

New NMFS Technical Reports Published

NOAA Technical Report NMFS 58. Vaughan, Douglas S. "Stock Assessment of the Gulf Menhaden, *Brevoortia patronus*, Fishery." September 1987, iii + 18 p., 19 figs., 14 tables.

ABSTRACT

A stock assessment of the Gulf menhaden, *Brevoortia patronus*, fishery was conducted with data on purse-seine landings from 1946 to 1985 and port sampling data from 1964 to 1985. These data were analyzed to determine growth rates, yield-per-recruit, spawner-recruit relationships, and maximum sustainable yield (MSY). Virtual population analysis was used to estimate stock size, year-class size, and fishing mortality rates. During the period studied an average of 27 percent of age-1 fish and 55 percent of age-2 and age-3 fish were taken by the fishery, and 54 percent for age-1 and 38 percent for age-2 and -3 fish were lost annually to natural causes.

Annual yield-per-recruit estimates ranged from 6.9 to 19.3 g, with recent mean conditions averaging 12.2 g since 1978. Surplus production models produced estimates of MSY from 620 to 700 kilometric tons. Recruits to age-1 ranged from 8.3 to 41.8 billion fish for 1964-82. Although there was substantial scatter about the fitted curves, Ricker-type spawner-recruit relationships were found suitable for use in a population simulation model. Estimates of MSY from

population simulation model runs ranged from 705 to 825 kilometric tons with F -multiples of the mean rate of fishing ranging from 1.0 to 1.5.

Recent harvests in excess of the historical MSY may not be detrimental to the Gulf menhaden stock. However, one should not expect long-term harvesting above the historical MSY because of the short life span of Gulf menhaden and possible changes from currently favorable environmental conditions supporting high recruitment.

NOAA Technical Report NMFS 59. Smith, Joseph W., William R. Nicholson, Douglas S. Vaughan, Donnie L. Dudley, Ethel A. Hall. "Atlantic Menhaden, *Brevoortia tyrannus*, Purse Seine Fishery, 1972-84, With a Brief Discussion of Age and Size Composition of the Landings." September 1987, iii + 23 p., 3 figs., 12 tables, 14 appendix tables.

ABSTRACT

This report summarizes (1) annual purse seine landings of Atlantic menhaden, *Brevoortia tyrannus*, for 1972-84, (2) estimated numbers of fish caught by fishing area, (3) estimates of nominal fishing effort and catcher-unit-effort, (4) mean fish length and weight, and (5) major changes in the fishery. During the 1970's stock size and recruitment

increased and the age composition broadened, reversing trends witnessed during the fishery's decline in the 1960's. Landings steadily improved and by 1980 the total coastwide landings exceeded 400,000 metric tons. Nevertheless, the character of the fishery changed considerably. Eleven reduction plants processed fish at seven ports in 1972, but in 1984 only eight plants operated at five ports. Beginning in the mid-1960's the center of fishing activity shifted from the Middle Atlantic area to the Chesapeake Bay area, which has continued to dominate the fishery in landings and effort through the 1970's and 1980's. During this period the average size and age of fish in the catches declined.

NOAA Technical Report NMFS 60. Smith, Joseph W., Eldon J. Levi, Douglas S. Vaughan, and Ethel A. Hall. "Gulf Menhaden, *Brevoortia patronus*, Purse Seine Fishery, 1974-85, With a Brief Discussion of Age and Size Composition of the Landings." December 1987, iii + 8 p., 1 fig., 8 tables, 2 appendix tables.

ABSTRACT

Routine biostatistical port sampling data and landings records collected from the Gulf menhaden purse seine fishery between 1974 and 1985 are updated. During most of the period, a total of 11 menhaden reduction plants operated in Mississippi and Louisiana, and the number of vessels in the purse seine fleet varied from 71 to 82. Total annual landings ranged from 447,100 metric tons in 1977 to the record landings for the fishery of 982,800 metric tons in 1984. Age-1 and -2 Gulf menhaden annually comprised almost 96 percent of the landings. Estimated total numbers of menhaden landed varied from 4,510.5 million in 1975 to 11,154.9 million in 1985. Annual mean lengths and weights of sampled fish-at-age showed little variation. Nominal or observed fishing effort gradually

How to Leave a Stricken Vessel

"How to Abandon Ship" by Phil Richards and John J. Banigan, a popular wartime (WWII) handbook, has been reprinted by Cornell Maritime Press, Inc., P.O. Box 456, Centreville, MD 21617, as one of the Press' 50th Anniversary Commemorative Editions. Some of the information is, of course, dated, but much is timeless. Besides

telling how to safely get off a vessel, it provides instructions on sea survival, navigation, seamanship, life rafts, medical needs, as well as tips on combatting thirst and hunger, icy weather, and maintaining morale.

