

Sibson NORTHEAST FISHERIES CENTER

MONTHLY HIGHLIGHTS



United States Department of Commerce
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
Northeast Fisheries Center
Woods Hole, Massachusetts 02543

JANUARY 1984

CATALOG OF TUNAS AND MACKERELS PUBLISHED BY FAO

FAO has published an annotated and illustrated catalog which is a world-wide inventory of all 49 representatives of the family Scombridae. It is aimed primarily at individual workers and institutions concerned with scombrid fisheries. The catalog is a source of wide-ranging basic information by species, and is relevant to all aspects of systematics, biology, and fisheries. Identification keys, distribution maps, and illustrations are provided for each species. It is the second in a series of worldwide species catalogs produced by FAO. It was written by Bruce B. Collette (National Systematics Laboratory) and Cornelia Nauen (FAO). Contact Dr. Bruce Collette (FTS/202-357-2524).

AT-SEA SAMPLING ON COMMERCIAL VESSELS EXPANDED--DATA TO BE USED IN ASSESSMENTS

The Center expanded its commercial sea-sampling program during January. A minimum of 26 trips are proposed for 1984, covering the area from Maine to Virginia. Trips will be undertaken on vessels from the major and some minor New England and Middle Atlantic ports. Vessel captains and/or owners are being invited to participate.

Assessment scientists and port agents will be placed aboard such vessels to collect information during fishing operations. This program will obtain detailed catch-and-effort data on a per-tow basis. Length measurements and age samples of fish discarded at sea, as well as the marketable catch, will also be obtained. Such information will be used in developing fish stock assessments. Contact Thurston Burns (FTS-840-1309 or 617-548-5123).

US-POLAND RESEARCH FISHERY FOR OVERWINTERING ATLANTIC MACKEREL UNDERWAY

Two Polish factory trawlers (*Admiral Arciszewski* and *Kniozik*) departed Boston on January 6 to begin a research fishery for Atlantic mackerel. This cooperative fishery has been conducted annually since 1981 by the GRYF Deep Sea Fishery Company (Szczecin), the Sea Fisheries Institute (Gdynia), and our Center. Periods of intensive searching alternate with routine fishing operations. Aboard each vessel a Polish and a Center scientist/technician collect data.

By the first port call in New York (January 25), the vessels had located and fished on mackerel from off northern New Jersey to the mouth of Chesapeake Bay. The initial catch of these vessels totaled about 1,800 metric tons. The two vessels will be permitted to take a total of 5,000 metric tons of mackerel in the conduct of the research activity. Work is expected to be completed by late March or early April. Contact Dr. Emory Anderson (FTS-840-1251 or 617-548-5123).

WITCH FLOUNDER FISHERY INTENSIFIES--MAINTAINING RECENT CATCH LEVELS QUESTIONABLE

A recent stock assessment for witch flounder in the Gulf of Maine indicates a substantial increase in exploitation of this resource. Landings have increased from an average of 3,300 metric tons during the late 1970's and early 1980's to 5,100 metric tons in 1982; landings for 1983 are expected to approximate 7,000 metric tons. To a large extent, these increased landings reflect development of a combined fishery for witch flounder and American plaice during warmer months, and by-catch in other fisheries (such as northern shrimp) in which effort has been increasing. Also, the abundance indices from the Center's research vessel surveys have declined since 1981. This downward trend implies a significant increase in fishing mortality.

Harvests of 5-6,000 metric tons during the early 1970's were followed by declines in abundance and biomass, and in reduced landings; it is therefore questionable whether recent catch levels can be sustained. Contact Dr. Stephen Clark (FTS-840-1312 or 617-548-5123).

GEORGES BANK FISHES: MAN CATCHES 10-15%; OTHER FISH, SQUIDS, WHALES, & BIRDS CATCH REST

A study was completed by Center staff on the productivity of Georges Bank compared with other high-latitude shelf ecosystems, for all trophic levels from phytoplankton to whales. Production of fish per unit of area on Georges Bank is higher than in other North Atlantic regions, and comparable to fish production in the East Bering Sea.

Most of the fish production on Georges Bank is consumed by natural predators, including other fish, squids, whales, and birds; only about 10-15 percent of the total fish production appears to be available to man on a sustainable basis. Contact Dr. Marvin Grosslein (FTS-840-1252 or 617-548-5123).

ALGAL BIOASSAYS SHOW NITROGEN USUALLY THE LIMITING NUTRIENT ON THE NORTHEASTERN SHELF

Assay of 23 samples completed a long-term algae assay study of the relative scarcity of phytoplankton nutrients on the Northeast shelf. Statistical analyses of assay results, which identify nitrogen to be most critical in this respect, are near completion. Contact John Mahoney (FTS-342-8255 or 201-892-0200).

FISH DISEASE SURVEY METHODS TO BE STANDARDIZED

Key staff with the Center's research-vessel survey program participated in an ICES-sponsored cruise and workshop which focused on methods of fish disease surveys. Some perceived differences in disease prevalence were shown to be only a function of variations in data collection, disease diagnosis criteria, and data evaluation. Practical work with the catches and discussions of the results of these exercises were carried out in addition to the formal presentation of prepared papers. A final report on standard procedures for conducting a disease survey will be submitted as an ICES document. Contact Linda Despres-Patanjo (FTS-840-1346 or 617-548-5123).

LECTURES ON MARINE FISH DISEASES ADDED TO USFWS'S FRESHWATER FISH DISEASES COURSE

For the first time, the six-month "long course" on freshwater fish diseases at the U.S. Fish and Wildlife Service's National Fisheries Academy has included lectures on diseases of marine fishes. On January 19, the Center's Dr. Robert Murchelano delivered two lectures on the etiology and pathogenesis of infectious diseases in economically important marine fishes. The lectures presented detailed morphological and biochemical information on a large variety of microbial and metazoan parasites, and also included in-depth descriptions of the histopathology produced by the pathogens discussed. The lectures were well received, and it is anticipated that in succeeding years the long course will include more presentations on marine fish diseases. Contact Dr. Robert Murchelano (301-226-5193).

NEW MONITORING OF HYDROCARBON POLLUTANTS IN GULF OF MAINE SEDIMENTS

A new monitoring study is underway to obtain baseline levels of sediment-bourne chlorinated and petroleum hydrocarbon pollutants from sites in Casco Bay and the Gulf of Maine. The specific pollutants are aromatics, alkanes, alkenes, polynuclear aromatics, and isoprenoids. Contact Donald Gadbois (FTS-837-9286 or 617-281-3600).

SEABED OXYGEN CONSUMPTION RATE IN NEW YORK BIGHT APEX UNCHANGED SINCE 1974

Studies have shown that the seabed oxygen consumption rate--a measure of the decomposition of organic matter--for the New York Bight, as a whole, has not changed significantly since a 1974-75 investigation, despite a general trend of declining consumption rates during this period. Seabed oxygen consumption has lowered significantly in response to decreased dredge-spoil dumping. This decrease, however, has been offset by increased rates of oxygen consumption in sediments impacted by increased sewage-sludge disposal. Contact William Phoel (FTS-342-8215 or 201-872-0200).

NO RED-TIDE-CAUSING DINOFLAGELLATES YET FOUND OFF NEW JERSEY

Our cooperative survey with the New Jersey Department of Environmental Protection for the red tide dinoflagellate *Gonyaulax excavata* in New Jersey did not detect vegetative cells in the Navesink and Shrewsbury Rivers or cysts in the Atlantic City area. On these occasions, we used a hand-pumping system for water and sediment collections which is a favored method by New England and New York investigators. Contact Dr. James Thomas (FTS-342-8246 or 201-872-0200).

GROWTH OF SURF CLAMS IN BOTTOM CAGES HAS AQUACULTURE POTENTIAL

Hatchery-produced surf clams (*Spisula solidissima*) of various sizes have been reared subtidally at various densities in wire-mesh cages. Cages were 60 cm x 60 cm x 35 cm, had either 1.25 or 0.75-cm mesh openings, were placed either nearshore (2 meters deep at mean low water) or offshore (75 meters deep at mean low water), and were partially buried in the natural seabed, allowing the clams to burrow. (cont.)

Clams smaller than 35 mm in length showed no reduction in growth at planting densities up to 2,000 per square meter. At lengths greater than 34 mm, clams grew most rapidly at a planting density of 500 per square meter. Growth was related to temperature as influenced by depth. Clams at shallow, nearshore sites grew most rapidly between May and September when seawater temperature was higher than at deeper offshore sites. Conversely, from September to November, growth at shallow sites ceased, while it continued at deeper sites where temperature was warmer. No significant difference in growth was found between clams in cages with 0.75 and 1.25-cm mesh openings.

Survival rates of the caged clams exceeded 90 percent. Predators were effectively excluded from the cages, and biofouling was minimal at all sites. Growth results suggest that one-season, intensive cage culture of surf clam seed can be a viable grow-out method to produce 50-mm clams for the commercial market. Contact Edwin Rhodes, Jr. (FTS-642-5226 or 203-783-4226).

CHEMICAL COMPOSITION OF ALGAE AFFECTS THEIR NUTRITIONAL VALUE TO JUVENILE AMERICAN OYSTERS

Studies were completed on the gross chemical composition of two closely related algal flagellates that differ in nutritional value for juvenile American oysters (*Crassostrea virginica*). The first algal species had a considerably smaller dry weight per cell, but contained higher percentages of protein and carbohydrate. The second species contained a significantly higher percentage of lipid.

In oyster feeding studies conducted with several other algal species, dry weight of algae has not correlated with nutritional value. It is likely that differences in the chemical compositions of these two algal species could explain the differences in their food values. Contact Dr. Ravenna Ukeles (FTS-642-5223 or 203-783-4223).

SORBATE TREATMENT EXTENDS SHELF LIFE OF BLUE CRAB MEAT

We have reported previously that sorbates can preserve fresh fillets as long or longer than irradiation. We have now found that a 2.5 percent potassium sorbate solution can extend the shelf life (at 34°F) of blue crab meat by 28 percent over non-dipped controls. Contact Vincent Ampola (FTS-837-92285 or 617-281-3600).

U.S. STANDARDS FOR GRADES OF SHRIMP BEING TOTALLY REVISED

Proposed U.S. Standards for Grades and draft Instructions concerning fresh or frozen fish steaks, fresh or frozen fillets, fillet blocks, minced fish blocks, frozen fish portions and fish sticks, fresh or frozen freshwater catfish, and fresh or frozen shrimp are being prepared. Based upon comments received at a recent industry meeting, the shrimp standard is being completely revised. Contact John Ryan (FTS-837-9248 or 617-281-3600).

For more information on the above items, contact the name and number within the item, or the Center's Information & Publications Office (FTS-840-1228 or 617-548-5123 x 228).

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FEBRUARY 1984

FOOD-DEPRIVED STRIPER LARVAE RAPIDLY BECOME BLIND; MORE VULNERABLE TO STARVATION & PREDATION

Although starvation per se may not be a major factor in survival of certain offshore larval fish species (e.g., Atlantic cod, haddock), it may be a major factor for those spawning in nearshore and estuarine environments that have been changed by man. Our experiments with newly hatched but food-deprived striped bass larvae have clearly shown degenerative and pathological changes in the neural and non-neural portions of the eye as early as five days after hatching. The conversion of striped bass larvae from endogenous (yolk) to exogenous (prey) feeding during their first week after hatching is considered "critical" to their survival. Rapid onset of limited vision in food-deprived striped bass larvae may increase their chances of starvation or predation by other fish species. Contact Dr. Joel Bodammer (301-226-5193).

