

BOOK REVIEWS

Life under the Fast Lane: Ecology and Conservation of the Bridge-Nesting Purple Martins in Urban Sacramento, by Daniel A. Airola. 2020. Central Valley Bird Club Special Publication No. 1. Central Valley Bird Club, Sacramento, CA. 114 pp. + appendices.

For more than 20 years, field ornithologist and consultant Dan Airola has been studying and helping manage a unique population of the Purple Martin (*Progne subis*) nesting under freeway bridges in Sacramento, California. This monograph (the first in what is intended to be a series from the Central Valley Bird Club, edited by Airola), brings together two decades of insight into balancing human-oriented infrastructure with the needs of a threatened bird species making a living in this bustling, constantly changing city. Historically nesting throughout the Central Valley, western martins never took to artificial nest boxes like their eastern cousins, though roof-nesting was noted by the earliest ornithologists visiting Sacramento in the 1800s. This phenomenon lasted into the 1970s when martins switched from building roofs to cement freeway bridges, coinciding with the arrival of European Starlings (*Sturnus vulgaris*), which seem physically unable to nest in the same vertical “weep holes” on the undersurfaces of bridges (p. 10–11).

Down from a high population of 173 pairs in 12 colonies in 2004 (the first full season of systematic surveys), by 2020 the Sacramento nesting population was estimated at 25 pairs in just 6 colonies (p. 30). Airola begins by summarizing the current population status of western martins, last estimated in 2005 at 3500 individuals. The most recent California estimate was 850–1850 pairs in 2006, yet here we are 15 years later, following a decline of 88% at the Sacramento colony (formerly one of the largest, if not the largest, in the state) since 2004. This monograph, essentially a combined research synthesis and management plan, is divided into 12 informative sections, several of which are hyper-local, focused on management of these colonies, but nonetheless have great relevance to (and will surely resonate with) anyone working on the ground in urban wildlife management. Sections like “Environmental Analysis Procedures” and “Significance Determinations” brim with detail that could be applied to just about any urban wildlife system around the country. I immediately thought of an analysis of herons nesting in Los Angeles on which I worked over a decade ago (Hamilton and Cooper 2010), and other field biologists will surely think of their own.

Urban–natural systems are fraught with unique logistic, political, and regulatory challenges—the martin colonies in Sacramento are managed by no fewer than eight federal, state, and local entities. Yet too often, such details are left out of conservation-oriented papers and even monitoring plans (or are vaguely referenced as “challenges and opportunities”). Here, the 40+ pages of appendices get granular (e.g., “Colony Site maps with Alpha-Numeric Hole Designations”), and include outlines of areas of nest-material collection as well as the nest sites superimposed onto aerial photographs. Airola packs in so many details on martin ecology that I was constantly thinking, “huh, that would make a good project...” (or dissertation topic, or life’s work): that all colonies extend at least 85 meters of bridge length, with at least 6 meters of unobstructed airspace below, or that birds bring in fresh (green) leaves to nests during incubation, perhaps to maintain humidity or to deter parasites. The basis for this behavior, widespread in birds, is still apparently a mystery (Dubiec et al. 2013, Heinrich 2013). Or that mud is used in nest-construction, and yet no one seems to have seen a Sacramento martin collecting mud. Airola documents a remarkable “aggregation site” along the American River consisting of 35-m tall transmission towers, where most of the population seems to hang out, with numbers peaking in mid-summer. I learned that females eat tiny clam shells for calcium, and that young accompany adults back

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to nest sites for roosting for several weeks after fledging, but certain juveniles aren't physically able to fly back up into the weep holes, which may depress survivorship (yes, they've calculated how many can't—nearly 80% of observed attempts during two months of observation, according to fellow researcher Dan Kopp). Wire-mesh nest guards developed by fellow researcher Jesse Grantham, and put to wide use by Airola and his colleagues to prevent “nest fallout,” are described and photographed in detail, which should spark ideas for researchers working with other cavity-nesting species.

Numerous “Sidebar Discussion” text boxes relate the lived experience of Airola's team of researchers who have spent decades with these birds. Topics like “Purple Martins and the homeless population: Partners in neglect,” and “Anatomy of a fiasco: Inadequate environmental analysis and protection during construction causes 2018 nesting failure” are sure to interest practitioners around the state, where so many field biologists are employed (or begin their employment) as construction monitors on infrastructure projects. Some readers may be puzzled at Airola's mentions of the unhoused human residents who share space with martins, but I say, “bring it on”—we have clearly entered a new era in which we need honest discussions of who gets to live where, under what conditions, and how wildlife fits into this new reality.

