

BRADDOCK BAY SPRING HAWK MIGRATIONS

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INTRODUCTION

The Braddock Bay Hawk Lookout is part of a nationwide network of lookouts monitoring the spring migration of hawks as they move north to their nesting grounds. It is one of several spring lookouts on the Great Lakes, some of the others being Whitefish Point on Lake Superior; Grimsby, Ontario, at the western end of Lake Ontario; and Derby Hill, New York, at the eastern end of Lake Ontario (Figure 1). Since the formation of the Hawk Migration Association of North America in 1974, numerous spring lookouts have been manned across the continent, from Alaska and Washington, south to the Rio Grande, and east to the New Jersey coast. The purpose of this paper is to give a brief history of Braddock Bay, to show the effect of the topography and weather on the migration, to describe the methods used in counting, and to discuss the species and numbers recorded at the site for the eight year period from 1977-1984, with some references to 1949-1950.

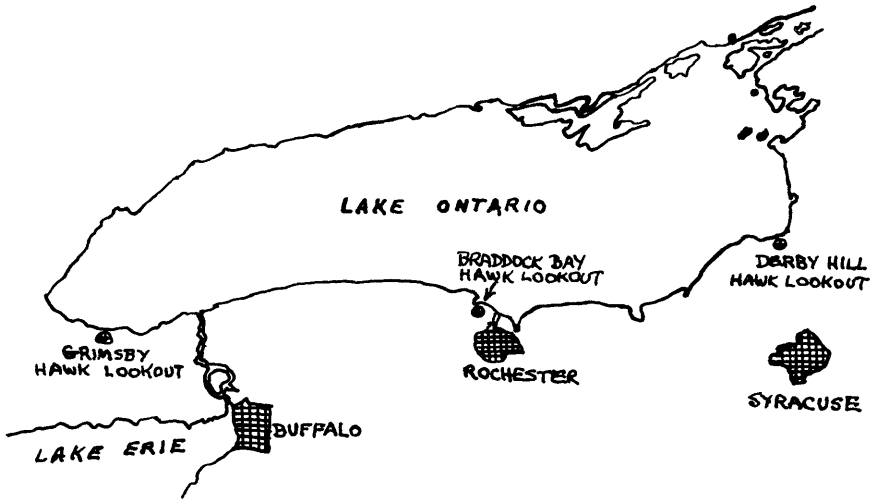


Figure 1. SPRING HAWK LOOKOUTS ON LAKE ONTARIO

HISTORY

Spring hawk migrations of large proportions along the south shore of Lake Ontario have been known for more than 80 years. Early in this century, Dr. Elon Howard Eaton, author of *Birds of New York*, 1910-1914, wrote in *The Auk* (1904), "We wish to present some of the conclusions which have been reached as the result of observations made near Rochester during the spring of 1903. First, regarding the yearly migration of hawks, it has been confirmed that an incredible number of these birds pass each spring along the southern shore of Lake Ontario and move toward the east over the country south of the lake, evidently making their way around its eastern end toward the north. The height of the migration occurs during the latter part of April and the first week in May." Dr. Eaton goes on to describe the various species and then says, "Many [buteos] are often seen together or in the same field of view and, as far as I have noticed on these occasions, they are absolutely silent, and when one party has passed off the scene another appears going in the same direction. Thus there is a constant whirling stream passing over, sometimes during the greater part of the day . . . One morning at least one hundred of these birds [Sharp-shinned Hawks] passed over a single observer within two hours, and on another occasion we saw twenty-five of this species lying in one pile back of the little hotel on Buck Pond, where the proprietor had been trying his marksmanship after breakfast."

Unfortunately, many of the first observations of hawks in our area were made in this same manner, over the barrel of a gun. As far as we know, none of the shooting at Braddock Bay has been reported in the literature, but over the years several of the old time hunters have come to the Braddock Bay Hawk Lookout and have told us that they did shoot a lot of hawks. The attitude toward hawk shooting has changed, but none of these people wants to be identified or wants to tell exactly what took place. The last known shooting incident in the Braddock Bay area was of a Red-shouldered Hawk shot in 1950 on the West Spit, reported by Richard O'Hara (1950).

We have searched the literature during Eaton's time but can find no records of hawk flight data, no lists, and no attempt to assess the total migration as we do today. Eaton, in his *Birds of New York*, does mention flights along the south shore of Lake Ontario, all going east, of Sharp-shinned Hawks, Cooper's Hawks, Northern Goshawks, Red-tailed Hawks, Red-shouldered Hawks, Broad-winged Hawks, Peregrine Falcons, Merlins, and American Kestrels. Eaton writes about "hundreds" and "large flights," but gives very little in actual numbers. As we will show in this paper, the above nine hawks, plus six other species,

migrate regularly every spring at Braddock Bay, some in huge numbers.

