Interim Summary: Nesting Counts of Ospreys and Brown Pelicans in Northwestern Mexico, 2006

By Charles J. Henny and Daniel W. Anderson

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Interim Summary: Nesting Counts of Ospreys and Brown Pelicans in Northwestern Mexico, 2006

By Charles J. Henny[1] and Daniel W. Anderson[2]

Abstract

The distribution and abundance of nesting populations of California brown pelicans (*Pelecanus occidentalis californicus*) and ospreys (*Pandion haliaetus*) were documented in 2006 in northwestern Mexico. For ospreys only, the 2006 data were compared to population estimates from two previous surveys (one conducted in 1977 and another conducted in the period 1992-1993). Overall, the total osprey nesting population increased from 1977 to 1992-1993 and then only changed slightly by 2006, but included regions with localized declines, increases, and stable populations. Preliminary population estimates for California brown pelicans suggest a large and apparently healthy breeding population.

Problem Statement and Implications

California brown pelicans (*Pelecanus occidentalis californicus*) and osprey (*Pandion haliaetus*) nesting along the coast of northwestern Mexico, including the Gulf of California, are an important component of Pacific Coast populations. Surveys of the osprey nesting population were conducted in 1977 and 1992-93 by Charles Henny (CJH) and Daniel Anderson (DWA), the same observers for this study, which provides a strong basis for comparisons over 29 years. No complete, range-wide survey of nesting California brown pelicans has been conducted in the past, and the subspecies is currently listed as endangered under the Endangered Species Act. The most recent published information for pelicans in the region is from the mid-1970s. Information about the current nesting population size and distribution are a priority need for a delisting analysis. The overall nesting population of ospreys in northwestern Mexico increased 68% from 810 ± 55 (95% C.I.) pairs in 1977 to 1,362 ± 278 pairs in 1992-93, but the population nesting along the Gulf Coast of Baja California remained stationary (255 versus 236 pairs). This atypical pattern of population recovery warrants additional investigation.

Objectives

1. Document the present (2006) numbers and distribution of nesting populations of California brown pelicans and ospreys
2. Compare 1977 and 1992-93 population estimates for ospreys with 2006 population estimates to evaluate population trends and changes in distribution.

[1] U.S. Geological Survey, Forest and Rangeland Ecosystem Science Center, 3200 SW Jefferson Way, Corvallis, OR 97331
[2] Department of Wildlife, Fish, and Conservation Biology, University of California, Davis, CA 95616

Methods and Study Area

The study area encompasses coastal Baja California, coastal Sonora, coastal Sinaloa and coastal Nayarit (south to San Blas), including the islands in the Gulf of California and along the Pacific Coast of the Baja California peninsula. Aerial surveys were conducted between 23 March and 1 April 2006. A pilot and two observers (CJH and DWA, same as in 1977 and 1992-93) conducted the aerial survey with about 80 hours of flying time. Pelican colonies were surveyed and some photographed with digital cameras. We believe the locations of all brown pelican colonies in the study area were known, with most visited by DWA in past years. Visual estimates of nesting pairs and associated data were made and calibrated with data from the photographs where possible (number of birds, number of nests, phenology, colony configurations, etc.). Investigators visited selected locations by boat to ground-truth and collect additional data.

Osprey populations were estimated using a double-sampling technique (air plus ground surveys) with partial double coverage. The study area was divided into seven regions during earlier surveys: northern and southern portion of the Pacific Ocean and the Gulf of California side of Baja California, the Midriff Islands in the Gulf of California, coastal Sonora and coastal Sinaloa. A single flight along the shore was needed to census rocky or sandy cliffs adjacent to the shoreline or flat terrain with no cacti. In areas where large cactus or mangrove forests existed near the shoreline, transects were flown at increasing distances landward from shore until no more osprey nests were observed. The survey was flown at an altitude of about 100 m. Osprey nests were classified as occupied if an adult was present on or in the immediate vicinity of the nest, or if young or eggs were seen in the nest. The survey was scheduled at the peak of the osprey nesting cycle. The entire study area was surveyed by air, and approximately 10% of the population was surveyed again from the ground to develop a partial double-survey population estimate. Numbers of occupied nests seen from the air, ground, and both air and ground were then compared. Comparing data from both counts permitted us to develop a visibility rate (multiplication factor) for adjusting the aerial counts to the total nesting population by use of a modification of the Peterson Estimator.

