THE FALL HAWK MIGRATION
THE EASTERN MASSACHUSETTS HAWK WATCH: TWENTY YEARS AND COUNTING

by Paul M. Roberts

Twenty years ago this fall about a dozen people participated in the first Eastern Massachusetts Hawk Watch (EMHW). Little was known about hawk migration through Massachusetts at that time. Mount Tom in Easthampton had been discovered as an excellent hawkwatching site by Archie Hagar in the 1930s, but little hawkwatching had been done anywhere else in the state. The largest documented count in eastern Massachusetts prior to 1976 of which I am aware was 316 Broad-winged Hawks seen from a backyard in Wellesley in 1975. The very simple objectives of the watch in its first years were to ascertain what hawks migrate through our region, in what numbers, and when.

In its first year, the EMHW recorded 2074 hawks, including flights of 394, 476, and 713 hawks, more than anyone expected. The watch, therefore, attracted more volunteer observers and extended its coverage. In the third year, 1978, regular coverage began at Mount Wachusett, as it was called then. The result was the biggest single hawk flight ever reported in New England: 10,086 hawks! Some people found that number hard to comprehend, much less believe, but the count that day, September 13, 1978, demonstrated beyond any doubt that large numbers of hawks regularly migrated through eastern Massachusetts.

Such flights previously had not been observed, recorded, and reported in one of the most heavily birded areas of the country. Usually you have to look specifically for migrating hawks to see them. On that incredible September 13, visitors to the summit asked what we were looking at. They did not see the hawks until we loaned them binoculars and told them to look straight up.

The flight of September 13, 1978, altered our perspective. Not only did we want to maintain regular coverage at Wachusett Mountain, we wanted to distribute coverage across the region to see where these hawks and others were passing and in what number. That people now knew they could see hawks locally enabled us to expand our coverage considerably.

The potential magnitude of the migration was revealed on September 13, 1983, when 19,912 Broad-winged Hawks were reported from Wachusett Mountain, with more than 16,000 in little more than thirty minutes. This became the largest hawk flight ever reported in New England (subsequently, larger flights were reported from southwestern Connecticut).

It was now clear that we were establishing a significant database on migrating hawks, data that could be combined with those from other regions to help monitor raptor populations at a critical time period, when species such as Osprey, Bald Eagle, and Peregrine Falcon were beginning to come back from

the brink of extinction.

It was also evidence that when people saw hawks well or in major concentrations, they often encouraged others to look for, learn more about, and eventually help protect raptors.

For more than fifteen years, the possibility of seeing large Broad-winged Hawk flights has attracted large numbers of observers to Wachusett Mountain in mid-September. However, observers can see impressive numbers of Broadwings and other hawks in September at many other sites. Equally important is the possibility of seeing numbers of other migrant hawks in eastern Massachusetts during October and November. The satisfaction can be just as great then, although the totals are much smaller than in September.

This article briefly describes the nature and use of the data gathered by EMHW and other hawk watches and, by documenting peak fall flights, provides guidelines as to when and where you may see significant concentrations of migrating hawks. This information will, we hope, encourage you to go out hawkwatching for the sheer pleasure of it and to report on what you have seen.

Interpreting EMHW Data

EMHW data come from two types of sites. Three sites maintain relatively "continuous" coverage during the migration from year to year: Wachusett Mountain (Table 1), Mount Watatic (Table 2), and Lancaster (a banding station). All are covered during most of September when the weather seems favorable for migration, and on weekends in October and early November.

"Distributed sites" are covered one or more days a season, but not on any continuous basis. Bolton Flats in Bolton and the Page School in West Newbury are two leading distributed sites from which multiple reports have been received each fall, but some EMHW reports come from backyards in towns such as Acton and Sterling.

The continuous-coverage sites help provide a baseline by which to monitor the migration over a period of years. The distributed sites are covered primarily in September, when the largest numbers of hawks move through on a relatively broad front, and help plot the paths and relative magnitude of that migration.