Obviously out-of-date is the first aid material. However, the volume still has a lot of useful advice, particularly as regards preparedness: "Most casualties at sea are actually the result of panic, which is the result of ignorance." The

basics of sea survival seem eternal, and this is an interesting and historic look at the topic that draws on some hard-earned knowledge. As the senior author wrote, "This manual is the result of open boat experience in the time of stress, danger, and sudden death. It contains no armchair theory. It is a digest of the lessons learned by the survivors of torpedoed ships." Paperbound and indexed, the small 152-page handbook is available from the publisher for \$6.95.

increased through the 1970's and 1980's, reaching 655,800 vessel-ton-weeks in 1983.

NOAA Technical Report NMFS 61. Aebersold, Paul B., Gary A. Winans, David J. Teel, George B. Milner, and Fred M. Utter. "Manual for Starch Gel Electrophoresis: A Method for the Detection of Genetic Variation." December 1987, iii + 19 p., 8 figs., 1 table, 2 appendices.

ABSTRACT

The procedure to conduct horizontal starch gel electrophoresis on enzymes is described in detail. Areas covered are 1) collection and storage of specimens, 2) preparation of tissues, 3) preparation of a starch gel, 4) application of enzyme extracts to a gel, 5) setting up a gel for electrophoresis, 6) slicing a gel, and 7) staining a gel. Recipes are also included for 47 enzyme stains and 3 selected gel buffers.

NOAA Technical Report 62. Martin, Cynthia S., Shelley E. Arenas, Jacki A. Guffey, Joni M. Packard. "Fishery Publication Index, 1980-85 Technical Memorandum Index, 1972-85." December 1987, iii + 149 p.

ABSTRACT

The following series of fishery publications produced in calendar years 1980-85 by the Scientific Publications Office of the U.S. National Marine Fisheries Service (NMFS) are listed numerically and indexed by author

and subject: Circular, *Fishery Bulletin*, *Marine Fisheries Review*, Special Scientific Report-Fisheries, and Technical Report NMFS. Also included is an alphanumeric listing of the NOAA Technical Memorandum NMFS series published in calendar years 1972-85 by NMFS regional offices and fisheries research centers. Authors and subjects for the Memorandum series are indexed with the other publication series.

NOAA Technical Report NMFS 63. Vaughan, Douglas S., and Joseph W. Smith. "Stock Assessment of the Atlantic Menhaden, *Brevoortia tyrannus*, Fishery." January 1988, iii + 18 p., 17 figs., 13 tables.

ABSTRACT

A stock assessment of the Atlantic menhaden, *Brevoortia tyrannus*, fishery was conducted with purse-seine landings data from 1940 to 1984 and port sampling data from 1955 to 1984. These data were analyzed to determine growth rates, maximum sustainable yield (MSY), spawner-recruit relationships, and yield per recruit. Virtual population analysis was used to estimate stock size, year class size, and fishing mortality rates.

Surplus production models produced estimates of MSY from 450 to 490 kmt compared with yields of 416 to 436 kmt based roughly on maximum recruitment from a weak spawner-recruit relationship. Recruitment to age-1 ranged from 1.2 to 14.8 billion fish for year classes 1955-81. Recent mean recruitment to age-1 for the 1975-81 year classes averaged 5.7 billion fish and compared favorably with the mean of 7.7 billion age-1 fish recruited during the late 1950's. Mean recruitment from recent years suggests possible coastwide yields of 416 to 481 kmt.

Continued dominance of late age-2 spawners among the spawning stock is of concern, since the stock is at greater risk through poor recruitment if recent favorable environmental conditions change.

Yield-per-recruit estimates ranged from 46 g to 59 g since 1970. The high dependency of the modern fishery on prespawners has increased concerns about fluctuations in year-to-year availability and catches. To increase yield and enhance the stability of the resource, the number of age classes contributing significantly to the fishery should be increased, creating a buffer against future poor recruitment years and lessening the year-to-year fluctuations in landings.

NOAA Technical Report NMFS 64. Farfante, Isabel Perez. "Illustrated Key to Penaeoid Shrimps of Commerce in the Americas." April 1988, iii + 32 p., 49 figs.

ABSTRACT

The commercially important species of penaeoid shrimps comprise 4 families, 12 genera, and 37 species in the Americas. This key is supported by 49 figures including lateral views of whole shrimps in 10 of the 12 genera and detailed figures of male (petasma) and female (thelycum) genital structures of the species. A glossary of terms used in shrimp taxonomy plus a bibliography of references useful in identifying shrimps are included.

NOAA Technical Report NMFS 65. Reeves, Randall R., and Edward Mitchell. "History of Whaling in and Near North Carolina." March 1988, iii + 28 p., 10 figs., 5 tables.

