New NMFS Scientific Reports Published

The publications listed below may be obtained from either the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402; from D812, Publication Services Branch, Information Management Division, Environmental Science Information Center, NOAA, Rockville, MD 20852; or from the National Technical Information Service, Springfield, VA 22151. Writing to the agency prior to ordering is advisable to determine availability and price, where appropriate (prices may change and prepayment is required).

NOAA Technical Report NMFS Circular 444. Leatherwood, Stephen, Randall R. Reeves, William F. Perrin, and William E. Evans. **"Whales, dolphins, and porpoises of the eastern North Pacific and adjacent Arctic waters. A guide to their identification."** July 1982, 245 p.

ABSTRACT

This field guide is designed to permit observers to identify the cetaceans (whales, dolphins, and porpoises) they see in the waters of the eastern North Pacific, including the Gulf of California, Hawaii, and the western Arctic of North America. The animals described are grouped not by scientific relationships but by similarities in appearance in the field. Photographs of the animals in their natural environment are the main aids to identification. Appendices describe how and to whom to report data on live and dead cetaceans and provide information to aid in identification of stranded cetaceans.

NOAA Technical Report NMFS Circular 445. Garrick, J. A. F. **"Sharks of the genus *Carcharhinus*."** May 1982, 194 p.

ABSTRACT

The genus *Carcharhinus* Blainville contains 25 living species of whaler sharks, one of which (*C. wheeleri*) is described as new while the other 24 incorporate 95 identifiable nominal species which fall into the limits of the genus as here recognized. Features studied include morphometrics, external morphology, color, tooth numbers and shapes, vertebral numbers and other vertebral characteristics, and biological data. The systematic value of these features is reviewed, and it is concluded that despite their importance at the specific level they do not in general allow firm statements on subgeneric groupings or on the relationship between *Carcharhinus* and other similar genera. Accordingly, no formal subdivision of the genus is proposed, and the limits and characterization of the genus are essentially as in Bigelow and Schroeder (1948) except that the following six nominal species are excluded because of one or more notably divergent aspects of their morphology: *Carcharias gangeticus* Müller and Henle, *C. glyphis* M. and H., *C. oxyrhynchus* M. and H., *C. temminckii* M. and H., *Carcharhinus tephrodes* Fowler, and *Carcharinus velox* Gilbert. A further 13 nominal species are treated as species dubia.

Long-established names for two species, *Carcharhinus limbatus* Valenciennes and *C. sorrah* Val., are retained though each has a poorly founded senior synonym; their cases must be put to the International Commission of Zoological Nomenclature. A neotype is designated for *brachyurus* Günther, and lectotypes are designated for *dussumieri* Val., *henlei* Val., *malabaricus* Day, *menisorrah* Val., *pleurotaenia* Bleeker, *sorrah* Val., and *tjutjot* Bleeker.

A key is given to differentiate the species. For each species primary synonyms are listed and discussed and a diagnosis and description are given. Descriptions include measurements and counts and line illustrations that show the whole shark in lateral view, underside of head, nostril, and teeth. The geographic distribution is described, and biological data on number of embryos, size at birth, size at sexual maturity, and maximum size are summarized.

Seals, Humans, and Resource Management

"Seals and Man," subtitled "A Study of Interactions" and published by the Washington Sea Grant program explores an often controversial topic: Pinniped exploitation. Author W. Nigel Bonner, who has extensively studied seals in both northern and southern seas, currently heads the Life Sciences Division of the British Antarctic Survey.

Beginning with an overview of the pinnipedia and their physical adaptations to the marine environment, the author then provides a historical look at the human-seal interactions, beginning with early archaeological data on hunting by European and Eskimo cultures. He then provides concise, chapter-by-chapter reviews of the biology, numbers, and harvests of northern seals (harp and northern fur seals), fur seals of the southern hemisphere, southern elephant seal, and the relatively unexploited Antarctic (Weddell, crabeater, leopard, and Ross) seals. Details are also provided on the exploitation and management of those seals.

One chapter is devoted to seal and fisheries interactions, i.e., damage to fishing gear, consumption of fish by seals, seals as parasite (i.e., codworm and other anisakine nematodes) hosts, and measures used to control seals. Another chapter reviews the problem of the gray seal in the United Kingdom where a variety of harvesting, conservation, and protection measures have been tried. A final chapter discusses such indirect human impacts on seals as fishing net mortality; harvesting of fishes used as food by seals; pollution; disturbances by sightseers, oil exploration, boat traffic, etc.; and where either a food supply (i.e., krill) or habitat has improved for some species.

