

PREFACE

In this book we offer a comprehensive account of the practice of ecological restoration, the discipline that recovers impaired ecosystems and returns them to wholeness. We wrote it for all those who initiate, finance, administer, manage, plan, and, most particularly, implement ecological restoration projects. We also had in mind all of those who serve in supportive roles, such as growers who provide nursery stock, ecologists who monitor and evaluate projects, social scientists who provide liaison with the public sector, and agency personnel who perform regulatory functions. Above all, we wrote this book for students and young professionals from around the world who are considering careers in ecological restoration, so that they may understand the challenges and appreciate the profound satisfaction that this discipline will bring them.

This is not a book on ecology per se, although we describe at length the scientific underpinnings of restoration practice in what we hope is both a substantive and accessible manner. In addition, we examine in depth the many values that ecological restoration fulfills. We discuss how ecological restoration projects are structured and administered. We also explore allied fields of natural resource management and conservation with which ecological restoration is sometimes conflated.

We did not write the book to attract a broad public readership, but those members of the general public with an interest in our field will hopefully find much stimulating and provocative material. We hope to attract readers who are public policy makers and business leaders whose professional activities and decisions regarding environmental issues will benefit from a thorough understanding of our field. We also hope to attract environmental philosophers and those writers who are attempting to satisfy a rapidly growing public interest in ecological restoration. We want to reach this diverse audience because its understanding of restoration

is crucially important in order for our field to realize its full potential. Indeed, ecological restoration is emerging as a meeting ground for many different fields and interest groups in all strata of society and in all cultures around the world. A common understanding of its precepts and its practice is essential for effective dialogue and collaboration.

Those who are familiar with the first edition of this book (Clewell and Aronson 2007) will find that this, the second edition, has been revised and reorganized from top to bottom. The impetus for revision was to improve what reviewers had already proclaimed to be a successful book, update it regarding new developments in this rapidly advancing discipline, and add new topics for discussion. We solicited review comments concerning the first edition and incorporated suggestions as best we could. Our insertion of case histories of restoration projects by those practitioners who conducted them, which we called Virtual Field Trips (VFTs), was highly popular in the first edition. We replace them with entirely new Virtual Field Trips here for added interest. This edition lacks the appendix that appeared in the first edition, which was a verbatim copy of a foundation document of the Society for Ecological Restoration (SER) entitled *Guidelines for Developing and Managing Ecological Restoration Projects*. That document is available on SER's web page (www.ser.org), and it was important to include it in the first edition, because it had not been published previously in hard copy.

The first edition was written in large part as an elaboration on another foundation document, *The SER Primer on Ecological Restoration* (SER 2004). We continue to refer to the *SER Primer*, but this edition is more of a stand-alone volume than was the first edition. Versions of the *SER Primer* were issued in 2002 and 2004. The text is identical in both versions, and the only difference lies in their formatting. In our first edition (Clewell and Aronson 2007), we cited SER (2002). In this edition, we cite SER (2004), the version that is currently posted on the SER website. Readers should be aware that both the *SER Guidelines* and the *SER Primer* will probably undergo review soon for possible updating and revision.

We have prepared a somewhat revised glossary for this edition, covering the perplexing array of terms that relate to ecological restoration. Definitions are tailored to the way we use those terms in this book. For the most part, we retained the same definitions as in the first edition; however, we added more terms and updated others, relying primarily on definitions accepted by *The Economics of Ecosystems and Biodiversity* (TEEB 2010) and van Andel and Aronson (2012).

Layout of Sections and Chapters

The book is not a "how-to" manual that instructs the reader in particular tactics and methods for performing ecological restoration at a given project site, or in

a given ecoregion. Instead, it attempts to cover all of the *other* topics relevant to restoration practice. The book consists of twelve chapters, arranged in four parts.

Part I, entitled *Why We Restore*, begins with an overview of the entire field of ecological restoration, what it means to civilization, and introductions of important principles that recur throughout the book. Next, we consider the personal, cultural, socioeconomic, and ecological values that are fulfilled by ecosystems after they have largely recovered from impairment. We offer a conceptual model that organizes these values coherently. The section ends by addressing the globally relevant issue of ecosystem impairment.

Part II, entitled *What We Restore*, examines the complex topic of ecological recovery, the meaning of which is central to the definition of ecological restoration, and how recovery is accomplished. We describe ecological attributes that give restored ecosystems wholeness when they are attained. The controversial topic of the restoration of semicultural ecosystems is thoroughly treated.

Part III, entitled *How We Restore*, addresses the essential topic of reference systems and reference models, which inform almost every aspect of restoration planning. Strategic approaches to ecological restoration are examined, including the factors that determine the intensity of effort needed to complete a restoration project. The necessary steps that are common to every ecological restoration project are enumerated, starting with the initial conceptualization of a project and ending with the publication of its case history. Stakeholder involvement is a recurring theme throughout.

Part IV, entitled *Ecological Restoration as a Profession*, examines the relationship of the field to other disciplines, including ecological engineering, landscape design, and the restoration of natural capital (RNC). The section also deals with professional training and certification; the ways that restorationists and other professionals perceive the discipline of ecological restoration; and topically urgent issues for which ecological restoration has relevance, such as climate change. We conclude the book with recommendations that we feel will advance our emerging profession.

How to Use This Book

Different readers will want different kinds of information from this book. Many will want to read it in sequence. Others may want to read the Virtual Field Trips first as general background before tackling the text. Later chapters are more specialized and may mean more to those who are already experienced restorationists. Most chapters are more or less independent essays and can be read in any order, particularly by those with experience in the field.

We wrote this book to refine definitions, clarify concepts, illuminate current

trends, encourage interdisciplinary alliances, and stimulate our readership to develop new visions. We recognize that this book is only a temporal contribution to a rapidly developing discipline. We hope that it will contribute to a global dialogue that pushes ecological restoration forward, in synergy with the related activities of ecological engineering, ecological economics, and sustainability science. We are ready to participate in this dialogue, and to that end we invite your response by email, addressed to us at clewell@verizon.net and james.aronson@cefe.cnrs.fr.

Acknowledgments: Tein McDonald and Karen Holl read parts of advanced versions of this edition and made a number of incisive suggestions to clarify and expand our messages. Paddy Woodworth—journalist extraordinaire—examined the book and challenged us to rethink some of its passages. He asked that we acknowledge a conflict of interest that bothered him as he wrote the foreword for this book, since he assisted in its editing. We would share his concern if he had not provided us with constructive criticism that we could only call “tough love.” We thank Bérengère Merlot and Christelle Fontaine for tremendous support as research and editorial assistants, and all our numerous colleagues around the world for ongoing debate and dialogue. It is customary for authors to tip their hats to editors of publishing houses who were assigned the task of smoothing rough edges before their books went into production. Instead, we express our gratitude to Barbara Dean of Island Press and her associate Erin Johnson, who assumed much larger roles by insisting by means of their reviews and criticisms that we perform to our highest potentials, both intellectually and as writers.