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Review: Mammals of Colorado. Second edition. David M. Armstrong, James P. Fitzgerald, and Carron A. Meaney.

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disciplines and methods employed by the chapter authors as social scientists, including literature review, qualitative case analysis, survey research, economic analysis, techniques for public involvement and collaboration, and the assessment and evaluation of project planning and implementation.

Thus, one strength of *Human Dimensions of Ecological Restoration* is exposing its readers—especially those less familiar with the applications of social sciences in research—to several key aspects and ramifications of research findings about human dimensions in relation to ecological restoration practices. As the book's publisher notes, "in twenty-six chapters written by experts from around the world, it provides practical and theoretical information, analysis, models, and guidelines for optimizing human involvement in restoration projects."

The book's editors supplement this collection of human dimensions studies with introductory and concluding chapters that frame the collection's background and suggest its implications, providing context for the studies and clarifying their value and significance. In addition, the editors seek to enhance the reader's understanding of the relationships among the concepts and findings of these varied studies by structuring the book's chapters based on three "overarching meta-themes." Themes under which these papers are grouped and introduced include: "participation" (with case studies and research reviews focusing on volunteerism, community-based restoration, and collaboration with stakeholders); "power" (with papers focusing on political ecology, planning, resource economics, and policy and politics); and "perspective" (with papers exploring newer, more expansive restoration activities such as "eco-cultural restoration" and "restoration-based education"). One could quibble about the appropriateness, comprehensiveness, and applicability of these meta-themes, but that is true of most simplifying frameworks for increased understanding; this reviewer does not do so.

However, one should note that this volume does, in general, suffer from some of the same weaknesses found in similar edited volumes, in that the chapters, when considered as a whole, seem at times somewhat unrelated, redundant, and even repetitious. Also, their coverage of key concepts, issues, and other topics can seem somewhat selective and spotty. The most serious aspect of this incompleteness is its bearing on the book's stated scope highlighted in the subtitle (i.e., integrating science, nature, and culture) and in the editors' statement that they "seek to show why recognizing and understanding the human dimensions of ecological restoration are critical to the success and longevity of all ecological restoration efforts" (page 1). Although this compilation is a commendable exploration of some key elements of the "human side of conservation," any reader who comes to the book without a background in the social sciences could finish reading its papers without a fully developed and well-rounded understanding of the complete range of possible social science applications to the practice of ecological restoration. This shortcoming stands in marked contrast to the breadth and depth of ecologists and social scientists whose contributions are grounded in a broader, systems-theoretic approach, such as that provided by the continually expanding body of research and knowledge based on Resiliency Theory, with its holistic, comprehensive, integrative, and multi-disciplinary focus on social-ecological systems.

These shortcomings aside, this edited volume is a significant contribution to the field of ecological restoration and the education of current and future practitioners, including non-scientists who have had little exposure to the formal, rigorous study of some of the many ways in which human activities have impeded or promoted progress in restoring degraded ecosystems. *Human Dimensions of Ecological Restoration* is especially notable for exposing the uninitiated to the wealth of knowledge and activities provided by social scientists—scientists who are as diverse and specialized in their disciplines and approaches as their counterparts in the physical sciences. As the book's editors suggest, however, this book is nonetheless a most useful introduction to the human dimensions of ecological restoration for "scholars and students alike." Significantly, readers of the chapters in this volume can benefit greatly from its value for increasing awareness and appreciation of the human aspects of this growing field of resource management practice and the eclectic contributions of social scientists and practitioners actively engaged in advancing that practice.—*Chuck Harris, Professor of Environmental Policy, Planning and Management, College of Natural Resources, University of Idaho, Moscow, Idaho 83844-1139, USA.*

Mammals of Colorado. Second edition. David M. Armstrong, James P. Fitzgerald, and Carron A. Meaney. 2011. Denver Museum of Nature & Science and University Press of Colorado, Boulder, Colorado, USA. 620 pages + xiii. $55.00 (cloth), $45.00 (e-book). ISBN: 978-1-60732-047-0.

In my view, the second edition of Mammals of Colorado is among the finest state-level books on mammals available. The book is a major revision of the first edition (Fitzgerald et al. 1994) and is a reference worth having, even if the first edition is already at hand. In this review, I summarize aspects of the new volume and provide comparisons to the first edition in an effort to persuade the reader that this is indeed the case.

