

residential development were already apparent. Strikingly, these same tensions persist on Martha's Vineyard (and other New England islands) today, and are perhaps made even more intense by the astronomical land prices. Martha's Vineyard represents a model of what can be achieved with 40% of the land currently protected, a land bank established, and an island-wide conservation commission.

The book concludes with a vision of how effective land management could help conserve the island's landscapes. Rather than advocating for expensive and recurring management methods, such as fire or mowing, to lock the landscape in place, Foster strongly argues for land managers to allow foresters and farmers to use the land at low cost as long as they carry out practices that are compatible with conservation goals. For example, farmers could be given grazing or haying rights at a low price as long as they agree to mow fields only after birds have fledged. Foresters could be allowed to selectively cut trees to facilitate successional species and create open spaces. In the process, more local employment opportunities would be created, and more locally produced goods would be supplied to the island economy.

One missing piece from the book is a description of how the landscapes of Martha's Vineyard contribute to conservation education and the quality of life on the island. How much are the citizens of the island involved in monitoring island biodiversity or restoring damaged ecosystems? What efforts are being made to reach local people, especially school children and tourists, with messages of conservation and sustainability? And even though it is probably beyond the scope of the book, I would have liked to see something about how landscape

conservation can be used to address some of the major social issues on the island, such as the difficulty of year-round residents, especially the immigrant community, to find affordable housing and equitable incomes?

As I read Foster's book, I wondered whom the audience would be for 300 pages focused on land-use history and conservation. I picture two main audiences. First, for Martha's Vineyard residents who already know something about land-use history and are committed to conservation and want to know a great deal more, this book will provide a wealth of information. For those looking for a more general introduction to the land use of Martha's Vineyard within the context of New England, it is perhaps too detailed. Second, ecologists and natural historians will provide another keen audience for this book, especially those interested in the rigorous application of ecological theory to conservation management. Members of the Ecological Society of America could apply this same approach to their own town, city, island, national park, or study area, to the great benefit of local residents and the conservation and ecology communities. Foster's telling of how to apply the powerful Harvard Forest approach to land use and conservation to Martha's Vineyard should inspire ecologists to dig into their local natural history, and apply this approach to other places.

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## A biogeoscience view of ecosystems

Johnson, Edward A., and Yvonne E. Martin, editors. 2016. **A biogeoscience approach to ecosystems**. Cambridge University Press, Cambridge, United Kingdom. xiii + 480 p. \$94.99 (hardcover), ISBN: 978-1-107-04670-2.

*Key words:* biogeoscience; conceptual model; ecosystem; geoscience.

This ambitious book seeks to present “ecological-geoscience connections that illustrate a mechanistic and process-based approach” (p. xi). At a modest level, the goal is to bring up-to-date representations of recent progress in the earth sciences to ecologists; the more challenging, overarching intent is to promote coupling

of concept and practices in ecosystem science. The editors acknowledge that no unified “formal biogeosciences viewpoint” (p. 3) exists. They assert that attempts to bridge disciplinary worldviews generally have asymmetry between the geo- and bio- components; e.g., soil erosion models that have just enough vegetation information to support the geophysical objectives. Yet many attempts at interdisciplinarity throughout the contemporary environmental sciences community are evident in Table 1.1, listing 13 areas of research in biogeosciences pursuing integration across components of the bio-, hydro-, litho-, and atmosphere.

A wide range of views is represented within this context. In each of the 14 chapters, multi-disciplinary individuals

or interdisciplinary teams present integrative narrative and in most cases mathematical representations of the systems of interest. The 27 authors of these chapters are based in six countries (including 11 from the US and eight from Canada) and dominantly reside in academic geography and environmental studies programs, which generally seem well suited to accommodating boundary spanners. The editors have coaxed the authors to effectively tell their stories at common scales of resolution and to avoid getting down “into the weeds” of their personal research. Clearly the editors have given this topic a great deal of thought for many years and have drawn on their extensive networks of colleagues to enlist contributors.

