

Elliott A. Norse and Larry B. Crowder (eds): Review of “Marine Conservation Biology: the science of maintaining the sea’s biodiversity”

Island Press, Washington DC, USA, 470 pp, 2005 ISBN 1-55963-661-0

**B. Jessen · J. Black · R. Cormier · A. Gabela ·
J. Murt · S. Pautzke · J. Smith · F. Juanes**

Received: 5 June 2006 / Accepted: 9 June 2006 / Published online: 19 July 2006
© Springer Science+Business Media B.V. 2006

With the collapse of many fisheries, evident habitat destruction, and loss of biodiversity, there is little question that conservation and restoration of life in the seas is necessary today. Yet important questions remain. Which species or ecosystems are the most critical? What are the restoration goals? Are there potentially negative consequences of restoration plans? *Marine Conservation Biology* seeks to address these questions and others by presenting the science, acknowledging the uncertainties, and considering the socio-economic concerns that surround conservation efforts. The editors have assembled leading researchers in related fields to contribute their knowledge on marine conservation efforts. This text was reviewed by graduate students in an aquatic ecosystem conservation seminar.

The editors begin with a persuasive argument for why the emerging field of marine conservation biology requires its own text. Chapter 1 presents a thorough comparison between terrestrial and marine conservation, a reoccurring theme throughout the book. Both disciplines emphasize biodiversity, focus on keystone species and

vulnerable populations, and are subject to stakeholder conflicts. Marine conservation is set apart from its terrestrial counterpart by physical constraints. The inherent difficulty of observing ecosystem health beneath the water’s surface limits public awareness of existing and impending problems at sea. Chapter 2 encourages thoughtful consideration of restoration efforts, noting that we are at a loss to determine the qualities of pristine ecosystems due to the lack of historical data and a shifting baseline that comes with each new generation of marine scientists.

Part One, “Marine Populations: The Basics” combines chapters on life history and population dynamics as they relate to conservation efforts in the sea. Chapter 3 provides a comprehensive description of various life histories for several phyla and their subsequent requirements for effective conservation. Chapter 4 is devoted to the Allee effect. While there is speculation that marine organisms may be more or less prone to Allee effects compared with terrestrial organisms, there does not appear to be enough conclusive evidence for an entire chapter devoted to this subject. We suggest a broader chapter on invertebrate population dynamics. The Allee effect is appropriately discussed in chapter 5, with an examination of the risk of extinction for marine species due to direct and indirect human impacts. The section ends with an interesting chapter on marine animal behavior analysis, used to develop highly effective fishing

B. Jessen · J. Black · R. Cormier · A. Gabela ·
J. Murt · S. Pautzke · J. Smith · F. Juanes (✉)
Department of Natural Resources Conservation,
University of Massachusetts, Amherst, MA 01003,
USA
e-mail: juanes@forwild.umass.edu

gear as well as aiding conservation efforts, such as the prevention of by-catch.

Part Two, “Threats to Marine Biological Diversity,” is surprisingly silent on the effects of global warming and climate change. However, the chapters incorporate many other stresses affecting marine life. Chapter 7 presents a clear overview of nutrient enrichment using case studies from North America. Other sources of pollution such as PCBs, oil spills, and heavy metals would have enhanced a more general discussion on pollution. Chapter 8 presents examples of bioinvasions on a global scale with great detail and informative case studies, including a discussion on natural and human-induced invasions. Chapter 9 effectively calls for more attention to be brought to the important yet little-understood area of marine diseases, addressing possible bacterial introduction and antibiotic resistance associated with human inputs. As a conclusion to the section, Chapter 10 reviews effects of multiple stressors on a population, and calls for a multidisciplinary approach to understand all stresses involved, which is indeed appropriate for every challenge presented in this book.