Studies in the Early Life History of Fishes

An attempt to compile an initial listing of articles and reports on marine recreational fisheries (MFR 49(2)) and on marine fisheries history (MFR 50(4)), makes it easier to understand the frustrations some have with the use of computerized databases, particularly for locating more obscure references and "gray" literature or informal publications. Some databases do not go back very far, some references are listed erroneously, some are missing, some are listed under the wrong categories, and

printouts often contain many useless items.

To avoid such problems, Robert D. Hoyt of the Department of Biology, Western Kentucky University, Bowling Green, KY 42101, has compiled in one handy reference "A Bibliography of the Early Life History of Fishes." An immense amount of work has gone into this publication and the result—an indexed two-volume listing of nearly 14,000 titles—should be a great help for those working in this field. Beginning with a database provided by R. Kernehan of the AFS Early Life History Section, Hoyt consulted several other data-

bases, surveyed existing bibliographies, and visited six major fisheries research institutions in the United States and Scotland to make detailed searches of their holdings of early life history literature in the summer of 1987. Indexed, cross-referenced, and easy to use, this two-volume set provides a comprehensive reference guide to the literature relating to the early life history of fishes for ichthyologists and fisheries libraries.

The literature (Volume I) is listed alphabetically by author, and includes 7,500 citations published since 1970; it is current to about summer 1987. Only 22 of the citations were undated; 10,166

ABSTRACT

This study reconstructs the history of shore whaling in the southeastern United States, emphasizing statistics on the catch of right whales, *Eubalaena glacialis*, the preferred target. The earliest record of whaling in North Carolina is of a proposed voyage from New York in 1667. Early settlers on the Outer Banks utilized whale strandings by trying out the blubber of carcasses that came ashore, and some whale oil was exported from the 1660's onward. New England whalers whaled along the North Carolina coast during the 1720's, and possibly earlier. As some of the whalers from the northern colonies moved to North Carolina, a shore-based whale fishery developed. This activity apparently continued without interruption until the War of Independence in 1776, and continued or was reestablished after the war. The methods and techniques of the North Carolina shore whalers changed slowly: As late as the 1890's they used a drogue at the end of the harpoon line and refrained from staying fast to the harpooned whale, they seldom employed harpoon guns, and then only during the waning years of the fishery.

The whaling season extended from late December to May, most successfully between February and May. Whalers believed they were intercepting whales migrating north along the coast. Although some whaling occurred as far north as Cape Hatteras, it centered on the outer coasts of Core, Shackleford, and Bogue banks, particularly near Cape Lookout. Capture of whales other than right whales was rare. The number of boat crews probably remained fairly stable during much of the 19th century, with some increase in effort in the late 1870's and early 1880's when numbers of boat crews reached 12-18. Then by the late 1880's and 1890's only about 6 crews were active. North Carolina

whaling had become desultory by the early 1900's, and ended completely in 1917.

Judging by export and tax records, some ocean-going vessels made good catches off this coast in about 1715-30, including an estimated 13 whales in 1719, 15 in one year during the early 1720's, 5-6 in a 3-year period of the middle to late 1720's, 8 by one ship's crew in 1727, 17 by one group of whalers in 1728-29, and 8-9 by two boats working from Ocracoke prior to 1730. It is impossible to know how representative these fragmentary records are for the period as a whole. The Carolina coast declined in importance as a cruising ground for pelagic whalers by the 1740's or 1750's. Thereafter, shore whaling probably accounted for most of the (poorly documented) catch.

Lifetime catches by individual whalers on Shackleford Banks suggest that the average annual catch was at least one to two whales during 1930-80, perhaps about four during the late 1870's and early 1880's, and declining to about one by the late 1880's. Data are insufficient to estimate the hunting loss rate in the Outer Banks whale fishery.

North Carolina is the only state south of New Jersey known to have had a long and well established shore whaling industry. Some whaling took place in Chesapeake Bay and along the coast of Virginia during the late 17th and early 18th centuries, but it is poorly documented. Most of the right whales taken off South Carolina, Georgia, and northern Florida during the 19th century were killed by pelagic whalers. Florida is the only southeastern state with evidence of an aboriginal (pre-contact) whale fishery. Right whale calves may have been among the aboriginal whalers' principal targets.

NOAA Technical Report NMFS 66.
Allen, M. James, and Gary B. Smith.
"Atlas and Zoogeography of Common

Fishes in the Bering Sea and North-eastern Pacific." April 1988, iii + 151 p., 4 figs., 8 tables.

