RESULTS OF THE 1982 SPRING MIGRATION WATCH

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In the spring of 1980 and 1981, a cooperative field study of spring migration was organized and results were published in Bird Observer (see references). In those years, the migration study focused exclusively upon warblers (Parulidae) observed during the month of May. In 1982 the study was expanded to include the 120 species between Yellow-billed Cuckoo and Scarlet Tanager on the state checklist published by the Massachusetts Audubon Society, and the study duration was increased to cover the period April 15 to May 31. This report presents the 1982 results and compares the three years of the project.

Methods. The methods used in the study have been described in detail in our earlier published reports and are summarized only briefly here. Participants were asked to visit their selected sites at least once every four days during the study period. They were requested to follow fixed routes through the sites and to record the numbers of each species detected either by visual sighting or by song. At the end of the study they were asked to identify those species for which breeding residents contributed to the count and to note any species that was seen in distinctly greater or lesser numbers than usual.

Results. As some observers had too few visits and some deviated from the instructions, not every data set of the twenty-two submitted was suitable for detailed analysis. Thirteen of the more complete data sets were selected for full analysis (see Table 1). They represent 217 site visits and a total of 239.7 hours of field observation. Only these thirteen are included in the data analysis that follows.

Table 1. Sites Subjected to Complete Data Analysis in 1982.

SITE	VISITS APR.	VISITS MAY	FIELD HOURS	TOTAL SPECIES	OBSERVERS
Cambridge-Mt.A.	3	10	10.25	61	L.Robinson
Cambridge-Mt.A.	6	11	26.58	73	F.Bouchard
Braintree/Weymouth-Pond Meadow Park	7	12	21.33	65	G.d'Entremont R.Campbell
Marblehead - MNWS	1	14	12.92	62	C.Blasczak
Lexington-Whipple H.	2	14	14.86	48	J.Andrews
Newton-Novitiate Park	6	11	25.92	70	N.Komar
Newton-Bowen School	8	10	12.97	50	O.Komar
Jam.Plain-Gethsemane	7	9	31.47	60	N.Komar,M.Greenwald
P'town-Beech Forest	4	17	16.92	65	B.Nikula
Waltham-Met.St.Hosp.	6	11	16.00	55	L.Taylor
Cambridge-Acorn Park	5	13	12.00	37	L.Robinson
Bolton-Bolton Flats	5	8	12.58	51	B.Parker
Concord-GMNWR	5	12	16.92	42	B.Porter
COMBINED TOTALS	65	152	239.72	95	

Overall, the 1982 spring migration was rated as poor by experienced participants. This evaluation was in agreement with the reports in American Birds, 36(5): 823 (September 1982), where R. J. Adams wrote, "Passerine numbers were low - warblers in particular . . . . The sparseness of birds on the East Coast no doubt relates to the strong easterly winds which kept trans-Gulf migrants away from the Florida coast and probably the other eastern regions as well."

A summary of the counts for each species is provided in Table 2. Of the 120 species on the current Massachusetts Audubon checklist within the study limits, 92 were recorded during the project. In addition, there were write-ins of three species not on the checklist (Prothonotary Warbler, Cerulean Warbler, and Kentucky Warbler). The ten most abundant species were, in order of decreasing abundance, Red-winged Blackbird, European Starling, Common Grackle, Yellow-rumped Warbler, American Robin, Blue Jay, American Crow, Black-capped Chickadee, Gray Catbird, and Common Yellowthroat. With the sole exception of Yellow-rumped Warbler, the high counts of these species were predominantly due to breeding residents.

In Table 2, the comment which follows any species listed indicates that two or more participants reported that a species had occurred in distinctly greater or lesser numbers than usual. These subjective ratings are useful in identifying years with migration patterns that differ sharply from the preceding few years. However, the authors are convinced that only quantitative data are reliable for detecting gradual long-term changes. The reason is that if the abundance of a species changes gradually (e.g., increasing ten percent each year), the expectations of observers might change accordingly.

Breeding frequency may also be understood from Table 2. Use of a site by a breeding pair was sufficient for recording that site as a breeding site. Only eleven of the thirteen sites reported breeding information. Therefore, the numbers given in the table must be compared with that total (eleven).

Table 2. Abundance by Species.

