BOOK REVIEW

Birds of California's Channel Islands, by Paul William Collins, Justyn Todd Stahl, and Harry Lee Jones. Santa Barbara Museum of Natural History Monographs No. 9, Studies in Biodiversity No. 7. Two volumes, 781 pages. Hardcover, $129.00. ISBN-13: 978-0-936-49420-3. **Volume 1, Ecology, History, and Human Influence.**

The Channel Islands have long intrigued and enticed naturalists, evoking an enduring sense of adventure and discovery off the coast of southern California. Half a century in the making, with a cutoff date of 31 December 2023, *Birds of California's Channel Islands* presents a satisfyingly comprehensive treatment of this storied archipelago's avifauna. The hardcover, two-volume set is handsomely published, printed on heavy stock, and furnished in a blue, cloth-covered slipcase. The typesetting, with cyan/blue headings and black text, is neat and very readable, and the writing is, for the most part, clean and direct. Scattered small drawings by Dana Gardner and N. John Schmitt are attractive and unobtrusive. A recurring motif is the Island Scrub-Jay, aptly chosen as "the ideal ambassador for the avifauna of California's Channel Islands."

As the size, scope, and significance of this work call for a substantial review, I've chosen to cover only volume 1 here; I'll address volume 2, *Species Accounts*, and Appendix 4, *Checklist of the Birds of California's Channel Islands* in another issue of *Western Birds***.**

As stated on page 3 of the Introduction, "The intent of this book is to serve as a reference guide to the avifauna of the Channel Islands, the islands' history during the past 180 years, their status, and efforts being undertaken to preserve and conserve them." Furthermore, "Data summarized in this book should serve as a baseline against which any future stressors could be assessed, such as the introduction of novel diseases, future colonization by non-native predators or competitors, habitat change, and the effects of climate change." *Birds of California's Channel Islands* achieves these rigorous scientific objectives while also bundling in one neat package the scores of outrageous records of vagrants that function as avian catnip for so many mainland birders.

Lead author Paul Collins, curator emeritus of vertebrate zoology at the Santa Barbara Museum of Natural History, has visited each of the Channel Islands, spending the most time on little-studied Santa Rosa. Collins devoted decades to the painstaking tasks of tracking down museum records and publications, developing extensive databases, and writing the text (a paragraph on the back of Volume 2 credits his co-authors with "field contributions, editing, and e-Bird verification"). How fortunate we are that he lived long enough with the requisite fortitude and the right co-authors to see this daunting project through to its ripe and succulent fruition.

In 2023, Justyn Stahl joined the effort, bringing his 15 years of experience helping to conserve the endemic subspecies of the Loggerhead Shrike and Bell's Sparrow on San Clemente Island. Many mainland birders know Stahl best for his long (2008–2023) and enviable run of records of vagrants from the famed Lemon Tank and elsewhere on San Clemente, where he documented such gems as the Dusky Warbler, Bluethroat, and Smith's Longspur. Let us hope that any anguish Stahl might have experienced from being off the island on 25 September 2017, when a Eurasian Wryneck was photographed at Lemon Tank, has by now abated.

H. Lee Jones' personal experience across the Channel Islands is even more significant, dating to the 1970s when he earned his doctorate under Jared Diamond at UCLA with a dissertation titled, *Studies of Avian Turnover, Dispersal, and Colonization of the California Channel Islands*. In this early work, Jones demonstrated that the Channel Islands function as last-gasp havens for wayward migrants caught out over the ocean during migration, much like the famous Southeast Farallon Island

off San Francisco. Jones's contributions include records of such scarce waifs as the Chimney Swift, Scissor-tailed Flycatcher, and Golden-winged Warbler. He has also prepared annotated bird checklists and published on the natural history of the seabird colonies on the islands.

Chapter 1 of *Birds of California's Channel Islands* addresses the physical environment. The eight Channel Islands differ from each other in their geology, topography, climate, size, maximum elevation, and degree of isolation. Their distance from the mainland varies from 12 miles for Anacapa to 61 miles for San Nicolas. All islands excluding San Nicolas have offshore rocky islets that provide important roosting and nesting sites for seabirds. Current human activities vary from island to island, but conservation and restoration of their natural communities and endemic taxa have been a shared priority across all of the islands since the 1970s.

