parian wildlife. The approach is from the community level, highlighting physical and biotic interactions at varying spatial scales. This section most resembles material from a classic stream ecology text, but is modern in content and presentation. Material here is universal among regions. (3) "Ecosystem processes" is the longest section of the book and covers what is often termed "ecosystem ecology" from the standpoint of process, structure, and function. There is no systematic organization among chapters of this section; rather, it includes both spatial (e.g., landscapes, riparian forests, hyporheic zone) and functional approaches (nutrients, woody debris, trophic dynamics, biodiversity). Disturbance and effects of human activities are recurring themes in this section. (4) "Management" spans monitoring and assessment, including statistical considerations and broad-scale and community approaches, but also covers sociopolitical topics, such as social organizations, economics, and law. And finally, (5) "The future" focuses on watershed management and restoration, and includes a curious but interesting discussion on the role of nonprofit groups in conservation and an insightful closing on watershed ecosystem management and strategies for the future.

The book was designed to synthesize the many advances in stream ecology and management of the last two decades and was developed around the premise that an understanding of fundamental ecological and social processes will lead to improved management. The chapter authors are primarily faculty and students of University of Washington and resource professionals of the U.S. Forest Service, but include contributors from other institutions and the private sector, mostly located within the region. Organization of the book is logical; writing and figures are clear; typographic errors are present, but few; the index is adequate; and the overall appearance is attractive. Each chapter opens with an overview in the form of a bulleted list of paragraphs, and each concludes with a literature cited section. The amount and quality of literature cited constitutes a useful resource in itself. There is some redundancy among chapters within the book and with those of other recent books, but overall the compilation and synthesis of this material should prove valuable.

It is unclear to me what niche this book will fill in education, research, or management. While I view its most appropriate application as a graduate or upper-level undergraduate stream ecology text, faculty and students from other regions may be hesitant to embark on such an in-depth course of study of the Pacific coastal ecoregion. However, the wealth of science and literature in the book renders it a useful summary and reference for aquatic and watershed researchers, and most of the concepts and applications extend beyond the ecoregion. Most importantly, this book should be required reading for all ecosystem and natural resource managers of the Pacific Northwest—aquatic, terrestrial, or social. The lessons to be learned from the history, conceptual paradigms, research findings, and management approaches presented in this book are many and varied and would benefit managers of other ecoregions as well. I recommend the book to all of the above, but this is an advanced treatment of the subject and less suitable for the lay reader or students of unrelated disciplines.

Unfortunately, the hefty price of this book may limit the breadth of the niche it will occupy. At first glance, the cost of this book ($189.00) may appear excessive, but upon further examination, it is reasonable, compared to other recent publications. The cost per printed page of Naiman and Bilby's book is $0.27—not out of line for hardbound volumes of comparable quality. Three recent aquatic ecology texts from other publishers cost $0.11, $0.12, and $0.44 per page. However, to the relief of students and scientists of stream ecology, the latter three books are also currently available in paperback edition at substantially lower prices ($0.06, $0.08, $0.15 per page). In time, a paper cover edition of *River ecology and management: lessons from the Pacific coastal ecoregion* would be welcomed by the scientific community and would surely increase the access and utility of this important work.

Many of the "lessons from the Pacific coastal ecoregion" were learned the hard way, through trial and error and unplanned experiments. Most of the case studies and examples presented are from this region, but the messages are universal. This book provides a benchmark of the current state of our knowledge of stream ecology and management of the Pacific coast, a region of rapidly changing landscape, resources, and sociopolitical climate. The book's final section, "The future," is perhaps its most important, which along with the preceding background material, forms the necessary components to guide and improve management of flowing-water ecosystems. I await similar detailed studies of riverine science from other regions that may be stimulated by this book, as well as an update on progress and developments for future decades in the Pacific coastal ecoregion.

THOMAS J. KWAK

U.S. Geological Survey, Biological Resources Division
North Carolina Cooperative Fish and Wildlife Research Unit
Department of Zoology, North Carolina State University
Raleigh, North Carolina 27695-7617

Ecology, 81(3), 2000, pp. 883–885

WE CAN RUN BUT WE CANNOT HIDE

Terborgh, John. 1999. **Requiem for nature.** Island Press, Washington, D.C. xii + 234 p. $24.95, ISBN: 1-55963-587-8 (alk. paper).

If there is one thing on which ecologists and environmental policy-makers could probably agree, it is that given a finite planet with finite supplies of basic elements, if the human population continues to grow, the population sizes of every other species will decline. Despite the inflexible logic of this simple fact, individuals, organizations, and governments who profess concern for the preservation of biological diversity

(in whatever sense) inevitably fail to incorporate the inexorable pressures of human populations on nature reserve design. In John Terborgh's words, "wild nature and the biodiversity it perpetuates are not a necessity for humans; they are a luxury" and "sustainable development will remain an oxymoron until population growth ceases." More concisely: people and biological diversity don't mix. This is the ultimate lesson from this readable and approachable book, but Terborgh's patronizing tone and condescending approach make it unlikely that his readers will give his suggested solutions more than a passing, dismissive thought. This is unfortunate, since Terborgh has, in plain language, identified most of the key reasons that we have failed, and continue to fail to protect and conserve the Earth's biological heritage.

