

case studies are bookended by overview chapters by the editors; the final chapter is a particularly well-written synthesis and would be useful to read before and after the case studies. Chapter 10, *Historical Ecology of the North Sea Basin*, provides a useful summary of the utility and limitations of various archeological methods.

Even in prehistoric times, humans clearly had a variety of complex interactions with marine ecosystems, although these chapters show that impacts can be hard to pinpoint in the archeological record or untangle from the environmental context. This volume will help inspire the next generation of interdisciplinary research in this area, from data collection to analysis and modeling tools. It should be read by anyone interested in coupled human-natural systems, including archeologists, ecologists, environmental scientists, historians, marine conservationists, fisheries managers, and policymakers.

JENNIFER A. DUNNE, *Santa Fe Institute, Santa Fe, New Mexico*

MITIGATING IMPACTS OF NATURAL HAZARDS ON FISHERY ECOSYSTEMS. *Based on a symposium held in San Francisco, California, 5–6 September 2007. American Fisheries Society Symposium, Volume 64.*

Edited by Katherine D. McLaughlin. Bethesda (Maryland): American Fisheries Society. \$60.00. xviii + 446 p.; ill.; no index. ISBN: 978-1-934874-01-1. 2008.

Stuff happens, even to fishery ecosystems. Not only must many fish populations withstand overfishing and habitat degradation, but these nearly steady stresses may be punctuated by forceful natural hazards of varied duration. The list is worrying, and includes tsunamis, volcanic eruptions, hurricanes and other coastal storms, stormwater runoff, harmful algal blooms, and hypoxia, as well as these (and other) events in multiple forms.

Because of their episodic nature, these events do not receive the sustained research and management attention as do the chronic forces that compromise fisheries. This volume is based on a 2007 symposium designed to place these rare but inevitable dangers within a broader framework. Its skeleton is logical—within each section (by hazard) comes pre-hazard planning and ecosystem-response forecasting, the immediate response to the events, the planning of recovery actions and, finally, the implementation of those actions.

The authors stress the inclusion of humans in fishery ecosystems. Fishers have huge influence on these ecosystems prior to disaster, but they may suffer enormous consequences afterward, even

more than the ecosystem itself. When Hurricane Katrina and its sister, Rita, together ravaged 200 miles of Gulf coastline in 2005, 85% of the fishing fleet was disabled, nearly the entire fishery support system—supply, purchase, and processing—collapsed, and some fishers lost homes and family members. However, the less-than-effective governmental response caused many victims to give up the fishery lives that their families had followed for three or four generations.

Because it is largely based on papers that cover case histories, this volume does not represent an exhaustive view of all the potential impacts of every natural hazard possible. But it does provide a set of interesting real-world examples. And from these are offered a distillation for improvements to society's responses: calls for better monitoring systems, improved communications, the need to rectify vulnerable preexisting conditions and to encourage ecosystem resilience, and to use those disasters that do occur to leverage change so that the impacts of future events are sharply reduced.

JOHN WALDMAN, *Biology, Queens College, City University of New York, Flushing, New York*

RECONCILING FISHERIES WITH CONSERVATION: PROCEEDINGS OF THE FOURTH WORLD FISHERIES CONGRESS, VOLUMES I AND II. *Based on a symposium held in Vancouver, British Columbia, Canada, 2–6 May 2004. American Fisheries Society Symposium, Volume 49.*

Edited by Jennifer Nielsen, Julian J. Dodson, Kevin Friedland, Troy R. Hamon, Jack Musick, and Eric Verspoor. Bethesda (Maryland): American Fisheries Society. \$75.00 (paper). (I) xvi + 942 p.; ill.; no index. (II) xii + pp. 943–1946; ill.; no index.

ISBN: 978-1-888569-80-3 (two-volume set). 2008.

This two-volume collection of papers from a symposium held in 2004 focuses on reconciling fisheries with conservation. The proceedings are organized around four major questions, each anchored on the symposium's theme: What should we care about? (36 papers); Who owns the fish and what are they worth to society? (22 papers); Can we get more fish or benefit from fisheries? (20 papers); and How can we manage aquatic ecosystems? (36 papers). Two additional sections (36 papers) on examples from marine and freshwater habitats complete the proceedings apart from a useful reflective epilogue on whether the Congress delivered.

