FRESHWATER FISHES OF TEXAS.

By Earl W Chilton II; illustrated by Nancy McGowan et al. Distributed for Texas Parks and Wildlife Press by University of Texas Press, Austin, Texas. $12.95 (paper). v + 98 p; ill.; no index. ISBN: 1-885696-23-X. 1997.

IMPROVING FISH STOCK ASSESSMENTS.

By the National Research Council committees. Washington (DC): National Academy Press. $36.00 (paper). x + 177 p; ill.; no index. ISBN: 0-309-05725-6. 1998.

This report provides a timely appraisal of how fish stock assessment methodology is currently conducted in U.S. marine laboratories (some reference is also made to freshwater fisheries, but this is limited). Outputs from stock assessment models form the basis upon which fisheries management organizations control commercial catches and develop regulations. Thus, the findings are very important to the safeguarding of U.S. marine fisheries. The report was authored by an 11-member NRC committee comprised primarily of academics who are well trained in quantitative mathematics.

The committee reviewed stock assessment models and compared them, using actual and simulated data to test sensitivity and robustness. U.S. fish stock assessment scientists were asked to conduct blind runs of simulated data sets using five different models. Certain features included in the simulations were aging error, fishery catchability changes, age selectivity differences, age at 50% maturity higher than age at 50% selectivity to the fishery, survey gear with a dome-shaped selectivity function, natural mortality variation, and inaccurate catch statistics.

Of the many findings, it was shown that trends in fishery catch rates and aging errors can seriously affect advice. Perhaps most worrisome were the observations that abrupt changes in abundance (both stock declines and recoveries) were not detected quickly enough using current stock assessment methodology. This shortcoming results in overharvesting of rapidly declining stocks. Stock assessment methodology that incorporates uncertainty (such as Bayesian methods) are recommended for future work.

Although the assumption of natural mortality (M=0.2) was clearly dealt with, there was a failure by the committee to consider the assumptions inherent in spawning stock biomass (SSB)—its representation of stock reproductive potential. Considering that U.S. fishery harvesting levels are based on SSB (i.e., F_{med} and F_{rep}), the lack of attention to SSB is notable. Specifically, empirical research in the 1990s has shown that SSB overestimates stock reproductive potential in age-truncated stocks exhibiting early maturity. This altered reproductive state of low-density populations should be examined in future analyses. The committee's work is highly commendable, and efforts of a similar nature should be considered by other fishing nations. It is highly advisable that those involved in fish stock assessments be aware of this report.

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PENAEOID AND SERGESTOID SHRIMPS AND PRAWNS OF THE WORLD: KEYS AND DIAGNOSES FOR THE FAMILIES AND GENERA. *Zoologie, Volume 175.*

By Isabel Pérez Farfante and Brian Kensley; illustrated by Molly Kelly Ryan. Paris: Éditions du Muséum. $58.00. 233 p; ill.; index to taxa. ISBN: 2-85653-510-0. 1997.

Most shrimps and prawns of commercial value are active swimmers, and groups of adults often form dense aggregations, a behavior that contributes to their exploitation. Commercially important species of *Macrobrachium*, solitary caridean shrimps that can be cultured in freshwater ponds, are the nonaggregating exceptions. Boreal pandalids are the only aggregating marine carideans for which there is a large fishery. The remaining and commercially most important shrimps belong to the Penaeidae and Sergestidae, are two of the seven families of dendobranchiate decapods discussed in this valuable volume about shrimp taxonomy.

The backbone of the volume consists of contemporary diagnoses of the 56 genera and the seven families. A representative species (usually the type species) of each genus is diagnosed. A list of the valid species and subspecies follows each generic diagnosis, but the authors do not attempt to describe or differentiate the more than 500 species among the seven families. A thorough synonymy of each generic name, carefully linked to the cited literature, is an excellent work of historical scholarship. Information is provided about the type species, including the locality of its capture and gender of the Latin word from which the genus name was derived. Remarks inexplicably are limited to a few genera and families. Three new generic names are introduced: *Austropenaeus*, *Megokris* and *Rimapenaeus*. Other nomenclature changes include a new rank for five subgenera, use of two previously synonymized genus names and designation of new authors for a genus name. The illustrated glossary is an invaluable contribution for readers unfamiliar with shrimp skeletal morphology. An index to the taxonomic names is complete. Keys to the superfamilies, families and genera round out the volume.

