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STATUS OF TUNDRA SWANS AND TRUMPETER SWANS IN MEXICO

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ABSTRACT.—We summarize Tundra Swan (*Cygnus columbianus*) and Trumpeter Swan (*C. buccinator*) observations from Mexico recorded by the U. S. Fish and Wildlife Service during January aerial waterfowl surveys, 1947–94, other winter surveys and observations, 1972–95, and band recoveries. Swans were not identified by species with certainty during aerial surveys, but were presumed to be Tundra Swans. A total of 121 swans, including five band recoveries was reported at 22 locations in seven Mexican states; 83 were in the Interior Highlands, 23 near the Gulf Coast, and 15 in Pacific Coast states. Most records were from Chihuahua (66), followed by Tamaulipas (23), Durango (13) and Sonora (11); eight were from three other states. The most commonly used winter area was Laguna de Santa Maria in northern Chihuahua where 29 swans were observed. Of 121 swans recorded, three were identified as Trumpeter Swans in Chihuahua (2) and Tamaulipas (1) and two others as possible Trumpeters in Durango. These data and information from other sources show that Tundra Swans and Trumpeter Swans are rare and irregular winter visitors, mainly to northern Mexico. *Received 25 September 1996, accepted 19 August 1997.*

The Tundra Swan (*Cygnus columbianus*) and the Trumpeter Swan (*C. buccinator*) are occasional winter visitors in Mexico. During the first half of the 20th century, Trumpeter Swans were recorded only once in Mexico, near the Gulf Coast at Matamoros, Tamaulipas in January 1909 (Phillips 1911, Coale 1915, Saunders and Saunders 1981, Howell and Webb 1995). Tundra Swans have been classified as rare to casual winter visitors to Baja California, Chihuahua, and Tamaulipas (Friedmann et al. 1950, Blake 1953, Saunders and Saunders 1981, Wilbur 1987), and currently are considered irregular, rare winter visitors to northern Mexico (Howell and Webb 1995). They were formerly more abundant in northern Mexico (Saunders and Saunders 1981) although there is little published information. Several sources (e.g., Cooke 1906, Bent 1925, Grinnell 1928, Palmer 1976, E. A. Goldman *in* Saunders and Saunders 1981:94, Saunders and Saunders 1981, Wilbur 1987) reported Tundra Swans along the Mexican Gulf Coast in Tamaulipas, the Pacific Coast in Baja California Norte and Sur, and states in the Interior Highlands, including Chihuahua, Coahuila, Durango, Guanajuato, and occasionally south to Lake Chapala, Jalisco in severe winters. In 1916, General J. Pershing's troops reported large flocks in Chihuahua at Laguna de Guzman and smaller numbers near Ascension (Saunders and Saunders 1981).

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In this paper, we update information on the distribution and numbers of Tundra Swans and Trumpeter Swans reported in Mexico from (1) winter aerial waterfowl surveys conducted by the U.S. Fish and Wildlife Service (FWS), 1947–94, (2) other ground and aerial surveys and incidental observations, winters 1972–95, and (3) band recoveries received by the Bird Banding Laboratory.

STUDY AREAS AND METHODS

U.S. Fish and Wildlife Service aerial surveys.—We summarized the number and distribution of Tundra/Trumpeter Swans recorded by the FWS during January aerial waterfowl surveys conducted in most winters, 1947–94. The FWS initiated aerial waterfowl surveys in the Gulf and Pacific coastal states of Mexico in 1947 and in the Interior Highlands in 1951 (Saunders 1964, Saunders and Saunders 1981, Smith 1984). Other wetlands in the Interior Highlands were added to surveys through the 1960s. All swans recorded were presumed to be Tundra Swans, but due to difficulty of separating the 2 species (Banko 1960, Bellrose 1976, Patten and Heindel 1994), especially during aerial surveys, we have classified them as swans (Tundra/Trumpeter). Details of survey methods and locations, habitat conditions, and species recorded were reported by Saunders and Saunders (1981) and in Mexico Winter Waterfowl Survey Administrative Reports (filed with FWS, Off. Migr. Bird Manage., Portland, Oregon).