Results and Discussion

Nesting Ospreys in Coastal Baja California, Sonora and Sinaloa, Mexico, 1977, 1992-1993 and 2006

We again used a double-sampling technique (air plus ground survey) in 2006, with partial double coverage, to estimate the present size of the osprey nesting population in northwestern Mexico (Figure 1). The osprey population was previously surveyed in 1977 and 1992-1993 by the same observers. An estimated 810 pairs were nesting in 1977, and 1362 pairs were nesting in 1992-1993 “at the time of aerial survey” (Baja California surveyed in 1992, Sonora and Sinaloa in 1993). Details of the air: ground calculations are documented in Henny and Anderson (2004). The air: ground calculations are shown in Table 1, with cliff, cactus and other nesting substrate visibility rates (multiplication factor applied to aerial counts) similar during each survey: 2006 (1.75), 1992-1993 (1.71) and 1977 (1.63). Thus, total population estimates for the three time periods were negligibly influenced by the relatively consistent visibility rates.

The total population estimate for 2006 was 1343 nesting pairs; however, this total is not directly comparable to the earlier years because Natividad, Cedros and San Benitos Islands (all along Pacific Coast of Baja California) were not surveyed in 2006 because of fog. By excluding data from those islands in the 1977 and 1992-93 surveys, total population estimates for comparable survey areas in 1977, 1992-93 and 2006 were 740, 1302, and 1343 nesting pairs, respectively.

