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Problem-Solving in Conservation Biology and Wildlife Management

Second Edition

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Problem-Solving in Conservation Biology and Wildlife Management

**Exercises for Class, Field,
and Laboratory**

**James P. Gibbs
Malcolm L. Hunter, Jr.
Eleanor J. Sterling**



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Preface

If you are a student today you have an opportunity to play a significant role in how the biodiversity crisis plays out. Although the long-term trajectory of the human population is unclear, during the next few decades the level at which it might eventually stabilize will become increasingly clear. Of course, enormous expanses of the environment have been fundamentally transformed by our activities, yet much is left that merits conserving. How we conserve that which remains, and how we choose to live upon and in some cases restore the rest, will determine the fates of millions of wild species. Much of this will transpire during your career.

While you can learn a good deal from attending class lectures, what will be most useful to you are practical experiences. This is because conservation biology and wildlife management are, more than anything, about the application of ideas to the solving of problems. One can go to great effort to discuss all the dimensions of the biodiversity crisis, carefully enumerate the individuals in an endangered population, or methodically poll the public on its attitudes toward wild life. Ultimately what matters most is putting this information into action. This is the biggest challenge that any practicing conservationist faces.

We have generated this book expressly for the students and teachers of conservation biology and wildlife management who want to have an impact beyond the classroom. The book originated from our collective sense that “learning by doing” is the most effective, fun, and durable way to develop into a professional. A so-called problem-based learning approach worked best for us when we were students. Now we wish to share this engaging learning approach with you.

We have created a set of exercises that addresses problems spanning a wide range of conservation issues:

genetic analysis, population biology, ecosystem management, the public policy process, and more. Some can be used as simple homework exercises for individuals working alone. Others are lengthy, group exercises. All carry a message about “making it happen,” that is, how to take what you have learned in an exercise and have an impact in the larger world.

The first edition of this book was published in 1998. In the interim, the book has been purchased and used by many around the world, enough to warrant a second edition. We now have more experience in developing exercises that “work.” Approximately two-thirds of the material in this second edition is new or dramatically revised from the first.

Our target audience is upper-level college undergraduates, early-stage graduate students, and possibly some practicing professionals. While the book might best complement an existing conservation biology or wildlife management lecture course, it can contribute to a variety of courses, and has, for example, been adopted for a re-training course for secondary school teachers and a field-based natural history course.

We view conservation biology and wildlife management as complementary fields, and have therefore included exercises applicable to both. The two fields contrast mostly in terms of emphasis. Conservation biology views all of nature’s diversity as important and having inherent value, whereas traditional wildlife management operates from a somewhat more utilitarian perspective with a primary objective of providing recreational resources for people, including sustained yields of harvested species, especially birds and mammals. Both fields recognize the need to integrate the contributions of non-biologists (economists, sociologists, political scientists) to conserve wild species. This commonality distinguishes both fields from the pure sciences. Because of the blurred distinctions between these

fields we have intentionally not tried to identify which exercises are more suitable to a conservation biology class versus a wildlife management class.

The book has been designed to accompany any of the main-stream conservation biology and wildlife management texts. Instructors should be aware that they need a copy of the accompanying instructors' manual to make certain exercises succeed. To secure a copy, see "Important note about the instructor's manual" below.

Copying

We are well aware that the cost of textbooks often leads both students and faculty to copy portions of textbooks illegally. The temptation to do this is particularly great with lab texts in which not all of the exercises will be used. We have tried to minimize this temptation by keeping the price of the book low. We are also aware that many scanned, electronic copies of exercises from the first edition of the book are posted on course websites on the internet. This is flattering yet frustrating as it undercuts not only our efforts but also any publisher's interest in books such as this. Perhaps it will help some people to avoid the temptation of photocopying to know that all of the royalties from this book have been dedicated to conservation: two fellowship funds for natural resource and biology students from developing countries.

Important Note About the Instructor's Manual

Instructors should be aware that they need a copy of an accompanying instructor's manual to make many exercises succeed. While developing this book we compiled a

companion electronic document with the answers to all the exercises as well as many tips and suggestions. We wish to manage the distribution of this manual to instructors of classes. To receive an electronic copy, please send an email message to James Gibbs at jpgibbs@esf.edu indicating:

- your institution and position
- the course name and number, and
- approximate number of students in the class.

With this information we will arrange a web download or email transmission of the manual.

As we regard this as an evolving project please also send along suggestions and criticisms. We would especially like to hear about ways to improve these exercises. We know that many teachers of conservation biology and wildlife management courses have put together similar exercises for their classes. For possible inclusion in a future edition of the book, please send them along to us.

The Book's Website

This book has an accompanying website with the data sets and other resources to support many of the exercises presented herein: www.blackwellpublishing.com/gibbs

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We are most grateful to the students who worked through earlier, less polished versions of these exercises. Most of the exercises have been “field-tested” and greatly improved by students at the State University of New York’s College of Environmental Science and Forestry, Columbia University, the University of Maine, and Yale University. Also, Erin McCreless and Brian Weeks kindly assisted with exercise preparation.

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Drawings were produced by Debbie Maizels and the staff of Emantras.

Last, but certainly not least, at Blackwell Publishing Rosie Hayden patiently guided us through an extended publication process and Janey Fisher did an extraordinary job scrutinizing the manuscript during the copy-editing process for this 2nd edition.

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PART 1

INTRODUCTION

CHAPTER 1

WHAT IS BIODIVERSITY? SPIDERS AS EXEMPLARS OF THE BIODIVERSITY CONCEPT

**James P. Gibbs, Ian J. Harrison, and Jennifer
Griffiths**



What is biodiversity? Ask anybody on the street if they have heard of the word “biodiversity” and you will usually get an affirmative answer. This is because the term has become very widely known – competing with some of the most popular terms from the media on the Internet.