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PEREGRINE FALCON RECOVERY ALONG THE WEST CENTRAL COAST OF THE BAJA CALIFORNIA PENINSULA, MEXICO

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ABSTRACT.—The central west coast of the Baja California peninsula was an important Peregrine Falcon (*Falco peregrinus*) breeding area supporting a population of about 13 breeding pairs. This population declined drastically during the 1960s and early 1970s. We conducted field surveys and compiled data on nesting Peregrine pairs from 1980–94 to address the current status of the Baja population. We found 10 pairs nesting in the area indicating the Peregrine population has recovered in the area since the late 1970s. Due to increased human activity in the area, proper management is needed to provide suitable nesting sites and to minimize human disturbances during the nesting season.

KEY WORDS: *Peregrine Falcon; recovery; status; Baja California;* Falco peregrinus.

Recuperación del halcón peregrino en la costa centro occidental de la península de Baja California, México.

RESUMEN.—La costa centro occidental de la península de Baja California, ha sido un área importante de reproducción del halcón peregrino (*Falco peregrinus*), manteniendo alrededor de 13 territorios de anidación. Esta población declinó drásticamente entre los años 1960s e inicios de los 1970s. Nosotros realizamos estudios en el campo y recabamos datos sobre las parejas anidantes de peregrinos entre 1980 y 1994 para determinar su situación actual. Encontramos diez parejas de peregrinos anidando en el área. Nuestros hallazgos sugieren que los peregrinos se han estado recuperando desde finales de los años 1970s. Las actividades humanas están creciendo en el área, lo que representa tanto amenazas como oportunidades para los peregrinos. Se requiere de un manejo apropiado que proveea de sitios adecuados de anidamiento para minimizar las pérdidas reproductivas asociadas al hombre durante la estación reproductiva.

[Traducción Autores]

Peregrine Falcon (*Falco peregrinus*) recovery has been documented in several regions of the world (Fyfe 1988, Kiff 1988, Ratcliffe 1993, Enderson et al. 1995). Nesting territories, deserted during the decline of the species are now being reoccupied by breeding pairs. Reproduction has now returned to pre-DDT levels (Kiff 1988, Newton 1979, Ratcliffe 1993). The ban on DDT use in many countries (Ratcliffe 1993) and the success of Peregrine recovery programs (Fyfe 1988, Ratcliffe 1993) has contributed to the Peregrine's removal from endangered status and to a redesign

