New NMFS Scientific Reports Published

The publications listed below may be obtained from either the Superintendent of Documents (address given at end of title paragraph on affected publications) or from D825, Technical Information Division, Environmental Science Information Center, NOAA, Washington, DC 20235. 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 SSRF-705. Uzmann, Joseph R., Richard A. Cooper, and Kenneth J. Pecci. **"Migration and dispersion of tagged American lobsters, *Homarus americanus*, on the southern New England continental shelf."** January 1977. 92 p.

ABSTRACT

An apparently contiguous stock of American lobsters, *Homarus americanus,* is concentrated along the outer continental shelf margin and slope from Corsair Canyon westward and southward to the region of Baltimore Canyon. Between April 1968 and May 1971 we captured, tagged, and released a total of 7,326 lobsters at 52 localities between Corsair Canyon and Baltimore Canyon. As of December 1972, 945 recaptures (12.9% recovery) had been reported, providing a basis for interpretation of seasonal and long-term movements, as well as measurements of growth rate and moult frequency. A classification scheme is developed and applied to distinguish between apparently directed seasonal movements (migrations), localized movements of less than 10 nautical miles (18.5 km), and long-period (120 days) dispersions of 10 miles or more. This last category includes point to point tracks that cannot be objectively resolved in terms of directionality and may represent random dispersal, a summation of seasonally directed tracks, or both.

We conclude from the track analyses that at least 20% of the offshore lobsters annually engage in directed shoalward migrations in spring and summer with return to the shelf margin and slope in fall and winter. This conclusion is reinforced by independent analysis of the time/depth/temperature associations of tagged lobsters at recapture which, of itself, suggests that an even larger proportion of the offshore lobsters annually effect directed migrations in response to seasonal temperature variations.

NOAA Technical Report NMFS SSRF-704. Anderson, William D., Jr., James K. Dias, Robert K. Dias, David M. Cupka, and Norman A. Chamberlain. **"The macrofauna of the surf zone off Folly Beach, South Carolina."** January 1977. 23 p.

ABSTRACT

A seining survey of the macrofauna of the surf zone at Folly Beach, Charleston County, S.C., was conducted from October 1969 to October 1971. Eighty-seven collections were made in the surf and associated tidal pool resulting in the capture of 512 specimens of swimming invertebrates representing at least 17 species and 5,095 specimens of bony fishes representing 41 species.

The data obtained are analyzed on seasonal and yearly bases for total weights and numbers of species and specimens. Species are ranked as to importance; and prediction equations for monthly average number of specimens per collection in the surf, based on environmental variables, are developed. Length-frequency data and other aspects of the biology of selected species are presented. Length-length and length-weight relationships are given for certain species. Recommendations for the improvement of the methodology for similar surveys are made.

NOAA Technical Report NMFS SSRF-706. Matthews, Frances D., David M. Damkaer, Leslie W. Knapp, and Bruce B. Collette. **"Food of western North Atlantic tunas (*Thunnus*) and lancetfishes (*Alepisaurus*)."** January 1977. 19 p. For sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402.

ABSTRACT

Stomach contents of 395 longline-caught specimens of *Thunnus* (281 *T. albacares,* 52 *T. t. thynnus,* 48 *T. alalunga,* 14 *T. obesus*) and 89 *Alepisaurus* were examined. About 45% of the tuna's food, by volume, was composed of fishes, 35% of cephalopods, 15% of crustaceans, and 5% of miscellaneous items. Fishes eaten by tunas ranged in length 9-360 mm SL ($\bar{x}$ 65 mm) and represented a minimum of 88 genera in 58 families. Fishes eaten by *Alepisaurus* were 8-846 mm SL ($\bar{x}$ 98 mm) and represented 40 genera in 34 families. Most forage fishes were immature forms of midwater and shore fishes, many of which are associates of the pelagic *Sargassum* community. Ten of the most frequently occurring families in *Thunnus* and *Alepisaurus* stomachs were Bramidae, Alepisauridae, Balistidae, Paralepididae, Scombridae, Sternoptychidae, Carangidae, Tetraodontidae, Gempylidae, and Syngnathidae.

