

## SPRING WARBLER MIGRATION AT TORONTO, 1987

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This study is a project of the Toronto Ornithological Club. The purpose is to show the patterns of the spring warbler migration at Toronto, to compare the relative abundance of each species studied and to document the fluctuations in the number of warblers seen from year to year.

This was the sixteenth year in which the study was carried out in the same manner. The study was begun in 1970 and continued each year with the exception of 1985 and 1986. The first four years were published in the Ontario Field Biologist (see Fairfield, 1971, 1973, 1974). The results from 1987 on are to be published in the Toronto Region Bird Report. The acquisition of a micro-computer by the writer has made possible the compilation and analysis of the enormous amount of data that was collected in the intervening years and that work is underway.

These annual reports are in fact interim reports and it is hoped within the next two or three years to publish a major study involving all the data collected from the beginning of the project.

### METHODS AND STUDY AREAS

The 21 most common species of warbler were chosen as indicators of the migration through Toronto. For additional information and comparison three other species which migrate through Toronto at the same time as the warblers were also counted. They were, Swainson's Thrush, Scarlet Tanager, and Rose-breasted Grosbeak.

The data was collected by several observers making daily counts of a number of study areas during the month of May plus the first five days of June. In 1987 there were six study areas within the boundaries of Metropolitan Toronto plus two outside Metro Toronto. (See Table 1)

The Toronto study areas are mostly wooded ravines and hillsides surrounded by built-up areas of the city. The areas are small enough that they can be covered in 30 to 60 minutes. Their positions within the heavily built-up residential and industrial areas discourages those species that would normally nest in this part of Ontario from setting up territories. Although this results in much lower counts than the richer habitats away from the city it also avoids the problem of sorting out the resident birds from the migrants. The out-of-town plots are nonetheless of great value in allowing a comparison of those species which are migrants and providing arrival dates for the resident birds.

Table 1 lists the study areas, the number of visits made to each of them in 1989, and the name of the observers responsible for each area.

All the observers are competent, experienced birders capable of identifying all the species by voice and in all plumages.

TABLE 1

Study Areas	Number of Visits	Observer
<u>Metropolitan Toronto</u>		
McCowan Park	25	Edmund Johns
Moore Park Ravine	34	George Fairfield
Mount Pleasant Cemetery	34	Harry Kerr
Sherwood Park	28	Bruce White
Unwin Avenue	36	Donald Peuramaki
Wychwood Park	36	Hugh Currie & Herb Elliott
<u>Outside Metropolitan Toronto</u>		
Haliburton	27	Artur Smith
Thickson's Woods	28	Margaret Bain

COVERAGE

The number of study areas covered in Metropolitan Toronto was the lowest since the study started. This was partly offset by the fact that the observers missed very few days during the study period. Six areas were visited a total of 187 times, an average of 31 times each during the possible 36 days of the study period. On no days were less than three plots covered.

In addition a total of 55 visits were made to the two study areas outside Toronto.

### THE MIGRATION PATTERN

Graph 1 shows the average number of warblers per visit for each day from May 1 to June 5, 1987 for the Metropolitan Toronto area.

The migration started and ended early compared to the earlier years of the study. Peak numbers occurred on May 6, 17, and 21. A detailed description follows.

For the first five days of May southern Ontario and the eastern United States as far south as North Carolina had been under a large high pressure system with clear skies, warm days and cool nights. Winds were moderate from the north. The northerly winds can not have been a serious detriment to the migration because the first big flight of warblers arrived on the night of May 5/6. The next morning we found large numbers of Yellow-rumps with a few Black and Whites, Nashvilles, Black-throated Greens, and Palms. In the first six years of our study we found that the first big influx of warblers came between May 10 and May 14 so this flight was at least four days early.

On the 7th, 8th and 9th the weather remained clear but storms developed south of the Lakes. Our birds apparently moved north and we had low counts on those days.

May 10 was warm and raining with winds varying from south to south-east. A small peak in the numbers occurred, probably the result of the grounding of the birds which were migrating over the city at the time. Fifteen species were represented., The most common was Yellow-rump and we had the first large influx of Tennessees.