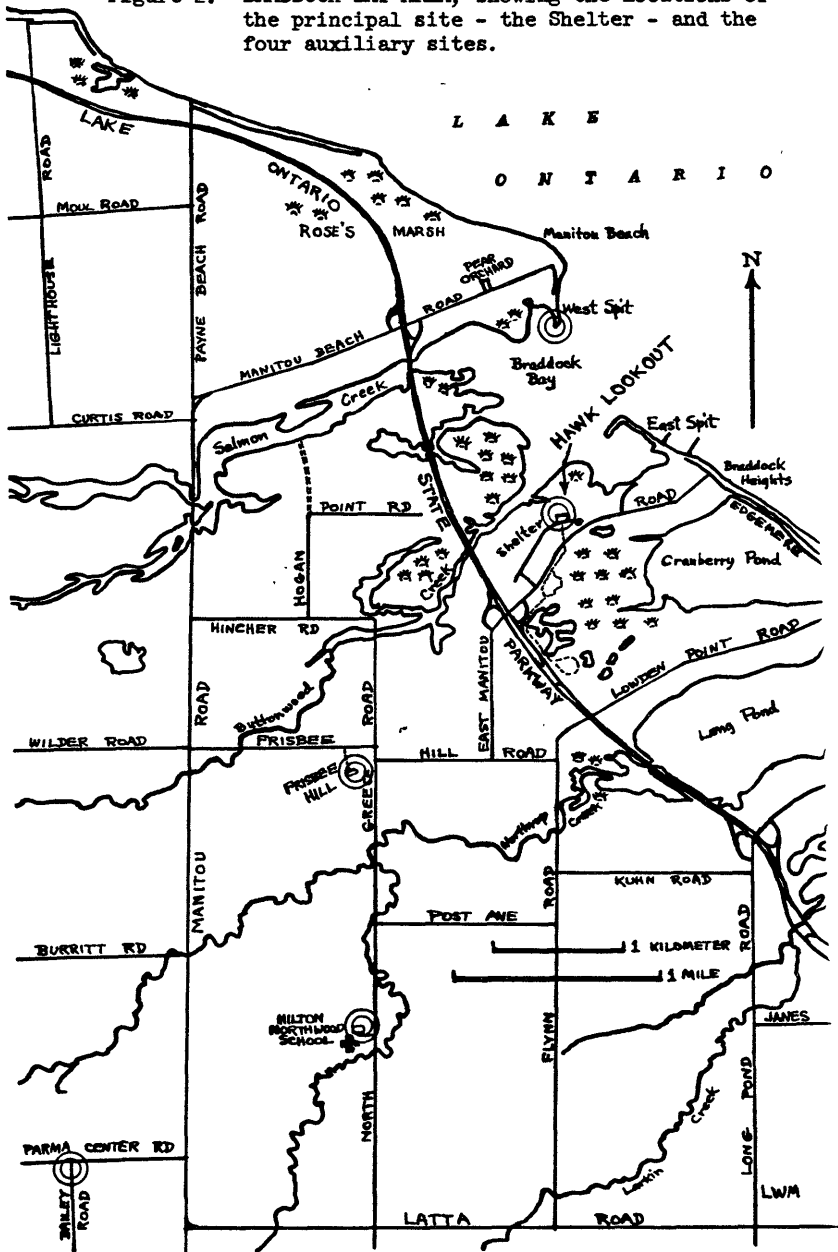
The Genesee Ornithological Society, a section of the Rochester Academy of Science, was established in 1938 and the large flights of hawks along the shore were well known to members of the organization at that time. The Genesee Ornithological Society published its first issue of *The Goshawk* in November 1947; and the following spring it began to publish hawk migration data. The next year, Walter Listman, Donald Wolf, and Donald Bieber set up a serious hawk watch at Braddock Bay. They had discovered "that a point on the East Manitou Road, about three-eighths of a mile south of Lake Ontario, was ideal. It was chosen because it was in the direct line of flight and afforded an excellent view in almost all directions." They covered the lookout on 50 of the most promising days that spring and recorded 21,621 raptors of 14 species, with only the Northern Goshawk missing. The following year they did a similar study, covering 55 days and recording 21,488 individuals of 15 species. Their data, with weather conditions, number of observers, and hours of observation, were published in *The Goshawk*. The 1949 records were published that year, but the 1950 records were not published until 1984.

Since that time, however, there were only reports of peak days or sporadic observations until Laura Moon sensed the need for something better, and in 1977 set up a hawk watch at Braddock Bay. She personally manned the watch that spring and went out every day that looked favorable for a hawk migration. This resulted in 49 days of observation and 22,566 raptors recorded. In 1978 she decided that the study should be conducted on a daily basis and was at the lookout every day from 27 Feb. to 30 June, a total of 120 consecutive days. The daily coverage has been continued since then. The authors have been the principal observers, assisted by others, whose help was indispensable, especially in manning the auxiliary lookouts on days when that was necessary.

DESCRIPTION OF THE AREA

Braddock Bay Hawk Lookout is located on the lake plain along the south shore of Lake Ontario, in Monroe County, midway between the east and west ends of the lake. It is in Braddock Bay Park, about 10 miles northwest of the center of Rochester, New York, and is part of the Braddock Bay Fish and Wildlife Management Area consisting of 2325 acres which straddle Lake Ontario State Parkway and extend from Rose's Marsh on the northwest to Island Cottage Road on the southeast. Formerly a state park, the land was leased in 1981 by the State of New York to the Town of Greece for 99 years; the wetlands are under the supervision of the New York State Department of Environmental Conservation (hereafter DEC) and the uplands are under the supervision

Figure 2. BRADDOCK BAY AREA, showing the locations of the principal site - the Shelter - and the four auxiliary sites.



of the Town of Greece. The land slopes gently up from the lake and there are few hills or ridges to obstruct the view. The countryside is partly farm land under cultivation and partly abandoned fields in various stages of vegetative succession, interspersed with woodlands and large marshes which provide some of the best waterfowl nest sites in the state.

The hawk lookout is in the area of the Braddock Bay Park picnic shelter on the south side of the bay, on an access road off the East Manitou Road (Figure 2). The latter road is an exit on the Lake Ontario State Parkway 6.2 miles west of Lake Avenue in Rochester. In 1984, a hawk observation platform was constructed by the Town of Greece. It was funded jointly by the Town of Greece and the DEC with "Return a Gift to Wildlife" money. Under severe weather conditions, observations are moved to the perimeter of the Shelter, a covered picnic area, with wide overhanging eaves which provide protection from high winds, blowing snow, extreme cold, and rain or drizzle.

The Great Lakes with their extremely cold water during the spring, not conducive to producing thermals, act as a barrier to northward migrating hawks. When hawks reach Lake Erie, most turn northeast along the shoreline, but a few go around the western end of Lake Erie. When the stream of hawks moving northeast reaches Lake Ontario, some go west, but larger numbers turn east along the south shore and thus come to Braddock Bay (Figure 1). Here the shoreline changes from a generally east-west direction to almost due southeast for twelve miles to Irondequoit Bay, before resuming its east-west direction. Hawks coming along the shoreline from the west see open water ahead and turn southeast, converging in a more narrow band at the hawk lookout. It is due to this topographical feature that there is such a large concentration of hawks at Braddock Bay during their migration in spring.

Many migrating accipiters and falcons, plus some other hawks, cannot be seen from the principal lookout at the Shelter, because they fly low along the shore of Lake Ontario or out over the lake for some distance, more or less parallel with the shore. The best place to see these and count them is the West Spit of Braddock Bay (1.1 mile directly north and across the bay from the principal lookout) (Figure 2). This is one of four auxiliary lookouts. If this lookout was not manned on a part-time basis, as well as the others described below, the count would include only part of the migration along the south shore of the lake. For example, on 14 Apr. 1983, 1057 American Kestrels were counted from the West Spit and only 109 at the Shelter. If an observer had not been at the West Spit, only 109 American Kestrels would have been counted, and the biggest one day flight (1166) of American Kestrels ever recorded in the area would have been missed.

Under certain weather conditions, large numbers of buteos are found migrating inland on a path more or less parallel with the Lake Ontario shoreline which, as was described earlier, turns southeast at Braddock Bay. This inland migration is usually caused by the "lake effect." When the land becomes warm during the day, the heated air rises. If the southwest wind is not strong enough, at least 10 mph, a cold breeze may suddenly come off Lake Ontario from the northeast, underneath the warm rising air. The temperature may drop 10° in a few minutes, and the kettles of hawks will no longer be seen at the principal lookout. The hawk flight sometimes stops entirely, but often the hawks turn southeast before they get to the bay and fly at various distances inland and parallel to the lake shore, depending on how far inland the cold breeze extends. By moving inland, one can frequently locate the stream of migrating hawks. This "lake effect" was well known to hawk watchers at Braddock Bay as early as the 1940's and it was known to the hunters before that.

