

## BOOK REVIEWS

**Bird Versus Bulldozer**, by Audrey L. Mayer. Yale University Press. 296 pages. Hardcover, \$30.00. ISBN: 978-0-300-24790-9.

Under California's Natural Communities Conservation Planning (NCCP) Act of 1991, local governments have developed and implemented ecosystem-based conservation plans (NCCPs) that build upon aspects of the federal government's Habitat Conservation Plan (HCP) model. An HCP sets aside and manages natural lands for certain plant and/or wildlife species listed under the federal Endangered Species Act (ESA) and allows for "incidental take" of the species by the landowner. An NCCP expands upon this concept, setting aside large, well-connected tracts of land and managing them for multiple species of listed and otherwise declining species. In *Bird Versus Bulldozer*, Audrey Mayer evaluates the effectiveness of the NCCP approach to conserving the California Gnatcatcher and other taxa reliant on coastal sage scrub in southern California.

The publisher promises a synthesis of "insights from ecology, environmental history, public policy analysis, and urban planning" in Mayer's review of "much-neglected regional conservation planning strategies." The book jacket comes emblazoned with enthusiastic blurbs from the likes of Kieran Suckling ("dives deep below simple headlines"), John Marzluff ("a deep dive into the science and policy of endangered species conservation"), and Robert Askins ("deeply relevant to anyone who is interested in preserving natural ecosystems threatened by development"). As a biological land-use consultant who helped to prepare the NCCP/HCP for central and coastal Orange County and who has contributed to implementing this plan, and others, through more than 30 years of field studies of the gnatcatcher and Cactus Wren, I welcomed the opportunity to compare notes with those of a credentialed researcher publishing under an Ivy League imprint. As the margins of my copy of the book filled with question marks, I grew concerned that a truly thorough review would fill out a volume of *Western Birds*, but ultimately *Bird Versus Bulldozer* is not serious enough to warrant so much attention.

Ten pages in, Mayer cites Joseph Grinnell's 1898 *Birds of the Pacific Coast of Los Angeles County* and Grinnell and Alden Miller's 1944 *The Distribution of the Birds of California* in support of her claim that the California Gnatcatcher plummeted from "common" in the late 1800s to "rare by the 1940s." The author refutes herself on page 42, quoting from both references: "Common resident in a few limited localities on brushy mesas and washes, principally along the base of the foot-hills" and "Common locally; areas of suitable habitat somewhat reduced in last twenty years." Thanks largely to the NCCP, this remains the gnatcatcher's status in the region today.

On page 49, Mayer complains that gnatcatchers on the Palos Verdes Peninsula "are collectively separated from other coastal sage scrub by the vast urban sprawl of Los Angeles—precisely the situation that the NCCP policy was intended to prevent." No policy could ever "prevent" or reverse pre-existing development on a large scale. A thorough evaluation of the NCCP's relationship to the landscape *as it exists* could have contributed to our collective understanding of how NCCP land managers prioritize, implement, monitor, and fund different management prescriptions.

On page 51, Mayer lumps together the Coyote Hills—fewer than 1000 acres of functionally isolated knolls in north-central Orange County—with the Santa Ana Mountains, which cover more than 500,000 acres. Orange County's NCCP reserves incorporate *tens of thousands of acres* of the Santa Ana Mountain foothills, the range itself lies largely within the Cleveland National Forest, and the Western Riverside County Multiple Species Habitat Conservation Plan (MSHCP) includes additional lands on the mountains' eastern flank. Mayer could have spent a chapter describing the importance of the Santa Ana Mountains to regional conservation planning,

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including Paul Beier's pioneering work to track mountain lion movements, the successful campaign to establish a wildlife connection through Coal Canyon to the Chino Hills, and current plans for a wildlife crossing over Interstate 15, identified as being necessary to restore the "Santa Ana–Palomar Mountains Linkage" for big cats and other terrestrial species (Mayer does, in fact, mention the need for this overpass much later, on page 179). After a single dismissive paragraph, however, Mayer moves on, tossing out a bizarre claim that "Researchers and surveyors have consistently overlooked this area."