ABSTRACT

The geographic and depth frequency distribution of 124 common demersal fish species in the northeastern Pacific were plotted from data on file at the Northwest and Alaska Fisheries Center (NWAFC), National Marine Fisheries Service. The data included catch records of fishes and invertebrates from 24,881 samples taken from the Chukchi Sea, throughout the Bering Sea, Aleutian Basin, Aleutian Archipelago, and the Gulf of Alaska, and from southeastern Alaska south to southern California. Samples were collected by a number of agencies and institutions over a 30-year period (1953-83), but were primarily from NWAFC demersal trawls. The distributions of all species with 100 or more occurrences in the data set were plotted by computer.

Distributions plotted from these data were then compared with geographic and depth-range limits given in the literature. These data provide new range extensions (geographic, depth, or both) for 114 species. Questionable extensions are noted, the depth ranges determined for 95 percent of occurrences, and depths of most frequent occurrence are recorded.

Ranges of the species were classified zoogeographically, according to life zone, and with regard to the depth zone of greatest occurrence. Because most species examined have broad geographic ranges, they do not provide the best information for testing the validity of proposed zoogeographic province boundaries. Because of the location of greatest sampling effort and methods used in sampling, most fishes examined were eastern boreal Pacific, sublittoral bathyal (outer shelf) species.

were published since 1960, and 2,182 were published before 1950. Listed also are 458 titles published prior to 1900. The Index (Volume II) is presented as five Appendices, with four short and simple: B and C, scientific and common names, respectively; D, family name index; and E, location (geographic) index. Appendix A is the huge 404-page subject index ranging from "aberrant gene expression" to "zuger glasses." Like a dictionary, the indexes have header words to identify the starting and ending words for the page.

There are some minor inconsistencies in author's name spellings and in titles,

but that should not be a big problem. Some of the index cross-referencing is not as complete as it could have been, but researchers should be able to overcome that by checking the potential keywords for the topic(s) in which they are interested. The author candidly points out other "shortcomings," such as an incomplete collection of salmonid literature and the limited availability of Japanese, South Pacific, and Russian titles—primarily owing to lack of library holdings and/or English translations. Indeed, the few "shortcomings" in this reference work should be far outweighed by its utility.

It grows ever more difficult to get established publishers to print works like this one, owing to the size, cost, and often a limited audience. Thus, the Author took the unusual move to publish it himself and, all things considered, has done a commendable job. Volume I is 525 pages and Volume II is 448 pages, with plastic binding, paper covers, and the set may be ordered directly from the author, Robert D. Hoyt, Dept. of Biology, Western Kentucky University, Bowling Green, KY 42101 at \$55.00 plus \$5.00 postage for orders outside the United States (make checks payable in U.S. currency or the equivalent).

The Future of the Atlantic Salmon

"Atlantic Salmon: Planning for the Future," edited by Derek Mills and David Piggins, has been published by Timber Press, 9999 S.W. Wilshire, Portland, OR 97225. Mills is with the Department of Forestry and Natural Resources, University of Edinburgh, and Piggins is with The Salmon Research Trust of Ireland; the volume was published on behalf of the Atlantic Salmon Trust. The book presents papers from the Third International Atlantic Salmon Symposium held in Biarritz, France, in October 1986, and constitutes a major international review of the biology, management, and conservation of *Salmo salar*; it should be a useful reference for those interested in or involved with studying or managing the species.

The book's 30 papers are divided into five parts. In Part I, papers of interest include a review of NASCO and progress in salmon management under it, the EEC's approach to international salmon management, and a presentation on steps taken by Canada and the United States in Atlantic salmon protection and restoration. Papers in Part II review the status of exploitation in all areas of the Atlantic salmon's range, and recent management measures for commercial and sport fishing.

Papers in Part III relate problems in obtaining and using catch records, relating catch records to stocks, measuring spawning escapement, salmon stock enhancement, review of a number of salmon restoration programs, and methods of assessing or predicting Atlantic salmon abundance. Part IV reviews the exploitation and migrations of the Atlantic salmon on the high seas and off Greenland, in Faroese waters, and the ocean life of the species in the Northwest Atlantic. Another paper identifies some of the most important gaps in knowledge about the species' marine life and suggests studies to fill in the gaps.

Finally, Part V discusses the important impact of illegal fishing on Atlantic salmon in Norway and Ireland, along with problems associated with seeming-

ly unregulated fishing in certain areas by Native Americans in eastern Canada. Final recommendations include 1) Investigation by NASCO of a salmon tagging scheme for more reliable collection of catch data and better control of illegal fishing; 2) that drift and hang nets (except operations off Greenland) be phased out; 3) that EEC funds be made available to improve and coordinate national salmon fisheries inspectorates; and 4) that each Atlantic salmon nation encourage the introduction of a reasonable daily and season rod-catch quota, prohibit the sale of the catch, and consider the adoption of a "catch and release" philosophy. Finally, the symposium and the book closes with a Resolution: "That each salmon-producing national government is urged to declare a salmon policy which will institute, as a conservation measure in its waters, management programs to reduce commercial harvesting of salmon with a view to increasing salmon stocks and improving recreational salmon fisheries." Indexed, the 587-page hardbound volume is available from the publisher for \$69.95 plus \$3.00 shipping for the first book and \$2.00 for each additional volume.

