

Preface to the Second Edition

This book outlines a system that organizes the Earth into a hierarchy of increasingly finer-scale ecosystems that can serve as a consistent framework for ecological analysis and management. The system consists of a three-level hierarchy of nested ecosystem units and their associated mapping criteria. Delineation of units involves identifying the environmental factors controlling the spatial geography of ecosystems at various levels and establishing boundaries where these factors change significantly. Macroscale units (*ecoregions*) are climatically controlled and delineated as Köppen–Trewartha climate zones. Nested within these are *landscape mosaics*, the mesoscale units, controlled by landform and delineated by Hammond’s landform regions. At the microscale are individual *sites* controlled by topographically determined topoclimate and soil moisture regimes.

The first edition of this work (1996) was written at a time when few published materials on ecosystem geography were available, and none of these had systematically elaborated the principles underlying the mapping of ecosystems in a form accessible to advanced students and practitioners. This second edition builds on the strengths of its predecessor, incorporates new information, clarifies concepts presented in the first edition, and contains new sections.

The new sections address how ecoregion boundaries were determined, ecoregion redistribution under climate change, ecosystem processes (such as fire regimes), empirical versus genetic approaches to classification, and human modification to ecosystems (for instance, through the introduction of invasive species).

Once again, I would like to thank many people who have made the completion of this book possible: Nancy Maysmith for re-creating many

of the first edition diagrams and drawing several new ones, and to Shaun Horne for the frontispiece; Michael Wilson and Renee O'Brien, Program Manager and Deputy Program Manager, respectively, for Inventory, Monitoring, and Analysis at the Rocky Mountain Research Station, for their support; and Eric Smith of the U.S. Forest Service for his review and suggested improvements in the section on climate change. I appreciate the helpful criticism of several reviewers of the first edition, but I should mention especially Richard Huggett, Hartmut Leser, Randy Rosiere, Robert Smith, Duane Griffin, Kenneth Young, John Fedkiw, Steven Jennings, David Scarnecchia, Fred Smeins, and Melinda Knutson. As always, it has been a pleasure to work with Janet Slobodien at Springer in translating this work to print.

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Preface to the First Edition

The management of public land needs a new approach. To fill this need, many public land-management agencies in the United States and abroad are working toward the management of ecosystems rather than the management of individual resources. Historically, the ecosystem has been defined as a small homogeneous area, such as a stand of trees or a meadow. Today there are several reasons for recognizing ecosystems at broader scales. Because of the linkages between systems, a modification of one system may affect the operation of surrounding systems. Furthermore, how a system will respond to management is partially determined by relationships with surrounding systems. Understanding these relationships is important in analyzing cumulative effects, with action at one scale and effects at another. This has created the need to subdivide the land into ecosystems of different size (or scale) based on how geographically related systems are linked. This book explores a new approach: one involving ecosystem geography, the study of the distribution and structure of ecosystems as interacting spatial units at various scales, and the processes that have differentiated them.

The basic concepts about scale and ecosystems are discussed in textbooks on landscape ecology and geography (cf. Isachenko 1973; Leser 1976; Forman and Godron 1986). I have presented a synthesis of these concepts elsewhere (Bailey 1985). In follow-up publications (Bailey 1987, 1988a), I suggested criteria for subdividing land areas into ecosystems and provided a discussion of applications. I also showed how existing information and maps could be used to map ecosystems. The scheme that serves as the framework of this book was first devised as a training program for my course in multiscale ecosystem analysis for the U.S.

Forest Service. This publication updates and expands the knowledge of the subject.

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