So what's not to like? Not much. I was not entirely sold on the proposed link between martin decline, insect decline, and the rise of neonicotinoid pesticides, for which Airola provides limited (and circumstantial) evidence, such as declines in local butterflies during the same period as martin declines. Such links are notoriously difficult to study (e.g., see Wagner et al. 2021), and countless aspects of California ecology have *also* changed in the past 15 years, yet martins seem to be in sustained freefall statewide, miles from where appreciable amounts of pesticides are sprayed. These include extirpations on the Modoc Plateau and in the Sierra Nevada. And while martins apparently eat butterflies (see p. 46, “Food Supply”), no data are presented quantifying local diet, nor is there much on the population status of other species that feed on the same prey (i.e., other bridge-nesting swallows and swifts; but see “Interactions with other Cavity-nesting Species,” pp. 51–55). I would have liked to have read more about the status of martin populations nesting elsewhere in California (where, as Airola points out, a new statewide survey is urgently needed), as well as on the local population *outside* the nesting season, including in Latin America, where it may be more exposed to pesticides than at its urban California nesting sites. Work tracking eastern martin populations in migration and winter is cited (e.g., Stuchbury et al. 2009), but is there no specific research on winter movements in our western populations? (I couldn't find references to this in Brown et al. 2021.)

Airola's comments on sustainable management practices are particularly thought-provoking; he terms provisioning of nesting material “un-sustainable” (p. 49), drawing a contrast with the more sustainable preservation of habitat near colonies for collection of (natural) material. In light of municipal politics, urban housing priorities, and the unending demands of infrastructure projects, I'm not sure I'd agree with this distinction. His work challenges us to ponder not only the limits of conservation (the population is still declining, despite the tireless work of his team over many years), but also our responsibility to the remaining colonies. For me, the line between intervention and “letting nature take its course” becomes muddled in these cases of birds that nest in our bridges, roost on our utility wires, and feast on an invasive clamshell brought in by our ubiquitous water-manipulation projects. But should we not continue to do what we can to come to its aid? Until we can come to grips with our own behavior as a species, how we degrade and endlessly alter our surroundings, and what we value as worth conserving, I think we must.

LITERATURE CITED

Brown, C. R., Airola, D. A., and Tarof, S. 2021. Purple Martin (*Progne subis*), in *Birds of the World* (P. G. Rodewald, ed.), version 2.0. Cornell Lab Ornithol., Ithaca, NY; <https://doi.org/10.2173/bow.purmar.02>.

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- Dubiec, A., Gozdz, I., and Mazgajski, T. 2013. Green plant material in avian nests. *Avian Biol. Res.* 6:133–146; <https://doi.org/10.3184/175815513X13615363233558>.
- Hamilton, R. A., and Cooper, D. S. 2010. Conservation & Management Plan for Marina del Rey, Los Angeles Co., California, September 16, 2010. Prepared for county of Los Angeles, Dept. of Beaches and Harbors, Marina del Rey, CA.
- Heinrich, B. 2013. Why does a hawk build with green nesting material? *Northeast. Nat.* 20:209–218; <https://doi.org/10.1656/045.020.0202>.
- Stutchbury, B. J. M., Tarof, S. A., Done, T., Gow, E., Kramer, P. M., Tautin, J., Fox, J. W., and Afanasyev, V. 2009. Tracking long-distance songbird migration by using geolocators. *Science* 323:896; <https://doi.org/10.1126/science.1166664>.
- Wagner, D. L., Grames, E. M., Forister, M. L., Berenbaum, M. R., and Stopak D. 2021. Insect decline in the Anthropocene: Death by a thousand cuts. *Proc. Natl. Acad. Sci.* 118(2) e2023989118; <https://doi.org/10.1073/pnas.2023989118>.

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Sacramento County Breeding Birds, by E. R. Pandolfino, L. A. Douglas, T. D. Manolis, and C. Conard. Central Valley Bird Club Special Publication 2. 2021. 209 pages, softcover, \$35.00; order at <http://www.cvbirds.org/birding-resources/birding-references/sacramento-county-breeding-birds/>. ISBN 978-0-578-93728-1.

In our hyperconnected era, torrents of fresh sightings gush through the computers of eBird editors and splash onto our screens. The sheer volume of data can create an illusion that repeatedly touching our lips to the mighty eBird firehose will somehow quench our thirst for knowledge, but the resulting depth of understanding tends to be rather shallow. Deeper aquifers of wisdom are tapped when local experts curate collections of observations and place them in proper historical and biogeographical contexts. From 1988 to 1993, Tim Manolis led a cutting-edge effort to collect the data for a Sacramento County breeding bird atlas (BBA) that was not published. In 2015, Ed Pandolfino, Manolis, Lily Douglas, and Chris Conard decided to reanimate the zombie information by transforming it into the baseline against which to compare a new batch of data, collected from 2016 to 2020. Thus, in 2021, Sacramento County became the first region of California to publish the results of two BBA projects (Sonoma County also completed its second round of field work in 2020, but the results are not yet published).

Chapter 1, Methods, describes how the atlas organizers divided the county into 136 5-km blocks. They assembled the first data set in the traditional, centralized way, assigning blocks to observers who visited their blocks repeatedly over the five years to achieve high levels of coverage. For the second set, they deployed a “core group” of 16 local birders, did not assign blocks to individuals, and made liberal use of eBird data. These differences in methods inevitably complicated the interpretation of the results, but not to the extent of vitiating them. Given eBird’s prominence in today’s increasingly decentralized birding culture, BBA organizers should increasingly embrace this data-collection platform.

