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PEREGRINE FALCONS AND MERLINS IN SINALOA, MEXICO, IN WINTER

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ABSTRACT.—Peregrine Falcons (*Falco peregrinus*) and Merlins (*F. columbarius*) were observed on the west coast of Mexico near Culiacan, Sinaloa, in fall 1989 and 1990. The vast marsh attracted several million waterfowl and shorebirds, and in turn many peregrines. In the marsh, we saw 2.0 and 2.3 peregrines per hour in 1989 and 1990, respectively, when we corrected for re-sightings. Sightings on a barrier beach were far fewer, and an average of one peregrine was seen each 39 km traveled. No migration of peregrines was evident. Three female peregrines were radiotagged and resulting locations for each bird had maximum diameters of 4, 8, and 19 km for up to 24 d. About 77% of all peregrines were adult females and all three North American subspecies may have been present. Teal were the most common prey of peregrines in the marsh, but other species were taken on the flats and beaches. Merlins were over three times more common than peregrines on the beach; one was seen for every 12 km of travel. We believe this region is a major wintering area for peregrines and merlins. A banded peregrine was trapped that had originated in Grand Teton National Park.

Halcónes de las especies *Falco peregrinus* y *Falco columbarius* en Sinaloa, México, en invierno

EXTRACTO.—Halcones de las especies *Falco peregrinus* y *F. columbarius* fueron observados en la costa oeste de México cerca a Culiacán, Sinaloa, en los otoños de 1989 y 1990. El amplio pantano atrajo muchos millones de aves acuáticas y aves de las orillas, y en su turno muchos Halcones Peregrinos. En el pantano, vimos 2.0 y 2.3 Halcones Peregrinos por hora en 1989 y 1990 respectivamente, cuando hicimos los ajustes para probables repeticiones de observaciones. Observaciones en la playa de la península fueron muy pocas, y un promedio de un Halcón Peregrino fue visto por cada 39 km de viaje. Migraciones de Halcones Peregrinos no fueron evidentes. Tres Halcones Peregrinos hembras fueron radio-controladas, y en las resultantes áreas habitadas por cada ave la dispersión máxima fue de 4, 8, y 19 km de diámetro, para períodos de hasta 24 días. Cerca del 77% de todos los Halcones Peregrinos fueron hembras adultas; y todas las tres sub-especies norteamericanas puede que hayan estado presentes. Cercetas (*Anas crecca, A. discors, A. cyanoptera*) fueron la presa más común de los Halcones Peregrinos en el pantano, pero otras especies fueron cogidas en los llanos y las playas. En la playa, los halcones de la especie *F. columbarius* fueron comunes en más del triple que los halcones de la especie *F. peregrinus*; se vio uno por cada 12 km de viaje. Creemos que esta región es una área de mayor importancia para los halcones de ambas especies en el invierno. Se atrapó un Halcón Peregrino anillado originado en Parque Nacional Grand Teton.
[Traducción de Eudoxio Paredes-Ruiz]

Migration of Peregrine Falcons (*Falco peregrinus*) on the Gulf Coast of Mexico is well known (Enderson 1965, Hunt et al. 1975, Yates et al. 1988). The majority are of high latitude origin and winter in Central and South America, but some winter as far north as Texas and Florida. Migrant or wintering peregrines on the west coast of Mexico have not been studied. The presence of a wintering population near Culiacán, Sinaloa, was first suggested by P. Widener (pers. comm.) based on observations of duck hunters.

We visited the area from 28 December 1989 to 14 January 1990 and from 10 October to 6 November 1990 to determine the abundance, distribution and behavior of peregrines. By capturing banded individuals we hoped to determine their origin. Telemetry was used to ascertain migration and use of habitat.

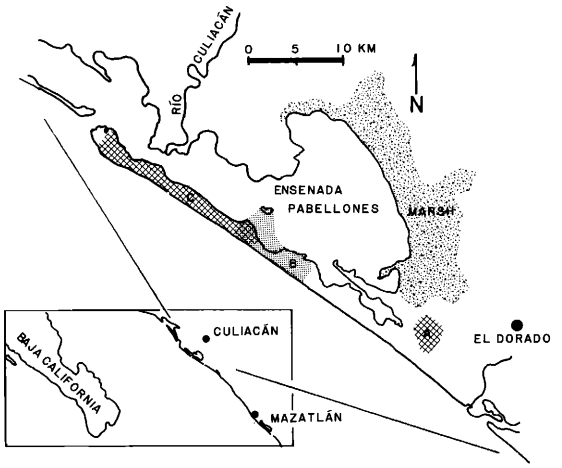

Figure 1. Areas used by radio-tagged adult female peregrines in winter 1989–90 (A on sand flat), and in fall 1990 (B and C on Península de Lucenilla).

