

# NORTHEAST FISHERIES CENTER

## END-OF-YEAR REPORT



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

1985

The year 1985 was a rough one for the Center, for fisheries resources & habitats, and for commercial & recreational fishing interests. A September fire destroyed one of two buildings at the Center's Sandy Hook (New Jersey) Laboratory. In particular, the fire impaired research on the sources, fates, and effects of environmental pollutants on the Northeast's continental shelf. As a temporary solution, NOAA provided a quarter-million dollars to us for minimally restoring these research capabilities. The bulk of the money was spent to restore equipment lost in the fire. The equipment will be housed in three trailers--two for continuing experiments on pollutant and environmental effects on marine fishes, and one for continuing chemical analysis of marine sediments, water, and organisms. A final solution on what and how to restore should be reached within a year.

Many popular fish and invertebrate resources were scarce in 1985. Atlantic cod, haddock, yellowtail flounder, striped bass, and sea scallops were at or near all-time lows. There are some bright spots, though. The 1985 year classes of Georges Bank cod and perhaps haddock, and the 1982 year classes of Mid-Atlantic and Georges Bank scallops, appear to be large. The 1982 year class of Chesapeake stripers isn't large, but it's the only significant one in more than a decade. The ability of fisheries managers to protect these year classes through early 1988 for cod, haddock, and stripers, and early 1987 for scallops -- when these good year classes will first spawn in strength -- will largely determine the abundance of these stocks well into the 1990's.

There was a high incidence of disease among fish and invertebrates in several inshore habitats in 1985. Epidemics of an infectious sarcoma disease in Chesapeake Bay softshell clams, the bacterial disease MSX in Cape Cod, Delaware Bay, & Chesapeake Bay oysters, the viral disease lymphocystis in Raritan Bay winter flounder, and liver disease in Massachusetts winter flounder were among the major problems. These diseases reduced populations and/or affected harvests. A major thrust of Center research is to partition such disease outbreaks into either natural or man-induced (i.e., correctible) causes. Introduction of infectious materials from other areas likely caused the 1985 clam and oyster epidemics. Chemical contaminants likely contributed to last year's winter flounder disease outbreaks. Stronger controls on marine pollution and interstate transport of infected marine organisms will be needed to lessen these disease problems.

In 1985, our fishermen felt the full force of the new U.S.-Canadian boundary on Georges Bank. Harvests of sea scallops were especially affected. The new boundary also complicates the management of fish stocks which move freely back and forth across the line. The Center began last year to develop the cooperative research with our Canadian counterparts needed to properly manage these transboundary stocks.

Following are short descriptions of those Center research activities during 1985 which produced information directly and immediately usable by one or more of our constituent groups. At the end of each description is the name and telephone number of a Center scientist to contact for more information. We continue to work on improving our communications with you, our constituents. If you have any suggestions in this regard, please let us know.

**RESEARCH VESSEL SURVEYS:** Monitored continental shelf fisheries resources at 1,336 sampling stations between Nova Scotia and Cape Fear, North Carolina, including 759 fish & squid stations and 577 sea scallop stations. (Thomas R. Azarovitz, FTS 840-1283 or (617) 548-5123)

**SURVEY VESSEL & GEAR EVALUATIONS:** Compared research vessel fishing power and bottom trawl door behavior during 225 side-by-side tows of the NOAA ships *Albatross IV* and *Delaware II*. (Charles J. Byrne, FTS 840-1224 or (617) 548-5123)

**TRAWL DOOR COMPARISON:** Tested a one-tenth scale model of the Center's bottom survey trawl in the University of Rhode Island's tow tank in order to compare the performance of BMW oval "otter" boards (doors) and Portuguese polyvalent doors -- the latter are replacing the former on our surveys. (Alan J. Blott, (401) 792-6577)

**IMPROVED SURVEY ANALYSIS:** Developed a new statistical method for interpreting bottom trawl survey data which partially adjusts for changes in species catchability and more efficiently portrays trends in species abundance. (Dr. Marvin D. Grosslein, FTS 840-1252 or (617) 548-5123)

**FISHERMEN'S REPORT:** Distributed information to interested fishermen within two weeks after completion of spring and fall bottom trawl surveys and the summer sea scallop survey on sampling locations, catches of selected fish and invertebrate species, and environmental conditions. (Linda I. Despres-Patanjo, FTS 840-1346 or (617) 548-5123)

**COOPERATIVE COASTAL SURVEYS:** Used the Center's research vessel *Gloria Michelle* in cooperative surveys with coastal states for larval Atlantic herring, inshore demersal fishes, and northern shrimp. (Alan J. Blott, (401) 792-6577)

**YELLOWTAIL FLOUNDER SURVEY:** Conducted a winter survey of yellowtail flounder off Southern New England, showing the lowest abundance since these surveys began in 1980, as well as poor recruitment to the 1986 fishery. (Dr. Stephen H. Clark, FTS 840-1312 or (617) 548-5123)

