



CONSERVATION BIOLOGY

EXUBERANT LIFE: AN EVOLUTIONARY APPROACH TO CONSERVATION IN GALÁPAGOS.

By William H. Durham. *Oxford and New York: Oxford University Press.* \$49.95. xxi + 382 p.; ill.; index. ISBN: 978-0-19-753151-8. [A companion website is available.] 2021.

The Galápagos, William Durham argues, are an incredible case study not only for evolution but for the socio-ecological-systems (SESs) that, whether we like it or not, are intertwined these days with all life on Earth. Thus, to properly conserve the Earth's biodiversity, we not only must understand and appreciate biology, but we also must understand how humans are intimately related to biodiversity. The author has written a gem of a book that illustrates the utility of this approach. The volume not only serves as an amazing companion for Galápagos-bound tourists to enrich their understanding of what they are seeing, but it serves as a model for sustainable biodiversity management globally.

Durham adopts what I found to be a novel structure for most of the 10 chapters. He first describes the evolved unique adaptations of key animals and plants found on the Galápagos, and then poses and evaluates general hypotheses to explain how and why we see these adaptations. Many are tied with a variety of things that make the endemic species on the Galápagos novel, including their long isolation from humans and rather simplified terrestrial ecosystems. He then describes how humans are related to these species' ongoing sustainability. This ranges from land clearance to creating the global heating that makes the El Niños that drive so much of endemic demography. Finally, he uses an understanding of these adaptations to propose evolutionary-inspired management solutions to various anthropogenic assaults. It is a fascinating way to link evolution to conservation and management that short shrifts neither the fascinating biology nor the fascinating human socioecological dimension.

The author focuses on the waved albatross, Galápagos giant tortoises, Galápagos rail, the world's only ocean foraging lizard—the Galápagos marine iguana, Darwin's finches, boobies, Galápagos cormorant, the only penguin found in the Northern Hemisphere—Galápagos penguin, and the brown sea cucumber that illustrates poignantly the human conflict that has plagued Galápagos conservation in the past few decades. Yet, by appreciating these are SES, and by applying insights from Nobel Prize winner Elinor Ostrom's work on natural resource management,

he shows that the future of conservation in the Galápagos must be centered on creating sustainable management that will involve and be driven by stakeholders at all levels and will be supported, to a large part, by a better managed ecotourist industry. Durham offers suggestions on how to enjoy and conserve the amazing biodiversity that makes the Galápagos special.

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THE LAST BUTTERFLIES: A SCIENTIST'S QUEST TO SAVE A RARE AND VANISHING CREATURE.

By Nick Haddad. *Princeton (New Jersey): Princeton University Press.* \$24.95. xiii + 250 p. + 16 pl.; ill.; index. ISBN: 978-0-691-16500-4. 2019.

The author, a researcher at Michigan State University and director of the W. K. Kellogg Biological Station, has been working with and thinking about rare butterflies for two decades. In his book *The Last Butterflies: A Scientist's Quest to Save a Rare and Vanishing Creature*, Haddad introduces readers to the world of butterfly conservation science, and to the scientists who are working to understand the biology of imperiled butterfly species. After an introductory chapter, the volume consists of six chapters—each on a sensitive butterfly species, and each increasingly rare—followed by a chapter each on an extinct butterfly, the British large blue (*Maculinea arion euthyphron*), and on the monarch (*Danaus plexippus*), and ending with a discussion of both butterfly and general insect conservation moving forward.

Despite living through the loss of populations of the butterflies he studies, the author is optimistic that good science, land management, and a thorough understanding of natural history can work together to help the rarest butterflies, and ultimately inform conservation of insects that are not yet as rare, but certainly could be. He takes stories such as that of the British large blue and frames them as lessons for conservation practitioners and researchers whose work is meant to aid them. Haddad also makes space for a nuanced discussion about the role of disturbance in maintaining butterfly populations. In his research on the Saint Francis' satyr (*Neonympha mitchellii francisci*), he found that, in fact, the area that promoted the best habitat was at the center of an artillery range. Low-level fires started by military target practice help to discourage woody plant encroachment and maintain the open habitat the Saint Francis' satyr depends on, and beaver activity provides periodical flooding that further discourages encroachment and encourages the growth of plants the caterpillars depend on. Over the course of his career the author had made peace with the role of disturbance, and notes that loss of natural disturbance is