

44 | *Recoveries of Peregrine Falcons Migrating Through the Eastern and Central United States, 1955–1985*

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Extensive banding and recovery records available for the Peregrine Falcon provide insights into the movements of fall and spring migrants from various geographic regions, their wintering areas, and survivorship. The east and Gulf* coasts are areas of major autumn concentrations of migrating Peregrines (Enderson 1969c). Respective focal points of these routes are Assateague Island in Maryland and Virginia and North and South Padre Islands, Texas, where most bandings and recoveries have occurred. The study area at Assateague Island has been described by Ward and Berry (1972), and at Padre Island by Hunt et al. (1980) and Weise and White (1980). North and South Padre Islands are also the only known localities in the western hemisphere where northward migrating Peregrines are numerous in spring (Ward et al. 1978). In this analysis we attempted to determine origins, wintering areas, and migration routes of these migrants, to measure their fidelity to migratory routes, to characterize routes southward and wintering areas of Peregrines passing Wisconsin (another area of concentration in autumn), and to estimate age-specific mortality through recoveries of banded Peregrines from records in the Bird Banding Laboratory of the U. S. Fish and Wildlife Service (USFWS).

METHODS

Visits were made during July and August 1985 to the Bird Banding Laboratory, USFWS, and computer listings of bandings and recoveries were obtained. Bandings were available in computer files back to 1955. We only analyzed recoveries since then, because by that time very few resident eastern Peregrines were being banded. We discarded bandings and recoveries of captive-bred Peregrines and their progeny, known

*Editors' Note: Authors' use of "Gulf" refers to the Gulf of Mexico.

eastern *F. p. anatum*, and individuals held in captivity more than one week. Also eliminated were live recoveries of Peregrines in the same study area and same migratory season as banding. All bandings and recoveries were segregated by east coast (ME, NH, VT, MA, CT, RI, NY, NJ, PA, DE, MD, VA, WV, NC, SC, GA, FL), Gulf coast (TX, MS, LA, AL), and Wisconsin, including Peregrines banded elsewhere and recovered on the east and Gulf coasts. Also listed were birds banded in Canada and recovered anywhere south of Canada, and birds banded in Greenland and Alaska which were recovered on the east and Gulf coasts. Finally, records were available for Peregrines banded as nestlings or in their hatching-year and later recovered dead. Because the complete 1984 banding summaries were not yet available, we used the totals on record and added 1984 bandings in NJ, MD, VA, NC, FL, and TX that were not on file but otherwise available to us. We mapped the bandings and recoveries to aid in analysis.

RESULTS AND DISCUSSION

Of 4477 Peregrines banded on the east and Gulf coasts and in Wisconsin, 4.65% were recovered (Table 1). Recoveries of Peregrines

TABLE 1. Number of Peregrines banded and recovered, 1955-84.^a

	No. banded	No. recovered	% recovered
East Coast			
MA	5	0	0
RI	1	0	0
CT	4	0	0
NY	64	8	12.5
NJ	274	21	7.7
PA	20	2	10.0
MD	684	32	4.7
VA	897	28	3.1
NC	142	2	1.4
GA	97	7	7.2
FL	215	5	2.3
Total	2403	105	4.4
Gulf Coast			
AL	59	0	0
LA	2	0	0
TX	1703	86	5.1
Total	1764	86	4.9
Wisconsin	310	17	5.5
Total	4477	208	4.65

^a 1984 banding totals incomplete.

banded as nestlings indicate the Greenland population figures prominently in the fall migration on the east coast (Table 2), as suggested by Shor (1970a). Of 23 Peregrines banded as nestlings and recovered on the east coast, 12 were from Greenland. Origins of the rest were distributed fairly evenly across the Arctic from Quebec westward, but only two came from Alaska (Table 2, Figure 1). Of 105 recoveries of Peregrines banded on the east coast, 48 were recovered elsewhere (Figure 2), including 13 from north of the United States border. Eight of these were in Greenland, two in Keewatin (Northwest Territories), and one each in Manitoba, Saskatchewan and Alaska. The 29 recoveries south of the United States border were from the West Indies and Antilles, Central America, and most of South America to latitude 38°S in Argentina.

