

A SURVEY OF GOLDEN EAGLES IN NORTHERN MEXICO IN 1984 AND RECENT RECORDS IN CENTRAL AND SOUTHERN BAJA CALIFORNIA PENINSULA

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ABSTRACT.—Results of a Golden Eagle (*Aquila chrysaetos*) survey in the states of Coahuila, Durango, Zacatecas, Chihuahua, and Sonora in 1984, and records of eagles in the southern portion of the Baja California peninsula are presented. Results showed that Golden Eagles were common in all northern states of Mexico and in southern Baja California peninsula. Although most were found in sierras with oak-pine forest vegetation and valleys with grasslands, Golden Eagles were also found to be common in xerophytic scrub vegetation. In Baja California Sur, Golden Eagles were recorded in sierras and valleys with oak-pine forest, but more frequently in xerophytic scrub vegetation. We found old nests that were probably constructed by Golden Eagles, but no actual breeding activity was recorded in the state of Baja California Sur. More studies should be done in order to understand the trends of Golden Eagle populations in Mexico. The Golden Eagle National Recovery Plan supports the idea that long-term studies on Golden Eagles in Mexico should be done to better understand the factors affecting populations on the local and regional scale.

KEY WORDS: *Golden Eagle; Aquila chrysaetos; Coahuila; Durango; Zacatecas; Chihuahua; Sonora; Baja California peninsula; Mexico.*

Monitoreo de águila real en el norte de México (1984), y algunos registros recientes del centro y sur de la península de Baja California

RESÚMEN.—Se presentan los resultados de un recorrido por los estados norteros de Coahuila, Durango, Zacatecas, Chihuahua y Sonora, México realizado en 1984 buscando águila real. Asimismo, se presentan los resultados de los registros de águila real en la península de Baja California. Las águilas fueron encontradas principalmente en sierras con bosque de encino-pino y en valles con pastizales, aunque también fueron comunes en la vegetación de matorral xerófilo, habiéndose registrado en 18 localidades en Coahuila, 17 en Durango, 16 en Chihuahua, 13 en Zacatecas y 5 en Sonora. En Baja California Sur fueron especialmente frecuentes los registros en el área del desierto de El Vizcaíno y en Sierra de la Laguna. En Baja California localizamos algunos nidos viejos probablemente construídos por águilas reales, sin embargo no hemos sido capaces de localizar parejas reproductivas. Aunque la información para el norte de México es de 1984, puede servir para darnos una idea de la situación de las poblaciones de águila real en aquel periodo. Esta información podría ser contrastada con la situación actual si se hiciera un muestreo similar ahora. En la actualidad no es posible entender las tendencias de las poblaciones de águila real en México debido a que no existe información ubicada de manera temporal que lo permita. El Plan Nacional de Recuperación del Águila Real de México promueve en su estrategia la realización de estudios a largo plazo del águila real como una manera de entender los factores que afectan sus poblaciones en una escala local y regional.

[Traducción del autor]

The Golden Eagle (*Aquila chrysaetos*) has been studied very little in Mexico and, at the present, little published information exists (Watson 1997). In the 1950s, the Golden Eagle occupied an extensive range in the country from northern to central Mexico, and once was reported in the valley of Mexico (e.g., Mexico City). At present, its distri-

bution has been reduced as the burgeoning Mexican population has encroached on its preferred habitats; however, the extent of the decline in the population in Mexico remains unknown. In central Mexico, the Golden Eagle is now recorded in the states of Zacatecas, Aguascalientes, San Luis Potosí, and Jalisco and it is still widely distributed in north-

