

that of the cases examined, “While some can manage resources and regulate uses, most are limited to planning, coordinating, or advisory roles.” Thus, in terms of point #4, it could be argued that the majority of cases in the book are not truly EBM, as the processes discussed do not involve “management”—making decisions about human uses of the ocean. In summary, to address the lack of consensus on marine EBM noted at the beginning of this review, the book would have benefitted by consistently asking the basic question of each case study: in what way is this (or is it not) EBM?

A more systematic assessment of the EBM-ness of the cases could draw on two useful lists the authors provide. One appears at the very start of the book, the Preface (p. xiii–xiv), where the authors list 5 dimensions with which to categorize EBM initiatives: (1) scale (spatial and organizational scale, e.g. from local to multinational); (2) authorities (who holds the decision-making power); (3) purpose and scope (breadth or narrowness of what is covered); (4) genesis (who and what led to establishment of the initiative); and (5) age (how long it has been operating). This set of dimensions is not peculiar to EBM, and seems a helpful way to compare across any set of human institutions (as the book’s case studies represent).

Second, the book lists five elements that typically characterize EBM initiatives (p. 3): (1) scale (“use of ecologically relevant boundaries”); (2) complexity (“acknowledge and use complexity in management”); (3) balance (“balance and integrate the needs of multiple human user groups” – integrated management, as above); (4) collaboration (“engages a diverse set of organizations and individuals”); and (5) adaptive management (“monitoring and evaluation linked to changes in future management”). This useful set of characterizations could be applied to examine each case study. Indeed, it applies to terrestrial as much as marine settings, and to other approaches (e.g. integrated management) as much as EBM.

Overall, while more comprehensive books are available on marine EBM (e.g., Fogarty and McCarthy 2014), this volume has some compelling features. One of these is the book’s emphasis on the diversity of approaches and tools in

marine spatial management (whether or not EBM). Indeed, they critique (p. 211) those who “have advanced single tools as their policy approach, including marine spatial planning and zoning.” They state perceptively that “The problem with prescribed tools is that all problems start to look the same. If my only tool is a hammer, then all problems start to look like nails.” Noting that “The end goal is not to put a tool in place but to improve the ecological and social conditions in the place,” they conclude that the best approaches “are usually derived from the combination of several strategies, adaptively managed.”

A second, very notable attribute is the book’s emphasis on the human dimensions of spatial management approaches such as EBM. I commend the authors for highlighting a topic that is too-little covered in EBM, integrated management and other spatial management—namely, “sense of place and purpose” (p. 194–196). Their discussion highlights “passion about a shared sense of place” together with “a strong sense of common purpose and collective responsibility to protect that place” as key ingredients of success. I agree. These are fundamental because, as this book highlights, EBM is not as much about ecosystems and scientific studies as it is about people.

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## Evolutionary community ecology: from coexistence to coevolution

McPeck, Mark A. 2017. **Evolutionary community ecology**. Princeton University Press, Princeton, New Jersey. 313 p. \$60.00 (cloth), ISBN: 978-0-691-08877-8 (acid-free paper).

*Key words:* eco-evolutionary dynamics; ecological niche; ecological opportunity; functional group; neutral species.

A burgeoning interest in eco-evolutionary dynamics has made substantial progress over the last decade. With

appealing heuristic models and a compelling narrative, eco-evolutionary thinking is becoming an important framework for understanding the joint dynamics of ecology and evolution in natural populations. However, understanding of eco-evolutionary dynamics at the community level has seen comparatively little development thus far. Given the continued development of community ecology into a synthetic and predictive field, an up-to-date theoretical approach including evolutionary dynamics is due (Holyoak et al. 2005,

Vellend 2016). In *Evolutionary community ecology*, Mark McPeck conducts an expansive analysis uniting community dynamics with evolutionary process and uses it to promote a more ecological and mechanistic view of adaptive evolution in a community context.

