

## Life, the Universe, and Everything

**The Idea of Biodiversity: Philosophies of Paradise.** Takacs, D. 1996. Johns Hopkins University Press, Baltimore. 393 pp. \$35.95. ISBN 0-8018-5400-8.

This may be the beginning of what some have been afraid of—that through our advocacy as concerned scientists we may lose the status as objective high priests of data analysis and be relegated to a status of just another bunch of citizens with an agenda. To win the battle to save the Earth, scientists are going to have to become activists, and many conservation biologists already have. The most prominent of them are interviewed for this book: Ehrlich, Janzen, Wilson, Raven, Noss, Soulé, Lubchenco, Pimentel, Brussard. The list goes on.

Takacs warns the readers to be sophisticated readers, questioning the motivation of the scientist who has left the cover of dispassionate objectivity to further an agenda in which he, like Wilson, has “woven an elaborate resource web, at whose center he sits” controlling “so many of the resources we would need to solve the problems he has defined.” It’s a cynical book, presenting a view, basically, that the term *biodiversity* was coined to manipulate public opinion and policy. Unfortunately, it doesn’t have much depth. It picks up in the chapters that contain the statements of the interviewees—major forces all. This is a book in which eminent scientists think out loud about the dangers of expressing values in the public sphere.

Science without advocacy isn’t working. Of course, science has been outrageously successful, but

the world is going to hell. At the level at which conservation policy is operating, it takes only a little science, but lots of policy work, lobbying, and depositions by people who understand the importance and the needs of biodiversity. Perhaps we are more effective as concerned citizens, activists, and policy makers. We’ve had “objective” science for a long time—and see where that got us . . . Takacs does not deny this, or want us to abandon advocacy. On the contrary, he advises us to acknowledge the role of values in science and use it to our advantage. He says, “To science studiers, all facts are value-laden.” Takacs reiterates Hume’s distinction between *is* and *ought*, which, amazingly, is so often overlooked even by academics. That values make us less effective as scientists is a myth. Describing what *is*, is our job. Fighting for what *ought to be* is our life and our driving force. “If [biologists] fail to convey clearly what biodiversity is, why it matters to them, and why they should be permitted to speak for it, not only may biologists lose status as trusted spokespersons for conservation; they also jeopardize the enormous amount of conservation momentum that has gathered behind biodiversity.”

We need a new ethic. “No important change in ethics was ever accomplished without an internal change in our intellectual emphasis, loyalties, affections and convictions” (Aldo Leopold). We do not need a genetic *biophilia*—an adopted one will do nicely. We can be spiritual about nature without positing a genetic mechanism that is far-fetched and group-selectionist.

I am slightly at a loss as to the book’s audience. To anyone wondering what *biodiversity* adds to the old *species richness*, or even *nature*, this book may cast a light that others have not. Some chapters are rife with war prose, and there *is* a war out there. To those of us in the trenches, it may serve to invigorate by reporting the thoughts and drives we share with others in the field. To those on the verge it may give moral support to join in the fray, seeing that others have done so and survived. And to those on the outside, it may illuminate the struggle and show why we’re doing what we’re doing. But it misses the boat for those of us who are wondering what *we* can do—those of us who are not Paul Ehrlich, or Dan Janzen, or Peter Raven. It does not speak to the battles that must be fought—overpopulation, overconsumption, and the omnipresence of humanity. It does not speak of the evils of anthropocentrism.

Many of us will find that the book surveys our concerns and our fears, but provides no answers—which is what we seek. The concluding chapter offers some PC drivel about the need for “eloquent articulation of the profuse and insidious ways in which the haves benefit at the expense of the have-nots”—with no demonstration that this is indeed necessary. It cites the need for “new laws and new lifeways that will debilitate the forces destroying biodiversity and human lives.” Indeed, but like everybody else Takacs offers no suggestions as to how we can get there. Again, Takacs warns of the self-interested rationalizations of conservation biologists, “who by evad-

ing the sociopolitical factors that require us to fence off and protect land in the first place, do nothing to mitigate the forces of destruction." "Other suggestions for saving biodiversity, such as the proposed infusion of resources into insect taxonomy, seem an even more obvious avoidance of the deeper problems" (p. 334).

