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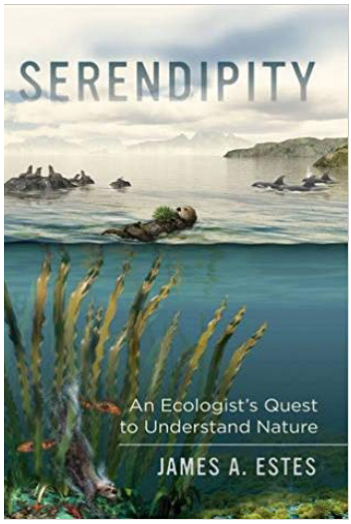
Book Review:
Serendipity: an ecologist's quest to understand nature

James A. Estes. 2016. University of California Press, Oakland, USA. 276 pages (hard cover). $29.95. ISBN: 978-0-520-28503-3



With publication of *Serendipity: an ecologist's quest to understand nature*, an extremely competent and highly respected scientist provides readers with a detailed review of his life's work exploring marine ecosystems. Most of James Estes' investigations were conducted in the northern Pacific Ocean and, more specifically, in the Aleutian Archipelago of southwest Alaska, but also included work elsewhere in the Pacific Ocean and in the southern hemisphere. Key subjects in Estes' life-long research have been sea otters, kelp, sea urchins and, almost fortuitously, the unintended consequences of human actions. During a career spanning nearly 50 years, Estes has been a leading proponent of discovering the linkages between, and consequences of, ecosystem perturbations. In this book he recounts, largely in chronological order, the observations, experiments, serendipitous happenings, setbacks, discoveries, and successes that have characterized his efforts.

Dr. Estes' work has involved large numbers of collaborators, among which have been graduate students, academics, agency scientists, and technicians, all of who contributed to his successes. In reviewing the acknowledgments, I noted that four employees of the California Department of Fish and Game added in meaningful ways to his work, and I also am privileged to have worked closely with three of them during my 34 years with that agency. It is gratifying to see the efforts of agency personnel acknowledged as major contributors to, or facilitators of, research of the magnitude and import described in Serendipity.

While space does not permit a detailed description of the work conducted or the importance of the results, the book can be succinctly described as one scientist's efforts to understand the relevance of top-down forcing, its implications for ecosystem function, and the consequences of anthropogenic perturbations and their role in, and implications for, ecosystem change. The work described in Serendipity had its origins with an early emphasis on food webs and the ecological linkages among sea otters, kelp, and sea urchins, and evolved into an exploration of top-down forcing, keystone species, and trophic cascades, all of which are discussed in detail by the author.

The book consists of 16 chapters, each dedicated to some aspect of the long-term research conducted by Dr. Estes, and each chapter generally builds on knowledge gained, observations made, or results of efforts described in the preceding chapter. In Chapter 15,

Estes identifies the goals of the book as being to (1) recount knowledge gained over a research career spanning roughly 50 years; (2) describe broadly how predators and prey interact with one another (and the consequences thereof); and, (3) explain how the science he conducted actually happened. After identifying these goals, he presents what he identifies as the seven conceptual high-points of his five-decade adventure with creatures ranging in size from the great whales to phytoplankton, and the role that the actions of Homo sapiens played in providing grist for much of the research described. These seven high points are identified and discussed as (1) the importance of perturbations; (2) generality and variation [of results]; (3) state shifts and hysteresis; (4) the far-reaching influences of trophic cascades; (5) coevolution; (6) inter-ecosystem connectivity; and, (7) serendipity.

Although Serendipity was written by a scientist and recounts the history of numerous ideas and subsequent discoveries, it is a very reader-friendly work. With the end of each chapter, I found myself wanting to continue with the next, and sometimes found myself reading well into the evening. The text is clear, the messages are of great interest, and the conclusions are fascinating and have implications both for conservation and management. The text is presented in a manner that is easy reading for researchers, students, and interested members of the public. Although the material is technical in many ways, Estes has taken the opportunity to provide explanations and definitions throughout the book, which includes a detailed glossary and a thorough list of citations. Moreover, Serendipity is exceedingly well-written and carefully edited, and I noted only one error in the text. On pages 72 and 73, reference is made to, "… the late-1990s through the end of the first decade of the twentieth century…". Surely, the author had intended to refer to the first decade of the twenty-first century.

In the final chapter Estes writes, "Living with large predators means rethinking the spatial scales of conservation and management. Small protected areas simply won't do, as they cannot maintain viable populations of large predators, especially large predatory mammals. We will need landscapes and seascapes that are managed and protected at large enough scales to maintain these animals at ecologically effective population densities." I couldn't agree more with those thoughts. As noted elsewhere (Bleich 2016), many recent North American efforts to ensure continuation of ongoing ecological and evolutionary (E&E) processes appear to have been established as the result of desires to please special interest groups, and the perceived benefits of political expediency. To the dismay of many, however, such areas have been established largely in the absence of ecological forethought and at scales too small to ensure the continuation of E&E processes (Bleich 2016). Instead, proponents of many recently protected areas have emphasized the sociological or recreational benefits, rather than ecological benefits, of such areas, and increasing rates of visitation further confound the efficacy of such areas (Sarmento and Berger 2017). Perhaps the continuing advocacy of James Estes and other scientists of his caliber will yield changes in the ways that efforts to conserve viable ecosystems occur in the future.

Another review (Ball et al. 2017) was published just as I completed this review, and it generally was positive. Nevertheless, those authors described what they felt were several weaknesses and I must disagree with them on one issue raised in their comments. Ball et al. (2017) described the tone used by Estes when referring to his major scientific discoveries and subsequent publications in prestigious journals as "casual," and described references to submitting concepts to the National Science Foundation and the apparent ease in receiving funding as "glib." The authors of that review voiced concern that Estes' descriptions of those

activities were "somewhat cavalier" and that they could "even be discouraging to graduate students who are struggling to establish themselves as scientists." I view such criticism as unfortunate and unnecessary, but note the review was prepared as part of a graduate seminar. Rather than finding such statements discouraging, I would prefer to think that at least some of those students, by having read Serendipity, will be motivated to strive for the level of success achieved by Jim Estes during his stellar career.

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Literature Cited

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