On page 58, Mayer states, "To reconnect the isolated gnatcatcher populations on the Palos Verdes Peninsula, in Ventura County, and in the Coyote Hills—the spine of foothills running between Orange and Riverside Counties—we need to preserve and restore gnatcatcher habitat across the region." Again, Mayer conflates the tiny, isolated Coyote Hills with the massive Santa Ana Mountains. Reconnecting the Coyote Hills to the nearest gnatcatcher population would require clearing homes and businesses from a corridor three miles long and planting it with scrub. Similarly incomprehensible feats would be required to connect populations on the Palos Verdes Peninsula to populations elsewhere.

Chapter 4, California Gnatcatcher Taxonomy, confuses more than clarifies. On page 88, Mayer warns that, "if a 10-meter-high border wall appears," gnatcatcher "populations on northern side of the border will likely genetically diverge from those on the southern side over time anyway, owing to the loss of reproductive connectivity of California gnatcatchers across the border." Amy Vandergast and colleagues did recently identify a distinct genetic break at the international border (2022). Subspecies differentiation and range-wide genetic structure are driven by climate in the California Gnatcatcher, a flagship species for coastal sage scrub conservation. *Evolutionary Applications* 15:1201–1217; doi.org/10.1111/eva.13429), but gnatcatchers can fly higher than 10 meters and the border wall has slats, so Mayer should not be attributing genetic divergence to a wall. After reaching no conclusions about the validity of different taxonomic approaches, Mayer ends the chapter by observing that the gnatcatcher's listing may have "prevented other coastal sage scrub species from ending up on the ESA list." True enough, but readers wondering about the taxonomic sturdiness of the gnatcatcher's umbrella of protection will need to look elsewhere.

Chapter 6 describes the NCCP's inception but somehow ignores the socio-political context. During the 1980s, with few flat areas left to develop, builders moved into the scrub-covered hills. Following a recession in 1981/82, cash-starved local governments unleashed a fast-rising tide of hillside development that threatened to catastrophically diminish, fragment, and degrade the region's complex and biodiverse landscape. With no scrub-dependent wildlife species listed as threatened or endangered, and with most local governments dominated by real-estate interests, few forces of moderation existed to counterbalance the aggressive and powerful building industry. In the face of rampant land speculation, a sense of doom mixed with righteous anger infused the environmental community during the 1980s and early 1990s. Concerns over vanishing natural beauty, livability, and ecological integrity were not limited to environmental activists. Most importantly, the Irvine Company in Orange County (under the guidance of consultant Rob Schonholtz, a visionary biologist all but forgotten after his death in 2003) pushed hard not only for development but also adoption of an ecologically sensitive, landscape-level approach to conservation. Mayer does acknowledge this corporate leadership, but devotes more space to pointlessly grumbling about how the 1982 listing of Stephens' Kangaroo Rat (*Dipodomys stephensi*) supposedly "hobbled the development industry in Riverside and San Bernardino Counties."

Thus it was into a combustible atmosphere of rapacious greed, political opportunism, legal brinkmanship, frustration, and desperation—tempered at the margin by rational and politically connected demands for reform—that in 1988 Jonathan

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Atwood made the case for re-recognizing the California and Black-tailed Gnatcatchers as different species. At that point, biologists, activists, attorneys, landowners, local governments, and regulators rushed to become familiar with the little gray birds mewing away in the aromatic bushes that were so quickly disappearing. Although the NCCP Planning Act was adopted in 1991, landowners' participation lagged in the absence of species listed under the ESA to serve as the regulatory specter to drive negotiations. Finally, in 1993, the gnatcatcher's federal listing as threatened provided the necessary irritant around which the pearl of NCCP planning would form.

On page 129 Mayer, quoting from a 2001 report prepared by the California Research Bureau, laments that "Policy makers and politicians . . . chose to move the planning process forward, sacrificing scientific certainty for political support." But did such a choice ever exist? During the first half of the 1990s, under immense financial and political pressures, a broad and unlikely coalition—politicians, large landowners, agency biologists, government planners, environmental activists, and consultants, working in concert with a scientific review panel of highly regarded conservation biologists retained by the state—identified important natural landscapes that could be feasibly purchased and linked together. During intense planning sessions, subregional plans were worked out on maps, aligned with the ESA and other regulations, subjected to formal public review and comment, set down in complicated implementation agreements, and funded. If we accept for the sake of argument that "scientific certainty" exists as an attainable concept in land-use planning, the review panel's recommendations could not have been followed to the letter without convincing all of the private and public stakeholders who put up the land and most of the funding to give up all control over the process. Furthermore, many stakeholders would not have waited patiently for a lengthy scientific review process to play out, and nobody ever advocated placing all planning and decision-making power in the review panel's hands in the first place. For these reasons, a "scientific certainty option" never existed.