STUDY AREA AND METHODS

The Culiacán area, east of southern Baja California (Fig. 1), is a coastal plain 40 km wide and 130 km long used for irrigated farming. The Gulf of California there is bordered by barrier beaches. Extending 8–17 km inland are salt water bays and farther east, fresh water marshes. Where crops are not cultivated, low scrub woodland occurred on the high ground. Near sea level, shallow pools in vast open sand flats with little vegetation attracted shorebirds and waterfowl. In the first period, winter 1989–90, we searched for peregrines on such flats, and in a freshwater marsh 6 km wide and 20 km long on the mainland side of a bay, Ensenada del Pabellones (Fig. 1). In the second period, fall 1990, we also searched a 43 km long barrier beach, Península de Lucenilla, seaward of the bay and marsh.

The marsh was open water, usually less than 1 m deep, except for about 25% coverage by cattails (*Typha* sp.). Several hundred thousand each of Northern Pintails (*Anas acuta*), Cinnamon Teal (*A. cyanoptera*), Green-winged Teal (*A. crecca*), and American Coots (*Fulica americana*) were present. Yellow-headed Blackbirds (*Xanthocephalus xanthocephalus*) were the most conspicuous icterid. Blackbirds of several species, important prey of peregrines nesting in the western United States, numbered in the millions.

We traveled on the marsh by airboat, recording the age-group and sex of peregrines attracted to thousands of waterfowl flushed from our path. Sex was determined by relative size and wing-beat rate. In the first period, we searched flats only from roads, but in the second period we used all-terrain vehicles to reach the flats and outer barrier beach. Peregrines were captured using Rock Doves (*Columba livia*) with noose harnesses. Tail-mounted transmitters, 216 mHz, were placed on three adult females, and locations determined for up to 24 d afterward, often by searching until the bird was seen.

RESULTS

Habitat Use. In 24 hr of searching the marsh by airboat over 10 d in the first winter period, we saw 58 peregrines (2.4/hr). In the second period, 9 were seen in 3.5 hr (2.6/hr). When we adjusted for probable repeat sightings and omitted trips when resightings could not be determined based on plumage characteristics or location, 31 individuals were seen in 15.5 hr in the first period (2.0/hr) and 8 in 3.5 hr (2.3/hr) in the second period. One peregrine seen in the second period bore an anodized black band on the left leg, of the type used in the western United States. In the first period, five of the searches exceeded 2.5 hr and between 5 and 11 individuals were seen in each period.

In the second period, we made 10 complete and 2 partial trips on the 43 km barrier beach on Peninsula de Lucenilla. Peregrines seen on the first legs of the round trips, totaling 473 km, were recorded. We saw a peregrine for every 39 km of travel. Generally the outer beach had few peregrines. No more than six individuals were thought present in the period between 12 October and 6 November 1990.

In the first period, on 31 December 1989, we radiotagged an adult female on the largest flat 9 km west of the town of El Dorado (Fig. 1). This female bore a band attached in 1982, in Teton Park, Wyoming, where the bird was released. This bird was subsequently found on the flats three times in the presence of an adult male. In the second period, two adult females used the same flat and were seen in view of each other several times. One was wearing a black band on the left leg.

Dispersion. The adult female caught on the flat in the first period, and the two adult females caught on Peninsula de Lucenilla in the second period were equipped with transmitters and tracked for periods of 14, 23 and 24 d, respectively, until we left the region. The first falcon was located on each of six days when we searched, in an area smaller than 4 km in diameter. The bird was on the ground in the open, on posts, or twice in trees less than 3 m high.

The other two peregrines were captured on 14 and 15 October 1990. They were found 12 and 10 times, with maximum dispersion less than 19 and 8 km in extent, respectively (Fig. 1). Signals from the latter bird sometimes came from a small island in the bay inland of the peninsula. Both birds were located whenever we searched and were actually seen in several searches. They unpredictably moved in

the areas they frequented and showed no trend to move over days in a given direction. All three birds appeared to be established winter residents.

Age and Sex Ratios. Most peregrines identified were adult females. Combined totals for both periods in the marsh were 41 adult females, 2 adult males, 6 hatch-year females, and 4 hatch-year males. On the beach in the second period nine adult females, one hatch-year female, one hatch-year male, and a yearling female mid-way in the molt to adult plumage were seen.

