



History and Status of Colonies of Heermann's Gull in Mexico

Author(s): Eric Mellink

Source: *Waterbirds: The International Journal of Waterbird Biology*, Vol. 24, No. 2 (Aug., 2001), pp. 188-194

Published by: Waterbird Society

Stable URL: <http://www.jstor.org/stable/1522029>

Accessed: 11/03/2010 14:56

Your use of the JSTOR archive indicates your acceptance of JSTOR's Terms and Conditions of Use, available at <http://www.jstor.org/page/info/about/policies/terms.jsp>. JSTOR's Terms and Conditions of Use provides, in part, that unless you have obtained prior permission, you may not download an entire issue of a journal or multiple copies of articles, and you may use content in the JSTOR archive only for your personal, non-commercial use.

Please contact the publisher regarding any further use of this work. Publisher contact information may be obtained at <http://www.jstor.org/action/showPublisher?publisherCode=waterbird>.

Each copy of any part of a JSTOR transmission must contain the same copyright notice that appears on the screen or printed page of such transmission.

JSTOR is a not-for-profit service that helps scholars, researchers, and students discover, use, and build upon a wide range of content in a trusted digital archive. We use information technology and tools to increase productivity and facilitate new forms of scholarship. For more information about JSTOR, please contact support@jstor.org.



Waterbird Society is collaborating with JSTOR to digitize, preserve and extend access to *Waterbirds: The International Journal of Waterbird Biology*.

<http://www.jstor.org>

History and Status of Colonies of Heermann's Gull in Mexico

ERIC MELLINK

Centro de Investigación Científica y de Educación Superior de Ensenada
Carretera Tijuana—Ensenada Km 107. Ensenada, B.C., México

International mailing: CICESE, P.O. Box 434844, San Diego, CA 92143-4844, U.S.A.

Internet: emellink@cicese.mx

Abstract.—Heermann's Gulls (*Larus heermanni*) have been reported to nest on 19 islands in Mexico, but during 1999-2000 they bred on only twelve. Of the known active colonies, one, Isla Rasa, harbors over 95% of the breeding numbers, with between 300,000-400,000 adults. Three islands each support between 2,000 and 20,000 adults, and the rest from 4 to 2,000 adults. The colonies of this species have exhibited major variations through time, but data are inadequate to judge whether human activities or changes in oceanographic conditions were the cause of these variations. These two, along with size and distribution of nesting colonies, should be monitored, if the species' population dynamics are to be understood. Received 21 August 2000, accepted 19 September 2000.

Key words.—Heermann's Gulls, *Larus heermanni*, status, Gulf of California, Mexico.

Waterbirds 24(2): 188-194, 2001

The breeding of Heermann's Gulls (*Larus heermanni*) is restricted to a number of islands in northwestern Mexico, mostly in the Gulf of California, with a few along the Pacific coast of the Baja California peninsula and slightly south of the mouth of the Gulf. Two nesting attempts have been documented in California, on Alcatraz in 1979, 1980, and 1981, and on rocks near Shell Beach in 1980, but neither appears to have been successful (Howell *et al.* 1983). With numbers presumed to be in the "mid-to-high hundreds of thousands" (Everett and Anderson 1991), the great majority of nesting birds occur on one island, Isla Rasa. Vermeer *et al.* (1993) recommended that Heermann's Gull should receive immediate protection and conservation measures, and it has been declared protected by the Mexican government.

Almost all the islands in northwestern Mexico, including those on which this gull nests or has nested, are now protected. Signs informing visitors of the protected status and giving instructions to prevent the introduction of alien species have been placed on many of the islands in the Gulf of California and a few on the Pacific Coast. However, active conservation measures have been limited to the eradication of invasive mammals—rodents and cats—on selected islands, by staff from the Universidad Nacional Autónoma de México, and by a binational non-governmental organization (Island Conservation & Ecology Group).

Recently, eight colonies of Heermann's Gulls were identified (Anderson *et al.* 1976; Anderson 1980), in addition to small colonies ". . . at several other locations throughout the entire length of the Gulf" (Everett and Anderson 1991). The small colonies were not listed. Furthermore, presumed existence of colonies was sometimes based on outdated information, and some colonies no longer exist. Updated information on the status of the colonies is not available, nor has the history of the different colonies, except Isla Rasa, been reviewed. The objective of this paper is to review the existing information on the number of Heermann's Gulls in all of its colonies.

