL NET-HOURS EACH YEAR (RELATIVE EFFORT)

Site	1960	1961	1962	1963	1964	1965	1966	7-Year Total
Site I	2400	1464	1426	1929	1856	1736	408	11,219
Dike	300	2100	1658	1786	2667	3211	3265	17,688
Site IV	2400	1608	1192	2026	1957	1893	1318	12,394
Total, all sites	5100	5172	4276	5741	6480	6840	4991	41,301

to keep them out of traps after the initial capture, or an addiction to the bait that soon makes them trap-prone. Capture of birds by the use of nets has similar but, at the same time, different problems. Stam (1960) found net-shyness very difficult to measure but felt it occurred. On the basis of data analyzed for probability of occurrence, Swinebroad (1964) found the Wood Thrush population he netted not to be net-shy. He suggested that the problem of net-shyness must be examined on a species-by-species and net-by-net basis. In the present study the two-week undisturbed intervals between 24-hour netting periods is probably sufficient to make net-shyness a negligible factor.

Blake (1957) using a water-drip trap, showed "5 returns from 583 warblers banded long enough to show returns . . . (or) . . . 0.86% return". Comparable figures of the Field Station are 94 returns from 1117 warblers banded long enough to show returns, or an 8.4 per cent return rate. These 94 returns came from 75 individual birds; that is, 6.7 per cent of the 1117 warblers banded long enough to return have returned at least once.

These data are not really comparable since Blake's work was based on the selectivity of a water-drip in an essentially oak-woods suburban area rather than a relatively non-selective netting operation in woodlands. Although Blake's returns came from 3 species which have also produced returns for us (Black and White Warbler, Ovenbird, and Yellowthroat), there is no real basis for comparison since Blake gives no indication of whether the birds were primarily migrants or summer residents. Migrants would be expected to show a much lower rate of return than breeding birds.

The return rates given in Table VI are most comparable to Blake's (1953) analysis of return rates for all species. However, it should be noted that Table VI does not separate breeding species from species present only as migrants. Two hundred and ninety-two individual birds (26.1 per cent) of the 1117 birds banded between 1960 and 1965 are considered to be migrant species in south-eastern Massachusetts. They accounted for only 2 (2.7 per cent) of the 75 returns.

Hann's study of the Ovenbird revealed an extraordinarily high return rate from a small sample when compared with other studies. Over a period of 3 years 11 out of 21 males (52.4 per cent) and 13 out of 23 females (54.5 per cent) returned. One out of 68 young birds returned (1.5 per cent). His adults were caught by drop traps at their nests, and his studies were concentrated in a 35-40 acre plot. These percentages are considerably higher than the Field Station returns for the same species, a predictable result of intensive trapping in a limited area.

By way of comparison, Middleton's (1958) rates for Catbirds on a breeding territory (an average of 5.6 per cent for combined age groups) is closer to our 6.7 per cent overall return rate for all warblers taken (Table VI).

The return of two Blackpoll Warblers is particularly interesting, since it is a migrant species in Massachusetts. Their return to the

swamp where they had been banded the previous autumn supports the theory that "one population of Blackpoll Warblers interrupts its migration for three to four weeks in the coastal region of New England, specifically for the purpose of putting on fat for a long non-stop flight," (Nisbet, Drury and Baird, 1963). In fact, in 1963, one of these Blackpolls was retaken in a net only 200 feet from the net in which it had been captured 365 days earlier. Apparently these annual "fat stops" are extremely precise for the individual birds.

Males outnumbered females 49 to 10 among returning warblers originally banded as adults. Females outnumbered males 6 to 5 among immature birds of known sex returning. The preponderance of males recaptured may be due to the fact that they spent less time in the immediate vicinity of the nest engaged in nest-building, incubation and brooding and were perhaps more far-ranging in their feeding habits, all of which would enhance the chances for contact with nets. Ficken (1962, 1963) found that female American Redstarts newly-arrived on breeding areas at first explored the entire territory, learning the boundaries and selecting the nest site, but then restricted their activities principally to the area immediately about the nest. This may well be true of other warbler species.

Wing (1956) found that the Ovenbird and the Yellowthroat lived for 7 years. In fact, he surmised that "it may well be 7 is the '3 score and 10' for warblers and other small birds". Table V shows that two Ovenbirds had reached at least 7 years of age and a Black and White Warbler, a Yellowthroat and a Canada Warbler had reached a minimum of 6 years. Eleven individual birds of 4 species were known to be 5 years of age or older. Additional years of observation will thus be necessary to test Wing's postulation.

The Encephalitis Field Station has, as yet, had no recovery reports of banded warblers. This is to be expected since small birds of retiring habits and remote habitat, such as warblers, are likely to live and die apart from contact with band-conscious humans.

Although a superficial look at the numbers of returns and recoveries for all warblers banded in North America (Van Velzen, 1965) indicates a rate of return and recovery well below that of larger birds, this low recovery rate may reflect banding emphasis concentrated on large numbers of migrant warblers which produce few returns, as at Operation Recovery stations. Intensive studies of breeding or wintering populations of small birds probably would produce return rates similar to the 6.7 per cent found in this study.

SUMMARY

Thirteen hundred and seventy warblers of 26 species were banded at two sites in southeastern Massachusetts in regularly-scheduled netting operations between May 1960 and October 1966. Seventy-three individuals of 6 breeding species and 2 individual migrants (both Blackpoll Warblers) have returned at least once. Return rates for warblers were comparable to return rates for other passeriformes on breeding grounds. Males outnumbered females 49 to 10 among returning individuals, possibly a reflection of the nest-centered restriction of female activities. Two Ovenbirds were at

least 7 years of age and a Black and White Warbler, a Yellowthroat and a Canada Warbler had each reached a minimum of 6 years of age.

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APPENDIX I. SCIENTIFIC NAMES OF SPECIES MENTIONED IN
THE TEXT AND TABLES

Tufted Titmouse, *Parus bicolor*
Catbird, *Dumetella carolinensis*
Brown Thrasher, *Toxostoma rufum*
Black-and-White Warbler, *Mniotilta varia*
Worm-eating Warbler, *Helmitheros vermivorus*
Blue-winged Warbler, *Vermivora pinus*
Brewster's Warbler, *Vermivora leucobronchialis*
Nashville Warbler, *Vermivora ruficapilla*
Yellow Warbler, *Dendroica petechia*
Magnolia Warbler, *Dendroica magnolia*
Cape May Warbler, *Dendroica tigrina*
Black-throated Blue Warbler, *Dendroica caerulescens*
Myrtle Warbler, *Dendroica coronata*
Black-throated Green Warbler, *Dendroica virens*
Blackburnian Warbler, *Dendroica fusca*
Chestnut-sided Warbler, *Dendroica pensylvanica*
Bay-breasted Warbler, *Dendroica castanea*
Blackpoll Warbler, *Dendroica striata*
Prairie Warbler, *Dendroica discolor*
Palm Warbler, *Dendroica palmarum*
Ovenbird, *Seiurus aurocapillus*
Northern Waterthrush, *Seiurus noveboracensis*
Kentucky Warbler, *Oporornis formosus*
Connecticut Warbler, *Oporornis agilis*
Yellowthroat, *Geothlypis trichas*
Yellow-breasted Chat, *Icteria virens*
Wilson's Warbler, *Wilsonia pusilla*
Canada Warbler, *Wilsonia canadensis*
American Redstart, *Steophaga ruticilla*
Tree Sparrow, *Spizella arborea*
White-crowned Sparrow, *Zonotrichia leucophrys*
Song Sparrow, *Melospiza melodia*