NOTES ON THE BIRDS OF SAN IGNACIO LAGOON, BAJA CALIFORNIA SUR, MEXICO

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Little information is available on the avifauna of San Ignacio Lagoon. The only published accounts dealing specifically with this area are those of Huey (1927), who visited the lagoon over 60 years ago, and Bancroft (1927), who mentioned this area as breeding ground for the Osprey (*Pandion haliaetus*) and some species of waterbirds. As far as we know, the only other ornithological research there is that of Reitherman and Storrer (1981), who studied the Osprey population of Ballena Island from 1980 to 1983.

During 1988 and 1989, Danemann (1991) spent 117 days at San Ignacio Lagoon, studying primarily the community ecology of birds breeding on Ballena Island. Here we summarize observations recorded during those visits.

STUDY AREA

San Ignacio Lagoon is located on the western coast of the Baja California peninsula, between latitudes 26°38' and 27°00' N and longitudes 113°06' and 113°18' W (Figure 1). It covers 175 km^2 (Contreras 1985) with depths from 2 to 4 m in most areas and up to 18 m in its main channels. The shoreline of the lagoon consists of sand beaches, mud flats, mangroves, salt marshes, and a few rocky areas. Low tides expose large shoals extending well into the lagoon. The main body of water is the northern arm of the lagoon, whereas a second inlet, running east, includes most of the mangroves.

Ballena Island (also called Whale, Pelícanos, Garza, or Zopilotes Island) lies in the northern section of the lagoon (Figure 1). It covers 1.3 km^2 and, at its closest point, is 1700 m from the nearest land. The island is divided in two sections separated by a tidal channel. The south section (SBI) is basically flat, while the north section (NBI) includes cliffs as high as 10 m. The vegetation of the island includes several desert plants such as cholla (*Opuntia cholla*), garambullo (*Lophocereus schottii*), pitahaya agria (*Machaeracereus gummosus*), chamiz (*Atriplex* spp.), cardón (*Pachycereus pringlei*), frutilla (*Lycium* spp.), and palo adán (*Fouquieira diguetti*), and some coastal plants such as *Allenrolfea occidentalis*. Sand beaches and mud flats constitute most of the shoreline of this island.

In general, the climate is warm, windy, and very dry, with rains falling mainly in summer. Annual average temperatures are between 18° and 22°C, with daily fluctuations from 7° to 14°C (Contreras 1985).

San Ignacio Lagoon is 70 km from San Ignacio, the closest town. Several fishing camps are located along its shores, and a small-scale fishery has

been developed. Other commercial activities in the lagoon include the seasonal clam fishery, from late spring to fall, and tourism, especially whale-watching, during the winter.

