Rev Fish Biol Fisheries (2010) 20:137–138
DOI 10.1007/s11160-009-9122-5

BOOK REVIEW

Nicholas V. C. Polunin (ed): Review of "Aquatic ecosystems: trends and global prospects"

Cambridge University Press, New York, 482 pp, 2008, ISBN 978-0-521-83327-1

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Received: 1 June 2009 / Accepted: 4 June 2009 / Published online: 30 June 2009

Casting an impressively wide net, this new textbook gathers information on the threats now facing aquatic ecosystems across the globe. Editor Nicholas V. C. Polunin and 104 contributing authors evaluate the current impacts of global climate change and human population growth on aquatic ecosystems, with a goal of elucidating their likely influences on the future of these ecosystems to the year 2025. The book is organized into 21 chapters that address particular ecosystems and also includes a general introduction and synthesis. This review is the work of graduate and advanced undergraduate students in a university course entitled Aquatic Ecosystem Conservation.

The book achieves a truly global perspective with authors who originate from a diversity of nations. Together they compile a comprehensive overview of threats to Earth's aquatic systems. Of primary concern across all ecosystems are pollution, flow modification, water diversion, invasive species introductions, land-use changes, over-harvesting, and global climate change. The authors highlight some crucial areas for further study, including the synergistic effects of multiple threats. In particular, the authors repeatedly call for more research on how climate change will amplify or mitigate existing threats.

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Many of the chapters address the differences between environmental conditions in developed and developing nations. Developed nations often have stable populations, along with the money and public support to alleviate some negative anthropogenic impacts through habitat restoration, pollution control and ecological management. Conversely, developing nations generally must prioritize basic human needs over environmental protection. Without mitigation efforts, environmental damage often accumulates in these regions. Projected population and economic growth in developing regions will undoubtedly cause more rapid environmental decline, the abatement of which is unlikely without considerable assistance from wealthier nations. A solution frequently identified by the authors is ecosystem-based management strategies (e.g., watershed-scale planning) that can address the specific ecological, economic and social factors causing environmental degradation in any region.

Despite these astute recommendations and its global scope, *Aquatic Ecosystems* exhibits some noteworthy deficiencies. Most chapters are simply pared-down versions of articles previously published in the journal *Environmental Conservation* in 2002 and 2003. Authors have added little recent research to their chapters, and out of 106 pages of references that contain 2,827 publications, only 11% are from 2003 and after. Given the pressing nature of the topic and the impressive volume of research being produced in the fields of aquatic ecology and environmental change, the text falls short of describing *current* states and

offers little advantage over reading the original articles.

In addition, the authors are inconsistent in describing near-future conditions. The introduction stresses the goal of making predictions to the year 2025. The authors suggest this date is "sufficiently far in the future to provoke thoughtful and imaginative projections across all ecosystems, but within a time-frame for which some detailed scenarios such as of human population growth and global ambient temperatures existed"(p. 2). They further argue that this charge represents an "appropriate time horizon at an appropriate ecological scale" (p. 2). Robust, imaginative, science-based projections are scarce, however, and while chapter authors repeatedly stress the certainty of change, they are generally reticent to offer details about the probable magnitude or direction of this change.

There may be good reasons for the authors' reluctance to make predictions, such as lack of data or professional distaste for extrapolation. Most authors, for example, argue that climate projections are so variable and climate processes so poorly understood that predictions about climate effects are not possible. Although there is agreement that climate change will not precipitate the kind of immediate degradation that human population growth is causing, few predictions for 2025 are presented on either front. Whatever the explanation, the stated goal is not achieved. As editor, Polunin could have requested consistent content from his contributors or have included an insightful discussion on the difficulties of addressing the 2025 time horizon.

Some useful tables pepper the text and serve as handy references, yet the book's figures are largely disappointing. Graphs are not labeled clearly or consistently and their cursory captions do little to integrate displayed data with chapter content. Too often the maps, diagrams and graphs do more to confuse and distract than to clarify and enhance. Standardized formatting of graphs and maps would be a welcome improvement.

The greatest challenge in reviewing this book was determining its intended audience. The publisher states that it is "written for academic researchers and professionals" (p. 1). Certainly, it is unsuitable as an introductory textbook, as the writing is often dense and inaccessible with undefined terminology and scant information on basic ecology. Nor is the book ideal for seasoned researchers given its broad focus and shortage of current data. The same information could be accessed easily and inexpensively through online journal databases. The book might be used as a resource for conservation professionals but it only sporadically and superficially addresses management strategies and provides few case studies. Perhaps the text is best described as a useful reference guide for beginning research scientists. Its global reach establishes a valuable context for any future research and the thousands of references provide a roadmap to essential background knowledge on threats to aquatic ecosystems.

In a scientific field that is rapidly growing and that expressly studies change, it is easy for texts to quickly slide into obsolescence. Despite its breadth and commendable goals, this book has already begun to gather dust because it presents little current research and falls short of providing meaningful, science-based projections of near-future aquatic conditions.