Observations at Frisbee Hill (1.5 miles southwest of the Shelter) show that the path of migration near the shoreline sometimes spreads over a wide band, or shifts to a relatively narrow band inland. The other two observation sites, much less frequently used, are the Hilton-Northwood School (2.7 miles southwest of the Shelter) and Bailey Road (3.8 miles southwest of the Shelter). These four auxiliary observation sites were selected after much trial and error and provide a series of points across the line of migration. We have searched farther inland, and although migrating hawks and even kettles have been seen as much as 15 miles inland, there seems to be no consistent inland line of flight.

To better illustrate the use of auxiliary sites, Table 1 gives the number of raptors seen at each site during 1982, which could be called a typical year. The figures in parentheses are the hours of observation at each particular site and in many cases are overlapping.

We sometimes monitor these stations simultaneously and sometimes they are done sequentially. It all depends on where the raptors are to be found. When we conduct simultaneous observations, walkie-talkies are used whenever possible, and we have strict rules about what is counted in order to prevent duplication. For example, we always compare notes and times at the end of the day, before we go home, and make a decision to eliminate any possible duplication. We are sure we drop some perfectly good records at times. Separate daily forms are kept for each location. (Moon and Moon 1985).

Table 1. SPRING HAWK COUNT 1982, showing the counts at the principal site – the Shelter – and the four auxiliary sites. Figures in parentheses are hours of observation.

WINTER, 1985	Shelter	West Spit	Frisbee Hill	School	Bailey Road	Shelter	West Spit	Frisbee Hill	School	Bailey Road
						Apr.				
Feb.										
26	4 (4.0)					1	28 (4.3)	7 (0.8)		
27	5 (6.0)					2	27 (6.5)			
28	0 (5.0)					3	32 (5.5)	84 (2.5)		
Mar.						4	13 (4.8)			
1	18 (7.3)					5	3 (4.0)			
2	0 (4.0)					6	5 (1.0)			
3	4 (5.0)					7	0 (3.5)			
4	0 (1.3)					8	5 (4.0)			
5	14 (6.3)					9	43 (6.0)			
6	4 (5.5)					10	131 (7.5)	21 (2.5)		
7	0 (4.0)					11	78 (5.5)	10 (2.0)		
8	1 (5.0)					12	55 (5.0)			
9	6 (4.8)					13	86 (5.5)	147 (2.5)		
10	0 (3.5)					14	95 (5.5)			
11	4 (8.2)	7 (2.0)				15	55 (5.5)			
12	4 (6.0)					16	3169 (9.5)	847 (7.5)		
13	544 (11.0)	112 (6.5)				17	3432 (8.5)	1404 (4.5)	543 (3.0)	
14	56 (8.0)					18	110 (8.5)			
15	6 (5.0)					19	66 (5.5)		15 (0.5)	18 (1.0)
16	6 (4.0)					20	13 (5.5)			
17	0 (2.5)					21	10 (4.0)			
18	93 (5.0)					22	12 (4.5)			
19	14 (4.5)					23	200 (7.0)	159 (3.0)		
20	22 (6.0)					24	2426 (11.0)			
21	125 (6.5)	29 (4.0)				25	1740 (9.0)		329 (1.8)	248 (2.0)
22	146 (6.5)					26	910 (5.5)			149 (1.3)
23	48 (5.0)			6 (1.0)		27	33 (6.0)			
24	482 (7.0)					28	3 (2.5)			
25	8 (4.0)					29	164 (7.0)	127 (3.0)		
26	0 (2.5)					30	199 (7.5)	142 (3.0)		
27	0 (5.5)									
28	38 (7.5)									
29	56 (7.3)	11 (2.0)								
30	20 (8.5)	10 (4.0)								
31	1277 (8.0)	293 (8.0)								

Table 1. SPRING HAWK COUNT 1982, showing the counts at the principal site – the Shelter – and the four auxiliary sites. Figures in parentheses are hours of observation.

	Shelter	WestSpit	Frisbee Hill	School	Bailey Road		Shelter	WestSpit	Frisbee Hill	School	Bailey Road
May						June					
1	270 (5.8)	86 (3.5)				1	737 (7.0)			25 (1.7)	
2	345 (7.0)	90 (2.7)				2	43 (2.3)			28 (2.7)	
3	535 (6.3)					3	1 (1.5)				
4	327 (7.0)					4	1 (3.0)				
5	264 (7.5)					5	0 (0.5)				
6	2623 (7.5)	274 (2.5)				6	0 (1.3)				
7	470 (4.0)	441 (3.5)		73 (1.2)	73 (0.5)	7	8 (4.0)		2 (1.3)		
8	0 (1.0)					8	4 (4.0)				
9	221 (7.5)	130 (5.0)				9	17 (3.5)		0 (0.8)		
10	74 (6.5)					10	390 (7.5)		24 (0.5)		
11	17 (3.0)					11	37 (7.0)				
12	48 (3.7)	141 (2.8)	235 (3.8)			12	24 (3.5)				
13	21 (3.3)		112 (2.5)			13	81 (4.3)				30 (1.3)
14	107 (3.3)			146 (4.5)		14	36 (4.0)				
15	21 (3.2)	6 (1.5)		85 (3.5)		15	0 (1.5)			3 (1.3)	
16	246 (2.7)	25 (1.5)	104 (1.8)			16	14 (2.5)				
17	13 (1.2)			16 (1.0)		17	24 (3.0)				
18	13 (2.5)	13 (0.5)				18	0 (2.5)			9 (1.5)	
19	1690 (10.0)	295 (7.5)	153 (1.0)			19	3 (3.8)				
20	314 (7.0)					20	22 (3.5)				
21	16 (4.0)					21	12 (3.8)				
22	0 (1.5)					22	0 (3.0)				
23	16 (7.0)					23	0 (3.0)				
24	1 (2.8)					24	2 (2.3)				
25	43 (4.5)		104 (2.8)			25	1 (3.0)				
26	96 (1.8)		142 (3.3)	57 (3.5)		26	0 (1.0)				
27	0 (2.3)	17 (2.7)				27	0 (2.0)			0 (1.3)	
28	36 (5.5)	4 (2.8)				28	0 (1.5)			2 (1.0)	
29	56 (2.3)	50 (1.3)	706 (4.0)	118 (1.8)		29	0 (1.5)				
30	431 (2.8)		12 (0.8)	21 (0.8)		30	0 (5.5)				
31	879 (5.0)	869 (5.5)									

