



UNITED STATES DEPARTMENT OF COMMERCE  
National Oceanic and Atmospheric Administration  
NATIONAL MARINE FISHERIES SERVICE  
Northeast Fisheries Center  
Woods Hole, Massachusetts 02543

11 January 1977

Reply to Attn. of:  
Jon A. Gibson  
Technical Writer-Editor

TO: FNE, William G. Gordon  
Regional Director, Northeast Region, NMFS

FROM: F13, Robert L. Edwards  
Center Director, NEFC

SUBJECT: Monthly Narrative Report for December 1976

Woods Hole Laboratory

On 22 and 23 December the DELAWARE II and 10 NEFC scientists collected samples and measurements in the vicinity of the ARGO MERCHANT oil spill. The research vessel worked in both contaminated and uncontaminated water along the southern edge of the oil spill to document the condition of the water and sediments, and the species, sizes, and numbers of fish, ichthyoplankton, and benthic invertebrates in the area. George Kelly coordinates the laboratory's effort to monitor, describe, and analyze the phenomenon. Kenneth Sherman of the Narragansett Laboratory coordinates the NEFC's effort with other governmental and private organizations.

The Resource Assessment Division prepared draft environmental impact statements and preliminary fishery management plans (DEIS/PFMP) for haddock, Atlantic cod, and yellowtail flounder in the Northwest Atlantic. The division is now rewriting a DEIS/PFMP for the Atlantic sea scallop following an initial review by both the NEFC and the Regional Office.

Three major topics of a recent ICNAF special meeting were the assessments of northern shrimp, silver hake, and Atlantic mackerel stocks. The Standing Committee on Research and Statistics recommended 1977 TACs of 40,000 metric tons for northern shrimp in Subarea 4, and 105,000 metric tons for Atlantic mackerel in Subareas 3, 4 and 5 and in Statistical Area 6. In April 1976 the U.S. position was for a 1977 TAC of 0 metric tons for Atlantic mackerel in order to rebuild the stocks. To comply with the intent of the Fishery Conservation and Management Act of 1976, the position changed in June to a TAC for 1977 of 55,000 metric tons. Based on available data, the latter TAC was the amount of fish to be harvested at  $F_{0.1}$ . However, recent information on smaller than expected 1976 catches of Atlantic mackerel by foreign fleets, a stronger than expected incoming year class in the Gulf of St. Lawrence, and inconclusive evidence on any critical depletion of the spawning stock, prompted the higher TAC.



State and federal advisors recently recommended a closed season on northern shrimp off the northern New England States in order to rebuild the severely depleted stocks. The presentation came before the Northern Shrimp Subcouncil of the Northeast Marine Fisheries Council. The Subcouncil overrode the objections of its scientific advisors and opened a 135-day season beginning 1 January 1977, with a TAC of 3.5 million pounds. The total catches in recent years were: 1969-28 million pounds; 1974-17 million pounds; 1975-11 million pounds; 1976-2 million pounds.

Cruises for which results have not been compiled include: (1) a 6-16 November cruise of the Polish research vessel WIECZNO to study the day and night catchability differences for Atlantic mackerel on Georges Bank; (2) a 9 November-2 December cruise of the French research vessel CRYOS for a squid and bottom trawl survey from Cape Hatteras to Georges Bank; (3) a 12 November-1 December cruise of the West German research vessel ANTON DOHRN, and a 26 November-13 December cruise of the American research vessel RESEARCHER, both for an ICNAF larval Atlantic herring survey of Georges Bank and the Gulf of Maine; and (4) a 22-24 December cruise of the research vessel DELAWARE II to collect fish for hydrocarbon analysis and to sample fish populations for the kinds, sizes, and numbers of species present in the vicinity of the ARGO MERCHANT oil spill.

#### Narragansett Laboratory

In connection with the christening of the University of Rhode Island's new research vessel, ENDEAVOR, the laboratory held an open house on 11 and 12 December. Several thousand people viewed static displays depicting the work of each of the laboratory's investigations.