METHODS

I reviewed all information available in the published literature and the results from cruises made in April 1999 and April 2000 through the Middle Gulf of California in which several islands, islets and rocks en route were examined. Colleagues kindly provided me with their recent unpublished numbers of Heermann's Gulls on islands that I had not visited.

I have grouped the islands in three biogeographic areas (*sensu* Anderson 1983): i) Mexican, ii) Gulf of California, and iii) San Diego. I further divided the Gulf of California Province into Middle Gulf of California (the southern, or mouth of the Gulf of California is part of the Mexican Province), the Midriff Islands region, and the Northern Gulf of California (Fig. 1). Within each region, the islands are listed from south to north.

Some sources indicate number of adults, or breeding birds, others, pairs, and still others, nests. Herein I unified the data to numbers of adults by converting pairs and nests to two adults each. I indicate the num-

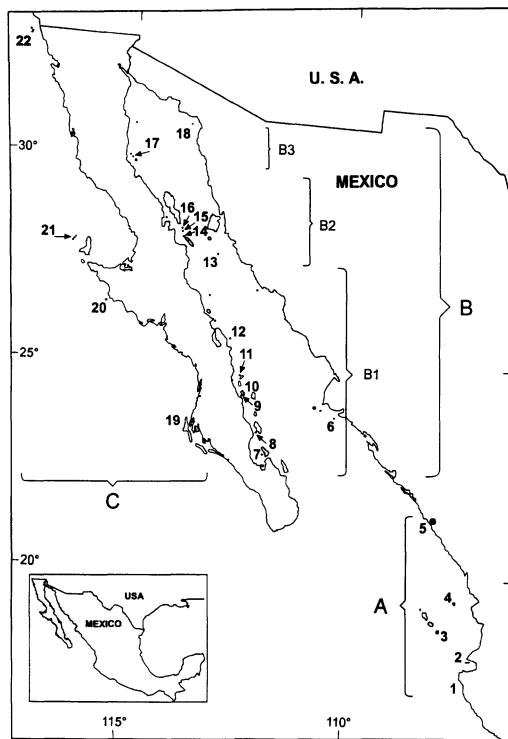


Figure 1. Northwestern Mexico indicating the location where Heermann's Gulls have been reported to nest. Biogeographic regions: A = Mexican, B1 = Middle Gulf of California, B2 = Midriff islands region, B3 = Northern Gulf of California, C = San Diegan. Locations: 1 = Islas Pajarera and Cocina 2 = Islas Marietas, 3 = Isla María Cleofas, 4 = Isla Isabel, 5 = Mazatlán, 6 = Farallón de San Ignacio, 7 = Isla Ballena, 8 = Islote Callo, 9 = Roca Marcial, 10 = Isla Monserrat, 11 = Isla Cholla, 12 = Isla San Ildefonso, 13 = Isla San Pedro Mártir, 14 = Isla Salsipuedes, 15 = Isla Rasa, 16 = Isla Partida, 17 = Isla Cholluda, 18 = Isla San Jorge 19 = Bahía Magdalena, 20 = Isla San Roque, 21 = Isla San Benito de Enmedio, and 22 = Islas Coronados.

bers of nests when this provides additional information. Numbers in parenthesis after biogeographic areas and locality names refer to Figure 1.

RESULTS

Mexican Province (A)

Heermann's Gulls have been reported to nest on Islas Pajarera and Cocina, on rocks in the Islas Marietas, on an islet near María Cleofas (in the Islas Marías), on Isla Isabel and on rocks at Mazatlán. Pajarera and Cocina (1 in Fig. 1) are two small islets in Bahía de Chamela about whose birds no published records exist. In the spring 2000, between 40

and 50 pairs of Heermann's Gulls nested on Pajarera and five on Cocina (S. Hernández, pers. comm.).

The Marietas (2) is a group of small islands, rocks and shoals that extend nearly 7 km, at the northern end of Bahía Banderas, Jalisco (U. S. Hydrographic Office 1937). Lamb (1910) found Heermann's Gulls nesting on rocks in this group, on 11 April 1909. Osburn (1909) found 80-100 adults nesting on a few rocks, which he did not name, in the state of Jalisco. He suggested a latitude of about 18°N, but this was clearly an error, and his description of the rocks suggests he was in the Marietas (21°46'N). A specimen of the Mockingbird (*Mimus polyglottos*) collected by him was ascribed to the Marietas by Grant (1964).