HERRING LANDINGS ON THE DECLINE

The Gulf of Maine's Atlantic herring fisheries have sharply declined within the last two years. Landings in the coastal Maine juvenile herring fishery declined from 48,200 metric tons (mt) in 1981 (the highest catch since 1963) to only 18,200 mt in 1983. This decline is believed attributable both to reduced availability of juvenile herring to the fixed-gear fisheries, and to reduced recruitment. Similar declines occurred in the Jeffreys Ledge adult herring fishery, where landings declined from 36,200 mt in 1980 to only 4,300 mt in 1983. Here, declining abundance, changes in availability, and a weak export market associated with recovery of European herring stocks all appear to have contributed to the decline in landings.

Both Center and Massachusetts Division of Marine Fisheries (MDMF) research-vessel survey results indicate decreased abundance of herring during the last several years. No improved recruitment has been found in Maine Department of Marine Resources larval herring surveys or in MDMF estuarine seine surveys in which "brit" (age 1) herring have been routinely collected. A recently completed Center winter survey will be used to evaluate relative abundance of herring as a supplement to these alternative survey methods. Contact Gordon Waring (FTS-840-1311 or 617-548-5123).

CAN LENGTH OF FROZEN STORAGE IMPROVE LENGTH OF ICED STORAGE AFTER THAWING?

We have found what appears to be a progressive reduction in the bacterial content of frozen Atlantic cod fillets over a six-month storage period. This reduction prolonged the iced shelf life of the cod fillets when thawed, commensurate with the length of time the fish had been frozen. Contact John Kaylor (FTS-837-9275 or 617-281-3600).

SHARK TAGGING ON INCREASE; TAGGING NEWSLETTER ALMOST READY

Just like the East Coast recreational shark fishery--now 22 million pounds annually--the NMFS Cooperative Shark Tagging Program is growing. In 1983, a record 5,860 fish representing 29 shark species and seven teleost (bony fishes) species were tagged under the program. The principal species tagged were blue, sandbar, dusky, and mako sharks. A record 186 tags were also recaptured from 19 shark species by fishermen from 13 countries. Recaptures included: blue sharks after 2.3 years at liberty and over distances of nearly 1,800 miles, sandbar sharks after a record 17.6 years and over nearly 2,000 miles, and a tiger shark over a record 1,900 miles from New York to Costa Rica.

This and other information on food habits, age & growth, and distribution have been summarized for our 1983 newsletter, "The Shark Tagger," which will be sent to 2,500 cooperators next month. Contact John Casey (FTS-838-7142 or 401-789-9326).

PREY AVAILABILITY TO JUVENILE BLUEFISH MAY INFLUENCE STOCK RECRUITMENT

During 1981 and 1983 we investigated the relationship between feeding and growth of juvenile bluefish in Sandy Hook Bay, New Jersey, an important nursery area for this species. Stomach contents from fish sampled in 1981 showed that juveniles fed predominantly on fishes, including Atlantic silversides, bay anchovy, mummichog, and striped killfish. In contrast, during 1983 the juvenile bluefish were consuming plankton in June, but were consuming crustaceans and fishes by September. Comparison of growth/condition between the two year classes of juvenile bluefish showed that, generally, growth was highest when consumption of fish prey was also highest. The results suggest that a lack of certain prey, specifically silversides and anchovy, may limit growth/condition of juvenile bluefish during their first year, and ultimately reduce survival and subsequent recruitment to the fishery. Contact Anne Studholme (FTS-342-8279 or 201-872-0200).

HADDOCK ASSESSMENT MARKS CONTINUED DECLINE

The Center has released an updated assessment of the Georges Bank and Gulf of Maine haddock resource. Results for Georges Bank indicate a continued decline in abundance since the brief period of recovery in the late 1970's. Landings have declined from 27,500 mt in 1980 to only 12,600 mt in 1983; stock biomass estimates and research-vessel survey indices declined by over 70 percent during the same period. The 1984 catch is expected to be substantially less than 10,000 mt. A reversal of this trend is unlikely before 1986 at the earliest, since research-vessel survey indices for recent year classes are very poor.

The outlook for the Gulf of Maine stock is brighter, although abundance appears to be lower than in former years. Landings in the last several years have averaged around 6,500 mt and will probably remain near this level in 1984. Future prospects appear better since the 1979, 1980, and 1982 year classes seem relatively strong. Contact Dr. William Overholtz (FTS-840-1256 or 617-548-5123).

U.S. DELEGATION GARNERS OFFICIAL APPOINTMENTS WITHIN NEW SALMON CONSERVATION ORGANIZATION

Representatives of several nations from both sides of the Atlantic gathered in Edinburgh, Scotland, during January 16-20 for the inaugural meeting of the North Atlantic Salmon Conservation Organization (NASCO). The purpose of NASCO is to promote the conservation, restoration, enhancement, and rational management of salmon stocks in the North Atlantic Ocean. NASCO is composed of a Council and three Regional Commissions which are responsible for developing scientific research programs and regulatory measures to reduce the interception of salmon by offshore foreign fisheries.

The U.S. delegation was composed of three Commissioners to NASCO (Allen Peterson, Frank Carlton, and Richard Buck), as well as government advisors and scientists. At the meeting, Peterson was appointed as Vice President of NASCO's Council, and Buck was appointed as Vice Chairman of the North American Regional Commission. The next meeting is again in Edinburgh beginning May 22. Contact Arthur Neill (FTS-840-1350 or 617-548-5123).

ONLY ONE-DAY-FRESH COD KEEP QUALITY AFTER SIX MONTHS OF FROZEN STORAGE

The experiment to determine the frozen-storage stability of Atlantic cod that had been stored on ice for 1, 6, or 9 days prior to freezing is continuing. All frozen samples were rated as unacceptable after six months of storage at +10°, 0°, and -10°F, except for the one-day-iced sample stored at -10°F. This sample is still acceptable after eight months of storage. Instron, texture, and Hunter L color measurements of the samples are continuing. Contact John Kaylor (FTS-837-9275 or 617-281-3600).

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MARCH 1984

U.S. BUTTERFISH CATCH HIGH, DISCARD A MAJOR PROBLEM

Landings of butterfish by U.S. fishermen during January-February totalled 5,600 metric tons (MT), the highest ever for the U.S. winter fishery. (The record *yearly* total for U.S. landings was 8,900 MT in 1982.) In addition, the record high discard rates of age 0 butterfish observed during August-December 1983 appear to be continuing into 1984. Estimates of present discard are about 30-50 percent of the landed catch. These high discard rates result from the strong 1983 year class and the decreased abundance of older, larger butterfish.

The development of a new "supersmall" market category has encouraged an intense fishery on small butterfish, but has also helped to maintain the high discard rates, as not all small fish are acceptable in the new market category. The large catches of small butterfish will result in lost yield and reduced recruitment to the spawning stock. Contact Gordon Waring (FTS-840-1311 or 617-548-5123).

NEW AND POTENTIALLY SERIOUS DISEASE FOUND IN SOFT CLAMS

We recently applied a new method of disease diagnosis--using histocytologic preparations of molluscan blood--to soft clam and blue mussel samples from several sites along the Northeast and Mid-Atlantic States. The diagnosis revealed a possibly new species of haplosporidian parasite in the blood of 3 of 50 clams from Sandwich, Massachusetts. These three blood-based diagnoses were verified histologically. Gross lesions which contained plasmodia of this parasite also occurred in gill tissue of nine of these clams. We estimate a disease prevalence of 20 percent in this population. This parasite is a potentially serious pathogen of clams; it's morphologically similar to *Haplosporidium nelsoni*, the oyster pathogen associated with mass mortalities along the Mid-Atlantic States. Contact Austin Farley (301-226-5193).

NEW LOW-ENERGY PROCESS TO CONVERT FISH WASTES TO FERTILIZER

The fish-waste byproducts generated during fish processing are a potential source of marine pollution if discharged into the marine environment, but are a potential source of livestock feed or agricultural fertilizer if converted into fish meal. Such conversion, though, involves dehydration which involves high energy use.

The Center has just developed a method which produces fish silage acceptable for agricultural fertilizer within 48 hours and with little energy expenditure. The silage produced by this "formic acid process" will be tested by the Essex (Massachusetts) Agricultural Institute to evaluate its agricultural potential. Contact Vincent Ampola (FTS-837-9285 or 617-281-3600).

BOTTOM INVERTEBRATE POPULATIONS IN NORTHEAST ARE STABLE OVER TIME

As part of NOAA's Northeast Monitoring Program, Center scientists have sampled small bottom-living invertebrates such as clams, snails, crustaceans, and polychaete worms at 25 stations on the Northeast continental shelf each summer and winter since 1978. Populations of these animals are monitored because they are: (1) often the most useful indicators of biological effects of environmental change, both natural and man-induced; (2) important prey for commercially and recreationally valuable species; and (3) a source of contamination for those species. For nine of the stations, we could compare our findings with earlier data collected by other investigators, going back as far as 1955 for the Buzzards Bay station.

Based on a comparison of such ecological parameters as species diversity, community structure, etc., we find that inshore stations, particularly those in the New York Bight's Christiaensen Basin and Upper Hudson Shelf Valley, have been and remain the most stressed. Populations in these two areas have not been much further altered since the early 1970's, however. The other stations used in the comparison are not becoming more like the Bight ones, or otherwise showing signs of increasing stress, even though there has often been considerable variability in their ecological parameters. Contact Robert Reid (FTS-342-8220 or 201-872-0200).

U.S.-POLISH MACKEREL RESEARCH FISHERY BENEFITTING U.S. INDUSTRY

The U.S.-Polish cooperative research fishery for Atlantic mackerel which began in early January is nearing completion. Two Polish factory trawlers, *Admiral Arciszewski* and *Kniazik*, have conducted searching and fishing operations primarily between New Jersey and North Carolina, but have gone as far north and east as Georges Bank. Mackerel have been found throughout the New Jersey-North Carolina area, and catches through the end of March have totalled about 4,600 metric tons. The two Polish trawlers have benefitted some U.S. trawlers that are fishing for mackerel and participating in joint ventures with East German and Dutch trawlers, by providing information to the U.S. trawlers on fish location and fishing methods. Contact Dr. Emory Anderson (FTS-840-1251 or 617-548-5123).

FEASIBILITY OF ECOSYSTEM-LEVEL FISHERIES MANAGEMENT TO BE PROMOTED

The Center and the University of Rhode Island will convene a symposium on the "Variability and Management of Large Marine Ecosystems" at the annual meeting of the American Association for the Advancement of Science at the New York Hilton on May 28 and 29. The three sessions will deal with: (1) impact of perturbations on productivity of renewable resources in large marine ecosystems (LME's); (2) measuring variability in LME's; and (3) the institutional framework for managing LME's. The symposium should establish the feasibility of ecosystem-level management of renewable marine resources. The NOAA Administrator will address symposium participants at a May 28 dinner. Those interested in attending or obtaining more information should contact Alice DeNofa (FTS-838-7143 or 401-789-9326).

CENTER ASSISTS SHELLFISH AQUACULTURE DEMONSTRATION PROJECT

The Center is providing information on shellfish aquaculture technology to the Urban Development Corporation (UDC) of New York. The UDC has received one-million dollars from New York State to initiate a shellfish aquaculture demonstration project on eastern Long Island. Natural shellfish harvests have drastically declined in this area. The UDC plans to train unemployed baymen in aquaculture techniques, provide them with the appropriate gear and shellfish seed to begin production, and eventually market the shellfish through a fishermen's cooperative. The current plan would involve about 50 baymen by 1985. Contact Ed Rhodes (FTS-642-5226 or 203-783-4200).

