

**PUBLICACIONES EN REVISTAS
ARBITRADAS**

**SOLICITUD DE
RECATEGORIZACIÓN**

**DR. EDUARDO PALACIOS
CASTRO**

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1. Whitworth D. L., H. Carter, E. Palacios, J. Koepke, W. McIver, C. Hamilton, G. McChesney, y F. Gress. 2021. The rarest alcid: status and history of the Guadalupe Murrelet *Synthliboramphus hypoleucus* at Isla Guadalupe, México (1892–2007). *Marine Ornithology* 49:133-143.
2. Cruz López Medardo, Fernández Aceves Guillermo Juan, Hipperson Helen, & Palacios Eduardo (2020). **Allelic diversity and patterns of selection at the major histocompatibility complex class I and II loci in a threatened shorebird, the Snowy Plover (*Charadrius nivosus*)**. *BMC EVOLUTIONARY BIOLOGY*, 20(114), 1-16.
3. Whitworth Darrell L., Carter Harry R., Palacios Eduardo, & Gress Franklin (2020). **AT-SEA CONGREGATION SURVEYS TO ASSESS THE STATUS OF SCRIPPS'S MURRELETS *SYNTHLIBORAMPHUS SCRIPPSI* AT ISLANDS OFF WESTERN BAJA CALIFORNIA, MÉXICO IN 2002-2008**. *Marine Ornithology*, 48(1), 41-52.
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THE RAREST ALCID: STATUS AND HISTORY OF THE GUADALUPE MURRELET *SYNTHLIBORAMPHUS HYPOLEUCUS* AT ISLA GUADALUPE, MEXICO (1892–2007)

DARRELL L. WHITWORTH^{1*}, HARRY R. CARTER^{1,2,†}, EDUARDO PALACIOS^{1,3}, JOSH S. KOEPKE^{1,4}, WILLIAM R. MCIVER^{1,5},
CHRISTINE D. HAMILTON^{1,6}, GERARD J. MCCHESENEY⁷ & FRANKLIN GRESS¹

¹California Institute of Environmental Studies, P.O. Box 1185, Davis, California 95617, USA *darrellwhitworth@ciesresearch.org

²Carter Biological Consulting, 1015 Hampshire Road, Victoria, British Columbia V8S 4S8, Canada

³Current Address: Centro de Investigación Científica y Educación Superior de Ensenada, Unidad La Paz, Miraflores 334 Col. Bellavista,
La Paz, Baja California Sur 23050, México

⁴Current Address: Samara Restoration, 3396 Antoinette Court, Arcata, California 95521, USA

⁵Current Address: US Fish and Wildlife Service, Arcata Fish and Wildlife Office, 1655 Heindon Road, Arcata, California 95521, USA

⁶Current Address: California Department of Transportation, 1656 Union Street, Eureka, California 95501, USA

⁷US Fish and Wildlife Service, San Francisco Bay National Wildlife Refuge Complex, 1 Marshlands Road, Fremont, California 94555, USA
[†]Deceased

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ABSTRACT

WHITWORTH, D.L., CARTER, H.R., PALACIOS, E., KOEPKE, J.S., MCIVER, W.R., HAMILTON, C.D., MCCHESENEY, G.J. & GRESS, F. 2021. The rarest alcid: status and history of the Guadalupe Murrelet *Synthliboramphus hypoleucus* at Isla Guadalupe, Mexico (1892–2007). *Marine Ornithology* 49: 133–143.

The Guadalupe Murrelet (GUMU) *Synthliboramphus hypoleucus* is the rarest alcid in the world (< 5000 pairs), with regular breeding documented only at Islas Guadalupe (hereafter, “Guadalupe”) and San Benito off the west-central coast of Baja California, Mexico. GUMU were discovered at Guadalupe in 1892, but by then feral cats *Felis catus* had already devastated the population and limited most nesting to predator-free islets just offshore. Despite its status as the only major GUMU breeding island, the population at Guadalupe was never adequately surveyed during the 20th century. In March–April 2007, we used survey techniques developed specifically for *Synthliboramphus* murrelets to assess the status and distribution of GUMU at Guadalupe. We counted 1511 GUMU during spotlight surveys in waters around the island. GUMU were abundant near the islets but also relatively numerous near suitable breeding habitats off the north and south coasts of Guadalupe proper. Searches on four islets yielded 93 nests, most at Islotes Zapato (66; 71%) and Morro Prieto (21; 23%), where scores of abandoned eggs indicated intense competition for nests. We found seven nests on Guadalupe proper, the first proof of breeding there since 1950, but we also found 68 carcasses that confirmed significant predation by cats and raptors. A spotlight survey correction factor yielded 2418 breeding pairs (95% confidence interval = 1662–4367) at Guadalupe and its islets, which accounted for ~90% of the world breeding population (1822–4789 pairs). About 1150–1750 pairs were estimated on Islotes Zapato and Morro Prieto in 1968, but comparable data were lacking to assess historical or recent changes. Basic studies of GUMU biology have only recently been initiated and should be a continuing priority. Recent conservation actions have benefited the native biota of Guadalupe, but further measures, such as localized rodent control and robust biosecurity on the islets, should be considered to mitigate serious threats to the vulnerable GUMU population and other seabirds.


Key words: Isla Guadalupe, Islote Morro Prieto, Islote Zapato, Baja California, Guadalupe Murrelet, spotlight surveys, *Synthliboramphus hypoleucus*

RESEARCH ARTICLE

Open Access



Allelic diversity and patterns of selection at the major histocompatibility complex class I and II loci in a threatened shorebird, the Snowy Plover (*Charadrius nivosus*)

Medardo Cruz-López^{1*}, Guillermo Fernández², Helen Hipperson³, Eduardo Palacios⁴, John Cavitt⁵, Daniel Galindo-Espinosa⁶, Salvador Gómez del Angel¹, Raya Pruner⁷, Oscar Gonzalez^{8,9}, Terry Burke³ and Clemens Küpper^{10*} 

Abstract

Background: Understanding the structure and variability of adaptive loci such as the major histocompatibility complex (MHC) genes is a primary research goal for evolutionary and conservation genetics. Typically, classical MHC genes show high polymorphism and are under strong balancing selection, as their products trigger the adaptive immune response in vertebrates. Here, we assess the allelic diversity and patterns of selection for MHC class I and class II loci in a threatened shorebird with highly flexible mating and parental care behaviour, the Snowy Plover (*Charadrius nivosus*) across its broad geographic range.

Results: We determined the allelic and nucleotide diversity for MHC class I and class II genes using samples of 250 individuals from eight breeding population of Snowy Plovers. We found 40 alleles at MHC class I and six alleles at MHC class II, with individuals carrying two to seven different alleles (mean 3.70) at MHC class I and up to two alleles (mean 1.45) at MHC class II. Diversity was higher in the peptide-binding region, which suggests balancing selection. The MHC class I locus showed stronger signatures of both positive and negative selection than the MHC class II locus. Most alleles were present in more than one population. If present, private alleles generally occurred at very low frequencies in each population, except for the private alleles of MHC class I in one island population (Puerto Rico, lineage *tenuirostris*).

Conclusion: Snowy Plovers exhibited an intermediate level of diversity at the MHC, similar to that reported in other Charadriiformes. The differences found in the patterns of selection between the class I and II loci are consistent with the hypothesis that different mechanisms shape the sequence evolution of MHC class I and class II genes. The rarity of private alleles across populations is consistent with high natal and breeding dispersal and the low genetic structure previously observed at neutral genetic markers in this species.

Keywords: Major histocompatibility complex (MHC), Balancing selection, Peptide-binding region (PBR), MHC class I, MHC class II, Private alleles, *Charadrius*

* Correspondence: tod472@gmail.com; ckuepper@orn.mpg.de

¹Posgrado en Ciencias del Mar y Limnología, Universidad Nacional Autónoma de México, Ciudad Universitaria, 04510 Cd. México, Mexico

¹⁰Max Planck Institute for Ornithology, Eberhard-Gwinner-Strasse, 82319 Seewiesen, Germany

Full list of author information is available at the end of the article



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AT-SEA CONGREGATION SURVEYS TO ASSESS THE STATUS OF SCRIPPS'S MURRELETS *SYNTHLIBORAMPHUS SCRIPPSI* AT ISLANDS OFF WESTERN BAJA CALIFORNIA, MÉXICO IN 2002–2008

DARRELL L. WHITWORTH^{1*}, HARRY R. CARTER^{1,2,†}, EDUARDO PALACIOS^{1,3} & FRANKLIN GRESS¹

¹California Institute of Environmental Studies, P.O. Box 1185, Davis, California 95617, USA *darrellwhitworth@ciesresearch.com

²Carter Biological Consulting, 1015 Hampshire Road, Victoria, British Columbia V8S 4S8, Canada

³Centro de Investigación Científica y Educación Superior de Ensenada, Unidad La Paz, Miraflores 334 Col. Bellavista, La Paz, Baja California Sur 23050, México

[†]Deceased

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ABSTRACT

WHITWORTH, D.L., CARTER, H.R., PALACIOS, E. & GRESS, F. 2020. At-sea congregation surveys to assess the status of Scripps's Murrelets *Synthliboramphus scrippsi* at islands off western Baja California, México in 2002–2008. *Marine Ornithology* 48: 41–52.

In 2002–2008, we conducted spotlight surveys and at-sea captures to determine the distribution and estimate the population size of *Synthliboramphus* murrelets at nine islands off the Pacific coast of Baja California (BC), México. Scripps's Murrelets *S. scrippsi* (SCMU) were detected in nocturnal at-sea congregations near six islands: Islas Coronado (IC), Todos Santos (TS), San Martín (SM), San Jerónimo (SJ), San Benito (SB), and Cedros (CD). Nest searches confirmed breeding at all islands except SM and CD, where breeding was presumed based on congregation attendance. Historically, SCMU were known or suspected to breed at all of these islands except CD, but knowledge of population size and trends prior to 1999 was limited to qualitative estimates and speculation. In 2002–2008, we estimated the total SCMU breeding population in the region to be 1686–4428 pairs, including 1117–2933 at IC, 262–688 at TS, 19–49 at SM, 24–64 at SJ, 231–607 at SB, and 33–87 at CD. SCMU populations have likely increased at IC, TS, SM, and SB since the eradication of cats in the late 1990s, but the small colony on SJ may be limited by competition for nest sites by a large and growing Cassin's Auklet *Ptychoramphus aleuticus* colony. Recent trends are unknown for the remnant SCMU population at CD, where breeding is restricted to isolated refuges safe from terrestrial predators. Although these surveys were conducted 11–17 years ago, these data provide the most recent population estimates available for these islands and offer a reliable modern baseline for measuring future population trends.

Key words: at-sea congregation, Baja California, Islas Coronado, San Benito, San Jerónimo, Todos Santos, Scripps's Murrelet, spotlight surveys

A re-evaluation of management units based on gene flow of a rare waterbird in the Americas

Golya Shahrokhi¹  | David Rodriguez²  | Samantha Collins³ | Gina Kent⁴  | Ken Meyer⁴ | Eduardo Palacios⁵  | Michael Clay Green²

¹Oklahoma Biological Survey, University of Oklahoma, Norman, OK, USA

²Department of Biology, Texas State University, San Marcos, TX, USA

³Louisiana Department of Wildlife and Fisheries, Rockefeller Wildlife Refuge, Grand Chenier, LA, USA

⁴Avian Research and Conservation Institute, Gainesville, FL, USA

⁵Unidad La Paz, Centro de Investigación Científica y Educación Superior de Ensenada, Baja California Sur, México

Correspondence

Golya Shahrokhi, Oklahoma Biological Survey, University of Oklahoma, Norman, OK 73019, USA.
Email: golya.shahrokhi@ou.edu

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Abstract

The maintenance of gene flow in species that have experienced population contractions and are geographically fragmented is important to the maintenance of genetic variation and evolutionary potential; thus, gene flow is also important to conservation and management of these species. For example, the Reddish Egret (*Egretta rufescens*) has recovered after severe population reductions during the 19th and 20th centuries, but population numbers remain below historical levels. In this study, we characterized gene flow among management units of the Reddish Egret by using ten nuclear microsatellite markers and part of the mitochondrial (mtDNA) control region from 176 nestlings captured at eight localities in Mexico (Baja California, Chiapas, Tamaulipas, and Yucatan), the USA (Texas, Louisiana, and Florida), and the Bahamas. We found evidence of population structure and that males disperse more often and across longer distances compared with females, which is congruent with previous banding and telemetry data. The maternally inherited mtDNA and biparentally inherited microsatellite data supported slightly different MU models; however, when interpreted together, a four MU model that considered population structure and geographic proximity was most optimal. Namely, MU 1 (Baja California); MU 2 (Chiapas); MU 3 (Yucatan, Tamaulipas, Texas, and Louisiana); and MU 4 (Florida and the Bahamas). Regions outside our sampled localities (e.g., the Greater Antilles and South America) require additional sampling to fully understand gene flow and movement of individuals across the species' entire range. However, the four MUs we have defined group nesting localities into genetically similar subpopulations, which can guide future management plans.

Abstract in Spanish is available with online material

KEYWORDS

Egretta rufescens, female philopatry, microsatellites, mtDNA, Reddish Egret, sex-biased dispersal



Population differentiation and historical demography of the threatened snowy plover *Charadrius nivosus* (Cassin, 1858)

Josephine D'Urban Jackson^{1,2} · Michael W. Bruford² · Tamás Székely^{1,3} · Jeffrey M. DaCosta^{4,5} · Michael D. Sorenson⁵ · Isa-Rita M. Russo² · Kathryn H. Maher^{1,6} · Medardo Cruz-López⁷ · Daniel Galindo-Espinosa⁸ · Eduardo Palacios⁹ · Atahualpa Eduardo De Sucre-Medrano¹⁰ · John Cavitt¹¹ · Raya Pruner¹² · Alcides L. Morales¹³ · Oscar Gonzalez^{14,15} · Terry Burke⁶ · Clemens Küpper¹⁶

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Abstract

Delineating conservation units is a complex and often controversial process that is particularly challenging for highly vagile species. Here, we reassess population genetic structure and identify those populations of highest conservation value in the threatened snowy plover (*Charadrius nivosus*, Cassin, 1858), a partial migrant shorebird endemic to the Americas. We use four categories of genetic data—mitochondrial DNA (mtDNA), microsatellites, Z-linked and autosomal single nucleotide polymorphisms (SNPs)—to: (1) assess subspecies delineation and examine population structure (2) compare the sensitivity of the different types of genetic data to detect spatial genetic patterns, and (3) reconstruct demographic history of the populations analysed. Delineation of two traditionally recognised subspecies was broadly supported by all data. In addition, microsatellite and SNPs but not mtDNA supported the recognition of Caribbean snowy plovers (*C. n. tenuirostris*) and Floridian populations (eastern *C. n. nivosus*) as distinct genetic lineage and deme, respectively. Low migration rates estimated from autosomal SNPs ($m < 0.03$) reflect a general paucity of exchange between genetic lineages. In contrast, we detected strong unidirectional migration ($m = 0.26$) from the western into the eastern *nivosus* deme. Within western *nivosus*, we found no genetic differentiation between coastal Pacific and inland populations. The correlation between geographic and genetic distances was weak but significant for all genetic data sets. All demes showed signatures of bottlenecks occurring during the past 1000 years. We conclude that at least four snowy plover conservation units are warranted: in addition to subspecies *nivosus* and *occidentalis*, a third unit comprises the Caribbean *tenuirostris* lineage and a fourth unit the distinct eastern *nivosus* deme.

Keywords *Charadrius nivosus* · Microsatellite · ddRAD · mtDNA · Demography · Conservation units

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Research Paper

A monitoring framework for assessing threats to nonbreeding shorebirds on the Pacific Coast of the Americas

Matthew E. Reiter¹, Eduardo Palacios², Diana Eusse-Gonzalez³, Richard Johnston González^{3,4}, Pete Davidson⁵, David W. Bradley⁵, Rob Clay⁶, Khara M. Strum⁷, James Chu⁸, Blake A. Barbaree¹, Catherine M. Hickey¹, David B. Lank⁴, Mark Drever⁹, Ronald C. Ydenberg⁴ and Robert Butler¹⁰

¹Point Blue Conservation Science, ²Centro de Investigación Científica y de Educación Superior de Ensenada, Baja California, Unidad La Paz, ³Asociación para el estudio y la conservación de las aves Acuáticas en Colombia - Calidris, ⁴Centre for Wildlife Ecology, Simon Fraser University, ⁵Birds Canada, ⁶WHSRN Executive Office, Manomet, ⁷Audubon California, ⁸United States Forest Service International Programs, ⁹Environment and Climate Change Canada, ¹⁰Pacific Wildlife Foundation

ABSTRACT. Many shorebirds (Order: Charadriiformes; Family: Charadriidae, Recurvirostridae, Scolopacidae, Haematopodidae, Jacanidae) are highly migratory, traversing thousands of kilometers between high latitude breeding and low latitude nonbreeding sites. In doing so, they are dependent on networks of coastal and interior wetland ecosystems. To aid in the effective conservation and management of their populations, and to assess the impact of threats facing shorebirds, standardized data on shorebird abundance are needed from multiple sites representing a gradient of conditions across the hemisphere. Such data would provide insight on whether fluctuations at one location represent real changes in abundance because of some localized threat, or whether other factors acting across broader scales such as the redistribution of predators, are responsible. We designed the Migratory Shorebird Project (MSP), now implemented in 11 countries along the Pacific Coast of the Americas, to characterize spatial and temporal variation in shorebird abundance, to understand which factors (habitat, threats) most influence their populations across the flyway, and to increase capacity for integrated research, monitoring, and conservation. We used bird inventory data from historical surveys and spatial data on habitat distribution along with a set of hypotheses about important threats to guide the design of the project and to identify data requirements to test hypotheses. We counted birds one time per year at 84 nonbreeding sites (~1400 sampling units) between 15 November and 15 February, when shorebirds were relatively stationary. In each of the first three annual counts from 2013/14 to 2015/16, the Migratory Shorebird Project counted ~1M shorebirds representing 44 species, including five species for which > 20% of the estimated biogeographic population was recorded annually, and nine additional species with > 5% recorded annually. The magnitude of variability in estimates of shorebird abundance was inversely correlated with survey effort with the most uncertainty, and lowest survey effort, in the South Temperate region followed by the Neotropical region (southern Mexico to northern Peru) and then the North Temperate region. Evaluation of variance highlighted both among-site and among-unit ("units" are nested within sites) variation in bird abundance and cover types as well as threats such as potential disturbance and predator abundance. Overall, shorebird density was significantly, and positively, associated with the area (ha) of intertidal mudflats, beaches, and aquaculture. Survey units with intermediate levels of bare ground and flooding had the highest shorebird density. As for threats, we found, contrary to our hypothesis, that shorebird abundance was significantly, and positively, associated, with the density of Peregrine Falcons (*Falco peregrinus*); however we found no relationship between shorebird abundance and the amount of urban development, our index to potential human disturbance, in the surrounding landscape. The Migratory Shorebird Project is providing an essential data foundation and network for increased knowledge of the factors affecting shorebirds across the Pacific Coast of the Americas and identifying what and where conservation actions could have the greatest impact.

