

The Biology of Disturbed Habitats.

Author: Frelich, Lee E.

Source: BioScience, 62(10) : 924-925

Published By: American Institute of Biological Sciences

URL: <https://doi.org/10.1525/bio.2012.62.10.13>

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them: because historical baselines are needed to move beyond maximum sustainable yield (Jackson and Alexander, p. 3) and redefine targets in fisheries management (Bolster and colleagues, p. 103); because historical ecology helps combat the “collective amnesia that allows policymakers to commit the same errors over and over again without any clear awareness of how similar courses have proved disastrous before” (Vickers and McClenachan, p. 123); because “we cannot effectively restore degraded marine populations, communities, or ecosystems without historical baselines to use as reference points” (Lotze and colleagues, p. 137); because “together, knowledge and imagination give us back what is lost in living memory: a long-term vision of the history of nature and of ourselves.... We can use that vision to question our actions and their consequences for the ocean and to rethink and redirect our path into the future” (Lotze and colleagues, p. 161); because “the International Whaling Commission received a global mandate to monitor the current state and determine the past condition of whale populations in order to manage hunting in the future” (Palumbi, p. 165); because “history can provide a working model and act as a bridge between stakeholders who are often at odds” (Rosenberg and colleagues, p. 190); because “the concept of shifting baselines helps to neutralize denial” (Jackson and Alexander, p. 205).

Such a heterogeneous inventory has an advantage: Every reader can find an interest in the shifting baselines concept. It also makes it look too much like a Swiss Army knife—with many tools for many purposes—but apparent contradictions within the book are not addressed. Lotze and colleagues underline “that past...was ever changeable so that our baseline for comparison depends on when we choose to measure it” (p. 137). Rosenberg and colleagues assert that “frankly, managers have had enough of a struggle trying to reverse the downward spiral of fish stocks, let alone rebuild fully functional ecosystems” (p. 179) and

further remind us that “elected officials respond to the political pressure of the loudest voices engaged in an issue” (p. 181). Then how exactly is historical ecology supposed to be used? The point is not to question the fundamental interest of marrying ecology to history; *Shifting Baselines* offers a wealth of viewpoints, examples, and methodologies that make it an important milestone toward this end. However, a more elaborate concluding chapter discussing apparent internal contradictions and bringing a more coherent argument for the reader to take home would have been welcome.

An unfortunate characteristic of the book must be mentioned: Seventy pages of detailed and well-documented notes are neither numbered nor called out in the text. This issue may be corrected in later printings, but it considerably hampered the scientific robustness of the text I had in my hands. It also does not prevent reading and enjoying the book, but it will raise considerable frustration, especially for students and researchers.

Having said that, *Shifting Baselines* is a stimulating and necessary volume for anyone interested in the issues surrounding marine conservation, ecosystem-based management, or how societies may set ambitious but realistic targets for biodiversity. Shifting baselines in fisheries management will also meet concerns in other fields of environmental management, where scientists and authors have already demonstrated how history changes the way we see current action, as well as future opportunities and constraints—a perspective that remains too often marginal in the biodiversity conservation arena.

Reference cited

Pauly D. 1995. Anecdotes and the shifting baseline syndrome of fisheries. *Trends in Ecology and Evolution* 10: 430.

RAPHAËL BILLÉ

Raphaël Billé (raphael.bille@iddri.org) is the Biodiversity Program director for the Institute for Sustainable Development and International Relations (IDDRI) in Paris, France.

DISTURBANCE AT THE CENTER OF ECOLOGY AND HUMAN LIVES

The Biology of Disturbed Habitats. Lawrence R. Walker. Oxford University Press, 2012. 360 pp., illus. \$59.95 (ISBN 9780199575305 paper).

In *The Biology of Disturbed Habitats*, readers will find a pithy but well-balanced review of the relevant research on ecological theory, but disturbance ecology is the focal point throughout the book. In reading, we view the whole of ecology through the lens of disturbance—as a modulator of biodiversity, ecosystem processes, and stability. I do not know of any previously published work more comprehensive in its inclusiveness of the types of natural and human disturbances, in spatial and temporal scales, within aquatic and terrestrial ecosystems, affecting both plants and animals. The interplay between the natural and anthropogenic disturbances and how they affect human use of the environment and sustainability is the book's key component. The statement “To survive, humans have adapted to disturbances that we cannot manage and manipulated those we can” (p. 211) captures its essence.

