

SWFC Research Activities on Albacore and Tropical Tuna, 1981-82

The La Jolla Laboratory of the NMFS Southwest Fisheries Center, La Jolla, Calif., conducts research on Atlantic albacore and tropical tunas in support of the U.S. commitment to the International Commission for the Conservation of Atlantic Tunas (ICCAT). The Center also administers a tuna port sampling program in Puerto Rico, maintains a comprehensive Atlantic tunas data base, facilitates the exchange of data between U.S. and foreign researchers and coordinates general scientific matters involving ICCAT-related research being done by U.S. scientists.

During 1981-82, research continued on stock assessments and fishery evaluations of Atlantic tropical and albacore tunas. U.S. fisheries were monitored and biological and fishery data collected in cooperation with the U.S. tuna industry and government officials. Atlantic tuna imports were sampled for biological information in Puerto Rico. Data collected through these activities were compiled and submitted to ICCAT, as required of ICCAT members.

A document describing 1981 Puerto Rican import sampling activities was prepared for the 1982 SCRS meeting. The 1981 results indicate that 79 percent, by number, of the yellowfin tuna imports sampled, and 83 percent of the bigeye tuna imports sampled were less than 55 cm fork length. Sampling for species composition in Puerto Rico during 1981 indicated that bigeye tuna comprised approximately 8 percent (by weight) of the mixed yellowfin-bigeye tuna import tonnage sampled.

The production model was used to analyze the Atlantic yellowfin tuna fishery. An approach which considers the appropriateness of the different production curves on the basis of current population theory was used to calculate

CPUE vectors. Results indicate that maximum sustainable average yield (MSAY) is between 110,000 t and 150,000 t for the Eastern Atlantic, and that the present fishery is operating near this level with the optimal amount of effort.

Between 1975 and 1980, review of Atlantic tropical tuna fisheries focused attention on the expansion of the surface fishery. This expansion consisted mainly of an increase in the number of large purse seiners participating in the fishery and an offshore extension of the fishery in the eastern tropical Atlantic during this period.

Single set data from the U.S. tropical tuna fleet covering the period 1968-81 were analyzed. Changes in fishing pat-

terns and operations were examined with respect to changes in fishing success.

The condition of the South Atlantic albacore stock was evaluated through production model analysis and Monte Carlo Simulation using updated data. The sensitivity of the results to data accuracy was investigated. The production model analysis suggests that the South Atlantic albacore stock is being exploited beyond MSY under the current pattern of fishing.

Research in support of ICCAT's International Skipjack Year Program (ISYP) continues at the SWFC. Maturity-fecundity and feeding behavior of skipjack tuna from the Western Atlantic are being investigated. Gonads and stomach samples were collected from landings in Puerto Rico and Brazil. Gonads are being analyzed historically to determine temporal/spatial distribution of spawning adults, and stomachs are being analyzed for food contents with particular attention to the occurrence and extent of skipjack cannibalism in the Western Atlantic. A new approach to stock identification using mitochondrial DNA is also being investigated.

Fish Attraction Buoys Deployed off California

The use of anchored buoys as "fish aggregating devices" (FAD's) was pioneered in the United States by the Honolulu Laboratory of the Southwest Fisheries Center (SWFC). After initial success in Hawaiian waters, the use of FAD's spread to many of the islands in the central and south Pacific. Perhaps the most successful employment of FAD's is in the tuna purse seine fishery in the Philippines, where for many years, "payaos," rafts constructed of bamboo, have been used to aggregate tunas.

Off the California coast, bluefin tuna show up regularly in summer and fall, and are caught by purse seiners working out of San Pedro and Port Hueneme. Researchers at the SWFC Laboratory at Tiburon, Calif., believe the FAD's deployed at strategic areas may attract and

hold the fish, providing greater efficiency to the fishery. A cooperative project to install FAD's has been initiated by the Fishermen's Cooperative Association of San Pedro, the Southwest Region of NMFS, and the SWFC Tiburon Laboratory.

The staff of the Fisheries Development Task at Tiburon assembled equipment and materials needed to build FAD's for deployment in the vicinity of Sixty Mile Bank last summer. Much of the equipment needed for constructing the FAD's was donated by the U.S. Coast Guard. Coast Guard personnel as well as personnel of the SWFC Honolulu Laboratory also contributed useful technical advice on how to construct and anchor the FAD's. Early reports showed evidence of their worth. Reports from sport fishermen indicated that many fish—mostly skipjack tuna—had been taken near both FAD's.