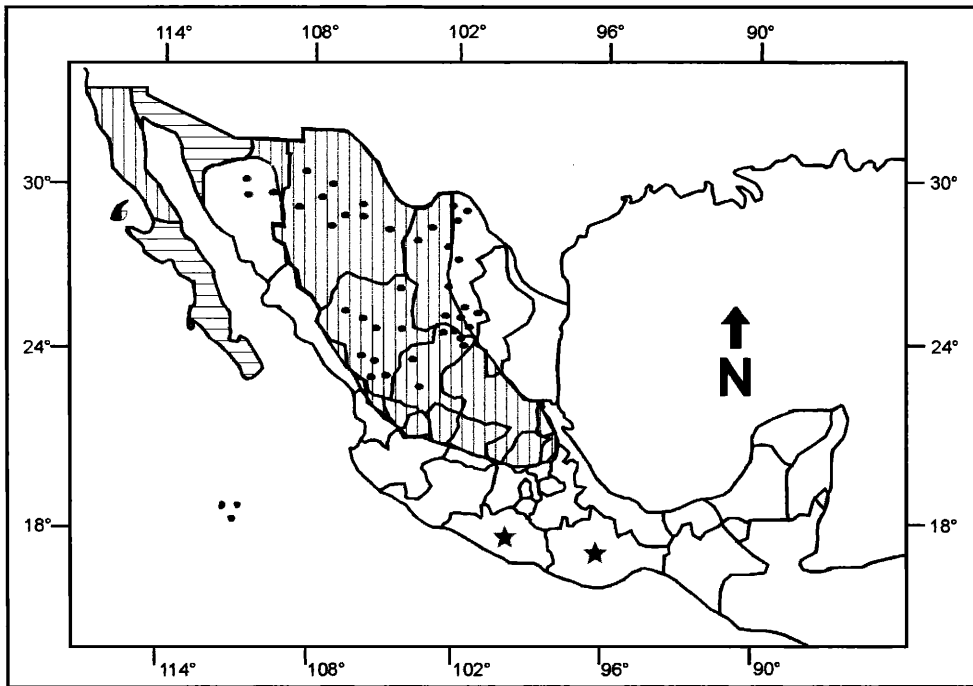


Figure 1. Golden Eagle records (points) in northern Mexico obtained during the 1984 survey. Hatched areas show the Golden Eagle distribution according to Howell and Webb (1995). Museum records of Oaxaca and Guerrero are marked with a star (Ramírez-Bastida and Navarro pers. comm.).

ern Mexico, particularly in remote areas where eagles may nest in the absence of human disturbance.

In 1984, we made the first national Golden Eagle survey in northern Mexico to determine the actual and potential range of the resident breeding population (Rodríguez-Estrella and Nocedal 1985). Although this study was made over an extensive area in a short period of time, the results we obtained give a general idea of the status of the Golden Eagle in 1984 in northern Mexico. Our technical report was the first document used by federal agencies to establish priorities for Golden Eagle conservation. In addition, after our report was published, local studies in several states of Mexico began to determine more precisely the regional status of the Golden Eagle, a species that is listed as Endangered in Mexico (NOM-059, Diario Oficial de la Federación 1994). Herein, we report the results of the 1984 Golden Eagle survey and the records of Golden Eagles in the southern portion of the Baja California peninsula. Our goal is to contribute to the knowledge of the ecology and distribution of the Golden Eagle in Mexico.

STUDY AREA

The study was conducted in the states of Coahuila, Durango, Zacatecas, Chihuahua, and Sonora, and the Baja California peninsula (Fig. 1). Surveys were made in sierras with valleys and canyons. Predominant vegetation was oak (*Quercus* spp.) and oak-pine (*Pinus* spp.) forests in elevated sierras and canyons, xerophytic scrub vegetation in low sierras, valleys, and canyons, and grasslands in valleys.