#### Milford Laboratory

The Genetics Investigation has examined Atlantic mackerel eggs collected by the research vessel WESTWARD in May 1974 along the New Jersey coast paralleling the flow of the Hudson River into the New York Bight. Those eggs sampled in a string of 10 stations starting at Sandy Hook, going south and halfway out to the continental shelf, were largely moribund or dead. This general pattern of near-total moribundity and mortality was less regular for the more southern stations than for the more northern ones which were remarkably consistent for all seven stages of early egg development being studied independently.

The investigation of physiological effects of pollutant stress has determined the effects of mercury and silver, both individually and in combination, on developing embryos of the American oyster at 20<sup>o</sup>, 25<sup>o</sup>, and 30<sup>o</sup>C. As with copper and zinc, both silver and mercury (individually and in combination) were not as toxic at 25<sup>o</sup> as at 20<sup>o</sup> and 30<sup>o</sup>C. The Ag-Hg mixture was slightly antagonistic at all three temperatures (more so at 30<sup>o</sup>C), but the toxicity of the mixture was not significantly different from that expected of simple additivity.

### Sandy Hook Laboratory

In review of this past calendar year's activities, the major effort centered on the 2,500-square-mile, four-month-long, anoxic zone off New York, New Jersey, and Delaware. A multidisciplinary report will come out in March 1977 on the causes and effects of this important environmental event in the Northwest Atlantic last year. The laboratory has scheduled two post-anoxia surveys through the area to quantify the impact on finfish and on sea scallops. The laboratory has also scheduled the DELAWARE II to survey the surf clam resources, with special attention to the anoxic area. This latter cruise will provide a final assessment of surf clam mortalities. As of the last surf clam survey in October, when anoxic conditions still prevailed, the surf clam mortalities had reached 56,000 metric tons of meats, valued at approximately 73 million dollars.

### Oxford Laboratory

The laboratory intends to examine the surface of olfactory receptor cells from striped bass exposed to sublethal concentrations of pollutants. To achieve this goal, Dr. Joel Bodammer of the staff is being tutored in freeze-etch electron microscopy by Dr. Gunther Bahr of the Armed Forces Institute of Pathology, and by Dr. Russell Steere of the Agricultural Research Center in Beltsville, Maryland. Through the use of ferritin conjugated lectins, the distribution and binding properties of certain types of molecules within the olfactory membrane will be demonstrated ultrastructurally.

Work with pesticides and heavy metals has not yet established any histopathologic effects in American oysters exposed to Kepone. The staff did confirm the occurrence of Mirex in one of the clam samples and in one of the sediment samples from the Tred Avon River in Maryland. The laboratory continues to study the effect of cadmium on striped bass through electron and light microscopy of the species' phagocytes.

An examination of decapods collected off Ambrose Light in early October has shown that 100 percent of the Jonah crabs, 50 percent of the American lobsters, and 84 percent of the rock crabs had blackened or discolored gills. Swelling, necrotism, bacterial infections and debris were common in the gills of the 108 crabs. A single peritrich ciliate was found in the gills of the two lobsters.

In order to determine the changes in the cranial nerves and brain white matter of menhaden under stress, the staff is studying the central nervous system (CNS) of healthy specimens. This baseline study concentrates on the prevalence of inflammatory infiltrates and degenerative tissues in the CNS of the healthy specimens.

The laboratory recovered and examined caged winter flounders that had been placed at a sludge-dumping site and at a control site. The fish had been placed there to determine the effect of the sludge on the occurrence and severity of fin rot disease. No significant difference was found in the control and experimental fish, and the fin rot that did occur was unlike that found in specimens recently caught by otter trawl.