The annual totals for all EMHW sites (Table 3) indicate what has been seen in our area. They do not represent a "census" of all hawks that pass through the region. The data from eastern Massachusetts should be interpreted with caution because they are limited in scope, geographically and temporally. Counts are biased toward the Broad-winged Hawk because an overwhelming majority of the coverage is conducted during the Broadwing migration period. However, a significant percentage of Ospreys, Bald Eagles, Sharp-shinned Hawks, and American Kestrels also migrate at that time, so our data are more indicative for those species than for species such as the Red-tailed and Red-shouldered hawk where peak migration is in October and November.

There is also variability in the coverage at our "continuous coverage" sites from year to year, due in part to the weather but also to the availability of volunteer observers. To help correct for the variability in coverage from year to year, the raw data shown in Tables 1-3 can be evaluated in terms of "hawks per hundred hours" of coverage (HPHH). Simply divide the total number reported of a species by the hours of coverage and multiply by 100. For example, the actual count of kestrels at Wachusett in 1994 (46) was the second lowest ever. However, when you compensate for the coverage that was also the second lowest in nineteen years (49 hours) by analyzing the data in terms of HPHH, we see that kestrels were seen at a rate of 94 HPHH, the second highest HPHH count of kestrels in Wachusett's history. Data for all EMHW sites and analyses of those data are published seasonally.

The EMHW data are then rolled in with data gathered from other sites in New England, eastern New York, and northern New Jersey by the NorthEast Hawk Watch (NEHW, founded in 1971 as the New England Hawk Watch). NEHW now has twenty-four years of data for the region, which makes it one of the most extensive and valuable regional raptor databases in the world.

At least thirteen hawk watch sites in the NEHW average over 250 hours of coverage a year, providing good coverage throughout the migration season from late August well into November. When data from these sites are compared with the data from all NEHW distributed sites covered only eight or more hours a season, on the basis of hawks per hundred hours of coverage, there are minimal differences in data trends, with the exception of the Broad-winged Hawk and, to a lesser extent, Cooper's Hawk and Northern Goshawk (NEHW 1995). NEHW data and analyses for spring and fall migrations are published every spring.

The NEHW data are then combined and evaluated with data gathered from across the continent from Canada to Mexico by the Hawk Migration Association of North America (HMANA). HMANA was established in 1974 to coordinate hawk-counting procedures and to centralize and share the data being gathered then by literally dozens of small, independent hawk watches springing up across the continent. Those watches now report in standardized fashion to HMANA, which publishes regional and continental summaries of the fall and spring migration each year. HMANA now has twenty years of data and has helped stimulate hawk migration research across the U.S.

The proliferation of personal computers during the last decade has facilitated the development of local and regional databases that are now analyzed with surprising sophistication by amateurs (professional raptor biologists will tell you that not enough money is available from government or business to pursue migration studies professionally on an ongoing basis).

Massachusetts' own Seth Kellogg, using EMHW, NEHW, and HMANA data from the eastern U.S. has been one of the pioneers in hawk migration data analysis. Recently, the U.S. National Biological Survey began to enter HMANA

TABLE 1. WACHUSETT MOUNTAIN FALL TOTALS (Averages are for 1977-1994 only.)

