



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

July 27, 1976

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Reply to
Attn. of: F131/J. Gibson

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

FROM : F13, Robert L. Edwards
Center Director, Northeast Fisheries Center

SUBJECT: Monthly Narrative Report for July 1976

This report covers both the Woods Hole, Massachusetts, and Narragansett, Rhode Island, facilities.

Drs. Robert Edwards, Bradford Brown, Geoffrey Laurence, Redwood Wright, and Mrs. Helen Mustafa returned on July 16 from an eight-day meeting at the Polish Sea Fisheries Institute in Gdynia. The talks stressed the development of comparable statistical procedures for Northwest Atlantic research, and the possible exchange of scientists for cooperative research cruises and studies. Dr. Yuri Vjalov, Director of the Soviets' AtlantNIRO Laboratory in Kaliningrad, also attended the discussions during the later phases of the talks.

Drs. Marvin Grosslein and Stephen Clark completed on July 20 a report on the "Distribution of Selected Fish Species and Status of Major Fisheries in the Northwest Atlantic". The report provides information for the bilateral discussions between the U.S. and Canada on the fisheries of the northeast peak of Georges Bank. Under extended jurisdiction, Canada and the U.S. could potentially both participate in the management of the fisheries of the northeast peak. To focus the information base more in depth, Keith Smith and Dr. Fred Olson have also completed a report on a "Brief Historical Synopsis of Certain Northeast U.S. Fisheries".

Dr. Robert Edwards, Mr. Richard Hennemuth, Dr. Emory Anderson, Dr. Vaughn Anthony, Dr. Bradford Brown, Dr. Marvin Grosslein, and Mrs. Judy Brennan-Hoskins participated in the May 31-June 22 ICNAF meeting in Montreal, Canada. The Commission delayed action on total allowable catch of mackerel, closed areas/seasons, and comprehensive catch quotas until later this year.

The ALBATROSS IV leaves July 30 for an 81-day oceanographic survey. Primary objectives are to record bathymetric information on the Northeast Channel, to determine the shelf water-slope water interface on the southern edge of Georges Bank, and to study the hydrography of the northern edge of Georges Bank and in the Great South Channel. The Woods Hole Oceanographic Institution and the Bigelow Laboratory for Ocean Science will also join the cruise to study primary production/phytoplankton and zooplankton in the shelf water-slope water boundary areas. Prior to the July 30 cruise, the ALBATROSS IV will make a 24-hour trip on July 28-29 to test a current meter array mooring system for later use in the Northeast Channel.



Mr. John Casey supervised two longline cruises on June 21-24. The R/V GERONIMO's catch of entirely blue sharks came from Dumpsite 106 and the Block Canyon vicinity. Two of the thirty fish underwent microconstituent analysis, all others were tagged and released. The M/V PENOBSCOT GULF's mixed catch of 41 fish underwent biological data collection and micro-constituent analysis.

Eighteen center personnel participated in the June 14-30 dives of the NEKTON GAMMA, a submersible contracted through General Oceanics, Inc. Observations of siphonophores during a transect from Provincetown to Cape Ann, Massachusetts, were a major objective of the cruise. Siphonophores were possible contributors to the lipo (slime) fouling of fishermen's nets in this area last year. Initial reports showed the siphonophores to be negatively phototactic, generally remaining well below the thermocline during daylight. However, the organisms displayed a contagious distribution that rarely came any closer to the bottom than five meters. The cruise, under the coordination of George Kelly, also stressed the study of distribution and behavior of various fish and shellfish.

Chuck Stillwell attended a shark tournament off Jacksonville, Florida, on July 3-4. The cooperation of the Jacksonville Shark Club permitted the collection of biological data and tagging of a significant number of sharks. The increased public interest in shark fishing and the consequent publicity of the tagging program have created a greater demand for tags than the current budget permits.

Jack Casey and his oceanic gamefish investigation staff attended the Montauk, Long Island, New York Shark Tournament on July 24-25. Over 100 sport fishing boats registered for the tournament and participated in the contribution of sharks for biological data collection.

Dr. Geoffrey Laurence presented a paper on "A Bioenergetic Model for the Analysis of Feeding and Survival Potential of Winter Flounder Larvae, *Pseudopleuronectes americanus*, During the Period from Hatching to Metamorphosis," at the annual meeting of the American Society of Limnologists and Oceanographers in Savannah, Georgia.

Dr. Antonio Vazquez of Spain's Institute for Fisheries Investigations in Vigo, arrived July 6 to study with the assessments and biostatistics units for two months.

Dr. Robert Cotten, Director of the Chilean Foundation, (a subsidiary of I.T. & T.) visited the Woods Hole facility on July 13. The foundation is responsible for the development of a fisheries production program for Chile. Dr. Cotten conferred with Richard Hennemuth and Keith Smith.



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Reply to
Attn. of: F131/J. Gibson

August 25, 1976

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

FROM: F13, Robert L. Edwards
Center Director, Northeast Fisheries Center

SUBJECT: Monthly Narrative Report for August 1976


8/27/76
Robert L. Edwards, Center Director

This report covers the Woods Hole, Massachusetts, and Narragansett, Rhode Island, facilities.

Five preliminary combination management plans - environmental impact statements for fishery resources under extended jurisdiction are being prepared. Fish stocks covered by the five documents include two stocks of silver hake and one of red hake, one stock of herring, one stock of mackerel, two stocks of squid, and one stock for all other finfish.

The Northeast Fisheries Center and the Middle Atlantic Coastal Fisheries Center are cooperating on assessment of mackerel stocks off the Northwest and Middle Atlantic Coasts. Dr. Emory Anderson departed Woods Hole August 24 for Sandy Hook to coordinate the generation of a more comprehensive data base for the ICNAF meeting in the Canary Islands on November 23. Topics discussed in Sandy Hook included sport fishery impact, stock identification, species behavior, capture and surveillance gear, and statistical analysis of research data to refine abundance indices.

Dr. Gotthilf Hempel, Deputy Director of the Institut für Meereskunde in Kiel, Federal Republic of Germany, visited the Narragansett facility. Purpose of the visit was to arrange for cooperative research on larval fish metabolism with Dr. Geoffrey Laurence. The principals also agreed on the visitation of Dr. Kunhold from the Institut for 11 months.