Ten pages are devoted to describing the islands' complex geologic history. In short, the four northern Channel Islands, San Miguel, Santa Rosa, Santa Cruz, and Anacapa, are products of volcanic and tectonic forces. About 19 million years ago, the Transverse Ranges Block broke free from the North American Plate and was dragged northward by the Pacific Plate. The northern part of this block embedded into the continent at Point Conception as the southern part, while being compressed, rotated clockwise by 110° so that its elevated central ridge now runs east and west, forming the Transverse Ranges onshore and the four northern Channel Islands offshore. Sea-level fluctuations associated with cycles of glaciation have caused the northern Channel Islands to repeatedly coalesce into a single mega-island, "Santarosae," that has always been separated from the mainland by a water gap of at least five miles. The southern Channel Islands, San Nicolas, Santa Barbara, Santa Catalina, and San Clemente, are more geographically isolated from each other and from the mainland than the northern Channel Islands and, unlike the northern islands, these were never connected to each other. The southern Channel Islands, which arose through volcanism and tectonic uplift, are oriented parallel to the Peninsular Ranges, as they were not subject to the tectonic rotation of the northern quartet. The authors' detailed discussions of the geology of each island and of the two major groupings of islands, explain why the landforms appear as they do today. These discussions also provide context for understanding the mix of endemic and near-endemic birds, and other life forms, found on different islands.

Maps include three pull-out overleaves: a topographic map of the islands with unlabeled submarine topography, a topographic map of the islands with labeled submarine topography, and a topographic map depicting conditions 20,000 years ago, when sea levels were 300–330 feet lower than today. The third pull-out shows that the Southern California Bight was once dotted with 26 islands that accounted for 1780 square miles (18 more islands and 1431 more square miles than in modern times). A regular-sized map shows the eight current islands as they appeared 20,000 years ago, 10,000 years ago, and as they are now. Another map shows surface ocean circulation and the mixing of the California Current, Davidson Current, and California Countercurrent in the Southern California Bight.

Surprisingly, maps that depict each island and its named/cited features are not included, so most readers will need to seek out this basic information online. The National Park Service has produced hiking maps for the four northern islands, plus Santa Barbara Island, which appear to be reasonably complete, although some holes remain (e.g., "Windmill Canyon," cited in the species account for the Northern Harrier, is missing from the hiking map of Santa Rosa Island). The Catalina Island Conservancy provides a detailed map of Santa Catalina Island. Detailed maps of San Nicolas and San Clemente islands can be found at Islapedia.com, and many cited locations on the latter island are mapped as hotspots at eBird.org. To save readers from this bother, the Santa Barbara Museum of Natural History might consider developing a set of uniform maps that could be accessed on its website. In the case

of a second print-run, two of the pull-out maps (Figures 1.1 and 1.3) could be easily combined to save money.

Chapter 2 describes the biotic environment, starting with the interplay of oceanic currents in different parts of the Southern California Bight at various seasons, which affects the distribution of seabirds on and around the islands. Northwest winds intensify in late winter and spring, driving upwelling of cold, nutrient-rich waters of the southbound California Current in the bight. These fortified waters feed the small fish and squid that support not only local breeding colonies of resident seabirds, but also a wide range of migratory seabirds and overwintering subarctic species. The narrative highlights regions of the Southern California Bight that support the greatest concentrations of seabirds: Arguello Canyon off Point Conception, waters off the west end of San Miguel Island, waters along the Santa Rosa–Cortes Ridge, and waters at the margins of submerged island shelves. The authors praise the efforts of observers to document seasonal patterns of seabird migration off the western shore of San Clemente Island (Sullivan, B. R., and Kershner. E. L. 2005. The birds of San Clemente Island. W. Birds 36:158–273) and call out for "more shore-based surveys . . . particularly on San Nicolas and San Miguel islands."

