

species problem into its dominant sectors and craft laws specific to the sector (e.g., pet trade, plant trade, aquaculture). In politics, it is necessary to remember that the perfect is often the enemy of the good. Perhaps that is the way forward and this book clearly points towards much that would be good to accomplish. While not perfect, this is a good book, well worth reading.

ROY VAN DRIESCHE

University of Massachusetts

Department of Environmental Conservation

Amherst, Massachusetts 01003 USA

E-mail: vandries@cns.umass.edu

Ecology, 96(9), 2015, pp. 2570–2571
© 2015 by the Ecological Society of America

Forests and forestry in a changing world

Landsberg, Joe, and Richard Waring. 2014. **Forests in our changing world: new principles for conservation and management**. Island Press, Washington, D.C. xiii + 209 p. \$70.00 (cloth), ISBN: 978-1-61091-495-6 (alk. paper); \$35.00 (paper), ISBN: 978-1-61091-496-3 (alk. paper).

Key words: adaptive management; conservation; forest ecosystems; forest management; global change.

Never has the need been greater for forest managers trained with a comprehensive understanding of forests as dynamic systems under pressure in a changing world. The push towards sustainable forestry over the last several decades, largely focused on providing a broader range of biodiversity and ecosystem services, comes as new challenges face those working to understand, conserve, and manage forests. These include all aspects of global change: climatic disruption, spread of invasive species, expanding human populations and land-use changes, atmospheric deposition of pollutants, as well as global shifts in investment capital within the forest sector.

Into the fray steps *Forests in our changing world: new principles for conservation and management*, a concise, relatively easy-to-read book by Joe Landsberg and Richard Waring, intended by the authors to provide “an accessible introduction to key concepts that future forest managers will need to keep [forests] . . . healthy and resilient.” *Forests* makes a sincere effort to describe key concepts in forest ecology and contemporary issues related to global change. It succeeds in covering a wide range of topics in a short volume (just 177 pages of main text), and clearly benefits from the authors’ extensive knowledge and experience.

But readers may have mixed reactions. Some will find this a useful introduction to the field. Others may find the text a little hard to absorb, thrown off by a tendency to bounce around among sub-topics, leaving some treated superficially. Some readers will find themselves looking for something more to grasp, wishing the authors would go a little deeper and present a richer story. For instance, after a brief introduction (Chapter 1), *Forests* continues with a welcome introduction to the biogeography of forested biomes globally (Chapter 2), and ecophysiology related to climate influences (Chapter 3). Here is where the authors are at their best, clearly and succinctly describing physiological processes controlling forest growth in relation to precipitation, temperature, hydrology, and other limiting factors.

But then the book jumps to the 30 000 foot level, with a review of climate science written almost as a separate piece (Chapter 4), before connecting back to the topic at hand with a

brief section entitled “Effects on forests” that reads a bit like a series of insufficiently connected examples. Chapters 5 and 6 deal with forest uses, economics, policies, and management practices, but presents these as a series of unlinked and far from comprehensive set of sub-topics with little depth, occasionally falling prey to outdated clichés of economics vs. ecology. Here the reader cannot figure out if the book is intended as a basic forest management text (e.g., a review of concepts like net present value and growth and yield), or is really about how forests will respond to a changing world. Maybe the book is meant to be a little of both, but this is a tricky formula to pull off well, especially in an abbreviated form.

Reaching the final chapter (“The future of forests”), the reader hopes to find what he or she is looking for: a clear synthesis of forest ecosystem attributes conferring resilience, or perhaps a description of scenarios of future landscape change and adaptation options. But here too the book fails to deliver, offering only a limited set of ideas. A few more figures (there are 14) and pictures (there were none) would liven things up, especially if the intended audience is undergraduate students. This reader found the book visually drab, but perhaps others may like the low-key style. The figures mostly present bivariate relationships among ecological parameters and are both clear and highly informative.

Though several recent attempts have been made, forest science and forestry have yet to see a definitive text emerge that encompasses a broad global scope and provides clear guidance on the oft-advocated but still poorly operationalized concepts of managing forests for resilience and adaptability (not the same thing!) to climate change. *Forests*, too, falls shy of that mark, and the reader is left wondering where the “new principles for conservation and management” are that the title advertises. The principles that are articulated in *Forests* appear rather conventional (e.g., managing forests for diversity, restoring fire regimes, conserving native and tropical forests), though everyone would acknowledge their importance and continued relevance. With some notable exceptions, such as the need to manage forests for carbon storage, the applied principles were not clearly linked to pressing issues of global change as the title of the book promises.

Forestry as a field is crying out for guidance on how to address concerns such as species range shifts, near vs. long-term changes in forest productivity, interactive environmental stressors, continued habitat fragmentation from exurban sprawl, altered disturbance regimes, and expanding forest health problems and functional extirpations caused by invasive pests and pathogens. These are unprecedented challenges requiring scrutiny and debate over hot-button adaptation proposals, such as assisted species migration, broader incorpo-

ration of geophysical diversity within protected areas systems, community-based forest conservation, continuous cover forestry, invasive species control, pros and cons of increased wood bioenergy use, and many others.

