
If controversy is one indicator of a healthy scientific discipline, then invasion ecology is vibrant and alive. The idea that high diversity provides resistance to invasion has recently been challenged. The search for universal invader traits is now likened to folly. Numerous papers defining “invader” have emerged; the discussions are wide-ranging and inconclusive.

Spinning away from the arena of invasion ecology is the popular science picture of invasions and invaders. This picture, often designed by those seeking balance in natural systems, is one of exotic menaces lurking in the backyard pond, weeds overtaking homes and roads, and ecological crises portending the end of nature as we know it.

So when this book arrived on my desk, I proceeded to place it in one of two categories: science or hype. The title suggested hype and the description on the front flap of the jacket only reinforced this notion. But then I looked further in an attempt to identify the biases and was intrigued by the combination of players: a gifted and accomplished science writer, Yvonne Baskin, teamed up with the Scientific Committee on Problems of the Environment (SCOPE). I discarded the jacket and gathered more information.

Chapter 1 provides eight themes that presumably set the general tone of the book. It is clear from the careful wording that the author now clearly understands the complexities of the invasion issue when cast in the context of history, science, policy, economics, and values. Furthermore, she distances herself from those who would ban all introductions and even admits that some introductions have value. But at the same time and in the same place she encourages action “...to preserve or restore something we value: native biodiversity and the wild places and systems where it can thrive, the look of a landscape, a sense of place, the functioning of an ecosystem, the economic productivity of our working lands and waters, the health of people, animals, and plants.” I can only surmise that too many editors were involved in this opening chapter.

Chapters 2–5 provide a summary of various introductions and their costs. This includes pathogens, plants, and animals. We are left with the firm impression that people have indeed facilitated the movement of species around the earth. And in some cases, economic costs associated with introductions are high. But we get no clear distinction about the fundamental differences between pests in a soybean field and invaders of natural areas. The issue of invasion susceptibility was not treated in any great detail. And I was also somewhat disap-

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**Book Reviews**

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**INVADERS AT THE DOOR**

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This short and eminently readable book by Stanford ecologist Gretchen Daily and Pulitzer-Prize-winning journalist Katherine Ellison is a report on the “green” economy coming of age. Arguing that 21st century economies can no longer afford to ignore the commodities and services Nature provides, the authors make the case that these gifts are not only valuable, but “value-able.” Lush forests, clean water, and fresh air are things worth paying for; indeed, they must be paid for. If not, and we continue to take Nature’s gifts for granted and ignore the damage we have inflicted on her, Daily and Ellison assert, Nature will provide no more. In the “new economy,” we must start paying for what was previously “free.” Unfortunately, like grown children living at home and now required to pay rent, we balk at spending money for the comfort and services that we previously took for granted.

Their schemes range from safeguarding tropical forests by establishing markets for buying and selling carbon sequestration “credits,” to an Australian company whose “product” is the biodiversity it sells to tourists visiting its preserves, to the city of New York protecting the Catskills from development to sustain the high-quality, low-cost water purification services these mountain watersheds provide. We meet Karen Rippey, a former welder who convinces voters in her small California town to raise taxes so the Napa River can run free; ecologist Dan Janzen who sees the happy convergence between human failings and private philanthropy alone are insufficient to rescue a planet in the throes of environmental crisis. To stem the tide of environmental degradation, and do so expeditiously, we need to harness a more potent force—self-interest—and make conservation a paying, if not lucrative, proposition.

