

Brownlow
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 1986

IN THIS ISSUE:

CENTER REDUCES RESEARCH VESSEL ACTIVITIES TO MEET BUDGET CONSTRAINTS

MONOGRAPH PUBLISHED ON MUD SHRIMPS OF EASTERN PACIFIC

DISEASES CONTINUE TO AFFECT OYSTER RESOURCES

SUMMARY PREPARED ON WATER MASSES RECEIVING CHEMICAL WASTES AT THE 106-MILE DUMPSITE

REFRIGERATED SEAWATER IMPROVES QUALITY OF LANDED FISH

SALT CONTENT MODERATE IN BRINE-DIPPED COD FILLETS

LONG ISLAND SOUND FIRST SUBJECT OF CENTER'S INCREASED ESTUARINE RESEARCH

METHOD DEVELOPED TO RAPIDLY DISPLAY OCEANOGRAPHIC DATA

RECENT PUBLICATIONS, REPORTS, AND PRESENTATIONS

The Northeast Fisheries Center's *Monthly Highlights* is an administrative report on key Center research activities during the month. The report focuses on the practical applications of research findings to fisheries resource and habitat management. A name and telephone number have been included at the end of each research highlight to contact for more information.

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National Oceanic and Atmospheric Administration
National Marine Fisheries Service
Northeast Fisheries Center

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LABORATORIES

Woods Hole Laboratory
National Marine Fisheries Service, NOAA
Water St.
Woods Hole, MA 02543
(617) 548-5123 & FTS 840-1011
Officer-in-Charge: Dr. Marvin D. Grosslein

Sandy Hook Laboratory
National Marine Fisheries Service, NOAA
P. O. Box 428
Highlands, NJ 07732
(201) 872-0200 & FTS 342-8200
Officer-in-Charge: Anne L. Studholme

Gloucester Laboratory
National Marine Fisheries Service, NOAA
Emerson Ave.
Gloucester, MA 01930
(617) 281-3600 & FTS 837-9276
Officer-in-Charge: Robert J. Learson

National Systematics Laboratory
National Marine Fisheries Service, NOAA
National Museum of Natural History
10th & Constitution Ave., N.W.
Washington, DC 20560
(202) 357-2552 & FTS 357-2552
Director: Dr. Bruce B. Collette

Narragansett Laboratory
National Marine Fisheries Service, NOAA
So. Ferry Rd.
Narragansett, RI 02882
(401) 789-9326 & FTS 838-7142
Officer-in-Charge: Dr. Kenneth Sherman

Oxford Laboratory
National Marine Fisheries Service, NOAA
Railroad Ave.
Oxford, MD 21654
(301) 226-5193
Officer-in-Charge: Dr. Aaron Rosenfield

Milford Laboratory
National Marine Fisheries Service, NOAA
212 Rogers Ave.
Milford, CT 06460
(203) 783-4200 & FTS 642-5200
Officer-in-Charge: Dr. Anthony Calabrese

CENTER REDUCES RESEARCH VESSEL ACTIVITIES TO MEET BUDGET CONSTRAINTS

The Center has deleted 88 "sea days" from its Fiscal Year 1986 schedule of cruises by the fisheries research vessels *Albatross IV* and *Delaware II*. This reduction is the Center's contribution to the overall reduction in sea days by the NOAA fleet to meet budgetary constraints imposed by the Deficit Reduction Act of 1985 (Gramm-Rudman-Hollings).

As part of the 88-day reduction, the Center will delete: (1) a cruise to monitor environmental quality of fish habitats from the Gulf of Maine to Chesapeake Bay; and (2) a cruise to study distribution, migration, and reproduction of apex predators (e.g., sharks, tunas, billfishes) along the East Coast. We are attempting to partially compensate for the loss of sampling time and data acquisition by "piggybacking" on other cruises. Contact H.C. Boyar, FTS 840-1235 or (617) 548-5123.

MONOGRAPH PUBLISHED ON MUD SHRIMPS OF EASTERN PACIFIC

A monograph has been published in the *San Diego Society of Natural History Memoir* series on the National Systematics Laboratory's study of mud shrimps (*Upogebia*) of the eastern Pacific between Alaska and the Galapagos Islands. The monograph recognizes 20 species from the region, 15 new to science and one an abortive introduction from the western Atlantic, possibly imported with oysters. Contact Dr. Austin B. Williams, FTS/(202) 357-2639.

DISEASES CONTINUE TO AFFECT OYSTER RESOURCES

Samples obtained in early 1985 indicate that both "MSX" (*Haplosporidium nelsoni*) and "Dermo" (*Perkinsus marinus*) are infecting oysters in the Maryland portion of Chesapeake Bay. Newspaper reports also indicate that MSX is infecting oysters in the Virginia portion of Chesapeake Bay and in Delaware Bay. Neither disease affects humans, but both diseases can seriously affect oyster populations, and thus, oyster harvests.

Environmental conditions, particularly above-average salinity levels; are similar to those during 1980-82 when there were major losses of oyster resources in both Maryland and Virginia. Below-average rainfall, leading to above-average salinity, promotes lethal infections of both MSX and Dermo. In 1985, water samples obtained from the same areas as the oyster samples showed salinity levels 3-5 parts per thousand above levels normally recorded. We would predict similar mortalities for Maryland oysters during 1986 should these drought conditions continue.

Oyster samples obtained during autumn 1985 from other areas reporting high oyster mortalities (New York, Connecticut, Massachusetts, and Georgia) indicate that MSX was the causative agent in the New England area, and Dermo the likely agent in Georgia. Contact Dr. Aaron Rosenfield, (301) 226-5193.

SUMMARY PREPARED ON WATER MASSES RECEIVING CHEMICAL WASTES AT THE 106-MILE DUMPSITE

Applied Science Associates, Inc., under contract to the Center, has completed a summary report on the water masses which receive chemical wastes dumped at the 106-Mile Dumpsite. The Dumpsite, which is located about 120 nautical miles east of Cape May (New Jersey) in water that is 7,300-9,000 feet deep, is a designated site for disposal of industrial wastes. It has also just become a designated site for disposal of sewage sludge to be barged from

such municipalities as New York City.

The report states that of the 370-million gallons of chemical wastes dumped at the site in the past decade, 66 percent went into slope water, 17 percent into shelf water, 13 percent into warm-core rings, 2 percent into the Gulf Stream, and 2 percent into unknown waters. About one-fifth of the time, the site was overlain by shelf water, carrying along with it the pelagic fishes normally found in the outer shelf environment, potentially exposing them to the dumped chemical wastes. Contact Dr. Merton C. Ingham, FTS 838-7138 or (401) 789-9326.

REFRIGERATED SEAWATER IMPROVES QUALITY OF LANDED FISH

On-board holding of fish in refrigerated seawater, as opposed to holding them on ice, improves the overall quality, shelf life, and market value of commercial landings. This conclusion stems from a study conducted by White Dove, Inc., of Cape May, New Jersey, and funded through a National Marine Fisheries Service grant. The study compared the two different on-board preservation techniques using such Mid-Atlantic species as butterfish, scup, silver hake, Atlantic mackerel, black sea bass, bluefish, weakfish, summer flounder, long-finned squid, and short-finned squid.

For a copy of the study's completion report, contact Daniel W. Baker, FTS 837-9269 or (617) 281-3600.

SALT CONTENT MODERATE IN BRINE-DIPPED COD FILLETS

Dipping fillets in a salt (sodium chloride) brine is a common practice in fish processing. The brine dipping, among other things, retards moisture loss and gives an attractive sheen. Because consumers are increasingly interested in the salt content of the foods they eat, the Center is studying the salt content, and the factors affecting salt content, in brine-dipped fish fillets of several species.

Preliminary results show the salt content of brine-dipped Atlantic cod fillets sampled from retail markets to be moderate, i.e., 20-130 milligrams of salt per 100 grams of fillet. We are currently examining winter flounder fillets for those factors (fillet size, dipping time, etc.) which affect salt uptake during brine dipping. Contact Elinor M. Ravesi, FTS 837-9287 or (617) 281-3600.

LONG ISLAND SOUND FIRST SUBJECT OF CENTER'S INCREASED ESTUARINE RESEARCH

The Center has both increased and focused its estuarine research because: (1) we have found that while offshore fish habitats are generally healthy, many inshore habitats are degraded; and (2) the federal government has increased its attention to estuarine degradation. Center estuarine research will emphasize reproductive success, survival, and recruitment of key fish and bivalve mollusks in Northeast estuaries (e.g., Long Island Sound, Narragansett Bay, Buzzards Bay) subjected to contaminant effects. Physiology, biochemistry, genetics, pathology, ecology, analytical chemistry, and stock assessment studies will all be undertaken.

In this first year of study, the focus will be the reproductive success of winter flounder and hard clams in Long Island Sound. Contact Dr. Anthony Calabrese, FTS 642-5240 or (203) 783-4240.

METHOD DEVELOPED TO RAPIDLY DISPLAY OCEANOGRAPHIC DATA

The Center has developed a relatively rapid method to display computerized, geographically associated, oceanographic data for irregularly -- rather than rectangularly -- shaped areas of the ocean. Such irregularly shaped areas usually result from political, topographic, etc., features (e.g., Georges Bank).

The new method, called Interactive Geographic Onscreen Retrieval, or IGOR, has been developed using an IBM PC-XT personal computer and a VAX 11/780 computer, although the method can be adapted to other computers. Use of IGOR cuts the time for retrieving data for irregularly shaped areas from several weeks to less than a half hour. Contact Steven M. Atran, FTS 342-8270 or (201) 872-0200.

RECENT PUBLICATIONS, REPORTS, AND PRESENTATIONS

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- Perez-Farfante, I. 1985. The rock shrimp genus *Sicyonia* (Crustacea: Decapoda: Penaeoidea) in the eastern Pacific. Fish. Bull., U.S. 83(1):1-79.
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Information Services Section
Northeast Fisheries Center
National Marine Fisheries Service, NOAA
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FEBRUARY 1986



MAY 19 1986

IN THIS ISSUE:

ATLANTIC MACKEREL STILL INCREASING

SILVER HAKE REASSIGNED TO TWO STOCKS INSTEAD OF THREE

ASSISTANCE TO LOBSTER RETAILERS WITH HOLDING-WATER PROBLEMS

SODIUM CONTENT OF BRINE-DIPPED FLOUNDER FILLETS LINKED TO DIPPING TIME,
BRINE STRENGTH

FIRST ANALYSIS OF SEDIMENT CONTAMINANTS IN NORTHEAST ESTUARIES AS PART OF
"S&T" PROGRAM

METHOD ADAPTED FOR CLONING OYSTERS

The Northeast Fisheries Center's *Monthly Highlights* is an administrative report on key Center research activities during the month. The report focuses on the practical applications of research findings to fisheries resource and habitat management. A name and telephone number have been included at the end of each research highlight to contact for more information.

ATLANTIC MACKEREL STILL INCREASING

Atlantic mackerel appear to be continuing an increase that started in 1981. Recent assessment of the Northwest Atlantic mackerel stock suggests that it is approaching the high abundance observed in the late 1960's and early 1970's. The stock peaked at 4.2 billion pounds in 1970-71. Large 1981, 1982, and 1984 year classes are contributing to this resurgence.

Catches in the U.S. domestic and joint-venture fisheries have increased every year since 1977 and totaled 14.7 million pounds in 1985. The total mackerel catch (all countries) reached 125.4 million pounds in 1985, and will probably increase in 1986. A joint research fishery now being conducted by the United States and Poland with the Polish vessels *Admiral Arciszewski* and *Lutjan* has taken large amounts (i.e., about four million pounds for the month) of mackerel from Hudson Canyon south to Chesapeake Bay. Contact Dr. William J. Overholtz, FTS 840-1256 or (617) 548-5123.