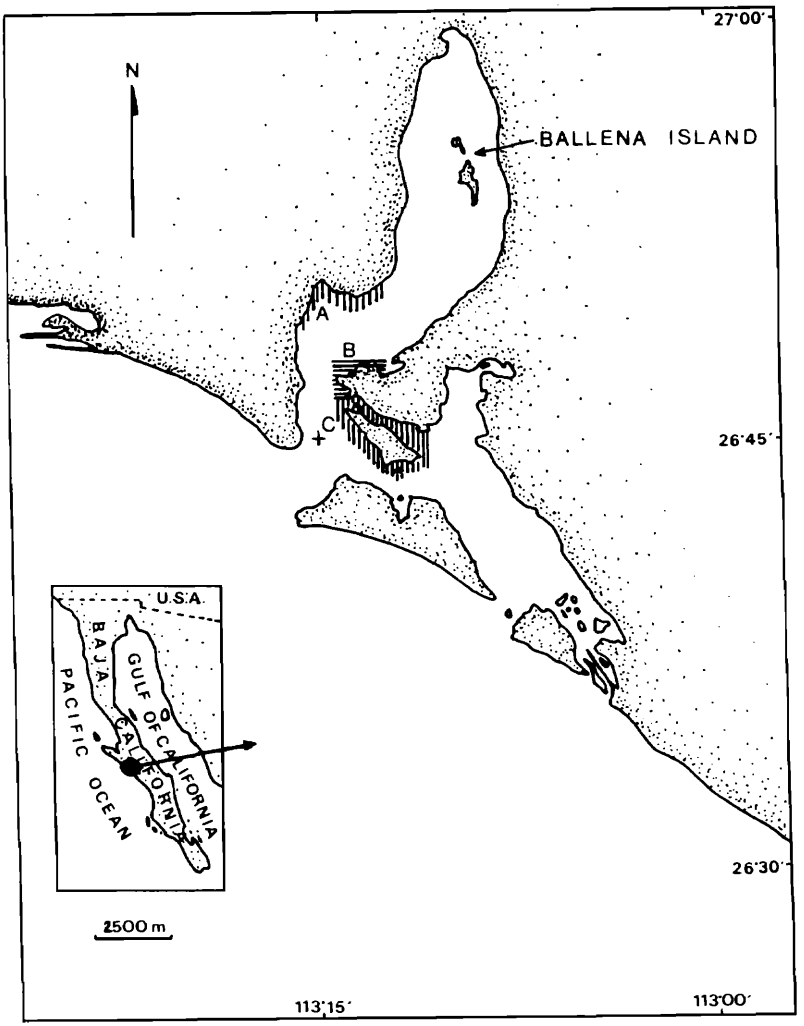

Figure 1. San Ignacio Lagoon, showing locations of Ballena Island and surveyed zones. A, shoreline and mangrove patches and channels on the western side of the lagoon; B, sandy beach and intertidal flats around Punta Piedra; C, mangrove patches and channels in the southeastern arm of the lagoon.

METHODS

The study carried out by Danemann at Ballena Island began with visits on 4–5 July, 29 November–1 December, and 22 December 1988, then continued from 11 January to 17 September 1989. The colonies were visited and censuses of the breeding birds were conducted weekly, and the number and condition of eggs and/or nestlings were recorded when possible. Species that might have been disturbed by our presence (Anderson and Keith 1980, Anderson 1988) were censused with 10× binoculars from a minimum distance of 100 m. Other species allowed a closer approach to the nests. Observations of nonbreeding species were also recorded.

On 21 and 22 April 1989, we surveyed the southern shoreline and south half of the lagoon from a 22-foot outboard motor boat. Surveyed areas are shaded in Figure 1. These surveys took place during high tides, from 0800 to 1600. Our data, therefore, offer a complete picture of birds breeding on Ballena Island but an incomplete view of nonbreeding species and of birds nesting around other parts of the lagoon.

SPECIES ACCOUNTS

We recorded 52 species during our visits to Ballena Island and San Ignacio Lagoon. Here we discuss all species noted at Ballena Island, as well as the species recorded only on the lagoon survey of 21 and 22 April 1989.

Fregata magnificens. Magnificent Frigatebirds were seen occasionally at Ballena Island but do not nest in the area. They probably come from the closest breeding colony, located at Santa Margarita Island, in Magdalena Bay.

Pelecanus erythrorhynchos. Local fishermen reported that White Pelicans are common winter residents of the mangroves and marshes of the southeastern inlet of the lagoon. We observed this species on only one occasion, when two individuals were swimming close to NBI, on 7 April 1989.

Pelecanus occidentalis. Ballena Island has become an important breeding site for Brown Pelicans. In 1984, around 50 pairs nested close to the southernmost point of SBI (Reitherman pers. comm.). On 4 July 1988, we observed around 100 chicks in the southwestern corner of the high central area of NBI. At this time many young had already fledged and were still around the colony. All nests were already abandoned, and at that point it was not possible to estimate the breeding population for that year. In 1989, from early February to early August, about 1100 pairs nested in the high central portion of NBI (Figure 2), and the colony extended over most of the frutilla bushes.