Breeding population size and trends of American Oystercatchers on small islands of Bahía Santa María-La Reforma, Sinaloa, Mexico

Ivonne I. Vega-Ruiz,¹ José Alfredo Castillo-Guerrero,²  Eduardo Palacios,³  and Guillermo Fernández^{4,5} 

¹Posgrado en Ciencias del Mar y Limnología, Universidad Nacional Autónoma de México, Ciudad Universitaria, Ciudad de México, Mexico

²Departamento de Estudios para el Desarrollo Sustentable de Zonas Costeras, Centro Universitario de la Costa Sur, Universidad de Guadalajara, San Patricio-Melaque, Cibuatlán, Jalisco, Mexico

³Centro de Investigación Científica y Educación Superior de Ensenada, Unidad La Paz, Miraflores 334 Col. Bella Vista, La Paz, Baja California Sur 23050, Mexico

⁴Instituto de Ciencias del Mar y Limnología, Unidad Académica Mazatlán, Universidad Nacional Autónoma de México, Apartado Postal 811, Col. Centro, Mazatlán, Sinaloa 82040, Mexico

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ABSTRACT. The islands of Bahía Santa María-La Reforma, Sinaloa, Mexico, host the largest breeding population of the western race of American Oystercatchers (*Haematopus palliatus frazari*). This resident shorebird has a small breeding range restricted to northwestern Mexico and, although listed as endangered, little is known about their breeding biology. We estimated the number of pairs on the El Rancho and Melendres islands, the detection rate of pairs in different habitats, and the relationship between habitat length and number of pairs during three breeding seasons (2016–2018). In 2016 and 2017, the number of pairs peaked in mid-April (97 and 95 pairs, respectively) at El Rancho, and in early May and early April (50 and 42 pairs, respectively) at Melendres. In 2018, both islands had the maximum number of pairs during mid-May, with 109 pairs at El Rancho and 42 at Melendres. Detectability of breeding pairs in plots with sandy beach and dune habitats was higher (86–100%) than in those with mangrove habitat (22%). Detectability was associated with habitat type and should be considered in estimating the population size of this subspecies. We estimated that ~11% of the total *frazari* American Oystercatcher population breeds on these two small islands. The density of breeding pairs varied between habitats (range = 0–13 pairs/km). We also found a positive relationship between the number of pairs and plot length, suggesting that habitat availability might be a limiting factor for populations of American Oystercatchers in Mexico.

Colonies of Reddish Egret (*Egretta rufescens*) in Western Mexico

EDUARDO PALACIOS^{1,*}, EDGAR S. AMADOR SILVA², M. CLAY GREEN³, MARCO ANTONIO GONZÁLEZ-BERNAL⁴
AND JOSÉ ALFREDO CASTILLO-GUERRERO⁵

¹Centro de Investigación Científica y de Educación Superior de Ensenada, Unidad La Paz, Miraflores 334,
Colonia Bellavista, La Paz, Baja California Sur, 23050, México

²Centro de Investigaciones Biológicas del Noroeste, S.C. (CIBNOR), Mar Bermejo #195,
Colonia Playa Palo de Santa Rita, Apartado Postal 128, La Paz, Baja California Sur, 23090, México

³Department of Biology, Texas State University, 601 University Drive, San Marcos, Texas, 78666, USA

⁴Escuela de Biología, Universidad Autónoma de Sinaloa, Avenida Universitarios, Sin Número,
Ciudad Universitaria, Culiacán, Sinaloa 80010, México

⁵CONACYT-Universidad de Guadalajara, Centro Universitario de la Costa Sur,
Departamento de Estudios para el Desarrollo Sustentable de la Zona Costera, Gomez-Farias #82,
San Patricio-Melaque, Cihuatlán, Jalisco, 48980, México

*Corresponding author; E-mail: epalacio@cicese.mx

Abstract.—Very little is known about the numbers and distribution of the Reddish Egret (*Egretta rufescens*) in western Mexico. To estimate the size and distribution of Reddish Egret colonies along the coast of western Mexico, historical and potential Reddish Egret nesting sites were surveyed in 2008 and 2009. Forty-six colonies were found from Baja California to Chiapas. Mean colony size was 24 pairs/colony (95% CI \pm 15; n = 46), but most (74%) colonies were < 20 pairs (Median = 7 pairs; n = 46). The largest colony (258 pairs) and the only two colonies with dark and white morphs were found in Oaxaca. The second largest colony (248 pairs) was found in Baja California Sur. The total breeding population was estimated at 1,108 breeding pairs; 788 pairs in 43 colonies were located in northwestern Mexico (Baja California peninsula, Sonora and Sinaloa, subspecies *E. r. dickeyi*) and 320 pairs in three colonies were in southern Mexico (Oaxaca and Chiapas, subspecies undetermined). This breeding population, although small, is three to four times larger than previously reported for the Pacific Coast of Mexico (225-300 pairs). Thirty-five (76%) Reddish Egret nesting sites were inside a natural protected area; however, the Oaxaca and Chiapas colonies were not. Received 21 February 2018, accepted 30 May 2018.

Key words.—colony size, distribution, *Egretta rufescens dickeyi*, population size, Reddish Egret, western Mexico.

Waterbirds 41 (4): 401-410, 2018

Age Determination in California Brown Pelican (*Pelecanus occidentalis californicus*) Chicks in the Gulf of California

EDUARDO PALACIOS^{1,*} AND DANIEL W. ANDERSON²

¹Centro de Investigación Científica y de Educación Superior de Ensenada, Unidad La Paz, Miraflores 334, Colonia Bellavista, La Paz, Baja California Sur, 23050, Mexico

²University of California-Davis, Department of Wildlife, Fish, and Conservation Biology, 501 Isla Place, Davis, California, 95616, USA

*Corresponding author; E-mail: epalacio@cicese.mx

Abstract.—A rapid and reliable method to age California Brown Pelican (*Pelecanus occidentalis californicus*) pre-fledged young based on exposed culmen measurements is presented. In 1997, 1998, and 1999, a total of 52 unknown-age young were marked and recaptured one to three times throughout the nesting season on Isla Piojo, Bahía de Los Angeles, Mexico. From culmen growth increments of these young, we developed an age scale. The linear equation that described the age/culmen relationship was: estimated age (week) = exposed culmen length (cm) \times 0.378 - 0.565. The accuracy of the model, as calculated by the k-Fold cross validation method, was 0.149. California Brown Pelican chicks can thus be aged by culmen length measurements. The application of this aging technique allows the mass of chicks to be plotted against their ages to obtain an average body mass growth curve for any sampled cohort of young California Brown Pelicans based on less frequent visits to the colony to minimize the potential effects of disturbance. Received 6 September 2017, accepted 21 October 2017.

Key words.—aging technique, California Brown Pelican, chick growth, exposed culmen length, *Pelecanus occidentalis californicus*.

Waterbirds 41 (3): 305-309, 2018

BREEDING OF CRAVERI'S MURRELET *SYNTHLIBORAMPHUS CRAVERI* AT FOUR ISLANDS OFF WEST-CENTRAL BAJA CALIFORNIA, MÉXICO

DARRELL L. WHITWORTH¹, HARRY R. CARTER^{1,2,†}, EDUARDO PALACIOS^{1,3} & FRANKLIN GRESS¹

¹California Institute of Environmental Studies, P.O. Box 1185, Davis, California 95617 USA (darrellwhitworth@ciesresearch.com)

²Carter Biological Consulting, 1015 Hampshire Road, Victoria, British Columbia V8S 4S8 Canada

³Centro de Investigación Científica y Educación Superior de Ensenada, Unidad La Paz, Miraflores 334 Col. Bellavista, La Paz, Baja California Sur 23050, México

[†]Deceased

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ABSTRACT

WHITWORTH, D.L., CARTER, H.R., PALACIOS, E. & GRESS, F. 2018. Breeding of Craveri's Murrelet *Synthliboramphus craveri* at four islands off west-central Baja California, México. *Marine Ornithology* 46: 117–124.

Breeding by Craveri's Murrelet (CRMU) has been documented on many islands in the Gulf of California, México, but has never been convincingly demonstrated on islands off the west coast of Baja California (BC). In 2007–2008, we confirmed CRMU breeding at Islas San Roque ($n = 1$ nest), Asunción ($n = 2$), Cedros ($n = 2$), and San Martín ($n = 1$) off west-central BC, using genetic analysis of eggshell membranes to confirm species identity. Spotlight surveys of *Synthliboramphus* murrelets attending at-sea congregations recorded 9–14 murrelets ($n = 1$ survey) at San Roque, 24–25 at Asunción ($n = 1$), 168 at Cedros ($n = 1$), and 69 (± 15 SD; $n = 2$) at San Martín. All murrelets captured in at-sea congregations at San Roque ($n = 6$) were CRMU, but two species (82% CRMU, 18% Scripps's Murrelet *S. scrippsi* [SCMU]) were captured at Cedros ($n = 11$), and three species (63 % CRMU, 25% SCMU, 13% Guadalupe Murrelet *S. hypoleucus*) were captured at San Martín ($n = 8$). Applying a spotlight survey correction factor that quantified the relationship between the number of murrelets attending at-sea congregations and the number of nests on the adjacent shoreline, we tentatively estimated 14–22 CRMU pairs (95% C.I. = 10–40 pairs) at San Roque, 38–40 (95% C.I. = 26–72) at Asunción, 221 (95% C.I. = 152–399) at Cedros and 69 (95% C.I. = 47–124) at San Martín. To our knowledge, these are the first population estimates for any CRMU colony. Confirmation of CRMU breeding at these four islands increased our understanding of *Synthliboramphus* murrelet distribution in the region, lending credence to presumed historical breeding by CRMU at Islas Natividad and San Benitos (where breeding has since been confirmed). More spotlight surveys, at-sea captures, and nest searches are needed to better determine the presence, size, and species composition of the murrelet populations on either side of BC.

Key words: Baja California, Craveri's Murrelet, Isla Asunción, Isla Cedros, Isla San Martín, Isla San Roque, *Synthliboramphus craveri*



Joseph Grinnell meets eBird: Climate change and 100 years of latitudinal movement in the avifauna of the Californias

RICHARD A. ERICKSON^{1, 2, *}, KIMBALL L. GARRETT³, EDUARDO PALACIOS⁴,
STEPHEN C. ROTTENBORN⁵, AND PHILIP UNITT²

Abstract: The geographic ranges of birds and other organisms are expected to move north in the northern hemisphere as the climate becomes warmer. To evaluate the hypothesis that such shifts are already underway, we examined ~100 years of literature concerning the ranges (breeding, wintering, migration/dispersal) of 672 avian species, subspecies, and subspecies groups ("species") recorded in the states of California, Baja California, and Baja California Sur, including their offshore waters. The generally north-south alignment of these states over ~2500 km (>20° of latitude) along the west coast of North America is well suited for our inquiry. Making our analysis possible was the series of avifaunal summaries for these regions prepared primarily by Joseph Grinnell and colleagues early in the 20th century. Of the 672 species examined, 533 showed a real or apparent change in distribution. In 51% of those cases (270 species), we conclude the change was apparent rather than real, attributable to greater observer coverage and the accumulation of knowledge and records with the passing of time. Of the 263 species judged to show real changes, 26% represent fluctuating distributions, westward or eastward expansions, novel ocean expansions, extinctions or extirpations, or the result of introductions and escapes. The remaining 194 species exhibited latitudinal changes. We consider 46 (24%) of these changes to reflect primarily habitat alteration or recovery from other direct human effects (cessation of the feather trade, decreased shooting). Of 148 (all native) species with latitudinal range changes not readily explained by such factors, 102 adjusted northward, 36 adjusted southward, and 10 adjusted in both directions. Changes in resident species are evenly divided between northward and southward adjustments. In contrast, 64% of changes to breeding ranges of migratory species and 89% of those to winter ranges and in other seasonal roles were northward. Northward range expansion and southward range contraction occurred primarily in California, northward contraction occurred primarily in southern California and Baja California, and southward expansion occurred primarily in southern California. Nonpasserines (particularly waterfowl, rails, cranes, terns, skimmers, and herons and allies) are disproportionately overrepresented among the 148 species changing latitudinally not directly affected by human actions; grebes, shorebirds, loons, and seabirds are disproportionately underrepresented. Swallows are the passerine group best represented by latitudinal range changes. Habitats most closely associated with these 148 species are wetlands, marine, and mixed forest (66%), especially among nonpasserines (80%). In aggregate, the range changes we summarize show the northward movement of bird distributions predicted to result from warming.

Keywords: Baja California Peninsula, California, climate change, geographic range expansions and contractions

Supplemental Online Material for this paper (Appendix S1) is available at www.wfopublications.org/Avifaunal_Change/Erickson/Erickson_SOM.pdf

Full citation: Erickson, R. A., Garrett, K. L., Palacios, E., Rottenborn, S. C., and Unitt, P. 2018. Joseph Grinnell meets eBird: Climate change and 100 years of latitudinal movement in the avifauna of the Californias, *in* Trends and traditions: Avifaunal change in western North America (W. D. Shuford, R. E. Gill Jr., and C. M. Handel, eds.), pp. 12–49. Studies of Western Birds 3. Western Field Ornithologists, Camarillo, CA; doi 10.21199/SWB3.1.

¹LSA Associates, 20 Executive Park, Suite 200, Irvine, California 92614, ²San Diego Natural History Museum, P. O. Box 121390, San Diego, California 92112, ³Natural History Museum of Los Angeles County, 900 Exposition Blvd., Los Angeles, California 90007, ⁴Centro de Investigación Científica y Educación Superior de Ensenada, B. C. (CICESE Unidad La Paz), Miraflores 334, Fracc. Bella Vista, La Paz, Baja California Sur 23050, México, ⁵H. T. Harvey & Associates, 983 University Avenue, Building D, Los Gatos, California 95032; *corresponding author: Richard.Erickson@lsa.net

Population Status of American Oystercatchers (*Haematopus palliatus frazari*) Breeding in Northwest Mexico

EDUARDO PALACIOS^{1,*}, JOSÉ ALFREDO CASTILLO-GUERRERO², DANIEL GALINDO-ESPINOSA^{1,6},
LUCÍA ALFARO³, EDGAR AMADOR⁴, GUILLERMO FERNÁNDEZ⁵, JONATHAN VARGAS⁶ AND XICOTÉNCATL VEGA³

¹Centro de Investigación Científica y Educación Superior de Ensenada, Unidad La Paz, Miraflores 334,
Col. Bella Vista, La Paz, Baja California Sur, 23050, México

²Consejo Nacional de Ciencia y Tecnología – Centro Universitario de la Costa Sur,
Universidad de Guadalajara, Gómez Farías 82, San Patricio–Melaque, Cihuatlán, Jalisco, 48980, México

³Terra Peninsular A.C. Tercera 1282. Centro. Ensenada B.C., 22800, México

⁴Centro de Investigaciones Biológicas del Noroeste (CIBNOR), Mar Bermejo 195, Col. Playa Palo de Santa Rita,
Apartado Postal 128, La Paz, Baja California Sur, 23090, México

⁵Unidad Académica Mazatlán, Instituto de Ciencias del Mar y Limnología, Universidad Nacional Autónoma de
México, Apartado Postal 811, Mazatlán, Sinaloa, 82040, México

⁶Departamento Académico de Ciencias Marinas y Costera, Universidad Autónoma de Baja California Sur,
La Paz, Baja California Sur, 23080, México

*Corresponding author; E-mail: epalacio@cicese.mx

Abstract.—The western race of the American Oystercatcher (*Haematopus palliatus frazari*) is a resident and endangered shorebird of western Mexico. Its breeding population and conservation concerns are poorly known, but recent information indicates extremely low numbers and a discrete breeding distribution. Because of loss and degradation of sandy beaches by coastal development and disturbance from human recreational activities, the American Oystercatcher is a priority species in the Shorebird Conservation Plans of the United States and Mexico. Research on its distribution and abundance during the 2009 breeding season resulted in the identification of 2,286 adults in northwest Mexico. Although the population is higher than previous estimates, its distribution is more restricted than expected. It is distributed almost exclusively in northwest Mexico, and 80% of the total breeding population is found on the islands of Sinaloa and Baja California Sur. Based on these results, this species was officially federally listed on the Mexican List of Protected Species in 2010. This legal mechanism will promote the management and protection of this priority subspecies as well as other waterbirds occupying the same habitats. *Received 31 July 2015, accepted 18 March 2016.*

Key words.—breeding population, discrete distribution, islands, sandy habitat, threats.

Waterbirds 40 (Special Publication 1): 72-78, 2017

Non-breeding Distribution, Abundance, and Roosting Habitat Use of the American Oystercatcher (*Haematopus palliatus frazari*) in Sinaloa, Mexico

MIRIAM LERMA¹, JOSÉ ALFREDO CASTILLO-GUERRERO^{2,*} AND EDUARDO PALACIOS³

¹Terra Peninsular Asociacion Civil, Tercera 1282, Colonia Centro, Ensenada, Baja California, 22800, Mexico

²Consejo Nacional de Ciencia y Tecnología – Departamento de Estudios para el Desarrollo Sustentable de Zonas Costeras, Centro Universitario de la Costa Sur, Universidad de Guadalajara, Gomez Farias 82, San Patricio–Melaque, Cihuatlán, Jalisco, 48980, Mexico

³Centro de Investigación Científica y de Educación Superior de Ensenada, Unidad La Paz, Miraflores 334, Colonia Bella Vista, La Paz, Baja California Sur, 23050, Mexico

*Corresponding author; E-mail: alfredocas@gmail.com

Abstract.—The American Oystercatcher (*Haematopus palliatus frazari*) is federally listed as endangered in Mexico due to habitat loss and small population size. Recent surveys indicate that the State of Sinaloa supports about half of the breeding population in Mexico. However, no information is available about the non-breeding ecology in Mexico. To assess American Oystercatcher distribution, abundance, and roosting habitat use during the non-breeding season (3 August 2014–23 January 2015), six bays were surveyed in Sinaloa. A total of 1,351 American Oystercatchers were detected using this area based on maximum count per roosting site at or near high tide. American Oystercatchers roosted in flocks of variable size (3–253 individuals per flock) with Bahía Santa María hosting the main roosting sites in Sinaloa. Mangrove islands and mudflats had larger numbers of individuals than expected relative to the availability of those habitats. The non-breeding Sinaloa population comprised approximately 45.0% of the total *H. p. frazari* population estimate ($n = 3,000$ individuals). Bahía Santa María represented 74.6% of the non-breeding population observed in Sinaloa. Thus, Sinaloa, and particularly Bahía Santa María, stand out as critical sites for the conservation of this subspecies. Hypothesized threats to American Oystercatchers were predators, livestock, and human activities. Received 31 July 2015, accepted 22 April 2016.

Key words.—coastal lagoons, flock size, Gulf of California, *Haematopus palliatus frazari*, threats, wintering.

Waterbirds 40 (Special Publication 1): 95–103, 2017

Forster's Tern (*Sterna forsteri*) Breeding Inland near Mexico City, Mexico

SALVADOR GÓMEZ DEL ÁNGEL^{1,3}, EDUARDO PALACIOS^{2,*} AND ATAHUALPA EDUARDO DE SUCRE MEDRANO¹

¹Laboratorio de Zoología, Facultad de Estudios Superiores Iztacala, Universidad Nacional Autónoma de México, Avenida De los Barrios No. 1, Los Reyes Iztacala Tlalnepantla de Baz, 54000, México

²Centro de Investigación Científica y de Educación Superior de Ensenada, Unidad La Paz, Miraflores 334 between La Paz and Mulegé, Colonia Bellavista, La Paz, Baja California Sur, 23050, México

³Current address: Unidad Académica Mazatlán, Instituto de Ciencias del Mar y Limnología, Universidad Nacional Autónoma de México, Apartado Postal 811, Mazatlán, Sinaloa, 82040, México

*Corresponding author; E-mail: epalacio@cicese.mx

Abstract.—Forster's Terns (*Sterna forsteri*) breed mainly in central Canada and the north-central USA, and along both coasts of North America. In Mexico, only five nesting colonies were known prior to this study and all are coastal, three from Baja California, one from Colima on the Pacific coast, and one from Tamaulipas on the Gulf of Mexico. In 2014, a new inland colony was found at the Lake of Texcoco, east of Mexico City, México. Eight nests that were located on small islets 400 m away from shore were monitored from April to June 2014. Almost 90% of the eggs ($n = 16$) were lost by flooding, and only two chicks hatched. One chick died and the other survived to fledging, and at 25 days old it dispersed more than 3 km from the colony. This nesting colony at the Lake of Texcoco represents a new breeding site of Forster's Tern in México, the first breeding record in an interior wetland of México, and a southward expansion of the known breeding range for this species. These observations reinforce the importance of the Lake of Texcoco for breeding waterbirds in the Valley of México. *Received 10 July 2015, accepted 5 August 2015.*

Key words.—breeding, Forster's Tern, Lake of Texcoco, México, *Sterna forsteri*.

