BOOK REVIEWS

Limnol. Oceanogr., 47(4), 2002, 1268

KNOX, G. A. 2001. **The ecology of seashores.** CRC Press. 557 p. US$90. ISBN 0-8493-0008-8.

Seashores are where Earth's major physical realms meet. Owing their existence and character in equal measure to sea and land, they are in a perpetual state of transition at every temporal scale. This conflicted environment alternates between emergence and submergence in time to tidal rhythms; and at the other temporal extreme, geologic strata record the translocation of seashores over cycles of expansion and contraction in sea volume measured on millennial time scales. It is an environment of strong gradients shaped by ever-changing pressures of both physical and biotic forces acting on both the stage and the players on it. Few organisms make it their permanent home, but many visit. Our own species finds it irresistible and fascinating, as evidenced by the affinity of the world's human population for coastlines.

A complete characterization of such a variable zone in all of its diverse forms, locations, biotic communities, and functions would not be a realistic expectation for any book. This volume, which is intended for use by advanced undergraduates, graduate students, and researchers and managers, emphasizes the use of systems analysis to describe and explore the ecological processes underlying the strong spatial and temporal dynamics that are at the core of basic research on coastlines. It is divided into seven chapters. The first is a brief (17 pages) general description of environmental gradients, seawater, tides, waves, and physical properties of shorelines. This is followed by three chapters that describe shores with hard and soft substrata (a dichotomy maintained throughout the book) and the adaptations required for life in the intertidal zone. The fifth chapter summarizes observations and experimental manipulations aimed at elucidating the roles of various biotic interactions in the dynamics of intertidal communities. The final two chapters deal with energy and material fluxes and comparisons of ecosystem models that characterize key processes in the functioning of intertidal systems.

Knox has made a deliberate effort to include studies from the southern hemisphere (primarily New Zealand, Australia, and South Africa) to complement the more extensive literature from Europe and North America. Given that most of the world's landmass and seashores are north of the equator, previous emphasis on the northern hemisphere is understandable. By highlighting studies in other regions, Knox helps promote a healthy trend toward broadening the geographic coverage of our knowledge base. Ecological studies of shorelines remain underrepresented in many locales, including much of South America and Africa, as well as oceanic islands and polar regions.

The book is presented in a hybrid style of both a general text and a scientific review article; although this may be useful to some, the strings of citations that often occur in place of crisp summaries typical of an engaging textbook will likely challenge most students. The reference list includes >2400 entries and establishes a historical context for seashore research. Although the Preface indicates an emphasis on work published over the past decade, my haphazard sample of 544 of the references included only 11% that met that criterion (>80% of the citations dated prior to 1988, and the median date of citation was ~1981). Given the large number of references, one expects some to be in error. Perhaps by unfortunate coincidence, the only one that I checked (my own) met that expectation: Kneib (1987) in Ecology **68**: 379–386 is incorrectly cited to support a statement about indirect effects involving killifish (erroneously identified as ''kill fish''); the correct reference should be Kneib (1988) Ecology **69:** 1795–1805. Further scrutiny will likely uncover similar defects elsewhere.

The volume is liberally illustrated with figures and tables, most of which are pertinent and useful. However, excessive use is made of complex compartmental flow diagrams to describe energy and material transfers in specific populations or ecosystems; furthermore, some of these are illegible (e.g., Fig. 7.8, p. 439) or outdated. The components and flows of ecosystems models summarize information available at the time of their construction and are virtually always designed to be adjusted and refined over time; cataloging details of specific models that are unlikely to reflect current insights may provide historical perspective, but it is an invitation to rapid obsolescence.

Conspicuous by its near absence from this book is any substantive treatment of the role of humans in seashore ecology. Anthropogenic effects have long permeated the ecological functioning of coastal ecosystems, but only recently have we acknowledged the folly and costs of attempting to force stability on an environment defined by change. Clearly, interfering with natural cycles of give and take between the land and sea has significantly altered ecological functions and processes in this critical transition zone. Global warming and the associated sea level rise will exacerbate this problem and increasingly focus attention on these ecosystems.

The field of ecology owes much to the empirical studies and theory inspired by these accessible environments, which package ecological patterns on scales so conveniently observed and manipulated. Recent trends toward restoration of degraded shoreline habitats will surely challenge our current understanding of this environment, offer new opportunities to explore their integrity, and validate our enduring interest in the mutable boundary between land and sea.

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