Counts remained high until May 12 when there was a strong fall-off in numbers. It is likely that "our" birds were moving northward while new warblers were held back by the occluded front which was causing cloudy, rainy weather across the mid-eastern United States.

The biggest peak in warbler numbers of the spring occurred on the morning of May 17. A high centered over Virginia brought a flow of warm, moist maritime tropical air into the Great Lakes region. The weather on May 16 and 17 was cloudy and warm with strong south-west winds. The temperature during the night was about 55 degrees celsius and climbed to 30 degrees by mid-afternoon. The wind averaged 15 km/h at Toronto and 19 km/h south of the lake at St. Catherines. Sixteen species of warblers occurred averaging 20 birds per study area. the commonest species was the Tennessee Warbler but the peak was not the result of the "peaking" of any one species but rather the occurrence of moderate numbers of many species.

At Thickson's Woods near Oshawa Margaret Bain also experienced a heavy migration on the 21st, - 57 warblers of 19 species.

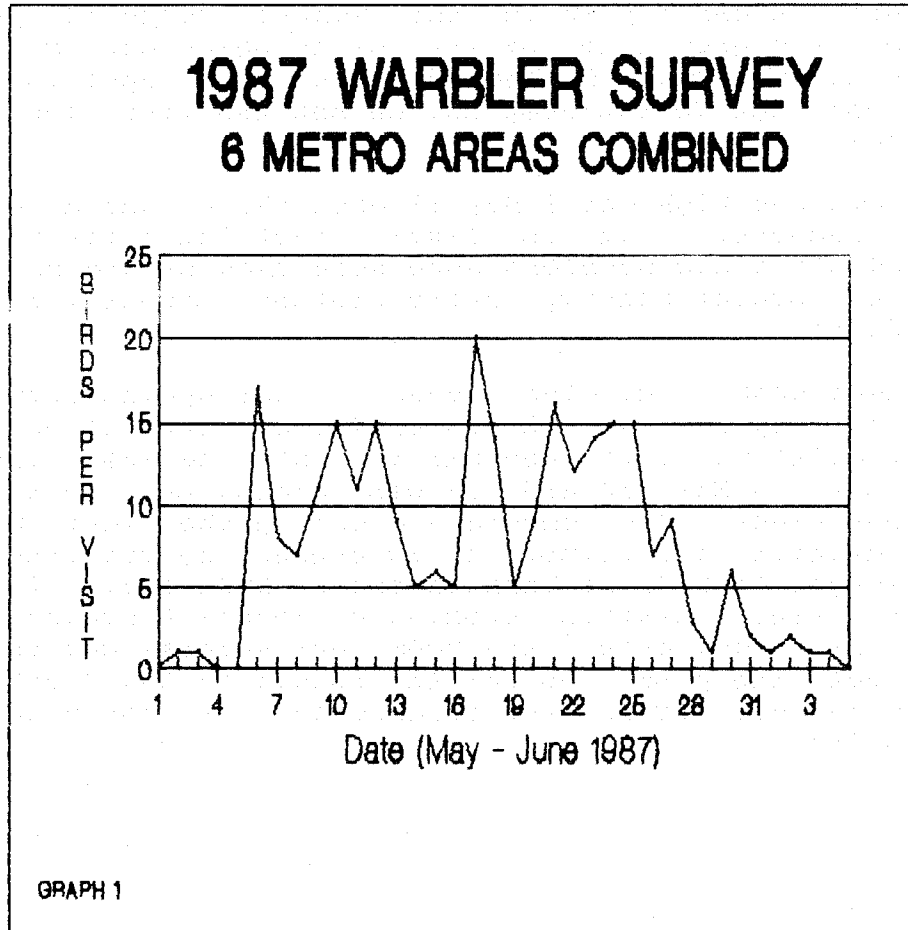
This peak was followed by a sharp decrease on May 18 and on May 19 we had the lowest numbers since the first influx on May 6. At the same time Arthur Smith at Haliberton, 130 kms. north of Toronto experienced his biggest day so far this year. Presumably the big flight had moved on north and new birds were blocked south of the Lake where once again there was an occluded front with cloud and rain.

From May 21 until the 25th warbler counts were again high. Magnolias peaked on the 21st both at Toronto and Oshawa. The birds arrived on a warm southerly flow of air which began on May 20 and continued through the 21st and into the 22nd.