Subtitled, “the quest to make conservation profitable,” this book is about the pursuit and creation of “green” economic incentives and it profiles the deal-making entrepreneurs, concerned scientists, and grass-roots activists who are trying to bring them into being. Daily and Ellison introduce us to a handful of driven and inspired individuals who have dreamed up ways to save some of the Earth’s ecosystems, improve people’s lives, and often, turn a tidy profit in the bargain. Their schemes range from safeguarding tropical forests by establishing markets for buying and selling carbon sequestration “credits,” to an Australian company whose “product” is the biodiversity it sells to tourists visiting its preserves, to the city of New York protecting the Catskills from development to sustain the high-quality, low-cost water purification services these mountain watersheds provide. We meet Karen Rippey, a former welder who convinces voters in her small California town to raise taxes so the Napa River can run free; ecologist Dan Janzen who sees the happy convergence between his efforts to restore the Costa Rican dry tropical forest and a local orange juice company’s need to dispose of waste pulp; and former math professor turned eco-entrepreneur, John Wamsley, who figures out a way for koalas, platypus, and kangaroos to turn a profit in the Australian stock market. The book profiles these players in the new economy, describes their ideas, explores their motivations, reveals the hype when it surfaces, and documents their occasional successes. The stories are thoughtfully written, objective in viewpoint, and neither optimistic nor pessimistic, but candid and sensible.

As the authors write in their prologue, “We wrote this book as both advocates and critics, but chiefly as pragmatists. Financial motives and markets aren’t going away anytime soon. And whether they appeal to us or not, experiments in finding market values for such essential gifts of Nature as clean water and fresh air are well under way. Understanding them is key to making the best of them and, as the eminent biologist Edward O. Wilson has urged, to giving economist Adam Smith’s ‘invisible hand’ a green thumb.”

A friend who borrowed and read my copy of The new economy of nature felt the book would make a good companion to E. O. Wilson’s recently published, The future of life (2001. Random House, New York), and I agree. Wilson’s book makes vividly clear the peril faced by wild nature, and though ultimately hopeful, the book leaves the reader wanting further data, some affirmation that we may yet change our environmentally profligate ways. Daily and Ellison don’t necessarily provide solace, but they do dig up and deliver evidence from around the world of what has been, is being, and can be done to harness the economic engine for environmental good (surprisingly, they do not list Wilson’s book in their “Further reading” section).

The authors’ objectives are clear, their stories are well told, and the book is well organized; one chapter leads into another without losing the pace of the narrative. One thing I particularly liked about the book was its dispassionate, clear-eyed reporting. Daily and Ellison make plain that they want and hope the new economy will take form, but they make no attempt to glorify its pioneers. The individuals profiled are not always without hubris or greed, and their sometimes-dazzling schemes are not always successful. And while these human failings are discouraging at times, Daily and Ellison document this necessary history in a sincere attempt to address what they call “a great unanswered question” of our time: “whether the drive for profits, which has done so much to harm the planet, can possibly be harnessed to save it.”

If I have any criticism of The new economy of nature, it is its overemphasis on the new and novel. Granted, this approach is explicit in the book’s title; however, I think the book misleadingly implies that only new market incentives and entrepreneurial zeal will save Mother Earth from her wanton and overachieving human children. In fact, two of the biggest success stories in the book are the product of old-fashioned, grass-roots activism and an old-school conservation ethic. The efforts by the Napa Valley community to allow the Napa River to run free and by New York City to save its natural filtration plant in the Catskills—something it has relied on for over 100 yr—required no “new” economic incentives. The essential ingredient in these stories was simply the realization that Nature has real esthetic and monetary value and that value needs to be factored into bottom-line accounting.
In the acknowledgements, Ellison tells how she and Daily came to meet after a grim but hopeful lecture by Daily on the imperiled state of the planet, and together they describe how their scientific and journalistic sensibilities complemented one another during the book’s research and writing. It was as fun to read about how the authors started on this venture and this reviewer could not agree more that Ellison and Daily are complementary authors. Throughout this intelligent and insightful book, the authors’ voices mesh perfectly to convey the challenge we have created for ourselves, and describe the efforts by some who passionately believe that turning Nature’s green into gold is the only way to save our beautiful home.