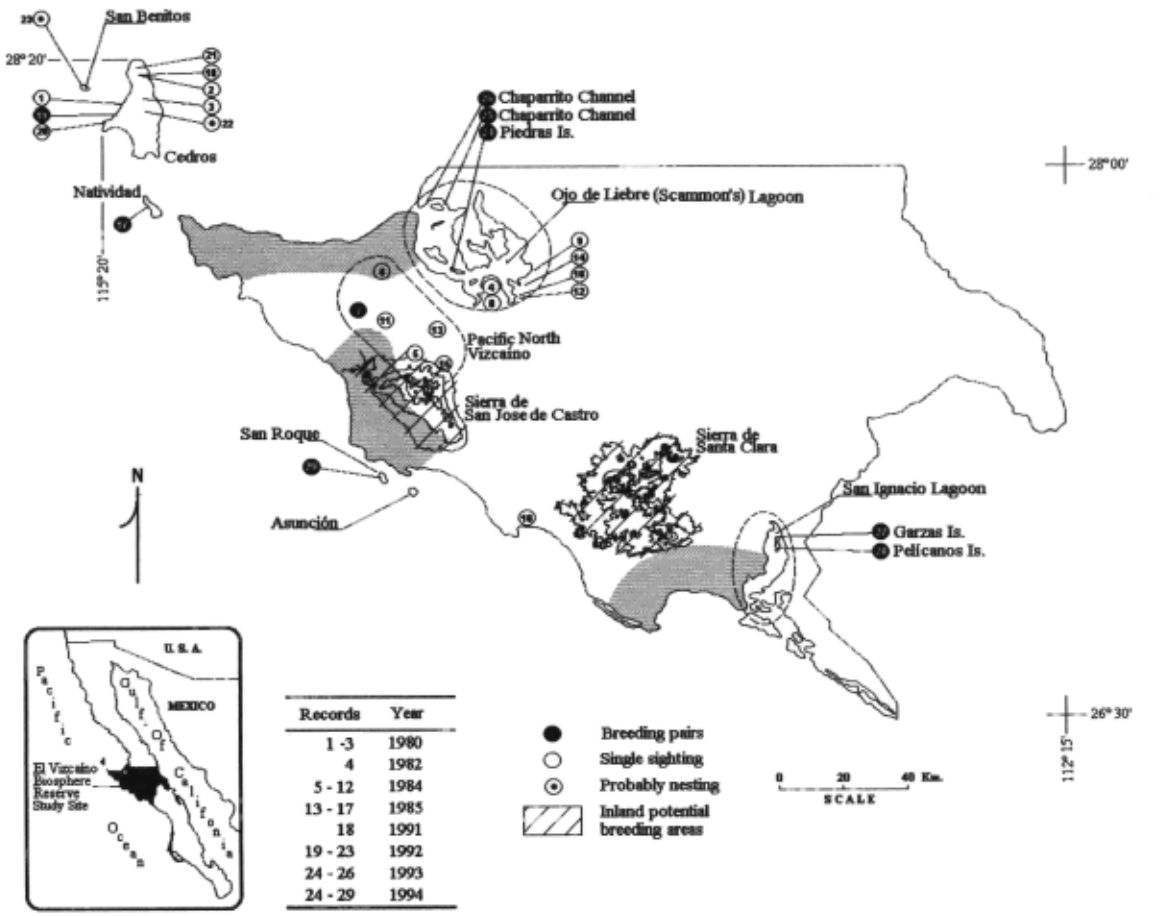

Figure 1. Recent records of nesting Peregrine Falcons on the central west coast of Baja California, Mexico. (Shaded areas are Banks, 1969 records.)

of its management strategies (Walton and Thelander 1988).

The historical and current status of the Mexican Peregrine Falcon population is not well known (Banks 1969, Fyfe et al. 1976). Populations in the Baja California peninsula and the Gulf of California are known to have declined between 1967–84 (Porter et al. 1988). By 1976, the Baja west coast population, once containing 38 breeding pairs, was considered on the brink of extirpation (Fyfe et al. 1976). However, recent reports of newly occupied nesting territories in this area (Daneman and Guzmán Poo 1992, Castellanos et al. 1994) suggest a recovery is in process. In this report, we provide information on current numbers, distribution, and productivity of Peregrines, and discuss their conservation needs on the west central coast of the Baja California peninsula.

STUDY AREA AND METHODS

The study area, a part of El Vizcaino biosphere reserve, covers about 350 km along the west coast of Baja California, Mexico (Fig. 1). The study area includes: desert islands, a coastal fringe of mostly sandy beaches and two big coastal lagoons with extensive wetlands (Massey and Palacios 1994). Most of the area is covered with halophytic vegetation, 30 cm high. Mountains are restricted to Benitos and Cedros Islands and some parts of the El Vizcaíno reserve.

We used three data sources on the breeding population of Peregrine Falcons in the area. Data from 1980–85 were obtained by F. Jaramillo during wildlife inventories to promote the creation of the El Vizcaino Reserve and in 1994 on Cedros and Benitos Islands. Data from Ojo de Liebre and San Ignacio lagoons were obtained by

A. Castellanos, F. Salinas, C. Arguelles and A. Ortega in 1993–94. Nesting surveys of breeding Peregrine Falcons were conducted by searching the plateaus, canyons, hills and islands on foot and inspecting all potential nesting sites using binoculars. Boats were used to explore the lagoons and to reach the islands. We also used recent records in the oological collection of the Western Foundation of Vertebrate Zoology (WFVZ) and personal reports from other individual observers. We compared our data with those of Banks (1969). Productivity of breeding pairs was estimated by checking three nests in 1993 and five nests in 1994.