HABITAT MONITORING NOW EMPHASIZES INSHORE WATERS, FOCUSES ON FEWER SPECIES

Since 1978, NOAA's Northeast Monitoring Program (NEMP) and its NMFS predecessor, the Ocean Pulse Program, have been establishing baselines and seeking trends in the health of resource species and their habitats on the continental shelf between Cape Hatteras and Canada. At the just-completed NEMP annual program review, it was decided to emphasize inshore waters in the future since the program has not found major contaminant problems on the middle and outer shelf, and to focus on fewer species in assessing factors affecting health and contaminant burdens of fisheries resources.

The first such "case study" will involve winter flounder; a workshop is being planned to review what is known about this species and what informational gaps remain to be filled. Candidate species for future case studies include red hake, surf clam, ocean quahog, bluefish, and American lobster. A summary report on findings and plans discussed at the program review will soon be available through Dr. John Pearce (FTS-342-8206 or 201-872-0200).

CONGRESS HEARS TESTIMONY ON DEPLETED EAST COAST STRIPER STOCK

On March 20, the House Subcommittee on Fisheries and Wildlife Conservation and the Environment heard testimony on a bill introduced by Representative Claudine Schneider of Rhode Island. The bill calls for a three-year moratorium on the catch, sale, or possession of striped bass from North Carolina to Maine. The bill is intended to reduce fishing mortality on this depleted stock. Among those testifying on the bill was the Center's Dr. John Boreman, who described the current production and fisheries for striped bass off the Northeast and Mid-Atlantic States. Contact Dr. John Boreman (FTS-840-1225 or 617-548-5123).

SHELLFISH AQUACULTURE WORKSHOP HELD FOR COMMERCIAL AND RESEARCH FACILITIES

The Center hosted a one-day shellfish aquaculture workshop at the Milford Laboratory for 33 people from 17 commercial and research facilities in the Northeast and Mid-Atlantic States. Topics included: the different nutritional values of two algal species as food sources for juvenile American oysters; an overview of disease incidences in ten hatcheries with suggested control measures; the aquaculture potential of bay scallops and surf clams; feeding regimens which could significantly improve seed production; and application of genetic (including recombinant DNA, cell & embryo manipulations, and cryopreservation) to improving hatchery rearing procedures. Contact Dr. Walter Blogoslawski (FTS-642-5235 or 203-783-4240).

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APRIL 1984

NORTH AMERICAN-SPAWNED ATLANTIC SALMON BEING HEAVILY OVERFISHED

To assist the U.S. Commissioners to the new North Atlantic Salmon Conservation Organization in developing management proposals for Atlantic salmon, Center scientists have: (1) summarized available information on Atlantic salmon fisheries; (2) reviewed the status of Northwest Atlantic salmon stocks; and (3) contracted research on ways to determine the proportion of U.S.-spawned Atlantic salmon in the catch off eastern Canada and West Greenland. Although many more data need to be analyzed, those data which have been analyzed confirm that North American-spawned Atlantic salmon are being heavily overfished off both West Greenland and Newfoundland/Labrador. Contact Dr. Vaughn Anthony (FTS-840-1304 or 617-548-5123).

LONG ISLAND SOUND'S CAPACITY FOR BAY SCALLOP AQUACULTURE BEING EXPLORED

We have begun a seven-month experiment on how phytoplanktonic prey are used by their shellfish predators within a three-dimensional aquaculture system. The experiment's results should allow us to predict the carrying capacity of certain areas of Long Island Sound for growing planted bay scallop seed to a marketable size. We have cultured 500,000 scallop seed (1-3 mm size) from a February and March spawning, and will soon deploy 200,000 of them (5-mm size) in the Sound in a cube-shaped array: Contact Edwin Rhodes (FTS-642-5226 or 203-783-4226).

PARASITES OF MACKEREL MAY HELP IN CONSERVATION OF MACKEREL

Atlantic mackerel have historically shown large population fluctuations. To determine how certain natural factors--as opposed to fishing--may influence these fluctuations, the Center began a joint study with the Polish Sea Fisheries Institute in 1982 to study the prevalence and significance of the blood parasite *Haematraectidium scombri* in Northwest Atlantic mackerel. Observations to date show little effect by this parasite on mackerel populations.

However, there may be significant differences in the prevalence of this blood parasite, as well as the gill parasite *Kuhnia scombri*, between the two contingents (north and south) of the Northwest Atlantic mackerel stock. Accordingly, we are redirecting the study to see if *H. scombri* and *K. scombri* can be used as tracers or "tags" for each contingent, and thus help differentiate the contingents' seasonal distributions. With the mackerel resource recovering well from foreign overfishing in the late 60's and early 70's, the ability to determine the seasonal separation or mixing of the north and south contingents could help managers prevent disproportional harvests from these contingents, and thus help protect against future overfishing. Contact Sharon MacLean (301-226-5193).

GEORGES BANK GYRE VARIES ANNUALLY; MAY EXPLAIN SOME OF THE ANNUAL VARIATION IN LARVAL SURVIVAL THERE

The "leaky clockwise gyre" on Georges Bank has been called the salvation or damnation of the Bank's important fisheries resources: salvation if it retains fish larvae in the plankton-rich waters on the Bank, damnation if it removes them from the Bank. To document a missing link in our information on the gyre, we began last fall to study the influx of slope-region water and its plankton onto western Georges Bank through the Great South Channel. (Marianna Pastusak of the Polish Sea Fisheries Institute visited us in March and April to assist in this study.)

One result of the study is an indication that the influx of slope water, and likely the amount of recirculation of water around the Bank itself, varies significantly from year to year. Such annual variations in the amount of recirculation of water around the Bank may explain some of the annual variations we see in the feeding, growth, and survival of the Bank's fish larvae. Contact David Mountain (FTS-840-1271 or 617-548-5123).

CENTER PRESENTS FIRST-TIME COURSE IN MARINE ANIMAL DISEASES AT NATIONAL FISHERIES ACADEMY

Center scientists have presented a first-time, week-long course on diseases of marine finfish and shellfish to students of the U.S. Fish and Wildlife Service's National Fisheries Academy in Leetown, West Virginia. Lectures covered: specific diseases of marine fish, crustaceans, and mollusks; effects of these diseases on populations; diseases associated with pollution; public health aspects of animal diseases; and strategies for disease management. In the laboratory sessions, students learned practical techniques for handling and preserving specimens and diagnosing diseases. Contact Dr. Aaron Rosenfield (301-226-5193).

CENTER MICROBIOLOGIST ELECTED PRESIDENT OF NORTHEAST SHELLFISH SANITATION ASSOCIATION

Dr. Walter J. Blogoslawski was voted President-Elect of the Northeast Shellfish Sanitation Association (NESSA) during its April 25 annual meeting at Riverhead, New York. NESSA, a quasi-professional organization of Northeast shellfish researchers, public health officials, commercial shellfish harvesters, and federal fisheries authorities, provides a forum for exchanging information on quality improvement in marketed shellfish. Contact Dr. Walter Blogoslawski (FTS-642-5235 or 203-783-4235).

For more information on the above items, contact the name and number within the item, or the Center's Information & Publications Office (FTS-840-1228 or 617-548-5123 x 228).

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MAY 1984

BOOK PUBLISHED ON ATLANTIC COAST SHRIMPS, LOBSTERS, AND CRABS

Shrimps, Lobsters, and Crabs of the Atlantic Coast of the United States, Maine to Northern Florida, by Austin B. Williams, was issued by the Smithsonian Institution Press in May. This book treats 342 species and includes a general introduction which discusses the systematics of the groups and analyzes their zoogeographic affinities. A general key to families is followed by family, subfamily, generic, and specific accounts, with keys to categories below family scattered through the text. Each species account includes abbreviated synonymy, recognition characters, figure(s), measurements, habitat, type-locality, and general remarks on life history and ecology. Selected references are cited. The book will be valuable as a general reference for stock assessments, food habits of predators studies, life history studies, ecological surveys, and geographic distribution studies, as well as a compendium of documented information on the species discussed. Contact Dr. Austin B. Williams (FTS/202-357-2639).

The book can be purchased from the Smithsonian Institution Press, 1111 N. Capital St., Washington, D.C. 20002, (202) 357-1793, for \$35.00. Orders or questions should be directed to the Press.

BOOM AND BUST FOR THE YELLOWTAIL FLOUNDER FISHERY

Recent landings of yellowtail flounder have dropped significantly. According to the Northeast Regional Office's *Fishery Market News Report* issued out of Boston, 1984 landings--as of May 25--are 41 percent below the corresponding 1983 total. This apparent turnaround comes at the heels of a rapid expansion in the fishery wherein total annual landings increased 112 percent between 1981 and 1983. Southern New England landings increased from 4,900 tons in 1981 to 10,300 tons in 1982 to 17,000 tons in 1983. Georges Bank landings increased from 6,400 tons in 1981 to 10,600 tons in 1982 to 11,400 tons in 1983.

Increased 1982 and 1983 landings for these areas resulted both from recruitment of the strong 1980 year class, which accounted for over 50 percent of the total number landed in 1982, and from removal of quotas under the Interim Management Plan for Atlantic Groundfish. However, the level of fishing mortality was very high during 1982 and 1983, the rate of discarding the 1980 year class was high when recruited in 1982, and more recent year classes appear to be weaker than the 1980 year class, hence the recent drop in landings. Contact Margaret McBride (FTS-840-1246 or 617-548-5123).

DREDGE-SPOIL IMPACTS UPON BENTHOS MEASURED AT EASTERN LONG ISLAND DUMPSITE

Our multivariate statistical analyses of dredge-spoil disposal at the New London (Conn.) Dumpsite have shown benthic invertebrates at the disposal point to be immediately and severely impacted, but with recovery beginning shortly after dumping stopped. After 6-9 months of continuous dumping, major impacts extended at least 1/4 nautical mile "downstream" (southeast) from the disposal point; lesser impacts extended to or beyond 1/4 nautical mile "upstream" (northwest) from the disposal point. We detected no impacts more than 1/2 nautical mile away. Impacts may have been less than expected due to the dredged material being relatively uncontaminated preindustrial clays rather than more contaminated surface sediments.

Our analyses also showed that we could begin studying a subset of the 200 benthic species now being studied at the site, and still detect major impacts. The study may begin to deal with just these selected indicator species. Contact Robert Reid for data (FTS-342-8220 or 201-872-0200) and Dr. Sukwoo Chang for analyses (FTS-342-8267 or 201-872-0200).

NORTHERN SHRIMP FISHERY CONTINUES COMEBACK

Gulf of Maine northern shrimp landings for the December 1983-April 1984 season totaled approximately 3,000 metric tons or 6.5 million pounds. This is the highest total since 1975, and is double the 1982-83 average. This increase is thought to reflect both increased abundance (as evidenced by Center surveys) and a coastwide increase in fishing effort. For Maine, the number of vessels fishing for shrimp peaked at 238 in February 1984 as compared to 164 in 1983. For Massachusetts, the number of vessels peaked at over 40 vessels in 1984 as compared to 25 in 1983. Contact Dr. Stephen Clark (FTS-840-1243 or 617-548-5123).

PRODUCTION OF ATLANTIC HERRING LARVAE REMAINS LOW

The Center's MARMAP surveys have shown low production of Atlantic herring larvae during the 1982-83 spawning season in the once-productive spawning beds on Georges Bank. For the fifth consecutive year, we failed to catch a single larva over the eastern half of the Bank, or that part of the survey area where spawning was most intense during the 1950's and 1960's. Young herring were moderately abundant in the Massachusetts Bay area in both October and November, and around German Bank off western Nova Scotia in October; otherwise, their distribution was limited to scattered occurrences, mostly along the western edge of the Gulf of Maine. Young herring, 7-19 mm, occurred over the northwestern part of Georges Bank in November, but these larvae apparently originated in the Massachusetts Bay area. Contact Wallace Smith (FTS-342-8260 or 201-872-0200).