Recoveries on the Gulf coast of 29 Peregrines banded as nestlings included 17 from Alaska and only 3 from Greenland. The remaining recoveries were of birds from the Yukon and Northwest Territories, Canada (Table 2, Figure 3). Of 86 recoveries of Peregrines banded on the Gulf coast, only 19 were recorded later outside of Texas (Figure 2). The one recovery north of the United States border was in Franklin, Northwest Territories. The 13 recovered south of Texas included birds from the Gulf coast of Mexico, Central America, and the southern two-thirds of South America to latitude 33°S in Uruguay. East and Gulf coast migrants share many wintering areas, but east coast migrants have not been recovered between Honduras and the United States border. Conversely, Gulf coast migrants have not been recorded in the northeastern one-third of South America or in the Antilles and West Indies.

Banding recoveries indicate that most Peregrines display fidelity to a particular flyway. Despite the fact that many are trapped and banded

TABLE 2. Peregrines banded as nestlings and recovered on the east and Gulf coasts, January 1955 - June 1985.

Origin	Recovered on east coast		Recovered on Gulf coast	
	No.	%	No.	%
Greenland	12	52.2	3	10.3
Quebec	2	8.7	0	0
Keewatin, NWT	3	13.1	2	6.9
Franklin, NWT	1	4.3	1	3.5
Mackenzie Valley, NWT	1	4.3	4	13.7
Alberta	0	0	1	3.5
Yukon	2	8.7	1	3.5
Alaska	2	8.7	17	58.6
Total	23	100.0	29	100.0

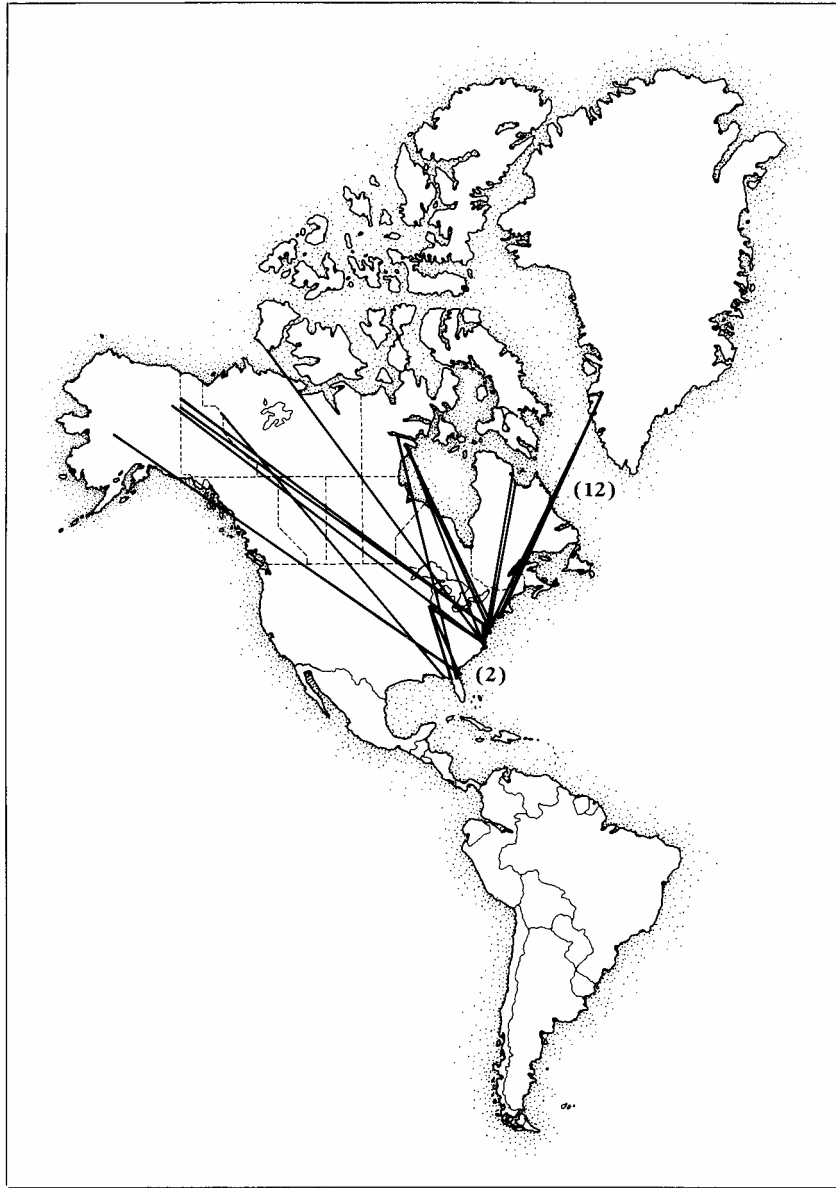


FIGURE 1. Recoveries on the east coast of Peregrines banded elsewhere, January 1955-June 1985.