Waterbirds 38(4): 427-430, 2015

Dimorfismo sexual en tamaño y marca frontal en el chorlo nevado (*Charadrius nivosus*)

Salvador Gómez del Ángel,^{1*} Eduardo Palacios Castro² y Atahualpa Eduardo De Sucre-Medrano¹

Resumen

El dimorfismo sexual en aves se expresa de diferentes formas, entre ellas está el tamaño o la coloración del plumaje. En aves playeras las marcas melánicas son distintas entre sexos y muy variables; se cree que cumplen una función disruptiva con el paisaje. Analizamos el dimorfismo sexual en tamaño corporal y en la estructura de la barra frontal del chorlo nevado (*Charadrius nivosus*) y encontramos que el tarso, la cuerda alar y que tanto la longitud como la amplitud de la barra frontal son de mayores dimensiones en los machos. Además, describimos por primera vez un ornamento con forma de “cuernos” en la frente, exclusivo de los machos. Aunque otros autores han revisado la variabilidad de estas marcas, su valor adaptativo es poco conocido. Consideramos que el dimorfismo en la estructura de la barra frontal es importante dentro y entre sexos durante la temporada reproductora, ya que cumple un papel clave durante los despliegues de cortejo y en la competencia entre machos, donde son exhibidas las plumas del pecho que contrastan con esta marca. Además, las medidas morfométricas mayores en los machos son consistentes con la poliandria y la competitividad intensa entre los machos.

Palabras clave: morfometría, ornamento en forma de cuernos, cuenca de México, lago de Texcoco.

Sexual dimorphism in size and forehead marking of the snowy plover (*Charadrius nivosus*)

Abstract

Sexual dimorphism in birds is expressed in different forms such as size or plumage coloration. In shorebirds melanistic marks differ between sexes and are highly variable, and it is believed that they play a disruptive role in the landscape. For the Snowy Plover (*Charadrius nivosus*) we analyzed the sexual dimorphism in body size and structure of the frontal bar. We found that the male is larger in the tarsus, wing chord, and the length and breadth of the frontal bar. In addition, we describe for the first time a horn-shaped ornament on the forehead bar, exclusive of males. Although other authors have reviewed the variability of these marks, its adaptive significance is poorly understood. We believe that dimorphism in the frontal bar is important both within and between sexes during the breeding season, playing a key role during courtship displays and male-male competition, where breast feathers contrast with this mark. Also a greater body size of males is consistent with polyandry and intense male-male competition.

Keywords: morphometry, horn-shaped ornament, Mexican basin, Texcoco lake.

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Editor asociado: Fernando Villaseñor Gómez



Ecología

Estatus del chorlo nevado (*Charadrius nivosus*) en San Quintín y su disminución poblacional en la península de Baja California

Status of the Snowy Plover (Charadrius nivosus) in San Quintín and its population decline in the Baja California peninsula

Daniel Galindo-Espinosa^a y Eduardo Palacios^{b,*}

^a Instituto Politécnico Nacional, Centro Interdisciplinario de Ciencias Marinas, Apartado postal 592, 23000, La Paz, Baja California Sur, México

^b Centro de Investigación Científica y de Educación Superior de Ensenada, Unidad La Paz, Miraflores 334, Fraccionamiento Bellavista, 23050, La Paz, Baja California Sur, México

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Resumen

El chorlo nevado (*Charadrius nivosus*) es un ave playera amenazada en México y en EUA. La población reproductora de la costa del Pacífico es un segmento poblacional distinto (SPD) que se distribuye desde Washington, EUA, hasta Baja California Sur, México. San Quintín alberga el 50% de la población del SPD de la península de Baja California, por lo cual es prioritario para la especie. Se usaron conteos históricos (1991) y actuales (2007-2014), además de información sobre aves marcadas y recapturadas, para evaluar cambios poblacionales del SPD que anida en la península de Baja California. Se estimó que entre 1991 y 2008 la población peninsular disminuyó un 33%. Sin embargo, la población de San Quintín no siguió esta tendencia y se consideró estable. En invierno, la población residente de chorlos de San Quintín se duplicó por la inmigración de individuos del norte. La abundancia relativa de chorlos en la temporada reproductora, aunque variable, fue mayor en salitrales que en playas arenosas y salinas. En los 2 últimos inviernos la distribución de los chorlos ha cambiado entre playas arenosas y salitrales. La conservación del SPD mexicano depende en un 50% de la protección del hábitat y la conservación de San Quintín.

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Palabras clave: Especie amenazada; Abundancia; Reproducción; Invernada; Migración; Aves playeras

Abstract

The snowy plover (*Charadrius nivosus*) is a shorebird that is threatened in Mexico and US. The breeding population of the Pacific coast is a distinct population segment (DPS) whose distribution goes from Washington, USA, to Baja California Sur, Mexico. San Quintin hosts 50% of the DPS of the Baja California peninsula and, therefore, is a priority site for the species. Historical (1991) and current surveys (2007-2014), plus information on marked and recaptured birds, were used to assess population changes in the DPS nesting in the Baja California peninsula. It was estimated that between 1991 and 2008 the peninsular population declined by 33%. However the population of San Quintin did not follow this trend and it was considered stable. In Winter the resident population of plovers of San Quintin doubled by the immigration of individuals from the north. Density of plovers in the breeding season, although variable, was higher in salt works and sandy beaches. In the last 2 winters there was a shift in the plover distribution between sandy beaches and salt flats. Conservation of the Mexican DPS depends 50% on habitat protection and conservation in San Quintin.

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Keywords: Threatened species; Abundance; Breeding; Wintering; Migration; Shorebirds

* Autor para correspondencia.

Correo electrónico: epalacio@cicese.mx (E. Palacios).

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Comparisons of Reddish Egret (*Egretta rufescens*) Diet During the Breeding Season Across its Geographic Range

ZACHARY HOLDERBY¹, AUSTIN HILL^{2,7}, EDUARDO PALACIOS³, M. CLAY GREEN^{4,*}, EDGAR AMADOR⁵
AND CECILIA DE DIOS⁶

¹Wildlife Ecology Program, Department of Biology, Texas State University, San Marcos, Texas, 78666, USA

²Population and Conservation Biology Program, Department of Biology, Texas State University, San Marcos, Texas, 78666, USA

³CICESE (Unidad La Paz), Miraflores 334 Col. Bellavista, La Paz, Baja California Sur, 23050, México

⁴Department of Biology, Texas State University, San Marcos, Texas, 78666, USA

⁵Centro de Investigaciones Biológicas del Noroeste, S. C. Instituto Politécnico Nacional No. 195, Colonia Playa Palo de Santa Rita, La Paz, Baja California Sur, 23096, México

⁶Posgrado en Ciencias del Mar y Limnología, Universidad Nacional Autónoma de México, Circuito Exterior s/n Ciudad Universitaria, Distrito Federal, 04510, México

⁷Current address: SWCA Environmental Consultants, Arlington, Texas, 76006, USA

*Corresponding author; E-mail: claygreen@txstate.edu

Abstract.—Although the prey of Reddish Egrets (*Egretta rufescens*) generally consists of shallow-water, euryhaline fish species, rangewide differences in breeding season diet have not been examined. Furthermore, the relative proportions of the two Reddish Egret color morphs vary from east to west across the species' range. Color morph may influence foraging efficiency, but variations in prey across the species' range and between morphs is undocumented. By examining boluses from Reddish Egret ($n = 109$) nestlings, prey species proportions were compared between morphs, among regions and among colonies within Texas. Between regions, prey species and proportion of species differed widely; however, fish species with similar life histories were selected across the Reddish Egret's range (Bahamas: 100% sheepshead minnow (*Cyprinodon variegatus*); Texas: 85% sheepshead minnow; Baja California Sur: 49% American shadow goby (*Quiatula y-cauda*); Yucatán: 64% Yucatán pupfish (*C. artifrons*)). Within the Laguna Madre in Texas, significant differences in prey species were not detected between morphs ($F_{(1,61)} = 1.36, P = 0.224$); however, prey mass by species differed between colonies ($F_{(1,60)} = 2.68, P = 0.010$). While our results only pertain to Reddish Egret diet during the breeding season, this study increases our understanding of Reddish Egret ecology and provides initial diet information across the species' range. Received 9 September 2013, accepted 12 November 2013.

Key words.—Bahamas, Baja California Sur, color polymorphism, Cyprinodontidae, *Egretta rufescens*, Reddish Egret, Texas, Yucatán.

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SIZE AND DISTRIBUTION OF THE CALIFORNIA BROWN PELICAN METAPOPOPULATION IN A NON-ENSO YEAR

DANIEL W. ANDERSON^{1,4}, CHARLES J. HENNY², CARLOS GODÍNEZ-REYES³, FRANKLIN GRESS⁴, EDUARDO L. PALACIOS⁵,
KARINA SANTOS DEL PRADO⁶, JUAN PABLO GALLO-REYNOSO⁷ & JAMES BREDY⁸

¹Department of Wildlife, Fish, and Conservation Biology, University of California, Davis, CA 95616, USA (dwanderson@ucdavis.edu)

²US Geological Survey, Forest and Rangeland Ecosystem Science Center, 3200 SW Jefferson Way, Corvallis, OR 97331, USA

³CONANP/SEMARNAT, APFF Islas del Golfo de California en Baja California, Avenida del Puerto No. 375-24,
Frac. Playa Ensenada, Ensenada BCN, 22880 México

⁴California Institute of Environmental Studies, 3408 Whaler Avenue, Davis, CA 95616, USA

⁵CICESE/PRONATURA, Ignacio Ramírez 1579 e/Sonora y Sinaloa, Colonia Puebla Nuevo, La Paz BCS, 23060 México

⁶INE/SEMARNAT, Subdirección de Conservación de Especies, Periférico Sur 5000, 2° Piso,
Colonia Insurgentes Cuicuilco, Delegación Coyoacán, México DF, 04530 México

⁷Centro de Investigación en Alimentación y Desarrollo A.C., Unidad Guaymas, Carretera a Varadero Nacional km 6.6,
Col. Las Playitas, Guaymas, Sonora 85480 México

⁸USFWS Region 2, Aviation Management, P.O. Box 1306, 500 Gold Avenue SW, Albuquerque, NM 87102, USA

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SUMMARY

ANDERSON, D.W., HENNY, C.J., GODÍNEZ-REYES, C., GRESS, F., PALACIOS, E.L., SANTOS DEL PRADO, K., GALLO-REYNOSO, J.P., & BREDY, J. 2013. Size and distribution of the California Brown Pelican metapopulation in a non-ENSO year. *Marine Ornithology* 41: 95–106.

In 2009, the Brown Pelican *Pelecanus occidentalis* was removed from the US Endangered Species List. The California subspecies *P. o. californicus* (hereafter CABRPE) was also removed from the California state endangered species list. Three years earlier (2006), we estimated the metapopulation of CABRPE to be 70680 ± 2640 breeding pairs (mean \pm SD) and 195900 ± 7225 individuals. The largest single breeding aggregation within the range occurred among two to three islands of the San Lorenzo Archipelago, Gulf of California (GOC), totaling ~17225 breeding pairs, or ~24.4% of the metapopulation. This and the other 4 subpopulations were composed of a single “core” breeding aggregation (on one or a few adjacent islands) and many smaller but isolated colonies (a colony represents all birds on a single island). Extremely small colonies (<65 nests) made up ~35.6% of total colonies, but only ~0.9% of the total estimated numbers, corrected for detectability. Modal colony size throughout the range was much smaller (230 to 1300 breeding pairs), indicating that small, scattered colonies and sub-colonies have a function in CABRPE distributional dynamics and demography. Thus, negative single-survey data (no occupancy and small numbers) still have conservation importance as alternate or growing colonies in source-sink dynamics. Little numerical change in CABRPE in at least three decades was indicated from less precise data south of the northernmost Southern California Bight (SCB) subpopulation, but significant recent improvements in the SCB were reflected by our high estimates in 2006, supporting the USFWS delisting. At that time, we estimated the improved SCB breeding population as 11695 ± 450 pairs. However, continuing threats throughout the range, especially in the south, now include commercial fishing, tourist developments, increased human activities, and extensive/expanding aqua-cultural developments (as well as, to a lesser degree, agricultural activities). Repeated endangerment is a possibility. Continued monitoring will be important.

Key words: California Brown Pelican, *Pelecanus occidentalis californicus*, breeding pairs, El Niño, metapopulation estimate, subpopulation estimates, survey bias, distribution, breeding atlas

RESEARCH

Open Access

Foraging guild structure and niche characteristics of waterbirds in an epicontinental lake in Mexico

María José Pérez-Crespo¹, Juanita Fonseca¹, Rubén Pineda-López², Eduardo Palacios³ and Carlos Lara^{4*}

Abstract

Background: It was suggested that ecological patterns can be used to infer the nature of ecological processes (i.e., competition) that structure communities. Analysis of patterns of resource partitioning under the classical niche paradigm (competitive niche differentiation in exploiting limited resources) has traditionally been used to understand the structure of communities. On the contrary, neutral theory states that patterns result from neutral processes such as stochasticity and dispersal abilities. Thus, if any ecological process gives rise to a characteristic ecological pattern, the comparative study of patterns with appropriate neutral models may reveal the magnitude of that process. In this study, we analyzed patterns of resource utilization of a waterbird community in Lake Acuitlapilco, an epicontinental lake in central Mexico. In February 2011 to January 2012, we recorded foraging behaviors of waterbird species in two niche dimensions or axes: feeding technique and foraging habitat. The pattern of resource utilization was characterized by niche breadth and niche overlap.

Results: Results showed that waterbird species in Lake Acuitlapilco were specialists in resource utilization patterns and therefore were vulnerable to fluctuations in resources, particularly feeding habitat. Niche overlaps were generally largest among species belonging to the same guild. To test competition as an ecological process that plays a role in the community structure, observed niche overlaps were compared with niche overlaps generated with null models of communities in the absence of competition using the RA4 randomization algorithm. Habitat and observed bidimensional overlaps were higher than those of randomly generated communities.

Conclusions: Our study suggested that other processes can be used to predict resource utilization patterns instead of competition alone, as suggested by neutral theory. Future studies analyzing the mechanisms that structure waterbird communities should include the use of null models to support their conclusions.

Keywords: Communities; Feeding behavior; Habitat use; Niche overlap; Null models; Neutral theory

Genetic diversity and population structure of North America's rarest heron, the reddish egret (*Egretta rufescens*)

Austin Hill · Clay Green · Eduardo Palacios

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Abstract The global distribution of the reddish egret is characterized by disjunct colonies occurring from the Pacific side of Northwest Mexico to the Caribbean. We examined distantly isolated colonies of reddish egret to determine global population genetic structure. We used seven polymorphic microsatellites to accomplish five goals: (1) to assess range wide population differentiation among reddish egret (*Egretta rufescens*) populations, (2) identify extent of gene flow, (3) determine any historical occurrence of bottlenecks, (4) assess genetic differentiation between color morphs, (5) clarify subspecies status of *E. r. dickeyi*, a completely dark morph population located in and around the Baja California peninsula, Mexico. Genetic differentiation was dramatic (global $F_{st} = 0.161$) throughout the reddish egrets range extending from Baja California, Mexico to Great Inagua, Bahamas. Differentiation occurred among three distinct regions ($F_{st} = 0.238$) but not among colonies/islands within regions suggesting regional philopatry.

Genetic diversity (alleles per locus, and heterozygosity) in Baja California Sur, Mexico and Great Inagua, Bahamas populations is lower than in the Texas/Mexico population due to minimal dispersal between regions and smaller population sizes. Dark and white color morphs when present within the same region showed no differentiation. Patterns of recent population bottlenecks are not evident in each of the three regional populations. With evidence of limited gene flow in addition to low genetic diversity and prospects of habitat loss we recommend that reddish egrets be managed as three distinct or evolutionary significant units.

Keywords Reddish egret · Microsatellite · Plumage dimorphism · Genetic diversity · *Egretta rufescens* · Philopatry

Introduction



RANGEWIDE POPULATION GENETIC STRUCTURE OF XANTUS'S MURRELET (*SYNTHLIBORAMPHUS HYPOLEUCUS*)

TIM P. BIRT,^{1,4} HARRY R. CARTER,^{2,5} DARRELL L. WHITWORTH,² ANNE McDONALD,¹
SCOTT H. NEWMAN,³ FRANKLIN GRESS,² EDUARDO PALACIOS,^{2,6} JOSH S. KOEPKE,² AND VICKI L. FRIESEN¹

¹Department of Biology, Queen's University, Kingston, Ontario K0H 2H0, Canada;

²California Institute of Environmental Studies, 3408 Whaler Avenue, Davis, California 95616, USA; and

³Animal Health Service, Food and Agriculture Organization of the United Nations, Viale delle Terme di Caracalla, Rome 00153, Italy

ABSTRACT.—Population genetic structure was characterized in Xantus's Murrelet (*Synthliboramphus hypoleucus*) by analyzing variation in the mitochondrial control region (505 samples) and 12 microsatellite loci (428 samples) in birds captured at all 13 current breeding areas in southern California and northwestern Baja California, Mexico. The two types of molecular markers were consistent in revealing strong genetic differentiation between the two currently recognized subspecies (*S. h. hypoleucus* and *S. h. scrippsi*) and little or no differentiation among breeding areas within subspecies. Estimates of gene flow were essentially zero, and no evidence for admixture was found. Gene flow among breeding locations within subspecies, on the other hand, was seemingly high. Given these genetic results, as well as clear morphological differences between the subspecies and the apparent lack of interbreeding at breeding areas where the two forms are sympatric, we suggest that two species be recognized. Both forms are genetically distinct from Craveri's Murrelet (*S. craveri*), a closely related species whose breeding range partially overlaps that of Xantus's Murrelet. Taxonomic subdivision of Xantus's Murrelet introduces new conservation concerns, especially for *S. h. hypoleucus*, which urgently requires greater study and protective efforts. Received 13 January 2011, accepted 27 September 2011.

Key words: conservation genetics, control region, gene flow, microsatellite, mitochondrial DNA, mtDNA, population genetic structure, *Synthliboramphus hypoleucus*, Xantus's Murrelet.

Estructura Genética Poblacional en Toda la Distribución de (*Synthliboramphus hypoleucus*)

RESUMEN.—Se caracterizó la estructura genética de las poblaciones de *Synthliboramphus hypoleucus* mediante el análisis de la variación en la región control mitocondrial (505 muestras) y en 12 loci de microsatélites (428 muestras) en aves capturadas en las 13 áreas de reproducción actuales en el sur de California y el noreste de Baja California, México. Los dos tipos de marcadores moleculares fueron consistentes al revelar una fuerte diferenciación genética entre las dos subespecies reconocidas (*S. h. hypoleucus* y *S. h. scrippsi*) y poca o ninguna diferenciación entre las zonas de reproducción dentro de las subespecies. Los estimados de flujo genético fueron esencialmente cero y no se encontró evidencia de entrecruzamiento. Por otro lado, el flujo genético entre zonas de reproducción dentro de las subespecies fue aparentemente alto. Con base en estos resultados genéticos, y considerando las diferencias morfológicas claras entre las subespecies y la falta aparente de entrecruzamiento en las zonas reproductivas donde ambas subespecies son simpátricas, sugerimos que se reconozcan dos especies diferentes. Ambas formas son genéticamente distintas de *S. craveri*, una especie cercanamente relacionada cuya área de distribución reproductiva se sobrepone parcialmente con la de *S. hypoleucus*. La subdivisión taxonómica de *S. hypoleucus* introduce nuevas preocupaciones sobre la conservación, especialmente para *S. h. hypoleucus*, que requiere urgentemente de mayores estudios y esfuerzos para protegerla.

