

## THE DEVIL'S CORMORANT: A NATURAL HISTORY

King, R.J. 2013. Durham, NH: University of New Hampshire Press. 352 pp., 21 black and white illustrations, two maps. Hardcover: ISBN 978-1-61168-225-0, US\$29.95. Paperback: 978-1-61168-699-9, US\$24.95. Ebook: ISBN 978-1-61168-472-2, US\$24.99.

The “ability to catch fish and the nature of their guano have brought cormorants an extraordinary amount of human attention.” That statement on page 2 pretty sums up what this interesting and enjoyable book is about. Through 12 chapters, Richard King takes us on a journey around the globe investigating the history of human interactions and attitudes towards the Phalacrocoracidae. Based mainly on literature review, interviews and on-site visits, the book is well researched. Appropriately, the story begins in Gifu City, Japan, where the ancient art of *ukai*, or cormorant fishing, is still practiced with Japanese Cormorants *Phalacrocorax capillatus* to crowds of spectators. To the *usho*, or master cormorant fisherman, the cormorant is “the bridge between God and man.” In Gifu City, cormorants are like royalty.

But, as we’re quickly reminded, things haven’t gone so well in other parts of the world. In Chapter 2, King describes the slaughter of 20 000 Double-crested Cormorants *Phalacrocorax auritus* on Little Galloo Island, New York, in 1998 by a local citizen group. Calling itself “Concerned Citizens for Cormorant Control,” this group of local fishermen saw the cormorants as competitors for the fish of Lake Ontario. Considered local heroes and fined for their atrocities, their act brought to the modern forefront old attitudes about cormorants and paved a new path in Double-crested Cormorant management in North America.

To better understand the anger towards cormorants shared by so many, especially in North American and Europe, King explores literature and other records for earlier origins. From early children’s books and folktales, the bible, to John Milton’s epic poem *Paradise Lost*, and even to John Steinbeck and Ed Rickett’s *Sea of Cortez*, in literature cormorants have most often been associated with evil and greed. With their blackish plumage, many cormorants resemble ravens and crows, and their associations with mischief and ill portent have gone along with it. These stories likely have aided the picture of cormorants that many still have today.

In England, we find that the perception of cormorants as a threat goes back centuries, and bounties were once placed upon them. With Great Cormorant *Phalacrocorax carbo* numbers back on the rise following years of protection, attitudes towards these cormorants as depleters of fish stocks have returned, and organized groups such as Cormorant Watch lobby government wildlife managers for cormorant control. In the United States, King visits East Sand Island in the Columbia River estuary, where the largest Double-crested Cormorant colony in the world now resides. Controversy over this cormorant colony’s intake of endangered salmonids has led to a recent program to haze and cull the birds.

King also spends a chapter describing the channel catfish *Ictalurus punctatus* aquaculture industry and its concerns with Double-crested Cormorants in the Mississippi Delta. In this region, numbers of wintering cormorants rocketed following the expansion of catfish farming in the 1980s, providing the birds with easy prey. Now, depredation permits can be issued to fish farmers for almost unlimited cormorant take.

Other chapters examine the more positive sides of human interactions with cormorants. We are told of the fascinating 19th century explosion of the Peruvian guano mining industry that led to some of the earliest seabird management practices anywhere in the world to protect the economically important colonies. In some lighter chapters, we learn the historic value of Antarctic Blue-eyed Shags *Phalacrocorax bransfieldensis* as a Christmas dinner delight, and some of the theories from literature, such as the evolution of the Flightless Cormorant *Phalacrocorax harrisi* in Kurt Vonnegut’s *Galapagos*. One of my favorite chapters describes the discovery and rapid extinction of the Spectacled, or Pallas’s, Cormorant *Phalacrocorax perspicillatus* from Bering Island, Russia.

In addition to these and other stories, King provides descriptions of cormorant taxonomy and life history detailed enough for the biologist to appreciate and easy enough for the layman to understand. The author patches these bits of fact with stories from his own journeys to many of the book’s places as well as to the cormorant colony near his home in Connecticut. The one topic I found lacking was the impact of organochlorines such as DDT on Double-crested Cormorants (and other seabirds) in the mid-20th century, and the cormorant population recovery following reduction of these pollutants.

An Appendix lists the world’s cormorant species and IUCN status. A section called *Notes* painstakingly tracks the citations of each chapter. The *Selected Bibliography* contains an extensive list of books, plays, poems, short stories, scholarly articles, websites, films and videos about cormorants.

This is a great read for any seabird biologist. With cormorant population issues now at the forefront in many parts of North America and Europe, *The Devil’s Cormorant* is recommended to anyone with an interest in these underappreciated birds and certainly for anyone involved in the mess of what is now called cormorant management.

