

Preface

Conservation biology as a discipline has seen many positive developments in the face of sobering challenges since we published our first edition of *An Introduction to Conservation Biology* in 2016. We have witnessed a dramatic rise in the engagement of citizen scientists via the use of ubiquitous smartphone technology and web interfaces for data collection and management. Communications and community building among those concerned with conservation of biological diversity have been strengthened through the use of social media. Technology continues to improve and be applied to conservation and management in myriad ways, including the use of drones to collect data, to spread food or pesticides, and even to transport gametes. Molecular techniques are cheaper and easier to use than ever before, helping to evaluate the status and size of populations and to discover new species. Propagation and breeding techniques are improving, which benefits *ex situ* conservation and also lessens pressures on wild populations. Harvesting levels from certain oceans and lakes are also decreasing as aquaculture improves. The number and size of marine protected areas have grown exponentially in recent years, and research shows that newer terrestrial protected areas have less intense human pressure than older ones (Jones et al. 2018). Several endangered species have improved their status due to legislation and management, including those that have been “delisted” in the United States, and thousands of new species have been described in recent years.

And yet there is still much work to be done. As this edition goes to press, the United Nations’ Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services has released the results of its comprehensive biodiversity survey. This report by 145 scientists and others from 50 countries has shocking statistics: 75% of land and 66% of the marine environment has been significantly altered by humans, and a million species are threatened with extinction (www.un.org). According to the 2018 World Wildlife Fund Living Planet Report, we have witnessed an average decline of 60% in vertebrate animal populations in just over 40 years, and species continue to go extinct across the planet (WWF 2018). The IUCN’s World Conservation Congress determined that on average, the status of several major groups, especially corals, has declined over the last decade. International funding for conservation is only a fraction of what is needed, and yet some of the wealthiest countries, including the United States, are decreasing their assistance. The human population is now estimated to be 7.7 billion and growing, requiring increasing resources. Greenhouse gases continue to increase. But our situation is not hopeless; Professor Sandra Díaz, who co-chaired the UN assessment, said, “The diversity within species, between species and of ecosystems, as well as many fundamental contributions we derive from nature, are declining fast, although

we still have the means to ensure a sustainable future for people and the planet." It is up to us and the next generation to address this formidable task head-on. It is our intention that *An Introduction to Conservation Biology* present both these challenges as well as the growing list of tools and approaches to address them.

New to the Second Edition

We have made many significant improvements to the second edition in response to the changing field and valuable feedback on the first edition. Most notably, the first edition's Chapter 4, "Threats to Biodiversity," has been split into two chapters so that more content could be added. In this second edition, Chapter 4, "Threats to Biodiversity: Habitat Change," focuses on the greatest threat to species: the loss, fragmentation, and degradation of habitat, supported by 11 new figures and dozens of updates, including the addition of the dangers of microplastics to marine fauna. The new Chapter 5, "Climate Change and Other Threats to Biodiversity," expands coverage of global climate change, presenting a variety of data in figures that illustrate both the causes and consequences of this threat, plus current research on overexploitation, invasive species, and disease.

There are now learning outcomes listed for each section of each chapter, and suggested readings have been updated throughout. Every chapter has new figures and images to enhance comprehension of concepts and excitement for the subject. We have increased inclusion of scientific methods and the role of evolutionary processes, in response to reviewers' requests. There are hundreds of new examples from the peer-reviewed literature, and we have been painstaking in checking and updating information in every chapter. In these examples and accompanying figures and photographs, we have made sure to represent diversity at every level, including the range of scientists and members of the public involved in research, geographical location, and all types of species.

In short, we have worked to make the second edition of *An Introduction to Conservation Biology* the most readable, most up-to-date, and most inspiring undergraduate conservation textbook available. It is designed to serve a wide variety of courses and students as a primary textbook or as a supplement.

As Richard has said,

It is our goal that readers of this book will be inspired to find out more about the extinction crisis facing species and ecosystems and how they can take action to halt it. I encourage readers to take the field's activist spirit to heart—use the Appendix to find organizations and sources of information on how to help. If readers gain a greater appreciation for the goals, methods, and importance of conservation biology, and if they are moved to make a difference in their everyday lives, this textbook will have served its purpose.

Acknowledgments

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Finally, I must thank Richard Primack for his mentorship, and for all of his input at every stage. It has been a deeply rewarding experience.

Anna A. Sher
Denver, Colorado
May 9, 2019

This new edition of *An Introduction to Conservation Biology* has been thoroughly revised by my coauthor Anna Sher to include the latest advances in conservation biology. I am particularly pleased by the addition of so many new figures that convey the excitement in the field. The future of this textbook is assured with the strong writing of Anna Sher combined with the skills and experience of the staff of Sinauer Associates/Oxford University Press. After writing and revising 14 conservation biology textbooks over 27 years, I am glad to be transferring the responsibility to such capable people.

Richard Primack
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May 9, 2019