After May 25 the numbers of warblers declined as the end of the migration period approached.

There was one more small peak on May 30, mostly Blackpolls and Redstarts, and then the migration dropped to few stragglers.

Arthur Smith at Haliburton experienced his largest counts from May 27 on. Some fourteen species totaling approximately 27 warblers occurred on his study area. No doubt most of these birds were establishing nesting territories.



INDIVIDUAL SPECIES COUNTS

Table 2 sets out all of the observations within Metropolitan Toronto of the 24 species studied. The totals for each day and each species are given.

In addition the average number of warblers per visit per day and for the five-week study period are included. This "Warblers per Visit" data is much more meaningful than the simple total of the birds observed. It eliminates the error which would result from a different number of observers going out on any given day. Since very few of the participants can visit their plots every day for five weeks this adjustment is necessary.

TABLE 2  
SIX TORONTO AREAS COMBINED

SPECIES	MAY																															JUNE					TOTAL		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	1	2	3	4	5			
Black & White	1	0	0	0	0	0	4	4	3	3	7	3	2	3	1	0	0	2	3	2	2	1	1	2	1	0	0	0	0	0	0	0	0	1	0	1	0	46	
Tennessee	2	0	0	0	0	0	0	0	0	5	10	3	7	6	4	13	1	15	12	7	21	15	7	7	6	8	1	1	0	0	3	0	1	0	0	0	153		
Nashville	3	0	1	0	0	0	3	9	4	2	5	3	9	3	1	2	0	1	3	1	0	3	0	2	0	1	0	0	0	0	0	0	0	0	0	0	53		
Yellow	4	0	0	0	0	0	2	2	2	2	6	3	0	2	3	0	4	5	2	1	1	6	2	2	3	5	1	1	2	2	3	2	0	3	1	1	0	69	
Magnolia	5	0	0	0	0	0	0	0	0	0	2	3	3	3	3	5	1	1	2	2	6	14	7	10	12	5	1	5	3	0	3	0	0	0	0	0	0	91	
Cape May	6	0	0	0	0	0	0	0	0	1	0	1	1	0	0	0	0	1	0	0	3	3	1	7	0	0	0	0	0	0	0	2	0	0	0	0	0	20	
Black-thr. Blue	7	0	0	0	0	0	0	1	0	2	5	2	4	1	1	2	1	4	2	1	1	1	0	3	1	3	1	0	0	0	1	1	0	0	0	0	0	38	
Yellow-rumped	8	0	1	2	0	1	48	27	24	11	26	20	12	8	4	0	2	3	0	0	2	1	0	1	3	0	0	0	0	0	0	0	0	0	0	0	0	196	
Black-thr. Green	9	0	0	0	0	0	5	2	2	2	8	3	9	4	0	2	2	3	7	2	5	11	4	5	3	9	0	0	3	0	1	1	0	0	0	0	0	93	
Blackburnian	10	1	0	0	0	0	0	1	0	0	2	4	2	1	0	0	0	2	1	0	2	10	4	5	7	4	1	1	1	1	0	0	0	0	0	0	50		
Chestnut-sided	11	0	0	0	0	0	0	0	1	1	7	6	9	6	3	3	1	4	1	0	2	2	5	4	9	10	2	3	2	0	0	0	0	0	0	0	0	81	
Bay-breasted	12	0	0	0	0	0	0	0	0	0	2	0	6	3	2	1	0	8	5	3	1	3	1	7	14	10	6	2	3	1	2	2	0	0	0	0	0	82	
Blackpoll	13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	0	5	7	9	4	3	2	0	5	1	0	0	0	1	41	
Palm	14	0	3	1	0	0	3	4	1	1	1	0	3	1	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	21	
Ovenbird	15	0	0	0	0	0	1	0	4	1	4	4	7	2	3	4	2	2	4	1	1	7	0	2	2	2	1	1	0	1	0	0	0	0	2	0	0	58	
N. Water Thrush	16	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	
Mourning	17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	1	0	2	0	7	
Yellow-throat	18	0	0	0	0	0	0	0	0	0	3	1	0	2	2	0	2	3	4	0	2	3	4	4	3	3	1	1	1	1	3	1	0	2	1	0	0	47	
Wilson's	19	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	1	1	4	5	1	4	2	1	0	0	1	0	0	0	0	0	22	
Canada	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	3	2	3	4	5	0	2	2	0	0	0	0	0	23	
Am. Redstart	21	0	0	0	0	0	0	0	0	0	1	0	2	1	0	4	2	5	9	6	5	11	14	8	12	10	6	6	1	1	7	4	0	0	1	2	0	118	
VISIT=1, NO VISIT=0	6	6	6	6	6	4	6	6	3	6	5	5	5	5	6	4	3	4	6	6	6	5	6	6	6	4	3	6	6	5	5	5	5	5	5	6	4	187	
DAILY TOTALS:	1	5	3	0	1	66	50	41	33	89	56	77	46	27	38	19	60	57	27	56	96	58	84	88	88	27	27	20	8	32	12	3	8	4	5	1	1,313		
WARBLERS PER VISIT Rounded to the closest whole number	0	1	1	0	0	17	8	7	11	15	11	15	9	5	6	5	20	14	5	9	16	12	14	15	15	7	9	3	1	6	2	1	2	1	1	0	7		
Swainson's Thrush	22	0	0	0	0	0	0	0	0	0	5	0	1	2	1	3	1	1	1	1	4	6	3	6	4	5	3	3	0	0	1	0	0	0	0	0	0	50	
Scarlet Tanager	23	0	0	0	0	0	0	0	0	1	3	2	1	1	0	0	0	3	0	0	0	1	1	0	1	1	0	0	0	0	0	0	0	1	0	0	1	0	17
Rose-br. Grosbeak	24	0	0	0	0	0	0	0	0	2	10	4	2	3	0	3	5	7	3	6	3	7	3	5	3	4	1	0	1	3	3	3	0	0	0	0	0	81	

