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978-0-521-45712-5 - An Introduction to Applied Biogeography

Ian F. Spellerberg and John W. D. Sawyer

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## **An introduction to applied biogeography**

Biogeography is about the geographical distribution, both past and present, of plants, animals and other organisms. Ian Spellerberg and John Sawyer bring a modern and new approach to an old subject, writing in a lively and sometimes provocative manner. Throughout, the applications of biogeography in conservation management, economic production, environmental assessment, sustainable use of resources, landscape planning and public health are emphasised. Applications of island biogeography in conservation are critically appraised, analysis of biogeographical data is explained, the concept of wildlife corridors is questioned and the role of humans and their cultures in biogeography is explored. The authors pay warm tributes to important events and people in biogeography and conclude by discussing the future roles for biogeography.

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*Published in association with the Institute of Biology*



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## Foreword

There is an island in Indonesia with a particularly beautiful parrot that lives nowhere else. Local people trap large numbers of the birds for export to bird fanciers around the world and are more than happy to do so because they feel it is a pest. However, there was growing concern that the population was dropping to alarming levels. Conservationists working there conducted surveys of the population size, trapping pressures, breeding biology, and crop damage, thereby determining a way in which the wild population could be harvested at a sustainable rate and crop damage limited. During discussions with officials who would have to monitor and control the rate of harvesting there was only half-hearted preparedness to cooperate. Then they were told that this bird was found nowhere else, and attitudes changed completely. The officials had thought that the parrot was found everywhere, but that they somehow had a monopoly on the supply to those strange people who wanted a pest as a pet. Once those in charge were given a grasp of biogeography their support was won.

Of course, knowledge of biogeography is not in itself going to save the world's biodiversity, but it does at least put into perspective the increasing global concern for the massive decline of populations and loss of species in all ecosystems. It forms the basis of the many and varied exercises to assess conservation priorities around the world, even though the complexities mean that the answers are never precisely the same. This prioritization is essential, since, although there are far more financial resources available now than ever before for global conservation, there are not nearly enough to right every wrong and cure every ill, and decision makers need to allocate funds in as rational a way as possible.



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It is over twenty years since Ian Spellerberg taught me biogeography, ecology and behaviour at Southampton University and captured my interest in these fields to the extent that I went off and became wholly engrossed and enmeshed in them. I am thrilled that he, this time together with John Sawyer, has produced another clear and important book which I hope will be used and read widely, and perhaps translated into other languages to touch as many people as possible.

Tony Whitten  
Biodiversity Specialist  
The World Bank  
Washington, DC

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## Preface

Biogeography is the study of the distribution and patterns of distribution of plants, animals and other organisms across the globe, on land, in the sea and in the air. Information from biogeography provides the basis for environmental protection and resource management. It has a very important role to play in managing the world's biological diversity and can be applied in many areas. It can be used to show where species and groups of species are distributed, to provide information which can be used in environmental impact assessments and to provide information to ensure sustainable use and conservation of those biological resources. Biogeography is an interesting and developing subject and is particularly important in providing a basis for understanding the critical relationships between humans and the environment.

In almost any area of natural sciences there are general components, underlying themes and specialist aspects. Biology, for example, is the general name for the study of life but there are many aspects of biology, such as molecular biology, population biology and human biology. Under the general heading of biological sciences we could include genetics, ecology, immunology and biogeography. Similarly, biogeography has a general theme as well as underlying themes and specialist aspects. Underlying themes include historical biogeography, analytical biogeography, ecological biogeography and applied biogeography.

This book is an introduction to applied biogeography. It is an introduction to a subject that underpins human understanding of ecology and it also describes some of the many applications of biogeography in resource management and environmental protection. The text provides structured and

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analytical ways of looking at the distribution patterns of plants and animals and also the complex patterns of interactions between humans and the environment. We describe patterns of distribution at scales ranging from global to agricultural fields. We also describe research that seeks explanations for those patterns and the processes which maintain them. The patterns may be found on land, sea and in the air and at many spatial scales. The patterns may also change over periods of time (thousands of years, centuries, months or days). One of the challenges of writing this book was to choose the spatial limits for the examples in the text. For example, whereas species patterns of grasses in a whole country would certainly be considered as biogeography, would a study of the distribution pattern of beetles in a woodland also be considered as biogeography? For us the answer was yes.

Chapter 1 includes an introduction to the nature of biogeography and also explains the rationale for the structure of the rest of the book. Biogeography may have had a poor image in the past but we believe that biogeography from an ecological perspective is a challenging science and one which has many applications in a changing world. The most valuable application is provision of the necessary information for sustainable use of some species and conservation of other species.

We commenced researching and writing this book in England and finished it in New Zealand. By chance, both of us had independently moved across the world from a relatively new continental island to an ancient island. That move has helped to enrich our understanding of biogeography. We have used our own experiences of research in ecology and biogeography but have also included a synthesis of some of the most modern aspects of the latter. As well as relying heavily on the results of many recent research programmes, we also pay tribute to many of the historical developments in the discipline and in so doing we put those developments into perspective. We feel that it is important not to interpret historical developments in a modern setting. The work of the earlier biogeographers and actual populations are best understood if we are able to have a glimpse of their time, their culture and their way of life. Although what was thought and known during their time may have been modified and corrected, the same process applies to us today; what we have written will be corrected and modified in the future.

Biogeography has developed largely from descriptive studies, mapping plant and animal distributions, and may therefore appear uninteresting. The biogeographical studies of the 18th century were bold and innovative for their time and, for some of the early biogeographers, it required much courage to make public their discoveries and beliefs. We must ensure that applied biogeography is both rigorous and objective – as a tribute to the early

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biogeographers. We believe that applied biogeography will continue to play an important role in environmental management and that it will continue to underpin ecological research and conservation well into the 21st century.

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Many people have kindly provided information and have found time to read parts of the text. To all those who assisted in this way, we are truly grateful. In particular we would like to acknowledge the help of the following: Ian Abbott, Keith Barber, Andy Barker, Jack Chernin, Jonathan Cowie, Paul Curran, Peter de Lange, Gina Douglas, Richard Duncan, Rowan Emberson, Neil Enright, Dianne Gleeson, Collin Hindmarch, Peter Hopkins, Sandi Irvine, Michael Johnston, John Marsden, John Mitchell, Keith Morrison, Hugh Possingham, Amanda Reid, Alan Saunders, Gillian Sawyer, J. Michael Scott, Phillip Simpson, Kathryn Spellerberg, Bianca Sullivan, Ian Thornton, Geoff Tunnicliffe, Nigel Webb and Tony Whitten.

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