Phalacrocorax auritus. On 5 July 1988, around 100 pairs of Double-crested Cormorants were nesting close to the southern tip of SBI. Another 60 pairs were nesting on NBI, within the Brown Pelican colony. In 1989, 500 pairs nested together with Brown Pelicans on NBI (Figure 2). Beginning later than the breeding season of the pelicans, the breeding season of the cormorants extended from early March to late August. Their nesting substrate was mostly the same as that used by the pelicans, although cormorants also utilized narrower branches of frutilla and *Bursera* bushes. In some cases, they even built their nests over those of the pelicans, once the chicks of the latter had fledged.

Phalacrocorax penicillatus. Brandt's Cormorants were seen occasionally at Ballena Island but do not nest there.

Nycticorax violaceus. During the study only one pair of Yellow-crowned Night Herons was observed on Ballena Island, nesting on a cholla on NBI, in July 1989.

Butorides striatus. The Green-backed Heron was noted only once, in a mangrove channel in the southeastern arm of the lagoon, on 21 April 1989.

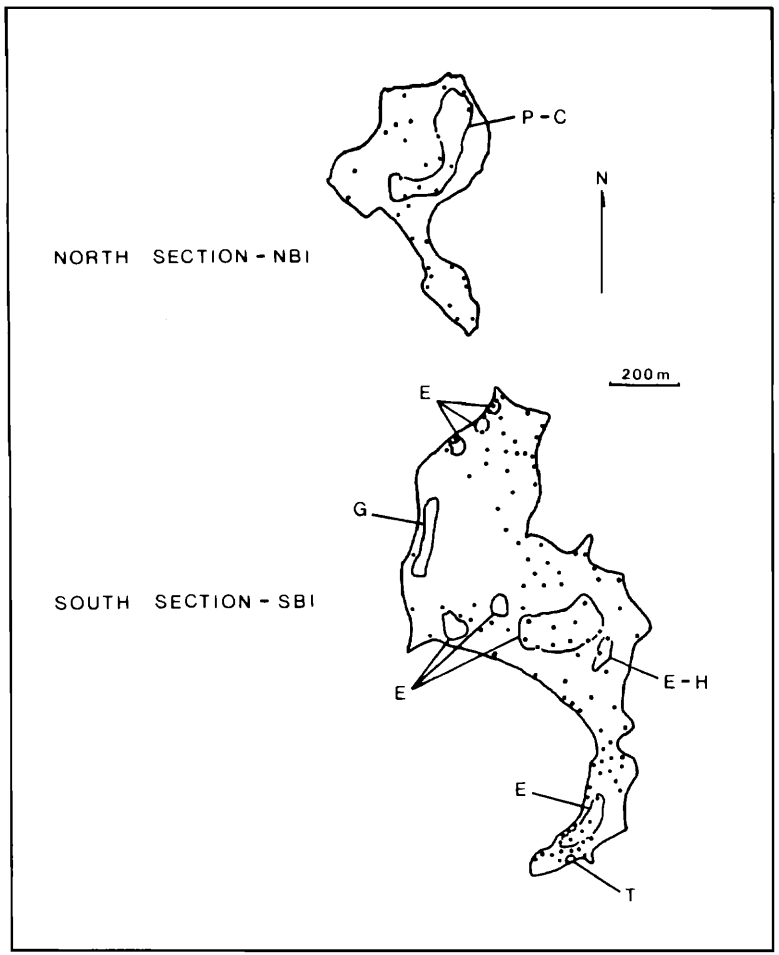

Figure 2. Ballena Island, showing distribution of active nests of Osprey (dots) and nesting areas of Brown Pelican (P), Double-crested Cormorant (C), Reddish Egret (E), Great Blue Heron (H), Western Gull (G), and Caspian Tern (T). From Danemann (1991).

Egretta tricolor. A single Tricolored Heron was noted at Ballena Island, a well-dried carcass found on 15 January 1989. The species was also recorded in the mangrove channels on the western side of the lagoon, on 21 April 1991.