SILVER HAKE REASSIGNED TO TWO STOCKS INSTEAD OF THREE

The Center has completed a study on delineating stocks of Northwest Atlantic silver hake. We now recognize two stocks: a Gulf of Maine-Northern Georges Bank stock and a Southern Georges Bank-Middle Atlantic stock. Prior to this major study, we had recognized three stocks: Gulf of Maine, Georges Bank, and Southern New England-Middle Atlantic.

These findings will immediately improve our accuracy in assessing this species, and will ultimately improve the ability for managing it throughout its range. Contact Frank P. Almeida, FTS 840-1308 or (617) 548-5123.

ASSISTANCE TO LOBSTER RETAILERS WITH HOLDING-WATER PROBLEMS

Center chemists recently assisted two New Jersey lobster retailers in solving water quality problems in their holding tanks. In one case, a mass mortality occurred soon after the water was changed. Oxygen levels were low in the tanks following the mortality, but not in the new bay bottom water when the tanks were refilled. We found the potential for a rapid depletion of the oxygen, though, because of high phytoplankton levels in the bay's bottom waters resulting from light penetrating through the clear surface waters of winter. We recommended aerating the water for several days before the lobsters were added.

In the other case, the retailer wanted to use cold well water to save on chilling costs. We found the well water to be anoxic, slightly sulfidic, and only moderately saline. We recommended a system to oxygenate the water, remove the sulfide, and raise the salinity. Contact Andrew F. Draxler, FTS 342-8254 or (201) 872-0200.

SODIUM CONTENT OF BRINE-DIPPED FLOUNDER FILLETS LINKED TO DIPPING TIME, BRINE STRENGTH

In the last issue, we mentioned our study of the salt (sodium) content, and factors affecting salt content, in brine-dipped fillets. (Fish processors commonly dip fillets in salt brine to retard moisture loss and give an attractive sheen.) This month's work with winter flounder shows non-dipped fillets with about 40-50 milligrams of sodium per 100 grams of fillet -- moderately low by FDA standards. The table below shows the milligrams of sodium in 100 grams of flounder fillet for various brine dipping times and brine strengths:

	time (seconds)		
	30	60	90
strength (percent)			
05	180 mg	-	-
10	280 mg	340 mg	410 mg
15	440 mg	-	-

These data will have value for fish processors as they evaluate: (1) the moisture-retarding and appearance-enhancing aspects of brine dipping; and (2) the consumer's interest in the sodium content of seafood products. Contact Elinor M. Ravesi, FTS 837-9287 or (617) 281-3600.

FIRST ANALYSIS OF SEDIMENT CONTAMINANTS IN NORTHEAST ESTUARIES AS PART OF "S&T" PROGRAM

We have analyzed sediment samples from several Northeast estuaries for 17 metals, 14 of which are possible contaminants. The samples come from the first round of sampling under NOAA's Status & Trends ("S&T") Program which is looking at long-term changes in the environmental quality of the nation's coastal and estuarine habitats. The estuaries for which we have first analyzed sediments are those we expect to be most polluted -- Raritan-Hudson, Long Island Sound, Narragansett Bay, Boston Harbor, and Salem Harbor.

As expected, the Raritan-Hudson system had the highest concentrations for most heavy metals, followed by Boston Harbor. However, the highest concentrations of chromium (2,950 ppm) and cadmium (9.44 ppm) were from Salem Harbor. We have previously seen such levels of cadmium only at sewage sludge dumping sites. We are now analyzing sediments from estuaries we expect to be least polluted. Contact Vincent S. Zdanowicz, FTS 342-8232 or (201) 872-0200.

METHOD ADAPTED FOR CLONING OYSTERS

The Center has adapted a method of cloning American oysters. This gives us the potential to develop a population of genetically identical oysters for research activities such as testing the effects of various types and levels of pollutants. Cloned organisms may be useful for pollutant-effect tests because the organisms' responses aren't influenced by any differences in the organisms themselves. Contact Sheila Stiles, FTS 642-5224 or (203) 783-4224.

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MARCH 1986

IN THIS ISSUE:

SUBSTANTIAL U.S. LANDINGS FROM THE "TAIL OF THE BANK" IN '85

SEA SCALLOP CATCH HITS 10-YEAR LOW

SCALLOP IMPORTS REACH RECORD HIGH

BOOK PUBLISHED ON VARIABILITY & MANAGEMENT OF LARGE MARINE ECOSYSTEMS

SATELLITE MONITORING OF SEWAGE SLUDGE DUMPING AT THE 106-MILE DUMPSITE

ANNUAL REPORT ON EMERGENCY STRIPED BASS STUDY

NEW SHRIMP SPECIES DISCOVERED ON MID-ATLANTIC RIDGE

LIST OF 1985 CENTER PUBLICATIONS & REPORTS

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SUBSTANTIAL U.S. LANDINGS FROM THE "TAIL OF THE BANK" IN '85

Over 12.5 million pounds of groundfish, particularly flounders, were landed in 1985 by U.S. trawlers fishing an area of the Grand Banks of Newfoundland known as the "Tail of the Bank." The Tail of the Bank is a portion of the continental shelf which lies beyond the Canadian 200-mile limit, and thus in international waters.

A total of 133 bottom trawl trips by U.S. vessels accounted for 8.4 million pounds of yellowtail flounder, 2.9 million pounds of American plaice, and 0.6 million pounds of witch flounder. Of the principal ports involved in this fishery, Rockland, Maine, accounted for 41 percent of total landings, New Bedford, Massachusetts, for 29 percent, and Portland, Maine, for 27 percent. In the case of yellowtail flounder, landings from the Tail of the Bank represented a significant share of the total 1985 U.S. landings of this species, exceeding those from any other yellowtail stock off New England by more than 2.2 million pounds. Contact Ralph K. Mayo, FTS 840-1310 or (617) 548-5123.

SEA SCALLOP CATCH HITS 10-YEAR LOW

U.S. landings of sea scallops in the Georges Bank, Mid-Atlantic, and Gulf of Maine fisheries declined in 1985 to 14.9 million pounds of meats -- the lowest in 10 years. Last year marked the seventh consecutive year of decline. The value of the 1985 landings dropped to 71.8 million dollars, almost 23 million dollars less than 1984, and less than any year since 1977. The average ex-vessel (i.e., dockside) price per pound of meat was \$4.82 in 1985, down from \$5.53 in 1984. Although fishing effort in 1985 was only down three percent from the record high 1984 level, the catch rates in all three fisheries fell to record low levels.

Sea scallop abundance will increase in 1986 due to strong recruitment from the 1982 year class in the Mid-Atlantic region and the U.S. portion of Georges Bank. This increased abundance should be reflected in increased U.S. landings in the latter half of 1986 and during 1987 as scallops from the 1982 spawning attain legal size. Contact Dr. Fredric M. Serchuk, FTS 840-1245 or (617) 548-5123.

SCALLOP IMPORTS REACH RECORD HIGH

Scallop imports to the United States totaled a record 42.0 million pounds in 1985, a 54 percent increase from 1984. Major exporters to the United States were Canada (11.8 million pounds of Atlantic sea scallops), Peru (11.4 million pounds of purple or "Ostion" scallops), and Japan (10.9 million pounds of "hotategai" scallops). All of these scallop species are marketed as "sea scallops."

Scallop imports should remain high in 1986, although there will likely be a pronounced shift among the major exporting nations. Imports from Canada should markedly increase due to increased abundance of commercial-sized sea scallops in the Canadian portion of Georges Bank resulting from outstanding recruitment of the 1981 year class. Imports from Peru, however, should decline sharply. In January 1986, the Peruvian Minister of Fisheries totally banned scallop harvesting until at least May 1986 due to past overfishing and aquacultural failures.

Although U.S. sea scallop landings should increase in 1986, our calico scallop landings (39 million pounds of meats in 1984) will likely be reduced

due to resource depletion and closure of fishing grounds resulting from the Space Shuttle *Challenger* salvage operations. The market for imported scallops thus appears strong. Contact Dr. Fredric M. Serchuk, FTS 840-1245 or (617) 548-5123.

BOOK PUBLISHED ON VARIABILITY & MANAGEMENT OF LARGE MARINE ECOSYSTEMS

A Center scientist and a University of Rhode Island geographer are editors of a just-released book which deals with the natural and manmade changes in large marine ecosystems (LME's) that affect fisheries. An LME is an extensive area in which the fisheries resources are ecologically linked as a result of continuity and similarity in the area's bottom configuration, oceanic currents, temperature ranges, and other unique environmental and biological conditions. Our Northeast shelf is one of the United States' eight LME's.

The book, *Variability and Management of Large Marine Ecosystems*, is the result of a special symposium held during the 1984 annual meeting of the American Association for the Advancement of Science. It specifically covers: (1) how to determine long-term, broad-scale changes in LME's; (2) how to partition these changes into natural and manmade causes; and (3) options for government to prevent or counter the causes that are detrimental to our fisheries. Contact Dr. Kenneth Sherman, FTS 838-7142 or (401) 789-9326.

SATELLITE MONITORING OF SEWAGE SLUDGE DUMPING AT THE 106-MILE DUMPSITE

Center scientists are monitoring infrared data from NOAA satellites to identify the water masses receiving sewage sludge at the 106-Mile Dumpsite. By identifying the various water masses receiving the sludge and then following the movements of these water masses, we should know where the sludge--and its contaminants--will ultimately be distributed in the marine environment.

Sludge dumping began at the 106-Mile Dumpsite on March 17 when the first load arrived from New York City. Over the next 21 months, the sludge dumping rate there will increase as sludge normally bound for the 12-Mile Dumpsite is diverted to the more distant, deeper-water site. By December 1987, dumping at the 12-mile site will cease; all sludge from the New York Metropolitan Area will then be dumped at the 106-mile site under a five-year EPA permit.

The Center uses the University of Rhode Island's Oceanographic Remote Sensing Laboratory to receive infrared images from NOAA satellites of sea-surface temperatures for the area in and around the 106-Mile Dumpsite. Large differences in these sea-surface temperatures within a short distance across the surface usually indicate a boundary between two water masses, and thus can delineate the locations of the various water masses in and around the dumpsite. The Center has now begun to superimpose an outline of the dumpsite location over the boundaries of the water-mass locations in order to estimate the percentage of sewage sludge ending up in each water mass. Contact Kenneth Barton, (401) 792-6837.

ANNUAL REPORT ON EMERGENCY STRIPED BASS STUDY

In conjunction with the NMFS Washington Office and the U.S. Fish and Wildlife Service, the Center contributed to the 1985 Annual Report to Congress on the Emergency Striped Bass Study. The report, soon to be publicly released, notes that the 1985 young-of-the-year indexes were low for most striper production areas, including the Hudson River. The report also notes that laboratory experiments suggest that contaminants may limit larval survival. In 1985, though, water quality in the Chesapeake area appeared adequate for survival of young. Contact Dr. R. Anne Richards, FTS 840-1347 or (617) 548-5123.

NEW SHRIMP SPECIES DISCOVERED ON MID-ATLANTIC RIDGE

Caridean shrimps were discovered in a hydrothermally active area of the Mid-Atlantic Ridge during a NOAA VENTS Program cruise on the NOAA research vessel *Researcher* during July-August 1985. This discovery will be adding one genus and two species new to science. Contact Dr. Austin B. Williams, FTS/(202) 357-2639.

LIST OF 1985 CENTER PUBLICATIONS & REPORTS

The Center will soon have available a list of its 1985 publications and reports. To obtain a copy when the list becomes available, write: "1985 Publications List," Northeast Fisheries Center, Woods Hole, MA 02543, or contact Judith Brownlow, FTS 840-1260 or (617) 548-5123.