Year	Days	Hrs	TV	OS	BE	NH	SS	CH	NG	RS	BW	SW	RT	RL	GE	AK	M	P	U	TOTAL
1976	3	16	0	5	0	0	9	0	1	0	691	0	6	0	0	11	0	0	10	733
1977	19	83	3	47	1	13	379	9	1	6	2577	0	94	0	0	52	1	0	119	3302
1978	27	155	16	142	1	16	612	11	5	8	11856	0	122	0	0	88	5	0	264	13058
1979	22	125	32	163	3	34	788	8	2	13	6490	0	94	2	1	96	1	0	298	8025
1980	35	211	46	176	1	53	598	3	14	19	9282	0	77	1	0	111	1	1	393	10776
1981	27	147	29	115	1	31	586	7	6	5	2488	0	104	1	0	119	3	1	432	3928
1982	30	176	190	220	0	52	789	24	13	42	7172	0	165	0	0	152	1	2	354	9176
1983	47	278	112	340	5	124	867	4	12	19	26910	0	113	0	0	169	2	6	237	28920
1984	23	157	104	216	8	44	687	5	7	3	27090	0	37	0	2	114	4	2	162	28485
1985	29	194	19	312	6	65	1242	8	11	13	17193	0	77	0	2	181	9	1	293	19432
1986	34	183	144	335	9	53	752	6	3	10	11764	0	86	0	0	147	3	2	196	13510
1987	27	148	26	285	8	58	596	10	5	14	21704	0	101	0	1	109	0	2	160	23079
1988	25	132	61	363	14	40	561	18	4	8	19601	0	44	0	0	82	4	2	90	20891
1989	26	118	11	183	9	54	484	8	2	4	17863	0	11	0	0	172	4	4	56	18865
1990	26	146	39	195	8	21	418	54	6	29	6640	1	87	0	1	115	12	2	112	7740
1991	24	124	80	181	12	10	366	23	2	22	6481	0	25	1	1	91	2	2	45	7344
1992	21	102	50	157	16	19	316	9	6	11	10634	0	48	0	0	82	6	0	59	11413
1993	13	49	29	49	17	8	144	10	2	2	4127	0	20	0	0	46	1	1	27	4483
1994	23	113	95	108	20	22	152	16	7	13	9274	0	66	0	0	87	6	2	61	9929
Ave.	27	147	60	199	8	40	574	13	6	13	12175	0	76	0.3	0.3	113	4	2	186	13464
TOTAL	481	2653	1086	3591	139	717	10346	233	109	241	219837	1	1377	5	8	1936	65	30	3368	243082

TABLE 2. MOUNT WATATIC FALL TOTALS

Year	Days	Hours	TV	OS	BE	NH	SS	CH	NG	RS	BW	SW	RT	RL	GE	AK	M	P	U	TOTAL
1987	9	47	32	23	0	9	98	3	5	11	75	0	24	0	0	16	2	1	61	360
1988	21	151	36	79	2	51	355	4	3	2	861	0	89	0	0	163	2	2	57	1706
1989	28	182	70	172	8	47	554	10	3	7	9189	0	156	0	1	157	5	0	167	10546
1990	26	174	65	192	3	24	856	12	2	81	2122	0	162	1	0	193	6	1	140	3860
1991	22	158	42	151	2	18	714	15	3	61	5440	0	125	0	1	129	7	1	52	6761
1992	11	67	18	93	14	5	236	12	4	9	7678	0	34	0	1	84	3	2	13	8206
1993	14	105	104	106	7	25	340	7	5	39	2995	0	72	0	2	138	8	2	22	3872
1994	14	94	47	53	9	12	362	26	3	21	9997	0	76	0	1	98	6	2	7	10720
Ave.	18	122	51	108	6	23	439	11	4	28	4795	0	92	0.1	1	122	5	1	64	5754
TOTAL	145	977	414	869	45	191	3515	89	28	231	38357	0	738	1	6	978	39	11	519	46031

NOTES FOR TABLES 1 AND 2:

TV=Turkey Vulture; OS=Osprey; BE=Bald Eagle; NH=Northern Harrier; SS=Sharp-shinned Hawk; CH=Cooper's Hawk; NG=Northern Goshawk; RS=Red-shouldered Hawk; BW=Broad-winged Hawk; SW=Swainson's Hawk; RT=Red-tailed Hawk; RL=Rough-legged Hawk; GE=Golden Eagle; AK=American Kestrel; M=Merlin; P=Peregrine Falcon; U=Unknown.

Hours and averages rounded to nearest whole numbers.

