

Appendix 3. Summary of active (2006) and otherwise-known BRPE breeding colonies for the *Gulf of California (GOC)* subpopulation^a.

| Site Name | Approx LAT | Approx LONGI | Nests (Air) | STG ^b | Da/Mo | r/s ^c | #Nests | Da/Mo/Yr | #Nests (fin. est.) | Source Final Est ^d | Dis ^e | # not @ Nests ^f | Est Non-YY # ⁱ | % BH ^f | REM ^g |
|-----------------------------|------------|--------------|-------------|------------------|-------|------------------|--------|----------|--------------------|-------------------------------|------------------|----------------------------|---------------------------|-------------------|------------------|
| Isla Cerralvo, BCS | 24 14.6 | 109 51.4 | 300 | EE | 25/03 | * | * | * | 375 | 1,2 | CD | 40 | 120 | <20 | 11 |
| Isla Gallo, BCS | 24 27.0 | 110 23.1 | 0 | NO | 25/03 | * | * | * | 0 | 1 | ND | 12 | 12 | ? | 12 |
| Isla Ballena, BCS | 24 28.9 | 110 24.3 | 950 | EE | 25/03 | * | * | * | 1,030* | 1,2 | ND | 200+ | 350 | ? | 13 |
| Isla Caya, BCS | 24 52.5 | 110 36.2 | 20 | EE | 25/03 | * | * | * | 20 | 1 | ND | 0 | 235 | ? | 14 |
| Islote las Animas, BCS | 25 06.2 | 110 35.1 | 25 | EE | 25/03 | * | * | * | 25 | 1 | ND | 0 | 0 | <5 | 15 |
| Isla Habana, BCS | 25 07.7 | 110 51.7 | 5 | EE | 25/03 | * | * | * | 5 | 1 | ND | 0 | 0 | 0 | 16 |
| Isla San Diego, BCS | 25 12.0 | 110 41.9 | 0 | NO | 25/03 | * | * | * | 0 | 1 | ND | 0 | 0 | * | |
| Isla Santa Cruz, BCS | 25 17.2 | 110 42.8 | 0 | NO | 25/03 | * | * | * | 0 | 1 | ND | 0 | 20 | ? | |
| Isla Santa Catalina, BCS | 25 41.4 | 110 46.8 | 0 | NO | 25/03 | * | * | * | 0 | 1 | ND | 0 | 40 | ? | 17 |
| Isla Monserrat, BCS | 25 42.2 | 111 02.9 | 0 | NO | 25/03 | * | * | * | 0 | 1 | ND | 0 | 30 | ? | |
| Isla Danzante, BCS | 25 47.2 | 111 15.1 | 0 | NO | 25/03 | * | * | * | 0 | 1 | ND | 0 | 0 | * | 18 |
| Isla San Ildefonso, BCS | 26 38.1 | 111 25.5 | 750 | EE | 24/03 | * | * | * | 700 | 1,2 | CD | few | 580+ | <5 | |
| Isla Guapa (Blanca), BCS | 26 43.3 | 111 52.0 | 0 | NO | 24/03 | * | * | * | 0 | 1 | ND | 0 | 20 | ? | 19 |
| Isla el Coyote, BCS | 26 43.4 | 111 53.3 | 0 | NO | 24/03 | * | * | * | 0 | 1 | ND | 0 | 10 | ? | |
| Isla la Cueva, BCS | 26 44.6 | 111 52.5 | 75 | EE | 24/03 | * | * | * | 75 | 1 | ND | 150 | 200+ | <1 | |
| Isla la Pitahaya, BCS | 26 45.1 | 111 52.3 | 20 | VE | 24/03 | * | * | * | 20 | 1 | ND | 0 | 0 | 0 | |
| Isla (San) Ramón, BCS | 26 45.4 | 111 53.2 | 0 | NO | 24/03 | * | * | * | 0 | 1 | ND | <5 | <5 | ? | |
| Isla Tortuga, BCS | 27 27.0 | 111 52.8 | 7,700 | EE | 27/03 | * | * | * | 8,800* | 1,2 | ND | few | many | ? | 20 |
| Isla Pájaros (Guaymas), SON | 27 54.6 | 110 52.3 | 650 | EE | 31/03 | 8 | * | * | 700 | 1,2 | CD | few | 450+ | >80 | |
| Isla Pastel, SON | 27 56.1 | 110 59.5 | 0 | EE | 31/03 | 8 | ±50 | 26/04 | 50 | 1,3,6 | CD | 25 | 25 | 0 | 21 |