METHODS

We surveyed Coahuila, Durango, Zacatecas, Chihuahua, and Sonora from October–December 1984. Golden Eagles were surveyed by car and on foot. Potential breeding areas were identified by using 1:50 000 topographic and vegetation maps. Because Golden Eagles are resident year-round, and because overwintering Golden Eagles could be also present in these areas, we made inquiries of local people familiar with Golden Eagles to better determine likely areas to search. These inquiries helped to more accurately determine potential nesting areas (Fuller and Mosher 1981). We were also guided by local people to some nesting areas. We spent at least 10 d in each state, except for Sonora, where we surveyed for 3 d. We did not determine the area of potential breeding habitat we visited because of the possibility some nests could have been overlooked and because there were not previous studies that showed the historical distribution of

Table 1. Sightings of Golden Eagles in northern states of Mexico 1984. Sightings in bold indicate individuals in potential and confirmed breeding areas.

LOCATION	STATE	NUMBER OF EAGLES	HABITAT	VEGETATION	ALTITUDE (m)	DATE
Rancho el Negro	Coahuila	1 [♂]	cliffs, canyons, extensive valleys	desert scrub	1480	12 October 1984
Sierra Maderas del Carmen	Coahuila	1 [♂]	cliffs in front extensive valleys	desert scrub	2000	12 October 1984
Universidad Autónoma Agraria Antonio Narro	Coahuila	2 [♂] , 1 [♂]	canyons in sierras	rosotophyllous scrub with <i>Larrea</i> ; highlands with oak and oak-pine forest	1910	17 October 1984
Rancho Experimental Ganadero los Angeles	Coahuila	1 [♀]	small sierras and extensive grasslands, valleys	pine forest	1940	19 October 1984
Sierra el Campano, los Barrancos	Coahuila	1 [♀]	sierra, abundant cliffs, valley	desert scrub, dominated by mesquite <i>Prosopis</i> sp.	1880	18 November 1984
Sierra la Paila	Coahuila	Common	sierra, abundant cliffs	desert scrub	1200	18 October 1984
Navíos	Durango	1 [♂]	sierra	pine and oak-pine forest	2040	25 October 1984
Pueblo Nuevo	Durango	1 [♀]	sierra	pine and oak-pine forest	1000	26 October 1984
La Michilia	Durango	1 [♂]	sierra	pine, oak-pine forest, grasslands	2380	25 May 1979
		1 [♂]				2 March 1982
		1 [♂]				May 1983
		1 [♂]				14 August 1983
Rancho las Margaritas	Durango	Common	sierra	grasslands	2000	27 October 1984
Cerro San Ignacio, Mapimí	Durango	2 [♂] , 1 [♂]	isolated mountain, valley	xerophytic desert scrub, dominated by <i>Larrea</i> , <i>Agave</i> , <i>Opuntia</i> , <i>Fouquieria</i>	1300	11 February 1984
		1 [♂] , 1 [♂]				
Coatillas o Hacienda Prediseno	Durango	1 [♂]	valley	xerophytic desert scrub	500	27 October 1984
Col. Guanajuato, Carretera a Fresnillo	Zacatecas	3 [♀]	sierra and valley	oak forest in sierra; desert scrub (<i>Opuntia</i> , <i>Larrea</i> , <i>Agave</i>) in valley	—	15 November 1984
Lobatos	Zacatecas	1 [♀]	sierra	oak forest	2000	16 November 1984
Adjuntas del Refugio, Sierra los Alamos	Zacatecas	1	sierra	oak-pine forest	1486	September 1984
Sierra de los Berros	Zacatecas	1	sierra, canyon	pine forest	1940	28 October 1984
Sierra de la Junta	Zacatecas	1	sierra	pine forest	1500	10 November 1984
Melchor Ocampo	Zacatecas	1	cliffs, sierra, extensive valleys	desert scrub, dominated by mesquite	1870	18 November 1984

Table 1. Continued.