In the preface, Takacs states that "we need a more sophisticated, more creative, more critical, more joyous understanding of wild nature, human nature, and the bonds between them." More than that, we need a new ethic; a revolution in how we deal with other species and nature, our place in nature, what it means to have a good life, and how we interact with other species. To counter the evils of anthropocentrism, we need a new ethic that includes other species on par with humanity. Those who recognize the threats to biodiversity and wild places have a right to fight for what they value and a responsibility to spread the word.

As scientists, we have knowledge of the natural world that others do not and cannot avail themselves of. Yet when trying to tell the world why biodiversity is important, we often scorn the arguments of economic value, scientific value, or even ecological value, for the emotional values we find in nature. We switch away from scientific arguments to philosophical/ethical ones because these are overarching and more persuasive. There's an audience for that. Who else is there to speak for biodiversity? Why should the mediation of values be left to priests, philosophers, poets, or politicians? Hume would concur.

Scientists should not be afraid to speak of emotions and their deep affinity for the natural world, wild places, or their favorite organisms. Life is not worth living in a world without Siberian tigers.

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## Updated *Principles*

**Principles of Conservation Biology. Second Edition.** Meffe, G. K., C. R. Carroll, and Contributors. 1997. Sinauer Associates Inc., Sunderland, Massachusetts. 729 pp. \$54.95. ISBN 0-87893-521-5.

The publication of the second edition of *Principles of Conservation Biology* represents the rapid maturing of conservation biology as a scientific discipline. When the first edition appeared in 1994 there was a scarcity of textbooks on conservation biology. Although the number of options for course material has increased considerably since then, the new edition of the "bible of conservation biology" remains the most comprehensive textbook and reference currently available on the subject.

As the title *Principles of Conservation Biology* reveals, the epos deals with the foundations of conservation biology, a field as diverse as life itself. The book contains an incredible wealth of information including all the main components of conservation biology. The extensive coverage of the subject has necessarily resulted in a thick book. The first edition of the book was described as a "massive tome of 600 pages" (*Conservation Biology* 9:222-223), whereas the second edition of the tome has become even more massive with its 729 pages.

In addition to a generally updated treatise on conservation biology, the main developments in the second edition are the focus on ecosystem management and a new section dealing explicitly with conservation policy. Increased emphasis on ecosystem management is an appreciated effort to clarify the terminology, philosophy, and methodology of this popular but controversial approach. The conservation policy issue has been expanded considerably by including a new chapter entitled Conservation Biologists in the Policy Process: Learning to be Practical and Effective. Expansion of this theme

was quite expected because the authors anticipated in the first edition that "one of the greatest potentials for progress in conservation is within the political and economic realms."

The volume is divided into four parts (Introductory Concepts, Population-Level Considerations, System-Level Considerations, and Practical Applications and Human Considerations), which in turn contain a total of 19 chapters. The book begins by setting the stage with a description of the most important concepts including definitions and history of conservation biology and biodiversity and an account on ethics. The sections on ethics and biodiversity are especially comprehensive and well-balanced. The history of conservation biology, on the other hand, is fairly short and describes and emphasizes developments in the United States.

The second and third parts of the volume deal with the biological principles of conservation biology and are divided into genetic, population, and community-ecosystem levels. The section on genetics and conservation is a good introduction to the topic, but as emphasized by the authors, the reader is assumed to have a working knowledge of basic genetics. The population-level treatment is a fairly short (ca. 30 pages) but comprehensive summary of the key concepts. However, some new developments in population biology with promising possibilities of application in conservation biology are only briefly treated. For instance, recent metapopulation studies demonstrating the potential use of the approach in nature conservation and management would have merited a more extensive analysis.

The chapter on communities and ecosystems deals mainly with species interactions and disturbances with relevance to conservation. Moreover, the effects of invading species receive considerable attention. The next chapter provides a detailed treatment of the complex issues re-

lated to habitat fragmentation. The focus, however, is again on the United States, and many illustrious studies from other parts of the world remain unmentioned. The last pages of part three are devoted to the design of conservation reserves in heterogeneous environments. This section draws on recent literature and highlights the importance of the landscape context in reserve design.

The fourth and last part of the volume entitled Practical Applications and Human Considerations discusses first the principles of ecosystem management and provides detailed examples of several successful ecosystem management projects. After a short section about ecological restoration, the rest of the book deals with politics, economics, conservation education, and related policy and societal issues. This part of the book is very thorough, especially the concept of ecosystem management and its applications.