Amply illustrated (64 figures, 10 tables) and indexed, the 170-page paperbound volume presents a good, concise overview of human and seal relationships. It is available from the University of Washington Press, Seattle, WA 98105 for $9.95.

The 25 species are predominantly tropical-subtropical, but only two appear to be confined to the tropics and seven have been recorded from the tropics to latitudes as high as 40°. Most are coastal, one is virtually insular, and one, or perhaps two, enter fresh or brackish water. Eight species are worldwide; 23 occur in the Indo-Pacific, 13 in the western Atlantic, 11 in the eastern Atlantic, 10 in the eastern Pacific, and 5 in the Mediterranean.

NOAA Technical Report NMFS Circular 446. Taylor, Ronald M. **"Marine flora and fauna of the northeastern United States. Lichens (Ascomycetes) of the intertidal region."** August 1982, 26 p.

ABSTRACT

This manual treats the lichens found in the intertidal region from New Jersey to Newfoundland. Methods of collection, preparation, and study are briefly treated. Twenty-two species are covered, both in an illustrated key and an alphabetical listing, with brief descriptions and notes on ecology and distribution. A glossary of terms is included.

NOAA Technical Report NMFS Circular 447. Shaw, William N. (editor). **"Proceedings of the Eighth U.S.-Japan Meeting on Aquaculture at Bellingham, Washington, October 17-18, 1979."** November 1982, iii + 25 p. (5 papers.)

NOAA Technical Report NMFS SSRF-757. Wenner, Elizabeth Lewis, Malcolm H. Shealy, Jr., and Paul A. Sandifer. **"A profile of the fish and decapod crustacean community in a South Carolina estuarine system prior to flow alteration."** March 1982, iii + 17 p., 8 figs., 5 tables.

ABSTRACT

The seasonal distribution and abundance of fishes and decapod Crustacea collected by 6 m otter trawl from the North and South Santee Rivers, South Carolina, were examined over a 2-year sampling period. Species richness was greatest during summer and at stations located in proximity to the river mouths. Although species richness was found to be related to salinity, temperature, depth, and dissolved oxygen, it was most noticeably affected by a spring freshet which considerably lowered richness and abundance.

Eleven species accounted for 93 percent of the number and ~70 percent of the total fish biomass taken in both rivers: *Micropogonias undulatus*, *Anchoa mitchilli*, *Bairdiella chrysoura*, *Stellifer lanceolatus*, *Ictalurus catus*, *Cynoscion regalis*, *Dorosoma petenense*, *Leiostomus xanthurus*, *Trinectes maculatus*, *Brevoortia tyrannus*, and *Symphurus plagiusa*. White shrimp, *Penaeus setiferus*; brown shrimp, *P. aztecus*; and blue crabs, *Callinectes sapidus*, comprised over 96 percent by number and weight of the decapod fauna collected in both rivers. Dominant fishes were present in fairly equal abundance throughout the year and utilized the Santee system as either a residential or nursery area, while *P. setiferus* and *P. aztecus* were more seasonal in their pattern of appearance and abundance.

Length-frequency analysis showed the Santee system fish fauna to be composed mostly of juvenile specimens. Their presence throughout the year indicated that the Santee is a temporally stable and relatively non-stressed system and an important nursery area.

The predominance of juveniles accounted for lower biomass (kg/ha) of fishes in the Santee system compared to values for other estuaries along the Atlantic coast of the United States. The continued importance of juvenile fishes and shrimp in the Santee system is questionable in view of salinity changes in the nursery habitat following proposed river rediversion.

NOAA Technical Report NMFS SSRF-758. Gentry, Roger L., and John R. Holt. **"Equipment and techniques for handling northern fur seals."** July 1982. 15 p.