Part Three, “The Greatest Threat: Fisheries,” is the strongest section of the book, examining the harmful effects of fishing practices and offering some solutions to the growing crisis. Chapter 11 stresses the necessity for fisheries and conservation coexistence. The authors analyze failures in current stock assessment and management goals and propose a solution in the form of marine protected areas, which are discussed at length in the next section. Chapter 12 is a compelling overview of trawling and dredging practices, providing details of common techniques, negative impacts, and high frequency of use in specific areas. Chapter 13 demonstrates the negative effects of targeted fishing practices on long-lived marine species, with a clearly-written background of their life history characteristics and a focus on possible management strategies to alleviate this problem. The effects of targeted fishing practices are also examined in chapter 14, but from an evolutionary perspective, as fishing selects for a specific trait from the gene pool. The chapter is strengthened by including studies that show a heritable shift by a population from the pheno-

type selected by harvest. Chapter 15 adds a positive conclusion to this section by examining two case studies of sustainable fisheries in the United States, Pacific halibut and Bristol Bay sockeye salmon. The chapter details characteristics common to sustainable fisheries, including a comprehensive understanding of the stock status, flexible management, minimal ecological impact, a viable fishing community, and a target species that can recover within a reasonable time.

Part Four, “Place-Based Management of Marine Ecosystems,” examines the approach of whole-ecosystem management by incorporating analyses of marine protected areas (MPAs). An opening chapter to this section would greatly benefit the reader by including an overview of the varieties of MPAs, including the different regulations that may be in effect as well as different goals set for conservation. Chapter 16 focuses on marine reserves, noting that one-hundredth of one percent of the oceans is protected, and provides examples of current reserves and their status. Chapter 17 analyzes reserve function and design, noting the costs and benefits of a reserve, with consideration for conservationists, managers, and fishers. This chapter was enhanced by extensive figures that detail the current results seen from reserves. Chapter 18 is a call for protected areas in the open ocean for migratory fish, and suggests that temporary MPAs should be set up along migratory routes and pelagic hot spots of diversity. Whether this is feasible with current international law and enforcement ability is unclear. Chapter 19 focuses on the importance of movement among sub-populations when designating marine reserves, taking into consideration life history strategies and hydrological forces. The authors note that poorly-designed reserves may benefit one sub-population while endangering the rest of the population by re-focusing fishing efforts, thus reminding the reader that careful consideration must be taken with any conservation or restoration plan.

Part Five, “Human Dimensions,” adds an important element to consider for conservation strategy in addition to the biological science. Chapter 20 describes the general success of self-management within peasant and tribal fishing communities. Two examples of sustainable fishing

successes in the developed world are portrayed: the Maine lobster fishery, and Japanese cooperative fisheries. This close examination of healthy fisheries found in local communities is encouraging and informative, but cannot be easily applied to large-scale fisheries. Chapter 21 provides an overview of the main U.S. and international laws that apply to marine conservation and management. This is a crucial topic for marine conservation. The authors could have provided a more detailed and balanced review of policy failures and benefits if this chapter had been split into two, one each for U.S. and international law. Chapter 22 reflects on the role of uncertainty in decision-making, and makes it clear that imposing negative short-term policy without certainty of long-term benefits requires careful consideration. Chapter 23 covers the biology subdiscipline “restoration ecology,” using coral reef restoration projects as informative case studies. An interesting note from the author is that lessons can be learned from perceived failures at sea. Chapter 24 is a poignant introduction to the philosophy of moral thinking when applied to marine systems. This thought-provoking subject complements the process of designing and defending conservation strategy. Chapter 25 argues that zoning in the oceans will lead to less conflict and increased financial gain for the fishers but was unsuccessful as a concluding chapter. A more effective approach would have been to provide a concise and detailed chapter on zoning as a management tool with a following chapter appropriate for concluding thoughts and opinions.

A main concern, as is the case with many other edited texts, is the lack of consistency from one chapter to another. The amount of assumed technical background varies with each chapter, with no glossary for undefined terms, and limited use of graphs and illustrations. Writing styles also vary, from concise reviews to opinion-laden passages. Some similarities between chapters may also be distracting, such as an overlap of material. An example is the ever-present case study of sea urchin, kelp, and sea otter numbers, which may lead to the perception that this is the only impacted community structure dynamic that marine scientists have observed.

Marine Conservation Biology could be used as a core text for an upper-level conservation or management course, especially when complemented with the primary literature that is exceptionally well-referenced at the end of each chapter. A consistent message throughout this work is that unless management of marine systems takes a precautionary approach, the burden of proof to show that human actions at sea are harmful lies with the scientists, who themselves must take on an advocacy and stakeholder role. Throughout most chapters, there is a clear sense that all is not lost, and that actions today will reap rewards for future generations. The efforts of the authors and editors provide a tremendous benefit to this new field, convincing and encouraging students and scientists to consider all aspects of conservation and management at sea.