Prey. Ducks flushed by airboats in the marsh attracted peregrines. We saw nine ducks caught when falcons rushed large flocks in near-level flight, but some attacks were from below. Once a pintail was caught and then released when the load seemed too heavy to carry; the falcon caught a teal soon afterward and flew inland. Fourteen teal, seen caught or identified from remains included a Blue-winged Teal (*A. discors*), two Cinnamon Teal and two Green-winged Teal (*A. carolinensis*). Nine teals were not identified to species. Other fresh prey remains, abandoned by peregrines at our approach, included a White-winged Dove (*Zenaida asiatica*), a Cattle Egret (*Bubulcus ibis*), and three unidentified shorebirds.

Merlins. Merlins (*F. columbarius*) were recorded on 11 trips on the beach in fall 1990. Sightings on the return trip were omitted to avoid repeat counts. In all, 36 Merlins were seen in 430 km of travel (1 individual/12 km). Many others were seen on the flats. Merlins attacked flocks of small shorebirds but most often were seen eating or carrying small passerines. Several were seen chasing small birds among the dunes. Very dark Merlins resembling *F. c. suckleyi,* typical of the North American Pacific Northwest, and pale birds, typical of the *F. c. richardsonii* from the Northern Prairie were seen.

DISCUSSION

The enormous prey resource attracted large numbers of peregrines to the Sinaloa area. The 130 km^2 marsh was probably hunted regularly by an estimated 10–20 peregrines based on the portion we searched and the rate of sightings. Some were seen on the few dead trees in the otherwise open marsh, but most hunted from perches on the perimeter and returned to perches with prey. Ducks larger than teal were probably not often taken because they are difficult to carry and there was little dry ground in the marsh where a falcon could land and feed.

The open flat with shallow pools near El Dorado was regularly used by one peregrine in the first period and by two in the second. These birds usually fed by 0700 H, suggesting conditions conducive to easy hunting. We saw several attacks where the peregrine climbed steeply to 100–200 m and then flew powerfully in an increasingly high speed dive. Prey was usually hit near the ground.

The barrier beach had few peregrines compared to Merlins, and seemed to have few prey birds in the size range taken by either falcon. No peregrine was seen hunting there, although an adult female was seen eating a medium-sized shorebird. Most peregrine prey was probably caught on the bay side of the peninsula, perhaps over water. Merlins probably hunted inland from the beach where large open grassland areas were present. When flushed on the beach, Merlins nearly always flew inland. The wide, open beach was seemingly attractive to both species because it offered numerous perching places on driftwood clear of vegetation.

In contrast to the eastern coast of Mexico, no peregrine migration was evident in this study. In the second period, when the migration was at its peak on the east coast (T. Maechtle, pers. comm.), we never saw more than three peregrines on the beach in one day. Furthermore, on 4 of 12 trips no peregrine was seen, although the positions of radio-tagged falcons were found. If a migration typical of the coast along the Gulf of Mexico had been in progress we might have encountered several times more peregrines each trip and those would have been replaced by others of different plumages and sexes within a few days, revealing a turnover of individuals.

We believe only 1–2 individuals in addition to the two radio-tagged birds were resident on the 43 km long peninsula. Peregrines apparently use coastal areas in winter in other regions. Of 10 banded peregrines from Canada recovered in winter in Central and South America, seven were within 30 km of coasts (Schmutz et al. 1991).

Some of the peregrines wintering near Culiacán are from the western United States. Besides the evidence provided by the three banded birds encountered, plumages of many were like those nesting in the Rocky Mountains or the Colorado Plateau. The warm climate, and very abundant prey resource of the study area sharply contrast with the cold montane nights and relatively sparse prey resource encountered by these birds in the breeding season. Curiously, only 1 of 45 peregrines, most banded in

western Canada, was recovered on the Pacific coast (Schmutz et al. 1991).

Apparently not all peregrines in Sinaloa in winter are of inland, temperate origin. One of the captured females was in mid-molt in mid-October (4 of 12 tail feathers were fully grown), typical of peregrines from the arctic. The captured hatch-year male was typical of *F. p. pealei* from Pacific maritime regions.

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NOTE ADDED IN PROOF:

We recently learned that Bird C (Fig. 1) was identified by our marker-band on 8 July 1991, nesting 50 km downstream of Eagle, Alaska. She had two young and her transmitter was still in place.