BREEDING BIRDS OF LAGUNA FIGUEROA AND LA PINTA POND, BAJA CALIFORNIA, MEXICO

EDUARDO PALACIOS and LUCIA ALFARO, Centro de Investigacion Cientifica y Educacion Superior de Ensenada (CISESE), P. O. Box 434844, San Diego, California 92143-4844 (USA mailing address)

Coastal lagoons, with their adjacent beaches, salt marshes, and mudflats, are important habitats for numerous birds, including terns and shorebirds. These habitats are used by both migratory and resident species, the former including not only those present during the winter, but also those that reproduce in the area. The future of these habitats is threatened by the ever-increasing impacts of residential and recreational development. In California, two of the bird species that have been most directly affected by the loss or reduction of these habitats are the Snowy Plover (*Charadrius alexandrinus nivosus*) and the California Least Tern (*Sterna antillarium browni*). In Baja California, coastal lagoons harbor important breeding populations of these species, but, even here, the colonies are being directly affected by the off-road vehicles and pets of tourists. As indicated by Atwood (1987), their habitat, besides these individual species, should be considered endangered. Accordingly, it is important to inventory the present extent and utilization of these habitats before additional plans to develop them are approved and carried out. We present here a survey of the breeding birds of two such coastal wetlands, Laguna Figueroa and La Pinta Pond, Baja California.

Laguna Figueroa, also known as Laguna Mormona, is located 163 km south of Ensenada, between Colonia Guerrero and San Quintín. It is a long, closed, hypersaline lagoon, separated from the ocean by a barrier dune ridge 20 km long, 100 - 150 m wide, and 8 - 12 m high. The lagoon extends inland 0.5 - 2.5 km from this barrier dune (Horodyski 1977, Horodisky et al. 1977, Margulis et al. 1983). The wetland includes a narrow band of marsh and a large salt flat (Figure 1). The northern part of the marsh consists of two types of habitats: an inundated area of relatively tall intermediate marsh composed of annual pickleweed (*Salicornia bigelovii*) and saltwort (*Batis maritima*), and a non-inundated area of relatively low upper marsh composed of shoregrass (*Monanthochloe littoralis*), saltgrass (*Distichlis spicata*), and pickleweed (*Salicornia subterminalis*).

Although the tides are the primary influence on the lagoon's water level, the variations are largely damped out by percolation through the barrier dune. There are both permanent and ephemeral ponds, varying in diameter from a few meters to several hundred meters, and in depth from a few centimeters to several decimeters (Horodyski 1977). Runoff rain water also contributes to this lagoon during the November - March rainy season.

There are, in Baja California, several other small largely unstudied lagoons. La Pinta Pond is one such small closed lagoon approximately 53 km south of Laguna Figueroa, in the northeastern part of Bahia de Santa Maria, and 500 m north of Hotel La Pinta - San Quintín (Figure 1). This lagoon is bordered by middle marsh species, mainly pickleweed (*S. virginica*), and includes a small island 9.5 m long and 6.3 m wide, also covered by this vegetation.

We surveyed both lagoons on 13 and 14 June and from 4 to 6 July 1990 as part of our study of nesting Least Terns. During these visits we also recorded nesting by other species, described below.