LOCATION	STATE	NUMBER OF EAGLES	HABITAT	VEGETATION	ALTITUDE (m)	DATE
Tres Castillos, 9 km from Rancho las Tuzas	Chihuahua	2 ^a	cliffs, valley, desert prairie	microphyllous scrub	1500	28 December 1984
Rancho las Palmitas, Sierra Gomeños	Chihuahua	3 ^a	sierra, extensive valleys	<i>Larrea</i> and <i>Yucca</i> spp.	1560	28 December 1984
Nacori Chico, 24 km, south	Sonora	1 [?]	cliff	pine forest	1180	November 1984
Cumpas (4 kms from the town)	Sonora	1 [?]	sierra, valleys	microphyllous scrub	800	November 1984

^a Adult.^j Juvenile.^s Subadult.[?] Unknown.

Golden Eagles in Mexico. Moreover, we were interested in finding the greatest number of Golden Eagle nests to determine nesting habitat characteristics, but not the density of breeding pairs.

Golden Eagles were surveyed irregularly between 1984–96 in Baja California Sur. Surveys were made by car and on foot, using topographic maps (see Rodríguez-Estrella et al. 1991). Most of the records were obtained from the central part of Baja California peninsula, but individuals were also recorded in the southern part of the peninsula. We particularly surveyed the higher and the lower sierras, including isolated mountains. Vegetation of the area is desert thicket, comprised mainly of mesquite (*Prosopis* spp.), Adam's tree (*Fouquieria diguetti*), paloverde (*Cercidium microphyllum*), and columnar cacti cardons (*Pachycereus pringlei*) (see a detailed description in Rodríguez-Estrella et al. 1991). For northern Baja California, we also conducted a bibliographic survey of the available literature.

RESULTS AND DISCUSSION

Golden Eagles were common in the states of Coahuila (18 locations), Durango (17 locations), Chihuahua (16 locations), Zacatecas (13 locations), and Sonora (5 locations) (Fig. 1, Table 1). Interviews with local people showed that there were other areas where Golden Eagles were commonly observed, but we did not survey them. These areas included Sierra de la Paila, Ejido de Higuera, Ejido Casa Blanca, Sierra de Arteaga (Cañón El Colorado), Mesillas (El Paredón), sheep raising areas of Acuña, and La Muralla in Coahuila; Cofradías, Cebollas, Tepehuanes, Santiago Papasquiaro, Cambray, Ciénega de Escobar, and Rancho Santa Teresa in freeway Durango-Parral in Durango; Azafrán, Sierra de las Peñas in Cañón 2 Bocas, Pico de Teira, Manga del Sacramento, Tatalucas near Valparaíso, and Sierra Guadalupe de las Corrientes in Zacatecas; Sierra del Sueco, Colonia Benito Juárez, Cañón de Santa Clara, Sierra de la Esperanza, Ojo Laguna, Tepehuanes, Madera, Temosachic, Rancho Terrenatos, Sierra Catalina, Rancho El Escondido, Rancho Agua de Pérez, Rancho Maynas, and Mesa Tres Ríos in Chihuahua; San Pedro of Ejido Vicente Guerrero, and Cananea in Sonora. Most eagles were found in sierras with oak-pine forest vegetation and valleys with grasslands. However, Golden Eagles were also found to be common in xerophytic scrub vegetation.

We also recorded Golden Eagles in the Baja California peninsula (Fig. 2, Table 2). During April, July, and October 1984, November 1987, February–March 1988, October 1989, and January–May 1992, 1995, and 1996, we observed 27 adults, 1 sub-adult, and 5 immatures at different sites in Baja California Sur (Table 2, modified from Rodríguez-

