

## New NMFS Scientific Reports Published

Some publications listed below may be sold by the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402. Copies of all are sold by the National Technical Information Service, Springfield, VA 22151. Writing to either agency prior to ordering is advisable to determine availability and price (prices may change and prepayment is required).

NOAA Technical Report NMFS 14. Dadswell, Michael J., Bruce D. Taubert, Thomas S. Squiers, Donald Marchette, and Jack Buckley. "Synopsis of biological data on shortnose sturgeon, *Acipenser brevirostrum* LeSueur 1818." October 1984, iv + 45 p., 43 figs., 24 tables.

### ABSTRACT

Information on the biology and populations of the shortnose sturgeon, *Acipenser brevirostrum*, is compiled, reviewed, and analyzed in the FAO species synopsis style. New information indicates this species exhibits biological and life-cycle differences over its north-south latitudinal range and that it is more abundant than previously thought.

NOAA Technical Report NMFS 15. Michel, Harding B. "Chaetognatha of the Caribbean Sea and adjacent areas." October 1984, iv + 33 p., 41 figs., 5 tables.

### ABSTRACT

This illustrated manual is a guide to the distribution and identification of the 6 genera and 28 species of benthic and planktonic Chaetognatha known to occur in the Caribbean Sea, the Gulf of Mexico, the Florida Straits, and the southwestern North Atlantic Ocean. As background, previous studies of chaetognaths in these areas are reviewed, gross morphology of the different forms is described, and in-

structions on methods of preserving and handling specimens preparatory to identification are provided. The key to genera and species is preceded by a discussion of chaetognath taxonomy. A description of each species, consisting of an abbreviated synonymy, a summary of taxonomically important morphological features, and horizontal and vertical distribution follows the key. The occurrence of species in relation to water masses in the Caribbean and adjacent areas is noted.

NOAA Technical Report NMFS 16. Sindermann, Carl J. (editor). "Proceedings of the Ninth and Tenth U.S.-Japan Meetings on Aquaculture." November 1984, 92 p. (11 papers.)

NOAA Technical Report NMFS 17. Wolff, Gary A. "Identification and estimation of size from the beaks of 18 species of cephalopods from the Pacific Ocean." November 1984, iv + 50 p., 55 figs., 3 tables.

### ABSTRACT

A method of identifying the beaks and estimating body weight and mantle length of 18 species of cephalopods from the Pacific Ocean is presented. Twenty specimens were selected from each of the following cephalopod species: *Symplectoteuthis oualaniensis*, *Dosidicus gigas*, *Ommastrephes bartramii*, *S. luminosa*, *Todarodes pacificus*, *Nototodarus hawaiiensis*, *Ornithoteuthis volatilis*, *Hyaloteuthis pelagica*, *Onychoteuthis banksii*, *Pterygioteuthis giardi*, *Abraliopsis affinis*, *A. felis*, *Liocranchia reinhardti*, *Leachia danae*, *Histioteuthis heteropsis*, *H. dofleini*, *Gonatus onyx*, and *Loligo opalescens*. Dimensions measured on the upper and lower beak are converted to ratios and compared individually among the species using an analysis of variance procedure with Tukey's omega and Duncan's multiple range tests. Significant differences ( $P = 0.05$ ) observed among the species' beak ratio means and structural characteristics are used to construct artificial keys for the upper and lower beaks

of the 18 species. Upper and lower beak dimensions are used as independent variables in a linear regression model with mantle length and body weight (log transformed).

NOAA Technical Report NMFS 18. Wenner, E. L., P. Hinde, D. M. Knott, and R. F. Van Dolah. "A temporal and spatial study of invertebrate communities associated with hard-bottom habitats in the South Atlantic Bight." November 1984, iii + 104 p., 6 figs., 8 tables, 3 app.

### ABSTRACT

Species composition, biomass, density, and diversity of benthic invertebrates from six hard-bottom areas were evaluated. Seasonal collections using a dredge, trawl, and suction and grab samplers yielded 432,525, and 845 taxa, respectively. Based on collections with the different gear types, species composition of invertebrates was found to change bathymetrically. Inner- and middle-shelf sites were more similar to each other in terms of invertebrate species composition than they were to outer-shelf sites, regardless of season. Sites on the inner and outer shelf were grouped according to latitude; however, results suggest that depth is apparently a more important determinant of invertebrate species composition than either season or latitude. Sponges generally dominated dredge and trawl collections in terms of biomass. Generally, cnidarians, bryozoans, and sponges dominated at sites in terms of number of taxa collected.

The most abundant smaller macrofauna collected in suction and grab samples were polychaetes, amphipods, and mollusks. Densities of the numerically dominant species changed both seasonally and bathymetrically, with very few of these species restricted to a specific bathymetric zone.