Chapter 2 provides relevant information on changes in climate and land cover between the two atlas periods. In short, temperatures rose moderately; residential development, orchards, and vineyards increased substantially; and large expanses of grasslands, rangelands, and pasture lands were lost.

Chapter 3 discusses changes in breeding phenology between the atlas periods. Only modest changes were observed, but some incipient patterns emerged that warrant further evaluation as the climate continues to seek a new equilibrium.

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Chapter 4 discusses up to 17(!) new breeding species added, six known or likely breeding species lost, and eight non-native species that have undergone major changes between atlas periods. Chapter 5 discusses five native species showing major increases between the atlas periods. Chapter 6 discusses eight native species that decreased substantially from the first period to the second. These three chapters provide the book's meatiest analyses, with copious citations from the historical and recent literature, and I found them to be generally satisfying. The authors describe large-scale phenomena, such as habitat loss, habitat fragmentation, increasingly sterile agricultural practices, the widespread collapse of insect populations, and the ill effects of the West Nile virus that are combining to drive down many populations of many birds, among them the Loggerhead Shrike, Yellow-billed Magpie, Horned Lark, and Lark Sparrow. Concentrating the analyses in three short chapters facilitates clear and efficient communication, superior to repetitive discussion of the same basic topics through multiple species accounts.

I was encouraged to read that, despite many species registering major declines, the number of confirmed breeding species *increased* from 107 to 119. As with the negative changes, most of the positive ones can be traced back to human actions. For example, effective regulation of pesticides has led to recovery of the Bald Eagle, Osprey, and Peregrine Falcon, and provision of nest boxes has helped the Hooded Merganser.

Scanning the bad news, I was shocked to learn that two very adaptable marsh breeders, the Pied-billed Grebe and American Coot, experienced “considerable loss of breeding range” between the atlas periods, *despite a net increase in the extent of wetlands*. As always, we must become conscious of a problem before solutions can be devised, and BBAs are powerful tools for documenting and highlighting population declines that birders might otherwise overlook.

Chapter 7, which discusses numerous occasional, former, and potential breeders, will be of great interest to local birders, but generally less so for outsiders. Nevertheless, I found the Least Bell's Vireo account intriguing. Why has this riparian bird, which can successfully incorporate substantial tracts of coastal sage scrub and mustard into its breeding territories in southern California, failed to recolonize seemingly ideal patches of riparian habitat in the Sacramento Valley, where it nested historically?

In Chapter 8, each species account takes up a page. Side-by-side maps show whether, during the first and second BBA periods, breeding was confirmed, probable, or possible in each block, and a bar graph compares the totals for each category of certainty of breeding. A short interpretive paragraph explains whether any differences between the two maps are likely to represent actual changes in the population or variations in observers' coverage or emphasis. For those species that did undergo a particularly notable increase or decrease, the reader is redirected to the relevant analysis in one of the earlier chapters. A small table provides the trends for California and North America according to the Breeding Bird Survey (1966 to 2019), and a few words are devoted to describing the species' breeding habitat and nest type. I applaud this streamlined approach, which cuts to the core objectives of any BBA: to identify and analyze changes in breeding status and distribution in a timely manner, to help direct land-use policies and management. Better to see BBAs published promptly with few frills than to wait for years while authors struggle to engagingly describe the local nesting habits of several dozen common species.

Each species account closes with either a snippet from the field notes of an unnamed BBA participant or a published passage from such historical giants as Ralph Hoffman and William Dawson. I must question the curatorial decision to intersperse utilitarian phrases culled from field notes, such as this description of a family of Northern Flickers—“Heard young inside cavity of snag next to pond as adult appeared to feed it”—with meticulously crafted curios from the old masters,

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such as Dawson's description of a male Anna's Hummingbird: "At a turn of the head the entire foreparts assume one cast of rose-purple; at another, the gorget will go to velvet of some dark nameless tint in relief." However unfair the comparison between field notes and published prose, I found myself repeatedly staving off the uncomfortable feeling that something's been lost over time. This valuable space might have been better used to briefly describe some distinctive or otherwise notable aspect of the species' local natural history.

A three-page appendix that superficially discusses the changing status of colonial waterbirds in the county from 1987 to 2020 would have benefited from provision of maps, and the information probably should have been incorporated into the main body of the atlas.

Sacramento County's "two-fer" atlas demonstrates the tremendous value of periodically repeating the BBA process and comparing the results. The authors made excellent choices in how they collected and presented the data, and I commend them for publishing it quickly without getting bogged down in too many details. This BBA will be essential reading for anyone involved in land management in the Central Valley, and I strongly recommend it to anyone interested in the status and distribution of birds in California or elsewhere in western North America.

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