SPECIES	SITES AT WHICH SEEN	BR. SITES	BIRDS /HOUR	SPECIES	SITES AT WHICH SEEN	BR. SITES	BIRDS /HOUR
Y.-b.Cuckoo	5	2	0.046	H.Woodp.	11	6	0.221
B.-b.Cuckoo	7	1	0.054	D.Woodp.	13	9	1.318
G.H.Owl	2		0.008	E.Kingb.	10	5	0.492
C.Nighthawk	2		0.008	G.C.Flyc.	9	2	0.167
Ch.Swift	12	3	0.868	E.Phoebe	1		0.033
R.-th.Humm.	4		0.029	Y.-b.Flyc.	3		0.029
4 of 9 at Mt.Auburn				Acad.Flyc.	1		0.004
B.Kingf.	6		0.054	Provincetown			
No.Flicker	13	10	2.011	Will.Flyc.	4	1	0.067
Pi.Woodp.	1		0.004	Ald.Flyc.	2		0.050
Concord				L.Flyc.	5		0.067

Table 2. (continued)

SPECIES	SITES AT WHICH SEEN	BR. SITES	BIRDS /HOUR
E.Wood-Pewee	9	3	0.096
O.-s.Flyc.	1		0.008
Bolton			
T.Swallow	9	4	0.617
Bank Sw.			0.038
N.R.-w.Swall.	5		0.125
Barn Sw.	11	5	0.734
P.Martin	2		0.008
Blue Jay	13	10	4.683
Am.Crow	13	9	4.308
Fish Crow	6		0.209
B.-c.Chickadee	13	10	3.496
T.Titmouse	13	9	1.827
W.-b.Nuth.	10	7	0.476
R.-b.Nuth.	3		0.079
House Wren	10	5	0.409
Marsh Wren	2	1	0.008
N.Mockingbird	11	4	0.592
G.Catbird	13	11	3.150
B.Thrasher	11	2	0.505
Am.Robin	13	9	5.018
W.Thrush	10	4	0.342
H.Thrush	7		0.093
S.Thrush	11		0.259
G.-ch.Thrush	3		0.017
3 of 4 at Mt.Auburn			
Veery	9		0.175
B.-g.Gnatc.	9		0.334
Above average (2 sites)			
G.-c.Kinglet	2		0.013
R.-c.Kinglet	11		0.722
Below average (2 sites)			
C.Waxwing	10	1	1.806
E.Starling	13	10	7.117
W.-e.Vireo	2		0.017
Newton(NP), Marblehead			
Y.-t.Vireo	2		0.008
Bolton, Marblehead			
Sol.Vireo	11		0.279
R.-e.Vireo	13	6	0.517
Phil.Vireo	1		0.004
Braintree			
Warb.Vireo	8	1	0.213
B.-and-w.Warb.	13		1.339
G.-w.Warbler	1		0.004
Marblehead			
Blue-w.Warb.	5		0.038
Proth.Warb.	1		0.004
Mt.Auburn			
Tenn.Warb.	9		0.334
Nash.Warb.	10	1	0.284
N.Parula	12		1.018
Yell.Warb.	13	6	2.040
Mag.Warb.	13		0.709
Below average			
Cape May Warb.	4		0.071
B.-t.B.Warb.	11		0.234
Y.-r.Warbler	13		5.523
B.-t.G.Warb.	12		0.413
Blackb.Warb.	10		0.263
Ch.-s.Warb.	7		0.142
Bay-b.Warb.	7		0.154
Blackpoll	11		0.734
Cerul.Warb.	1		0.004
Provincetown			
Pine Warb.	4	1	0.167
Breeding: Provincetown			
Prairie W.	5	2	0.129
Palm Warb.	11		0.484
Ovenbird	11		0.455
N.Waterthr.	8		0.150
Mourn.Warb.	4		0.025
C.Yellowthr.	13	10	2.474
Y.-b.Chat	1		0.004
Marblehead			
Hood.Warb.	1		0.004
Marblehead			
Kent.Warb.	1		0.004
Braintree			
Wils.Warb.	9		0.154
Can.Warb.	11		0.459
Am.Redstart	13		1.130
Below average (2 sites)			
House Sparrow	8	3	0.384
Bobolink	10	1	1.589
E.Meadowlark	3	2	0.129
R.-w.Blackb.	13	10	8.567
Orch.Oriole	2		0.013
2 Mt.Auburn, 1 Braintree			
N.Oriole	13	8	1.039
Rusty Blackb.	5		0.108
C.Grackle	13	10	5.626
B.-h.Cowbird	13	8	1.873
Sc.Tanager	12	3	0.125
Below Average (2 sites)			