Judy Rosenthal

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APRIL 1986

IN THIS ISSUE:

COMMERCIAL DATA COLLECTION NOW COMPUTER-AIDED FOR MOST OF NORTHEAST

U.S.-CANADIAN MEETING ON NORTHWEST ATLANTIC FISHERIES RESEARCH

FACT SHEETS FOR SEAFOOD CONSUMERS

CENTER DEVELOPS IN-HOUSE ABILITY TO TEST FISH FOR LEVELS OF CERTAIN TOXINS/CARCINOGENS

WORKSHOP ON CLAM SARCOMA DISEASE IN THE NORTHEAST

NEW SHRIMP SPECIES NAMED FOR CENTER SCIENTIST

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National Marine Fisheries Service, NOAA
So. Ferry Rd.
Narragansett, RI 02882
(401) 789-9326 & FTS 838-7142
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Milford Laboratory
National Marine Fisheries Service, NOAA
212 Rogers Ave.
Milford, CT 06460
(203) 783-4200 & FTS 642-5200
Officer-in-Charge: Dr. Anthony Calabrese

Sandy Hook Laboratory
National Marine Fisheries Service, NOAA
P. O. Box 428
Highlands, NJ 07732
(201) 872-0200 & FTS 342-8200
Officer-in-Charge: Anne L. Studholme

National Systematics Laboratory
National Marine Fisheries Service, NOAA
National Museum of Natural History
10th & Constitution Ave., N.W.
Washington, DC 20560
(202) 357-2552 & FTS 357-2552
Director: Dr. Bruce B. Collette

Oxford Laboratory
National Marine Fisheries Service, NOAA
Railroad Ave.
Oxford, MD 21654
(301) 226-5193
Officer-in-Charge: Dr. Aaron Rosenfield

COMMERCIAL DATA COLLECTION NOW COMPUTER-AIDED FOR MOST OF NORTHEAST

Commercial fisheries data collection is now computer-aided in all Northeast states except New Hampshire, Connecticut, and Delaware. Center port agents for Rockland, Me., Provincetown, Mass., Newport and Pt. Judith, R.I., Long Island, N.Y., Pt. Pleasant, N.J., and Hampton, Va., have completed their in-service training with the IBM-PC microcomputer and the computer programs developed by the Center called CODES (commercial data entry system). Port agents in Portland, Me., Gloucester, Boston, and New Bedford, Mass., and Cape May, N.J., had earlier adopted CODES. Accuracy has increased and turnaround time seems to be decreasing as a result of the new system. Contact Ronnee L. Schultz, FTS 840-1264 or (617) 548-5123.

U.S.-CANADIAN MEETING ON NORTHWEST ATLANTIC FISHERIES RESEARCH

During early April, the Center hosted the eighth annual meeting of U.S. and Canadian government fisheries scientists designed to promote awareness and cooperation in Northwest Atlantic fisheries research. These meetings have increased in importance since the partitioning of Georges Bank and the Gulf of Maine between U.S. and Canadian exclusive economic zones.

Topics discussed at the meeting included: (1) U.S. and Canadian finfish and shellfish research vessel survey sampling designs, gear comparisons, data exchanges, and data analysis; (2) U.S. and Canadian ichthyoplankton research vessel sampling designs and gear comparisons; (3) environmental factors affecting recruitment; and (4) stock assessment methodology, data needs, and future cooperation. Additionally, ad hoc working groups (shellfish, groundfish, cooperative surveys, gear behavior, etc.) were formed to address specific issues which arose during the discussions. A summary report on the meeting is available. Contact Dr. Tim D. Smith, FTS 840-1251 or (617) 548-5123.

FACT SHEETS FOR SEAFOOD CONSUMERS

We have developed a series of fact sheets for seafood consumers. The fact sheets cover: "Worms and Other Parasites," "Poisonous Fish," "Food Poisoning and Seafood Handling," "Red Tide," and "Radionuclides and Food Irradiation." These fact sheets are the Center's contribution to a New England Marine Advisory Council-sponsored project to develop a packet of fact sheets which can be used to uniformly and factually answer questions from the public and news media concerning seafood contamination. The Massachusetts Division of Marine Fisheries and the New England Fisheries Development Foundation will coordinate development and distribution of the fact sheet packets. Contact Dr. Joseph J. Licciardello, FTS 837-9236 or (617) 281-3600.

CENTER DEVELOPS IN-HOUSE ABILITY TO TEST FISH FOR LEVELS OF CERTAIN TOXINS/CARCINOGENS

The Center has passed a test of its in-house ability to measure concentrations of certain chemical contaminants in fish bile. The test compared the performance of the Center's analytical chemical facility at Gloucester with the National Marine Fisheries Service's national analytical facility at Seattle in measuring naphthalene and benzo(a)pyrene--metabolites of aromatic hydrocarbons--in a pooled sample of bile from a West Coast flounder species. The test looks at the metabolites in the bile rather than at the

parent aromatic hydrocarbon compounds in the tissue in general because fish rapidly convert the aromatic hydrocarbons to various metabolic products.

The Center's in-house ability to measure these harmful metabolites will be used to test winter flounder from various Northeast sites as part of NOAA's Status and Trends Program which is monitoring long-term changes in the environmental quality of the nation's coastal and estuarine habitats. Contact Donald F. Gadbois, FTS 837-9286 or (617) 281-3600.

WORKSHOP ON CLAM SARCOMA DISEASE IN THE NORTHEAST

The Center and Rutgers University jointly held an early April workshop in Bivalve, New Jersey, to review and document the prevalence and mortality of infectious sarcoma disease in the Northeast's softshell clam populations. In addition to the well publicized sarcoma problems in Chesapeake Bay, workshop participants discussed the known or possible role of sarcoma in softshell clam die-offs in Maine, Massachusetts, Rhode Island, Connecticut, and New Jersey. Maine appears to have sarcoma in numerous sites with prevalences similar to those in Maryland, but with no field documentation on mortalities.

An histocytological method developed by the Center to diagnose infectious sarcoma disease in softshell clams was demonstrated to workshop participants. The participants agreed to adopt this method as part of a new, standardized, integrated study of the extent, intensity, mechanisms, and processes of infectious sarcoma disease in the Northeast. Contact Dr. Aaron Rosenfield, (301) 226-5193.

NEW SHRIMP SPECIES NAMED FOR CENTER SCIENTIST

A newly recognized species of shrimp, collected on the 1907-10 Philippine expedition of the original *Albatross*, has been named *Parapenaeus perezfarfanta* for a member (Isabel Perez Farfante) of the National Systematics Laboratory. Dr. Alain Crosnier of the French Office for Overseas Scientific Research and Technology, and the French National Museum of Natural History, authored the new species name. Contact Dr. Bruce B. Collette, FTS/(202) 357-2524.

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Judith Brownlow

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

MAY 1986

IN THIS ISSUE:

ASSESSMENT WORKSHOP YIELDS REPORT ON 13 SPECIES

ATLANTIC SALMON SMOLTS TAGGED

TWO SPECIES OF FRIGATE TUNA OCCUR IN ATLANTIC

WARM-CORE RING DAMAGES DEEPSEA LOBSTER FISHERY

CONTAMINANT LEVELS GENERALLY LOW IN OCEAN QUAHOGS

PARASITES DETECTED IN CLAMS SCHEDULED FOR INTRODUCTION TO SAMOA

MANUAL AVAILABLE ON HISTOLOGICAL TECHNIQUES FOR MARINE BIVALVE MOLLUSKS

POTASSIUM SORBATE PROLONGS SHELF LIFE OF CRAB MEAT

The Northeast Fisheries Center's *Monthly Highlights* is an administrative report on key Center research activities during the month. The report focuses on the practical applications of research findings to fisheries resource and habitat management. A name and telephone number have been included at the end of each research highlight to contact for more information.

ASSESSMENT WORKSHOP YIELDS REPORT ON 13 SPECIES

The Center has issued a report describing up-to-date assessments of the status of the stocks of 13 Northeast fish and invertebrate species. The report also identifies important limitations and alternative uses of this assessment information. Species covered were haddock, silver hake, white hake, red hake, redfish, yellowtail flounder, witch flounder, American plaice, butterfish, Atlantic mackerel, sea scallops, long-finned squid, and short-finned squid. The report was prepared during a May 5-9 workshop in Woods Hole which included participation by several state marine fisheries agencies, the New England & Mid-Atlantic Fishery Management Councils, the Southeast Fisheries Center, several universities, and other interested parties. Copies of the report are available as *Woods Hole Laboratory Reference Document No. 86-09*. Contact Dr. Tim D. Smith, FTS 840-1251 or (617) 548-5123.

ATLANTIC SALMON SMOLTS TAGGED

The Center, in cooperation with the U.S. Fish and Wildlife Service, sponsored the recent release of 150,000 hatchery-produced juvenile or "smolt" Atlantic salmon marked with external "Carlin" tags. One-hundred thousand tagged smolts were released in Maine's Penobscot River; 50,000 tagged smolts were released in the Connecticut River at Turners Falls, Massachusetts. These fish averaged 6-1/2 inches in length and bore the blue or green plastic tags in their backs. Additionally, a large number of smolts were tagged with internal coded-wire tags which can only be detected with special metal detectors. A sampling program has been established to retrieve these latter tags.

Anyone catching a Carlin-tagged Atlantic salmon 15 or more inches long is asked to return the tag with information on the fish's length and the catch gear/location/date to the Center's headquarters in Woods Hole. An eight-dollar reward and information on when and where the fish was released will be sent to the fisherman. However, any salmon less than 15 inches long (those not likely to have had a chance to migrate to the ocean where they would grow and mature) should be returned to the water. If the salmon has been tagged, the tag number, fish length, and catch information may be recorded prior to release. This information should also be forwarded to the Center.

Regulations regarding the capture of Atlantic salmon vary by state and river system, and apply to both tagged and untagged fish. Fishermen should be aware of those regulations pertaining to the area in which they fish. Contact Dr. Kevin Friedland, FTS 840-1344 or (617) 548-5123.

TWO SPECIES OF FRIGATE TUNA OCCUR IN ATLANTIC

The frigate tuna genus *Auxis* has been revised. The genus includes two worldwide species: *A. thazard*, the narrow caudate frigate tuna, and *A. rochei*, the wide caudate frigate tuna or bullet tuna. (Frigate tunas are not yet utilized in the United States, but world harvests annually exceed 100 thousand metric tons.)

The Indo-Pacific populations of both species are easily distinguished by differences in body proportions, color, and other characteristics. However, the Atlantic population of *A. rochei* differs morphologically from its Indo-Pacific population, making it difficult to distinguish it from *A. thazard*. This difficulty in distinguishing between the two species in the Atlantic, combined with the relative scarcity of *A. thazard* in the Atlantic, has mistakenly led to the belief that there was only one Atlantic species of *Auxis*. Contact Dr. Bruce B. Collette, FTS/(202) 357-2524.

WARM-CORE RING DAMAGES DEEPSEA LOBSTER FISHERY

Warm-core ring 86-A -- a cutoff meander of the Gulf Stream -- has swept away some lobster pots and apparently killed lobsters in some of the remaining pots in the canyons of southwestern Georges Bank. The pots were swept away by the ring's strong currents, and the lobsters were likely killed by the ring's warm waters (i.e., surface temperatures in the canyon area were 68° F. whereas surface temperatures on Georges Bank proper were 41-45° F.). Using NOAA satellites, the Center documented ring 86-A being formed in early January near 62° W longitude, drifting westward after that, and remaining near Hydrographer Canyon throughout May.

Similar warm-core rings have invaded the canyon areas of the Mid-Atlantic Bight and southern Georges Bank in the past, prompting many deepsea lobster and crab fishermen to monitor ring locations to avoid these kinds of problems. Fishermen can obtain information on the status of warm-core rings by contacting either Kenneth Barton, FTS 838-7138 or (401) 792-6837, or Reed S. Armstrong, FTS 838-7138 or (401) 789-9326.