**NORTHERN SHRIMP SURVEY:** Conducted, in cooperation with Maine, New Hampshire, and Massachusetts, the annual Gulf of Maine northern shrimp survey, noting highest catches off central Maine, dominance of the 1982 year class, and improved prospects for the 1985-86 winter fishery. (Dr. Stephen H. Clark, FTS 840-1312 or (617) 548-5123)

**PELAGIC GAMEFISH SURVEY:** Began a cooperative survey with the Southeast Fisheries Center to estimate catches and obtain biological samples from tunas, billfishes, and sharks by relying on random telephone and dockside interviews and by covering selected tournaments from New York through Virginia. (Darryl J. Christensen, FTS 840-1358 or (617) 548-5123)

**BLUEFISH ANGLER SURVEY:** Received bluefish catch and effort data from 10 cooperating surf-fishing clubs from New England to North Carolina, showing 4,000 angler fishing days, a mean catch of 2.3 fish per angler day, and over 30 percent of the fish weighing more than 10 pounds. (Dr. Michael J. Fogarty, FTS 840-1255 or (617) 548-5123)

**MACKEREL RESEARCH FISHERY:** Completed the fifth year of a cooperative Atlantic mackerel research fishery with Poland to monitor age structure of the overwintering stock, define winter distribution, and relate environmental conditions to distribution and migration. (Dr. William J. Overholtz, FTS 840-1256 or (617) 548-5123)

**FISH & INVERTEBRATE AGE DETERMINATIONS:** Aged 33,000 fish specimens -- representing 12 commercially and/or recreationally important species -- using Center personnel, as well as 800 surf clams and 1,600 sea scallops using contracts with minority universities. (Judith A. Penttila, FTS 840-1316 or (617) 548-5123)

**MULTISPECIES GROUND FISH ASSESSMENT:** Completed a multispecies assessment of four key groundfish stocks (Atlantic cod, haddock, pollock, and yellowtail flounder) in the Georges Bank bottom trawl fishery to determine the likely responses of these stocks in the next several years to possible fishery management changes. (Dr. William J. Overholtz, FTS 840-1256 or (617) 548-5123)

**STOCK ASSESSMENT WORKSHOP:** Held our first technical workshop on stock assessment during which 65 federal, state, and regional fishery management council representatives: reviewed the adequacy of 33 species or species-groups assessments; assigned a priority to each assessment; identified future assessment research needs; discussed state-federal cooperation in upgrading assessments of mutual interest; and suggested new ways to conduct assessments. (Dr. Vaughn C. Anthony, FTS 840-1304 or (617) 548-5123)

**STOCK ASSESSMENT REPORTS:** Prepared assessment reports (with more advanced methods and more detailed results in several cases) on the status of 40 Northwest Atlantic fish and invertebrate stocks, and issued a *Status of the Fishery Resources Off the Northeastern United States for 1985* which summarized individual stock assessments and provided an economic overview of several major fisheries. (Dr. Tim D. Smith, FTS 840-1251 or (617) 548-5123)

**GRAND BANKS FLOUNDER FISHERIES:** Assessed the potential yields, current landings, and catch rates for flounder resources from the "Tail of the Bank," a section of the Grand Banks of Newfoundland beyond Canadian fisheries jurisdiction which American fishermen began fishing in 1985. (Ralph K. Mayo, FTS 840-1310 or (617) 548-5123)

**GEORGES BANK APEX PREDATORS:** Estimated the shark catches by U.S. fishermen and the abundance and prey consumption of apex predators (sharks, tunas, and billfishes) on Georges Bank. (John G. Casey, FTS 838-7142 or (401) 789-9326)

**SALMON TAGGING & EXPLOITATION:** Provided financial support and scientific advice for tagging 536,000 Atlantic salmon smolts to evaluate future exploitation of U.S.-origin salmon in ocean fisheries, and analyzed existing tagging data to determine where, when, and how many U.S.-origin salmon have been caught in ocean fisheries. (Dr. Vaughn C. Anthony, FTS 840-1304 or (617) 548-5123)

**SALMON ADVISORY MEETING:** Hosted a meeting of the Atlantic Salmon Working Group of the International Council for the Exploration of the Sea which reviewed new data and analyses, and prepared advice for the North Atlantic Commission of the North Atlantic Salmon Conservation Organization. (Dr. Vaughn C. Anthony, FTS 840-1304 or (617) 548-5123)

**BUTTERFISH SIZE COMPOSITION:** Evaluated the size composition of butterfish by area and season using data from U.S. and foreign fisheries and the Center's bottom trawl survey. (Gordon T. Waring, FTS 840-1311 or (617) 548-5123)

