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Tropical Conservation Biology

8 09 2008

An obvious personal plug - but I'm allowed to do that on my own blog ;-)

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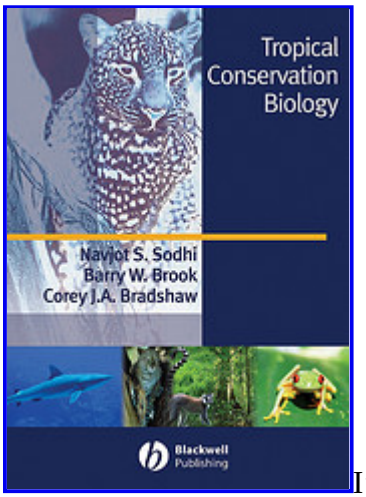

I'd like to introduce a (relatively) new textbook that my colleagues, Navjot Sodhi and Barry Brook, and I wrote and published last year with Blackwell (now Wiley-Blackwell) Scientific Publishing - **Tropical Conservation Biology**.

We're rather proud of this book because it was a timely summary and assessment of the scientific evidence for the degree of devastation facing tropical biodiversity today and in the future. I've summarised some of the main issues in a previous post covering a paper we have 'in press' that was born of the text book, but obviously the book is a far more detailed account of the problems facing the tropics.

This introductory textbook examines diminishing terrestrial and aquatic habitats in the tropics, covering a

broad range of topics including the fate of the coral reefs; the impact of agriculture, urbanisation, and logging on habitat depletion; and the effects of fire on plants and animal survival.

One of the highlights of the book is that each chapter (see below) Includes case studies and interviews with prominent conservation scientists to help situate key concepts in a real world context: Norman Myers (Chapter 1), Gretchen Daily (Chapter 2), William Laurance (Chapter 3), Mark Cochrane (Chapter 4), Daniel Simberloff (Chapter 5), Bruce Campbell (Chapter 6), Daniel Pauly (Chapter 7), Stephen Schneider (Chapter 8), Stuart Pimm (Chapter 9) and Andrew Balmford (Chapter 10). These biographies are followed by a brief set of questions and answers that focus on some of the most pertinent and pressing issues in tropical conservation biology today. It is our intention that readers of Tropical Conservation Biology will benefit from the knowledge and be inspired by the passion of these renowned conservation experts.

TABLE OF CONTENTS

1. **Chapter 1**: ***Diminishing habitats in regions of high biodiversity***. We report on the loss of tropical habitats across the tropics (e.g., deforestation rates). We also highlight the drivers of habitat loss such as human population expansion. Finally, we identify the areas in immediate need of conservation action by elucidating the concept of biodiversity hotspots.
2. **Chapter 2**: ***Invaluable losses***. We discuss the utilitarian role of tropical forests in maintaining soil stability, regulation of hydrological processes and climate, and carbon sequestration, especially in relation to the importance of ecosystem servicing offered by nature to humanity (e.g., pollination and catchment protection). We also highlight the evolutionary uniqueness, irreplacability and intrinsic value of nature that is being eroded by habitat and species loss.
3. **Chapter 3**: ***Broken homes: tropical biotas in fragmented landscapes***. Due to massive deforestation and forest degradation, fragmentation is one of the major drivers of species loss in the tropics. We discuss the theoretical premises upon which the importance of habitat fragmentation is based (e.g., negative edge effects and meta-population dynamics). We then exemplify various concepts using empirical information and a wide range of examples.
4. **Chapter 4**: ***Burning down the house***. Prolonged drought and poor land-use decisions have made many tropical landscapes vulnerable to fire, thus creating a negative feedback cycle that is damaging at both local (e.g., habitat loss) and global scales (e.g., atmospheric pollution). We describe the effects of fire on tropical biotas and how these processes interact with other drivers to exacerbate threats.
5. **Chapter 5**: ***Alien invaders***. We report on the documented impacts of invasive species on tropical biotas. We describe the process of invasion and the factors that affect 'invasiveness' (of both the invading organism and the invaded habitat). We then described a range of documented impacts of invasive species in tropical regions.
6. **Chapter 6**: ***Human uses and abuses of tropical biodiversity***. Tropical biodiversity is under heavy threat from anthropogenic over-exploitation (e.g., harvest for food or live specimens for the pet trade). For example, wild ('bush') meat hunting is imperilling many tropical species as expanding human populations in these regions seek new or long-favoured sources of protein and potentially profitable new avenues for trade. Here we highlight the effects of human exploitation on tropical biodiversity and the unsustainability of current practices.
7. **Chapter 7**: ***Threats in three dimensions: tropical aquatic conservation***. This chapter expands on the major marine and freshwater conservation issues plaguing tropical regions. We focus on the impacts of over-fishing, water pollution and climate change on the astonishing biodiversity supported by marine and freshwater ecosystems.
8. **Chapter 8**: ***Climate change: feeling the tropical heat***. We summarize the main lines of evidence for the biotic response to climate change in the tropical realm - past, present and future. Examples are drawn from studies on local populations through to investigations of pantropical ecosystems. Finally, we discuss options for mitigating the worst of climate change's predicted effects on tropical biodiversity.