#### Gloucester Laboratory

A study of the economic impact of controlling the quality of fish products up to the point of sale has finally impressed two large grocery chains, "Stop & Shop" and "First National Stores," as well as a third smaller chain, "DeMoulas." Two of these chains are running pilot tests. One benefit of this study is the introduction of products from the less popular species into the market by associating them with a logo that guarantees "Grade A" quality at the point of sale.

#### National Systematics Laboratory

Work on benthic fishes has focused on a description of populations in Deepwater Dumpsite 106, and a review of American toadfishes of the genus Batrachoides.

The laboratory has undertaken a taxonomic review of the cod-like genus Antimora, a common demersal fish of temperate continental slopes and abyssal depths. Since there are several ecological studies of Antimora going on, the staff has begun to compare the six previously described species within the genus.

The staff is preparing a paper for an upcoming coral reef symposium in Miami on previously unknown communities of reef fishes and sponges off the mouths of the Amazon River.

The FAO received assistance from the laboratory on the preparation of species identification sheets for penaeid shrimps living in the tropical western Atlantic.

Work continues on the "Guide to the Temperate Water Decapod Crustaceans of the U.S. East Coast."



UNITED STATES DEPARTMENT OF COMMERCE  
National Oceanic and Atmospheric Administration  
NATIONAL MARINE FISHERIES SERVICE  
Northeast Fisheries Center  
Woods Hole, Massachusetts 02543

10 February 1977

Reply to Attn. of:  
Jon A. Gibson, F13  
Technical Writer-Editor, NEFC

TO: William G. Gordon, FNE  
Regional Director, Northeast Region, NMFS

FROM: Robert L. Edwards, F13  
Center Director, NEFC

SUBJECT: Monthly Narrative Report for January 1977

Woods Hole Laboratory (F131)

A final report on the washing ashore of dead and dying shortfin squid along Cape Cod Bay from mid-October to early December, indicates that approximately 10 million squid, or 3,400 metric tons, became stranded. Because the squid were abnormally abundant in 1976, showed no significant pathological disorders, were able to survive well in aquaria after beaching, had been recently feeding, and appeared on the shore in alternate waves of abundance and scarcity, the causes of the strandings were more probably natural than man-induced. A recent hypothesis on the cause of the stranding is that the squid were feeding on sand lance, became disoriented in the shallow water, and swam east and south (toward shore) instead of north and west (toward deeper water). East and south would be the directions of deeper water if it were not for the barrier of Cape Cod.

On 25 and 26 January, 11 Woods Hole Laboratory scientists hosted four scientists from Narragansett Laboratory, one from Sandy Hook Laboratory, four from Bedford Institute of Oceanography (Nova Scotia), and three from Brookhaven National Laboratory (New York) to develop an American-Canadian study of larval Atlantic herring patches on Georges Bank. To fill in some gaps in knowledge on the fate of pelagic fishes from egg to early juvenile stages, the International Commission for the Northwest Atlantic Fisheries advocated this study. The study during fall 1977 will concern the effects of physical (water motion) and biological forces on the structure and fate of the patches. An earlier meeting on this problem was held on 2 and 3 December in Halifax.

Recent analysis of samples collected in the vicinity of the ARGO MERCHANT oil spill showed no oil or tarballs associated with the bottom sediments. Of 305 fish stomachs analyzed, however, the stomachs of Atlantic cod and little skate did contain oil. In the 38,000 stomachs examined at the laboratory within the past few years this is the first occurrence of oil.



### Narragansett Laboratory (F132)

Staff members are sorting the plankton collected on 22 and 23 December by the fisheries research ship DELAWARE II in the vicinity of the tanker ARGO MERCHANT oil spill. In those samples contaminated by oil, the oil has more of a tarry than a filmy consistency.

### Milford Laboratory (F133)

Studies on growth of young bay scallops in raceways have shown cessation of growth below 10°C and that growth is strongly inversely proportional to population density.