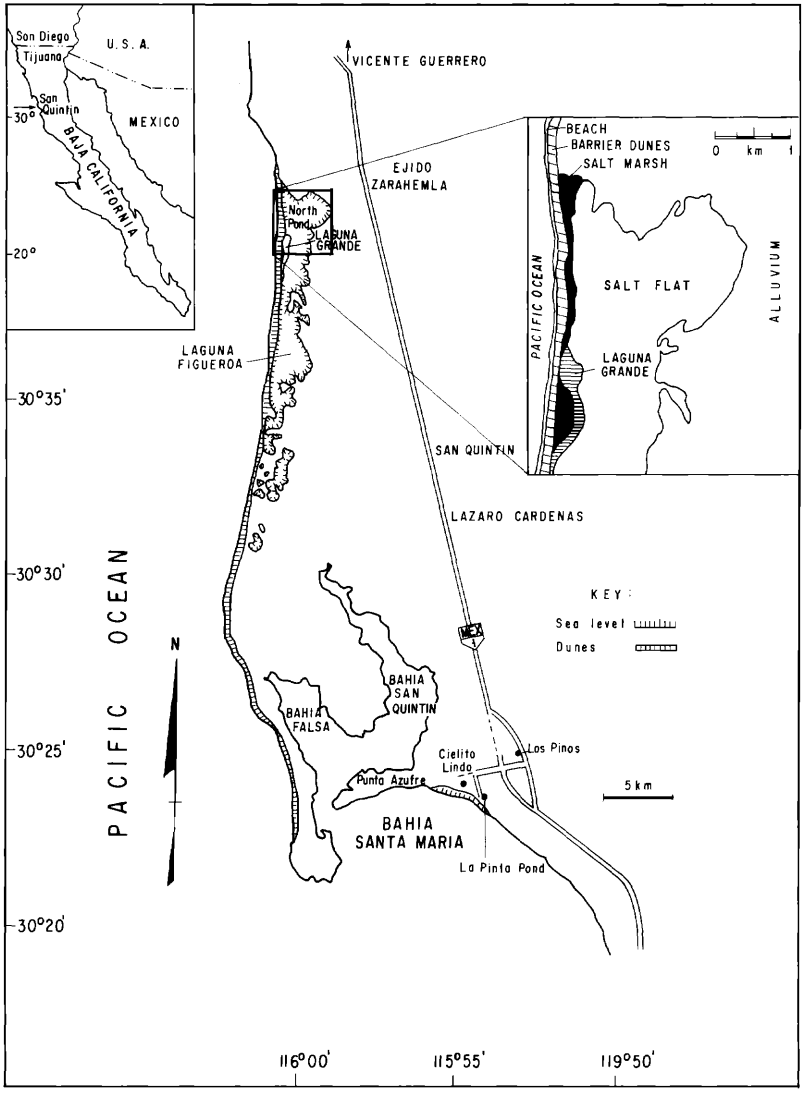

Figure 1. Locations of Laguna Figueroa (Laguna Mormona) and La Pinta Pond, Baja California, Mexico.

SPECIES ACCOUNTS

Snowy Plover (*Charadrius alexandrinus*): We found 15 pairs at Laguna Figueroa. During our first visit one pair on the northern pond had three chicks. There were four active nests in the area between the salt flat and the open marsh, together with nesting Least Terns. The plover nests were widely separated, with an average distance between them of about 100 m. The average clutch was 2.75 eggs. By our second visit, all the eggs recorded on the first visit had presumably hatched, as we found four empty nests plus one active nest with three eggs, and four egg shells. We did not detect any chicks. This breeding population, of at least 30 individuals, is probably augmented by the arrival of migrants during the winter, as at Estero de Punta Banda, Baja California (Palacios et al. in press), Bolinas Lagoon, California (Page *et al.* 1979), and elsewhere along the Pacific coast. In La Pinta Pond we observed two pairs of these plovers, one of them running before us in a distraction display. We found also an empty nest on the dry mud flat. The Snowy Plover also nests along the sandy beach of Punta Azufre (Figure 1) in Bahia San Quintin, and it was previously recorded breeding at Laguna Figueroa by Anderson and Kelly (1980).

Killdeer (*Charadrius vociferus*): At each of the two sites we found one pair, both performing the broken-wing distraction display. We didn't find any nests, eggs, or chicks.

Black-necked Stilt (*Himantopus mexicanus*): We saw three pairs in the area of closed marsh at each site. They exhibited typical distraction behavior, crying and flying near us, landing about 20 m from us and vigorously flapping their winds, and feigning incubation while others foraged nervously at the side of the pond. We found two empty nests during our first visit to Laguna Figueroa. These were built of dry branches of pickleweed and formed floating rafts.