CONTAMINANT LEVELS GENERALLY LOW IN OCEAN QUAHOGS

Scientists from the Center and Battelle New England Laboratory have jointly found that contaminant levels in the Northeast's ocean quahogs are generally low. The study looked at ocean quahogs which had been collected between Nova Scotia and Virginia for their levels of polychlorinated biphenyls (PCB's), polynuclear aromatic hydrocarbons (from both petroleum and combustion sources), total petroleum hydrocarbons, and trace metals (i.e., cadmium, chromium, copper, lead, nickel, silver, and zinc). The highest levels, although well below the FDA's action levels for these various contaminants, generally came from the inner New York Bight and Rhode Island Sound. Contact Frank W. Steimle, Jr., FTS 342-8259 or (201) 872-0200.

PARASITES DETECTED IN CLAMS SCHEDULED FOR INTRODUCTION TO SAMOA

At the request of the Interior Department, the Center examined a sample of giant clams (*Tridacna derasa*) from the waters of the Palau Islands which were scheduled to be introduced into the waters of American Samoa. We found 58 percent of the Palau giant clams to be infected with a parasitic metazoan worm. At the same time, we found no parasites in the giant clams (*T. maxima*) already native to American Samoa. To prevent the introduction of a potentially damaging parasite into the native clams of American Samoa, we provided the Interior Department not only with the results of our diagnostic examination, but also with guidelines developed by the International Council for the Exploration of the Sea designed to prevent such parasitic introductions. Contact Frederick G. Kern, (301) 226-5193.

MANUAL AVAILABLE ON HISTOLOGICAL TECHNIQUES FOR MARINE BIVALVE MOLLUSKS

The Center has produced a techniques manual for preparing high-quality histological sections and slides and related materials from marine mollusk tissues. The manual covers preservatives, fixation, blocking of tissues, stains, equipment, safety, and data management. A special feature throughout the manual are the tried-and-tested techniques for troubleshooting when unsatisfactory results are obtained. Copies are available. Contact B. Jane Swann, (301) 226-5193.

POTASSIUM SORBATE PROLONGS SHELF LIFE OF CRAB MEAT

Potassium sorbate was tested to see if and how much it can prolong the shelf life of fresh crab meat. Using common processing procedures, we briefly immersed freshly picked Jonah crab claw meat with either four-percent potassium sorbate or distilled water (the control). The control crab meat had a 10-11 day shelf life; the potassium sorbate-treated meat had a 17-18 day shelf life. Contact Vincent G. Ampola, FTS 837-9285 or (617) 281-3600.

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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

JUNE 1986

IN THIS ISSUE:

PCB LEVELS IN BLUEFISH REPORTED TO CONGRESS

"GHOST" GILL NET SURVEY COMPLETED

ENVIRONMENTAL CONDITIONS SUMMARIZED FOR NORTHWEST ATLANTIC IN 1985

GAMBA PRAWN GENUS *PSEUDARISTEUS* REVISED

"PROFILES" DEVELOPED FOR FLAVOR AND TEXTURE OF FLOUNDERS AND TUNA

The Northeast Fisheries Center's *Monthly Highlights* is an administrative report on key Center research activities during the month. The report focuses on the practical applications of research findings to fisheries resource and habitat management. A name and telephone number have been included at the end of each research highlight to contact for more information.

PCB LEVELS IN BLUEFISH REPORTED TO CONGRESS

Preliminary findings of a one-year study by NOAA, EPA, and FDA on polychlorinated biphenyl (PCB) levels in Atlantic Coast bluefish suggest that seafood consumers who procure their bluefish through commercial sources aren't at a health risk since bluefish are only a portion of their seafood consumption. Those seafood consumers such as some recreational fishermen and their families though, who may consume bluefish day after day, year after year, might be at risk. Continuing analysis of the study's data should better define any categories of seafood consumers who might be at risk.

The study, in which the Center was significantly involved, collected 4,258 bluefish of all sizes between Massachusetts and Florida from January to November 1985, and performed over 1,200 chemical analyses. No bluefish -- regardless of the sampling site -- that had a length less than 20 inches had PCB levels above the FDA's two-parts-per-million action level. However, for those bluefish with a length more than 20 inches, between 3 and 45 percent of the fish at each sampling site exceeded the action level.

An initial data/statistical report was sent to Congress on June 12; a final interpretive report will be sent to Congress in December. Contact Stuart J. Wilk, FTS 342-8208 or (201) 872-0200.

"GHOST" GILL NET SURVEY COMPLETED

The third and final annual underwater survey of lost ("ghost") gill nets in the Stellwagen Bank-Jeffreys Ledge area found a single ghost net some 1,000 feet long on Stellwagen Bank. The survey, a cooperative effort among the Center, the Massachusetts Division of Marine Fisheries, and the National Undersea Research Program - University of Connecticut at Avery Point, included 10 dives during June 10-17 on five traditionally fished gill net sites on Stellwagen Bank using the research submersible *Delta* with support vessel *Atlantic Twin*.

The 1,000-foot net appeared to be recently lost and was actively fishing; the catch included many dogfish (fresh and decaying), several crab species (Jonah, rock, and spider), and lobsters. Hagfish were feeding on the dead fish. We also resurveyed, for the third year, two ghost nets on Jeffreys Ledge. Both nets were still fishing, but less effectively than in 1984 and 1985.

Perceived degradation of historically productive commercial and recreational fishing grounds by fleet gill netting, and suspected fishing by ghost gill nets, was the original impetus for the three-year survey. A final report of survey findings is being prepared for the New England Fishery Management Council. Contact Joseph R. Uzman, FTS 840-1271 or (617) 548-5123.

ENVIRONMENTAL CONDITIONS SUMMARIZED FOR NORTHWEST ATLANTIC 1985

The Center has prepared four reports of environmental conditions in the Northwest Atlantic during 1985. The reports cover: (1) variation in the shelf-water front position from Georges Bank to Cape Romain; (2) water-column thermal structure across the shelf and slope southeast of Sandy Hook, New Jersey; (3) sea-surface temperatures in the Northwest Atlantic; and (4) anticyclonic warm-core Gulf Stream rings off the northeastern United States. Copies are available from Joyce Denecour, National Marine Fisheries Service, South Ferry Road, Narragansett, RI 02882. Contact Reed S. Armstrong, FTS 838-7138 or (401) 789-9326.

GAMBA PRAWN GENUS *PSEUDARISTEUS* REVISED

A monograph has been completed which revises the gamba prawn (shrimp) genus *Pseudaristeus*. This wide-ranging group of prawns includes six species with commercial potential, two of which were previously unknown to science, and another of which was previously known only in the juvenile stage. Contact Dr. Isabel C. Canet, FTS/(202) 357-2524.

"PROFILES" DEVELOPED FOR FLAVOR AND TEXTURE OF FLOUNDERS AND TUNA

As part of the Center's ongoing program to "profile" the edibility characteristics (i.e., flavor and texture) of seafood species, we have just completed profiles for four more species: winter flounder, yellowtail flounder, witch flounder, and yellowfin tuna. Such profiles are an effort to enhance the marketability of traditional seafood species, and to improve the marketability of less traditional seafood species, by emphasizing their table characteristics instead of their market names. Contact Joseph M. Mendelsohn, FTS 837-9282 or (617) 281-3600.

NORTHEAST FISHERIES CENTER

MONTHLY HIGHLIGHTS



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IN THIS ISSUE:

SHELLFISH DREDGING AND CULLING LESS HARMFUL THAN THOUGHT

CHECKLIST DRAFTED FOR NAMES OF DECAPOD CRUSTACEANS

SHARKS, TUNAS, AND BILLFISHES SUBJECT OF COOPERATIVE CRUISE WITH POLISH SCIENTISTS

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FACILITIES

Woods Hole Laboratory
National Marine Fisheries Service, NOAA
Water Street
Woods Hole, MA 02543
(617) 548-5123 & FTS 840-1011
Officer-in-Charge: Dr. Marvin D. Grosslein

Gloucester Laboratory
National Marine Fisheries Service, NOAA
Emerson Avenue
Gloucester, MA 01930
(617) 281-3600 & FTS 837-9276
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Narragansett Laboratory
National Marine Fisheries Service, NOAA
South Ferry Road
Narragansett, RI 02882
(401) 789-9326 & FTS 838-7138
Officer-in-Charge: Dr. Kenneth Sherman

Milford Laboratory
National Marine Fisheries Service, NOAA
212 Rogers Avenue
Milford, CT 06460
(203) 783-4200 & FTS 642-5200
Officer-in-Charge: Dr. Anthony Calabrese

Sandy Hook Laboratory
National Marine Fisheries Service, NOAA
P.O. Box 428
Highlands, NJ 07732
(201) 872-0200 & FTS 342-8200
Officer-in-Charge: Anne L. Studholme

National Systematics Laboratory
National Marine Fisheries Service, NOAA
National Museum of Natural History
10th & Constitution Avenue, N.W.
Washington, DC 20560
(202) 357-2552 & FTS 357-2552
Director: Dr. Bruce B. Collette

Oxford Laboratory
National Marine Fisheries Service, NOAA
Railroad Avenue
Oxford, MD 21654
(301) 226-5193
Officer-in-Charge: Dr. Aaron Rosenfield

SHELLFISH DREDGING AND CULLING LESS HARMFUL THAN THOUGHT

A recent undersea study by the Center suggests that dredging and culling of surf clams, ocean quahogs, and sea scallops cause less mortality to unharvested and discarded shellfish than previously thought. The study took place off New Jersey and Delaware at depths of 70-220 feet, and involved six vessels: the fishing vessels *Carolina Dawn* (scallop), *John Marvin* (surf clammer), and *Shrewsbury* (ocean quahogger); the Center research vessel *Delaware II*; and the Harbor Branch Foundation's manned research submersible *Johnson-Sea-Link I* and its supporting research vessel *Edwin Link*.

The study's 16 dives during a 10-day period yielded 40 videotapes and 5,600 photographs of our first-ever undersea observations of the effects that dredging and culling have on mortality of offshore shellfish resources. A videotape which summarizes our findings is being prepared for viewing by the New England and Mid-Atlantic Fishery Management Councils, as well as the shellfish fishing industry. Contact Dr. Fredric M. Serchuk, FTS 840-1245 or (617) 548-5123.

CHECKLIST DRAFTED FOR NAMES OF DECAPOD CRUSTACEANS

A checklist of the names of the approximately 1,600 species of decapod crustaceans known to occur in fresh and marine waters of North America is nearing completion. Modeled on the American Fisheries Society's (AFS) *List of Common and Scientific Names of Fishes from the United States and Canada*, the crustacean list gives accepted scientific names with author and date of original description for each species, general distribution, and an accepted common name for many but not all species. Initiated by the AFS Committee on Common and Scientific Names of Aquatic Invertebrates, the list was actually drafted by a Committee of the Crustacean Society in collaboration with interested scientists. The list is intended for a special publication of AFS. General distribution is not possible at this time, but written queries concerning individual species will be considered. Contact Dr. Austin B. Williams, National Marine Fisheries Service, National Systematics Laboratory, U.S. National Museum of Natural History, Washington, D.C. 20560.

SHARKS, TUNAS, AND BILLFISHES SUBJECT OF COOPERATIVE CRUISE WITH POLISH SCIENTISTS

The possibility of a shark fishery management plan being developed by the Regional Fishery Management Councils has increased the importance of the Center's ongoing research into large pelagic fishes (sharks, tunas, and billfishes). A major cooperative cruise (Polish research vessel *Wieczno*) to study large pelagics, particularly sharks, began in late July, and will end in mid-September. The cruise will survey continental shelf and slope waters from Georges Bank to Miami, Florida, as well as Gulf Stream waters from Miami to about 300 miles northeast of Cape Hatteras, in order to gather data and samples to yield information on: (1) species composition; (2) geographic distribution; (3) migrations; (4) food and feeding habits; (5) growth rates; (6) age composition; (7) relative abundance; (8) parasites; and (9) vulnerability to various fishing gear. Contact John G. Casey, FTS 838-7138 or (401) 789-9326.