Cephalopods were the most frequently occurring (80-90%) invertebrate group in the tuna stomachs, particularly the squid family Ommastrephidae. Crustaceans followed the cephalopods in frequency of occurrence (30-80% depending on tuna species). Larval decapods and hyperiid amphipods were the principal groups of crustaceans. In *Alepisaurus* stomachs, cephalopods occurred with 50% frequency, usually octopods and soft-bodied squids, families Cranchiidae, Histioteuthidae, and Bathyteuthidae. Crustaceans were present in 75% of *Alepisaurus* stomachs. Fewer decapod larvae were found than in the tunas, while amphipods were found

more frequently. Pelagic polychaetes (Family Alciopidae), not found in any tunas, occurred in 38% of *Alepisaurus* specimens.

Differences in the relative importance of particular forage categories in the diet of different species of *Thunnus* and between the diets of *Thunnus* and *Alepisaurus* suggest interspecific differences in feeding, either anatomical (i.e., relative predatory ability) or behavioral, particularly the relative swimming speeds and feeding depths of different predators. The small-mouthed tunas consumed generally smaller prey fishes ($\bar{x}$ 98 mm SL) than did the large-mouthed lancetfishes ($\bar{x}$ 240 mm SL). Smaller sized yellowfin tunas generally consumed smaller prey than did larger yellowfins. Differences in swimming ability between tunas and *Alepisaurus* were reflected in the larger number of swift-moving muscular squids eaten by the tunas. Composition of the forage indicated that *T. albacares* fed at shallower depths than the other species of *Thunnus* and that *Alepisaurus* fed at greater depths than any of the tunas.

NOAA Technical Report NMFS SSRF-707. Temple, Robert F., David L. Harrington, and John A. Martin. **"Monthly temperature and salinity measurements of continental shelf waters of the northwestern Gulf of Mexico, 1963-65."** February 1977. 26 p. For sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402.

ABSTRACT

Temperature and salinity observations made monthly from January 1963 to December 1965 at 48 stations in the northwestern Gulf of Mexico are presented. Off the coasts of Louisiana and Texas monthly average temperatures of surface and bottom waters at station depths of 7, 14, 28, 46, and 73 m exhibited seasonal trends that were similar over a 3-yr period. Monthly average temperatures of surface and bottom waters were generally similar at station depths of 7 and 14 m, but differences were noted at station depths of 28, 46, and 73 m and increased with depth. Maximum average temperatures of bottom waters at station depths generally greater than 14 m occurred after surface temperatures

A New NOAA-MARAD Report: Hydrocarbons in the Ocean

The first comprehensive survey of existing hydrocarbons in the world's oceans shows small quantities of these compounds everywhere, with faint trails of higher concentrations along major routes followed by oil tankers.

The study by the National Oceanic and Atmospheric Administration (NOAA), the U.S. Maritime Administration (MARAD), and Exxon Corporation measured the amounts of hydrocarbons currently present in ocean waters. This knowledge of present-day distributions of hydrocarbons, which can come from a variety of sources besides petroleum, provides a baseline against which future environmental changes can be detected and evaluated.

A final report of the study has now been published by MARAD and NOAA's Marine Ecosystems Analysis Program. Both MARAD and NOAA are agencies of the Department of Commerce. In the report Edward P. Myers of the MESA program, and Charles G. Gunnerson, Environmental Engineering Advisor for NOAA's Environmental Research Laboratories, conclude that though hydrocarbon levels vary greatly from place to place, most measurements in the upper water levels are in the range of 1-10 parts per billion. In deeper ocean waters, hydrocarbon levels are lower, often less than 1 part per billion. Coastal and harbor waters, and open ocean waters frequented by tanker traffic, have higher concentrations of hydrocarbons than does the open ocean off major routes.

For the study, water samples were collected from Exxon tankers travelling on such routes as New York to the Gulf Mexico and the Persian Gulf to Europe, and from research vessels associated with the National Science Foundation in the Atlantic and Pacific. The researchers also culled hydrocarbon measurements from reports of research conducted by many other scientists.