Egretta rufescens. On 5 July 1988, we found 26 active nests of Reddish Egret on Ballena Island. Both eggs and grown chicks were present. From early March to late July 1989, 95 pairs nested on the island. They were present in almost all cholla and frutilla patches of SBI (Figure 2), and smaller numbers were mixed among the Brown Pelicans, Double-crested Cormorants, and Ospreys in the high central area of NBI.

Egretta thula. The Snowy Egret was seen at Ballena Island only once, on 8 February 1989. A flock of 14 was noted in the southwestern arm of the lagoon, on 21 April 1989.

Casmerodius albus. The Great Egret was observed in the mangrove patches along the southeastern arm (one individual) and western side (six individuals) of the lagoon, on 21 April 1989.

Ardea herodias. On 5 July 1988, we recorded two active nests of the Great Blue Heron on Ballena Island, sharing frutilla bushes with Reddish Egrets. Both nests had grown chicks. In 1989, one pair nested on NBI and seven nested on SBI (Figure 2), from late April to late July.

Eudocimus albus. The White Ibis was noted only once, a single individual observed in a mangrove channel in the southeastern arm of the lagoon, on 21 April 1989.

Branta bernicla. Large numbers of Brants winter in the area. They dispersed over the lagoon to feed during the day, and at night roosted regularly in dense flocks along the shore of SBI and along the east side of the lagoon. In the summer of 1989 just a few groups of up to 20 to 30 individuals remained around Ballena Island. In April, Brants were also observed in the southeastern mangrove channels of the lagoon.

Mergus serrator. Two Red-breasted Mergansers were recorded in a mangrove patch on the western side of the lagoon, on 21 April 1989.

Haematopus bachmani. The Black Oystercatcher was recorded only once, in a mangrove channel in the southeastern arm of the lagoon, on 21 April 1989. It was in a flock of 17 American Oystercatchers.

Haematopus palliatus. The American Oystercatcher is a common breeder and resident at Ballena Island. We found seven active nests of this species on the shell-covered shores of SBI, and saw the birds on every shore of the island throughout the year. They were also observed in the southeastern mangrove channels of the lagoon.

Charadrius alexandrinus. Only a few Snowy Plovers remained on Ballena Island during the winter. Storrer (pers. comm.) reported this species as a breeder in this location, but we failed to find any evidence of nesting.

Other Charadriidae. The Wilson's Plover (*Charadrius wilsonia*) and the Black-bellied Plover (*Pluvialis squatarola*) were seasonal visitors to Ballena Island, observed during fall and winter. Both species were recorded in the southeastern arm of the lagoon (flocks of 10 and 55 individuals, respectively) on 21 April 1989.

Scolopacidae. The Marbled Godwit (*Limosa fedoa*) is common year round at San Ignacio Lagoon and Ballena Island. Flocks of up to 700 individuals were observed in the east side of the lagoon, and much smaller numbers occurred in the shoals around Ballena Island. The Whimbrel (*Numenius phaeopus*), Long-billed Curlew (*N. americanus*), and Willet (*Catoptrophorus semipalmatus*) were also regular in small

numbers at Ballena Island, sometimes occurring within a large flock of the Marbled Godwit. The Greater and Lesser Yellowlegs (*Tringa melanoleuca* and *T. flavipes*, 11 and 1 individuals, respectively) were noted in the mangrove channels of the western side of the lagoon on 21 April 1989. Dowitchers (*Limnodromus* sp.), Ruddy and Black turnstones (*Arenaria interpres* and *A. melanocephala*), Dunlins (*Calidris alpina*), Western and Least sandpipers (*C. mauri* and *C. minutilla*) were seasonal visitors to Ballena Island, observed during fall and winter. A flock of 850 Dunlins was noted in a channel of the southeastern arm of the lagoon on 21 April 1989.

Larus occidentalis. At SBI on 4 July 1988 we recorded seven active nests of the Western Gull, with eggs, as well as 12 downy chicks away from the nests. In 1989, 40 pairs nested on a sand flat close to the southwest coast of SBI (Figure 2). The breeding season of this species extended from mid-April to late July.