9. **Chapter 9**: ***Lost without a trace: tropical extinction trends***. We first discuss the empirical evidence for and controversies surrounding current and predictive extinction estimates. We then provide case studies of both local population and species extinctions from the tropics and extract generalities of extinction trends in this region. We also discuss the species traits correlated to extinction proneness or vulnerability of species to decline due to human encroachment in mega-diverse tropical ecosystems.
10. **Chapter 10**: ***Lights at the end of the tunnel: conservation options and challenges***. We make pragmatic recommendations for the protection of existing biodiversity. We report on the state, adequacy and complementarity of current protected areas, and discuss the minimum preserved areas required to protect biodiversity at national, regional and global scales. We stress the need to consider the social issues (e.g., human hunger) to achieve effective conservation objectives by highlighting examples of conservation successes in different regions of the tropics.

This book emphasises the biological aspects of biodiversity conservation rather than the social or political processes that drive human behaviour. Regardless, the book should not be viewed as a resource solely for biologists - it also contains important information on how natural resource managers, politicians and policy makers can mitigate many of the negative effects of an increasingly human-dominated planet. We have strived overall to present the book's content so that it will appeal to advanced undergraduate and postgraduate students, scientists, and managers with an interest in tropical conservation biology.

We haven't had many full reviews so far, except for this one by Paul Ganderton of the British Ecological Society's Teaching Ecology Group:

> *Judging by various commentaries it would appear that there are two main "canaries" in the global warming "mine". The one that gets more coverage is the Arctic with evocative (even if inaccurate) pictures of polar bears standing on lone ice floes. The other would have to be the tropical regions where temperature and rainfall changes could wreak equal havoc. Given its proximity to population centres the impact could be even greater. Whilst there is much discussion there is little concrete work easily available which is where this book comes in. Its aim is to provide an overview of conservation issues but focussed solely on the tropics.*
>
> *Chapter one opens the debate by outlining the actual loss of habitat by type and region. There are numerous data all pointing to the diminishing resources. There's also some attempt to highlight why this might be so. Chapter two takes the familiar line of ecosystem services - the idea that far from being a free good, tropical areas should be valued for what they provide (from climatic control to soil stability). Of course, services can only be provided when there is sufficient of a resource to produce it. This requires, as chapter three highlights, a sufficient size of a resource and not one which is fragmented. Starting with theory we are guided through some of the key aspects and impacts of fragmentation. Not all loss is through fragmentation. Large swathes of land are subject to burning - a process which alters landscape and biodiversity. There's the impact of alien species, fast becoming one of the biggest drivers of biodiversity change in all ecosystems. To all of these we can add the general threats caused by humans and described in chapter six. Bushmeat means the removal of species at possibly unsustainable rates (but see the counterpoint here). The wildlife trade also pays its part as does the medicinal uses of plants and animals although this again has become more complex as we better appreciate the dimensions of ethnobotany. Chapter 7 is a departure not just in topic but location as we are taken into issues on tropical waters. The usual culprits are mentioned e.g. bycatch, reef destruction, pollution etc. but these are brought together to highlight the multiple impacts upon this ecosystem. Chapter 8 looks at a topic mentioned in other parts of the book but just is passing - climate change. It is acknowledged that this will cause considerable issues for tropical regions and it is here that we get to see what this means. In a similar vein, chapter 9 describes the changes wrought by species extinction. Finally, we have an examination of some*

of the key problems facing the area and also some of the more positive ways forward.

There is much to recommend in this text. It covers a key area in some detail and provides the sort of overview that is needed if we are to better understand the connections between tropical ecosystems. The text is extremely well supported through numerous case studies and data. Each chapter has a useful summary and key selected texts. A highlight is the use of biographies whereby most chapters have a leading exponent of that work describe what they do and where they see conservation going. It brings the subject to life and helps the reader see who the main characters are - it's a great device for the beginner in a subject and one too little used. Overall, a very good text written in an accessible style. It deserves a wide readership.

CJA Bradshaw

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