The gear mensuration cruise of the Albatross IV which was scheduled to begin August 24, was superseded by a cruise from the Lower Hudson



Estuary to the outer New York Bight to study water conditions, particularly dissolved oxygen levels, in the area of recent large fish kills. The Albatross IV is temporarily conducting work planned for the Delaware II which has been detained in dry dock longer than originally anticipated.

The Soviet's R/V Kvant took on Tom Morris and George Bolz as participants for the August 5-18 ecological survey of the Northwest Atlantic. Objectives of the survey are to gather information on factors associated with silver hake spawning and to contribute data for assessment of silver hake stocks.

The Center is conducting a literature review for the Regional Office on certain aspects of coho salmon trophic ecology. To provide a data base to analyze the impact of a potentially large introduction of coho salmon on the East Coast fisheries, the Center is reviewing such things as coho salmon food habits and caloric food requirements, and the caloric content of selected food items.

Dr. Bradford Brown attended the Workshop on the Stock Assessment of Eastern Pacific Porpoises Involved in the Yellowfin Tuna Fishery held in La Jolla, California, on July 27-30. The workshop, directed by Dr. William Fox, concentrated on the definition and estimation of the existing and optimum sustainable population levels of the porpoises and the effect of fishing mortality on those levels.

The recent surge in shark sightings along Long Island Sound beaches has prompted a flood of requests from the public, particularly the news media, on whether the increased sightings indicate an increased shark population. Jack Casey has assured the inquirers that the increased sightings are probably more reflective of an increased public sensitivity to the situation than of any possible increase in the numbers of sharks.

The Woods Hole facility was visited on August 12-13 by Mr. FitzGerald Bemiss, an advisor to Secretary Richardson on extended jurisdiction. All investigations were introduced to Mr. Bemiss, but primary concentration was on the roles of the fishery management biology and resource ecology investigations within the context of extended jurisdiction. The past, present, and future of United States involvement with the International Commission for the Northwest Atlantic Fisheries was also discussed.

The Center held an open house for the Albatross IV and the Peirce on August 22. The Peirce is a 164-foot coastal survey ship of the National Ocean Survey that has been updating nautical charts in Buzzards Bay this summer. The Albatross IV, the Center's 183-stern trawler, had onboard exhibits of fish models, water pollution samples from the New York Bight, and pictorial results of the spring groundfish survey in the Northwest Atlantic.

Two veterinary pathologists from the University of Pennsylvania and one from Johns Hopkins University recently visited the Woods Hole facility. Drs. Donald Apt and Leonard Weiss from Pennsylvania and Dr. Frederick Bang from Johns Hopkins discussed the growing interest of veterinary pathologists in the effects of environmental stress on the health of marine organisms.

NOAA's representative to the Living Rivers program was Dave Potter of the Woods Hole facility. The program, produced by the Quebec-Labrador Mission Foundation and the International Atlantic Salmon Foundation, was held July 31 to August 20 in Tabusintac, New Brunswick.



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DATE: September 28, 1976

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

FROM: F13, Robert L. Edwards
Center Director, Northeast Fisheries Center

SUBJECT: Monthly Narrative Report for September 1976

9/28/76

Robert L. Edwards, Center Director

This report covers the Woods Hole, Massachusetts, and Narragansett, Rhode Island, facilities.

The Assessments Unit has reexamined historical catch data for mackerel for differences in catches in the daytime and nighttime and in different strata. The Unit has also tried to determine the variability in the catches at age of the various foreign mackerel fisheries in order to determine the variability associated with the stock sizes at age.

Several members of the Center are developing an energy budget for the Georges Bank ecosystem. The modeling effort will draw upon the Environmental Management, Fishery Management Biology, Benthic Resources, and Larval Fish Physiology Investigations.

Stomach samples of blue sharks, shortfin makos, longnose lancetfish, and swordfish recently collected off Deepwater Dumpsite 106 have been analyzed for food habits. Food items were recorded by number of individuals, percentage of occurrence, cumulative weight, percentage of total stomach content weight, and mean weight per stomach. Two preliminary observations were the significant occurrences of squids other than Loligo and Illex, and of hyperiid amphipods, in the diets of blue sharks and longnose lancetfish, respectively.

(Jon Gibson)



Survey throughout NOAA by the Center's Manned Underseas Research and Technology Investigation defined some desirable qualities for OCEANLAB-- NOAA's concept of a mobile undersea laboratory. The survey showed that the vessel should be able to handle six scientists, four of which would be able to pressurize for lockout diving. The survey also showed other desirable qualities to be a four-week, 600-nautical-mile cruise capability and an ability to dive to 1,500 feet in shirt sleeves or to 1,000 feet for saturation diving.

The USSR's BELOGORSK arrived September 2 in Woods Hole. The vessel participated in a fall groundfish survey from September 4 to September 13. Bottom trawl stations were on Georges Bank and off southern Nova Scotia and southern Long Island. During the September 15-30 cruise of the BELOGORSK for a tagging program of spawning sea herring in the Georges Bank area, ICNAF scientists tagged about 30,000 fish. Three persons from the Center assisted in the tagging. The program seeks to define the feeding, spawning, and overwintering areas; recruitment migrations from juvenile fisheries; stock intermixing in feeding and overwintering areas; and mortality rates of sea herring. The UBILEINIY, a Soviet purse seiner, assisted in the three-country (US, Canada, and USSR) effort from the Great South Channel to Cultivator Shoals and along the northern edge of Georges Bank to the Northeast Peak.

The Center's ALBATROSS IV completed work on September 9 for the study of water conditions, particularly dissolved oxygen levels, in the area of recent large fish kills in the New York Bight off the New Jersey-Delaware coast. The breakdown of two of the ALBATROSS IV's three generators cancelled the Standard 36 and Standard 41 trawl comparison experiments planned with the Soviet's BELOGORSK. The ALBATROSS IV departed Woods Hole on September 28 to conduct the first phase of the fall bottom trawl survey. Stations occur in 5-200 fathom depths from Cape Hatteras to Martha's Vineyard.