Some of the samples were analyzed to determine the chemical types and possible origins of hydrocarbons. The researchers found that cycloparaffins were the dominant type everywhere. "Since cycloparaffins have not been reported as being ubiquitous in marine organisms, their presence would tend to suggest a petroleum source," they reported.

The National Academy of Sciences estimates that 6 million metric tons of hydrocarbons enter the sea each year. About 35 percent of this can be attributed to leakage incidental to the marine transportation of petroleum, river runoff adds 26 percent; natural seeps and the atmosphere contribute 10 percent each; nonrefining industrial wastes, urban runoff, and municipal wastes a total of 15 percent; and coastal refineries and offshore oil production, 4 percent. Organisms in the sea also produce hydrocarbons, but of a chemical type different from petroleum.

Myers and Gunnerson point out that experiments on petroleum's effects on marine life usually involve much higher concentrations than they found. But petroleum hydrocarbons at levels near those found at some places in the oceans can affect behavioral traits of certain organisms. The researchers suggest that studies focus on the effects and risks associated with present and possible future levels of hydrocarbons in the oceans.

The hydrocarbon report includes maps showing the locations where water samples were collected and the average hydrocarbon levels in different regions, graphs of relative frequencies of hydrocarbon concentrations along tanker and research ship routes, and profiles of hydrocarbon types at different depths.

The report **Hydrocarbons in the Ocean,** is available from Marine Ecosystems Analysis Program, NOAA, ERL, Boulder, CO 80302.

had passed their maximum and were dropping.

Salinities of surface and bottom waters varied markedly at 7- and 14-m stations, whereas at deeper stations seasonal fluctuations were restricted primarily to surface waters. The magnitude of yearly salinity fluctuations decreased with an increase in distance offshore. The effects of the seasonal freshwater inflow of the Mississippi River and other Louisiana rivers on salinities were clearly apparent in Louisiana and Texas offshore waters, although in the latter case there may have been a 1- or 2-mo lag.

NOAA Technical Report NMFS SSRF-708. Sutherland, Doyle F. **"Catch and catch rates of fishes caught by anglers in the St. Andrew Bay system, Florida, and adjacent coastal waters, 1973."** March 1977. 9 p. For sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402.

ABSTRACT

Anglers were interviewed on four fixed platforms in the St. Andrew Bay system and on charter boats that were fishing in the bay and adjacent coastal waters in 1973. They caught fishes of at least 54 species (not all were identified to species) in 31 families. The majority (58.0%) of the fishes that were caught from fixed platforms consisted of pinfish, *Lagodon rhomboides*, (18.2%); sea catfish, *Arius felis*, (12.2%); spotted seatrout, *Cynoscion nebulosus*, (10.0%); blue runner, *Caranx crysos*, (8.8%); and crevalle jack, *Caranx hippos*, (8.8%). On charter boats, king mackerel, *Scomberomorus cavalla*, comprised the majority of the catches (73.9%).

The average catch rates varied from 0.0 to 10.7 fish/h among anglers on fixed platforms and from 0.0 to 32.0 fish/h among charter boats. The greatest monthly average catch rates on fixed platforms were 2.2 fish/h in October at Deer Point Dam, 1.8 in October at Bailey Bridge, 1.8 in December at Hathaway Bridge, 2.3 in May at West Jetty, and 10.6 in September on charter boats. On the fixed platforms, the highest average catch rate for all months was 1.4 with squid and the lowest was 0.5 with fiddler crabs. Whole round scads and 00-squid spoons were used for bait by virtually all surveyed charter boats.

NOAA Technical Report NMFS SSRF-709. Cook, Steven K., and Keith A. Hausknecht. **"Expendable bathythermograph observations from the NMFS/MARAD Ship of Opportunity Program for 1974."** April 1977. 45 p. For sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402.