**SURF CLAM-OCEAN QUAHOG FISHERY:** Evaluated discarding rates and size distribution of landings in relation to minimum size limits for the surf clam fishery, and determined that there would be adequate resource to support continued high landings of both surf clams and ocean quahogs. (Dr. Steven A. Murawski, FTS 840-1303 or (617) 548-5123)

**LOBSTER-POT-RAIDING HAGFISH:** Established that hagfish -- primitive eel-like creatures closely related to sea lampreys -- can consume up to 90 percent of the bait within 24 hours from commercially fished lobster traps, raising questions on the efficiency of current baiting practices. (Joseph R. Uzmann, FTS 840-1272 or (617) 548-5123)

**GHOST GILL NETS:** Surveyed a small portion of Jeffreys Ledge and Stellwagen Bank in the Gulf of Maine to assess the nature and extent of lost or "ghost" gill nets, finding segments of 11 nets, three of which were still entangling fish and invertebrates. (Joseph R. Uzmann, FTS 840-1272 or (617) 548-5123)

**ARTIFICIAL REEF PLANS:** Contributed to NMFS's National Artificial Reef Plan which will guide reef development and management as required by the National Fishing Enhancement Act of 1984, and contributed to preparation of individual state artificial reef management plans in New Jersey, Delaware, and Maryland. (Frank W. Steimle, Jr., FTS 342-8259 or (201) 872-0200)

**FISHERIES MANAGEMENT FORUM:** Held forums, as part of the Woods Hole Laboratory's centennial celebration, on the future of fisheries research and fisheries management, with the latter forum dealing with federal funding, marine recreational fisheries, and limited entry. (Dr. Marvin D. Grosslein, FTS 840-1252 or (617) 548-5123)

**SEAFOOD EDIBILITY CHARACTERISTICS:** Established flavor and texture characteristics of pollock, walleye pollock, silver hake, Atlantic cod, redfish, Atlantic herring, red hake, goosefish, bluefish, Atlantic wolffish, and bluefin tuna as part of a national effort to "profile" the edibility of seafood species. (Joseph M. Mendelsohn, FTS 837-9282 or (617) 281-3600)

**RED HAKE SURIMI:** Produced, in cooperation with the University of Rhode Island, high quality surimi from very fresh red hake. (Kurt A. Wilhelm, FTS 837-9308 or (617) 281-3600)

**FISH OIL THERAPY:** Began separating marine fish oils into their component parts in order to obtain pure eicosapentaenoic acid and docosahexaenoic acid for use in the study of these fatty acids in heart disease therapy. (Judith Krzynowek, FTS 837-9226 or (617) 281-3600)

**SQUID CHOLESTEROL CONTENT:** Analyzed the cholesterol content of long-finned and short-finned squid which had been collected during different seasons and from various locations in the Northwest Atlantic during the last two years. (Judith Krzynowek, FTS 837-9226 or (617) 281-3600)

**AMERICAN PLAICE FROZEN STORAGE:** Demonstrated that American plaice fillets which had been held in ice for one, five, or nine days and then stored at temperatures from +10° to -10° F, maintained their edibility for 5-8 months with the fillet quality -- as expected -- being retained longer with less ice-holding time and lower frozen-storage temperatures. (Joseph M. Mendelsohn, FTS 837-9282 or (617) 281-3600)

**SORBATE-TREATED FILLETS:** Demonstrated that treating yellowtail flounder and pollock fillets with a five-percent potassium sorbate solution significantly extended the shelf life of these fillets -- in some cases more than doubling it -- at a cost of about one-half cent per pound of fish. (Vincent G. Ampola, FTS 837-9285 or (617) 281-3600)

**OZONE-TREATED COD:** Showed that washing fresh, gutted Atlantic cod in ozonated rinse water, or that storing them in ozonated seawater or in ice made from ozonated water, didn't extend their refrigerated shelf life. (Elinor M. Ravesi, FTS 837-9287 or (617) 281-3600)

**CLAM & MUSSEL IRRADIATION:** Determined the feasibility of using ionizing radiation to inactivate certain contaminant pathogenic bacteria in softshell clams and blue mussels. (Dr. Joseph J. Licciardello, FTS 837-9236 or (617) 281-3600)

**BRINE-DIPPED FILLETS:** Showed that when fish processors dip Atlantic cod and winter flounder fillets in a brine (sodium chloride) solution to retain moisture and improve appearance, that brine concentration, submersion time, and fillet size are the factors that most affect the fillets' sodium content. (Elinor M. Ravesi, FTS 837-9287 or (617) 281-3600)

**SPANISH MACKEREL REVISION:** Published a worldwide revision of the 18 species of Spanish mackerels and seerfishes of the genus *Scomberomorus*, providing for each species an illustration and information on historical scientific names, diagnostic characteristics, body shape/size data, distribution, geographic variation, biology, and fishery interests. (Dr. Bruce B. Collette, FTS/(202) 357-2524)