Overall, the book covers well all the main principles of conservation biology and reflects the current thinking in the field. Issues related to society, policy, and practical applications have received considerably more attention than in the first edition of the book. It is interesting to note the number of pages the authors devoted to the various topics of conservation biology. The first part (introduction and definitions) covers some 150 pages, the two parts about biological principles cover in total some 180 pages, whereas practical applications and human considerations (Part IV) covers about 330 pages. If these figures are proportional to the importance of the various components, it appears that "managing people" is the most urgent task in contemporary conservation biology.

The book is structured in an appealing way. The body of text is supplemented by short essays related to the topic being discussed and providing new approaches to the themes. In addition, there are boxes that deepen the treatment. The essays

and boxes have been authored by tens of leading conservation biologists with backgrounds in conservation research and management.

Although the volume is a thorough treatment of conservation biology, the overall emphasis on the United States is somewhat disturbing to a non-American reader. For instance, 11 of the 12 chapter authors are from the United States, and only a handful of the authors of the circa 80 essays and boxes are non-Americans. Furthermore, the principles of conservation biology are mainly drawn from studies conducted in North America. There is undoubtedly good conservation research being done there, but including more of the excellent work carried out elsewhere in the world would have contributed considerably to the book. A book providing a truly international approach to conservation biology with authors, approaches and examples from different parts of the world would enable us to reach a more complete understanding of this complex field and would help us in developing a global perspective on the conservation and sustainable management of Earth's biodiversity.

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### Cutting off the Rhino Debate

**Horn of Darkness: Rhinos on the Edge.** Cunningham, C., and J. Berger. 1997. Oxford University Press, Oxford. 256 pp. \$25.00. ISBN 0-19-511113-3.

In 1989 Namibia became the first country to dehorn black rhinos (*Diceros bicornis*) in an effort to reduce poaching mortality, thus creating a controversy that has attracted much international attention. With the hope of obtaining data useful to rhino conservation efforts, Cunning-

ham and Berger traveled to Namibia in 1991 to investigate the population biology of black rhinos and the efficacy of dehorning. Because they had not worked previously on rhinos or in Africa, their initial efforts were without much success, but they ultimately accomplished three seasons of data collection. During this time they began publishing their results, some of which drew unfavorable attention to the dehorning program. As a result, they became enmeshed in the politics of conservation, which led to their giving up their fourth field season when it appeared that permits would not be forthcoming to continue their research.

*Horn of Darkness* presents a personal account of the authors' field work during the 3 years they were in Namibia. Cunningham and Berger are a well-seasoned team, who have studied the behavior and population biology of several large mammals. Both work at the University of Nevada, Reno where Berger teaches in the Program in Ecology, Evolution, and Conservation Biology. Their account provides an honest perspective on the reality of difficult field work, the deprivations, logistic screw-ups, the dedication required, but also the freedom and satisfaction gained. Throughout the book they take separate authorship for the chapters and include journal entries that add perspective to both the project and their lives together. Some of the writing gets bogged down with travelogue trivia, but overall the tale is well crafted and interspersed with drama and intrigue. An added dimension to their work was the presence of their daughter who begins the adventure as a rather young research assistant of just 19 months.

Their research was initially welcomed by many as an opportunity to provide an independent assessment of the dehorning project, whereas others anticipated their efforts would amount to just "more Americans bumbling around in the bush." In the beginning, the pair seemed to fulfil the latter expectation, and one

begins to wonder what these neophytes to the African bush can accomplish. That they survived the experience seems to say as much about luck as anything. But it is all part of the tale they weave, and by acknowledging their own limitations and getting the help they need, they are ultimately successful and get on with collecting the data. Their growing friendship with a Namibian tracker who worked closely with them brings an understanding of the lives of those in the many small communities who are strongly affected by wildlife management decisions.

As the book progresses, the politics of conservation begin to surface and with it comes a breakdown of communication and trust. This ultimately builds to a story of frustration, misunderstandings, a project that needed more data, and two scientists leaving the country shortly after arriving for another field season. Of interest to other biologists in similar situations is the realization that the support they had built for their project was undermined by a decision to publish controversial results before completion of the study. Reaction to their findings and the surrounding publicity called into question the policy of dehorning and put the Namibian government, and organizations supporting dehorning, in defensive positions. In the end, the politics of conservation dominate and the authors set themselves up as examples of how things can get rapidly out of hand. In some cases, the authors do not spare the details of unproductive encounters with particular individuals who come across in rather negative terms. Whether this is helpful to the story or to the larger goals of conservation is unclear. It surely results in a one-sided interpretation and one is left with questions about the other side of the story.