ABSTRACT

Results of the fourth year of operation of the NMFS/MARAD Ship of Opportunity Program (SOOP) are presented in the form of vertical distributions of temperature and horizontal distributions of sea surface temperature and salinity. Operational and data management procedures also, are discussed. Included are descriptive analyses of the most dynamic transects showing the Yucatan, Loop, Florida, and Gulf Stream currents and related eddies. Also, characteristics of the cold cell of bottom water on the Atlantic continental shelf are discussed.

NOAA Technical Report NMFS Circular 398. Cavaliere, A.R. **"Marine flora and fauna of the northeastern United States. Higher fungi: *Ascomycetes, Deuteromycetes,* and *Basidiomycetes.*"** March 1977. 49 p. For sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402.

ABSTRACT

This manual provides an illustrated key and alphabetical listing, with brief descriptions, of common genera of higher marine fungi in the classes Ascomycetes, Deuteromycetes (Fungi Imperfecti), and a single member of the Basidiomycetes. A glossary and selected bibliography complement the key. Information on methods of harvesting, incubation, and studying these fungi is also included.

NOAA Technical Report NMFS Circular 399. Coull, Bruce D. **"Marine flora and fauna of the northeastern United States. Copepoda: Harpacticoida."** March 1977. 48 p. For sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402.

ABSTRACT

This manual contains an introduction to the general biology, an illustrated key, an annotated systematic list, a selected bibliography, and an index of the 72 genera and 121 species of marine harpacticoid copepods reported from New Jersey

Effects of Marine Pollution Examined

The Health of the Oceans, by Edward D. Goldberg, published by the Unesco Press, is billed as "a preliminary report on the health of the oceans." Goldberg, Professor of Chemistry at Scripps Institution of Oceanography, La Jolla, Calif., lists five major marine pollutants: 1) halogenated hydrocarbons, 2) radioactivity, 3) heavy metals, 4) petroleum hydrocarbons, and 5) litter.

For each pollutant the author reviewed the international scientific literature on quantities being contributed by man and/or by nature, in order to evaluate man's impact on the marine environment. The effects of these pollutants on several marine organisms (and on man, in the case of mercury, etc.) is discussed. In addition the author discusses marine pollution dynamics, pollution prediction and monitoring strategies, and time scales in oceanic and societal processes. The author asks what more needs to be known, compared with what is already known, about the effects of man's pollution on the marine environment, in order to chart long- and short-term strategies for coping with marine pollution problems.

The Health of the Oceans, a 172-page, soft-cover book, costs $9.25 and is available from Unesco, 7, Place de Fontenoy, 75700, Paris, France.

to Maine. The key facilitates identification to genus, whereas the annotated systematic list discusses each known species.

NOAA Technical Report NMFS Circular 400. Engett, Mary Ellen, and Lee C. Thorson. **"Fishery publication index, 1965-74."** March 1977. 220 p. For sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402.

ABSTRACT

The following series of fishery publications of the Bureau of Commercial Fisheries (U.S. Fish and Wildlife Service) and the National Marine Fisheries Service (National Oceanic and Atmospheric Administration) in calendar years 1965-74 are listed numerically and indexed by author and subject: Circular, Current Economic Analysis, Current Fishery Statistics, Data Report, Fishery and Oceanography Translations, Fishery Bulletin, Fishery Facts, Fishery Industrial Research, Fishery Leaflet, Fishery Market Development Series, Foreign Fishery Leaflets, NOAA Technical Memorandum NMFS, Separates, Special Scientific Report—Fisheries, Statistical Digest, and Test Kitchen Series.

NOAA Technical Report NMFS Circular 401. McHugh, J. L. **"Fisheries and fishery resources of New York Bight."** March 1977. 50 p. For sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402.

ABSTRACT

The history of total fish and shellfish landings in the two states (New York and New Jersey) that form the landward boundaries of New York Bight is a history of change. Resource after resource has produced maximum landings, then declined. Total landings dropped from about 315,000 metric tons in 1956 to about 23,000 in 1967 and have risen only moderately since that time. The rise and fall of the industrial fisheries, mostly menhaden, was responsible for most of this

Tropical and Subtropical Fishery Technology and Maritime Bibliography Volumes Published

The first Tropical and Subtropical Fisheries Technological Conference was held 8-10 March 1976 in Corpus Christi, Tex. The proceedings, 37 papers, have been published by Texas A&M University's Center for Marine Resources in two volumes totalling 686 pages. They were compiled by the late Bryant F. Cobb III and Alexandra B. Stockton.