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## COLLECTED PAPERS OF MICHAEL E. SOULÉ: EARLY YEARS IN MODERN CONSERVATION BIOLOGY

Soulé, M.E. with Peters, R.L. 2014. Washington, DC: Island Press. 355 pp., 14 illustrations, 19 tables. Hardcover: ISBN 978-1-61-091574-8, C\$35.00. E-book: ISBN 978-1-61-091576-2, C\$34.99.

There are many strong leaders and there are many excellent scientists, but few people do both well. Michael Soulé, the father of conservation biology, was one of those people.

If you study any aspect of the ecosystem, from apex predators to food webs, from marine planning to biodiversity, this book will provide the foundation for your science. This book is a compilation of publications by Soulé and others in the field of conservation biology who have been strongly influenced by Soulé's original groundbreaking ideas and research from the 1970s onward. The essays define conservation biology, address biodiversity and population numbers, predict the future of the planet with unregulated growth of human populations, align conservation biology with the real world, and cover recent population extinctions and other challenges that humans face in today's world.

The book touches on alien species, public health, climate change, as well as conservation management and ethics. Chapters such as "Rewilding and Biodiversity," "Conserving Nature at Regional and Continental Scales," "Conservation Goals for Interactive Species" — essentially how many species are enough to maintain healthy ecosystems — show the depth and breadth of the essays in this book. Most of the chapters are taken directly from the journals in which they were originally published. Each chapter has an extensive literature-cited section into which the interested reader can delve. There is also a bibliography of all of the original papers published.

The foreword to the book is written by a colleague of Soulé, James Estes, and it provides background on how Soulé was influenced and inspired to pursue his lifelong interest in conservation biology. It all started when he was a kid, exploring the yet-to-be-developed canyons around San Diego California. At graduate school he studied under Paul Ehrlich, the renowned biologist who was spreading the word on overpopulation of the human race in the late 1960s and early 1970s. Exposure to Ehrlich set Soulé's course of interest in life. After accepting a tenure-track position at the University of California at San Diego, Soulé became so disturbed at the unchecked and rampant development in San Diego with no voice of opposition that he quit his professorship and joined a Buddhist commune in Los Angeles.

He eventually left the commune, steeped in a desire to help protect nature, because he felt he needed to act on his beliefs and do something tangible that would make a difference in what he saw as the rapid destruction of nature. He took a position at the University of Michigan, where he wove his strong feelings about nature with his rigorous scientific training, founded the Society for Conservation Biology, and wrote some of the first scientifically based books on conservation biology.

Later moving to the University of California Santa Cruz (UCSC), he injected his energy into the Environmental Studies Program there, honing it into a world-class department. In his efforts for conservation biology at UCSC, Soulé integrated the natural and social sciences — at the time a daring move. He paved the way

for conservation biology to become a strong voice for nature in the late 20th century, and the meat of his research — his collaborative workshops, symposia and books — are the essays that constitute this book. The first four chapters demonstrate one of his tenets — that populations need to remain viable in order to prevent their extinction. The individual chapters reference many of his research and publications and are a good starting point for anyone seriously interested in pursuing conservation biology. This single idea of population viability has influenced every species recovery plan under the *United States Endangered Species Act*. His concept of population viability is a key concept in defining the number of individuals needed to prevent extinction.

Soulé also spearheaded the field of conservation genetics. His work on isolation, speciation and adaptation of lizards formed the coalescing thoughts behind the need to determine a population's genetics, its ability to evolve in a world rife with population pressures from environmental destruction or change. Genetic diversity became the mantra in many recovery plans. One chapter summarizes the difficulties with and the problems to overcome using population genetics to aid conservation biology.

Soulé also introduced the concept of "ecologically effective population size," which takes into consideration interactions among species — predators, prey, competitors, commensal and keystone species and the like. In the essays, he shows that the keystone species are often apex predators such as seabirds, and shows how they often hold together the entire food web. And he clearly states that it is specifically these apex animals that are most affected by anthropogenic alterations to the ecosystem.

Soulé and his students brought forth the idea of "mesopredators" — the penultimate predators usually held in check by the apex predators, which explode in numbers once the apex predator is removed ("mesopredator release"). On land, this would include animals such as raccoons and what he calls "subsidized recreational hunters" (cats). These mesopredators can drive to extinction smaller animals below them in the food web. The bottom line is that, without keystone predators, the web loses biodiversity. This loss often becomes a slippery slope to the loss of population viability and ultimate extinction.

This concept of maintaining biodiversity in an ecosystem has led to the field of marine planning — making sure that there are enough large, interconnected habitats so that populations remain viable and that the apex predator populations remain at a level to control mesopredators. This interconnectivity is easier to accomplish on land than in the ocean, but Soulé has laid the groundwork for marine interconnectivity, and the essays in this collection give the facts needed to pursue that goal.

