

## BOOK REVIEW

**TAKING STOCK OF FISH STRESS****Biological Indicators of Aquatic Ecosystem Stress****Edited by S. Marshall Adams**

American Fisheries Society (2002)  
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 respectively, for members of AFS)

“Because biocriteria, including biomarkers and bioindicators, have become increasingly popular assessment tools, it is important to have a comprehensive document that provides guidance relative to the design, measurement, and application of various biocriteria in aquatic ecosystems. The main purpose of this book, therefore, is to provide a comprehensive reference and guide relative to the various biological endpoints that can be measured and used to assess the effects of environmental stressors on aquatic organisms, populations, and communities.” The 16 chapters of *Biological Indicators of Aquatic Ecosystem Stress* generally meet this justification and aim, stated in the introductory chapter, and this book should benefit those interested in assessing or predicting effects of stressors.

The book takes a hierarchical approach, with topics ranging from the subcellular to communities. Chapters could be categorized as concerning organismic, population/species and community levels of organization. There are eight chapters that are primarily focused on organism-level biomarkers and criteria and entail topics covering biochemistry, molecular biomarkers, physiology, immunology, histopathology, bioenergetics, reproduction and behavior. There are two chapters directed at the population level, covering population genetics and general population biology. There is a single chapter that considers communities, and a single chapter that integrates population, community and landscape levels of organization; this chapter is heavily oriented towards simulation models. Two other chapters address assessing effects across levels of organization and statistics. The last chapter is basically a summary chapter.

The chapters comprising this book are written by internationally recognized experts in their respective disciplines. Many of the chapters provide excellent reviews of biomarkers and bioindicators relevant to their topic areas; these chapters provide the theoretical background on each class of indicator, usefully contrast pros and cons for each biomarker or indicator type and give ‘useful tips’ for application of these

measures. Other chapters provide quite thorough ‘states of the science’ for their respective subjects, providing excellent reviews of their disciplines; these chapters are quite minimalist concerning pros and cons of different methods or the application of the methods in assessing stress. While most chapters are exceptionally current in the treatment of their subject matters, a few are basically redundant of other published works and add little new. The result is that, taken as a whole, the book has a rather uneven nature, as though the authors of the chapters were not all starting from the same perspective.

Readers will find that the chapters are well written and provide useful reference material on particular biomarkers and indicators. Most of the chapters will also serve as excellent reading for students in selective advanced courses on particular relevant subjects or for graduate students ‘getting up to speed’ on certain subjects. The book is well worth twice the price.

Given that there are many positive things to say about it, this is one book that should definitely not be judged by its cover. While the title of the book implies that the volume is about ‘ecosystem stress’, the main theme that runs through the book is toxicants. In one chapter, the authors appear to have based their review on species of concern to aquaculture. The major topics in which most people concerned with freshwater ecosystems would be interested are not addressed anywhere in the book. Landscape disturbance regimes, monitoring and sampling designs at the landscape level (for example, those currently used by the US Environmental Protection Agency and numerous state agencies) and measurements of ecosystem-level processes are not covered at all. The book is clearly imbalanced towards the organismic level of organization and almost ignores the ecosystem; this becomes obvious based on the number of chapters devoted to particular topics. The book is ichthyocentric, ignoring aquatic invertebrates and other vertebrate classes. Readers will find this a wonderful volume on “design, measurement, and application of various biocriteria” for assessment of fish in potentially contaminated environments, with some brief forays into higher levels of organization and into stress in general, but it seems to have been written and compiled for some title other than ecosystem stress.

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