Chapters are grouped in four parts. Part I, titled “Connecting ecosystem and geoscience processes,” is a single chapter setting forth the multi-scale Metabolic Theory of Ecology of West, Brown, and Enquist. This perspective is weighted significantly to the biological side concerning the scaling of an organism’s metabolic rate and mass in the context of energy, water, and nutrient fluxes. The final section of this chapter offers an interesting reflective and prospective view of this theory, which has been challenged over the 20 yr since its first publication. Part II contains two stage-setting chapters; one on heat balances and the other on water budgets in ecosystem contexts. These chapters are quite comprehensive in the principles addressed and wide-ranging in the types of examples (e.g., a steady-state heat budget for a mouse in a box and a swimming leatherback sea turtle on land and at sea). Terms are defined and explained, and concepts are diagrammed followed by presentation of mathematical and simulation modeling approaches. Part III consists of five chapters focused on the coupling of hillslope geomorphology, soil, hydrology, and terrestrial ecosystems. Featured topics include modeling landform evolution, soil systems across watersheds and time, precipitation-canopy interactions, nutrient dynamics, and evapotranspiration. Part IV concludes the book with five chapters on rather disparate topics: fine-scale

interactions of aquatic biota and flowing water in fluvial systems; tidal flow, vegetation, and carbon dynamics in salt marsh systems; dunes and vegetation dynamics (clearly a favorite of the book editors, who are authors of this chapter, which begins with the quote “sand dunes are great fun”); and “biogeomorphic ecosystems” involving “biological engineers,” such as termites, and pioneer plants in highly stressed environments.

This book has impressive breadth of content and the stories are well told. The extensive literature cited appears after each chapter. The book is sturdy, and it is well-illustrated, formatted, and indexed. My quibbles are few, but a notable one is lack of consideration of scaling from small streams to large rivers through drainage networks. For example, how do sediment-organism relations at the fine scale presented in the book relate to larger scales, such as represented in the River Continuum Concept of Vannote and colleagues.

How close does this book come to presenting a unified, formal biogeosciences viewpoint? I believe that it falls well short of that lofty goal, but it is an important and provocative attempt. The importance of the book may lie as much in its exploration of the process of interdisciplinary work as in the technical content of the chapters. For the sake of training tomorrow’s environmental scientists, I agree with the editors that this text would be useful in courses for advanced undergraduates and graduate students as a complement to existing, strong ecosystem texts. The editors suggest several such texts. But I believe the book also has great value in educational programs aimed at developing social processes for bridging disciplinary boundaries.

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#### BOOKS AND MONOGRAPHS RECEIVED THROUGH APRIL 2017

Armstrong, Melanie. 2017. **Germ wars: the politics of microbes and America’s landscape of fear.** University of California Press, Berkeley, California. 293 p. \$85.00 (cloth), ISBN: 978-0-520-29276-5 (alk. paper); 293 p. \$34.05 (paper), ISBN: 978-0-520-29277-2 (alk. paper); \$33.18 (e-book), ISBN: 978-0-520-96614-7.

Castellani, Claudia, and Martin Edwards, editors. 2017. **Marine plankton: a practical guide to ecology, methodology, and taxonomy.** Oxford University Press,

Oxford, UK. xix + 678 p. \$225.00 (hardcover), ISBN: 978-0-19-923326-7.

Duckert, Lowell. 2017. **For all waters: finding ourselves in early modern wetscapes.** University of Minnesota Press, Minneapolis, Minnesota. xxvi + 305 p. \$120 (cloth), ISBN: 978-1-5179-0046-5 (acid-free paper); xxvi + 305 p. \$30.00 (paper), ISBN: 978-1-5179-0047-2 (acid-free paper).

Dunnivant, Frank M. 2017. **Environmental success stories: solving major ecological problems & confronting**