The Identification of Fish Stocks

The identification of discrete fishery resource units is crucial to the effective fishery management. Toward that end, a workshop was organized by the Panama City Laboratory of the NMFS Southeast Fisheries Center in late 1985 to review and discuss the advances in techniques and equipment for stock identification, and the results have now been published as **"Proceedings of the Stock Identification Workshop,"** Herman E. Kumpf, editor-in-chief. Other members of the editorial committee included Rosalie N. Vaught, Churchill B. Grimes, Allyn G. Johnson, and Eugene L. Nakamura.

The major objective of the workshop was to gain a more comprehensive understanding of stock identification problems and approaches to their solutions,

and the Proceedings should be of wide interest and use to scientists and fishery managers. For the Plenary session invited speakers produced six critical reviews of both traditional and innovative stock identification methods; those contributions received peer reviews and editing. Section two of the proceedings presents 19 abstracts of contributions on innovative techniques and their applications to fishery stock problems. A final section of interest is the panel discussion, including exchanges from the floor of thoughts, ideas, and commentary.

In the lead Plenary Session paper, Brad Brown, George Darcy, and William Overholtz reviewed some of the major marine fishery assessment problems in the southeastern United States related to stock identification, along with some historical stock-assessment/identification interaction case studies. Gary Winans then discussed the use of morphometric and meristic characters for identifying fish stocks, focusing on types of characters, data collection procedures, and statistical analyses, and using examples of his studies of milkfish and chinook salmon.

A paper by Fred Utter outlines the applications of genotypic and allelic data obtained by protein electrophoresis in fish stock identification, and John C. Avise reviews identification and interpretation of mitochondrial DNA stocks in marine species, suggesting fruitful areas for future research. Ronald C. Lundstrom then discusses the potential use of monoclonal antibodies for identification of fish stocks. Finally, Saul Salla and Brooks Martin present a review and guide to some multivariate methods for stock identification.

Information on availability of the 228-page paperbound volume, NOAA Technical Memorandum NMFS-SEFC-199, is available from the NMFS Panama City Laboratory, 3500 Delwood Beach Road, Panama City, FL 32407-7499. Copies of volumes in this NOAA Technical Memorandum series, if out of print, are always available in either microfiche or hard copy from the National Technical Information Service, 5285 Port Royal Road, Springfield, VA 22161.

The Variability and Quality of Fish Flesh

Publication of **"The Food Fishes, Their Intrinsic Variation and Practical Implications"** by R. Malcolm Love of the Torrey Research Station in Scotland has been announced by the Van Nostrand Reinhold Company, 115 Fifth Avenue, New York, NY 10003 (as an AVI book imprint), Fish, as a raw material, is inherently variable—the fishes themselves vary greatly in size, shape, microbiology, chemistry, biochemistry, etc., not to mention by season of catch. This book deals uniquely with the chemical and biochemical variations in fishes and should help to advance their utilization. Rather than presenting an assemblage of tables and figures, the author has here chosen to explain the variability of fish in terms of the underlying physiological changes, of external influences, and of biochemical responses to them.

The review is divided into three sections: Part I, the fish themselves, discusses the physical structure of fish muscle and its chemistry, growth and aging, maturation and spawning, recovery from starvation, and fish diet. Part II relates aspects of fish quality—texture, color, flavor, and gaping. Chapters deal with the nature, causes and alleviation of gaping, natural variations in the responses of fish muscle to cold storage, and the nature of freezing. Each chapter is wrapped up with a section entitled "Technological Perspectives" to review and assess the salient points. And, Part III discusses the environmental factors influencing fish quality (i.e., depth, pH, water movement, crowding, salinity, oxygenation, temperature, stress, and fishing grounds conditions).

Also provided is an appendix of common and scientific names of fish mentioned in the text, a glossary of technical terms, a list of references and an author index (with page numbers where the author has been quoted or cited in the text), and a subject index. The author has drawn together a considerable amount of material, much fairly recent, and assessed and presented it in a manner which should be both interesting and

useful for nutritionists, food technologists, and food scientists as well as fish culturists. Hardbound, the 276-page volume is available from the publisher for \$49.95; in the United Kingdom it is published by Farrand Press, London.