| | | | | | | | | | | | | | | | |
|---|---------|----------|--------|-------|-------|-----|--------|-------|--------|-------|----|--------|---------|-----|----|
| Isla Chaperona, SON | 27 57.0 | 111 01.8 | 250 | EE | 31/03 | 8 | ±450 | 26/04 | 450 | 1,3,6 | CD | 3,000+ | 4,000+ | >80 | |
| Isla San Pedro Nolasco, SON | 27 57.6 | 111 22.4 | 350 | EE | 31/03 | 8 | 995 | 08/05 | 995 | 1,2,6 | ND | few | many | >80 | 22 |
| Isla San Pedro Mártir, SON | 28 22.9 | 112 18.4 | ? | UK | * | 8,9 | 2,500 | 2005 | 2,500 | 6 | CD | ? | ? | ? | 23 |
| Isla San Lorenzo, BC | 28 40.0 | 112 52.2 | 7,000 | EE | 27/03 | 10 | 6,550 | 25/05 | 6,550 | 1,5 | CD | 1,000s | >20,000 | <10 | 24 |
| Isla las Animas, BC | 28 41.7 | 112 55.0 | 10,000 | EE | 27/03 | 10 | 10,625 | 25/05 | 10,625 | 1,5 | CD | -- | -- | -- | 24 |
| Isla Salsipuedes, BC | 28 43.6 | 112 57.4 | 50 | EE | 27/03 | 10 | * | * | 50 | 1 | ND | -- | -- | -- | 24 |
| Isla Alcatraz, SON | 28 48.6 | 111 58.2 | 75 | EE | 31/03 | 11 | 320 | 29/03 | 320 | 1,6 | CD | ? | 200+ | ? | 25 |
| Isla Partida, BC | 28 53.8 | 113 02.1 | 0 | NO | 27/03 | * | * | * | 0 | 1 | NO | 0 | ? | ? | 26 |
| Isla Piojo, BC | 29 01.1 | 113 27.9 | 700 | MM | 01/04 | 10 | 650 | 20/05 | 600 | 1,4 | CD | ? | ? | ? | 27 |
| Isla Patos, SON | 29 16.2 | 112 27.6 | 0 | NO | 27/03 | * | * | * | 0 | 1 | ND | 0 | 1225 | <30 | 28 |
| Isla Angel de la Guarda (MID) (Playa Bahía Pulpito), BC | 29 19.4 | 113 22.3 | 0 | NO | 27/03 | 10 | 0 | 23/05 | 0 | 1 | ND | 0 | few | ? | |
| Isla Angel de la Guarda(NE), BC | 29 32.3 | 113 31.6 | 0 | NO | 27/03 | 10 | 0 | 23/05 | 0 | 1,4 | ND | 0 | >250 | >10 | 29 |
| Isla Angel de la Guarda(NW), BC | 29 32.3 | 113 33.9 | 3,000 | EE | 27/03 | 10 | 2,700 | 23/05 | 2,700 | 1,4 | CD | 1500+ | >550 | >10 | 29 |
| Isla Pelicano (Navio), BC | 29 33.1 | 113 33.5 | 750 | EE | 27/03 | 10 | 200 | 23/05 | 750 | 1,4 | CD | -- | -- | -- | 29 |
| Isla Mejia, BC | 29 33.3 | 113 33.7 | 0 | NO | 27/03 | * | * | * | 0 | 1 | CD | -- | -- | -- | |
| Isla Granito, BC | 29 33.9 | 113 32.4 | <100 | MM | 27/03 | * | * | * | 100 | 1 | ND | -- | -- | -- | 29 |
| Isla San Luis, BC | 29 58.8 | 114 24.4 | 3,000 | EE,LL | 01/04 | 10 | 5460 | 28/05 | 5,460 | 1,4 | PL | few | 800 | >5 | 30 |
| Isla Encantada(Cholluda), BC | 30 01.1 | 114 28.8 | 250 | EE | 01/04 | * | * | * | 450 | 1,4 | PL | few | 50 | >5 | 31 |
| Isla San Jorge, SON | 31 00.6 | 113 14.6 | 0 | NO | * | 12 | 0 | 2005 | 0 | 7 | ND | ? | ? | ? | 32 |
| Isla Montague, SON | 31 42.0 | 114 41.5 | 0 | NO | * | 13 | * | * | 0 | 6 | ND | ? | ? | ? | 32 |
| Obsidian Island, Salton Sea, CA | 33 10.4 | 115 38.6 | 0 | NO | * | 14 | * | * | 0 | 6 | ND | ? | ? | ? | 33 |
| Mullet Island, Salton Sea, CA | 33 13.5 | 115 36.6 | 0 | NO | * | 14 | * | * | 0 | 6 | ND | ? | ? | ? | 33 |

NOTES & REMARKS (footnoted from above):

^{a, b, d, e, f, g}These footnotes are identical to those from Appendix 1.