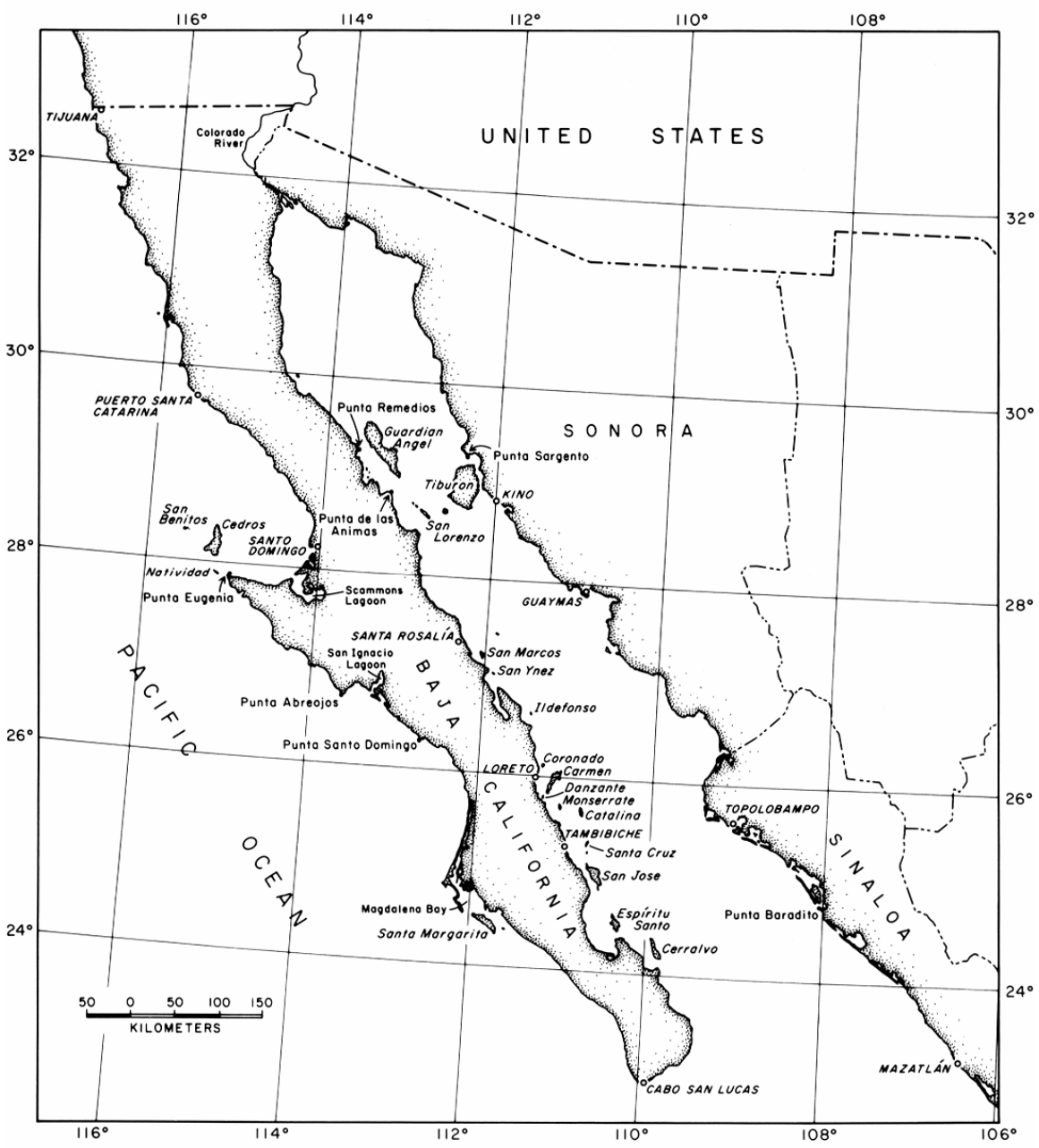

Figure 1. The Baja California and Gulf of California study area for ospreys.

Table 1. Number of occupied osprey nests (nesting pairs) seen from the air and ground in double-sampling areas in northwestern Mexico. These data were used to calculate visibility rates (multiplication factor applied to aerial counts).

Year nest substrate	Air (s_a)	Ground (s_g)	Both (m)	Total est. (N)	Visibility Rate (N/s_a)
1977					
Cliffs	88	121	74	143.89	1.64[a]
Cactus	7	9	6	10.50	1.50
Cliffs and Cactus (combined)	95	130	80	154.38	1.63
Scammon's Lagoon (ground nests)	26	23	22	27.18	1.05
1992, 1993					
Cliffs (LA Bay)[b]	32	43	25	55.04	1.72
Cactus (Kino)	16	27	16	27.00	1.69
Cliffs and Cactus (combined)	48	70	41	81.95	1.71
2006					
Cliffs (LA Bay)	25	37	22	40.22	1.61
Cactus and Other (Kino and vicinity)	23	33	18	42.17	1.83
All Combined	48	70	40	84.00	1.75

Note: $N = s_a s_g/m$.

[a] Values for three locations sampled in 1977 were 1.54, 1.75 and 1.77.

[b] Combined information for both 1992 and 1993.

Detailed population estimates are shown for the various regions and localities (same subdivisions as earlier reports) in Tables 2-4. Although a detailed report, including a discussion of the findings will be developed for publication at a later time, several points are notable. The large ground nesting population that nested on two islands in San Ignacio Lagoon was no longer present on the islands in 2006, but a similar number (198 pairs in 1992; 199 in 2006) was found in the region at small towns and adjoining power lines to the north and south of the lagoon. The population on the Gulf side of Baja California generally remained stable during the three surveys (255, 236 and 252 pairs). The Midriff Islands population generally decreased slightly from 1992-93 (308 pairs) to 2006 (289 pairs), but the Guardian Angel population increased (45 to 105 pairs [+60 pairs]) while the Tiburon population decreased (164 to 109 pairs [-55 pairs]). The mainland Mexico (Sonora and Sinaloa) osprey population showed a general increase from 1993 (393 pairs) to 2006 (443 pairs), but the population in Sonora decreased (214 to 158 pairs [-56 pairs]) in a manner similar to that on adjacent Tiburon Island, while the population in Sinaloa increased from 180 to 285 pairs [+105 pairs]. Overall, the osprey population from 1992-93 to 2006 in comparable survey areas (excluding islands not surveyed in 2006) showed a slight population increase (1302 versus 1343 pairs), but included regions with declines, increases and no change. The most obvious change was the loss of the large ground-nesting population at San Ignacio Lagoon and the appearance of similar numbers at adjacent towns nesting on power poles and other artificial structures. Clearly, the use of artificial nesting structures increased from the 6.2% of the population reported using them in 1992-93. These changes will be discussed in more detail in a final report for publication.

Table 2. Distribution and abundance of occupied osprey nests at the "time of the aerial survey" on the Pacific side of Baja California in 1977, 1992, and 2006.