The high diversity of invertebrates from hard-bottom sites is attributed to the large number of rare species. No consistent seasonal changes in diversity or number of species were noted for individual stations or depth zones. In addition,  $H'$  and its components showed no definite patterns related to depth or latitude. However, more species were collected at middle-shelf sites than at inner- or outer-shelf sites, which may be related to more stable bottom temperature or greater habitat complexity in that area.

NOAA Technical Report NMFS 19. Darcy, George H. "Synopsis of biological data on the spottail pinfish, *Diplodus holbrookii* (Pisces:

**Sparidae).**" January 1985, iv + 11 p., 8 figs.

#### ABSTRACT

Information on the biology and fishery resources of the spottail pinfish, *Diplodus holbrooki*, is compiled, reviewed, and analyzed in the FAO species synopsis style.

### **Fish and Fisheries in Contaminated Water**

Publication of "**Contaminant Effects on Fisheries**," edited by Victor W. Cairns, Peter V. Hodson, and Jerome O. Nriagu, has been announced by John Wiley & Sons, Inc., 605 Third Avenue, New York, NY 10158, as Volume 16 in the Wiley Series in Advances in Environmental Science and Technology. In it, a number of leading toxicologists and fisheries biologists from Canada and the United States review and examine the bioaccumulation, metabolism, and excretion of toxicants by fish, the effects of those toxicants on certain fisheries, and recommend additional studies.

The book addresses the tolerance of fish and fish populations to the stress of environmental alterations, and covers the changes in the biochemical and physiological systems associated with exposure to common toxicants. Epidemiology of fish diseases induced by toxicants is reviewed, and strategies for reestablishing disturbed fisheries are outlined.

Portions of the book are derived from a Great Lakes Fishery Commission workshop which was convened to discuss suitable methods for assessing the effects of contaminants on wild fish populations. The first two chapters provide a background to Great Lakes chemical and fisheries problems and introduce the basic concepts of epidemiology.

Other chapter topics include epidemiology of diseases in wild fish populations, a critique of the use of histopathology in aquatic toxicology, biochemical indicators of stress in fishes, fish serum chemistry as a pathology tool, using physiological

tests to measure fish health, monitoring lead exposure of fish, a review of metallothionein and fish acclimation to heavy metals, the adenylate energy charge as a measure of stress in fish, problems and methods of monitoring fish tolerance to environmental stress, modeling approaches for assessing the effects of stress on fish populations, and more. Thus, it provides a comprehensive review on the impacts of water pollutants on fishes and fish culture. The 333-page hardbound volume is available from the publisher for \$69.95.

### **Marine, Freshwater Research Methods**

The second edition of IBP Handbook 16, "**Methods for the Study of Marine Benthos**," edited by N. A. Holme and A. D. McIntyre, has been published by Blackwell Scientific Publications, Inc., The Downing House, 706 Cowper Street, Palo Alto, CA 94301. The handbook deals primarily with the sampling and study of sediments and their biota from the intertidal zone to the deep sea, and reflects much of the changing needs and directions of such studies in the 12 years since the original edition was published; many of the contributions have been considerably revised or completely rewritten.

Included are chapters discussing the design of sampling programs, position fixing of ship and gear, sediment analysis, photography and television, diving, macrofauna techniques, meiofauna techniques, phytobenthos sampling and estimation of primary production, and energy flow measurements. Each chapter also includes many references necessary to provide precise details on the various techniques and studies. Thus, the volume is a good general guide to the equipment and techniques used in studying marine benthos. Indexed, the 387-page hardbound volume is available from the publisher for \$44.00.

Publications of "**Methods in Marine Zooplankton Ecology**," by Makoto Omori and Tsutomu Ikeda,

has been announced by John Wiley & Sons, Inc., 605 Third Avenue, New York, NY 10158. Omori is with the Tokyo University of Fisheries and Ikeda is with the Antarctic Division of Australia's Department of Science and Technology. This is a basic book encompassing the principles, procedures, research problems, and current methods used in the study of marine zooplankton, and is a revision (based on a translation) of the authors' previous book "Methods in Zooplankton Ecology," published by Kyoritsu Shuppan, Tokyo, in Japanese in 1976.

The authors begin with a definition and ecological classification of zooplankton, then review and describe sampling methods, sample fixation and preservation, zooplankton observation and identification, processing and measurements, rearing and culture, feeding; measuring respiration, excretion, and productivity; and distributional patterns and community structure. Thus, the volume provides a sound, basic introduction to zooplankton and a review of field sampling strategies and laboratory methods for students and biologists. Indexed, the 332-page volume is available from the publisher for \$44.95.