The Marietas had at least 1,100 adults in May 1962, and 200 in April 1963 on Isla Larga, the westernmost of the two largest Marietas (Grant 1964). In February 1978, there were 220 adults on Isla Larga, and 330 on Isla Redonda, the easternmost Marieta (Gaviñode la Torre and Uribe-Peña 1980). In both cases there were nests being built, but no eggs had been laid. The most recent census estimated 4,500 adult Heermann's Gulls on these islands (Rebón 2000).

The Islas Marías consist of four islands: María Cleofas, María Magdalena, María Madre and San Juanico. On 30 May 1897, Nelson (1899) found a nest that had been abandoned and an almost full growth chick on an islet near María Cleofas (3). In March 1905, Bailey (1906) suspected breeding on a rock off María Cleofas. He reported a dozen adults on the Marías. In April and May 1955, Stager (1957) surveyed the birds of the Islas Marías, but failed to find any nesting Heermann's Gulls, and considered Nelson's (1899) record unconvincing. Likewise, Grant and Cowan (1964) considered the Heermann's Gull to be a "migrant" on Islas Marías. The current status of the species there is unknown.

On 23 April 1897, Nelson (1899) found two or three "pairs" (suggesting they were nesting) on Isla Isabel (4). Similarly, the behavior of some adults suggested breeding on a rock north of Isabel in early April 1905 (Bailey 1906). By 1955, the Heermann's Gull was a "very common nesting species" on this

island (Stager 1957), and the current nesting numbers are estimated between 200 and 800 adults (H. Drummond, pers. comm.).

Bent (1921) reported Heermann's Gulls nesting "at Mazatlán (5)." He gave no source for his information, and I have not been able to find any supportive information or an independent report". Bent might have misinterpreted Bailey's (1906) indication of the presence of Heermann's Gulls on the rocks of the Mazatlán harbor.

Middle Gulf of California (B1)

Heermann's Gulls have been found nesting on one island off the coast of northern Sinaloa: Farallón de San Ignacio, and six islands on the Gulf coast of Baja California Sur: Isla Ballena, Islote Callo, Roca Marcial, Isla Monserrat, a rock near Isla Carmen and Isla San Ildefonso.

Farallón de San Ignacio (6) is a small, towering rock known for its large numbers of Brown and Blue-footed Boobies (*Sula leucogaster* and *S. nebouxii*), but with no previous record of breeding Heermann's Gulls. On 18 April 2000, there were between 20 and 40 gulls apparently sitting on nests but, except from confirming eggs in one nest, bad weather prevented us from landing to make a detailed examination and count. Heermann's Gulls have been reported to nest in areas with no direct access to water (Vermeer *et al.* 1993). But, Heermann's Gulls nesting on Farallón de San Ignacio were a few meters from the water and in direct sight of it, and this probably is the case for other "rock-nesting" sites reported from the Marías and San Pedro Mártir (see account under the Midriff Islands region for the latter).

Isla Ballena (7) lies about halfway along the west side of Isla Espíritu Santo, in Bahía de La Paz. Carmona *et al.* (1994) found two nests in April 1990, with 2 and 3 eggs, but both failed to produce chicks. There were no Heermann's Gulls nesting there in July 1995, nor in April 1999 (E. Mellink, unpublished).

Islote El Callo (8) is at the southeastern end of Isla San José. On 4-7 May 1995, there were 14 nests and 26 chicks, but two weeks later only eleven chicks remained (Carmona

et al. 1996). Predation by Yellow-legged Gulls (*Larus livens*) was suggested as the cause of this reduction in chicks.

Roca San Marcial (9) has been known for a number of years as a Heermann's Gull breeding site (E. Palacios, pers. comm.). On 9 April 1999, there were about 500 adults but only 36 nests (34 with one egg and two nests with two eggs), and on 7 April 2000, 84 adults out of about 200 appeared to be sitting on nests. Of 17 nests examined, 12 had one egg, and five had two eggs. In both cases, the number of eggs suggested that laying had just begun. In April 1999, twelve eggs and two adults had been predated; the adults by Peregrine Falcons (*Falco peregrinus*; see Velarde 1993), but eggs could have been taken by conspecifics (Bent 1921; E. Mellink, unpublished). Although the island is shared by a small colony of Yellow-footed Gulls, on our landing, these gulls did not approach the incubating Heermann's Gulls, as they do to incubating Brown Pelicans (*Pelecanus occidentalis*) on other islands.