This is *not* to say that science has occupied its proper place of prominence, either in the original NCCP planning processes or in the continuing adaptive management of subregional reserves. For example, any legitimate effort at "adaptive management" should incorporate predictive modeling, yet the NCCP's long-term endowments have been inadequate for the development of useful predictive models to be incorporated into ongoing monitoring and management plans (Hamilton, R. A. 2008. Cactus Wrens in central & coastal Orange County: How will a worst-case scenario play out under the NCCP? *Western Tanager* 75:2–7). Especially in something as long as a book, the point of describing the legitimate shortcomings of a policy should be to frame the challenges facing policy administrators accurately, and, if possible, to help them improve. Doing so requires a nuanced understanding of the policy and its history combined with the scientific expertise and vision needed to develop well-reasoned and feasible prescriptions that decision-makers would be wise to follow, in spite of inevitable political and financial hurdles.

Finally, on page 168 we stumble across the book's buried lede: "That the NCCP has managed to protect over 400,000 hectares of natural habitat statewide . . . should perhaps be considered heroic." As one who, during the 1980s, could not hope to imagine ecosystem-based planning becoming the norm across southern California, I view protection of nearly a million acres of natural lands under the NCCP banner (so far) as emphatically heroic, despite the program's inevitable flaws. Had Mayer undertaken original research into the NCCP and its origins, and perhaps interviewed people intimately familiar with the program—such as Dan Silver of the Endangered Habitats League, Trish Smith of The Nature Conservancy, and others too numerous to name—she could have provided useful insights into the negotiating sessions, described the challenges of designing and implementing the new plans, and analyzed the legal and regulatory battles that were fought and usually won. In short, Mayer

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could have given readers a new, multifaceted lens with which to view the NCCP experiment in its proper historical context.

In the book as written, however, Mayer's final chapter abruptly shifts from half-heartedly describing the NCCP to enthusiastically promoting "green infrastructure" as "a life support system that makes cities habitable and sustainable." Readers are urged to recognize "the importance of nature to the well-being of urban residents" while challenging planners to "use smaller, more numerous parks to add green space without driving up housing costs." Children on their screens may contract "nature-deficit disorder," and the ghost of Frederick Law Olmstead preaches about improving "the health and vigor of men" through "occasional contemplation of natural scenes." We all love city parks, but they fulfill much different ecological and social functions than do reserves established under an NCCP. The latter comprise expansive blocks of natural lands managed specifically to conserve threatened populations of plants and wildlife, many of which would not persist for long in small, urban nature parks.

Ultimately, *Bird Versus Bulldozer* represents a missed opportunity to satisfyingly explain the complicated significance of the NCCP program, which in less than a decade, and despite shortcomings, transformed major aspects of land-use policy in southern California from back-room political deals among self-interested parties to an ecologically coherent approach of landscape-level preservation and management of the region's coastal sage scrub and associated natural communities.

Robert A. Hamilton

**Flights of Fancy: Defying Gravity by Design and Evolution**, by Richard Dawkins. 2021. Head of Zeus Ltd, London. 294 pp. Hardcover, \$29.95. ISBN 9781838937850.

When evolutionary biologist Richard Dawkins (*The Selfish Gene*, *The Blind Watchmaker*, *The Extended Phenotype*, *Climbing Mount Improbable*), widely regarded as one of the world's great thinkers, writes a new book, it is probably worth reading. *Flights of Fancy* is a book about flight in the broadest sense, movement through the air, escaping gravity to the extent possible. It is not a technical book and lacks aerodynamic equations; all of the principles necessary to understand unpowered and powered flight are presented in an intuitive way that is easy to understand. Birds, the premier living flyers, feature prominently, but Dawkins' treatment is eclectic, and we meet everything from dandelion seeds to Pegasus, the Roc, Icarus, Leonardo da Vinci's "ornithopter," and the *Gossamer Albatross*. The illustrations by Jana Lenzová are attractive, often whimsical (though generally accurate), and add much to the book.

