nest, which was 3.9 m high in a trembling aspen (*Populus tremuloides*). Prey delivered to the nest were identified with the aid of a 20–40 × spotting scope and 7 × 35 mm binoculars.

We calculated percent frequency of each prey item from the total number delivered; percent biomass was estimated by weighing prey brought to the nest, from weights of the prey species obtained in an area about 160 km north of the nest (D. Kent, pers. comm.), and from weights given in Burt and Grossenheider (1952).

We observed 107 prey items delivered to the nest. Mammals and birds together comprised most of the diet both in frequency (68.2%) and biomass (84.0%). Eastern American toads were delivered most frequently, but the eastern chipmunk contributed most to biomass. Mosher and Matray (1974) reported that the eastern chipmunk was the single most important species in terms of biomass in the diet of nestling Broad-winged Hawks in New York.

Our data along with those of others, suggest that nesting Broad-winged Hawks commonly prey upon nestling and fledgling birds. Of 30 birds delivered to the nest, 25 were nestlings or fledglings; these (except for a Ruffed Grouse and a Yellow-billed Cuckoo) were small passerines lacking diagnostic plumage (Table 1). Fitch (1974) and Mosher and Matray (1974) also reported that most birds brought to Broad-winged Hawk nests were nestlings or fledglings.

Though food habit studies indicate that nesting Broad-winged Hawks prey on a number of prey species, mammals comprise the greatest portion of the diet in terms of biomass. The relatively high frequency of amphibians in both this and Mosher and Matray's study (1974; 27.9%) indicates their importance and may explain why Broad-winged Hawks tend to nest near water (Keran 1978, Titus and Mosher 1981). This nest was in an area of upland hardwoods with poorly drained soils that contained small (2–10 m^2) pools of water throughout spring and summer.

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LITERATURE CITED

BURT, W. H., AND R. P. GROSSENHEIDER. 1952. A field guide to the mammals. Houghton Mifflin Co., Boston.

FITCH, H. S. 1974. Observations on the food and nesting of the Broad-winged Hawk (*Buteo platypterus*) in northeastern Kansas. Condor 76:331–333.

KERAN, D. 1978. Nest site selection by the Broad-winged Hawk in north central Minnesota and Wisconsin. Raptor Res. 12:15–20.

MOSHER, J. A., AND P. F. MATRAY. 1974. Size dimorphism: a factor in energy savings for Broad-winged Hawks. Auk 91:325–341.

RUSCH, D. H., AND P. DOERR. 1972. Broad-winged Hawk nesting and food habits. Auk 89:139–145.

TITUS, K., AND J. A. MOSHER. 1981. Nest-site habitat selected by woodland hawks in the central Appalachians. Auk 98:270–281.

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Fidelity of Semipalmated Plovers to a Migration Stopover Area.—The beach at Manomet, Plymouth County, Massachusetts (41°55'N, 70°32'W) is a hard sandy flat exposed for several hours at low tide. A relatively isolated section, 10 to 15 ha in size, is littered with rocks and latticed with rills which drain numerous shallow tide pools. Each fall, this area supports a small (ca. 60 maximum) population of migrating Semipalmated Plovers, *Charadrius semipalmatus,* along with a hundred or more shorebirds of other species, primarily Semipalmated Sandpipers, *Calidris pusilla.* Shorebirds do not use this area more than casually during spring migration.

In mid-August 1974, the staff of the Manomet Bird Observatory marked 10 Semi-

TABLE 1. Sightings of returned individuals, 1975–1982.

Year	# banded as adults	# Returned n years later							
		1	2	3	4	5	6	7	8
1974	10	6	5	4	3	2	1[a]	1[a]	1
1978	21	10	4	2[a]	2				
1981	10	3							
Total	41	19	9	6[a]	5	2	1[a]	1[a]	1

[a] Presumptive. Limited or no observations in affected years.

palmated Plovers with combinations of color-bands unique to each individual. All were adults; few juveniles of this species appear on the Massachusetts coast before late August. In August 1978, another 21 adults were uniquely color-banded at the same location as were 10 more in August 1981.

In the years from 1974 through 1980 and again in 1982, the flat was monitored almost daily during the fall migration period for color-banded plovers. The site where the marked individuals normally roosted was also checked regularly. A record was kept of each individual present. Efforts in 1979 and 1980 were less comprehensive than in the other years. In 1982 the average stay of distinguishable birds, including additional individuals marked that year, was 23 days (SD = 3.4, n = 14). These figures exclude 4 banded individuals which were encountered only once and an injured individual which lingered at least 42 days. None of the marked birds has been observed or recovered elsewhere.

Records of returned individuals from the marked population on a year-by-year basis are shown in Table 1. Only one individual reappeared after being undetected in a year of regular coverage.

The number of returned individuals was a *minimum* figure in each year. The plastic color-bands, which were placed mostly below the intertarsal joint, tended to be lost within a few years, perhaps due to corrosion (Jehl 1969) or to inadequate gluing of the seam (Myers 1980). In 1982, two Semipalmated Plovers, one banded in 1974 and one banded in 1978, were recaptured without color-bands but still with their metal F&WS band. The year of color-band loss is unknown. These individuals were fitted with new color-bands. In 1982 alone there were at least 3, and perhaps as many as 6, individuals present wearing only F&WS bands. These presumably were from the population under study inasmuch as no banded Semipalmated Plovers other than those marked locally were found in the vicinity despite intensive searching during the first 2 years of the study. Color bands also tended to fade seriously under field conditions within 1 or 2 years, causing uncertainty about the identity of some individuals. Questionable sightings were ignored. The aluminum F&WS bands, which were mostly placed above the intertarsal joint, were more resilient, but at least one was known to have been lost.

