

BOOK REVIEWS

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MOSS, B., J. MADGWICK, AND G. PHILLIPS. 1996. **A guide to the restoration of nutrient-enriched shallow lakes.** Broads Authority, 18 Colegate, Norwich, Norfolk NR3 1BQ, UK. 180 p. 14.95£. ISBN 0-948119-29-2.

If you are a limnologist, lake manager, fisheries biologist, or a layman with an interest in the management of shallow eutrophic lakes, you need this book. This is particularly true if you live in the United States, where our ideas of lake restoration are dominated by the success of nutrient reduction in Lake Washington. Europeans have discovered that this approach, which was developed from studies on deep lakes, does not necessarily work to restore nutrient-enriched, shallow lakes that have switched from having clear waters dominated by macrophytes to having turbid waters with heavy algal blooms. They have developed a theory of alternative stable states that says that under certain circumstances a lake can switch from one of these biological communities to the other without any change in external nutrient supplies. This book explains why lakes switch from one condition to the other and the use that has been made of this information to restore specific water bodies.

The first chapter deals with how lakes work (basic aquatic ecology) with an emphasis on shallow lakes. The information on biotic interactions within macrophyte beds is usually not emphasized in traditional limnology texts, so there is much to be learned from this exposition even if you are a long-time student of limnology. The next chapter deals with how lakes are altered by human activity. Here the theory of alternative stable states is explained, particular attention being given to forward and reverse switches: forward switches are the factors that can move a lake from a macrophyte state to an algal state, and reverse switches are the factors that can move a lake from an algal state to the macrophyte state. Biomanipulation, nutrients, and fish are important switches.

Chapters 3 and 4 deal with how to set restoration targets for a particular lake and the overall strategy for the restoration of shallow eutrophic lakes. The general strategy is a series of graded steps. These are: 1) forward switch detection and removal, 2) external and internal nutrient control, 3) restructuring the ecosystem by a reverse switch (generally biomanipulation), 4) plant establishment, and 5) stabilizing and managing the restored system. The book concludes with a series of case studies of European lakes where restoration projects have been carried out. In each case the lake is described, the problem is outlined, the restoration activities are described, and the results are presented. Most importantly, for each lake there is a discussion of what was learned in the process.

This is an exceptionally well-written book that can be understood by professionals in non-limnological fields as well as the intelligent layman. There is a minimum of jargon, and technical terms are defined as they are encountered. Definitions of key limnological terms are also included in the index in the back of the book. Of particular note is the large number of photos, drawings, graphs, tables, and flow charts (one on nearly every page) that help the reader to understand the materials at hand. The illustrations are superb (most are in color), and the entire book has the mark of professional design and layout.

For the professional limnologist or lake manager this book brings together in one place the theory of alternative stable states and how it has been applied in practical lake management. The extensive treatment of biomanipulation and the role of fish and invertebrate grazers will appeal to those who feel that lake restoration in the 1990s tends to be

more about chemistry than biology. Also noteworthy is the up-to-date bibliography, which is invaluable for anyone who wishes to get into the nuts and bolts of shallow lake structure, function, and management. This book deserves to play an important role in changing our thinking on management of shallow lakes in North America.

The book can be purchased directly from the Broads Authority. It is also available through the World Wide Web from THE NATURAL HISTORY BOOKSTORE in England (<http://www.nhbs.co.uk/index.html>).

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PAXON, JOHN R., AND WILLIAM N. ESCHMEYER [EDS.]. 1998. **Encyclopedia of fishes.** Second edition. Academic Press. 240 p. \$34.95. ISBN 0-12-547665-5.

Twenty years ago limnologists and oceanographers knew that fish existed, but you would never have known it from what we published in *L&O*. Times have certainly changed! Indeed, *L&O* now receives enough "fishy" papers to warrant having an associate editor that specializes in this area (Gary Mittelbach). Nevertheless, I venture to guess that most of us still know little about this remarkable group of organisms.

Subtitled "A comprehensive illustrated guide by international experts," this is one of those rare books that will appeal to both scholars and laymen. Formatted as a coffee-table book (12½" × 9½", or 31 × 25 cm), it is replete with spectacular color photographs and facts about all major fish groups, both marine and freshwater. Despite being written by many specialists, the text has been edited to a uniform and highly readable standard. It will be at home in your office, living room, laboratory, or classroom; and I guarantee that it will be the most frequently browsed book in your collection.

There are two major sections. Part 1—The World of Fishes—gives a concise but entirely satisfactory overview of ichthyological fundamentals (morphology, reproduction, classification, geological record, ecology, behavior, and conservation status). Part 2—Kinds of Fishes—forms the bulk of the book (178 pages); it presents myriad details for the major fish groups. The scope of individual chapters varies, from families to superorders; most deal with orders. The most peculiar one treats the superorder Elopomorpha, which includes seemingly disparate beasts (tarpons and eels); this superorder is not listed in the taxonomic summary in Part 1. This is confusing, but I had to look hard to find even this minor blemish. The book concludes with a brief bibliography (3–5 references for each chapter) and a superb index.

An encyclopedia is not meant to be read cover-to-cover, and I haven't, but if what is presented for the family Cichlidae (the fish that I am presently most interested in) is typical, then this book is a treasure trove.

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