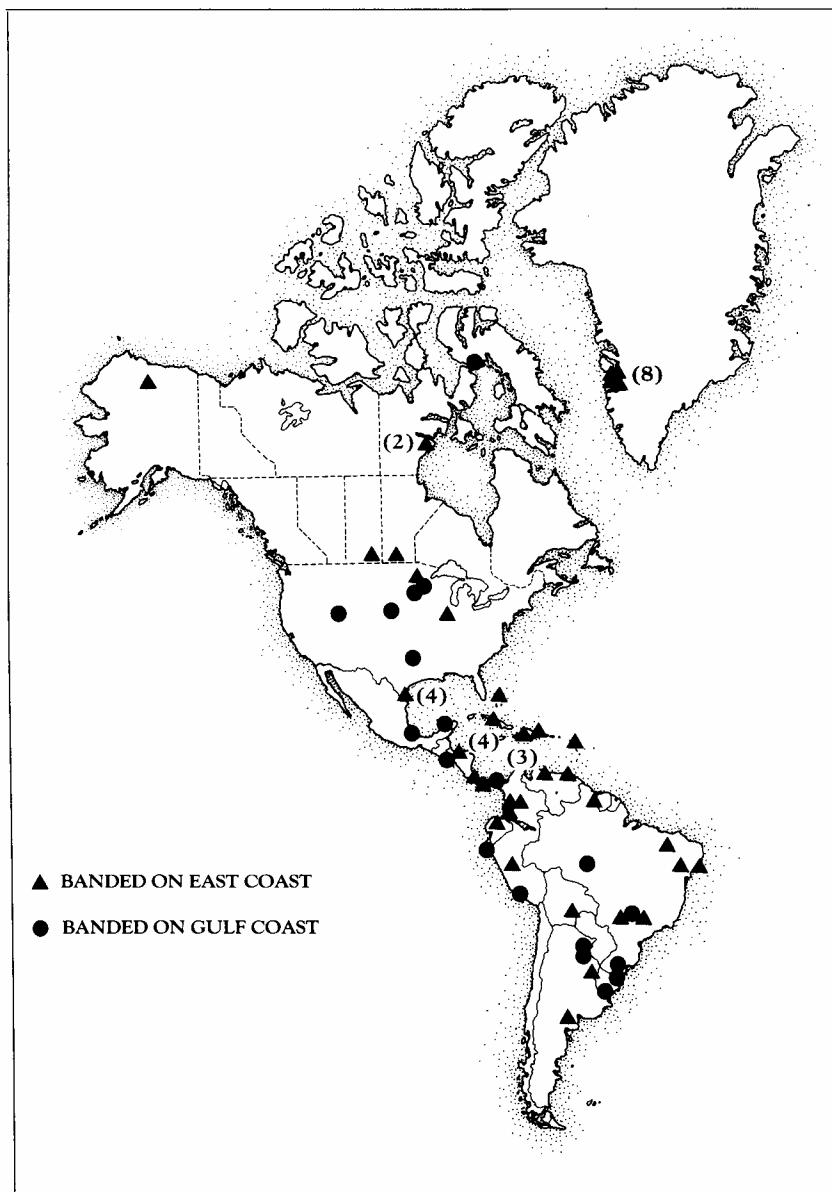


FIGURE 2. Recoveries elsewhere of Peregrines banded on the east coast and Gulf of Mexico coast, January 1955-June 1985.