ABSTRACT

This paper describes techniques for capturing, immobilizing, and marking northern fur seals, *Callorhinus ursinus*, of all ages and both sexes. It is intended as an explicit field manual for handling this species, and as a source of ideas for handling other eared seals, wild or captive. Furthermore, it advocates capturing and manipulating wild seals as an approach to investigating behavior. The paper deals only with short term physical restraint; immobilization with drugs is not considered. Emphasis is placed on the importance of animal behavior in determining the design of capture equipment and techniques. Because of this dependence, capture techniques must change seasonally as behavior changes, and different techniques may be needed for different species. A wide range of techniques is considered,

Aquaculture and the Law

Publication of **"Aquaculture: The Legal Framework,"** by Bruce H. Wildsmith, announced by Emond-Montgomery Ltd., Canadian Law Publishers, 12 Mercer Street, 2nd Floor, Toronto, Ontario, Canada M5V 1H3, is the first book published in Canada on the legal and policy aspects of fish culture. The author is associate professor, Faculty of Law, Dalhousie University.

The volume sprang from the preparation of a model provincial law to promote and regulate aquaculture in Nova Scotia. The author was project leader for the effort and the result is presented as Appendix A. The project necessarily dealt with historic rights to fish, fishing, waters and submerged lands, etc., and this material forms the basis for the book.

The text examines common law as well as statutory material from around the world to set the stage for a thorough rundown on Canadian Federal and Provincial laws affecting aquaculture. Information is also presented on non-Canadian aquaculture legislation, such as a sample aquaculture lease from the State of Florida (Appendix 4).

Following a brief introduction, chapter 2 discusses such international aspects as the Law of the Sea conference, fisheries treaties, and the role of the FAO in aquaculture promotion. Chapter 3 presents a look at constitutional aspects affecting fisheries and aquaculture, and chapter 4 examines private property and public rights of aquaculturists, fishermen, land owners, etc. Risks and incentives in fish culture are detailed in chapter 5 (i.e., pollution problems, insurance, and disease from legal, administrative, and policy views).

Chapter 6 looks at aquaculture leasing, and chapter 7 provides a rundown on Canadian legislative provisions and practices concerning aquaculture. Finally, chapter 8 presents an in-depth review of the comprehensive Nova Scotia aquaculture act (printed as Appendix A). Appendix B lists sources of aquaculture information; and Appendix C presents a sample aquaculture insurance policy.

Indexed and with a lengthy bibliography, the 313 page hardbound book is available from the publisher for $45.

from the capture of single pups to the mass captures of adult females.

NOAA Technical Report NMFS SRRF-759. Squire, James L., Jr. **"Catch temperatures for some important marine species off California."** August 1982, 19 p.

ABSTRACT

Airborne sea surface temperature surveys using infrared techniques were conducted monthly off the central and southern California coast, 1963 through 1968, by the National Marine Fisheries Service in cooperation with the U.S. Coast Guard. The resulting temperature data were matched to commercial sportfishing boat catch data to determine the relationship between catch and temperature for the following major sport species: Chinook and silver salmon, *Oncorhynchus tshawytscha* and *O. kisutch*; yellowtail, *Seriola dorsalis*; Pacific bonito, *Sarda chiliensis*; Pacific barracuda, *Sphyraena argentea*; white seabass, *Atractoscion nobilis*; and albacore, *Thunnus alalunga*.

Part I presents graphs for each of the above species for areas having high catches, the month during which most fish were caught, sea surface temperature at which most fish were caught, mean catch temperature and its standard deviation, and temperature range.

Part II describes how catch and catch-per-unit-effort (CPUE) are related to temperature. A series of weekly airborne temperature surveys were flown over a high catch rate area off San Diego, Calif., April through October, in 1972, 1973, and 1974. These temperature data were compared with catches of yellowtail, Pacific barracuda, and Pacific bonito by the sportfishing fleet within the survey area. Graphical Kolmogorov-Smirnov cumulative preference curves of catch versus temperature for yellowtail, Pacific barracuda, and Pacific bonito show increased catch rates through the midrange temperatures 17.8° to 20.0°C (64° to 68°F) with a reduction in rates above 20.5°C (69°F).

For a 31-week period starting on 1 April 1972, 1973, and 1974, the temperature at the 20th percentile of the catch temperature curve was slightly above the 20th percentile of the cumulative temperature curve, indicating that fewer fish were taken at the very lowest temperatures; otherwise, catch for the three species appears representative of the temperature distribution. The average yearly temperature for large catches of Pacific barracuda, yellowtail, and Pacific bonito (30 percent or more above mean) fluctuated from 16.2°C (61.2°F) to 23.0°C (73.5°F), with a mean value of 19.5°C (67.1°F) for Pacific barracuda, 18.5°C (65.4°F) for yellowtail, and 19.6°C (67.4°F) for Pacific bonito. Nonparametric rank correlation tests (Spearman and Kendall) for catch and CPUE versus temperature showed consistently higher correlations for catch than for CPUE, indicating an increase in effort with increasing catch. In analyses of temperature and CPUE by species and year for 12-, 17-, and 31-week periods, about one-half of the individual cases tested were, on the average, statistically significant at the 0.05 level.