Other gulls. The Heermann's (*Larus heermanni*), Ring-billed (*L. delawarensis*), Herring (*L. argentatus*), and California (*L. californicus*) gulls were occasional visitors to Ballena Island.

Sterna elegans. The Elegant Tern was noted at Ballena Island once, on 6 May 1989. Five individuals of this species were recorded in the sandy beach around Punta Piedra on 21 April 1989.

Sterna maxima. The Royal Tern occurred occasionally at Ballena Island, but did not nest there. Seventeen were on the sandy beach around Punta Piedra on 21 April 1989.

Sterna caspia. On 4 July 1988 we found 42 nests of the Caspian Tern with eggs. Seven chicks, probably from an earlier egg-laying peak, had already left the nesting area and joined the adults in shallow water. In 1989, 93 pairs established their colony very close to the site of the previous year, in a flat dusty area close to the southern tip of SBI (Figure 2). Their breeding season, extending from early May to late July, encompassed two peaks of egg laying. To our knowledge, this is one of only two Caspian Tern breeding colonies in Baja California, the other being in Ojo de Liebre (Scammon's) Lagoon (Bancroft 1927, Danemann pers. obs.).

Cathartes aura. The Turkey Vulture was an occasional visitor to Ballena Island. We observed this species in May 1989 feeding on carcasses of Brown Pelican chicks.

Pandion haliaetus. The most remarkable feature of the avifauna of Ballena Island is the high density of nesting Ospreys. First described by Reitherman and Storrer (1981), this ground-nesting population is the densest known for the species (Poole 1989). In the 1989 breeding season the island held 143 active nests (Figure 2), for a maximum density of 93.85 per square kilometer. The productivity was 1.02 fledglings per active nest. The Ospreys' breeding season extended from mid-December 1988 to late June 1989.

Falco peregrinus. Two pairs of the Peregrine Falcon nested on Ballena Island during 1989. One of the nests was successful, fledging two young.

Archilochus alexandri. The Black-chinned Hummingbird was noted at Ballena Island occasionally. Both male and female could be clearly observed, together and from a short distance, feeding on flowers of *Fouquieira diguetti*.

Melanerpes uropygialis. The Gila Woodpecker was noted on Ballena Island occasionally.

Eremophila alpestris. The Horned Lark was noted at Ballena Island only once, a flock of 20 individuals on 18 January 1989.

Corvus corax. The Common Raven occurred regularly on Ballena Island. This species and the Western Gull were the most important predators on eggs of the Brown Pelican and Double-crested Cormorant. We did not find any raven nests.

Lanius ludovicianus. The Loggerhead Shrike was a common resident on Ballena Island throughout 1989. We did not find any nests, although it bred there between 1981 and 1984 (Storrer pers. comm.).

Mimus polyglottos. The Northern Mockingbird was seen on Ballena Island only once, on 15 March 1989.

Anthus rubescens. We noted the Water Pipit on Ballena Island only once, on 16 January 1989.

Dendroica petechia castaneiceps. The Mangrove Warbler was fairly common in every mangrove patch of both shores of the lagoon. The behavior and song of the males suggest that this species breeds in the area, as observed by Huey (1927).

Passerculus sandwichensis. The Savannah Sparrow was a permanent resident of the *Allenrolfea occidentalis* bushes along the shoreline of Ballena Island. Although we did not find any nests, the birds' continuous song and behavior suggest that the species breeds at this location.

During their research in San Ignacio Lagoon, from 1980 to 1983, Reitherman and Storrer (pers. comm.) recorded eight species that we did not observe in 1988 or 1989. Those were the Least Bittern (*Ixobrychus exilis*), American Bittern (*Botaurus lentiginosus*), Black-crowned Night Heron (*Nycticorax nycticorax*), Little Blue Heron (*Egretta caerulea*), Clapper Rail (*Rallus longirostris*), Northern Harrier (*Circus cyaneus*), Great Horned Owl (*Bubo virginianus*), and Belted Kingfisher (*Ceryle alcyon*).