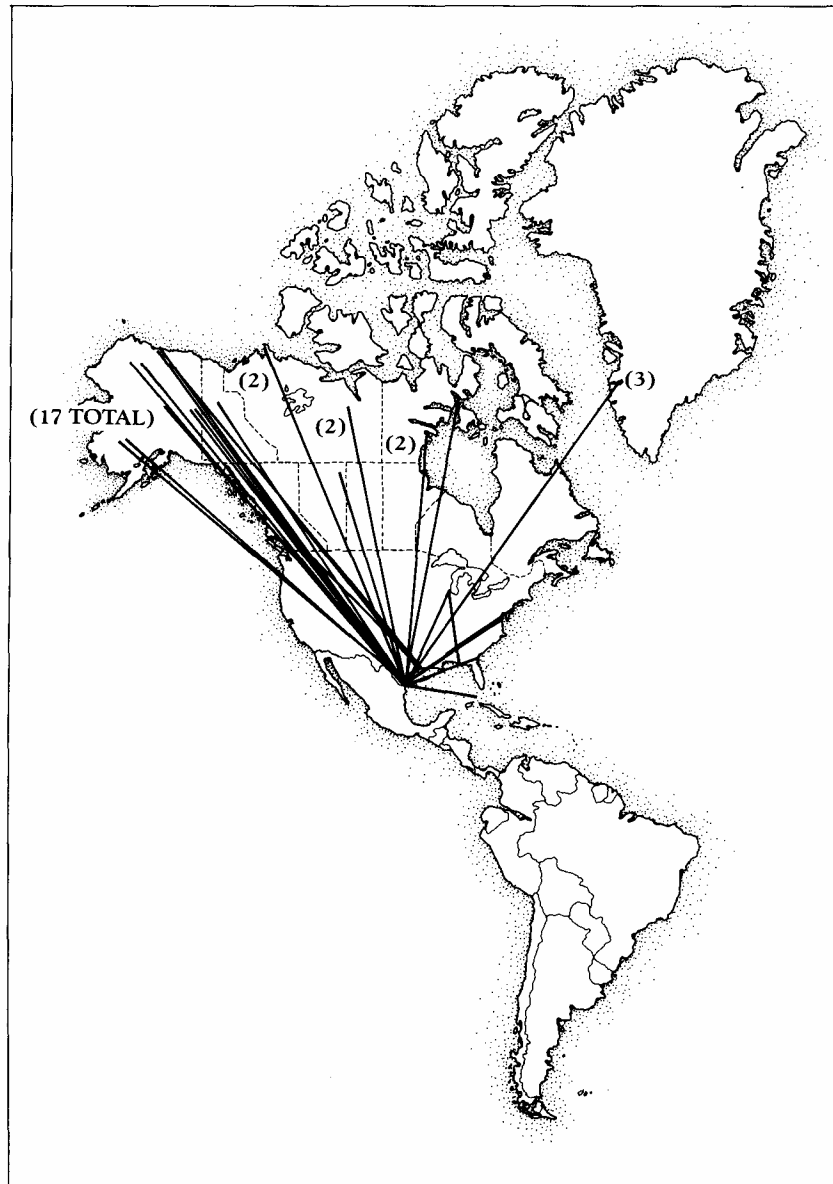


FIGURE 3. Recoveries on the Gulf of Mexico coast of Peregrines banded elsewhere, January 1955-June 1985.

on the east and Gulf coasts, few records of interchange between flyways exist. No Peregrine banded on the Gulf coast has been recovered on the east coast, and only 4 of the 105 recoveries of bands from the east coast occurred on the Gulf coast. Three of these were from birds banded on the east coast in autumn and recovered in Texas on a subsequent spring migration, suggesting that only a small proportion of the east coast sample may participate in a "loop" migration. All data indicate that separate and distinct autumn migratory populations pass through the east and Gulf coasts. Recoveries of Peregrines banded in Canada show association with broad-front migrations south (Figures 4 and 5). The Alaska and Greenland recoveries also indicate variability, because Peregrines from the same natal locale do not always use the same flyway on migration. Indeed, siblings fledged from the same cliff do not always use the same flyway. In 1983, three of four sibling Peregrines in Greenland were recovered on autumn migration, two on the east coast and one in northeastern Iowa (Mattox unpubl. data). Apparently once an individual selects its migratory route, it is unlikely to deviate from it on subsequent migrations. Further support for this conclusion lies in the fact that over half of the subsequent recoveries of east coast-banded Peregrines occurred on the east coast; the Gulf coast figure is over 75%.