Location	1977	1992	2006					
	Total Estimate[a]	Total Estimate[b]	Cliff	Cactus	Ground	Other	Max. Observed	Total Estimate
Northwest Baja, L.C.								
U.S. Border to Puerto Santa Catarina	0	0	5.25	0	0	1.75	4	7.0
Puerto Santa Catarina to Morro Santa Domingo	19.5	30.8	26.25	0	0	5.25	18	31.5
Scammon's Lagoon and vicinity[c]	50.1	126.0	0	0	18.00	102.00	120	120.0
Punta Mallarrimo to Punta Eugenia	0	10.2	0	0	0	1.75	1	1.8
Natividad Island	22.8	8.6						NS[d]
Cedros Island	19.6	18.8						NS
San Benitos Islands	26.0	32.5						NS
Subtotal	138.0 (69.6)[e]	226.9 (167.0)[e]	31.50	0	18.00	110.75	143	160.3
Southwest Baja, L.C.								
Punta Eugenia to Punta Abreojos	1.6	5.1	14.00	0	0	54.25	39	68.3
San Ignacio Lagoon	27.3	143.0	0	0	3.00[f]		3	3.0
El Datil to Cabo San Lucas	6.5	49.6	7.00	0	0	0 120.75	73	127.8
Subtotal	34.5	197.7	21.00	0	3.00	175.00	115	199.0
Grand Total	173.4 (104.1)[e]	424.6 (364.7)[e]	52.50	0	21.00	285.75	255	359.3

[a] From Henny and Anderson (1979).

[b] From Henny and Anderson (2004).

[c] Ground count by Aradit Castellanos Vera 5-7 Feb 2004.

[d] NS = not surveyed in 2006 due to fog.

[e] Value in ( ) estimate without Natividad, Cedros and San Benitos Islands (comparable to 2006 total estimate).

[f] Ground count by Roberto Carmona, 25 Jan 2006.

Table 3. Distribution and abundance of occupied osprey nests at the "time of the aerial survey" on the Gulf side of Baja California and Midriff Islands in 1977, 1992 and 2006.

Location	1977	1992	2006					
	Total Estimate[a]	Total Estimate[b]	Cliff	Cactus	Ground	Other	Max. Observed	Total Estimate
Northeast Baja, L.C.								
Colorado River to Punta Remedios	37.4	23.9	21.00	3.50	0	5.25	17	29.8
Punta Remedios to Punta de las Animas								
Los Angeles Bay Islands	35.0	29.3[c]	40.22	0	0	0	39	40.2[d]
Other Locations	22.1	17.1	21.00	0	0	0	12	21.0
Punta de las Animas to Santa Rosalia	22.8	35.9	24.50	8.75	0	1.75	20	35.0
Subtotal	117.3	106.2	106.72	12.25	0	7.00	88	126.0
Southeast Baja, L.C.								
Santa Rosalia to Loreto	65.6	49.5	42.00	0	0	14.00	32	56.0
Loreto to Timbabichi	42.4	49.6	36.75	0	0	1.75	22	38.5
Timbabichi to Cabo San Lucas	29.3	30.8	22.75	0	0	8.75	18	31.5
Subtotal	137.3	129.9	101.50	0	0	24.50	72	126.0
Grand Total	254.6	236.1	208.22	12.25	0	31.50	160	252.0
Midriff Islands								
Guardian Angel	40.8	44.5	105.00	0	0	0	60	105.0
San Lorenzo, San Lorenzo Norte, Partida, Salispuedes, Raza	52.2	53.0	36.75	0	0	0	21	36.8
Tiburon	71.8	164.2[e]	40.25	66.50	0	1.75[f]		108.5
San Estabon, Turner, Cholla[g]	22.8	46.2[e]	39.00	0	0	0	62 29	39.0
Grand Total	187.6	307.9	221.00	66.50	0	1.75	172	289.3

[a] From Henny and Anderson (1979). [b] From Henny and Anderson (2004). [c] Total estimate for 1993 was 25.2. [d] Used adjustment factor determined for LA Bay Islands in 2006. [e] Aerial survey conducted in 1993. [f] Only tree nest in Midriff Islands (near a well). [g] Includes ground count by Tad Pfister in 2006 (4 occupied nests).

Table 4. Distribution and abundance of occupied osprey nests at the "time of the aerial survey" in coastal Sonora and Sinaloa in 1977, 1993 and 2006.

Location	1977	1993	2006[c]					
	Total Estimate[a]	Total Estimate[b]	Cliff	Cactus	Mangrove[d]	Other	Max. Observed	Total Estimate
Coastal Sonora								
Colorado River to Punta Sargento	78.4	106.0	12.25	66.50	0	15.75	61	94.5
Punta Sargento to Sinaloa Border	45.6	107.7	21.00	31.50	0	10.50	39	63.0
Subtotal	124.0	213.7	33.25	98.00	0	26.25	100	157.5
Coastal Sinaloa								
Sonora border to Topolobampo	6.5	13.7	0	15.75	0	7.00	13	22.8
Topolobampo to Punta Baradito	61.9	165.9	0	243.25	15.75	3.50	150	262.5
Punta Baradito to Mazatlan	1.6	0	0	0	0	0	0	0
Subtotal	70.0	179.6	0	259.00	15.75	10.50	163	285.3
Grand Total	194.0	393.3	33.25	357.00	15.75	36.75	263	442.8

[a] From Henny and Anderson (1979).