Tests on the physiological effects of exposing American lobsters for 30 days to 60 ppb of copper compounds show that copper sulfate causes greater metabolic disturbance than copper chloride.

A 30 or 90-day flow-through exposure of five bivalve species (Crassostrea virginica, Mercenaria mercenaria, Mya arenaria, Mytilus edulis, and Placopecten magellanicus) to 10-100 ppb of silver nitrate significantly elevated oxygen consumption, although the elevation varied by species. Gill tissue contained as much as 140 ppm of silver by wet weight. The oxygen consumption elevations were higher in organisms collected from unpolluted waters than from polluted waters. Depending upon the species tested and the exposure concentration, the organisms began to return to normal after living 30 days in contaminant-free water following 30 days of contaminant exposure.

The staff has succeeded in inducing parthenogenesis in American oysters by promoting fertilization with x-ray-irradiated sperm.

A study of tissues from organisms collected near the ARGO MERCHANT oil spill includes both fish and invertebrate and living and frozen samples. Organisms and the types of tissues being studied or soon to be studied are: fish(blood), teleost fish (liver), fish eggs after various degrees of development at the Narragansett Laboratory (cytogenetic matter), lobster (hepatopancreas), bivalves (gill-tissue oxygen consumption), and deep sea scallops and horse mussels (mantle, gill, muscle, gonad).

The staff tested the dried blue-green alga Spirulina as a food source for oyster larvae. The product is commercially available in France and Japan. After grinding the product to reduce the particle size to a consumable size, the staff found that the alga was not toxic to the larvae, but that it did foul the water supply enough to require frequent water changes. The resultant growth rates were also lower than those obtained by feeding upon live foods.

Research on developing a more economical growth medium for algae culture has shown that a 50 percent phosphate reduction and an as yet undetermined nitrate reduction in the mediums now used had no effect on 58 percent of the algal species tested.

Striped bass kidneys exposed to mercury chloride showed less disruption of enzyme activity in this experiment than did flounder kidneys in an earlier experiment. Such biochemical tests perhaps indicate that anadromous fish are more resistant to the challenge of heavy metals than are more marine fish.

The results of a recent study of Atlantic mackerel egg survival in the New York Bight in spring 1974 and spring 1976 have prompted a study of egg survival of other species. The initial and incomplete results so far show that the areas just off New Jersey induce high mortality and moribundity in the eggs of all species, and that all other areas, including dumpsites, induce lower mortality and moribundity in the eggs of species other than Atlantic mackerel.

Flounder eggs being cultured at the laboratory were found to be cytologically dead or cytogenetically moribund while still floating. Since dead flounder eggs should sink to the bottom, this evidence raises questions on the viability of planktonic egg collections.

#### Sandy Hook Laboratory (F134)

An interim report on last summer's bottom anoxia/fish kill off New Jersey is in assembly. The report includes information on the phenomenon's impact on the populations of surf clams, ocean quahogs, and sea scallops, and on the behavior of bluefish and summer flounder. Eighteen federal, state, and academic institutions contributed to the report through seven workshops (meteorology, physical oceanography, chemical oceanography, sediments, plankton, benthos, and fish and shellfish) and individual authorships. Papers will be accepted until 15 February and the report will be distributed on 30 March.

A 35-day cruise of the DELAWARE II beginning in early February to survey surf clam and ocean quahog resources has three objectives. First, the cruise will measure biomass in the Mid-Atlantic Bight and note losses due to this past summer's fish kill there. The results will probably support a reduction in the surf clam harvest and a shifting of fishing effort to ocean quahogs. Second, the cruise assess ocean quahog stocks west of Block Island and along the western edge of Nantucket Shoals. This effort is part of a cooperative venture with the States of Massachusetts and Maine to assess the stocks from Casco Bay, Maine to Virginia. Third, the cruise will conduct comparative dredging with commercial vessels in the Mid-Atlantic Bight to inform the commercial interests of the techniques and statistical bases of scientific surveys, and thus of the bases for quotas on harvests.