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Judith Brownlow
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

AUGUST 1986

IN THIS ISSUE:

STATUS-OF-THE-STOCKS REPORT

COMMERCIAL FISHING DATA COLLECTION

SHELF-WATER TEMPERATURE CHARTS

ILLUSTRATED KEY TO COMMERCIAL AMERICAN PENAEOID SHRIMPS

12-MILE DUMPSITE MONITORING

NUTRITIONAL COMPOSITION OF 17 SEAFOOD SPECIES

BOSTON SEAFOOD FESTIVAL

RIGHT WHALE RESEARCH

The Northeast Fisheries Center's *Monthly Highlights* is an administrative report on key Center research activities during the month. The report focuses on the practical applications of research findings to fisheries resource and habitat management. A name and telephone number have been included at the end of each research highlight to contact for more information.

STATUS-OF-THE-STOCKS REPORT

The Center has completed the report on "The Status of the Fishery Resources Off the Northeastern United States for 1986" and will issue it during November in the *NOAA Technical Memorandum NMFS-F/NEC* series. This status-of-the-stocks report is an annual update to a five-year-old series of such reports. The status of 34 species, or groups of species, is described in a series of 2-5 page writeups. Summaries of commercial/recreational catches and research vessel survey catches are presented in graphs and tables accompanying each writeup. Summaries of general economic and biological information on each species are presented in the introduction.

Some of the material for this report came from the Center's Stock Assessment Workshop (SAW) conducted in May. At this workshop, scientists from NMFS, regional fishery management councils, state marine fisheries agencies, and universities reviewed new and updated stock assessment information for 13 species, and produced a report which presented detailed assessment information. Another Stock Assessment Workshop is planned for the first week in September, during which assessment information for an additional 11 species of commercial/recreational value will be reviewed. Contact Dr. Tim D. Smith, FTS 840-1251 or (617) 548-5123.

COMMERCIAL FISHING DATA COLLECTION

The Center has completed installing IBM PC-XT microcomputer systems in major commercial fishing ports of NMFS's Northeast Region. These systems are now being used by the Center's port agents to enter and audit catch-effort and economic data collected in the ports. Audited data are transmitted to the Center's Woods Hole Laboratory on diskettes for inclusion in the Center's commercial fisheries data base.

Early results show marked improvement in data quality and decreased turnaround time between data collection and availability to users. Time saved will be devoted to increasing the number of interviews with vessel captains, enhancing biological sampling efforts, and improving the overall data collection program. Contact Ronnee L. Schultz, FTS 840-1264 or (617) 548-5123.

SHELF-WATER TEMPERATURE CHARTS

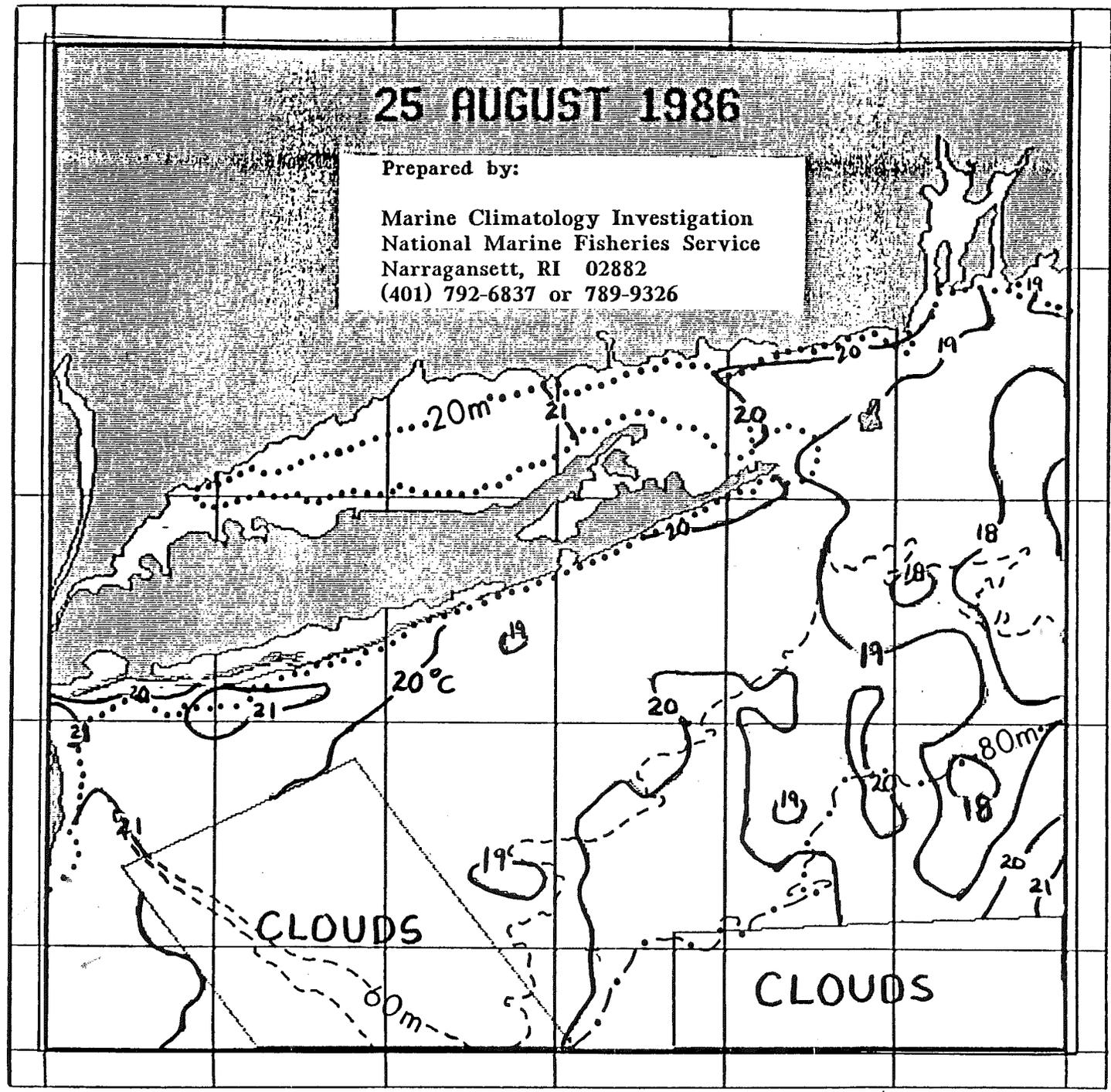
Infrared data from orbiting NOAA satellites are commonly used to produce near real-time charts of major frontal features such as the Gulf Stream, the shelf water - slope water front, and warm-core Gulf Stream rings in the slope-water mass. However, a similar set of near real-time charts of features or surface temperatures in the shelf-water mass is not routinely available on a scale useful to scientists or fishing interests operating in the coastal waters of the northeastern United States.

Accordingly, the Center has developed a prototype chart of near real-time sea-surface temperatures; a copy is attached for review and comment. If judged feasible, such charts would be produced weekly (cloud-free conditions permitting) and distributed to scientists in the Center; if a suitable distributional mechanism could be found, the charts would also be distributed to scientific and fisheries interests outside of the Center. Contact Carol A. Price, (401) 792-6837.

TEMPERATURE
CONVERSIONS

°C	°F
27	80.6
26	78.8
25	77.0
24	75.2
23	73.4
22	71.6
21	69.8
20	68.0
19	66.2
18	64.4
17	62.6
16	60.8
15	59.0
14	57.2
13	55.4
12	53.6
11	51.8
10	50.0
9	48.2
8	46.4
7	44.6
6	42.8
5	41.0
4	39.2

-2-



25 AUGUST 1986

Prepared by:
 Marine Climatology Investigation
 National Marine Fisheries Service
 Narragansett, RI 02882
 (401) 792-6837 or 789-9326

42°N

41°

40°

74°

73°

72°

71°

ILLUSTRATED KEY TO COMMERCIAL AMERICAN PENAEOID SHRIMPS

The National Systematics Laboratory has completed an illustrated key to the commercial penaeoid shrimps of the Americas. Currently, it is difficult to identify some of the economically valuable species occurring in the western Atlantic and eastern Pacific. The key, which is based on readily recognizable characteristics, will improve the identification of the exploited species. Several of the characteristics used in the key became evident only during the course of this study. Four previously undescribed species were also discovered. Illustrations of the anatomical terms used in the key are presented on three plates, and 40 other plates depict the entire animal or the carapace together with the male (petasma) and the female (thelycum) genitalia. Contact Dr. Isabel C. Canet, FTS/(202) 357-1417.

12-MILE DUMPSITE MONITORING

The Center has completed the first round of sampling in a three-year study to monitor recovery of the 12-mile sewage sludge dumpsite off the New York - New Jersey coast. Disposal of sewage sludge at this site since 1924 has altered adversely the site's benthic habitats, as well as has affected its shellfish, finfish, and other marine resources. Gradual phaseout of the dumpsite began in April 1986, and will cease by December 1987.

The multidisciplinary study, incorporating physical, chemical, and biological measures, will provide data on distribution and abundance of finfish, shellfish, and forage species with related data on organic and heavy metal concentrations in sediments and tissues. Microbial contamination in shellfish will be monitored (with FDA support) to determine changes in areas acceptable for harvesting. Rates of change in chemical burdens and changes in community structure will be used to develop a model of resource recovery. Contact Dr. Robert A. Murchelano, FTS 840-1263 or (617) 548-5123.

NUTRITIONAL COMPOSITION OF 17 SEAFOOD SPECIES

The Center's nomenclature project is an ongoing study designed to categorize fish species by such sensory characteristics as flavor and texture. By showing that the sensory characteristics of certain species of fish are similar, then the more lightly marketed species can be more readily substituted for the more heavily marketed (and more commonly overfished) species.

As part of this project, the Center has analyzed 17 fish species local to the fishing port of Gloucester, Massachusetts, for proximate composition (i.e., protein, fat, ash, and moisture), cholesterol content, and fatty acid profiles (the latter being related to the study of the therapeutic effects of fish oils on human heart disease). Species analyzed are: Atlantic cod, silver hake (whiting), pollock, red hake (ling), haddock, redfish (ocean perch), goosefish (monkfish), Atlantic wolffish (ocean cat), skate, American plaice (dab), yellowtail flounder, witch flounder (grey sole), winter flounder (blackback flounder), Atlantic herring, Atlantic mackerel, bluefin tuna, and yellowfin tuna. Contact Judith Krzynowek, FTS 837-9226 or (617) 281-3600.

BOSTON SEAFOOD FESTIVAL

The Center participated in the Boston Seafood Festival held on July 27 and 28 on the Boston Fish Pier. Edible samples of 17 species of fresh local fish were displayed on the deck of NOAA research vessel *Albatross IV*. A large number of people attended despite the rainy weather, and showed genuine interest in the number of species available locally for good eating. Contact Robert J. Learson, FTS 837-9247 or (617) 281-3600.

RIGHT WHALE RESEARCH

The Center has signed a cooperative agreement with the University of Rhode Island (URI) to implement a Congressional initiative for research on the severely threatened North Atlantic right whale. Research will be conducted by a consortium of East Coast institutions, including URI's Graduate School of Oceanography, the New England Aquarium, the Provincetown Center for Coastal Studies, and the Woods Hole Oceanographic Institution. The research objectives are to: (1) develop indices for monitoring population changes; and (2) determine the causes for such changes.