Collecting for Brewster, M. A. Frazar found Heermann's Gulls breeding on Isla Monserrat (10) on 14 March 1887. There are no further records for this island. Frazar also reported Heermann's Gulls breeding on a small rocky island between Loreto and Isla Carmen on 14 March 1887 (Brewster 1902). Isla Cholla (11) on the northeastern end of Carmen is likely to have been this rock: it is the only above-water feature in that area, and it has seemingly appropriate habitat for the nesting of Heermann's Gulls. This islet is currently used as a fishing camp, and Yellow-footed Gulls were the only surface-nesting seabirds breeding there in 1999 and 2000. Frazar did not give details on these colonies, except that egg-laying had just started (Brewster 1902).

Isla San Ildefonso (12) is a small island with a plateau 116 m above sea level, and a low valley running to the sea at its southern end. This site has been long known for its large Heermann's Gull colony. In 1909, W. W. Brown visited it and documented about 5,000 adults (Thayer's (1909) report of more than 10,000 birds, based on Brown's letters, was an error), and the beginning of the egg-laying season on 2 April (Thayer 1909, 1911).

In April 1911, considerable numbers nested here (Townsend 1923) but on 17 May 1921, only a small nesting colony was present (Slevin 1923). On 7 March 1939, there were "countless numbers" of Heermann's Gulls, but they had not started nesting and there were abundant signs of nesting in the previous year (Loye Miller, unpublished typescript in E. Mellink's personal library). However, collectors of seabirds' eggs for the market were already roaming the island.

On a brief survey on 2 April 1962, there were adults present, but no nesting (Lindsay 1962; Richard Banks, field notes at the San Diego Natural History Museum). In August 1989, local fishermen reported to Bernie Tershy that Heermann's Gulls nested on the island, and the presence of old nests, dead chicks, egg shells, and numerous recently fledged young confirmed this (B. Tershy, pers. comm.). Velarde and Anderson (1994) indicated that 200 individuals nested here, but gave no information on which years visits took place. I visited the island on 17 July 1995, 12 April 1999 and 10 April 2000, and did not find nesting Heermann's Gulls.

Midriff Islands Region (B2)

Heermann's Gulls have been reported to nest on four islands in this region: Isla San Pedro Mártir, Isla Salsipuedes, Isla Rasa and Isla Partida. San Pedro Mártir (13), renowned for its nesting seabirds, especially the Blue-footed and Brown Boobies, is the most isolated island in the Gulf of California (Tershy and Breese 1977). Although this island has had a long history of visits by ornithologists (Goss 1888; Slevin 1923; Banks 1963; Lindsay 1966), nesting Heermann's Gulls were discovered only in 1991, on two small rocky bars at the southeast and northeast ends of the island. The latter, with 150 and 194 adults in 1991 and 1992, had over 90% of the nesting birds of this island (Tershy *et al.* 1992; Tershy and Breese 1997). Recently, 500 birds were reported to be nesting on this island (Cervantes-Abrego *et al.* 2000).

Isla Salsipuedes (14) lies at the northern end of the San Lorenzo Archipelago. Its southern end rises to 113 m a.s.l., but its

northern end is only about 17 m a.s.l. (U.S. Hydrographic Office 1937). Slevin (1923) and Mailliard (1923) reported a small colony of Heermann's Gulls here on 9 May 1921. At least two scientific parties visited Salsipuedes in the 1960s at the appropriate time of the year. A group collecting parasites from nesting birds on several islands surveyed on 21 May 1962 (Ryckman and Ryckman 1963), and a California Academy of Sciences party visited in 1966 (Lindsay 1966). Neither group recorded nesting Heermann's Gulls. In May 1985, Alfredo Zavala (pers. comm.) observed a congregation of a few hundred Heermann's Gulls on the northern low plateau, but did not examine the area. Enrique Zamora visited the island at my request on 18 July 2000 and failed to find nesting Heermann's Gulls.