The 1976 summer inshore biome groundfish and plankton survey utilized the merchant vessel SPIRIT OF 76. A survey of 18 stations in Cape Cod and Massachusetts Bays showed a diverse catch. Spiny dogfish dominated the lower Cape Cod Bay catches. Squid and winter flounder were the principal organisms along the eastern shore of the bay. Small lobsters and flounders were numerous from Duxbury to north of Boston. Young pollock were taken at three northern stations; young haddock at two.

The ongoing monthly temperature transects across the Gulf of Maine utilizing the ferry BLUENOSE, showed water temperatures still warming. Compared to September 1975 temperatures, the current temperatures are 2°C warmer above 50 meters and 1-2°C warmer below that depth. The prolonged summer thermocline this year and the general warming trend in the gulf are the probable causes for the warmer temperatures. Surface temperatures and salinities were also higher than last year.

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Three current meter arrays, each with three meters, were moored along the Northeast Channel. The arrays will monitor flow below 55 fathoms for the next six months primarily to determine the nature of water inflow into the Gulf of Maine. The NOAA ship MT MITCHELL from the Atlantic Marine Center was used to deploy the arrays during a September 22-25 cruise.

The Woods Hole facility hosted a meeting of US and Canadian fishing industry representatives on September 23. The Center briefed the representatives on the options for reciprocal fishing rights and management of important stocks along the extended jurisdiction boundary line.

Dr. J. J. Zijlstra, Biological Director of the Netherlands Institute for Sea Research, recently visited the Woods Hole facility. One of his interests is the study of the apparent changes in statistical distributions about a population as the population itself changes in size. This problem was considered in the context of recent apparent changes in the statistical distributions about the mackerel stocks in the Northwest and Middle Atlantic.

Vaughn Anthony spoke on "Fisheries of the 20th Century - As Viewed From the Year Two Thousand", at the American Fisheries Society's Annual Meeting in Dearborn, Michigan, on September 21. Topics discussed were changes in species abundance, environmental changes, and new concepts of management.

The Center Director and Deputy Center Director attended the national meeting of the eight regional fishery management councils during September 13 to 17 in Arlington, Virginia.

Several persons from the Narragansett facility attended a seminar on extended jurisdiction at the Alton Jones Campus of the University of Rhode Island in West Kingston. The American Fisheries Society sponsored the seminar.

Jack Casey attended a public hearing on the preliminary fishery management plans for billfishes and sharks. The hearing, sponsored by the Southeast Fisheries Center and held in Atlanta, provided a forum for comments by several state administrators on the national position.

The public display aquarium in Woods Hole closed September 11 after a 93-day open season. More than 200,000 visitors toured the facility. Over 1,300 foreign visitors (excluding 900 Canadians) from 56 countries signed the registry. The only addition to the display this past season, a model otter trawl, drew a favorable response from the public.



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

10 November 1976

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

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

SUBJECT: Monthly Narrative Report for October 1976

Woods Hole Laboratory

During October the ALBATROSS IV conducted the first two phases of the 1976 bottom trawl survey of the Northwest Atlantic. The first phase (28 September-18 October) studied the seasonal distribution and relative abundance of fish (including ichthyoplankton) and invertebrate species on the continental shelf from Cape Hatteras to Cape Cod. The second phase (18 October-5 November) continued the survey from Georges Bank to the Scotian Shelf, including the Gulf of Maine. In addition to the six standard types of samples taken on the surveys, 15 special types of samples were taken during the second phase.

Five Woods Hole Laboratory personnel and three Narragansett Laboratory personnel were on board the visiting Soviet research vessel BELOGORSK for an ICNAF larval herring survey (4-22 October), bottom trawl survey (4-22 October), oceanographic survey (4-22 October), and mackerel day-night catchability study (24 October-3 November) in the Georges Bank and Gulf of Maine areas. Few mackerel were landed, but the large catch of short-finned squid during the latter study provided excellent information on feeding dynamics of the squid and associated species.

The Woods Hole Laboratory and the Narragansett Laboratory each contributed a scientist to the ICNAF larval herring studies in the Georges Bank and Gulf of Maine areas by the visiting Polish research vessel WIECZNO. The 13 October-4 November cruise concentrated on larval herring distribution and abundance, primary productivity, and water mass distribution in the study area.

The research vessel ANNANDALE carried five NEFC personnel for a 1-18 October larval herring patch study in the Georges Bank and Gulf of Maine areas. Objectives of the cruise were similar to those of the WIECZNO study.



An inshore biome groundfish and plankton survey of Cape Cod and Massachusetts Bays was shortened by adverse weather. The merchant vessel PHALAROPE returned to Sandwich, Massachusetts on 15 October after a four-day study. Flounders, squid, dogfish, and hake dominated the trawl catches. Young-of-the-year fishes and squid were common.

Four Resource Assessment Division members left 7 October for a 25-day tagging operation on spawning sea herring in the Jeffreys Ledge area. The tagging operation was part of an ICNAF program to study the movements and mortality of sea herring in the Northwest Atlantic. The study chartered the fishing vessel SILVER LINING.

The October temperature records for the Gulf of Maine from Bar Harbor, Maine, to Yarmouth, Nova Scotia, taken from the ferry BLUENOSE continue to show warmer surface temperatures than at the same time in 1975. However, the NEFC-Atlantic Environmental Group program has noted smaller temperature differences during October than during previous months.

In response to the need for more information on fishery resources of that portion of Georges Bank claimed by both the United States and Canada under extended jurisdiction, the Woods Hole Laboratory is preparing basic elements of preliminary fishery management plans on sea scallops, cod, haddock, pollock, and yellowtail flounder, among others.

Ten NEFC personnel attended the annual ICES meeting, in Copenhagen, Denmark, on 4-13 October. Center Director Robert L. Edwards chaired the American delegation along with Warren S. Wooster of the University of Washington. Keith Smith, Geoffrey Laurence, Gregory Lough, and Kenneth Sherman presented papers.

Narragansett Laboratory

Four fisheries biologists from the Massachusetts Division of Marine Fisheries, Cape Cod Canal Project, spent two days with Thomas McKenney going through the laboratory's ichthyoplankton reference collection. The research program they are pursuing concerns the effects on fish by the warmwater plume of the fossil fuel electric generating plant located on the eastern end of the canal.

