Research Reports

Numbers of Fall Migrant Songbirds Declining on Block Island

by Steven E. Reinert and Elise Lapham

For 31 years beginning in 1968, Elise Lapham and her daughter, Helen Lapham, have been mist-netting and banding songbirds in habitats surrounding Elise's house in the "Clay Head" area on the northeast corner of Block Island, RI, ten miles off the state's mainland coast. Sadly, Helen died of ovarian cancer in 1997. Her spirit, however, lives on at the station in the minds of Elise and her team of dedicated volunteers including Kim Gaffett, who will succeed Elise in carrying on the banding tradition at the site; Sue, Mark, and Sarah Carr; and more recently, Scott Comings of Block Island's Nature Conservancy Field Office.

Running between five and ten 8-foot tall by 42-foot long mist nets during most days of each spring and fall migratory period, the Lapham team has amassed over 155,000 net-hours of effort in the 31 years, capturing over 70,000 birds of 155 species in the process. This list includes such east-coast rarities as Summer Tanager; Say's Phoebe; Yellow-headed Blackbird; Bewick's Wren; and Prothonotary, Golden-winged, Cerulean, and Yellow-throated warblers. Birds captured in the fall (57,632 total) far outnumber spring birds (16,716), this due to the vast numbers of recently hatched birds (hatch-year, or "HY" birds) that head south from their northern breeding grounds at the end of each breeding season. Indeed, 93% of all fall songbirds captured at the Block Island station are HY birds.

Recently, the authors presented an analysis of the first 28 years (1968-1995) of fall banding data at the Audubon Society of Rhode Island's 1999 Birder's Conference. This article will summarize some of those results and introduce ideas for future analyses. The data presented here are from files provided by the Federal Bird Banding Laboratory (BBL), which each year computerizes annual reports from all banders. Also underway is an effort incorporating 15 volunteers to enter all records from the 31 years at the Block Island Station, including data on the time of capture, wing-length, weight, fat-class, and molting, none of which are available in the BBL files.

Table 1 presents the breakdown of captured fall migrants by wintering destination. Although US-wintering migrants comprise 63% of the total number of captured birds, those wintering in Central and South America, and the islands of the Caribbean, the so-called "neotropical migrants," comprise over 55% of the 108 fall migrant species.

Analyses of Breeding Bird Census data during recent decades have documented the declines of some eastern-breeding neotropical migrants, such as the Wood Thrush (e.g., Askins et al. 1990). These discoveries have resulted in a vast amount of attention in the ornithological literature devoted to the population trends of these songbirds. An objective of this report is to present data illuminating the population trends of some of the dominant fall migrants on Block Island, as calculated from the banding capture data. Results presented, however, must be interpreted while considering some of problems inherent in the data, including (1) dramatic habitat changes at the net-lane sites over the 30+ years: habitats have grown from knee-high old-field communities, to shrub communities as tall as or taller than the nets; (2) new net sites were added as years progressed; (3) some birds were caught in baited ground-traps, and they cannot be separated (in the BBL data) from birds captured in nets; (4) recaptures of birds banded in previous seasons or years are not included in the BBL data; (5) finally, nets were left open for fewer hours per day in the earlier years than in the later years.

The last-named concern is especially problematic in analyzing a commonly-used index of capture abundance, "birds per net-hour." This index adjusts capture numbers for differences in netting effort among years, thus enabling valid comparisons of bird abundance over time. Because netting efforts at the Block Island station were concentrated in the peak early-morning hours during the early years,

Wintering Destination	Total Captured	Percent Captured	Total Species	Percent Species
Northeast US	533	0.9	11	10.2
Southeast US	35,587	61.8	37	34.3
Central Am./Carib.	15,455	26.8	40	37.0
South America	6,046	10.5	20	18.5
Totals	57,621	100.0	108	100.0

Table 1. Block Island Fall Migrants by Wintering Destination Class

however, birds-per-net-hour calculations are inflated for those years. In later years, nets were left open into the afternoon hours when capture rates are reduced, thus deflating the birds-per-net-hour values.

Thus, we chose an alternative means of examining changes in the numbers of fall migrants over time. Table 2 presents the mean number of birds captured per year for the 12 years 1968-1979 vs. the 16 years 1980-1995 (this split follows methods of researchers at the Manomet Bird Observatory [Hagan et al. 1992] who reported on similar fall migration capture data for the years 1970-1989). A quick glance down the column presenting the percent difference between the means reveals a preponderance of negative changes, the mean capture numbers for many species in the more recent period reaching only half or less of the numbers from the late 60s and 70s. These negative changes prevail despite fewer mean total net-hours per year in the earlier period (mean=4,163) than in the later years (mean=6,489). A