Isla Rasa (15; meaning "flat", and often misspelled as "Raza") supports over 90% of the entire numbers of Heermann's Gulls (Bancroft 1927; Nelson 1921; Osorio-Taffal 1944; Velarde and Anderson 1994), and has been a nesting site since the earliest visits by ornithologists (Streets 1877; Townsend 1923). On 21 April 1921, there were thousands of adults, but only a few eggs (Slevin 1923). Two weeks later, it was found that the eggs were being removed by eggers from Santa Rosalía and Guaymas (Slevin 1923).

Breeding by Heermann's Gulls and collecting of their eggs for commercial purposes continued through the 1950s (Walker 1951, 1953) and into the 1960s (Banks 1963; Lindsay 1962). The island was protected in 1964, and in that year the number of Heermann's Gulls on the island was estimated at 100,000 adults (Walker 1965). Two years later, it was estimated as at least 80,000 adults (Lindsay 1966), and in 1975, between 86,000 and 128,000 adults of Heermann's Gulls nested here (Boswall and Barrett 1978).

A number of estimates for the late 1960s and 1970s (Barreto 1975; Hernández 1968; Velázquez-Noguerón 1970) are, in my view, unreliable. They were discussed by Boswall and Barrett (1978; note that Hernández 1968 was cited as Tobías 1968, and Velázquez-Noguerón 1970 as 1969, by Boswall and Barrett). In 1980, about 260,480 adults were estimated to nest here (Velarde 1999), and the

colony is currently considered to be stable at about 300,000-400,000 adults (Anderson 1983; Velarde and Anderson 1994).

Isla Partida (16; also known as Partida Norte, and as Cardonosa) is eight kilometers north of Rasa. Velarde and Anderson (1994) reported a colony of 8,000 adults. Between 1996 and 2000 about 14,000 adults nested here, except in 1998 when nesting was interrupted (E. Palacios, pers. comm.).

Northern Gulf of California (B3)

Heermann's Gulls have been reported to breed only on two islands in the northern Gulf of California: Isla Cholluda and Isla San Jorge. Isla Cholluda (17; also known as Encantada), a small island in the Archipiélago de San Luis Gonzaga, harbors a colony of Heermann's Gulls of a few thousand individuals. Velarde and Anderson (1994) indicated a colony of 1,000 adults, and on 5 May 1999 there were 2,000-3,000 adults of which about 800 seemed to be sitting on nests (E. Mellink, unpublished data). Breeding was confirmed two weeks later by E. Palacios (pers. comm.). The history of this colony is unknown. It was not mentioned by Bancroft (1927), who studied the birds in the Archipiélago de San Luis Gonzaga in 1925 and 1926, although it is unclear whether he visited Cholluda.

Isla San Jorge (18; originally known as George's Island or Isla Jorge) is a small island in the northeastern corner of the Gulf of California, with a large breeding colony of Brown Boobies (Mellink and Palacios 1993). On 26 April 1921, there was a small colony of Heermann's Gulls, with almost completely incubated eggs and chicks (Slevin 1923; Mailiard 1923). This colony was active in 1937 (photographs in DeWitt 1939 and Fraser 1943). A few years later, Osorio-Taffal (1944) mentioned that this colony appeared to have increased, without providing supportive information. Velarde and Anderson (1994) reported 300 adults breeding on the island, based on an aerial reconnaissance made in April 1977 (D. W. Anderson, pers. comm.). This species was not found breeding here in 1991 and 1992 (Mellink and Palacios 1993), nor have I found it nesting in subsequent

years, until 1999. On 23 March 1999, there were two nests of Heermann's Gulls on San Jorge, containing 1 and 3 eggs, respectively.

San Diegan Province (C)

Four locations have been reported as breeding sites for Heermann's Gulls on the Pacific side of the Baja California peninsula: Bahía Magdalena, Isla San Roque, Isla San Benito de Enmedio, and Islas Coronados. The records from Bahía Magdalena (19) and Los Coronados (22) were dismissed by Grinnell (1928). The first of these, by Ridgway (1919; see also Bent 1921), might have resulted from a misinterpretation of Bryant (1889; or his quote by Brewster 1902).

There was a well known colony of Heermann's Gulls on Isla San Roque (20) early in the 20th century, which Anthony (1925) thought had been destroyed by fishermen. However, in 1927, a colony of 70 adults was found (Huey 1927). In 1944, Osorio-Taffal indicated that the species was especially abundant there, without providing further details. In May 1993, 66 adults nested on the Island, and in April of 1994, 84 adults (B. Tershy, pers. comm.).

