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Analysis of Banding and Recovery Data for Sharp-shinned Hawks at Whitefish Point, Michigan, 1984-1987

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INTRODUCTION

Spring Sharp-shinned Hawk (*Accipiter striatus*) migration at Whitefish Point, Chippewa County, Michigan, was summarized by Devereux et al. (1985) and included all banding data through 1983. This paper examines banding data from 1984-1987 and expands upon these previous findings.

METHODS

Sharp-shinned Hawks banded in this study were captured during spring migration in mist nets placed in Jack Pines (*Pinus banksiana*) at the tip of Whitefish Point, or by luring (see Clark 1970 for a description of luring). Banding was done from early April to late May, the duration of the Sharp-shinned Hawk migration period at Whitefish Point (Devereux et al. 1985). Coverage was most extensive during late April and early May, the peak migration period for Sharp-shinned Hawks (Devereux et al. 1985), when several banders were present. At other times, usually only a single bander was present. Thus, many banders contributed to this project in addition to the authors (see acknowledgments). Encounter data through May 1988 were obtained from the Bird Banding Laboratory for Sharp-shinned Hawks banded at Whitefish Point.

RESULTS

There were 4830 Sharp-shinned Hawks banded at Whitefish Point from 1984-1987. An average of 11.1% of the Sharp-shinned Hawks seen on standardized counts (see Peacock 1987, 1988) during April and May were banded (Table 1). From 1984-1987, 47 Sharp-shinned Hawks banded at Whitefish Point were encountered elsewhere; 43 (91%) were females. About 20% of the Sharp-shinned Hawks banded at Whitefish Point are males (Devereux et al. 1985) so the number of males encountered does not differ significantly from the number expected based on the proportion banded (Chi-square = 3.19, df = 1, $P < 0.1$, Yate's correction, Zar 1984:48). Thirty-four (79%) of the

females encountered were SY (second year) birds when banded. The time span between banding and encounter date varied from the same day to four years, six months and 14 days. From 1956-1987, there were 12,882 Sharp-shinned Hawks banded at Whitefish Point; and as of May 1988, 86 have been encountered elsewhere, an overall encounter rate of 0.67%.

Twenty-two of the 47 encounters occurred during spring and summer (March-August). Twelve of these 22 birds were encountered within 21 days from their banding date. Only three were encountered north of Whitefish Point: one 370 km NNE in northern Ontario, and two 250 km WNW in the Keweenaw Peninsula of Michigan (Figure 1). The remaining nine birds were encountered WSW to ESE of Whitefish Point; three (two females and one male) were ASY (after second year) birds (Figure 1). One SY female traveled 500 km to the SE in 20 days and was encountered in the SE corner of the Lower Peninsula of Michigan (Figure 1). Another SY female traveled 825 km ESE, being encountered in southern Quebec nine days following banding (Figure 1); the average distance traveled per day was 91.6 km.

Ten birds were encountered during a subsequent spring or summer. Most were encountered in eastern Wisconsin, the western side of the Lower Peninsula of Michigan, or in the Keweenaw Peninsula of Michigan (Figure 1). The recoveries from Paris, Tennessee and Mexico were found dead on an unknown date; the information was received by the Bird Banding Laboratory in June but probably these birds died during spring or winter. The Nicaragua encounter was on 15 March, the SE Wisconsin encounter near the Illinois border occurred on 7 March, and the northern Ontario encounter occurred on 9 June. The remaining encounters occurred during April and May.

Twenty-three birds banded at Whitefish Point returned during 1984 to 1987 one to six springs later; 22 (96%) were females. Twelve of the 23 birds were SY when originally banded; they were subsequently recaptured at a significantly earlier date ($P < 0.025$, 1-tailed Wilcoxon

paired-sample test, Zar 1984:153-154). The 11 birds that were ASY when originally banded showed no significant difference between the original banding date and the date they were recaptured ($P < 0.5$, 2-tailed Wilcoxon paired-sample test). We used the 8052 Sharp-shinned Hawks banded from 1956-1983 to estimate a return rate; through the spring of 1987, 25 (0.31%) had returned. A bird banded 25 April 1981 near Grimsby, Ontario, was retrapped four springs later at Whitefish Point (Figure 1). This was the only foreign retrap that involved a bird banded during spring migration.

