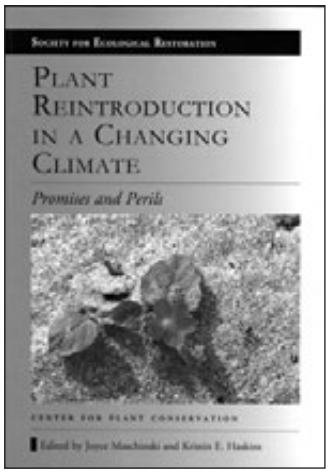
Plant Reintroduction in a Changing Climate: Promises and Perils

Maschinski, J. and K. E. Haskins. 2012. ISBN 978-1-59726-831-8 432 pp. Island Press, Washington, D.C. www.islandpress.com; $100 cloth, $50 paper.

After the Endangered Species Act was passed in 1973, preventing extirpation (artificial extinction) became a serious national interest. The conservation and restoration of natural communities remains the primary emphasis because threatened species are always protected best in their natural habitats. Where species have disappeared from their natural habitats, however, plans to reintroduce them have assumed great importance.



Plant reintroduction is our foremost strategy to return declining endangered and threatened plant populations back to sustainable levels. This book is a review of recent progress in this field over the past fifteen years or so; it follows a review published in 1996. Not a book for the casual reader, it is directed at professionals and students in the field, serving as a vehicle for sharing practical experience and new ideas. Much of the text is technical, especially the statistical models that bring order to diverse sets of data. Of more general interest will be the chapters that summarize past experience and offer guidance for future practice.

The first chapters summarize the rest of the book. In chapter 2, Ed Guerrant, conservation director at the Berry Botanic Garden, provides a cogent narrative of the past two decades of rare plant reintroduction: what conservation managers have attempted and their success rates. I found Chapter 3 the most informative chapter in the book: a team of British botanists do a meta-analysis of reintroductions of an incredible array of plant forms, experimental styles, and habitats from around the world since 1900. Among their more surprising observations is that widespread regional endemics are as fussy about their habitat requirements as narrow endemics, not having a broader habit tolerance and thus just as difficult to reintroduce successfully. From this they conclude that, "there is little ecological justification for using reintroduction throughout a species' historic range while ignoring the potential of close range MR to mitigate against threatened plant decline."

The "MR" just quoted is an acronym for "managed relocation," a powerful subtext of this book. It is an emerging paradigm that hides under the presumed attention to climate change of the book's title. In all the discussions, after affirming climate change is important, there is no clear offering on how to incorporate climate change predictions into plant reintroduction models. While almost every chapter makes reference to MR, Chapter 13 tackles the subject head on. Managed relocation is a hot topic because its application is controversial. Attention to the idea in the conservation community is recent. The publication record begins in 2005 with a definition of the phrase "assisted migration," changed eventually to "managed relocation" to avoid confusion with animal migration. Managed relocation is exactly the same as reintroduction but with the introduction sites being outside the historical range of the species. The further outside the historical range, the more uneasy skeptical conservation biologists are. Those who are flatly opposed to MR call it "planned invasion." There is a spectrum of conservation biologists whose willingness to consider MR ranges from modest to those who advocate constructing new ecological communities. The arguments make for interesting reading. Most opposition involves fears that relocation could go awry, introducing a potentially aggressive invasive and its microbial associates—also potentially aggressive, detrimental invasives. There are few data to support this apprehension, but it is clearly a strong force to contend with in rare species conservation circles.

The middle chapters of this book focus on issues dealing with this controversy in the broader context of reintroduction theory. Chapters 4, 5 and 6 discuss public involvement, genetics, and microbial associations with rare plants.

Chapter 7 posits that, "Of all conservation strategies…reintroductions require the most sophisticated understanding of species biology and ecology." A dense review of niche theory is weak in practical application but strong in modeling that predicts future distributions. It is followed by a discussion of niche attribute studies that show microsite properties are especially critical for long term persistence of propagules in reintroduction projects. Chapter 8 is also focused on modeling, in this case on rare species habitats. It is anticipated that practical applications will result from understanding gained from the models. The most statistically complex topic in the book is Population Viability Analysis (PVA) covered in Chapter 9. PVA is invoked in other chapters, also, as offering the best means of analyzing data to predict success in survival of long lived perennials. There are, however, few studies that use PVA in planning and evaluating reintroduction success because of the expense and effort needed to gather the detailed demographic data needed for PVA.

Small population paradigms are discussed in Chapter 10, covering founder factors in survival. Chapter 11 is about success criteria as defined by the IUCN, with a target of monitoring for over 10 years. Chapter 12 discusses the unique problems of working with very small source populations in Hawaii. The most significant contribution this book makes to practical reintroduction strategy is contained in its Appendix 1, "Center for Plant Conservation Best Reintroduction Practice Guidelines." There are 43 carefully crafted guidelines that every land manager would do well to read and absorb when entertaining a rare plant reintroduction project.

-David Wagner, Emerald Chapter.