Chapter 2 discusses the main habitat types and their distribution on and around the islands: nearshore waters, rocky coastline, coastal strand, coastal salt marsh, freshwater marsh, freshwater impoundments, coastal sage scrub, coastal bluff scrub, maritime cactus scrub, island chaparral, grasslands, riparian woodland, oak woodland, island woodland (variable woodlands consisting of ironwoods, oaks, scrub oaks, etc.), conifer forest, and human-altered habitats. It lists the characteristic bird species of each island's terrestrial habitats. Provision of scientific names in Appendix 5, rather than in the text, improves the readability of these descriptions. The discussion of island chaparral notes that many birds typical of mainland chaparral, such as the California Thrasher and California Towhee, have failed to reach the Channel Islands, resulting in competitive release (allowing species to be more common in island chaparral than they are on the mainland) and increased niche breadth (changes to habitat usage by some island species in response to decreased interspecific competition).

Chapter 3 describes the prehistoric avian environment as investigated by Collins and the late Dan Guthrie, among others. The five-page chapter contains extensive data on the islands' prehistoric record, which includes seven extinct species: (two flightless sea ducks, a puffin, a flightless alcid, a gannet, an eared owl, and a condor) and an extinct subspecies of caracara. This chapter also describes ways in which the Chumash and Tongva peoples have related both spiritually and materially to the birds of the islands. The chapter is filled with interesting and relevant information, but I found it difficult to wade through because the narrative jumps around chronologically and geographically, repeats information, and discusses extirpations that have occurred much more recently than in prehistoric times. Those with an especially keen interest in prehistory should be able to overlook the organizational problems, but general readers will likely spend more time pondering Tables 1 and 2 in Appendix 1, which specify the numbers of bones recovered for each bird species on each island (amounting to more than 96,000!).

Chapter 4, Human Influences, describes the known influences of people on the islands' avifauna during the prehistoric period (pre-European contact), protohistoric period (European contact through the early 1800s), historic period/herbivore era (1850s to late 1990s), and the conservation and restoration period (1970s to present). As many as 3000 to 4000 Chumash and Tongva occupied the northern Channel Islands for 13,000 years and the southern Channel Islands for 9500 years, up until the 1820s, when those who had managed to survive epidemics of Old World diseases were removed to Spanish missions on the mainland. These tribes' lasting influences on the ecology of the Channel Islands include the translocation from the mainland

of various small mammals that in time evolved into island taxa (most famously the Island Fox) and the wiping out of "several burrow-nesting seabirds" and a large sea duck, *Chendytes lawi*.

Between the 1700s and the late 1990s, and in some respects extending to the present day, humans from various lands have exploited the Channel Islands in many ways, from commercial fishing and abalone harvesting to hunting of otters and pinnipeds to grazing of livestock to introduction of game animals for hunting to military uses, and, of course, tourism. Overlooked in the narrative are mining and, more importantly, hard-rock quarrying (most notably, the massive Pebbly Beach Quarry on Santa Catalina Island, which has supplied marine-grade riprap to coastal projects on the mainland for nearly a century). Table 4.1 lists the 19 terrestrial mammal species introduced to and, in most cases, eradicated from the various islands. This table also specifies the year that each island—except Santa Catalina with its enduring populations of Mule Deer and American Bison—was freed of herbivores.

Volume 1 is nearly error-free, but I was momentarily thrown by a claim on page 54 that "feral burrows" had been eradicated from San Miguel before recognizing this as a misspelling. In Table 7.5, the Graylag Goose should be listed for Santa Catalina, not Santa Barbara. The only other miscues that came to my attention, both in the Literature Cited, involve Robert Pyle being credited as author of one of Peter Pyle's publications, and the book authored by this father/son team being listed out of alphabetical order.

Chapter 4 goes on to describe how dumping of DDT and other organochlorine pollutants into the Southern California Bight by the Montrose Corporation during the 1950s and 1960s led to the decline and extirpation of several marine birds and terrestrial raptors from the Channel Islands. On a positive note, settlement funds from legal actions taken against Montrose have supported successful programs to reintroduce the Peregrine Falcon and Bald Eagle to the islands, to eradicate the Black Rat from Anacapa, and to improve seabirds' recruitment and productivity.