Twenty-five of the 47 encounters occurred during autumn and winter (Figure 2). Fifteen (one male, 14 females) of the 19 autumn encounters were birds recaptured during September and October at fall raptor banding stations located along the NW shore of Lake Superior and the western shore of Lake Michigan (Figure 2). The only other fall encounter in the Great Lakes region was a male encountered in the Garden Peninsula of Michigan on 1 October (Figure 2). The remaining fall encounters occurred during November in Mississippi, SE Texas and El Salvador (Figure 2). The six winter encounters occurred in SW Ohio, Alabama, Florida, and southern Mexico (Figure 2); all were females.

Although there were many foreign retraps at Whitefish Point of birds that were banded by the major fall raptor banding stations along the Great Lakes (Hawk Cliff Raptor Banding Station, Ontario; Hawk Ridge Nature Reserve Raptor Research Station, Minnesota; Cedar Grove Ornithological Station, Wisconsin; Little Suamico Ornithological Station, Wisconsin), these were not included since they will eventually be published by the original banders and the general pattern was shown in Devereux et al. (1985). The only foreign retrap of a fall banded bird that was not banded by a major raptor banding station was a bird banded by Arthur Carpenter on Grosse Ile, Michigan on 15 September 1981 and recaptured by Arthur Carpenter at Whitefish Point on 10 May 1985!

DISCUSSION

We captured an average of 11.1% of the Sharp-shinned Hawks which passed over Whitefish Point. This was similar to the 12% captured during fall migration at Cedar Grove, Wisconsin (Mueller and Berger 1967) but is lower than the 23% captured at Duluth, Minnesota (Evans and Rosenfield 1985). We feel that our overall low capture rate was due to irregularities in the banding effort. During 1984, when there was extensive banding during the peak migration in late April, we captured 23.9%—about the same proportion as at Duluth.

Most (91%) of our encounters were females. This is much higher than the incidence reported at fall raptor banding

stations (72%, Duncan 1982; 70%, Clark 1985; 59% Evans and Rosenfield 1985). This difference is probably due to the high proportion (about 80%, Devereux et al. 1985) of females banded at Whitefish Point. The proportion of females banded at the above locations ranged from 48-59%. The reasons why we capture so many females compared with fall raptor banding stations are unclear. For birds captured through luring, the almost exclusive use of starlings (*Sturnus vulgaris*) as lures probably biases the capture ratio in favor of females (Mueller and Berger 1970, Duncan 1982). However, Sharp-shinned Hawks captured in mist nets were also predominately females (authors, unpublished) so males may be more likely to fly at higher altitudes where they are not captured. Or, there may actually be more females passing Whitefish Point, though this seems unlikely.

As of May 1988, 0.67% of the Sharp-shinned Hawks banded at Whitefish Point had been encountered elsewhere. This is similar to the 0.5% encounter rate at Duluth, Minnesota (Evans and Rosenfield 1985) but is lower than the rates at most other fall raptor banding stations (0.98%, Hawk Cliff, Ontario (Duncan 1982); 1.5% Cape May Point, New Jersey (Clark 1985); 3.0%, Cedar Grove, Wisconsin (Mueller and Berger 1967)). Two factors probably contribute to our low encounter rate. First, the mortality rate is highest during the first few months of independence in most raptors (Newton 1979). Thus, many HY (hatching year) birds are probably recovered before spring migration. HY birds constitute a large proportion of the individuals banded at most fall raptor banding stations (Clark 1985, Table 6). Raptors banded during spring migration have survived this critical mortality period and thus probably have a lower likelihood of being recovered. Second, many of the birds banded at Whitefish Point winter south of the U.S. border where bands may be less frequently reported when encountered (Clark 1985). A higher proportion of birds banded at fall raptor banding stations located south of Whitefish Point winter in the U.S. as discussed below.