CLOSED SYSTEM SUCCESSFULLY USED TO CONDITION OYSTERS FOR SPAWNING

The Center has developed information on using a closed system to condition molluscan brood stock for spawning. In particular, this information could assist shellfish researchers and commercial hatchery operators who desire to breed or work with nonindigenous species or stocks which are restricted to quarantine conditions. Japanese oysters (*Crassostrea gigas*) were brought successfully through gametogenesis to sexual maturity for spawning within two months by thermal conditioning and feeding in a recirculating seawater system. Survival was high at greater than 95 percent. Periodic cytological examination of gonads confirmed the progressive advancement in gametogenesis. Spawning trials at weekly intervals also indicated the spawnability of these oysters. At the completion of conditioning, three of the females produced a total of 129 million eggs, an average of 43 million, in a single spawning. Viable gametes resulted in normal larvae. Contact Sheila Stiles (FTS-642-5224 or 203-783-4224).

UNDERSEA STUDY BEGINS ON NEW ENGLAND GILLNET FISHERY

The Center has begun the undersea phase of a planned three-year study of gillnetting in New England waters. The study stems from a 1982 request by the New England Fishery Management Council to the Center. The Council had been approached in 1982 by the Interstate Party Boat Association to look into competition among various users--trawlers, gillnetters, party boat operators, etc.--for the same species in the same areas. The Council felt, though, that not enough information was available on gillnetting in New England waters to adequately address the issue. Thus, the Council asked the Center to find out: (1) what kinds, amounts, and sizes of fish are caught by gillnets; (2) what happens to the fish after they're caught, but before they're hauled aboard the boat; and (3) to what extent lost or "ghost" gillnets might continue to catch fish?

Scientists from the Center, Massachusetts Division of Marine Fisheries (MDMF), University of Connecticut (UC), and University of New Hampshire (UNH) began a series of 27 dives on Pigeon Hill off Cape Ann, Mass., during late May, descending and ascending in a NOAA National Undersea Research Program diving bell--operated from the University of North Carolina at Wilmington's research vessel *Seahawk*--then using surface-supplied dive gear to study the nets. The MDMF's research vessel *F.C. Wilbour* is assisting the study by setting and hauling the gillnets, and making daily trips between Pigeon Hill and Rockport, Mass.

Following the late May cruise using the *Seahawk* for studies directed at tended gillnets, scientists from the Center, MDMF, UNH, UC, and Southeastern Massachusetts University will conduct a late June cruise using the Harbor Branch Foundation's (Fort Pierce, Fla.) research submersible *Johnson Sea-Link* for studies directed at ghost gillnets. Contact Dr. Alan Hulbert (FTS-840-1336 or 617-548-5123).

VOLUNTARY PARTY-BOAT LOGBOOKS LOOK PROMISING

A voluntary system for collecting party-boat fishery data using logbooks was cooperatively developed during summer 1983 by the Interstate Party Boat Association and the Center, and implemented on a trial basis during a five-week period in autumn 1983, to evaluate the merits of such a system in documenting party boat-gillnet interactions. A report recently completed by Center scientists indicates that the data collected were of high quality and broad utility in documenting party boat-gillnet interactions and in evaluating resource and fishery conditions. The data enabled resource analyses to be performed which would otherwise not have been possible. Contact Dr. Fredric Serchuk (FTS-840-1245 or 617-548-5123).

TWO CONFERENCES HELD ON FISH HEALTH AND DISEASE RESEARCH

Two important conferences on fish health and disease research sponsored by the National Marine Fisheries Service and cooperating organizations, were held during May. The first meeting, held on April 30 and May 1 at the Rutgers University Oyster Research Laboratory in Cape May, N.J., concerned infectious and pollution-related diseases in shellfish. Neoplastic diseases, viruses, and other infectious diseases were discussed by scientists from state and university organizations located on the Chesapeake Bay, Delaware Bay, and from New York and New England.

The other meeting, held in Boothbay Harbor, Me., during May 10-12, involved scientists from the United States, France, Norway, Finland, Scotland, Canada, and Denmark. In-depth reviews and reports on cancer-like diseases and virus diseases in finfish and shellfish were presented for both the East and West Coasts and northern Europe. Reports of both meetings should be available in several months. Contact Dr. Aaron Rosenfield (301-226-5193).

TRIPOLYPHOSPHATE ADDITIVES DON'T SPEED UP THAWING RATE OF FROZEN FISH BLOCKS

The National Fisheries Institute recently asked the Center about a view it heard that tripolyphosphate additives could speed up the thawing rates of frozen fish blocks--something that could enhance the marketability of fishery products. To test its own views on the effects of tripolyphosphate on the freezing and thawing of fish blocks, the Center experimented with three kinds of fish blocks: untreated, those with 10 percent added water, and those with 10 percent added water at a 12 percent tripolyphosphate level. Duplicate samples of each kind of block were frozen (0°F), thawed (38°F), refrozen, and rethawed (72°F). As expected, we detected no differences in the freezing or thawing rates of any of the samples. Contact Dan Baker (FTS-837-9269 or 617-281-3600).

OZONE DOESN'T YET SHOW ABILITY TO EXTEND SHELF LIFE OF FRESH COD

The Center has completed a second phase of its study on the use of ozone to extend the shelf life of fresh gutted Atlantic cod. We compared the spoilage of cod stored in slush ice which had been ozonated daily, with the spoilage of cod stored in ordinary slush ice. To mimic conditions on "trip vessels," we stored the fish in slush ice for seven days, then transferred them to flake ice for additional storage. Under these conditions, ozone doesn't show the ability to extend shelf life. Contact Elinor Ravesi (FTS-837-9287 or 617-281-3600).

CENTER SCIENTIST ELECTED PRESIDENT OF AMERICAN FISHERIES SOCIETY'S
NORTHEASTERN DIVISION

Dr. Fredric M. Serchuk was voted President-Elect of the Northeastern Division of the American Fisheries Society (AFS) and installed during its May 14-16, 1984, Annual Meeting at Ocean City, Md. AFS, founded in 1870, is the oldest and largest professional society representing fisheries scientists. It promotes scientific research and enlightened management of aquatic resources for optimum use and enjoyment by the public. It likewise encourages a comprehensive education for fisheries scientists and continuing on-the-job training. Contact Dr. Fredric Serchuk (FTS-840-1245 or 617-548-5123).

For more information on the above items, contact the name and number within the item, or the Center's Information & Publications Office (FTS-840-1228 or 617-548-5123x228).

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JUNE 1984

SURF CLAMS ABUNDANT; LANDINGS AHEAD OF QUOTA

The quota on landings of surf clams from the Middle Atlantic was 1,180,000 bushels through June 30. Landings as of June 15, though, were 1,334,000 bushels--13 percent ahead of quota. Consequently, the Northeast Regional Office closed the Middle Atlantic fishery from June 24 to July 7. These ahead-of-quota catches are evidence of recruitment of the strong 1976 year class.

Landings from New England had nearly reached the quota of 100,000 bushels when Amendment 4 of the Surf Clam Fishery Management Plan, which became effective on July 1, raised the quota to 200,000 bushels. But, New England landings may even exceed 200,000 bushels due to a new fishery on Georges Bank which was not even considered in Amendment 4.

We found evidence of the concentration of surf clams on Georges Bank during exploratory fishing operations by NOAA's R/V *Delaware II*, but we have not yet been able to assess the total size of the Georges Bank resource. Therefore, the Georges Bank fishery will be an unrestricted fishery for up to 90 days for fishing vessels which cooperate with the Center in collecting data. Also, the Center will modify its annual summer surf clam research vessel survey to include greater coverage of Georges Bank. Contact Steven Murawski (FTS-840-1303 or 617-548-5123).

FLOUNDERS SHOWING EARLY SIGNS OF STRESS IN POLLUTED HABITATS

During a summer 1983 environmental survey of the Northeast's continental shelf, we collected several flounder species from both polluted and unpolluted habitats. We have just completed a biochemical analysis of these flounder samples for the levels of a kidney enzyme, "G6PDH." High levels of this enzyme indicate that an organism has encountered and is trying to cope with environmental pollutants, but before those pollutants have physiologically harmed the organism. When physiological harm occurs, the G6PDH levels plummet, as do many other physiological indicators.

For the summer 1983 samples, all yellowtail, winter, and windowpane flounders from unpolluted habitats had G6PDH levels of 42-63, well within the normal range of 35-70. However, between 25 and 100 percent of winter and windowpane flounder collected in the New York Bight apex, Buzzards Bay, Block Island Sound, and the mouth of Delaware Bay had G6PDH levels over 100, a level considered both statistically and biologically significant. Thus, in these latter habitats, which are subject to major pollution, a large percentage of the flounder are showing the initial response to environmental pollutants. Although we collected no yellowtail flounder in the polluted habitats during the summer 1983 survey, we have earlier found G6PDH levels in this species well over 100 when collected from the mouth of the Merrimack River and off Race Point, both in the polluted Massachusetts Bay.

Interestingly, the flounders in the polluted habitats were divided into two distinct groups--about 50-70 percent in a normal 38-59 range, and the remaining 30-50 percent in an exceptionally high 103-142 range. Apparently, some fish were longtime residents of the polluted habitats, others were newcomers. Contact Edith Gould (FTS-642-5222 or 203-783-5222).

BIOLOGICAL DATA ON BLUE CRAB PUBLISHED BY NMFS

The first issue in the new *NOAA Technical Report NMFS* series, which combined the old *NOAA Technical Report NMFS Special Scientific Report-Fisheries* and *Circulars* series, is a synopsis of biological data on the blue crab (*Callinectes sapidus*). This publication, also No. 138 in the *FAO Fisheries Synopsis Series*, reviews information on the species from over 300 reports published through 1982: taxonomy, morphology, distribution, life history, commercial hard and soft crab fisheries, physiology, diseases, ecology, laboratory culture methodology, and influences of environmental pollutants on the species. The most recent reported landings and value for this species (1983) were 191.7 million pounds and 55.1 million dollars. The report is coauthored by M.R. Millikan, formerly of the Southeast Fisheries Center's Charleston Laboratory, and A.B. Williams of the National Systematics Laboratory. Contact Dr. Austin Williams (202-357-2639).

FLOUNDER VIRUS MAY BE USEFUL VACCINE AGAINST TROUT VIRUS

Cooperative studies with the U.S. Fish and Wildlife Service have isolated a new strain of infectious pancreatic necrosis virus (IPNV). The new strain, designated "flounder strain," has been found in southern flounder, hogchoker, spot, and Atlantic silversides.

This flounder strain seems to be more similar to the European Ab strain of IPNV than to the North American salmonid or clupeid strains of IPNV, and seems to be avirulent (not harmful) to other fishes when they are exposed to it. Isolates of the flounder strain may become a useful vaccine for such fishes as the brook trout which has suffered mass mortalities to the salmonid strain of IPNV under hatchery conditions. Contact Martin Newman (301-226-5193).

JOINT AMERICAN AND SOVIET FISHERIES RESEARCH TO BE DOCUMENTED

In line with the June 27 announcement by President Reagan on the need for increased dialog and cooperation between scientific sectors of the United States and the Soviet Union, the Center will cooperatively produce a book on joint American and Soviet fisheries research since 1967 with the Soviet's All-Union and Atlantic Scientific Research Institutes for Marine Fisheries and Oceanography. We expect the book to be released during 1986 in both English and Russian editions. The Soviet Union will do all the translating; the United States will do the publishing.