RESULTS AND DISCUSSION

We located at least 10 nesting pairs of Peregrine Falcons in six locations in the survey area, including small islands in the open sea, islets inside coastal lagoons and an inland mountainous zone (Fig. 1). The maximum number of pairs seen in a single year was six pairs in 1994 when we observed pairs on San Roque islands, Laguna Ojo de Liebre (Piedras Island and El Chaparrito navigation channel) and San Ignacio Lagoon (Pelicano and Ballena Islands) (Fig. 1, Table 1). Because not all the historical and potential nesting sites were surveyed, we considered this to be a minimum estimate of the total number of breeding pairs in the area. The historical population estimate for the study area was about 13 pairs (Banks 1969).

Breeding pairs were found on small cliffs, directly on the ground, in Osprey nests and on artificial structures such as channel markers and shipwrecks. Ojo de Liebre (Scammon's) lagoon nest sites were new (Castellanos et al. 1994). Lack of inland nesting records from the study area led us to believe that the cliff-nesting pairs on Pacific North Vizcaino (near Sierra San José de Castro) were also new to the breeding population. A nesting record in the WFVZ reported by B. Reitherman in 1981 documented a pair nesting at San Ignacio Lagoon for the first time. Daneman and Guzmán Poo (1992) also found two pairs nesting there in 1989.

In addition to the 10 nesting pairs, there were several recent single sightings and two probable nest site reports from Benitos and Cedros islands (Fig. 1, Table 1). Nearest nesting site distances varied between 4.4 and 60 km. Nests were 4.4 km apart in San Ignacio lagoon and 8 and 22 km apart in Ojo de Liebre lagoon (Fig. 1)

We followed the reproductive success of three pairs during 1993 and five pairs during 1994, located at Ojo de Liebre and San Ignacio Lagoons. An average of 3 eggs, 1.8 nestlings, and 1.6 fledglings were produced per nest (Table 2). This productivity appeared to be within the range of productivity for healthy populations (Cade et al. 1988, Ratcliffe 1993).

The Peregrine Falcon is defined by Mexican law as a vulnerable species (Diario Oficial 16 de Mayo de 1994). In spite of its status, lack of national recovery programs on threatened species has failed to produce management plans in their Mexican range. The use of organochlorine pesticides in the region is not well documented but it has apparently been reduced since the late 1970s. Studies conducted then and in the late 1980s in Baja California, the Gulf of California and in northwestern Mexican waterfowl wintering areas show pesticide levels in eggs and bird tissues are among the lowest in North America (Spitzer et al. 1977, Mora et al. 1987). This evidence leads us to believe that current organochlorine pesticide use does not represent a major threat for Peregrines in the region.

We did, however, identify other threats to breeding Peregrines in the area. Nests on the ground are accessible to dogs and cats abandoned by fishermen in the islands. Coyotes (*Canis latrans*) temporarily invade Piedras island in Ojo de Liebre Lagoon destroying the nests of Peregrines, Ospreys and other birds. We found coyote tracks at one failed Peregrine nest in 1994 and presumed the coyote caused the nest failure. Avian depredation by Western Gulls (*Larus occidentalis*) and Common Ravens (*Corvus corax*) is also a problem. Gulls and ravens apparently caused the disappearance of three eggs from a nest on a tower over the water in Ojo de Liebre lagoon.

A third and more serious threat to nesting Peregrines in the area is from humans when fishing, tourism and other human activities cause incidental disturbances at nests (Daneman and Guzman Poo 1992). The study area is still relatively inaccessible and partially uninhabited, thus, habitat destruction apparently is not yet a factor of concern.

The coastal lagoons, islands and wetlands within the study area support a magnificent avifauna which provides adequate numbers and variety of Peregrine prey (Massey and Palacios 1993). Nevertheless, the density of breeding Peregrine Falcons in the area seems to be rather low for such an ideal location. Most of the resident pairs reported are coastal or "small island Peregrines" (Ratcliffe 1993) nesting on small cliffs or even on the ground. This is apparently because of a shortage of suitable natural nesting sites on the main-

Table 1. Historical and recent records of nesting Peregrine Falcons in the central west coast of Baja California. Recent records are from 1980–94.