Birds encountered during a subsequent spring migration were from eastern Wisconsin, the western Lower Peninsula of Michigan, and the Keweenaw Peninsula of Michigan, supporting the migratory route suggested by Devereux et al. (1985). However, two Sharp-shinned Hawks banded at Whitefish Point were recaptured in the Keweenaw Peninsula a few days later so not all birds passing Whitefish Point proceed in an easterly direction into Canada as would be expected due to the configuration of the Lake Superior shoreline (Devereux et al. 1985).

About 0.31% of the Sharp-shinned Hawks banded at Whitefish Point returned during a subsequent spring. This is much higher than the return rates at fall banding stations (0.0001%, Cape May Point, New Jersey (Clark 1985); 0.001%, Hawk Cliff, Ontario and Cedar Grove, Wisconsin).

sin (Duncan 1982; Mueller and Berger 1967)). The Lake Superior shoreline is a major leading line which effectively concentrates large numbers of hawks during spring migration (Devereux et al. 1985). This, and the lower mortality rate for spring banded raptors discussed above, probably account for these differences. The extensive use of mist nets at Whitefish Point may also be a factor; presumably many birds caught by luring learn to avoid similar situations and hence are not recaptured. Luring is the primary capture method at most fall raptor banding stations. The foreign retrap at Whitefish Point of a bird banded near Grimsby, Ontario, four springs earlier shows that all birds do not take the same path around the Great Lakes every year. Weather conditions encountered during migration probably determine where birds encounter the Great Lakes and which direction they then take to go around them. We found that birds which were SY when banded returned at a significantly earlier date. This supports the findings of Devereux et al. (1985) that SY birds migrate later than adults.

Three ASY Sharp-shinned Hawks were encountered south of Whitefish Point later in the same spring in which they were banded; all were within the breeding range (Godfrey 1986, Payne 1983). Two SY females showing reverse migration in this study traveled 825 km and 500 km from Whitefish Point. All of the encounters showing reverse migration reported in Devereux et al. (1985) were SY females encountered within 306 km of Whitefish Point.

The breeding area of birds banded at Whitefish Point is difficult to ascertain. There were two encounters in northern Ontario, suggesting this as the probable breeding area. Most of the encounters showing reverse migration were within the known breeding range (Godfrey 1986, Payne 1983). Since only one encounter occurred during summer (June), the possibility that encountered individuals were still migrating cannot be ruled out.

Most of our autumn encounters were birds recaptured along the west side of Lake Michigan and the northwest shore of Lake Superior. This suggests that many of the Sharp-shinned Hawks passing Whitefish Point in spring are from the same populations as birds banded in the fall at these locations. Mueller and Berger (1967) suggested that most of the Sharp-shinned Hawks traveling along the west side of Lake Michigan in fall arrive there from the Upper Peninsula of Michigan. Our autumn encounter in the Garden Peninsula of Michigan is consistent with this route.

Most winter encounters occurred in the Gulf states east to Florida, and in southern Mexico and Central America. The winter encounters in the U.S. were farther east than those reported in Devereux et al. (1985). Our winter encounters are similar to the winter encounters from birds banded during fall at Duluth, Minnesota (Evans and

Rosenfield 1985). Although our winter encounters overlap some with winter encounters from birds banded in fall at Cedar Grove, Wisconsin, and Hawk Cliff, Ontario, these sites have many encounters located farther east and north. This may be because all our winter encounters were females which tend to winter farther south than males (Evans and Rosenfield 1985; Clark 1985). Also, both Duluth, Minnesota, and Whitefish Point, due to their more northerly locations, are probably banding a higher proportion of birds from the northern reaches of the breeding range; and birds which breed the farthest north tend to winter the farthest south in many raptors (Newton 1979). Our winter encounters show very little overlap with the winter encounters of birds banded in fall at Cape May Point, New Jersey (Clark 1985).