TABLE 3. TOTAL FOR ALL EMHW SITES

Year	Sites	Hours	TV	OS	BE	NH	SS	CH	NG	RS	BW	SW	RT	RL	GE	AK	M	P	U	TOTAL
1976	26	128	0	44	1	25	131	0	2	2	1632	0	58	0	0	129	16	1	33	2074
1977	60	219	5	84	2	40	501	13	6	13	2944	1	199	0	0	117	10	9	170	4114
1978	109	467	26	250	2	57	1432	52	12	28	13411	0	336	0	0	268	30	7	433	16344
1979	72	373	53	264	4	55	1371	20	6	49	11218	1	216	3	4	234	8	1	601	14108
1980	61	327	63	229	2	75	789	9	18	21	9622	0	158	1	0	169	3	1	0	11160
1981	118	546	68	189	3	77	2325	29	13	6	5581	0	350	8	0	322	22	5	0	8998
1982	49	270	214	239	0	63	908	29	20	66	8430	0	204	0	0	231	2	3	0	10409
1983	107	595	129	475	5	41	1028	12	12	20	27329	0	198	0	0	323	12	8	0	29592
1984	71	493	127	353	8	57	937	14	9	5	29979	0	100	0	2	270	13	3	0	31877
1985	105	547	61	474	8	105	1876	18	13	15	20555	0	190	0	2	381	21	10	0	23729
1986	102	498	183	584	15	99	1248	19	5	15	24305	0	206	0	3	449	19	5	352	27507
1987	75	523	149	515	14	109	1136	23	18	28	28444	0	280	0	1	525	13	11	310	31576
1988	114	566	180	794	26	130	1463	40	11	17	33407	0	203	0	1	662	25	9	310	37278
1989	92	494	181	622	19	135	1557	28	7	20	31305	0	224	0	1	621	27	5	286	35038
1990	147	653	147	667	21	83	1920	85	11	112	28230	1	372	1	1	788	31	21	330	32821
1991	114	617	188	526	20	62	1511	64	8	94	14062	0	223	1	2	573	24	16	153	17527
1992	102	484	154	409	37	48	935	29	16	72	19417	0	304	1	1	394	29	5	111	21962
1993	107	472	216	411	32	80	1151	40	14	50	11868	0	248	0	2	707	37	16	135	15007
1994	91	365	186	262	44	98	923	66	13	37	21938	0	239	2	1	450	20	11	125	24418
Ave.	94	473	129	408	15	79	1278	38	12	37	19002	0.2	236	1	1	416	19	8	184	21859
TOTAL	1722	8636	2330	7391	263	1439	23142	590	214	670	343677	3	4308	17	21	7613	362	147	3349	395539

TV=Turkey Vulture; OS=Osprey; BE=Bald Eagle; NH=Northern Harrier; SS=Sharp-shinned Hawk; CH=Cooper's Hawk; NG= Northern Goshawk; RS= Red-shouldered Hawk; BW=Broad-winged Hawk; SW=Swainson's Hawk; RT=Red-tailed Hawk; RL=Rough-legged Hawk; GE=Golden Eagle; AK=American Kestrel; M=Merlin; P=Peregrine Falcon; U=Unknown. Hours and averages rounded to nearest whole numbers.

data from major sites across the country to enable researchers to take full advantage of the biggest and best hawk migration database in the world. (Everyone interested in hawks or the environment should urge Congress and the President to continue the National Biological Survey.)

Eastern Massachusetts birders can be proud of the significant contribution they have made to these databases, as well as to our understanding of the avifauna of Massachusetts. But the challenge is not over. Hawk watch coverage needs to be maintained, preferably expanded, in the years ahead. Our environment and hawk populations are not static entities. We see some worrisome trends for several species, and with the current political environment, we can expect increased threats to our physical environment, and to that of the hawks. The need for hawk migration counts is as great as ever. EMHW therefore needs more volunteers to maintain and extend its coverage, including exploring many potentially excellent sites that have rarely or never been covered. There is still abundant opportunity for anyone to discover something new about raptors in Massachusetts and to contribute to their conservation.

Peak Fall Flights

This section reports on the peak daily counts by species. The numbers reported below represent the peak official EMHW counts. Data that were entered into the hawk migration database. Official counts are submitted on standardized report forms, which request basic weather information and species counts on an hourly basis. These reports are entered into a local database and then copied and forwarded to the NEHW and HMANA for entry into their databases and for analysis.