In La Pinta Pond we found one pair with three chicks not yet fledged, two empty nests, and an egg shell. Here the nests were built in depressions in dry mud, lightly lined and covered with plant material. By mid-June any young would have fledged.

American Avocet (*Recurvirostra americana*): In Laguna Figueroa we found only three pairs of avocets but six active nests. One had two recently hatched chicks, and the others contained eggs. The average nest diameter was 150 mm (range 120-150 mm, $n = 5$) and the average clutch size was 2.5 eggs (range 1-4 eggs, $n = 5$). The measurements of four eggs averaged 52.1 by 33.9 mm; the eggs showing the four extremes measured **53.6** by 33.5, 52.0 by **34.6**, **51.0** by 33.4, and 51.0 by **33.4** mm. The nests were located on floating rafts of dry vegetation, in the channels of the closed marsh. During the second visit we found that 9 out of 11 eggs in five marked nests had hatched. One active nest still had four eggs; we also found two broken eggs. Anderson and Kelly (1980) also recorded avocets breeding at Laguna Figueroa.

In La Pinta Pond we found one nest with three eggs in a depression in the dry mud flat. It had dry branches in the bottom and around the edges. We also found one empty nest and three pairs of adults in breeding plumage, one near the active nest and the other two feeding in the lagoon.

Forster's Tern (*Sterna forsteri*): We saw 15 pairs, 10 active nests, and 7 empty nests at Laguna Figueroa. During the first visit we found one one-day-old

chick in a nest, probably one of the first of the season. The average clutch size was two (range 1 - 3 eggs, $n = 10$). The colony was in the area of closed marsh, together with the avocets and stilts. The nests were made out of dry branches, placed on vegetated islets (from 1 to 3 m in diameter), and almost completely surrounded by water. The average diameter of the nests was 120 mm (range 100 - 130 mm, $n = 10$). The distance between nests averaged 6.55 m (range 2.0 - 12 mm, $n = 8$). Thirteen of the 18 eggs in nests recorded on the first visit hatched. We found five eggs broken by predators, probably birds. Western Gulls (*Larus occidentalis*) were the only avian predator seen; both tern species mobbed them vigorously. There were also Coyote (*Canis latrans*) tracks near the nests.

During the first visit to La Pinta Pond we found 15 breeding pairs and 11 active nests: one with one egg, five with two, and five with three. We collected three eggs that had rolled out of their nests, next to the islet. A pair was observed copulating on the side of the lagoon. By the second visit, 12 of the 26 eggs in the nests recorded on the first visit had hatched, while 14 were still in the nests, probably still viable. Moreover, four nests were built after the first visit, two with two eggs and two with three. The nest that had lost two eggs out of three, at the time of the first visit, had two new eggs.

Nine eggs that were measured averaged 42.89 by 30.11 mm; the eggs showing the four extremes measured **44,5** by 30.4, **39.4** by 29.6, 44.0 by **30.5**, and 42.5 by **29.0** mm. The nests were well defined and round, and consisted of a depression in the bare ground, lined and covered with dry branches. All but one of the nests were located around the islet on the beach between the vegetation and the water; a single nest was in an open space in the middle of the islet. The average distance between nests was 2 m (range 1.8 - 3.0 m, $n = 11$).

We also collected five juvenile perch (*Hyperprosopon argenteum*), measuring 76 mm long, that were on the ground in the midst of the nesting area. Such dropped fish indicate the diet of terns during their reproductive season (Atwood and Kelly 1984). Although there are summer records of Forster's Terns at San Quintín and El Rosario (Grinnell 1928, Wilbur 1987), our observations are the first of breeding for this species in the peninsula of Baja California, and constitute a southward extension of its breeding range of about 300 km (3°) from San Diego Bay, California. So La Pinta Pond becomes the southernmost known colony of the species on the Pacific coast.