Heermann's Gulls were found nesting on Isla San Benito de Enmedio (21) on May 1971 when there were nine nests. On 21 June 1974, there were only two nests, each with a small chick (Jehl 1976). On 9 June 1975, there were twelve active nests (Boswall 1978). In both June 1993 and June 2000, there were approximately 200 adults on the island (B. Tershy, pers. comm.).

DISCUSSION

Conservation Status

Clearly, the number of breeding Heermann's Gulls is much lower than the "mid-to-high hundreds of thousands" reported in the literature (Anderson *et al.* 1976; Anderson 1980; Everett and Anderson 1991; Velarde and Anderson 1994), and the number of adults is not greater than 450,000, and not less than 300,000. Regardless of any reductions that might have occurred, the earlier estimates were probably too optimistic. Only

twelve of the 19 islands on which breeding by this species has been recorded were in use in 1999 or 2000. Particularly evident is the collapse of some previously occupied colonies, and the absence of the "several small colonies throughout the entire Gulf of California" (Everett and Anderson 1991).

Several factors have been indicated as adversely affecting seabird colonies in northwestern Mexico, namely: direct exploitation, incidental take, competition with commercial fisheries, pollution and poisoning, disturbance and habitat reduction, and predators (Everett and Anderson 1991). The information available is inadequate to determine the weight of each of these factors on Heermann's Gulls or whether changes in number and size of colonies are rather the result of oceanographic phenomena (*sensu* Mellink and Palacios 1993). In addition to the recommendation by Vermeer *et al.* (1993) for colony monitoring, I feel that oceanographic conditions and human activity must be monitored if we want to develop an understanding of Heermann's Gulls' population dynamics.

ACKNOWLEDGMENTS

The Kelton Foundation supported my work in the Middle Gulf of California in 1999 and 2000, aboard the Enchantress. Its crew were: Richard Kelton (Captain), Robert Chappel, Mary Nicholls-Jereabek and Juana Graciano-Domínguez. Beatriz Contreras (1999) and Adriana Orozco (2000) assisted during these cruises. Bernie Tershy, Eduardo Palacios, Hugh Drummond, and Salvador Hernández kindly provided unpublished data and Fanny Rebón gave me access to her data in press. Daniel W. Anderson, Alfredo Zavala, and Enrique Zamora contributed other information. Eduardo Palacios, Vicente Ferreira and John C. Coulson provided editorial assistance. To all of them, my deepest appreciation.