Chapter 5 describes the islands' rich ornithological history, which dates back to 1842 when William Gambel twice voyaged to Santa Catalina. Gambel was only 18 years old that year, and no record exists of him having set foot on any other Channel Island before typhoid claimed him eight years later. Synopses describe five government-sponsored surveys, undertaken by such renowned figures as William Dall, James Cooper, Henry Henshaw, John Townsend, Edgar Mearns, and Alfred Anthony. Chapter 5 refers the reader to Appendix 2, which catalogues the participants in more than 1000 ornithological expeditions to the islands (from 1842 through the early 2000s), and to Appendix 3, which lists the abbreviations used to identify more than 1600 cited observers. One is honored to see his or her own name in an ornithological lineage descended from such giants as Harold Bryant, Joseph Grinnell, Alden Miller, George Willett, A. J. Van Rossem, and the curator of ornithology and mammalogy at the Santa Barbara Museum of Natural History from 1935 to 1963, Egmont Rett. Morbidly, I checked for Ralph Hoffmann's ill-fated excursion to San Miguel Island on 23 July 1932, but apparently no bird records survived his fatal fall from a cliff while botanizing, and thus the last entry for Hoffmann is from March of that year, when he notably observed a Townsend's Solitaire above Pelican Harbor on Santa Cruz Island. I got a little misty harkening back to my own 22 visits to beloved San Nicolas Island, all but three of which took place before 11 September 2001. The U.S. Navy's subsequent ratcheting up of restrictions on civilian access to this fascinating outpost represents one of the lesser, but still unfortunate, casualties of the ever-expanding global war on everything.

Chapter 5 includes two more very useful tables, one listing the original and current names of each endemic avian taxon described from the Channel Islands and the other showing their current distribution on each island. Potential confusion arises from the last column being labeled "Mainland Species" instead of "Mainland

Subspecies" and from the term "I" (for introduced) not being explained in the notes below the table.

Chapter 5 next discusses molecular studies of the Channel Islands' endemic taxa, hinting at possible future recognition of new subspecies. It details specimen and egg collecting on the islands over time with the aid of four more tables and a histogram. The chapter concludes with a rundown of ornithological research on the islands from the late 1960s to present. Among a dizzying number of projects mentioned in this section and incorporated into the species accounts in Volume 2 are various studies of the effects of organochlorides on eggshells, multiple island-wide surveys of seabird colonies by George Hunt and others, the work of Ned Johnson on the origin and differentiation of the islands' endemic avifauna, and Jonathan Atwood's study of the breeding biology of the Channel Islands' only extant endemic bird species, the Island Scrub-Jay.

Chapter 6 lays out the methods used to put the set together, which include not only all published literature but also the extensive "gray literature" on seabirds and, to a somewhat lesser extent, landbirds. Collins diligently mined museum data to create two important databases: the Channel Islands Bird Specimen database, with records of 9119 individuals of 253 species from 38 museum collections, and the Channel Islands Egg Set and Nest database, with records of 1894 egg sets of 45 species from 39 museum collections. The final major sources of data are observers' field notes, results of banding efforts, and records from eBird.org and iNaturalist.org. Long-term trend data, presented in Appendix 1, Tables 6–10, were obtained from Christmas Bird Counts, Breeding Bird Surveys, and point-count monitoring surveys. Chapter 6 concludes by explaining the plan of the species accounts in Volume 2 and the relative-abundance codes used in the Appendix 4 checklist (both to be addressed in part 2 of this review).

Chapter 7, Results and Discussion, starts with a review of the historical record of previous compilations of bird records from the islands dating back to A. B. Howell's 1917 monograph, *Avifauna of the Channel Islands off the Coast of Southern California*. Table 7.1 summarizes the number of bird species recorded on each island after the publication of each new island-specific, or island-wide, compilation. The islands with the best observer coverage, San Clemente, Santa Cruz, and San Nicolas, average 92 more species than do the least covered, San Miguel, Anacapa, and Santa Rosa (347 to 255). Table 7.2 reports the number of species recorded per family on the Channel Islands by ecological groups.

Page 84 lists out the 32 species recorded only on a single island, including such coveted rarities as the Jouanin's Petrel, Northern Wheatear, Common Redpoll, and Cerulean Warbler. Two pages later, Table 7.3 lists the 14 species for which a sighting from the islands represents the first or second record for California. A standout among standouts is the record of an Asian Stonechat on San Clemente Island 20–21 October 1995, misidentified for years as a Vermilion Flycatcher!