To achieve these objectives, a fully integrated research program for North Atlantic right whales will be conducted. Designs for research tasks and plans for shipboard and aerial surveys are being developed. Data will be collected on behavior patterns, respiration rates, habitat usage, microscale movements, residence times, surface feeding, social groupings, and reproductive rates. The data will be incorporated into a standardized data base which began in 1956. Contact Gordon T. Waring, FTS 840-1311 or (617) 548-5123.

Judy Brownlaw
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

SEPTEMBER 1986

IN THIS ISSUE:

COD STOCKS DECLINE AS FISHING MORTALITY REACHES RECORD HIGH

SEA SCALLOP SURVEY SHOWS A RECOVERY IN ABUNDANCE

NORTHERN SHRIMP SURVEY YIELDS A GOOD OUTLOOK

MAJOR LONGLINE SURVEY COMPLETED FOR APEX PREDATORS

STUDY UNDERWAY ON HABITAT RECOVERY AT 12-MILE DUMPSITE

STOCK ASSESSMENT WORKSHOP HELD

REVISION UNDERWAY FOR *FISHES OF THE GULF OF MAINE*

NATIONAL SYSTEMATICS LABORATORY'S SHRIMP BIOLOGIST RETIRES

The Northeast Fisheries Center's *Monthly Highlights* is an administrative report on key Center research activities during the month. The report focuses on the practical applications of research findings to fisheries resource and habitat management. A name and telephone number have been included at the end of each research highlight to contact for more information.

COD STOCKS DECLINE AS FISHING MORTALITY REACHES RECORD HIGH

Atlantic cod stocks off the northeastern United States have declined to historically low levels of abundance. Up-to-date assessments of both the Georges Bank and Gulf of Maine cod stocks were recently presented and peer-reviewed at the Center's third stock assessment workshop held during September 6-12 in Woods Hole. For the Georges Bank cod stock, workshop participants concluded that the biomass of the spawning stock had declined by 50 percent between 1978 and 1985; and fishing mortality had doubled, reaching a record high level in 1985. For the Gulf of Maine cod stock, the consensus was that the stock was in poor condition since various abundance measures (commercial catch rates, research vessel survey indices, and other indicators) were all at historically low levels.

For both stocks, the workshop participants felt that "growth" overfishing (catching fish at such a young age/small size that there will be a loss in the harvestable biomass due to the unrealized growth in the young/small fish) was occurring and that, given present trends, "recruitment" overfishing (catching fish at such a heavy rate that there won't be enough spawners left to replace themselves) was a possibility. Contact Dr. Fredric M. Serchuk, FTS 840-1245 or (617) 548-5123.

SEA SCALLOP SURVEY SHOWS A RECOVERY IN ABUNDANCE

The Center conducted the 1986 survey of the Georges Bank and Mid-Atlantic sea scallop resources during July 29 - August 29, using the NOAA research vessel *Albatross IV*. Survey results indicate that the marked improvement in sea scallop abundance that began in 1985 has continued. Resource recovery from the record low 1983-84 condition has occurred due to widespread outstanding recruitment of the 1982 and 1983 year classes. In the U.S. portion of Georges Bank, the 1986 survey abundance values were among the highest in the 12-year series of annual surveys. Current abundance levels in both resource areas are three-to-four-fold greater than during 1983-84.

A report summarizing the 1986 survey data is available. Contact Dr. Fredric M. Serchuk, FTS 840-1245 or (617) 548-5123.

NORTHERN SHRIMP SURVEY YIELDS A OUTLOOK

The fourth annual Gulf of Maine northern shrimp survey was completed in August aboard the Center's research vessel *Gloria Michelle*. Catches were highest off the south-central Maine coast; abundance dropped sharply east of Penobscot Bay. Abundance and biomass levels were comparable to those observed last year. Catches contained a relatively high proportion of what were assumed to be (based on size distribution) age 4 (or 1982-year-class) shrimp. These observations suggest that the 1986-87 shrimp season will be rather good in terms of both resource availability and product quality.

As in former years, the survey has been performed on a cooperative basis by personnel from the Maine Department of Marine Resources, the New Hampshire Fish and Game Department, the Massachusetts Division of Marine Fisheries, and the Center. Contact Dr. Stephen H. Clark, FTS 840-1312 or (617) 548-5123.

MAJOR LONGLINE SURVEY COMPLETED FOR APEX PREDATORS

The Center has completed a major longline survey of apex predators, primarily large sharks, in the Middle Atlantic and South Atlantic Bights. The survey cooperatively used the Polish research vessel *Wieczno* as the sampling platform, occurred from July 31 to September 17, and covered the 20-1,000-meter depth range.

We captured 679 fish representing 32 species (17 of them sharks). The most common large shark species were sandbar and Atlantic sharpnose; the most common large nonshark species were swordfish and yellowfin tuna. Shark species which occur inshore (e.g., sandbar, bull, lemon, nurse, sandtiger, and blacktip) were not adequately sampled since the survey began at the 20-meter depth contour. Inshore surveys will be needed to complement our offshore surveys before comprehensive evaluations of shark populations can be made.

A key focus of the survey was to compare the effectiveness and efficiency of various types of longline gear and baits for the various species of apex predators. The small number of longline sets (from a statistical standpoint) makes the results inconclusive, but it appears that: (1) there was no significant difference in catch rates between "swordfish" gear and "tuna" gear; and (2) there was a higher catch rate using mackerel instead of squid as bait. A summary report of survey results is available. Contact John G. Casey, FTS 838-7142 or (401) 789-9326.

STUDY UNDERWAY ON HABITAT RECOVERY AT 12-MILE DUMPSITE

The first rounds of sampling habitats in the environs of the 12-mile sludge dumping area off New York Harbor have been completed. The purpose of this new study is to document change in chemistry and biota resulting from the closure of this nearshore sludge dumping area. The sampling plan includes broadscale and repetitive components to reliably characterize habitat, benthic biota, and bottom fish communities.

Fish samples were examined for size and biomass estimates. Subsamples of winter flounder, red hake, and American lobsters were examined for diet items, and winter flounder were tagged and released. In general, invertebrates, mainly rock crabs, have dominated the catches. Groundfish (flounders and hake) were in low abundance, and, as expected, spotty catches were made of squid and butterfish.

A coordinating meeting was held in Milford, Connecticut, to develop plans and protocols for pathology observations and the collection of samples for organic analyses. Contact Anne L. Studholme, FTS 342-8201 or (201) 872-0200.

STOCK ASSESSMENT WORKSHOP HELD

The Center held its third stock assessment workshop (SAW) during early September. These workshops, held on a semiannual basis, provide a forum for the collaboration of scientists from state and federal agencies, the regional fishery management councils, the Atlantic States Marine Fisheries Commission (ASMFC), and academia in the assessment of fishery stocks off the northeastern United States. Discussions related to individual stock assessments provide the New England and Mid-Atlantic Fishery Management Councils and the ASMFC with scientific advice needed in their management processes. In addition, these workshops provide an arena for discussions of ongoing and proposed research projects relative to many generic fisheries issues.

During the third SAW, updated stock assessments were reviewed for surf clams, ocean quahogs, summer flounder, American lobster, winter flounder, bluefish, Atlantic cod, pollock, and northern shrimp resources. Research needs for the assessment of weakfish were also discussed. Special discussion topics included working group reports on trawl survey design, bluefish aging research needs, methods of measuring long-term potential catch, and changes in catchability. Contact Anne M.T. Lange, FTS 840-1301 or (617) 548-5123.

REVISION UNDERWAY FOR FISHES OF THE GULF MAINE

Henry Bigelow and William Schroeder's classic book on the *Fishes of the Gulf of Maine* will be updated and revised. Bigelow and Schroeder's work, which was published in 1953 as part of the *Fishery Bulletin* series, was itself a revision of an earlier work by Bigelow and William Welsh in 1925. The 1953 book is still a useful reference for fishery researchers, managers, and instructors, as well as commercial and recreational fishermen operating in the Gulf of Maine. Harvard University's Museum of Comparative Zoology continues to reprint and sell the 1953 edition.

In the past 34 years, though, many changes have occurred in the scientific and common names of Gulf of Maine fishes, and much new information has also been developed on these fishes' early life history and food habits. A considerable amount of this new information may well be contained in unpublished manuscripts and data files. Those familiar with Bigelow and Schroeder's 1953 work who have such new information are encouraged to contact Dr. Bruce B. Collette, Director of NMFS's National Systematics Laboratory, at (202) 357-2524. Dr. Collette and Dr. Grace Klein MacPhee, who is associated with the University of Rhode Island, will undertake the revision. Drs. Collette and MacPhee will also update the fisheries information in addition to the biological information in the book.

NATIONAL SYSTEMATICS LABORATORY'S SHRIMP BIOLOGIST RETIRES

Dr. Isabel C. Canet (Perez Farfante) retired after more than 45 years as a marine biologist, the last 20 years with the National Systematics Laboratory. Born in Cuba, educated at Havana and Radcliffe (where she received her doctorate), she taught in Cuba, authored a textbook, and became Director of the Cuban Fisheries Research Center -- "Centro de Investigaciones Pesqueras." She, her husband, and two sons left other family and Cuba for the United States after the revolution went communistic in 1960. As a leading world authority on shrimps, Dr. Canet published over 70 scientific papers, two of which were nominated for the *Fishery Bulletin's* "Best Publication" award. Although officially retiring from government service, she will continue her research in emeritus status with the National Systematics Laboratory, and as a research associate of the Smithsonian Institution. Dr. Canet is presently working on a key and list of genera and subgenera of the world penaeoid and sergestoid shrimps. Contact Dr. Bruce B. Collette, FTS/(202) 357-2524.

Judith Brownlow
NORTHEAST FISHERIES CENTER

**MONTHLY
HIGHLIGHTS**



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

OCTOBER 1986

IN THIS ISSUE:

NORTHEAST SHRIMP STOCK REMAINS STRONG

ATLANTIC SALMON SAMPLED IN CANADIAN AND GREENLAND COMMERCIAL FISHERIES

INFECTIOUS SARCOMA DISEASE DROPS OFF, BOUNCES BACK IN CHESAPEAKE BAY
SOFTSHELL CLAMS

HIGH INCIDENCE OF HAIRS AND FIBERS IN NEW YORK BIGHT LOBSTERS

NARRAGANSETT BAY'S HARD CLAMS EXAMINED FOR HISTOPATHOLOGY

STONE CRAB DIVIDED INTO TWO SPECIES

REMOTE SENSING VEHICLE OBTAINS VIDEOTAPES OF NEW YORK BIGHT DUMP AREAS

INSTRUCTING ITALY IN BIVALVE MOLLUSK AGING TECHNIQUES

CENTER ASSISTS SMALL BUSINESS ADMINISTRATION ON RECENT RED-TIDE BLOOM IN
TEXAS

PARASITIC ISOPOD NAMED FOR CENTER BIOLOGIST

16TH ANNUAL OPEN HOUSE HELD AT SANDY HOOK LABORATORY

RECENT PUBLICATIONS, REPORTS, AND PRESENTATIONS

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UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
Northeast Fisheries Center

ADMINISTRATION

Center Director.....Allen E. Peterson, Jr.
Deputy Center Director.....Dr. John B. Pearce
Conservation and Utilization Division Chief.....Dr. Vaughn C. Anthony
Fisheries Ecology Division Chief.....Dr. Michael P. Sissenwine
Environmental Processes Division Chief.....Dr. Robert A. Murchelano
National Systematics Laboratory Director.....Dr. Bruce B. Collette
Research Planning and Coordination Staff Chief.....Richard C. Hennemuth
Program Support Chief (Acting).....Mary G. Laird

LABORATORIES

Woods Hole Laboratory
National Marine Fisheries Service, NOAA
Water Street
Woods Hole, MA 02543
(617) 548-5123 & FTS 840-1011
Officer-in-Charge: Dr. Marvin D. Grosslein