^cr/s = References and Sources (as numbered):

8—Ana Luisa Figueroa, CONANP, JPG, and E. Mellink, CICESE, *pers. comm.*

9—Because of logistical problems, we conducted no ground survey at Isla San Pedro Mártir in 2006; but in a recent report issued by the *Reserva de la Biosfera Isla San Pedro Mártir* (2007), 2,000 to 3,000 nesting pairs are considered as “normal” BRPE nest numbers for that island; we compromised at 2,500 nests. Biosphere staff figures are based largely on Tershy & Breese (1997), who based their estimates on Velarde & Anderson (1994). Previous counts by DWA (*field notes*) have been as high as 5,000 pairs, so we do not feel our “estimate” is unreasonable for 2006, and if anything, could be higher by ~1,000 more pairs.

10—CGR and CSDP; Thomas Bowen, Fresno State University; DWA.

11—Galván (2006).

12—Erik Mellink, CICESE, *pers. comm.*

13—Mellink and Palacios (1993) reported substantial seabird nesting on Isla San Jorge but no known BRPE nesting ever for the island, although without disturbance, we believe this island has potential for it. Palacios and Mellink (1992, 1993) and Peresbarbosa & Mellink (2001) also report significant seabird nesting on Isla Montague, but no BRPE have ever been recorded at this isolated site either. We considered both of these islands as potential sites for BRPE, however, because of their history and nesting activity regarding other waterbird species.

14—Sonny Bono Salton Sea National Wildlife Refuge staff, *pers. comm.*

^gADDITIONAL REMARKS FROM THIS COLUMN (“REM”):

11—Despite having spent around 45 days exploring this island, Banks (1963a) did not report nesting BRPE on Isla Cerralvo.

12—Data are reported for two near islands, Isla Gallo and Isla Gallina, “satellites” of Isla Ballena, both of which have had small numbers of nesting BRPE in the past (Carmona *et al.* 1994). Much boating and kayak activity was seen in the area and there were 145 additional BRPE scattered in the general area (Isla Espíritu Santo/Isla Partida). About 20 old, unoccupied BRPE nests were seen on Isla Gallo, thus its being reported here as a BRPE nesting site.

13—Multiple-passes over this island to survey, with estimates by DWA and pilot, JB, made this aerial estimate more reliable, nor could it be revised from the aerial photos. A correction factor of 1.081 was used. This entire area was one of high boating, kayak activity, and touristic activities, however.

14—About 70% of the BRPE numbers were associated with feeding activity on the SE end of Isla San José.

15—R. W. Risebrough, UC Berkeley (*pers. comm.*) reported to DWA that on 28 May 1969, there were 10 active nests on this islet; although small, this is apparently a “regular” nesting island for BRPE, as Banks (1963b) reported more than 100 nests there in 1962.

16—There were people kayaking, boating, etc. literally everywhere and few BRPE or other bird species seen in this general area, other than about 5 adult BRPE incubating on nests on this island.

17—There was scattered solitary feeding by 25 BRPE from this total along the east side of the island; but there were few other pelicans in the general area. Based on past visits to this island by DWA (*field notes*) relatively-isolated Isla Santa Catalina has been considered a “regular” BRPE nesting island in the past. Although we circled close to the island’s northern uplands (where the previous nesting activities had been known to occur, DWA *field notes*), we saw no signs of activity (white-wash, large numbers of birds, etc.).

18—Banks (1963b) reported 200 BRPE nests on this island, but on our survey, there were none associated with the island.

19—C. T. Mitchell (*pers. comm.*) reported 550 BRPE nests on “Isla San Ramón” in 1999; Banks (1963b) reported BRPE nesting on Isla Blanca in 1962, but did not give estimates of numbers of nests. Nesting BRPE likely shift-around frequently on the many islands of Bahía Concepción, perhaps in response to the high level of human activity and tourism characteristic of that area.

20—Our pilot, JB, believed that there were more than 7,700 BRPE nests on Isla Tortuga; photos also indicated more than the estimate by DWA, but due to the remoteness of the island from mainland, our pilot was cautious about altitude and time spent there; thus, our estimate is a compromise between DWA and JB, using a correction factor of 1.142 to obtain our final estimate.