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Population Size of Snowy Plovers Breeding in North America

SUSAN M. THOMAS^{1,12}, JAMES E. LYONS², BRAD A. ANDRES^{3,*}, ELISE ELLIOTT-SMITH⁴,
EDUARDO PALACIOS⁵, JOHN F. CAVITT⁶, J. ANDREW ROYLE⁷, SUZANNE D. FELLOWS⁸, KENDRA MATY¹,
WILLIAM H. HOWE⁹, ERIC MELLINK¹⁰, STEFANI MELVIN^{11,13} AND TARA ZIMMERMAN^{1,14}

¹U.S. Fish and Wildlife Service, Division of Migratory Birds and Habitat Programs, 911 NE 11th Avenue,
Portland, OR, 97232, USA

²U.S. Fish and Wildlife Service, Division of Migratory Bird Management, Patuxent Wildlife Research Center,
11510 American Holly Drive, Laurel, MD, 20708, USA

³U.S. Fish and Wildlife Service, Division of Migratory Bird Management, PO Box 25486, DFC,
Denver, CO, 80225, USA

⁴U.S. Geological Survey, Forest and Rangeland Ecosystem Science Center, 3200 SW Jefferson Way,
Corvallis, OR, 97331, USA

⁵Departamento de Biología de la Conservación, Centro de Investigación Científica y de Educación Superior de
Ensenada, B.C. (Unidad La Paz), Miraflores # 334, Fracc. Bella Vista, La Paz, Baja California Sur, 23050, México

⁶Department of Zoology, Weber State University, 2505 University Circle, Ogden, UT, 84408-2505, USA

⁷U.S. Geological Survey, Patuxent Wildlife Research Center, 12100 Beech Forest Road, Laurel, MD, 20708, USA

⁸U.S. Fish and Wildlife Service, Region 6 Migratory Bird Management Program, P.O. Box 25486, DFC,
Denver, CO, 80225, USA

⁹U.S. Fish and Wildlife Service, Region 2 Nongame Migratory Bird Program, Albuquerque, NM, 87103, USA

¹⁰Departamento de Biología de la Conservación, Centro de Investigación Científica y de Educación Superior de
Ensenada, Baja California, Carretera Tijuana-Ensenada 3918, 22860 Ensenada, BC, México

¹¹U.S. Fish and Wildlife Service, Migratory Bird Office, 1875 Century Blvd., Suite 420, Atlanta, GA, 30345, USA

¹²Current Address: Washington Maritime National Wildlife Refuge, 715 Holgerson Road, Sequim,
WA, 98368, USA

¹³Current Address: Salmon-Challis National Forest, 1206 S. Challis St., Salmon, ID, 83467, USA

¹⁴Current Address: Kinglet Consulting, 36803 SE 25th St., Washougal, WA, 98671, USA

*Corresponding author; E-mail: brad_andres@fws.gov

Abstract.—Snowy Plovers (*Charadrius nivosus*) may be one of the rarest shorebirds in North America yet a comprehensive assessment of their abundance and distribution has not been completed. During 2007 and 2008, 557 discrete wetlands were surveyed and nine additional large wetland complexes sampled in México and the USA. From these surveys, a population of 23,555 (95% CI = 17,299 - 29,859) breeding Snowy Plovers was estimated. Combining the estimate with information from areas not surveyed, the total North American population was assessed at 25,869 (95% CI = 18,917 - 32,173). Approximately 42% of all breeding Snowy Plovers in North America resided at two sites (Great Salt Lake, Utah, and Salt Plains National Wildlife Refuge, Oklahoma), and 33% of all these were on wetlands in the Great Basin (including Great Salt Lake). Also, coastal habitats in central and southern Texas supported large numbers of breeding plovers. New breeding sites were discovered in interior deserts and highlands and along the Pacific coast of México; approximately 9% of the North American breeding population occurred in México. Because of uncertainties about effects of climate change and current stresses to breeding habitats, the spe-

ANNUAL PERMANENCY OF THE AMERICAN WHITE PELICAN *Pelecanus erythrorhynchos* IN ENSENADA DE ARIPE, BAJA CALIFORNIA SUR, MEXICO

Permanencia anual del pelicano blanco *Pelecanus erythrorhynchos* en la Ensenada de Aripes, Baja California Sur, México

RA Mendoza-Salgado ✉, E Amador, C Salinas-Zavala, E Palacios

(RAMS)(EA)(CSZ) Centro de Investigaciones Biológicas del Noroeste (CIBNor). Mar Bermejo No. 195, Col. Playa Palo de Santa Rita, La Paz, B.C.S. 23090, México. Teléfono (612) 123 8484. Fax (612) 125 3625 rams@cibnor.mx
(EP) Centro de Investigación Científica y de Educación Superior de Ensenada, (CICESE-La Paz)

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ABSTRACT. This is the first report of the American White Pelican (*Pelecanus erythrorhynchos*) residing over a three year and three month period at Ensenada de Aripes, Baja California Sur. The pelicans remained in the study area throughout the year. Some non-breeding individuals stay in the region, suggesting that the adults migrate to their nesting areas.

Key words: Baja California Sur, migration, *Pelecanus erythrorhynchos*, American White Pelican.

RESUMEN. Se documenta el primer reporte de la permanencia del pelicano blanco (*Pelecanus erythrorhynchos*) durante un periodo de tres años y tres meses en la Ensenada de Aripes, Baja California Sur, permaneciendo en los sitios de estudio todo el año. Algunos individuos no reproductivos permanecen en la región, esto sugiere que los adultos migran a sus sitios de crianza.

Palabras clave: Baja California, migración, *Pelecanus erythrorhynchos*, pelicano blanco.

INTRODUCTION

American White Pelicans (*Pelecanus erythrorhynchos*) are found in North America and northern Central America, with breeding areas in Canada and the United States, as well as in Mexico in Laguna de Santiaguillo, Durango and Laguna Madre, Tamaulipas (Carroll JJ 1930. Condor 32:202-204; Schaller GB 1964. Condor 66:3-23; Sloan NF 1973. Inland Bird Banding News 45:83-96; Sloan NF 1982. American Birds 36(3); Johnson RF, Sedan HF 1978. Wilson Bulletin 90:348-352; Bunnell FL, Dunbar D, Koza L, Ryder G 1981. Colonial Waterbirds 4:2-11; American Ornithologist Union 1998. Check-list of North American Birds. 7th Ed. Allen Press). The birds spend the Summer along the Pacific coast of California, western United States, from the interior of mainland Mexico to Nicaragua, and along the coast of the Gulf of Mexico from Florida to the Yucatan Peninsula (Thiollay JM 1979. Alauda 47:235-245; American Ornithologist Union 1998. Check-list

of North American Birds. 7th Ed. Allen Press). American White Pelicans have been observed in Baja California Sur since the 1920s (Pearson Auk 38:513-523). Several authors have reported American White Pelicans in various locations in Baja California Sur (Grinnell J 1928. A distributional summation of the ornithology of Lower California. University of California Publications in Zoology; Wilbur S 1987. Birds of Baja California. University of California Press; Howell NG, Webb S 1995; Amador R unpublished data; Danemann GD 1998. Ciencias Marinas 24:389-408). However, reports of the American White Pelican are scarce for Bahía de La Paz and Ensenada de Aripes (24°08' N, 110°23' W) (Massey BW and Palacios E. 1994. Studies in Avian Biology 15:45-57). Occasional observations from 1978 to 1990 (author's observations) have recorded small groups of American White Pelicans feeding behind trawling ships, as well as in areas along the shore of Bahía de La Paz, between Pichilingue and Isla Espíritu Santo. The American White Pelican may be considered a sporadic

U.S. Fish & Wildlife Service

Status Review and Conservation Recommendations for the Gull-billed Tern (*Gelochelidon nilotica*) in North America

Biological Technical Publication
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Kathy C. Molina¹

R. Michael Erwin²

Eduardo Palacios³

Eric Mellink⁴

Nanette W. H. Seto^{5, 6}

¹ Natural History Museum of Los Angeles County, Los Angeles, CA

² U.S. Geological Survey, Patuxent Wildlife Research Center,
University of Virginia, Charlottesville, VA

³ Centro de Investigación Científica y de Educación Superior de Ensenada
(CICESE Unidad La Paz), Pronatura Noroeste, A.C., La Paz, B.C.S. México

⁴ Centro de Investigación Científica y de Educación Superior de Ensenada
(CICESE), Ensenada, B.C., México

⁵ U.S. Fish and Wildlife Service, Migratory Birds and Habitat Programs,
Portland, OR

⁶ Current Address: Migratory Bird Management, Arlington, VA

Executive Summary

The Gull-billed Tern (*Gelochelidon nilotica*) is a medium-sized tern that breeds in small, scattered, often ephemeral colonies, typically in habitat devoid of vegetation near marine waters or saline lakes. In North America, the species breeds along the Atlantic coast south of New York, the Gulf of Mexico, and the Pacific coast of California and Mexico. Its distribution has contracted from known historic range along the Atlantic Coast, but has expanded along the Pacific Coast. Range changes in Mexico are unknown due to fragmentary knowledge of historical colony locations, but some range contraction may have occurred. Two subspecies (*G. n. aranea* and *G. n. vanrossemi*) occur in North America. The current population of *G. n. aranea* in the United States is estimated to be approximately 3610 pairs, over 60% of which occur in Texas. The number of birds in Texas appears stable, but the number of individuals has declined in Maryland, Delaware, Virginia, North Carolina, Florida, and possibly Georgia. *G. n. vanrossemi* has 737 to 808 pairs breeding in western Mexico and southern California.

Gull-billed Terns are designated as a Bird of Conservation Concern by the U.S. Fish and Wildlife Service. *G. n. aranea* is designated as endangered, threatened or of management concern in nine states and *G. n. vanrossemi* is designated as a Bird Species of Special Concern in California.

The main causes of population declines in North America are disturbance of nesting colonies, loss of natural nesting islands, and development or modification of upland foraging habitats. This species often nests on artificially deposited substrates, suggesting it could respond to management of breeding habitat.

Management priorities for Gull-billed Terns are: (1) protection of known nesting colony sites; (2) enhancement and conservation of potential nesting and foraging areas; (3) predator control; (4) development of population viability models; and (5) resolution of conflicts with other species and aquaculture. Research and monitoring needs are: (1) resolution of the subspecific identity of birds breeding in North America; (2) demographic studies addressing population viability; (3) the identification and linkage of breeding and non-breeding ranges; (4) studies of habitat use and ecology during the breeding and non-breeding seasons, especially in Mexico and Central America; (5) continued monitoring of breeding colonies, particularly in the Gulf Coast of Mexico; and (6) the establishment of monitoring efforts in the West Indies.



Primer reporte formal de la urraca-hermosa cara negra (*Calocitta colliei*) en Baja California Sur, México

Edgar Amador^{1*}, Renato A. Mendoza Salgado¹, Juan J. Ramírez Rosas¹ y Eduardo Palacios².

¹Centro de Investigaciones Biológicas del Noroeste. Mar Bermejo No. 195, Col. Playa Palo de Santa Rita, A.P. 128, La Paz, Baja California Sur, 23090, México. Correo electrónico: *eamador04@cibnor.mx

²Centro de Investigación Científica y de Educación Superior de Ensenada, Unidad La Paz / Pronatura Noroeste, A.C. Miraflores 334, Fracc. Bellavista, La Paz, Baja California Sur, 23050, México.

Resumen

Éste es el primer reporte formal de registro visual de la urraca-hermosa cara negra (*Calocitta colliei*) en Baja California Sur, México. Ejemplares de esta especie han sido vistos en la región desde 2002 a la fecha, en parvadas de hasta nueve individuos; se presume que podría tratarse de individuos escapados que han encontrado un hábitat adecuado para mantener una población feral.

Palabras clave: aves, Corvidae, nuevo registro, especies introducidas.

First formal record of the Black-throated Magpie-Jay (*Calocitta colliei*) from Baja California Sur, Mexico

Abstract

This is the first formal sighting report of the Black-throated Magpie-Jay (*Calocitta colliei*) from Baja California Sur, México. Sightings of flocks of up to nine individuals of this species have occurred since 2002 in the region. We consider that it is likely that these birds come from escaped birds that have found a suitable habitat that supports a feral population.

Key words: birds, Corvidae, new record, introduced species.

Premier registre formel du geai à face noire (*Calocitta colliei*) en Basse Californie Sud, Mexique

Résumé

Ceci constitue le premier rapport formel de registre visuel du geai à face noire (*Calocitta colliei*) en Basse Californie Sud, Mexique. Cette espèce a été observée dans la région depuis 2002, en groupes de jusqu'à neuf individus. Il pourrait s'agir d'individus captifs qui se sont échappés et ont trouvé un habitat adéquat qui leur permet de maintenir une population sauvage.

Mots clé: oiseaux, Corvidae, nouveau registre, espèce introduite.

HUITZIL (2009) 10(1):22-23

THE DISTRIBUTION AND STATUS OF ROYAL TERNS ON THE PACIFIC COAST OF SOUTHERN CALIFORNIA AND BAJA CALIFORNIA, MEXICO

CHARLES T. COLLINS AND EDUARDO PALACIOS

Abstract. In the early part of the 1900s non-breeding Royal Terns (*Thalasseus maximus*) were commonly found on the California coast, particularly in winter. By the 1950s their numbers had declined, along with populations of the Pacific sardine (*Sardinops sagax*). Today they are resident on the southern California coast and have bred there since 1959. The current breeding population is nearly 140 pairs and slowly increasing. On the Pacific coast of Baja California, Mexico, Royal Terns are also permanent residents and have bred in coastal wetlands since at least 1926. The recent breeding population in the Laguna San Ignacio and Laguna Ojo de Liebre wetland systems is between 1,300 and 3,500 pairs. Continued protection of colony sites from human disturbance and terrestrial predators, particularly in southern California, seem to be the most important factors for the continued increase in Royal Tern populations in this portion of their extensive range.

Key Words: Baja California, breeding distribution, California, Mexico, population size, *Thalasseus maximus*.

DISTRIBUCIÓN Y STATUS DE LA GOLONDRINA MARINA REAL EN LA COSTA DEL PACIFICO DEL SUR DE CALIFORNIA Y BAJA CALIFORNIA, MEXICO

Resumen. A principios de los 1900s, los individuos no reproductivos de golondrinas marinas reales (*Thalasseus maximus*) eran comunes en la costa de California, particularmente en invierno. Hacia los 1950s sus números habían disminuido, junto con las poblaciones de la sardina Monterrey (*Sardinops sagax*). Ahora son residentes en la costa del sur de California y han anidado ahí desde 1959. La población reproductiva actual es 140 parejas pero esta aumentando gradualmente. En la costa del Pacifico de la península de Baja California, México, las golondrinas marinas reales también son residentes permanentes y se reproducen en lagunas costeras desde por lo menos 1926. La población reproductiva actual en los complejos lagunares de Laguna Ojo de Liebre y Laguna San Ignacio es de alrededor de 1,300–3,500 parejas. La protección continua de las colonias contra el disturbio humano y los depredadores terrestres, especialmente en el sur de California, parecen ser los factores más importantes para el aumento continuo de las poblaciones de la golondrina marina real en esta porción de su extenso intervalo de distribución.

Estructura de la comunidad y asociación de las aves acuáticas con la heterogeneidad espacial del complejo lagunar Bahía Magdalena-Almejas, Baja California Sur, México

Bulmara Zárate-Ovando¹, Eduardo Palacios² & Héctor Reyes-Bonilla³

1 Centro de Investigaciones Biológicas del Noroeste, Apdo. Postal 128, Mar Bermejo # 195, Playa Palo de Santa Rita, La Paz, Baja California Sur, 23090, México; bzarate04@cibnor.mx

2 Centro de Investigación Científica y de Educación Superior de Ensenada, B.C. (CICESE) Unidad La Paz. Miraflores 334, Fracc. Bellavista, La Paz, Baja California Sur, 23050, México; epalacio@cicese.mx

3 Departamento de Biología Marina, Universidad Autónoma de Baja California Sur, Apdo. Postal 19-B, La Paz, Baja California Sur, C.P. 23080, México; hreyes@uabcs.mx

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Abstract: Community structure and association of waterbirds with spatial heterogeneity in the Bahía Magdalena-Almejas wetland complex, Baja California Sur, Mexico. To test the hypothesis that spatial heterogeneity determines waterbird diversity in a coastal wetland, we compared waterbird density, diversity, and species composition among various habitats and landscape units in Bahía Magdalena-Almejas, Baja California Sur, Mexico. Based on diversity patterns and bird distribution, we assessed the effect of coastal development on the waterbird community structure. To gather information on habitat features and waterbird populations we conducted waterbird censuses in 329 habitat segments along the internal coastline of the study area, from February 2002 to February 2003. We performed non-parametric analyses to test the null hypothesis of no difference on waterbird density, and diversity among landscape units and seasons. The species composition was evaluated using ordination techniques. Waterbird density was higher in winter and autumn in the three lagoons of the study area, particularly in the insular coast, sandy beach and dunes; it was higher in the few segments of antropic substrate. Diversity was significantly higher in mangrove habitat along the peninsular coast, and in mangrove-dunes association on the insular coast. Although modification of coastal natural habitat and boat transit disturbance had no influence on waterbird density or diversity, the highest richness of waterbirds occurred in well preserved areas. Species composition analysis showed differences between Santo Domingo Channel and Magdalena Bay. Pelagic and mangrove habitat had a species composition difference higher than those associations in other habitats. Such differences in species assemblages by habitat and landscape units suggest that communities are structured according to the range of available natural resources in structurally complex habitats, and that dominant piscivorous waterbird species were favored in this community. *Rev. Biol. Trop.* 56 (1): 371-389. Epub 2008 March 31.

Key words: Bahía Magdalena-Almejas, Baja California Sur, coastal zones, community structure, density, disturbance, heterogeneity, waterbirds.

La distribución de las aves no es uniforme en las zonas costeras, sino que se relaciona con la disponibilidad y concentración temporal del alimento (Weller 1999), que a su vez se rige de procesos y factores ambientales (Butler *et al.* 1997, Weller 1999, Roshier *et al.* 2001, Becker y Bissinger 2003, Jaquement *et al.* 2004). El

hábitat, a nivel de paisaje o microhábitat, es uno de los factores ambientales que define el patrón de diversidad y el tipo de comunidad, porque limita la presencia de determinados grupos de aves (Weller 1999, Hattori y Mae 2001). De tal modo que en la línea de costa, aquellos humedales con diferentes tipos de



Nota científica

Manejo de un sitio de anidación para la conservación de *Sternula antillarum* (Charadriiformes: Laridae) en Baja California Sur, México

Nesting site management for *Sternula antillarum* (Charadriiformes: Laridae) conservation in Baja California Sur, Mexico

Edgar Amador^{1*}, Renato Mendoza-Salgado¹ y Eduardo Palacios²

¹ Centro de Investigaciones Biológicas del Noroeste (CIBNOR). Mar Bermejo 195, Col. Playa Palo de Santa Rita. Apartado postal 18, 23090 La Paz, Baja California Sur, México.

² Centro de Investigación Científica y de Educación Superior de Ensenada (CICESE), Unidad La Paz y Pronatura Noroeste, A.C., Miraflores 334 e/ Mulegé y La Paz, 23050 La Paz, Baja California Sur, México.

*Correspondencia: eamador04@cibnor.mx

Resumen. El gallito marino menor (*Sternula antillarum*) es una especie sujeta a protección especial, que anida en colonias pequeñas en hábitats costeros. Las mareas altas son un problema para la anidación de *S. antillarum* en Baja California Sur, pues causan la inundación de algunas colonias. Para reducir el impacto potencial del flujo de marea alta sobre los nidos, se elevó 20 cm el nivel del suelo por medio de una plataforma elevada construida con llantas de desecho rellenas y cubiertas de arena. La ocupación de este sitio por *S. antillarum* se monitoreó durante las temporadas reproductivas de 1990, y de 2002 a 2005. Las mareas altas no afectaron los nidos establecidos sobre la plataforma y la densidad de nidos sobre ella fue mayor que la que hubo en el terreno natural de la planicie costera adyacente. Este método de manejo del hábitat de anidación de *S. antillarum* es una buena alternativa en los sitios con riesgo por flujo de marea.

Palabras clave: *Sternula antillarum*, gallito marino menor, mareas, manejo, reproducción.