However, not all is positive. His most recent essays have become more negative about the future. They are fitting and sobering statements that reflect Soulé's growing dismay that conservation biology and his ideas, backed by years of research, are not being implemented as fast or as ubiquitously as hoped. His final essay,

“The New Conservation,” from 2013 laments that much of this new conservation does not target biodiversity alone but rather includes an element that benefits people.

The current thinking is that the conservation of biological diversity is “out of touch with the economic realities of ordinary people.” He shows how this argument is false, and that the protection of nature and biodiversity is not only for “the elite,” as the New Conservationists argue. Likewise, he discusses the dangers of two of the more alarming tenets of the New Conservationists — that the goal of conservation should be to spur economic growth and that interest in nature “will grow in step with economic growth.” These New Conservationists never mention a steady-state economy, although large scientific groups such as The Wildlife Society have endorsed this concept. The New Conservationists believe that “benefits of economic development will trickle down and protect biological diversity.” Soulé rebuts these arguments and points out that they ignore solid science and knowledge of ecological systems — e.g. that species richness and genetic diversity stabilize ecosystems and increase their productivity. He shows how these New Conservationists ignore the importance of keystone species

and apex predators in the stabilization of communities and how they focus instead on increased economic growth.

He ends with a caveat to those who would donate to conservation organizations. They should find where their money is being spent: whether on nature protection or on humanitarian projects. Soulé agrees that helping the underprivileged is important, but he makes it clear that habitat conservation should be based on ideas from science of these habitats and rather than only on materially benefitting humans.

The essays are all short and to the point, and each stands alone, so that anyone interested in biodiversity, population regulation, food webs, apex predators or creating marine habitat areas would benefit by picking the relevant chapters, gleaning their focused and salient points, avidly pursuing the papers cited in each, and then synthesizing it all in order to make their own research better, relevant and accessible to policy-makers and to the public.

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## CLIMATE CHANGE ADAPTATION PLAN FOR AUSTRALIAN BIRDS

Garnett, S.T. & Franklin, D.C. 2014. Melbourne, Australia: CSIRO Publishing. 262 pp., 11 illustrations & 286 climate suitability distribution maps for 59 bird species. Paperback: 978-0-643-10802-8, A\$69.95.

This intriguing book is an attempt to assess the vulnerability of Australia’s diverse bird fauna to the likely effects of climate change on their habitat and distribution. As the authors state, the evidence for climate change is now overwhelming, and with the likely effects of this change within Australia on temperatures, rainfall, weather variability, extreme events, fire regimes, cyclone intensity and marine productivity, we can expect to see big impacts on our bird populations over coming decades.

Given that almost 900 bird species have been recorded from Australia, this study is an enormous undertaking. Discounting vagrants still leaves over 730 species, about 45% of which are endemic. The authors used over 16 500 000 distribution records for 705 bird species to make a detailed picture of the distribution of all significant Australian bird species and subspecies. They related this to a small-scale climate grid of Australia to get an indication of the present and historical climate space for each species. They also used climate projections for the year 2085 over all of Australia for each 50 × 50 km grid square to assess the exposure of the different species and subspecies to the 70-year projected climate change. This gave an indication of whether each species was likely to feel any effects of the predicted climate change.

The authors then assessed the sensitivity of each species/subspecies to this projected climate change, using metrics such as habitat use, food types and foraging strategies, relative brain size and population size. These sensitivity metrics were then aggregated to get an overall sensitivity score for each taxon. Bird taxa that were rated as both highly exposed to climate change and highly sensitive to climate change were considered the most vulnerable. Marine

birds were treated separately and were rated as vulnerable if the productivity of the areas where they breed was predicted to decrease significantly as a result of climate change.

The habitats of Australian birds most exposed to climate change impacts were those of small islands, followed by terrestrial and marine habitats. Taxa in the marine habitat were the most sensitive to climate change, followed by small-island taxa. Interestingly, those taxa with an IUCN status of critically endangered had the highest proportion of very high sensitivity ratings, and those with a status of least concern had the lowest proportion of very high sensitivity ratings. Garnett and Franklin state that bird species currently suffering are likely to be most affected by climate change over the next 70 years.

Most taxa rated as highly vulnerable to climate change live close to the coast, with the biggest concentration of taxa in the monsoonal rainforest birds of northern Cape York. For birds in marine habitat, those that are highly vulnerable to climate change breed mainly on Lord Howe and Norfolk Islands, with some species associated with the northern and southern Great Barrier Reef.