Gloucester Laboratory
National Marine Fisheries Service, NOAA
Emerson Avenue
Gloucester, MA 01930
(617) 281-3600 & FTS 837-9276
Officer-in-Charge: Robert J. Learson

Narragansett Laboratory
National Marine Fisheries Service, NOAA
South Ferry Road
Narragansett, RI 02882
(401) 789-9326 & FTS 838-7142
Officer-in-Charge: Dr. Kenneth Sherman

Milford Laboratory
National Marine Fisheries Service, NOAA
212 Rogers Avenue
Milford, CT 06460
(203) 783-4200 & FTS 642-5200
Officer-in-Charge: Dr. Anthony Calabrese

Sandy Hook Laboratory
National Marine Fisheries Service, NOAA
P.O. Box 428
Highlands, NJ 07732
(201) 872-0200 & FTS 342-8200
Officer-in-Charge: Anne L. Studholme

National Systematics Laboratory
National Marine Fisheries Service, NOAA
National Museum of Natural History
10th & Constitution Avenue, N.W.
Washington, DC 20560
(202) 357-2552 & FTS 357-2552
Director: Dr. Bruce B. Collette

Oxford Laboratory
National Marine Fisheries Service, NOAA
Railroad Avenue
Oxford, MD 21654
(301) 226-5193
Officer-in-Charge: Dr. Aaron Rosenfield

NORTHERN SHRIMP STOCK REMAINS STRONG

A recent assessment of the Gulf of Maine shrimp stock by state and Center scientists serving on the Atlantic States Marine Fisheries Commission's (ASMFC) Northern Shrimp Technical Committee indicates that the resource picture for the coming season is good. Analysis of summer survey data collected aboard the Center's research vessel *Gloria Michelle* has revealed that stock biomass is comparable to levels observed last year and that substantial numbers of large shrimp from the 1982 year class will be available to the 1986-87 winter fishery.

Accordingly, the Northern Shrimp Section of the ASMFC has established a December 1 - May 31 season for 1986-87, the maximum allowable (six months) under current ASMFC management policy. Prospects for future seasons appear more problematic, as subsequent year classes appear weaker. Contact Dr. Stephen H. Clark, FTS 840-1312 or (617) 548-5123.

ATLANTIC SALMON SAMPLED IN CANADIAN AND GREENLAND COMMERCIAL FISHERIES

American scientists from Maine's Atlantic Sea-Run Salmon Commission and from the Center were sent to Canada and Greenland this past summer to collect data on the salmon fisheries of Labrador and West Greenland. Since these fisheries intercept salmon of both North American and European origin, visiting scientists were granted permission not only to collect biological data, but also to recover tags from the commercial catch in order to determine the country of origin of the individual fish in the catch.

For the study of stock composition and the estimation of the harvest of U.S. salmon in these fisheries, smolts from U.S. hatcheries are now being marked with coded-wire tags prior to their seaward migration. The tags are subsequently detected in adult salmon with a magnetic sensor, then removed from the fish for interpretation. They contain information on the country, river, and hatchery of origin, which is remarkable considering they are less than one-millimeter long. Tags are recaptured beginning one year after smolt release, thus sampling efforts this past summer were able to recover tags implanted in the 1985 smolt class. Sampling next summer will be to recover tags in the 1986 smolt class and the 1985 tags still at large. Contact Dr. Kevin Friedland, FTS 840-1335 or (617) 548-5123.

INFECTIOUS SARCOMA DISEASE DROPS OFF, BOUNCES BACK IN CHESAPEAKE BAY SOFTSHELL CLAMS

The spring 1986 survey of representative populations of softshell clams from 13 key sites in Chesapeake Bay indicated that the prevalence of infectious sarcoma disease was generally very low (less than 10 percent) compared to the previous year. Our monthly samples from Swan Point (the most severely affected site) had similarly low prevalences until last month (September 1986), though, when 42 percent of the clams had early and intermediate stage sarcomas. These findings suggest a resurgence of the disease and that softshell clam fishermen in Chesapeake Bay may again encounter a scarcity of clams this coming winter. Contact Austin C. Farley, (301) 226-5193.

HIGH INCIDENCE OF HAIRS AND FIBERS IN NEW YORK BIGHT LOBSTERS

The Center is attempting to document changes in fishery resources and their habitats as dumping is phased out at the 12-mile sewage sludge dumpsite in the New York Bight. Part of the project involves analyzing the food habits of key finfish species (winter flounder and red & silver hake) and American lobsters from the area of greatest sludge accumulation, as well as from reference stations to the north and south.

In the first three months of sampling (July-September 1986), at least 50 percent of the lobsters collected from each of the three areas had hairs and fibers (both cloth and metal) wrapped around the gastric teeth or in balls in their stomachs. Most of the hairs and fibers are presumably from sludge dumping, although other human inputs could be contributing. We do not yet know whether the lobsters' health is being affected. Our monitoring of the incidence of hairs and fibers will provide one indication of any reduction in sludge in lobster habitats as abatement proceeds. Contact Frank W. Steimle, Jr., FTS 342-8259 or (201) 872-0200.

NARRAGANSETT BAY'S HARD CLAMS EXAMINED FOR HISTOPATHOLOGY

On October 2, we forwarded a progress report to EPA on our histopathological examination of Narragansett Bay's hard clams. With the exception of those clams that were observed during gross examination as "gapers," the majority of the clams showed little in the way of health threatening pathology. Most of the histopathology found was associated with the stress of spawning. Two clams were diagnosed with a neoplastic lesion. Preparation of the final report is in progress. Contact Dr. Aaron Rosenfield, (301) 226-5193.

STONE CRAB DIVIDED INTO TWO SPECIES

The stone crab, known until now as *Menippe mercenaria* in the Caribbean and Carolinian provinces of the western North Atlantic, is divisible into two morphologically distinct populations with almost separate, narrowly overlapping ranges. These populations have now been recognized as distinct species by A. B. Williams and D. L. Felder. (See the "Recent Publications, Reports, and Presentations" section of this newsletter.)

The species differ in color, carapace morphometry, and stidulatory patches on chelae of the chelipeds. *Menippe mercenaria*, the Florida stone crab, ranges from Cape Lookout, North Carolina, through peninsular Florida, the Bahamas, and the Greater Antilles, to the Yucatan peninsula, Mexico, and Belize. *Menippe adina*, the Gulf stone crab, ranges from northwestern Florida around the Gulf of Mexico to Tamaulipas State, Mexico. The two species hybridize in the Apalachee Bay region of northwestern Florida. Contact Dr. Austin B. Williams, FTS/(202) 357-2639.

REMOTE SENSING VEHICLE OBTAINS VIDEOTAPES OF NEW YORK BIGHT DUMP AREAS

In a collaborative study with Queens College of the City University of New York, the Explorers Club, and representatives of private industry, the Center used a low-cost remotely operated vehicle (LCROV) to obtain videotapes of the sediment-water interface at: (1) the New York Bight cellar-dirt dredge dumpsite; (2) the 12-mile sewage sludge dumpsite; and (3) the Christiaensen Basin, the latter being a depositional area which receives input from the dredge-spoil and sewage-sludge dumpsites. The study showed the effectiveness of using an LCROV for ecological monitoring, especially in areas such as the cellar-dirt dumpsite where building rubble precludes more traditional sampling techniques.

The almost two-and-one-half hours of videotape showed: (1) an artificial-reef-type live bottom with several species of fish at the cellar-dirt dumpsite; (2) sand ripples and a burrowing anemone community at the lightly used northeast corner of the sewage-sludge dumpsite; and (3) soft black muds with extensive tubeworms (*Glycera* spp.) and white bacterial mats (probably *Beggiatoa* spp.) in the Christiaensen Basin. Contact William C. Phoel, FTS 342-8215 or (201) 872-0200.

INSTRUCTING ITALY IN BIVALVE MOLLUSK AGING TECHNIQUES

Scientists from the Istituto di Ricerche Sulla Pesca Marittima in Ancona, Italy, visited the Center during October 20-31 to consult with Center scientists on aging techniques. Although problems with aging several finfish species from the Adriatic and Mediterranean Seas were discussed, the major point of interest was our method for preparing bivalve mollusk species for age determinations. Contact John W. Ropes, FTS 840-1287 or (617) 548-5123.

CENTER ASSISTS SMALL BUSINESS ADMINISTRATION ON RECENT RED-TIDE BLOOM IN TEXAS

The Center recently assisted the Disaster Division of the Small Business Administration (SBA) with information on the nature of the red tide currently causing fish kills in the Gulf of Mexico. The Governor of Texas has inquired of the SBA about disaster relief for businesses in his state that suffered as a result of the red tide, and the SBA must make a technical decision on the basic classification of a red-tide occurrence. Contact John B. Mahoney, FTS 342-8255 or (201) 872-0200.

PARASITIC ISOPOD NAMED FOR CENTER BIOLOGIST

Dr. Bruce B. Collette, National Systematics Laboratory Director, was honored by having a new species of parasitic isopod named after him. The isopod was described by Dr. Niel L. Bruce in the *Journal of Natural History*, volume 20, pages 1089-1192. The isopod, *Mothocya collettei*, was part of a large collection of isopods removed from the gills and oral cavities of needlefishes and halfbeaks as they were studied by Dr. Collette. Contact Dr. Austin B. Williams, FTS/(202) 357-2639.

16TH ANNUAL OPEN HOUSE HELD AT SANDY HOOK LABORATORY

The Center's Sandy Hook Laboratory in Highlands, New Jersey, held its 16th annual open house on Friday, October 10. Exhibits were on display throughout the building and research activities were discussed. Research topics focused on studies of commercial and recreational fisheries in the Mid-Atlantic area. Other marine-oriented organizations participating in the event included: New Jersey Marine Sciences Consortium; American Littoral Society; U.S. Coast Guard; Marine Academy of Science and Technology; Gateway National Recreation Area; New Jersey Department of Environmental Protection; U.S. Environmental Protection Agency; and a representative from the Fulton Fish Market, New York. A videotape showing the recent exploration of the *Titanic*, provided by the Woods Hole Oceanographic Institution, was also shown. Contact Cathy Noonan, FTS 342-8205 or (201) 872-0200.

RECENT PUBLICATIONS, REPORTS, AND PRESENTATIONS

- ✓ 7.0 COLLETTE, B.B., and R.F. Cressey. 1986. Occurrence of *Caligus coryphaenae* on *Thunnus thynnus* by Hogans (1985): corrections (Copepoda, Caligidae). *Crustaceana* 121(2):220.
- 5.3.2 FARLEY, C.A. 1986. Current status of sarcoma prevalence in Chesapeake Bay soft clam populations. Paper presented at: Helminthol. Soc. Wash.; Bethesda, Md.; Oct. 15, 1986.
- ✓ 5.3.2 JOHNSON, P.T. 1986. Parasites of benthic amphipods: dinoflagellates (Duboscquodinia: Syndinidae). *Fish. Bull.*, U.S. 84:605-614.
- ✓ 7.0 PEREZ FARFANTE, I., and B.B. Boothe, Jr. 1986. Redescription and range extension of the shrimp *Parapenaeopsis balli* (Decapoda: Penaeidae). *J. Crustacean Biol.* 6(3):401-407.
- ✓ 4.2.2. ROPES, J.W. 1986. Measuring the age of ocean quahogs. *Maritimes* 30(3):8-10.
- ✓ 1 WILLIAMS, A.B., and D.L. Felder. 1986. Analysis of stone crabs: *Menippe mercenaria* (Say), restricted, and previously unrecognized species described (Decapoda: Xanthidae). *Proc. Biol. Soc. Wash.* 99(3):517-543.
- ✓ 1 WILLIAMS, A.B., and P.A. Rona. 1986. Two new caridean shrimps (Bresiliidae) from a hydrothermal field on the Mid-Atlantic Ridge. *J. Crustacean Biol.* 6(3):446-462.
- ✓ 1 WILLIAMS, A.B., and R.D. Turner. 1986. Squat lobsters (Galatheidae: *Munidopsis*) associated with mesh-enclosed wood panels submerged in the deep sea. *J. Crustacean Biol.* 6(3): 617-624.