Nineteen Named to Regional Fishery Management Councils

Malcolm Baldrige, Secretary of Commerce, has appointed 19 people to the nation's eight Regional Fishery Management Councils. The appointments (R = Reappointment) are as follows. Caribbean Fishery Management Council: Arthur E. Dammann, R, former chief scientist, Caribbean Fishery Management Council, St. John, V.I. Gulf of Mexico Fishery Management Council: John M. Green, R, President, Mil-Vid Properties, Inc., Beaumont, Tex.; George A. Brumfield, R, Vice President—Operations, Zapata Haynie Corporation, Moss Point, Miss.; Mary A. Kumpe, governing board member, Southwest Florida Water Management District, Brooksville, Fla.

North Pacific Fishery Management Council: John R. Winther, owner, fishing vessel, *Teresa Marie*, Petersburg, Alaska; Sara S. Hemphill, President, Trading Company of Alaska, Anchorage, Alaska. Pacific Fishery Management Council: Richard A. Schwarz, assistant manager/engineering and projects, USDOE, Idaho Operations Office, Idaho Falls, Ida.; Robert G. Kaneen, retired from the California Department of Fish and Game, Long Beach, Calif. (and on 3 August 1983, Roger Thomas was appointed to the Council's California obligatory vacancy). South Atlantic Fishery Management Council: J. M. Pendarvis, R, owner, Pendarvis Chevrolet, Edgefield, S.C.; Margaret A. Stamey, R, member, North Carolina General Assembly, Raleigh, N.C.

Western Pacific Fishery Management Council: Gertrude I. Nishihara, R, founding member and board director of the Hawaii Fishing Coalition, Honolulu, Hawaii; Paul Stevenson, R, program director, Division of Instructional Development, Department of Education, Pago Pago, American Samoa. Mid-Atlantic Fishery Management Council: Alfred J. Hurlock, Jr., R, owner and President, Hurlock Roofing Co., Wilmington, Del.; David H. Hart, R, retired commercial fisherman, Cape May, N.J.; Harry M. Keene, R, owner, Bay County

Industrial Supply Co., Easton, Md.; James F. McHugh, R, consultant, Hampton, Vir. New England Fishery Management Council: Herbert R. Drake, owner, Drake's Harborside Fish Market, Rye, N.H.; Alan D. Guimond, President, Stonington Seafood Products, Point Judith, R.I.; William A. Lund, Jr., associate professor, Department of Marine Sciences, University of Connecticut, Noank, Conn.

The Fishery Management Councils, established by the Magnuson Fishery Conservation and Management Act of 1976, prepare management plans for the fishery resources within their geographic area. Council members are selected from nominees submitted by the governors of the states served by each council.

U.S. Sends Dry Salted Cod Sales Mission to Brazil

Six U.S. firms and Mission Director Milton M. Rose, NMFS, returned on September 21, 1983, from a 10-day codfish sales mission to Brazil with stops in Sao Paulo, Salvador da Bahia, and Rio de Janeiro. The mission's goals were to explore the market potential for exports of U.S. cod to Brazil and to position U.S. firms for future market penetration.

Brazil is an important consumer of dry salted species (bacalhau) and in 1982 imported 16,950 tons worth \$42 million. Over 90 percent of this fish was imported from Norway. Although at this time Brazil does not import any seafoods from the U.S., it exports annually to this country \$120 million worth of shrimp, lobster tails, tuna and other species.

The U.S. Foreign Commercial Service and the U.S. Embassy in Brazil provided extensive support and arranged for publicity and appointments prior to the mission's arrival. The participants received detailed briefings and background material on the Brazilian market and over 170 business meetings were held with Brazilian importers, brokers, agents, bankers, and government officials. In addition, mission members had the opportunity to make contact with importers and key government officials at receptions hosted at

each location by U.S. Consuls as well as at lunches and dinners where U.S. cod dishes were served.

The mission received wide exposure in the Brazilian press, radio, and television. Although the participants did not expect to make any sales, some did manage to sell products. In addition, all developed an excellent understanding of the market and concluded solid business relationships which will lead to future sales, barter, and joint ventures. According to the participants, the mission was a tremendous success.

Guatemala, Honduras Sign Tuna Agreement

Guatemala and Honduras have signed a tuna licensing agreement that should allow U.S. vessels access to major tuna grounds in the eastern tropical Pacific during the 1984 fishing season, according to the National Oceanic and Atmospheric Administration (NOAA).

