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Records of Migrant Hawks from the North Atlantic Ocean

PAUL KERLINGER[1], JEFFREY D. CHERRY[1], AND KEVIN D. POWERS[2]
[1]*Department of Biological Sciences, State University of New York, Albany, New York 12222 USA, and*
[2]*Manomet Bird Observatory, Manomet, Massachusetts 02345 USA*

Long-distance water crossings by migrating raptors are believed to be limited to Ospreys (*Pandion haliaetus*), some falcons, and a few other species (Brown and Amadon 1968, Henny and Van Velzen 1972, Beamon and Galea 1974, Walter 1979). Most diurnal raptors depend on soaring flight, which makes use of convective currents, during migration. Flights over water, usually devoid of atmospheric convective currents (Woodcock 1975), are energetically expensive and potentially dangerous when great distances are involved. Consequently, many raptors circumvent water barriers, which results in large aggregations such as those along the shores of the Great Lakes (Haugh and Cade 1966, Mueller and Berger 1967). Other species make short-distance crossings at narrows such as the Straits of Gibraltar (Evans and Lathbury 1973) and Whitefish Point, Michigan in Lake Superior (Kerlinger MS). Even at crossing sites, the frequency of attempted crossings varies with respect to species, visibility, wind velocity, and distance (Kerlinger MS). Here, we present records of raptors seen during spring and fall migration off the northeastern coast of the United States and discuss these sightings with regard to possible migration routes. Other than the present study, there are few records of raptors from the North Atlantic Ocean (Scholander 1955, Larkin et al. 1979).

While participating in a survey of the distribution and abundance of pelagic birds from Cape Hatteras (35°00'N) to the Bay of Fundy (44°00'N) and from the coast seaward to 65°00'W, representatives of Manomet Bird Observatory observed raptors in offshore waters from 1976 to 1980. Cruises were mostly restricted to the continental shelf. Observers were stationed on National Marine Fisheries research and U.S. Coast Guard vessels. The geographical and temporal distribution of the observational effort is reported in detail by Powers (in press) and Powers and Cherry (in press). In addition to making regular counts of pelagic birds, observers recorded the following data for non-pelagic birds: species, number, time of day, and latitude-longitude. Hawks were seen only during May, June, September, and October. The number of cruises and total days of observations for these months are given in Table 1.

In 10 field seasons, 102 hawks of five species were recorded. The species and totals are given in Table 1. Most of the hawks were seen during the fall (95%). On the fall cruises 0.3 hawks/ship/day were seen as compared with 0.03 hawks/ship/day on spring cruis-

TABLE 1. List of hawks seen in waters off the coast of the northeastern United States and at a coastal hawk lookout. The offshore data are from 19 spring cruises with 204 cruise-days and 26 fall cruises with 138 cruise-days. The coastal data show the mean number (total seen/5) of each species seen in the five fall migrations from 1976 to 1980 at Cape May Point, New Jersey (from Dunne 1976–1980).

	Offshore					Coastal	
	Number of hawks		Proportion of fall total	Mean distance from land (±1 SD)	Percentage with land visible	Mean number of hawks	Proportion of total
Species	Spring	Fall					
Peregrine Falcon	1	17	17.9	84 ± 50	11.1	149	0.3
Merlin	0	25	26.3	87 ± 56	4.3	862	1.5
Osprey	5	19	20.0	118 ± 53	4.3	1,170	2.0
Sharp-shinned Hawk	0	15	15.8	91 ± 81	38.5	41,876	72.6
American Kestrel	1	19	20.0	86 ± 66	18.8	13,643	23.6