Dr. Walther Kuhnhold of West Germany arrived at the laboratory on 14 October to spend a year working with Geoffrey Laurence in the Larval Fish Physiology Investigation. Dr. Kuhnhold, a fishery biologist with a chemical background, has researched the chemical influence of oil pollution on embryonic and larval fish.

At the conclusion of the recent ICES meeting in Copenhagen, Denmark, Robert Marak, Chief of the MARMAP Field Group, joined Center Director Robert L. Edwards and Kenneth Sherman at the Polish Plankton Sorting Center at Szczecin, Poland, to review the work being done there under Public Law 480 funding.

During 4-8 October the Manned Underseas Science and Technology Investigation's diving team picked up a small amount of Jeffreys Ledge substrata covered with herring eggs. The Narragansett Laboratory immediately placed the substrata and eggs in temperature-controlled aquaria. The viable eggs are hatching and several hundred larvae will be available for research on limiting factors of larval herring survival. During the past four years Geoffrey Laurence and his research team have successfully hatched and reared a number of different species of commercially important fish, but this is their first experience with herring.

Milford Laboratory

The Milford Laboratory continued to provide to cooperative investigators surplus bay scallops produced as a result of experimental aquaculture efforts this past summer. Recently 10,000 seed scallops averaging 20 mm in length were delivered to the Shinnecock Tribal Shellfish Project (funded by the Economic Development Administration) for planting in two locations on the reservation. The Center expects to gain information concerning the survival and growth of transplanted hatchery-produced scallops under field conditions. A similar sample was delivered in August to the Wampanaug Tribal Project (also EDA-funded) at Gay Head, Martha's Vineyard.

Growth data from surf clams from the past summer's tank farm experiments are being compiled. There appear to be distinct differences in mean length of populations maintained under different stocking densities and flow rates. Growth of young Spisula in the tank farm has decreased dramatically as temperatures have dropped to 14°C. Recent spawnings of Spisula have produced viable larvae which are being used in a follow-up to a previous temperature-salinity experiment. Data indicate that the optimal salinity range for larvae of Milford-acclimated brood stock is 26-29‰.

In response to a rearing failure of larval oysters at the Long Island Oyster Farms hatchery in Northport, New York, the laboratory is performing comparative experiments to isolate the problem. Initial analyses show that the hatchery seawater supply is the major problem.

Samples of water from the Bluepoints Oyster Company of West Sayville, New York, were examined by the Milford Laboratory in response to a request for an explanation of the abnormal behavior of the molluscs being held in bay water. Samples were examined microscopically, cultures made of the water samples, and organisms isolated. A pigmented bacterium was isolated from unfiltered water samples that was extremely toxic to oyster larvae. A report was prepared in which it was suggested that this bacterium in high numbers could be the cause of the abnormal behavior.

Oyster larvae are being reared in glass and plastic beakers to see if the growth vessel affects the growth rate. At the same time the study has compared growth in artificial and natural seawater.

Five new strains of algae were received from England and subcultured in three types of growth media. The laboratory has continued to subculture in artificial seawater and solid media those algal strains currently on hand. Laboratory personnel are using various concentrations of cryptoprotectorants to induce viability in three algal species at -60°C .

First generation spat from an American oyster growth rate experiment are being measured and sorted. Induced parthenogenesis of this species following sperm irradiation, and self-fertilization of hermaphroditic Japanese oysters are being studied and written up.

The laboratory is compiling chromosome data on seven early life stages of Atlantic mackerel from the New York Bight. Atlantic mackerel and other fish early life stages (early cleavage egg to tail-free embryo) from Dumpsite 106 are being prepared for a similar study.

Embryonic cell division of field-spawned herring eggs and the effects of temperature on early embryonic chromosomal activity of summer flounder are also being monitored by laboratory and other NEFC personnel.

Testing is continuing on the combined effect of copper and zinc on juvenile scallops. An initial study comparing the effects of copper, zinc, lead, and selenium on juvenile surf clams and scallops was completed and the LC5, LC50, and LC95 values were determined. A 60-day exposure of cunners to silver nitrate (5 and 10 ppb Ag) is in progress and one group of fish was removed for hematological studies. A second 30-day exposure of lobsters to copper sulfate (30 and 60 ppb Cu) was completed. Heart, gonad, antennal gland, and tail muscle samples were taken for biochemical testing. Biochemical analysis of heart tissues exposed to 60 ppb shows no significant changes in glycolytic or pentose shunt activity, or in the metalloenzyme LDH. Oxygen consumption measurements were made on isolated gill tissues. Blood samples were collected from each animal for determination of serum osmolality changes, as well as copper-induced changes in sodium, potassium, and calcium. The blood will also be examined electrophoretically for hemocyanins and other possible copper-protein complexes. The Environmental Chemistry Investigation will measure copper uptake into various body tissues. A similar 30-day exposure was begun using copper chloride instead of sulfate for comparison of the effects of the two different copper salts.

In response to the current low-oxygen situation in the surf clam beds along the New Jersey coast, a new study was initiated on some physiological effects of various low dissolved oxygen concentrations on different size classes of surf clams.

Sandy Hook Laboratory

The Sandy Hook Laboratory continued to monitor the large fish kill area off New Jersey. Over 50 cruises to date have indicated a significant abatement in the anoxic conditions over 2,500 square miles of oceanic waters. The most current cruises, part of the fall MARMAP SII survey, have revealed a loss of 59,000 metric tons of surf clams. During an

15-16 October workshop on "Anoxia on the Middle Atlantic Shelf during the Summer of 1976" sponsored by the National Science Foundation and the Office of the International Decade of Ocean Exploration, held in Chevy Chase, Maryland, Frank Steimle of the laboratory presented a talk on "A Summary of the Fish Kill-Anoxia Phenomenon Off New Jersey and Its Impact on Resource Species." An interagency steering committee to investigate the fish kill (consisting of representatives of the Sandy Hook Laboratory, MESA's New York Bight Project, the Environmental Protection Agency, the New Jersey Department of Environmental Protection, the American Littoral Society, and academia) has initiated a series of workshops to study the situation. Frank Steimle is the steering committee chairman for the workshop on benthos on 4 November. Dave Radosh of the Coastal Ecosystems Division presented the benthic data currently available at Sandy Hook.