Least Tern (*Sterna antillarum*). In Laguna Figueroa we found 10 pairs behaving aggressively and feeding young. During the first visit we found a nest with an egg that had been broken by an off-road vehicle, as well as three chicks (estimated ages 7, 7, and 11 days) in the open marsh area. During the second visit we found one active nest with one egg, and two chicks (estimated ages 5 and 8 days). Approximately 70% of the colony area was marked by recent tracks of off-road vehicles. The second nest probably represented a second nesting attempt of an unsuccessful pair, because the composition of a second nesting wave at a given colony could depend upon the success of the first wave, both there and at nearby sites (Massey and Atwood 1981). This colony represents an addition to the list of known colonies of the Least Tern in Baja California (Palacios and Mendoza, unpubl. data).

At La Pinta Pond we did not find any Least Terns, although they nest about 6.8 km to the west, on Punta Azufre (Figure 1) (Massey 1977, Palacios and

Escofet 1990). The absence of the species at this site can be explained by the lack of suitable habitat.

DISCUSSION

In addition to the endangered California Least Tern and the troubled Snowy Plover, Laguna Figueroa has also a population of Belding's Savannah Sparrow (*Passerculus sandwichensis beldingi*), endangered to the north in California. No attempt was made to census this population as it was well past the peak of the breeding season. The presence of these three species, in addition to the other nesting species we recorded, make this area an important target for any conservation project. We agree with Anderson (1988) and Ibarra-Obando (1990) that it must be included in any conservation program involving the larger San Quintin area to the south. La Pinta Pond, being a nesting site for coastal birds, shows that more effort should be spent in the inventory, study, and protection of even small and seemingly unimportant coastal lagoons.

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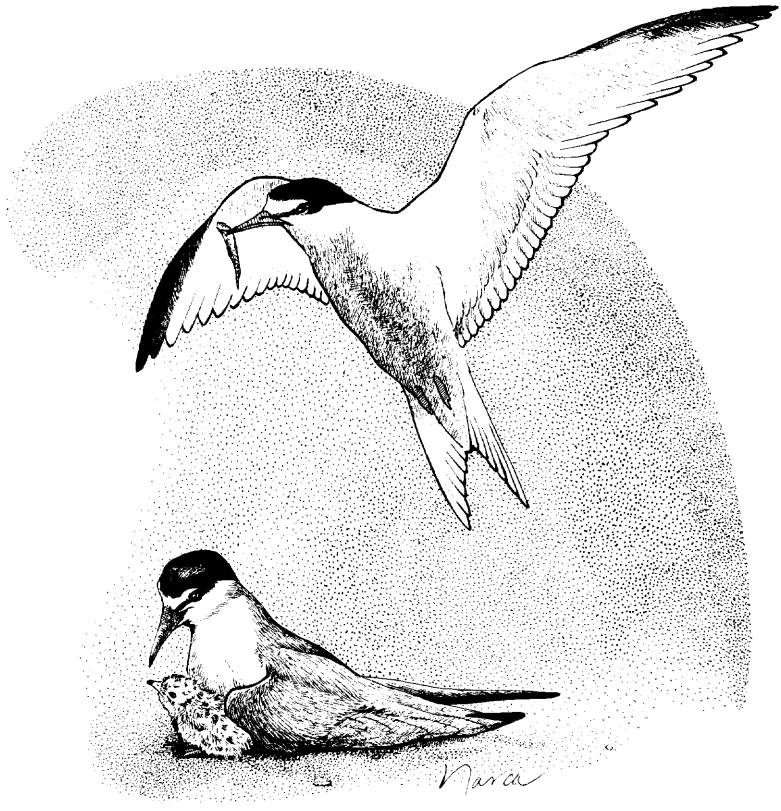

California Least Terns *Sketch by Narca Moore-Craig*