In many instances, the EMHW records represent peak counts for eastern Massachusetts, and even the entire state, but in some instances they are not. Consult Veit and Petersen (1993) for the maxima field birding counts for all species. A number of our largest flights are from sites that are not covered frequently, including Bolton Flats, Bolton; Marconi Station, Wellfleet; Gooseberry Neck, Westport; the Middle School, Littleton; the Page School, West Newbury; Worcester Airport; Little Wachusett, Princeton; Silver Hill, Haverhill; and others. The population trends briefly described in the following species accounts are based on the much larger NEHW database (NEHW 1995), using numbers of hawks per hundred hours of coverage, not on the EMHW raw data presented in Tables 1-3.

Total Hawks. The largest single-day hawk flights ever reported in eastern Massachusetts have all occurred during the peak of the Broad-winged Hawk migration. Because the Broadwing is a complete migrant, totally evacuating its breeding range each year, it moves through relatively early, often in imposing concentrations. Although the overwhelming majority of the "total hawks" are Broadwings, when migratory conditions are right and excellent thermals exist,

the volume of Broadwings in the thermals attracts other, less numerous migrating species of hawks, so that almost anything is possible in a good kettle of Broadwings.

The maximum counts (all from Wachusett Mountain) were as follows: 20,106 (9/13/83); 17,517 (9/17/84); 16,062 (9/13/89); 10,226 (9/17/87); 10,213 (9/13/78); 9792 (9/12/92); 9238 (9/15/94); 7619 (9/14/88); 5455 (9/16/87).

Turkey Vulture. When the EMHW began, few Turkey Vultures were ever seen in eastern Massachusetts, and then primarily in spring. Over the past two decades, however, the Turkey Vulture has considerably expanded its range northward, so that they are now seen year-round in Boston and are probably the second most frequently seen raptor in the state throughout the year. Most daily, and therefore seasonal, totals indicate the maximum number of individuals, not confirmed migrants, seen at one time on any given day. Good numbers can be seen in September and October.

The maximum counts (from Wachusett Mountain except where noted) were as follows: 33 (9/15/94); 25 (9/8/91); 24 (9/8/84, 9/27/86); 23 (9/15/83); 20 (9/5/93, Mount Watatic; 9/22/91, Wachusett Mountain Ledges); 19 (9/19/93, Mount Watatic); 18 (9/4/92; 9/16/89, Wachusett Mountain, Oxbow).

Osprey. Osprey, a predominantly eastern species, was seriously endangered in the mid-1900s. Its numbers bottomed out in the 1960s and early 1970s. During the late 1970s and early 1980s, we witnessed a major resurgence, including the expansion of the small breeding colony in southeastern Massachusetts, helped in part by the use of artificial nesting platforms. In the past several years, migrants have declined in numbers but are still close to average. Ospreys migrate from August through October, with the majority passing in the last three weeks of September.

The maximum counts (from Wachusett Mountain except where noted) were as follows: 93 (9/14/88); 70 (9/13/83); 57 (9/12/83); 55 (9/17/85); 53 (9/22/85); 47 (9/16/88); 46 (9/13/78, 9/14/83; 9/16/89, Bolton Flats); 45 (9/16/90, Bolton Flats).

Bald Eagle. Bald Eagles were the most popular of the severely endangered species in the 1960s and 1970s. During the 1980s they made a significant comeback due to the ban of DDT and ambitious restoration programs in many states, including Massachusetts and New York. Overall counts have increased in the past decade, with the biggest numbers moving in the second and third weeks of September. There is a second peak in November, and the migration can continue into January. Increased counts are also due in part to more knowledgeable and experienced observers being able to identify eagles at some distance from the site. Less than ten years ago, few people knew how to identify eagles in immature plumage.

The maximum counts (from Wachusett Mountain except where noted) were as follows: 12 (9/12/92); 6 (9/18/94); 4 (9/13/94, Wachusett Mountain, Oxbow);

3 (9/2/94, 9/4/94, 9/10/94).