[b] From Henny and Anderson (2004).

[c] Survey extended south from Mazatlan to San Blas, Nayarit in 2006, but no nesting ospreys located.

[d] Or other trees/bushes.

Nesting California Brown Pelicans in California, Baja California, Sonora, Sinaloa, Nayarit, Jalisco, Colima, Michoacan, and Guerrero, 2006

In 2006, the U. S. Fish and Wildlife Service proposed to review proposals for delisting or down-listing the California subspecies of the brown pelican. Thus, a complete and recent population survey was required. It was also essential that we conduct this survey in a non-El Niño year, because during El Niño events, pelicans and other seabirds often reduce their nesting efforts considerably or do not nest at all. This survey was conducted in 2006, a non-El Niño year.

We used several methods to estimate the total population-size of the California brown pelican. They were: (1) aerial counts (in some cases compared to photographs taken with a hand-held camera to determine accuracy), combined with (2) ground-truth surveys from boats at selected locations, supplemented by (3) recent information from co-operators on nesting-colony sizes, breeding phenology, and locations in selected areas, and (4) utilizing literature surveys where no other information was available. In essence, as with the osprey surveys reported here, we used double-sampling techniques (but from multiple sources) to account for (1) observer and count variation, (2) variations in phenology expected over such a large geographic area, (3) possible non-detection of a small number of nesting colonies, and (4) our inability to survey a few areas in 2006 due to safety considerations (fog, large distances of over-water flight required, and logistical problems). Our survey zone included the State of California (through co-operators), the Baja California coasts, and the west coast of Mexico south through San Blas, Nayarit, as far as our permit allowed (also including much information from co-operators). Small populations of the California brown pelican known to be nesting south of our survey area were estimated from literature references and co-operator contacts. In some cases, this information was quite "old" and hopefully, ground surveys can be conducted in these areas in the near future to more precisely estimate numbers in this small sub-population at the periphery of the range.

A preliminary compilation of aerial counts versus ground-truth data, or photo-corrected counts, showed that many cross-checks and corrections are necessary to establish a total population estimate (including possible future refinements), especially when dealing with phenological differences (early versus later) amongst the breeding colonies at different latitudes. A regression analysis of aerial counts versus final population estimates indicated that the aerial counts were incomplete. Furthermore, the degree of completeness varied with the nesting stage of the colony at the time of the aerial survey. Aerial counts at "early nesting" colonies accounted for about 68% of the nesting population (visibility rate 1.47, i.e., multiplication factor applied to aerial counts), while much more complete counts (91%) were obtained from the air at "mid-season" nesting colonies (visibility rate 1.09). Future surveys, however, must incorporate various types of double-sampling, and our first conclusion is that a one-time, wide geographical survey like that reported here cannot be accomplished from the air alone, without appropriate air: ground adjustment factors (visibility rates), at least for "early nesting" and "later nesting" colonies.

Our total population estimate for the subspecies maximum number of nesting pairs in 2006 = breeding attempts = nests), was 71,200 nesting pairs (Table 5). This preliminary estimate from phenologically and photographically corrected counts is subject to further analysis and interpretation which will be included in a detailed publication currently being prepared, but the preliminary estimates suggest a large and apparently healthy total breeding population.

Based on a previous mapping by Gress and Anderson (1983), we further refine the estimates of breeding sub-populations within the subspecies' range in Figure 2. This summary was based on previous sub-divisions, plus further insights from 35 years of experience with the subspecies by DWA, and additional insights gained from the 2006 survey.

Table 5. Estimated numbers of breeding pairs and general characteristics of tentatively designated sub-populations of the California brown pelican (*Pelecanus occidentalis californicus*), based largely on the 2006 aerial survey.

