Preface

Now is the time for conservation science—a mission-oriented scientific enterprise that seeks to protect nature, including Earth's animals, plants, and ecosystems, in the face of unprecedented human demands upon the planet. Conservation scientists apply principles from ecology, population genetics, economics, political science, and other natural and social sciences to manage and preserve nature. The focus of this book is first and foremost on protecting nature and especially Earth's biota.

Because conservation is concerned with how we humans live on the planet, passions can run deep. In these pages we try to capture the excitement of conservation as it stands today—a lively field involving many unsettled debates. We try to provoke spirited classroom debate by ending chapters with essays that describe a current situation in which conservationists face vexing choices.

Our Intended Audience

We wrote this book primarily for upper-level (junior/senior) undergraduates and beginning graduate students who are interested either in academic careers or in doing science-based conservation at government agencies, nongovernmental organizations, or international institutions. Most readers will benefit from an introductory knowledge of evolution, genetics, and ecology. This book may also benefit those who are already involved in conservation and need to bolster their understanding of conservation science. We hope this text will prompt readers at all points in their careers to reconsider some of their assumptions and explore new ideas or analyses.

A Book That Students Can Learn From

Our emphasis is not on memorizing definitions or formulas but on understanding the importance of clear critical thinking. We focus on how conservation scientists go about their work as they attempt to draw valid inferences about threats to nature and the effectiveness of various conservation actions.

At the end of each chapter, we provide group projects that ask students to analyze primary data in a sophisticated manner, as if they are working for a government agency or conservation nonprofit. To facilitate these projects and further exploration of chapter topics, we maintain an online guide (http://www.conservationscience.us) to reputable websites that provide data and case studies to pursue in greater depth.

Finally, this edition is accompanied by a list of suggested readings and an online assessment that allows students to test their understanding of the concepts, quantitative figures, and ideas presented in each chapter.

Organization and Topical Coverage

We have organized the contents into four sections, although the chapters can be covered in a variety of orders. The first section introduces the need for conservation in the modern world. The second highlights the roles that conservation policy, protected areas, and planning serve in advancing the broader goals of conservation. The third section delves into the ecological and genetic principles that form the traditional foundation of conservation science. In the final section, we explore directions for the future that can help make conservation successful in a world dominated by a human population of 7 billion and growing.

Many books have separate chapters on conservation genetics. We do not. Instead, to help students learn genetics in the context of its application, we integrate its treatment where appropriate throughout the book. We also do not shy away from the mathematical models and quantitative analyses that form an important core of conservation science.

Conservation is filled with heroes from all socioeconomic and educational backgrounds. Some have documented the low genetic diversity among cheetahs or how the timing of plant flowering is shifting in response to climate change. Some remove invasive kudzu vines from forest patches. Others work to increase the number of trees in our urban landscapes or to get children out into nature. We can all own conservation. We think science and rigorous thinking are key to getting more people involved and yielding bigger and better results. We hope this book gives you some tools and experience with scientific thinking that you can carry with you long after the course ends.

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Reviewers of the Second Edition

David Allan (U Michigan), Dan Ardia (Franklin and Marshall), Karen Beard (Utah State U), David Berg (Miami U), Dale Bottrell (U Maryland), Andrew Cox (U Omaha), Amy Downing (Ohio Wesleyan U), Danielle Garneau (SUNY Plattsburgh), Thomas Hetherington (Ohio State U), Karen Hodges (U British Columbia, Okanagan), David Jachowski (Virginia Tech), Chris Johnson (U Northern British Columbia), Cindy Johnson (Gustavus Adolphus College), Jamie Kneitel (California State U, Sacramento), David Knochel (U Colorado), Arielle Levine (San Diego State U), Christopher Lortie (York U), Jessa Madosky (Warren-Wilson College), Ellen Marsden (U Vermont), Rodney Mauricio (U Georgia), Michael McDonald (U Vermont), Amy McEuen (U Illinois, Springfield), Shawn Meagher (Western Illinois U), Bob Minckley (U Rochester), James Murdoch (U Vermont), Erin Questad (California State Polytechnic U, Pomona), John Quinn (Furman U), George Robinson (SUNY Albany), Margaret Ronsheim (Vassar College), Heather Sander (U Iowa), Dov Sax (Brown U), Cynthia Stringfield (Moorpark College), Julie Stromberg (Arizona State U), Alexander Wait (Missouri State U), Paige Warren (U Massachusetts), Louise Weber (U Saint Francis), Christine Whitcraft (Cali-

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With our deepest gratitude to our teachers, mentors, colleagues, and students,

Peter Kareiva & Michelle Marvier