Migration Timing in 1982. Migration timing is a topic of some interest to both casual observers and data analysts. In previous years (see references), a technique was developed for determining the peaks and troughs of the migration by

comparing the number of migrants seen on a given day to the number that would have been seen if each reporting site had seen an average number of migrants. For example, if 15 migrants were reported from a site for which the average was only 10, then the migration magnitude would be 1.5 for that site on that particular day. When more than one site report, the counts for those sites are added together, and a combined migration magnitude is then computed.

Because of the massive data entry problems that would have resulted from attempting to analyze timing for all 95 species recorded in 1982, a streamlined timing analysis was applied this year using seven "indicator" species. These seven were common species that were clearly migratory in the sense of having no significant breeding populations within the study region. A mix of early, mid-, and late season migrants was included. The seven species were Ruby-crowned Kinglet, Solitary Vireo, Black-and-white Warbler, Northern Parula, Palm Warbler, Blackpoll Warbler, and American Redstart.

Eight general movements were discovered. They occurred on April 19 and 25, and May 5, 10, 16-18, 20, 23, and 31. Major troughs (less than one-fourth the average number of migrants) occurred on April 18, 26, and 28, and May 7 and 22. Amplitudes of the peaks were less dramatic this year than in either of the preceding two years: no peak of magnitude greater than 2.0 occurred. In 1980, a sustained movement was observed in mid-May, but in 1982, the migration was erratic and inconsistent.

All previous experience has indicated that temperature and wind direction are weather parameters with a definite impact on migration. In spring, northerly winds followed by a shift to the southwest seem to be correlated with the heaviest migration, a result that appeals to common sense. Inspection of data from the National Weather Service for Boston showed that these conditions prevailed only on April 16-20 and 25-26 this year. Peaks in migration did occur at these times. In May, cold easterly winds prevailed for almost the whole month. It is easy to believe that whatever May migration we experienced was induced not so much by favorable weather as by desperation!

Analysis of Warbler Counts. The counts of warblers were subjected to special analysis in order to compare the 1982 results to the data from the previous two years. The first step in this analysis was to eliminate counts of breeding individuals so that only the migrating population could be studied. This was accomplished by noting the counts of breeding species on days of little migratory activity when the purely migrant species were essentially missing from the count. The counts on these "no migration" days were taken to represent the abundance of the sedentary breeding population and were subtracted from counts on other days in the same time period. These corrections had the greatest impact on the

counts for Yellow Warbler, Pine Warbler, Prairie Warbler, and Common Yellowthroat.

The relative abundances of each warbler species are provided in Table 3. The first three columns contain the abundances for the three separate years, and the fourth column provides the abundances for all three years combined. The variations in the relative abundances are low for most species, especially in view of the fact that different sites and different observers have been employed in the three years of the study. The stability in the rank ordering is apparent. More than 85% of the yearly rankings fall within ±2 places of the combined rankings.

Table 3. Relative Abundance of Migrant Warblers, 1980-82.

WARBLER SPECIES	1980	1981	1982	COMBINED 1980-82	MT.A. 1980-82
Yellow-rumped	21.21	29.80	37.14*	29.79	43.23
American Redstart	11.86	9.44	7.43	9.47	5.79
Black-and-white	7.87	8.01	7.57	7.78	6.80
Northern Parula	7.57	5.10	6.54	6.58	5.24
Magnolia	6.69	5.05	4.77	5.52	3.16
Blackpoll	6.36	4.13	4.94	5.26	5.11
Common Yellowthroat	4.16	7.19	3.56	4.61	2.34
Black-throated Green	5.64	3.16	2.81	3.89	4.30
Tennessee	6.00	3.27	2.24	3.81	5.34
Yellow	3.11	4.59	3.28	3.52	2.18
Canada	3.05	4.18	3.09	3.32	1.27
Ovenbird	2.56	3.42	2.64	2.79	1.27
Blackburnian	2.16	1.43	1.77	1.83	1.63
Palm	0.26	1.28	3.25*	1.74	2.51
Wilson's	2.20	2.24	1.04	1.73	1.30
Bay-breasted	2.49	0.82	1.04	1.50	1.43
Black-throated Blue	1.51	1.12	1.71	1.50	1.60
Nashville	1.28	1.48	1.65	1.48	1.50
Chestnut-sided	1.70	1.28	0.95	1.29	1.40
Northern Waterthrush	1.05	1.22	1.04	1.08	0.72
Cape May	0.69	0.87	0.48	0.64	1.20
Blue-winged	0.20	0.51	0.25	0.29	0.20
Prairie	0.29	0.20	0.20	0.23	0.16
Pine	0.07	0.00	0.36	0.17	0.13
Mourning	0.03	0.05	0.20	0.10	0.13
Cerulean	0.00	0.05	0.03	0.02	0.00
Prothonotary	0.00	0.05	0.03	0.02	0.03
Worm-eating	0.00	0.05	0.00	0.01	0.03
TOTAL COUNT (Bird-days)	3051	1960	3565	8576	3072