Northern Harrier. Northern Harrier counts were low in the late 1970s, increased during the 1980s, and decreased in the early 1990s. EMHW and New England counts have returned to average in the past two years, but concern remains that the harrier is continuing to lose its limited breeding habitat. This species deserves special watching. We in Massachusetts are unusually fortunate to see this bird with some regularity in our coastal marshes during much of the year. The report of fifty harriers at Wachusett on September 13, 1983, is perhaps the most incredible of all the single-day reports provided here. Harrier migration spans the entire fall, with immatures moving early and adults, especially adult males, tending to move late in the season, which is why few adult males are seen migrating.

The maximum counts (from Wachusett Mountain except where noted) were as follows: 50 (9/13/83); 13 (9/1/85); 12 (9/16/89, Bolton Flats; 9/17/86); 10 (9/13/89, Mount Watatic; 9/18/94, Bolton Flats); 9 (10/23/83).

Sharp-shinned Hawk. Historically, the Sharp-shinned Hawk has been our second most commonly seen migrant. At Wachusett, raw numbers peaked in the early 1980s and have been dropping continuously since then. These lower numbers are due, to some extent, to a decline in late September-through-November coverage of the mountain. Sharpshin counts have been below average in the northeast since 1987, with particularly low counts in three of the past four years. Speculation on the cause runs the gamut, from the decline of neotropical migrants (meaning there is less food to sustain Sharpshins) to "short-stopping" of traditional migrants that now stay farther north to feed off passerines using bird feeders. This decline may also be part of a standard population cycle for the Sharpshin because counts of the small accipiter dropped significantly in the 1960s and surged dramatically in the 1970s. Virtually no governmental research is being conducted on the status of the Sharp-shinned Hawk. Almost everything we know has been gathered by "amateur" hawkwatchers and banders. Locally, peak numbers have been reported in the last half of September, primarily immatures, but good flights continue into mid-October, the month when most adults are on the move.

The maximum counts (from Wachusett Mountain except where noted) were as follows: 1009 (9/20/81, Marconi Station, Wellfleet); 198 (9/25/82); 167 (9/22/85); 162 (9/23/79); 160 (9/17/78); 159 (9/16/80); 158 (9/17/81); 157 (10/8/90, Mount Watatic); 156 (9/25/88); 151 (9/25/85); 133 (9/21/84; 10/14/90, Mount Watatic).

Cooper's Hawk. Cooper's Hawk declined during the 1950s, 1960s, and early 1970s, but experienced a resurgence as a breeding and migrating species in the state and throughout the northeast during the past decade. Large concentrations are not yet seen at any one time at any site in eastern Massachusetts. The migration is primarily from mid-September to late October,

with the immatures moving early in that period. Some of the early September sightings no doubt represent local birds, including immatures, hanging around watch sites.

The maximum counts (from Wachusett Mountain except where noted) were as follows: 8 (9/18/94; 10/15/94, Mount Watatic); 6 (9/19/93); 5 (9/15/94, Mount Watatic; 9/17/82); 4 (9/4-9/25, many sites).

Northern Goshawk. Northern Goshawk is a fairly widespread, although never common, breeder in the state. Migration reports vary considerably from year to year, with a majority of sightings probably representing local birds, including immatures, hanging around sites. October and November birds are much more likely to be adult migrants.

The maximum counts (from Wachusett Mountain except where noted) were as follows: 5 (9/15/94, 9/17/82; 9/26/82, Little Wachusett); 3 (10/14/85; 10/27/79 and 10/29/79, Mount Watatic).

Red-shouldered Hawk. Red-shouldered Hawks, like the Cooper's Hawk, had seriously declined in numbers in the state for several decades. There was a very modest resurgence of the breeding population and migrants in the late 1970s and early 1980s. The following hawk counts are probably not very representative of the magnitude of the flight because very few observers hawk watch during the peak Redshouldered migration period from mid-October to mid-November.

The maximum counts (from Mount Watatic except where noted) were as follows: 32 (10/27/79); 29 (10/20/90); 26 (10/27/90); 23 (10/18/92, Page School, West Newbury); 22 (10/24/82); 19 (10/23/82, Wachusett Mountain); 17 (10/17/92); 16 (10/14/91); 15 (10/20/91 and 11/2/80, Wachusett Mountain); 14 (10/21/90).