Designated Sub-population	Size Breeding Population[a,b]	Dominant Habitat	Known Colonies[c]	Colony Size[a,b] (Range)[a,b]
Southern California Bight	11,695	Offshore Islands, Pelagic	14 (3)	10-4,000
Southern Baja-Pacific	3,650	Offshore Islands, Pelagic, Estuarine	11 (6)	100-2,500
Gulf of California	42,970	Offshore Islands, Pelagic	42 (18)	5-10,625
Mexican Mainland-Estuarine	10,960	Estuarine, Mangrove Islands	15 (4)	2-6,950
Mexican Mainland-Island	1,920	Offshore Islands, Pelagic	13 (4)	25-500

[a]Numbers are subject to re-assessment; but represent the best estimates from various data sources provided in the text (based mainly on aerial survey data for 2006).

[b]Numbers represent maximum estimates of active nests and breeding pairs in 2006. Anderson and Gress (1983) showed that variable proportions of adult brown pelicans come to nesting colonies each year and actually breed, but additional observations and long-term data insights from selected study sites in California and the Gulf of California (F. Gress and DWA, respectively) indicated that 2006 was a year when maximum proportions of adults bred throughout their range.

[c]Number of colonies known (from past experience of DWA, literature reviews, and personal communications with cooperators) to have been active in the past; the numbers in parentheses are colonies not active in 2006. It was not expected that all known colonies would be occupied in a given year. Brown pelicans commonly shift colony locations from year-to-year (i.e., many colonies "blink out and blink in" from year-to-year, and important characteristic for defining the subspecies as a "metapopulation").