Abstract. The Least Tern (*Sternula antillarum*) is a threatened seabird species that breeds in small colonies on coastal habitats. High tides constitute a problem for their reproduction in Baja California Sur, since they cause flooding of some colonies. To reduce the potential impact of high tides on the nests, the level of the ground was elevated by 20 cm, through an elevated platform that was built by using discarded tires filled and covered with sand. The occupation of this site by Least Terns was monitored during the breeding seasons of 1990 and from 2002 to 2005. High tides did not affect the nests established on the platform and density of nests on this platform was higher than on the natural adjacent mudflat area. This nesting habitat management method for the Least Tern is an appropriate alternative for those sites affected by high tides.

Key words: *Sternula antillarum*, Least Tern, tidal flooding, management, reproduction.

The Colonies of VanRossem's Gull-billed Tern (*Gelochelidon nilotica vanrossemi*) in México

EDUARDO PALACIOS^{1,2} AND ERIC MELLINK³

¹Centro de Investigación Científica y de Educación Superior de Ensenada (CICESE), Unidad La Paz

²Pronatura (Noroeste). Miraflores 334 e Mulegé y La Paz. Fracc. Bella Vista, La Paz, B.C.S. 23050, México

³Centro de Investigación Científica y de Educación Superior de Ensenada (CICESE),
Km 107 Carr. Tijuana-Ensenada, B.C. México

Corresponding author. Internet: emellink@cicese.mx

Abstract.—During the 2003 and 2005 breeding seasons we conducted ground surveys of historical, potential, and current nesting sites of the VanRossem's Gull-billed Tern (*Gelochelidon nilotica vanrossemi*) along the Pacific coast of Mexico. We documented 13 active colonies, including ten previously unrecorded nesting sites. One previously reported colony was inactive. Colony sizes ranged between one and 161 breeding pairs. In 2005, the estimated breeding population size was 526 pairs. Eighty-two percent of the total breeding population was concentrated in three relatively large colonies, Cerro Prieto and Isla Montague, Baja California and Laguna Las Garzas, Nayarit. Gull-billed Terns nested mostly on islets in very shallow waters. Colony associates included other terns, Black Skimmers (*Rhynchops niger*), gulls, and egrets. The nesting population of this subspecies in Mexico is very small and consists of a few widely separated colonies. This subspecies should be included in Mexico's official list of species at risk, and a management plan should be developed and implemented to assure its conservation and that of the wetland habitat on which it and other bird species depend. *Received 15 January 2007, accepted 30 March 2007.*

Key words.—Laridae, nesting colonies, population status, *Gelochelidon nilotica vanrossemi*, western Mexico.

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Colonies of Four Species of Terns and the Black Skimmer in Western Mexico

ERIC MELLINK¹, EDUARDO PALACIOS^{2,3} AND EDGAR AMADOR^{3,4}

¹Centro de Investigación Científica y de Educación Superior de Ensenada (CICESE).
Km 107 Carr. Tijuana-Ensenada, B.C. México

²Centro de Investigación Científica y de Educación Superior de Ensenada (CICESE Unidad La Paz)

³Pronatura Noroeste, A.C. Miraflores 334 e/ Mulegé y La Paz. Fracc. Bella Vista, La Paz, B.C.S. 23050 México

⁴Centro de Investigaciones Biológicas del Noroeste, S.C. Mar Bermejo No. 195,
Col. Playa Palo de Santa Rita. 23090 La Paz, B.C.S., México

Abstract.—During the 2003 breeding season 367 historic, potential, and current nesting sites of larids (Fam. Laridae) along the coast of western Mexico were surveyed. In 2004 and 2005, three areas: Guerrero Negro, in Baja California Sur; Marismas Nacionales, in Nayarit-Sinaloa; and Laguna Cuyutlán, in Colima were surveyed more intensively. In 2003-2005, there were nine nesting sites and probably between 200 and 300 breeding pairs of Caspian Tern (*Sterna caspia*); eleven confirmed nesting sites and at least 13,000 breeding pairs of Royal Tern (*S. maxima*); two nesting sites, one of which included almost the entire population, and 90,000 breeding pairs of Elegant Tern (*S. elegans*); four nesting sites and about 20 breeding pairs of Forster's Tern (*S. forsteri*); and 13 nesting sites and about 1,000 breeding pairs of Black Skimmer (*Rynchops niger*). Breeding of Caspian and Elegant Terns on the Pacific coast of Mexico is confined to the northern areas, whereas that of Royal Terns and Black Skimmers occurs at selected sites along most of the coast. Forster's Terns nest in two widely separated areas, one in the northern section of the coast, and one in the southern section. *Received 20 August 2006, accepted 19 December 2006.*

Key words.—*Sterna caspia*, *maxima*, *elegans*, *forsteri*, *Rynchops niger*.

Waterbirds 30(3): 358-366, 2007

Review

The Gulf of California: Review of ecosystem status and sustainability challenges

Salvador E. Lluch-Cota ^{a,*}, Eugenio A. Aragón-Noriega ^a,
Francisco Arreguín-Sánchez ^b, David Aurióles-Gamboa ^b,
J. Jesús Bautista-Romero ^a, Richard C. Brusca ^c,
Rafael Cervantes-Duarte ^b, Roberto Cortés-Altamirano ^d,
Pablo Del-Monte-Luna ^b, Alfonso Esquivel-Herrera ^e, Guillermo Fernández ^d,
Michel E. Hendrickx ^d, Sergio Hernández-Vázquez ^a, Hugo Herrera-Cervantes ^f,
Mati Kahru ^g, Miguel Lavín ^h, Daniel Lluch-Belda ^b, Daniel B. Lluch-Cota ^a,
Juana López-Martínez ^a, Silvio G. Marinone ^h, Manuel O. Nevárez-Martínez ⁱ,
Sofía Ortega-García ^b, Eduardo Palacios-Castro ^f, Alejandro Parés-Sierra ^h,
Germán Ponce-Díaz ^a, Mauricio Ramírez-Rodríguez ^b, Cesar A. Salinas-Zavala ^a,
Richard A. Schwartzlose ^{g,1}, Arturo P. Sierra-Beltrán ^a

^a Centro de Investigaciones Biológicas del Noroeste (CIBNOR), P.O. Box 128, La Paz, Baja California Sur 23000, Mexico^b Centro Interdisciplinario de Ciencias Marinas (CICIMAR-IPN), P.O. Box 592, La Paz, Baja California Sur 23000, Mexico^c Arizona-Sonora Desert Museum, Tucson, AZ 85743, USA^d Instituto de Ciencias del Mar y Limnología, Universidad Nacional Autónoma de México, Unidad Académica Mazatlán,
P.O. Box 818, Mazatlán, Sinaloa 82040, Mexico^e Universidad Autónoma Metropolitana (UAM-Xochimilco), Departamento El Hombre y Su Ambiente, Calzada del Hueso 1100,
Col. Villa Quietud, D.F. 04960, Mexico^f Centro de Investigación Científica y Educación Superior de Ensenada, Unidad Baja California Sur (CICESE-La Paz),
Miraflores 334, Frac. Bella Vista, La Paz, B.C.S. 23050, Mexico^g Scripps Institution of Oceanography, University of California, San Diego, CA 92093, USA^h Centro de Investigación Científica y Educación Superior de Ensenada (CICESE), P.O. Box 2732, Ensenada,
Baja California 22800, Mexicoⁱ Instituto Nacional de la Pesca, Centro Regional de Investigaciones Pesqueras (INP-CRIP) Calle 20 No. 605 sur,
Centro, Guaymas, Sonora 85400, Mexico

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Abstract

The Gulf of California is unique because of its geographical location and conformation. It hosts diverse ecosystems and important fisheries that support industry and provide livelihood to coastal settlements. It is also the site of interests and

problems, and an intense interaction among managers, producers, and conservationists. In this report, we scrutinize the abiotic (hydrography, climate, ocean circulation, and chemistry) and biotic (phyto- and zooplankton, fish, invertebrates, marine mammals, birds, and turtles) components of the marine ecosystem, and some particular aspects of climate variability, endemisms, harmful algal blooms, oxygen minimum layer, and pollution. We also review the current conditions and conflicts around the main fisheries (shrimp, small and large pelagic fishes, squid, artisanal and sportfishing), the most important human activity in the Gulf of California. We cover some aspects of management and conservation of fisheries, especially the claimed overexploitation of fish resources and the ecosystems, and review proposals for creating networks of marine protected areas. We conclude by identifying main needs for information and research, particularly the integration of data bases, the implementation of models and paleoreconstructions, establishment of monitoring programs, and the evaluation of fishing impacts and management actions.

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Keywords: Ecosystem; Fisheries; Conservation; Management; Mexico; Gulf of California

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Waterbirds of the Lagoon Complex Magdalena Bay—Almejas, Baja California Sur, Mexico

BULMARA ZÁRATE-OVANDO¹, EDUARDO PALACIOS^{2,3}, HÉCTOR REYES-BONILLA⁴,
EDGAR AMADOR¹ AND GEORGINA SAAD³

¹Centro de Investigaciones Biológicas del Noroeste, Apdo. Postal 128, Mar Bermejo # 195,
Playa Palo de Santa Rita, La Paz, Baja California Sur, 23090, México
Internet: bzarate04@cibnor.mx

²Centro de Investigación Científica y de Educación Superior de Ensenada, Unidad La Paz

³Pronatura, A. C. Noroeste, Dirección de Conservación en Baja California Sur,
Miraflores # 334 e/Mulegé y La Paz, Fracc. Bella Vista, La Paz, Baja California Sur, 23050, México

⁴Departamento de Biología Marina, Universidad Autónoma de Baja California Sur,
Apdo. Postal 19-B, La Paz, Baja California Sur, 23080, México

Abstract.—The spatial distribution of avifauna was documented in Magdalena Bay, the largest coastal wetland on the Pacific coast of the Baja California peninsula. An inventory of waterbirds in the three wetland zones of Magdalena Bay—Almejas, Baja California Sur was conducted by boat. Composition, abundance, and distribution of species were determined in 12 coastal censuses conducted from February 2002 to February 2003. A total of 207,383 individuals of 80 species and 20 families were recorded. Seven listed species breed in the wetland. Only ten out of 80 species were very common, while the others were occasional along the coastline. Guilds with highest populations were pelicans and allies (54%), followed by shorebirds (23%), and gulls, terns and skimmers (14%). The highest richness of 63 species was recorded in the Santo Domingo Channel in autumn. In contrast, the highest abundance (50,082) was recorded in fall in Magdalena Bay. Migratory birds explained spatial and temporal changes in richness, while resident pelicans and allies explain abundance variations. The highest species richness was observed in mangrove zones, particularly in the Santo Domingo Channel. Therefore, this habitat together with breeding and gathering places used for other activities, should be primary targets for future management and conservation initiatives. *Received 10 January 2006, accepted 15 April 2006.*

Key words.—Waterbirds community, Bahía Magdalena-Almejas Bay, spatial analysis, distribution.

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Transboundary seabird conservation in an important North American marine ecoregion

S. WOLF^{1*}, B. KEITT², A. AGUIRRE-MUÑOZ³, B. TERSHY², E. PALACIOS⁴
AND D. CROLL^{1,2}

¹University of California Santa Cruz, Long Marine Lab, 100 Shaffer Road, Santa Cruz, CA 95060, USA, ²Island Conservation, Long Marine Lab, 100 Shaffer Road, Santa Cruz, CA 95060, USA, ³Grupo de Ecología y Conservación de Islas, AC, Avenida López Mateos No. 1590-3, Ensenada, BC, México, CP 22880, and ⁴Centro de Investigación Científica y de Educación Superior de Ensenada (CICESE), Unidad La Paz, Miraflores 334 e/Mulegé y La Paz, Fracc. Bella Vista, La Paz, BCS, México

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SUMMARY

Many seabird species of conservation concern have large geographic ranges that span political borders, forcing conservation planners to facilitate their protection in multiple countries. Seabird conservation planning within the seabird-diverse California Current System (CCS) marine ecoregion presents an important opportunity for transboundary collaborations to better protect seabirds across the USA/México border. While seabird populations in the USA are relatively well-studied and well-protected, the status of seabird populations in the Mexican region of the CCS is not well known and seabird colonies have been virtually unprotected. This study synthesizes and supplements information on breeding seabird diversity and distribution, identifies and ranks threats to seabirds and evaluates conservation capacity in the Mexican CCS to provide a framework for transboundary seabird conservation throughout the CCS ecoregion. Island-breeding seabirds in México support 43–57% of CCS breeding individuals, 59% of CCS breeding taxa and a high level of endemism. Connectivity between populations in México and the USA is high. At least 17 of the 22 extant Mexican CCS breeding seabirds are USA/México transboundary breeders or foragers, 13 of which are federally listed in the USA or México. Introduced predators and human disturbance have caused multiple seabird population extirpations in the Mexican CCS because breeding colonies lack legal protection or enforcement. However, conservation capacity in this region has increased rapidly in recent years through the establishment of new protected areas, growth of local conservation non-governmental organizations, and increase in local community support, all of which will allow for more effective use of conservation funds. Transboundary conservation coordination would better protect CCS seabirds by facilitating restoration of seabird colonies in the Mexican CCS and enabling an ecoregion-wide

prioritization of seabird conservation targets to direct funding bodies to the most cost-effective investments.

Keywords: California Current System, conservation, international, México, seabird, transboundary

INTRODUCTION

Seabirds pose an international conservation challenge because most seabirds have large ranges that span international borders (Kushlan *et al.* 2002) and require protection at both their terrestrial breeding and roosting sites and marine foraging grounds. Effective conservation strategies for wide-ranging species often necessitate collaborations across political borders to ensure population persistence and to conserve genetic and ecological diversity across species' ranges (Roca *et al.* 1996; Abbutt *et al.* 2000). Transboundary cooperation can facilitate more effective research and prioritization, better protect large contiguous areas, provide better control of cross-border threats such as spread of invasive species, poaching and pollution, and provide economic benefits to local and national economies (Weber & Rabinowitz 1996; Sanderson *et al.* 2002).

Increasingly, seabirds are being recognized as an ecologically important and threatened component of marine and terrestrial ecosystems. As top predators with high metabolic rates, seabirds remove an estimated 7% of global aquatic primary production annually, which is roughly equivalent to that taken by all fisheries worldwide (Brooke 2004). Additionally, seabirds transport nutrient subsidies from their marine foraging grounds to their terrestrial breeding colonies which can alter the structure of terrestrial food webs and community diversity (Anderson & Polis 1999; Croll *et al.* 2005). Seabirds have life history characteristics that make them particularly vulnerable to population declines and, in some cases, extinctions. They are typically long-lived and have delayed reproductive maturity and low annual fecundity, which limits their ability to recover quickly from disturbances (Russell 1999). Furthermore, seabirds often nest in concentrated colonies in coastal areas and islands which are particularly vulnerable to human impacts (Boersma *et al.* 2002). As a result of multiple threats, more than 30% of the world's seabirds are at risk of global extinction (IUCN [World Conservation Union] 2006).

*Correspondence: Shaye Wolf Tel: +1 831 459 4581 Fax: +1 831 459 3383 e-mail: wolf@biology.ucsc.edu

Composición espacial y temporal de la avifauna de humedales pequeños costeros y
hábitats adyacentes en el noroeste de Baja California, México

Spatial and temporal composition of the avifauna from small coastal wetlands and adjacent habitats
in northwestern Baja California, Mexico

Gorgonio Ruiz-Campos^{1*}
Eduardo Palacios²
José Alfredo Castillo-Guerrero³
Salvador González-Guzmán¹
Elías Habib Batche-González¹

¹ Facultad de Ciencias
Universidad Autónoma de Baja California
Apartado postal 1653
Ensenada, CP 22800, Baja California, México
* E-mail: gruiz@uabc.mx

² Centro de Investigación Científica y de Educación Superior de Ensenada, Unidad La Paz
y Pronatura, A.C. (Noroeste)
Miraflores 334 e/ Mulegé y La Paz, Fracc. Bella Vista
La Paz, CP 23050, Baja California Sur, México

³ Centro de Investigación Científica y de Educación Superior de Ensenada
Km 107 Carr. Tijuana-Ensenada
Ensenada, CP 22860, Baja California, México

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Resumen

Se determinó la composición espacio-temporal de la avifauna en 13 humedales pequeños costeros del noroeste de Baja California entre febrero y diciembre de 2002. Se registraron 17,978 individuos pertenecientes a 187 especies, 121 géneros y 47 familias. Las familias con mayor número de especies fueron Anatidae (17), Scolopacidae (17) y Laridae (12). Los humedales con mayor riqueza específica fueron El Rosario (126), Santo Tomás (107) y La Misión (95), los cuales en conjunto incluyeron al 86% del total de especies observadas. Setenta y seis especies (41%) fueron residentes permanentes, 73 (39%) visitantes estacionales, y 38 (20%) visitantes ocasionales. Con base en la presencia o ausencia de las especies se distinguen cuatro grupos de humedales: (a) San Simón, (b) La Salina, (c) El Descanso-El Ciprés y (d) un grupo de nueve sitios que está subdividido en dos ramas de cuatro y cinco localidades, respectivamente: (d.1) San Telmo-Santo Tomás-El Rosario-La Misión y (d.2) San Rafael-San Miguel-El Salado-Santo Domingo-Cantamar. La presencia o ausencia de un cuerpo de agua permanente, los tipos de hábitat y la presencia o ausencia de influencia antropogénica en cada localidad fueron los factores que contribuyeron al agrupamiento de estos humedales. La riqueza y abundancia de especies estuvieron correlacionadas con la diversidad de hábitats. Se documentaron evidencias de reproducción para 20 especies.

Palabras clave: avifauna, humedales pequeños, noroeste de Baja California, registros reproductivos.

Abstract

We studied the spatial and temporal composition of the avifauna from 13 small coastal wetlands and adjacent habitats in northwestern Baja California, Mexico, between February and December 2002. A total of 17,978 individuals belonging to 187 species, 121 genera and 47 families were registered. The richest families in species were Anatidae (17), Scolopacidae (17) and Laridae (12). The wetlands showing the highest specific richness were El Rosario (126), Santo Tomás (107) and La Misión (95), which pooled represented 86% of the total avifauna. Seventy-six species (41%) were permanent residents, 73 (39%) seasonal visitors and 38 (20%) occasional visitors. On the basis of presence or absence of species, four groups of wetlands are distinguished: (a) San Simón, (b) La Salina, (c) El Descanso-El Ciprés, and (d) a group of nine sites that is subdivided into two branches with four and five localities each, one (d.1) consisting of San Telmo-Santo Tomás-El Rosario-La Misión and the other

DISTRIBUTION AND ABUNDANCE OF BURROWING OWLS ON THE PENINSULA AND ISLANDS OF BAJA CALIFORNIA

EDUARDO PALACIOS and DANIEL W. ANDERSON, Department of Wildlife, Fish, and Conservation Biology, University of California, Davis, California 95616

ERIC MELLINK and SALVADOR GONZÁLEZ-GUZMÁN, Centro de Investigación Científica y Educación Superior de Ensenada, Ecología, Km 107 Carr. Tijuana-Ensenada, 22860 Ensenada, Baja California, México (U.S. mailing address: P. O. Box 434844, San Diego, California 92143-4844) (current address of Palacios)

ABSTRACT: We compiled 166 historical and recent records of Burrowing Owl sightings and/or specimens from 61 locations throughout the peninsula of Baja California and associated islands. Thirty-eight records are from the delta of the Colorado River, 57 from northwestern Baja California, 3 from the Central Desert, 12 from the Vizcaino Desert, and 12 from the Cape region. These records confirm that the Burrowing Owl is a widespread, albeit perhaps uncommon, resident the length of the peninsula. The larger aggregations have been reported from the central and northern portions of the peninsula, while the species is rather rare in the Cape region. About one half of the records of Burrowing Owls on the peninsula are from spring and summer. Forty-three percent of the records are from agricultural lands, 18% from wetlands, 15% from open desert, and 12% from coastal sage scrub.