Broad-winged Hawk. Broad-winged Hawks are clearly the stars of the migration season, with at times several hundred hawkwatchers appearing at Wachusett Mountain in hopes of seeing one of those monster flights. Research by the NEHW suggests that Broadwings may migrate on a fairly broad front, perhaps fifty miles wide at times, with denser currents in the stream, so good numbers can be seen virtually anywhere north or west of southeastern Massachusetts. The single most spectacular Broadwing flight in Massachusetts occurred on September 13, 1983, when more than 16,000 hawks were tallied in little more than thirty minutes! At the time, this was again the largest hawk flight every reported in New England. Subsequently, much larger single-day flights have been reported at several sites in southwestern Connecticut and eastern New York. An overwhelming majority of all the migrant Broad-winged Hawks seen in any one season may pass through southern New England in a single day or, as on September 13, 1983, pass a single site within an hour.

Originally, many observers questioned the accuracy of the large counts. Having been there for all the major Broadwing flights at Wachusett, I am

confident that the numbers reported below are conservative and reliable. Recent research in California and on a much larger scale in Veracruz, Mexico, suggests that even highly experienced observers significantly undercount huge kettles of hawks. The preponderance of migrant Broadwings passes through New England between September 12 and 19. Broad-winged Hawk counts vary considerably from year to year. Below average counts were reported throughout the NEHW region during the early 1990s, but a record Broad-winged Hawk flight was seen in the western half of the region in 1993, followed by an average flight in 1994.

Although the largest single counts of Broad-winged Hawks have been seen at Wachusett Mountain (Table 1), very large flights, and often the largest Broadwing flights of the year have been reported from many other sites throughout eastern Massachusetts.

Broadwing High Counts from Other Eastern Massachusetts Sites

Count	Date	Place
4527	9/15/88	Page School, West Newbury
4524	9/17/87	Lancaster
3990	9/13/92	Mount Watatic
3828	9/15/89	Mount Watatic
3776	9/13/89	Mount Watatic
3242	9/12/92	Mount Watatic
2440	9/14/86	Page School, West Newbury
2195	9/19/93	Mount Watatic
2070	9/14/86	Bolton Flats
1993	9/14/88	Worcester Airport
1725	9/15/85	Bolton Flats
1708	9/12/88	Worcester Airport
1633	9/15/87	Bolton Flats
1512	9/19/93	Fales School, Westboro
1479	9/13/86	Middle School, Littleton
1159	9/16/84	Page School, West Newbury

Swainson's Hawk. Only three Swainson's Hawks have been reported from official hawk watches, although several others have been reported in late fall. A complete migrant, like the Broad-winged Hawk, most of these western hawks leave the country in September and early October, with an occasional straggler discovered in New England into November. Single Swainson's Hawks were reported on 9/15/79 (Framingham), 9/27/90 (Wachusett Mountain), and 10/5/77

(Braintree).

Red-tailed Hawk. Red-tailed Hawks are the most commonly seen hawk in the state. Juveniles are on the move already in August, and temporary residents may be found anywhere over the next several months. The most significant migration is from mid-October to mid-November, when relatively substantial numbers of undeniable migrants may be seen. Few hawkwatching sights are more spectacular than numbers of Redtails, often accompanied by Redshoulders, seen well in the superb light of late fall. Totals reported have been erratic, due in part to some observers counting only visibly migrating hawks, while others report a maximum number of individuals seen, including locals.

Maximum counts (from Mount Watatic except where noted) were as follows: 58 (10/23/82, Wachusett Mountain); 57 (11/1/92, Wachusett Mountain, Oxbow); 39 (10/27/90); 36 (10/21/90); 33 (10/20/90, 11/5/89); 32 (10/23/93); 28 (10/10/94; 11/11/94, Wachusett Mountain, Oxbow); 27 (10/12/87, Wachusett Mountain).

Rough-legged Hawk. With relatively few hawk watches conducted in October and November, few Rough-legged Hawks are reported each year. No EMHW site has ever reported more than one. November is the peak migration period. Increased coverage might yield slightly larger counts.