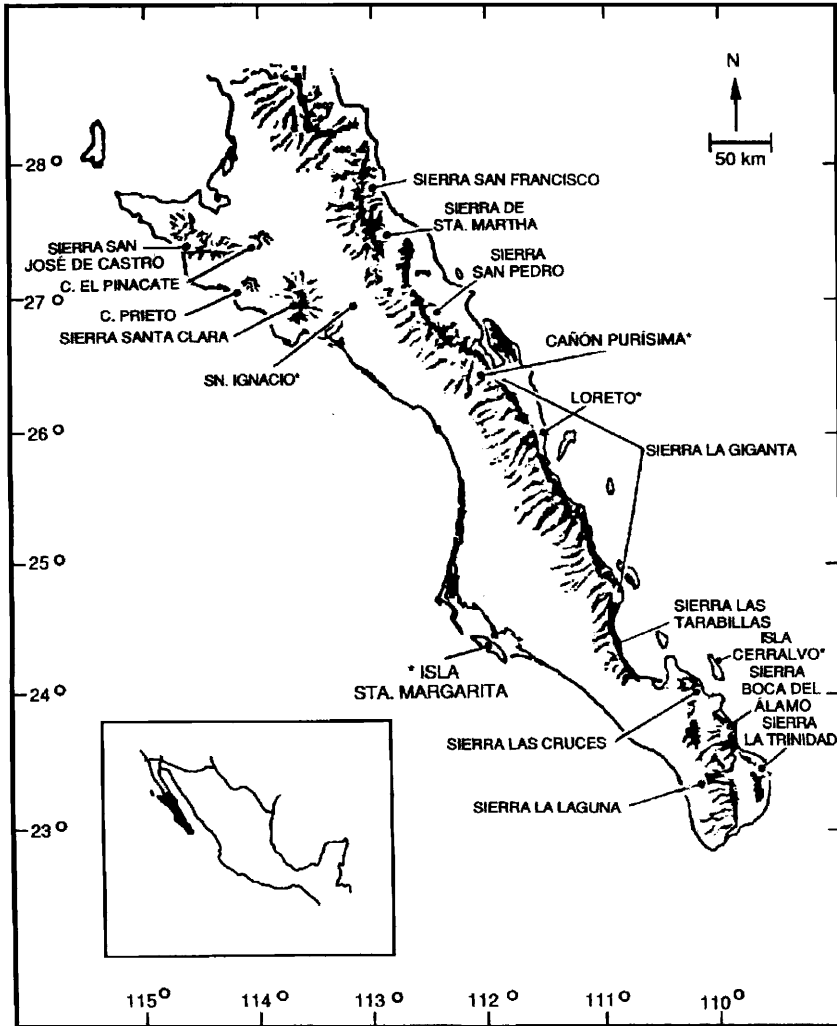


Figure 2. Baja California Golden Eagle records (from Rodríguez-Estrella et al. 1991).

Estrella et al. 1991). Oak-pine forest and xerophytic scrub vegetation were habitats where Golden Eagles were recorded in sierras and valleys. We found old nests that were apparently constructed by Golden Eagles, but recorded no breeding activity. Older local people recognize Golden Eagles and remember nests of the species in some areas, where they no longer nest.

CONCLUSIONS

The status of the Golden Eagle in Mexico is poorly known. Data on Golden Eagle breeding populations in northern Mexico are still scarce and not enough information exists to correctly deter-

mine population trends. Even at well-known sites, data collection has been irregular and little long-term breeding data (5–10 yr) exist. Ecological data are poor and knowledge of population trends does not exist. The information we present could help to determine a general trend in surveyed areas of northern and northcentral Mexico if a repeat survey is carried out. The status and distribution of Golden Eagles in Baja California has not been clearly determined (see Rodríguez-Estrella et al 1991). However, Golden Eagle population in Baja California Sur seems to be stable. Additionally, there could be two Golden Eagle populations in Baja California, one resident, nonmigratory breed-

Table 2. Historical Golden Eagle records from Baja California Peninsula (modified from Rodríguez-Estrella et al 1991). Numbers inside an entry indicate sightings of eagles. Each number indicates the number of individuals recorded in one site.