Chapter 7 goes on to describe four "Characteristics of Channel Islands Avifauna," which I won't repeat here (you really should buy the set!), but one generalization is that the breeding seabirds are "diverse and abundant" (reflecting the high seasonal productivity of the waters of the Southern California Bight and the widespread availability of protected nesting sites, especially on islands and islets that lack Island Foxes), whereas the breeding landbirds are characterized as "depauperate" (attributed mainly to the failure of many mainland residents to colonize any island and to migratory species that regularly pass through the islands without staying to breed).

After a review of the source regions of vagrant birds recorded on the Channel Islands (eastern North America, central North America, southwestern U.S. and Mexico, Asian and Arctic, Pelagic) and a brief discussion of introduced species and escaped exotics, Chapter 7 dives into a thorough summary of the Channel Islands' breeding avifauna. Since the last comprehensive assessments of breeding landbirds and seabirds in 1980, 32 or 33 additional breeding species have been confirmed

(both numbers are cited) and 11 more are suspected to have nested on one or more islands. Table 7.5 shows the Guadalupe Murrelet as a new breeder, although the species account notes that in 1977 and 1978 this species (then classified as a subspecies of Xantus's Murrelet) nested on Santa Barbara Island. The listing of breeding-status codes below Table 7.5 is missing the codes for common, irregular, and uncommon, although they are defined in Chapter 6. These points aside, Table 7.5 is a useful summary of the known and suspected breeding status of each species on each island, and Table 7.6 shows the estimated size for breeding seabirds' population by island; see also Tables 3–5 in Appendix 1, which give counts of cormorants and pelicans at the islands' breeding colonies over the years. Any questions raised in these summary tables are answered in the species accounts (Volume 2).

Pages 100–102 describe changes in the breeding avifauna of the Channel Islands resulting from anthropogenic effects, especially the introduction of many non-native mammals (e.g., sheep, deer, rabbits, rats, cats), most of which were eventually removed. While many beneficial results have come about through passive recovery of habitats after removal of invasive species, the authors note, for example, that "no chaparral plants have sprouted on San Miguel since non-native herbivores were removed 50–60 years ago" with the assertion that "active restoration will be needed to assist in the reestablishment of chaparral on the island." Invasive species remain on some islands, Catalina especially, where human residents of Avalon help to maintain their populations and, at least in the case of the Mule Deer, actively oppose their removal.

The Conservation and Restoration section describes many successful programs enacted to maintain, increase, and in some cases re-establish, populations of various avian taxa affected by human-related degradation of island ecosystems. For seabirds, removal of herbivores from most of the islands has had profoundly positive effects, as has eradication of rats from Anacapa and cats from San Nicolas. Other measures that have improved conditions for burrow-nesting seabirds include establishing artificial burrows with broadcast of social vocalizations, replacing exotic plants with appropriate natives that provide better protection from avian predators, translocation of Spotted Skunks away from nesting areas, improved lighting practices for squid boats operating near the islands, and restricting human access to certain breeding areas during the nesting season. After describing actions taken to conserve the Bald Eagle, Peregrine Falcon, Island Scrub-Jay, and on San Clemente Island, Loggerhead Shrike and Bell's Sparrow, the section closes with discussions of how the effects of climate change, including increasing air and ocean temperatures, reduced precipitation, a rising sea level, increasing ocean acidification, and increasingly intense El Niño events, are likely to affect the islands' terrestrial and marine ecosystems by the end of the twenty-first century. As the authors note in conclusion, we can only wait to see how so many mercurial parameters will interact to affect the islands' bird populations. Thankfully, *Birds of California's Channel Islands* provides a full suite of benchmarks that will be invaluable to tomorrow's researchers.

Birds of California's Channel Islands not only presents a thorough and engaging portrait of the archipelago and its birdlife, it represents a consequential work of ornithological research, documentation, synthesis, and analysis undertaken on a scale seldom attempted and even more rarely achieved. As the planet's climate continues to warm, with potentially dire consequences for many insular (and mainland) bird populations, *Birds of California's Channel Islands* establishes countless points of reference against which future data from the Channel Islands can and will be evaluated. If this review has failed to persuade any reader of *Western Birds* to order a copy of *Birds of California's Channel Islands*, before the first printing runs out (only 250 sets were published!), rest assured that the upcoming review of Volume 2 will provide further encouragement.

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