



## A Physiological Perspective on Forest Ecosystems

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### A PHYSIOLOGICAL PERSPECTIVE ON FOREST ECOSYSTEMS

Waring, Richard H., and William H. Schlesinger, 1985. **Forest ecosystems—concepts and management**. Academic Press, Orlando, Florida. xiii + 340 p. \$45.00, £39.50 (cloth), \$24.95, £22.50 (paper).

Criticisms of ecosystem science often stem from the perception that the science is largely descriptive. Through the extensive use of perspectives from whole-plant physiology, Waring and Schlesinger's book provides a distinctly mechanistic approach to ecosystem processes. Although the authors are vague about the intended audience, the organization and content of the book clearly suggest that the authors intend the book to be used in graduate or upper-level undergraduate courses in forest ecology.

The core of the book consists of 3 pairs of chapters on the topics of productivity, hydrology and nutrient cycling. Each pair consists of a chapter on processes and factors affecting individual trees coupled with a chapter on system-level patterns and processes. None of the chapters really attempts to provide either a comprehensive review of a subject or a particularly novel synthesis of the material. The real strengths of the chapters lie in (1) the focus on the unique physiological and morphological features of trees and the consequences of these features for system-level behavior, and (2) the attempt to bring all of this material together in one place.

The chapter on the carbon balance of trees is necessarily brief, but balances the discussion of photosynthesis with a considerable amount of material on respiration and secondary compounds. The chapter also introduces several empirical relationships (e.g., sapwood cross-sectional area versus leaf area) that have been used extensively by Waring in the development of indices of system-level function. The 32 pages of the paired chapter on forest productivity are largely a rather perfunctory treatment of the extensive literature on this subject; however, the chapter does present several interesting recent studies that illustrate the importance of forest structure in determining the responses of forests to fertilization. The chapter on forest hydrology is essentially a condensed version of an earlier chapter by Waring and others in one of the IBP synthesis volumes. The three chapters on nutrient cycling

(broken down into separate chapters on nutrient uptake and internal distribution within trees, decomposition, and inter-system cycling) provide a basic but well-written coverage of the topic.

The rest of the book consists of 3 chapters that address a variety of topics of current interest in forest ecology. The first of these chapters, *Susceptibility and response of forests to natural agents of disturbance* suffers considerably from an attempt to integrate too wide a range of phenomena under the rubric of "disturbance." For instance, acid rain is treated as both a "disturbance" and an "experimental manipulation." Neither term is particularly appropriate (and the implication that acid rain is "natural" seems especially odd). Despite these problems in terminology, the chapter presents a good discussion of interactions between herbivores and ecosystem function. A second chapter provides a well-organized discussion of linkages between terrestrial and aquatic ecosystems. The final chapter briefly discusses forests in the context of global ecology, focusing primarily on interactions between forests and the atmosphere.

The book provides a convincing argument for the importance of tree morphology and physiology in ecosystem structure and function. However, the focus on physiology was achieved at the expense of consideration of population and community level processes, as well as consideration of growth forms other than trees (the words "herb," "shrub," and "understory" do not appear in the index at all). Moreover, the use of the word "management" in the title of the book may represent the wishful thinking of an editor, but it is hardly a significant component of the text. Practicing ecosystem ecologists and forest ecologists are unlikely to find much in the book that has not been reviewed in considerably more detail elsewhere. However, the book would provide an excellent introduction to forest ecosystems for beginning graduate students in both ecology and forestry.

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### FLOODPLAINS BEFORE FLOOD CONTROL

Penka, Miroslav, Miroslav Vyskot, Emil Klimo, and Ferdinand Vašiček. 1985. **Floodplain forest ecosystem. Part 1. Before water management measures**. Developments in Agriculture and Managed-Forest Ecology. Volume 15A. Elsevier, New York. 466 p. \$101.75, Dfl. 275.00.

This is the first of two volumes dealing with a partial ecosystem analysis of the Southern Moravian floodplain forest.

This first part is a look at ecological conditions of the floodplain before flood control measures (which controlled flooding by 1973) were initiated. The second volume will characterize conditions following flood control measures. The study was part of the Czechoslovakian project MAB 2, No. 86: *Ecological effects of stream water regulation and changing methods of land management in the region of the floodplain forests of Southern Moravia*.

Contents begin with a general discussion of natural con-