

*Limnol. Oceanogr.*, 46(6), 2001, 1583  
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ZEDLER, J. B. 2000. **Handbook for restoring tidal wetlands**. CRC Press. 439 p. \$89.95. ISBN 0-8493-9063-X.

Habitat restoration is an important field that has only recently been seriously considered as a subject for research by ecologists. Although restoration has long been practiced in many aquatic habitats, most such work has been organized by management agencies, with only minor involvement of research ecologists. This is primarily because the scope of work and the costs involved have been beyond researchers' capabilities. Moreover, the logistics of creating new habitats frequently make replication—the mantra of ecologists—difficult or impossible. Increasingly, however, clever ecologists have been able to extract interesting results from a variety of restoration efforts. This book does an admirable job outlining the successes and failures of several such studies from California coastal wetlands.

Intended for a broad audience, including planners, the general public, and researchers, this excellent compendium is easy to read. I particularly liked the 77 original full-page plates, which will be particularly useful to people working in Southern California coastal ecosystems who might have less access to taxonomic sources. They also make the discussions in the text a bit more understandable.

Zedler, who edited the book, claims that there is no broad-based compilation of case studies and principles to guide restoration studies (but there is at least one that I know of that addresses this issue for seagrasses: Fonseca et al. 1998), and she uses her experiences to fill some of the information needs for restoring Southern California tidal ecosystems. Although there is a great deal of grist for planners and practitioners in this book, the somewhat simplistic approach may be less appealing to the scientific research community. For example, Zedler cites a stepwise approach to restoration focusing on gathering background data, establishing goals, and monitoring; few researchers need coaxing in these areas. Likewise, although suggestions to develop agreements with shareholders may be worth reiterating to the scientific community, statements that scientists should engage people with attractive visual arts seem misplaced. "Water drains more quickly from steeper slopes and plants located farther from the water's edge are submersed for less time" also seems a bit obvious. The nonresearch audience might appreciate such obvious statements but few *Limnology and Oceanography* readers will find this material compelling.

However, scattered throughout the book is information that can contribute to topics that are currently of interest to research ecologists, viz. succession, disturbance, life histories, dispersal, and landscape ecology. For example, while discussing various planting strategies, Zedler notes that placing plants in clusters may be desirable if the open spaces lead to natural recruitment. This suggests an interesting way to test ideas about recruitment relative to size of spacing, which is of particular interest at present because of the

problems associated with the invasion of exotic species into newly restored ecosystems. Additionally, the response of a restored area to an unplanned disturbance can provide insight into community assembly and resilience. The chapter on faunal use of habitats was quite up to date and was the most scientifically sophisticated, containing many research ideas. These are but a few examples of topics in the book that could fit into a research agenda.

Two parts of the book were disappointing to me. First, its discussion of the "success" of a restoration, a subject that elicits much comment among restoration scientists, does little to clear the air. Zedler and her colleagues argue that a strict attainment of success, based upon multiple criteria, may not always be obtainable even if some criteria have been satisfied. They argue that "the degree of progress towards functional equivalence" should be employed as a measure of success. But how close to functional equivalence do you need to be to be making progress? Should we settle for making progress? I worry that we will encounter new kinds of semantic problems with this definition of success, which may also be very unsettling for agencies that are involved in the legal aspects of mitigation. Evaluating success logically must be based upon the stated goals of each project. Hopefully, our science will improve to the point that we will be able to develop success criteria that are more reasonable and perhaps even predictable.

My second objection is that the book does not contain a section on the methodology to assess the effects of a restoration project. A thorough discussion of exactly how to compare the restored area to a reference area, including the design of the monitoring program and the types of statistical techniques that can be used, would be of great help to practitioners, as well as researchers. A better understanding of the research tools that are available to make comparisons is needed so that results can be rigorously defended.

Overall, I recommend this book to planners and practitioners. It is rich in examples and experiences that would be helpful to those in the field. I will use it as a reference book, drawing upon the bibliographies included at the end of the chapters, and will encourage my students to use it as a resource because it contains a very readable amalgamation of science and policy issues.

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#### References

- FONSECA, M., W. J. KENWORTHY, AND G. W. THAYER. 1998. Guidelines for the conservation and restoration of seagrasses in the United States and adjacent waters. NOAA Coastal Ocean Program, Decision Analysis Series No. 12.