During the past two weeks, the Biological Oceanography Investigation at the laboratory has submitted two papers for inclusion in the Proceedings of the 4th Hudson River Ecology Symposium. The papers deal with the annual primary production (nannoplankton, net plankton, dissolved organic matter) in lower New York Bay, and the seabed oxygen consumption in the lower Hudson Estuary. The investigation has also submitted a joint paper with Exxon Research and Engineering Company of Linden, New Jersey, to be included in the Proceedings of the 5th Conference on Prevention, Behavior, Control, and Cleanup of Oil Pollution. Topic of the paper is the extractable organics and nonvolatile hydrocarbons in New York Harbor waters.

The Sandy Hook Laboratory completed a multivariate analysis of the species composition of benthic invertebrate communities over 2,500 square miles of the New York Bight Apex. Five factors, all the synergistic effects of 11 sedimentary variables, accounted for 97 percent of the variance in the species composition. At least six of the 11 variables were directly related to ocean dumping.

Oxford Laboratory

The Oxford Laboratory is cooperatively studying with the Food and Drug Administration and the National Institute of Health (NIH) the cause of epizootic neoplasia in bivalve mollusks. Samples of Macoma balthica and immediately surrounding substrata collected from the Tred Avon River, a tributary of Chesapeake Bay, are being histologically examined and chemically analyzed, respectively. Preliminary gas chromatographic analysis of sediments by NIH personnel indicates the presence of heptachlor, methoxychlor, lindane, aldrin, and Mirex. Analyses by other laboratories are in progress to determine if the peak for Mirex is real or an artifact. Mirex has never before been reported from Chesapeake Bay.

Histologic examination of Macoma balthica experimentally exposed to dieldrin is complete. Other than inhibition of fungal growth in detritus and clams, no effects were noted in clams exposed to varying concentrations of dieldrin. Clams were exposed up to nine months.

Experimental studies with blue crab viruses continued. Large numbers of blue crabs were infected with reolike virus. The crabs will provide abundant material for biochemical characterization of the virus. To date blue crabs infected with the Chesapeake Bay virus have remained well. Forced oral and and hemolymph injection methods have been used to transmit the virus. Collections of herpeslike virus (HLV) infected blue crabs from Assawoman Bay are complete. HLV is not common in natural populations of blue crabs, with the possible exception of early summer.

Two collections of rock crabs were made to evaluate the gross and microscopic condition of gill tissues. Only 16 percent of 103 crabs collected near Ambrose Light in the New York Bight had apparently clean gills. However, 86 percent of 67 crabs collected near Boothbay Harbor, Maine, had clean gills. Tissues from crabs collected from the New York Bight and from Maine now are being processed for comparative histopathology. A manuscript on "Cytological Observations on the Blood and Hemopoietic Tissue in the Crab, Callinectes sapidus. I. The Fine Structure of Hemocytes from Intermolt Animals," was completed.

Entrapment studies with winter flounder in the New York Bight continue to be affected by the anoxic bottom conditions prevalent throughout the bight. For the past several months winter flounder placed in the traps have not survived the exposure period. Studies of the effects of heavy metals on immune mechanisms in marine fishes are continuing. Striped bass and cunner were exposed to 10 ppm cadmium and simultaneously immunized with bovine serum albumin (BSA), BSA with sulfanilic acid, and sheep red blood cells (SRBC). It was not possible to assess the effect of heavy metal exposure since control fish consistently did not produce good antibody responses to the antigens employed.

Dead and dying oyster larvae from Long Island Oyster Farms were examined bacteriologically. Bacteriologic counts made on culture water showed 10^5 cells/ml with six predominant morphologically dissimilar colonies. In oyster larvae challenge experiments two of these isolates caused mass mortality. The experiments are being repeated before the isolates are subjected to taxonomic studies. Oysters from Fishers Island, New York, and Charlestown, Rhode Island, were examined for parasites and histopathology. No pathogens or parasites were noted in either oyster sample examined.

Martin Newman of the Oxford Laboratory has completed serving on a Technical Proposal Evaluation Committee (TPEC) for the Bureau of Land Management (BLM). The TPEC was formed to evaluate the proposals received by BLM in response to request for proposals for baseline studies of Northeast and South Atlantic offshore oil lease areas. One of the areas to be studied is the baseline prevalence of infectious diseases and histopathology in benthic organisms. Evaluation of the adequacy of the proposals for histopathological studies was made by Mr. Newman and a representative from the Environmental Protection Agency.

Gloucester Laboratory

On 21 October a squid processing demonstration was held at the Gloucester Laboratory for various industry representatives. Over the last several months, the laboratory has been working on squid processing mechanization in the areas of size grading, skinning, and slicing. Three different processing operations using commercially available equipment were employed. The sizing demonstration was carried out using a MOBA grading machine which was loaned by the manufacturer. Although this machine grades by weight rather than length, it proved to be adequate for grading squid, since from any given lot, the weight/length relationship is reasonably consistent. The skinning demonstration was carried out on a Jensen Skinner which was leased from a local producer. This machine uses a continuous steel knife blade which slices the skin from one side of the squid. Although the yield factors have not yet been determined, the concept works well for split mantles (single pass) and for whole tubes (double pass). The slicing demonstration was carried out using the Urschel Model J Slicer. By changing the distances between slicing blades and by either adding or removing the cross-cut blades, this machine can produce rings or strips in a variety of sizes. Over 20 industry people attended the demonstration. This showing, considering the short notice, and the interest demonstrated by the attendees indicates the dramatic increase in interest by the United States industry in squid processing.

Joe Licciardello, Steve Hulme, Ron Lundstrom, Sol Shenouda, and Joe Mendelsohn of the laboratory presented papers at the Atlantic Fisheries Technological Conference in Newport, Rhode Island. Approximately 120 people were in attendance representing the technological research interests of industry, universities, and various governments including the United States, Canada, Iceland and Norway. Lou Ronsivalli and Bob Learson took part in the panel session on the "Technology and Use of Alternate Fisheries Resources." Bob Learson also served on the Executive Committee and the Earl P. McFee Award Committee.