Requiem for nature is a book conceived in anguish and written in anger. Like many ecologists, Terborgh acknowledges that he came to his science from a childhood spent exploring nature. The bucolic idylls of his childhood were "shattered by an onslaught of bulldozers, trucks, and construction workers" that overnight led to the vanishing of his beloved forests. As a child, Terborgh writes, he felt powerless in the face of this onslaught, and he notes that the sense of outrage he felt then persists to this day. This outrage also permeates this book. In essence, this book, aimed at a broad, non-scientific audience, is a travelogue through time and space, where a series of tranquil, tropical paradises are each, in turn, summarily destroyed by human activities.

Like many tropical ecologists of his generation, Terborgh did his early work as far as he thought possible from even the most gossamer touch of humanity. He describes Perú's "wholly pristine" Apurímac valley as "the most beautiful place [he] had ever seen." Within seven years of his first encountering it, the virgin rainforests of the Apurímac valley had been replaced by plantations of coffee, cacao, and coca, and its once negligible population had grown to greater than 100,000 individuals. On leaving it for the last time in 1972, Terborgh writes "I knew I would not return. . . because the wild nature that had drawn me there had been extinguished." He fled to the next paradise upriver, Peru's Manu National Park, in a distant corner of the upper Amazon basin, a place where nature exists "largely as it existed before humans intruded into the scene." For the last 25 years, Terborgh has there managed a small research station, Cocha Cashu Biological Station, and splits his time between station management and research, his teaching responsibilities at Duke, and his service on boards of international conservation agencies. In recent years, the ever-expanding population of Perú has finally reached the edges of Manu, and it is nibbling away at the edges of this last tropical Eden. With nowhere left to run, Terborgh hopes to convince ecologists, conservation groups, and governments to invest heavily in saving the last, best representatives of tropical nature in South America. Most of the rest of the world, he concludes, is beyond the pale.

The means by which Terborgh reaches this conclusion, which may yet turn out to be correct, will be aggravating to ecologists and infuriating to the general public. Ecologists will find in this book an overwhelming emphasis on the importance of top predators (currently in vogue as "top-down control"), little concern for the bottom of the trophic pyramid (microbes, plants, herbivores), and a curious adherence to the notion, rarely seen anymore in ecological journals or textbooks, that nature is somehow in balance. For example, in describing the long-term decline in bird species richness on Panama's Barro Colorado Island (BCI) documented by Edwin Willis in the early 1970s, Terborgh assets "it is clear that extinctions occurred on BCI because nature had fallen out of balance." Similar ecological imbalances are described for Hawaii's Haleakala Crater, Florida's Hillsborough River State Park, Venezuela's Lago Guri, and Boston's Middlesex Fells Reservation. These imbalances are "invisible to the public eye" and require "a trained scientist to know that something is going wrong." Although resuscitating the ghost of nature's balance may lend appeal of his argument to non-specialists, I suspect that Terborgh's intended audience will not respond well to this invocation of the necessity of a scientific priesthood. The scientific remedy for correcting these imbalances is the maintenance of top predators, as they are "the true indicators of ecosystem health," a characteristic of ecosystems undefined by Terborgh. In clear parallel, Terborgh's suggested political remedy for correcting these imbalances is top-down control of nature protection by national governments and international organizations.

Why top-down and not bottom-up protection? People need to eat, and more people need to eat more than fewer people do. Our economic and social systems are essentially predicated on consumption (as would be expected of a sentient top predator), and despite our best intentions, and the creation of conservation organizations that can show us the error of our ways, we continue to dismantle Eden apace. By acknowledging forthrightly, and correctly, that slowing down or halting tropical deforestation will require strong resistance to powerful, growing populations and economic imperatives, Terborgh concludes that most individuals are unwilling or unable to halt their activities for the benefit of the luxury of biodiversity.

The one exception, in Terborgh's view, is the United States. Here, because of a fortunate, historical accident, we have a system of land-tenure that combines public and private ownership that in his view has conserved most of our biological diversity. Economic gain derives from private land, and biodiversity thrives on public land because our laws prohibit changes in land use (once a park, always a park), and because here in the United States, we respect our laws. The United States therefore has, according to Terborgh, achieved one criterion for sustainable development and protection of biodiversity: a stable pattern of land use. (The U.S. is also not growing, the other pillar on which sustainability rests.) Unfortunately for the tropics, in Terborgh's eyes, a combination of unstable land tenure, lawless individuals, and corrupt governments that give low priority to parklands conspire to maintain there countless tragedies of the commons.