Flight in living organisms is, of course, an evolved trait that has developed independently and many times over millions of years through the slow, inexorable process by which natural selection favors tiny heritable improvements. Much of Dawkins' writing over the years has been devoted to elucidating this process and explaining how it produces the most improbable and complex adaptations: what good is half a wing? Human flight is a product of deliberate design and technology, not evolution, but the problems that have to be overcome and the physics involved are exactly the same. Nature had solved them all a very long time before we showed up and wanted to take to the air. Engineering has enabled us to vastly push the boundaries in many areas (speed, distance, duration, altitude), but with the possible exception of lighter-than-air ballooning, which no animal seems to have achieved, we have discovered nothing fundamentally new in the realm of flight.

Because flight has evolved repeatedly across a diverse array of organisms, it seems obvious that it must confer many familiar benefits: locating food, catching food, escaping predators, finding a mate, seasonal migration, and many others. If flying confers so many advantages, why don't all animals, or at least more of them,

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fly? Presumably because the anatomy and physiology required to fly are energetically costly. Dawkins uses the many examples of loss of flight in once volant creatures as instructive case studies of the costs and benefits of flying. This leads us on a tour of the many instances of secondary loss and near loss of flight in birds, including the ratites, various species that found themselves accidentally on isolated islands, even long extinct examples such as the “Terror Birds” (Phorusrhacidae) of South America, three-meter tall carnivores with enormous heads. Some insects lose their wings (some even chew them off at the appropriate stage in the life cycle) during life. No birds do this and only the moas lost all trace of wings, even internal vestiges of skeleton.

The enemies of flight are size and, most importantly, weight. Small and light are the ideals if you need to fly. If you must be large and fly it is necessary to evolve a disproportionately large surface area because that is what catches air. The simplest kind of flight is unpowered—gliding, as exemplified by many raptors, seabirds, and flying fish, and what we might call paragliding as in the flying squirrels, the convergent sugar gliders of Australia, and the colugo or “flying lemur” of southeast Asia. No matter how efficient, any glider ultimately succumbs to gravity and returns to earth, though skillful use of thermals and other sources of lift can greatly prolong the flight. To be able to fly more or less indefinitely requires power to provide forward motion that creates airflow past the wing and generates lift. In planes this power is provided by propellers or jet engines; in animals it results from muscles moving wings in just the right way. Dawkins provides a lucid, but nontechnical, explanation of how airfoils generate lift and then takes us on a tour of powered animal flight from birds and bats through a variety of insects and even pterosaurs.

While birds figure prominently in the book, which is why it is being reviewed here, there are scores of other fascinating examples of organisms taking to the air: aerial plankton, ballooning spiders, many kinds of plant seeds, the pterosaur *Quetzalcoatlus* (the size of a small airplane and the largest flying animal), the four-winged dinosaur *Microraptor*, flying squid, frogs, lizards, snakes, and the numerous attempts (most failed, some spectacularly) at human-powered flight.

All of this is presented in Dawkins’ entertaining prose and I recommend it. I enjoyed the book thoroughly until I reached the last chapter in which he embarks on a flight of fancy of his own that left me stupefied. He is apparently enthralled with Elon Musk, to whom he dedicated the book, and espouses the notion of creating a human colony on Mars as a hedge against the destruction of the earth by various possible disasters from a meteor strike to the long-term effects of climate change. This colony, tiny though it would necessarily be, might provide the possibility of recolonizing the earth when and if it recovers (after a million years, two million, more?). But here’s the thing. The biggest threat to life on earth is climate change and it is already here. We don’t have a century or two to mitigate this disaster with a pie in the sky colony on a planet that, except for *terra firma*, provides virtually none of the requisites for life. Promoting this fantasy seems to me a dangerous distraction from what humanity needs desperately to be doing, but is not: using all of our energy and resources to save the only known place in the universe that can sustain life.

Kenneth P. Able