WEATHER AND MIGRATION

Optimum conditions for a good hawk flight at Braddock Bay occur when there is a strong southwest wind, 10 miles per hour or more, accompanied by rising temperatures. These conditions occur when a low pressure system approaches from the west and passes north of Rochester. Hawks will be grounded if there is precipitation. Most will not fly in the rain, except for accipiters which often continue to fly in a light drizzle. Precipitation west of Rochester, even as far away as the Ohio Valley, can hold back the hawks and prevent a good flight at Braddock Bay, even though it is dry locally and wind and temperature conditions are right. Also, if the southwest winds occur on the back of a high pressure system located east of Rochester—and not as a result of a low pressure system north of Rochester—hawks will not pass in large numbers. On the other hand, good flights can occur at times when the wind is from directions other than southwest. A warm air mass moving north from the Gulf of Mexico, as shown on television weather maps, is a good indication in spring that hawks are moving north with it.

The traditional starting day for the hawk watch at Braddock Bay is the 27th of February, but if warm southwest winds occur earlier in the month, hawks will arrive sooner. In 1984, the flight started on 19 Feb. with eleven hawks of three species. By 26 Feb. there were 104 hawks of seven species, including an immature Bald Eagle. A blizzard completely wiped out the next three days.

The peak of migration usually takes place in the last ten days of April or the first week of May, when the massive flights of Broad-winged Hawks come through. Each species has its own pattern as is shown in Table 2, compiled from the past eight years of data.

The hawk watch is continued until 30 June, because hawks may still be migrating in good numbers. In that month, almost all birds are immatures. In June 1979, there were 3628 raptors of ten species, including four Bald Eagles. Bald Eagles and Ospreys have been seen in June in all of the eight years, and three Golden Eagles have been seen in June.

At Braddock Bay, there are not only spectacular numbers of hawks in spring, but thousands of other birds are concentrated along the lakeshore. On outstanding migration days, there are flocks of Scarlet Tanagers, Northern Orioles, Rose-breasted Grosbeaks, and thousands of Blue Jays, etc. Most of the birds migrate east, but some species, like Canada Goose, Tundra Swan, and others, go west.

Table 2. EIGHT YEAR HAWK SUMMARY

	Arrives Range	Peak Day Range	Departs Range	Maximum in One Single Day	Total
Turkey Vulture	9-29 Mar.	30 Mar- 7 May	17-30 June	31 Mar 1982	533
Osprey	1-13 Apr	26 Apr-12 May	7-29 June	30 Apr 1984	35
Bald Eagle	23 Feb-27 Apr	31 Mar-25 May	21 May-21 June	4 Apr 1983	5
Northern Harrier	16 Feb-7 Mar	29 Mar-21 Apr	12-30 June	14 Apr 1984	152
Sharp-shinned Hawk	22 Feb-20 Mar	17 Apr-11 May	1-30 June	7 May 1983	4944
Cooper's Hawk	3-22 Mar	29 Mar-17 Apr	6-30 May	17 Apr 1982	48
Northern Goshawk	22 Feb-20 Mar	23 Mar-14 Apr	26 Apr-23 May	4 Apr 1983	42
Red-shouldered Hawk	1-22 Mar	15 Mar-4 Apr	20 Apr-22 May	4 Apr 1983	316
Broad-winged Hawk	12-18 Apr	21 Apr-9 May	18-30 June	27 Apr 1984	19,879
Red-tailed Hawk	15 Feb-11 Mar	15 Mar-16 Apr	1-30 June	14 Apr 1984	861
Rough-legged Hawk	15 Feb-11 Mar	23 Feb-26 Apr	1 May-2 June	28 Mar 1978	91
Golden Eagle	24 Mar-16 Apr	4 Apr-9 May	21 Apr-8 June	21 Apr 1979	5
American Kestrel	23 Feb-11 Mar	29 Mar-20 Apr	3-30 June	14 Apr 1983	1166
Merlin	16 Mar-13 Apr	29 Mar-7 May	28 Apr-23 May	30 Apr 1984	4
Peregrine Falcon	13 Mar-16 Apr	25 Mar-19 May	15 May-10 June	25 Mar 1979	2
				26 Apr 1983	2
				12 May 1984	2
				19 May 1982	2

Swainson's Hawk, one seen 20 May 1979

METHODS

The instructions and the printed forms supplied by the Hawk Migration Association of North America (HMANA) are used for keeping records, with a separate form for each day, and separate forms are also used for each site when auxiliary lookouts are utilized. Numbers of hawks are recorded for each hour, along with weather data, including maximum visibility in kilometers, air temperatures in Celsius, cloud cover and precipitation, wind speed, wind direction, flight direction, number of observers and minutes observed for each hour in the field. We use a weathervane, a Dwyer wind meter, a thermometer, and a weather cube radio for detailed weather reports during the day, the latter being helpful in determining what the weather is west of Braddock Bay. Notes are made of pertinent facts, such as the age of Bald and Golden Eagles and whether or not they are tagged.

The daily forms are forwarded to HMANA and are ultimately stored at Hawk Mountain, Pennsylvania. Eventually they will be put on computer. A compilation of the information, along with the data from other hawk lookouts, spring and fall, is published in *The Newsletter of the Hawk Migration Association of North America*. A condensed form of the Braddock Bay data is published each month during the hawk watch in *The Goshawk*, publication of the Genesee Ornithological Society.

The condensed hawk counts for the past eight years of observations, 1977-1984, plus the two years in 1949-1950 are in Table 3. This table shows a rather steady increase in total numbers, but this may be misleading due to the fact that the increased use of auxiliary sites has had a big effect on the total numbers. Details of the individual species are given below.

Because of space limitations, only the daily hawk counts for 1984 have been included (Table 4). This table clearly shows that the migration starts slowly in late February, builds to a peak in late April, and finally tapers off to practically nothing by the end of June.