The agreement, signed by the United States, Costa Rica, and Panama on 15 March 1983, goes into effect as soon as five coastal nations have ratified it. The United States Senate gave its approval for ratification on 27 July. U.S. officials expected all five countries to ratify the agreement by the end of the year.

NOAA said the new multinational accord should end the cycle of seizures of U.S. tuna boats because of conflicting jurisdictional claims and the subsequent imposition of retaliatory embargoes required by U.S. law. The agreement will allow fishermen of any nation that is party to the treaty to buy licenses to fish for tuna in a broad area of the Pacific, including the 200-mile fishery conservation zones of the member nations.

Fees charged fishermen from the first five countries to ratify the agreement will be \$60 per net-registered-ton. That fee may be renegotiated up to \$100 per net-registered-ton as other countries subsequently join the treaty. Modern U.S. tuna boats are typically about 600 net-registered-tons. Tunas covered by the agreement include yellowfin, skipjack, bigeye, albacore, bluefin, bonito, black skipjack, bullet, frigate, and kawakawa.

Ocean Pollution Data and Information Network

NOAA's Ocean Pollution Data and Information Network (OPDIN) has been established to improve dissemination of data and information resulting from ocean pollution programs conducted or sponsored by the U.S. Government. Ocean pollution data and information tend to be collected to serve the programmatic goals of particular agencies and stored in forms useful primarily to project investigators and agency personnel. Furthermore, it is often difficult for both Federal and non-Federal users to determine what ocean pollution data are available from Federal sources and how to obtain them. The OPDIN is being developed as a coordinating mechanism to make these data and information more accessible and useful.

In May 1981, NOAA's National Oceanographic Data Center (NODC) established the Central Coordination and Referral Office (CCRO) to head the development and operation of the Network. The goals of the Network are to: 1) Improve the accessibility and usefulness of Federal ocean pollution data and information to both Federal and non-Federal users, and 2) strengthen Federal interagency communication and coordination regarding ocean pollution data and information, as well as state, regional, and private sector awareness of these resources.

The Network is intended to supplement (rather than replace) existing agency data and information sources and will utilize existing facilities where possible. The essential components of the Ocean Pollution Data and Information Network are now in place and available to provide service to users. The CCRO is able to provide or assist in providing specific ocean pollution information or data and data products from Federal

sources, as well as from state agencies, academic institutions, and other non-Federal facilities.

CCRO establishment has enabled OPDIN to begin fulfilling one of its primary functions: Providing users of Federal ocean pollution data and information with a single contact point. In addition, a number of tasks to improve accessibility of ocean pollution data and information have been completed or are underway. Significant accomplishments to date include: 1) Regional Coordination and Referral Offices (RCRO's), 2) Network Design, 3) The National Marine Pollution Information System

(NMPIS), 4) NODC Marine Toxic Substances and Pollutants Data System, 5) Coastal Ocean Pollution Assessment News (COPAS), 6) Coastal Information System, 7) Pollution Data Entry Evaluation Project, and 8) OPDIN Round Table.

General information on Network activities and developments is available without charge. Requests for ocean pollution data and information from NOAA or from other Federal agencies are fulfilled at costs determined by the individual agencies. Costs of data and information products generally depend on the size and complexity of requests and on the ability of the activity to provide the needed products.

Requests for NOAA ocean pollution data and information or for assistance in obtaining ocean pollution data and information from other agencies or activities may be directed to Ocean Pollution Data and Information Network/CCRO, National Oceanographic Data Center, NOAA/NESDIS E/OCx8, Washington, DC 20235 (telephone 202-634-7510 or FTS 634-7510).

American Lobster Fishery Management Plan Approved

Conditional approval of the American Lobster Fishery Management Plan was announced late last summer by the NMFS Northeast Regional Office. The Plan was developed by the New England Fishery Management Council to implement the Federal share of a coastwide lobster management program. Regulations to implement the Plan were published in the *Federal Register* on 10 August 1983. The Plan will promote consistent coast-wide management of this valuable fishery. Many of the measures are currently imposed by the coastal states where lobsters are landed. The measures are scheduled to take effect over a period of 3 years. The measures and their effective dates are as follows:

7 September 1983

Landing or possession of lobster meat

was prohibited. Lobster parts may be landed (until 1 January 1986), provided that the sixth tail segment measures at least $1\frac{1}{16}$ inches in length and that not more than two claws are landed with each lobster tail. Landing of female lobsters bearing extruded eggs are prohibited, as is the removal of such eggs or the possession of lobsters from which eggs have been removed.