Also planned are joint field studies during summer and fall 1986 on recruitment variability. A meeting is being considered for fall 1985 in Woods Hole to make detailed plans for the field studies, as well as to review progress on the book. Contact Richard Hennemuth (FTS-840-1238 or 617-548-5123).

ANTARCTIC CONSERVATION COMMISSION CONSIDERS DATA NEEDS FOR ASSESSING FISH & KRILL STOCKS

The Center hosted a June 11-16 meeting of an Ad Hoc Working Group on Data Collection and Handling of the Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR). Twenty-five scientists from 11 member countries, the European Economic Community, and the United Nations Food and Agriculture Organization participated.

The working groups developed information on the kinds and amounts of data needed from the international fisheries in order to assess the Antarctic's fish and krill stocks. This information will be considered by the CCAMLR's Scientific Committee at its annual meeting this September in Australia. Contact Richard Hennemuth (FTS-840-1238 or 617-548-5123).

For more information on the above items, contact the name and number within the item, or the Center's Information & Publications Office (FTS-840-1228 or 617-548-5123x228).

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JULY 1984

POLLOCK POPULATION IN GOOD SHAPE

The pollock population of the Northwest Atlantic is in good shape, according to a just-completed report by Center scientists. The population's total weight, or biomass, increased substantially during the mid-to-late 1970's, and has continued to be supported by the addition of large numbers of catchable-sized fish from the 1979 and 1982 spawnings.

Fishermen's catches in recent years have also been at levels which have allowed the population to replenish itself. In fact, commercial catches declined from 59 to 49 thousand tons between 1981 and 1983. The decline is apparently due to a weaker market for pollock. Contact Ralph Mayo, FTS 840-1310 or (617) 548-5123.

SERVICE ISSUES ANNUAL REPORT ON HABITAT CONSERVATION

The Service's Habitat Conservation Program has issued its first annual report (1983). The report, coming on the heels of the Service's first habitat conservation policy issued last November, is an excellent summary of the major habitat issues and Center activities in the Northwest Atlantic. Free copies are available from the Habitat Conservation Division, National Marine Fisheries Service, 3300 Whitehaven St., N.W., Washington, D.C. 20235.

NEW VIEW OF OYSTER GROWTH RATE; CYCLIC PATTERNS

The usual way to measure the growth rate of oysters is to divide any increase in the oyster's size by the amount of time it took to achieve that increase. That's an "absolute" growth rate. Another (and little used) way to measure growth rate is to first divide any increase in the oyster's size by the original size of the oyster, then to divide that percentage by the amount of time. That's a "relative" growth rate.

When we measured the relative growth rate of the juvenile oysters that were reared in our laboratory for 12 weeks under highly controlled conditions, we observed an unexpected cycle in the relative growth rate. Regardless of the types of phytoplankton the juvenile oysters were fed, or of the year or season in which experiments were conducted, the daily-fed juvenile oysters showed two peaks in the relative growth rate separated by intervals of about five weeks.

We believe this observation, that oysters are capable of cycles in relative growth rate, to be the first of its kind, and may have significance in the growth of wild as well as cultured oysters. Contact Ravenna Ukeles, FTS 642-5223 or (203) 783-4223.

FIRST WORKSHOP HELD FOR SERVICE'S PUBLIC AFFAIRS PERSONNEL

The NOAA Office of Public Affairs held the first technical workshop for the Service's public affairs personnel in Washington, D.C., during July 25-27. The 12 individuals with public affairs responsibilities and duties who attended the workshop represented the headquarters office and both the regional office and the fisheries center in the Northeast, Southeast, and Southwest.

Purpose of the workshop was to instruct the public affairs personnel on how they can: (1) help their organization's managers use public affairs to better achieve their goals and objectives; (2) handle public affairs problems and capitalize on public affairs opportunities; (3) prepare and place news material and news products with the news media; and (4) continue to develop their public affairs knowledge and skills for the benefit of their organizations. Contact Jon Gibson, FTS 840-1228 or (617) 548-5123.

SHELF LIFE OF FROZEN AMERICAN PLAICE UNDER STUDY

In the Center's ongoing study of the shelf life of frozen fish, a new effort has begun with American plaice (commercially called "dab"). Plaice fillets were cut from fish which had been held on ice for 1, 5, or 9 days (to represent conditions on commercial fishing vessels), then were subjected to +10°, 0°, or -10°F storage. After one month, all fillets were acceptable in quality.

An earlier effort with Atlantic cod--using fish caught in the summer--may be supplemented with another effort using fish caught during other seasons. The summer-feeding cod were rich in fat which may have shortened their shelf life during frozen storage. Contact Joseph Mendelsohn, FTS 837-9282 or (617) 281-3600.

HORSESHOE CRABS BEING OVERFISHED?

Fisheries for horseshoe crabs for fishing bait and biomedical purposes are growing. In fact, horseshoe crabs may be overfished in some areas. To establish the biological basis for managing horseshoe crabs--should that be needed--scientists from the Center and Fordham University have begun a joint study of the species' distribution, abundance, feeding, and growth.

Historical data from the Center's bottom-trawl surveys will provide information on trends in distribution and abundance. Recent data from the surveys will provide information on feeding by this predator of clams, scallops, etc. One of the more unusual efforts will be trying to determine the age of limpets growing on the shells of horseshoe crabs as a way of indirectly determining how long the crabs themselves can live. Contact John Ropes, FTS 840-1287 or (617) 548-5123.

For more information on the above items, contact the name and number within the item, or the Center's Information & Publications Office, FTS 840-1228 or (617) 548-5123 x 228.

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AUGUST 1984

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IDENTIFYING U.S.-SPAWNED ATLANTIC SALMON IN THE OPEN OCEAN

PAPER PRESENTED ON RISKS OF TRANSPORTING SHELLFISH FOR PROPAGATION
OR CULTIVATION

The Northeast Fisheries Center's "Monthly Highlights" is a selection of brief popularized accounts of Center research activities in the preceding month. These accounts focus on the practical applications of research findings to fisheries resource and habitat conservation. The name and telephone number of a Center scientist has been included at the end of each account to contact for more information.

NORTHERN SHRIMP RESOURCE CONTINUES RECOVERY IN GULF OF MAINE

Center scientists and personnel from the Maine Department of Marine Resources, New Hampshire Fish and Game Department, and Massachusetts Division of Marine Fisheries completed the 1984 northern shrimp survey of the western Gulf of Maine during July 31-August 6 aboard the Center's R/V *Gloria Michelle*. For areas sampled both in 1983 and 1984, catch rates in 1984 were generally the same or higher than in 1983. **These catch rates suggest continued recovery of this resource from the rock-bottom levels of the late 1970's.** Highest abundance occurred in the Jeffreys Ledge and Platts Bank region, although abundance appeared to be relatively high further east. Contact Steve Clark, FTS 840-1234 or (617) 548-5123.

FISH-WASTE SILAGE INCREASINGLY APPEARS TO BE PRACTICAL PLANT FERTILIZER

Fish wastes from fish processing plants have traditionally been dumped into adjoining harbors, creating organic pollution, bacterial build-ups, and oxygen depletions. As environmental management agencies have begun restricting such fish-waste dumping, how to treat or dispose of these wastes has become more difficult and expensive. In the past year, the Center and the Essex (Mass.) Agricultural and Technical Institute have cooperatively researched the simple and inexpensive conversion of fish wastes into fish silage for subsequent use as a plant fertilizer.

In our latest experiment, we planted string bean seeds in four equal-sized plots of land. Plot No. 1 was left unfertilized; plot No. 2 was fertilized with a normal amount of 10-10-10 commercial fertilizer; plot No. 3 was fertilized with silage around the base of the plants (represents hand fertilization) after sprouting began; and plot No. 4 was fertilized with silage over ground and plants alike (represents mechanical fertilization) after sprouting began. Results of the first picking about two months after planting are shown below:

Plot No.	Treatment	No. of plants	Average yield per plant (g)
1	Unfertilized	12	78.9
2	Fertilized with 10-10-10	21	129.7
3	Fertilized with silage around base of plants	23	136.8
4	Fertilized with silage over ground and plants	20	148.3

So far, acidified (pH 3.8) shelf-stable silage appears to be equal to or better than commercial fertilizer. The experiment and harvesting continue. Contact Burt Tinker, FTS 837-9217 or (617) 281-3600.

HIGHEST SQUID CATCHES NEAR JUNCTURE OF SHELF AND SLOPE WATER MASSES

The Center has analyzed over 1,500 foreign fisheries observers' logs to determine the catch rates and locations of short-finned squid caught off the Mid-Atlantic states during 1980-82. The Center has also analyzed satellite-produced infrared images of the sea surface to determine the locations of where the continental shelf water mass came up against the continental slope water mass ("shelf-slope front") for the same region and years. **By comparing the fisheries data with the satellite data, we found that even though only 50-60 percent of the fishing effort occurred within 10 nautical miles of the front, up to 80-100 percent of the highest catch rates occurred there.**

Further analysis of these and similar data should confirm if the satellite data will be as useful a tool for directing initial fishing effort for squid as it now appears. Contact Mert Ingham, FTS 838-7142 or (401) 789-9326, or Anne Lange, FTS 840-1301 or (617) 548-5123.

BLUEFISH EGG AND LARVA SURVEY HAS BETTER DEFINED SPAWNING HABITAT; MAY BETTER ESTIMATE SPAWNING POPULATION

A common way to estimate finfish populations, the virtual population analysis, needs data on both the size of catches by commercial and recreational fishermen, and the size of samples from scientific surveys. Since the Center's basic finfish surveys use bottom trawls, excellent survey data are available for bottom-associated finfishes (e.g., haddock), but for more open-water-associated finfishes (e.g., bluefish), the data -- while still useful -- may not be as conclusive. An alternative and perhaps better way to estimate bluefish populations is to find out how many bluefish eggs are spawned each year, then figure out how many bluefish adults there had to have been to spawn that many eggs.

From mid-May through mid-August, the Center blanketed the continental shelf off the Southern New England and Mid-Atlantic states with five egg and larva surveys. These egg and larva surveys use fine-meshed plankton nets towed obliquely from the bottom to the surface. The egg and larva data will be ultimately analyzed to estimate the number of spawning adult bluefish north of Cape Hatteras. **Already, the data show that spawning peaks from late June to July about midway out on the continental shelf from New Jersey to the offings of Chesapeake Bay.** These better defined spawning locations and times are useful in protecting critical spawning habitat from offshore waste disposal, mineral extraction, etc. Contact Wally Smith, FTS 342-8260 or (201) 872-0200.

CENTER RESPONDS TO LOBSTERMEN'S CONCERNS OVER LOW DISSOLVED OXYGEN OFF NORTHERN NEW JERSEY

New Jersey lobstermen have been sensitive to summertime depletion of dissolved oxygen off their coast since 1976 when such a depletion cost them about 1.4 million dollars by killing off or driving off lobsters in inshore waters. Overall, that 1976 oxygen depletion off New Jersey cost the

commercial and recreational fishing industries, and their related processing and servicing industries, as much as 550 million dollars, and prompted the federal government to declare the New Jersey coast a resource disaster area. The surf clam fisheries were especially hard hit.

Understandably, northern New Jersey lobstermen became concerned and sought more information from Center scientists during August when local recreational divers reported low dissolved oxygen levels at an artificial reef. Furthermore, these reports of low dissolved oxygen came on the heels of an unusually large number of phytoplankton blooms (*Olisthodiscus* and *Skeletonema*) during August -- blooms similar to those associated with the 1976 disaster.

