

Book review

Carl J. Walters and Steven J.D. Martell, *Fisheries Ecology And Management*, Princeton University Press, Princeton, NJ 2004, ISBN 0-691-11545-1 Paperback, 423 pp.

“*Fisheries Ecology and Management*,” written by Carl J. Walters and Steven J.D. Martell, is a text intended for upper level undergraduate and introductory graduate classes. The aim of the book is to give a broader review of assessment methods and policy issues than is available in existing texts on fisheries harvest management. This review was carried out as part of a graduate fisheries ecology seminar. The fourteen chapters of the book are distributed into six parts.

Chapter one begins with the authors lending their support to the use of ecosystem based models for formulating management advice. They are careful not to introduce this approach as a substitute for single-species population-dynamics modeling, by confirming that their purpose is to provide the capability for fisheries scientists to respond to a broader set of policy questions and predictive demand. Chapter two emphasizes the importance of understanding trade-offs in policy decisions. These two chapters serve as a great introduction as the material is easily understandable. However, we were disappointed by the authors’ overly strong opinions and their use of unprofessional language.

Part two of the book was also divided into two chapters: how to choose a policy strategy that allows a sustainable maximum harvest, and methods used to regulate these harvests. Chapter three describes feedback policy design and also an alternative ‘actively adaptive’ strategy. A brief evaluation of the current status of stock assessments is provided along with their limitations. It is left to the reader to decide which strategy may be best for a particular species, as this chapter only outlines the direction of current research.

The authors do not take into account the social aspect of management that often prevents the implementation of certain strategies. Chapter four discusses the use of quotas for managing harvests. It also identifies the great importance of data collection for all species before they are threatened by overfishing. The description of two approaches, input and output controls, is interesting and well written. We found the use of certain terms in this chapter to be potentially misleading. For example, the term ‘elementary’ may be misleading to some students who might be deterred by the level of math included. The word ‘tactics’ is used repeatedly in chapter four and has a slightly negative connotation. Its use seems to indicate that fisheries managers are unable to work with other parties involved in policy implementation and need to resort to certain practices to achieve their goals.

Part three, consisting of chapters five, six and seven, introduces and discusses aspects of single species assessment models (S-SAM^s). Chapter five does this by providing a brief historical perspective of model building and development of S-SAM^s. Chapter six introduces the concept of foraging theory and discusses the implications of recruitment patterns within the foraging arena context. In chapter seven, a few key problems that have been encountered in practical analysis of recruitment relationships for fisheries policy design are identified. Concepts such as state observation dynamics, stock recruitment, density dependent resources and juvenile carrying capacity are just some of the methods used to formulate S-SAM^s. The chapters in part three were logically structured and effectively related to previous chapters. The language of these chapters is simple and direct, but the ideas are not as easily comprehensible. We found the technical aspects of these chapters to be challenging. In many ways, part three provides the framework for the remaining chapters, and

communicates a mostly professional, direct, and positive tone.

Part four begins with chapter eight which addresses dynamic pool models and proposes the use of spatial life history trajectories and various models associated with them. Eulerian and Lagrangian models are described and discussed. The chapter concludes with an introduction to policy gaming with spatial models and discusses specific spatial models such as Reefgame. This chapter is clearly laid out, well organized and led effectively to the next chapter in the section. Chapter nine was well written and focused on fishing effort. The authors cover short-term effort responses, as well as temporal and spatial effort, and the chapter concludes with an enlightening look at mosaic closures. Throughout this chapter the examples are knowledgeable with a practical application, and the graphics adequately support the material.

Part five consists of three chapters. Chapter ten discusses Foraging Arena Theory (II), which one would have expected to follow Foraging Arena Theory (I), located in chapter six. This chapter, although dealing with difficult concepts, is made easier by its comprehensive introduction. Under the sub-heading 'Understanding Foraging Arena Theory', the chapter uses the simplest explanation combined with equally concise graphics to ease the reader into difficult material. Overall, this chapter is complex and thorough, and provides a valuable introduction and discussion of components of foraging arena theory. Chapter eleven begins with an overview of the difficulties that managers encounter when trying to consider models for ecosystem management. The authors begin by describing how difficult model selection can be and candidly admit to making mistakes themselves. This chapter is aptly named 'Options for Ecosystem Management', and, as it should, gives the reader many options. The main emphasis of the chapter is to encourage the reader to consider the use of numerous models. For a chapter dedicated to model selection, it was somewhat surprising how little confidence the authors seem to place in models. Because of this, it is difficult not to come away from the chapter feeling wary of the uncertainties of ecosystem modeling. Chapter twelve evolves seamlessly from the previous chapter and is titled 'Parameterization of Ecosystem Models'.

If ecosystems are to be modeled, complex parameterization problems need to be dealt with, unless, as the authors state almost sarcastically, "scientists want to base policy predictions on pure intuition." Thankfully, the authors restore the reader's confidence in the use of models by inferring that all parameters cannot be modeled. Instead, models should be simplified whenever possible.

The last part of the book, part six, discusses potential strategies for ecosystem management. Chapter thirteen introduces artificial propagation and the benefits and problems of stocking fish to enhance ecosystems. This chapter focuses primarily on the restoration of salmon, rather than other marine fisheries. The last chapter of the book ends by discussing different options for achieving a more natural ecosystem, while re-visiting information from previous chapters. The authors conclude with the belief that fisheries managers should be made accountable for the consequences of their assessments and recommendations.

Our overall consensus is that *Fisheries Ecology and Management* is an extremely valuable book for fisheries scientists involved, or looking to become involved, with modeling. Aiming the book at upper level undergraduates and entry level graduate students may be underestimating the complexity of topics breached in the book. Some of the chapters were not as easily understood by the reviewing students because the authors didn't provide enough introductory material. Also, the authors could have been more consistent with the book's layout. There are many difficult equations throughout the book, some were confined to boxes, while some were intertwined with the text and complicated to read. Finally, there is potential to enhance the reader's understanding of the material by reevaluating the graphics. Although some of the graphs and diagrams were extremely informative and are based on real data, most of the graphics remained too small, and many diagrams, which were originally produced in color, were unreadable in grayscale. In conclusion, we want to reiterate that we believe this to be a very important text for fisheries ecology and management. We recommend that instructors intending on using this text complement it with Hilborn and Walters (1992) or Quinn and Deriso (1999). Using these supplementary texts will allow students to gain a deeper understanding of some

of the more complex issues that Walters and Martell evaluate.

References

- Hilborn, R. and Walters, C.J. (1992) *Quantitative Fisheries Stock Assessment: Choice, Dynamics, and Uncertainty*. Chapman and Hall, New York, 592 pp.
- Quinn, T.J. II and Deriso, R.B. (1999) *Quantitative Fish Dynamics*. Oxford University Press, New York, 542 pp.

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