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

NOVEMBER 1986

IN THIS ISSUE:

FISHERMEN'S REPORT AVAILABLE FOR 1986 AUTUMN BOTTOM TRAWL SURVEY

LARGE 1985 YEAR CLASS OF GEORGES BANK COD CONFIRMED

NATIONAL SYSTEMATICS LABORATORY UNDERTAKES RESEARCH ON CORAL TAXONOMY

NEW FOREIGN FISHERIES OBSERVERS TRAINED

LARGE SEAWARD MOVEMENT OF SHELF WATER IN GEORGES BANK REGION

The Northeast Fisheries Center's *Monthly Highlights* is an administrative report on key Center research activities during the month. The report focuses on the practical applications of research findings to fisheries resource and habitat management. A name and telephone number have been included at the end of each research highlight to contact for more information.

FISHERMEN'S REPORT AVAILABLE FOR 1986 AUTUMN BOTTOM TRAWL SURVEY

A *Fishermen's Report*, based on the Center's 1986 autumn bottom trawl survey, is available free of charge for the asking. The report lists the composition and size of catches of 23 commercially and recreationally important species at 360 sites between Nova Scotia and North Carolina. The report also includes information on the exact location (Loran C and latitude/longitude), water depth, and bottom temperature of the sampling sites.

This autumn's survey was conducted September 14 - November 7 aboard the NOAA research vessels *Albatross IV* and *Delaware II*. Catches in many areas, particularly the Southwest and Cultivator Shoals areas of Georges Bank, were lighter than in previous years. Contact Linda Despres-Patanjo, FTS 840-1346 or (617) 548-5123.

LARGE 1985 YEAR CLASS OF GEORGES BANK COD CONFIRMED

The Center's 1986 autumn bottom trawl survey has confirmed a large 1985 year class of Atlantic cod on Georges Bank. The survey showed the highest number of one-year-old cod (the 1985 year class) since 1981, and the fifth highest number in the 24 years of these autumn surveys. Consequently, scrod cod abundance will increase significantly on Georges Bank during 1987. Also, preliminary analysis of the survey data suggests that the 1985 year class of Georges Bank haddock may be smaller than indicated by earlier survey data. Contact Dr. Fredric M. Serchuk, FTS 840-1245 or (617) 548-5123.

NATIONAL SYSTEMATICS LABORATORY UNDERTAKES RESEARCH ON CORAL TAXONOMY

The National Systematics Laboratory has begun research to clarify the taxonomy of the Caribbean and Atlantic species of *Porites* corals. *Porites* corals are among the most abundant and widely distributed reef-building corals in the world, and play a major role in the development and occurrence of coral-reef fish communities. Contact Lt. Stephen C. Jameson, FTS/(202) 357-2486.

NEW FOREIGN FISHERIES OBSERVERS TRAINED

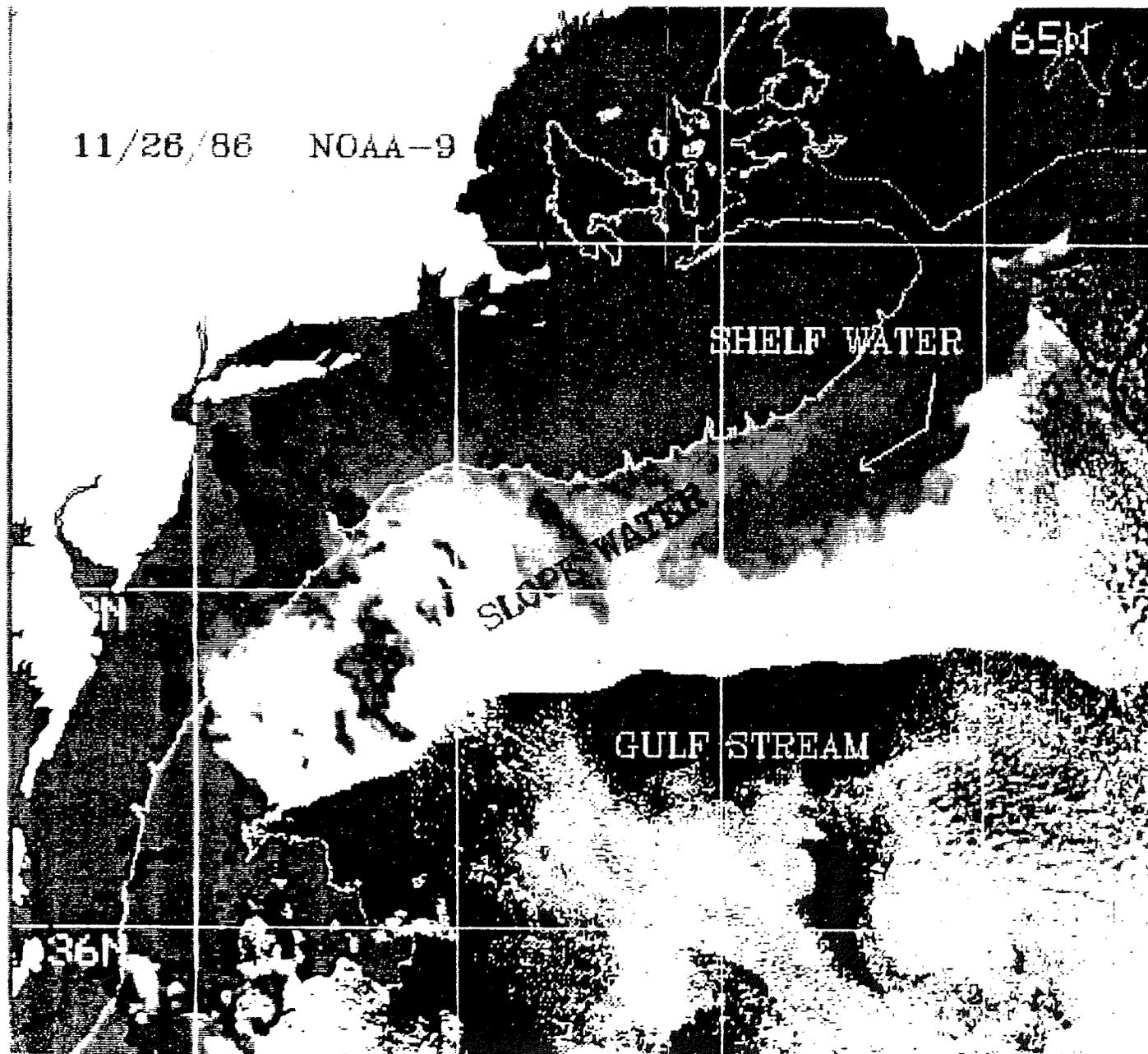
During November 3-14 at the Center's Woods Hole Laboratory, Center scientists assisted in the training of nine new foreign fisheries observers who will soon be on board foreign vessels to monitor their fishing activities off the New England and Mid-Atlantic states. The U.S. Coast Guard, U.S. Navy, and other elements of NOAA assisted in the training.

The Center's efforts focused on the identification of species, the theory of sampling, and the techniques of collecting biological samples (scales, otoliths, etc.). Good samples from foreign fisheries are needed to assure sound assessments of several of the region's fish stocks. Contact Anne M.T. Lange, FTS 840-1301 or (617) 548-5123.

LARGE SEAWARD MOVEMENT OF SHELF WATER IN GEORGES BANK REGION

During November, a large parcel of cool continental shelf water moved seaward more than 80 nautical miles into the warmer continental slope waters between the Northeast Channel and Corsair Canyon along the eastern end of Georges Bank. The attached satellite image taken on November 26 shows the shelf water extension. The causes of this oceanographic event, as well as any ecological effects it may produce, cannot yet be determined, but its size can be. The extension occupies 14,000 square nautical miles, which compares favorably to the size of all of Georges Bank (inside the 100-meter depth contour) at 15,400 square nautical miles! Contact Lt. j.g. Kenneth Barton, (401) 792-6837.

11/26/86 NOAA-9



Judith Brownlow

NORTHEAST FISHERIES CENTER

MONTHLY HIGHLIGHTS



United States Department of Commerce
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DECEMBER 1986

IN THIS ISSUE:

PLANS FOR STUDYING RECOVERY OF 12-MILE DUMPSITE COMPLETED

NATIONAL SYSTEMATICS LABORATORY BEGINS SQUID RESEARCH

COPEPOD PARASITISM OF LARVAL AND JUVENILE FISH DOCUMENTED

OYSTER DIE-OFFS IN MASSACHUSETTS AND GEORGIA INVESTIGATED

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PLANS FOR STUDYING RECOVERY OF 12-MILE DUMPSITE COMPLETED

The Center has completed its plans for the study of the recovery of the New York Bight's 12-Mile Dumpsite. The dumpsite, the major site for sewage sludge disposal from New York City, will cease receiving sludge in December 1987. To see if and how this site's fisheries resources and habitats respond to the dumping phaseout, the Center will sample 27 sites--covering all habitat types--each month until at least a year after the dumping stops. Data will be gathered on distribution, abundance, food habits, gross disease, small and medium-sized bottom-dwelling animals, organic contaminant levels in various animals, water movements, water chemistry, and sediment chemistry. Collaborating groups include Brookhaven National Laboratory, U.S. Environmental Protection Agency, University of Delaware, Food and Drug Administration, and other elements of the National Marine Fisheries Service. Contact Anne L. Studholme or Robert N. Reid, FTS 342-8200 or (201) 872-0200.

NATIONAL SYSTEMATICS LABORATORY BEGINS SQUID RESEARCH

The National Systematics Laboratory has undertaken a three-part study of cephalopods, particularly squids: (1) a worldwide revision of the family Loliginidae which includes the Northeast's commercially valuable long-finned squid; (2) a reexamination of the genus *Illex* which includes the Northeast's commercially valuable short-finned squid and which is currently considered to have several closely related species that are hard to tell apart; and (3) the taxonomy and distribution of paralarval cephalopods to yield information on the little known early life history of these animals. Contact Dr. Bruce B. Collette, FTS/(202) 357-2524.

COPEPOD PARASITISM OF LARVAL AND JUVENILE FISH DOCUMENTED

Little is known of the nature and extent of parasitism in general, and copepod parasitism in specific, for larval and juvenile marine fishes. Consequently, during the Center's June 1986 juvenile fish survey of Georges Bank, we examined several hundred specimens of larval and juvenile groundfish for visible external parasites. We found that over 97 percent of the Atlantic cod and 95 percent of the haddock were infested with the parasitic stage of the copepod *Caligus elongatus*. The average number of copepods on an individual haddock was 13.1; on cod it was 11.5.

Later laboratory examination showed that the filaments used by the parasitic copepods to anchor themselves to the fish did create sores in the skin, muscle, and connective tissue, may have affected such physiological functions as swimming, and may have offered a route for pathogens to enter the body. More study will be needed to determine the role of such parasites in the survival, growth, and recruitment of larval and juvenile fish. Contact Dr. Aaron Rosenfield, (301) 226-5193.

OYSTER DIE-OFFS IN MASSACHUSETTS AND GEORGIA INVESTIGATED

The Center has examined samples of American oysters from Massachusetts and Georgia to determine the cause of recent die-offs in those states' coastal waters. The cause of the Massachusetts die-off was not immediately apparent. The cause of the Georgia die-off was due, at least in part, to a severe infection by the oyster pathogen *Perkinsis marinus* ("Dermo"). Ninety-six percent of the Georgia oysters had Dermo infections. Contact Dr. Aaron Rosenfield, (301) 226-5193.