Areas flown by the FWS during winter waterfowl surveys in Mexico were described by Saunders and Saunders (1981), and included waterfowl habitats in three major geographical regions (Fig. 1): (1) *Gulf and Caribbean Coast Zone* (Gulf Coast) included wetlands from the Rio Grande delta along the United States–Mexico border in Tamaulipas southward to sites on the Yucatan Peninsula (see also Baldassarre et al. 1989), (2) *Interior Highlands* included the elevated central plateau from the United States–Mexico border in Chihuahua and Coahuila southward below Mexico City to Michoacan and Puebla. This region is bounded on the east by the Sierra Madre Oriental and on the west by the Sierra Madre Occidental, and (3) *Pacific Coastal Zone* (Pacific Coast) extended from Baja California and Sonora southward to Chiapas (see also Kramer and Migoya 1989).

Other surveys.—Seven wetlands in western and central Chihuahua were surveyed for waterbirds by Drewien et al. (1996). Areas from north to south included: (1) Ascension, (2) two reservoirs near N. Casas Grandes, (3) Santa Maria River valley near Galeana, (4) Laguna de Encinillas, (5) Laguna de Babicora, (6) Laguna de Bustillos, and (7) Laguna de los Mexicanos. Descriptions and locations of these wetlands were reported by Arellano and Rojas (1956), Knoder et al. (1980), Saunders and Saunders (1981), and Drewien et al. (1996).

During winters 1970 (Dec. 70–Jan. 71)–1995 (Dec. 95–Jan. 96), we made 22 trips (five aerial, 17 ground) to Chihuahua, five (four aerial, one ground) to Durango, and two (ground) to Sonora. Swans were recorded by species and age (adults—white plumage, immatures—gray plumage; Banko 1960, Limpert and Earnst 1994, Patten and Heindel 1994) during ground surveys.

We also reviewed early waterfowl surveys conducted from the ground (Goldman and Goldman 1935, 1936, Goldman 1942a,b, 1943), and report incidental observations of swans, including those by Knoder et al. (1980) during eight winter aerial surveys in the 1970s.

Band recoveries.—We reviewed band recovery data for Tundra Swans and Trumpeter Swans from Mexico to assess distribution. These data were provided by the Bird Banding Laboratory, Laurel, Maryland (J. Tautin and M. K. Klimkiewicz, pers. comm.).