The Gloucester Laboratory recently cooperated with Sea Grant when Perry Lane took part in a "From Hooking to Storing" program for marine recreational fishermen. Dr. Lane talked about quality attributes in fresh fish and the factors and conditions that cause quality loss. He described the steps sports fishermen can take to preserve the quality of their catch and demonstrated how to clear, fillet, and prepare fish for the freezer.

National Systematics Laboratory

The National Systematics Laboratory has continued work on the description of a new species of Penaeopsis shrimp from the Indo-West Pacific, a "Guide to the Temperate Water Decapod Crustaceans of the U. S. East Coast," the taxonomy of Spanish mackerels and halfbeaks, and a synopsis of the approximately 80 genera of ophidiiform fishes. In addition, a Lowell Institute lecture entitled "Zoogeography of Mackerel and Tuna" was presented by Bruce Collette on 21 October at the Boston Aquarium. Dr. Collette also talked at Northeastern University where he discussed his research on the biology of coral reef fishes during the TEKTITE project.



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Regional Director, Northeast Region, NMFS

FROM: F13, Robert L. Edwards
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SUBJECT: Monthly Narrative Report for November 1976

Woods Hole Laboratory

The appearance of large numbers of short-finned squid along the eastern shoreline of Cape Cod Bay launched an effort to monitor and analyze the phenomenon. A photographic survey from Barnstable Harbor to Provincetown on 18 November showed the primary concentrations between Orleans and Wellfleet. Initial estimates before photographic analysis were 1 ton (2,000 individuals) per linear mile of shoreline in the more concentrated areas. Samples were sent to the Sandy Hook Laboratory for pesticide and heavy metal analysis, and to the Oxford Laboratory for pathological analysis. An examination of the stomachs showed that fish comprised 90 percent of the total stomach contents by weight. Sand and eel grass also occurred in a majority of the specimens. An equal number of short-finned squid collected by the NEFC's research vessel ALBATROSS IV in 1974-1975 was examined to serve as a control. The control specimens: (1) contained approximately 10 times more food per stomach by weight; (2) held three times less fish per stomach on a percentage of weight basis; and (3) had consumed unidentified squid as 60 percent of the stomach contents by weight. The appearance of dead and dying short-finned squid is not a new phenomenon for the area. Accounts dating back to 1882 document such die-offs in Cape Cod Bay. Cold shock remains a primary hypothesis for the appearance of the dead or stunned squid.

The Resource Assessment Division prepared approximately 20 papers on mackerel for ICNAF's special commission meeting in the Canary Islands. Topics included behavior and population dynamics of the species, recreational and commercial fisheries, and data analysis. Several papers focused on the causes and implications of age distribution differences between foreign and domestic survey data.



Three major topics of the recent ICNAF 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 1, 70,000 metric tons for silver hake 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.

During November, the Center Liaison Staff to the Regional Fishery Management Councils attended two council meetings and four public hearings on the proposed environmental impact statements and preliminary fishery management plans (EIS/PMP) under extended jurisdiction. At both council meetings priority species were established so the councils could write their own PMPs, and candidates' qualifications for the post of executive director were reviewed. Regional Office representatives joined the Center Liaison Staff for the public hearings in Atlantic City, New Jersey; Hampton, Virginia; Brunswick, Maine; and Boston, Massachusetts. Purpose of the hearings was to explain and to receive criticism on the EIS/PMPs.

The Manned Underseas Research and Technology Program recently evaluated and advised on the various designs for OCEANLAB, NOAA's concept of a mobile undersea laboratory. For the three designs under the most consideration--an autonomous submarine, a towed habitat, and a carried system--program members rated them on such factors as safety, performance, handling, cost, convenience, flexibility, and technical confidence. Any one of the designs could potentially be made operational by 1980 or 1981.

Members of the Ecosystem Dynamics Investigation are currently standardizing the data from the 1971-1976 ICNAF Larval Herring Survey Program and entering them into a computer for quality control purposes. Information derived from the six years of 505- μ mesh net samples should ultimately show the dispersal and rate of production, growth, and mortality in larval herring. The 1976 samples with the 333- μ mesh nets are undergoing a complete sorting at the Polish Plankton Sorting Center in Szczecin.

The ALBATROSS IV has entered the Munroe Dry Dock in Chelsea, Massachusetts, until March 1977. Work on the ship will include the addition of laboratory space on the main deck, the refurbishing of all laboratories, and the reconditioning of the ship's winches.

The Benthic Dynamics Investigation has completed a study of pollock stomachs for food and feeding habits. Only white hake and red hake remain to be studied from the 1969-1972 collection of gadiform stomachs. Cod, haddock, and silver hake were completed in 1972. The data will be analyzed on an annual, seasonal, regional, and sexual basis. Information on interspecific competition for food should ultimately come from the analyses. For the 1973-1976 collection of stomach contents, the field data are completely audited for all 17 target species. Marine Research, Inc., who is performing the stomach analysis, has completed approximately 50 percent of the samples.

The chartered fishing vessel SILVER LINING returned on 31 October from a 25-day ICNAF Atlantic herring tagging effort on southwestern Jeffreys Ledge. Rough weather limited the purse seiner to seven trips, only three of which were successful in capturing and tagging herring for the stock identification and delineation studies. Blue sharks, Atlantic mackerel, and short-finned squid dominated the catches. An unconfirmed sighting of a school of humpback whales occurred on 8 October off Gloucester Harbor. On 12 October a single humpback was sighted three miles southwest of Thatcher's Light.

Two recent ICNAF larval Atlantic herring cruises covered the area from south of Martha's Vineyard to the western Gulf of Maine. The research vessel ANNANDALE returned on 18 October from an 18-day study of larval abundance and distribution in the western Gulf of Maine. The greatest larval densities were from Cape Small to Grand Manan Island in water less than 100 meters. On 17 October the ANNANDALE passed within visual range of 30 pilot whales, 15-20 fin whales, and a number of dolphins along northern Jeffreys Ledge. Large numbers of the Scyphomedusae Cyanea capillata were also sighted in the area. The second cruise was with the Polish research vessel WIECZNO. It returned on 4 November from a 23-day tour of Georges Bank, Jeffreys Ledge, and south of Martha's Vineyard. Small herring larvae (10-15 millimeters long) were collected at only 12 of 112 stations. Chaetognaths dominated the samples.