**ROCK SHRIMP SPECIES:** Recognized 12 species of rock shrimps (genus *Sicyonia*) in the American Pacific in a publication which included a species key, descriptions, and color notes (invaluable for field identifications), distribution maps (extending the known range for six species), information on reproduction and habitat, and indication of present or potential economic value. (Dr. Isabel Canet (Perez Farfante), FTS/(202) 357-1417)

**POLLOCK STOCK IDENTIFICATION:** Evaluated jointly with Canada the existing information for identifying the stock(s) of pollock resources in the Gulf of Maine-Nova Scotia region. (Ralph K. Mayo, FTS 840-1310 or (617) 548-5123)

**STONE CRAB POPULATIONS:** Distinguished, using color and adult morphology, two populations of the stone crab (*Menippe mercenaria*), one population in the northern Gulf of Mexico and another population throughout the rest of the range from Cape Lookout, North Carolina, to the Greater Antilles and Yucatan. (Dr. Austin B. Williams, FTS/(202) 357-2639)

**HIGHLY MIGRATORY SPECIES:** Recognized four distribution patterns for the tunas and their relatives -- worldwide (12 species), oceanwide (six semicoastal species), one side of an ocean (13 coastal species), and restricted distribution within the Indo-Pacific Ocean (18 coastal species) -- with only the bluefin, southern bluefin, albacore, and perhaps the bigeye tunas seeming to be truly migratory. (Dr. Bruce B. Collette, FTS/(202) 357-2524)

**RECORD SHARK TAG RETURNS:** Set a record for releases (6,000 sharks comprising 30 species) and recaptures (300 sharks -- comprising 15 species -- and swordfish) in the 24th year of the NMFS Cooperative Shark Tagging Program, highlighted by a sandbar shark recapture after 18 years at liberty and by blue and mako shark recaptures over transatlantic distances of 3,000 miles. (John G. Casey, FTS 838-7142 or (401) 789-9326)

**BLUE SHARK REAPPEARANCES:** Documented the reasons for the 1984 disappearance of blue sharks off western Long Island for the first time in 20 years, and correctly predicted their reappearance to shelf waters in 1985. (John G. Casey, FTS 838-7142 or (401) 789-9326)

**OFFSHORE LOBSTER ECOLOGY:** Demonstrated, in conjunction with the State of Maine, that the Gulf of Maine offshore lobster stock is composed of broadly dispersed, highly nomadic adults. (Joseph R. Uzmann, FTS 840-1272 or (617) 548-5123)

**TAGGED LOBSTER MOVEMENTS:** Found, through a three-year tagging program with the State of Maine, that American lobsters tagged in the central Gulf of Maine during the summer move extensively throughout the Gulf of Maine-Georges Bank-Nantucket Shoals area, but that they move mostly onshore between Machias, Maine, and Vineyard Sound, Massachusetts. (Joseph R. Uzman, FTS 840-1272 or (617) 548-5123)

**GEORGES BANK HERRING:** Found the traditional spawning beds of Atlantic herring on eastern Georges Bank to be dormant for the seventh consecutive year, contrasting sharply with the 1960's and early 1970's when abundance estimates for Georges Bank occasionally exceeded 40 herring larvae per square foot of sea surface. (Wallace G. Smith, FTS 342-8260 or (201) 872-0200)

**HARD CLAM SPAWNING SANCTUARIES:** Contributed to developing a plan in association with Rutgers University and New Jersey state personnel for establishing 10 hard clam spawning sanctuaries in Barnegat Bay where hard clam production has fallen considerably in recent years. (Clyde L. MacKenzie, Jr., FTS 342-8260 or (201) 872-0200)

**SCALLOP REPRODUCTIVE FAILURE:** Established that a population of sea scallops off inshore northern New Jersey had a gradually diminishing reproductive capability over the 1981-84 period -- reason not yet determined -- with an apparently completely unsuccessful spawning in 1984. (Edith Gould, FTS 642-5222 or (203) 783-4222)

**SQUID PREDATION SIGNIFICANCE:** Found that short-finned and long-finned squid predation may account for a significant proportion of the natural mortality of juvenile fishes. (Ray Maurer, FTS 840-1320 or (617) 548-5123)

**BLUEFISH FEEDING BEHAVIOR:** Determined under laboratory conditions that the daily consumption rate of adult bluefish increases independently of temperature during the spring migratory period. (Allen J. Bejda, FTS 342-8208 or (201) 872-0200)

**FORMULATED JUVENILE FISH DIETS:** Formulated readily consumed, highly nutritious, pelleted diets for juvenile marine fishes, with the pellets consisting of a mixture of fish flesh, roe, and fish meal (ground fish solids, vitamins, and minerals). (Dr. Lawrence J. Buckley, FTS 838-7142 or (401) 789-9326)