Fieldwork at South Padre Island in 1978 disclosed a substantial migration in April and May. Hunt et al. (1981) discovered that Peregrines use the habitat as a staging area during the migration north. Radio telemetry studies indicate that on departure from Padre Island, Peregrines begin a direct course to their northerly destination (W. G. Hunt and J. Chase pers. comm.). There are three records of autumn-banded east coast Peregrines recovered in Texas during spring migration, but data indicate that most spring migrants are probably those passing the Texas coast in the previous fall migration. Fully half the recoveries of Peregrines banded in Texas have come in April-May at Padre Island. Spring work at Assateague Island in 1972-74 and 1976, in Panama in 1973-74, at Dry Tortugas, Florida in 1974-75 and 1983, at Cumberland Island, Georgia in 1976, and at Sandy Hook, New Jersey in 1977-78 resulted in fewer than 15 Peregrine sightings and only one capture (Ward et al. 1978). There is no evidence of a spring concentration of east coast migrants similar to that described for Gulf coast migrants.

Peregrines migrating through Wisconsin in autumn appear to use a separate south to southeast course. Of 17 recoveries of these birds (Figure 6), 1 occurred in Texas and 5 were on the east coast. There were also two recoveries in Ohio, one in Illinois, two in Tennessee, one in Missouri, and one in Alabama. Recoveries south of the United States border totaled four; three of these were in areas where east coast migrants were recovered, but no recovery of a Gulf coast migrant is on

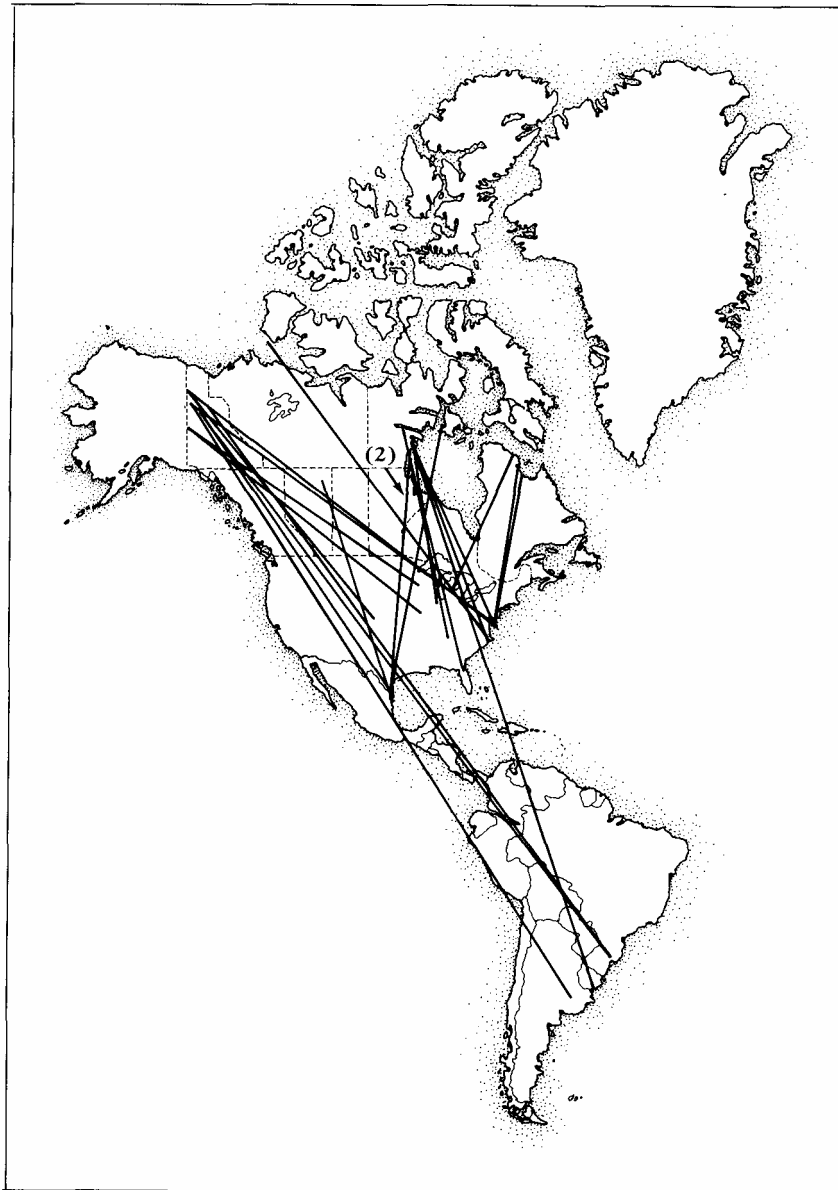


FIGURE 4. Peregrines banded in Canada and recovered south of Canada, January 1955-June 1985 (excluding Mackenzie Valley, Northwest Territories).