"**A Manual on Methods for the Assessment of Secondary Productivity in Fresh Waters**," Second Edition, edited by John A. Downing and Frank H. Rigler, has been published by Blackwell Scientific Publications, Inc., The Downing House, 706 Cowper Street, Palo Alto, CA 94301. The handbook is a good summarization of current literature and synthesis of recent technical progress, and deals with such topics as methods for estimating zooplankton abundance, sampling stream and standing water benthos, sampling aquatic insect emergence, estimating abundance and biomass of zooplankton in samples, statistical methods for experiment design and sample analysis, methods of studying zooplankton feeding, filtering, and assimilation, and respiration measurement. With author, taxonomic, and subject in-

dexes, the 501-page hardbound volume is available from the publisher for \$55.00.

## Charting and Navigation for Commercial Fishermen

Four handbooks of interest to marine vessel operators have been published by the Cornell Maritime Press (CMP), P.O. Box 456, Centreville, MD 21617. The first, **"Chartwork and Marine Navigation for Fishermen and Boat Owners"** by Geoff A. Motte with Thomas M. Stout, is an updating of two earlier URI Sea Grant manuals for fishermen. Part I, provides an introduction to chartwork, basic definitions for fixing position near land, reading a chart (symbols and abbreviations), general chart layout and construction, distance, the running fix, magnetism of earth and vessel, the compass and its use, chart projections, practical chartwork, the marine sextant, etc., providing readers with clear and concise step-by-step instructions in small-boat navigation skills.

Part II, Section 1, Marine Navigation, presents basic principles (data on the solar system, earth motion, moon motion, the stars, and instruments and sextant angles), while Section 2, Practical Navigation, gives data on azimuth and amplitude, latitude by meridian altitude, the Pole Star, celestial position line, three methods of sight reduction, fixing position, etc. In sum, the authors have presented a handy, well-illustrated reference to nautical astronomy and the primary approaches to sight reduction. In addition, hyperbolic grid concept and the Loran C system is explained, and practical exercises included are aimed at the conditions and situations likely to be encountered by fishermen and small-boat operators. Paperbound, the 173-page volume is available from the publisher for \$11.50.

**"Concise Tables for Sight Reduction"**, by Thomas D. Davies, is the third navigational table that the author, a retired rear admiral, USN,

has developed. Earlier ones were "Star Sight Reduction Tables" and the "Sight Reduction Tables for Sun, Moon, and Planets" in which he introduced his "assumed latitude method of celestial navigation." In this new handbook, complete sight reduction is accomplished by the manipulation of six angles extracted from a very small set of tables (30 pages), with an accuracy superior to most other tables. Calculations are simple and speedy and present a simple method for eliminating errors from the use of an assumed position. The volume also contains a "Long Term Almanac" by which one can reduce star or sun sights when the current "Almanac" is not available. The 64-page paperbound volume costs \$8.50.

**"Celestial Navigation Planning"** by Leonard Gray is a complete guide to precruise planning intended to save time at sea and improve navigation results that would be useful under less than optimum, or even survival, conditions. A basic knowledge of celestial navigation is assumed and, through detailed and worked-out examples, instructions, and illustrations, the author provides formulas for storm avoidance maneuvers, average boat speed, backup sight reduction, noon-sight computation, and a celestial navigation program for a programmable calculator.

Topics covered include planning the best departure dates and routes; a format for daily navigation guides for twilight sights, sun-and-moon fixes during the day and sights during the night, weather advice, planning for error reduction and landfall, etc. While the examples deal with a sailing cruise, elements of the system can also be used by recreational and commercial fishing vessels. Appendixes include necessary formulas, suggested publications, a glossary, excerpts from *Nautical Almanac* and H.O. 249, Vol. 1, a comparison of sight-reduction methods, and a sight-reduction form for H.O. 249 or H.O. 229, and more. The handy, indexed 133-page paperbound volume is available from the publisher for

\$12.95.

The new **"Yachting Signal Book"** by J. R. Collier, Capt., USN (Ret.), provides a universal code of signals primarily for recreational boaters, but with its emphasis on encoding and decoding flags and radio signals to relay messages between vessels, has broader interest, too.

Following a lengthy chapter on definitions and instructions is a second on emergency signals and signaling. Other chapters detail one- and two-letter signals, flag and pennant meanings, and flag use and etiquette. The author also provides an encoding directory, important extracts from the International Code of Signals, a color guide to special and international flag and pennant meanings, plus an encoding directory, and important extracts from the International Code of Signals. The 118-page hardbound volume is sold by the publisher for \$17.50. In addition, a catalog of CMP and Tidewater Publishers titles on navigation, fishing vessels, oceanography, safety, conservation, and related maritime titles is available.