This complex and largely analytical synthesis includes five core chapters covering topics ranging from speciation, coevolution, and biogeography, as well as more typical community ecology foci. These chapters are framed around the following questions: (1) How do species coexist? (2) How do species evolve in communities? (3) Where do species come from? (4) What are the ecological conditions underlying species differentiation within communities? and (5) How does dispersal affect evolution within communities? Despite this expansive coverage, it's important to note that *Evolutionary community ecology* is not a broad synthesis or a literature review. Rather, it extends and develops existing theoretical work by McPeck and others to advance a more synthetic and predictive theoretical model for understanding species interactions, community assembly, and community structure. McPeck's comprehension of the literature, complex analytical modeling, and natural history combine into an original and thought-provoking investigation of how communities form.

One of the book's primary points is that evolutionary ecologists often overlook or fail to integrate the direct ecological consequences of natural selection and adaptive evolution—change in population size and growth rate. The unifying linkage is the equivalence of per-capita growth rate and average individual fitness. Therefore, evolution synchronously influences the distribution of phenotypes in the population and their abundance. This ecological effect of evolution by natural selection may seem obvious when we consider extreme scenarios such as the extinction of maladapted populations. But, in a community context, selection-driven shifts in a species' phenotype and abundance fundamentally alters the strength of interactions with co-occurring predators and/or prey. This ecological effect of evolution underpins the various dynamics developed in the book and serves as the conceptual base from which McPeck explores related phenomena: coexistence, coevolution, diversification, and dispersal.

Tracking all the moving parts in *Evolutionary community ecology* is a substantial challenge. Consequently, working through the analytical core of the book requires more investment than some other Princeton Monographs. Penetrable summaries of major findings provide a welcome reorientation at the conclusion of each chapter. Nevertheless, I found it worthwhile to reread portions of each chapter before moving on to the next. I also found the online supplement to be quite helpful (<http://enallagma.com/evolutionarycommunityecology/>). This well-designed online resource allows users to animate key figures and toy with models featured in the book. In combination, the in-depth analysis and supplemental support (including code) make the book a great resource for graduate students interested in evolutionary ecology—especially those willing to devote extra time experimenting with the models. I encourage new students looking for dissertation ideas to ply these pages for testable hypotheses.

In addition to the core evolutionary dynamics explored in the book, McPeck deviates from traditional ecological

perspectives on coexistence theory throughout the book and essays an interesting critique in the final chapter. For example, McPeck's use of negative density-dependent regulation via intrinsic factors (e.g., mate harassment and cannibalism) as a mechanism driving the creation of ecological opportunity is an interesting departure from models focused on competition for food and other extrinsic factors. By doing so, he sidesteps theory that generally constrains stable coexistence mechanisms to conditions in which intraspecific competition is stronger than interspecific competition. Avoiding this engrained ecological precept, McPeck's analysis opens a range of interesting ecological dynamics such as the stable coexistence and convergent evolution of ecologically neutral species. He argues convincingly in support of these views, provoking readers to think broadly about the processes structuring communities. Plainly stated opinions such as these make the book a much richer, original, and interesting work.

Of course, this wide-ranging book has some limitations. First, the book was remarkably short on supporting empirical evidence. For example, substantial evidence for widespread existence of neutrality that might help identify when, where, and what species exhibit ecological neutrality is lacking. Similarly, evidence for dynamic fitness surfaces was not sufficiently integrated, despite an increasing number of studies on this topic (Svensson and Sinervo 2004, Martin and Wainwright 2013). These deficits indicate a tendency to rely on a few exceptionally well-studied model systems for vetting model predictions with empirical data (stickleback, *Anolis* lizards, Galapagos finches, damselflies). In my opinion, this relatively narrow empirical range unnecessarily abstracts the work. Perhaps most disappointing was a reticence to entertain contemporary eco-evolutionary perspectives, lexicon, evidence, and analytical approaches in the book. Such a divisive position suggests an unnecessarily fraught relationship between this work and other eco-evolutionary syntheses (Witham et al. 2007, Hendry 2016). This omission only serves to insulate *Evolutionary community ecology* within this rapidly expanding field.

I enjoyed reading this book. While rather technical in parts, it is an original and thought-provoking synthesis bursting with fresh ideas and testable predictions. This book will serve as an important resource for graduate students, particularly those interested in theoretical ecology and eco-evolutionary dynamics. However, any ecologist or evolutionist interested in researching the evolutionary dynamics underlying community formation will do well to trawl its pages. This book will be an essential resource and is well worth your time. Over the coming years, I hope to see a wave of community-level studies following up on McPeck's insights. One thing is certain, *Evolutionary community ecology* will change how you think about community ecology.

