

Frank E. Zachos  
Jan Christian Habel  
*Editors*

# Biodiversity Hotspots

Distribution and Protection  
of Conservation Priority Areas

 Springer

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Distribution and Protection of Conservation  
Priority Areas



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*Cover illustrations:*

Front cover: Coral reefs are among the most diverse habitats on the planet. The front cover photograph was taken by Jonas Thormar in the Red Sea and shows a bombora, or isolated piece of reef, near Eilat, Israel.

Back cover: A still-undescribed species of Harlequin frog (*Atelopus* sp.) photographed in the Tropical Andes biodiversity hotspot by Jos Kielgast. This species is on the verge of extinction, as are more than 80% of the members of its large and spectacular genus. Amphibians on the whole are among the taxa suffering most in the present biodiversity crisis.

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# Preface

The United Nations declared 2010 to be the International Year of Biodiversity. This declaration highlights both the value of biodiversity and the urgent need to take action preserving it in the light of what has often been called the Sixth Extinction. Already some twenty years ago, E.O. Wilson estimated that about 30,000 species became extinct per year (or, roughly, 3.5 species per hour!). While there has been an ongoing debate about the causes of the first five mass extinctions, there is no doubt about the present one – it is man-made, and there is little reason to believe it will cease in the near future. The IUCN acknowledges three levels of biodiversity: ecosystem, species and genetic diversity, and all three of them are unevenly distributed across our planet. This has led to the concept of biodiversity hotspots, a term that is used with different meanings. While in its strict sense, it is based on a combination of quantified species endemism (at least 1,500 endemic plant species, i.e., 0.5% of all known species) and habitat loss (70% or more of an area's primary vegetation), biodiversity hotspots *sensu lato* refer to any area or region with exceptionally high biodiversity at one or more of the three above-mentioned levels. In this book, unless stated otherwise, this latter usage of the term prevails because it is being applied in both the popular and technical literature (and therefore, it is not feasible to reduce the hotspot term to its technical definition only). The number of acknowledged biodiversity hotspots *sensu stricto* has, over the years, increased from 18 in the late 1980s through 25 in the year 2000 to, until very recently, 34. With the publication of this book, the Forests of East Australia have made it into the list as number 35 (see Chap. 16).

This volume owes its existence to a conference on *Biodiversity Hotspots – Evolution and Conservation* held in Luxembourg in March 2009, where experts from different disciplines and continents presented and discussed topics related to biodiversity, its threats and conservation. While some of the following chapters have their roots in talks given at this conference, this book was never intended to be a “conference proceedings volume”. Instead, we aimed at filling gaps and covering a wider range of topics by inviting more international experts to contribute chapters from their area of research. A multi-author volume like this will never be a

monolithic and fully coherent book, and we are aware that there are inevitably differences in breadth, depth, scope and quality among chapters. Also, we are sure that some readers may wonder why some region or aspect is considered, while others are not. In a single volume of merely 500+ pages, there will always be a certain degree of contingency with respect to the choice of subjects, and even more so when a topic as colossal as this is tackled. We freely admit that there are still gaps at least some of which, however, are due to the fact that invited authors declined or were not able to contribute a chapter within the time frame of this book. We have been aware of these shortcomings from the beginning, and we have tried to compensate for this by broadening our scope and also including chapters on human diversity, ways of measuring biodiversity and the sociocultural dimension of conservation biology. We are happy to have, apart from the newly described 35th biodiversity hotspot *s. str.*, chapters on classical regions or biotopes of high diversity such as Madagascar, the Mata Atlantica, the Mediterranean or coral reefs, and we were lucky enough to also have a chapter on the deep sea, a realm whose contribution to global biodiversity we are only just beginning to understand. In addition to this, the book contains chapters on particular taxa, among them African cichlid fishes, the textbook example of adaptive radiation and species diversity, amphibians (which are threatened globally) and invertebrates (which are strikingly underrepresented in biodiversity assessments – despite the fact that they account for more than 90% of all species).

Although biodiversity and its conservation are very much en vogue in today's ecological and evolutionary research, we hope that a book like this may still contribute to deepening our knowledge and increasing the awareness for the rapid loss of our most valuable legacy. We are grateful to Springer publishers for the opportunity to edit this volume and to Andrea Schlitzberger and Dieter Czeschlik for their editorial help. Moreover, we thankfully acknowledge the Springer referees who made valuable suggestions and insightful comments during the planning phase of this book, and last but not least we wish to express our gratitude to the peer-reviewers of the single chapters that have helped to improve this book by sharing their knowledge with us.

Kiel, Germany  
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