

edited volume is broad, ranging from individual-based to biogeochemical models, it does not quite cover the whole toolbox of a modern quantitative ecologist. The modeling approach and ethos presented here is that of the tradition of heavy, parameter-rich models, typically modeling large-scale phenomena. References to work published in the journal *Ecological Modelling* dominate the chapters and there is far less coverage of ecological modeling in other mainstream ecological journals. There is obviously nothing wrong in choosing a particular approach, but this philosophy is not explicitly stated, and it is therefore misleading to claim to cover the whole field. I was a bit surprised that the well-known problems with very parameter-rich models (for instance, overfitting, difficulties in interpreting the results, and challenges of sensitivity analysis) are not presented, neither are the modern widely used approaches of model comparison, or the whole idea of parsimony in modeling. In the same vein, the only chapter that focused exclusively on statistical methods is about data mining. So, all in all, this volume does not live up to its stated intentions, but putting this shortcoming aside, it does provide a wealth of material that I would expect to interest those researchers in particular who find themselves reading *Ecological Modelling* often. The accompanying CD-ROM provides additional material and software from ten of the chapters.

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A PRACTICAL GUIDE TO ECOLOGICAL MODELLING: USING R AS A SIMULATION PLATFORM.

By Karline Soetaert and Peter M.J. Herman. *Dordrecht (The Netherlands) and New York: Springer.* \$99.00. xv + 372 p.; ill.; index. ISBN: 978-1-4020-8623-6 (hc); 978-1-4020-8624-3 (eb). 2009.

The authors introduce ecological modeling with an emphasis on differential and difference equations and a writing style that is generally lively and sometimes humorous. They use the R programming environment, a popular tool in statistics and ecological modeling. The authors begin with a detailed section on the need for models and how models are formulated from knowledge about ecological systems. Their introduction starts with chemical reactions and develops to ecological interactions, including spatial modeling. Fitting statistical models, one of the strengths of R, is addressed only briefly in the context of estimating parameters for use in simulation models. Analytical and numeric methods for solving models and evaluating stability are introduced and illustrated with several examples. Multiple time scales and discrete time

models are also presented, ending with approaches for testing and validating models. There is some emphasis on the use of modeling in aquatic systems, with examples such as nutrient flows in lakes, dynamics of phytoplankton, zooplankton and detritus, and organic matter dynamics in sediments. There are also interesting terrestrial examples such as spatial models of plant competition and insect dispersal, and age-structured population models.

In addition to students of ecology, this book will appeal to chemistry, geology, and biological engineering students interested in applications in ecology. Readers will need some background in mathematics and biology to fully appreciate the topics. The examples in R will be stimulating for users. Readers new to R will be able to apply the example code, but may need other input to learn to write comparable code. There is an R package corresponding to the volume that can be directly installed from the R webpage and loaded for use. The Springer website includes additional documents, including the R code used in examples, a longer introduction to R, and examples of modeling in spreadsheets for anyone who desires a gateway modeling experience.

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THE SYMBIOTIC HABIT.

By Angela E. Douglas. *Princeton (New Jersey): Princeton University Press.* \$45.00. xi + 202 p.; ill.; index. ISBN: 978-0-691-11341-8. 2010.

This book provides a detailed summary of organisms living together for mutual benefit, covering aspects ranging from the semantic to the genomic to the applied. Material is organized into five substantive chapters and a sixth that provides a broad perspective. The first chapter presents a well-reasoned argument for and against the definition of a symbiosis as a persistent, mutually beneficial, interspecific association between individuals. Regardless of one's semantic agreement, the volume covers a fascinatingly broad range of ecological systems and evolutionary responses with a mix of detailed natural history descriptions, genomic information, and game theoretic underpinnings. The four material chapters emphasize evolutionary origins, conflicts, partner choice, and success in symbioses, in that order. I learned about many new topics, such as the "collective action" model supplementing the "tragedy of the commons" model, as well as refinements of classic ecological stories, including the symbiosis aspect of the evolution of virulence in myxoma. Among the many cases, Douglas presents fascinating examples in which one partner uses addiction as a dastardly