

Chapter 11 (“The calving season: birth and survival in small herds and on calving grounds”) describes what must be one of the most awe-inspiring natural phenomena on Earth. To borrow Estes’ calculations, 400 000 or so calves are dropped in a three-week calving season. And, based on my own observations, most are born between 1:00 p.m. and 3:00 p.m. Spectacular! Estes points out that the two wildebeest species are the only antelopes that have a birth-and-follow system rather than a birth-and-hide strategy. His reasoning about why is convincing.

Estes takes the title for his concluding chapter (“Serengeti shall not die? Africa’s most iconic World Heritage Site under siege”) from the book by Bernhard and Michael Grzimek published in 1960 (*Serengeti shall not die*. Hamish Hamilton, London, United Kingdom). He has a carefully reasoned chapter on what it will take to “save” the Serengeti ecosystem and how likely that is to happen. He is more optimistic than I am. I have to reflect back to the slaughter of American wildlife in the 19th century. Only a handful of bison left, wapiti exterminated on the Great Plains, pronghorns reduced to a handful. No, I’m not particularly hopeful after thirty years of doing Serengeti research and watching elephants melt away in the late 1970s to mid-1990s—and rhinos disappearing completely during that same period.

A satisfying, but unusual aspect of the book, to me at least, are the personal asides about such topics as Estes’ childhood fascination with Africa (which I also experienced); a lion prowling around his Ngorongoro campsite at night and making

getting comfortable there difficult; his honeymoon with his wife, Runi, watching wildebeest on the floor of Ngorongoro Crater; and other asides that add human interest to the ethological core. The text also is accompanied by many photographs that demonstrate behavior and support the text. The index and bibliography are both among the best I have seen in a book on any subject.

Aspects of the book I did not like are the format of citations and lack of graphs. It would have been much easier to use the bibliography if he had used the Ecological Society method, which gives near instant access. There are a few sketches but, unless I completely lost track, only two graphs, separated by only a couple of pages. The advantage of graphs is that they summarize so much in a compressed and instantly obvious form. Several of Estes’ narratives, but by no means all, would have been helped by a graph or two.

This is a book that will appeal to readers at many levels and anyone with an interest in African ecosystems and their large mammals will discover much of interest. It is both informative and entertaining.

SAMUEL J. MCNAUGHTON

Syracuse University
Biology Department
Syracuse, New York 13244 USA
E-mail: sjmcaug@syr.edu

Ecology, 96(1), 2015, pp. 306–307
 © 2015 by the Ecological Society of America

A long-term view of the demise of eastern hemlock

Foster, David R., editor. 2014. **Hemlock: a forest giant on the edge**. Yale University Press, New Haven, Connecticut. xxviii + 306 p. \$40.00, ISBN: 978-0-300-17938-5 (alk. paper).

Key words: disturbance; foundation species; hemlock woolly adelgid; paleoecology.

Hemlock: a forest giant on the edge tells the story of the potential demise of the eastern hemlock in the eastern U.S. from an exotic invasive insect (the hemlock woolly adelgid or HWA) that was introduced to the eastern U.S. in the early 1950s. Although species of all kinds are being lost at an alarming rate across the globe, the potential loss of a large, iconic tree species such as eastern hemlock grabs the attention of ecologists, land managers, policy makers, and the general public. The authors combine science, history, a strong sense of place, and personal reflection to tell the story in a way that is unlikely to be told for many other species or places. This book is also a story about giants of a different kind—namely, the dedicated scientists and naturalists whose plot establishment, data collection, published works, writings, vision, and passion for the New England landscape and the Harvard Forest provided much of the foundation for this book. As often happens, real or perceived catastrophic events provide powerful reflection and teaching moments and the authors do an admirable job of explaining the role of natural disturbances in shaping eastern forests, including the

overarching influence of humans. The book is well organized and clearly written, and while scientists will enjoy reading this book (I certainly did), it is not written for scientists per se. The authors effectively interpret and synthesize the existing scientific literature for the region, but do not include data tables and graphs. Instead, readers are treated to a conversational writing style and black-and-white photographs of people (past and present), research infrastructure, and historical and contemporary photographs of forests and hemlock stands in various post-disturbance conditions. I found the starkness of the photographs and black-and-white (and green) coloring of the cover sleeve to be especially appealing. I also confess a special connection to the topic and the storyline. I have personally witnessed and intensively studied the rapid demise of hemlock in its southern range at a place with a comparable long history of research (Coweeta Hydrologic Laboratory), and I have benefitted from the legacies left by a cast of remarkable visionaries associated with Coweeta.