The editors had an unenviable task with such a diversity of papers that varied in their relevance to the theme. There was, of course, general acceptance among the contributors that the majority of harvested species, from shrimp to tuna, have been seriously depleted as a consequence of overharvest and habitat degradation. Solutions were diverse and

ranged from tinkering with quotas using biomass and yield per recruit estimates, shifting the harvest to species at lower trophic levels to access greater biomass, incorporating ethical values in setting more conservative quotas, accessing local community-based knowledge for developing fishing regulations, broader application of ecosystem-based modeling, incremental reduction of quotas to a level of preindustrial fishing (back to the future) as well as increasing numbers of artificial reefs and marine protected areas. Although the latter seem obvious, four decades after the importance of these were recognized, only 0.1% of the oceans are currently protected as no-take zones (see L. J. Wood et al. 2008. *Oryx* 42(3):340–351). Even in Canada, with an international profile in policy development and training of fishery scientists and where the Congress was held, less than 0.1% of its marine habitat is off-limits to fishery extraction.

I found that one of the most substantive deficiencies in the fishery/conservation conflict within these proceedings was the failure to examine ecological dissimilarities between human fishery extraction and that of natural predators. The latter have coexisted with a much larger prey biomass until our recent emergence as a major player. Apart from our quotas, which greatly exceed that of most individual predator species, humans are also distinctive in targeting and capture of the largest individuals of a species, typically the reproductive age classes and, at the same time, minimizing capture of early recruits such as juveniles (C. T. Darimont et al. 2009. *Proceedings of the National Academy of Sciences of the United States of America* 106:952–954). Yet the J-shaped survivorship curve that defines the overwhelming majority of aquatic species is driven by predators taking primarily fry and progressively fewer juveniles, subadults, and adults. At equilibrium, predation is on interest or recruitment every generation rather than on the reproductive capital. Throughout the proceedings and embedded in fisheries management, the increased presence of younger age classes in the catches is a proxy for overfishing and there is recurrent emphasis that protecting the juveniles is paramount. Ecologically, the issue is inverted as it is the capture of reproductive adults that is problematic, not that of the young recruits. In this context, the Congress did not deliver and the failure to grapple with these distinguishing attributes of the new supercompetitor and superpredator will continue to compromise most efforts at ecosystem conservation.

Despite this shortcoming, the two volumes are an up-to-date sampling of the histories and interpretations for the collapsing state of the world fisheries and aquatic ecosystems, and would be

useful for institutional library holdings. Occasional treasures within the proceedings, such as the prospects of large, multiple no-take zones, artificial reefs, and setting quotas based on preindustrial fishing levels, set a positive agenda for the future and rationale for the next Congress.

T. E. REIMCHEN, *Biology, University of Victoria, Victoria, British Columbia, Canada*



EVOLUTION

EVOLUTION: WHAT THE FOSSILS SAY AND WHY IT MATTERS.

By Donald R. Prothero; original illustrations by Carl Buell. New York: Columbia University Press. \$29.50. xxiv + 381 p.; ill.; index. ISBN: 978-0-231-13962-5. 2007.

The fossil record reveals a startling lack of transitional forms—or so we are told by creationist critics of evolutionary science. These doubters equip themselves with a variety of rhetorical tricks, but they seldom have any real understanding of the empirical fossil record. With his new book, Donald Prothero has made their position—never strong to begin with—even harder to defend. Example after example illustrates the plain fact that the fossil record, although undoubtedly incomplete, preserves an enormous number of evolutionary transitions.

The book is separated into two parts. The first part introduces readers to the nature of science, the fossil record, creationism, and evolutionary biology. Discussion of the fossil record mostly rebuts arguments of Young Earth Creationists, including a delightful dismantling of the claim that a worldwide flood can explain the exposed strata of the Grand Canyon. The second part of the volume systematically catalogs many transitional forms in the fossil record. After brief chapters on the origin of life, the Cambrian Explosion, and invertebrates, the next seven chapters explore the fossil record of vertebrate animals, with more popular groups (dinosaurs and mammals) receiving proportionately greater coverage. Repeated throughout these sections is the theme that documenting evolutionary transitions is not about finding direct ancestors, but instead involves tracing pathways of change on a highly bushy tree of life.

With respect to its main goal, this book is extremely successful: an open-minded person will almost certainly finish this volume with a deepened appreciation of the fossil record as an archive of evolution. Given its breadth, however, it is prob-