Regional Guides to Marine Fishes

"Coastal Fishes of the Pacific Northwest" by Andy Lamb and Phil Edgell has been published by Harbour Publishing Co., Ltd., P.O. Box 219, Madeira Park, B.C., Canada V0N 2H0, and is a very well illustrated handbook of that region's marine fishes for anglers, commercial fishermen, scuba divers, and biologists. It would be especially useful for its individual color photographs of 174 species, which are numbered to correspond with the species listings. The photographs were made in natural settings—not a studio—which gives a better picture of each species' typical habitat.

Species are presented by family, with a brief discussion of each family and a representative line drawing. General information is given on pertinent biological and ecological data, world-wide distribution, size, its largest member, its history, importance to man, and distinctive features. Although there is no "key to fishes" per se, fishes similar in appearance are grouped together; thus, readers can use the photographs and drawings as a form of "visual" key, along with descriptions to identify them.

Accepted common and scientific names, along with "alternate" or other local names are given in the species accounts. A pencil drawing illustrates special identifying features for each species, and data is given on maximum recorded sizes and distribution. Specific information is given for anglers, scuba divers, commercial fishermen, beachcombers or tide pool observers, along with cautionary data for hazardous species along with tips on kitchen preparation of edible species. Indexed, the book also includes selected references for further reading or data, and it would be useful, generally, from about northern

California into southeastern Alaska. Cost of the 239-page paperbound volume is \$29.95.

A smaller and more specific guide to problem species is **"Dangerous Marine Animals of the Pacific Coast"** by Christina Parsons and published by Sea Challengers, 4 Somerset Rise, Skyline Forest, Monterey, CA 93940. This is a very general guide to problem marine animals in that its data on the toxins involved is not specified; the reader is only told that a species is toxic and then is given first aid treatment instructions. It goes beyond just the toxic species, however, to include sections on mammals, fishes, and invertebrates which may bite, shock, have a venomous spine or sting, and those which are poisonous to eat. The problem species are illustrated and described, along with the potential hazard, how to avoid it, what the symptoms are, and what the first aid treatment is. It would be useful for anglers, commercial fishermen, divers, and others who may come in contact with potentially hazardous west coast marine life. The small, paperbound, 96-page volume is available from the publisher for \$4.95.

"Fishes of the Gulf of Mexico" by H. Dickson Hoesé and Richard H. Moore is subtitled "Texas, Louisiana, and Adjacent Waters," and is published by the Texas A&M University Press, Drawer C, College Station, TX 77843. Underwater photographs in the volume were made by Farley Sonnier, and it is number one in the W. L. Moody, Jr., Natural History Series. With more than 600 photos and drawings (more than 330 color photos alone including many excellent underwater shots), this authoritative volume clearly and excellently illustrates about 500 marine fishes in the Gulf waters of Texas and Louisiana, though it would, of course, be useful well beyond those two states.

Keys are also provided, first, to determine the family, then to identify the genus and species. Each fish is described, giving common and scientific names, identifying characteristics (spine, ray, and scale counts), abundance, importance, habitat, geographic

range, and approximate maximum size. For nontechnical readers, an illustrated glossary is helpful.

Introductory chapters discuss environmental variables affecting the region's fishes, as well as aspects of zoogeography, conservation efforts, regional history of ichthyological research, and methods to use in identifying fish. Then follow the color illustrations, and the family and species accounts. Indexed, the 327-page volume is available from the publisher at \$19.95 (cloth) and \$9.95 (paper).

Coastal and Estuarine Studies Published

Construction of the Calvert Cliffs nuclear power plant on the western shore of the Chesapeake Bay, Maryland, provided an opportunity for study and assessment of the potential effects that operation of the Calvert Cliffs Nuclear Power Plant (CCNPP) might have on the mid-portion of that important bay system, by scientists from The Academy of Natural Sciences of Philadelphia. Major biotic components of the system were studied over an area and time period sufficient to allow comparison of conditions before and after power plant operation had begun.

"Ecological Studies in the Middle Reach of Chesapeake Bay (Calvert Cliffs)", edited by Kenneth L. Heck, Jr., and published by Springer-Verlag, 175 Fifth Avenue, New York, NY 10010, is an excellent summary of those studies. Elements chosen for detailed research included species composition and production rates of major primary producers, water chemistry, zooplankton, benthos, and finfish abundance and species composition; the abundance and growth rates of commercially important shellfish (clams, oysters, and blue crabs); and the colonization sequences of invertebrates on artificial substrates.

The studies document and provide important data on long-term patterns and trends for the area, and allow the characterization of dominant physical, chemical and biological processes in the area. They also facilitate the exploration

of relationships between nutrient availability and primary production, between primary and secondary production, and between climatic variation and biological response. The volume also summarizes the effects of the nuclear plant operations on the Bay ecosystem, evaluates the general significance of the findings, and gives some recommendations for further studies of impacts on estuarine systems. Paperbound, the 287-page volume is number 23 in the Springer-Verlag series "Lecture Notes on Coastal and Estuarine Studies," and is available from the publisher.