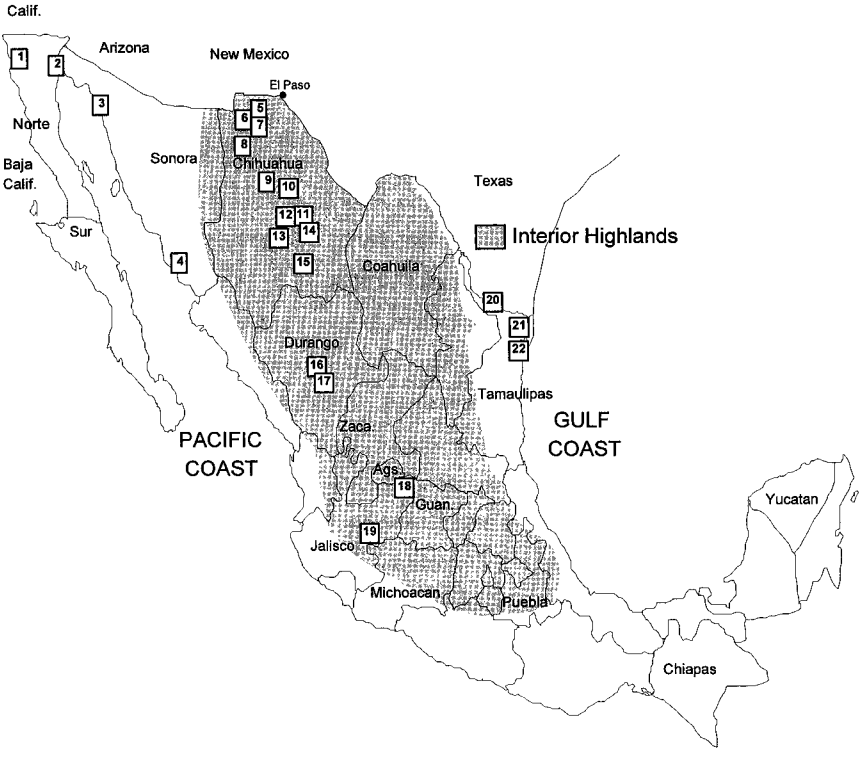

FIG. 1. Winter distribution of Tundra Swans and Trumpeter Swans in Mexico recorded by the U.S. Fish and Wildlife Service during January aerial surveys, 1947–94, Knoder et al. (1980), Drewien et al. (1996), other observers, and from band recoveries. See Table 1 for locations and numbers of swans reported.

RESULTS

U.S. Fish and Wildlife Service winter aerial surveys.—During January aerial surveys between 1947–94 (34-Gulf Coast, 27-Interior Highlands, 42-Pacific Coast), 104 swans were recorded; 70 were in the Interior Highlands, 22 along the Gulf Coast, and 12 in Pacific Coast states (Table 1). No swans were observed south of Tamaulipas along the Gulf Coast, south of Sonora on the Pacific Coast, or south of Jalisco in the Interior Highlands (Fig. 1). The southern-most sighting was of three swans in January 1975 at a wetland complex near Ocotlan, Jalisco (20°28′N, 102°47′W), north of Lake Chapala. No Mute Swans (*C. olor*) were reported during aerial surveys. Swans were recorded at 16 locations in seven states, including 11 sites in the Interior Highlands, two on the Gulf Coast, and three in Pacific Coast states (Table 1, Fig. 1). Chihuahua accounted for

TABLE 1

LOCATIONS AND NUMBERS OF TUNDRA SWANS (TUSW) AND TRUMPETER SWANS (TRSW) IN MEXICO RECORDED BY THE U.S. FISH AND WILDLIFE SERVICE (FWS) DURING JANUARY AERIAL WATERFOWL SURVEYS, 1947–94, AND OTHER OBSERVATIONS DURING WINTERS (DEC.–FEB.) 1972–95 INCLUDING FIVE BAND RECOVERIES (LOCATION NUMBERS IN FIG. 1 ARE IN BRACKETS)

Location	Number of swans			No. and date
	FWS	Other	Total	
Baja California Norte				
nr. Ensenada [1]		3	3	(3) 1987, TUSW band recoveries
northern B.C. [2]	1		1	(1) 1960[a]
Sonora				
NW Coast [3]	7		7	(7) 1980[b]
Obregon [4]	4		4	(2) 1956[c], (2) 1958
Chihuahua				
L Guzman [5]	1		1	(1) 1953
Ascension [6]		2	2	(1) 1981 TUSW[d], 1987 TRSW[d]
L. Santa Maria [7]	29		29	(4) 1951, (11) 1960, (10) 1963, 4 (1965)
N. Casas Grandes [8]		3	3	(2) 1986 TUSW[d], (1) 1992 TRSW band recovery
Tintero Res. [9]	2		2	(1) 1981, (1) 1991
L. Encinillas [10]	2	2	4	(2) 1979, (2) 1986 TUSW[d]
Chihuahua City [11]		2	2	(2) 1995 TUSW[e]
L. Bustillos [12]	6		6	(3) 1975, (2) 1979, (1) 1981
L. Mexicanos [13]	8	1	9	(1) 1976 TUSW[d], (5) 1979, (3) 1988
L. Delicias [14]		1	1	(1) 1972 TUSW band recovery
L. Toronto [15]	7		7	(3) 1955, (3) 1975, (1) 1982
Durango				
L. Santiaguillo [16]	8	2	10	(2) 1979 TRSW[f], (7) 1985, (1) 1988
Durango [17]	3		3	(1) 1982, (2) 1985
Aguascalientes-Jalisco border				
El Languillo [18]	1		1	(1) 1980
Jalisco				
Ocotlan [19]	3		3	(3) 1975
Tamaulipas				
Falcon Dam [20]		1	1	(1) 1989 TRSW[g]
Rio Grande delta [21]	10		10	(10) 1977
Laguna Madre [22]	12		12	(11) 1964, (1) 1975
Total	104	17	121	