Vessel owners intending to fish for lobster in the fishery conservation zone (from 3 to 200 miles offshore) are required to obtain permits issued by NMFS or through cooperative agreements with the coastal states. NMFS will attempt to establish cooperative agreements with each State before the start of the 1984 fishing season. Until that time, the NMFS Regional Director indicated that as a matter of practicality a valid State lobster fishing license would be sufficient for fishing in the FCZ. After 1 January 1984, State licenses will only be accepted for FCZ fishing if the

license is properly endorsed and issued under a cooperative agreement. After 1 January 1984, fishermen who wish to apply for a lobster permit should contact their State marine fisheries agency to determine whether a cooperative permit program is in effect for their State. Any fisherman may also apply directly to NMFS for an FCZ permit. Information about the lobster fishery will be collected using the NMFS Three Tier Fishery Information Collection System.

1 January 1985

All lobsters landed whole must meet a minimum carapace length of $3\frac{3}{16}$ inches. All traps must be vented to allow release of sublegal lobsters and be marked with the owner's identification.

1 January 1986

All lobsters must be landed whole. A measure prohibiting the possession of V-notched lobsters in the fishery conservation zone in portions of the Gulf of Maine was also conditionally approved, for a period not to exceed 120 days (ending 4 January 1984) from 7 September 1983. The conditional approval made the measure effective on an interim basis while the New England Council considered modifications which would extend the measure throughout the range of the fishery and provide for enforcement at the dock. The public had an opportunity to comment on any changes in the regulations required by these modifications.

During the 120-day conditional approval, it was unlawful for fishermen to retain on board in the V-notch conservation area any lobster bearing a V-shaped notch in the right flipper next to the middle flipper, or any female lobster which is mutilated in a manner which could hide or obliterate such a mark. The V-notch conservation area is that part of the fishery conservation zone north and east of a line which begins at a point lat. $43^{\circ}06'N$, long. $70^{\circ}34'W$, and runs due southeast to a point lat. $42^{\circ}N$, long. $69^{\circ}35'W$, and then runs due east along the 42nd parallel to the seaward limit of the fishery conservation zone.

Fishermen or interested members of the public may obtain a copy of the Fed-

eral lobster fishery regulations by writing to the National Marine Fisheries Service, State Fish Pier, Gloucester, Massachusetts 01930. Mark the envelope "Request for Lobster Regulations."

Hawaiian Cruise Nets Squid Data

The National Oceanic and Atmospheric Administration (NOAA) ship, *Townsend Cromwell* returned to Honolulu on 25 September 1983, ending a 53-day fishery research cruise in the central North Pacific to assess squid resources between the Northwestern Hawaiian Islands and the fishing grounds of the North Pacific commercial squid gill-net fishery. Automatic squid jigging machines, surface gill nets, and midwater trawls were used on the cruise, according to Richard S. Shomura, Director, Honolulu Laboratory, SWFC.

Two kinds of squids, flying squid and red squid, both species caught and utilized commercially by the Japanese, comprised the bulk of the catch (92 percent by number and 98.8 percent by weight). Although their distribution overlaps during parts of the year, there was a clear separation of the species during the cruise. Flying squids were taken south of lat. $35^{\circ}N$, whereas red squids were taken north of this latitude. The commercial gill-net fishery for red squid extends from lat. 40° to $50^{\circ}N$ in the central North Pacific. Other species of squids taken during the cruise were the striped squid (1-14 at stations between lat. 29° and $40^{\circ}N$, and two juvenile *Onychoteuthis banksii* at lat. 33° and $37^{\circ}N$).

Jigging was the most effective means of catching the squids, according to Walter M. Matsumoto, Chief Scientist on the cruise. The best catch of flying squids (5.0 kg per machine per hour) was made at lat. $30^{\circ}N$, whereas that of red squids was at lat. $42^{\circ}N$ (13.4 kg per machine per hour). The latter catch rate is comparable with the catch rate of about 10.0 kg per machine per hour attained by commercial jigging boats in the Japanese squid jig fishery.