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**Conservation Genetics Comes of Age**


Several years ago, as I prepared to teach a course in conservation genetics, I was unable to find a suitable textbook. Having a textbook means that a field has matured and is important enough to deserve its own courses rather than being a sub-section of a larger course. Luckily for those of us who are teaching this topic, and those who work in the field of conservation, Richard Frankham et al. have published this book. It is a very complete and thorough treatment of the important topics of population and conservation genetics.

The authors have divided the book into four sections. The first (Chapters 1 and 2) presents a brief overview of the field of conservation genetics and outlines why genetics is important to consider in management plans for endangered species. Section I (Chapters 3–9) discusses issues related to genetic diversity and the evolutionary genetics of natural populations. While much of this material is abstract and mathematical, the use of examples focusing on real problems in conservation helps remind the reader why this material is important. The focus of Section II (Chapters 10–14) is the effect of population size reduction for species and an especial focus on inbreeding and inbreeding depression. The final section (Section III, Chapters 15–20) takes the material that has been explained in the previous chapters and puts it into a real world context by showing how it has been applied to conservation problems.

The authors state that their goal is to create a book that could be used as a course textbook, as a book for self-instruction, or as a reference book for professionals working in the field of conservation. As a textbook for an upper level course or graduate seminar it would be excellent; however its length would make it hard to cover all the material in a short (less than 15 wk) semester. Lower level students would find the work daunting and upper level students may find some of the material in Section II redundant if they have already had a good course in population genetics or evolution. As a book for self-instruction the material is presented in a clear manner with worked examples for most of the mathematical formulas so that it would be possible to use this to teach yourself the basics of conservation genetics.

This book’s greatest use however will be as a reference book for professionals working in the field. For too long the people who are managing species-recovery programs and people working in the often theoretical fields of evolutionary and population genetics have not been communicating with each other. This book brings both fields together by clearly and lucidly presenting evolutionary and population genetics models and using real world problems to show how they apply to saving endangered species. It’s greatest strength is the wealth of examples that the authors use to make what can be abstract more concrete. This book belongs on the bookshelf of every manager of an endangered species recovery program.

This book has several other strengths. First, it is comprehensive! The reference list is up-to-date to 2001 and lists all of the important papers and monographs in the field. Coverage of the material is complete and the authors take into account how non-mammalian genetic systems (polyploid, haplo-diploid, etc.) will affect the predictions of the mathematical models. Thus biologists working with a wide range of taxa will be able to use the information presented here. The authors have made very good use of examples from the literature using a wide variety of taxa. There is very complete coverage of plants and non-mammalian examples are provided throughout.

One of the things I like best about this book is the way the authors have incorporated the literature that they used into the text. Too often textbooks are written without citing material so it is almost impossible to follow up on a topic unless you look at the list of references at the back of the book reference by reference. Frankham et al. have given citations throughout the text so that the reader can easily go back to the original sources. This will make the book an invaluable reference for the field. Each chapter also concludes with an annotated list of further readings which I have found very useful.

Another strength of the book is the illustrations. Line drawings by Karina McInness of the species being discussed are...
found throughout the book and help interest the reader in the material being presented. Figures and charts are clearly drawn and have complete captions to explain them to the reader.

Several features will make this book very useful in the classroom. Boxed material appears in each chapter to either work the reader through the calculations or to give real-life examples of the topic being discussed. At the end of each chapter are problem questions, although in many cases they are the sort that tests reading comprehension and don’t force students to process the material in any way. Several chapters have practical exercise suggestions; however in most cases there is not enough explanation for how to do the exercise. The Cambridge University Press website for the book doesn’t give any supplemental instructions for these, nor does the site that the authors maintain for the book. There are a few minor typographical errors in the book, but the authors’ site (http://consgen.mq.edu.au/) lists these and is being updated whenever a new error is brought to their attention.

My chief criticism of the book is that it is almost too big. At 617 pages (including references) it is hardly an introduction to the topic. Some of the material in each chapter is repeated in a slightly different form in another chapter and the reader is continually being told to go to another chapter for more information. Chapter 2 for example focuses on an overview of inbreeding and could have been deleted as the material is presented later in the book in a more detailed format. Still, since this is the first comprehensive textbook for the field I feel that it was correct to err on the side of including material rather than excluding material.

