Conservation Biology

This beautifully illustrated textbook introduces students to conservation biology, the science of preserving biodiversity. Conservation biology is fast emerging as a major new discipline, which incorporates biological principles in the design of effective strategies for the sustainable management of populations, species and entire ecosystems. This book begins by taking the reader on a tour of the many and varied ecosystems of our planet, providing a setting in which to explore the factors that have led to the alarming loss of biodiversity that we now see. In particular the fundamental problems of habitat loss and fragmentation, habitat disturbance and the non-sustainable exploitation of species in both aquatic and terrestrial ecosystems are explored. The methods that have been developed to address these problems, from the most traditional forms of conservation, creation of protected areas and single-species programmes, to new approaches at genetic to landscape scales are then discussed, showing how the science can be put into practice.

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To George and his generation

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Preface

At the time of writing I have just spent the last 24 hours or so celebrating the coming of the year 2001, the real new Millennium. Having to stay at home looking after my young son and therefore being unable to go out to any parties this year, I watched the New Year celebrations take place around the globe beamed by satellite to my TV set. One overpowering message that came to me, and I know to many others, is how closely connected we have now become and how much smaller the Earth feels as a result. Now more than ever before, it should be obvious to all just how limited the earth's resources are and how crowded the planet is becoming. We need to manage these resources very skilfully if we are to prosper as a species.

This book is intended as an introduction to the science of conservation biology: a science that I believe will become one of the most important to us in the twenty-first century. It seeks to provide the information about our natural world that will enable the sustainable management of genes, species and communities and to maintain the biodiversity that characterises the richness of our planet. We have a significant challenge on our hands, but we must face it head-on and develop our knowledge rapidly to give us the tools to do the job.

The text is written primarily as an aid to undergraduate-level teaching, supporting either short courses or modules in conservation biology within broader degree programmes. It is written with the presumption that readers have a fundamental knowledge of basic biology and some ecology. The book is based on the course in conservation biology that I taught first at Keele University and lately at The University of Birmingham, UK. One of the key motives for writing this text was that in teaching conservation biology I was frustrated by the lack of a text that reflected European as well as North American conservation issues. Europe is more crowded and has a longer history of human occupation than most of the rest of the world and most of its ecosystems have been fundamentally altered and degraded for millennia. Other continents may be able to learn by our mistakes. This book has a global perspective but includes many examples from Europe that may be indicators of problems to come elsewhere.

The content of the book is deliberately confined to the science of conservation biology and the mechanisms by which the science can influence practical actions. There is no attempt to cover wider conservation issues involving politics, economics and social sciences. In my view these subjects are often covered inadequately in conservation biology texts and I did not want to repeat the mistakes. There are a number of textbooks dedicated to these aspects of conservation and some are listed as further reading.

I have separated the text into three basic sections. The first two chapters introduce biodiversity and the characteristic ecosystems of the planet. These chapters may be too basic for some who will want to skip

over them, but I find that many students need this basic information to fully appreciate more complex conservation issues. The second section (Chapters 3–6) explores the factors that have led to problems in conservation and threats to biodiversity: loss and fragmentation of habitats, habitat disturbance and non-sustainable exploitation of species. The final section (Chapters 7–15) explores the development of conservation biology, the conservation actions that have been taken and those that might be considered in the future. Early chapters in this section cover the most traditional forms of conservation, formation of protected areas and single species programmes and later chapters move on to developing aspects of the science, exploring both strengths and weaknesses in our knowledge that underpins conservation strategies.

I am very grateful to my undergraduates for giving me feedback on earlier drafts of the manuscript and for spotting minor mistakes. My thanks go to Ward Cooper, Barnaby Willetts, Jayne Aldhouse and Shana Coates at Cambridge University Press for encouragement and advice and to many others who have provided me with information and allowed me to present their data. My greatest debt goes to my partner Teri Knight for her unceasing support and expert comments on the manuscript.

Andrew S. Pullin
Birmingham
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