Golden Eagle. With few hawk watches conducted in October and November, their peak migration time, few Golden Eagles are reported in any year. Thus, the dates given below are somewhat misleading. Golden Eagles can be seen anytime, but are most likely to be seen migrating inland in late fall. Increased coverage would probably produce only one or two more per year. The small eastern population of Golden Eagles migrates primarily along the Appalachian ridge. Three birds were seen on 9/16/79 in Littleton, and two on 9/12/85 (Wachusett Mountain) and 10/11/93 (Mount Watatic).

American Kestrel. Kestrels migrate primarily in late August and September, when there is generally broad-based coverage, but the flight continues well into October. Wachusett's raw counts have been dropping for the past five years, but when adjusted for coverage, they have been average, as counts have been throughout the northeast region. Many of the largest kestrel flights are reported from sites that are not covered frequently (the same applies to counts of all falcons).

Maximum counts (from Wachusett Mountain except where noted) were as follows: 71 (9/18/94, Bolton Flats); 53 (9/17/81); 46 (9/24/87, Lancaster); 43 (9/23/79); 38 (9/16/90, Page School, West Newbury; 10/8/90, Mount Watatic); 37 (9/16/89, Mount Watatic); 32 (9/17/78, Silver Hill, Haverhill; 9/22/88, Page School, West Newbury); 29 (9/12/89, 9/12/84, 9/30/84).

Merlin. Merlins have been seen in above average numbers at EMHW watches since 1988, although large numbers have not been reported at any

single site. Peak migration time is late September and October. The largest Merlin flight ever reported in Massachusetts was fifty seen on October 3, 1990, at Gay Head on Martha's Vineyard (not an EMHW report). Anecdotal reports suggest that more Merlins have been seen migrating inland during the fall than were reported there in the 1970s and early 1980s. Part of this may be due to more experienced birders correctly identifying this small, dark, and very fast-moving falcon.

Six birds were seen on 9/25/85 (Marconi Station, Wellfleet), five on 9/23/78 (Nantucket), and four on 9/8/90 (Wachusett Mountain), 9/22/88 (Wachusett Mountain, Oxbow), and 9/23/78 and 9/28/91 (Mount Watatic).

Peregrine Falcon. The largest concentration of migrating Peregrines ever reported in the state was thirty-two, seen on October 3, 1990, at Gay Head, Martha's Vineyard (not an EMHW report). Regrettably, no one has regularly covered or reported from this site. Certainly Cape Cod, including Monomoy, is fertile ground during the peak Peregrine migration period from late September to mid-October.

Maximum counts were as follows: 7 (10/9/93, Fort Hill, Eastham); 5 (10/2/90, Gooseberry Neck, Westport); 3 (10/1/88, Cisco Beach, Nantucket); 2 (10/6/87, Lancaster); 2 (10/5/86, Wachusett Mountain).

Final Notes

Generally, the biggest hawk flights in the fall are reported on the first or second day of a cold front, when winds are somewhere out of the north, from northeast to northwest. However, many hawks, especially Broad-winged Hawks, will continue to move as long so they are not flying into rain or strong headwinds. Some excellent flights have been seen on weak southeast winds. Peregrine Falcons and Merlins often migrate over water along the coast and may be found in good numbers on at east wind.

If you would like more information on hawk migration or hawkwatching, please write EMHW at 254 Arlington Street, Medford, MA 02155 or call 617-483-4263 evenings or weekends.

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Migration Association and recently received that organization's highest honor, the Maurice Broun award, for outstanding service to further hawk migration study and conservation, as well as the Massachusetts Audubon Society's "A Award" for his work on hawk migration research and education. Paul notes that this article would not have been possible without the efforts of literally hundreds of people who have contributed their time and data to the EMHW over nineteen years. Thanks go to all these individuals, and special thanks go to those who have invested literally hundreds of hours over the years, including the following: Bart Kamp, Tom Lipsky, Katie Durham, Donna Schilling, Tom and Linda McCullough, Mike Olmstead, Lloyd Bushey, Eliot Taylor, and Nancy and Alden Clayton. Paul dedicates this article to Richard Butler, who was a key supporter of the EMHW in its formative years and a valued birding companion.