Clearly the authors have moved the field of conservation genetics forward. This book is a much-needed summary of an important field and deserves to become a widely used tool when designing any recovery plan for an endangered species. The material covered here goes beyond that, however, and is important not only to those working directly in species recovery plans but also to anybody interested in preserving endangered species. Finally there is a single source that clearly and lucidly explains the importance of genetics to conservation—this book will become a standard reference for the field.

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There are many environmental problems associated with conventional agricultural practices, including erosion, habitat loss, and pollution of water by sediments, nutrients, and pesticides. This book challenges the common perception that in order to feed the world, we must accept agricultural land as an “ecological sacrifice.” Jackson and Jackson acknowledge the many challenges in managing land for both agriculture and conservation, but also provide examples demonstrating that this can be done.

In order to appreciate what this book has to offer, it is critical to understand what it is not. It is not a treatise on the ills of conventional agriculture, it does not present an ecological approach to designing agricultural systems, nor is it meant to be a “how to” manual with the details needed to farm sustainably. All of these topics are briefly touched upon, and anyone interested in an introduction to these topics should look elsewhere. The strength of this book is its well-balanced presentation of the social and economic opportunities for achieving a partnership between agriculture and conservation. Rather than criticizing farmers for environmental problems associated with agriculture, it focuses on the willingness of farmers to increase the conservation function of their farms. The farm as natural habitat provides examples of farms that are productive and profitable, while decreasing their negative impacts on the environment and providing habitat for the conservation of nature. The true value of this book is its clear demonstration that managing land for agriculture and conservation is not always a simple process and is not the sole responsibility of the farmer, but requires the collaboration of a diverse group of people, including farmers, conservationists, ecologists, policy makers, and ultimately the consumer.

The common thread running through these chapters is the need for partnerships, and understanding the needs and motivations in both agriculture and conservation. The styles of the authors are as diverse as their approaches, and undoubtedly different audiences will be inspired by some chapters, and want to skim through others. The first part of the book focuses on debunking the concept of “agriculture as an ecological sacrifice.” Chapter 2 provides a good review of the negative impacts of conventional agriculture, but the other chapters in Part 1 might have been more effective if they had used more ecological data to argue for a move away from conventional agricultural practices. Part 2 is much stronger and focuses on examples of farmers who have restored natural areas on their land. It deals with issues ranging from the effectiveness of programs promoting sustainable agriculture, to finding the common ground between conservation and ag-
Tropical ecosystems typically have high species diversity and endemism relative to temperate ecosystems. Most of the tropics lie almost completely within the borders of developing countries. Developing countries are host to eight of the “hottest” hotspots of endemism and diversity, but only 3–11% of the area is relatively pristine habitat. Developing countries rarely have the financial or political resources to protect sensitive areas from further degradation. Human population growth, coupled in some cases with epidemic disease, civil war, and resource extraction operations, hamper conservation efforts. Given the rapidly changing biological and social conditions in these countries and the current global species extinction rate, efficient and rapid protection of the remaining natural areas should be a priority. National parks are the most common vehicle used to protect such areas, although improvement in organization and administration is often needed. To address these issues, Terborgh et al. convened a conference that brought together park managers, researchers, and conservationists with park experience in developing countries.

Making parks work: strategies for preserving tropical nature, a product of the conference, addresses the issues related to the establishment, funding, and management of parks in developing countries.

The subject is necessary and timely, and the book underscores several key points concerning the development of parks. First, conservation of biodiversity must be the primary focus of national parks, and any sustainable development plans involving the park must be overtly linked to conservation efforts. Second, resource extraction within park boundaries should not be permitted, otherwise it is functionally something else, such as a “wildlife refuge” in the United States. In addition, the number and activity of people within park boundaries should be limited to well-controlled ecotourism. Finally, adequate and dependable law enforcement is an absolute necessity.