	Species	Winter Dest[2]	% Total	Mean Capt 68-79	Mean Capt 80-95	% Diff Means	Mean ln Capt 68-79	Mean ln Capt 80-95	P[3]	% HY Birds[4]
1	Yellow-rumped Warbler	SE	35.8	1081	478	-55.8	74.6	40.0	<0.01	98.4 (96.8, 98.5)
2	Gray Catbird	CA	12.9	274	260	-5.0	59.6	58.5	0.85	96.4 (96.1, 96.4)
3	Red-eyed Vireo	SA	4.8	149	60	-59.9	35.1	17.2	0.04	98.8 (98.6, 98.8)
4	Golden-crowned Kinglet	SE	4.3	91	93	2.5	20.5	16.5	0.22	99.8 (77.3, 99.8)
5	White-throated Sparrow	SE	3.1	83	49	-41.6	22.5	13.1	0.03	98.3 (93.6, 98.4)
6	Common Yellowthroat	CA	2.4	68	36	-47.4	17.8	8.1	0.02	90.2 (88.1, 90.4)
7	Song Sparrow	SE	2.3	82	23	-71.5	22.1	4.7	<0.01	95.6 (85.1, 96.1)
8	Swainson's Thrush	SA	2.3	81	21	-73.9	18.5	4.3	<0.01	96.5 (95.7, 96.5)
9	Ruby-crowned Kinglet	SE	2.1	55	34	-38.2	12.2	7.5	0.19	98.4 (51.8, 99.1)
10	Hermit Thrush	SE	1.9	55	26	-51.9	14.2	6.7	<0.01	98.3 (98.2, 98.3)
11	Dark-eyed Junco	SE	1.8	45	30	-32.7	11.7	7.1	0.06	98.4 (97.4, 98.4)
12	American Redstart	CA	1.8	44	31	-31.2	11.2	7.3	0.53	95.5 (94.4, 95.6)
13	Brown Creeper	SE	1.7	28	41	48.4	6.6	10.4	0.50	98.3 (87.6, 98.5)
14	American Robin	SE	1.4	45	18	-61.3	10.9	3.0	<0.01	90.6 (86.1, 91.1)
15	Veery	CA	1.4	39	20	-49.1	10.5	4.5	0.04	96.4 (96.1, 96.4)
16	Black-throated Blue Warbler	CA	1.2	22	28	26.8	4.4	6.6	0.18	96.9 (95.0, 96.9)
17	Swamp Sparrow	SE	1.2	32	18	-43.2	8.3	4.5	0.10	96.4 (92.4, 96.5)
18	Gray-cheeked Thrush	SA	1.2	42	11	-74.1	8.9	1.7	0.01	97.6 (97.0, 97.6)
19	Eastern Towhee	SE	1.1	30	18	-38.6	6.7	3.4	0.04	92.9 (92.3, 92.9)
20	Blackpoll Warbler	SA	1.1	40	10	-75.1	9.9	1.5	<0.01	90.0 (88.7, 90.1)
21	Cedar Waxwing	CA	1.0	35	11	-69.1	8.8	2.5	<0.01	95.4 (94.5, 95.5)
22	Red-breasted Nuthatch	SE	0.8	22	19	-14.0	5.5	4.5	0.86	85.8 (77.7, 87.2)
23	Eastern Phoebe	SE	0.7	14	15	2.6	2.9	3.5	0.82	88.0 (51.3, 93.0)
24	Northern Waterthrush	CA	0.7	24	8	-68.9	5.5	1.2	0.01	94.4 (92.8, 94.5)
25	Black-and-white Warbler	CA	0.7	14	14	-3.3	2.8	2.5	0.96	94.9 (93.3, 95.0)
26	Ovenbird	CA	0.7	16	12	-28.4	3.0	2.0	0.21	94.8 (92.8, 94.9)
27	House Wren	SE	0.6	17	9	-46.2	3.2	1.2	0.05	96.9 (92.5, 97.0)
28	Winter Wren	SE	0.6	16	8	-48.2	3.7	1.2	0.10	99.6 (94.5, 99.6)
29	Cape May Warbler	CA	0.5	20	5	-77.6	4.2	0.6	0.12	99.6 (98.9, 99.6)
30	Scarlet Tanager	SA	0.4	12	8	-38.4	2.3	1.3	0.06	95.0 (93.1, 95.1)
31	Blue-headed Vireo	SE	0.4	7	11	62.6	0.8	1.9	0.10	97.3 (87.8, 97.5)
32	Magnolia Warbler	CA	0.4	12	6	-47.4	2.1	0.7	0.01	96.4 (94.5, 96.5)
33	Western Palm Warbler	SE	0.4	14	5	-65.0	2.7	0.9	0.01	98.8 (96.7, 98.9)
34	Brown Thrasher	SE	0.4	14	3	-80.4	2.6	0.3	<0.01	88.0 (73.5, 90.0)
35	Baltimore Oriole	CA	0.3	17	6	-68.1	4.3	1.3	0.04	94.2 (65.3, 96.0)
36	Northern Cardinal	NE	0.3	4	7	98.2	0.5	1.2	0.14	79.5 (60.6, 84.4)
37	Philadelphia Vireo	CA	0.3	10	2	-83.2	2.1	0.1	<0.01	97.4 (95.0, 97.5)
38	Northern Parula	CA	0.2	8	3	-58.8	1.4	0.3	<0.01	97.3 (93.2, 97.4)
39	Purple Finch	SE	0.2	7	3	-57.1	1.1	0.4	0.01	90.9 (75.0, 92.5)
40	Black-capped Chickadee	NE	0.2	2	6	147.1	0.4	0.6	0.41	91.0 (51.5, 94.9)

1 Presents differences in the mean annual daily capture totals per species and the annual means of the totals of the natural log of daily captures per species for the years 1968-79 vs. the years 1980-95. Mean annual net-hours for years 1968-79=4,163; 1980-95=6,489.