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Table 1. Number of Sharp-shinned Hawks seen on standardized counts during April and May, and the number banded, Whitefish Point, Chippewa County, Michigan. The number seen was taken from Peacock (1987, 1988).

<u>Year</u>	<u>Number Seen</u>	<u>Number Banded</u>	<u>Percent Banded</u>
1984	5,407	1,293	23.9
1985	10,678	907	8.5
1986	14,429	1,630	11.3
1987	12,972	1,000	7.7
Total	43,486	4,830	11.1



Figure 1. Spring and summer encounters of Sharp-shinned Hawks banded at Whitefish Point, Michigan. Circles represent birds which were banded as ASY and triangles represent birds which were banded as SY. Squares represent birds banded elsewhere during spring migration that were recaptured at Whitefish Point. Open symbols represent birds encountered during the spring or summer immediately following banding; closed symbols represent birds encountered during a subsequent spring or summer.

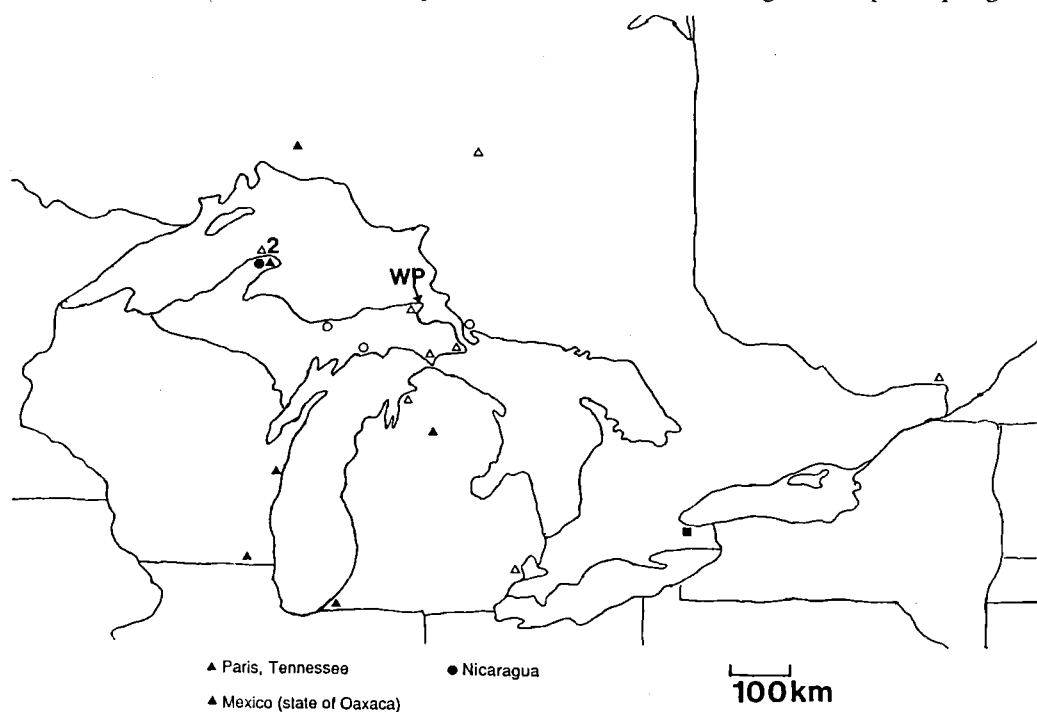


Figure 2. Autumn and winter encounters of Sharp-shinned Hawks banded at Whitefish Point, Michigan. Circles show autumn encounters and squares show winter encounters. Triangles represent birds banded elsewhere during fall migration and recaptured at Whitefish Point. Open symbols represent birds encountered during the first fall or winter following banding, and closed symbols represent birds encountered during the second or later fall or winter.