Fishing with a limited amount of gill nets 0.55 miles long and composed of nets with mesh sizes ranging from 2.5 to 7.5 inches, 55 red squids were taken in three sets at lat. $41-42^{\circ}N$. Most of the squids (53) were taken on the 2.5- and 3.5-inch mesh nets and two were taken on the 4.5-inch mesh net. None were taken on the 5.5- and 7.5-inch mesh nets.

The midwater trawl caught 166 juvenile postlarval squids representing 6 or more species from lat. 27° to $42^{\circ}N$; 36 percent of the catch was tentatively identified as red squid. The presence of juveniles and postlarvae suggests that the area is a spawning and nursery ground for these species. Matsumoto noted two interesting observations. One squid measuring 49.5 cm and weighing 3.5 kg (7.7 pounds) was taken at lat. $42^{\circ}N$, inside the area of the commercial gill-net fishery; and a second, measuring 52.6 cm and weighing 4.5 kg (9.9 pounds), was taken at lat. $33^{\circ}N$, well south of the fishery. Both squids exceeded the presently known maximum size of 45 cm for this species.

The second was the capture of flying squids in moderate to large numbers in the area to the south of the commercial fishery. Additional cruises to the area and in different seasons should provide the data necessary to determine if the concentration of this species of squid is large enough to support a commercial fishery.

Matsumoto was assisted on the cruise by Research Assistant Victor A. Honda of the Honolulu Laboratory. Other scientists participating in the cruise were Dean Parsons, National Marine Fisheries Service, Washington, D.C. and Hiromichi Yatomi, Tokai University, Japan.

Prepared and Preserved Fish Imports Are Up 22%

The United States International Trade Commission has released a report indicating that during 1978-82, U.S. imports of prepared or preserved fish increased from 234 million pounds to 285 million pounds, or about 22 percent.

The imports consisted primarily of canned fish, much of which is similar to the types of such fish domestically produced. Imports of prepared or preserved fish have supplied about one-quarter of U.S. consumption of such fish in recent years. During the period, U.S. exports, which showed an irregular upward trend from 81 million pounds in 1978 to 102 million pounds in 1982, consisted mainly of fish roe. U.S. consumption, consisting mostly of canned fish, averaged about 1 billion pounds a year and showed no marked shifts.

U.S. production of prepared or preserved fish showed no discernible trend in terms of quantity, reaching a high of 1.0 billion pounds in 1981 and a low of an estimated 0.8 billion pounds in 1982. The U.S. industry consists of hundreds of firms that prepare or preserve fish in canned, cured, and speciality forms; most of the firms are located in coastal areas.

This report is one of a series of summaries of trade and tariff information containing information on U.S. imports, exports, production, and conditions of competition in world trade. The summaries are designed to meet the

needs of wide and varied interests, including the Congress, the courts, Government agencies, importers, domestic producers, research organizations, and many others. The summaries contain descriptions of the thousands of products imported into and exported from the United States and information on product uses, U.S. producers, and customs treatment. The summaries also include analyses of the trade, as well as those bearing on the competitiveness of U.S. industries in domestic and foreign markets.

Copies of the report (USITC Publication 841, Control No. 1-3-37) can be obtained from the Office of the Secretary, United States International Trade Commission, 701 E Street NW, Washington, DC 20436.

Puget Sound Squid Resource Evaluated

The Utilization Research Division of the Northwest and Alaska Fisheries Center (NWAFC) has been cooperating with the Washington State Department of Fisheries and a commercial fishing vessel owner in evaluating the commercial potential of squid, *Loligo* spp., taken from Puget Sound.

About 350 pounds of squid, caught by the fishing vessel *Elusive* in Port Angeles harbor, were evaluated for process yields, fresh storage characteristics, and marketability. The squid, harvested by brail, ranged in size from 87.5 to 134 mm (mantle length) and weighed from 28 to 79 g. The sizes observed here generally corresponded with the size of squid typically found in the California fishery as reported by Kato and Hardwick (FAO Fish. Rep. (170) Suppl. 1:150 pp., 1975).

About 19 pounds of squid (average 8.0 count squid/pound) were processed by hand which included removing tentacles, viscera, and skin and washing the mantles. This yielded 6.2 pounds (33 percent) of mantles or steaks and 3 pounds (16 percent) of tentacles for a total recovery of edible meats of 49 percent. A similar yield was obtained for small (13 count) squid. Ten pounds of 9

count squid were skinned by machine (Townsend Model 7000¹) with little or no difficulty. The Townsend will skin whole or cleaned (mantle tubes only) squid at about 15 squid/minute. With a little practice, the skinning rate can be increased. The yield of cleaned tubes from this operation was 38 percent.

