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Principles of Ecosystem Stewardship: Resilience-Based Natural Resource Management in a Changing World

EDITED BY F. STUART CHAPIN III, GARY P. KOFINAS AND CARL FOLKE

xii + 401 pp., 26 × 18 × 2 cm, ISBN 978 0 387 73032 5 hardback, GB£ 35.99/US$ 49.95, New York, NY, USA: Springer-Science & Business Media LLC, 2009

Conventional management of natural resources, especially that focusing on maximized or optimized 'sustainable yield' of a single resource (for example timber, fish or game) is increasingly unable to cope with the unprecedented upheavals of global environmental change, such as climate change, the biodiversity crisis and a growing world population. To better meet the challenges of a rapidly-changing world, innovative approaches to ecosystem management are emerging. A new paradigm, here referred to as 'ecosystem stewardship', concentrates on sustaining the capacity of ecosystems to provide services that benefit society, thereby linking integrity and diversity of ecosystems with adaptive capacity and societal well-being. While an extensive body of scholarly literature has developed around resilience-based ecosystem stewardship, accessible synthesized information for students and practitioners has thus far been lacking. With *Principles of Ecosystem Stewardship*, three leading members of the resilience school, Stuart Chapin III, Gary P. Kofinas and Carl Folke, have now aimed to fill this gap, and provide an interdisciplinary application-oriented framework based on stewardship of ecosystems for human well-being. The textbook is aimed at students, professionals and policymakers in the field of natural resources management.

Principles of Ecosystem-based Stewardship is divided into two sections. The first five chapters impart a general overview of existing theories and frameworks for the understanding and management of social-ecological change. The first chapter introduces the idea of analysing environmental problems from a social-ecological systems perspective and presents vulnerability, adaptive capacity, resilience and transformability as key terms. The following chapters further inform on concepts of ecosystem services, human well-being, social-ecological governance and transformations. In the second section, these theories and concepts are applied to a broad range of social-ecological systems, namely rural hinterlands, forests, dry lands, fresh waters, oceans, coasts, agricultural systems, urban areas and the earth as a whole. For each of these systems, key vulnerabilities, specific sources or resilience, and plausible undesirable and desirable transformations are identified. Localized case studies from all parts of the world illustrate how people and institutions adaptively manage resources and ecosystem services around the world. The book ends with several messages: recognition of the interdependencies of social-ecological systems, concentration on critical vulnerabilities, fostering of biological, cultural and institutional diversity, and harnessing opportunities for desirable transformations are key strategies for ecosystem stewardship.

As social processes are related with their physical and biological environment throughout the book, the book demands at least some pre-existing knowledge from fields as diverse as ecology, institutional economics, forestry or the political sciences from its student readers. But the effort is definitively worthwhile; the authors convincingly illustrate the many interdependencies between social and ecological problems, and demonstrate how the dynamics of systems as different as dry lands and open oceans can be analysed by a set of tools, such as the adaptive cycles, thresholds, or stabilizing or amplifying feedback loops. Although a multi-author work, the textbook is logically ordered, with each chapter building on its predecessors, without unnecessary redundancies. Review questions at the end of each chapter and a detailed glossary facilitate the learning process. The book certainly meets its aims, in that it sparks interest in ecosystem-based approaches to resource management. While the presented approaches are valuable for a broad audience, I feel that many management professionals may need more specific advice for implementing ecosystem-based stewardship on the ground. It is thus desirable that resource management agencies incorporate the thoughts of ecosystem-based stewardship and elaborate ecosystem-specific and regionalized guidelines.

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Grasslands in Europe of High Nature Value

EDITED BY PETER VEEN, RICHARD JEFFERSON, JACQUES DE SMIDT AND JAN VAN DER STRAATEN

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I'm often asked as a 'Brit' living in the USA to rationalize the European's love of their countryside with its apparent lack of any undisturbed habitat. I usually struggle to explain how we have a beautiful anthropogenic cultural landscape that retains high levels of biodiversity. So, I found this excellent book both interesting and informative because it explains where the diversity-rich grassland habitats in Europe are, why and how they came to be, and the extent to which they are now threatened. Of course, except in a few places, grassland is not really a natural vegetation type in Europe, but ancient agricultural practices following forest clearance allowed species-rich grasslands to develop. As pointed out in the first chapter by Küster and Keenleyside, these high nature value (HNV) grasslands are often referred to as 'semi-natural', but might be better termed 'traditional grasslands' or 'less intensively managed grasslands'. Modern methods of intensification lead to species and habitat loss that needs to be better understood.

