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Book Review

A guide to the relationships between marine spatial patterns and ecological processes

Seascape Ecology by Simon Pittman (editor)
2017, Wiley-Blackwell, 526 pp., ISBN: 978-1119084433, www.wiley.com

Seascape Ecology is a timely addition to a burgeoning field, introducing readers to the application of landscape ecology in marine systems. The book, edited by Simon Pittman, covers the history, key concepts, and future directions of the field, with a focus on management and conservation. Generally, each chapter and section is able to stand alone, making this text a good reference for a wide variety of topics. We recommend the book for those comfortable with spatial ecology but new to the seascape ecology field, including graduate students and long-term practitioners.

Seascape ecology has its roots in landscape ecology, which is itself a fusion of the disciplines of geography and ecology. While Troll (1939 *Zeitschrift der Gesellschaft fűr Erdkunde zu Berlin*) defined landscape ecology as "the study of the main complex causal relationships between...communities and their environment." Pittman and colleagues define seascape ecology as "the study of the relationship between spatial pattern and ecological processes in marine environments on a range of spatiotemporal scales." Many concepts in landscape ecology apply to seascape ecology: both fields focus on spatial structure, how structure affects function, and the ways spatial relationships are dynamic. However, seascapes differ from landscapes in that they encompass a three-dimensional, highly connected system with complex spatial patterns across multiple scales. Marine environments are also challenging to study due to the difficulty of accessing underwater habitats. *Seascape Ecology* identifies recent advances in technology, as well as more sophisticated tools and models, as catalysts for initiating the application of landscape ecology concepts in the ocean. With the goal of understanding relationships between marine organisms and their environments and a focus on marine spatial planning, the book is divided into four sections, each of which focuses on specific themes in this new and multidisciplinary field: spatial patterning, linking seascapes and ecological processes, connectivity, and human impacts. This book underscores the diversity of topics contained within seascape ecology and its applications to systems that are largely "open" with processes acting at large spatial scales.

Spatial approaches in ecology are vitally important, especially in linking ecological patterns and processes. However, many such approaches are relatively new in their application to marine systems. This book was reviewed in the context of a marine ecology reading group, and the text provoked discussion on how to incorporate seascape ecology into our own research. The chapters on seagrass and saltmarsh patterning (Ch. 5, Böstrom, Pittman, and Simenstad), seascape patch dynamics (Ch. 6, Jackson, Santos-Corujo, and Pittman), and quantifying seascape connectivity (Ch. 10, Treml and Kool) were especially useful for providing clear examples and resources. Some chapters provided guidelines for implementing modeling approaches such as the chapters on patch dynamics (Ch. 6, Jackson, Santos-Corujo and Pittman) and individual-based models (Ch. 8, Hovel and Regan). The authors of these chapters provided necessary background information and model theory, clear toolkits for implementation, and additional resources for those interested in more in-depth and complex integrations of these types of models into their own research.

While reading the book, we appreciated many elements that were represented in some but not all chapters, and would ideally be incorporated broadly in future editions, including clear conceptual diagrams and figures (see Ch. 3, 5), glossaries (Ch. 3, 9, 10), and future directions (Ch. 6, 8, 9, 10). These subsections provided essential background information for those less familiar with a topic, while allowing readers with more experience to focus on the main text. Chapters with in-depth case studies and future directions provided clear examples of application. Case studies covered a variety of systems and scales, although the majority consisted of coastal (e.g., tropical reef and seagrass) systems. Although it was generally apparent how these techniques could be applied in other systems, examples across a broader range of habitats (including pelagic and rocky intertidal systems) could increase the text's scope and impact.

The last section of the book is the most applied; it focuses on how humans impact seascapes and how ecosystem (seascape) based management can be used as a management tool. This section emphasizes the connections between humans and marine systems. These interactions can be mapped and modeled using a seascape ecology approach, and the emergent understanding can be used to inform the creation of effective marine protected areas and the valuation and protection of seascape goods and services. Given the promise of applying seascape ecology as a management and conservation tool, this book is especially timely and relevant.

Seascape Ecology is targeted toward researchers and professionals in both science and conservation fields and is advertised as a supplementary text for university courses. With such a broad intended audience, however, the book as a whole sometimes falls short as individual chapters can be repetitive or overly detailed. For a reader familiar with spatial processes, this book can be an effective tool for advancing a reader's understanding of the framework of seascape ecology. While appropriate for graduate students and established researchers and managers, *Seascape Ecology* may be too complex and/or costly for the average undergraduate student. Additionally, for those relying on the e-book, images and figures are often difficult to view or interpret on the screen. Overall, the book provides a strong literature review of the history of seascape ecology, methods for its current application, and future directions for the field and will make a good at-hand reference for researchers and conservationists in graduate school and beyond.

Whether as an introduction to seascape ecology or as a guide to incorporating these techniques, *Seascape Ecology* encourages readers to question how processes like scale and connectivity apply to their own work and how a seascape perspective can be incorporated. Many chapters provided references for analysis tools, conceptual diagrams of difficult concepts, and glossaries of terms specific to the field, which made complex theories and practices approachable. Because of this, many chapters can stand alone as reference guides for practitioners interested in topics ranging from patch dynamics to marine protected areas. While someone who is just starting out on the seascape ecology path may need to consult additional references to take on some of these approaches, this text provides an excellent introduction and starting point. And, as *Seascape Ecology* emphasizes, one organism's habitat is another organism's seascape: once you have the foundational knowledge of seascape ecology, you can always scale up.

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