Temperature distributions within 20th percentile ranges of the cumulative CPUE curves obtained for the three species combined indicate that the lowest temperature range, 12.7° to 15.5°C (55° to 60°F), is the only area where catch rates were lower than expected.

There is little evidence for a preferred temperature within the range of 15.5° to 21.1°C (60° to 70°F). Conclusions from this study indicate that fishery data are by no means optimal for examining the hypothesis of preferred temperature, due to confounding of the cause and effect between catch and effort. Lack of simultaneous observation of the spatial distribution of species and environmental measurements over the extent of distribution over time are limiting factors in determining the true relationship of species to the environmental factor of sea surface temperature.

NOAA Technical Report NMFS SSRF-760. Moles, Adam. **"Parasite-host records of Alaskan fishes."** September 1982, 41 p.

ABSTRACT

This report summarizes the published records of parasites of freshwater and coastal marine fishes of Alaska through 1980. The report is organized both by parasite and by host, is cross-referenced, and provides a convenient, single source of information on parasites of Alaskan fishes.

How to Export U.S. Fish Products to Japan

The U.S. Embassy in Tokyo, Japan, has prepared a 43-page handbook entitled **"Exporting U.S. Fishery Products to Japan."** The booklet includes background information on the Japanese fisheries market and suggested business practices, types of packaging, financing, and shipping. Also included in the handbook as appendices are lists of import quotas, tariff rates, Japanese names for fish and shellfish species, and business contacts.

U.S. companies can obtain a copy of the report for $5 by requesting report number ITA-82-11-029 from NTIS, the National Technical Information Service, Department of Commerce, Springfield, VA 22161.

In addition, the NMFS and the Gulf and South Atlantic Fisheries Development Foundation conducted a seafood trade mission to Japan in March 1982 to assess the market for fish caught in the Gulf of Mexico and the South Atlantic. Fishery exhibitions were held in Tokyo, Kobe, and Fukuoka, and NMFS International Trade Specialist E. Moret Smith has prepared a 51-page report on the exhibitions with pertinent information on exporting U.S. fishery products to Japan.

The first section includes information on Japanese wholesale markets, major Japanese wholesale purchasers, Japanese packaging methods, and Japanese agents for U.S. exporters. The second section includes information on marketing and sales prospects in Japan for individual species and products. Species and products included in the second section are: Crevalle, croakers, moonfish, black mullet, blue runners, sheepshead, blackfin tuna, clams, clam juice and chowder, conches, shrimp, flounder, porgies, redfish, drums, red snapper, catfish, sea urchin, scallops, king mackerel, fish meal, bluefish, little tunny, sharks, and others.

U.S. companies can obtain a copy of the report entitled "Foodex '82 and Trade Mission (Japan, USA)" for $5 by requesting report number ITA-82-11-031 from NTIS.

Marketing Canned Fish in England

The United Kingdom imported over $170 million worth of canned fish in 1980. Except for herring and mackerel all major canned fish products must be imported to completely satisfy the domestic demand. The most significant import is canned salmon, amounting to over $100 million in 1980, or more than half of the total. One steadily growing import commodity is canned tuna. While tuna imports only totaled $23 million in 1980, they are rapidly becoming a major import commodity.

J.C.E.J. van der Eeden of Rotterdam, Holland, has prepared a 4-page report outlining the U.K. canned fish market. The report includes a product review of the six major canned fish products and advice on how to market these products in the United Kingdom. A copy of the report can be obtained by requesting the attachment to IFR-81/174, "The Market for

Canned Fish in the United Kingdom," from NMFS Statistics and Market News Offices, enclosing a self-addressed envelope with $0.37 postage.

Marine Birds, Mammals of the Puget Sound Region

Publication of **"Marine Birds and Mammals of Puget Sound,"** announced by the University of Washington Press, is the third in a series of books on that region's marine resources, physical properties, and uses. Supported by NOAA's Office of Marine Pollution Assessment, the Washington Sea Grant program, and the Environmental Protection Agency, the volume presents a fairly thorough, if sometimes personal, description of those marine species and their habitat needs by authors Tony Angell and Kenneth C. Balcomb III. Angell is an award winning artist and Balcomb is a marine biologist who has specialized in marine mammal studies.