[a] Saunders and Saunders (1981:94) reported sighting for 1959, but records show 1960, specific location not given.
[b] Specific location not recorded.
[c] Saunders and Saunders (1981:94) reported this sighting in Baja California but records show they were in Sonora.
[d] Recorded during surveys by Drewien et al. (1996).
[e] Reported by R. Uranga T., Chihuahua, Chih. (pers. comm.)
[f] Recorded during surveys by Knoder et al. (1980).
[g] Reported by H. H. Burgess, Weslaco, Texas (pers. comm.).

52.9% (55) of the swans recorded, Tamaulipas 21.2% (22), Durango 10.6% (11), Sonora 10.6% (11), and the remaining 4.8% (5) were found in three other states. The most commonly used winter site was Laguna de Santa Maria, Chihuahua where 29 swans (27.9%) were observed. Classification of 29 groups and single swans recorded showed that singles (10) and pairs (5) accounted for 51.7% of sightings, flocks of 3-7 (10) 34.5%, and flocks of 10-11 (4) 13.8% (Table 1). Numbers of swans observed by decade were: 1940s-0, 1950s-13; 1960s-36; 1970s-29; 1980s-25; 1990s-1.

Other surveys.—Seven swans, including six Tundra Swans (five adults, one immature) and a probable immature Trumpeter Swan classified by its very dark juvenal plumage (Patten and Heindel 1994) were recorded at four locations in Chihuahua during surveys by Drewien et al. (1996) (Table 1). FWS aerial surveys had not previously recorded swans at two of these locations. Knoder et al. (1980, C. E. Knoder pers. comm.) saw 2 adults at Laguna de Santiaguillo, Durango on 28 February 1979 (Table 1), and based upon their size, no obvious yellow lore spots and behavior suspected that they were Trumpeters. An immature Trumpeter Swan wintered along the international border in both Tamaulipas and Texas on the Rio Grande below Falcon Dam during 1989/90 (H. H. Burgess, pers. comm.). Two Tundra Swans were observed (1 immature photographed) northeast of the city of Chihuahua in January 1995 (R. Uranga T., Chihuahua, Chih., pers comm.). These sightings involved single swans or pairs (Table 1). No swans were observed during ground surveys in the 1930s–early 1940s, although Goldman (1942a,b) reported swan sightings during earlier years at Laguna de Encinillas and Laguna de Babicora, Chihuahua.

Band recoveries.—Recoveries of Four Tundra and one Trumpeter Swan from Mexico were reported to the Bird Banding Laboratory through October 1995 (Table 1, Fig. 1). Three immature Tundra Swans were recovered near Ensenada in northwestern Baja California Norte in December 1987. They had been banded at Izembek National Wildlife Refuge, Alaska, during July 1987, and possibly were a family group. Another Tundra Swan, an immature banded near the Selawik River, Alaska by W. Sladen in August 1972, was reported near Delicias, Chihuahua in December 1972. An adult female Trumpeter Swan that was shot at N. Casas Grandes, Chihuahua in December 1992, had been banded by the first author on the Henry's Fork of the Snake River, Fremont County, Idaho in November 1992 and translocated with 37 other Trumpeter Swans to the Seedskadee National Wildlife Refuge, Sweetwater County, Wyoming. Of the five recoveries, three were misidentified as geese and shot, one was found with a broken wing, and one was an observation of a neck-collared swan.