### WARBLER COUNTS OVER AN 18-YEAR PERIOD

Table 3 gives the figures for the nine years for which our calculations have been completed (six years of data have still to be input).

Variations from year to year can be expected because on some years more of the migrating warblers pass over Toronto without landing than on other years. After all, we are only counting grounded birds.

Another variable is introduced by the fact that we do not use the same mix of plots each year. Invariably some participants have to drop out and others decide to join. Some of the new people will survey previously used plots but many must opt for a new area closer to their home or work place.

But even with these inaccuracies the fall-off in warbler numbers since the early 1970's as illustrated in Table 3 is difficult to ignore.

Whether this apparent decrease results from the destruction of the birds' winter or summer habitat or some other factor is a matter for study but projects such as the present one will contribute to the answer.

TABLE 3

#### NUMBER OF WARBLERS SEEN

<u>Year</u>	<u>No. of Visits</u>	<u>No. of Birds Counted</u>	<u>Average No. of Birds per Visit</u>
1970	117	1413	12.1
1972	99	1265	12.8
1973	248	2600	10.5
1974	303	3174	11.4
1975	301	2921	10.5
1980	203	2340	11.5
1981	237	1436	6.1
1984	108	864	8.0
1987	187	1313	7.0

## RELATIVE ABUNDANCE OF THE SPECIES STUDIED

Table 4 gives the order of abundance of the warblers for the years 1970 through 1975, 1980, 1981, 1984 and 1987. The most common warbler each year is given the number 1 and the least common number 21.

Where the individual species fall in the hierarchy is affected by a number of factors including how easily the species is to observe and its propensity to sing during migration. Therefore it is more important to note whether a species is becoming more or less common over the years than to note where it stands in the hierarchy.

I think most local birders would agree that the Yellow-rump is the most common species of warbler in southern Ontario during migration. The species erratic movement up and down our hierarchy probably has more to do with the timing of the migration than to actual rise or fall in numbers of birds. On years when a large proportion of the birds come through before our study period begins we get lower counts than on years when their migration is late. Although the overall migration was early in 1987 the main bulk of the Yellow-rumps came through between May 6 and May 12.

The Tennessee Warbler was the second most common warbler during the study period and in fact has become much more common at Toronto relative to the other warblers since our study began in 1970.

Black-throated greens were much more scarce in the last two migrations.