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## Big burns, big questions

Struzik, Edward. 2017. **Firestorm: how wildfire will shape our future**. Island Press, Washington, DC. 257 p. \$30.00 (cloth), ISBN: 978-1-61091-818-3; \$29.99 (e-book), ISBN: 978-1-61091-819-0.

*Key words:* boreal forest; fire ecology; fire science; forest fire; North America.

Landscape fire is news in ways that, even 30 yr ago, it was not. Megafires are paired with melting ice as emblems of the Anthropocene. For many ecosystems free-burning fire is recognized as essential, and fire exclusion as a significant disrupter. Lands, towns, and even fire crews are burning. I read this book shortly after watching *Only the Brave*, Hollywood's re-imagining of the Yarnell Hill fire that wiped out all but one of the Granite Mountain Hotshots, and between the fire complexes that blasted northern and southern California. Not surprisingly, journalists are writing books about fire.

Edward Struzik directs *Firestorm: how wildfire will shape our future* primarily at the boreal forests of North America. The book opens, and continues for a fifth of its length, with a human-centered account of the Hungry Horse fire that burned into Fort McMurray, Alberta in the spring of 2016. The author describes the direct impacts that wildfire can inflict on people and their habitations. ("The Horse River fire is the kind of wildfire that scientists expect to see more of in the future as the climate heats up and as more and more people live, work, and recreate in and around northern forests.") [p.58] Most of the book then surveys the indirect effects—the collateral consequences for wildlife, air, water, soil, even ice. There is a primer of sorts on the history of fire suppression and a review of the premonitory 2003 fire season that afflicted British Columbia.

The book's style is the well-trod path in which a journalist visits a scientist in his or her natural setting and records what the scientist says about the subject. Most of Edward Struzik's treks take him to western Canada and Alaska, with a few forays to the eastern boreal and south into the US for better illustrations on particular themes. The range of topics includes pyrocumulus clouds; carbon and climate; postburn hydrology; gaseous (and other) emissions, not just

greenhouse gases but toxic chemicals such as arsenic, mercury, asbestos, and radioactive cesium; indigenous fire practices; droughts and their knock-on consequences for diseases and insects as well as wildfire; permafrost; and wildlife from grizzly bears (*Ursus arctos*) to flammulated owls (*Psiloscops flammeolus*).

The author concludes that our new-order fires are causing wide-spectrum effects, most of them not visible to the public, and that old strategies to deal with fire will no longer work in the future that such fires are helping shape. Bad fire breeds more bad fire. What the future might bring is unclear, but it will look very different from the known past. We need more research and better fire-protection programs.

The upshot is a reader-friendly, picaresque narrative of personal encounters and tutorials. But beyond the specter of world-changing fire, there is not much to hold the parts together. The book has no organizing structure and no organizing concept of fire. It has no index. It repeats observations, often in identical sentences. It has few sources other than conversations and no further reading. It moves toward no climax. Rather it allows the idea of megafire to act as a magnetic core to hold its pieces together.

For me its best feature is the attention it gives to Parks Canada and fire officers like Ian Pengelly and Mark Heathcott and to Canadian fire scientists like Brian Stocks, Marty Alexander, Mike Flannigan, Charlie Van Wagner, Cliff White, and Cordy Tymstra, among others. It's a curiosity that, alone among the ancient elements, fire has no academic discipline of its own. Even biology, which should claim the subject, barely nods to it in introductory texts. Those who make a career studying fire, typically as government researchers, struggle for recognition outside their sphere of colleagues. The growing prominence of fire, however, may change that fact, and Edward Struzik's book may assist.

But there were more things about the book that annoyed me. Many were the result of careless writing and editing. US Forest Service occasionally becomes US National Forest Service. The Black Dragon fire of 1987 finds itself in 1988, then back again, and grew from 3 million acres in Manchuria to 18 million across Trans-Baikalia Asia. The 1871