Do not expect a presentation of data or scientific objectivity, although some results are discussed toward the end of the book. Importantly, a tentative conclusion is drawn

that calf survival is compromised in regions where hyenas are also present, presumably because dehorned females are unable to defend them. Unfortunately, this important conclusion suffered from small sample sizes and was not uncovered until the end of their third season when it was too late to focus on this issue.

The reader comes away with an appreciation of the enormity of problems that can be encountered in obtaining reliable data and a confirmation of the human dimension to conservation efforts, both positive and negative. *Horn of Darkness* is well worth reading and provides valuable insights for students of conservation biology and those involved in research on "political species."

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### **More Protection, Less Participation**

**Last Stand: Protected Areas & the Defense of Tropical Biodiversity.** Kramer, R., C. van Schaik, and J. Johnson (editors). 1997. Oxford University Press, New York. 242 pp. \$39.95. ISBN 0-19-509554-5.

That loud creaking sound you hear is the biodiversity pendulum beginning a slow swing back toward preservationism. In the broadest sense, *Last Stand* is the latest installment in a century-old debate between the philosophies of preservation and conservation. Although the debate dates back to the turn of the century, this book calls for a refreshing new brand of preservationism. Rather than swing back to a fortress approach, the pendulum comes to rest at a midway point—one with ample allowance for political realities, local participation, and economic development.

The book emerged from a 1993 workshop at Duke University. The

goal of the workshop was to explore realistic ways to increase protection of fast-disappearing tropical ecosystems. The contributing authors are leading voices in international conservation, representing fields ranging from ecology and political science to economics and development sociology. Having a diverse and distinguished group tackle a difficult conservation subject is no longer unusual. What is uncommon, however, is their consensus that conservation efforts should emphasize stricter protection of parks, rather than focusing on needs of local residents. The authors make a compelling case for redirecting biodiversity conservation efforts away from the prevailing sustainable use paradigm and toward a renewed commitment to maintaining inviolate protected areas.

Each of the 10 chapters builds a case for a stronger commitment to protected areas as the cornerstone of a global conservation strategy. In "Preservation Paradigms and Tropical Rain Forests," Randall Kramer and Carel van Schaik describe how the majority of international conservation projects emphasize community development rather than protection of biodiversity and that the two are not always compatible. Their message is not antidevelopment, but that development should be secondary to the larger goal of biodiversity protection.

The next three chapters justify heightened efforts to protect tropical biodiversity. First, John Terborgh and Carel van Schaik describe key threats to rain forests, concluding that strictly protected areas must serve as the last bastions of nature. Next, Kathy MacKinnon cites numerous examples from parks around the world to provide an ecological foundation for protection of biodiversity, with preservation of tropical rain forests and large parks as priorities.

Chapter 4 presents an intriguing contradiction. It is lacking in scientific rigor, yet may be one of the most important conservation writ-

ings of the decade. With "The Silent Crisis: The State of Rain Forest Nature Reserves," Carel van Schaik, John Terborgh, and Barbara Dugelby take on the formidable task of assessing the condition of parks in the tropics. The authors openly acknowledge that the chapter is necessarily based on meager data, anecdotal information, and a crude quantification scheme. Surveying 203 parks in 17 countries, they come to the unpleasant conclusion that "... the final bulwark erected to shield tropical nature from extinction is collapsing." Paper parks and the magnitude of their threats are even greater than expected. In fact, "most rain forest parks are faltering and are in urgent need of rigorous protection."

Chapter 5 may also be destined for wider readership. Katrina Brandon convincingly debunks seven popular assumptions that have long held the center stage of biodiversity conservation. En route, Brandon insists that parks are not being well maintained. "It seems as though there are fewer advocates for stronger protection and reduced use—a position that is now tantamount to being the bad guy." Additionally, "... what is being called conservation is no longer conservation. The majority of conservation efforts are in fact large and complicated social programs." Finally, "... the attention to sustainable development and poverty alleviation, while important, does not directly address environmental issues—much less biodiversity conservation in particular. If anything, these concerns broaden the agenda and dilute the message." Brandon's chapter will be blasphemy to the peace, love, and participation crowd. Its strength stems not just from the message but from the sociologist messenger. As a leading authority on human aspects of conservation, Brandon was instrumental in getting the plight of local residents onto the conservation agenda, and turning "people and parks" into a rallying cry for the nineties. In this

chapter she reminds us that the bottom line is still protection of biodiversity.