The first four chapters of the second edition include background information and updated material about Colorado environments, mammals in general, the history of mammals and mammalogy in Colorado, and the stewardship

of wild mammals in the state. The chapter on history is new; history was only a short subsection in the first edition. Chapter 1 focuses on environments and includes an expanded description of grassland habitats, including their susceptibility to invasive plants and their rapid conversion to urbanized landscapes in parts of Colorado. Table 1-2 lists habitats of Coloradan mammals and now includes 51 species (plus humans) as grassland dwellers (only 46 species were listed in the 1994 edition). Chapter 2 focuses on origins, characteristics, and diversity of Mammalia and contains the same headings and much of the same material that was included in the first edition, but with some interesting updates, such as the discovery of lactation in males of some Old World species of bats, the increase in the number of known species of mammals worldwide, and references to more comprehensive works on mammalian biology.

A major change in the introductory chapters occurs in Chapters 3 and 4 (50 total pages), which expand greatly on the material that was contained in just one chapter in the previous edition (Chapter 3 totaled 22 pages in the first edition). Chapter 3 now covers the fossil history of mammals in Colorado and the history of mammalogy in the state. The former subject is a welcome addition that was absent in the first edition. This chapter also includes three new tables. The first table scales the history of Earth in relation to a metaphoric one-year calendar, thus aiding the reader's understanding of events leading to and including the appearance of life and later the emergence of mammals. The second table highlights major geologic and mammalogical events since the Triassic period, including examples of the geologic formations in Colorado that bear mammalian fossils. This is followed by a third table and well-written narratives on the Holocene history of humans and mammals in Colorado. This new material on mammals of the past gives a rewarding overview of major changes in the ancient landscapes of Colorado and the mammals that inhabited them. The second part of Chapter 3 on the history of Coloradan mammalogy is a finely written account that starts with philosophical reflections on the beginnings of scientific thinking and innovation that were undoubtedly workings of the minds of the earliest humans. It then extends from a discussion of indigenous people's knowledge about mammals through the millennia, to the nineteenth century beginnings of our more formal scientific exploration and discovery about mammals, and ends with some of the institutional frameworks for current research on mammals of Colorado. Chapter 4 presents valuable information and food-for-thought concerning people and wildlife in Colorado, including recreational, economic, aesthetic, scientific, and public health aspects of Coloradan mammals in relation to modern society.

Chapters 5 through 14 each cover separate orders of mammals. Ordinal groupings follow modern systematic schemes; higher-level classification of mammals will nonetheless remain in flux for many years to come. A short chapter on primates has been added, but it focuses only on humans (the Sasquatch also is mentioned, but undoubtedly with tongue-in-cheek). The chapters contain updated dichotomous keys to families, genera, and species, with introductory narratives at each level above the species. The species accounts include photographs, skull drawings, and updated distribution maps for North America and Colorado (showing county, state, and provincial outlines). Some of the photographs are spectacular (e.g., the new photograph of a mountain lion). Topic headings in the narratives of the species accounts are physical description, distribution, and natural history. The natural history sections are a great strength of the book and provide interesting, well-documented, and readable information on each species based on research from throughout the species' ranges. I enjoyed and appreciated the natural history material above all; it is well-researched and contemporary. The natural history sections for the more charismatic, larger mammals of Colorado (mountain lions, wolves, bears, bighorn sheep, deer, elk, moose, and pronghorn) will undoubtedly capture the attention of the general readers, wildlife managers, and hunters, but the more obscure species also are given their due share of coverage. By my count, in the new edition, there is a nearly 50% increase in the total lengths of the narratives devoted to the natural history of the 51 grassland species.

The Literature Cited section is comprehensive. Nearly 4,000 references are included in the second edition (about 1,700 references were in the first edition), and about 250 of these references were in print within three years of the second edition's publication date (about 40 references appeared within three years of the first edition's publication date). This not only reflects the pattern of growth in the scientific literature, but also the strong efforts on the part of the authors to be comprehensive. I noted a few minor errors in the long list of literature cited; most of these errors involved cases in which the dates of publication were omitted. A major improvement of the second edition is the provision of an index, which was absent in the first edition. I randomly checked 20 entries that referred to 92 pages in the text, and all of these entries were found on the pages that were specified.

Armstrong and his coauthors note that "Mammals—like the rest of biodiversity—are not just something to identify or memorize but something to appreciate deeply" (page 45). Such is the prevailing tone of this book. There are several field guides to mammals that will fit in a pocket and might be handier than this book for quick identification, but none possesses the in-depth scholarship coupled with good writing style that this book provides. The Mammals of Colorado is a major synopsis that will be consulted at home, in the office, in the classroom, or at the library after identification of the mammal has been made—and thus begins the reader's deeper appreciation of Coloradan mammals.—*Thomas J. O'Shea, U.S. Geological Survey (retired), P.O. Box 65, Glen Haven, Colorado 80532, USA.*

LITERATURE CITED

Fitzgerald, J. P., C. A. Meaney, and D. M. Armstrong. 1994. Mammals of Colorado. Denver Museum of Natural History and University Press of Colorado, Boulder, Colorado, USA.