*Increased 1982 counts for these species were due largely to the addition of two weeks in April to the count period.

Comparison of Mt. Auburn to Other Sites. Mount Auburn Cemetery in Cambridge is probably the most intensively birded area in eastern Massachusetts during the spring migration. Bird

Observer publishes many reports from Mount Auburn, and a long-term migration study at this site could be readily sustained. For these reasons, it is of considerable interest whether or not the species composition of the migrant population at Mount Auburn is typical of eastern Massachusetts as a whole. In order to investigate this question, warbler data from six available sets of Mount Auburn data (two from each year of the project) were combined into a special data set. The relative abundances from this set are given in the last column of Table 3. In comparing Mount Auburn data with the combined data, it should be noted that while Yellow-rumped Warbler was most abundant in both data sets, it is much more dominant at Mount Auburn (43.23% compared to 29.79%). In further analysis, Yellow-rumped Warbler was deleted, and the relative abundances of the remaining 27 species were tested for statistically significant ($P < .01$) differences. This analysis revealed that Mount Auburn had significantly greater relative abundances for Black-throated Green, Tennessee, Palm, and Cape May warblers. Mount Auburn had significantly smaller relative abundances for American Redstart, Magnolia Warbler, Common Yellowthroat, Yellow Warbler, Canada Warbler, and Ovenbird.

On the basis of these observations, one notes that the two early migrants, Yellow-rumped Warbler and Palm Warbler, occur in greater relative abundances at Mount Auburn. For the species that migrate mostly during May, Mount Auburn seems to exhibit a trend toward a lower proportion of ground or low-foraging species and a higher proportion of treetop-foraging species. Landscaping practices which remove leaf litter and underbrush may be affecting the species composition at well-tended cemetery sites like Mount Auburn. If so, then habitat changes at a site may pose a problem for a long-term population study. The availability of counts from several different sites with different habitat characteristics provides a safeguard against confusing changes due to site habitat alterations with actual changes in the general migratory population.

Comparison with Connecticut River Valley Data. A remarkable data set was received from Seth Kellog who selected South Pond in Southwick (southeast of Springfield) as his site. Seth was afield on 13 visits in April and 22 visits in May. Because his site was outside the nominal study region, his data were not combined with the other data sets, but serve an important function in allowing us to compare the migration in the Connecticut River Valley with the migration in eastern Massachusetts. The following differences are notable: 1) Southwick produced much higher numbers of certain migrant species such as swallows and Rusty Blackbirds; 2) certain breeding species were much more abundant (Veery, Yellow-throated Vireo, Blue-gray Gnatcatcher, Blue-winged Warbler, Northern Waterthrush, Bank Swallow, and Cliff Swallow.

Although we have our hands full with the data from eastern

Massachusetts, it is obviously impossible to adequately understand the migration without some knowledge of what is happening farther west. This is especially true in years when it is suspected that weather conditions have deflected migrants east or west of their normal routes. The Field Study Committee will follow with interest any migration watch activity in Western Massachusetts.

It is our hope that the Spring Migration Watch can be repeated under the sponsorship of the Bird Observer Field Study Committee. New participants who can provide regular coverage of a site within the study area are welcomed. To receive a set of project instructions, contact Lee Taylor, 92 Brooks Avenue, Arlington, MA 02174.

REFERENCES

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