This is not the first time that an exotic invasive pest has decimated an iconic tree species in the eastern U.S. The loss of the American chestnut dealt a major blow to the structure and function of many eastern forest ecosystems. Sprouting chestnuts can still be found, but they have been effectively eliminated from forests where they once occupied a large proportion of the stand. However, unlike chestnut, the authors note that scientific infrastructure (e.g., scientists, graduate students, analytical tools, etc.), well documented long-term forest plots, and paleoecological techniques were available at the Harvard Forest

to quantify the pre-historical, historical, and contemporary forces that have shaped the distribution, abundance, and functional role of eastern hemlock across the New England landscape. In short, Harvard Forest researchers were in the “right place at the right time” to quantify the impacts of the HWA on eastern hemlock forests. Readers should be aware that this book is focused on New England forests, so much of the impacts (and associated scientific literature) from the extensive hemlock mortality that has already occurred in its southern range is not discussed. Regardless, the book provides a real-world example of the value of active experimental areas and investment in long-term studies. Unlike chestnut blight, the book describes how scientists at the Harvard Forest anticipated the arrival of HWA, and then analyzed historical data, initiated experiments (“cut or girdle”), and developed and applied models to test hypotheses. Indeed, an entire chapter (and reprise) of the book is devoted to the concept of “foundation species,” describing the important and unique role that hemlock has played in eastern forests. They describe key ecological characteristics of foundation species (e.g., high abundance and biomass, key components of food webs), and one perceptual characteristic: “we readily recognize a foundation species as an inseparable part of its ecosystem—we celebrate and enjoy its presence, and we mourn its loss.” I think this statement rings true with anyone who has spent time in areas where hemlocks are (or were) a major component of the forest.

The existence of this book provides clear evidence that eastern hemlock holds a special value to both scientists and non-scientists alike. As such, it is neither surprising nor unexpected that millions of dollars have been spent trying to control HWA with biological and chemical controls, with biological controls perhaps the only viable strategy at landscape scales. The authors note that most evidence suggests limited large-scale success to date. This evidence-based skepticism

might not sit well with forest health specialists and entomologists who continue to actively pursue control strategies, but it does begin to facilitate discussion on how to manage declining or dead eastern hemlock stands now and in the future, and perhaps provides some lessons learned for the “next” exotic pest. For example, the authors aptly describe the paleoecological record which suggests that large-scale hemlock die-off also occurred around 5500 years ago. It is not much consolation that it rebounded after about 2000 years, but this is a well-told story for most forest ecosystems: disturbance and recovery, followed by disturbance and recovery, followed by disturbance and recovery . . . repeat.

What follows after the loss of eastern hemlock will be different across its geographic range, but a post-hemlock forest *will* develop with its own structural and functional attributes. A key point worth debating is: what type and level of management intervention should be implemented to shape the post-hemlock forest? As the authors point out, options range from “do nothing” to active management that “deflects” the trajectory in a certain direction. The historical perspective advanced in this book should be helpful in informing this debate.

JAMES M. VOSE

*USDA Forest Service
Southern Research Station, Center for Integrated Forest Science
and
North Carolina State University
Department of Forestry and Environmental Resources
Raleigh, North Carolina 27695 USA
E-mail: jvose@fs.fed.us*

Ecology, 96(1), 2015, pp. 307–308
© 2015 by the Ecological Society of America

Gender equality and environmental change

Musil, Robert K. 2014. ***Rachel Carson and her sisters: extraordinary women who have shaped America's environment***. Rutgers University Press, New Brunswick, New Jersey. xv + 309 p. \$26.95 (cloth), ISBN: 978-0-8135-6242-1 (alk. Paper); \$26.95 (ebook), ISBN: 978-0-8135-6243-8.

Key words: environment; gender; ornithology; Rachel Carson; toxicology.

In May 2014, a set of murders of young women by a male student at the University of California, Santa Barbara prompted a flood of Twitter posts with the hashtag #YesAllWomen. The thread illustrated vehemently the extent to which gender inequality pervades civil society and the intellectual and emotional responses of women worldwide to that reality.

In the wake of these events, my reactions to *Rachel Carson and her sisters* were mixed and strong. Rachel Carson was among the many natural historians and scientists in the nineteenth and twentieth centuries who encouraged her peers and the public to explore relations among land use and the

condition of ecosystems and species, including humans. The 50th anniversary of Carson's death led Robert K. Musil, president and chief executive officer of The Rachel Carson Council, to publish a book on the connections among Carson's work and the work of those who influenced or were influenced by Carson. The insights offered by the book might be deeper if the language was less hyperbolic and forced, which unfortunately can seem condescending, and, perhaps ironically, if the book did not focus so narrowly on women.

The intended audience of *Rachel Carson and her sisters* is naturalists without extensive scientific training, and the introduction cautions readers that science lies within. The book is divided about evenly between women whose work preceded and followed that of Carson. However, a greater number of women—among them Susan Fenimore Cooper, Graceanna Lewis, Martha Maxwell, Florence Merriam Bailey, Olive Thorne Miller, Mabel Osgood Wright, Mary Hunter Austin, Ellen Swallow Richards, and Alice Hamilton—are presented in the first half of the book than in the second. The second half of the book dedicates one chapter each to Terry Tempest Williams, Sandra Steingraber, Devra Davis, and Theodora (Theo) Colborn. Musil says that he knows and has worked with