Number 24 in the same series is **"Environmental Studies in Port Valdez, Alaska, A Basis for Management,"** edited by David G. Shaw and Mohammad J. Hameedi. When the Port of Valdez, Alaska, was chosen as the terminus of the Trans-Alaska Pipeline, it provided researchers with a unique opportunity to study an essentially pristine marine system and measure any changes over time owing to environmental disturbance. Highly treated oil tanker ballast water, millions of gallons of, would be discharged each day with still 8-10 parts per million of the most soluble fraction of petroleum, meaning that 8-10 barrels of those hydrocarbons would be discharged daily. Preliminary biological studies began in 1969, followed by a major oceanographic study from May 1971 to April 1972. In March 1976 field work resumed and continued through November 1978, during which time the tanker terminal became operational.

This volume reviews and analyzes the information gathered through those and related studies at Port Valdez. Some of the general conclusions drawn to date are that: Ballast discharge has created no ecologically or socially significant biological change; flushing of Port Valdez and nutrient input and cycling, is heavily influenced by storm patterns; the energy producing regime (phytoplankton and macrophytes) and the primary grazing regime (zooplankton and micronekton) changed dramatically between the before- and after-operation studies; and relatively little hydrocarbon

contamination of the sediments is found in Port Valdez (as compared with other oil contaminated regions). Three final chapters discuss scientific, technical, and regulatory considerations in environmental management; use of scientific information by managers; and lessons gained from the Port Valdez studies. The 423-page paperbound volume is available from the publisher.

The Regulation of Marine Populations

Number one in a series "Books in Recruitment Fishery Oceanography" is **"Marine Populations, An Essay on Population Regulation and Speciation"** by Michael Sinclair and published by the Washington Sea Grant Program, University of Washington, 3716 Brooklyn Avenue, N.E., Seattle, WA 98105. The author is a marine biologist with the Canadian Department of Fisheries and Oceans and is on the staff of the Halifax Fisheries Research Laboratory. His book is an outgrowth of a series of lectures on the topic that he delivered in 1985 at a new U.W. Sea Grant Seminar Series by the same title.

In introducing the new series, "recruitment fishery oceanography" is defined as "the study of the effects of environmental variability on year class strength, or recruitment, in populations of marine organisms, especially those of commercial importance." Such studies are concerned with the factors that determine the productivity of living resources under environmental and fishing stress, and they also touch on a wide variety of disciplines, such as physical, chemical, and biological oceanography, as well as fishery science, meteorology, and more. Thus, the lectures and this book present a very interesting perspective on the topic of population biology and regulation.

Chapter 3 presents a fairly detailed review of recent developments on the population biology of Atlantic herring. The member/vagrant hypothesis is presented in chapter 4 and in the following 3 chapters the author reviews aspects of the fisheries, estuarine, oceanic island,

zooplankton, and benthos literature to provide support for the member/vagrant hypothesis, concluding with a summary in chapter 8. Assuming support for the hypothesis, the author next discusses implications for selected ecological issues. He highlights pattern, richness, and abundance, rather than variability, in his treatment of population regulation.

In the last three chapters the author discusses the implications for evolutionary theory. The discussions are presented more in essay form and argue a particular point of view not shared by all scientists, but which should help advance discussions and perhaps point out useful avenues for future research. Indexed and with extensive references, the 252-page volume is available from the publisher at US\$15.00 (paper) and US\$25.00 (cloth).

Marine Invertebrate Reproduction Reviews

"Reproduction of Marine Invertebrates, Volume IX, General Aspects: Seeking Unity in Diversity," edited by Arthur Giese, John Pearse, and Vicki B. Pearse, has been published by Blackwell Scientific Publications, Inc., 667 Lytton Avenue, Palo Alto, CA 94301. This volume is a fine and up-to-date systematic review of major aspects of reproduction for all the phyla of free-living marine invertebrates. Five volumes have already been published in the series on metazoans, coelomates, annelids and echinurans, gastropods and cephalopods, and pelecypods and lesser molluscan classes; volumes on lophophorates and echinoderms, nonmalacostracan arthropods, and malacostracan arthropods remain in press.

Gamete production—the start of sexual reproduction—is the subject of the first two chapters, gametogenesis and oogenesis, in which the authors demonstrate that, despite the wide diversity among metazoans, gametogenesis and the final form and function of gametes are quite uniform and provide a sound basis for broad generalizations. The next two chapters provide a look at the

complexity of endocrine control of gametogenesis and spawning, and the synchronozation of these processes for all metazoans. Chapter 5 then discusses chronobiology, presenting methods for computer analysis of reproductive periodicities in marine invertebrates.