As an early warning system against any recurrence of the dissolved oxygen depletion, the Center monitors the dissolved oxygen levels in New Jersey coastal waters every week during the warmer months. This routine monitoring, along with a special survey around the recently reported site of low dissolved oxygen, have shown the problem confined to a very small area. **With cooler water temperatures and increased water circulation likely soon, the low dissolved oxygen levels observed should remain a localized problem with no significant fisheries impact.** Contact J. O'Reilly, FTS 342-8251 or (201) 872-0200.

IDENTIFYING U.S.-SPAWNED ATLANTIC SALMON IN THE OPEN OCEAN

A problem in U.S. conservation of Atlantic salmon is determining the proportion of U.S.-spawned salmon caught in the open ocean as they mix on feeding grounds and along migratory routes with salmon spawned in other countries. To begin to solve this problem, the Center sponsored three studies last year to review methods for identifying U.S.-spawned salmon caught in the open ocean. On August 28 and 29, the Center hosted a workshop to evaluate these studies which looked at methods based on: (1) scale and "ear bone" characteristics; (2) genetic characteristics; and (3) other characteristics, including dyes and tracers, scale and ray counts, body proportions, etc. **So far, scale characteristics -- particularly circuli or "ring" patterns -- seem to be one of the more promising and practical methods.**

The workshop also dealt with future data needs and research plans for effective U.S. participation in the North Atlantic Salmon Conservation Organization. Contact Vaughn Anthony, FTS 840-1304 or (617) 548-5123.

PAPER PRESENTED ON RISKS OF TRANSPORTING SHELLFISH FOR PROPAGATION OR CULTIVATION

The introduction of exotic pests, parasites, and pathogens of shellfish into previously uncontaminated ecosystems -- as a result of intentional or accidental transport of shellfish between ecosystems -- is a time bomb waiting to explode. We got a taste of the problem a number of years ago when oysters infected with the deadly MSX disease were transported from the James River area of Chesapeake Bay to the Wellfleet Harbor area of Cape Cod Bay. The James River oysters and the native Wellfleet Harbor oysters which they in turn infected were both wiped out. Even today, oysters in Wellfleet Harbor are quarantined. Similar problems have occurred in other areas.

One of two Center scientists attending the August 5-9 annual meeting of the Society of Invertebrate Pathologists in Davis, California, presented a paper on the risks of shellfish transport, and discussed the Center's quarantine and inspection system for transported shellfish. Copies of the abstracted paper are available from Aaron Rosenfield, (301) 226-5193.

GIBSON

NORTHEAST FISHERIES CENTER

MONTHLY HIGHLIGHTS



United States Department of Commerce
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National Marine Fisheries Service
Northeast Fisheries Center
Woods Hole, Massachusetts 02543

SEPTEMBER 1984

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STATUS-OF-THE-STOCKS ANNUAL REPORT ISSUED

During mid-September, the Center issued its annual report on the status of the stocks in the Northeast Region. The report, entitled "Status of the Fishery Resources Off the Northeastern United States for 1983" (*NOAA Technical Memorandum NMFS-F/NEC-29*), contains information on stocks of 34 commercially and recreationally important species.

Like the 1981 and 1982 annual reports, this 1983 annual report includes sections on the trends in the region's commercial and recreational fisheries. **This year's report, though, includes two new sections: a summary of the status of each species/stock, and an overview of the economics of several major fisheries.** Only a handful of copies remain from the first printing of 600. A second printing may occur. Contact Emory Anderson, FTS 840-1251 or (617) 548-5123.

CAPTURING AND USING WASTE HEAT FROM SEAFOOD REFRIGERATION SYSTEMS

The Center's Gloucester Laboratory is constructing a heat pump to capture the waste heat in the cooling water of the Laboratory's seafood refrigeration system. Currently, this waste heat is discharged into the atmosphere through a cooling tower. Ultimately, the captured waste heat will supplement the Laboratory's traditional heating plant.

By using an automatic on-off switch for the heat pump, the energy cost for running the pump will be about the same as the energy cost for running the cooling tower. But, because the pump gains heat and the tower loses heat, the pump is more energy efficient. **This energy-saving approach should serve as a model for commercial seafood processing and retailing facilities.** Contact Bob VanTwyver, FTS 837-9319 or (617) 281-3600.

BLUEFISH RECRUITMENT LINKED TO FIRST-YEAR DIET?

Field studies of feeding and growth by juvenile (age 0) bluefish during summer 1981 and summer 1983 suggest that first-year growth varies with diet. The 1981 age 0 blues mostly fed on other fish; the 1983 age 0 blues fed on a mixture of fish and invertebrates. As one would expect, the fish-fed 1981 blues were larger and healthier. In light of the long migration age 0 blues undertake in the fall, their size and condition after their first summer's feeding may affect their first-year survival, which in turn may affect their recruitment to the adult stock. In fact, the 1983 status-of-the-stocks report described earlier in this issue showed recruitment from the 1981 year class higher than that from the 1983 year class.

Our first observation on our just-completed 1984 summer sampling shows this year's class of age 0 blues to be feeding on a very large number of very small invertebrates (copepods). **If the trend holds, the 1984 year class of bluefish may not be as strong as the 1981 and 1983 year classes.** Contact Anne Studholme, FTS 342-8280 or (201) 872-0200.

FDA TO CONSIDER DRUGS FOR TREATING DISEASE OUTBREAKS IN SHELLFISH HATCHERIES

Disease is a major limiting factor in the success of commercial shellfish hatcheries. Although the Food and Drug Administration (FDA) has not yet approved any drugs for treating disease outbreaks at such hatcheries, it has started the process by which it approves such drugs by holding two workshops in Gaithersburg, Maryland, during August 20-22: "Drug Disposition and

Metabolism in Aquatic Species" and "Minor Use of New Animal Drugs." At the invitation of the FDA, a Center scientist represented the National Marine Fisheries Service and the shellfish aquaculture industry at these workshops, and is now preparing an outline of culture methods and a list of prophylactic drugs for FDA consideration. Contact Carolyn Brown, FTS 642-5239 or (203) 783-4239.

MARMAP EGG SURVEYS YIELD SPAWNING STOCK BIOMASS ESTIMATES

The Center's MARMAP surveys of fish egg and larval distribution and abundance provide information on first-year mortality which in turn provides information on year-class success. In addition, the egg abundance data can be used to back-calculate the biomass of spawning stocks. **Based on these MARMAP surveys, the Center has just issued a report on spawning stock biomass estimates for five species for the region from Cape Hatteras to the Gulf of Maine.** The report, "Recent Estimates of Adult Spawning Stock Biomass Off the Northeastern United States from MARMAP Ichthyoplankton Surveys" (*NOAA Technical Memorandum NMFS-F/NEC-30*), documents spawning stock estimates for one or more years since 1977 for Atlantic mackerel, yellowtail flounder, silver hake, haddock, and sand lance.

These fishery-independent estimates are useful for species or stocks for which there is no fishery, for instance, the sand lance which is currently at high abundance and is a significant item in the diet of many marine fish, mammals, and birds. The estimates are also useful as supplementary data for fisheries in which catch data are inadequate for traditional stock assessment methods such as virtual population analysis (VPA), for instance the bluefish (see August issue of "Monthly Highlights"). Another example is the silver hake fishery. Since the drastic reduction of distant-water fleets since 1977, the offshore catch of silver hake has rapidly declined, resulting in less reliable VPA population estimates. The first estimate of silver hake spawning stocks based on MARMAP surveys was made in 1979 and compared favorably with the available VPA estimate. The egg estimate can also determine the distribution of spawning activity for migratory stocks which range over wide areas, for instance, the Northwest Atlantic mackerel stock which ranges from Newfoundland to Cape Hatteras. The MARMAP spawning biomass estimates of this stock strengthen our estimates of the proportion of the stock which spawns in U.S. waters.

Determining the accuracy of these spawning stock estimates based on egg surveys will require a time series of comparisons with reliable VPA estimates; one of the important results of the MARMAP program. Contact Peter Berrien, FTS 342-8266 or (201) 872-0200, or Mike Pennington, FTS 840-1285 or (617) 548-5123.

CENTER SCIENTISTS TRAIN AND ADVISE SOUTH CAROLINA AND GEORGIA SHELLFISH AQUACULTURISTS

The Center is helping the State of South Carolina's recently completed James M. Waddell, Jr., Mariculture Center to provide technical assistance to that state's shellfish aquaculture industry. Our scientists offered 10-day, hands-on training at the Milford Laboratory for Waddell's hatchery manager and algal culturist, then later offered on-site advice on managing Waddell's seawater system and on raising offspring of genetic-specific stocks.

The Center is also helping the University of Georgia's Skidway Campus to choose productive avenues in shellfish research. Our scientists provided

comments and/or suggestions on shellfish research facilities, oyster spat collection and substrate use, bay scallop research (using all three subspecies), and genetic breeding and rearing of hard clams.

This transfer of scientific and technical knowledge from the Center to state institutions is one of the important products/byproducts of the Center's shellfish research. As these and other state and private institutions progress, though, not only will there continue to be this one-way transfer of knowledge, but through cooperative research efforts, the transfer will undoubtedly become a two-way affair. Contact Ed Rhodes, FTS 642-5200 or (203) 783-4200.

SPECIES IDENTIFICATION SHEETS AVAILABLE FOR WEST INDIAN OCEAN FISHERIES

The United Nations Food and Agriculture Organization (FAO) has published a set of species identification sheets for fishing purposes in FAO Fishing Area 51, the western Indian Ocean. This set, consisting of five looseleaf volumes and an index, covers bony fishes, cartilaginous fishes, lobsters, shrimps, and turtles. Each species account includes scientific names, common names, distinctive characters, size, distribution, fishing grounds, and catch. There are figures of the entire animal, its diagnostic characters, and similar species, as well as a map of its distribution in the fishing area.

The National Systematics Laboratory contributed accounts for nine families (Belonidae, Bregmacerotidae, Coryphaenidae, Echeneidae, Hemiramphidae, Moridae, Pomatomidae, Rachycentridae, and Scombridae). **This set of sheets, along with earlier sets on the west Central Atlantic and east Central Atlantic, are available from: Walter Fischer, Fisheries Dept., FAO, Vic delle Terme di Caracalla, 00100 Rome, Italy.** Contact Bruce Collette, (202) 357-2524.

SOFTSHELL CLAM POPULATIONS OF CHESAPEAKE BAY LIMITED BY CANCEROUS TUMORS

Animals, just as humans, can develop diseases when exposed to disease-causing conditions and/or disease-causing agents. It's not surprising, therefore, that a number of animals, just as humans, develop cancerous tumors when exposed to cancer-associated environmental conditions and/or viral agents. One of the animals which has been so affected is the softshell clam of Chesapeake Bay. Cancerous animals--clams or anything else--can't transmit their cancer to humans, so there is no concern for the effects on man. But, cancerous animals can suffer high mortality, so there is concern for the effects on clam populations.

Both Center and non-Center scientists have just coauthored a manuscript for publication on this outbreak of cancerous tumors in softshell clams of Chesapeake Bay. **The manuscript covers how the disease: (1) may have been introduced into Chesapeake Bay; (2) has established itself at high prevalences (50 percent) over a wide area of the Bay within five years; and (3) progressively advances and ultimately kills clams.** Contact Austin Farley, (301) 226-5193.

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MONTHLY HIGHLIGHTS



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OCTOBER 1984

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SEA SCALLOPS MORE ABUNDANT IN SOME AREAS

The Center's 1984 survey of sea scallop populations in the Gulf of Maine, Georges Bank, and Mid-Atlantic areas shows that scallops in some areas are more abundant to fishermen this year than last. The 1983 survey showed record low abundance.