The authors discuss the costs and options for conserving Australian bird populations in the face of climate change, with strategies ranging from maintaining and enhancing habitat and habitat connectivity, to intensive management of wild populations, to captive breeding programs to preserve extremely vulnerable and threatened species. All such conservation programs rely on timely monitoring programs to establish what is happening, so that appropriate responses can be planned and implemented.

Most of the book is devoted to a detailed description of adaptation profiles for the 59 bird species that were both highly sensitive and highly exposed to climate change. This section includes useful details of abundance, ecology, distribution, sensitivity metrics, climate space considerations and appropriate adaptation responses for all subspecies. The detailed maps showing present/historical climatic suitability and projected climatic suitability in 2085 for all subspecies of these 59 species are particularly interesting. The book finishes by listing the approximately 570 species/subspecies that are rated as highly or very highly sensitive or exposed to climate change or both.

This book will be most useful for those who have an interest in, or who work in the field of, the conservation of Australian birds, but it will also be of interest to anyone who is concerned about climate change or has a serious interest in bird watching. All those interested in the natural world will glean something useful by looking at the maps, which outline possible impacts to the most at-risk bird species. The detailed species coverage includes about 15 seabirds, and this book provides a useful introduction to the likely impact of climate change on this wide-ranging group of birds.

As someone with a keen interest in climate change and its likely impact on humans and on marine systems, I was pleased to read this book and realise the extent of data available for bird abundance

and biology and for climate. I think the authors have made a useful contribution to alerting us to the likely scenarios for Australian bird populations once climate change really starts to bite. The consequences of even this relatively short-term projection for Australia's wet tropics are of particular concern to me and should be equally so to everyone who comes across this book.

I found the book needed careful reading to extract full meaning out of it. I would have been pleased if simpler summaries had been provided, but I expect it is appropriate for the intended expert audience. Maybe it would have benefitted from being slanted more towards those with less knowledge of the subject. I have a slight problem with the title of the book: adaptation implies evolutionary change, and I think the book is more aimed at possible human interventions to allow the at-risk bird taxa to survive rather than encouraging an evolutionary response.

A huge amount of work has gone into this book, and it provides useful insight into the possible impacts of climate change on the Australian bird fauna. I think it will be important to constantly update this information with possible responses as further work refines the concepts and provides more reliable information on climate change scenarios in Australia.

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## THE AMAZING WORLD OF FLYINGFISH

Howell, S.N.G. 2014. Princeton, NJ: Princeton University Press. 45 pp., 97 color illustrations. Hardcover: ISBN 978-0-691-16011-5, US\$12.95.

This slim volume (slightly thicker than a well-traveled passport) presents a popular introduction and breezy overview of the flyingfishes (Exocoetidae) — a little studied and largely underappreciated group. The eight short chapters are all presented in the form of questions, such as “What is a flyingfish?,” “How many kinds are there?,” and “How do they fly?” Most of the 37 text pages are filled with spectacular images of flyingfishes, highlighting their surprising color pattern diversity. And in case you have any doubt that flying is their main means of predator avoidance, every fish in the photographs is headed away from the photographer. To accumulate this collection of photos, Howell reports logging “several hundred” observation hours from the bows of ships and boats in various tropical seas; having tried my own hand at this, I am sure it is no exaggeration. The book also includes a short reference section and an unnecessary index.

While seabird biologists work with birds named, for example, Sooty Storm-petrel, Sooty Shearwater, Sooty Tern, Sooty Gull, and Sooty Albatross, terrestrial ornithologists worked a little harder to come up with names like Adorable Coquette, Scaly-throated Leaf-tosser, and Streaky-breasted Spiderhunter (although there is a Sooty Robin). Howell clearly embraces the latter school, and he and his associates have coined a whole list of fanciful names for the flyingfishes he has photographed, including Violaceous Rainmaker, Pixellated Midget and Fenestrated Naffwing (are we to assume

there are non-fenestrated Naffwings?). However, many of the names offered by Howell refer to the various juvenile stages of the same species (including the Ornate Goldwing that graces the cover), and those names won't have a life much beyond this book.

To understand the significance of flyingfishes to marine ornithology, one needs only to visit a booby colony in the tropics. For example, tiny Clipperton Island in the eastern tropical Pacific is home to by far the largest Masked Booby colony in the world. Working there with my wife, Lisa Ballance, in 2005, we estimated that flyingfishes constituted 73% of the Masked Booby diet by weight and that the boobies were consuming an astonishing 32 tonnes of them each day! Absent flyingfishes, many of largest of tropical seabirds — boobies, frigatebirds and tropicbirds — might not even exist.

This book is the kind of fare that, when consumed at a young age, can instill a lifelong fascination and concern for all things marine — perfect propaganda for seabird biologists to pass along to the nestlings on their gift list. It could easily be a book for children or adults. But make sure you take a look at it before you give it away — you may want to buy another copy!

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