Other chapters address biodiversity politics (Steve Sanderson and Kent Redford), biodiversity user rights (Marie Lynn Miranda and Sharon LaPalme), benefits and costs of parks in the tropics (Randall Kramer and Narendra Sharma), and use of compensation and economic incentives to relieve pressure on parks (Paul Ferraro and Randall Kramer). In their chapter on compensation, Ferraro and Kramer discuss types and uses of incentives. They note that, "... although many proponents of conservation appear to be uncomfortable with or skeptical of the use of economic incentives, they often fail to recognize that economic incentives are driving the degradation in and around protected areas. Thus, in order to protect these areas, it will be necessary to alter these incentives in ways that promote conservation goals."

The book culminates in four principles for designing solutions to the problem of conservation in the tropics. First, active protection (law enforcement) should be a fact of life for protected areas. This may be unpalatable to optimists who believe that sufficient education, incentives, conflict resolution, and local empowerment will safeguard parks. Second, people throughout the world who receive indirect benefits from parks in the tropics should be asked to pay for these benefits. That means you and me. Third, national and international involvement in management of a country's biodiversity is justified. Finally, the authors recommend limits to the current devolution revolution, stating that delegating management authority to local entities should not preclude stakeholders at the national or international level from having a voice in park decisions.

The book is well written and breaks considerable new ground; however, it is not without shortcomings. For example, Chapter 4 claims

that protected area degradation is caused both by locals ("small players") and by organized elites ("big players") who build mines, dams, and plantations. The distinction is useful but incomplete. A more thorough assessment would include the key role played by nonlocal residents. After all, who consumes the petroleum taken from the Maya Biosphere Reserve? Who purchases the rings and other jewelry made from the gold mines of Corcovado National Park? The root cause of destruction may be neither local nor elite. The web of causality is exceedingly complex. It was surprising to see economists ignore something as basic as international consumer demand for rain forest products.

A second area of concern is an overly sanguine view of industrialization and urbanization as solutions to parks' problems. One author maintains, "... the most effective long-term solution is to provide aid aimed at improving urban infrastructure elsewhere that encourages industrial development." Such an approach will likely relieve pressure on parks, but at what cost? The increased pollution and resource degradation caused by newly industrialized countries and their superconsumers may lead to even greater environmental problems than before.

Finally, the authors could provide greater balance in their treatment of some subjects. For example, there is no mention of Costa Rica and its relatively successful park system in the review of park conditions in the tropics. Similarly, the call for large parks ignores recent research into the surprising ability of forest patches to support biodiversity. Finally, the discussion of war's adverse impacts on biodiversity neglects to mention any potentially positive results. In Sierra Leone, for example, civil unrest may be slowing deforestation and promoting forest regeneration because thousands of would-be swidden agriculturalists are afraid to farm. Far from weakening their position, acknowledging these and other

opposing views could lend additional credibility to the authors and their message.

Overall, the book provides a much needed wake-up call for the conservation community. It demonstrates the key challenges of conservation, as well as potential solutions. It shows that high levels of interest in biodiversity have not sufficiently translated into real protection. It reminds us that today's conservation rhetoric is a far cry from reality. While the clever title *Last Stand* could refer to a final battle or to a grove of trees, the book's main message is crystal clear—a system of large and well protected parks must still be the cornerstone of all conservation strategies aimed at limiting the inevitable reduction of the planet's biodiversity.

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### Unified View of Tropical Fragments

**Tropical Forest Fragments. Ecology, Management, and Conservation of Fragmented Communities.** Laurance, W. F., and R. O. Bierregaard (editors). 1997. University of Chicago Press, London. 616 pp. \$38.00. ISBN 0-226-46899-2.

People around the globe have always been proud of their tropical forests. High rainfalls and warm humid climates have imparted to the flora and fauna an extraordinarily high richness and diversity that is matched in few other habitats. In the past natural changes in global topographic, edaphic, and climatic patterns have largely determined the distribution of the world's tropical forests. Within the past half-century, however, an increasing number of anthropogenic factors have overwhelmed climate as prime determinants of the extent and nature of these ecosystems.