In western North America the breeding range of the Burrowing Owl (*Athene cunicularia*) extends from southern interior British Columbia to Baja California, including many coastal islands, as well as Guadalupe Island, and south to central Mexico, including Clarión Island in the Revillagigedo group (Brewster 1902, Hang et al. 1993, Howell and Webb 1995, A.O.U. 1998). Burrowing Owls winter throughout their breeding range, except for the northern portions of the Great Basin and the Great Plains, and south to southern Mexico, Central, and South America (A.O.U. 1998).

The number of Burrowing Owls that breed in Canada and some parts of the U.S.A., including California, is declining (National Wildlife Federation 1989, Carter et al. 1996, James and Espie 1997, De Sante et al. 1997). It has been hypothesized that the major causes of such a decline have been habitat alterations and other human activities such as poisoning and loss of nest sites through the control of squirrels and prairie dogs (White 1994, see also Lincer 1997). In North America the Burrowing Owl has been designated as threatened widely throughout its range (James and Espie 1997). In Mexico the Burrowing Owl is listed as threatened in the 1994 official list of species at risk (NOM-059-ECOL-1994). Despite this designation, actual information on the status of this species in Mexico is scant (see Enriquez-Rocha 1997). If conservation plans for it are to be developed, more information is needed, especially from its wintering range.

Although the general distribution of the Burrowing Owl in the peninsula of Baja California is well known (see Grinnell 1928, and Wilbur 1987), specific habitats occupied and the abundance of owls are not. The Burrowing Owl was first recorded in the peninsula of Baja California by Baird et al. (1874) from the Cape region and by Sharpe (1875) from Magdalena Bay. Its status is poorly known over much of the peninsula, mostly because there has been

NESTING WATERBIRDS ON ISLAS SAN MARTIN AND TODOS SANTOS, BAJA CALIFORNIA

EDUARDO PALACIOS and ERIC MELLINK, Ecología, Centro de Investigación Científica y Educación Superior de Ensenada, Km 107 Carr. Tijuana-Ensenada, 22860 Ensenada, Baja California, México (U.S. mailing address: P.O. Box 434844, San Diego, California 92143-4844)

ABSTRACT: A survey of Isla San Martín on 2 June 1999 revealed about 30 Brown Pelican, 600 Double-crested Cormorant, and over 300 occupied Western Gull nests, plus a mixed pair of oystercatchers. Thus the Double-crested Cormorant has reoccupied what was once its largest colony in North America. Surveys of Isla Todos Santos on 3 June 1999 and 27 March 2000 revealed 115 Double-crested Cormorant and at least 184 occupied Brandt's Cormorant nests, plus about 1400 nesting pairs of Western Gulls. On Todos Santos, at least two nests of the Pelagic Cormorant represent a southward extension of that species' breeding range, whereas two nesting pairs of the Reddish Egret represent a northward extension.

During the late 1960s and early 1970s several fish-eating bird species experienced decreases in breeding success, and hence severe population declines, due to eggshell thinning caused by organochlorine ingestion (Keith et al. 1971, Risebrough et al. 1971, Jehl 1973, Anderson et al. 1975, Anderson and Gress 1983, Gress 1995). After use of DDT was curtailed in the early 1970s some species, like the Brown Pelican (*Pelecanus occidentalis*), started to recover in the late 1970s (Jehl 1984, Anderson et al. 1996).

Despite the reduction in organochlorine pollution, human disturbance on islands still threatens seabird nesting colonies in northwestern Mexico (Anderson and Keith 1980, Anderson 1988). Human disturbance on islands has increased steadily as tourism, scientific and educational expeditions, sport-fishing, outdoor activities, and commercial harvest of marine resources have developed (Velarde and Anderson 1994). Since people visit islands that are near shore more often than distant ones, continuous human-induced effects are expected to be greatest on islands closest to the mainland (Burger and Gochfeld 1994). On islands, human disturbance usually occurs close to fishing camps and/or landing sites. The extreme sensitivity of Brown Pelicans and cormorants to human disturbance can limit the available suitable nesting habitat for these birds (Anderson 1988, Everett and Anderson 1991).

At least since 1913 (Wright 1913), and until the late 1960s (Jehl 1973), Isla San Martín supported a large mixed colony of Brown Pelicans, Double-crested Cormorants (*Phalacrocorax auritus*), and Brandt's Cormorants (*P. penicillatus*). Indeed, the breeding colony of Double-crested Cormorants was considered the largest in North America (Gress et al. 1973, Everett and Anderson 1991, Carter et al. 1995). Disturbance by tourists has been suggested as the major factor in the demise of the seabird colonies on this island (Anderson and Keith 1980, Jehl 1973, 1984).

The objective of this note is to contribute to the knowledge of the status of nesting waterbirds on islas San Martín and Todos Santos by reporting our observations during visits to each island in June 1999. San Martín was surveyed on 2 June, Todos Santos on 3 June. Our trip was aboard the trimaran

NUMBERS OF WINTERING SHOREBIRDS IN COASTAL WETLANDS OF BAJA CALIFORNIA, MEXICO

GARY W. PAGE

*Point Reyes Bird Observatory
4990 Shoreline Highway
Stinson Beach, California 94970 USA*

EDUARDO PALACIOS, LUCIA ALFARO, SALVADOR GONZALEZ

*Centro de Investigacion Cientifica y
Educacion Superior de Ensenada
Apartado Postal 2732
Ensenada, Baja California 22830 Mexico*

LYNNE E. STENZEL

*Point Reyes Bird Observatory
4990 Shoreline Highway
Stinson Beach, California 94970 USA*

MICHAEL JUNGERS

*7393 Park View C6 #163
Santee, California 92071 USA*

Abstract.—A paucity of information on shorebird regional population sizes and numbers in particular wetlands has precluded quantitative assessment of the effect of wetland loss on shorebirds. To address this, Point Reyes Bird Observatory organized a broad survey to quantify the importance of specific wetlands to wintering and migratory shorebirds in western North America. In wetlands along the west coast of Baja California, Mexico, 354,905 shorebirds were estimated present in winter based on ground and air surveys between January 1991 and January 1994. This compares to 500,000–575,000 for coastal California wetlands during the winters of 1990–1992. Western Sandpipers (*Calidris mauri*) made up 35.8%, Marbled Godwits (*Limosa fedoa*) 25.4%, dowitchers (*Limnodromus* spp.) 13.6%, Dunlins (*Calidris alpina*) 11.0%, Willets (*Catoptrophorus semipalmatus*) 4.7%, Black-bellied Plovers (*Pluvialis squatarola*) 3.7%, and 20 other species each less than 1.0% of the wintering shorebirds in the Baja California wetlands. The Laguna Ojo de Liebre/Guerrero Negro wetland complex held many more wintering shorebirds than any other Baja California site. When compared to other Pacific coast wetlands in the United States and Canada, it had the most wintering Marbled Godwits, was second (to San Francisco Bay) in total wintering shorebirds and Western Sandpipers, and was one of only three sites supporting several hundred wintering Red Knots (*Calidris canutus*). In comparison with coastal California, numbers of wintering American Avocets (*Recurvirostra americana*), Black-necked Stilts (*Himantopus mexicanus*), and Least Sandpipers (*Calidris minutilla*) were relatively low in western Baja California.

NON-BREEDING WATERBIRDS OF THE DELTA OF THE RÍO COLORADO, MÉXICO

ERIC MEILLINK, EDUARDO PALACIOS, AND SALVADOR GONZÁLEZ

*Centro de Investigación Científica y de Educación Superior de Ensenada
B.C. Apdo. Postal 2732
Ensenada, Baja California, México*

Abstract.—The delta of the Río Colorado was a very important area for water birds until early in the century, after which damming and upstreams diversion caused significant habitat modifications in the area. Although recent information suggested the area was still important to many birds, detailed data on such use was lacking. Between the fall of 1993 and the summer of 1994 we made 14 surveys and two aerial flights over the area. The largest numbers of birds occurred during the winter, when we counted over 100,000 birds. Shorebirds dominated the bird community, with Western Sandpipers accounting for the majority of the individuals. The areas most used by shorebirds were the extensive mudflats at the mouth of the delta. Interior habitats were important mostly to herons and ducks.

AVES ACUÁTICAS NO REPRODUCTIVAS EN EL DELTA DEL RÍO COLORADO, MÉXICO

Sinopsis.—El delta del Río Colorado fue importante para aves acuáticas hasta principios de este siglo, cuando la construcción de presas y división del agua modificaron sustancialmente los habitats del área. Información reciente sugería que el área era aún importante para aves, pero no había información detallada sobre su uso a lo largo del año. Entre el otoño de 1993 y el verano de 1994 realizamos 14 muestreos y dos vuelos aéreos sobre el área. Encontramos que las mayores congregaciones de aves ocurren durante el invierno, cuando contamos más de 100,000 aves. Los playeros fueron el grupo dominante, y *Calidris mauri* la especie más abundante. Las áreas más usadas por las aves fueron las extensas planicies lodosas en la boca del delta. Los habitats interiores fueron importantes especialmente para garzas y patos.

Migrant shorebirds at sandy beaches located between two major wetlands on the Pacific coast of Baja California (Mexico)

By: [LopezUriarte, E](#) (LopezUriarte, E); [Escofet, A](#) (Escofet, A); [Palacios, E](#) (Palacios, E); [Gonzalez, S](#) (Gonzalez, S)

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Abstract

In this paper we describe the composition and abundance of shorebirds at two sandy beaches located north and south of Punta Cabra (Baja California, Mexico). These beaches are located halfway between two coastal lagoons that are important along the Pacific Flyway (estero Punta Banda and San Quintin bay, 180 km apart). Scarcity of coastal lagoons in Baja California triggered our interest in documenting shorebird migration in the absence of major wetlands. We conducted 23 censuses biweekly from September 1990 through October 1991. Nineteen shorebird species and 1,127 individuals were recorded. The sanderling (*Calidris alba*) was the most abundant species at both beaches. Chi-square tests showed significant differences in the abundance of whimbrel (*Numenius phaeopus*), snowy plover (*Charadrius alexandrinus*), and the surfbird (*Aphriza virgata*) between beaches. Peaks of abundance were dominated by three or fewer species. There were differences between beaches in the time of occurrence of the peaks, and in species composition. Removal of the dominant species in the analysis of similarity revealed differences between beaches and showed that both are important to the shorebird assemblage. Our findings suggest that open beaches are important for the sanderling and the snowy plover. Species recorded at Punta Cabra but not at estero Punta Panda can be explained by unique habitat features such as rock outcrops next to the beaches, sandy beaches where kelp (*Macrocystis*) has washed ashore, and natural vegetation near the beaches. Sandy beaches provided migration habitat for species previously recorded only at flats in the region. Differences found in this study indicate that the importance of small sites deserves further investigation in coastal areas where major wetlands are scarce or far apart. Conservation of Punta Cabra at a regional level should be considered in shorebird protection programs.

Keywords

Author Keywords: [Baja California](#); [coastal ecology](#); [sandy beaches](#); [shorebird migration](#); [wetlands](#)

KeyWords Plus: [ABUNDANCE](#)

STATUS OF THE LEAST TERN IN THE GULF OF CALIFORNIA

EDUARDO PALACIOS AND ERIC MELLINK

*Centro de Investigación Científica y
Educación Superior de Ensenada
Apartado Postal 2732
Ensenada, Baja California, México*

Abstract.—Between 1985 and 1994 all known and potential nesting sites of the Least Tern (*Sterna antillarum*) along the Gulf coasts of Baja California, Baja California Sur and Sonora, Mexico, were surveyed, with especially intensive field work in 1992. Twenty-nine nesting sites were found; of which some might constitute clusters of alternative sites. On the basis of the numbers of nesting pairs at each colony in 1992-1994, the breeding population of the Least Tern in the part of the Gulf of California that was surveyed was estimated to be about 400 breeding pairs. Disturbance by off-road vehicles is the main problem for the Least Tern in the Gulf of California.

ESTADO DE *STERNA ANTILLARUM* EN EL GOLFO DE CALIFORNIA

Sinopsis.—Entre 1985 y 1994 se revisaron todos los sitios de anidación conocidos y potenciales del gallito marino *Sterna antillarum*, a lo largo de las costas de Baja California, Baja California Sur y Sonora, en el Golfo de California, México. Se registraron 29 sitios de anidación, algunos de los cuales podrían constituir grupos de sitios alternos. Con base en el número máximo de parejas anidantes entre 1992 y 1994, se estimó que existían alrededor de 400 parejas, en la parte del Golfo de California muestreada. El disturbio humano, por medio de vehículos para todo terreno es el principal problema para estos gallitos, en las costas del Golfo de California.

The Least Tern (*Sterna antillarum*) faces conservation problems both in the United States and in Mexico, where it has been given the legal status of endangered (Secretaría de Desarrollo Social 1994). Although the populations that nest in the United States have been researched intensely during the last 20 yr, those in Mexico have not. In particular, the abundance and distribution of Least Terns in the Gulf of California remain largely unknown.

On the Pacific coast of North America this species nests close to estuaries and coastal lagoons, and on sandy beaches and playas, from San Francisco Bay south to southern Mexico. Current data suggest a breeding population of about 2000 pairs in approximately 30 widely distributed colonies along the Pacific coast of the United States (B. W. Massey, pers. comm.). The Least Tern winters along the coasts of central and northern South America, but details of the winter range are still poorly known. Massey (1981) observed a group of banded California Least Terns (*S. a. browni*) wintering in Colima, Mexico; one banded bird, from a California colony, was recovered from Guatemala (C. T. Collins, pers. comm.).

The first record of a Least Tern in the Gulf of California was that of Brewster (1902) from San José del Cabo, Baja California Sur, but it was not until 1923 that a nesting colony was recorded at the same locality (Lamb 1927). The next breeding record in the Gulf of California was from Bahía Tóbari, Sonora, in 1930 (Van Rossem and Hachisuka 1937).

NOTES

NOTES ON NESTING BIRDS OF THE CIÉNEGA DE SANTA CLARA SALTFLAT, NORTHWESTERN SONORA, MEXICO

ERIC MELLINK, EDUARDO PALACIOS, and SALVADOR GONZÁLEZ, Centro de Investigación Científica y Educación Superior de Ensenada, Apdo. Postal 2732, Ensenada, Baja California, México (international mailing address P. O. Box 434844, San Diego, California 92143)

The Ciénega de Santa Clara is a 20,000-hectare brackish wetland on the east side of the delta of the Rio Colorado in Sonora, México. It has developed as a result of the discharge of brine from the Wellton-Mohawk Irrigation District, in southwestern Arizona, through the Wellton-Mohawk Main Outlet Drain Extension, since 1977. The northern third of the ciénega is covered by dense cattails (*Typha domingensis*), Common Reed (*Phragmites communis*), and bulrush (*Scirpus americanus*). The southern two-thirds of the wetland consist of unvegetated evaporative saltflats (Glenn et al. 1992). The area is important for conservation, yet little effort has been devoted toward its birds. Investigations have focused mainly on its vegetated portion, which supports a large population of the endangered Yuma Clapper Rail (*Rallus longirostris yumanensis*; see Eddleman 1989) and of wintering waterfowl. The use of the saltflats by birds has been mostly overlooked. Only Eddleman (1989) has reported on the birds his team recorded incidentally while surveying Yuma Clapper Rails.

On 20 April and 3–4 May 1994, we visited two sites on the saltflat, both adjacent to pools of fresh water. These are fed by underground springs located on the San Jacinto Fault, which runs through the eastern boundary of the ciénega to the Estero de Santa Clara and beyond into the Gulf of California. We have named the sites after the nearest villages, El Doctor and La Flor del Desierto, from which they are about 2 and 3.5 km to the southwest, respectively.

American Avocet (*Recurvirostra americana*). On 20 April 1994 we found 20 adults and 2 nests at El Doctor. One nest had four eggs, the other three eggs and one fledgling. On 3 May one of the nests had only eggshell fragments, and we presume successful hatching. We could not refind the other nest. Although no nesting of this species in Sonora has been confirmed previously, Mellink and Palacios (1993) suspected that avocets breed near Puerto Peñasco, also in the northern Gulf of California. Howell and Webb (1995) reported the species as a breeder only in northwestern Baja California and on the central plateau of Mexico.

Black-necked Stilt (*Himantopus mexicanus*). On 20 April we recorded about 20 adults, some of which were performing distraction behavior, at El Doctor. On 3 May three adults were performing the broken-wing display there. Eddleman (1989) reported stilts in roughly the same area in 1984, and G. Monson (pers. comm.) and S. M. Russell found a nest with three eggs a few kilometers north of the site on 9 April 1994. Howell and Webb (1995) did not record the species as breeding in Sonora.

Snowy Plover (*Charadrius alexandrinus*). At El Doctor there were about 40 adults and we located two nests. To reduce disturbance we did not search for more nests, but

NOTEWORTHY RECORDS OF BIRDS IN NORTHWESTERN BAJA CALIFORNIA, MEXICO

PHILIP UNITT and AMADEO M. REA, San Diego Natural History Museum, P. O. Box 1390, San Diego, California 92112

EDUARDO PALACIOS, ERIC MELLINK, LUCIA ALFARO, and SALVADOR GONZÁLEZ, Centro de Investigación Científica y Educación Superior de Ensenada, B. C., Apdo. Postal 2732, Ensenada, Baja California (U.S. mailing address: P. O. Box 434844, San Diego, California 92143)

Even after the contribution of Wilbur (1987) and several recent reports in *Western Birds*, the distributions of many birds in Baja California remain poorly known. Here we report observations made by us separately or together between 1975 and June 1994. We include data only for northwestern Baja California, that is, between the international border and Río del Rosario and west of the summits of the sierras Juárez and San Pedro Mártir. Almost all records are based on sight identification only, owing to the difficulty, even for Mexican citizens, in complying with current collecting regulations in Mexico.

Sites mentioned in the following accounts are plotted in Figure 1. Within each account, sites are ordered from north to south. Initials in parentheses denote the responsible observers.

SPECIES ACCOUNTS

Horned Grebe (*Podiceps auritus*). Not recorded from Baja California by Grinnell (1928), this species is still known here from only a few published records (Wilbur 1987). Our records: Bahía de San Quintín, where Horned Grebes had not yet been recorded: 3, 1 December 1986 (PU). Estero de Punta Banda: 6, 27–28 November 1987 (PU); 1, 2 February 1994 (EP). Steve N. G. Howell (pers. comm.) has also noted the species at these two sites, with a maximum of 20 in the Bahía de San Quintín, 8 December 1983. The status of this species in the Bahía de San Quintín and Estero de Punta Banda is probably similar to that on San Diego Bay: an uncommon annual winter visitor.

Pied-billed Grebe (*Podilymbus podiceps*). A "sparse resident the length of the peninsula" (Wilbur 1987), this species is scarce enough as a breeder we list our only two records. El Ciprés pond: 1 adult with a chick, 15 June 1991 (SG). A small temporary pond on the side of the highway 1 km north of Colonet: 1 adult with 5 chicks, 4 June 1994 (SG). S. N. G. Howell (pers. comm.) adds two further localities: Héroes de la Independencia (adult with chick, 14 May 1989) and Rancho San José de Meling (2 adults with 3 chicks, 11 May 1989).

Brandt's Cormorant (*Phalacrocorax penicillatus*). A rock on the northeastern side of South Isla Todos Santos: 40 nesting on 15 April 1991 (EP, EM). This species historically bred on the Islas Todos Santos (van Denburgh 1924, Howell 1912), and Everett and Anderson (1991) concluded that, except at San Martín and Los Coronados islands, its status in Baja California has probably changed little. We, however, found none on the main island, which the cormorants may have deserted because of disturbance by fishermen and, perhaps, tourists.