LITERATURE CITED

- Anderson, D. W. 1980. Islands, seabirds, and man: conservation in the Gulf of California. Pages 27-37 in *The birds of Mexico* (P. P. Schaeffer and S. M. Ehlers, Eds.). National Audubon Society.
- Anderson, D. 1983. The seabirds. Pages 246-481 in *Island biogeography in the Sea of Cortez* (T. J. Case and M. L. Cody, Eds.). University of California Press, Berkeley.
- Anderson, D. W., J. E. Mendoza and J. O. Keith. 1976. Seabirds in the Gulf of California: a vulnerable, International Resource. *Natural Resources Journal* 16: 484-505.
- Anthony, A. W. 1925. Expedition to Guadalupe Island, Mexico in 1922. *Proceedings of the California Academy of Sciences* 14: 277-320.
- Bailey, H. H. 1906. Ornithological notes from western Mexico and the Tres Marias and Isabella Islands. *Auk* 23: 369-391.
- Bancroft, G. 1927. Notes on the breeding coastal and insular birds of central Lower California. *Condor* 29: 188-195.
- Banks, R. C. 1963. Birds of the Belvedere expedition. *Transactions of the San Diego Society of Natural History* 13: 49-60.
- Barreto, C. J. A. 1975. Isla Rasa, B.C. refugio de gaviotas y gallitos de mar. *Bosques y Fauna* 10: 3-8.
- Bent, A. C. 1921. Life histories of north American gulls and terns. *Bulletin* 13. United States National Museum. Washington, D.C.
- Boswall, J. 1978. The birds of San Benito Islands, Lower California, Mexico. *Bristol Ornithology* 11: 23-30.
- Boswall, J. and M. Barrett. 1978. Notes on the breeding birds of Isla Raza, Baja California. *Western Birds* 9: 93-108.
- Brewster, W. 1902. Birds of the Cape region of Lower California. *Bulletin of the Museum of Comparative Zoology* 41: 1-241.
- Bryant, W. E. 1889. A catalogue of the birds of Lower California, Mexico. *Proceedings of the California Academy of Sciences*, ser. 2, 2: 237-320.
- Carmona, R., J. Guzmán, S. Ramírez and G. Fernández. 1994. Breeding waterbirds of La Paz Bay, Baja California Sur, Mexico. *Western Birds* 25: 151-157.
- Carmona, R., S. Ramírez, B. Zárate and F. Becerril. 1996. Some nesting waterbirds from southern San Jose Island and adjacent islands, Gulf of California, Mexico. *Western Birds* 27: 81-85.
- Cervantes-Abrego, M., J. Guzmán-Poo, J. P. Gallo-Reynoso and A. L. Figueroa-Carranza. 2000. Isla San Pedro Mártir. Page 43 in *Áreas de importancia para la conservación del avifauna en México* (M. C. Arizmendi and L. Márquez-Valdelamar, Eds.). Consejo Internacional para la Preservación de las Aves Sección México. México, D.F.
- DeWitt, M. 1939. *Voyages of the Velero III*. Bookhaven. Los Angeles.
- Everett, W. T. and D. W. Anderson. 1991. Status and conservation of the breeding seabirds on offshore Pacific islands of Baja California and the Gulf of California. *International Council of Bird Protection Technical Publication* 11: 115-139.
- Fraser, C. M. 1943. General account of the scientific work of the Velero III in the Eastern Pacific: Geographical and biological associations. *Allan Hancock Pacific Expeditions* 1: 49-258.
- Gaviño-de la Torre, G. and Z. Uribe-Peña. 1980. Distribución, población y época de la reproducción de las aves de las Islas Tres Marietas, Jalisco, México. *Anales del Instituto de Biología de la Universidad Nacional Autónoma de México, serie Zoológica* 51: 505-524.
- Goss, N. S. 1888. New and rare birds found breeding on the San Pedro Martir Isle. *Auk* 5: 240-244.
- Grant, P. R. 1964. The birds of Tres Marietas Islands, Nayarit, Mexico. *Auk* 81:514-519.
- Grant, P. R. and I. McT. Cowan. 1964. A review of the avifauna of the Tres Marias Islands, Nayarit, Mexico. *Condor* 66: 221-228.
- Grinnell, J. 1928. A distributional summation of the ornithology of Lower California. *University of California Publications in Zoology* 32: 1-300.
- Hernández, T. S. 1968. *Refugio de Aves Acuáticas Migratorias Isla Rasa, B.C.* Dirección General de Fauna Silvestre. México, D.F.

