



A new textbook on the ecology of landscape ecology

With, K.A.: *Essentials of Landscape Ecology*, Oxford University Press, Oxford, UK, 2019, 656 pp. illus. maps; paper, ISBN: 978-01988-3839-5, USD \$65; ebook, 978-01988-3838-8, USD \$49.99

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Landscape ecology teaching has advanced through generations of textbooks since Naveh and Lieberman, and Forman and Godron's seminal texts of the mid-1980s. Recently, Monica Turner's classic text and Sarah Gergel's associated lab manual have been released in second editions. But until now, there has never been a landscape ecology textbook that so completely embodies the look and feel of a mainstream undergraduate textbook in the environmental sciences.

Beautifully produced, with high quality full color figures and images throughout, together with lively tables and boxes, chapter summary points and questions, *Essentials* is the first landscape ecology textbook I've seen that feels completely prepared to serve as the only assigned text for an introductory undergraduate course in landscape ecology. For this reason, *Essentials* could help to facilitate the long-awaited arrival of landscape ecology as a fundamental required course in degree programs across the environmental sciences, from biology and ecology to conservation, forestry, geography and agronomy. I've taught this subject for almost as many years as the author, and I can say that the classic core material of landscape

ecology has never been so clearly and completely presented. A new teacher could readily use this textbook alone to develop a solid course on the subject.

All the basics of landscape ecology are covered in its 11 chapters, starting with the origins of the discipline, the definitions and theories of landscape, scale, patch, heterogeneity, dynamics, disturbance, connectivity, and spatial processes. Landscape concepts and theories are well developed through examples and entire chapters are dedicated to the application of landscape ecology theory and technique to better observe and understand the distribution and dynamics of individuals and populations, invasions and disease, gene flow, community and population structure, and ecosystem structure and function. The chapter on landscape pattern analysis is nearly a book in itself, its > 75 pages serving as both an introduction to the subject and a useful reference guide to the main tools, measures, and indicators used to map and measure landscape structure. The chapter on connectivity is also thorough, combining theory and measurement approaches. Anyone who has already taught a full course on landscape ecology will be comfortable with the core content of the book, which reprises the classic work in a familiar way, but with better illustrations and clarifying content.

Where the book really excels is where the author has focused: on teaching "the *ecology* of landscape

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ecology” (emphasis in original). Separate chapters on populations, movements, invasions, and especially, landscape genetics, are truly excellent and represent critical advances in the teaching of landscape ecology, where these subjects are generally covered in far less depth, often within a single chapter. All the way through, a wide array of technical methods and mathematical formulations are well illustrated and explained with solid examples, offering a level of both simplicity and rigor that will satisfy both experts and students new to these subjects. The glossary of terms alone is a fine reference, and together with the index and the actual content of the book, even experts in landscape ecology will find this text useful and well worth owning.

The book’s wonderful illustrations are available through a link on the publisher’s website, assisting those using the book for introductory teaching, including lectures, though these are graphics only, without titles, legends or most other descriptive content that would contextualize them for use directly in presentations. However, this is an oversight that might easily be remedied, compared with the most unfortunate limitation of this book, which is largely by design.

The first sentence of the book’s description (back cover and online) asserts that “Human activity during the Anthropocene has transformed landscapes worldwide on a scale that rivals or exceeds even the largest of natural forces.” The second sentence even frames landscape ecology “as a science to investigate the interactions between natural and anthropogenic landscapes...”. Yet the book itself contains only a tiny amount of content aimed at understanding the causes, consequences, dynamics, and practices of human alteration and management of landscapes. In keeping with the stated focus and background of the author, the book hews closely to the classic North American paradigm of landscape ecology (Fig. 1.4B in the book), a pre-Anthropocene perspective in which humans, and “human activities”, are viewed as disturbances to an otherwise natural world, rather than as the sustained shapers, managers, and stewards of an increasingly anthropogenic biosphere. The book would have gained so much if it had absorbed the credo on its own back cover and focused more on advancing landscape ecology as a science aimed at better understanding and managing landscapes for

both people and nonhuman nature. That is what the science of landscape ecology can and should become if it is to remain relevant in the Anthropocene.

The book contains not even one single mention of the terms “land system”, “social-ecological system”, or “coupled human and natural system” (CHANS), even though these are all quite mainstream frameworks for understanding how and why humans change and manage landscapes, and how landscape structure, function and change are coupled together with the dynamics of human social systems in both directions. In the one relatively extensive 15-page section relating to human interactions with landscapes, “Stages of Anthropogenic Landscape Transformation”, the book claims that “landscape transformation by humans tends to progress through a series of predictable stages”. If only things were so simple.

The book does include numerous examples that relate to conservation and restoration, and in some ways, sustainable land management, but these are more anecdotal than systematic, and there is no one chapter in the book focused exclusively on landscape management, planning, or even conservation. The concept of multifunctional landscapes makes a brief appearance at the end of the book, together with the concepts of land sharing/sparing, resilience and sustainability, but these are barely explained, let alone utilized, as rubrics enabling landscape ecology, as a transdisciplinary science, to assume a critical role in efforts to more sustainably manage the biosphere in the Anthropocene. Naveh and Forman were there long ago, and it is unfortunate not to see their influences, and the emerging paradigm of the Anthropocene, playing a stronger role in the pedagogy of this book.

What a pity that the first landscape ecology textbook to so fully address the needs of undergraduate students contains so little content that might help them better understand and manage the human landscapes that now cover most of the terrestrial biosphere. Perhaps this might be remedied in a second edition. Nevertheless, even with this profound limitation, *Essentials of Landscape Ecology* is the textbook that our discipline has long been waiting for, with the potential to widely expand the inclusion of landscape ecology in undergraduate curriculum across a variety of disciplines. I expect that all those who publish in this journal, and especially those who teach the subject, will soon or already do own a copy, and

better still will use it in their courses. Take notice, because with this textbook, landscape ecology is now finally ready to become the mainstream university subject it was always meant to be.

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