**LARVAL BIVALVE MOLLUSK GROWTH:** Found that high-density populations of bivalve mollusk larvae can be produced for experimental purposes by continuously exposing the growing larvae to low-density phytoplankton (i.e., prey) populations. (Edwin W. Rhodes, FTS 642-5226 or (203) 783-4226)

**SHELLFISH BIOLOGY/SANITATION SEMINARS:** Held two national meetings, one on shellfish biology and the other on shellfish sanitation, for over 300 attendees. (Dr. Walter J. Blogoslawski, FTS 642-5235 or (203) 783-4235)

**TWO-STAGE COD GROWTH:** Determined that the growth of juvenile Atlantic cod undergoes two stages, with each stage being characterized by very different biochemical processes, and with the transition between the two stages -- around three-quarter inches in length -- being a potentially critical point in their survival. (Dr. Lawrence J. Buckley, FTS 838-7142 or (401) 789-9326)

**SILVER HAKE DENSITY-DEPENDENT GROWTH:** Completed a study in cooperation with the University of Massachusetts on the effects of silver hake stock size on the growth rate of the stock's individuals. (Frank P. Almeida, FTS 840-1308 or (617) 548-5123).

**SURF CLAM GROWTH:** Showed that the potential for average individual growth within surf clam populations can be estimated by taking select physiological measurements on only a few individual representatives of the population. (Ronald Goldberg, FTS 642-5246 or (203) 783-4246)

**LOBSTER GROWTH MODEL:** Adapted a model incorporating "distributed delays" to the growth of American lobsters (which grow discontinuously due to their molt cycle) in order to better relate a lobster stock's exploitation to its egg production, size structure, and yield. (Joseph Idoine, FTS 840-1217 or (617) 548-5123)

**SARDINE & ANCHOVY RECRUITMENT:** Participated in an international seminar to develop a proposal of research on the recruitment processes of sardine and anchovy off Spain's Iberian Peninsula. (Dr. Kenneth Sherman, FTS 838-7138 or (401) 789-9326)

**FISH EGG & LARVA SURVEYS:** Conducted 10 surveys of fish eggs and larvae on the Northeast's continental shelf, with five of the surveys being extended southward to study bluefish spawning in the South Atlantic Bight. (Wallace G. Smith, FTS 342-8260 or (201) 872-0200)

**JUVENILE COD & HAKE SAMPLERS:** Compared the catch efficiency of two types of mid-water samplers (MOCNESS-10 and IGYPT trawl) and two types of bottom samplers (roller and cookie trawls) for studying distribution, abundance, and ecology of juvenile Atlantic cod and haddock. (Dr. Geoffrey C. Laurence, FTS 838-7142 or (401) 789-9326)

**SLIME-BLOOM PREDATION:** Concluded a three-year study of the siphonophore *Nanomia oara* (a slime-producing jellyfish whose blooms can clog fishermen's nets), finding that this siphonophore's occurrence is widespread, its density is highly variable, and its predatory threat to larval fish is minimal. (Carolyn A. Griswold, FTS 838-7142 or (401) 789-9326)

**NEW YORK BIGHT PHYTOPLANKTON:** Completed a multiyear survey of the seasonal assemblages of phytoplankton in the New York Bight. (Myra S. Cohn, FTS 342-8256 or (201) 872-0200)

**PHYTOPLANKTON NUTRITIONAL VALUE:** Observed that the nitrogen concentration in seawater controls the relative proportions of protein, carbohydrate, and lipid in certain phytoplankton species, affecting the nutritional value of these phytoplankters to filter-feeding bivalve mollusks. (Dr. Ravenna Ukeles, FTS 642-5223 or (203) 783-4223)

**IMAGE ANALYSIS APPLICATIONS:** Continued cooperative research with the University of Tokyo on image analysis, applying it to plankton sample analysis, toxic/nontoxic dinoflagellate separation, and krill aging. (Dr. Mark Berman, FTS 838-7142 or (401) 789-9326)

**OFFSHORE FISH HEALTH:** Examined 6,500 fish -- representing 15 species -- from Georges Bank, Nantucket Shoals, and the Gulf of Maine for external lesions, finding the health of the commercially and recreationally important fish to be good. (John J. Ziskowski, FTS 342-8287 or (201) 872-0200)

**FISH DISEASE INDEX:** Developed, in cooperation with other NOAA elements, an *Index of Fish Disease*, clearly showing that fin rot disease occurs most often in degraded coastal habitats. (John J. Ziskowski, FTS 342-8287 or (201) 872-0200)

