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Conservation Biology, by Michael E. Soule & Gordon H. Orians

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> communities, continuing the slow strangulation of the state's largest estuary, denying the original people of these islands their natural and constitutionally protected rights, and perpetuating a decades-old wrong.

Although we may have to wait for the sequel to learn how the final chapter unfolds for the Waiahole stream, the key ingredient necessary for a successful campaign is clearly present: volunteer citizen activists who have determination, perseverance, and a strong connection to the land and water resources they want to protect.

The same ingredient is present in the struggle to stop a mining company from reopening a gold mine near Yellowstone National Park; in the African-American communities in rural Louisiana who fought to stop an uranium processing plant; with the scientists, biologists, and foresters who risked their jobs and spoke up for the ancient Douglas firs and the northern spotted owls in Oregon; and with the uproar that killed a road-building project and restored the Anacostia River in Washington, D.C. What comes across loud and clear in *Justice on Earth* is that ordinary citizens who are willing to get engaged in their local and state legislatures, in Congress, in town hall meetings, and in the courts make all the difference.

REVIEWS

Conservation Biology. Edited by Michael E. Soulé & Gordon H. Orians. Washington: Island Press, 2001. Pp. 307. $50.00 cloth, $25.00 paper.

Conservation biology is no more than 35 years old. In the preface to this book the editors comment, "the main tasks of conservation biology are to provide the intellectual and technical tools to enable society to anticipate, prevent, and reduce ecological damage, and to generate the scientific information on which effective conservation policies can be designed and implemented." These are laudable goals; there is no debate that information is valuable when it comes to conservation decision making, and research is essential to maintain, update, and, if possible, enhance the knowledge base. The Society for Conservation Biology convened a workshop in April 2000 to update the conservation biology research agenda that had been articulated at a 1988 workshop. This book reports the views of the scientists who hail from four countries, primarily the United States, who assembled in 2000 to consider the issues.

What are the themes identified and how do the views of 38 contributing scientists judge the research priorities have changed between 1988 and 2000? In 1988 scientists judged that five areas were of highest priority. The five priority areas and the judgment of year 2000 scientists are stated in the Preface (xiv-xv).

Conduct a program of extensive surveys and mapping to identify areas that are critical for the protection of natural and genetic resources because of their high biotic diversity, or high levels of endemism, or because of imminent destruction of critical or unusual habitats and/or biota.

The 2000 experts judged this task had not been completed.

Establishment of a small number of research sites in the tropics to develop a coordinated program of comparative research on populations, communities, and ecosystems in relatively undisturbed and secure situations.

The 2000 experts judged that coordination of research themes among tropical field stations is till poor, no consensus has been obtained on a common set off research question, and a comparative science of tropical biology has yet to emerge.

Conduct studies at all spatial scales to assess the kinds, mechanisms, and magnitudes of impacts on ecological systems.

The 2000 experts judged this research agenda remained as important in 2000 as it was in 1988.

Enhanced support for research that focuses on the physiology, reproduction, behaviour, ecological interactions, and viability of individuals, populations, and species, especially with regard to species of critical ecological or economic importance.

The 2000 experts noted the growth in research in these areas but observed funding agencies have resisted supporting this field, perhaps because it is part basic and part applied science.

Increasing training for both basic scientists and natural resource managers, particularly in tropical developing countries.

The 2000 experts noted there have been exciting developments in this field, but the need is far from being met, in part because governments are alleged not to be adequately managing protected areas.

Ten major topics were identified by a steering committee before the 2000 workshop and one chapter is devoted to each major topic. Each chapter is co-authored by two to seven scientists, each assesses the current state of knowledge in the relevant topic, each includes extensive references (with close to 300 listed for chapter nine alone), and each of the ten main chapters concludes with boxed lists of research priorities. The ten major chapters traverse important topics as indicated by the chapter titles: Assessment and Management of Species at Risk; Human Alterations of Food Webs: Research Priorities for Conservation and Management; Exotic Species and Conservation: Research Needs; Habitat Fragmentation: Consequences, Management, and Future Research

Priorities; Conservation Priorities for Soil and Sediment Invertebrates; Oceans at Risk: Research Priorities in Marine Conservation Biology; Conservation Biology and the Health Sciences: Defining the Research Priorities of Conservation Medicine; Global Environmental Change: Effects on Biodiversity; and Making Smart Conservation Decisions; Ecological Restoration: A Key to Conservation Biology's Future.