## Canada's Atlantic Coast Fisheries and Management

Publication of **"Atlantic Fisheries and Coastal Communities: Fisheries Decision-Making Case Studies,"** edited by Cynthia Lamson and Arthur J. Hanson, has been announced by Dalhousie Ocean Studies Programme, 1321 Edward Street, Halifax, Nova Scotia, Canada. In short, this series of case studies relates the story of Canada's relatively recent Atlantic fishing industry expansion and contraction and the effects it has had on local communities, and the authors' attempt to draw several conclusions from them. It provides a perspective on fisheries management and community response to increased government intervention and regulation. Case studies related include management of Canada's offshore groundfisheries, bluefin tuna, Bay of Fundy herring fisheries, Newfound-

land inshore fishery, small boat fishery of Southwest Nova Scotia, and the consolidation of corporate power in the Nova Scotia fish processing industry.

The authors use those cases to explore the many complexities involved

in fisheries decision making in Canada's Atlantic fisheries sector, and the effects of those decisions on the fishermen, communities, and processors. They also discuss the processes involved in making fisheries decisions and the perceived need to in-

volve fishermen and communities more in helping make those decisions. The paperbound volume is available from The Institute for Resource and Environmental Studies, 1312 Robie Street, Halifax, Nova Scotia, Canada, B3H 3E2 for \$18.50.

## Biology and Culture of Red Swamp Crawfish

An updated edition of "**Red Swamp Crawfish: Biology and Exploitation**" by J. V. Huner and J. E. Barr has been published by the Louisiana Sea Grant College Program, Center for Wetland Resources, Baton Rouge, LA 70803-7507. From 30 to 60 million pounds of the red or red swamp crawfish, *Procambarus clarkii*, are harvested each year, mostly in Louisiana, though the species has been successfully introduced to both U.S. coasts, the West Indies, Central and South America, Europe, Africa, Hawaii, and Japan, and, perhaps, China.

General crawfish biology—external and internal anatomy and physiology—is reviewed, as is crawfish classification, zoogeography, and distribution of *P. clarkii*, as well as the species' ecological relationships. Also discussed are specific microbial and protozoan diseases, internal and external parasites, and other conditions (i.e., uropod swellings, gas-bubble disease, soft-shell syndrome, hollow-tail syndrome, etc.).

Another section reviews production of wild and domestic red crawfish, their harvest, holding, live shipping and storage, processing and marketing, management (particularly in Louisiana's Atchafalaya basin), and population estimation. Finally, history and techniques of crawfish culture are described, including data on economics, pond types and construction, and water problems and management. Also included is information on feeds and fertilizers, pond crawfish population dynamics, rice/crawfish culture, and crawfish/fish polyculture, and more.

Three applications give data on other species of crawfish suitable for cultivation, a sample problem for calculating age classes and average sizes in a pond, and calculation of crawfish populations. Literature is not cited specifically in the text, but extensive references are listed by topic (general biology, diseases, taxonomy/zoogeography, ecology, etc.). The volume thus gives an in-depth look at the red swamp crawfish in a nontechnical, well-written book useful to students, aquaculturists, and others. The 136-page paperbound publication, LSU T-83-002, is available from the publisher at \$10.00.

## Fisheries Development in Third World Nations

Publication of "**Economics of Fisheries Development**" by Rowena Lawson has been announced by Praeger Publishers, 521 Fifth Avenue, New York, NY 10175. The author, Emeritus Reader in Development Economics, University of Hull, is currently a consultant in fisheries development, and her book reflects her emphasis and interest in fisheries development in the so-called developing nations, especially those with fairly new and large EEZ's.

The author begins with an overview and analysis of the state of world fisheries and the economic theory of fish resource exploitation. She then discusses marine fisheries management, fish marketing and processing and the economics of the fish market, planning for fisheries development, institutional arrangements for developing EEZ's, government initiated projects for fisheries development

(feasibility studies and project formulation, analysis, appraisal, and evaluation), and development opportunities (small-scale fisheries, export-oriented fisheries, and aquaculture), with case studies drawn almost entirely from developing nations.

Appendices provide data on fishery organizations, CECAF terms, management term definitions, criteria for appraisal and review of fisheries projects, and a list of Canada's societal goals, policy objectives, and strategies for fishery management. Thus, the book constitutes an introductory text to the theoretical principles of fisheries economics and management and relates them to the fisheries of developing countries. Indexed, the 283-page hardbound volume is available from the publisher for \$28.95.

## Pacific Salmon Marketing

"**Uncertainty, Market Disequilibrium, and the Firm's Decision Process: Applications to the Pacific Salmon Market,**" by Rebecca J. Lent, has been published by the Oregon State University Sea Grant College Program, AdS 418, Corvallis, OR 97331, as ORESU-T-84-002. The author has provided a model of the short-run decision-making behavior of buyers and sellers of Pacific salmon at the wholesale level to improve the understanding of this important salmon market and how it functions. She reviews pertinent literature on uncertainty and market disequilibrium, Pacific salmon production and markets, and concludes with recommendations for future research. The 109-page paperbound volume is available free from the publisher.