In the Mid-Atlantic, abundance increased in the New York Bight (New Jersey to Long Island), remained the same off Delmarva, and decreased off Virginia-North Carolina. On Georges Bank, abundance markedly increased along the northern edge and on the northeast peak (now Canadian waters) due to exceptionally large recruitment from the 1981 year class, remained the same in the southeast part, and continued to decrease in the Great South Channel. In the Gulf of Maine, high survey catch rates occurred on Fippennies Ledge.

Contact Fred Serchuk, FTS 840-1245, or (617) 548-5123.

FISH POPULATION SHIFTS CONTINUE IN NORTH SEA

The North Sea and the U.S. northeast continental shelf are somewhat similar ecosystems. Consequently, similar changes in environmental conditions, fishing pressure, or management regimes can (but don't necessarily) cause similar changes in fish stocks. For example, when herring and mackerel stocks both in the North Sea and on Georges Bank greatly decreased in the mid-1970's, sand lance stocks in both ecosystems greatly increased due likely to the scarcity of herring and mackerel to prey upon them.

At the 1984 Statutory Meeting of the International Council for the Exploration of the Sea held earlier this month in Copenhagen, Denmark, a Dutch scientist reported that since 1977-78, North Sea herring have again increased, sand lance (and Norway pout) have remained at the same level, and mackerel (and sprat) have greatly decreased. However, because the North Sea herring are still scarce compared to the 1940's and 1950's, it's still premature to speculate on whether Georges Bank will again mimic the North Sea, with herring increasing, sand lance remaining the same, and mackerel decreasing. Center scientists and their western European counterparts continue to study the underlying causes and effects of these massive shifts in fish stock abundance on both sides of the Atlantic.

Contact Ken Sherman, FTS 838-7142 or (401) 789-9326.

HIGH LEVELS OF ORGANIC CONTAMINANTS IN MASSACHUSETTS BAY SEDIMENTS

Battelle Laboratory, under contract to NOAA's Northeast Monitoring Program, has completed a comprehensive survey of toxic organics in sediments and selected organisms of Boston Harbor, Massachusetts Bay, and Cape Cod Bay. Results of the survey, which generally show high levels of toxic organics in sediments but low levels in organisms, will soon be published as *NOAA Technical Memorandum NMFS-F/NEC-32*.

Massachusetts Bay sediments landward of Stellwagen Bank contain levels of polychlorinated biphenyls (PCB's) and polycyclic aromatic hydrocarbons (PAH's) 2-3 times higher than New York Bight sediments. (These levels are partly a reflection of most of Massachusetts Bay being deeper than the New York Bight and retaining more fine sediments which attract contaminants; not necessarily a reflection of the amount of contaminants being received by the two areas.) Limited comparisons with earlier data indicate levels may be increasing in Massachusetts Bay.

Cape Cod Bay and offshore Gulf of Maine sediments also contain high levels of PCB's and PAH's, although not as high as Massachusetts Bay sediments. Winter flounder and American plaice in Cape Cod Bay have low levels of these contaminants. Jonah crabs have higher levels, but maximum values are still only about a tenth of the Food and Drug Administration's two-parts-per-million action level for PCB's in finfish and shellfish. The potential exists for further uptake from the reservoir of contaminated sediments, however.

The survey also confirmed the heavy pollution of Boston Harbor sediments, and identified sewage discharges and storm water runoff as dominant sources.

Contact Bob Reid, FTS 342-8220 or (201) 872-0200.

OYSTER BAR MUD CRAB SPECIES COMPLEX RESOLVED

Panopeus crabs are significant predators on oysters, but there has been a long-standing problem on the taxonomic status of *P. herbstii*, the oyster bar mud crab. Three related papers in the most recent issue of the *Fishery Bulletin* (Volume 81, Issue 4)--authored by a National Systematics Laboratory scientist and associates--solve this problem. A reevaluation of the oyster bar mud crab complex, based on morphology, blood protein electrophoresis, and ecology, shows six closely related species: one on the eastern U.S. coast, one on the northern Gulf Coast, one associated with the marsh grass *Spartina* on both the eastern U.S. coast and northern Gulf Coast, one in the Caribbean and western South Atlantic, and two analogs of North American species in South America below Cape Frio.

Contact Austin Williams, (202) 357-2639.

COMPUTER-ASSISTED SYSTEM DEVELOPED TO IDENTIFY MARINE BACTERIA

The ability to identify specific disease-causing (pathogenic) bacteria is important in controlling diseases of cultured marine animals. Specific identifications are needed to predict disease effects, to plan therapeutic measures, and to trace disease sources.

Speedy and reliable systems (which combine: (1) commercially available instruments that analyze numerous biochemical characteristics of unknown pathogens, with (2) computer programs that numerically match the biochemical characteristics of unknown pathogens with the biochemical profiles of known pathogens) have been developed for identifying specific human pathogens. However, these systems do not cover most marine bacteria.

Consequently, to aid our identification of marine bacterial pathogens, we developed a computer program which rapidly compares the biochemical characteristics of unknown marine bacteria with the biochemical profiles of all previously characterized marine pathogens. We are now statistically analyzing the program's reliability when varying numbers of biochemical characteristics are used. **With this statistical analysis as a guide, we should be able to increase measurably the speed and reliability of our bacterial identifications.**

Contact Dick Robohm, FTS-642-5237 or (203) 783-4237.

CONSERVATION MEASURES ADOPTED FOR ANTARCTIC FISH STOCKS

The Center continues to assist U.S. participation in the Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR), particularly through the Center's involvement in the CCAMLR's Scientific Committee. At its third annual meeting in Hobart, Australia, last month, the CCAMLR--based on the Scientific Committee's advice--adopted its first conservation measures by enacting closed-fishing-area and minimum-mesh-size regulations, and by requesting no directed fishery and minimum bycatch for one species in particular. Before the next annual meeting, a Center scientist will convene the Scientific Committee's Ad Hoc Working Group on Fish Stock Assessment in Hobart to determine age/length compositions and recruitment trends of major stocks, and to advise the Scientific Committee of any subsequently needed conservation measures.

Contact Dick Hennemuth, FTS 840-1238 or (617) 548-5123.

COMMERCE DEPARTMENT AWARDS SILVER MEDAL TO CENTER SCIENTIST

The U.S. Department of Commerce has awarded a silver medal to the Center's Dr. Vaughn C. Anthony. The silver medal, the second highest award given by the Department, is granted by the Secretary of Commerce for "meritorious contributions of unusual value to the Department."

The award recognizes Dr. Anthony's stock assessment research accomplishments, his leadership in national and international assessment-oriented committees and working groups, and his innovations in communicating research findings to Center constituents in the form of semitechnical reports and popular articles. Dr. Anthony's contributions have significantly improved the management of fishery resources worth millions of dollars to the national economy.

Contact Mike Sissenwine, FTS 840-1239 or (617) 548-5123.

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MONTHLY HIGHLIGHTS



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NOVEMBER 1984

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OILY FISH SUCH AS SALMON AND MACKEREL REDUCE HEART DISEASE

Heart disease annually kills a half-million Americans. Earlier this year, the National Institutes of Health (NIH) scientifically linked for the first time the death rate from heart disease with the cholesterol levels in our blood. **At the same time evidence began to appear and grow that oily fish such as salmon and mackerel--once thought to raise cholesterol levels--now seem to decrease low-density lipoproteins (LDL) which package and deliver cholesterol throughout the circulatory system, and to increase high-density lipoproteins (HDL) which remove cholesterol from the system.** The NIH study showed that lowering the level of LDL and raising the level of HDL **substantially reduced the chance of heart attack.** Moreover, a diet high in fish oil can reduce the chance of stroke-causing blood clots by changing the blood's viscosity.

However, we don't know the specific ingredient in fish oil which lowers LDL and raises HDL, nor do we know how that ingredient operates. Accordingly, in the next few years, NIH will obtain refined and standardized fish oils from NMFS laboratories to identify the specific ingredient, define how it operates, and measure its health effects. In preparation for possible involvement in this joint NIH-NMFS study, Center scientists have met with their counterparts in the Southeast and Northwest & Alaska Fisheries Centers, and have met with MIT Sea Grant scientists who have an ongoing study into fish oils.

Contact Judy Kryznowek, FTS 837-9226 or (617) 281-3600.

YELLOWTAIL FLOUNDER FISHERY HEADED FOR DEEPER TROUBLE

Preliminary field data through September show that commercial landings of yellowtail flounder for the first three quarters of 1984 have decreased 45 percent from the corresponding period of 1983. Since the yellowtail fishery has major importance for the Northeast's commercial fishing industry, these decreased landings will significantly affect that industry. The 1983 yellowtail landings of 73 million pounds (worth 35 million dollars in "ex-vessel" or dockside prices to fishermen) were double the landings of any other flounder, and were second only to Atlantic cod in landings by the Northeast's bottom-trawl fisheries.

Data from the Center's perennial series of autumn bottom-trawl surveys of fish populations on the Northeast's continental shelf show declining indexes for yellowtail flounder on all fishing grounds since 1982. **The just completed 1984 survey yielded indexes among the lowest on record.**

Our current assessment indicates that fishing mortality of yellowtail flounder is at or near record high levels, and that the fishable population largely depends upon the recruitment of new year classes. The strong 1980 year class, which largely supported the 1982 and 1983 fisheries, has been greatly reduced by fishing; more recent year classes have been much weaker. **This autumn's survey catches of age 1 yellowtail (i.e., the 1983 year class) were extremely low, indicating that recruitment to the 1985 fishery will be poor.**

Contact Steve Clark, FTS 840-1312 or (617) 548-5123.

PRESERVATIVE EXTENDS SHELF LIFE OF FRESH POLLOCK FILLETS

We can increase our seafood supply not only by larger harvest from fish populations, but also by better use of the harvests themselves. Improved utilization is a conservation measure gaining importance as our harvests of several popular species are now near or beyond the long-term sustainable level (e.g., Atlantic cod, yellowtail flounder, etc.).

One way to improve utilization is to extend the shelf life of fresh and frozen fishery products. Accordingly, we are experimenting with potassium sorbate for, among other things, extending the shelf life of fresh fish fillets. (Potassium sorbate is an FDA-approved and widely used food preservative.) After earlier experimenting with cod and yellowtail, we are now experimenting with pollock since it will likely become more important in the Northeast's fisheries when the large spawn of 1982 grows to a catchable size in 1986. **The pollock results look excellent: 2-3-day-old fillets dipped in five-percent potassium sorbate had an average shelf life of 20 days; undipped fillets had an average shelf life of 10 days. Although potassium sorbate treatment is expensive, the effective doubling of fresh shelf life more than compensates.**

Contact Burt Tinker, FTS 837-9217 or (617) 281-3600.

MODEST INCREASE IN SCROD HADDOCK ON GEORGES BANK NEXT YEAR

The Center's just completed autumn bottom-trawl survey indicates a modest increase for 1985, compared to both 1983 and 1984, in the number of age 2 or small "scrod" haddock recruiting to the Georges Bank fishery. Although this autumn's average catch of age 1 haddock (i.e., the 1983 year class which recruits to the fishery next year at age 2) per survey tow on Georges Bank was higher than the past two autumns' surveys, the level was still much lower than the levels of the late 1970's prior to recruitment of the strong 1975 and 1978 year classes. Thus, we do not expect recruitment of the 1983 year class of haddock to significantly increase the stock size on Georges Bank.

This autumn's average catch of age 1 haddock per survey tow in the Gulf of Maine was also low.