Author Lawrence R. Walker, a professor of plant ecology at the University of Nevada and a published writer of many classic papers, has addressed this book to ecologists, naturalists, and land managers. The prose is straightforward and readable by an audience with a wide array of specialties. Although the subject matter is vast, the book narrows in on the specifics with illustrative examples of disturbance within various ecosystems, showing how the small observable details fit into the much larger concepts. Tables and conceptual diagrams summarize major points, making the book useful for teachers who wish to introduce students to the variety of processes and effects of disturbance. I found the tables that show the chronological development of ecological concepts

over the last century to be particularly convenient, because I had forgotten certain items since graduate school.

Walker's message is clear: Disturbances are constantly affecting all life, everywhere, in an integrative fashion. This point of view is likely to be eye opening for many students and researchers who believe that it is possible to experimentally isolate one factor of interest, one disturbed element, in field study. Carcasses create nutrient pulses; sand dunes move across the landscape. Floods, tsunamis, treefalls, insect infestations, fires, volcanoes, and landslides are all considered and then put in a larger temporal and spatial context. Anthropogenic disturbances, including forestry, mining, agriculture, dams, urbanization, and military activities—which are novel compared with the evolutionary history of most species and ecosystems—are given a particularly thorough treatment. An estimate of the proportion of the Earth's surface affected by each disturbance type is given when data are available.

The book is not flawless, however. For example, fire intensity is measured in kilowatts (not temperature); tornadoes and thunderstorm downbursts, which probably affect areas as large as cyclones (*hurricanes* in North America), are absent; and large herbivores are not discussed in chapter 2 ("Terrestrial habitats") but curiously appear later, in chapter 8 ("Temporal dynamics"), where they are certainly relevant but lack the necessary introduction that should have occurred earlier.

The usefulness and limitations of ecological theory are given reviews throughout the book. For example, Clements's theory on climax vegetation is put in the proper perspective with a discussion steering between the extreme viewpoints that have often been voiced elsewhere and the more indulgent approach, which allows it to mingle with the supposedly opposing individualistic theory. Discussions of ecological function, biodiversity, landscape ecology, patch dynamics

(including interface interactions, such as along shorelines), and restoration ecology appear in various chapters; these are like miniature textbooks on each of these topics and are among the highlights of the book. Chapter 8, on temporal dynamics, has a truly grand integrated discussion of the history, mechanisms, and trajectories of succession and how they are influenced by interactions with disturbance, plant-animal interactions, and environmental factors. This is the most readable discussion of the complexities of succession that I have encountered.



Some books in this genre have an anticlimactic ending that merely summarizes the earlier chapters of the book—not so here. Chapters 9 and 10 (the last two chapters) cover management concerns and future scenarios in the context of disturbance and maintain our interest until the end. These chapters highlight humans as managers of disturbance, degradation of the environment, and the possibilities and limitations of ecological restoration. Humans variously leave natural disturbance alone, try to restore it, try to mimic it, try to eliminate it, or—if none of those options fit the situation—try to adapt to it. These choices depend on views of nature that differ regionally and with the human population needs and size. Intentionally introduced disturbances can have unintended consequences, covering such a large area that ecosystems are undercut. The same applies to a number of disturbances that are unintentionally introduced, such as tree diseases like chestnut blight.

In these last chapters, Walker also intertwines his personal message regarding the balance among natural areas, exploitive uses of biodiversity such as forestry and fisheries, and urban areas in a changing climate. The vulnerability of humans to disturbance grows as population increases, putting more people in the line of fire with natural disturbances. We both enhance natural disturbance through climate change and desertification and create others ourselves, which come back to haunt us. Possibilities of using technological, cultural, and ecological knowledge to deal with these problems bring the book to a conclusion. This leaves us to ponder intangible questions such as whether a certain quality of life can be maintained in a world with rapidly changing climate and growing population, what balance of human exploitation and native species is needed to maintain that quality of life, whether we are smart enough to obtain the necessary knowledge of ecosystem functions, and if so, whether impartial science will be used, given the cultural divergences within our society.

The Biology of Disturbed Habitats shows us why disturbance is fundamentally tied to all of these questions.

LEE E. FRELICH

Lee E. Frellich (frel001@umn.edu) is director at the University of Minnesota Center for Forest Ecology in St. Paul, Minnesota.

THE BIG-TENT VIEW OF BIOLINGUISTICS

Phonological Architecture: A Biolinguistic Perspective. Bridget D. Samuels. Oxford University Press, 2011. 272 pp., illus. \$55.00 (ISBN 9780199694365 paper).

Attempting to unify biology and linguistics is not a new idea. George Zipf's work in the 1930s (e.g., Zipf 1935) demonstrated that

doi:10.1525/bio.2012.62.10.13