TABLE 4

ORDER OF ABUNDANCE

	1970	'71	'72	'73	'74	'75	'80	'81	'84	'87
Bl.& Wh.	3	6	4	9	11	6	9	10	13	13
Tenness.	15	16	13	6	3	4	1	3	3	2
Nashville	7	7	2	8	9	1	12	5	2	11
Yellow	8	18	8	11	13	10	13	9	1	8
Magnolia	5	3	11	3	2	5	6	6	4	5
C. May	20	20	16	17	20	16	17	16	17	19
B-t Blue	9	9	10	12	12	11	14	8	14	15
Yel-rump.	2	11	1	3	17	2	3	12	6	1
B-t Green	13	5	3	10	5	3	5	4	12	4
Bl'burn.	11	8	7	7	10	12	10	14	11	10
Chest-sd.	1	2	9	2	4	8	7	2	8	7
Bay-br.	16	12	15	4	6	17	8	7	10	6
Bl'poll	14	15	11	15	15	15	16	18	21	14
Palm	18	21	20	21	21	20	21	21	20	18
Ovenbird	10	10	14	13	7	7	4	1	5	9
N. W'thr.	17	19	19	19	18	18	19	19	18	21
Mourning	21	17	21	20	19	21	18	17	19	20
C.Y'thr.	4	13	17	16	14	13	15	13	9	12
Wilson's	19	14	18	18	16	19	20	20	16	17
Canada	12	4	12	14	8	14	11	15	15	16
A. Reds.	6	1	6	5	1	9	2	11	7	3



OTHER WARBLERS

Several species of warbler are not included in our statistical analyses because too few are seen. Those reported by the observers are set out in Table 5. For the names of the observers please refer to Table 1.

TABLE 5

OTHER WARBLERS

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Species	Number	Date (1988)	Study Area
Orange-crowned Warbler	1	May 9	Thickson's Woods
	1	May 22	Thickson's Woods
Blue-winged Warbler	1	May 10	McCowan Park
	2	May 10	Thickson's Woods
Northern Parula Warbler	1	May 10	Thickson's Woods
	1	May 18	Thickson's Woods
	1	May 21	Thickson's Woods
	1	May 22	Thickson's Woods
	1	May 24	Unwin Avenue
Pine Warbler	2	May 2	Thickson's Woods
	1	May 6	Unwin Avenue
	2	May 10	Thickson's Woods
	1	May 16	Thickson's Woods
	1		
Worm-eating Warbler	1	May 9	Wychwood Park
Kentucky Warbler	1	May 22	Thickson's Woods
Connecticut Warbler	1	May 22	Thickson's Woods

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TABLE 6  
ARRIVAL DATES (MAY)

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Species	Toronto	Thickson's Woods	Haliburton
Black and White	6	1	18
Tennessee	9	9	-
Nashville	2	2	11
Yellow	6	9	11
Magnolia	10	9	27
Cape May	9	10	-
Black-thr. Blue	7	9	-
Yellow-rumped	2	1	7
Black-thr. Green	6	1	11
Blackburnian	1	10	21
Chestnut-sided	8	9	21
Bay-breasted	10	10	-
Blackpoll	18	10	-
Palm	2	2	-
Ovenbird	6	9	17
N. Waterthrush	9	2	19
Mourning	17	10	21
Yellow-throat	10	11	13
Wilson's	9	10	-
Canada	16	11	June 3
Am. Redstart	10	9	19

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SUMMARY

Counts were made of 21 species of warblers plus three other passerine species on the mornings from May 1st to June 5th, 1987 at six study areas in Metropolitan Toronto and two areas outside Metropolitan Toronto.

The average number of birds per visit was compared with similar averages taken in most years between 1970 and 1988. Although there has been small fluctuations from year to year the trend has been markedly downward, with a drop of about one-third in the number of warblers visiting our study areas from 1970 to 1987.

The daily averages of all warblers were plotted and a graph prepared showing the peaks and lows of the migration.

The order of abundance of each species of warbler for each of the years of the study was set out in a chart.

#### ACKNOWLEDGEMENTS

I wish to thank Mr. R. Griffin and Mr. D. Broughton for providing instruction and help on the use of the computer to process the data and create the graph.

Many thanks to the observers listed in Table 1 who got up early each morning to count the birds on the study areas.