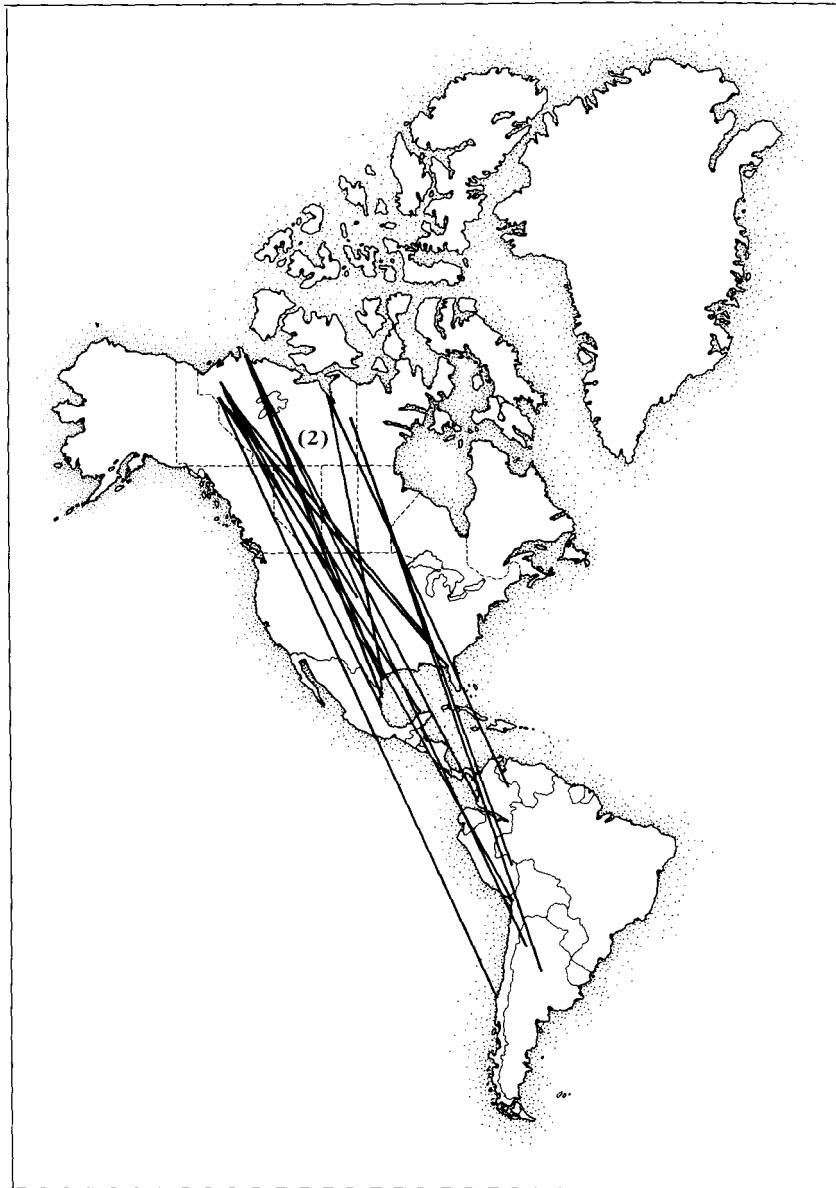


FIGURE 5. Peregrines banded in Mackenzie Valley, Northwest Territories and recovered south of Canada, January 1955-June 1985.