With stark rationality, Terborgh surveys the state of conservation throughout the tropics, and most everywhere finds it wanting. He identifies two types of institutional self-interests that have converged to undermine any hopes of true protection of biological diversity. Large donor groups (such as the World Bank) wishing to appear "green" and conservation organizations that wanted to expand their programs internationally together created ICDPs (integrated conservation and development projects). These ICDPs attempted to

reduce threats to parklands by encouraging economic activities on their periphery (the UN Biosphere Reserve model). Unfortunately, ICDPs, by stimulating local economies, put pressure on parks themselves. Further ICDPs have a short life-span (3–5 years), whereas parks should be forever. Finally, Terborgh claims, ICDPs aim at the wrong target: people instead of "nature." Focusing on economic development of people inevitably leads to increasing population density, increasing need for support services, and increasing demands on the park itself, whose land-rights are usually not clear. In summary, keeping people involved in parks, Terborgh suggests, is a glaring example of incompatible use.

Where do we go from here, on this one planet that we have? Terborgh states the obvious fact that conservation dollars are scarce and should be invested where they can do the most good, whether or not that meets current political fashion. In a rapid around-the-world survey in the penultimate chapter, Terborgh describes his vision of conservation triage: West Africa—hopeless; Central Africa—maybe Gabon and the Democratic Republic of Congo; Madagascar—a calculated risk; Southeast Asia and Papua New Guinea—nearly hopeless; Central America—some potential in Honduras, Nicaragua, and Panama, whereas Costa Rica is an exemplar; South America—the best prospects outside of Costa Rica. On the one hand, this litany seems self-serving. Terborgh has spent the bulk of his career working in South America, and he has a vested interest in seeing his Eden preserved. On the other hand . . . Like Terborgh, I have spent much of my professional career working in the tropics, mostly in Belize (a Central American country with a good conservation record, unaccountably omitted from his list of Central American countries). In 1994–95, Elizabeth Farnsworth and I spent six months exploring mangrove forests around the world. Our findings, albeit from a different tropical habitat, are comparable to Terborgh's. Very few sustainable mangrove ecosystems exist outside of South and Central America, and all are plagued by population pressures, ambiguous land-tenure and land rights, unenforced laws, and unregulated capitalism. Like Terborgh, we would like to see far fewer people impinging on these ecosystems, and what few there are should be kept as far away as possible from our favorite natural areas. However, I don't share Terborgh's optimism that increased land purchases and top-down, international control (perhaps by the United Nations) will solve the problems that he identifies in the tropics: "grossly skewed distributions of power, education, and income"; "systematic corruption and abuse of powers"; and ethnic heterogeneity and competition that "diminishes any sense of shared national destiny or collective social responsibility."

Perhaps it is true, as Terborgh suggests, that we need a system of purchased, protected parks, patrolled by an elite corps of armed international environmental rangers and overseen by international nature keepers (akin to our current UN peacekeepers). I suspect, however, that absent a dramatic reduction in population size from our current size of greater than 6 billion, such a scheme would only exacerbate the division between the wealthy minority supporting nature conservation and the poor majority needing to eat. Terborgh, I think, views this as an acceptable risk, while acknowledging the "political incorrectness" of these views. From decades spent working "in the trenches," Terborgh asserts that we need to move beyond the courtesy common in modern political discourse (which extends to the realm of conservation policy) if we ever hope to preserve any reasonable fraction of what biological diversity still exists. In that, he is assuredly correct.

AARON M. ELLISON

Mount Holyoke College
Center for Environmental Literacy
South Hadley, Massachusetts 01075-6418

Submit books and monographs for review to the Book Review Editor, Janet Lanza, Biology Department, University of Arkansas at Little Rock, Little Rock, Arkansas 72204 (telephone (501) 569-3500).

We welcome offers to review books for *Ecology,* but we cannot accept an offer to review a *specific* book. Anyone who wishes to review books for *Ecology* should send a current *curriculum vitae,* a description of competencies, and a statement of reviewing interests to the Book Review Editor. Authors of reviews must verify that they have no conflict of interest that might interfere with their objectivity, and that they have not offered (and will not offer) a review of the same book to another journal.

BOOKS AND MONOGRAPHS RECEIVED THROUGH OCTOBER 1999

Callicott, J. Baird, and Eric T. Freyfogle, editors. 1999. **For the health of the land: previously unpublished essays and other writings (Aldo Leopold).** Island Press, Washington, D.C. xix + 243 p. $22.95, ISBN: 1-55963-763-3 (acid-free paper).

Cann, Johnson Robin, Henry Elderfield, and A. Laughton, editors. 1999. **Mid-ocean ridges: dynamics of processes associated with creation of new ocean crust.** Cambridge University Press, New York. viii + 301 p. $85.00, ISBN: 0-521-58522-8.

Case, Ted J. 2000. **An illustrated guide to theoretical ecology.** Oxford University Press, New York. xi + 449 p. $45.00, ISBN: 0-19-508512-4 (alk. paper).

Chorus, Ingrid, and Jamie Bartram, editors. 1999. **Toxic cyanobacteria in water: a guide to their public health consequences, monitoring and management.** E and FN Spon, New York. xv + 416 p. $39.99, $59.99 (Canada), ISBN: 0-419-23930-8.

Clark, Tim W., A. Peyton Curlee, Steven C. Minta, and Peter M. Kareiva, editors. 1999. **Carnivores in ecosystems: the Yellowstone experience.** Yale University Press, New Haven, Connecticut. xii + 429 p. $37.50, ISBN: 0-300-07816-1 (alk. paper).