DISCUSSION

Our observations show that San Ignacio Lagoon is an important area for breeding water birds and Ospreys, and probably is important to migratory shorebirds, as suggested by its geographical position along the Pacific flyway. This latter hypothesis is supported by our records of numbers such as 400 Western Sandpipers in January and 850 Dunlins in April at Ballena Island alone. Still, regular censuses for shorebirds should be made to corroborate this.

The most dramatic change evident in the avifauna of San Ignacio Lagoon since 1927 is the increase in the populations breeding at Ballena Island. In his 1927 field notes, kept in the library of the San Diego Natural History Museum, Huey stated that the island "proved to be of little interest ornithologically." Huey (1927) did not report any Ospreys nesting at Ballena Island. At present, it is hard to step there without seeing the conspicuous nest structures all over. In contrast, Bancroft (1927) did report San Ignacio Lagoon as a breeding ground for Ospreys, but he did not indicate if they were nesting on Ballena Island. The notes on San Ignacio Lagoon published by Bancroft were probably based on observations made by Sechrist and Bussey, two young men commissioned to collect eggs and specimens for Bancroft's collection. Sechrist and Bussey accompanied Huey on his trip to

the lagoon but stayed there a week longer, while Huey visited La Escondida (Pond) Lagoon (Huey 1927 and field notes). Possibly, given the time they spent in the lagoon, Sechrist and Bussey inspected Ballena Island thoroughly, finding some Ospreys nesting. The increase in the breeding Osprey population of Ballena Island since 1927 coincides with the reduction of the ground-nesting populations of northern Baja California, as reported by Kenyon (1947).

Although the area is legally protected (Gobierno de los Estados Unidos Mexicanos 1988), enforcement is almost null. During the Ballena Island research we identified four main sources of disturbance: the foreign tourists that visit the lagoon, attracted mainly by whale watching, the professional and amateur photographers, fishermen, and the people involved in the seasonal scallop fishery. Visitors landing on the island provoke different degrees of disturbance, deeply affecting some of the breeding species such as the Brown Pelican and Double-crested Cormorant. Another potential threat to the breeding colonies is aircraft landings. In both sections of Ballena Island we found tracks of small planes.

The increase and present numbers of breeding populations, the unique characteristics of the Osprey colony, and the use of this area by large numbers of migratory birds demonstrate that San Ignacio Lagoon and particularly Ballena Island are of outstanding value to birds. In 1988, appreciation of the nesting birds prompted the Mexican government to designate Ballena Island as a nucleus zone of the "El Vizcaino" National Reserve of the Biosphere (Gobierno de los Estados Unidos Mexicanos 1988). Owing to its sensitivity and the disturbances to which it is exposed, San Ignacio Lagoon and its birds deserve increased protection.

ADDENDUM

While revising the manuscript of this paper, we visited San Ignacio Lagoon again, from 20 to 22 November 1990. On this visit we recorded four species new to our list: the Western Grebe (*Aechmophorus occidentalis*), one individual found drowned in a gill net in the central area of the lagoon, the Surf Scoter (*Melanitta perspicillata*) and the Bufflehead (*Bucephala albeola*), flocks of six and ten individuals, respectively, observed in the south portion of the lagoon, and the Forster's Tern (*Sterna forsteri*), a single individual observed on Ballena Island.

SUMMARY

During 1988 and 1989, 52 species of birds were recorded at San Ignacio Lagoon, Baja California Sur, México. Forty-four species were noted at Ballena Island, in the northern arm of the lagoon. Nine species breed on Ballena Island, including the densest known colony of Ospreys, a significant number of Reddish Egrets, and large and relatively recently established colonies of Brown Pelicans, Double-crested Cormorants, Great Blue Herons, Western Gulls, and Caspian Terns. In spite of increasing human disturbance, numbers and variety of birds nesting on Ballena Island are evidently greater than in 1927.

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Osprey in flight

Photo by © Daniel Lee Brown