**MALNUTRITION-IMPAIRED LARVAL VISION:** Showed that inadequate nutrition in early-stage striped bass larvae will rapidly modify eye structure and may lead to blindness. (Dr. Joel E. Bodammer, (301) 226-5193)

**MENHADEN ULCER OUTBREAK:** Continued surveillance -- without yet determining the cause or effect -- of an ulcer disease outbreak which began in 1984 in Atlantic menhaden and other estuarine species from upper Chesapeake Bay to Florida. (Dr. Aaron Rosenfield, (301) 226-5193)

**FISH TUMOR PREVALENCE:** Established the prevalence and severity of malignant tumors in winter flounder from Boston Harbor, the first indication that epizootic neoplasms occur in the Northeast's marine fishes. (Dr. Robert A. Murchelano, FTS 840-1263 or (617) 548-5123)

**CHESAPEAKE BAY CLAM SARCOMA:** Found an overall 60-percent prevalence and mortality rate for infectious sarcoma disease in Chesapeake Bay softshell clam populations. (C. Austin Farley, (301) 226-5193)

**CLAM DISEASE DETECTION:** Produced a "monoclonal antibody" which can rapidly and simply determine the presence of infectious sarcoma disease in softshell clams. (Ronald C. Lundstrom, FTS 837-9277 or (617) 281-3600)

**IMPROVED DISEASE DIAGNOSIS:** Developed new techniques for diagnosis of systemic diseases (e.g., "MSX" in American oysters, infectious sarcoma in softshell clams) using blood preparations. (C. Austin Farley, (301) 226-5193)

**NORTHEAST OYSTER DIE-OFFS:** Determined that the protozoan parasitic disease "MSX" was the most probable cause of recent mass mortalities of American oysters in Massachusetts, Connecticut, and New York. (Fred G. Kern, (301) 226-5193)

**PATHOGENIC MOLLUSCAN BACTERIUM:** Discovered a bacterium, *Vibrio alginolyticus*, in offshore sediments which causes severe larval mortality in the queen (or pink) conch and hard clam. (Dr. Walter J. Blogoslawski, FTS 642-5235 or (203) 783-4235)

**RED TIDE PRESENCE:** Detected, in a cooperative survey with the New Jersey Department of Environmental Protection, the presence of *Gonyaulax tamarensis* (a cause of paralytic shellfish poisoning or "red tide") in New Jersey waters for the first time. (Myra S. Cohn, FTS 342-8256 or (201) 872-0200)

**RED TIDE GROWTH:** Completed a study of the growth potential of the red tide dinoflagellate *Gonyaulax tamarensis* in lower New York Bay, concluding that essential trace metals by far exceeded the importance of nitrogen, phosphorus, and vitamins in limiting growth of this species, and that poor water quality also inhibited growth. (Dr. John B. Mahoney, FTS 342-0255 or (201) 872-0200)

**STATUS & TRENDS EXPANSION:** Expanded the Center's role in NOAA's Status and Trends Program to now monitor 71 stations in 14 estuaries from Machias Bay, Maine, to Chesapeake Bay, and also completed a second round of sampling sediments and biological tissues from these estuaries for analysis of trace metals, organic compounds, and tissue pathology. (Vincent S. Zdanowicz, FTS 342-8232 or (201) 872-0200)

**ESTUARINE SEDIMENT CONTAMINATION:** Analyzed, as part of NOAA's Status and Trends Program, sediment samples from the Northeast's most polluted estuaries for concentrations of 17 metals, finding the highest overall contamination in the Raritan-Hudson system and Boston Harbor, respectively, although Salem (Massachusetts) Harbor had the highest chromium and cadmium concentrations. (Vincent S. Zdanowicz, FTS 342-8232 or (201) 872-0200)

**COPPER-IMPAIRED LARVAL VISION:** Demonstrated that low levels of copper will damage the corneas of larval striped bass and sand lance, possibly impairing vision and contributing to starvation. (Dr. Joel E. Bodammer, (301) 226-5193)

**COPPER & CADMIUM EFFECTS ON SCALLOP RECRUITMENT:** Determined that 20 ppb of copper permanently decreases sea scallop gamete weight, that 10 ppb of copper temporarily decreases gamete weight, and that if low levels of cadmium are also present, then gamete weight cannot recover even at the 10-ppb level of copper. (Edith Gould, FTS 642-5222 or (203) 783-4222)

**CADMIUM-CONTAMINATED OYSTER FOODS:** Found that feeding cadmium-contaminated phytoplankton to juvenile oysters significantly increased oyster mortality, although some surviving oysters derived nutritional value from the metal-contaminated phytoplankters. (Gary H. Wikfors, FTS 642-5225 or (203) 783-4225)