The book begins with a brief review of the habitats of the Puget Sound estuary and the forces that impinge upon them (i.e., pollution, habitat losses/modification, and other human uses). The bulk of the book is given to the status, distribution, foods, and critical habitats of 14 marine mammals and 124 aquatic, shore, and predatory birds that frequent the Sound.

An appendix provides additional data for the listed species on their feeding strategies, nesting and breeding areas, feeding and resting areas, the impact of various human activities on them, and their occurrence, by month, in Puget Sound. Other appended data include the use by various species groups of different types of habitat, a regional map, and smaller maps keyed to marine bird areas, pinniped haulouts, cetacean sitings, eelgrass and kelp beds, and salt marshes. Brief life history notes are also given for the marine mammals. While the book is not a field guide, most species are well illustrated. Considerable use of personal anecdotes makes the book attractive to general readers, and those more technically inclined will find the data from a wide variety of often obscure sources—on species distribution, habitat, etc.—useful. Indexed, the 145-page 8½ × 11″ paperbound volume is available from the University of Washington Press, Seattle, WA 98105 for $14.50 plus $1.75 postage and handling.

Indian and Philippine Fishery Data Available

During India's 1981 Fiscal Year (IFY) (April 1981-March 1982), the value of Indian fishery exports increased by almost US$7 million to a record value of US$300 million. However, the quantity of Indian fishery exports decreased from 75,600 metric tons (t) in IFY 1980 to only 70,100 t in IFY 1981. Frozen shrimp accounted for 65 percent by quantity and 84 percent by value of India's total fishery exports. Over 75 percent of India's shrimp exports was shipped to the United States.

The U.S. Embassy in New Delhi has prepared an 11-page report describing recent developments in the country's fishing industry, Indian fishery exports, and its Five-Year Plan. Also included in the report is a list of marine equipment and seafood processing machinery for which U.S. manufacturers may have good sales prospects in India. U.S. companies can order this report for $5.00 by requesting report number ITA-82-10-021 from: NTIS, U.S. Department of Commerce, Springfield, VA 22161.

The Philippine fishing industry is an important sector of the national economy, accounting for about 4.2 percent of the country's Gross National Product (GNP) and supporting an estimated 5 million people. Philippine fishermen caught 1.8 million metric tons (t) in 1981, an increase of over 100,000 t, or about 10 percent over the 1980 catch. Philippine fishery exports, however, declined in 1981 to 65,700 t from 76,000 t in 1980.

The Philippine Government announced in February 1982 the formation of the Philippine Fishery Development Authority (FFDA) which will attempt to accelerate the development of the fishery industry in the Philippines and will consolidate several fishery-related agencies in the Philippine Government. The U.S. Embassy in Manila has prepared a 13-page report describing recent developments in the country's fishing industry and its fisheries development program. U.S. companies can order this report for $5.00 by requesting report number ITA-82-11-026 from the NTIS.

New Chilean Fishery Publications

Two publications have recently been released in Chile which may be of interest to U.S. researchers. The publications were sponsored by the state-owned development corporation, Corporacion de Fomento de la Produccion (CORFO). CORFO and the Instituto de Fomento Pesquero (IFOP) have released an English language version of its **Chilean Fisheries Resources Catalog.** It contains information and color photographs on 40 of the most important commercial species caught by Chilean fishermen. The catalog also includes notes on the laws and regulations affecting those species. Copies of the publication cost $20.00 plus mailing charges and can be ordered from the Instituto de Fomento Pesquero, Casilla 1287, Santiago, Chile.

CORFO has also sponsored research on mussel culture as a possible economic activity along Chile's lightly populated southern coast. CORFO awarded a contract to the Servicio de Cooperaction Tecnica (SERCOTEC) to study the Chilean mussel, *Mytilus chilensis*, which is larger than the mussel familiar to most U.S. and European consumers. A copy of the resulting three-volume report can be ordered for $102.57 plus tax by writing to the Corporacion de Fomento de la Produccion, Gerencia de Desarrollo, Casilla 3886, Santiago, Chile. (Source: IFR-81/178.)