DISCUSSION

The FWS aerial surveys, other surveys and observations, and band recoveries confirm that Tundra Swans and Trumpeter Swans are rare and irregular winter visitors mainly to northern Mexico. Swans were recorded at 22 locations in seven states with most records confined to the northern border states (86%) of Chihuahua, Tamaulipas, Sonora, and Baja California Norte; a few swans were observed southward in the Interior Highlands (14%) in Durango, Aguascalientes, and Jalisco.

The FWS winter waterfowl surveys probably identified the more important wetlands occasionally visited by swans in Mexico except in Baja California. Aerial surveys in Baja California focused mainly on coastal habitats used by Brant (*Branta bernicla*) and the Colorado River delta, and did not include other inland water areas where swans might occur. Wilbur (1987:53) noted that Tundra Swans were "Irregular winter visitors, a few apparently reaching Baja California almost every year." FWS surveys also recorded 11 swans at two sites in Sonora although none were reported by van Rossem (1945).

The largest number (29) of swans was observed at Laguna de Santa Maria, in northern Chihuahua between 1951–65; none has been observed there since 1965. Laguna de Santa Maria and the adjacent Laguna de Guzman are shallow lakes formed in sinks of the Casas Grandes and Santa Maria rivers. Although formerly they were important winter sites for waterfowl and cranes (Goldman 1942b, Saunders and Saunders 1981), the habitat quality of wetlands in the Interior Highlands has declined dramatically during this century due to upstream water diversions, drought cycles and human impacts (Corzo 1970, Saunders and Saunders 1981). In 1899, E. A. Goldman (1951:123) described Laguna de Santa Maria as "a saline body of water about 8 miles long and 6 miles wide . . . separated from that of the Laguna de Guzman . . . a short distance to the northwest, by a divide not more than 200 feet high. . . . Cottonwoods, willows, and mesquites grow along the Rio Santa Maria." In contrast, the January 1965 FWS survey report described Santa Maria as: "A small spring-fed reservoir remained with only a few acres of overflow water . . . in the sump adjoining." (Saunders and Saunders 1981:36). Only small numbers of geese and ducks averaging 1230, have been recorded there during 13 FWS winter surveys since 1965.

Currently, over 99% of Tundra Swans typically winter in traditional areas in the Pacific and Atlantic Flyways and only small numbers winter in the interior of the United States (Bellrose 1976, Serie and Bartonek 1991). Midwinter (January) counts compiled by the FWS since the mid-1950s show that Tundra Swans have been increasing (Serie and Bartonek

1991, Limpert and Earnst 1994), but not in the south-central United States near Mexico where they were formerly more common (Oberholser 1974). During Januarys 1990–96, the Western Population in the Pacific Flyway averaged 63,400 (Bartonek 1995, Trost 1996) and the Eastern Population in the Atlantic Flyway averaged 88,000, whereas an average of 590 wintered in the Mississippi Flyway and only eight in the Central Flyway (Sharp 1996).

Trumpeter Swans, formerly abundant and widespread in North America, were extirpated over most of their range by 1900 (Coale 1915, Bent 1925, Banko 1960). During recent decades they have increased (Mitchell 1994, Gillette and Shea 1995). A 1995 continental survey accounted for 19,756 with over 16,300 in Alaska and northwestern Canada (Caithamer 1996). Historically, their winter range included the Gulf Coast to Tamaulipas and adjacent interior areas in the southern United States (Banko 1960, Banko and Mackay 1964, Oberholser 1974). Their diminished abundance, the difficulty of distinguishing them from Tundra Swans (Banko 1960, Bellrose 1976, Pattern and Heindel 1994), and the rarity of swans in Mexico, have all contributed to the paucity of Trumpeter Swan records from Mexico during this century.

While Tundra and Trumpeter Swan populations have increased in North America during recent decades, these increases have not been reflected in more swans wintering in Mexico. Swans can only be expected to increase in Mexico if mortality of pioneers is minimized and suitable wetland habitats are conserved and enhanced.

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