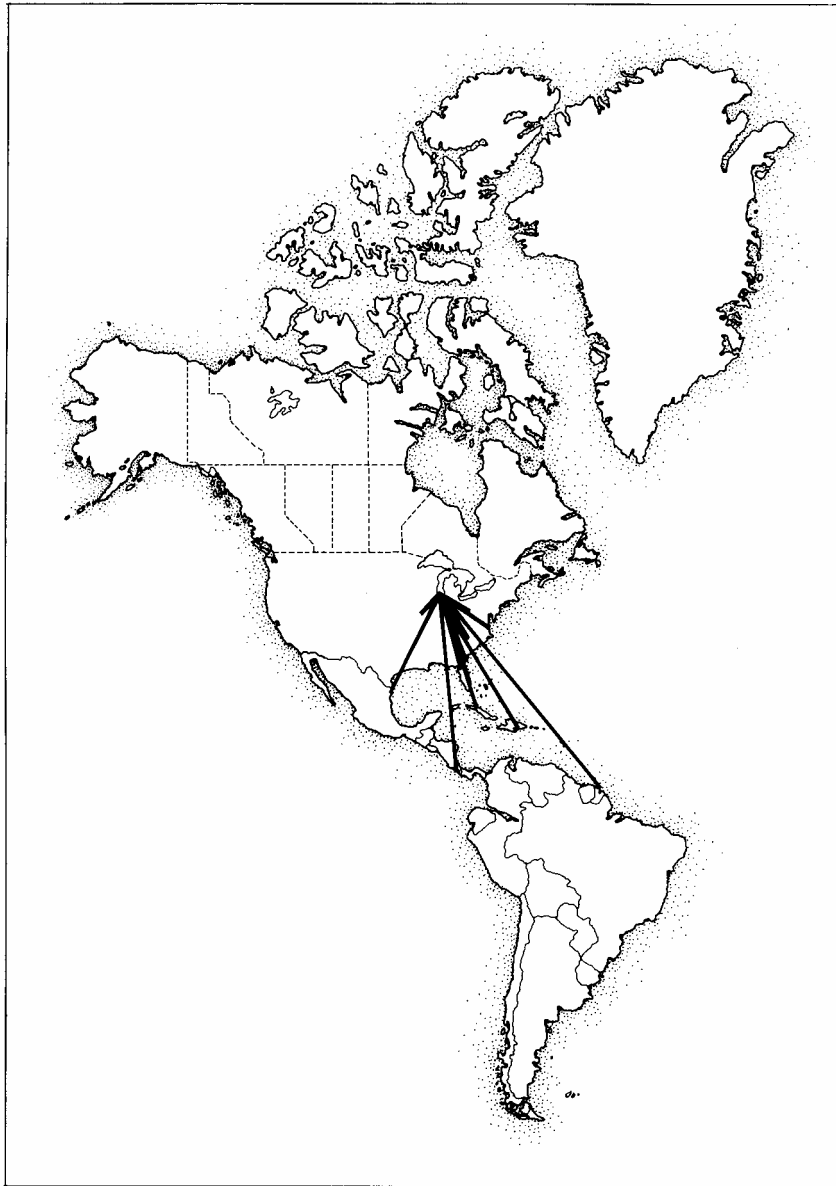


FIGURE 6. Recoveries elsewhere of Peregrines banded in Wisconsin, January 1955-June 1985.

record. In addition, it appears that the Wisconsin migrants sustain higher mortality rates than east or Gulf coast migrants. Only 4 of the 17 recoveries of Peregrines banded in Wisconsin were live, compared to at least 2 of every 3 recovered Peregrines banded on the east and Gulf coasts. Although intense banding efforts on the latter flyways would be expected to account for this difference, it must be noted that the percentage of recoveries is actually higher among the Wisconsin migrants.

Age-specific mortality was ascertained for 88 Peregrines banded as nestlings or hatching-year migrants and later recovered dead. Those banded as adults were not considered because age at death was not always known. For the most part, our method eliminated the biases attendant to estimating mortalities from recoveries discussed by Newton (1979), especially as we did not attempt to establish a yearly mortality rate (non-age-specific) for the entire population and assumed that all mortalities had an equal chance of being found and reported. The potential for overestimating first-year mortality also exists, since future recoveries of more recent bands placed on still-surviving birds cannot be factored into this study. We found that 55 (62.5%) of the 88 individuals did not survive to complete their first northward spring migration. The remaining 33 (37.5%) were recovered dead after their first year (Figure 7).