- Howell, J., D. Laclergue, S. Paris, W. I. Boarman, A. R. Degange and L. C. Binford. 1983. First nests of Heermann's Gull in the United States. *Western Birds* 14: 39-46.
- Huey, L. M. 1927. Northernmost breeding station of the Heermann Gull on the Pacific Ocean, and other notes from San Roque Island, Lower California. *Condor* 29: 205-206.
- Jehl, J. R. 1976. The northernmost colony of Heermann's Gulls. *Western Birds* 7: 25-26.
- Lamb, C. 1910. A glimpse of bird life on the west coast of Mexico. *Condor* 12: 74-79.
- Lindsay, G. E. 1962. The Beldevere expedition to the Gulf of California. *Transactions of the San Diego Society of Natural History* 13: 1-44.
- Lindsay, G. E. 1966. The Gulf Islands expedition of 1966. Proceedings of the California Academy of Sciences, 4th ser. 30:309-355.
- Mailliard, J. 1923. Expedition of the California Academy of Sciences to the Gulf of California in 1921: the birds. Proceedings of the California Academy of Sciences 12: 443-456.
- Mellink, E. In press. Effect of the 1997-1998 El Niño and 1998-1999 La Niña events on the numbers of breeding sea lions and water birds in the Upper Gulf of California, México. *Geofísica Internacional*.
- Mellink, E., A. Orozco-Meyer, B. Contreras and M. González-Jaramillo. In press. Observations on nesting seabirds, cetaceans, and insular rodents in the Middle Gulf of California in 1999 and 2000. *Bulletin of the Southern California Academy of Sciences*.
- Mellink, E. and E. Palacios. 1993. Notes on the breeding coastal waterbirds in northwestern Sonora. *Western Birds* 24: 29-37.
- Nelson, E. W. 1899. Birds of the Tres Marias Islands. *North American Fauna* 14: 21-62.
- Nelson, E. W. 1921. Lower California and its natural resources. National Academy of Sciences.
- Osburn, P. I. 1909. The nesting of the Heermann Gull. *Condor* 11: 151-154.
- Osorio-Taffal, B. F. 1944. La expedición del M.N. "Gracioso" por aguas del extremo noroeste mexicano. *Anales de la escuela Nacional de Ciencias Biológicas* 3: 331-360.
- Rebón, F. 2000. Distribucion, abundancia y conservación de la avifauna de las Islas Marietas, Nayarit, México. *Anales del Instituto de Biología, Serie Zoología* 71: In press.
- Ridgway, R. 1919. The birds of North America, part 8. U.S. National Museum Bulletin 50.
- Ryckman, R. E. and A. E. Ryckman. 1963. Loma Linda University's 1962 expedition to Baja California: medical entomology and parasitology. *Medical Arts and Sciences* 27: 65-76.
- Slevin, J. R. 1923. Expedition of the California Academy of Sciences to the Gulf of California in 1921; general account. Proceedings of the California Academy of Sciences 12: 55-72.
- Stager, K. E. 1957. The avifauna of Tres Marias Islands, Mexico. *Auk* 74: 413-432.
- Streets, T. H. 1877. Contributions to the natural history of the Hawaiian and Fanning Islands and Lower California. *Bulletin of the United States National Museum* 7: 1-172.
- Tershby, B. R. and D. Breese. 1997. The birds of San Pedro Mártir Island, Gulf of California, Mexico. *Western Birds* 28: 96-107.
- Tershby, B. R., D. Breese, A. Angeles-P., M. Cervantes-A., M. Mandujano-H., E. Hernandez-N. and A. Cordoba-A. 1992. Natural history and management of Isla San Pedro Martir, Gulf of California. Conservation International. Guyamas, Mexico.
- Thayer, J. E. 1909. The eggs of Heerman's Gull discovered. *Oologist* 26: 101.
- Thayer, J. E. 1911. A nesting colony of Heerman's Gulls and Brewster Boobies. *Condor* 13: 104-105.
- Townsend, C. H. 1923. Birds collected in Lower California. *Bulletin of the American Museum of Natural History* 48: 3-25.
- U. S. Hydrographic Office. 1937. Sailing directions for the west coasts of Mexico and Central America. 8th ed. H.O. 84. Washington, D.C.
- Velarde, E. 1992. Predation of Heermann's Gull (*Larus heermanni*) chicks by Yellow-footed Gulls (*Larus livens*) in dense and scattered nesting sites. *Colonial Waterbirds* 15: 8-13.
- Velarde, E. 1993. Predation of nesting larids by peregrine falcons at Rasa Island, Gulf of California, Mexico. *Condor* 95: 706-708.
- Velarde, E. 1999. Breeding biology of Heermann's Gulls on Isla Rasa, Gulf of California, Mexico. *Auk* 117: 513-519.
- Velarde, E. and D. W. Anderson. 1994. Conservation and management of seabird islands in the Gulf of California: setbacks and successes. Pages 721-767 in *Seabirds on islands: threats, case studies and action plans* (D. N. Nettleship, J. Burger y M. Gochfeld, Eds.). International Council for Bird preservation. Cambridge.
- Velázquez-Noguerón, V. 1970. Aves acuáticas migratorias en Isla Rasa, B.C. Pages 40-70 in *Subsecretaría Forestal y de la Fauna Silvestre. Fauna Silvestre; expresiones y planteamientos de un recursos 1964-70*. México, D.F.
- Vermeer, K., D. B. Irons, E. Velarde and Y. Watanuki. 1993. Status, conservation, and management of nesting *Larus* gulls in the North Pacific. Pages 131-139 in *The status, ecology, and conservation of marine birds of the North Pacific* (K. Vermeer, K. T. Briggs, K. H. Morgan and D. Siegel-Causey, Eds.). Special Publication. Canadian Wildlife Service, Ottawa.
- Walker, L. W. 1951. Sea birds of Isla Rasa. *National Geographic* 99: 239-248.
- Walker, L. W. 1953. Heerman's Gulls at home. *Natural History* 62: 182-186.
- Walker, L. W. 1965. Baja's island of birds. *Pacific Discovery* 18: 27-31.