The Preface (xvi) states that the audience for this book includes "scientists, resource managers, and funding agencies throughout the world." How valuable is the book likely to be for those readers? The range of topics examined is impressive, the writing quality is excellent, and the current state of knowledge and the research priorities listed in each chapter are built upon careful surveys of the relevant literature and the authors' own research and field knowledge. Recognising that the authors are employed in just four countries, the United States, Great Britain, Australia, Canada, but work in many more countries, the book is likely to be valuable to readers who want an expert overview of biophysical aspects of conservation biology.

There are some issues that should be noted when weighing the potential contribution of the book. Conservation biology is described as "a legitimate interdisciplinary science." (Boersma, p. x) The Foreword, Preface, and introductory chapter all comment on the threats to nature conservation and to biodiversity that a world of 6.25 billion people and a rapidly growing world economy pose. Boersma goes on to state, "Conservation biologists must provide insights not only into what makes the tapestry of life but also how we can maintain it, support it, and enrich it while using its services to support human life. Conservation biologists must provide much of the knowledge and help society to use it wisely." Orians and Soulé comment that "conservation biologists consider the preservation of species to be an ethical responsibility." Highlighting the ethical aspect of species preservation may blind some readers to the economic aspects of species preservation. Preservation of species requires allocation of habitat that might otherwise be used for other purposes—habitat might be used for agriculture, logging, or fishing. There are almost always opportunity costs for terrestrial habitat and for coastal habitat. Species conservation is costly. Control of invasive exotic species, threatened species breeding programmes, conservation advocacy, and education all require labour, capital, and other inputs from the economy. Explaining why species and habitat become threatened, measuring the costs of species conservation actions, and searching for the most cost effective ways to select habitat and to manage threatened species requires asking economic questions. Focusing on those and related economic questions is essential to understanding why species preservation is such a difficult challenge and to developing sustainable policies to combat threats to habitats and

species. There is a burgeoning economic literature on these topics (Swanson 1994, Barbier 2001, Hughey et al 2003), but readers will not find any references to that research in this book. The index contains no entries for cost, cost effectiveness, economics, economies of scale; economies of scope, effectiveness, or opportunity costs.

To their credit, some chapters of this book focus on these issues, most noticeably chapters two and ten. Chapter two explores which species are likely to become at risk, why they are more likely to become at risk, and how the effectiveness of management and implementation strategies can be assessed. Chapter ten focuses on Decision Theory and how it has been used in conservation, and on monitoring and performance evaluation. These two chapters are likely to be of considerable value to resource management and funding agency readers who are concerned with where their efforts and scarce resources are most likely to contribute to species preservation. Conservation biology is likely to become more effective if it asks more conservation economic questions and if it builds on insights from that research. Perhaps the next volume on research priorities will report good progress in that direction.

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Alternative Futures for Changing Landscapes: The Upper San Pedro River Basin in Arizona and Sonora. By Carl Steinitz, Hector Arias, Scott Bassett, Michael Flaxman, Tomas Goode, Thomas Maddock III, Dave Mount, Richard Peiser & Allen Shearer. Washington: Island Press, 2003. Pp. 202. $60 cloth, $30 paperback.

Alternative Futures brings together many of the interconnected strands of issues related to the Upper San Pedro River Basin and describes the future ramifications for each of a variety of policy options. By utilizing an innovative GIS-based simulation modeling approach, this in-depth work is like a crystal ball that allows one to gaze into the future. The book allows the reader to select the issues that are of most value