Table 3. BRADDOCK BAY SPRING HAWK COUNTS

	1949	1950	1977	1978	1979	1980	1981	1982	1983	1984
Turkey Vulture	56	27	858	1,150	1,638	1,626	1,707	2,512	2,133	2,632
Osprey	47	66	40	96	218	107	96	148	88	125
Bald Eagle	113	68	3	14	26	14	18	39	36	24
Northern Harrier	253	392	182	360	570	437	339	555	647	739
Sharp-shinned Hawk	3,336	3,606	1,923	6,271	4,879	7,714	4,612	8,452	10,573	9,515
Cooper's Hawk	102	199	59	74	133	142	124	167	220	216
Northern Goshawk	0	4	8	39	43	22	11	76	141	90
Red-shouldered Hawk	121	453	265	181	436	283	395	243	623	514
Broad-winged Hawk	15,941	15,011	16,919	8,300	22,142	24,204	15,927	18,608	30,037	44,347
Swainson's Hawk	0	0	0	0	1	0	0	0	0	0
Red-tailed Hawk	1,069	1,128	1,156	1,763	2,687	2,823	2,297	3,010	3,008	3,494
Rough-legged Hawk	139	140	174	442	419	231	275	411	330	547
Golden Eagle	7	10	4	14	16	8	6	11	9	11
American Kestrel	98	145	109	683	702	536	488	999	1,772	558
Merlin	5	11	0	4	8	6	7	16	13	16
Peregrine Falcon	4	18	1	6	6	3	2	4	5	6
Unidentified raptor	330	210	865	496	922	644	777	986	354	461
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Total	21,621	21,488	22,566	19,893	34,846	38,800	27,081	36,237	49,989	63,295
Days	50	55	49	120	123	127	136	125	126	122
Hours	265	235	214	646	794	638	626	665	625	623

TABLE 4. 1984 DAILY HAWK COUNTS

See key to abbreviations – Table 3

	Hours	Wind	TV	OS	BE	NH	SS	CH	GO	RS	BW	RT	RL	GE	AK	ML	PG	UR	Total
WINTER, 1985	Feb.																		
	19	2.00	SSW			6						2	3						11
	22	4.00	SW-SSW			6	2		1			22							31
	23	6.50	SW-NE			1	6					31	2		1			2	43
	24	6.50	SW-NW				7	2		1		6	2		1				19
	27	4.00	E-NE				1												1
	28	0.00	Snow																
	29	0.00	Snow																
		23.00		0	0	1	26	4	0	2	0	0	61	7	0	2	0	0	2
19	Mar																		
	1	0.00	Snow																
	2	0.50	W																0
	3	2.00	W																0
	4	5.75	WSW-N																0
	5	1.00	SW						1										1
	6	6.50	W-WNW																0
	7	2.25	NW-W																0
	8	2.00	E																0
	9	4.00	N-NW							1									1
	10	6.00	SW-WSW							1			5	1				1	8
	11	1.75	W			1							1						2
	12	5.00	NE										1		1				2
	13	4.00	SE				1												1
	14	5.00	NW											1					1
	15	7.25	E				1						1						2
	16	4.50	SW-WSW							1									1
	17	3.50	NE																0
	18	3.00	NE																0
	19	2.00	NE				1												1
	20	6.00	NE-SE-NE				3			1			3			2			9
21	4.00	E				4								1				5	
22	7.00	SW	1			21	1	2	6	4		95	18		13		5	166	
23	4.00	W	2			2						7	1				1	13	
24	7.00	WSW-NW	5			13	1		6	12		55	1		3		31	127	
25	6.50	NE	3			6	2		1	4		49	3				12	80	
26	5.30	N	5			2	1					2					2	12	
27	6.50	NNE	17			6		2		3		9			1		8	46	
28	3.50	NE	1			1						1			1			4	
29	0.00	Snow																	
30	4.50	NE-NW	13			4			2	9		22						50	
31	8.00	NW	13			9	23	5	6	67		180	10		1		1	32	
	128.30		60	0	1	74	28	9	26	99	0	430	36	0	23	0	1	92	879

Table 4. 1984 DAILY HAWK COUNTS

	Hours	Wind	TV	OS	BE	NH	SS	CH	GO	RS	BW	RT	RL	GE	AK	ML	PG	UR	Total
Apr																			
1	8.00	W-NW	69			10	15	4	5	124		73	4		1		1	8	314
2	8.00	SW-N	87		1	9	28	7		87		84	1		6			12	322
3	7.25	NE-E	51			1	6			4		11	1					3	77
4	7.50	SE-NE	98			2	10	2				13	1	1	9			15	151
5	2.50	E				1													1
6	8.75	SW-WSW	42	1	3	17	66	5	5	46		208	13		22			8	436
7	4.50	WNW-NW	1			1	1					1						1	5
8	6.75	NNW-N	125			18	19	9	2	8		105	3		5			9	303
9	5.50	NE	35			2	4	1				10			2				54
10	8.00	NE-NW	221	1	2	29	31	6	2	15		173	7					4	491
11	8.25	NNE-NE	172		1	4	19	2	2	15		76	1		4		1	8	305
12	6.25	NE	114	1		7	27	8	4	4		73	4		1			3	246
13	9.25	NE-SE				1	3	1							4	1			10
14	9.50	SE-E	507	5	2	152	1121	36	10	56		861	54	1	80			92	2977
15	7.75	NE-E	12	1		14	53	7							24	2		7	121
16	1.00	NE																	0
17	6.00	NW-NE	9	1		41	66	10	8	7	10	56	13	1	3			5	230
18	6.50	NE-NNE	58	4		4	78	9	2	27	3	162	34		3			67	451
19	5.75	NNE				1	6												7
20	10.00	NWN-WSW	23	3	1	98	250	9	2	5	7	169	65	2	110			5	749
21	7.00	WNW	35			8	23	3			17	41	11		5			3	146
22	5.75	NE-E	17	1		1	2					2	1		3				27
23	5.50	SE-E	1	1		3	7	1					3		3			3	22
24	2.00	WNW																	0
25	8.00	NW-WNW	41	1		13	68	5	1	4	267	47	36		2			37	522
26	10.00	W-NE-E	90	4		25	431	6		1	5808	110	29		19	1		19	6543
27	9.50	SE-E	66	6	1	16	965	11	3		19,879	118	58	2	64			2	21,191
28	7.50	S-SE-N	50	18	4	47	2383	6	4	6	7710	62	64	1	30	1		8*	10,394
29	6.00	NE-N	60	8		12	528	18	4	3	1697	86	58		5	3		11	2493
30	7.00	SW-WSW	122	35	1	45	2089	8	4		1581	57	22		101	4			4069
	205.25		2106	91	16	582	8299	174	58	412	36979	2598	484	8	506	12	2	330	52657