### Oxford Laboratory (F135)

Two new parasites of rock crabs have been identified. A single rock crab collected off Ambrose Light in the New York Bight had a severe infestation of the dinoflagellate Hematodinium. This infestation extends the range of the parasite northward from South Carolina to the New York Bight. Twenty percent of the rock crabs collected in the Sheepscot River, Maine, were parasitized with an unidentified acanthocephalan. This parasite is apparently restricted to more northern climates due to its absence in 600 rock crabs studied from more southern waters.

### Gloucester Laboratory (F136)

Recent tests have shown that holding squid in chilled sea water (CSW) just after catching extends the shelf life by 20 percent over holding in iced boxes and by 40 percent over holding in iced pens. The CSW-held squid were also firmer and more physically intact.

A talk by Louis Ronsivalli before the Salem, Massachusetts Rotary Club covered, in particular, fishery management and production under extended jurisdiction and fishery technological research and development. Club members sought and received answers to many of their questions on the quality and safety associated with fishery products.

### Systematics Laboratory (F137)

Daniel Cohen was chief scientist for the 4-12 January dives of the research submersible ALVIN in the Tongue of the Ocean, Bahamas. The University of Miami and the Smithsonian Institution joined in the determinations of diversity and population density of fish and large invertebrates between 1,200 and 3,700 meters in depth.



**U.S. DEPARTMENT OF COMMERCE**  
**National Oceanic and Atmospheric Administration**  
NATIONAL MARINE FISHERIES SERVICE  
Northeast Fisheries Center  
Woods Hole, Massachusetts 02543

10 March 1977

Reply to Attn. of:  
Jon A. Gibson  
Technical Writer-Editor, NEFC, F13

TO: William G. Gordon  
Regional Director, Northeast Region, NMFS, FNE

FROM: Robert L. Edwards  
Center Director, NEFC, F13

*George Hedgcock for*

SUBJECT: Monthly Narrative Report for February 1977

Woods Hole Laboratory (F131)

Investigators at Woods Hole and four other NEFC laboratories developed a report on the impact of the ARGO MERCHANT oil spill on the fisheries resources of the Nantucket Shoals-Georges Bank area. The report covers, among other things, the distribution and relative abundance of organisms sampled by otter trawl in the area; the results of hydrocarbon analysis of fish specimens collected; the temperature profiles; the nature of the bottom sediments; the results of the plankton collections including the cytological and cytogenetic health of ichthyoplankton; and the food habits of the fish sampled. In addition, a study is still being conducted on the effects of No. 6 fuel oil on pelagic fish eggs.

The Benthic Dynamics Investigation has released a 400-page report on the macrobenthic invertebrate fauna of the Middle Atlantic Bight Region. The faunal composition and quantitative distribution were related to depth, sediment types, organic carbon content of the sediments, and temperature. Three subareas were treated independently for much of the analysis: southern New England, New York Bight, and Chesapeake Bight.

The NOS medium survey ship MT. MITCHELL participated in an ICNAF larval herring survey during 12-26 February. In addition to the standard larval herring work, the vessel assisted in the collection of plankton, benthic invertebrate, and sediment samples in the vicinity of the ARGO MERCHANT oil spill.

The Polish fisheries research vessel WIECZNO joined in a bottom trawl, plankton, and dredge survey in the ARGO MERCHANT oil spill area. The mid-February cruise into the Nantucket Shoals-Georges Bank area focused on the collection of fish, benthic invertebrate, plankton, sediment, and water samples for either hydrocarbon, biochemical, or pathological analysis.

The Coastal Monitoring, Assessment, and Prediction Program sent a spokesman to the 28 February meeting of the Gloucester Fisheries Committee. The potential impacts of the spill and the research being conducted to determine those impacts were discussed.

