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## Conservation biology: past and present 1

Curt Meine

in Conservation Biology for All

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In this chapter, Curt Meine introduces the discipline by tracing its history. He also highlights the inter-disciplinary nature of conservation science. Conservation biology emerged in the mid-1980s as a new field focused on understanding, protecting, and perpetuating biological diversity at all scales and all levels of biological organization. Conservation biology has deep roots in the growth of biology over several centuries, but its emergence reflects more recent developments in an array of biological sciences (ecology, genetics, evolutionary biology, etc.) and natural resource management fields (forestry, wildlife and fisheries management, etc.). Conservation biology was conceived as a “mission-oriented” field based in the biological sciences, but with an explicit interdisciplinary approach that incorporated insights from the social sciences, humanities, and ethics. Since its founding, conservation biology has: (i) greatly elaborated its research agenda; (ii) built stronger connections with other fields and disciplines; (iii) extended its reach especially into aquatic and marine environments; (iv) developed its professional capacity for training, research, and field application; (v) become an increasingly international field; and (vi) become increasingly active at the interface of conservation science and policy.

## Allee Effects in Ecology and Conservation

Franck Courchamp, Ludek Berec, and Joanna Gascoigne

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Allee effects are broadly defined as a decline in individual fitness at low population size or density, that can result in critical population

thresholds below which populations crash to extinction. As such, they are very relevant to many conservation programmes, where scientists and managers are often working with populations that have been reduced to low densities or small numbers. There are a variety of mechanisms that can create Allee effects, including mating systems, predation, environmental modification, and social interactions among others. The abrupt and unpredicted collapses of many exploited populations is just one illustration of the need to bring Allee effects to the forefront of conservation and management strategies. This book provides an overview of the topic, collating and integrating a widely dispersed literature from various fields: marine and terrestrial, plant and animal, theoretical and empirical, academic and applied.

## Conclusion

Frederick Rowe Davis

in *The Man Who Saved Sea Turtles: Archie Carr and the Origins of Conservation Biology*

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Carr's career demonstrated that the naturalist tradition transformed into related disciplines of ecology and conservation over the course of the 20th century. Carr's life exhibits many dimensions of the naturalist tradition. Nearly a decade after Carr died, his example inspired an intense response to an editorial in the journal *Conservation Biology*. Inspired by the publication of *A Naturalist in Florida*, editor Reed Noss lamented the demise of natural history and field biology. During the course of his career, Archie Carr embodied E. O. Wilson's goals for the naturalist tradition and conservation biology in his passion for natural history, his acumen for systematics, his sense for ecology, his dedication to conservation, and his ability to write narratives that captured the hearts and minds of scientists and the public in all of these realms. The story of the man who saved sea turtles should be an inspiration to future generations of naturalists and conservationists.

# Ecological and Intellectual Baselines: Saving Lions, Tigers, and Rhinos in Asia

John Seidensticker

in Foundations of Environmental Sustainability: The Coevolution of Science and Policy

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This chapter begins by stating that one of the great problems in conservation biology is so-called ecological amnesia, the disappearance in the public mind of what environments were like even a few decades ago. Once species and natural environments are lost, mental adjustments are made in the minds of local people; what is “natural” now is not what was natural twenty or fifty years ago. If Asian conservation and restoration are to take place at all, it must be done in concert with the human populations that have always been part of the landscape. Two case studies are described: (1) Asian lions and the Gir Forest (India) and (2) rhinos, tigers, and the Chitwan Valley (Nepal).

## Orangutan population biology, life history, and conservation

Andrew J. Marshall, Robert Lacy, Marc Ancrenaz, Onnie Byers, Simon J. Husson, Mark Leighton, Erik Meijaard, Norm Rosen, Ian Singleton, Suzette Stephens, Kathy Traylor-Holzer, S. Suci Utami Atmoko, Carel P. van Schaik, and Serge A. Wich

in Orangutans: Geographic Variation in Behavioral Ecology and Conservation

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Item type: chapter

Orangutan populations are particularly susceptible to local extinction due to hunting, habitat loss, and fragmentation because they live at low population densities, grow slowly, and reproduce rarely. This chapter uses Population Viability Analysis (PVA) to consider the conservation implications of orangutan life history and population biology. First, a baseline model that incorporates the best available orangutan life-history data is presented. This model is then used to examine how plausible variation in model parameters, changes in the intensity of human-induced threats, and different conservation and management interventions would affect the probability of orangutan population persistence. The effects of existing threats on the extinction risk

of specific orangutan populations on Borneo and Sumatra are also modelled. Finally, the conservation and management implications of this modeling exercise are considered.