White-faced Ibis (*Plegadis chihi*). Wilbur (1987) considered this ibis a rare transient, listing only one record for northwestern Baja California. Our findings indicate it

DISTRIBUTION AND ABUNDANCE OF BREEDING SNOWY PLOVERS ON THE PACIFIC COAST OF BAJA CALIFORNIA

EDUARDO PALACIOS AND LUCIA ALFARO

*Centro de Investigación Científica y Educación Superior¹
de Ensenada, B. C.
Apartado Postal 2732
Ensenada, Baja California, México*

GARY W. PAGE

*PRBO
4990 Shoreline Highway
Stinson Beach, California 94970 USA*

Abstract.—The breeding population of Snowy Plovers (*Charadrius alexandrinus*) was surveyed along the Pacific coast of Baja California from 1991 to 1992. All accessible potential breeding sites from Tijuana to Cabo San Lucas were covered. The 1344 adult Snowy Plovers counted were mostly distributed (88% of the total Baja population) at the four main coastal wetland complexes of the peninsula: Bahía San Quintín; Laguna Ojo de Liebre and Laguna Guerrero Negro; Laguna San Ignacio; and Bahía Magdalena. The habitats harboring the largest numbers of birds were barrier beaches and salt flats. It is concluded that the number of Snowy Plovers on the peninsula of Baja California likely represents at least 50% of the total population nesting on the west coast of North America.

DISTRIBUCIÓN Y ABUNDANCIA DE *CHARADRIUS ALEXANDRINUS* EN REPRODUCCIÓN EN LA COSTA DEL PACÍFICO DE BAJA CALIFORNIA

Sinopsis.—La población reproductiva de *Charadrius alexandrinus* se muestreó a lo largo de la costa del Pacífico de Baja California desde 1991 a 1992. Se examinaron todas las áreas potenciales para la anidación de la especie entre Tijuana y el Cabo San Lucas. La mayoría de los 1344 *Charadrius alexandrinus* contados (88% de la población total de Baja California) se distribuyeron en los cuatro grandes complejos de humedales costeros de la península: Bahía de San Quintín, Laguna Ojo de Liebre y Laguna Guerrero Negro, Laguna San Ignacio y Bahía Magdalena. Los habitats con mayores números de aves fueron las barras arenosas y las planicies salinas. Se concluye que el número de *Charadrius alexandrinus* en la península de Baja California representa por lo menos 50% de la población total que anida en la costa de los Estados Unidos de Norte América.

On the Pacific coast, the Snowy Plover (*Charadrius alexandrinus*) breeds from southern Washington to southern Baja California (American Ornithologists' Union 1983). The coastal population in the western United States is declining because of heavy human recreational use of beaches (Page and Stenzel 1981, Page et al. 1991). The status of this species in Mexico is unknown. On the California coast of the United States, Page and Stenzel (1981) found larger concentrations of birds in the south than in the north, suggesting that the center of the coastal distribution of this species lies closer to the southern than the northern boundary of the state. Therefore, they hypothesized that Baja California might also support substantial numbers of breeding birds. The purpose of this paper is

¹ International mailing address: CICESE, P.O. Box 434844, San Diego, California 92143 USA.

AVIFAUNA OF THE WETLANDS OF BAJA CALIFORNIA, MÉXICO: CURRENT STATUS

BARBARA W. MASSEY AND EDUARDO PALACIOS

Abstract. Although Baja California has not experienced loss of wetlands comparable in magnitude to that in California, some habitat changes have provoked changes in the abundance and distribution of wetland avifauna. The Osprey population has increased in the Vizcaino wetlands, but at least three species of egrets and herons, and American Oystercatcher have declined due to human disturbance. The Elegant Tern is missing at Laguna Ojo de Liebre, but there is a new colony at Delta del Río Colorado. Several species have expanded their range into Baja California and have established breeding colonies, e.g., Little Blue Heron, Laughing Gull, Caspian, Royal, Forster's and Gull-billed terns, and Black Skimmer. Both number and variety of breeding birds have increased in Laguna San Ignacio. At least 52 species of water-associated birds breed in the several habitats of the wetlands, including five endangered or threatened species. The northernmost breeding colony of the Magnificent Frigatebird is located in Bahía Magdalena. Migratory birds use the wetlands in large numbers; the biggest concentrations of shorebirds are found in two wetlands—Laguna Ojo de Liebre and Delta del Río Colorado. The lagoons of Baja California are the primary wintering grounds for Brant. Mangroves in the southern wetlands have recently been identified as wintering habitat for passerines. Threats to the wetlands are primarily from resort and industrial developments being planned by international companies. Conservation of these vital avian habitats is a matter of concern to all ornithologists.

Key Words: México; Baja California; coastal wetlands; marsh avifauna; endangered species; distribution; conservation.

The peninsula of Baja California, México extends 1600 km south from Tijuana to Cabo San Lucas. Its diverse natural habitats include richly vegetated deserts, riparian valleys, rugged mountain ranges and the magnificent coastal wetlands whose avifauna is our subject. Long insulated from disturbance and development by lack of roads, the wetlands were also out of reach to all but the hardiest ornithologists prior to the opening of the peninsula-long highway in 1974. Post-highway changes have been gradual but inexorable and today some of the major wetlands are under threat, particularly from tourist-oriented development. However, most are still in near-pristine condition, and presumably have not experienced the changes in bird use that have characterized California's wetlands. Unfortunately, numerical baseline data are sketchy, as early ornithologists reported species' presence and breeding information, but seldom numbers.

The first checklist of the birds of Baja California appeared in 1889 (Bryant 1889), and in the 1920s Bancroft (1927a, b) and Grinnell (1928) added extensively to the

scant literature. In 1987 Wilbur compiled an annotated checklist from the literature and from reliable field observers (Wilbur 1987); his bibliography was comprehensive and allows us to concentrate on data gathered subsequently. Recently there has been an accelerated interest in documenting numbers and species in Baja California, and much of the information presented here has not been published heretofore. Scientific names of species are given in Table 1.

The first attempt at estimating numbers of birds in Baja California was in 1949 when the U.S. Fish and Wildlife Service (USFWS) added the peninsular lagoons to its aerial surveys of Mexican waterfowl (Sanders and Sanders 1981). Since 1974 the surveys have been a cooperative project with the Mexican government. Brant have received special attention and have been censused every year even when the all-México surveys were reduced to every 3rd year (U.S. Fish and Wildlife Service unpublished reports on winter waterfowl surveys of the Mexican West Coast and Baja California, 1954-1992, available from J. Voelzer, USFWS, Portland, OR).

NOTES

BREEDING BIRDS OF ESTEROS TÓBARI AND SAN JOSÉ, SOUTHERN SONORA

EDUARDO PALACIOS and ERIC MELLINK, Centro de Investigación Científica y Educación Superior de Ensenada, Apdo. Postal 2732, Ensenada, Baja California, Mexico or P. O. Box 434844, San Diego, California 92143

Although the ornithofauna of Sonora has been studied since, at least, the 19th century (van Rossem 1945), it is still rather poorly known. This is particularly true for its southern coastal area. Van Rossem and Hachisuka (1937) provided an extensive list of water birds from Estero Tóbari but found little evidence of local breeding for most species. In 1971 and 1972, Knoder et al. (1980) made aerial surveys of water birds and wetlands along the coasts of Baja California and the west coast of mainland Mexico, from the delta of the Río Colorado to San Blas, Nayarit, but did not include Estero Tóbari as one of their intensively surveyed sites.

Here we report on the breeding birds that we recorded on a trip to esteros Tóbari (including Isla Huivulai) and San José on 14 May 1994 (Figure 1). In Estero Tóbari, we surveyed the north and south mouths of the bay, two islets outside the north mouth, and two heronries on the southeast and northwest sides of Isla Huivulai. San José is a small fishermen's town 8 km northwest of the north mouth of Estero Tóbari, with an estero and a large saltflat nearby, both of which we surveyed. We visited also an abandoned shrimp farm at the north end of Estero Tóbari. The main purpose of our trip was to search for Least Tern breeding colonies.

Great Blue Heron (*Ardea herodias*). A heronry in NE Isla Huivulai contained eight nests, one with two half-grown chicks. On the west coast of mainland México, Great Blue Herons breed from the delta of the Río Colorado (Palacios and Mellink 1993) south to, at least, San Blas, Nayarit (Knoder et al. 1980). Griffing Bancroft (unpublished field notes) had found this species as a breeder at Estero Tóbari in 1930, and van Rossem and Hachisuka (1937) collected a specimen in breeding condition from there.

Great Egret (*Casmerodius albus*). Two heronries in SE and NE Huivulai had about 15 pairs with nests each. Van Rossem and Hachisuka (1937) had recorded this species as a breeder from the area.

Snowy Egret (*Egretta thula*). There were 20 pairs in the SE heronry and about the same number in the NE heronry on Isla Huivulai. The Snowy Egret is reported as occurring along the Pacific coast of Mexico from Puerto Peñasco south to the Istmo de Tehuantepec (Knoder et al. 1980) and being a resident from Guaymas south (van Rossem 1945), but no previous breeding records exist for southern Sonora.

Little Blue Heron (*Egretta caerulea*). We found three pairs with nests in each heronry on Isla Huivulai. This species is known to occur from Punta Sargento south to the Istmo de Tehuantepec (Knoder et al. 1980) and to be a summer resident of the mangrove association of southern Sonora (van Rossem 1945), but no particular breeding locations had been published.

Tricolored Heron (*Egretta tricolor*). We saw five adults feeding on the mudflat in front of the heronry in NE Isla Huivulai; we presume nesting. Like previous species, this heron has been noted from Guaymas south to Tehuantepec (Knoder et al. 1980) and to be a resident of coastal lagoons in southern Sonora (van Rossem 1945), but no specific breeding locations had been provided.

NOTES

FURTHER RECORDS OF THE MASKED BOOBY FROM BAJA CALIFORNIA

JAVIER GUILLÉN-HERRERA, Estación de Investigación Oceanográfica de Ensenada,
Vicente Guerrero 133 Altos, Fracc. Bahía, Ensenada, Baja California, México 22880

EDUARDO PALACIOS, Centro de Investigación Científica y de Educación Superior
de Ensenada, B. C. (CICESE), Apdo. Postal 2732, Ensenada, Baja California 22830
or P. O. Box 434844, San Diego, California 92143

EDGAR S. AMADOR-SILVA, Centro de Investigaciones Biológicas del Noroeste,
S. C., Apdo. Postal 128, La Paz, Baja California Sur, México 23000

The pantropical Masked Booby (*Sula dactylatra*) is one of the most pelagic of the Pelecaniformes. Off the Pacific coast of Mexico, the Masked Booby breeds on Isla Clarión and Isla San Benedicto in the Revillagigedo group (Everett and Anderson 1991) and on Clipperton Atoll (A. O. U. 1983). It has been reported breeding at Las Rocas Alijos (24° 57' N, 115° 45' W) since 1925 (Hanna 1926, McLellan 1926) with a current breeding population of about 50 pairs (Pitman 1985). Only three sighting reports exist for the Pacific coast of Baja California, of one juvenile on 23 April 1988 at Islas Los Coronados, Baja California (Everett and Teresa 1988), and single adults on 18 December 1968 and 30 November 1980, both at Cabo San Lucas, Baja California Sur (Wilbur 1987).

Here we report five additional records, including one for the Gulf of California, three for the Pacific coast of Baja California, and one for Isla Guadalupe. Amador and Palacios saw an adult Masked Booby loafing with a few Magnificent Frigatebirds (*Fregata magnificens*) at Punta Diablo, Bahía de La Paz, southwestern Gulf of California, on 11 June 1986. The bird was wearing adult plumage, with an all white head, extensive black facial skin, black tail, black tips to the longer scapulars, and more extensive black on the secondaries. The bill was yellow, but at the time we did not note whether it was greenish yellow (subspecies *californica*) or more pinkish orange (subspecies *granti*) (Patten and Erickson 1994). We eliminated an adult Red-footed Booby (*Sula sula*) by the bird's large size, grayish feet, and black scapulars. The only two previous reports of Masked Boobies inside the Gulf of California are from the central portion of the Gulf [May 1991, one 48 km west of Isla Lobos, no further details (Gallo 1994); June 1992, one *granti*, D. Breese and B. Tershy in Howell and Webb (1995)].

On 13 May 1985 and 12 November 1986 L. Moreno (pers. comm.) observed single adult Masked Boobies at Punta Lengua (24° 22' 58" N, 111° 41' 30" W), an important Brown Pelican (*Pelecanus occidentalis*) and Double-crested Cormorant (*Phalacrocorax auritus*) roosting site near the southern end of Isla Santa Margarita. The bird sighted in 1986 and closely photographed by Moreno at Isla Santa Margarita was wearing incomplete adult plumage, with an all-white head, black tips to longer scapulars, black tail, and black secondaries, but the rump was still brown. The Masked Booby gradually acquires adult plumage over two years, the rump staying brown longest. The bill of this bird was decidedly greenish yellow, implying the Mexican coastal subspecies *S. d. californica* (Patten and Erickson 1994).

On 4 February 1994, Amador observed an adult Masked Booby in flight approximately 2 km southwest of Isla Santa Margarita (24° 25' N, 111° 25' W). The black scapulars and lack of carpal patch on the underwing could be noted, but the exact bill color could not be discerned.

On 20 January 1994, Guillén saw an adult on Isla Guadalupe (29° N, 118° 17' W) with an all-white head, black tips to longer scapulars and more extensive black in secondaries, black tail, grayish feet, and greenish-yellow bill. The bird rested on a small fishing boat on Campamento Oeste and walked and perched around the fishermen's

**DISTRIBUCION TEMPORAL DE AVES ACUATICAS EN EL
ESTERO DE SAN JOSE DEL CABO, B.C.S, MEXICO**

**SEASONAL DISTRIBUTION OF AQUATIC BIRDS IN
ESTERO DE SAN JOSE DEL CABO, B.C.S., MEXICO**

Juan Guzmán¹
Roberto Carmona¹
Eduardo Palacios²
Míriam Bojórquez¹

¹ Departamento de Biología Marina
Universidad Autónoma de Baja California Sur
Apartado postal 19 B
La Paz, B.C.S., México

² Departamento de Ecología
Centro de Investigación Científica y
de Educación Superior de Ensenada (CICESE)
Apartado postal 2732
Ensenada, B.C., México

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RESUMEN

Con el fin de conocer la distribución temporal y la importancia relativa de cada una de las especies de aves acuáticas en el Estero de San José del Cabo, se realizaron censos mensuales de septiembre de 1986 a septiembre de 1987. Se observaron 12,490 aves de 50 especies. La comunidad estuvo dominada por la gallareta gris (*Fulica americana*, 9,176 individuos). Esta zona es también un apostadero importante para aves migratorias, principalmente de la familia Anatidae. Se comparó la presencia con los datos registrados por otros autores, y se notó una disminución del número de especies, explicable por el deterioro del estero. Al parecer la especie que más se ha podido adaptar a los cambios es la gallareta gris.

ABSTRACT

In order to determine the seasonal distribution and the importance of each of the species of aquatic and semiaquatic birds in the Estero de San José del Cabo, B.C.S. (Mexico), monthly censuses were performed from September 1986 to September 1987. A total of 12,490 birds, belonging to 50 species, were recorded. The presence and abundance of birds, compared to those reported by other authors, are significantly reduced, probably due to the deterioration of this habitat. In this bird community, the American coot (*Fulica americana*) was, by far, the most abundant species (9,176 individuals). This lagoon is an important stop for migratory birds, mainly anatids.

NOTES

ADDITIONAL RECORDS OF BREEDING BIRDS FROM MONTAGUE ISLAND, NORTHERN GULF OF CALIFORNIA

EDUARDO PALACIOS and ERIC MELLINK, Centro de Investigación Científica y Educación Superior de Ensenada, B. C., Apartado Postal 2732, Ensenada, Baja California, México (U.S. mailing address: P.O. Box 434844, San Diego, CA 92143)

Compared with the rest of Mexico's, the avifauna of Baja California has been studied extensively (e.g., Grinnell 1928, Wilbur 1987). Nevertheless, within Baja California certain areas such as the Rio Colorado delta have not been explored in detail. Knowledge of the bird life in this area is particularly important because of the striking changes in bird habitat along the Rio Colorado and in its delta area (see Leopold 1970).

Recently, in a preliminary reconnaissance of the birds of Montague Island (in the Rio Colorado delta), we found six species of waterbirds breeding or probably breeding on the island (Palacios and Mellink 1992). In this note we report additional breeders or probable breeding species discovered during a short trip to the island on 1 May 1992 (10:30–13:00 hours). We visited Estero del Chayo (from 31°39'39" N and 114°41'49" W to 31°43'24" N and 114°43'02" W) and the area around the lighthouse (about 3 km west of the mouth of Estero del Chayo).

In addition to the species we discuss below, we observed the Laughing Gull (*Larus atricilla*) and Snowy Egret (*Ardea thula*) colonies already reported by Palacios and Mellink (1992), but we did not attempt to estimate their size since our visit was too early in the breeding season.

Black-crowned Night-Heron (*Nycticorax nycticorax*). We saw two pairs in breeding plumage on the east bank of Estero del Chayo. We continue to suspect that this species breeds on the island but could not confirm it. These herons likely nest on the ground somewhere on the island, as they do on some islets of Laguna Ojo de Liebre, Baja California Sur (Bancroft 1927, E. Palacios and L. Alfaro pers. obs.).

Great Blue Heron (*Ardea herodias*). We found two nests, with three eggs each, on the ground on the western bank of Estero del Chayo, confirming their suspected breeding on Montague Island (Palacios and Mellink 1992).

Gull-billed Tern (*Sterna nilotica*). Friedmann et al. (1950) considered this species "probably breeding" on Montague Island. We found five subcolonies, each containing about 30–40 pairs, in the half of Estero del Chayo nearest its mouth. We examined more closely 21 nests in patches of open saltgrass (*Distichlis palmeri*). The nests were in groups of 4 to 7, and were placed on bare ground surrounded with dry saltgrass. Minimum distance between nests was 1.2 m. Five nests had one egg, 12 had two, and 4 had three.

Least Tern (*Sterna antillarum*). As we suspected in 1991, Least Terns breed on Montague Island. We found 20 pairs on two islets (4 and 16 pairs, respectively), about 130 m north of the lighthouse. We confirmed breeding by finding one nest with two eggs. To reduce disturbance, we did not search for more nests. W. R. Eddleman and B. A. Groshek (in U.S. Bureau of Reclamation and U.S. Fish and

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NOTES ON BREEDING COASTAL WATERBIRDS IN NORTHWESTERN SONORA

ERIC MELLINK and EDUARDO PALACIOS, Centro de Investigación Científica y Educación Superior de Ensenada, B. C., Apartado Postal 2732, Ensenada, Baja California, Mexico (international mailing address: CICESE, P. O. Box 434844, San Diego, California 92143)

Although several researchers have studied birds in the state of Sonora, Mexico, few published reports exist. Van Rossem (1945) published the only comprehensive summary, now outdated. Recently, Everett and Anderson (1991) addressed the status of the breeding seabirds of the Gulf of California.

The northernmost of Sonora's large lagoons is Bahía San Jorge, with its associated Estero San Francisquito and islands (Figure 1). Bahía San Jorge is a large bay separated from the open gulf by a long (10 km) sand bar on its southern side. Estero San Francisquito, a long, narrow tidal estuary, lies immediately to the south. Except for marshes inside the southern part of the bay, dunes are the principal terrestrial habitats around Bahía San Jorge. Certain areas are open flats with shell debris. Bahía San Jorge and Estero San Francisquito have not been investigated ornithologically in any detail, like the rest of the northern Sonora coast, with the exception of Puerto Peñasco, a popular destination for North American birdwatchers, reported on by Huey (1935) and Janes and Janes (1987).

The Islas San Jorge are several small rocky islands located just outside the bay. They lack vegetation (Felger and Lowe 1976) but are important for the nesting of several birds, including Red-billed Tropicbirds (*Phaethon aethereus*), Elegant Terns (*Sterna elegans*; Mailliard 1923), Royal Terns (*S. maxima*), Yellow-footed Gulls (*Larus livens*), Heermann's Gulls (*L. heermanni*; Bancroft 1927), Craveri's Murrelets (*Synthliboramphus craveri*; van Rossem 1926, Bancroft 1927), and Brown Boobies (*Sula leucogaster*; Everett and Anderson 1991). Felger and Lowe (1976) reported that guano was extracted from the Islas San Jorge, and Mailliard (1923) indicated that eggging was carried out by local people. Formerly, there was a fish-meal factory at the tip of the sand bar of Bahía de San Jorge, and the place is now called La Purinera. The bay and estero are used mainly for oyster farming, especially at La Purinera, and low-intensity recreation. However, there is interest in increasing tourist use of the area, and recently palapas (shades) were set in to make the place more attractive to visitors.