Volume I contains 19 papers, 16 devoted to shrimp. Of the non-shrimp contributions, one outlines the value of technology to the seafood industry, another explains the Food and Agriculture Organization's tropical fish technology cooperative research program. The third reviews the special problems associated with the handling and distribution of fresh fish and crustaceans in the tropics.

The shrimp papers cover the following topics: reproduction, Texas A&M mariculture programs, *Macrobrachium* culture chemical and nutritive composition of shrimp, cholesterol in shrimp tails, bacteriology, biochemistry, and physiology of shrimp, dehydration in stored frozen breaded shrimp, international standardization of shrimp products, trace elements in shrimp harvested from selected areas, PCB's and petroleum hydrocarbons in shrimp, etc.

The 18 papers in Volume II deal with such species as channel catfish, striped mullet, cod, croaker, lobster, and demersal and underutilized Gulf of Mexico fishes. Some of the topics include transfer of lipids through marine food chains, lipid metabolism in channel catfish, flavor problems in fish culture, comparisons of cage raised and wild striped mullet, using insects to supplement channel catfish feed, cold smoking of small mullet, microbial considerations of salt minced cod, fish as an extender in meat products, and underutilized fishery resources of the Gulf of Mexico.

Volume I (TAMU-SG-77-104) contains 416 pages while Volume II runs from page 417 through 686. Copies of the paperbound volumes of the **Proceedings of the First Annual Tropical and Subtropical Fisheries Technological Conference** are available at $20 per set from the Department of Marine Resources Information, Center for Marine Resources, Texas A&M University, College Station, TX 77843.

The **Bibliography of Maritime and Naval History Periodical Articles Published in 1974-75,** by Charles R. Schultz and Pamela A. McNulty, is the fourth volume in a continuing series. Schultz is a University Archivist with the Texas A&M Libraries, Texas A&M University, College Station, Tex., and McNulty is a Reference Librarian with the G. W. Blunt White Library, Mystic Seaport, Mystic, Conn.

This 160-page bibliography primarily lists articles published in 1974-75; however, it also includes articles from 1972 and 1973 that were not accessible when previous volumes were compiled. Items are arranged by subject into 17 categories, covering a wide span of marine literature. It includes useful sections on fisheries, vessels, small craft, maritime law, shipbuilding and allied topics, seaports and coastal areas, etc. The selection of "general" articles contains several references to ocean policy. The volume also has vessel, author, and subject indexes.

Copies of this fourth volume (TAMU-SG-77-601) are available from the Department of Marine Resources Information, Center for Marine Resources, Texas A&M University, College Station, TX 77843 at $4.00 each. Make checks payable to Texas A&M University. Copies of the 1973-74 volume may also be obtained from the Center for Marine Resources. The 1971 and 1972 bibliographies can be purchased from the Mystic Seaport Stores, Inc., Mystic, CT 06355, as long as the supply lasts.

decline, and this has masked trends in the food fisheries.

Altogether about 132 species or groups of species of fishes and invertebrates have been reported as landed in New Jersey or New York since 1880. Fifty of these are discussed and illustrated with figures and tables of landings.

Edible finfish species as a group reached peak landings in 1939 and declined fairly steadily to about one-third that level in the 1970s. Molluscan and crustacean shellfish production reached two peaks, in 1950 and 1966, the second considerably higher than the first. This recovery of shellfish landings in 1966 would not have occurred were it not for the rapid development of the surf clam fishery in the 1950s.

The timing of the decline makes it clear that foreign fishing was not the cause, for foreign fishing probably could not have affected the fisheries of New York Bight before the mid-1960s. Actually, total catches of resources taken only by domestic fishermen have declined more sharply than total domestic catches of species shared with foreign fleets. Foreign fishing is but a symptom of the troubles of the domestic fisheries, some of which are imagined. The ills of the domestic fisheries are economic and sociopolitical, and they will not yield easily to scientific solutions.