Because individuals banded as nestlings may endure a higher first-year mortality than those banded on migration, these samples were further separated and analyzed. Only 58% of 38 nestlings were first-year mortalities, while 66% of 50 migrants did not survive. Possible explanations are: (1) during the stressful migration period, less viable individuals are more susceptible to trapping, (2) observed mortality of those banded as nestlings is biased downwards compared to migrants, because the former die before migration to remote areas where discovery is unlikely, and (3) sample size is insufficient for meaningful conclusions. A larger statistical base would enhance accurate representation of yearly mortality beyond the first year.

The recoveries of two Peregrines banded on the Maryland portion of Assateague Island warrant special mention. A female banded as an adult on 7 October 1965 was recovered alive on the Virginia portion of Assateague Island on 2 October 1975; thus she was at least in her 12th year when retrapped. A hatching-year male banded on 25 September 1975 was recovered alive at Nuniluk Bluff, Colville River, Alaska on 15 July 1984 and was later shot and killed in Alagoas State, Brazil in December 1984. In addition to providing two upper longevity records, these returns and others less noteworthy bring us to a final point. We said previously that Peregrines display fidelity to

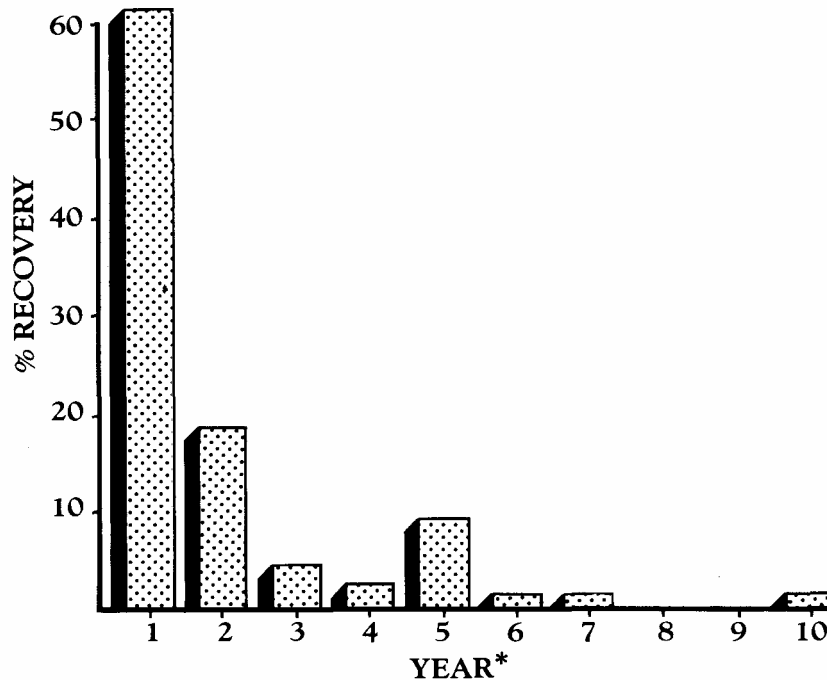


FIGURE 7. Peregrines banded as nestlings or hatching-year birds and recovered dead ($n=88$ records).

**Note: Individual is considered to have survived year if it completes northward migration to breeding grounds in spring.*

their chosen migratory routes. The first individual above made a minimum of 12 southerly migrations and was captured twice on migration; the second was captured on southerly migration once in 10 trips. Other recoveries demonstrate the same fact, i.e., individuals observed and captured on migration constitute a small fraction of the actual migratory population.

SUMMARY

Most Greenland Peregrines migrate along the east coast in autumn and constitute a significant proportion of migrants on that flyway; the same is true of Alaska Peregrines and the Gulf coast. Migrants of any origin may appear on any flyway and tend to display fidelity to that same flyway on subsequent southerly migrations. Many wintering areas are shared by east and Gulf coast autumn migrants, but members of

each group also seem to winter in areas unique to their migratory population. A significant northerly migration occurs along the Texas Gulf coast in spring, but there is no indication of a similar spring concentration on the east coast. Peregrines banded on autumn migration in Wisconsin comprise a separate but not distinct migratory population, which mixes more on wintering grounds with east coast autumn migrants than with Gulf coast counterparts. Recoveries of all banded first-year Peregrines suggest a 63% mortality before completion of their first northward migration. Those banded as nestlings suffered a 58% first-year mortality, but both estimates are subject to bias. Finally, recoveries suggest that only a small fraction of autumn migrants are observed or captured in any given year.

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