## Conservation Planning and Climate Change Effects

A. Townsend Peterson, Jorge Soberón, Richard G. Pearson, Robert P. Anderson, Enrique Martínez-Meyer, Miguel Nakamura, and Miguel Bastos Araújo

in Ecological Niches and Geographic Distributions (MPB-49)

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This chapter discusses the use of niche models to help address the “what” and “where” questions in conservation biology as well as climate change effects. It first reviews the conceptual aspects of the “what” and “where” questions in conservation planning, focusing on topics such as inferences about extinction risk, identification of regions for species reintroductions, conservation reserve network planning, and considerations of how climate change may affect species distributions. Each of these conservation applications is then examined with respect to the conceptual framework laid out for ecological niche modeling. The chapter concludes by offering practical recommendations regarding calibration and evaluation of niche models.

## The Future of Agricultural Pollination

Rosalind R. James and Theresa L. Pitts-Singer

in Bee Pollination in Agricultural Ecosystems

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This chapter summarizes how agricultural production and bees are inter-dependent. Honey bees are the most commonly used agricultural pollinators in the world, but are threatened by an increasing number of hive pests. In addition, not all crops are well pollinated by honey bees (e.g., tomatoes, alfalfa seed, and crops grown in greenhouses and under row covers). Fortunately, the world holds a huge diversity of bee species, although only a few of these are managed specifically as crop pollinators. Wild bees provide pollination services that often go unnoticed, yet are critical to the success of some forms of agriculture. The impact that bees

have on our food production systems should serve as a reminder to our dependence, in general, on the ecosystems around us.

## The Conditions for Existence as a Unifying Concept in Evolutionary Biology

John O. Reiss

in Not by Design: Retiring Darwin's Watchmaker

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california/9780520258938.003.0012

This chapter considers some of the ways in which the conditions for existence can serve as a unifying concept in evolutionary biology. It examines some of the areas in which recognition of the principle of the conditions for existence can highlight interconnections that are not often made, both within evolutionary biology and between evolutionary biology and other fields. These fields include quantitative genetics, the levels of selection, evo-devo, the ecological niche, physiology, and conservation biology.

## Experimental Approaches to Conservation Biology

Malcolm Gordon (ed.)

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We are living in the early stages of a looming worldwide extinction crisis. Abundant evidence shows that the current rate of species extinctions is nearing its highest level since the asteroid collision 65 million years ago, and that humans are largely responsible. This book addresses the urgent need to understand and find solutions to this crisis. The book provides a unique approach by focusing on individual species rather than whole plant and animal communities. Emphasizing throughout how conservation biology can benefit from an experimental approach, the book looks at a wide range of terrestrial and aquatic species — from giant pandas and tree snails to sea turtles and Steller sea lions — and demonstrates what can be done both to preserve rare species and to combat invasive organisms. Finally, chapters show how we can bridge the gap between policy makers and research scientists in order to develop lasting solutions to these problems.

# Venerable Trees

Tom Kimmerer

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When the Bluegrass region of Kentucky was settled, early farmers found natural woodland pastures of open-grown trees shading grass and cane. The same trees that shaded the natural pastures remain with us today, many of them between three hundred and five hundred years old. The horse and livestock farms that make the Bluegrass famous are shaded by these ancient trees; some woodland pastures cover hundreds of acres. There are still many old trees in urban areas, parks, and backyards, remnants of woodland pastures. Natural woodland pastures are extremely rare, found only in the Bluegrass and Nashville Basin in North America, and in several European countries. *Venerable Trees* is a narrative of the history of these trees from before settlement to today. The origin of the woodland pasture habitat is analyzed, with particular emphasis on the role of drought and the vast herds of bison that were here in the 1700s. Although there are still thousands of ancient trees in the Bluegrass and Nashville Basin, they are disappearing, succumbing to old age, urbanization, and poor management. The present status of the trees is described, and recommendations made to ensure that woodland pastures of ancient trees will continue to characterize the Bluegrass and Nashville Basin long into the future.