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practitioners in either the natural or social sciences. It tackles the truly challenging topic of how to manage the ocean's ecosystem services, and it presents the information in a thorough, succinct, and digestible manner. A book

on this subject, especially of such scope and depth, is long overdue. It will truly serve as a primer for developing a resilience-based approach to the management of the coupled social-ecological systems of the world's oceans.

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## *Cold-Water Corals: The Biology and Geology of Deep-Sea Coral Habitats*

By J. Murray Roberts, Andrew Wheeler, André Freiwald, and Stephen Cairns, Cambridge University Press, 2009, ISBN 978-0-521-88485-3, Hardcover, 352 pages, \$125 US

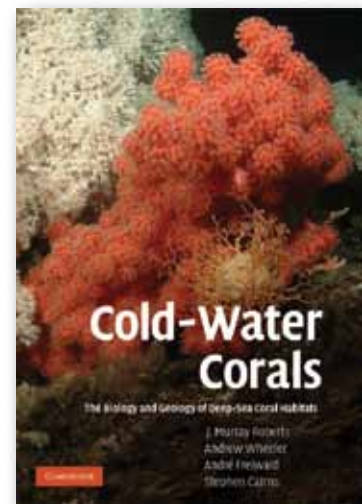
REVIEWED BY SANDRA BROOKE

*Cold-Water Corals* is the first comprehensive synthesis of one of the most active areas of current deep-sea research. It is a timely contribution to this field, which is experiencing a rapid increase in the number of scientific publications, has been the subject of several directed research programs, and has been the focus of four international conferences to date. The first three authors are recognized authorities on cold-water coral ecosystems in Europe, and the fourth author is a world authority on coral taxonomy. The targeted audience for this book is “professionals and students of marine science.” The well-written and easy-to-read format contains numerous topic boxes (12) and case studies (7) that help explain various sections. The book has few typographical errors, a comprehensive index, a fairly complete glossary, and a summary reference section

(relevant to all chapters) that is appropriate to the text. It includes many black and white illustrations, and a 16-page section of color plates.

The text of the book is well organized; its eight chapters follow a logical sequence, and each chapter ends with a useful introduction to the next chapter. Although brief in places, the text is fairly complete. Chapter 1 sets the stage by reviewing the background and history of cold-water coral research and research methods.

Chapter 2 defines cold-water corals taxonomically and ecologically, and discusses their diversity, environmental constraints, and genetic connectivity. An interesting debate related to this field concerns use of the word “reef” and whether the term is appropriate when the structures are not navigational hazards (which is where the word originated). Roberts and co-authors make a strong case in Chapter 2 that from an ecological and biological perspective these cold-water and usually deep-water structures function in a way similar to shallow coral reefs, and, thus, use of the term reef is justified. This chapter does a good job of putting cold-water corals



in a broader perspective so that their importance can be appreciated. One seeming contradiction (or even an error) in this chapter relates to the distribution of the Stylasteridae (p. 42). It is stated that they are “absent from off continental land masses,” but then it is noted that they are abundant off Florida (part of the US continental land mass). On p. 45, the same reference (Cairns, 1992b) is used to say that they “rarely occurred off continental land masses.” The extensive table listing the 711 valid species (also available in the online appendix) is valuable, but the depth ranges for *Madrepora* and *Lophelia* do not match those in the text.

In Chapter 3, the basic biology of the anthozoa is reviewed, leading off with a treatment of anatomy and morphology. Then follow sections on food supply and

nutrition, growth, ecophysiology, reproduction, and larval biology and dispersal. Chapter 4 presents a geological framework that discusses the theories of initial cold-water coral reef development and the processes by which mounds form over many thousands of years. Chapter 5 on habitats and ecology presents the larger perspective on cold-water coral communities, including a discussion of biodiversity. Some ecologists might take issue with the support for use of the Shannon-Wiener index (p. 143), which has been severely criticized, despite its continued use. Chapter 5 summarizes habitat types and general faunal communities, along with predictive mapping. The paleontology chapter (6) documents the evolutionary history and fossil record of cold-water corals, and it is followed by a chapter on how corals can be used as proxy archives for a variety of measurements of the ocean environment. The final chapter (8) covers anthropogenic impacts to these ecosystems and current management strategies applied to them.

For the most part, figures and tables are clear and support the text. The line drawings of the various coral species are good and clearly show differences among species. Perhaps in future versions it would be useful to have the color plates and illustrations referenced in the index.

Online materials related to the book ([www.lophelia.org/coldwatercoralsbook](http://www.lophelia.org/coldwatercoralsbook)) include access to an appendix (in PDF format) that provides a phylogenetic listing of the 711 currently known species of cold-water corals with their taxonomic synonyms, a gallery of some of the halftone drawings in the book and links to other photographic and video material, a teaching resources section that links to book figures at Cambridge

University Press, a section on reviews of the book, brief biographies of the authors, and information on ordering the book. Although these resources are valuable and lead the reader to other information posted on the Lophelia.org site, it might be more useful if all of the material were in one place instead of among several Web sites. Nevertheless, such material can be easily updated, kept current, and changed with new editions of this book.

Perhaps the most obvious bias in *Cold-Water Corals* is its emphasis on research and issues in the northeastern Atlantic. To some extent, this bias is understandable as this is the area of expertise of most of the authors, and this region has produced most of the research papers. However, noticeably missing was the major review of deep-water corals produced in 2007 for all US waters by the National Oceanic and Atmospheric Administration. One chapter from this report was used (Parrish and Baco, 2007), but others would also seem to contain useful data for this book. In other instances on pages 28 and 31, reference to coral habitats off the southeastern United States and in the Gulf of Mexico is not supported with literature even though such exists. On p. 147, this regional bias is clear in the Norway case study where the area is noted as “globally significant.” While true, it appears to ignore the reference by Paull et al. (2000) that notes there may be over 40,000 coral mounds in one area of the Blake Plateau. Finally, the new huge marine protected area off the southeastern United States that contains abundant deep-sea corals was under development when this book was being written, and it is not mentioned. The authors are urged to

consider adding this information in future revisions.

Overall, the book is a great summary of knowledge on the subject of cold-water corals. The book has a strong conservation message that it backs up with data and logical arguments. It is a good supplement to other texts on deep-sea habitats. The book points out numerous places where data do not exist or are limited and where additional work is needed. It is highly recommended to scientists and students looking for a basic introduction on the topic of cold-water corals.

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## REFERENCES

- Parrish, F.A., and A.R. Baco. 2007. State of deep coral ecosystems in the western Pacific region: Hawaii and the United States Pacific Islands. Pp. 155–194 in *The State of Deep Coral Ecosystems of the United States*. S.E. Lumsden, T.F. Hourigan, A.W. Bruckner, and G. Dorr, eds, NOAA Technical Memorandum CRCP-3, Silver Spring, MD.
- Paull, C.K., A.C. Neumann, B.A. am Ende, W. Ussler III, and N.M. Rodriguez. 2000. Lithoherms on the Florida-Hatteras slope. *Marine Geology* 166:83–101.