Fish population dynamics, monitoring and management sustainable fisheries in the eternal ocean
By I. Aoki, T. Yamakawa & A. Takasuka

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In the words on the cover of this book "it offers readers a broad understanding of the current methods and theory for sustainable exploitation of fisheries resources, and introduces recent findings and technological developments." This is a fair description of its scope which is covered in just under 250 pages. Inevitably for a concise volume with such a breadth of material to include, some topics are dealt with in a very cursory manner and there are notable omissions, but it makes a good read, especially for those interested in learning about how fisheries are managed in the seas around Japan.

Although the chapters are individually authored, the editors have succeeded in establishing a uniform style and the work follows a logical sequence so that there is continuity of themes making the book highly readable and accessible. It is divided into three parts. Part I discusses fish stock dynamics, part II addresses monitoring changes in fisheries resources, while part III examines management models and systems. A final chapter draws the preceding themes together in a summary and philosophical perspective.

Typically, each chapter offers a review of the topic under consideration but with a detailed case-study drawn from the regional seas around Japan. The intent is to use the case-studies to illustrate common principles but too often the details of the case-study predominate at the expense of generality. As so often happens, the enthusiasm of individual authors for their subject comes at the cost of the bigger picture.

Part I of the book focuses on the population biology of three classes of fish, small pelagics, demersal fish and sharks. There is much emphasis on the recruitment process especially in relation to sardine and anchovy with extensive review of hypotheses that may explain the changing dominance of each species in relation to environmental forcing. Demersal fish are exemplified by Walleye Pollock (Gadus chalcogrammus), an example while highly relevant, is perhaps too specific to draw reliable broad conclusions about demersal fish as a whole. The authors argue, for example, that demersal fish are inherently more vulnerable to collapse than small pelagics due to a late age of maturity and also more restricted habitat. Yet it is small pelagics that are often the subject of collapse. The in-depth reviews of the species considered are nevertheless valuable, but the section lacks an outline of basic population dynamics theory in which the population behaviour of individual species can be interpreted given their life history traits.

Monitoring systems are described in part II. These three chapters deal with monitoring plankton and the early life stages of fish, acoustic surveys and stock assessment models. The first focusses mainly on the technology for sampling and describes recent developments in the equipment used in monitoring eggs, larvae and zooplankton. There is recognition that monitoring these is important in understanding ecosystem function, but there is no discussion of how egg and larval surveys can be used to estimate spawning stock biomass or recruitment and support stock assessment. Similarly, the chapter on acoustic surveys places an emphasis on the technology and its use for supporting commercial fishing rather than as a tool to provide abundance estimates. The final chapter in this part reviews stock assessment methods with a strong focus on virtual population analysis (VPA).

Despite the dependence of VPA on catch at age data, there is no discussion of sampling commercial catches or how age data are derived. For most practitioners, VPA is an approach in decline, and while it is of some interest to have the relevant equations set out, modern approaches with greater statistical rigour are available and should have been dealt with in more detail to give the reader a greater understanding of current methodology.

In the final part of the book, harvest control rules (HCRs) and ecosystem modelling are addressed. The chapter on HCRs provides a good overview of the theory and practice as it is applied in Japan. While somewhat geographically specific, the subject is dealt with in a balanced way and provides the reader with a sound introduction to the topic. Not so for the chapter on ecosystem modelling. Here, a very limited range of established ecosystem models are very briefly mentioned before the authors provide a detailed description of an ecosystem model for data-poor situations. This is essentially a three species predator–prey model based on the Gompertz–Fox surplus production model, and it is something of a stretch to describe it as an ecosystem model. Tests of the model are presented, but this is really a research paper that needs to be submitted to a journal for peer review.

For readers curious to learn about fishery science and management in Japan, this is worthwhile book that is interesting and readable. It will also be useful for those with an interest in the case-studies. Part I, in particular, is thorough. For a more general textbook on fishery science, this book is less successful and there are a number of more authoritative works that would be a preferred choice.

Keywords: Sustainable fisheries; Japan; fish population dynamics

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