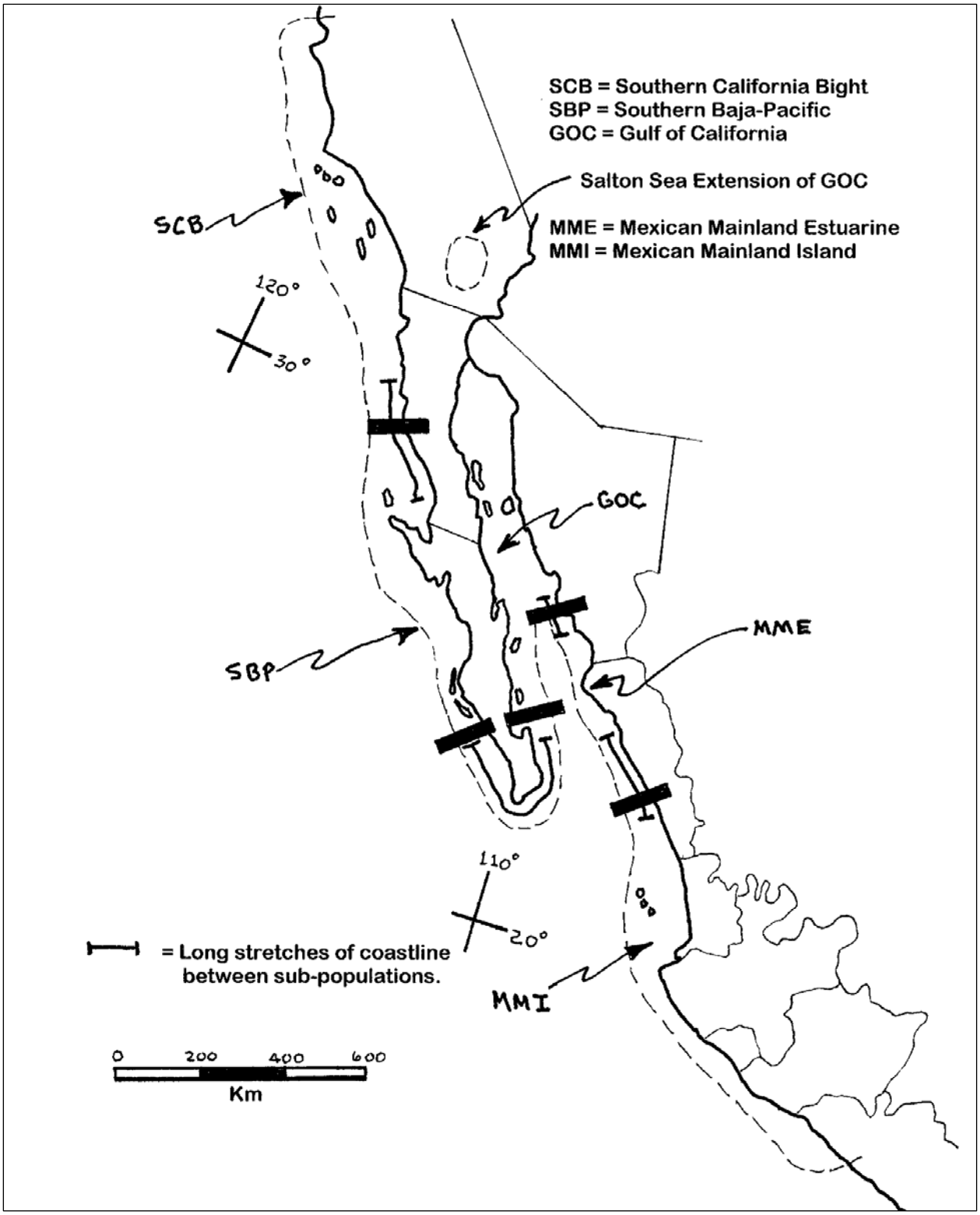

Figure 2. Map showing tentatively-identified sub-population designations within the California brown pelican metapopulation.

Acknowledgments

We thank Aradit Castellanos Vera, Roberto Carmona, Jean-Luc Cartron and Tad Pfister who provided osprey ground counts for selected sites. We also acknowledge the assistance of Carlos Godinez, Benito Bermudez, Ana Luisa Figueroa, Juan Pablo Gallo, Eduardo Palacios, Franklin Gress, Erik Mellink, Gustavo Danemann, Juan Pablo Galvan, Karina Santos del Prado and Hugh Drummond who participated in brown pelican ground counts at various locations. Jim Bredy safely piloted the aircraft, especially in areas where fueling stops were limited and planning was critical. The survey was partially funded by the U.S. Geological Survey, the U.S. Fish and Wildlife Service, the University of California, the Instituto Nacional de Ecología, and Comisión Nacional de Áreas Naturales Protegidas. This scientific survey would not have been successfully completed without the approval of La Secretaria de Relaciones Exteriores and the assistance of the many wildlife biologists in Mexico. Their assistance is very much appreciated.

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Appendix 1. Informé of Aerial Survey Activities in Mexíco

PARTICIPANTS

Charles J. Henny, U.S. Geological Survey
D. W. Anderson, University of California, Davis
James Bredy (pilot), U.S. Fish and Wildlife Service

DAY 0--22 March 2006

DWA left Davis, CA for San Diego, CA at about 1130; arrived SAN at 1330 and then met Chuck Henny at the baggage claim counter about one hour later. We waited for Jim Bredy to arrive in the USFWS Partenavia, N-737. Bredy arrived at 1750 and we all retired to a hotel in San Diego for the night to discuss plans for the aerial survey.

DAY 1--23 March 2006

We departed San Diego, CA in N-737 at 0935, arrived at the Tijuana Airport about 0945. We spent until 1145 checking through customs and immigration and were then given clearance to enter Mexico after showing our permits, personal papers, and describing our objectives. We left at 1250 and were airborne again at 1300. With permission from the Tijuana tower, we proceeded at 500' for a quick overflight of the Coronados Islands before proceeding south at 1310. Our flight plan was for Guerrero Negro and we were instructed to report to the military when we arrived.

We censused the coast south to Guerrero Negro, and then landed there at the military-operated airport at 1700. We reported to the military, they checked our papers and airplane. A taxi took us to the CONANP Biosphere Reserve office in town where we reported to Benito Bermudez, Director of the Biosphere Reserve. Because of unavailability of gas supplies, we changed our specific strategy on the census. One of the factors we learned early that would be most limiting for an aerial survey of this type would be the unpredictable distribution and availability of aviation gasoline on the Baja California peninsula.

DAY 2–24 March 2006

NOTE: Although we crossed back and forth between time zones on this trip, all times listed in this informé are Pacific Standard Time. Guerrero Negro was actually on Mountain Standard Time.

We were back in the air for Loreto at 0739, arriving there at about 0830 (we were over the little town of San Ignacio at 0812). In Loreto, Jim refueled N-737, reported to the military (the person in charge was Tte. Cab. Jarit Ruiz Alvarado), filed a new flight plan, and we were back into the air at 1030, starting our survey at 1104 in Bahía Concepción south from Isla el Gallo (south of Mulege). We censused the coast south to La Paz, arriving there at 1521, where we reported to military and civilian authorities.