The book is organized into three sections: a general introduction (six chapters), national case studies (24 chapters), and policy outlook (one chapter). The general introduction sets the stage with chapters describing the history, development and origin, use, value as butterfly and bird habitat, climatic relationships and current distribution of HNV grasslands in Europe. These chapters are very good, especially the first two history chapters by Küster and Keenleyside, and Poschlod *et al.*, as together, they summarize a wealth of information and opinion on HNV grassland origin and development. Veen and

Metzger's chapter on lowland grassland and climate is valuable, but would have been better if it covered more than just five central European countries (Lithuania, Belarus, Slovakia, Romania and Bulgaria). The national case studies that make up the bulk of the book each describe the HNV grasslands of a particular geographic area or habitat within a specific country; for example the grasslands of the Burren in Western Ireland. Each case study is informative and provides a useful summary of a particular grassland, including, in most cases, detailed phytosociological information, as well as management and policy concerns. While generally well written, each case study has its own format making comparisons of one to another difficult. As noted, each includes phytosociological information derived from surveys conducted within each country. The final policy outlook section of the book is limited to a single, but well written and informative chapter describing a farmer-centred outlook to conservation of HNV grasslands in Europe.

The back cover states that the book is intended for 'both specialists and the broader audience, including policy makers and land owners.' I agree and would add that European conservation biologists, restoration ecologists, plant ecologists and botanists interested in grasslands will find the book valuable. Except in a comparative sense, the floristic and phytosociological detail will be of only limited interest to non-Europeans.

The book succeeds in summarizing current knowledge of HNV grasslands. Although the general introduction and policy outlook sections are presumably intended to 'book end' the main case studies, I would have liked to see a summary chapter that brought together the grassland communities from the case studies into a single European-wide scheme. For example, what have the *Arrhenatherion* alliance hay meadows of Slovakia and the mesic *Arrhenatherion* meadows of Poland got in common, and how are they related? The reader cannot tell how representative the case studies are of HNV grasslands in Europe, although from a map in the Forward it looks like the geographic spread is fairly good, with most European Union countries being represented (but not Italy or Austria). The level of detail and coverage varies tremendously among the different case studies with some being limited to the vegetation, others bringing in detailed historical data, or information on the associated fauna.

The book is beautifully produced with numerous high quality photographs of grassland scenery, plants and animals. There are clear well-drawn maps accompanying each case study that are all produced with the same colour coding to the legend. The writing is clear, well-edited without any typographic errors that I could find, and of a generally high grammatical standard, despite English being a second language for most of the authors. Each chapter has its own set of references that are well up to date, including many from 2009, the publication year of the book. There is a short, somewhat perfunctory index and glossary.

Overall, I recommend this book to European conservation biologists, managers, policy makers and grassland ecologists. The book is an up to date and timely summary of a complex topic. Grassland ecologists outside of Europe will find this a useful introduction to the range of high diversity grasslands of the region.

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Oceanic Anglerfishes. Extraordinary Diversity in the Deep Sea

BY THEODORE W. PIETCH

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The Ceratioidei, a sub-order of the lophiiform fishes forms the most diverse vertebrate taxon below 1000 m depth in the sea. It contains 160 species, more than triple the number of the second most diverse taxon below the same depth. They are an intriguing and charismatic group exhibiting often grotesque appearances, elaborate bioluminescent luring apparatus and sexual dimorphism in the extreme. So rarely seen, many species are known only by their Latin binomial. Summarizing what is currently known about the Ceratioidei and describing their diversity is the ambitious aim of this book.

The book is extensively researched, and described to a level of detail well beyond the scope of more generic texts on deep-sea fishes such that no comparable volume exists. This makes this book of considerable value as a collation of biological and biosystematic information for 'professional ichthyologists' or deep-sea academics, but rather too much to be 'enjoyed by all those who find excitement in the wonders of the natural world'.

The book is split into two sections, the first summarizes the existing knowledge on the morphology, biology and ecology of Ceratioidei in their diverse forms. This is conducted at family or genus level, where most of the diversity is observed. The second half of the book contains a detailed taxonomic classification at species level for all 11 families, 35 genera and all 160 currently recognized species with associated identification keys. It is very much for 'readers who require more detailed systematic information'. The first section includes eight chapters covering broad aspects of Ceratioidei biology similar to many other fish biology texts (for example Randell & Farrell 1997), but weighted to the character of the suborder. 'Locomotion, food and feeding' for example are lumped together and dispensed in one of the shortest chapters representing a basic knowledge gap. In contrast an entire chapter is devoted to 'Bioluminescence and luring', a defining characteristic of the suborder.

The largest chapter in the first section covers 'Biodiversity', taxonomic descriptions at both family and genus level. It details the main distinguishing characters, associated entomology and then briefly outlines each species. Keys lead to family level descriptions which close with keys to differentiate among genera. This proves a particularly effective way of both organizing the chapter and allowing readers to navigate around. This chapter is followed by 'Evolutionary relationships' and 'Geographic distributions'. The latter chapter contains descriptions of ocean basin, latitudinal and depth-related fish distributions and is supported by 24 maps with colour-coded sighting records. However, given that only 30% of the species are represented by more than 20 specimens and 13% by only one, conclusions regarding geographic distribution are weak. To a large extent chapters on 'Biodiversity' and 'Geographic distribution' summarize the content of the second half of the book.

The sheer diversity of the suborder is catalogued visually from the front cover thoughout first section, which is lavishly illustrated with over 300 figures, 69 of which are colour and include quality holotype or specimen photographs. These and the abundant black and white images go a long way to conveying the diversity the books aims to cover.