The management of tropical forest fragments and their associated floral and faunal communities, presents enormous difficulties. This task is complicated by several factors: the recent and explosive growth of the field; the widely varying approaches of different investigators; the diversity of land use histories; poor information on the community ecology of most fragments; and the enormous natural variation inherent in the tropical forest biome. Diverse social, political, and economic factors heighten the complexity of these problems. These complications formed the impetus for a symposium (and subsequent workshop) at the 1995 annual meeting of the Ecological Society of America, which resulted in this fine book edited by Laurance and Bierregaard. This volume draws together information about the economics, ecology, management, and conservation of tropical forest fragments and is arguably the most comprehensive compilation of tropical fragmentation studies yet produced.

Its contributions are organized into seven main sections, each containing highly eclectic chapters spanning a range of taxa, research questions, and biogeographic regions (the New World Tropics and Australia are particularly well presented, with smaller contributions concerning Africa and Southeast Asia). The first section (two chapters) examines the scale and economics of deforestation—the rate of forest loss on both pantropical and regional scales and the economic factors that contribute to deforestation in tropical nations. The second section (four chapters) presents research on physical processes and edge effects (i.e., microclimatic changes associated with the margins of forest fragments and their influences on plants and leaf-litter invertebrates). The third (11 chapters) is by far the most extensive, describing the effects of fragmentation and forest clearing on the diversity, abundance, and biomass of tropical forest faunas from butterflies, centipedes,

frogs, and birds to small mammals. The five syncretic chapters in section four encompass both plants and plant-animal interactions: the persistence of higher plants and vertebrates within anthropogenic fragments; the recolonization of matrix habitats by plants; the genetic fate of fragmented tree populations; the interactions of trees and their seed predators and dispersers; and the effects of habitat loss on rare endemic plants.

Any scientific review of environmental problems, no matter how comprehensive, is ultimately of little use unless these can be practically addressed. As a prime objective, this book highlights the range of solutions needed to manage tropical forest fragments in light of current knowledge. The emphasis in section five (four chapters) is on applied methods, tools, and technologies that can contribute to landscape management and restoration, especially in terms of mitigating the effects of forest fragmentation. The first two chapters focus on the restoration of degraded lands or forest remnants, whereas the last two highlight the use of remote sensing technology and geographic information systems (GIS) in landscape management. The four chapters in section six all focus on the challenge of identifying key areas for nature conservation: the first assesses the rate of deforestation and the adequacy of existing nature reserves in western Madagascar and the latter three employ phylogenetic or biogeographic approaches to identify centers of tropical biodiversity.

Every section in *Tropical Forest Fragments* opens with an informative overview of the chapters that follow, and each chapter concludes with a list of the general implications arising from that research. Additionally, the final section of the book (comprising three key chapters that summarize the volume) offers a concise and informative synthesis of important concepts discussed in the volume and forwards

some challenging new perspectives. Crome presents a thoughtful and lively critique of tropical forest fragmentation that challenges researchers to think carefully about fundamental conceptual and methodological issues that plague not just fragmentation research, but much of contemporary science. Laurance and 14 others go on to discuss a wide range of concepts concerning the study, management, and conservation of fragmented tropical landscapes: the kinetics of extinction, species invasions, edge effects, hyperabundance, and higher-order effects. The final chapter, compiled by Bierregaard and 14 others, highlights essential priorities for future research focusing on methodological and socioeconomic issues, species-level and community-level inquiries, and resource management and conservation.

This book was fostered by the need to consider carefully the future of the world's tropical forests; however, its information and implications have a far wider significance. That is, many of the difficulties inherent in the struggle to adequately manage tropical forest fragments are applicable to a multitude of landscapes. Thus, *Tropical Forest Fragments* is compulsory reading for biologists, resource managers and policy makers researching tropical forest fragments, as well as those interested in landscape ecology in other fragmented systems. It is a well presented, informative and practical compilation of works that explore a plethora of key issues pertinent to the conservation and management of tropical forest fragments.

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#### Scholars at Sea

**Saving the Seas.** Brooks, L. A., and S. D. VanDeveer (editors). 1997. Sav-

ing the Seas. Maryland Sea Grant, College Park, Maryland. 480 pp. ISBN 0-943676-62-2.