See key to abbreviations – Table 3

* includes one unidentified eagle

Table 4. 1984 DAILY HAWK COUNTS

	Hours	Wind	TV	OS	BE	NH	SS	CH	GO	RS	BW	RT	RL	GE	AK	ML	PG	UR	Total	
May 1	7.00	WSW	10	4		3	37	4			2	18	1	2				1	82	
2	6.75	NW	16	1		1	85				8	5				1			117	
3	4.00	ENE-NE	1				3												4	
4	0.00	Rain																		
5	7.00	NW-W	3	1		6	81		1		32	34	2		3	1		2	166	
6	8.00	W-NE	1	1		4	91	6			62	4	7		2			2	180	
7	5.50	E-S	6	4			35	2		1	1	1			1				51	
8	3.00	SSW-W					1												1	
9	7.00	SW-W	14	2	2	3	194	3		2	53	49	2		1			7	332	
10	6.50	W-NW	6			6	28	2	1		14	20	1					2	80	
11	7.50	S-SW		3		9	105				1				2				120	
12	6.50	SW-NW	65	3	1	11	431	9			3393	82	3	1	9		2	5	4015	
13	4.50	W-NW	8	1			2	1			8	3	1						24	
14	3.50	NW	8				2				10	9	1					2	32	
15	3.25	NW	2						1									2	5	
16	6.25	NW	4	1		2	11	1							2				21	
17	3.50	N	1				1					1							3	
18	5.00	S		1		2	9								1	1	1		15	
19	7.00	WNW-SW	25	3		7	27	5	1		435	72			2	1		2	581	
20	2.50	NE		1															1	
21	2.50	NE																	0	
22	8.75	SW-NE	89	2	1	1	26				2796	26			2				2943	
23	2.75	W-NW									4	12						5	21	
24	6.00	SW-NE	16				3				4	14						5	42	
25	6.75	SSW-SW	84	1			8				314	29	1		1				438	
26	3.50	WNW	4	1							2	3						1	11	
27	4.50	N	13									1							14	
28	0.00	Rain																		
29	4.25	NE-W										1							1	
30	3.50	SW-NE										1							1	
31	4.00	NW-N										1							1	
			150.75	376	30	4	55	1180	33	4	3	7139	386	20	3	26	4	3	36	9302

See key to abbreviations – Table 3

Table 4. 1984 DAILY HAWK COUNTS

June	Hours	Wind	TV	OS	BE	NH	SS	CH	GO	RS	BW	RT	RL	GE	AK	ML	PG	UR	Total
1	4.00	NNW	1																1
2	3.00	NNW																	0
3	1.00	NW																	0
4	5.50	NW	8	1			1				12	2						1	25
5	3.75	SW-NE									7	1							8
6	4.50	WSW-NE	3				1				27	1			1				33
7	4.50	SW-W	14								4	2							20
8	6.00	SW	19		2						135	5							161
9	4.75	SW				1	1				31	5							38
10	4.00	WSW-SW	8								9								17
11	4.00	NW																	0
12	5.00	SW-E		1		1													2
13	4.25	NW-N	1																1
14	4.50	W-NW	7																7
15	5.00	NE-N	4										1						5
16	5.00	E-NE																	0
17	3.00	S-SE																	0
18	4.00	SW	2								4	2							8
19	5.00	NW	5																5
20	3.50	NE																	0
21	4.00	NE																	0
22	4.00	NE-E		1															1
23	2.50	ESE-NE																	0
24	0.00	Rain																	0
25	2.50	SW-NW	1																1
26	4.25	NW																	0
27	3.00	SW	1	1															2
28	4.00	WSW-NW	5				1												6
29	2.00	NE																	0
30	5.00	NE	11																11
	115.50		90	4	2	2	4	0	0	0	229	19	0	0	1	0	0	1	352

See key to abbreviations – Table 3

SPECIES ACCOUNTS

Turkey Vulture

This raptor has increased rapidly and steadily and its numbers passing the lookout have tripled in the last eight years. This is due to a northward spread of the species. It nests in a few places in west central New York, but there are no nesting records in the vicinity of Braddock Bay. It arrives rather early in the year and departs very late. Migrating squadrons of 30 or more Turkey Vultures are very impressive as they sail by. There was a record count of 533 on 31 March 1982, when they were flying ahead of a severe thunderstorm in very high winds. They feed on migration. A road-killed raccoon placed near the Shelter area was eaten by a group of 20 Turkey Vultures after a two day period. They sometimes roost in typical fashion by the hundreds in a wood lot for the night, with many in one tree.

Two Turkey Vultures with white patagial markers were seen, one on 25 May 1978, and another on 7 May 1981 (right wing). According to available information, these might have been marked in either Florida or Virginia.

Osprey

This species arrives very punctually in the first two weeks of April and continues to migrate to the end of June. They sometimes tarry at the bay to catch and eat fish, and often migrate east with a fish dangling from their talons. For unknown reasons the numbers of migrating Ospreys rise and fall over the years. They do not nest along the shores of Lake Ontario but do nest at Montezuma National Wildlife Refuge. This could change due to the large increase in fish in Lake Ontario in recent years because of stocking by the DEC. Most of the Ospreys migrate near the lakeshore, but they have been seen at all of the inland sites, including five at Bailey Road, 27 Apr. 1984.

Bald Eagle

Records of the Bald Eagle at Braddock Bay over the ten year period show the drastic decline of the species caused by DDT, followed by an increase as a result of the DEC hacking program. In 1949, there were 113 Bald Eagles. This is when DDT was just beginning to have its devastating effect. By 1977, only three Bald Eagles were seen. In 1977, the DEC began hacking eagles, starting with only a few at Montezuma National Wildlife Refuge, but increasing to about 22 per year during recent years at various locations in New York State. The number of Bald Eagles at Braddock Bay has increased to an average of 33 for the past three years, and some have been observed with yellow patagial markers put on by the DEC.

On 13 May 1982, an adult Bald Eagle with an orange marker on the left wing was seen at Braddock Bay; and on 10, 11, 13 June 1982, an

immature Bald Eagle with an orange marker on its right wing was seen. Eagles with this type of marker may have come from the Bald Eagle Recovery Team, Poco Sabo Plantation, South Carolina.

The Bald Eagle is more frequently recorded in the Braddock Bay area than the Golden Eagle by a factor of two. They often perch in the small woods, called "Island Woods" by the hawk watchers, in the middle of the Braddock Bay marsh, and make flights over the bay to pick up fish. In 1984, two unmarked Bald Eagles remained in the area for 16 days and were seen almost daily sitting in the small trees off the end of the West Spit, or on a bare snag of a tall tree in the Island Woods.

Northern Harrier

Harrier numbers have increased during the eight years, after a previously reported decline. They migrate over the entire spring. Harriers are difficult to count, because they nest in the marsh at Braddock Bay and course back and forth over the cattails and fields looking for food. We count only the birds that are definitely going through. In 1984, a pair nested in the cattails about a quarter of a mile from the observation platform. When the male was observed bringing food to the nest, the female would rise from the cattails, turn upside down, and take the food from his talons. This behaviour was repeated over and over during the nesting season. Sometimes late season birds have missing feathers which help to identify them individually. Braddock Bay is a superb place for watching the aerial acrobatics performed by this species during courtship.