Foundational knowledge of climate controls and human influences on ecosystem processes, stress responses, and feedbacks, as presented in *Forests*, is essential for informing these considerations, but the greatest challenge lies in moving from theory to practice. While *Forests* does not entirely achieve that goal, it is a step in the right direction. Students and forest sector professionals looking for a general overview of forest

science and several key conservation and management issues will find this book useful and interesting.

WILLIAM S. KEETON

*University of Vermont
Rubenstein School of Environment and Natural Resources
Burlington, Vermont 05405 USA*

E-mail: william.keeton@uvm.edu

Ecology, 96(9), 2015, pp. 2571–2572
© 2015 by the Ecological Society of America

An authoritative treatment of the dynamics and practical management of complex forest stands

O'Hara, Kevin L. 2014. **Multiaied silviculture: managing for complex forest stand structures**. Oxford University Press, New York. xi + 213 p. \$115.00 (cloth), ISBN: 978-0-19-870306-8; \$59.95 (paper), ISBN: 978-0-19-870307-5.

Key words: forest stand dynamics; selection systems; stand structure; uneven-aged management.

With this new text, forestry professor Kevin O'Hara (UC Berkeley) has produced a concise yet comprehensive primer on multiaied forest stands and their silvicultural management. Multiaied silviculture is as old as the practice of silviculture itself, but in North America at least, this topic, as presented in silviculture texts, has often languished in the shadow of even-aged systems. Always warranting a chapter in earlier books—but never much more—this text puts multiaied silviculture in the limelight, addressing the relevant ecological, operational, and social considerations that are essential to its successful implementation. Perhaps what is most surprising about this book is that such a concentrated treatment of multiaied silviculture did not already exist.

Globally recognized as an authority on this subject, O'Hara's research during three decades has addressed multiple and diverse aspects of multiaied silviculture, making him an excellent candidate to produce such a synthesis. The text's subtitle—"Managing for complex forest stand structures"—reveals O'Hara's perspective that multiaied silviculture is a pragmatic approach to enhancing the complexity of simple forests. In that regard, his timing could not be more relevant. Forest complexity has been a growing theme among both ecologists and silviculturists during the past decade; yet, how this objective can be practically incorporated into management strategies remains a significant challenge for foresters. This text contributes to—and will undoubtedly add substance to—a balanced dialogue on managing for forest complexity.

O'Hara breaks somewhat with convention in electing to use the term "multiaied" here and adopting a conceptual framework that is inclusive of all stand structures with multiple age classes, or cohorts. The classical silvicultural framework—which distinguishes stand structures as even-aged, two-aged, and uneven-aged (three or more age classes)—seems appropriate when stand production is the primary objective of silvicultural practice, but is less useful in other circumstances, such as when forest complexity itself is a primary objective.

O'Hara argues that stands with multiple age classes, whether they be two or many, possess more similarities than differences. This fresh organization enables O'Hara to address such emerging and still-developing silvicultural strategies as variable-retention harvesting and variable-density thinning. Where exactly those strategies fit into the discipline's traditional framework, and how they relate to established silvicultural terms and concepts, has been a source of confusion for students, and a point of debate among academics and researchers.

Appropriately, the text begins with a brief overview (Chapter 2) of the historical origins and applications of uneven-aged systems in Europe and North America. Here, O'Hara draws a clean distinction between uneven-aged systems and systemless selective cutting that has sometimes posed as multiaied silviculture. Chapters 3–5 delve into disturbance and stand dynamics. Elements of disturbance regimes that shape stand structure and composition are discussed in Chapter 3, and common disturbance types are highlighted separately. Chapter 4 is a brief primer on forest stand dynamics. Here, the emphasis is on the tree and stand development aspects of multiaied stands, with shade tolerance and understory-overstory dynamics as a particular focus. Many of these topics are addressed more fully in the landmark *Forest stand dynamics* (Oliver, Chadwick D., and Bruce C. Larson. 1996. Wiley, New York), but O'Hara's purpose here is to discuss such stand development topics as differentiation, growth, self-thinning, and mortality within the unique context of multiaied stand structure. Chapter 5 focuses on gap dynamics, including gap formation, gap microsite conditions, and their implications for recruitment.

With a focus on the operational logistics of managing multiaied stands, Chapters 6 and 7 are arguably the book's most significant contributions. Chapter 6 introduces the single tree and group selection approaches, and distinguishes them in terms of opening size and microenvironment. The unit area control management model is described in detail for group selection systems. Less familiar methods for managing structurally complex stands are also introduced, such as irregular group shelterwood (or *Femelschlag*) systems, and variable-density thinning and variable-retention harvesting. Although brief, this section is particularly welcome as it illustrates that there are other practices and systems beyond those associated with just single tree and group selection silviculture that can produce stands of enhanced vertical and spatial complexity. Chapter 7, the largest of the book by far, focuses on the heart of practical multiaied stand management: stocking control. Here,