DAY 3–25 March 2006

AM--Jim filed a flight plan and we were back in the air at 0745. We censused the coast south to Punta Arena de Ventana , Isla Cerralvo, Isla Espiritu Santo and nearby islets, Isla San Jose, nearby Isla las Animas, and then returned to La Paz for more gasoline. Jim filed a new flight plan to Loreto and we were in the air again at 1204, crossing the mountains behind La Paz back to Punta Arena de Ventana, then south along the coast through Cabo San Lucas and north along the coast to Magdalena Bay, censusing part of that area, and crossing back over Baja California to Loreto at about 1625. We were back on the ground in Loreto at 1700, cleared our permits again with the same people from the military.

DAY 4–26 March 2006

We were in the air at 0825, arriving back at Magdalen a Bay (la Curva del Diablo) at 0905. We finished Magdalena Bay at 0955 going north at 1030 and we flew back across Baja California again for more fuel in Loreto. We refueled, Jim filed another flight plan, and we arrived back at Boca San Andresito at 1210. We flew north along the coast at 500' at about 1211, through San Ignacio Lagoon and north again to Guerrero Negro, arriving there at 1505. We finished Guerrero Negro at 1600 as the fog started to come inland. That fog had precluded us from going out to Islas San Benitos, Isla Cedros, and Isla Natividad. We left Guerrero Negro avoiding the fog and were back in Loreto, touching down for the night at 1727.

DAY 5–27 March 2006

We were airborne at 0843, flying up the coast to near Mulege, and continuing our survey north along the Baja California eastern coast. We censused San Lorenzo Archipeligo, Isla Angel de la Guarda, Isla San Estaban, and crossed south to Guaymas. We were on the ground in Guaymas at 1400 and reported to the military (Officer in charge: Tte. Inf. Francisco Javier Lopez-Cepeda) for clearance.

DAY 6–28 March 2006

Today was the pilot's day off (following U.S. Fish and Wildlife Service regulations). We walked over to ITESM to look for people and, just wandering around, ran into Juan Pablo Gallo, (Centro de Investigacion en Alimentacion y Desarrollo, A.C.), Ana Luisa Figueroa's husband. At 1229, Juan Pablo told us that the new CONANP office is also located within walking distance of our hotel. We walked over and reported to Ana Luisa Figueroa (Director of the Guaymas Region, CONANP islands program, Islas del Golfo de California).

DAY 7–29 March 2006

We went to the airport at 0610 and had another military inspection at 0700 (it was the same officer-in-charge wanting to see some of our equipment). We were only carrying personal cameras, maps, and notebooks. We were airborne at 0830.

We flew directly south to Mazatlan, landing there at 1150, making reservations for the hotel, Playa de Mazatlan. Jim filed a new flight plan, and we were airborne again at 1305 after refueling. We censused the coast and islands south to San Blas and then returned north along the coast and back to just south of Mazatlan, arriving there for the night at 1536, checking with aviation authorities and the military, and then going to the hotel.

DAY 8–30 March 2006

At 0600 there was fog along the coast and Bredy did not want to take off until there were good signs of clearing, which he predicted about 0930. We arrived at the airport at 0900, and were in the air at 0922. Things moved fast at this international airport! By now the fog had cleared enough for us to continue to census. We censused the coast north, refueled again in Los Mochis from 1350-1449 (1 hour on the ground), continued up the coast, and arrived back in Guaymas, touching down at 1716, and reporting again to the military. I phoned Ana Luisa Figueroa at CONANP to report our success.

DAY 9–31 March 2006

We were airborne at 0743. We censused the coast north from Guaymas through Islas Patos and Tiburon, then returned to Guaymas for more gasoline, touching down at 1138. We refueled and were back in the air at 1214, flying back north to where we left off earlier. We censused the coast north, touching down in Mexicali for fuel at 1550. We refueled and then flew directly to San Felipe, arriving there at 1725 PST. We checked-in with the military and tied down the plane for the night.

DAY 10–01 April 2006

We were airborne from San Felipe at 0830, after Jim filed our flight plan. We started at Punta el Machorro (just north of San Felipe) and surveyed south to our previous stopping point at San Francisquito on DAY 5. We went south to this previous stop-off, and censused the coast north to Bahía de los Angeles, surveying the islands before landing.

In Bahía de los Angeles, we reported to the CONANP Islas office, and I sent off an e-mail message to Carlos Godinez (via Hugo Moreno) reporting our progress. We took off at about 1330, finished our survey going north, and then crossed the US/Mexico border at 1645 after Jim had filed his flight plan. We touched down in Yuma, Arizona at 1652. There we waited-for and then finished US Customs clearance, and parted individually for our homes.