Two other small coastal lagoons in this region are Los Tanques and Estero Morúa. Los Tanques lies about 18 km south of El Desemboque and is separated from the sea, on its southern side, by a sand bar and dunes. Estero Morúa, 10 km east of Puerto Peñasco, is limited, on its western side, by a high flattened sand bar, with steep slopes, that ends in a low flat tip.

The Gran Desierto of northwestern Sonora, although containing some small oases, has been overlooked by biologists. So far, there exists only a vegetation survey by Ezcurra et al. (1988). Van Rossem's (1945) work does not include any localities in this area. It is unclear from May's (1976) paper

ABUNDANCIA ESTACIONAL DE LA FOCA DE BAHIA
(*Phoca vitulina richardsi* Gray 1864),
EN EL ESTERO DE PUNTA BANDA (B.C., MEXICO)

SEASONAL ABUNDANCES OF THE HARBOR SEAL
(*Phoca vitulina richardsi* Gray 1864),
AT PUNTA BANDA ESTUARY (B.C., MEXICO)

Daniel H. Loya Salinas
Eduardo Palacios
Salvador González

Departamento de Ecología
Centro de Investigación Científica y
de Educación Superior de Ensenada (CICESE)
Apartado Postal 2732
Ensenada 22830, Baja California, México

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RESUMEN

Entre noviembre de 1988 y agosto de 1990 se realizaron 40 conteos de la agrupación de focas (*Phoca vitulina richardsi* Gray, 1864) que salen a descansar a un segmento de la ribera noreste del Estero de Punta Banda (Baja California, México), con el propósito de conocer la abundancia actual y su variación estacional. La abundancia promedio durante el periodo de estudio fue de 52 individuos, aunque se registró una variación estacional considerable. En la primavera ocurrió la mayor abundancia promedio ($\bar{x} = 69$; $n = 12$; intervalo = 31-110) y fue la mejor temporada para estimar la cantidad de focas que usan el estero. En verano se registró la menor abundancia ($\bar{x} = 28$; $n = 5$; intervalo = 2-72), mientras que en otoño el número de focas fue menor que en invierno y primavera ($\bar{x} = 31$; $n = 8$; intervalo = 18-48). Los conteos mayores de focas se registraron en el invierno, aunque su abundancia promedio fue menor que en primavera ($\bar{x} = 58$; $n = 15$; intervalo = 18-151), ya que la manada se incrementó por la presencia ocasional de crías y juveniles. No se encontró relación entre la abundancia de focas en la colonia y el nivel del mar. La variación estacional en el tamaño de la colonia se asoció con su periodo reproductivo a finales de invierno y con movimientos de la manada hacia otras zonas de agrupación cercanas.

Palabras claves: Foca de bahía, *Phoca vitulina richardsi*, conteos, variabilidad estacional, Estero de Punta Banda, Baja California.

ABSTRACT

In order to know the present abundance and seasonal variability of the seals (*Phoca vitulina richardsi* Gray, 1864) hauling at the inner northwest portion of Punta Banda Estuary (Baja California, Mexico), 40 counts were carried out between November 1988 and August 1990. The average abundance during the study period was 52 individuals, although a significant seasonal variability was noted. The largest mean abundance occurred in spring ($\bar{x} = 69$; $n = 12$; range = 31-110) and it was the best season to assess the number of seals that use the estuary. The lowest abundance was recorded in summer ($\bar{x} = 28$; $n = 5$; range = 2-72), while in autumn the number of seals was lower than in winter and spring ($\bar{x} = 31$; $n = 8$; range = 18-48). The maximum seal counts were noted in winter, although their average abundance was lower than in spring ($\bar{x} = 58$; $n = 15$; range = 18-151), since the herd increased by the occasional presence of

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BREEDING BIRD RECORDS FROM MONTAGUE ISLAND, NORTHERN GULF OF CALIFORNIA

EDUARDO PALACIOS and ERIC MELLINK, Centro de Investigacion Cientifica y Educacion Superior de Ensenada, Baja California. Apartado Postal 2732, Ensenada, Baja California, México (U.S.A. mailing address: P.O. Box 434844, San Diego, California 92143)

Early in this century, Leopold (1949) described the Colorado River delta as a wild majestic paradise for wildlife. Since Leopold's day, the river has been broken up by dams to sustain agricultural and urban development. Despite the area's previous importance to wildlife, little research has been done there. We know of only a few old works on the ornithology of the area (Murphy 1917, Price 1899, Stone and Rhoads 1905). Therefore, from 0940 to 1200 on 5 June 1991 we made a preliminary reconnaissance of the birds of Montague Island, in the Colorado Delta, Baja California (Figure 1). We focused our effort on Estero del Chayo, a channel cutting into the southern part of Isla Montague. The island is formed by river sediment and has a simple vegetation consisting of saltgrass (*Distichlis palmeri*) on the banks adjacent to the channels of the estero. Away from the channels, unvegetated dry mudflats dominate. There is an extensive mudflat south of the island.

We observed the following breeding or possibly breeding birds:

Black-crowned Night Heron (*Nycticorax nycticorax*). We saw about 40 adults on saltgrass patches on the eastern bank of Estero del Chayo. They were distributed in pairs, but we were unable to survey the area and see if they had nests, as we suspected.

Great Blue Heron (*Ardea herodias*). We saw one adult and one immature standing on the east bank of Estero del Chayo. The presence of an immature suggests breeding in the area.

Snowy Egret (*Ardea thula*). We estimated at least 100 nests with eggs, in a mixed colony with Laughing Gulls (see below). The nests were platforms of dry saltgrass twigs placed over flattened saltgrass on the edge of the banks of the channels. The average clutch size was 3.1 eggs (range 1–6; $n = 84$). Within a cluster of nests, the distance between nests of this species varied from 0.5 to 1 m. Minimum distance between a gull's nest and an egret's nest was 0.5 m.

Although van Rossem (1945) considered that northern Gulf records of the Snowy Egret were probably of wintering and postbreeding individuals, there are actual breeding reports for the Colorado River delta area (Bancroft 1927, Mora 1989, Wilbur 1987), the Rio Hardy area, (Stone and Rhoads 1905), the lower Colorado River and Imperial Valley (Garrett and Dunn 1981, Rosenberg et al. 1991). Murphy (1917) reported no nesting of the birds, but he learned of their being hunted for their nuptial plumes, which were later smuggled across the international frontier.

Laughing Gull (*Larus atricilla*). We found a breeding colony of Laughing Gulls, together with the breeding Snowy Egrets, along the east bank of Estero del Chayo. The nests were round bowls made of dry saltgrass twigs and placed among the saltgrass. We counted 60 nests. The mean clutch size was 2.68 eggs (range 1–3, $n = 46$). We saw one nest with two and another with three live chicks. One nest had one dead chick. Average intracluster distance between nests of gulls was 7 m (range 3–11; $n = 10$).

On the Pacific coast, this species breeds in Sonora and Sinaloa (AOU 1983). It bred at the Salton Sea from 1928 (Miller and van Rossem 1929) to 1957 (Garrett and Dunn 1981). Van Rossem (1945) reported that the species was common in late

NOTES

OCCURRENCE OF BLACK SKIMMERS IN BAJA CALIFORNIA

EDUARDO PALACIOS and LUCIA ALFARO, Centro de Investigación Científica y Educación Superior de Ensenada (CICESE), P. O. Box 434844, San Diego, California 92143-4844 (USA mailing address)

Although the Black Skimmer, *Rynchops niger*, is a familiar bird along the Pacific coast of mainland Mexico and southern California (AOU 1983), little is known of its occurrence on the peninsula of Baja California. Black Skimmers were not reported from Baja California until 1979 (Wilbur 1987) but now are observed regularly in winter along the northwestern coast (Wilbur 1987, Escofet et al. 1988). This colonial waterbird has recently established nesting colonies at San Diego Bay, in 1976 (McCaskie 1976, Unitt 1984), and at Bolsa Chica, Orange County, in 1985 (C. T. Collins, pers. comm.), so nesting is likely also in Baja California. In this area, Wilbur's supportive records, mostly for winter, are from only three locations (near Maneadero, Bahía de San Quintín, and Isla San Martín) and of between two and 44 individuals.

At present, we know of 57 additional records of *R. niger* for Baja California, including our observations and those of eight other colleagues, made from 1982 to 1992, at nine locations around the peninsula (Figure 1). These are summarized by location in Appendix 1. At Bahía de San Quintín we, with other observers, counted the numbers of skimmers during coordinated counts of the entire bay by Point Reyes Bird Observatory (PRBO). On most occasions, the Black Skimmers were resting with dozens of gulls, terns, and feeding shorebirds in the main coastal lagoons of Baja California. The observations encompass a total of 4517 individual skimmers.

Ensenada: In this location the birds roost at the mouth of Arroyo Ensenada and 800 m south of it, on the municipal beach. All of the 15 records are for autumn and winter, but the number of skimmers in fall was higher than in winter (Appendix 1), suggesting that this segment of beach is used mainly by birds dispersing after the April–August breeding season. We recorded the numbers of immature skimmers on five occasions: 25 October 1990, 26; 26 October 1990, 18; 28 December 1990, 5; 24 January 1991, 41; 2 February 1991, 5. We also observed banded birds, including adults and immatures, with aluminum and/or color bands: 26 October 1990, 25; 5 November 1990, 13; 28 December 1990, 27; 24 January 1991, 12; 2 February 1991, 4; 11 February 1991, 1; 22 February 1991, 4. These birds were banded at colonies in southern California. Some of them, with color bands, were banded as chicks at the Bolsa Chica colony between 1988 and 1990 (C. T. Collins pers. comm.).

Estero de Punta Banda: This is probably the location mentioned by Wilbur (1987) as "near Maneadero" because it is the typical habitat for skimmers nearest Maneadero. We have made (Palacios et al. 1991, S. González unpubl. data) regular weekly visits to this location since 1988. Fourteen of our 17 records (82%) for this site are for spring or summer; only three are for winter (Appendix 1). Only adults were observed at this location. We also observed banded birds. On the night of 17 April 1990, during a workshop on shorebirds (MBO–CICESE), we netted a skimmer that had been banded as a fledgling at Bolsa Chica on 8 August 1989. On 18 February 1991 we counted 10 banded birds among a flock of 44 individuals. These banded birds could be the same as those seen at Ensenada, dispersing to feed at the estuary and along the shoreline between the two locations.

We noted skimmers feeding at Estero de Punta Banda and Ensenada on 14 occasions, mainly near low tide. Nine observations were of one individual, two were of two individuals, and three were of three individuals. Erwin (1977) also found that skimmers frequently feed singly on their breeding grounds in Virginia.

NOTES

FIRST BREEDING RECORDS OF THE CASPIAN TERN IN BAJA CALIFORNIA, (NORTE), MEXICO

EDUARDO PALACIOS and LUCIA ALFARO, Centro de Investigación Científica y Educación Superior de Ensenada (CICESE), P. O. Box 434844, San Diego, California 92143-4844 (USA mailing address)

The Caspian Tern (*Sterna caspia*) is a nearly cosmopolitan species, except for South America, with a highly discontinuous breeding range (Voous 1960). On the Pacific coast of North America breeding colonies are widely scattered from Sinaloa, Mexico, to Washington, U.S.A. (AOU 1983). In the peninsula of Baja California, the only breeding colonies of Caspian Terns known so far are at Scammon's Lagoon (Bancroft 1927, Grinnell 1928, Wilbur 1987, Everett and Anderson 1991, M. Evans pers. comm.), where they nest together with Royal Terns (Bancroft 1927), and at Laguna San Ignacio (Danemann 1991, Danemann and Guzmán 1992). Both of these breeding colonies are located south of latitude 28°N, in the state of Baja California Sur. In this note, we report an additional small breeding colony at Laguna Figueroa (30°40'N), the first for the state of Baja California. We have described this closed coastal lagoon and its breeding birds previously (Palacios and Alfaro 1991).

We visited Laguna Figueroa on 7–9 May, 28 May, and 22 June 1991. During the first visit we found only the same breeding birds already reported for this lagoon, except Forster's Terns, which did not breed this year. On the second visit, we saw a pair of Caspian Terns on the ground, one of which was incubating and the other, alerted by our presence, was positioned 20 m from the nest. While we watched these birds, a third individual arrived but was attacked and driven away by the bird resting away from the nest. The nest, containing one egg, was a round depression in an off-road vehicle's track, on the salt flat at the northern end of the lagoon, 25 m from the northernmost pond. On the third visit, on 22 June, we found 22 individuals (10 pairs) at the colony, six nests with one egg, three with two eggs (average 1.33 eggs per nest), two eggs broken by predators, and a few empty nest scrapes. There were coyote (*Canis latrans*) tracks near the nests. All nests were found in the vicinity of the nest located on the first visit, and occupied a small area of about 25 m². The distance between nests averaged 4 m (range 2–5 m; $n = 6$). The Caspian Tern colony was located 50 m from the Least Tern colony, which increased from 10 pairs in 1990 when we first detected it (Palacios and Alfaro 1991) to 30 pairs in 1991.

We saw also a group of 10 Caspian Terns at La Misión, Baja California (about 35 km north of Ensenada), on 2 May 1991. One pair of this group was copulating; the male remained on its mate for about 5 minutes, alternating its copulatory movements with rest. Evans (1973) observed that Caspian Terns frequently copulate in migration to colony sites and at daytime roosting sites near colonies. Therefore, such behavior is not a good indication that the species may nest on a particular site. At San Antonio del Mar, Baja California, we observed three individuals flying and calling over a dried mud flat on 29 May 1991. Farther to the north Caspian Terns have nested at south San Diego Bay, San Diego County, and Bolsa Chica Ecological Reserve, Orange County, California, since 1941 and 1986 respectively (Unitt 1984, Collins et al. 1991).

Gill and Mewaldt (1983) found that the Pacific coast population of Caspian Terns, unlike that of certain other California coastal species, has increased dramatically since the mid-1960s. They speculated that the San Diego colony could have been the source of most birds that pioneered new colonies in Oregon and Washington. This colony might be also the source of birds for Baja California.

Caspian Terns are apparently attracted to a site by the presence of individuals of the same species. Our observations indicate that most of the Caspian Terns at Laguna Figueroa colonized during June, probably attracted by the isolated pair found

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

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

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

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

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

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

**EL ESTERO DE PUNTA BANDA, B.C., MEXICO COMO ESLABON DEL
"CORREDOR DEL PACIFICO": ABUNDANCIA DE AVES PLAYERAS**

**THE ESTERO DE PUNTA BANDA, B.C., MEXICO AS A LINK IN THE
"PACIFIC FLYWAY": ABUNDANCE OF SHOREBIRDS**

Eduardo Palacios
Anamaria Escofet
Daniel H. Loya-Salinas

Departamento de Ecología, Centro de Investigación
Científica y de Educación Superior de Ensenada (CICESE)
Espinoza 843
Ensenada, Baja California, 22800 México.

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RESUMEN

Entre octubre de 1988 y abril de 1989 se registraron 5683 individuos pertenecientes a 13 especies de aves playeras en tres ambientes de la porción distal de la barra del estero de Punta Banda (playa externa; planicies lodosas; playa terminal), y en una charca semiprotectida que se forma temporalmente en el ángulo suroeste del estero. La playa externa (siete especies; 1310 individuos), las planicies lodosas (13 especies; 3958 individuos) y la charca (dos especies; 146 individuos) mostraron elencos específicos muy distintos; la playa terminal (cinco especies; 239 individuos) se comportó como una extensión de la playa externa y/o de las planicies lodosas. La mayoría de las especies fueron exclusivas de un habitat, o semi-exclusivas (presentes en más de un habitat, pero con fuertes diferencias cuantitativas entre cada uno).

Se registró un cambio estacional claro, a pesar de que el período de estudio cubrió bien la migración de retorno en primavera, pero sólo la última porción del movimiento otoñal hacia el sur. El movimiento estacional no fue sincrónico en todos los ambientes.

Extrapolando los conteos realizados, se estima que el número de individuos que visitan el estero cada temporada es del orden de 14,000 (3,000 en playa externa y 11,000 en planicies lodosas). El 92% de las especies ya habían sido citadas para ésta laguna costera, pero ésta es la primera vez que se reporta información cuantitativa usando un diseño de censos por habitat, la cual muestra el papel del estero de Punta Banda en la ruta migratoria del Pacífico. Los grupos particulares de especies ligados a los diferentes habitats, y la asincronía del proceso migratorio en cada uno de ellos resalta la importancia de conservar el mosaico de habitats, fundamental para promover la riqueza de especies, y que ahora se pone de manifiesto también para la integridad del elenco migratorio y la persistencia de este importante proceso hemisférico.

ABSTRACT

Thirteen shorebird species and 5683 individuals were recorded at Estero Punta Banda from October 1988 to April 1989 in three soft-bottom habitats bordering the northern tip of the sand bar (open beach; terminal beach; mud-flats) and a semi-protected seasonal pond at the southwest corner of the estuary. The open beach (seven species; 1310 individuals), mud-flats (13 species; 3958 individuals) and the pond (two species; 146 individuals) harbored distinctive species assemblages while the terminal beach (five species; 239 individuals) acted as an extension of the

NOTES

OBSERVATIONS ON ISLA GUADALUPE IN NOVEMBER 1989

ERIC MELLINK and EDUARDO PALACIOS, Centro de Investigación Científica y Educación Superior de Ensenada, Baja California, P. O. Box 43844, San Diego, California 92143-4844

Isla Guadalupe (29° N, 118° 17' W) is located off the west coast of Baja California, Mexico. The history and status of its avifauna, as well as a brief description of the island, have been given by Jehl and Everett (1985). Additional recent observations have been reported by Dunlap (1988) and Oberbauer et al. (1989).

In this note we report on birds observed on and near Isla Guadalupe on 23 November 1989. Our time ashore lasted from 1000 to 1500 hours, during which we traveled about 60 km (round trip) by car from Melpomene Cove, at the southern end of the island, to the large barren area north of the remnant of the cypress forest, in the high central region. En route we also visited Campamento Weste.

At the start of the trip air temperature was in the low 20s (°C) and the visibility was several kilometers. By the time we arrived at the cypress forest, the temperature had dropped several degrees and become cold, it was misty and windy, and visibility had decreased to 100 meters.

An annotated list of birds observed is presented below:

Laysan Albatross (*Diomedea immutabilis*). We saw four individuals roosting on a barren rocky area at Melpomene Cove, while two were flying over. A breeding colony was discovered in the same place in 1986 (Dunlap 1988) and discussed by Everett (1988). This same colony was also reported on by Pitman (1988) and Oberbauer et al. (1989). We assumed that the birds sitting on the ground were incubating but did not attempt to confirm this because of possible disturbance.

Leach's Storm-Petrel (*Oceanodroma leucorhoa*). We saw several individuals flying close to the ship at night, near the north end of the island. These storm-petrels are regular breeders in the area, and their status was discussed by Jehl and Everett (1985).

American Kestrel (*Falco sparverius*). Several individuals, both females and males, were seen along the road. This is a common species of the island (Jehl and Everett 1985).

Killdeer (*Charadrius vociferus*). We saw two on the sandy beach of Campamento Weste.

Ring-billed Gull (*Larus delawarensis*). We saw a few flying between Isla Zapato and Isla Toro off the south end of the main island, in a mixed flock with Western Gulls (*Larus occidentalis*). These gulls were identified by their pale mantle, small size, and ringed yellow bill. Jehl and Everett (1985) reported only two previous sight records, one of them questionable.

Western Gull (*Larus occidentalis*). This species is resident on the island (Jehl and Everett 1985), but its abundance may be augmented by mainland birds during the winter (W. T. Everett pers. comm.). We saw several between Isla Zapato and Isla Toro.

White-winged Dove (*Zenaida asiatica*). We saw two individuals near Campamento Pista, in the high central area, on rocky ground with some herbaceous cover. This species has been collected only once on the island, on 10 June 1953 (Howell and Cade 1953).