Sharp-shinned Hawk

This species is an early-to-late-season migrant. They fly by, more or less, as individuals most of the time, but when thousands are migrating, there is a steady stream spread across the horizon from left to right. When it is very windy—a condition they seem to like—they sometimes fly very low, only a foot off the ground. These low-flying Sharp-shins use the flap-flap-flap-sail accipiter pattern, but on days when there are good thermals, they will soar with the kettles of Broad-wings and are often at the top of the kettle, above the Broad-wings and other buteos.

Sharp-shinned Hawks sometimes fly very early in the morning. On 26 Apr. 1979, Ronald Ballard arrived at the West Spit before six in the morning, and the Sharp-shins were already flying in good numbers. Between 0553 and 0630 hours, he counted 210 Sharp-shins for an average of 5.6 per minute. In the next 90 minutes, the rate slowed to 1.7 per minute. They continued to fly all day long for a total count of 1015.

The record count of Sharp-shins was on 7 May 1983, a day with very strong southwest winds and 68°-81° temperatures. On that day 4,944 Sharp-shins passed by in a steady stream at very low altitudes, just skimming the cattails and short grass around the shelter, many of them

resting briefly in low trees and then going on. They flew at an average of 14 per minute over a period of five hours, until the wind shifted to west southwest and then west, and the flight stopped.

A migrating Sharp-shin has been observed catching a warbler in full flight. They will also on occasion dive into a tree full of Red-winged Blackbirds, and the birds literally explode in all directions. When Sharp-shins are flying low, a look at their profile shows that many have full crops. Late season migrants are immatures.

Cooper's Hawk

The Cooper's Hawk arrives rather early and over the eight year period arrived between 3-22 Mar.; the latest date of departure is 30 May. The peak of the Cooper's Hawk migration occurs well before that of the Sharp-shinned Hawk. The Cooper's Hawk is a much less common accipiter and also soars with the buteos on a day when there are strong thermals.

Northern Goshawk

The goshawk is by far the least abundant of the three accipiters and migrates very early in the season. It is not easily seen at times because it barrels through at low levels and very fast. The observer usually has little time to watch a goshawk. The early season migrants are often adults and if there is snow on the ground, as is usual at Braddock Bay in March, those gray birds can be difficult to see. Goshawks, like the other accipiters, will sometimes migrate in a drizzle or while it is snowing. Late in the goshawk season, they are sometimes observed soaring with the buteos on thermals. Goshawk numbers are increasing rather steadily and considerably so over the 1949-1950 figures.

Red-shouldered Hawk

The Red-shoulder is one of the most colorful hawks, and it comes through the Braddock Bay area when it is in its beautiful spring plumage. It migrates very early in the year when there is usually snow on the ground and it is cold. Because there are not many thermals when the adults first arrive, they usually fly at a moderate height, and the rufous shoulders, as well as the robin-red underparts can often be seen. On certain days, the crescent windows in the wings of the Red-shoulders stand out beautifully and serve to separate them from the Red-tailed Hawks, which also have windows, that are squarish rather than crescent-shaped. Not as dependent on thermals as the Broad-winged Hawk, good flights of Red-shoulders can occur on brisk northwest winds.

Toward the end of the Red-shoulder season in April and May, there are strong thermals and under such conditions, the Red-shoulders and Red-tails climb almost out of sight, making it difficult to distinguish between the two. The count of Red-shoulders may suffer because they

cannot be identified for certain at such high altitudes, and therefore, many are recorded as unidentified raptors.

Broad-winged Hawk

Our most abundant migrant, the Broad-winged Hawk, arrives on an extremely tight schedule between 12 Apr. and 18 Apr. In three consecutive years, it arrived on 16 Apr. In the following year, an all day rain delayed its arrival until 17 Apr. Broad-wings like warm southwest winds and when such conditions occur, they soar in tremendous groups, called kettles, across the countryside. A kettle of Broad-wings will find a strong thermal and climb in a spiral sometimes so close together that it looks like they might collide with one another. Often the number of Broad-wings in a kettle will continue to increase as other birds are attracted to the rising column of air. When they finally get high enough or the thermal runs out, they all peel off in a glide to the southeast. That is when we can count them best, but by that time they may also be very high. The kettle size can vary from five to 600 or more.

The Broad-winged Hawk migration is very subject to the "lake effect," the cold north or northeast wind coming in from Lake Ontario. The kettles disappear from view almost at once, but as has been mentioned earlier, the line of flight may sometimes be found inland.

The early Broad-wings are adults with conspicuous black and white banded tails, mid-season birds are mostly immatures, and late in the season the immatures are molting birds with a feather or two missing in the middle of each wing, and frequently missing central tail feathers. Big flights of such immatures continue into June.

The biggest flight of Broad-wings took place on 27 Apr. two years in a row: 11,172 in 1983 and 19,879 in 1984, establishing new records for total species seen in a day of 12,006 in 1983 and 21,191 in 1984. One can readily see that the Broad-wing far outnumbers other species of hawks on big flight days. On the last five days of April 1984, 36,675 Broad-wings went through, out of a total of 44,347 for the entire four months of observation.

Swainson's Hawk

One adult Swainson's Hawk was seen on 20 May 1979. It came directly over the parking lot at the Shelter, flying at moderate altitude. It was spotted by Betty Perrigo, identified by Allen Kemnitzer, and seen by two others.

Red-tailed Hawk

Red-tailed Hawks have been known to migrate as early as 15 February and as late as 30 June. These are the extreme dates of observation at the Braddock Bay Hawk Lookout. Like the other hawks, the early season Red-tails are adults and the late season birds are immatures. Finally in May and June, many are seen with missing feathers, just

like the Broad-winged Hawk. The numbers of Red-tailed Hawks seem to be increasing very slightly over the years, but this could be due to the use of auxiliary sites. On 10 Apr. 1977, a Red-tail with two long narrow red streamers was observed. It was probably marked at the Little Suamico Ornithological Station in Wisconsin.

Rough-legged Hawk

One of the most spectacular species in flight over Braddock Bay is the Rough-legged Hawk, particularly the dark-phase birds, which are usually outnumbered by the light-phase birds. Rough-legs arrive as early as 15 Feb. and usually depart in late May, although the latest date is 2 June. There have been as many as 91 in a single day. They are often identified at extreme distances as they approach, and spectators can be advised of their approach in plenty of time to see them. Both their pattern, slight dihedral, and their heavy flight set them apart from other buteos seen in the area. Their total numbers each year, over the past eight years, have remained fairly constant, but have shown a definite increase over the 1949-1950 figures. They hunt for food late in the afternoon and can often be seen at that time, flying rather low over the marsh and hedgerows, sometimes in bad weather. On 22 March 1984, 12 Rough-legs were counted in the 3 o'clock hour (out of a count of 18 for the day) when a light snow was falling. Because of the drizzle and snow, they were flying very low that day, sometimes just skimming over the cattails in the marsh, along with No. Harriers. At times, when the snow became heavier, they went down and sat in the marsh and remained there for some time. They must have been sitting on muskrat houses, because they were slightly elevated and could be seen quite easily through the falling snow.