Squid are normally bleached by soaking in fresh water slush ice before they are packed and frozen. This requires about 4-8 hours of soaking with several stirrings. Besides bleaching for marketing, this process also serves to remove much of the "squid ink" while increasing weight. In our preliminary tests, the squid increased their gross weight by 10.7 percent in 4 hours.

Squid packed 40 pounds/bag, iced and stored at 35°F, spoiled in 3½ days after landing. Spoilage was characterized by an intense sulphur dioxide odor and reddening of the white mantle flesh. Squid held in slush ice were of acceptable quality through 4½ days of refrigerated storage.

Several local brokers familiar with squid products were invited to evaluate the quality of our 2.5-day frozen product. The consensus was that the products were of excellent quality and compared favorably with squid products produced in California.

Harold J. Barnett

Reward for Tagged Pollock

During September 1983, fisheries biologists tagged small "harbor" pollock along the central Maine Coast. Each tag is a yellow spaghetti-like tube which is inserted below the dorsal fin, and a \$3 reward will be given for each returned tag.

Anyone capturing a tagged pollock should return the tag, together with information on the date and location of capture, to the nearest National Marine Fisheries Service (NMFS) port agent

¹Mention of trade names or commercial firms does not imply endorsement by the National Marine Fisheries Service, NOAA.

This statement is required by The Act of August 12, 1970, Section 3685, Title 39, U.S. Code, showing ownership, management, and circulation of the *Marine Fisheries Review*, publication number 366-630, and was filed on 29 September 1983. The *Review* is published quarterly (four issues annually) with an annual subscription price of \$8.75 (sold by the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402). The complete mailing address of the office of publication is: Scientific Publications Office, F/NWR1, NMFS, NOAA, 7600 Sand Point Way N.E., Bin C15700, Seattle, WA 98115. The complete mailing address of the headquarters of the publishing agency is: National Marine Fisheries Service, NOAA, Department of Commerce, 2001 Wisconsin Ave., N.W., Washington, DC 20235. The name of the publisher is Jack McCormick and the editor and managing editor is Willis Hobart; their mailing address is: NMFS Scientific Publications Office, 7600 Sand Point Way N.E., Bin C15700, Seattle, WA 98115. The owner is the U.S. Department of Commerce, 14th St., N.W., Washington, DC 20230; there are no bondholders, mortgagees, or other security holders. The purpose, function, and nonprofit status of the organization (agency) and the exempt status for Federal income tax purposes has not changed during the preceding 12 months. The extent and nature of circulation is as follows: Total number of copies (A) (average number of copies of each issue during the preceding 12 months) was 2550 and the actual number of copies of the single issue published nearest to the filing date was 2551. Paid circulation (B) is handled by the U.S. Government Printing Office, Washington, DC 20402, and (C) the total number printed for their sales (mail subscriptions and individual sales) was 750 for both the average number of copies each issue during the preceding 12 months and the actual number of copies of the single issue published nearest to the filing date. Free distribution (D) by mail, carrier or other means, samples, complimentary, and other free copies (average number of copies each issue during the preceding 12 months) was 1800 and the actual number of copies of the single issue published nearest to the filing date was 1801. The total distribution (E: sum of C and D) (average number of copies each issue during the preceding 12 months) was 2550 and the actual number of copies of the single issue published nearest to the filing date was 2551. There were no copies not distributed or returned from news agents (F). The total (G: sum of E and F) is equal to the net press run figures shown in item A: 2550 and 2551 copies, respectively. I certify that the statements made by me above are correct and complete. (Signed) Jack McCormick, Publisher.

(offices in Rockland, Portland, and Gloucester), or to the nearest Maine Department of Marine Resources (MDMR) office or representative.

The tagging project is a cooperative effort between the NMFS Northeast Fisheries Center (NEFC) in Woods Hole, Mass., the MDMR, and the Canadian Department of Fisheries and Oceans in Dartmouth, Nova Scotia. According to Stephen H. Clark, Chief of the NEFC's Gulf of Maine-Georges Bank Resources Investigation, the project "should provide information for distinguishing different pollock populations, or 'stocks,' and for determining migration patterns in the western Gulf of Maine." Clark adds that "such information is needed to effectively manage pollock resources in the Northwest Atlantic."