State-Federal work during February involved both lobster and shrimp scientific committee meetings. At the former meeting the participants established a schedule to complete management plans and to attend assessment workshops. At the latter meeting plans were made for the analysis of bycatch of shrimp during closed seasons and for the preparation of management plans.

Biologists from the Resource Assessment Division are reviewing and preparing material on the Atlantic herring fisheries. This effort is in response to the requests of the Department of Justice for such material. NMFS and DOJ are involved in the current suit over permissible levels of foreign fishing for herring as allowed in the management plans issued by the Regional Fishery Management Councils.

The Benthic Dynamics Investigation reviewed the benthic ecology work of the Bureau of Land Management on the eastern Gulf of Mexico offshore continental shelf. The review was part of an interagency effort to evaluate studies in potential or actual areas of oil and gas extraction.

#### Milford Laboratory (F133)

Analysis of the few live surf clams collected by commercial dredgers in the New Jersey fish kill area last September shows significant levels of bacterial infection. Bacteria similar to some of those found in the clams were reportedly responsible for periodic fish kills off South Africa in the 1940s.

Further studies on fish eggs collected in the New York Bight in 1974 showed that three sampling locations in the northeastern corner of the bight had a much greater proportion of eggs able to progress to the morula stage.

A 60-day exposure of winter flounders to 10-20 ppb of mercury showed increased metabolism, gill tissue oxygen consumption, liver pentose shunt activity, and liver glycolytic activity. In addition, there were decreased levels of hemocrit, hemoglobin, and red cells.

Investigators working on the spawning and rearing of mollusks have successfully spawned bay scallops out of their regular reproductive season. Tests are now underway to evaluate the health of the larvae from these spawnings.

Another group of bay scallops that was hatched last August has been raised at ambient, 5, 10, 15, and 20°C. Growth at the latter three temperatures has been proportional to those temperatures. Growth at ambient (which dropped from 4 to 0°C during the most recent reporting period) and 5°C was not evident.

#### Sandy Hook Laboratory (F134)

A 14-18 February cruise of the research vessel KELEZ from Long Island to Cape May, New Jersey, was the first in a series of hydrographic cruises to determine when the annual thermocline forms in the area. The early formation of the thermocline in 1976 caused a major fish kill late in the summer due to bottom anoxia. Temperature, salinity, and dissolved oxygen were measured on this first cruise--no stratification was yet apparent.

### Oxford Laboratory (F135)

Rock crabs collected all along the East Coast had a 26 percent overall infestation rate with parasitic copepods on the gills. The New York Bight and Sandy Hook Bay had the lowest rate (17 percent) and the Sheepscott River of Maine had the highest rate (42 percent). Researchers are going to see if pollution can decrease copepod reproductive ability.

Histologic examination of oysters from a fall survey of Delaware Bay has been completed. The prevalence of Minchinia nelsoni was high in all areas sampled; however, it was not possible to associate the occurrence of the parasite with simultaneous mortalities. One oyster was found with a highly invasive neoplasm of undetermined cellular origin.

Gill and olfactory epithelium tissues from yellowtail flounder, winter flounder, and Atlantic herring obtained on a DELAWARE II cruise to the area of the ARGO MERCHANT oil spill have been examined for significant histopathology. It presently is not possible to associate either detachment of gill epithelium or hyperplasia of olfactory epithelium with oil pollution. Only 3 of 25 fish from oil-exposed water and 1 of 30 fish from oil-free water had detachment of the gill epithelium; however, 12 of 22 fish from oil-exposed water and 7 of 21 fish from oil-free water had hyperplasia of olfactory epithelium. Since the hyperplasia in the olfactory epithelium was noted in 7 of 10 winter flounder from supposedly oil-free water, it is difficult to associate this condition with oil pollution. Winter flounder will be obtained from Great Bay, New Jersey, an oil-free area, and examined to establish the normal variance in the architecture of the olfactory epithelium.