Contact Bill Overholtz or Steve Clark, FTS 840-1256/1282 or (617) 548-5123.

AMERICAN FINFISH & SHELLFISH SCIENTISTS GAIN FROM JAPANESE AQUACULTURAL EXPERIENCE

A Center scientist along with others representing NMFS, the U.S. Fish and Wildlife Service, and Sea Grant, attended the 13th annual meeting of the Aquaculture Panel of the United States-Japan Program in Natural Resources (UJNR), held last month in Ise, Japan. (The UJNR provides a fast-track information exchange between American and Japanese scientists in many natural resource fields.) A major benefit to American scientists at this meeting was experience with the large scale of Japanese finfish and shellfish aquaculture, as well as of Japanese research into such areas. In view of the ever-increasing demands upon NMFS to restore anadromous fish (e.g., Atlantic salmon, striped bass, etc.) and boost shellfish production (e.g., surf clams, American oysters, etc.), the meeting provided much useful information.

Contact Ed Rhodes, FTS 642-5226 or (203) 783-4226.

FIRST ASSESSMENT OF GEORGES BANK SURF CLAMS YIELDS INITIAL ESTIMATE FOR CATCH QUOTA

Through November, the Georges Bank surf clam fishery, which began last spring, has produced 401 thousand bushels of clams, or 6.8 million pounds of meats. To assist the Mid-Atlantic and New England Fishery Management Councils in managing this resource, the Center has produced its first assessment of it.

Our assessment shows that the Georges Bank surf clam population is only about 10 percent as large as the Mid-Atlantic population, but that significant concentrations do occur around Cultivator Shoals, Georges Shoals, etc. All significant concentrations occur on the American side of the new American-Canadian boundary on Georges Bank. Clams in shallow water (i.e., less than 30 fathoms) show good growth--similar to that in the Mid-Atlantic.

The Councils asked the Center for an initial estimate for a catch quota, based upon keeping the catch rate (i.e., the proportion of the population caught in one year) the same on Georges Bank as it is in the Mid-Atlantic. On this basis, the assessment yields an initial estimate of 250-300 thousand bushels of clams, or 4.3-5.1 million pounds of meats, per year. These harvest levels should keep the new fishery going for several years and renew interest in surf clam processing in New England.

Contact Steve Murawski, FTS 840-1303 or (617) 548-5123.

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NORTHEAST FISHERIES CENTER

MONTHLY HIGHLIGHTS



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DECEMBER 1984

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The Northeast Fisheries Center's "Monthly Highlights" is a selection of brief popularized accounts of Center research activities in the preceding month. These accounts focus on the practical applications of research findings to fisheries resource and habitat conservation. The name and telephone number of a Center scientist has been included at the end of each account to contact for more information.

NEW REPORT SERIES FOR FISHERMEN ON CENTER'S RESEARCH VESSEL SURVEY FINDINGS

The Center has started a *Fishermen's Report* to provide fishermen and others with timely information from the Center's research vessel surveys on finfish and invertebrate distribution and abundance. Each report is issued within 2-3 weeks of the end of a survey, and plots the sampling locations, lists details for each location (i.e., date & time, latitude & longitude, loran bearings, course & depth, and bottom temperature), and plots and lists size of catches for major species at each location. Most commercially and recreationally important species between the Gulf of Maine and Cape Hatteras are covered. The *Fishermen's Report* for the 1984 bottom trawl survey is available from Tom Azarovitz, FTS 840-1283 or (617) 548-5123.

PLANS FOR PROVIDING REAL-TIME TEMPERATURE INFORMATION TO FISHERMEN

The Atlantic Environmental Group (AEG) plans to provide sea-surface temperature information to fishermen 50-67 percent faster than in the past.

For many years, the AEG has provided the Northeast's fishermen with modified versions of NOAA's oceanographic analysis charts--satellite-derived charts of offshore sea-surface temperatures. Offshore fishermen use the charts' information on rapid temperature changes associated with ocean fronts and warm-core Gulf Stream rings to save time and fuel in locating swordfish, tunas, sharks, and marlin. (The New Jersey Sea Grant Extension Service and the American Swordfish Association estimate an annual savings of 2.25 million dollars in fuel costs.) Also, deep-sea red crab fishermen use the charts' information to avoid gear losses by keeping their pots away from the strong currents of warm-core rings.

Based on the success of the modified oceanographic analysis charts, for the past 1/2 years the AEG and the University of Rhode Island have provided about 175 Southern New England fishermen with 34 enhanced charts of inshore sea-surface temperatures within 48-72 hours of the data being gathered by NOAA satellite. Now, AEG plans to increase the coverage of the charts up and down the coast, and decrease the turnaround time to 24 hours. These improvements--requested by the commercial and recreational fishing industry--hinge on a continuing increase in the directness of communication between the satellite and AEG's Narragansett, Rhode Island, location. Contact Reed Armstrong, FTS 838-7142 or (401) 789-9326.

SOVIETS SUGGEST WORLD CATCH COULD DOUBLE IN 20-30 YEARS

A Soviet scientist, P. Moiseev, suggests that the world catch could increase from the current 70 million metric tons (mmt) to 150 mmt in the next 20-30 years. Moiseev made the suggestion in a book just recently translated by the NMFS Office of International Fisheries. The book, *Oceanology: Biology of the Ocean. Volume 2: Biological Productivity of the Ocean*, is edited by M.E. Vinogradov, Deputy Director of the Shirshov Institute of Oceanology of the U.S.S.R. Academy of Sciences. It comprehensively reviews Soviet studies in marine productivity at all trophic levels. Among the stocks indentified for potential increases are: anchovies off Mexico and Argentina; sardines off Africa and Australia; mackerels in the Southwest Pacific and off West Africa; sauries and sand eels in the North Pacific and North Atlantic; small tunas and sharks in the open waters of the Atlantic, Indian, and Pacific; and krill in the Antarctic.

The English translation is now in press as *NOAA Technical Memorandum NMFS-F/NEC-34* and should be available in late February. Contact Ken Sherman, FTS 838-7142 or (401) 789-9326.

MACKEREL STOCK CONTINUES INCREASE

The Center's latest assessment indicates a continuing increase in abundance and biomass of the Northwest Atlantic mackerel stock. Total stock biomass at the beginning of 1985 is estimated at nearly 1,200,000 metric tons (mt), more than double the 1980 level of about 475,000 mt. This increase is due to improved recruitment. The 1982 and 1984 year classes appear particularly strong.

Commercial and recreational catches off the U.S. and Canadian coasts have remained relatively stable during 1978-84 at an average of nearly 33,000 mt; the 1984 catch was 38,500 mt. Catches off the U.S. coast alone increased sharply in 1984 (due primarily to joint ventures) and are likely to increase further in 1985 as a result of such activity. The 1985 catch would be about 68,000 mt if fishing pressure remained the same as in 1984. Contact Emory Anderson, FTS 840-1251 or (617) 548-5123.

SQUID STOCKS DOWN

The Center's 1984 research vessel surveys indicate that the numbers of long-finned and short-finned squid recruiting to the 1985 fishery will be down. For long-finned squid, the 1984 year class appears to be half the size of the 1968-81 average, and if fishing pressure in 1985 is similar to that during 1978-81, then the 1985 harvest should be about 17-18 thousand metric tons. For short-finned squid, the 1984 year class appears to be the lowest since 1973, but the biomass of the population should be adequate to maintain the harvest at recent levels. Contact Anne Lange, FTS 840-1301 or (617) 548-5123.

SAND LANCE REPRODUCTION STILL HIGH, GEORGES BANK HERRING STILL NIL

The 1984 reproduction of sand lance continued robust with the larval population centered around Nantucket Shoals off Southern New England. Sand lance are a double-edged sword for the Northeast's fisheries; they are important prey for commercially and recreationally important fishes such as silver hake and Atlantic mackerel, but are also important competitors with young mackerel and Atlantic herring for their plankton prey. The once-productive spawning beds of Atlantic herring on Georges Bank remained largely barren in 1984. No evidence of significant herring spawning has been observed there now since 1979.

These reproduction estimates come from the Center's eighth year of egg and larval surveys from Nova Scotia to North Carolina. The 1984 surveys emphasized bluefish reproduction; results are not yet available, though. Bluefish will again be emphasized in the 1985 surveys, with the Southeast Fisheries Center covering the southern limits of the East Coast spawning range. Contact Wally Smith, FTS 342-8260 or (201) 872-0200.

CONTAMINATED SEDIMENTS RAISE RISKS TO BLOODWORM SURVIVAL

Center lab studies show that oil-contaminated sediments--at levels found in chronically polluted habitats--may not kill bloodworms (*Glycera dibranchiata*), but may alter their behavior enough to increase the risks of death from other causes. (Bloodworms are a popular fishing bait and support a major bait fishery in Maine.) Worms burrowing into oiled sediment soon emerge, exposing themselves to predation. Worms exposed to oiled sediment and then buried in clean sediment, burrow abnormally. The feeding rate is also reduced after exposure to the highest test levels. Contact Anne Studholme, FTS 342-8277 or (201) 872-0200.

COPPER HARMS SEA SCALLOP REPRODUCTION

Recent experiments by Center scientists show that copper can prevent the normal development of sea scallop gonads. When held for eight weeks in seawater with 10-20 parts per billion of copper, or with 10 parts per billion of copper and 18 parts per billion of cadmium, sea scallops showed reduced levels of gonad maturation. These levels of copper are similar to those found on some inshore scallop grounds of New England. If, and to what extent, copper has affected reproduction in natural scallop populations is not known.

However, the techniques used by Center scientists to link copper toxicity with reduced maturation in the lab, could be applied to natural populations. A combination of biological and biochemical techniques, including RNA, DNA, and protein analyses, reflects the level of gonad maturation and could be used to demonstrate the effect of copper on reproduction in the field. Contact Larry Buckley, FTS 838-7142 or (401) 789-9326.

LEADING BOOK PUBLISHED ON SYSTEMATICS & DEVELOPMENT OF BONY FISHES

The American Society of Ichthyologists and Herpetologists, with the assistance of the National Marine Fisheries Service, has published the Ahlstrom Symposium on the Ontogeny and Systematics of Fishes. The book summarizes the systematic status and developmental patterns of most groups of bony fishes, and contains major contributions by Center scientists on the Scombroidei (tunas, mackerels, billfishes, etc.), Gadiformes (cods, hakes, cusks, etc.), Beloniformes (halfbeaks, needlefishes, flyfishes, etc.), and Cyclopteridae (snailfishes, lumpsuckers, etc.). These contributions show relationships within each group, summarize scientific literature on eggs and larvae, and illustrate representative larvae. The book is available from Dr. Linda Trueb, Museum of Natural History, University of Kansas, Lawrence, Kansas 66044. Contact Bruce Collette (Beloniformes and Scombroidei), FTS/(202) 357-2524, or Mike Fahay (Gadiformes and Cyclopteridae), FTS 342-8261 or (201) 872-0200.

CENTER DEVELOPING INFORMATION FOR GENETICALLY BREEDING IMPROVED SHELLFISH POPULATIONS

After reviewing the prospects for using the new technology of gene transfer to improve (faster growth, more disease resistance, etc.) economically important plant and animal breeds, leading scientists are now calling for more research on the structure and control of genes in those breeds. These scientists are also cautioning, though, that this new genetic research should be in conjunction with, not at the expense of, the traditional breeding programs. Aquacultured finfish and shellfish should be included in this new research. Center scientists are now beginning work which will ultimately help in the practical transfer of cloned genes conferring economically important characteristics to shellfish species. Contact Arlene Longwell, FTS 642-5207 or (203) 783-4207.