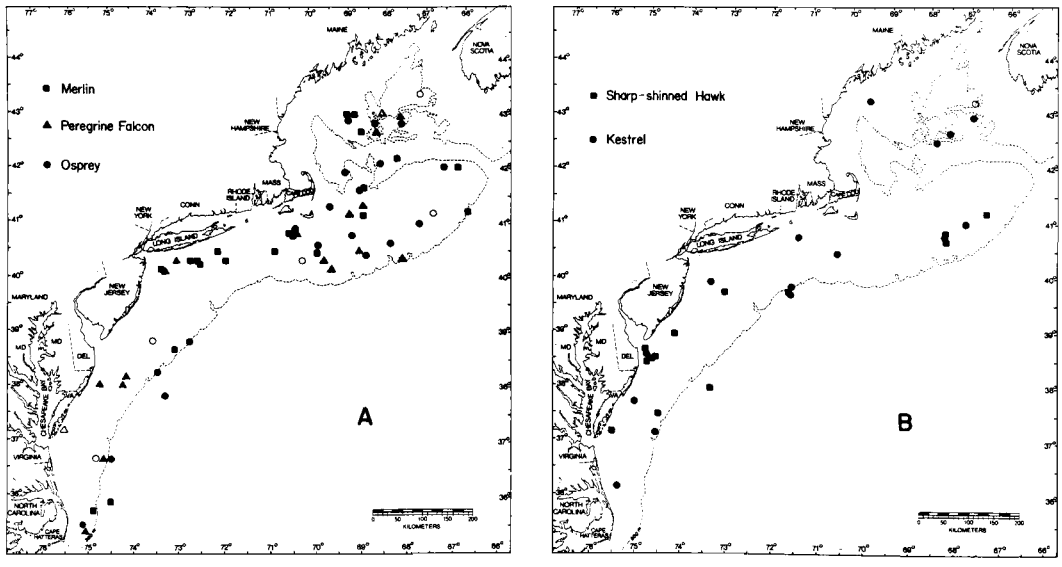

Fig. 1. Positions of raptors seen offshore from 1976 to 1980 in waters off the northeastern United States. Closed symbols denote fall sightings; open symbols denote spring sightings.

es. Comparisons of the abundance of these species with a coastal migration lookout reveal that there are fewer hawks at sea than on the coast and that the proportions of species are different (Table 1). At most coastal lookouts, Sharp-shinned Hawks (*Accipiter striatus*) and American Kestrels (*Falco sparverius*) account for the majority of the five species considered here, whereas at sea these species are seen at about the same frequency as the Peregrine Falcon (*F. peregrinus*), Merlin (*F. columbarius*), and Osprey. This difference in proportion indicates either that the latter three species migrate over water more often than the former species or that they make longer overwater flights during migration. We define long overwater flights as those beyond the limits of the bird's vision.

Behavioral notes were available for some of the sightings. Hawks attracted to the vessels often perched or flew around the ship. Ospreys and Peregrine Falcons sometimes roosted overnight, but in no case did they spend successive nights, as was found by Rogers and Leatherwood (1981). Birds were sometimes seen early or late in the day at distances of 100–250 km from shore, suggesting that some birds were at sea overnight. In addition to resting sites, ships can provide a food resource to bird-eating hawks, as exhausted passerines are often attracted to vessels at sea (McClintock et al. 1978) and are easy prey for hawks. One Merlin was seen eating a small bird while on the wing, and a Peregrine Falcon was noted eating three small birds in less than an hour.

The locations of all sightings of hawks are plotted in Fig. 1. Mean distances from the nearest land are given in Table 1. Although the means are similar, the dispersions of sightings of species seem to differ (Fig. 1). Clusters of sightings on the maps might indicate where raptors occur more frequently. A few distinct clusters were evident for individual species. Of 13 sightings of Sharp-shinned Hawks, six were off the coast of southern New Jersey southward to northern Virginia (Fig. 1). Winds at Atlantic City, New Jersey at 2 h before the sightings were from the west at 4–8 mps. These winds are potentially drifting winds (Mueller and Berger 1967) for Sharp-shinned Hawks and American Kestrels crossing from Cape May, New Jersey to Cape Henlopen, Delaware. At this location, few birds attempt to cross with these winds (Kerlinger MS).

Merlins showed a cluster of six birds off the coast of Long Island, New York (Fig. 1). These birds may have been either flying parallel to the coast or initiating longer distance flights to New Jersey or further south. Darrow (1963) observed Peregrine Falcons leaving Long Island on a heading that would bring them to the mid New Jersey coast. Nine Merlin sightings were on a line from Nova Scotia to Cape Cod or farther south, suggesting a southwest axis of migration for this species during the fall. Peregrine Falcons, Ospreys, and a few American Kestrels were also seen in this area, possibly indicating a regular long-distance water crossing.

The occurrence of raptors offshore along the Atlantic coast of the United States and Canada during migration can be interpreted as either normal migratory flights or accidental. The latter seems likely for Sharp-shinned Hawks and, possibly, American

Kestrels and may be explained by an aberrant compass, as has been proposed for some passerine migrants (Ralph 1978), or by drift offshore while attempting short-distance water crossings. These species may be less able than the other species to continue sustained flapping flight at air speeds that would allow them to maintain course with strong offshore winds. Further, Sharp-shinned Hawks and American Kestrels have been shown to hesitate even before making short-distance flights over water (Kerlinger MS). The position of nearly half of the Sharp-shinned Hawks was consistent with the hypothesis that winds had pushed these birds offshore. We suggest that American Kestrels and Sharp-shinned Hawks do not normally attempt long-distance water crossings. The evidence presented above for Peregrine Falcons, Merlins, and Ospreys suggests that some individuals of these species regularly engage in long-distance overwater flights during migration.

Several questions have arisen as a result of observations reported here. (1) Why do some species undertake long-distance water crossings while others do not? (2) Do raptors use thermals for lift during overwater flights as do some gulls? (3) Is there a relationship between flight morphology and a species' ability to undertake long bouts of powered flight or to use thermals over the sea? (4) Are the Sharp-shinned Hawks observed offshore in the north Atlantic a result of drift by strong westerly winds during short-distance water crossings? Answers to these questions cannot be obtained without more detailed behavioral observations of raptors along the coast and at sea, combined with a knowledge of the aerodynamic performance and energetic capabilities of these species.

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