Aquarium studies of fin rot disease at ambient water temperatures grossly reveal that winter flounder fin rot lesions are essentially unchanged after as many as three months in the laboratory. It also has not been possible to transmit fin rot disease by placing deliberately wounded winter flounder in aquaria with fin-rot-diseased fish.

The first catalogue of the Registry of Marine Pathology (ROMP) has been bound and mailed internationally to approximately 110 institutions and scientists who have expressed an interest. Early feedback has been unanimously gratifying. An insert soliciting accessions was included in the initial mailing and pertinent donations are expected. Since the catalogue is hand-collated and hand-stapled, copies are individually assembled to fill current requests.

The physiological, biochemical, and morphological characters (65 tests) of four isolates recovered from moribund Long Island Oyster Farms (LIOF) larvae were determined. Two of the isolates, a Vibrio and a Pseudomonas, appear to be pathogenic for oyster larvae. Two series of challenge experiments to verify shellfish pathogenicity from the LIOF isolates and an isolate from the Genetics Laboratory failed because experimental and control larvae developed abnormally. These experiments will be repeated with oyster eggs spawned at a later date. In the latest series of ultraviolet light (UV) disinfectant studies, a pathogenic pink pseudomonad was shown to be sensitive to the treatment regime used. With 100,000 cells per liter at a flow rate of 2.1 liters per minute, no trace of the pseudomonad was detected after UV treatment. The information obtained from this experiment may assist hatchery growers in their choice of effective disinfectants.

### Gloucester Laboratory (F136)

The laboratory demonstrated for several fish processing companies the new products made from minced whiting. A number of processors requested the product formulations and agreed that the products were potentially marketable.

The quality of crab meat lumps (such as to simulate lump meat from blue crabs) made from small pieces of rock crab meat was found to be as good as fresh control meat, even after 14 days of storage at 32°F. The crab meat lumps were formed in molds and dipped in a solution containing flavor enhancing salts. A shelf life of 14 days is considered to be relatively long for fresh seafoods.

Efforts to process squid mechanically are continuing. Results to date with the Spanish machine show that the removal of the heads and viscera is done effectively, but removal of the fins and pens is not. Removal of the skin is less than effective and, in the process, the mantles are somewhat mangled. Obviously, the machine requires modification. A machine employing agitation and abrasion does an adequate job of skinning squid, and data are being gathered using this process.

The results of organoleptic and chemical tests continue to show that sodium erythorbate at levels of 0.15 percent and 0.3 percent provides adequate protection against rancidity in precooked minced whiting sticks stored at 20°F.

After eight weeks of storage at -5°F, the texture of minced whiting, treated with alginate, pyruvate, or tripolyphosphate, remains acceptable. The storage study will continue.

All fishery product standards are being republished in accordance with the new system of numbering resulting from the recodification document published in the Federal Register. The unified fillet standard was finally published in the Federal Register, and this simplifies the inspection and grading of fish fillets.

Much of February was spent on the isolation and analysis of volatile N-nitrosamines in hot-smoked salmon treated with various concentrations of sodium nitrite and sodium chloride and stored for 7, 14, and 21 days at 33°F.

By means of the isoelectric focusing technique (IOF), "English" scallops mislabeled as "cape scallops" were positively identified. Efforts are still underway to improve the staining procedure associated with the IOF technique.

### National Systematics Laboratory (F137)

A report has been prepared on the benthic fishes observed during the 1975 submersible dives over and near Deepwater Dumpsite 106. A manuscript has also been completed which will document the extension of the range of two penaeid shrimps to Hudson Canyon--one from the Straits of Florida and another from south of Cape Hatteras.

Atlantic Environmental Group (F138)

Skipjack tuna sightings along the western African coast have been correlated with the depth of the oxycline. There is a strongly inverse relationship between the sightings and the depth of the top layer of poorly oxygenated waters. Investigators are unsure if the sightings reflect the true distribution or the availability of the tuna to the scouting technique used.