Cruises which have not been completed or for which results have not been compiled include: (1) a 6-16 November study of day and night catchability differences for Atlantic mackerel on Georges Bank with the WIECZNO; (2) a 9 November-2 December squid and bottom trawl survey from Cape Hatteras to Georges Bank with the French research vessel CRYOS; (3) a 12 November-1 December ICNAF larval Atlantic herring survey of Georges Bank and the Gulf of Maine with the West German research vessel ANTON DOHRN; and (4) another ICNAF larval herring survey of Georges Bank and the Gulf of Maine from 26 November to 13 December with the research vessel RESEARCHER.

Narragansett Laboratory

Longline fishing and sonic tagging of swordfish, tuna, and sharks took place on 18-29 November on board the Polish research vessel WIECZNO. The cruise extended along the edge of the continental shelf from Georges Bank to Cape Hatteras. Of the 115 sharks landed, 102 were sonically tagged. Of the 16 teleostean fishes landed, 13 were swordfish. One swordfish was sonically tagged and tracked for several hours. Frank Carey of Woods Hole Oceanographic Institution joined Chuck Stillwell of the Narragansett Laboratory for this fourth year of studies on behavioral and physiological responses of major oceanic gamefish to environmental factors.

Milford Laboratory

Fish eggs collected at Deepwater Dumpsite 106 in May 1974 and in February and March 1976 showed absences or gross morphological abnormalities at the cytological/cytogenetic level. Morphological abnormalities occurred in three of the four dominant species in the 1974 collections: cusk, menhaden, and Atlantic mackerel. Hake, the fourth species, showed fewer such abnormalities. On the other hand, the few eggs collected in the 1974 and 1976 groundfish surveys of the Middle Atlantic do not have abnormal embryos, a lack of embryos, or high mortalities. The research vessel WESTWARD collected Atlantic mackerel eggs in the New York Bight also in May 1974. In a comparison of mackerel eggs from the bight and from the dumpsite, there were few (about one percent) gross morphological abnormalities of embryos in the bight. In the dumpsite, such embryonic abnormalities occurred in 95 percent of neuston net samples and 45 percent of bongo net samples. The discrepancy between net samples is in the proportion of earlier developmental stages in them. For equally developed eggs, though, the dumpsite fostered higher mortality and moribundity, lower mitotic indices, and more chromosome abnormalities than the closest bight station (about 40 miles away). The poor condition of eggs of several species sampled in different years at Deepwater Dumpsite 106 does not refute the supposition that eggs can be affected disastrously by the dumping. The lack of specimens and background information, other than that of Atlantic mackerel, from cleaner control waters in the bight makes more definitive statements impossible.

Four, 48-hour, LC-50 bioassays showed that copper and zinc, individually and in combination, were less toxic to American oyster embryos at 25°C than at 20°C or 30°C. The copper-zinc combination was slightly antagonistic at 20°C and 25°C, and slightly synergistic at 30°C. The toxicity of the combination was not significantly different from that expected from a single metal.

Contrary to preliminary results, enzyme induction does occur in the hearts of lobsters exposed to 60 ppb of copper sulfate for 30 days. The induction is significant for a transaminase, a metalloenzyme, and two glycolytic enzymes. Similar work has started on antennal glands. Lobsters were also exposed to 60 ppb of copper chloride for 30 days. Serum sodium, potassium, and osmolality changed. Gill-tissue oxygen consumption was also measured. Because almost all of the copper chloride-exposed lobsters were molting or close to it at the end of the exposure period, mortalities were high. Testing also continues on lobster gonads exposed to 60 ppb of copper nitrate for 30 days. A student intern is being trained in polyacrylamide electrophoresis to evaluate the copper-protein complexes other than hemocyanin in copper-exposed lobsters.

In tests on the physiological effects of pollutant stress, LC-5 and LC-95 values for 96-hour exposure of juvenile surf clams and bay scallops to copper, lead, tin, and zinc have been estimated.

Data for two recently completed oyster larvae experiments show the effects of four variables on growth and mortality. The variables were: (a) plastic or glass containers; (2) artificial or natural seawater; (3) addition or nonaddition of supplementary magnesium to artificial seawater; and (4) addition or nonaddition of supplementary phosphate to artificial seawater. Growth-vessel materials (glass versus polypropylene) and essential metal concentrations significantly affected mortality. Increasing the concentration of magnesium lowered the percent mortality in artificial seawater. The effect of phosphate was not as clear as the latter result, but the evaluation of the data has not been completed.

Thirty thousand juvenile bay scallops reared at the Milford Experimental Hatchery were provided to the Connecticut Division of Aquaculture (20,000) and to the Gay Head Indian Project on Martha's Vineyard (10,000) for field studies of survival and growth of transplanted scallops.

To resolve the problem of the Long Island Oyster Farms hatchery in rearing oyster larvae, the laboratory compared the survival and growth of oyster eggs and larvae in the hatchery's seawater with that in the laboratory's seawater. Eggs did not develop differently. Results of the larvae survival and growth comparison were inconclusive. Growth was the same, but larvae died in hatchery water after about a week of growth. These tests will continue. The hatchery also consulted with the laboratory's genetics group on establishing a breeding program for hatchery-produced American oysters. The laboratory will give the hatchery a detailed selection program adjusted to the company's needs and capabilities, and an outline for testing stock they have already

been selecting for about 10 years. Information will be forwarded to the hatchery on hybridization, inbreeding, and heritability, based on experiments at the laboratory. A literature review was also made available to the hatchery.