Golden Eagle

Golden Eagles are not as numerous at Braddock Bay as Bald Eagles. They arrive between 24 March and 16 April, and the latest departure was 8 June. Five were seen on 21 April 1979, a record count for one day. One of these eagles was seen at the Shelter in the morning, but the flight there ceased abruptly at 1120 hours when the wind shifted from southwest to northeast. The flight moved inland all the way to Bailey Road. At 1520 hours there were two adults; at 1525 hours, one immature and at 1532 hours there was another immature; a total of four eagles in 12 minutes. Golden Eagles and Bald Eagles have flown past the lookout at the same time, which makes for very interesting comparisons.

American Kestrel

By far the most common falcon during migration at Braddock Bay is the American Kestrel. It migrates in big numbers early in the season shortly before the Broad-wings arrive and is still migrating in very small

numbers late in the spring season. Although it is seen at all of the auxiliary lookouts, it definitely prefers to migrate near the shoreline of Lake Ontario. As was mentioned earlier, the peak day was 14 Apr. 1983 with a count of 1166 American Kestrels for the day, 1057 of which were seen at the West Spit. Kestrels are often seen sitting in considerable numbers along the Lake Ontario State Parkway waiting for favorable winds to continue their migration. It is the only falcon that nests in the area. Kestrel numbers have increased markedly since the discovery in 1978 that in order to get an accurate count of the American Kestrel migration through Braddock Bay, observations must be at the West Spit early in the season when the bulk of the kestrels go through.

Merlin

Not very common at Braddock Bay, Merlins are probably missed because they fly fast and close to the ground most of the time. When Merlins come across the cattails in front of the platform, they drop close to the water at Buttonwood Creek, and they lift over a hedgerow or over the Shelter, but immediately return close to the ground. The dates of migration are listed in the table, but there are so few Merlins, it may not tell the whole story. Occasionally one is seen sitting along the Lake Ontario Parkway or stopping to rest in the Hawk Lookout woods.

Peregrine Falcon

The rarest hawk that migrates regularly past Braddock Bay in spring is the Peregrine Falcon. It has averaged only four per year over the past eight years. (Not included in the average are 18 seen in 1950, an indication of the adverse effect DDT has had on this species.) Data on arrival and departure do not mean much because of the low numbers, but it has been seen as early as 13 March and as late as 10 June. It usually flies with powerful wing beats through the area, but it has been known to soar on outstretched wings with the buteos and ride a thermal right over the Shelter without flapping a wing. Their numbers at Braddock Bay have not increased yet, as a result of the DEC hacking program in the Adirondacks or by releases in various localities by T. J. Cade of the Peregrine Foundation of the Cornell Laboratory of Ornithology.

FALL MIGRATION

There is a small migration of hawks in fall at Braddock Bay, but it has not been studied very well and there are only occasional reports of up to 200-300 birds in a day in late August, mostly immature Red-tailed Hawks, going east just as in spring. There are reports of a few Broad-winged Hawks, Northern Harriers, and Red-shouldered Hawks, also in August. In November, a flight of 35 Rough-legged Hawks, going

east, has been reported. A thorough study might show a definite migration, but certainly not as large as in spring.

OWLS

There is also a spring owl migration but little is known about it, except that there is a build-up of several species of owls along the lakeshore during February, March and April. These include the Long-eared Owl, Short-eared Owl, Northern Saw-whet Owl, and an occasional Common Barn-Owl. We have heard the latter migrating at night several times and can tell by its successive calls that it is flying eastward. Wintering Snowy Owls usually disappear from our area in March and April. Five individual Boreal Owls, that were probably migrants, have been recorded in the vicinity along the lakeshore, in Monroe County: 22-29 Feb. 1964; 24-26 Feb. 1965; 26 Feb. 1972 (found dead and preserved at the Rochester Museum of Arts and Sciences, Moon 1972); 4-6 Feb. 1978; and 3-6 Mar. 1979.

HAWK BANDING

In 1984, Clayton Taylor of Moodus, Connecticut (1984 and pers. comm.) set up a hawk banding station on the northwest side of Braddock Bay near the area known locally as the Pear Orchard. He used bow traps, mist nets, and live Rock Doves and House Sparrows as lures. He operated the station on 22 days during the peak of the migration between 23 Apr.-18 May. The banding operation was very successful and 218 hawks of seven species were caught. These were: Sharp-shinned Hawk 176, Cooper's Hawk 29, Northern Goshawk 3, Broad-winged Hawk 1, Red-tailed Hawk 2, American Kestrel 4, and Merlin 3.

Four hawks previously banded elsewhere were caught. The data on these foreign recoveries are extremely interesting, because they suggest from whence our spring hawks at Braddock Bay may come. They are as follows: On 28 April, Taylor caught an adult Sharp-shinned Hawk, female, that had been caught and banded at Long Point Bird Observatory, Ontario, Canada, on the north shore of Lake Erie on 1 October 1982. On 7 May, he caught two immature Sharp-shinned Hawks. Both had been caught and banded at the Hawk Cliff Raptor Banding Station, also on the north shore of Lake Erie, near Port Stanley. One was a female and had been banded on 18 September 1983; the other was a male and had been banded on 17 October 1983. It seems very logical that hawks that come north in spring at Braddock Bay would go south in fall along the north shore of Lake Erie. On 3 May, Taylor caught an adult Cooper's Hawk, female, that had been banded by a Mr. Frock in Pennsylvania on 4 October 1981.

ACKNOWLEDGMENTS

The authors would like to thank the many people who assisted in the Braddock Bay counts and also those who helped man the auxiliary lookouts over the years. Coverage on the West Spit on key days by Jeffery Dodge, William Symonds, Richard Mather, William Wegman, and Ronald and Kay Ballard has been invaluable. Jeffery and Joan Dodge, Donald Nelson, Robert McKinney, Warren Lloyd, and Evelyn Hamilton have taken the responsibility for covering the hawk lookout for full days.

We also express our appreciation to the Genesee Ornithological Society, Ornithology section of the Rochester Academy of Science, for sponsoring the hawkwatching program and for publishing the collected information in its publication, *The Goshawk*. We would also like to thank the town of Greece and the New York State DEC who shared equally the cost of the new hawk observation platform.

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