Detailed illustrations of characters considered taxonomically important in distinguishing species are carefully drafted. These characters are exoskel-

etal structures used by the male to transfer spermatophores to the female, and by the female to store transferred spermatophores. The morphological diversity of these structures has been documented exactingly by the senior author, and supports our understanding that selection, presumably by the opposite sex, on secondary sex characters is an expression of the speciation process among these crustaceans.

A second type of illustration, a lateral view of the representative species, was executed by Molly Kelly Ryan, an illustrator with the National Museum. Crustacean taxonomy is a comparative morphology of parts (body somites, appendage segments). Ryan's elegant illustrations remind readers of the remarkable morphological diversity represented by the entire shrimp.

Both authors have contributed significantly to the development of the National Museum's crustacean collection, which is the most important collection in the world today. This volume provides a wonderful testimony to the results of that development and to the scientific value of the collection.

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A COMPREHENSIVE PHYLOGENETIC STUDY OF AMIID FISHES (AMIIDAE) BASED ON COMPARATIVE SKELETAL ANATOMY. *An Empirical Search for Interconnected Patterns of Natural History. Society of Vertebrate Paleontology, Memoir 4.*

By Lance Grande and William E Bemis. Chicago (Illinois): Society of Vertebrate Paleontology. $75.00. x + 690 p + 2 foldouts; ill.; taxonomic and subject indexes. ISSN: 0272-4634. [Supplement to *Journal of Vertebrate Paleontology*, Volume 18, Number 1.] 1998.

The clade of ray-finned fishes (Actinopterygii) comprises roughly half of all vertebrates, with about 24,000 species. The vast majority of ray-finned fish species are contained in the Teleostei, a clade noted for its diversity of behavior, functional morphology, and ecology in aquatic habitats throughout the world. One of the keys to understanding the origin of teleost fishes are analyses of outgroup clades: nonteleost ray-finned fishes that retain plesiomorphic traits and hence provide considerable insight into the early evolution of ray-finned fishes. Unfortunately, very few such clades are available for analysis. Polypterids, sturgeons, paddlefishes, and gars are notable basal clades, as are the amiid fishes described in detail in this extensive monograph. Given the biological importance of these basal ray-finned fish clades, it is remarkable how little is known about relatively accessible features such as the anatomical structure of extant species. In a previous monograph, Grande and Bemis described the skeletal anatomy and phylogenetic relationships of paddlefishes, and in this volume they have undertaken a remarkably detailed and comprehensive overview of the amiid clade.

Although the family Amiidae has only one living species (the endemic North American bowfin *Amia calva*), four subfamilies are known from fossils that exhibit considerable morphological diversity. Grande and Bemis provide extremely detailed descriptions of skeletal anatomy in all amiid fishes, with considerable attention paid to variation and ontogeny of skeletal traits. The book concludes with a phylogenetic analysis. This volume is profusely illustrated and many of these figures consist of photographs side by side with detailed interpretive illustrations. Although the specifics of the descriptive work will be of interest mainly to those working on fish anatomy and phylogeny, the main lesson of this volume is the stunning amount of comparative data that can be obtained from a study of even one anatomical system. Grande and Bemis demonstrate convincingly the value of a detailed analysis of morphological systems and the thousands of characters that can be extracted from such an analysis. Biologists interested in understanding the value of comprehensive morphological analysis and its lasting contribution to understanding organismal design should peruse this book.

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FOULING ORGANISMS OF THE INDIAN OCEAN: BIOLOGY AND CONTROL TECHNOLOGY.

Edited by Rachakonda Nagabhushanam and Mary Frances Thompson. Rotterdam and Brookfield (Vermont): A. A. Balkema. $185.00. ix + 538 p; ill.; organism index. ISBN: 90-5410-739-1. 1997.

This book falls broadly into two sections and, like the curate's egg, it is good in parts. The first section consists of six chapters, starting with an overview of Indian research efforts on marine wood-boring and fouling organisms (Nagabhushanam and Sarojini) and progressing through five chapters that deal respectively with biological and technical aspects of marine aufwuchs (Wahl), natural antifouling compounds (Targett), succession in microfouling communities (Little and Wagner), chemical cues in larval settlement (Slattery) and biofouling control (Nair et al.). These five authoritative review chapters, written by internationally acclaimed experts in the field, are the real strength of the book. They are well written and clearly illustrated, and will be of considerable value to anyone with an interest in marine biofouling.

The second section, consisting of ten chapters and comprising well over half the total length of