The Canadian Department of Fisheries and Oceans has tagged small harbor pollock along the east coast of Nova Scotia for several years. Those tagged fish have been recaptured throughout the Scotian Shelf region, and a few have also been recaptured on eastern Georges Bank and in the central Gulf of Maine. Until now, no comparable tagging study has been done for the large concentrations of small harbor pollock found in some areas along the Maine coast in summer and autumn.

NOAA's Environmental Satellite Data Archive

NOAA's Satellite Data Services Division (SDSD) functions as the official U.S. archive for all data and information from NOAA's geostationary and polar-orbiting satellites, i.e., the Metsat system, as well as several NASA experimental satellites and some of the U.S. Defense Meteorological Program satellites.

As a part of the National Environmental Satellite, Data, and Information Services (NESDIS), SDSD is located in the World Weather Building near Washington, D.C. This arrangement gives the Division access to near-real-time data concerning the operational environmental satellites under NOAA's management. It also facilitates the transfer of

digital tapes and photographic negatives between the two organizations whenever the need arises.

The Satellite Data Services Division's archive dates back to April 1960, with data from the original TIROS-1 satellite, and continues through the present. Included in the archive today are data from the complete TIROS series, ESSA series, ITOS/NOAA series, and ATS/SMS/GOES series of spacecraft.

Currently, SDSD is receiving digital data and film products from the two operational geostationary satellites—GOES-East and GOES-West—every half-hour, 24 hours a day, in addition to data from the polar-orbiting satellites, NOAA-7 and NOAA-8, plus NASA's NIMBUS-7 with its experimental Coastal Zone Color Scanner. Over 10 million photographic negatives and the equivalent of over 250,000 computer-compatible tapes have been archived to date.

Products available from the Satellite Data Services Division include both full- and reduced-resolution digital data from the NOAA satellites, as well as photographic prints measuring up to 30 by 30 inches. Prices for a digital tape start at \$99 each; 10-inch black-and-white photographic prints start at \$8.50. Analysis charts (both historical and current) are available on a subscription basis, with weekly mailings.

Several products available through the Division are currently being used by organizations who are also familiar with Landsat data. These products include tapes and film of images acquired by the SEASAT Synthetic Aperture Radar (SAR) sensor, and high-resolution (1.1 km) data from the Advanced Very High Resolution Radiometer (AVHRR) sensors aboard the present NOAA-series polar-orbiting satellites. SAR data, with 24-m resolution, have provided a wealth of information for the geologic and oceanographic community, offering coverage from July-October 1978 over the United States, Canada, Central America, Western Europe, Greenland, Iceland, and the surrounding waters. AVHRR data, with 1-km resolution as compared to Landsat's 80-m resolution, have proven useful as a source of multichannel information which can be ac-

quired twice daily over any specified region of the world.

The staff at SDSD—meteorologists, oceanographers, systems analysts, and others—is ready to help users get environmental remote sensing data that fit their needs. Additional information on SDSD products, services, ordering procedures, and prices can be obtained by contacting: NOAA/NESDIS, Satellite Data Services Division, World Weather Building—Room 100, Washington, DC 20233; telephone: (301) 763-8111.

Double Freezing Pollock Is Tested in Alaska Lab

The Kodiak Laboratory of the NWAFC Utilization Research Division has participated in a cooperative experiment with a group of Alaska-based fishermen and a company representing a Chinese firm interested in processing Alaska pollock. The experiment involved freezing whole pollock held for various periods on ice, then thawing the fish, filleting, and refreezing in the fillet block form. This mode of operation has been considered to be one method of handling Alaska pollock for domestic use and is of considerable interest.

The tests at Kodiak consisted of two phases. The first was simply the preparation of blocks to be evaluated by the fishermen's potential customer. The second phase was a laboratory-scale test using pollock held on ice for periods of 3, 4, and 5 days. Samples of each lot were frozen whole and stored at -18°C . After 45 days, the fish were thawed, filleted, packed into 16.5-pound blocks, and refrozen. Following an additional storage period of 30 days, the blocks were evaluated along with fillets prepared from single frozen lots.

The results show detectable quality loss due to double freezing. However, the quality is acceptable and the change is probably not sufficient to justify rejection by a commercial user. If the product is acceptable to the user, the trawlers landing fresh Alaska pollock at Kodiak and Kodiak processors will have a market for whole frozen fish.

Richard W. Nelson