SITE	DATE	NUMBER OF INDIVIDUALS	SOURCE
North of Vizcaíno Desert			
Nachoguero (32°29')	5 October 1946	1	Hill and Wiggins 1948
Ensenada (31°43')	9 April 1967	1 ^a , 1 ^a	Short 1967
Laguna Hanson (31°39')	21 October 1926	1 ^b	Grinnell 1928
	7, 8 October 1946	1, 2	Hill and Wiggins 1948
Santo Tomás (31°31')	16 October 1946	Several	Hill and Wiggins 1948
San Telmo (30°49')	1893	2 ^c	Anthony 1893 (cited in Grinnell 1928)
	21 October 1946	3	Hill and Wiggins 1948
San José (30°48')	October 1946	Nest ^d	Hill and Wiggins 1948
	20 October 1946	1	Hill and Wiggins 1948
San Quintín (30°31')	25 February 1925	1	Huey 1926
La Grulla (30°04')	15 June 1923	1	Huey 1926
San Fernando (29°59')	1895	1	Anthony 1893 (cited in Grinnell 1928)
El Mármol (29°48')	26 October 1946	1	Hill and Wiggins 1948
Isla San Lorenzo (28°31')	17 April 1977	1	Wilbur 1987
Vizcaíno Desert			
Cerro El Pinacate (27°32')	7, 9, 10–12 July 1984	1, 1, 1, 2, 2	Rodríguez-Estrella et al. 1991
Sierra San Francisco (27°31')	11, 12 March 1988	1, 1	Rodríguez-Estrella et al. 1991
	27 October 1989	2 ^a	Rodríguez-Estrella et al. 1991
Sierra Santa Martha (27°25')	19 March 1988	1	Rodríguez-Estrella et al. 1991
Sierra de la Cabra (27°24')	17 November 1987	1	Rodríguez-Estrella et al. 1991
Sierra de Santa Clara (27°08')	14 October 1984	2	Rodríguez-Estrella et al. 1991
	8 May 1996	2, 1	This study
San Ignacio (27°02')	17 January 1985	1	Wilbur 1987
San Hipólito (26°59')	13, 14, 17 April, 15 October 1984	1, 2, 2, 2	Rodríguez-Estrella et al. 1991
South of Vizcaíno Desert			
Cañón Purísima (26°20')	17 November 1946	1	Hill and Wiggins 1948
Loreto (25°53')	15 January 1985	1	Wilbur 1987
Isla Santa Margarita (24°24')	25 April 1984	1	Amador 1985
Isla Cerralvo (24°12')	26 October 1961	1	Banks 1963
Isla Espíritu Santo	May 1995	1	This study
Los Planes (24°05')	June 1988	1	Rodríguez-Estrella et al. 1991
La Rivera (23°31')	November 1989	1	Rodríguez-Estrella et al. 1991
Sierra de la Laguna (23°19')	25 January 1990	1 ^a , 1	Rodríguez-Estrella et al. 1991
	3 February 2000	1	This study

^a Immature.

^b Skeleton in the Museum of Vertebrate Zoology, University of California, Berkeley, California U.S.A.

^c Eagles nesting.

^d A nest in good repair in a ponderosa pine (*Pinus ponderosa*).

ing population, and a migratory, overwintering population that breeds elsewhere, probably in the U.S. (Rodríguez-Estrella et al. 1991).

Golden Eagle numbers in Mexico have certainly decreased in some areas, especially in those areas heavily influenced by people. Many suitable habitats still exist in remote areas and Golden Eagles may persist in those habitats. Although local ex-

tinctions may be occurring in Mexico, the status on a regional scale is unclear.

More studies should be done to understand trends in Golden Eagle populations in northern and northcentral Mexico. The Golden Eagle National Recovery Plan (Plan Nacional de Recuperación del Aguila Real) encourages long-term studies of Golden Eagles in Mexico to better understand

the factors affecting populations on the local and regional scale. Current studies are now being done in Zacatecas, Durango, Chihuahua, and the Baja California peninsula. It is hoped that more information will be obtained in the coming years.

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