**COASTAL MAINE HYDROCARBONS:** Analyzed, as part of the Northeast Monitoring Program, the concentrations of polynuclear aromatic hydrocarbons (PAH's) in sediments of coastal Maine waters, finding Penobscot Bay sediments with concentrations similar to those in the relatively polluted New York Bight, Buzzards Bay, and Massachusetts Bay, whereas Casco Bay sediments had some concentrations even much higher, and Gulf of Maine sediments had concentrations approaching the low end of PAH concentrations reported worldwide. (Robert N. Reid, FTS 342-8220 or (201) 872-0200)

**OIL-AFFECTED BLOODWORM BEHAVIOR:** Demonstrated that bloodworms which are exposed to oiled sediment contaminated at levels found in chronically polluted habitats show impaired feeding as well as altered burrowing and emergence behavior, potentially reducing their growth and/or increasing their vulnerability to predation. (Anne L. Studholme, FTS 342-8201 or (201) 872-0200)

**BLUEFISH PCB SURVEY:** Completed all field sampling, biological subsampling, and data entry in the three-year survey of PCB's in Atlantic Coast bluefish, with the results now being summarized in a report scheduled to be forwarded to Congress in the first half of 1986. (Stuart J. Wilk, FTS 342-8208 or (201) 827-0200)

**POLLUTANT-ENVIRONMENTAL SYNERGISM:** Found that the combined effects of pollutants (e.g., aromatic & chlorinated hydrocarbons, polychlorinated biphenyls, lead, zinc, or chromium), abnormal water temperatures, and abnormal salinity levels harmed fish eggs more than any one of these factors could do so alone. (Dr. Sukwoo Chang, FTS 342-8267 or (201) 872-0200, or, Dr. Arlene Longwell, FTS 642-5207 or (203) 783-4207)

**POLLUTANT-EFFECTS MODEL:** Published a study on selected aspects of anatomy, physiology, biochemistry, and histopathology of juvenile striped bass which can serve as a model for research on contaminant effects in estuarine fishes. (Dr. Lawrence J. Buckley, FTS 838-7142 or (401) 789-9326)

**FISH IMMUNE SYSTEMS:** Showed that the immune systems of different fish species react differently to the same types and levels of pollutant stress, i.e., cadmium inhibits cunner antibodies but enhances striped bass antibodies. (Dr. Richard A. Robohm, FTS 642-5237 or (203) 783-4237)

**COASTAL FLOUNDER LESIONS:** Tabulated a year's worth of data on lesions in targeted Atlantic and Gulf Coast fishes, showing lesions -- apparently associated with contaminant stress -- occurring in winter flounder from New England coastal waters. (Martin W. Newman, (301) 226-5193)

**INSHORE FLOUNDER PHYSIOLOGY:** Assessed physiological damage to windowpane and winter flounder from inshore Northeast habitats, noting little damage to windowpane, significant damage to winter flounder from Boston Harbor, and modest damage to winter flounder from Massachusetts and Narragansett Bays. (Margaret A. Dawson, FTS 642-5242 or (203) 783-4242)

**DUMPSITE OXYGEN DEPLETION:** Showed that the sediments at the New York Bight's 12-mile sewage sludge dumpsite "consume" enough oxygen to cause, in part, the site's consistently depleted summertime dissolved oxygen levels. (Dr. William C. Phoel, FTS 342-8215 or (201) 872-0200)

**12-MILE DUMPSITE BIOPRODUCTION:** Detected relatively high levels of biomass and production of organisms living in the sediment's in and near the New York Bight's 12-Mile Dumpsite, and a correspondingly high use of these benthic organisms as prey by the area's fishes. (Frank W. Steimle, Jr., FTS 342-8259 or (201) 872-0200)

**NEW YORK BIGHT BENTHOS:** Found no clear trend between 1973 and 1984 in species composition or density for benthic invertebrate communities at a site in the New York Bight where sewage sludge accumulates, indicating that the inner Bight has been in a consistently degraded condition for at least the past decade. (Robert N. Reid, FTS 342-8220 or (201) 872-0200)

**DEEPWATER DUMPSITE 106 MONITORING:** Helped to draft a plan to determine the fates and effects of sewage sludge scheduled to begin being dumped in March 1986 at Deepwater Dumpsite 106 off southern New Jersey; highest priority will be looking for increased contaminant levels in tilefish. (Robert N. Reid, FTS 342-8220 or 872-0200)

**NEW YORK BIGHT DATABASE:** Assembled an extensive computerized database of historical and current hydrographic and dissolved oxygen data for the New York Bight in order to map out areas with chronically degraded water quality. (John E. O'Reilly, FTS 342-8215 or (201) 872-0200)

**NEW YORK BIGHT HYPOXIA:** Continued monitoring the two most degraded habitats in the New York Bight -- the 12-mile sewage sludge dumpsite and those waters influenced by the Raritan-Hudson estuarine plume -- and began constructing models to predict the summertime episodes of exceptionally low dissolved oxygen levels (hypoxia) in these habitats' bottom waters. (Andrew F. Draxler, FTS 342-8254 or (201) 872-0200)