FISHERIES OF URUGUAY LEAFLET IS PUBLISHED

A new Foreign Fisheries Leaflet, 77-1, "Fisheries of Uruguay, 1975" has been published by the International Fisheries Analysis Branch and is available for distribution. The 17-page leaflet contains information on catch, the Uruguayan economic situation, fishery resources, grounds, fleet, catch processing, exports, the fisheries administration, research, foreign assistance, investment, and sales opportunities for U.S. companies. A special section in the report details each of Uruguay's major fishing companies. The report was written by Stuart Lippe and Gordon Little of the U.S. Embassy in Montevideo and Dennis Weidner of the Branch's staff.

A copy can be requested from: Services Branch, D825, ESIC, NOAA, WSC4, 6009 Executive Blvd., Rockville, MD 20852. Please enclose two self-addressed labels to facilitate mailing.

So You Want To Be A Commercial Fisherman

Three years ago *Marine Fisheries Review* devoted its entire June issue (36:6) to a longish manuscript entitled "Some ABC's of Fo'c'sle Living." Written by Sig Jaeger and A. K. Larssen, it was instantly popular, used coast to coast by vocational students and instructors, and was just as instantly out of print, even though many extra copies had been printed. Now, expanded and slightly retitled **The ABC's of Fo'c'sle Living,** it is back in print as a paperback book from Madrona Publishers of Seattle, Wash.

The authors have retained all their homely advice, hard won during their collective 80 years in commercial fishing. They've also added some new material and the publisher has wrapped it up into a fine 103-page volume for those interested in making their living at sea. New and important chapters include "The Tools of the Trade" (fishing gear that might be used), "About Marlinspike Seamanship" (implements for splicing rope and line), "Take Care of the Catch" (practical knowledge about proper fish care), and "Who Started It All" (a look at commercial fisheries development in the Pacific Northwest).

The book also has chapters on fo'c'sle living, clothing and personal gear, pilothouse duty, deck work, the fisherman's responsibilities, the hold, medical rights and personal care, how fishermen get paid, shore leave, a glossary of essential terms, and more.

Larssen, now retired, has fished virtually around the world; his articles appear in fishing publications from Seattle to Bergen, Norway. Jaeger, Manager, North Pacific Fishing Vessel Owner's Association, Seattle, has also fished widely, longlining for halibut and black cod, trolling for albacore, dredging scallops, etc. He has also served as consultant to the Marine Advisory Programs of the University of Washington and the University of Alaska.

"The ABC's . . . " was conceived and written as a guide or text for use in extension courses and vocational classes for would-be commercial fishermen. The new, updated edition fulfills that purpose very well. **The ABC's of Fo'c'sle Living** is available at $3.95 per copy from Madrona Publishers, Inc., 113 Madrona Place East, Seattle, WA 98112.

A Selected List of Cetacean References

Whales, Whaling and Whale Research, subtitled "A Selected Bibliography," contains 1,000 numbered English-language references to books, articles, bibliographic reviews, etc. on cetaceans, cetacean research, whaling, whale products, and related subjects. The volume was compiled by L. R. Magnolia, Manager, Technical Information Center, TRW Defense and Space Systems Group, Redondo Beach, Calif., for the Whaling Museum Society, Long Island, N.Y., for scientists, historians, and laymen.

The citations encompass such topics as natural history, biology, conservation, whale oil substitutes, legal affairs, acoustics, population research, whale attacks, traditional and modern whaling techniques, whaling ships and boats, scrimshaw, etc. The citations, not indexed, are listed alphabetically by the senior author. Most of the references were published during the 30-year period from 1946 to March 1976. The oldest was published originally in 1820.

The soft-cover book has 91 pages and is available for $4.95 (plus 35 cents for shipping) from The Whaling Museum, Cold Spring Harbor, Long Island, NY 11724.