From Table 1 it is possible to compute a minimum return rate for adult Semipalmated Plovers at Manomet as the proportion of individuals which return in year j which were known to be present in year j-1. This technique follows that of Hann (1948), Soikkeli (1967), and Hilden (1978) for survival rates. The weighted mean minimum return rate for the period from 1974 to 1982 was 44/79, or .56. The true rate for the population studied probably is at least .7 when difficulties such as band loss and the lack of comprehensive coverage from 1979 to 1981 are taken into account. The weighted mean minimum return rate for the period of best coverage, 1974–1978, was .72 without considering color-band loss over that period.

The return rate is comparable to survival rates of .55 found by Laven (1940), .75 found by Bub (1962), and .8+ found by Pienkowski (pers. comm.) in breeding populations of the closely related Common Ringed Plover, *Charadrius hiaticula.* Recent studies of marked individuals of other shorebird species on their breeding grounds have yielded survival rates of .73 in Dunlins *Calidris alpina* (Soikkeli 1967), .81 in male Temminck's

Stints *Calidris temminckii* (Hilden 1978), and as high as .85 in Willets *Catoptrophorus semipalmatus* (Howe 1982). Analysis of banding recoveries for 23 species of shorebirds by Boyd (1962) generally showed survival rates of .55 to .70, with the Common Ringed Plover, Little Ringed Plover *Charadrius dubius,* and Kentish (=Snowy) Plover *Charadrius alexandrinus* being towards the lower end of the range. Soikkeli (1967) discusses reasons why Boyd's technique may be biased on the low side.

Despite the difficulties in establishing precise return or survival rates, the comparability of the return rate for Semipalmated Plovers at a migration stopover point, as determined by this study, to a nominal survival rate for the species is striking. The data suggest that adult Semipalmated Plovers which visit Manomet Beach on their fall migration normally do so every year as long as they survive. Conversely, none of the 87 Semipalmated Plovers marked in fall from 1972 to 1982 at Plymouth Beach and Scituate, 10 and 30 km to the north, have ever been observed at Manomet Beach.

Although many species of shorebirds are faithful to their wintering as well as to their breeding sites (Evans 1981), there are few data concerning their fidelity to migration stopover areas. Knorr (1971) published instances of 41 returns of migrating shorebirds (37 being Semipalmated Sandpipers) from her fall banding operations at South Amboy, New Jersey during the 1960's; Pienkowski (1976) discussed 45 returns of transient shorebirds in Morocco. Unpublished fieldwork on migrating shorebirds of several species along the Massachusetts coast and elsewhere by the staff of the Manomet Bird Observatory has resulted in numerous returns of banded individuals at sites where they originally were banded.

Roberson (1982) has pointed out that American birders frequently have commented that migrant shorebird rarities often appear in the same location annually, suggesting a hypothesis that individual shorebirds follow precisely the same routes in their migrations, and use the same stopover points, year after year. This study shows that individuals of at least one species traditionally use the same stopover area each year on fall passage.

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LITERATURE CITED

Boyd, H. 1962. Mortality and fertility of European charadrii. Ibis 104:368–387.

Bub, H. 1962. Planbergingungen am Sandregenpfeifer (*Charadrius hiaticula*). J. Ornithol. 103:243–249.

Evans, P. R. 1981. Migration and dispersal of shorebirds as a survival strategy. Pp. 275–290 *in* N. V. Jones and W. J. Wolff, eds., Feeding and Survival Strategies of Estuarine Organisms. Plenum Press, New York.

Hann, H. W. 1948. Longevity of the Oven-bird. Bird-Banding 19:5–12.

Hilden, O. 1978. Population dynamics in Temminck's Stint, *Calidris temminckii.* Oikos 30:17–28.

Howe, M. A. 1982. Social organization in a nesting population of Eastern Willets (*Catoptrophorus semipalmatus*). Auk 99:88–102.

Jehl, J. R. Jr. 1969. Band wear in Stilt Sandpipers—a warning. Bird-Banding 40:47.

Knorr, B. 1971. Returns of transient shorebirds. EBBA News 34:9–19.

Laven, H. 1940. Beitrage zur Biologie des Sandregenpfeifers (*Charadrius hiaticula*). J. Ornithol. 88:183–287.

Myers, J. P. 1980. Sanderlings *Calidris alba* at Bodega Bay: facts, inferences and shameless speculations. Wader Study Group Bull. 30:26–32.

Pienkowski, M. W. 1976. Recurrence of waders on autumn migration at sites in Morocco. Vogelwarte 28:293–297.

Roberson, D. 1982. The changing seasons. Am. Birds 36:948–953.

Soikkeli, M. 1967. Breeding cycle and population dynamics in the Dunlin (*Calidris alpina*). Ann. Zool. Fenn. 4:158–198.

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