LOCALITY SOURCES AND DATE	INDIVIDUAL/NEST	REFERENCE
San Benitos Islands		
Walker, 1927 and 1950	4 nests	Banks (1969)
Tyler, 8 April 1930	Nest with 2 eggs	WFVZ, this study
Harrison, 1 April 1938	Nest with 2 eggs	WFVZ, this study
22 March 1992	1 seen	This study
Cedros Island		
Kaeding, 1905	Common, breeding	Banks (1969)
Carpenter, 2 April 1932	Nest with 4 eggs	WFVZ, this study
8, 31 July and 18 August 1980	1 seen	This study
April 1991	1 seen	This study
2, 3 and 15 March 1992	1 pair, 2 sightings	This study
22 March 1992	1 female, 1 male	This study
Natividad Island		
Sechrist, 12 March 1917	Nest with 4 eggs	WFVZ, this study
Lamb, December 1924	6 pairs resident	Banks (1969)
D.S.D., 6 April 1930	Nest with 3 eggs	WFVZ, this study
Bancroft, 3 April 1932	2 nest with eggs	WFVZ, this study
31 July 1985	1 breeding pair	This study
Ojo de Liebre Lagoon		
26 January 1982	1 seen	This study
June, October, November 1984	1 seen	This study
29 July 1985	2 females and 2 males	This study
21 September 1985	1 seen	This study
1993 (Castellanos et al. 1994)	3 breeding pair	This study
San Roque Island		
Huey, 20 April 1927	Nest with 2 eggs	Banks (1969)
D.S.D., 5 April 1930	Nest with 3 eggs	WFVZ
Harrison, 6 April 1932	Nest with 4 eggs	WFVZ, this study
L. Flores, 1994	1 breeding pair	L. Flores pers. comm.
Asuncion Island		
Walker, 1938	1 pair	Banks (1969)
San Ignacio Lagoon		
Reitherman, 11 April 1981	Nest, 2 young, 2 eggs	WFVZ, this study
September 1985	1 pair, one seen	This study
Daneman & Guzmán Poo, 1992	2 breeding pairs	Daneman & Guzmán Poo, 1992
March–June, 1994	2 breeding pair	This study
Pacific North Vizcaino		
13 June, 1984	1 breeding pair	This study
June 1984	1 breeding pair	This study
4 November 1984	2 seen	This study
March and September 1985	2 seen	This study

Table 2. Peregrine Falcon reproductive success during 1993–1994 on the Scammon's and San Ignacio lagoons.

	1993	1994	
	SCAMMON'S LAGOON	SCAMMON'S LAGOON	SAN IGNACIO LAGOON
Occupied nests checked	3	3	2
Productive nests	3	1	1
Total eggs laid	10	10	4
Eggs failed to hatch	1	—	—
Eggs disappeared	—	6[a]	—
Eggs broken	—	1[b]	1[b]
Average clutch size	3.3	3.3	2.0
Nestlings	9	3	3
Nestling disappeared	1	1	
Total young fledged	8	2	3
Nestlings/occupied nest	3	1.0	1.5
Fledglings/occupied nest	2.6	0.6	1.5
Fledglings/productive nest	2.6	2.0	3.0

[a] Probably avian and coyote depredation.
[b] Unknown causes.

land coast, inland and on small islands, a factor that limits cliff-nesting raptors in other areas (Ratcliffe 1993). Peregrines do take advantage of suitable artificial nesting sites when they were available in the study area (Castellanos et al. 1994)

Given these circumstances, we suggest the implementation of a Peregrine Conservation Program in the El Vizcaino Reserve, focusing on the following: a) regular surveys of historical and new nesting territories to assess the current population status and trends; b) studies of biology and nesting ecology to enhance knowledge of this poorly known resident population; c) installation of artificial nesting substrates to increase the population on the mainland coast and at coastal lagoons; and d) an education program to promote public awareness of this and other species of wild birds.

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