The book is organized into four parts, and the first is an introduction that lays out problems common to many parks in developing countries, with recommendations supported in subsequent chapters. Each chapter in Part 2 describes parks in Africa, Latin America, and Asia, and is written by authors with experience in parks in these regions. Part 3 outlines trends, problems, and potential solutions at several scales (park, national, international). The final section summarizes lessons learned from these case studies, and advocates for the recommendations outlined in the introductory chapters.
Chapters focused on national parks in African countries are among the most useful and well written in the book. Chapter 6 (Tutin) outlines efforts made to preserve the extensive rainforests of the Congo Basin, which are spread across six countries. This chapter succinctly describes problems that plague all of the parks in these countries, including insufficient funding for ecological and law enforcement training, lack of basic ecological information on flora and fauna communities, no long-term management plans, and conflict with local human populations. In addition, this chapter is unique in pointing out the scientific benefit of parks that prohibit any human resource extraction. The chapter suggests that such parks could act as “controls” against which “experimental” treatments, such as sustainable logging or other extraction, in other areas can be compared to assess the sustainability of the activity. Chapter 8 (Struhsaker) specifically addresses forest conservation in Uganda, and presents an interesting counterintuitive result of economic collapse in that country: organized resource extraction from the parks was greatly decreased. Moreover, the benefits of consistent law enforcement (mostly anti-poaching efforts) are clearly illustrated. This chapter also outlines the effect of high per-capita consumption in industrialized countries on resource extraction (legal and illegal) in natural areas of developing countries. Chapter 9 (Wright and Andriamihaja) discusses the successes experienced by many of the parks in Madagascar, due to the involvement of the local communities in the development, management, and defense of the parks. This chapter clearly outlines which activities worked for these parks and which did not, and lists several issues that still need to be addressed, such as corridors between parks. Many chapters in the book mention the need to reduce civil conflicts and human population growth, both for the sake of the parks and for the human communities themselves. Finally, Chapter 21 (Davenport et al.) presents a well-written description of the advantages and problems with ecotourism in parks, and provides specific recommendations for change in this industry.

There are some drawbacks to the book, particularly in the opening section. Chapters 1 (Terborgh and van Shaik), 2 (Van Schaik and Rijksen) and 3 (Davenport and Rao) seem opinionated with few facts, figures, or peer-reviewed citations to support them. They set a very high bar in terms of supporting evidence expected in subsequent chapters that the book just barely clears, mainly through the chapters mentioned above. Several of the chapters describe experiences that seem to contradict some of the opinions put forward in the introductory chapters, especially with respect to those about the wholly negative interaction between sustainable development projects and conservation success of national parks. In addition, more editorial oversight could have improved the organization and logic flow that was lacking in some chapters, and eliminated some figures and tables that were unnecessary or unclear.

Overall, the book is insightful and would benefit researchers, park management, and a wide variety of conservation organizations (governmental, non-government, and private) in developing and industrialized countries. In fact, many of the problems and solutions described for parks in developing countries are also relevant to parks in the United States and other industrialized countries. For example, Everglades National Park in southern Florida is surrounded by a rapidly increasing human population that places pressure on the park due to water use. As in some parks in developing countries, management (e.g., control of exotics, hydrologic patterns) and law enforcement (especially against upstream polluters) need to be greatly improved. Some developing countries, such as Thailand (Chapter 16; Srikosamatara and Brockelman), have set aside up to 16% of their area, which makes the 2% set aside in national parks in developed countries such as the United States seem paltry (and 47% of this area is in Alaska). If readers start with Chapter 31 (“Putting the right parks in the right places,” by Brandon, easily the best one in the book), then read Parts 2 through 4, and end with Part 1, they will most efficiently absorb the pearls of wisdom contained throughout this book.

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