*Saving the Seas* brings together a diverse group of scholars to explore the philosophical, ethical, sociological, political, and ecological aspects involved with the conservation and use of enclosed large water bodies. Most of the discussion is, however, equally applicable to other ecosystems and resource commons and will, therefore, interest conservation biologists interested in following the increasingly sophisticated and interdisciplinary debate over the man and nature dyad. In this volume authors explore the normative thinking and behavior of scientists, citizens, and political leaders concerning common resources rather than ecological technicalities. Most authors believe that novel and parochial ecological and cultural processes dominate ecosystems and that making generalizations and predictions from other systems is foolhardy. Success, as viewed by these authors, is seldom purely an objective measure of an ecological structure or function but, rather, the development of a process of human self-organization with nature. This process will ultimately allow for the adaptation of human uses and organizations around resources that have no clear boundaries and owners, and that are fundamentally unmanageable, at least in a highly predictable, scale-independent, or mechanistic manner.

Many of the authors echo Mark Sagoff's contention that the citizenry's fundamental view of nature, as utility or place, is often most important in determining successful resource management. Restoration of nature, as espoused by many green movements and conservation biologists, is seen by Robert Nelson as a neotheological concept. Given this subjective view of resource management what roles do conservation scientists play? Conservation scientists' most important role is to recognize

and measure the important natural processes and to use this information to help structure the political debate over appropriate decisions concerning technology and management. Peter Haas argues that because scientists share a common methodology they are part of the citizenry that can greatly influence the nature and outcome of management debates and that many of the present management successes such as the Mediterranean Action Plan were successful because of the heavy involvement and reliance on this scientific citizenry. Scientific methodology and those that use it have a greater ability to transcend an otherwise largely selfish political process of determining resource use and to rely on principles of precaution rather than economic cost-benefit analyses.

This view may be disheartening to those who hope to achieve an a priori objective management that avoids ecological and resource-use disasters. But, it seems that these disasters are the nucleus for human and scientific exploration and organization around resources that can form the basis for the learning required for adaptive management. One problem, however, is that ecological processes are slow enough that, until recently, few human organizations, other than myths and legends, have been able to store the information required for management. If our myths and legends are no longer relevant in a changed world, are we then perpetually doomed to do too little too late because of insufficient institutional memory? Science can play a role in this institutional memory as well, but science is still young and there is sufficient cause for cynicism for both society and science. There are, however, many examples where the outcomes of this cynical view have been thwarted by concerned people.

The book gives many examples of organizations that have mobilized in support of the precautionary principle of resource use rather than the

selfish short-term interest. It surprised and comforted me to read about the numerous NGOs that have organized under different political systems as diverse as the North American Great Lakes and Hungarian Rivers. Even dancing with the devil is recommended by Virginia Hauffer as a way to encourage greener corporations. Consequently, can we live with the more optimistic view that we are all in this together and the we will somehow work it out? The conclusion of Michael Thompson and Alex Trisoglio is that there is no other way, that any other way is pure folly and that we “must put these ideas, the theory of surprise, scenario planning, artificial life and clumsy institutions together, add some intellectual spice and get Auntie Flo to stir the whole lot vigorously—and a much more productive way of managing ourselves in the midst of the unmanageable may emerge.”

Whether we can be optimistic or not may depend, according to James Rosenu, on the type of citizenry and priorities we can expect from Aunt Flo. He concludes that major developments are required to sway us

from our self-centered relationship with the world, we are susceptible to the bandwagon effect, and that the inability, for rational science and management, to promise early and satisfying benefits can result in reluctant aunties susceptible to information distortion and erosion. Consequently, disasters and changes in nature have the ability to refresh our minds. Again, an important role of scientists is often to make constituents aware of these changes and disasters without sounding like lonely shepherds.

I hope most conservation scientists, after reading this book, will take some satisfaction in their important role as stalwart shepherds. I worry, however, that some of the scholars' conclusions are self-aggrandizing and that successful conservation should be dependent more on some objective measure of resource quality and less on the citizens' ability to get along, listen carefully to scientists, and to hold dear to green values. I found Frieda Taub's description of the highly predictive response of Lake Washington to reduced phosphorous loading and the

reason for the present predictive limitations of ecological science as an outline toward a more objective means to measure success and delineating its limitations. Her chapter reminded me that ecology is still young and these limitations, when carefully examined, are not necessarily as insurmountable as ecological relativity and chaos-loving scholars might suggest. I believe the ultimate hope for conservation and wise use of resources will occur as conservation scientists inject greater ecological objectivity into the political debate and management decisions. Most would agree that science, citizenry, and values are the important ingredients, but we may quibble about proportions. It is clear that more investigation is required to learn about nature, including the portions and stirring used by Aunt Flo, and this book is a useful contribution toward this goal.

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