2 Principal wintering grounds: CA=Central America/Caribbean; NE=Northeastern US; SA=South America; SE=southeastern United States.

3 P-value of a Wilcoxon rank-sum test of the annual means of the totals of the natural log of daily captures for the years 1968-79 vs. the years 1980-95.

4 The interval in parentheses represents the % HY calculation with all birds of unknown age included as AHY and HY birds, respectively.

Table 2. Changes in Abundance of the Dominant Fall Passerine Migrants at Block Island, Rhode Island[1]

conservative statistical analysis of the differences (Wilcoxon rank-sum test of the annual means of the totals of the natural log of daily captures per species for the years 1968-79 vs. the years 1980-95; see Table 2) reveals that 22 of the 40 most abundant fall migrant species are significantly ($P \leq 0.05$) less abundant in the more recent period vs. the 12 years from 1968-79, while no species were significantly more abundant in the latter years. Of the 22 species exhibiting significant declines, 10 have their principal wintering grounds in the southeastern US, 8 in Central America/Caribbean, and 4 in South America; they represent 53%, 57%, and 80% of the species in those three migrant classes, respectively.

Although we believe that numbers of fall migrants have indeed decreased on Block Island during the study period, and that our data present strong evidence for such declines, we can only conclude positively from the data presented in Table 2, that the numbers of birds hitting the mist-nets have declined. In extending our data to fall migrants in general, the concerns with the data presented above must be considered. In particular, changes in the composition of vegetation in the net lanes over time could clearly influence the bird species attracted to the sites, while the taller vegetation present in the latter years could result in birds passing over the nets (which in earlier years would have been captured).

Also to be considered in evaluating our data on declines is the preponderance of HY birds captured. Presented in the last column of Table 2 are the percent of HY birds per species calculated using the fall data from 1970-1994 (years 1968 and 1969 were omitted because the aging technique of skulling was not employed regularly until 1970). The large proportions of HY birds during fall migration at Block Island further substantiate Ralph's (1981) theories regarding the "coastal effect": i. e., the large percentage of HY birds migrating along the coast in fall indicates that the coast is on the periphery of the migratory corridor for these species. Most of the migrants listed in Table 2 exhibit a markedly higher percentage of adult birds along inland "coastal plain" routes (Ralph 1981), suggesting that these inland corridors represent the centers of migratory movements for these species.

Discussions of combining the Block Island bird-banding data with data from other southeastern New England coastal banding stations in Manomet, MA (T. Lloyd-Evans, Manomet Observatory for the Conservation Sciences), Fire Island, NY (P. A. Buckley), and Kingston, RI (P. Paton, D. Kraus) are already underway. We look forward to revealing the results of combined analyses in the years to come.

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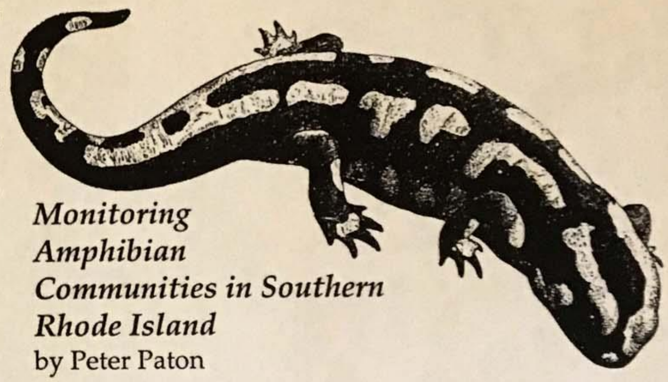
***Steven Reinert** has studied wetland and coastal birds in southeastern New England with URI, the Lloyd Center for Environmental Studies, and other groups for over 25 years.*
***Elise Lapham** has banded migratory birds on Block Island since 1967, and is personally responsible for the preservation of hundreds of acres of wildlife habitat at the north end of the island.*



Monitoring Amphibian Communities in Southern Rhode Island

by Peter Paton

When I moved to Rhode Island three years ago, I had no idea how abundant frogs and salamanders were in New England. My first encounter with this secretive community occurred in the spring of 1996, when I had the opportunity to go road running with Chris Raithel. Chris, who works for the RIDEM Division of Fish & Wildlife, is an extremely dedicated biologist and is one of the preeminent herpetologists of the region. We went out on a warm, rainy night in May during a torrential downpour. What astounded me was the number of frogs and salamanders we saw that night. They were everywhere, and it got me thinking about the vital role that amphibians must play in eastern forests.

By the following spring I had initiated research projects to assess community structure and population trends of amphibians at various sites in southern Rhode Island. With the help of Bill Crouch, an M.S. candidate, and wildlife students in the URI Department of Natural Resources Science, we now monitor seven ponds for as long as 275 consecutive days each year.