Additional chapters then draw together much recent information on different aspects of larval biology. Chapter 6 reviews the literature pertaining to abundance and distribution of pelagic larvae in the plankton, and much of chapter 7 concerns the feeding mechanisms and feeding rates of different larval forms. Chapter 8 discusses environmental influences (i.e., food quality and quantity, temperature, salinity, and other factors) on larval survival and rate of development. Finally, chapter 9 strives to interrelate the material provided in the other chapters and volumes by reviewing and discussing evolutionary aspects of marine invertebrate reproduction. The 712-page hardbound volume has taxonomic, author, and subject indexes and is available from the publisher for \$50.00.

Managing Fishes in Large Reservoirs

Publication of **"Reservoir Fishery Management and Development in Asia"** edited by Sena S. De Silva, has been announced by the International Development Research Center, P.O. Box 8500, Ottawa, Canada K1G 3H9. The volume constitutes the proceedings of a workshop held in Kathmandu, Nepal, on 23–28 November 1987, where representatives from 15 nations reviewed the status of reservoir fishery research in Asia, particularly as related to the present status of fisheries, limnological aspects, biological and resource aspects, management aspects, and fish culture. Summaries of pertinent discussion sessions are also included. The volume emphasizes the potential for increased fish production in reservoirs and the need for early involvement of fisheries scientists in the planning and in preimpoundment studies before dam construction.

Also discussed are aquaculture strate-

gies and techniques in Chinese, Sri Lankan, and Indonesian reservoirs. In some countries, such as Nepal, planning will be most advantageous; that nation currently has just 1,500 ha of reservoir surface area but anticipates growth to more than 200,000 ha by the year 2000. The 246-page paperbound volume, IDRC-264e, is available from the publisher (price not listed).

The Coastal Resources of Brunei Darussalam

"The Coastal Environmental Profile of Brunei Darussalam: Resource Assessment and Management Issues," edited by Chua Thia-Eng, Chou Loke Ming, and Marie Sol M. Sadorra, has been published as ICLARM Technical Reports 18 by the Fisheries Department, Brunei Darussalam, and the International Center for Living Aquatic Resources Management, MC P.O. Box 1501, Makati, Metro Manila, Philippines.

Brunei Darussalam is moving to diversify its economy, and this publication reviews and analyzes the nation's physical environment, coastal resources, population, land use and development, economics, pollution problems, institutional and legal framework, and coastal resources and management issues. Paperbound, the 192-page volume is available from ICLARM at \$2.00 (surface mail) and \$10 (airmail); ordering via airmail is recommended by the Center.

On Omega-3 Fatty Acids

The keynote address in the MIT Sea Grant Lecture and Seminar Series on the health effects of omega-3 fatty acids is **"The Impact of Dietary Fat on Human Health"** by Robert S. Lees, Professor of Cardiovascular Disease at MIT. Published as MITSG 88-3 by the MIT's Sea Grant Program, Building E38-300, 292 Main Street, Cambridge, MA 02139, it addresses the question, "Can eating fish reduce the risk of heart disease?"

Discussed are aspects of human fat

metabolism, dietary fat intake and disease, and dietary fat and individual diseases, the author provides a succinct look at the three major diseases to which dietary fat has been linked (cardiovascular disease, cancer, and arthritis). He

has reviewed epidemiological, biochemical, physiological, and pathological evidence to conclude that the types and amounts of fat in the human diet are clearly associated with heart disease, less so with cancer, and may have some

therapeutic effects on rheumatism and arthritis. Other aspects of the healthful benefits of fish oils, the author finds less conclusive. Single copies of the 28-page paperbound booklet are free; additional copies are \$2 each.

Shellfish Depuration Conference

Plans for the "First International Conference on Shellfish Depuration" have been announced, and it is scheduled for 5-8 November 1989 at Grosvenor (Walt Disney Village) Resort in Orlando, Fla. Topics to be discussed include national and international overviews, legal aspects, marketing considerations, economic evaluations, water quality and treatments, design and engineering

criteria, bacterial and viral monitoring, regulatory methods, etc. The conference is being organized by the Florida Sea Grant Program and the National Fisheries Institute, in cooperation with several other associations and agencies concerned with shellfish quality and safety. A conference proceedings will be published too. For further information contact Steven Otwell, 467 Food Science Building, University of Florida, Gainesville, FL 32611, or telephone 904-392-1991, or FAX 904-392-8594.

Errata

In the article "The traditional central California setnet fishery" by Edward Ueber in the *Marine Fisheries Review* 50(2):40-48, the name listed in the abstract and text for halibut was incorrect. The correct species is the California halibut, *Paralichthys californicus* (Ayers). Also, in the abstract, the name for the white croaker should read *Genyonemus* instead of *Gengonemus*.