**TEMPERATURE-RELATED LOBSTER PHYSIOLOGY:** Completed a study of the effect of water temperature on "cough" rate (a good indicator of pollutant stress), heart rate, and gill bailer activity in adult American lobsters. (Dr. Frederick P. Thurbery, FTS 642-5244 or (203) 783-4244)

**NEW JERSEY FISH KILL:** Determined that high temperatures and low dissolved oxygen levels in bottom waters were the cause of a summertime fish kill at a popular sport diving location off the New Jersey coast. (Dr. William C. Phoel, FTS 342-8215 or (201) 872-0200)

**RED HAKE HYPOXIA REACTION:** Showed that red hake are able to recognize and depart from waters with life-threatening low dissolved oxygen levels (hypoxia), but that movement from sheltered habitat to find oxygen-adequate areas exposes the fish to a higher predation risk, particularly for smaller individuals. (Allen J. Bejda, FTS 342-8208 or (201) 872-0200)

**GEORGES BANK WATER RECIRCULATION:** Measured, using current meters moored in the Great South Channel, the recirculation of water around Georges Bank to assess its role in the recruitment of economically important fishes. (Dr. Ronald J. Schlitz, FTS 840-1211 or (617) 548-5123)

**SHELF WATER/LARVAE LOSSES:** Determined that the Gulf Stream can withdraw water from the continental shelf at any point north of Cape Hatteras, North Carolina, creating the potential for withdrawing economically or ecologically important fish larvae from the shelf in this region. (Dr. Ronald J. Schlitz, FTS 840-1211 or (617) 548-5123)

**WARM-CORE RING INFLUENCE:** Determined that any offshore movement of shelf waters (and any fish eggs and larvae therein) behind warm-core rings occurs in narrow high-velocity filaments, that the source of the filaments can come either from ahead of or behind the ring, and that most filaments have a limited cross-shelf source. (Dr. Ronald J. Schlitz, FTS 840-1211 or (617) 548-5123)

**WARM-CORE RING MONITORING:** Continued to monitor, via satellite infrared sensors, the size, location, and movement of warm-core rings (cutoff meanders of the Gulf Stream) in slope waters of the Northwest Atlantic, and to provide monthly reports on these matters to interested parties. (Reed S. Armstrong, FTS 838-7142 or (401) 789-9326)

**HEIGHTENED MID-ATLANTIC SALINITY:** Established that freshwater discharge in 1985 from rivers emptying into the Mid-Atlantic Bight was only 75 percent of normal, with resulting salinities in the New York Bight being two parts per thousand above normal throughout the water column. (Reed S. Armstrong, FTS 838-7142 or (401) 789-9326)

**COASTAL WETLANDS MONITORING:** Concluded that the two remote-sensing systems used on Landsat satellites (multispectral scanner and thematic mapper) could distinguish between coastal wetlands and uplands with 80-85 percent accuracy, permitting us to determine coastal wetlands changes back to 1973 when multispectral scanner data first became available. (Dr. William C. Phoel, FTS 342-8215 or (201) 872-0200)

**MARINE MAMMAL RESEARCH:** Coordinated the fifth year of NMFS-sponsored research on Northwest Atlantic marine mammals, including marine mammal-gillnet fishery interactions in the Gulf of Maine, harbor seal populations in New England, marine mammal population monitoring during research vessel surveys, humpback whale stock identification, marine mammal habitat use in Cape Cod Bay-Stellwagen Bank, and archiving of marine mammal aerial census data. (Gordon T. Waring, FTS 840-1311 or (617) 548-5123)

**BEAKED WHALE DISTRIBUTION:** Found beaked whale distribution to be highly correlated with the location of the strong water temperature gradient at the boundary (front) between shelf water and slope water. (Reed S. Armstrong, FTS 838-7142 or (401) 789-9326)

**ANTARCTIC FISHERIES RESEARCH:** Participated in the fourth annual meeting of the Commission for the Conservation of Antarctic Living Marine Resources to help prepare a plan of research to: review catch-per-unit-of-effort and by-catch data; conduct short-term surveys to validate commercial fisheries data; assess and monitor natural variability in populations of krill, fishes, seals, whales, squids, and sea birds; and participate in a long-term study of harvesting effects on the structure and biomass of the Antarctic ecosystem. (Dr. Kenneth Sherman, FTS 838-7142 or (401) 789-9326)

**EASTERN PACIFIC HYDROTHERMAL VENTS:** Published an overview of the research to date on ecology, physiology, and biochemistry of the larger plants and animals, as well as the geology and geochemistry, of the eastern Pacific's hydrothermal vent habitats. (Dr. Austin B. Williams, FTS/(202) 357-2639)

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