Sandy Hook Laboratory

NOAA's Center for Experimental Design and Data Analysis, Dr. Rozette of Fordham University, and Dr. Saila of the University of Rhode Island, performed a highly sophisticated multivariate analysis on several million bytes of benthic, sedimentary, and metals data developed by the laboratory on the New York Bight Apex. The analysis stratifies the seabed into 16 strata of increasingly adverse conditions. Lower-numbered strata represent the relatively healthy sediments: low concentrations of heavy metals, low organic carbon content, and small grain-sized sediments. Higher-numbered strata represent sediments under or near dump sites: high concentrations of heavy metals, high organic carbon content, and large grain-sized sediments.

The DELAWARE II, inactive for five months due to a shipyard mishap, returned to duty on 18 November. The first cruise will be on 3-23 December to study winter distributions and abundances of Mid-Atlantic fish species and document the recolonization by fishes of the extensive (2,500 square miles) New Jersey fish kill area. This will be the 44th cruise through the fish kill area, but the first with the laboratory's own long-endurance vessel.

Oxford Laboratory

A viral agent in tissues of the blue crab was confirmed in ultrastructural studies. The new virus, the fourth discovered from blue crabs in the past two years, is probably related to the Picornaviridae. A second virus (Chesapeake Bay Virus) was used in exposure studies in which blue crabs were force fed or injected with virus-containing materials. Forty crabs from this study were sacrificed and their tissues are being processed for histological examination.

Chemical analyses of bottom sediments and oyster tissues continued. Sediments from 15 locations and 2 oyster-producing areas were collected and frozen for subsequent analysis. Sea scallops provided by the Law Enforcement Division of NMFS were examined and found to be heavily infested with a boring sponge, probably Cliona. Additional diagnostic services were provided to the Northeast Inspection Service and the Marine Salmon Farms. The histology unit prepared 1,456 stained slides of tissues from oysters, clams, crabs, and fish for examination by the laboratory staff.

Cages of winter flounder were placed in sludge and control sites in the New York Bight Apex for 21 days. Entrapped fish will be examined for comparative studies on possibly induced fin rot. Trawl surveys were made for summer and winter flounder with fin rot disease. Four diseased winter flounder and one diseased summer flounder were placed in laboratory aquaria in order to follow disease progression and mortality. Fish and sediment samples collected in Great Bay, New Jersey, were forwarded to Marjorie Sherwood (SCCWRP) as part of a collaborative study on PCB's in fish with fin rot disease.

The uptake of bacteria (Bacillus cereus) by phagocytic cells of the winter flounder is under study by ultrastructural techniques. Initial observations indicate that the role of the phagocytes and their functional mechanisms may differ from reports of other workers who have made similar studies with plaice. Tanks and water systems have been set up to accommodate shipments of striped bass from the Fish and Wildlife Service's Edenton, North Carolina, facility for use in studies throughout the coming winter.

Histological examination of rock crabs from Sheepscot Bay, Maine, and from the New York Bight Apex is partially complete. The two collections provided the first comparative data on black gill disease in rock crabs obtained from widely separated geographic areas. Black gills were not found in the Maine specimens, but their surfaces had bacteria and diatoms which resembled those in the New York specimens. Additionally, a larval helminth, probably belonging to the Acanthocephala, was found for the first time in the Maine animals.

The staff examined live and recently dead short-finned squid from the recent die-off in Cape Cod Bay for parasites and pathogens. The squid showed no gross abnormalities except for accumulations of sand and detritus in the gills and mantle cavity, and a pale coloration in digestive glands of recently dead specimens. Although live squid were sluggish, the occurrence of fish parts in their stomachs indicated that they had recently eaten. Tissues from each squid were histologically fixed to test for biotic etiology.

A proposal entitled "Ozone Detoxification of PSP in Shellfish" was submitted to the State of Maine Department of Marine Resources. The proposal outlines a study on the distribution of paralytic shellfish poison as shown by mouse bioassays and histopathology. A bacterium isolated from Long Island Oyster Farms moribund oyster larvae is being used for experimental infections with C. virginica larvae. The isolate, designated LIOF #6, causes about 95 percent mortality in 24 hours and is being used in additional studies to determine whether it produces a toxin.

Publicity for the Registry of Marine Pathology has been solicited in various Sea Grant newsletters. NOAA has been requested to advise Sea Grantees to submit suitable specimens generated by their studies to the Registry. Art work for the first catalogue cover has gone to the Department of Commerce printshop and binding will be completed within the next few weeks.

Gloucester Laboratory

Laboratory personnel made several presentations before the annual meeting of the National Blue Crab Industry Association in Newport News, Virginia, on 7-9 November. Presentation topics were: roller extraction techniques for blue crab meat, an automated butchering machine, shell content in crabmeat, reformation with binder systems to produce simulated lumpmeat, and crabmeat species identification.

Twenty industry members attended a demonstration at the laboratory on cutoff points for white, light, and dark color classification standards in cooked fish flesh. A proposed standard will now be revised and republished in the "Federal Register."

At the recent "Underutilized Freshwater Fish Species Technology Workshop" held at Ohio State University, the laboratory summarized the adequacy of current research in the field. The workshop focused on the research in progress on underutilized species in the Great Lakes.

Dr. Perry Lane prepared an immensely popular fresh fish display for "Fish Expo 76," held the last week of October in Boston's Prudential Center. The thousands who viewed the fish-and-ice-filled dory rated the attraction as one of the best.

National Systematics Laboratory

The staff's taxonomic revision of American solenocerid shrimps has been accepted for publication in the "Fishery Bulletin." Spermato-phores from male and female pink shrimp collected on Tortugas Grounds are being studied at Key West.

Daniel Cohen traveled to Miami to plan forthcoming research dives of the submersible ALVIN as part of a study of continental slope benthic fishes.

The laboratory continued preparing a manuscript on the taxonomy of Indo-West Pacific halfbeaks, and on a "Guide to the Temperate Water Decapod Crustaceans of the U.S. East Coast."

Atlantic Environmental Group

Group members told a Climate Diagnostics Workshop in Washington, D.C., on 4-5 November, that the fish-kill, bottom-anoxia problem off New Jersey this past year could be explained by a two-month earlier than normal spring warming and discharge of the Hudson River. The earlier warming led to earlier stratification in the coastal areas and aggravated the often occurring oxygen depletion of the area's bottom waters.