21—This island was traversed aerially only once and BRPE were observed to be present along with other species of seabirds, but no nesting was detected although small numbers may have been over-looked; a cooperator estimated about 50 nests in 2006.

22—Apparently this island has contained much higher BRPE breeding numbers in the past (early- to mid-1900s). For example, Mailliard (1923) reported nesting BRPE as “quite numerous” and van Rossem (1932) stated that this colony was “probably the largest one in the Gulf.” L. W. Walker (*pers. comm.* to J. O. Keith, USFWS) reported in the early-1960s, that Isla San Pedro Nolasco was the largest colony of nesting BRPE known to him at that time.

23—See footnotes 8 and 9, r/s above; this island has been a designated RAMSAR site since 2004.

24—Our estimates of numbers of associated pelicans at the time of census are at best, crude, but thousands of BRPE (+other species) we seen in long flight-lines, along the nearby coast, and in extensive “pileup” feeding throughout this area, thus the total represents the entire San Lorenzo Archipelago (San Lorenzo Sur, Animas or San Lorenzo Norte, and Salsipuedes).

25—Galván (2006) reported his maximum counts only a few days later than our aerial censuses; the difference between his maximum counts and our aerial counts were attributed to difficulty in seeing nesting BRPE on the rough, rocky terrain of Isla Alcatraz, and there being two sub-colonies on the island, whereas we only discovered one of the two by air.

26—Old BRPE nests from previous years were seen from the air, but none were occupied in 2006; this island has a variable, sporadic history of BRPE nesting, for several years in the past, as high as 4,000 nests (DWA *field notes*).

27—On the day of our ground-truthing and banding, some young had already fledged and were gone; yet, about 10 nests also still contained eggs. Our final estimate of nests therefore represents a compromise between our aerial survey and our ground survey.

28—Jorge E. Mendoza, PROFEPA (*pers. comm.*) reported 50 active BRPE nests on Isla Patos in 1973 (an El Niño year).

29—A discrepancy between aerial counts and ground-truthing (see data for other nesting areas at Puerto Refugio) may have been due to disturbances that eliminated many nests on the central and southern parts of Isla Pelicano (maps of nesting distributions, comparing the two censuses, indicated that this part of the island had been abandoned between censuses (two major boat anchorages for this island are also located in this part of the island). Yet disturbance was not confirmed, although a group of approximately 550 active nests had disappeared and been abandoned on Isla Pelicano. Numbers of pelicans associated with the Puerto Refugio area represent numbers associated not with individual islands, but the entire Puerto Refugio area.

30—Isla San Luis has often had a protracted breeding season in years past (DWA, *field notes*) and that was apparently the case in 2006, with basically two nesting cohorts throughout the total season. Many BRPE apparently came in to nest after our first survey (aerial) which likely represented the earlier cohort for 2006 because we can determine from surface distribution maps between the two surveys, that apparently, more than 1,000 birds came into the colony to nest after our aerial survey (or we somehow missed them on the aerial survey). We have no other explanation for this large discrepancy.

31—Isla Encantada (Cholluda) is considered a “satellite” colony of Isla San Luis, and numbers in the past are correlated between the two islands (DWA, *field notes*); because this island was not visited by our ground-truthing crew, we made the assumption that numbers between aerial survey and ground-truthing at both islands would have been proportionate, as they have been in the past.

32—It is not certain if BRPE have ever nested on Isla San Jorge, although both Brown Boobies (*Sula leucogaster*), Double-crested Cormorants (*P. auritus*) and other species of seabirds abundantly nest there, the boobies numbering into the thousands (Mellink and Palacios 1993). In addition, lower, flat areas of Isla San Jorge, where BRPE would be expected to nest, are subject to disturbances (Mellink and Palacios 1993), as the island is a common site for boat anchorages, but also a common site for large numbers of roosting BRPE (at times commonly exceeding >5000 individuals, DWA *field notes*). J. R. Campoy (deceased), Reserva de Biosphera, Alto Golfo de California y Delta del Río Colorado (*pers. comm.* to DWA) also observed a small BRPE nesting colony on Isla Montague, at the head of the GOC, in the 2001.

33--BRPE nesting at Salton Sea is a recent phenomenon, and it was documented sporadically in the 1990s (DWA, *in preparation*). A migration has been established by pelicans from the Gulf of California to the Salton Sea, and returning (DWA, FG, CGR *in preparation*). *This* BRPE nesting is a range expansion.